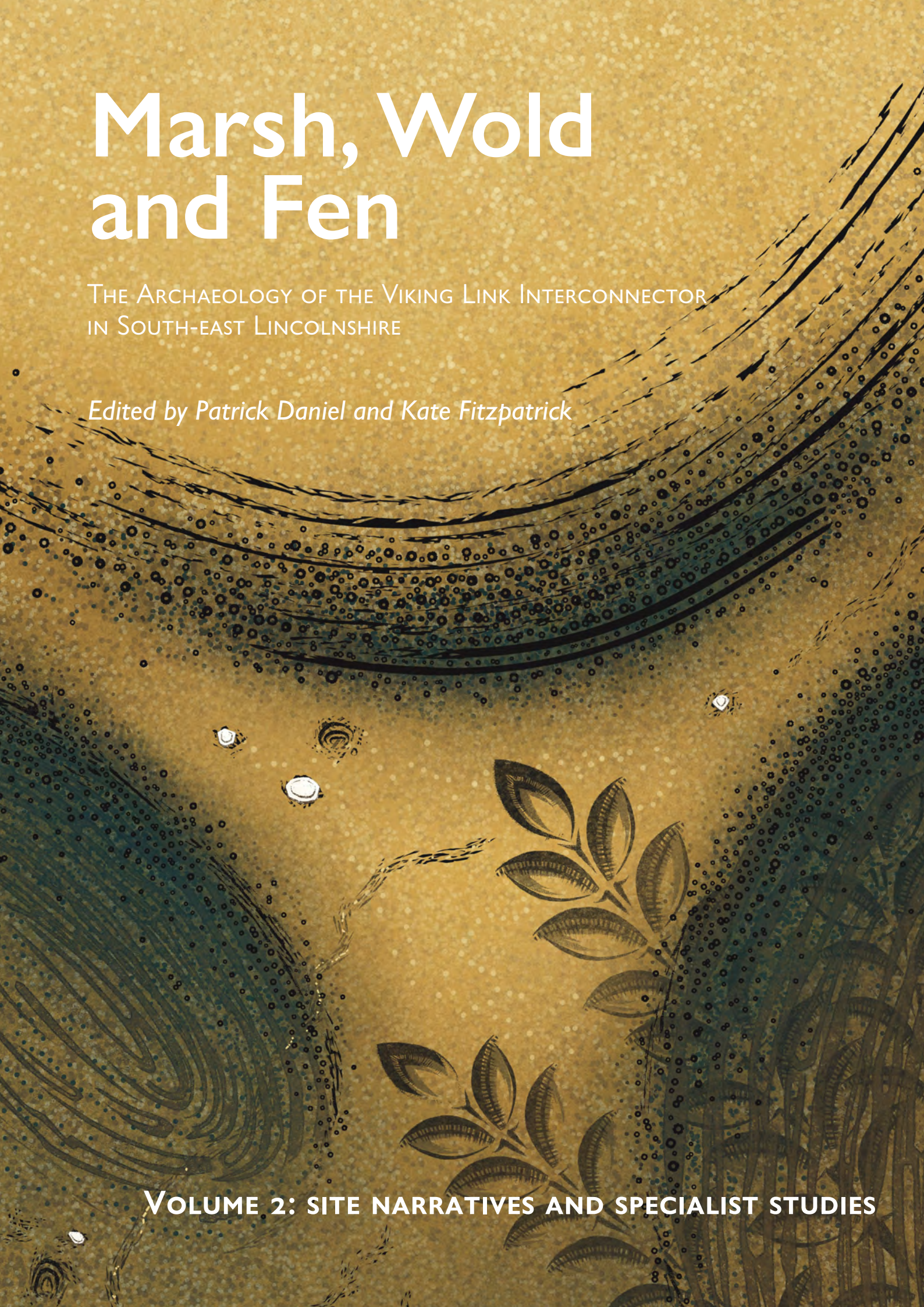
Marsh, Wold and Fen

The Archaeology of the Viking Link Interconnector in South-east Lincolnshire

Edited by Patrick Daniel and Kate Fitzpatrick



Volume 2: site narratives and specialist studies

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Top to bottom: gold and garnet pendant ON 238; copper alloy brooch ON 2; gold and garnet pendant ON 191; aerial view of Callow Carr barrow and cemetery

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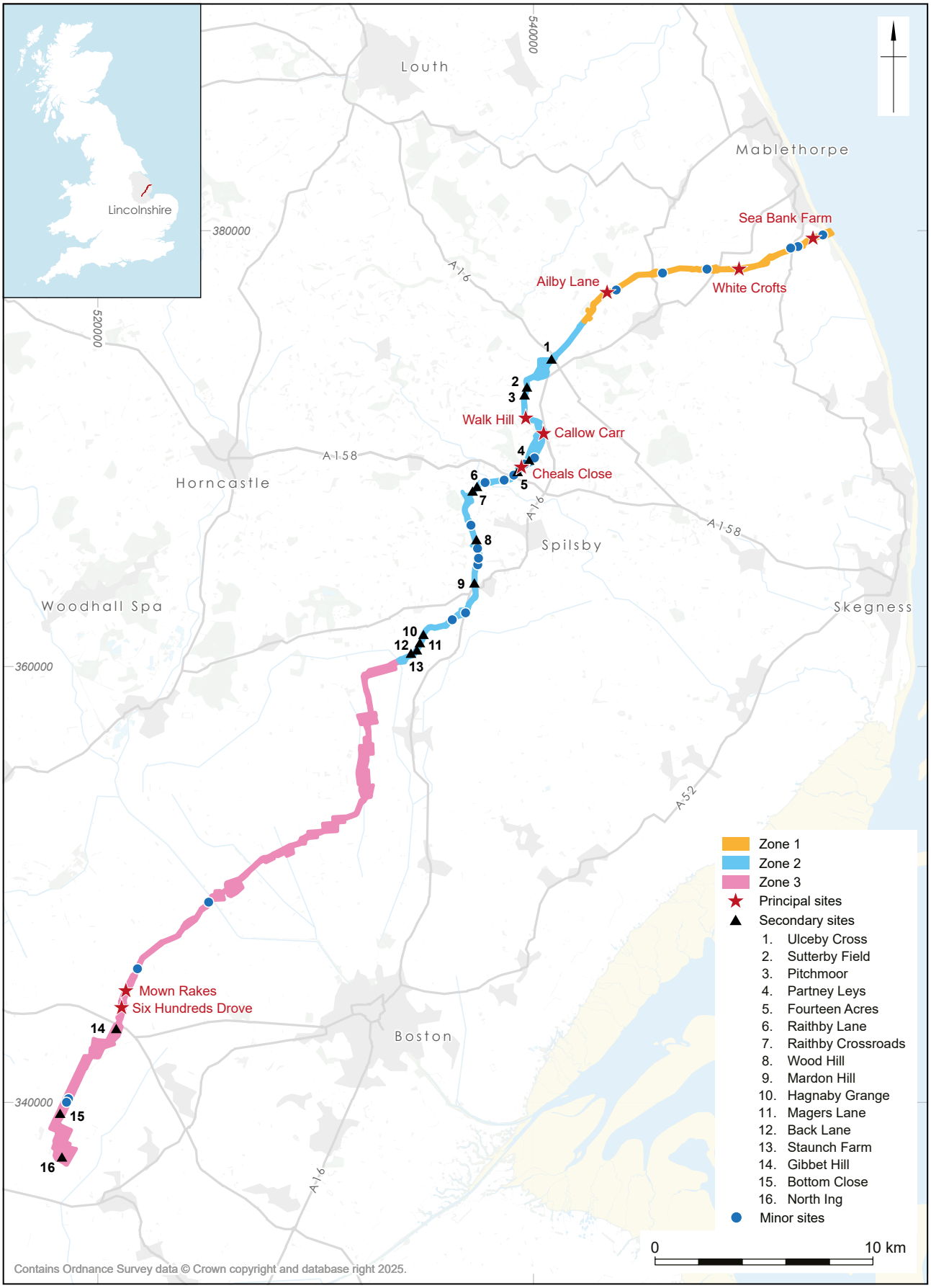
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The route of the Viking Link Interconnector, showing locations of the sites

Chapter 6
Principal Sites

Kate Fitzpatrick and Patrick Daniel

Sea Bank Farm

Romano-British

A substantial quantity of finds retrieved from the Tidal Flat deposits (200202) is thought to represent intrusive material deriving from nearby occupation. The assemblage included: fired clay, animal bone, oyster shells, iron objects, 2nd–3rd-century pottery and a Roman copper alloy coin. Radiocarbon dating of a carbonised deposit on pottery sherds provided an early–middle Romano-British date (UBA-54358, see López-Dóriga below).

Saltmaking

A cluster of ten pits (collectively 200201; Fig. 6.2) situated between two palaeochannels (200200 and 200108) contained debris from a Romano-British saltmaking structure that probably lay nearby, with a concentration of activity in the 2nd–4th centuries.

The pits were either an elongated oval shape or circular in plan and generally the oval pits were the larger. The circular pits ranged between 0.9 and 1.5 m in diameter, while the oval pits were 1.9–3.2 m long and 1–2.2 m wide. Both types of pits had similar depths, ranging between 0.25 and 0.5 m (Fig. 6.4). They contained multiple silty clay deposits,

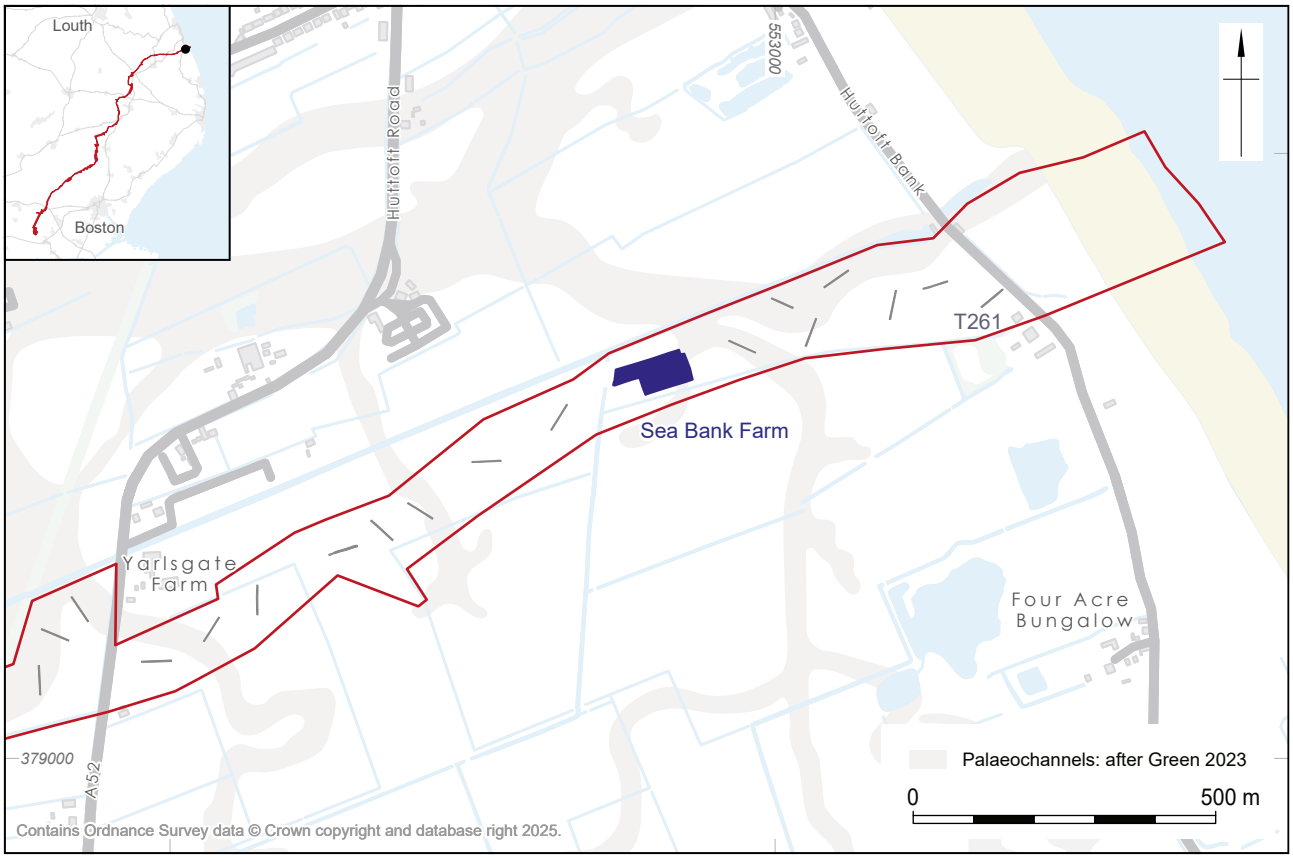


Figure 6.1 Sea Bank Farm: site location and overview

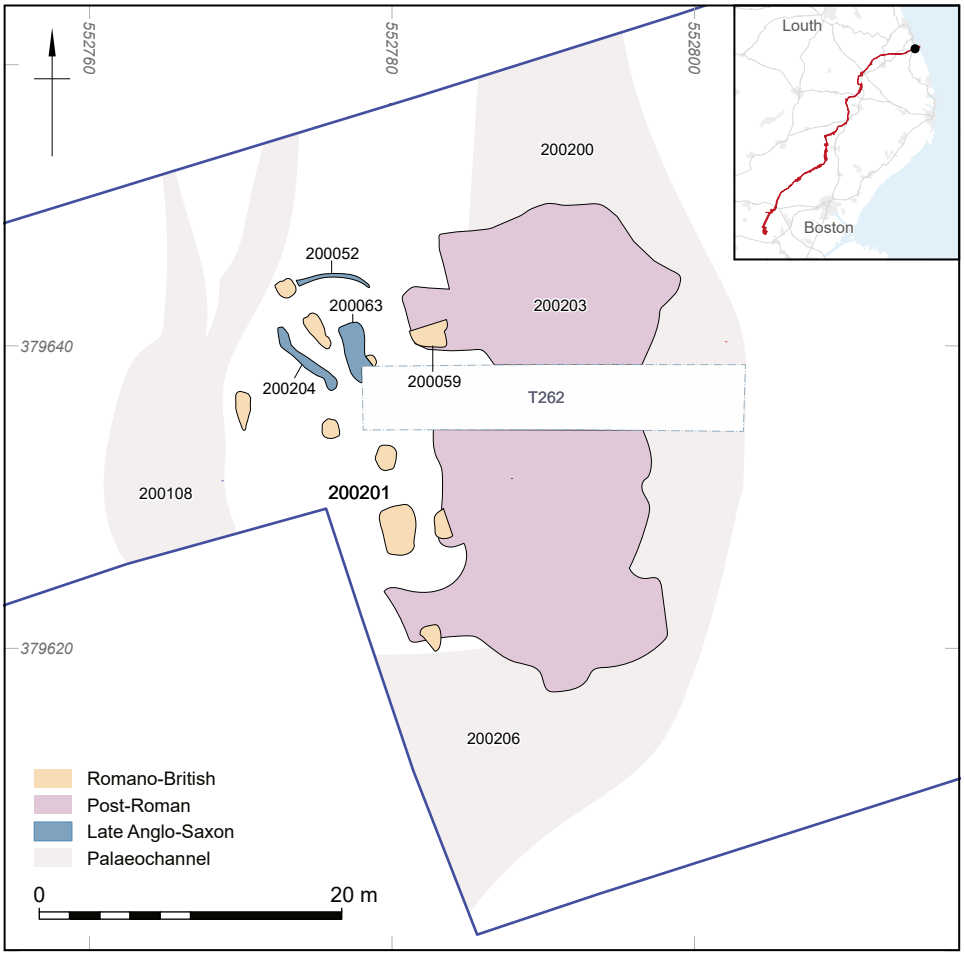


Figure 6.2 Sea Bank Farm: phased plan showing all features

often with charcoal inclusions, and in the northern pits a charcoal-rich upper deposit was occasionally observed. A relatively large amount of fired clay (386 pieces) was recovered from the site. Some pieces could be identified as briquetage (crude fired clay equipment used in saltmaking ovens/kilns), by patches of pink and lilac salt-bleached colours present on some. Fragments of oven/kiln bricks also indicated high-temperature activities were undertaken nearby. Other finds from the pits included 2nd- and 3rd-century pottery, a whetstone, burnt and unburnt animal bone, shell, an iron object, early Romano-British glass and ceramic building material (CBM).

A radiocarbon date obtained from charred plant remains retrieved from pit 200059 within this group produced a middle–late Romano-British date (FTMC-MB96-4).

Nearby middle or late Romano-British occupation

The two palaeochannels (200200 and 200108) were found to contain an abundance of material consistent with the deposition of refuse, likely from nearby occupation or settlement. The deposits within the palaeochannels were a succession of grey, brown or blue silts, with a large finds assemblage comprising over 300 sherds (>12 kg) of mid-2nd–3rd-century pottery including an almost complete vessel, a fragment of a shale possible lathe core, animal bone, a single piece of early Romano-British window glass, an early Romano-British bone pin, burnt stone, CBM including a fragment of Roman box-flue tile, fired clay, ash and charcoal, and oyster shell (Fig. 6.3). As with pits 200201, indicators of salt production were present on some of the fired clay pieces retrieved from the palaeochannels. Radiocarbon dating of a carbonised deposit on pottery recovered from channel 200200 provided a modelled radiocarbon date of *cal. AD 160–215* (UBA-54360).

A concentration of charcoal within one silt deposit may have been deposited during a dry period when the water had ceased to flow. Recovered environmental evidence was suggestive of crop-drying processes taking place in the locality, with associated refuse

deposited directly into the channel. A series of earlier alluvial deposits (200206) along the south-western side of palaeochannel 200200 indicated that the channel had migrated to the east over time. A small amount (three sherds) of 8th–10th-century pottery recovered from the palaeochannels reflected later activity taking place at the site.

Post-Romano-British

After the Romano-British pits had fallen into disuse, a flooding event had deposited a large and irregularly shaped alluvial spread (200203) across the site. The deposit sealed the eastern three pits (200201) and covered the eastern channel (200200); it was 32 m wide by 18 m long and varied between 0.1 and 0.45 m in depth and was formed of a soft greyish-brown silty clay. The alluvium contained a significant amount of pottery of mixed date, including 849 sherds of middle or late Romano-British pottery (including decorated samian ware), 45 sherds of late Saxon, 15 sherds of Late Iron Age or Romano-British, and two sherds of medieval pottery. Further occupation material comprised a suspected textile tool made of worked bone, an iron nail, animal bone, briquetage and other less distinctive pieces of fired clay. It was not possible to discern whether the alluvium had



Figure 6.3 Palaeochannel 200200, from the south-west (2 m scale)



Figure 6.4 Pit 200056 (group 200201), from the west (1 m scale)

been deposited prior to or during Anglo-Saxon activity at the site, only that it capped the Romano-British pits and contained an assemblage of mixed date. When compared to the Romano-British finds, the relatively low amount of Anglo-Saxon material could indicate that the deposit had accumulated prior to the activity in the latter period, and the material of that date was intrusive.

Late Anglo-Saxon

Salting or saltmaking?

The modest amount of Late Anglo-Saxon activity at the site comprised the remains of a high-temperature activity, likely saltmaking or food salting. The features were concentrated mostly in the centre of the site, between the palaeochannels, and included a curvilinear gully surviving in two parts (200204 and 200052; Fig. 6.5) that partially encircled a subrectangular pit (200063). The majority of the Anglo-Saxon pottery assemblage from the site was associated with high-temperature activity showing signs of sooting and salt-bleaching, the latter in particular indicative of either saltmaking or food salting processes, in turn suggesting nearby occupation of some form.

The two halves of the gully had been truncated by a furrow, although it was clear they were a continuation of the same feature. The southern gully, 200204 (5.2 x 0.45 x 0.25 m), was the better preserved of the two and contained animal bone, a single sherd of residual Romano-British and four sherds (76 g) of early to mid-10th-century pottery. The northern gully (200052: 4.8 x 0.31 x 0.15 m) was ephemeral and had been heavily truncated by the furrow that separated it from 200204. It was filled with a grey clay that contained no datable material.

Because of its morphology and the presence of 2nd-century pottery (17 sherds: 149 g) within pit 200063, it was originally suspected to be of Romano-British date and related to the Romano-British saltmaking pits nearby; however, 28 sherds (153 g) of mid-10th-century or earlier pottery and two consistent Late Anglo-Saxon radiocarbon dates on cereal grains (*Hordeum vulgare* and *Triticum* sp.) confirm a 10th–11th-century date for the feature (UBA-52955 and UBA-52956, combined/modelled at *cal. AD 990–1020*). The pit (2.5 m long, 1.5 m wide and 0.25 m deep) had steep straight sides with a flat base and contained grey clay silt. Along with the pottery, a small amount (18 g) of burnt and



Figure 6.5 Gully 200204 (slot 200078) from the north-west (1 m scale)

unburnt animal bone and eight pieces of undiagnostic fired clay showing signs of possible salt-bleaching were recovered. The majority of the Saxon pottery assemblage from alluvial deposit 200203 and gully 200204 was associated with high-temperature activity, appearing sooted and/or salt-bleached, indicative of either saltmaking or food salting.

The relatively small amount of Anglo-Saxon material recovered from the eastern palaeochannel (200200) and the post-Roman alluvial deposit (200203) is likely to be intrusive in nature, resulting from Anglo-Saxon activity taking place in the locale of these features.

Unbroken occupation from the Romano-British saltmaking to the Late Anglo-Saxon activity seems unlikely, and there was no evidence of sustained activity in the intervening centuries. It is possible that the marine regression events known to have occurred in Lincolnshire from the late Romano-British/Early Anglo-Saxon period (Green 2023; Simmons 2022), affected this site, and the aftermath is represented by alluvium 200203. However, there was no relationship between that deposit and the Late Anglo-Saxon features, so their mutual chronology could not be established.

Medieval

Medieval activity near Sea Bank Farm was limited to a number of parallel north-west to south-east-aligned ditches in evaluation trench 261, 0.5 km east of the site (not illustrated). Four of the ditches contained 12th–15th-century pottery, and two also contained small amounts of residual late 9th–early 11th-century pottery. Three undated ditches in trench 261 were probably related to this activity, given their orientation and morphology. The purpose of the ditches was not clear, although it should be noted that they followed the same alignment as the modern road 'Roman Bank' and were a maximum of 17 m to its south-west.

White Crofts

Late Neolithic/Early Bronze Age

The earliest datable activity at White Crofts comprised two pieces of Late Neolithic or Early Bronze Age worked flint recovered from ditch 300508 (5 m long, 0.7 m wide and 0.15 m deep). One was a fragment of a scale-flaked knife, typical of that date range. Although two pieces of flint constitutes a relatively small amount of datable material, the ditch is considered to be associated with earlier activity at the site as it had been cut by 1st–2nd-century pit 300053 and, unlike most other features investigated at White Crofts, did not contain any Romano-British pottery. The ditch was aligned north-west to south-east with a gentle bend through its centre; it had straight sides and a flat base with a shallow, concave terminal. It was filled by a single orangey brown silty clay secondary deposit.

Prehistoric

Several otherwise-undated ditches and a single pit in the east of White Crofts (investigated during the watching brief) were certain to pre-date the Romano-British period because of their stratigraphic relationships with Romano-British features (Fig. 6.7). The exact outline of the enclosure or boundary that these features delineated was unclear, given their widescale truncation by the later activity.

Possibly the earliest of these investigated prehistoric features was a lone north-west to south-east-aligned ditch (3206) in the north-east of the site. It was 13 m long, 0.6 m

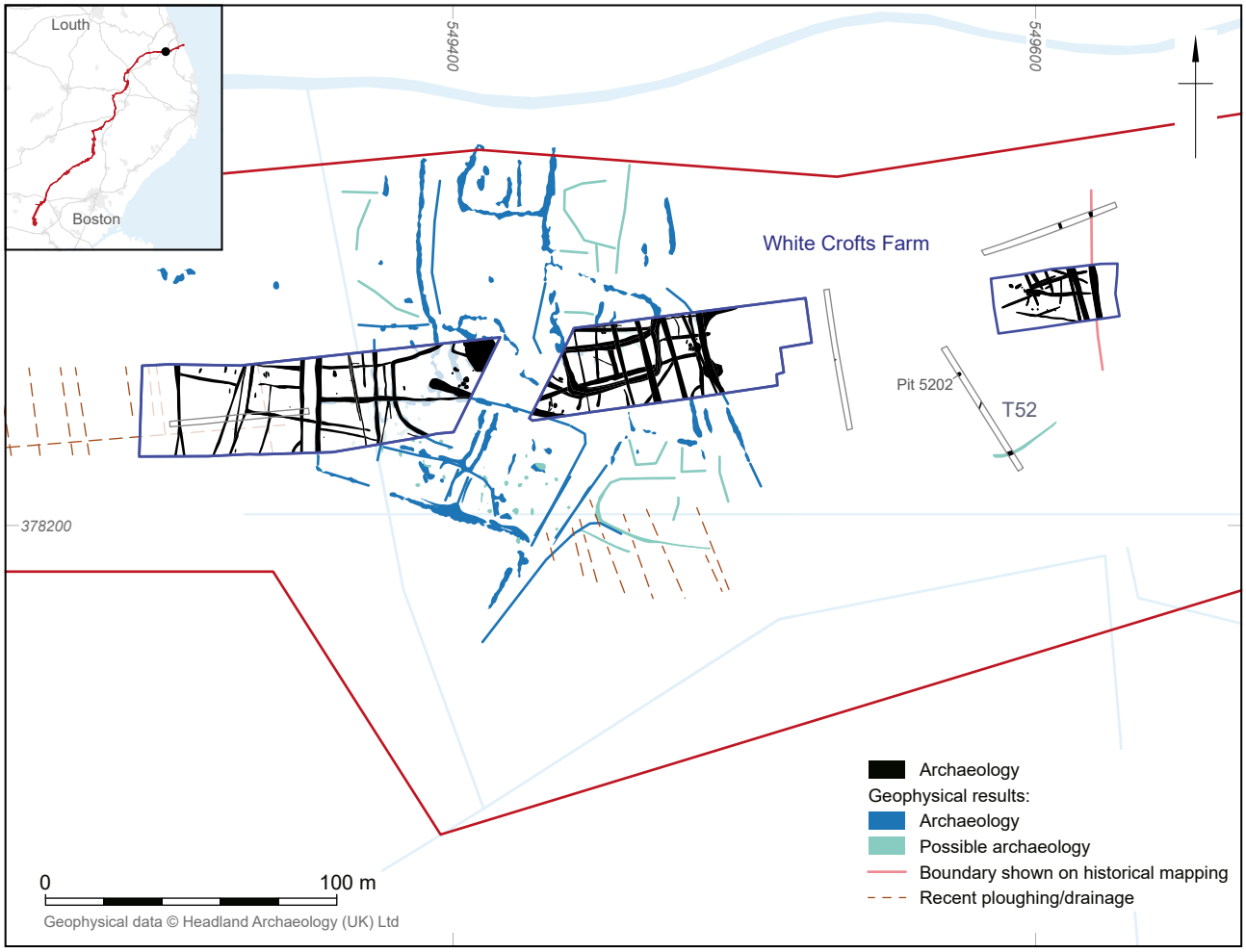


Figure 6.6 White Crofts: site location and overview

wide and 0.1 m deep, with concave sides, a flat base and a gradual terminal. It was filled with a single secondary deposit of brownish-grey clay silt. Not a great deal could be inferred from the ditch, as it contained no datable or environmental material. It was ephemeral, having been cut by modern ditch 3203/3210. Although its relationship with prehistoric ditch 3204 had been removed by Romano-British ditch 3205, they followed distinctly different alignments.

Two parallel north-west to south-east-aligned ditches (3204 and 3068) separated by a gap of almost 14 m crossed the centre of the area and were likely to represent the remains of an enclosure or boundary. The eastern ditch, 3204, continued beyond the northern and southern limits of excavation, while 3068 terminated in the middle of the area. Ditch 3204 contained a small amount of animal bone (five pieces) and a single sherd of intrusive 3rd-century pottery. Both ditches had been cut by the 3rd–4th-century ditches and post-medieval/modern land drains.

Two short ditches (3123 and 3208) were cut by 3rd–4th-century enclosure ditch 3207. Both were aligned NNE–SSW, although the westerly ditch (3123) had a gentle bend through its centre. Both were shallow, at 0.1 m deep, and had concave sides with a flat base. The easterly ditch (3208) appeared to continue the course of ditch 3044 to the north, although that appeared to belong to a later phase.

Late Iron Age–early Romano-British

Although a reasonable amount of Late Iron Age–early Romano-British pottery was recovered from White Crofts, mainly from features of a later date, only one could be dated to this period (300514; Fig. 6.8). This east–west ditch lay in the north of the

site and measured 0.5 m wide and 0.2 m deep. It had been severely truncated by later Roman ditches and land drains, but was likely to represent early enclosure efforts at White Crofts that were subsequently replaced by the extensive rectilinear enclosures. It contained a single silty deposit from which two sherds of Late Iron Age or Romano-British pottery was recovered.

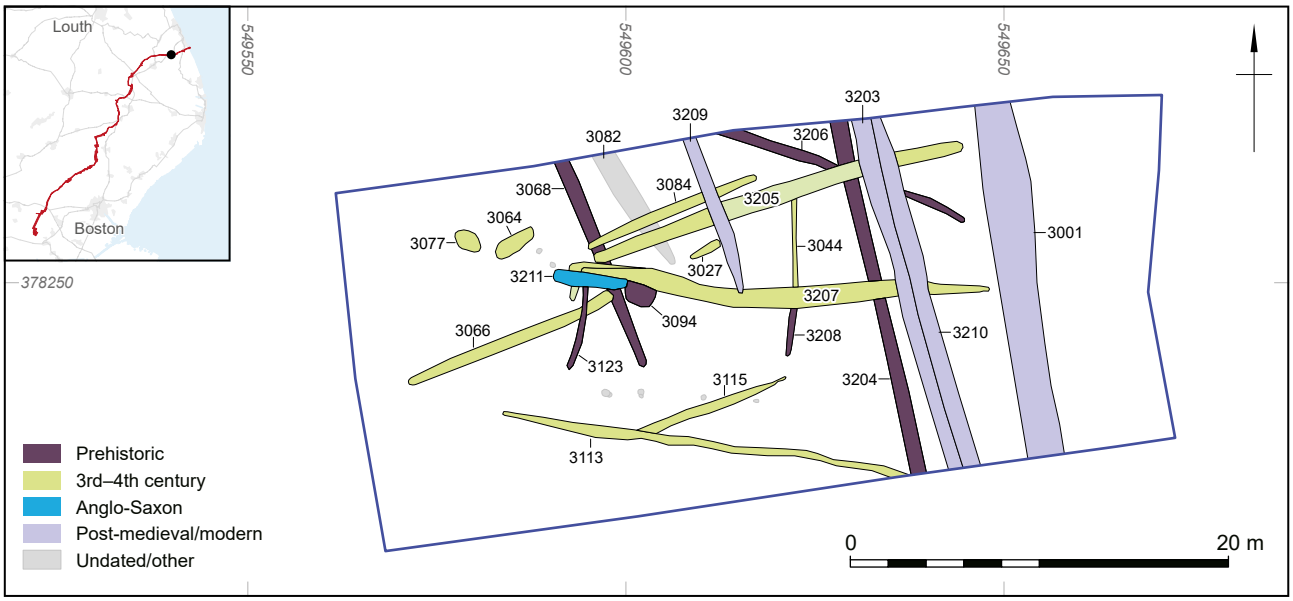


Figure 6.7 White Crofts: phased plan of eastern area

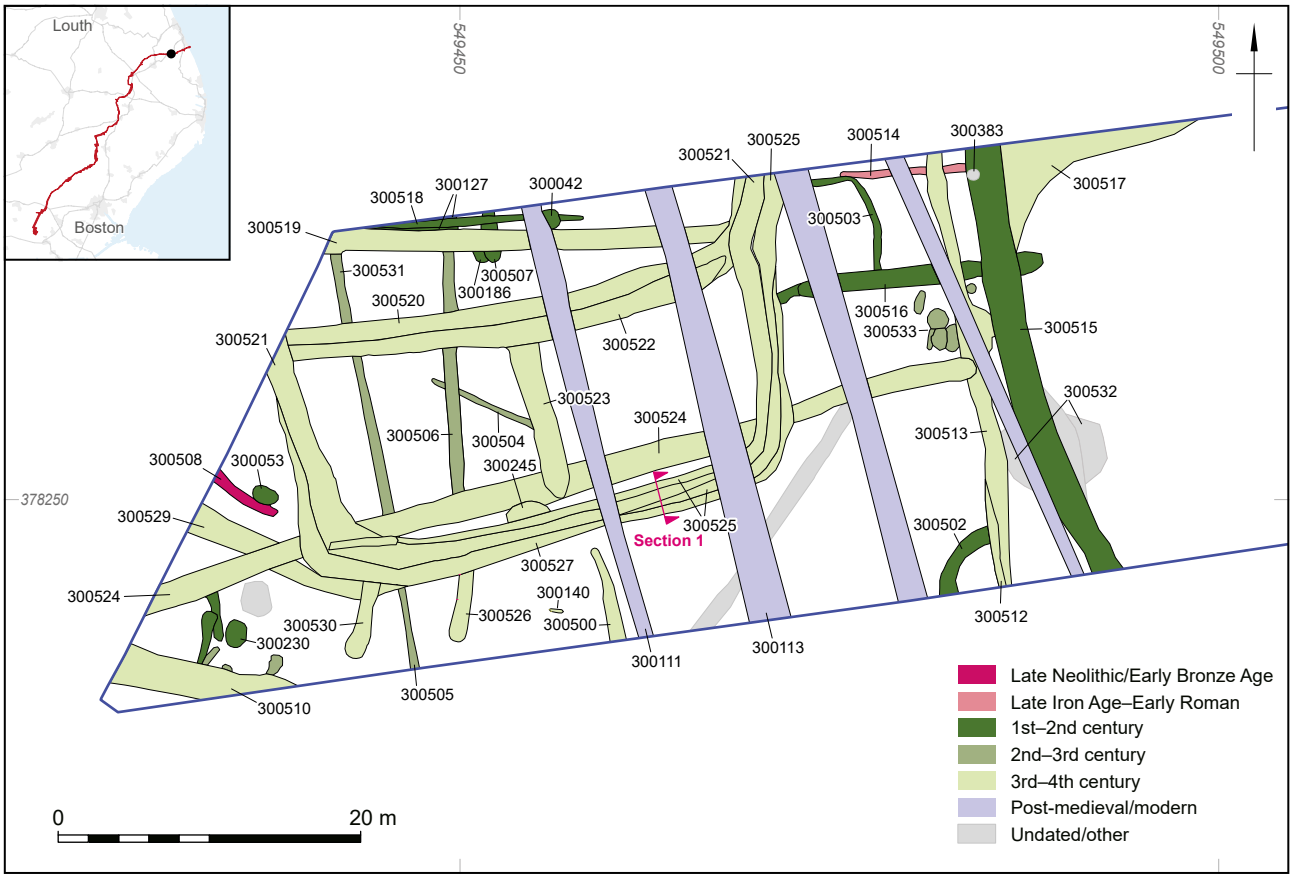


Figure 6.8 White Crofts: phased plan of central area

Romano-British

1st–2nd century

The early Romano-British remains investigated at White Crofts were similar in nature to those of Late Iron Age–early Romano-British date: they represent initial enclosures and boundaries that were mostly replaced by the late Romano-British activity at the site. Overall, the alignment of the later enclosure ditches corresponded to the organisation of the earlier phases, whose curvilinear ditches and gullies likely provided drainage to the larger ditches, but which ceased to function following the recutting of the wider system later in the Romano-British period.

The early Romano-British features were mainly found in the eastern part of the site (Fig. 6.8). These included a large north-west to south-east-aligned ditch (300515), curvilinear ditches and gullies (300502, 300503), two east–west-aligned ditches (300516 and 300518) and a scattering of pits (300230, 300042). The ditches, pits and gullies mostly contained rich assemblages of fired clay, burnt and worked flint, 1st–2nd-century pottery, animal bone, shell and iron nails. Notable finds included the near-complete remains of a dog from ditch 300518, a grey ware lug-handled jar from pit 300042 (Fig. 6.10), and a carved antler handle from ditch 300515. A large pit (300532: 6.5 long, 4.6 m wide and 0.8 m deep) was cut by ditch 300515. The pit was of unclear date and function; no finds apart from a small amount of animal bone and intrusive Middle–Late Roman pottery were recovered.

A cluster of pits and ditches in the north of the area (300127, 300186 and 300507) proved some amount of recutting and reorganisation had occurred during this period. The features had been heavily truncated and pre-dated early Romano-British ditch 300518, although they also contained Romano-British pottery, along with fired clay, animal bone and shell.

The only features of this date encountered in the western side of the site (Fig. 6.9) comprised two parallel ditches (301406 and 301411) and a single posthole (301199). The ditches (both 0.9–1 m wide and 0.1 m deep) were aligned north–south, separated by a gap of 6 m, and both contained a similar greyish-brown silty secondary deposit. The ditches contained very little in the way of dating evidence, and are attributed to this period as they were both cut by 2nd-century features (301407, 301403). The westerly ditch (301411) contained animal bone and a single sherd of Romano-British pottery, while ditch 301406 contained only animal bone.

The posthole (301199: 0.3 m diameter and 0.15 m deep) was subcircular, with concave sides and a concave base. It was filled with a single secondary deposit from which three sherds of late 1st–2nd-century pottery and a single piece of worked flint were recovered. It was isolated in the south of the site and was not obviously related to any nearby features.

2nd–3rd century

The west of the site appeared to be a focal point for 2nd–3rd-century activity, with minimal remains identified in the east, suggesting a west to east shift in activity over the period in question. The majority of the datable material recovered from the ditches is mixed, and a specific chronology could not be determined through finds alone, so much of the phasing in this area was reliant on stratigraphic relationships.

Activity of 2nd–3rd-century date in the centre of the site was limited to two gullies, a ditch and a scattering of pits (Fig. 6.8). Ditch 300506 and gully 300531 were almost parallel and had both been cut by the late Romano-British rectilinear enclosures. The ditch was the richest of the two in finds: it contained an assemblage of 2nd–3rd-century pottery, a hammerstone, Roman glass, shell, worked bone, animal bone, a piece of worked flint, fired clay and an iron nail. By contrast, the gully, 300531, contained Romano-British pottery, shell and a scrap of lead waste. Gully 300504 appeared to pre-date ditch 300506. It is likely that gully 300505 was a southern continuation of gully 300531, although the later enclosure system had removed any relationship between the two.

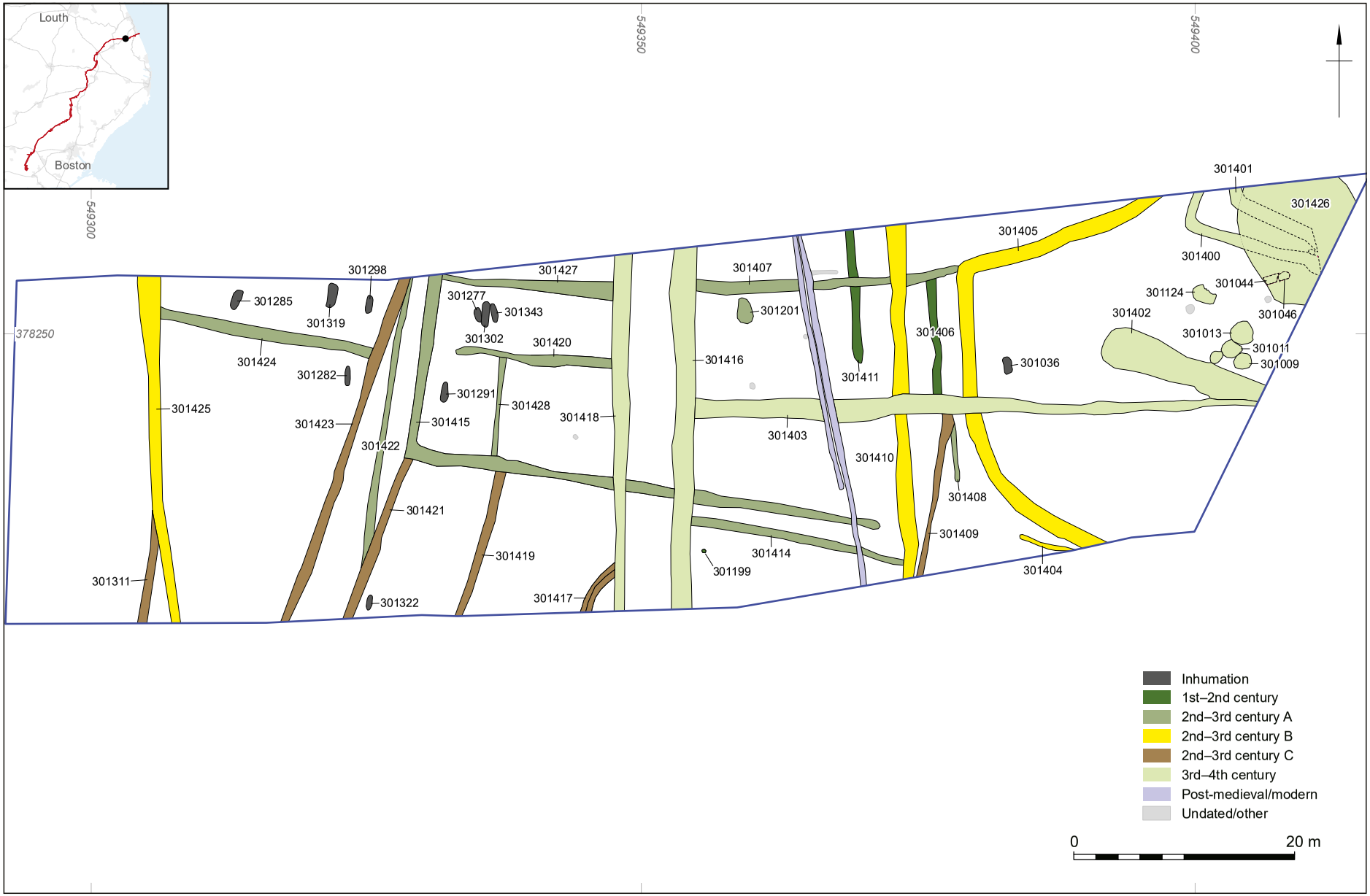


Figure 6.9 White Crofts: phased plan of western area



Figure 6.10 Romano-British grey ware lug-handled jug in situ *in pit 300042 (0.2 m scale)*

A cluster of six pits (300533) was cut by ditch 300513. The pits were either oval or subcircular in plan, and there was some variation in size (0.7–1.6 m diameter x 0.25–0.5 m deep). The northerly pit showed possible signs of *in situ* burning, and undated pottery was retrieved from the central pit.

Phase A (west)

The first phase of 2nd–3rd-century activity comprised a north-east to south-west-aligned trackway (301422) that provided the axis from which multiple rectilinear enclosures extended (301407, 301408, 301414, 301415, 301420, 301424, 301427 and 301428; Fig. 6.9). The trackway had been realigned, recut and widened once, with the creation of ditches 301421 and 301423 (phase C), and then fully replaced (and moved 17 m east) in the late Romano-British period by a north–south aligned trackway defined by ditches 301418 and 301416. The initial trackway was formed of ditch 301422 and the northern spur of 'L'-shaped ditch 301415. Many of the appended enclosure ditches were found to be contemporary with one another and contained similar silty clay secondary deposits. A reasonable amount of material was recovered from the enclosure formed by ditch 301415 and others, including pottery ranging from the Late Iron Age to the 4th century AD, a large amount of animal bone, one piece of worked flint and a single piece of fired clay. A lone pit could be attributed to this phase (301201); it contained 2nd–3rd-century pottery, and was to the south of enclosure ditch 301407. Many of the Romano-British inhumation burials found at White Crofts were located within the 'compartments' of the rectilinear enclosures.

Phase B (west)

Two parallel north–south-aligned ditches (301425 and 301410) and two curvilinear ditches (301404 and 301405) represented a second phase of 2nd–3rd-century activity that had cut phase A and possibly extended the enclosures to both the east and west.

The larger of the curvilinear ditches (301405: 1.3 m wide and 0.75 m deep) was filled with two clear deposits: a grey-brown primary fill followed by an orange-brown secondary fill, covered intermittently by a compact orange deposit that capped the ditch. The primary fill appeared to have slumped into the ditch from the west, suggesting the erosion of a bank that may have been present along that side of the ditch. All three deposits within the ditch contained finds which included fired clay, flint, Late Iron Age–Romano-British pottery, 2nd-century pottery and animal bones. The curvilinear ditches possibly represented continuations of an enclosure investigated to the east, or a link to a further enclosure identified through geophysical survey to the south-east (Fig. 6.6).

The parallel ditches were similar in size and shape: concave bases with straight or stepped sides and measuring 1.6–1.8 m wide and 0.3–0.8 m deep. Both contained two deposits of silty clay followed by a grey silt. The easterly ditch (301410) was richer in finds than 301425, possibly owing to its location closer to the eastern enclosures. It contained 1st–3rd-century pottery, two sherds of intrusive 13th–16th-century pottery, animal bone, a polished sandstone gaming counter, worked bone, worked flint, burnt flint, fired clay and an iron nail. Ditch 301425 contained two sherds of 2nd-century pottery, animal bone and shell.

Phase C (west)

This phase comprised five parallel north-east to south-west-aligned ditches (301311, 301409, 301419, 301421 and 301423) and one curvilinear ditch (301417) thought to be southern extensions to the enclosure. The ditches (1.1–1.3 m wide and 0.2–0.5 m deep) were of similar shape to one another, with concave sides and flat bases. The ditches may have been fairly short-lived, given the relatively small quantity of finds

recovered and the presence of only one recut (along the eastern side of ditch 301417). The combined assemblage included: 2nd–3rd-century pottery (16 sherds), two pottery sherds of uncertain date, animal bone and shell. Of note are the complete but fragmented remains of a small-to-medium-sized dog from ditch 301419.

3rd–4th century

Rectilinear enclosures

A large (50 x 30 m) late Romano-British rectilinear enclosure dominated the eastern mitigation area and appeared as the focus of 3rd–4th-century activity (Fig. 6.8). A small number of 3rd–4th-century ditches pre-dated the main enclosure (300512, 300513, 300524, 300526, 300529, 300530); they were comparable in profile and finds assemblages to the later enclosure. The geophysical survey results suggested the enclosure system measured at least 100 x 100 m overall, with it extending to the north and south of the excavation area. The main enclosure was formed of perpendicular ditches, with multiple recutting events visible (e.g., 300500, 300510, 300519–300523, 300525 and 300527; Figs 6.11–2). Generally, the ditches in this area were relatively large, measuring 1–2 m wide, between 0.3–0.8 m deep with 'U'-shaped profiles and filled with multiple secondary deposits. The majority of features contained substantial finds assemblages including 1st–4th-century pottery including samian ware, Roman vessel glass, a mid-1st–2nd-century copper alloy brooch, a late-3rd–4th-century copper alloy bracelet, three copper alloy coins (radiates or *nummi*), animal bone, unfinished worked bone items (including a pin), whetstones, iron nails, a circular lead object, CBM, fired clay, oyster shell, fuel ash slag and a small amount of residual worked flint. An otherwise undated, isolated feature (300140: 1 m long, 0.25 m wide and 0.1 m deep) to the south of the enclosure contained a single charcoal-rich deposit that produced a barley grain (*Hordeum vulgare*) that provided a radiocarbon date of *cal. AD 360–415* (UBA-52902).

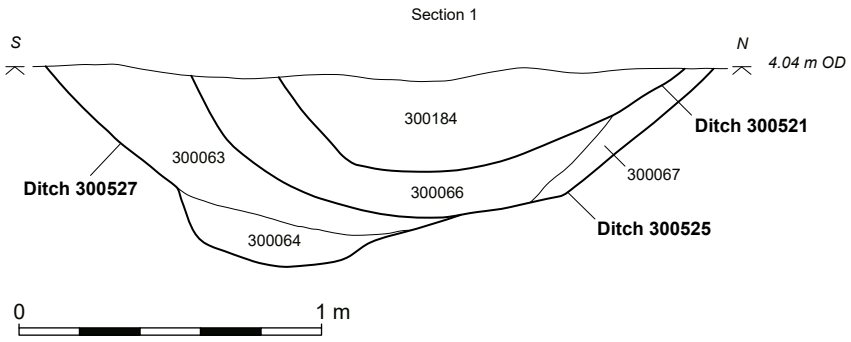


Figure 6.11 Ditches 300527, 300525 and 300521 from the east



Figure 6.12 Ditches 300520 and 300522 from the west (2 m scale)



Figure 6.13 Ditch 301416 from the south (1 and 0.5 m scales)

Although not as concentrated as the eastern area, traces of 3rd–4th-century activity were also present in the western side of White Crofts (Fig. 6.9). A north–south aligned trackway (301416 and 301418; Fig. 6.13) and an adjoining east–west aligned ditch (301403; Fig. 6.14) were recorded, along with an 'L'-shaped trackway or perhaps the corner of a double-ditched enclosure (301400 and 301401), a cluster of pits (e.g., 301009, 301011, 301013, 301044, 301046 and 301124) and a large possible boundary ditch terminal (301402). A substantial finds assemblage was recovered, including 2nd–4th-century pottery, vessel glass, animal bone, shell, fragments of *tegula* and brick (including oven/kiln bricks), iron nails and further residual worked flint. Other items of note comprise two copper alloy coins (a *nummus* and radiate).

A silting deposit (301426: 12.5 x 9 x 0.2 m; Fig. 6.15) had covered all archaeological features in the north-east of the eastern area and contained material suggestive of small-scale industry taking place nearby. The deposit was formed of a greyish-brown silty clay which was rich in finds, including 3rd–4th-century pottery, a copper alloy radiate, animal bone, a worked bone tool, a Roman hobnail/tack, shell and fired clay, metalworking waste of lead and copper alloy, and fuel ash slag.



Figure 6.14 Ditches 301403 and 301405 from the east (1 m scale)

Eastern features

At the far eastern extent of White Crofts, in the watching brief area (Fig. 6.7), activity was far less intense than that investigated to the west. Finds assemblages were smaller, and dating evidence proved to be less specific. Here, the ditches were either north-east to south-west or south-east to north-west-aligned. The largest of the ditches (3205 and 3207; Fig. 6.16) measured 1 m wide and 0.3–0.5 m deep, while the smaller (3084, 3066, 3113, 3115 and 3044) were 0.2–0.5 m wide and 0.05–0.15 m deep. Finds included Romano-British pottery (seven sherds) including five sherds of 3rd–4th-century date, a 4th-century copper *nummus*, animal bone, a small amount of lead waste, a copper alloy fitting, two iron nails and fired clay. A handful of residual prehistoric worked flint and pottery was also present. The animal bone assemblage recovered from ditch 3207 suggested different stages of the butchery process were taking place nearby.



Figure 6.15 Ditch 301015 and layer 301426, from the west (1 m scale)



Figure 6.16 Ditch 3207 from the east (0.2 m scale)

Three pits (3077, 3064, 3027) in the north-west of the area contained environmental material suggestive of a prehistoric–Romano-British midden, although it was not possible to assign a specific date to them. There was some variation in their size (1.5–2.3 m in length and 0.15–0.47 m in depth), and each contained a primary deposit followed by a refuse deposit. The only exception was pit 3027, which appeared disturbed. It was much shallower than the others (0.11 m in depth) and contained only a single fill from which no archaeological material was recovered. Pit 3077 produced animal bone, while pit 3064 contained an iron object, animal bone, slag and fired clay.

Cemetery

The excavated cemetery comprised ten graves containing the remains of twelve inhumation burials, mainly concentrated in a 12 x 25 m strip stretching across the north-west end of the site (Fig. 6.17). Most of the graves were within individual sections of the 2nd–3rd-century Romano-British enclosure, situated to either side of the trackway formed initially by ditches 301415 and 301422 (subsequently replaced by ditches 301421 and 301423). Only three graves appeared in a cluster and the remainder were not evenly spaced. Two were outliers, located in the east and south of the site.

All but two of the graves contained the remains of one adult. Grave 301036 contained the poorly preserved remains of an individual older than 10 years and a redeposited vertebral fragment probably from a second individual; the adult in grave 301291 was also accompanied by part of a skull and the disarticulated femur of another adult. Most of the skeletons were positioned in a supine position, either extended or with arms crossed over the pelvis or chest. One was flexed to the left, with both hands placed together under the chin, while another was loosely flexed to the right. The position of one skeleton was undetermined owing to poor bone preservation. The direction the skeletons faced was variable, with skulls present at the northern end of some graves and the southern end of others. There was, however, some consistency in the orientation of the graves, with 60% aligned NNE–SSW; two were NNW–SSE and one was north–south. The graves were either subrectangular or oval in plan, all with flat bases and mostly two rounded ends.

The majority of the inhumations were unfurnished, with only three of the graves containing grave goods. Sherds of Romano-British pottery were found in the backfill of four other burials, but these were probably redeposited. A late 3rd–4th-century thin copper bracelet was placed around the right arm of burial 301300, and a 4th-century grey ware bowl with an everted rim was present in grave 301282. A concentration of small iron nails typical of hobnail shoes or boots positioned at the feet of burial 301320 indicated that the individual may have been buried wearing footwear. Several iron nails found near the skull of this burial suggested a small wooden box was deposited in the grave.

One instance of a coffin was observed, where four iron nails were recovered from each corner of grave 301302. The arrangement of the remains in grave 301291 suggested the individual was possibly shrouded or strapped, as the upper limbs were held tightly to the sides, and the feet were together.

Romano-British radiocarbon dates were obtained from graves 301298 (FTMC-WG68-1), 301319 (FTMC-WG68-2) and 301322 (SUERC-126783). The disarticulated femur (301293)

in grave 301291 provided an Early Anglo-Saxon date (SUERC-126779, 1602±24, *cal. AD 415–505*) however, indicating the cemetery was considered to be a suitable place for burial into the post-Roman period.

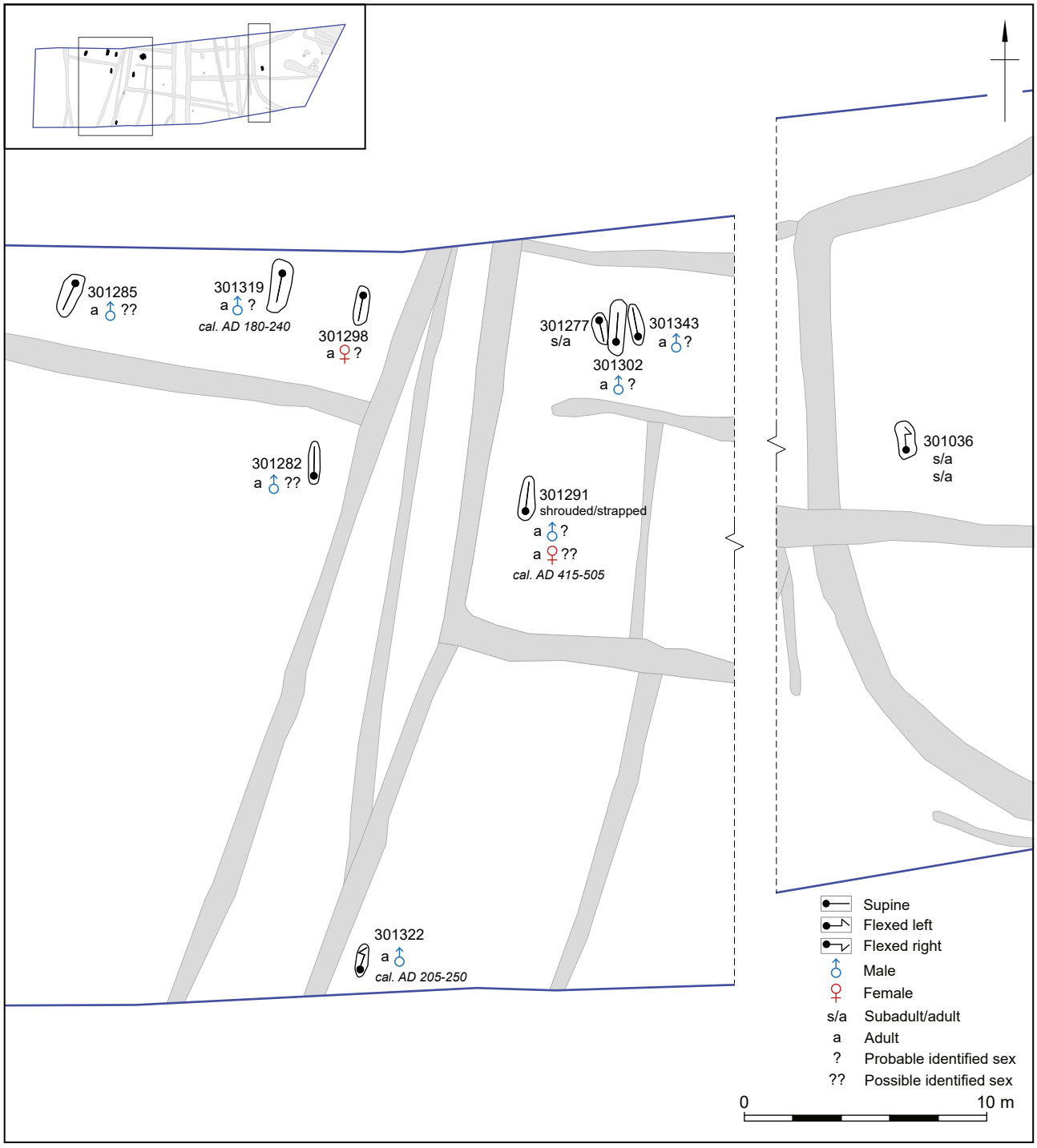


Figure 6.17 White Crofts: plan of cemetery

Grave catalogue

Key: s. a. u. l. – skull, axial, upper limbs, lower limbs (where not all elements recovered); L – length, W – width, D – diameter, T – thickness

Grave 301036 (burial 301038)
SSW–NNE; subrectangular, steep sides, flat base; 1.6 x 0.75 x 0.3 m deep; fill 301037

Human bone: loosely flexed to right; <1%; >10 yr

redeposited: <1%; >12 yr

Grave 301277 (burial 301279)
N–S; shape unclear, flat base; 1.2 x 0.4 x 0.01 m deep; fill 301278; heavily truncated by ploughing

Human bone: posture unclear, lower limbs extended; 2%, u.l.; subadult/adult > 15 yr

Grave 301282 (burial 301284)
S–N; sub-oval, steep sides, flat base; 1.75 x 0.7 x 0.1 m deep; fill 301283

Human bone: supine and extended, hand over chest; 35 %; adult 40–50 yr; ??male

Grave goods:
ON 3005: a grey ware bowl with an everted rim
Residual finds: Late Romano-British pottery

Grave 301285 (burial 301287)
SSE–NNW; subrectangular, rounded southern end, steep sides, flat base, rising towards the S portion; 1.9 x 0.6 x 0.23 m deep; fill 301286; truncated by land drain

Human bone: supine and extended, left arm flexed tightly at elbow with hand at shoulder, right arm flexed at elbow across chest with hand on upper left arm; 20%, s.u.l.; adult 30–40 yr; ??male

Residual finds: Romano-British pottery

Grave 301291 (burial 301292 & disarticulated remains 301293)
(Fig. 6.18)
S–N; subrectangular, rounded ends, steep sides, flat base; 1.85 x 0.6 x 0.14 m deep; fill 301293

Human bone: supine and extended, upper limbs held tightly against sides with feet together – possibly shrouded/strapped?; 60%; adult 45–60 yr, ?male

redeposited: 10%, s.l.; adult 18–35 yr, ??female

Scientific analyses: isotope analysis (Sr/O, C/N)

Residual finds: Early Romano-British pottery and animal bone

Phase: 301292: Failed radiocarbon date x 2 (GU67579 & GU68528)

301293*:* Early Anglo-Saxon: AD 420–540 (SUERC-126779); *cal. AD 415–505 (68% probability)*

Grave 301298 (burial 301300)
N–S; subrectangular, rounded ends, steep sides, flat base; 1.65 x 0.5 x 0.2 m deep; fill 301298

Human bone: supine and extended, upper limbs loosely flexed at elbows with right hand near right hips and left forearm overlay left abdomen; 20%, adult 35–50 yr ?female

Scientific analyses: isotope analysis (Sr/O)

Grave goods:
ON 3006: Thin copper alloy bracelet around right arm, poor preservation, possibly plain
Residual finds: Roman pottery

Phase: Middle–late Romano-British: AD 130–320 (FTMC-WG68-1); *cal. AD 205–250 (68% probability)*

Grave 301302 (burial 301303)
S–N; subrectangular, steep sides, flat base; 2.3 x 0.75 x 0.07 m deep; fill 301304

Human bone: supine and extended, upper limbs loosely flexed at elbows with hands together over pelvis; 10%, a.u.l.; adult >20 yr ?male

Coffin furniture:
ONs 3007–3010: 4 iron nails (one at each grave corner)
Residual finds: Romano-British pottery

Grave 301319 (burial 301320)
N–S; subrectangular, rounded ends, steep sides, flat base; 1.75 x 0.42 x 0.05 m deep; fill 301321; truncated by land drain

Human bone: supine and extended; 45%; adult 40+ yr, ?male

Grave goods:
ONs 3011–3020, 3022–3025: 15 iron nails near the skull (from a wooden box?)
ON 2021: 24 hobnails at the feet
Phase: Early Romano-British/middle Romano-British: AD 80–240 (FTMC-WG68-2); *cal. AD 180–240 (68% probability)*

Grave 301322 (burial 301324)
(Fig. 6.19)
SSW–NNE; sub-oval, steep sides, flat base; rising to the south; 1.85 x 0.68 x 0.15 m deep; fill 301324

Human bone: flexed on left side, slumped against E side of grave, arms both flexed at elbow with hands together under chin; 60%; adult 25–35 yr; male

Scientific analyses: isotope analysis (Sr/O)

Phase: Late Romano-British/Early Anglo-Saxon: AD 250–420 (SUERC-126783); *cal. AD 235–300 (68% probability)*

Grave 301343 (burial 301341)
S–N; sub-oval, rounded ends, concave sides, flat base; 1.7 x 0.5 x 0.12 m deep; fill 301432

Human bone: supine and extended, left arm flexed at elbow across abdomen; 30%; adult 22–30 yr; ?male



Figure 6.18 Grave 301291 showing primary inhumation 301292 and 5th–6th-century cal. AD disarticulated remains (skull and femoral fragments) (1 and 0.5 m scale)



Figure 6.19 Burial 301324 (0.5 m scale)

Anglo-Saxon

The level of activity at White Crofts dwindled during the Anglo-Saxon period, and dated remains are limited to two pits, an intrusive strap-end in an earlier ditch, and disarticulated human remains within grave 301291.

Radiocarbon dating provided a 5th–6th-century date for redeposited skeletal remains placed above burial 301292 in grave 301291 (SUERC-126779, 1602±24, cal. *AD 415–505*). The grave had not apparently been disturbed during antiquity, with the disarticulated elements seemingly placed over burial 301292 as the grave stood open. Therefore it would follow that the more intact (but otherwise undated) *in situ* individual 301292 also died after the end of Roman rule. This relatively late date when compared with the rest of the cemetery indicates continuity of mortuary practice throughout the late Romano-British and into the Early Anglo-Saxon period, despite the declining rate of occupation activity and broader cultural and political changes.

One of the two Anglo-Saxon pits at White Crofts was located in the east of the site in the watching brief area (3211), and the other (5202) in an evaluation trench 35 m to the south. Radiocarbon results for both pits have provided consistent dates modelled to the *late 8th to late 9th centuries cal. AD*.

Elongated pit 3211 was aligned WNW–ESE and truncated both prehistoric and Romano-British ditches (3123, 3068 and 3207). The pit had steep straight sides with a flat base, and measured 4 m long, 0.8 m wide and 0.4 m deep. It was filled with two deposits: a greenish-grey silty clay was capped by a dark grey clay from which an assemblage of ironworking slag, animal bone, fired clay, a lead handle, a single sherd of undated pottery, worked and burnt flint, and a possible whetstone was recovered. Radiocarbon dating of a wheat grain from the pit provided a Middle/Late Anglo-Saxon date (UBA-52871).

Pit 5202 was only partially revealed as it extended beyond the boundary of trench 52; it was subcircular and measured at least 1.3 m long, 1.4 m wide and 0.1 m deep. The clay silt deposits that filled the pit contained a similar finds assemblage to that of pit 3211, including animal bone, fired clay, worked flint and two sherds of late 3rd–4th-century pottery. Some of the fired clay pieces were possibly from an oven or hearth lining, while others featured wattle impressions and were likely to have been structural debris.

A substantial environmental assemblage from pit 5202 included free-threshing wheat, hulled barley and wood charcoal. Vivianite staining on some of the charred plant remains may indicate waterlogging and the presence of faecal matter. The environmental material recovered from pit 3211 is suggestive of a midden deposit, originally thought to be prehistoric–Romano-British in date, although radiocarbon dating of the charred plant assemblage provided a Middle/Late Anglo-Saxon date (UBA-52901).

A copper alloy strap-end of early medieval appearance was recovered from a north-west to south-east aligned ditch (3082). The ditch measured 7 m long, 1.2 m wide and 0.05 m deep, terminating to the south-east, and was filled with a brown silty clay deposit. It seems likely that the presence of the strap-end in ditch 3082 was intrusive, perhaps due to later disturbance from four modern land drains, as the feature had been cut by 3rd–4th-century ditches 3205 and 3084. Given that no other datable material was recovered from ditch 3082 (and no further early medieval activity was present nearby), it was not possible to determine a date for the ditch itself. It should be noted, however, that ditch 3082 broadly corresponded to the alignment of both prehistoric and Romano-British ditches in the vicinity.

Post-medieval and Modern

The majority of post-medieval and modern activity at the site was limited to drainage and agricultural practices. Cultivation furrows (not illustrated) were aligned north-west to

south-east, with the majority of the land drains following suit, although further drainage must have been required as occasionally further drains on different alignments were added. Both the furrows and land drains had truncated earlier features, and sherds of residual Romano-British pottery were recovered from some.

A NNW–SSE-aligned ditch (3210/3203) in the north-east of the site aligned with a field boundary present on 19th-century mapping. Modern iron objects including a hook and part of a plough were recovered. A parallel ditch (3209) was located 7 m west of the boundary, and was likely to be related. Ditch 3209 was clearly visible cutting late Romano-British ditches 3205 and 3084; it contained lead shot and a single piece of residual possibly Iron Age pottery.

A large ditch at the eastern extent of the same area (3001: 2.5 m wide and 0.6 m deep) contained no datable material, although as it cut the subsoil it could be safely attributed to post-medieval or modern activity at the site. It was aligned roughly parallel to ditch 3210/3203 and was possibly associated with the same boundary.

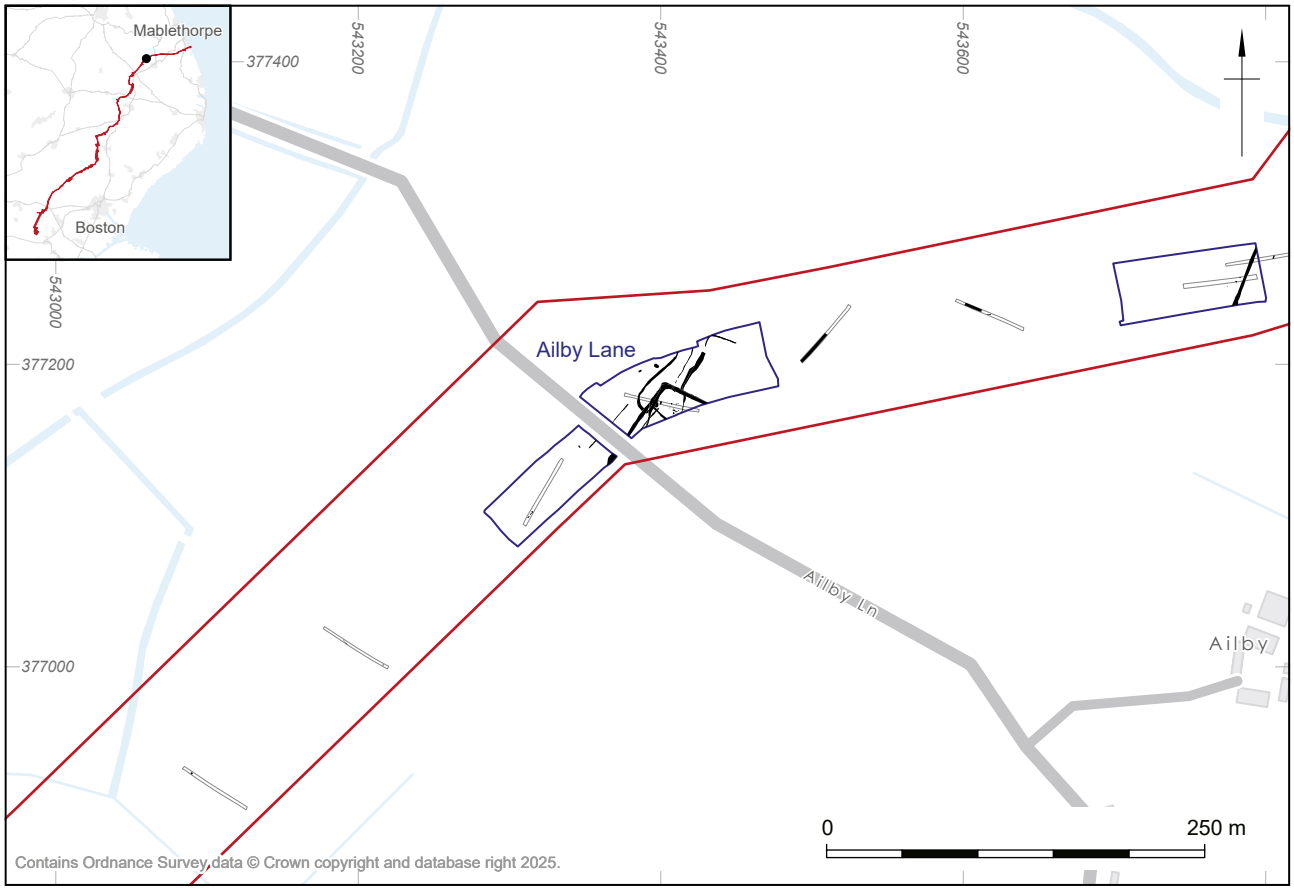


Figure 6.20 Ailby Lane: site location and overview

Ailby Lane

Bronze Age

The earliest activity encountered at Ailby Lane dated to the Bronze Age and comprised an isolated fire pit or hearth (401016) located in the south-west of the area (Fig. 6.21). The southern part of the feature had been destroyed by a land drain, with the remnants surviving as a shallow, sub rectangular pit (1.32 m long, 0.85 m wide and 0.15 m deep; Fig. 6.22). A possible flue (0.1 m wide and 0.1 m deep) extended 0.5 m to the north-west of the feature, and four stakeholes (0.15 m diameter and 0.1 m deep) in the base of the pit indicated stakes may once have formed a structure, although no further evidence of this remained (Fig. 6.23). A black, charcoal-rich clay filled most of the pit, above a light grey clay. Although no finds were recovered, the environmental assemblage contained

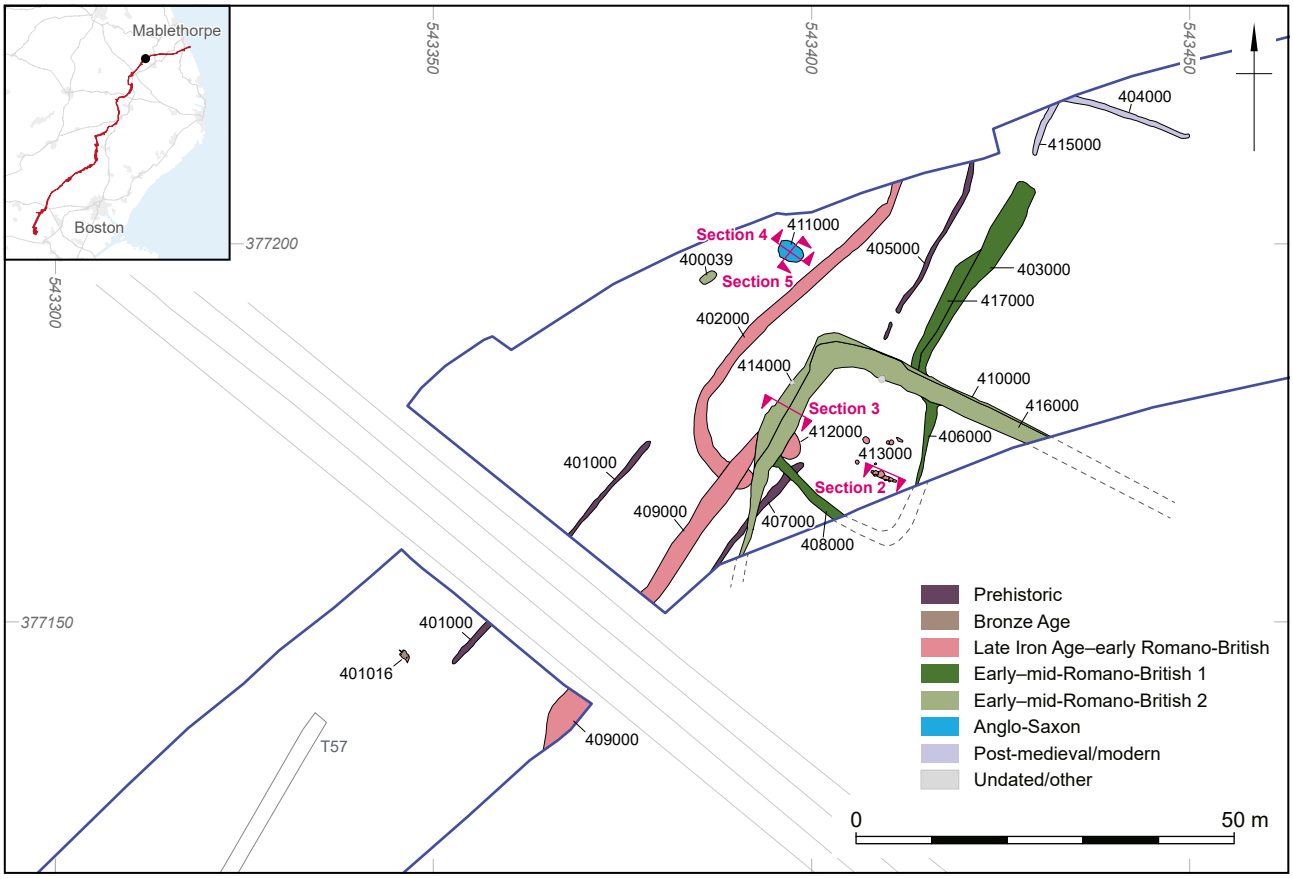


Figure 6.21 Ailby Lane: phased plan

the charred remains of hawthorn stones and hazel nutshells, and a moderate amount of wood charcoal; radiocarbon dating of a hazel nutshell provided a Middle–Late Bronze Age date (UBA-52870).

Prehistoric

Trackway

An assemblage of mixed date was recovered from a possible trackway. The trackway comprised two parallel ditches (401000 and 407000) situated 16 m apart, each measuring 0.6–0.8 m wide and 0.2 m deep. The ditches contained sandy silt secondary deposits and had concave sides and bases.

The north-western ditch (401000) contained two pieces of Late Neolithic or Early Bronze Age worked flint, a piece of prehistoric worked flint, one sherd of Late Iron Age or Romano-British pottery, and six sherds of broadly dated Romano-British pottery. Four sherds of Late Iron Age or Romano-British pottery were recovered from ditch 407000.

A further ditch (405000) continued the course of 407000 to the north-east. Although it only contained a single sherd of undated pottery and animal bone, its alignment and form suggest it was associated with the trackway.

The trackway is certain to pre-date the early–middle (1st–2nd century AD) Romano-British period, given its stratigraphic relationship with both phases of the Romano-British enclosure, although it did not have a clear relationship with the Late Iron Age–Early Roman activity in the same area (402000, 409000).



Figure 6.22 Fire pit/hearth 401016 from the east (1 m scale)



Figure 6.23 Fire pit/hearth 401016 post-excavation from the north, showing stakeholes (1 m scale)

Late Iron Age to early Romano-British

Two north-east to south-west-aligned ditches and two groups of pits represented Late Iron Age–early Romano-British activity at the site. Stratigraphically, the earliest component of the phase was curvilinear ditch 402000 (1.6 m wide and 0.8–1 m deep), from which a range of pottery was recovered, including earlier prehistoric (seven sherds), Iron Age (19 sherds), Late Iron Age or Romano-British (three sherds), general Romano-British (38 sherds) and middle or late Romano-British (25 sherds). A fragment of a sandstone quern, pieces of fired clay and a piece of Romano-British *tegula* were also found. Despite the mixed date of the pottery assemblage, ditch 402000 had clearly been truncated by Late Iron Age or Romano-British ditch 409000, so the later-dated pottery is presumed to be intrusive and a result of later activity taking place nearby. Ditch 402000 was filled with multiple sandy or silty clay secondary deposits, and had concave sides and a concave base.

The second phase of Late Iron Age–early Romano-British probable enclosure at the site comprised ditch 409000, which had cut the southern extent of ditch 402000 and appeared to have been replaced during the early–mid-Romano-British period by ditch 410000. Ditch 409000 (2–3 m wide and 0.8–1.2 m deep; Fig. 6.24) contained several deposits formed through natural weathering processes, mainly comprising silty and sandy clays. A pottery assemblage of Late Iron Age to early Romano-British date was recovered; it included 16 sherds assigned solely to the early Romano-British period, and was found alongside animal bone, CBM, undiagnostic fired clay and residual worked flint.

Seventeen pits were scattered across the site. Two (412000) were close to ditch 409000 and probably associated with Late Iron Age to early Romano-British activity. Both were cut by Romano-British ditch 410000, and the southerly pit contained a small amount of Late Iron Age or early Romano-British pottery. The southern pit was substantially larger than the northern (diameters 3.5 m and 0.5 m respectively), although both were similar morphologically, with stepped sides and flat bases. The larger, southerly pit contained several clay silt and silty sand deposits representative of episodes of slumping and a final backfill event.

Of the remaining 15 relatively small pits (413000), 10 were intercutting; all were located within an area around 10 m across and had steep or vertical straight sides, with flat or concave bases, and were of various sizes (0.4–0.9 m in diameter and 0.15–0.7 m in depth; Fig. 6.25). It is likely the pits were used for the deposition of refuse from nearby occupation, as they contained numerous sherds of Late Iron Age–early Romano-British pottery, animal bone, a possible rim of an Iron Age crucible, a clay mould, charcoal, heat-affected stone, and a flint core and flake. A radiocarbon date obtained from wood charcoal found within one of these pits (400099) supports the Late Iron Age–early Romano-British date suggested by the finds assemblage (FTMC-MB96-5)



Figure 6.24 Ditch 409000 (slot 401010) from the south-west (2 m scale)

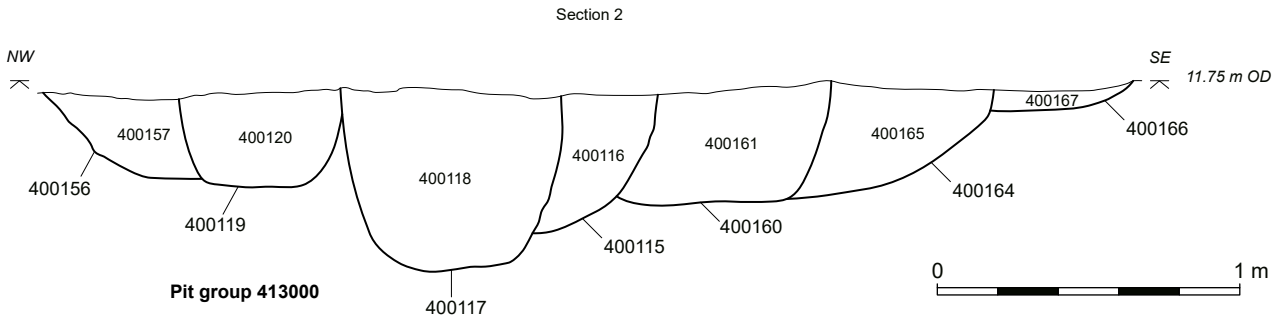


Figure 6.25 Intercutting pits 413000 from the south-west

Early–mid-Romano-British

Enclosure phase 1

The remnants of a possible rectilinear enclosure comprised three ditches (403000, 406000 and 408000) that had cut the prehistoric trackway and were subsequently cut by ditch 410000 (enclosure phase 2). The full extent of ditches 406000 and 408000 is visible on the geophysical survey results, in which both ditches extend further to the south where they join to form a corner.

Ditch 403000 was the largest of the enclosure ditches of this phase (2 m wide and 0.1–0.8 m deep) and its south-western extent had been recut (417000) along its north-western side. Two sandy silt deposits filled ditch 403000, while recut 417000 contained a single silty clay. Ditch 406000 widened to the north (0.5–1.3 m wide and 0.3–0.7 m deep), where it may have been recut; ditch 408000 was 1.2 m wide and 0.4 m deep. These three ditches contained few finds, with only 10 g of animal bone from 406000 and five sherds of early or middle Romano-British pottery from ditch recut 417000.

Enclosure phase 2

An 'L'-shaped boundary ditch (410000/414000/416000) represented a second phase of Romano-British enclosure. This appeared to have replaced the earlier enclosure, as it had cut ditches 403000, 417000, 406000 and 408000 (Fig. 6.26). The northern section of the ditch was relatively uniform in size (averaging 2.9 m wide and 0.6 m deep), but it tapered to 1 m wide at its south-western extent. The use of the ditch had been prolonged by a recut (416000) that was present along the inner side of the ditch. Both

the ditch and its recut had steep straight sides, with concave or 'V'-shaped bases, and were filled by one or two silty clay or sandy silt secondary deposits (Fig. 6.27). Both ditches were rich in finds, with a clear focus of activity in the mid–late 1st century AD that had dwindled by the mid-2nd century. The assemblage included over 300 sherds of early Romano-British pottery, 88 sherds of early–mid-Romano-British pottery, two pieces of probable Romano-British box-flue tile, animal bone, and a pair of Roman copper alloy tweezers. The relatively small amount (10 sherds) of Iron Age pottery recovered was considered to be residual and attributable to the nearby Late Iron Age activity, and two sherds of possible 7th–8th-century Anglo-Saxon pottery were likely to be intrusive.



Figure 6.26 Ditch 408000 cut by ditch 416000 from the south-west (1 m scale)

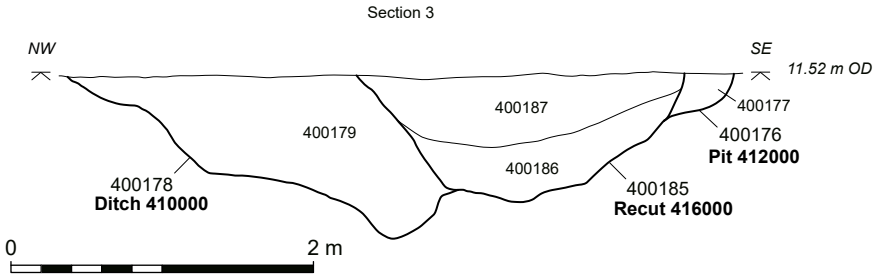


Figure 6.27 Ditch 410000, recut 416000 and pit 412000 from the south-west

Discrete feature

A lone pit (400039) in the north of the site contained two sherds of Roman grey ware, although its purpose was unclear and it was not possible to discern to which phase of Romano-British activity it belonged. The pit was oval (3.3 m long by 1.3 m wide, and 0.4 m deep), with concave sides and base.

Anglo-Saxon

Sunken-featured building

Anglo-Saxon occupation of the site was represented by a sunken-featured building that survived as a large sub-oval pit (411000: 3.4 m long, 2.3 m wide and 0.5 m deep), with slightly stepped sides at the north-west and south-west, moderately sloped sides at the south-east and north-east and a flat base. Depressions in the base were thought to represent postholes, likely used to form a superstructure, or as support for a roof. Their

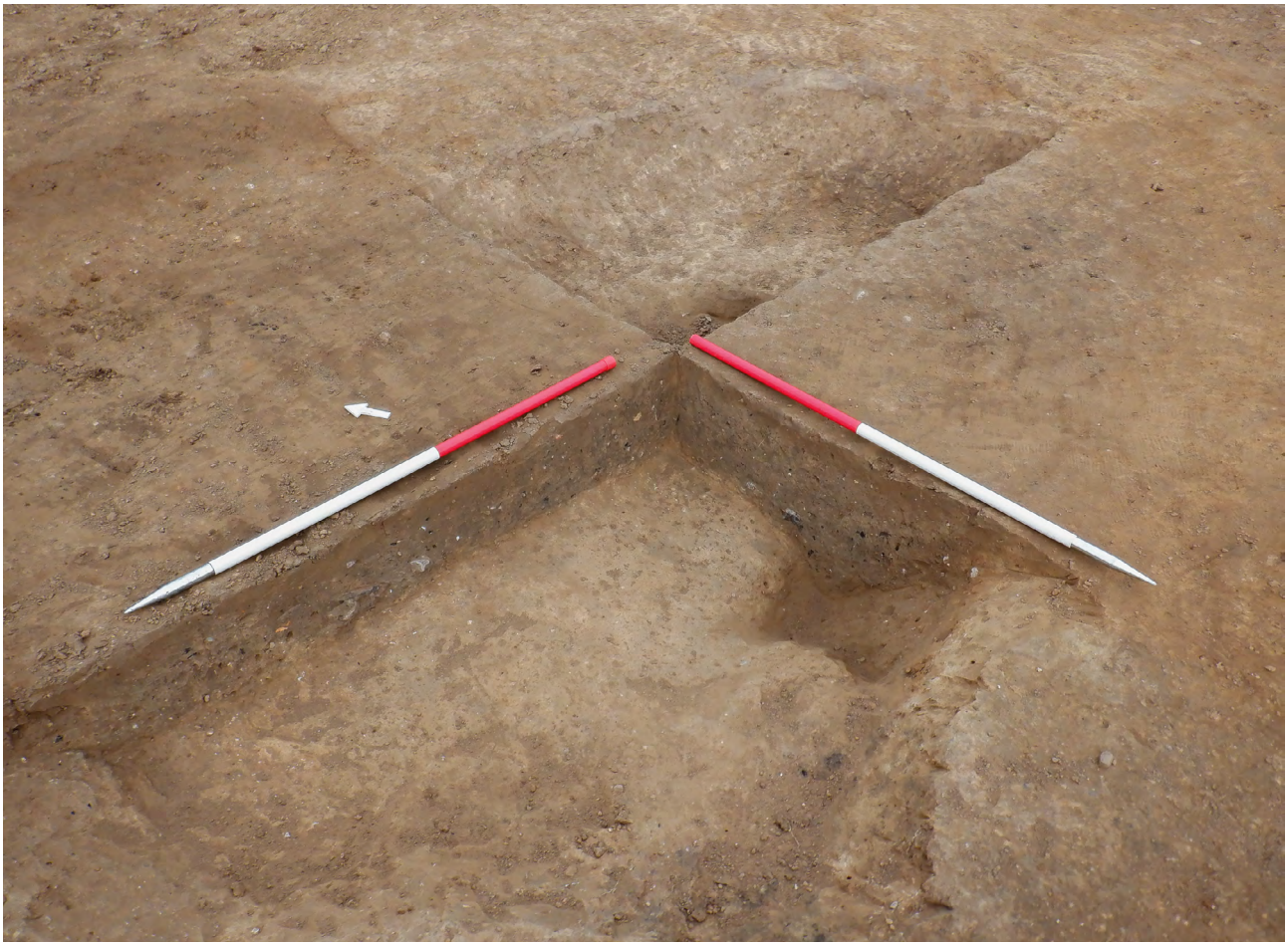


Figure 6.28 Sunken-featured building 411000 from the west (2 x 1 m scales)

presence, and the absence of any well-defined lip or shelf around the upper edge of the cut (Figs 6.28–9), would imply that this example did not have a suspended wooden floor (as commonly suggested for such structures: Tipper 2004), and the base of the cut represented the occupation level instead. The feature was rich in finds, with the assemblage comprising a large amount (97 sherds) of Anglo-Saxon pottery, fired clay (including a probable clay plate), animal bone, an Early Anglo-Saxon decorated copper girdle hanger, charcoal and residual worked flint. The pottery was handmade, and of types not previously recorded. The environmental assemblage was exceptionally rich in charcoal and charred plant remains characteristic of settlement activities. An Early Anglo-Saxon date was provided by two modelled radiocarbon dates taken from free-threshing wheat and broad bean (UBA-52881 and UBA-52883: *cal. AD 440–575*). However, a third radiocarbon date provided an inconsistent Late Iron Age/early Romano-British date (FTMC-MB96-6); this material is thought to be residual and derived from earlier phases of the site's use.

Post-medieval or Modern

Post-medieval/modern activity was characterised by boundary ditches and furrows representative of land management and agricultural practices. Two perpendicular ditches (415000 and 404000) in the north-east of the site are present on 1889 OS mapping. The ditches were similar, each measuring 0.9 m wide and 0.1 m deep, and filled with a similar silty deposit. Pottery of 16th–17th-century date was recovered from ditch 404000. Interestingly, the position and course of ditch 415000 broadly matches the line of a boundary that was marked during all phases of the site apart from the Anglo-Saxon.

All evidence of ridge and furrow (not illustrated) encountered across the area was aligned north-east to south-west, notably similar to the alignments of the majority of the earlier trackway and enclosures. The furrows averaged 1.6 m wide, separated by gaps of 5–6 m.

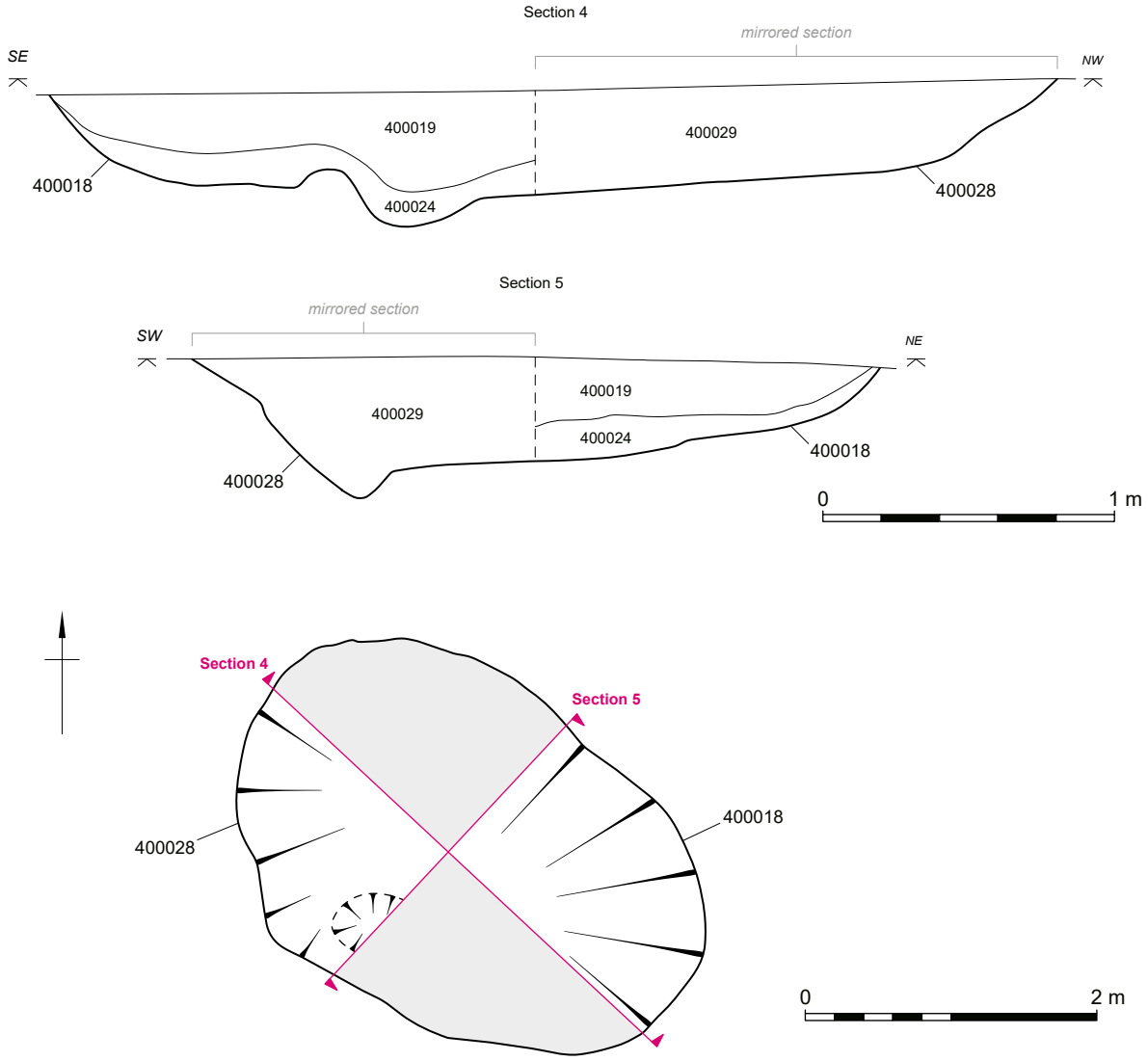


Figure 6.29 Cross-sections of sunken-featured building 411000

Walk Hill

Earlier Prehistoric

Findings from Walk Hill reveal activity on the site in prehistory to have been relatively intense when compared to most of the other Interconnector sites. Some of the pits at Walk Hill contained stratified flint assemblages and the site provided around 15% of the worked flint assemblage from the entire project.

That some of this activity occurred in the Early Neolithic period (4th millennium BC) is confirmed by radiocarbon dating. At the eastern end of the site, a group of five pits (collectively 800480) formed a rectangular arrangement with an outlier to the south. The pits measured 0.6–0.8 x 0.48–0.7 x 0.11 m and were 0.26 m deep. The fills were charcoal-rich and two of the pits (800332 and 800476) contained worked flint. This pair of features was radiocarbon dated: a wheat grain and hazel nutshell fragment from pit 800332 returned consistent dates that when combined/modelled span *3530–3375 cal. BC* (UBA-52873 and UBA-52874). Another hazel nutshell fragment, from outlying pit 800476, dated to the same time range as the wheat grain in pit 800332 (UBA-52872). The flint assemblage from pit 800332 included a core and broken blade fragments; four flint tools, three flakes and some micro-debitage came from pit 800476 to the south. The abundant charred hazelnuts and crab apple/apple seeds also found in pit 800476 sit well with the Neolithic dating evidence.

A few other pits scattered across the excavation site were also found to contain worked flint, albeit in generally small amounts (see Fig. 6.30 for locations). These features, 800240, 800186, 800308, 800068, 800371, 800451 and 800394, were generally fairly small (less than 1 m in diameter and no more than 0.37 m deep) and contained sandy silt fills; pits 800068, 800308 and 800371 showed signs of burning. Pit 800371 also contained shell-gritted pottery of earlier prehistoric appearance. The flint in pit 800068 may have been residual, as it formed part of an alignment that also provided a Middle Iron Age radiocarbon date (see below).

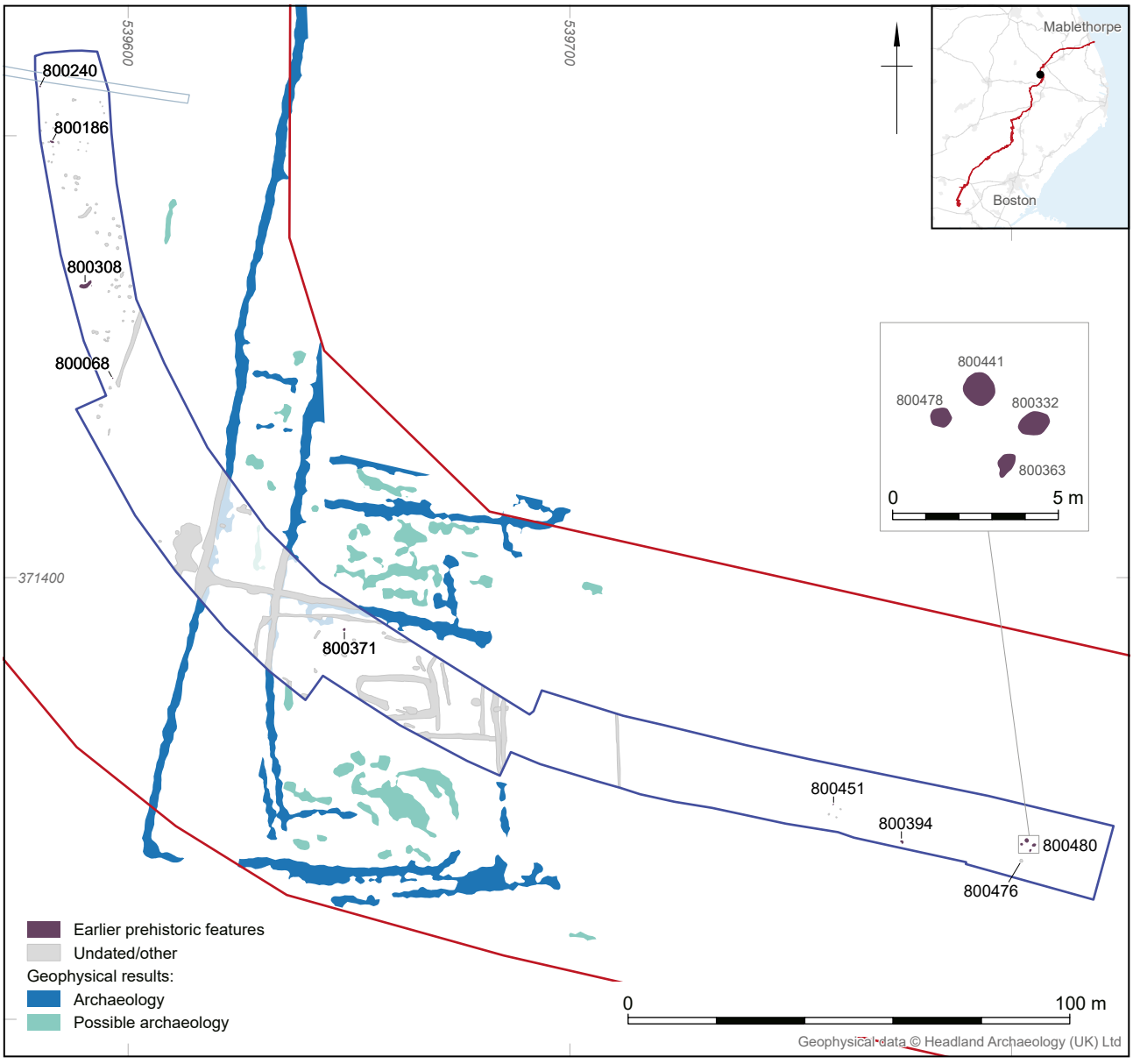


Figure 6.30 Walk Hill: locations of prehistoric features

Iron Age

Some of the pottery from the ditches at Walk Hill is of Late Iron Age to early Romano-British appearance, but radiocarbon dating also revealed activity on the site earlier in the Iron Age.

Four-post structures

At least five four-post structures of the type typically interpreted as granaries (Gent 1983) were set out along a broadly NNW–SSE alignment in the northern part of the site, with an outlier towards the eastern limit of excavation (Fig. 6.31). Finds were sparse, and the only one for which a date can be offered with any degree of confidence is the

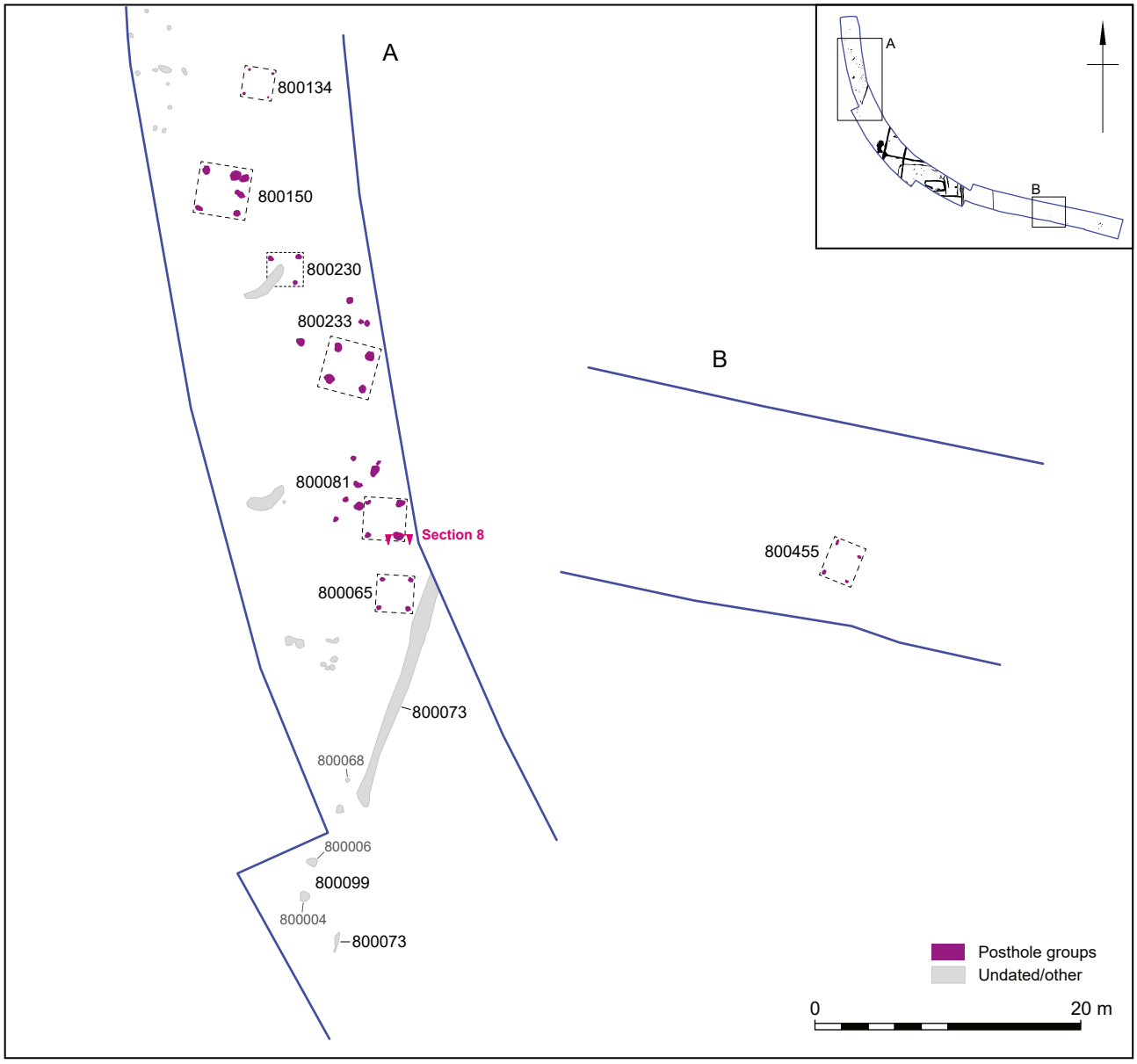


Figure 6.31 Walk Hill: Four-post structures and Iron Age boundary

southernmost example (800065), which appears to have been Iron Age. This measured 2.7 x 2.6 m (postholes 0.38–0.44 m in diameter and 0.2–0.28 deep; Fig. 6.32); a cereal grain from the south-western posthole returned a Middle Iron Age date (UBA-52906) and samples from three of the constituent features contained handmade pottery of possible or confirmed prehistoric date.

Details of the other, less well-dated, four-post structures at Walk Hill are listed below in Table 6.1 (presented in north–south order).

Boundary-marking

A north-east to south-west alignment of pits (800099) was identified towards the northern end of the site. It consisted of four features (0.3–0.8 m in diameter with depths ranging from 0.14 m to 0.27 m). Finds were sparse: the flint in pit 800068 mentioned above and a single abraded handmade pot sherd of probable Iron Age date retrieved from a sample taken from pit 800006 were all that were recovered, but a wheat grain from pit 800004 provided a Middle Iron Age radiocarbon date (UBA-52878). The alignment may have continued to the south-west, beyond the edge of site, but appeared to terminate to the north-east, from where its line was continued by undated gully 800073. The pit alignment and gully may have formed components of the same division, together representing the inception of boundary-marking at Walk Hill, an activity that seems to post-date at least one of the four-post structures.



Figure 6.32 Four-post structure 800065, view from east

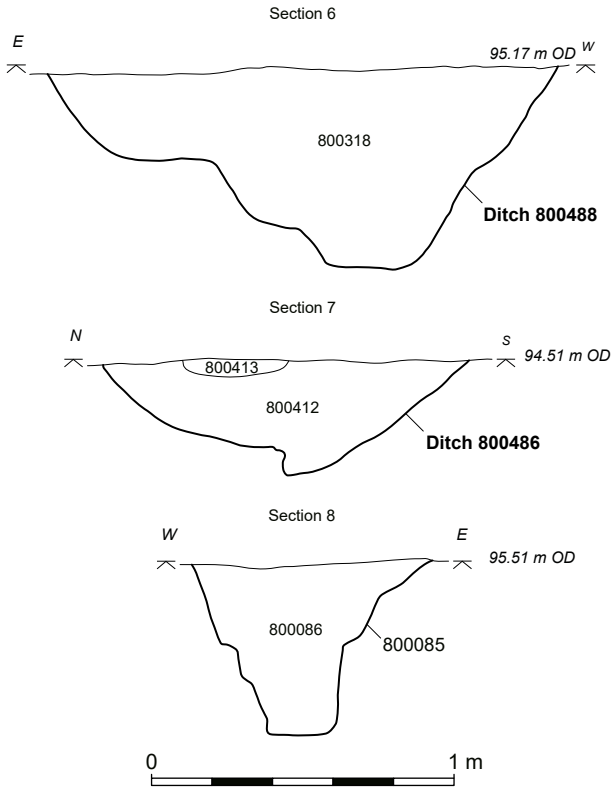


Figure 6.33 Walk Hill (sections)

Romano-British Settlement

The construction of the Interconnector afforded an opportunity to sample by excavation some of the ditched boundaries that had previously been detected as cropmarks and as geophysical anomalies. The establishment of the settlement may have occurred in the Late Iron Age to judge from the ceramic evidence, although local coarsewares were of long currency, so this phase of occupation may have begun after the conquest.

Earlier Romano-British features

The settlement area lay directly to the east of a broadly north–south-aligned 15.5 m-wide double-ditched trackway or boundary which was well represented in the geophysical survey results (Fig. 6.34). During the excavation this was recorded as ditches 800487 and 800488, which were a maximum of 1.70 m wide and 0.65 m deep (Fig. 6.33.6). Datable evidence was only recovered from the eastern boundary and comprised a moderate-sized pottery assemblage (1.2 kg) spanning the Late Iron Age to the mid-2nd century AD overall. A radiocarbon date of *cal. AD 165–230* (UBA-52886) on a charred tuber from the same ditch could indicate either a degree of residuality within this group of pottery or intrusive plant remains.

Finds evidence confirms that a handful of features were products of the early occupation and were presumably associated with the double-ditched boundary. These included a gully (800258) that curved from the south-western limit of excavation just to the east of the double-ditched boundary before terminating, and a pear-shaped pit (800029; Fig. 6.35) 6 m to the north-east. The gully is visible in the geophysical survey data as a lozenge-shaped feature that terminates 6 m beyond the southern edge of the site, and runs parallel overall with the main boundary. Around 8 m further to the north-east more pits were recorded, with six forming an irregular circle some 7.5 m in diameter (although one of these pits, 800371, was listed earlier on account of the struck flint it contained). Three of the pits contained pottery that overall dates to between the late 1st and mid-2nd century. To the east lay another earlier Romano-British feature, gully 800494, which contained mid-1st to mid-2nd-century pottery.

Finally with regard to activity in this part of the site, it is not known how right-angled ditch 800489 related to the lifespan of the double-ditched boundary, as no clear sequence was apparent at its intersection with ditch 800488, and both contained pottery spanning the late 1st to mid-2nd century AD. It may have pre- or post-dated the trackway, perhaps forming part of an enclosure along with gully 800494 to the east, with the pits (including 800029) and gully 800258 within it.

Table 6.1 Walk Hill – other four-post structures

Group number	*Dimensions (overall/constituent features)*	*Finds*	*Comments*
800134	2 x 2 m / diam. 0.16–0.26 m; depth 0.04–0.24 m	None	
800150	3.6 x 3.3 m / diam. 0.5–0.66 m; depth 0.07–0.5 m	None	A fifth posthole on the structure's E side was shallower than the others and may not have had a load-bearing function (or been related)
800230	2.6 x 2.4 m / diam. 0.2–0.5; depth 0.1–0.25 m	None	Truncated by sterile gully
800233	3.2 x 3.2 m / diam. 0.6–0.82 m; depth 0.36–0.55 m	Small group of handmade shell- and quartz-gritted pottery sherds of ?prehistoric & ?Romano-British date	
800081	3.2 x 2.3 m / diam. 0.44–0.8; depth 0.18–0.56 m	Two quartz-gritted pottery sherds of possible Iron Age to Middle Saxon date	Speculative grouping; also includes a short (5.8 m) north-east to south-west-aligned fenceline, which contained prehistoric and ?Romano-British potsherds. NE posthole of four-post structure proper contained Early–Middle Age wheat grain (*Hordeum vulgare*; UBA-52903; 2424±22; *500–410 cal. BC*)
800455	2.9 x 2.4 m / diam. 0.2–0.48 m; depth 0.12–0.17	Worked flint	Southern outlier; two postholes contained charred remains of possible oak posts

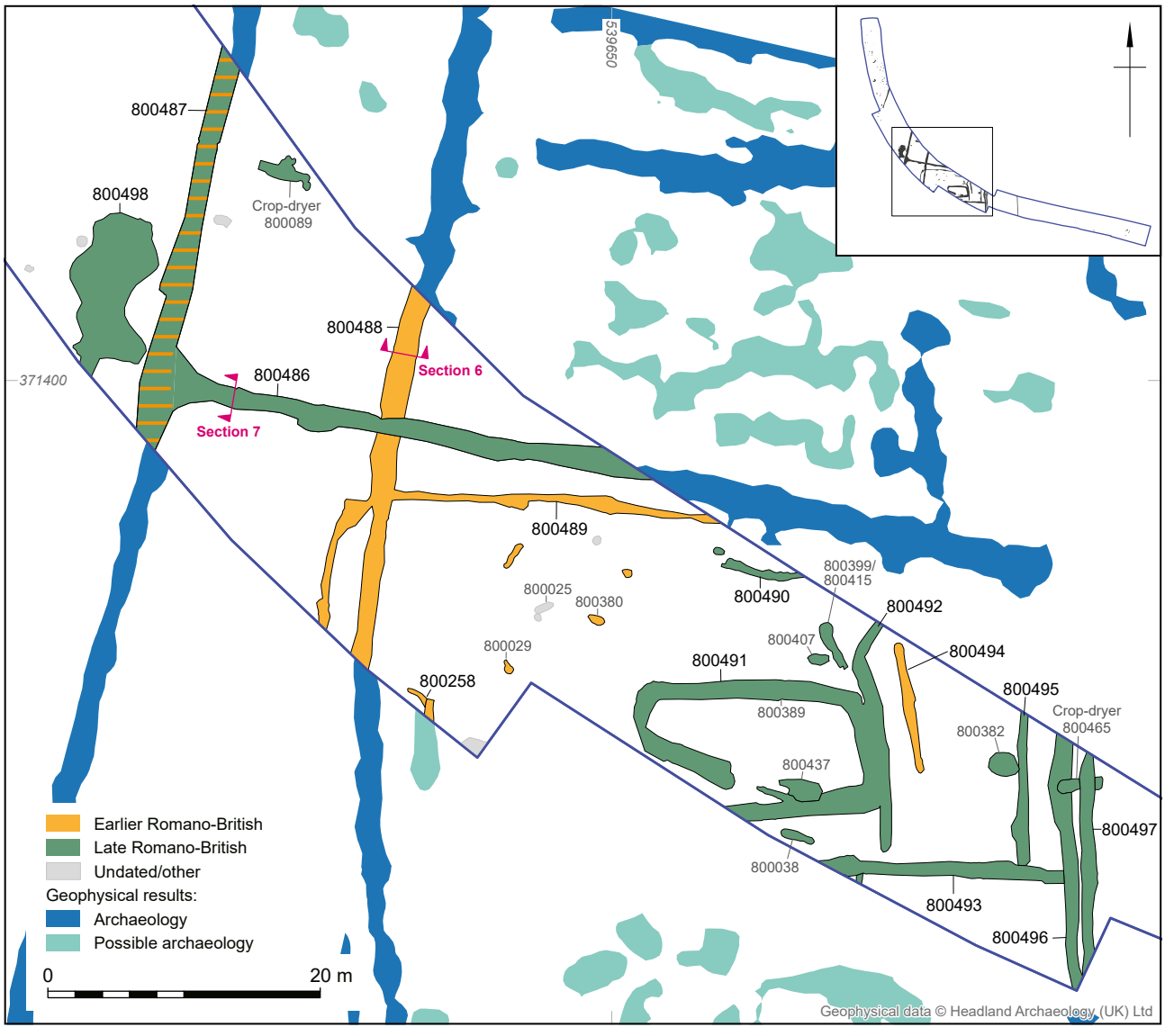


Figure 6.34 Walk Hill: Romano-British settlement



Figure 6.35 South-west facing section of pit 800029 (0.5 m scale)

Later Romano-British features

Enclosure

After an interval of perhaps 50 years or so, the double-ditched trackway or boundary was slighted by an east–west ditch (800486; Fig. 6.33.7) that was dug across its eastern side. Although no sequence could be discerned where ditches 800486 and 800488 crossed, finds evidence suggests the east–west feature was the later element as it contained late 2nd to 3rd-century material (whereas the assemblage from 800488 was no later than mid-2nd-century). Ditch 800486 formed a T-junction with ditch 800487, which marked the western side of the trackway and in doing so helped to define an enclosure which (to judge from the geophysical evidence from the wider corridor) measured around 70 m square. The southern boundary of this proposed enclosure lay some 30 m beyond the stripped area to the south, but its eastern side was initially defined by ditch 800496 (1.7 m wide and 0.29 m deep), which contained mid-3rd–4th-century Romano-British pottery and animal bone. Unburnt human bone (a fragment of left humerus belonging to a neonate) was also recovered from this ditch. Two cereal grains from different species of wheat from the same fill of ditch 800496 produced inconsistent but broadly later Romano-British results (UBA-52889 and UBA-52890).

Space within the eastern part of the enclosure was organised and divided by means of a co-axial grid of north–south and east–west ditches (800490, 800492, 800493 and 800495), as well as by ditch 800491, which turned in on itself to form a small sub-enclosure measuring a maximum of 15.2 m east–west by 7.5 m north–south. Ditch 800491 and a patch of trampled, disturbed ground (800437) within the area it enclosed both contained pottery of late 3rd–4th-century date. The ceramic assemblage from this grid of ditches was of potential 4th-century date overall, although residual pottery dating to the later 1st–2nd century was also recovered.

Three pits in the vicinity (800399/800415, 800407 and 800038) contained pottery of the same late Romano-British date, as well as animal bone and worked red deer antler, signalling further use of the space. A large pit (800498: 11 x 5 m and 0.72 m deep) had been dug outside the main enclosure/trackway on its western side and is thought to have been a midden area from the adjacent occupied area, containing as it did a dark, silty clay fill with a range of late 3rd to 4th-century pottery, animal bone, slag and shell (4.4 kg in total). A residual early prehistoric potsherd was also recovered.

Crop-dryers

The remains of two crop-dryers confirm crop-processing on the site and combine with the palaeoenvironmental evidence in revealing Walk Hill to have been located within an area of arable cultivation during the Romano-British period.

The first example (800089: 3.38 x 2.3 x 0.75 m; Fig. 6.36) lay between the two ditches defining the double-ditched boundary. As a clear obstruction it presumably post-dated any sort of trackway function the boundary may have had. Its contemporary setting was instead just outside the north-western corner of the 70 m-square enclosure that had superseded the double-ditched boundary. The crop-dryer was sub-oval in plan; a charred layer on the feature's base contained chronologically non-diagnostic Romano-British pottery, CBM, slag and iron. In places, the sides of the feature were heat-affected. Stone rubble (some chalk, some heat-affected) was concentrated in the backfill in the feature's eastern part, probably deriving from the demolished flue and chamber. Its final fill contained fragments of an unburnt human skull, deriving from an adult (35–55 years old), possibly male, alongside late 3rd to late 4th-century pottery. The skull fragments were radiocarbon dated to *cal. AD 245–345* (SUERC-126882) so the individual and the pottery are likely to have been contemporary, rather than the human remains representing curated 'heirlooms' (for further examples of 'unusual' deposits associated with crop-dryers, see Smith 2018b, 187–8).



Figure 6.36 North-facing section of crop-dryer 800089

The second crop-dryer (800465) post-dated the 70 m-square enclosure as it had been cut into ditch 800496 (which defined its eastern side). This second crop-dryer was smaller and of a different form to the first: its cut was broadly circular (1.4 m in diameter; 0.37 m deep) with an additional shallow, tapering flue or rake-out area on its eastern side (Fig. 6.37). The sides (but not the base) of the bowl were lined with a distinctive deposit of crushed limestone, 0.15 m thick, which appeared heat-affected in places. The feature was backfilled with limestone rubble in a greyish-brown sandy silt matrix, possibly the remains of a superstructure. A rye grain (*Secale cereale*) from the basal fill of crop-dryer 800465 was radiocarbon dated to *cal. AD 210–310* (UBA-52891). Finds were sparse and comprised animal bone, residual worked flint and a small assemblage of pottery, the most diagnostic of which was 2nd-century in date (and presumably therefore residual, considering the radiocarbon date and the fact that the crop-dryer had clearly cut ditch 800496, whose medium-sized group of mid-3rd–4th-century pottery was corroborated by the pair of later Romano-British radiocarbon dates described above). Samples from the feature contained abundant hulled wheat chaff and germinated grains, again indicative of a crop-drying function. A large pit (800382: 2.15 x 1.8 x 0.60 m; Fig. 6.38) 3 m to the west contained environmental remains that may have originated among the rake-out from the crop-dryer, as well as 2nd to 3rd-century pottery. The unburnt fragment of left neonate humerus mentioned above came from the same ditch (800496) that had had the second crop-dryer cut into it, potentially extending the association between crop-dryers and the deposition of human remains, although a distance of around 6 m separated the crop-dryer and the neonate humerus.

The rake-out area of crop-dryer 800465 had been cut by ditch 800497 to its immediate east (Fig. 6.37). This followed the same course as adjacent ditch 800496, and might have been its replacement, but as ditch 800497 was not well dated (it contained no pottery other than a single grey ware sherd) it could have been a later feature unrelated to the Romano-British activity, although this is not thought likely.



Figure 6.37 South-facing section showing crop-dryer 800465 cutting ditch 800496 (left) and being cut by ditch 800497 (right) (2 m scale)



Figure 6.38 South-facing section of pit 800382 (1 m scale)

Callow Carr

The Barrow

Towards the centre of the Callow Carr site was a rock-cut ring ditch, 900066, which had a bowl-shaped profile, measured 1.1 m across by 0.35 m deep, and contained one to two fills of dark greyish or reddish-brown silty clay with frequent chalk fragments (Figs 6.40.9 and 6.41). The ditch enclosed an area with an internal diameter of 15.5 m, although its full circumference lay beyond the stripped area to the east and west.

Artefacts comprising struck flint, animal bone and Beaker pottery (see Brook below) were recovered from the ditch fills. A hazel nutshell fragment and a cereal grain (*Triticum* sp. cf. *dicoccum/spelta*) from the same fill of the ring ditch were radiocarbon dated (FTMC-ME96-2 and FTMC-ME96-1) and returned, respectively, inconsistent Late Neolithic–Early Bronze Age and Middle Bronze Age dates. CBM (five fragments) was also recovered, although this is thought to be intrusive. The form of the ring ditch, the artefacts it contained and the radiocarbon evidence, in conjunction with its location close to the

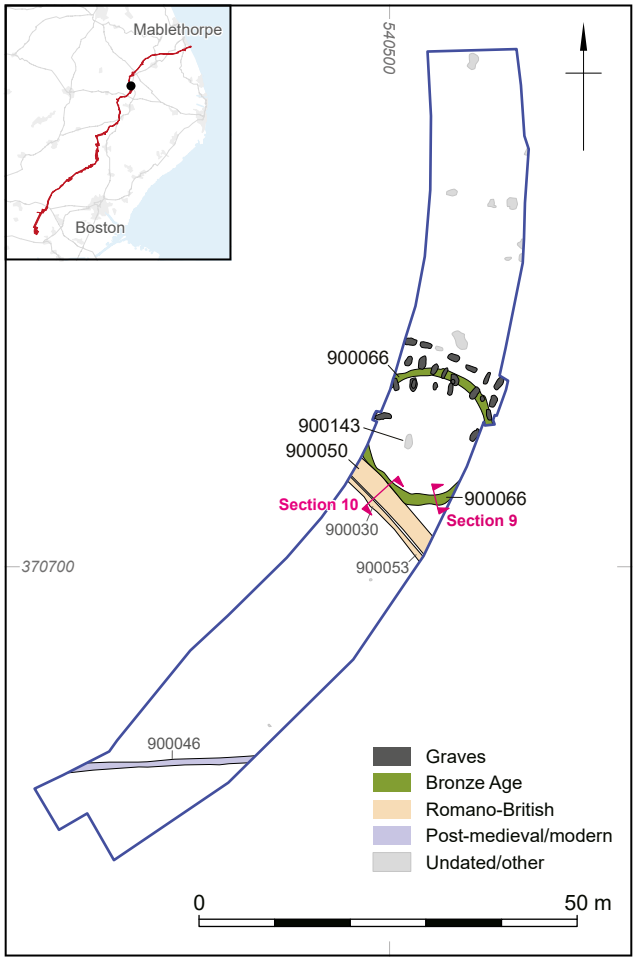


Figure 6.39 Callow Carr: site location and overview

Bronze Age Ring Holt barrow, indicates that this feature was also a barrow. No mound was present, however, and no contemporary human remains were evident. A grave-shaped feature (900143: 1.92 x 0.8 x 0.18 m) approximately 2.8 m south-west of the centre of the area enclosed by the ring ditch may have formed part of the barrow's original arrangement but was devoid of any finds or other remains, so this is uncertain.

To the south the ring ditch had been cut by a Romano-British trackway, while 22 Anglo-Saxon inhumation graves had been dug into or adjacent to its northern part. The presence of the graves adds weight to the notion that the ring ditch represents a barrow, as such monuments were commonly re-used as cemetery sites in the Anglo-Saxon period (Lucy 2000, 126; Williams 1997, 6).

The Trackway

Trackway 900050 cut across the southern part of ring ditch 900066 on a north-west to south-east alignment (Figs 6.40.10 and 6.42). It measured around 2.8 m wide, with up to four wheel-ruts spaced 1.1–1.5 m apart at its base. Romano-British pottery (343 g; the most chronologically distinctive of later 1st–2nd-century date) was recovered within the ruts, pressed into the natural chalk bedrock, and is presumed to reveal the date of the feature's use. An artefactually sterile drainage ditch (900030/900053) followed the trackway on its south-western side; it measured almost 1 m wide and 0.35 m deep and contained a similar fill to the trackway (typically pale yellowish-brown silty clay with frequent chalk gravel inclusions), suggesting that the two were contemporary. The presence of the Romano-British trackway may also have marked this out as a suitable location for an Anglo-Saxon cemetery, as Roman roads seem to have been of significance in that period, especially in its earlier part, with burials often found in their vicinity (Albone 2016, 113–20).

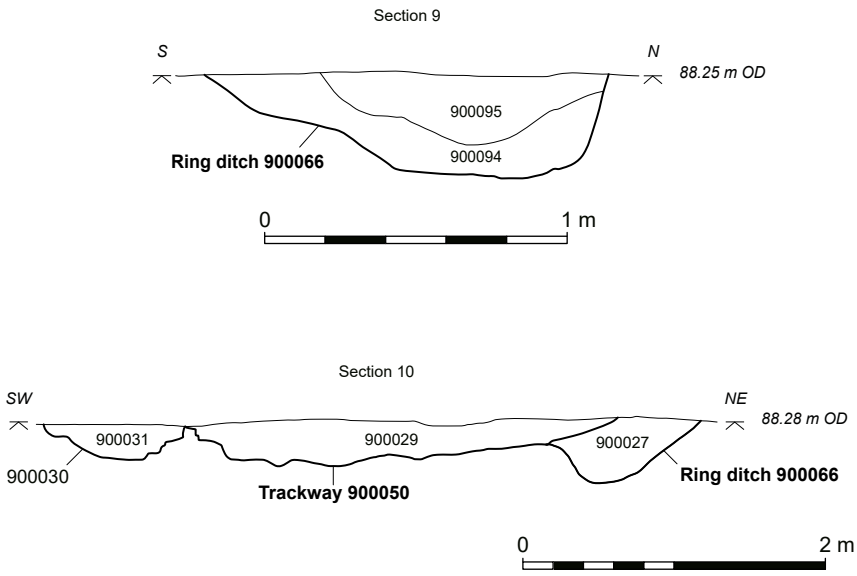


Figure 6.40 Callow Carr (sections)

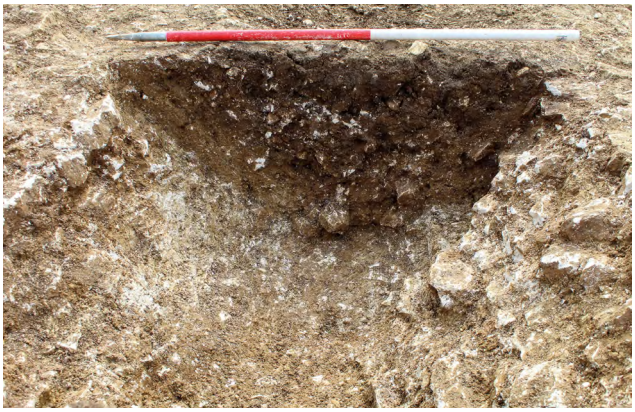


Figure 6.41 West-facing section of ring ditch 900066 (1 m scale)



Figure 6.42 Trackway 900050 cutting ring ditch 900066, view from south-east

Cemetery Features

Inhumation graves and burials

The excavated cemetery features included 22 inhumation graves mainly concentrated in a 6 m-wide band that stretched across the site (Fig. 6.43). The archaeological sequence was relatively uncomplicated, with 12 graves cut into nothing other than the natural substrate and 8 cut into the barrow ditch. There were two instances of clear intercutting, where graves 900067 and 900114 had both been dug across grave 900104 (one of those that had been dug into the barrow ditch). Graves 900067 and 900114 themselves slightly overlapped, but no sequence could be seen.

The barrow had a major influence on the layout of the cemetery, with burials clustered on its northern side but avoiding its southern edge where the trackway lay (or had lain). The extents of the stripped area did not allow an understanding of whether or not the eastern and western sides of the barrow had similarly attracted burials. The graves were distributed such that of the 22 visible, 5 lay wholly within the area enclosed by the ring ditch, where they may have occupied the berm between the toe of its mound and the inner lip of its ditch, 8 lay beyond the northern edge of the ditch, and the remainder overlapped with the ditch itself to a greater or lesser extent (i.e., had cut it). Had any graves been dug into the mound itself then they would have been especially vulnerable to plough truncation and probably entirely removed.

Where observable, a little over half of the graves were sub-oval in plan, the remainder subrectangular, often with rounded ends. Graves containing the remains of adults survived to depths of between 0.08 and 0.43 m, with a mean of 0.25 m.

Skulls were generally present in the northern halves of the graves, with those individuals buried with their heads to the south forming a small minority. Beyond this commonality there was a range of grave/body orientations, although 10 graves and 11 individuals lay on a north-east (head) to south-west (feet) or NNE–SSW alignment.

There was some sense of spatial pattern underlying the grave orientations: two WNW–ESE-oriented rows of burials are discernible; within the northern of these two rows, five of the seven graves were aligned WNW–ESE; within the southern row, the graves ran on a perpendicular orientation (i.e., NNE–SSW).

There seemed to be some consistency in the position of the human remains within the grave cuts: almost all of the individuals were found on their side, flexed (n = 18) or crouched (n = 1), though three were supine. Of those buried on their sides, 13 had been lain on their right sides and 6 on their left.

The 22 graves contained 23 *in situ* burials (excluding redeposited material – see human bone report below for minimum number of individuals). One grave (900019) contained both a subadult and a juvenile; the remainder contained one inhumation, an adult in around three-quarters of cases, with a few subadults and an infant in the others. No cremated remains were present at the cemetery.

None of the graves were unfurnished, although the quantity and range of items present varied across the cemetery. Over 250 separate Object Numbers (ON) were allocated, and the items include: jewellery and dress items, such as brooches, necklaces, pendants, beads

and buckles; personal equipment and tools, such as knives, whetstones, spindlewhorls and combs; and containers such as buckets, cups and a box. A seax is the sole weapon from the cemetery – and this was probably an heirloom by the time it was deposited. Materials used for these items include amber, copper alloy, garnet, glass, gold, iron, silver and stone (see Figs 6.44–6.84 and Schuster below).

Non-grave features

Feature 900158 (1.03 x 0.60 x 0.26 m) lay within the northernmost alignment of graves but contained no skeletal remains, despite its location and morphology. Flint debitage

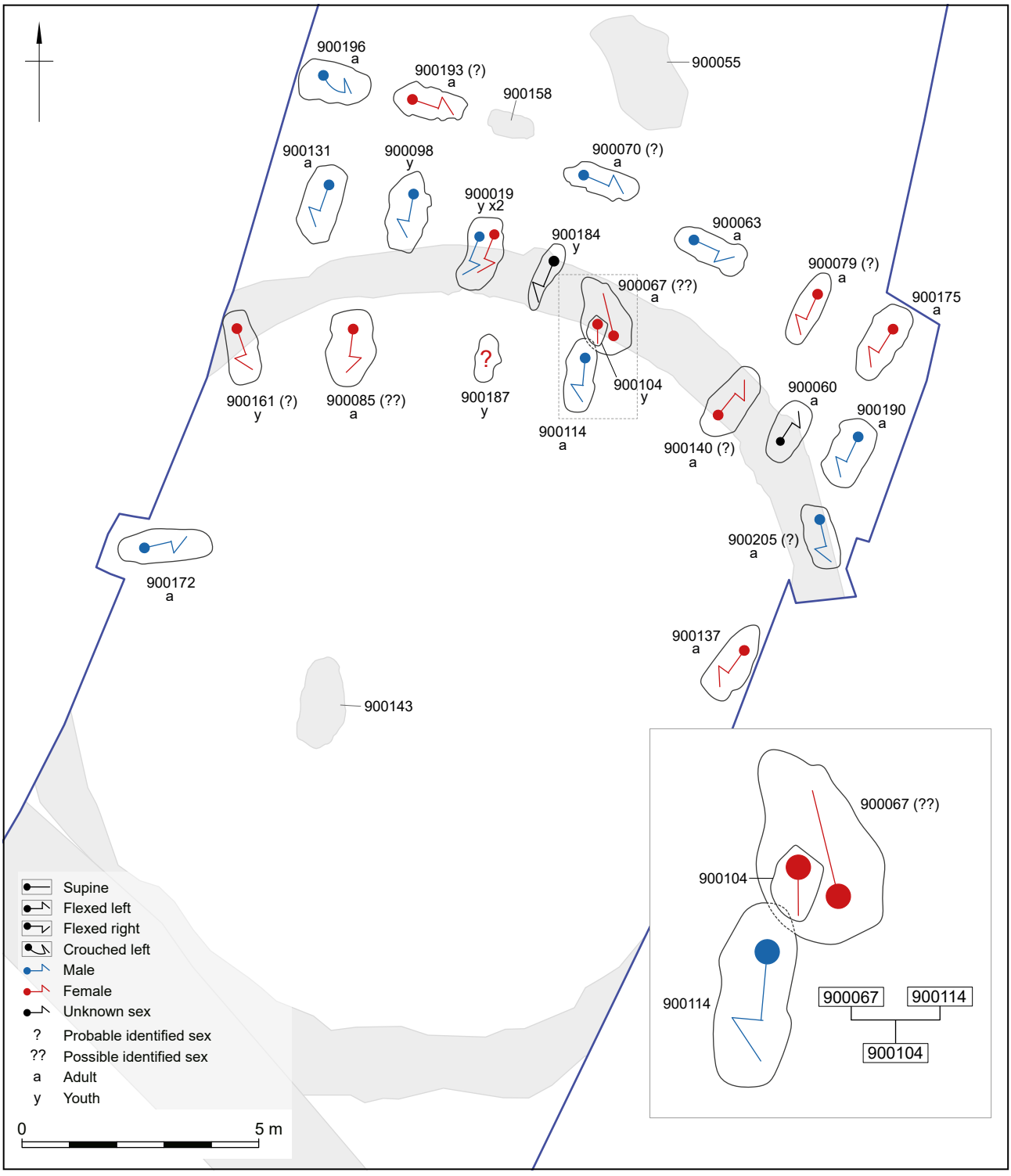


Figure 6.43 Callow Carr: plan of Anglo-Saxon graves

was recovered from an environmental sample taken from this feature. A pit (900055: 2.96 x 1.56 x 0.24 m) within 1 m of the northern row of graves contained a charcoal-rich lens towards its base but was artefactually sterile, and its relationship to the various phases of activity at Callow Carr is unknown.

After the cemetery

Gully 900046 crossed the southern part of the area on an east–west orientation. The base of a large bowl of mid-17th to mid-18th-century date was recovered from its fill, although the feature is not marked on 19th-century mapping. Such mapping does, however, record a 'stone pit' and lime kiln south of the cemetery, something of a 'near miss' for this site and Ring Holt barrow, both of which lie within about 100 m of the quarrying.

Grave catalogue

Jörn Schuster, Viktoría Halldórsdóttir and Ceridwen V. Boston

Further details of the human skeletal remains, the metalwork and other grave goods, as well as the mineral preserved fabrics, are presented further below. Sex is based on osteological characteristics, but where it has been established through DNA study then this is indicated below.

Object Numbers allocated during the excavation started at '900001', and this is reflected in the archive, but for the sake of simplicity they are presented below as starting at '1'. Directions and orientations are indicated on a 32-point compass rose.

Frequently used typologies include: Høilund Nielsen 2013; Knives: Blakelock and McDonnell 2007; Böhner 1958; Drinkall (in Drinkall and Foreman 1998); Evison 1987; belt buckles: Marzinzik 2003; beads: Brugmann 2004; Guido 1999.

Key: ABG – associated animal bone group; ON – Object Number; s.a.u.l. – skull, axial, upper limbs, lower limbs (where not all elements recovered); * – find not illustrated; L – length, W – width, D – diameter, T – thickness, Wt – weight; MPOR – Mineral preserved organic remains

Grave 900019 (burial 900021 & 900047)

(Figs 6.44–5)

NNE–SSW; sub-oval, curved, more rounded at foot end, irregular sides, flat base; 1.52 x 0.98 m, 0.26 m deep (base at 88.12 m OD); fill 900020. Two individuals in grave; subadult 900021 has back towards juvenile 900047. Grave truncates ring ditch 900066 and is disturbed by animal burrowing

Human bone (900021): Flexed on left side, slight arched back, arms up against chest; 60% s.u.l; subadult 14–16 yr, female

Human bone (900047): flexed on left side; 30% s.u.l; juvenile 5.5–7.5 yr, male

Scientific analyses: 900021: DNA analysis, isotope analysis (Sr/O)

Grave goods:

ON 2: Copper alloy penannular brooch, centrally in the middle of the chest, pin loop on left at 10 o'clock position, tip at 4 o'clock. E of middle of ?right humerus near edge of grave cut. Flattened ends spirally curled up onto the circular-sectioned hoop (like Fowler type C), which is decorated on the front with 6 groups of 4 transverse lines. The circular-sectioned pin (L 27.3 mm, W 1.7 mm) has 3 transverse lines marking the base of the pin loop (W 2.2 mm). Back plain. Little wear.
Høilund Nielsen BR3-f. Wt 2.265 g; D 24.9–25.5 mm. Fig. 8.56

ON 186: Silver/amber pendant, below skull, under jaw. Oval/ovoid backplate, four-ribbed strip loop with straight base, probably soldered to narrower end; now detached silver strip collet (W 2.45mm, now in at least 6 fragments) must have been attached (?soldered) to plate to hold an ovoid hemispherical amber setting. Several parallel strands of organic fibre (?wrapping or ?cover for setting) on the apex of the amber setting when first seen. Amber surface now uneven with several large spalls. Wt 1 g; L 14 mm, W 7.6 mm. Fig. 8.58

ON 191: Gold/garnet cabochon pendant, sample 900009, chest area. Set with dark red garnet (darker than ON 238); the sub-trapezoidal stone (straight, slightly convex base; the apex

near the loop rounded) is only slightly higher than the setting; in section the stone appears to be plano-convex. Slight surface damage near apex, buff ?precipitate on stone surface to right of damage, near mid-right edge and in middle of lower edge. Trapezoidal back plate with rounded corners has a triple-ribbed suspension loop whose triangular terminal is soldered to the top of the outer side of the backplate; the setting for the garnet cabochon is a flat strip collet around the gemstone, its top edge bent to hold the cabochon, followed on the outside by a beaded gold wire, starting in the lower left corner and winding its way around the collet 2.5x, creating the impression of 3 concentric wires. The beading of the central curl is wider and more spherical than the lower and higher ends; the end of the wire, from the middle of the right side to just below the loop, graduates from beading to plain. Fig. 8.59 (l)
Analysis of stone: Pearce 2024a & b
Høilund Nielsen PE9-b. Wt 0.64 g; L 13.5 mm, W 2.3–7 mm, T 2.4 mm

ON 192: Two glass doughnut beads, location? Translucent light blue/turquoise with small central perforation. Asymmetrical cross-section
1) diam. 6.5–6.8mm, L. 2.6mm, hole 1.3mm. Wt 0.153 g
2) diam. 6.7–6.8mm, L. 2.6mm, hole 1–1.1mm. Wt 0.165 g
Brugmann 2004, Group C type 8.2.5 Dghnt. Høilund Nielsen 2013, 204, type BE1-Dghnt. Fig. 8.60

ON 238: Gold/garnet cabochon pendant, sample 900476, skull area. Set with red garnet (lighter than ON 191). Rectangular stone with hogback-shaped front, ?cross-hatch metal foil effect in lower 2/3 of stone rather than actual plate foil attached to flat base. Rectangular back plate with rounded corners has a triple-ribbed suspension loop whose triangular terminal is (?reaction-) soldered (no actual solder visible) to the top of the outer side of the backplate; the setting for the cabochon is a flat strip collet around the gemstone, its top edge bent to hold the cabochon, the edge pushed down – accidentally – below right rib of suspension loop and at the base right corner; followed on the outside by 3 separate, concentric, beaded gold wires: a very fine one next to the collet, followed by a wider one; the outside wire starts at the top left corner and ends behind the lower right. The beading of the middle wire is wider and more spherical than the inner and outer; the beading of the outer wire, from the top of the left side to lower left corner is indistinguishable from the base plate and the beading visible only on top; along the bottom side, the outer wire visibly sits onto of the base plate, as does the middle wire along the right side. Surface of back side slightly uneven within area enclosed by collet on front; left edge (with loop at top) has shallow acute ridge from where it had been cut. Fig. 8.59 (r)
Analysis of stone: Pearce 2024a & b
Høilund Nielsen PE9-b. Wt 0.549 g; L 12.43 mm, W 6.1 mm, T 3 mm

Residual finds:
ON 1: 1 sherd Bronze Age pottery

Phase: 900021: Early–Middle Anglo-Saxon; 1358±27 BP – cal. AD 610–770 (SUERC-126883); *cal. AD 640–660 (68% probability)*



Figure 6.44 Detail of burial 900021 (grave 900019) with brooch ON 2 (0.2 m scale)

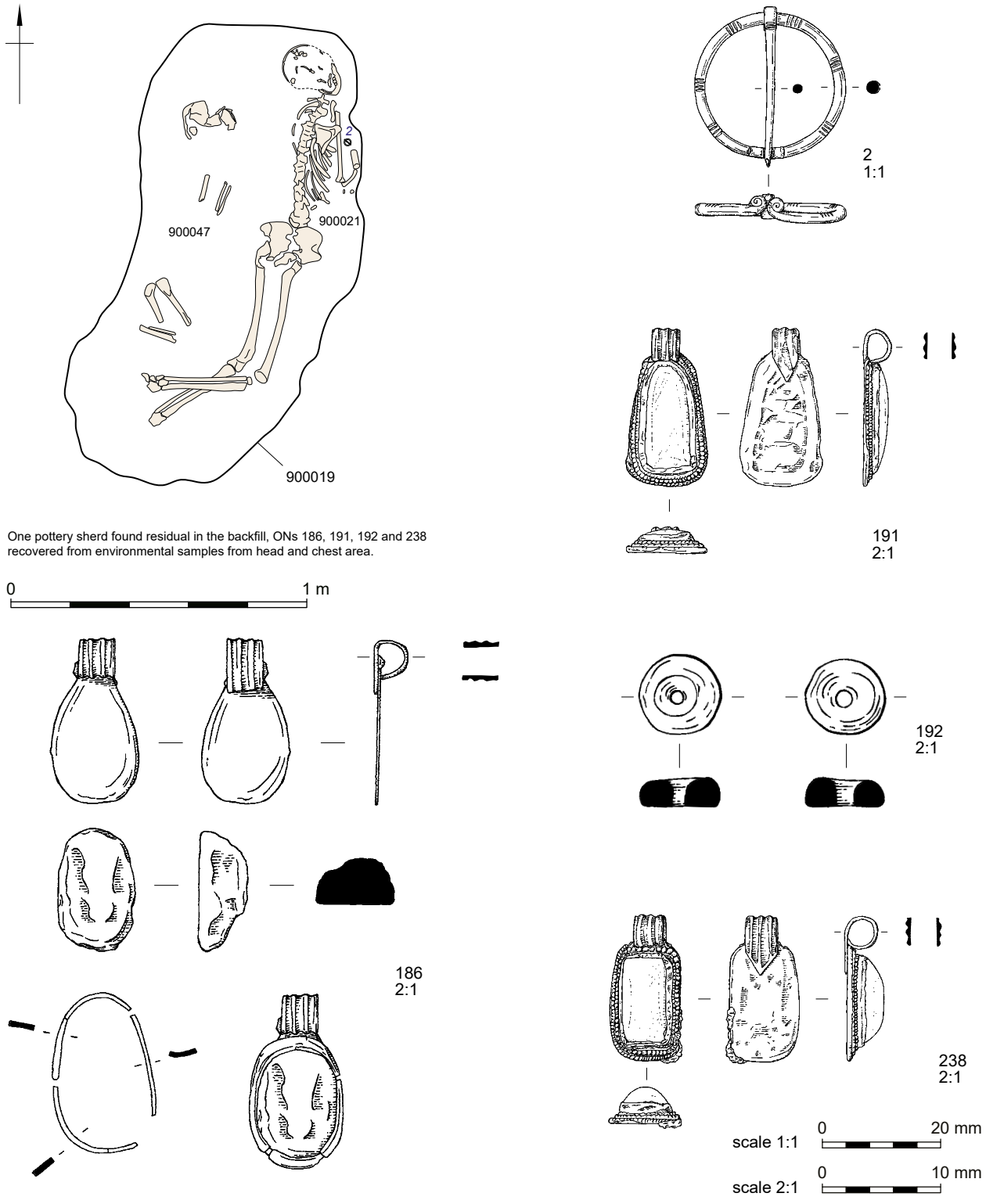


Figure 6.45 Grave 900019 with grave goods

Grave 900060 (burial 900062)
(Fig. 6.46)
NE–SW; sub-oval, moderately concave sides, irregular/undulating base; 1.46 x 0.82 m, 0.10 m deep (base at 88.14 m OD); fill 900061. Very shallow and truncates ring ditch 900066

Human bone: flexed on left side; 20% a.u.l; > adult 19 yr

Grave goods:
ON 3: Iron knife, in centre of grave, tip WSW, edge SSE. Triangular tang (L 44 mm, W 4.2–13.6 mm) with remains of ?wooden handle. Blade (L >93 mm) has rectangular shoulder and choil,

parallel back and edge, tip missing; covered in ?leather remains. 5 joining fragments (4 blade, 2 blade/tang and tang) +2 joining ?blade fragments; 3 rod fragments and 4 individual fragments, 2 largest probably belonging to sheath layer on blade
Drinkall ?D1. ?Evison 4. Blakelock & McDonnell B. Böhner C. Wt 19 g; L >137 mm, W 15.7 mm

ON 4: Iron rod, in centre of grave above tip of knife ON 3. Slightly tapering fragment with flat oval cross-section
?Implement handle or ?girdle hanger? stem?. Wt 5 g; L >36.9 mm, W 8.5–10.9 mm, T 5.1–5.8 mm

ON 5: Copper alloy hook, E of centre of grave, above tang of knife ON 3. 'U'-shaped hook with slightly everted round-sectioned hook with flat-sectioned folded, flat, triangular suspension loop (widest at the fold). No decoration. The reverse of the hook has a seam from the folding of metal during smithing
Part of chatelaine? Wt 2 g; L 28.4 mm, W 2.1–5.7 mm

ON 6: Copper alloy ring loop, N of centre, in abdomen/chest area. Loop with iron ?wire attachment (L >11.5mm). Loop worn opposite side of attachment, which appears to be made of a wire looped around ring and spirally wound wire head (visible in x-radiograph)
Part of chatelaine? Wt 2 g; L 22.2 mm, D 16.4 mm, T 1.8–2.5 mm

ON 7: Copper alloy nail, W of centre of grave. Club-shaped head and subcircular-sectioned 1.5mm-wide shaft, bent and curled from middle to tip. Wt 1 g; L 7.8 mm, D 2.4 mm

ON 18: Copper alloy/iron figure-of-eight loop, in centre, WSW of knife tip. Copper alloy wire loop with looped iron rod (iron loop obscured by corrosion products); rod part of ?linked rod chain?
Part of chatelaine. Wt 3 g; L 20.5 mm, W 6.1 mm, T 1.6 mm

ON 25: Iron strips, in centre, W of knife tip. 7 strip fragments for ?stave-built vessel, all with traces of transverse wooden grain structure preserved on one side. The thicker (L 80 mm, W 26.1 mm) strip has 3 joining fragments plus one narrower one (W >14.2 mm) with breaks on 3 sides (radius *c.* 140 mm). The narrower strip has 2 conjoining fragments (radius *c.* 110 mm). A separate fragment (L 24.3 mm, W 20.2 mm) has no obvious grain structure, possibly obscured by adhering soil concretions. Wt 33 g

Sample 900065: Chalk ball, tibia area. Naturally formed sphere with some areas smoother than others. Wt 11.96 g; D 20.4–22.7 mm

Residual finds: 2 stones, 2 burnt animal bones, 1 piece of prehistoric worked flint, and 3 iron objects

Grave 900063 (burial 900064)

(Figs 6.47–9)

NW–SE; subrectangular, steep concave sides, flat base; 1.63 x 0.77 m, 0.25 m deep (base at 88.45 m OD); fill 900065

Human bone: flexed on right side, with upper limbs flexed across chest at waist; 70%; adult 30–40 yr, ??male

Grave goods:

ON 9: Iron, in NE corner of grave cut, behind left heel. Unidentified fragment, possibly of socketed implement. Part of ON 11. Wt 2 g; L 21.9 mm, W 9.7 mm, T 8.4 mm

ON 10: Iron, in NE corner of grave cut, behind left heel. Unidentified fragment, possibly of socketed implement, or strip with bent rim. Part of ON 11. Wt 5 g; L 23.7 mm, W 16.9 mm, T 7.8 mm

ON 11: Iron bucket hoops, in NE corner of grave cut, behind left heel. Hoops (1–3) of iron-bound, probably stave-built stoup/bucket. There are no obvious handle fragments
1) Flat-sectioned hoop (D 211–234 mm, W 13–14.5 mm), x-radiograph shows riveted lap join
2) Flat-sectioned hoop (D 242–262 mm, W 10.4–16.4 mm)
3) Flat-sectioned hoop (D 245–252 mm, W 11.7–13.9 mm)
No longer joining fragments, incl. one (L 49 mm, W 22.4 mm) with slightly ?waisted sides and ?rounded end which appears to have a 4.5mm-wide rivet shaft *c.* 12mm below edge = upright. Others might be parts of hoops (incl. one L 35.2 mm, W 14.7 mm), although no curvature discernible. Wt 1 g

ON 17: Copper alloy buckle, below (E) of left elbow, 'beneath ribcage', pin pointing SSW, plate NNE. High oblong oval buckle (L 7.3 mm, W 17.8 mm with recessed axis and small, plain folded rectangular plate (L 21.7 mm, W 13 mm); 2 small *endständige* domed rivets near corners of rear edge of buckle plate. Base of pin flattened. Front and back of plate with longitudinal filing/smoothing marks; edges of plate and rivet heads show hardly any use, pin has 1.7 mm-wide polished zone right in front of inside of buckle where belt strap would have been held
Organic remains in between plate halves, uncertain whether from belt strap material?
Marzinzik Typegroup II.24.b-i. Wt 4 g; L 28.2 mm, W 17.8 mm

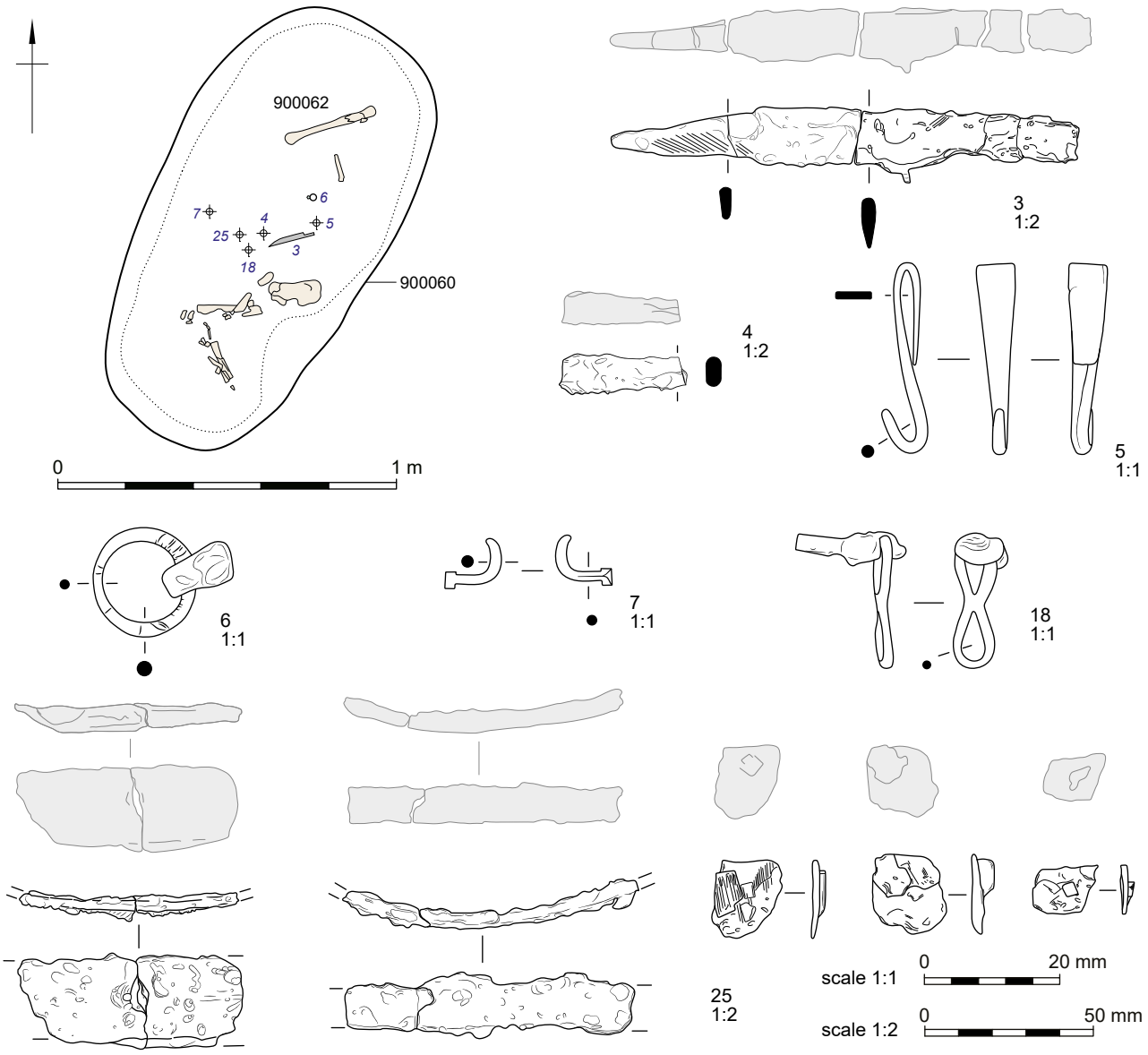


Figure 6.46 Grave 900060 with grave goods

Phase: Early–Middle Anglo-Saxon; 1413±21 BP – cal. AD 600–660 (SUERC-126510); *cal. AD 635–655 (68% probability)*

Grave 900067 (burial 900068)

(Fig. 6.50)

SE–NW; sub-oval/irregular, shallow concave sides, flat base; 1.6 x 0.56 m, 0.15 m deep (base at 88.57 m OD); fill 900069; skull and feet truncated by ploughing

Human bone: supine, extended with both upper limbs flexed at elbows and directed to the E or R side of body; 60% a.u.l.; adult 40–50 yr, ??female

Grave goods:

ON 16: Iron knife, above (S of) l ulna. Tip pointing (WSW) to elbow, edge SSE. Blade (L 55.6 mm), triangular tang (L 41.5 mm) with remains of ?wooden handle, joins blade below cutting edge, distinct deep concave shoulder to straight back, in last quarter of blade back angled down in straight line to tip (broken off but present) in line with straight cutting edge. Blade with remains of ?leather sheath? A circular-sectioned protrusion on the back just below the shoulder is likely to be an artefact of corrosion
Drinkall E1. Evison 5. Blakelock & McDonnell A. Böhner C. Wt 21 g; L 97.1 mm, W 17.8 mm

Residual finds: 15 sherds of pottery (prehistoric), CBM and prehistoric flint

Phase: Early–Middle Anglo-Saxon; 1446±24 BP – cal. AD 580–650 (SUERC-126511); *cal. AD 635–655 (68% probability)*

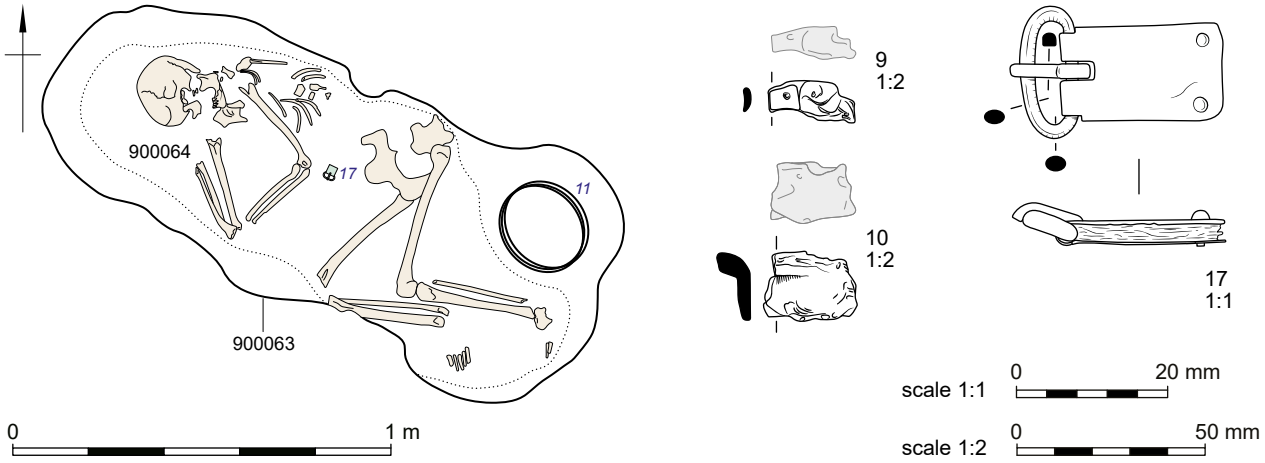


Figure 6.47 Grave 900063 with grave goods

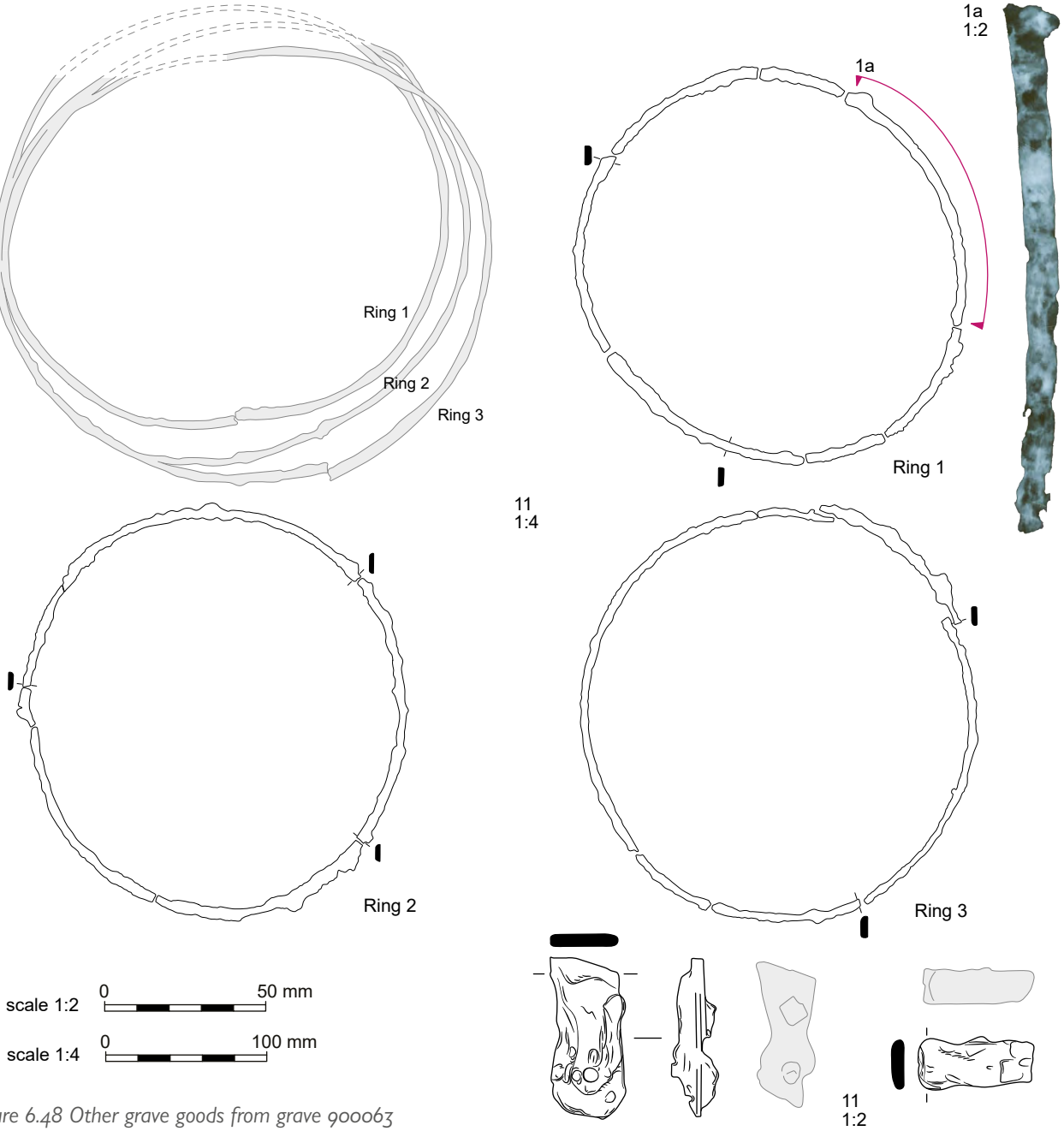


Figure 6.48 Other grave goods from grave 900063



Figure 6.49 Burial 900064 (grave 900063), view from south-east (1 m scale)

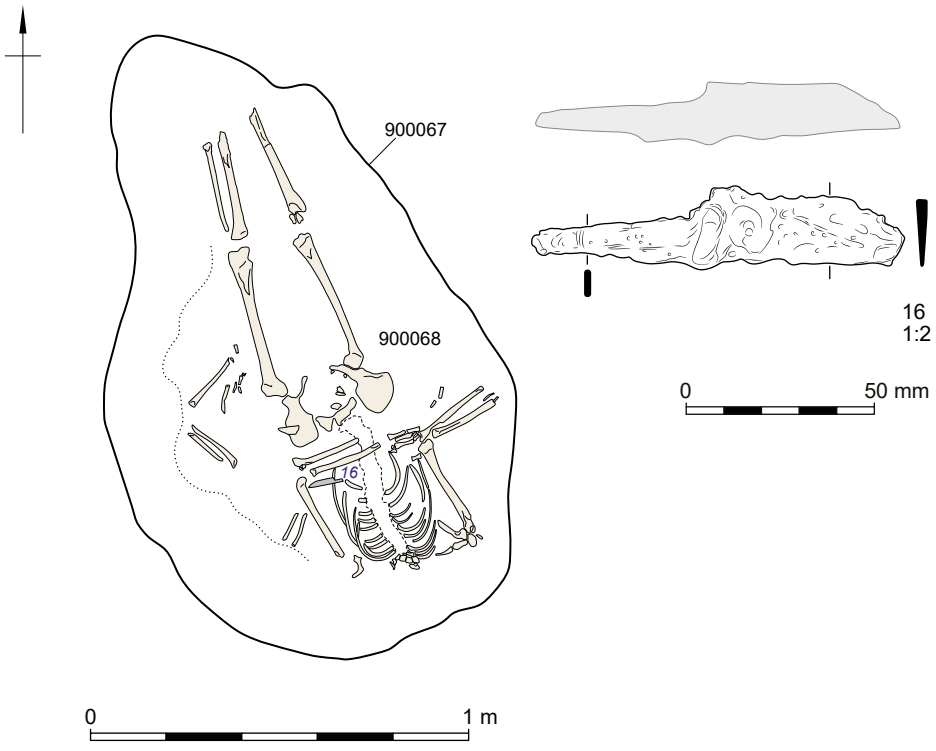


Figure 6.50 Grave 900067 with grave goods

Grave 900070 (burial 900071)

(Figs 6.51–2)

WNW–ESE; sub-oval, more rounded at foot end, concave shallow sides, flat base; 1.67 x 0.76 m, 0.20 m deep (base at 88.47 m OD); fill 900072

Human bone: flexed to the left, both hands in front of face; 55%; adult 40+ yr, ?male

Grave goods:

ON 8: Copper alloy strip, *c.* 400 mm N and outside of grave cut. Fragment with 'U'-shaped profile, irregularly bent and torn in places. No visible rivet holes. ?bucket rim? See Cook 2004; rims mostly held in place by riveted 'U'-shaped clips. Wt 6 g; L >77.5 mm, W 8.8–11 mm

ON 23: Iron knife, in front (N) of chest, E of r elbow; tip WNW (to head), edge SSW (to abdomen). Trapezoidal whittle tang, small choil (x-radiograph suggests none) and pronounced shoulder to straight back which curves down to tip in line with cutting edge. X-radiograph shows distinct weld line between (?steel) edge and back in midline of blade (L 69 mm, W 16.2 mm) and tang. MPOR of wooden handle and leather sheath
Drinkall D1. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 17 g; L 101.5 mm, W 16.2 mm

ON 24: Iron implement handle, in front/right of chest above middle of r humerus. Handle (for toilet implement?)? round-sectioned shaft and wider, flat oval head (possibly remains of suspension wire visible in x-radiograph; uncertain whether end bent into loop or flattened head perforated). Tip missing. Wt 1 g; L >21.7 mm, W 5.6 mm

ON 26: Copper alloy stud, between N edge of grave cut and NE of r elbow. Bag (?box) elements
Composite stud with domed head (L 5.4mm) made of circular sheet; round wire shaft with integral flat circular head soldered into head with ?lead solder, head visible at apex of dome, which is open, wire shaft tip missing. MPOR on inside of head (?leather). Wt 1 g; L 17.9 mm, W 9.8–10.2 mm

ON 27: Copper alloy clasp, between N edge of grave cut and NE of r elbow. Bag (?box) elements
a) Catch with 2 circular ends joined by a flat 'D'-sectioned bar, decorated with transverse corbelling; one end with large flat-headed rivet and washer, the other with a parallel-sided notch with rounded end at the centre
b) Flat-headed tack with tip of circular-sectioned shaft bent in a right turn; MPOR adhering to area between head and tip
Set with ON 30. Wt 2 g; L 23 mm, W 6.67 mm

ON 29*: Worked flint. Broken blade. Patinated white

ON 30: Copper alloy clasp, between N edge of grave cut and NE of r elbow. Bag (?box) elements
a) Catch with 2 circular ends joined by a flat 'D'-sectioned bar, decorated with transverse corbelling; one end with large flat-headed rivet and washer (D 4.5 mm), the other with a parallel-sided notch with rounded end at the centre
b) Flat-headed rivet with flat tip of circular-sectioned slightly burred (to hold) octagonal washer (D 6.4 mm); MPOR (?leather) collected separately
Set with ON 27. Wt 1 g

ON 57: Iron buckle, in front (N) of body in area between abdomen, between ribcage and pelvis. Pin pointing r to abdomen (SSW). Small square plate (L 28.65 mm, W 22.8 mm) and (now fragmented) oblong oval buckle. Three rivets set along the rear edge of the folded plate
Marzinzik type II.24a. Høilund Nielsen BU7. Wt 9 g, W >26.9 mm

ON 62: Copper alloy lace tag/aglet, *c.* 100 mm from S edge of grave cut, between distal end of r tibia and ON 67, in area where feet would have been. Separate front and back plates with rounded tip, waisted middle and circular rivet near straight rear end; front plate with smoothed (?bevelled) edges, tip and end slightly flatter. Back plate rear end broken before rivet hole, but present
A set with ON 67. Wt 1 g; L 26.6 mm

ON 67: Copper alloy lace tag/aglet, *c.* 150mm from SE corner, in area where feet would have been. Separate front and back plates with rounded tip, waisted middle and circular rivet near straight rear end; front plate with smoothed (?bevelled) edges
A set with ON 62. Wt 1 g; L 27.3 mm, W 3.87 mm, T 2.43 mm

ON 70: Copper alloy stud, between N edge of grave cut and E of r elbow, *c.* 100mm SSE of ON 27. Bag (?box) elements
Composite stud with domed head (H 4.2 mm) made of circular sheet with seam visible; round wire shaft with integral flat circular head soldered into head with ?lead solder (imprint of shaft head preserved), shaft tip bent at right angle. Wt 1 g; L 17.9 mm, W 9.8–10.2 mm

ON 75: Copper alloy strap loop, E of r elbow. Below (S) of cutting edge of knife ON 23. Oblong oval plates, with 2 circular rivets in centre line, joined by 'D'-sectioned 'U'-bent loop. Includes large fragment of ?leather strap. ?Part of sheath? Wt 2 g; L 20.6 mm, W 5.8 mm, T 6.1 mm

Residual finds: 1 iron object and 1 animal bone

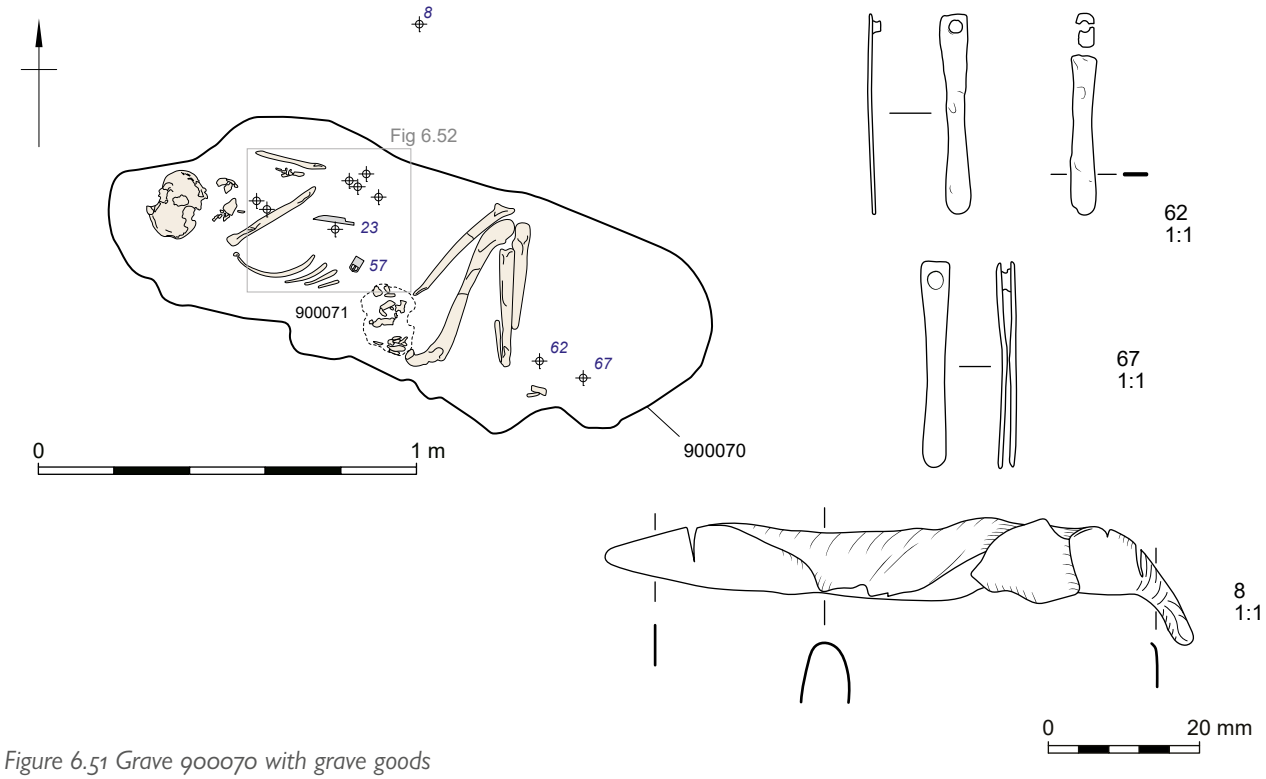


Figure 6.51 Grave 900070 with grave goods

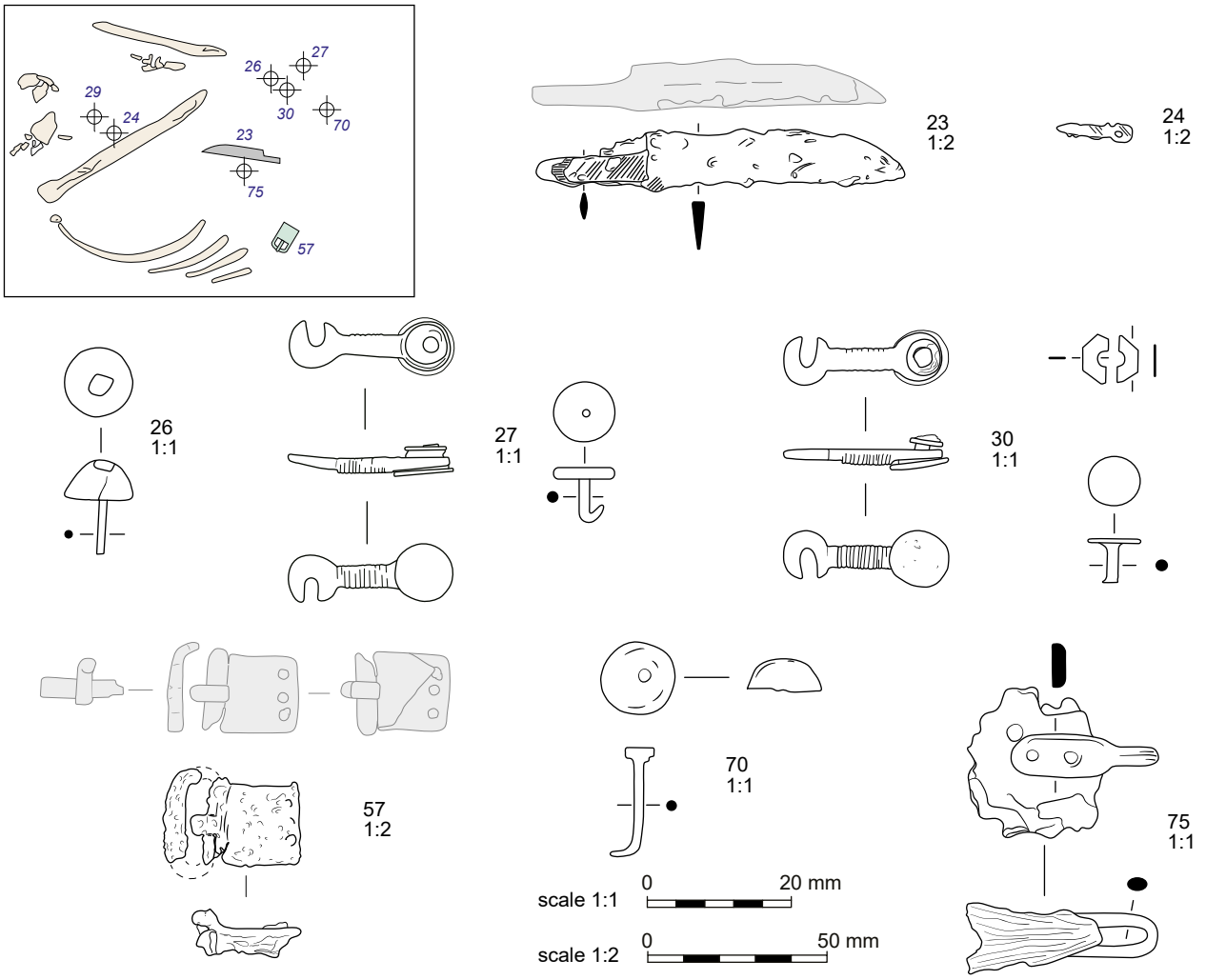


Figure 6.52 Other grave goods from grave 900070



Figure 6.53 Burial 900080 (grave 900079), view from south-west (0.5 m scale)

Grave 900079 (burial 900080)
(Figs 6.53–5)
NE–SW; subrectangular, rounded ends, steep straight sides, flat base; 1.68 x 0.6 m, 0.3 m deep (base at 88.35 m OD); fill 900081

Human bone: flexed on the right side, with arms crossed across the chest and abdomen; 80%; adult 20–30 yr, ?female

Grave goods:

ON 31: Fired clay spindlewhorl, S of left elbow and W of E edge of cut; N of ON 39. Plano-convex, with tightly spaced concentric lines around central hole (D 7.6–8 mm) covering entire surface. Grey (reduced) fabric, one third of edge damaged. Wt >31.7 g; D 42.5 mm, T 16.8 mm

ON 32: Copper alloy brooch, in upper-right chest area, below right clavicle and jaw. Opening to jaw (NNE), pin to SSE. Round-sectioned hoop and flattened ends spirally curled up onto the hoop in 1.5 turns. With the ends down, there is a group of 4 transverse lines on the right, starting *c.* 3.8 mm from the end; others might have been present but obscured by or lost through corrosion. The right side of the hoop has a pronounced seam from smithing. Circular-sectioned pin (L 29.7 mm) with flattened, curled socket; moves freely; area at 10 o'clock might have been 'pin rest'
Fowler type C. Høilund Nielsen type Br3-f. Booth type C. Wt 1.691 g; D 23.3–24.3 mm

ON 39: Iron knife, S of left elbow and W of E edge of cut; S of ON 31. Tip ESE, edge NNE. Slender triangular whittle tang, flat concave choil and straight shoulder at *c.* 60° angle (would have been entirely covered by wooden handle, which extends onto blade by another 5mm from top of shoulder near back. Edge and back parallel, back gently curving down to tip in line with edge. Very clear line between handle (tang L 46.5mm), with longitudinal wooden structure preserved, and less clear remains of sheath
Drinkall D1. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 19 g; L 116.5 mm, W 16.8 mm

ON 54: Iron bucket parts, next to (SW of) toes of left foot. Collection of iron fragments, possibly at least 3 objects or elements of a vessel
1) Bent rod with oval or flat cross-section (L 66.2 mm, W 6.5 mm). ?Vessel handle?
2) Rod (L >37 mm) with looped terminal bent at *c.* 70° and attached to broken ring (D 12.3 mm)
3) Straight, round-sectioned rod fragment, both ends broken (L >50.2 mm)
4) Flat bracket with short (broken) ends bent at right angles (L 27.4 mm, W 6.7 mm). Remains of wood grain with vessels aligned orthogonal to main bar
5) Rectangular, folded clip with two rivets in centre line. Remains of wood with vessels broken radially in between folded plates. (L 19.6 mm, W 15.8 mm)
Plus 5 fragments, one flat fragment with transverse wood remains. Wt 16 g

ON 59.1: Fired clay spindlewhorl, above l knee and middle of r femur, next to (W) of ON 60. Plano-convex, with tightly spaced concentric lines around central hole (D 7.6–9.8 mm) covering convex surface. Grey (reduced) fabric, only half of whorl preserved, plus small spall that fits break near hole on convex side. Wt >16.75 g; D 36 mm, T 18.1 mm

ON 59.2: Fired clay spindlewhorl, above l knee and middle of r femur, next to (W) of ON 60. Probably two flat surfaces with convex sides which are covered in concentric lines, entire surface crackled. Central hole D >6.4 mm, Wt >3.67 g; D >23.1 mm, T 10.6 mm

ON 59.3*: Stone 'pebble', above l knee and middle of r femur, next to (W) of ON 60 ?loesskindel/ clay concretion, triangular shape. Natural. Wt 0.7 g; L 16.9 mm, W 9.9 mm

ON 60: Worked bone spindlewhorl, above l knee and middle of r femur, next to (E) of ON 59. Probably originally plano-convex; entire surface affected by acidic leaching, especially the flat side, which now appears irregular concave. Central hole diam. 10.7 mm. Cattle femoral head. Wt >6.5 g; D 32.8–34.5 mm, T 14 mm

ON 69: Copper alloy buckle, at hip (behind back) above left side of pelvis. Vertical, plate towards ground, frame folded back, alignment ESE/WNW, pin would point to r. Oval buckle with recessed axis and small folded rectangular plate (L 17.9 mm, W 11 mm); 2 rivets at corners near base, the upper one (with buckle facing left) still holding dome-headed rivet, only the shaft remaining in the lower. The front of the plate is decorated (see also ON 53) with faint incised lines forming a 2.2 mm-wide band of cross-hatched lines set 1.5 mm from the edge and a 2.3 mm-wide cross-hatched field *c.* 4.3 mm behind the square base of gap for the 9.1mm-long pin. Pin and open loop (L 11.6 mm, W 15.5 mm) move freely
Marzinzik Typegroup II.24.b-i. Wt 2 g; L 23.4 mm, W 15.5 mm

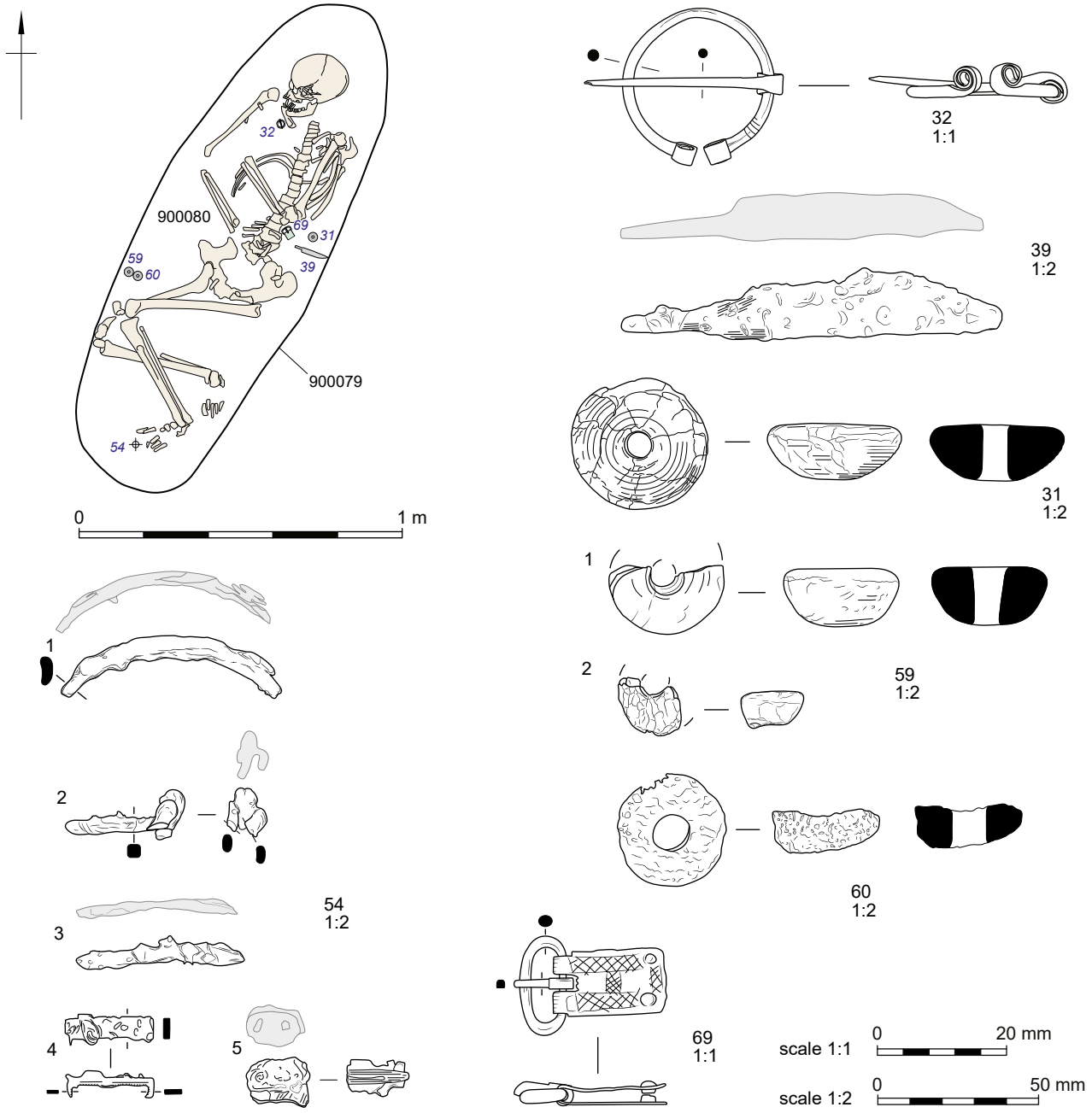


Figure 6.54 Grave 900079 with grave goods



Figure 6.55 Detail of spindlewhorl ON 31, knife ON 39 and buckle ON 69 in situ in grave 900079 (0.08 m scale)

Grave 900085 (burial 900122)
(Figs 6.56–8)
N–S; sub-oval, steep straight sides, flat base; 1.67 x 1.01 m, 0.3 m deep (base at 88.35 m OD); fill 900086. Buried with box near feet

Human bone: loosely flexed, almost extended inhumation, tilted on L side away from box; 40%; adult 22–32 yr, ??female

Grave goods:

ON 14: Iron finger-ring, in grave fill. Circular-sectioned hoop and oval bezel (W 11.6 mm) widening smoothly out of hoop (W 2.4 mm). Only half of hoop and bezel are preserved. Wt 2 g; D 23.9 mm

ON 38: Iron strip, between W edge of grave and l (W) of proximal end of r femur. Prob. part of box: Strip fragment. Longitudinal wood grain along long axis. Both ends broken. Wt 2 g; L 27 mm, W 11.3–12.5 mm

ON 42: Copper alloy lace tag/aglet, left (W) of right fibula distal end. Tongue shaped, flat open socket with one tubular rivet, middle waisted and square sectioned and faceted, tip flat and wider, corners bevelled. Slight longitudinal curve from socket to tip. Topside has seam line along centre right, from being made like a cone type, but subsequently flattened
A set with ON 56. Wt 1 g; L 28.4 mm, W 1.9–3.2 mm, T 1.2–2.5 mm

ON 56: Copper alloy lace tag/aglet, r (E) of l tibia distal end.
Tongue shaped, flat open socket with one tubular rivet, middle waisted and square sectioned, tip flat and wider, corners cut to tongue shape. Slight longitudinal curve from socket to tip. Underside has seam line running obliquely top right to bottom left, from being made like a cone type, but subsequently flattened
A set with ON 42. Wt 1 g; L 27.5 mm, W 1.9–3.2 mm, T 0.6–2.5 mm

ON 63: Iron knife, between chest and left elbow, tip NW (to shoulder), edge SW. Triangular whittle tang (L 35.3 mm, W 11 mm) and rectangular choil and shoulder. Blade (L 81.1 mm) with straight back curving down to tip in line with straight edge. Tang with remains of wood ?wedge and horn handle, blade with remains of ?leather sheath. 7 fragments
Drinkall D1. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 13 g; L 116.4 mm, W 16 mm

ON 65: Copper alloy brooch, centrally in upper chest/neck area, 50mm below (S) of ON 68. Pin pointing EbS. Flattened ends curled up onto the irregularly circular-sectioned hoop (like Fowler type C), part of the hoop has a facet on the inner upper quarter. Both the flat oval-sectioned pin (L 24.1 mm, loop W 3.5 mm) and the half of the hoop towards the terminals have a pronounced groove visible on much of their undersides (from where the rod was forged out of sheet metal). The pin loop has two faint longitudinal lines visible on its lower surface (?worn away above and below?).
Høilund Nielsen BR3-f. Wt 2 g; D 21.2–21.6 mm

ON 68: Copper alloy linked pins, left neck area, below skull, 50 mm above (N) of ON 65. 1. pointing W, head 5 mm from mid-shaft of 2., which is pointing SW. Two pins with joining chain of 11 open 'S'-shaped figure-of-eight links, still attached to one pin; L of chain 69 mm. Both pins have flat upright circular heads with central hole and round-sectioned shaft:
1) Complete pin (L 42 mm, D 1.2 mm, head D 2.8 mm, hole D 1 mm)
2) Head broken across hole and tip missing (L 41.7 mm, D 1.2 mm, hole D 1.1 mm). Links L 6.9–8.6 mm
Høilund Nielsen PI2-a. Ross type LXIV.ii.d. Wt 10.6 g; L 42 mm

From area of box, to l (W) of r leg:

ON 15: Iron strip, part of box: Strip, flat rectangular with ?rivet in hole at on end (fits ON 20), both ends broken. This and ON 20 angled at 80°. Wood grain longitudinally along strip length on inside. Wt 2 g; L 22.8 mm, W 12.7 mm

ON 20: Iron strip, part of box: Strip, flat rectangular with ?rivet (head diam. 8.4 mm) in hole at rounded end, both ends broken. This and ON 15 angled at 80°. Wood grain longitudinally along strip length on inside. Wt 4 g; L 39.7 mm, W 12.8 mm

ON 21: Iron strip, part of box: Strip fragment, rectangular outline, both ends broken; one has a recessed step to base of a perforated flange, broken across hole (>4.2 mm). Other end is broken obliquely across a slot (W >4.9 mm) along centre line. Wt 6 g; L 44.9 mm, W 19.5 mm, T 3.6 mm

ON 22: Iron nail and rove, part of box: ?Rivet and rove or possible nail and washer. A second shaft fragment with ends continuing to give an 'S'-shape could indicate that it was a split-pin loop. Wood grain longitudinally along rove length on inside. Wt 3 g; L 20.2 mm, D 15.2 mm

ON 33: Iron strip, part of box: Short section of iron strip with round-section rivet at one end, extending 4.2 mm. Longitudinal wood grain along long axis. Wt 1 g; L 15.9 mm, W 12.8 mm

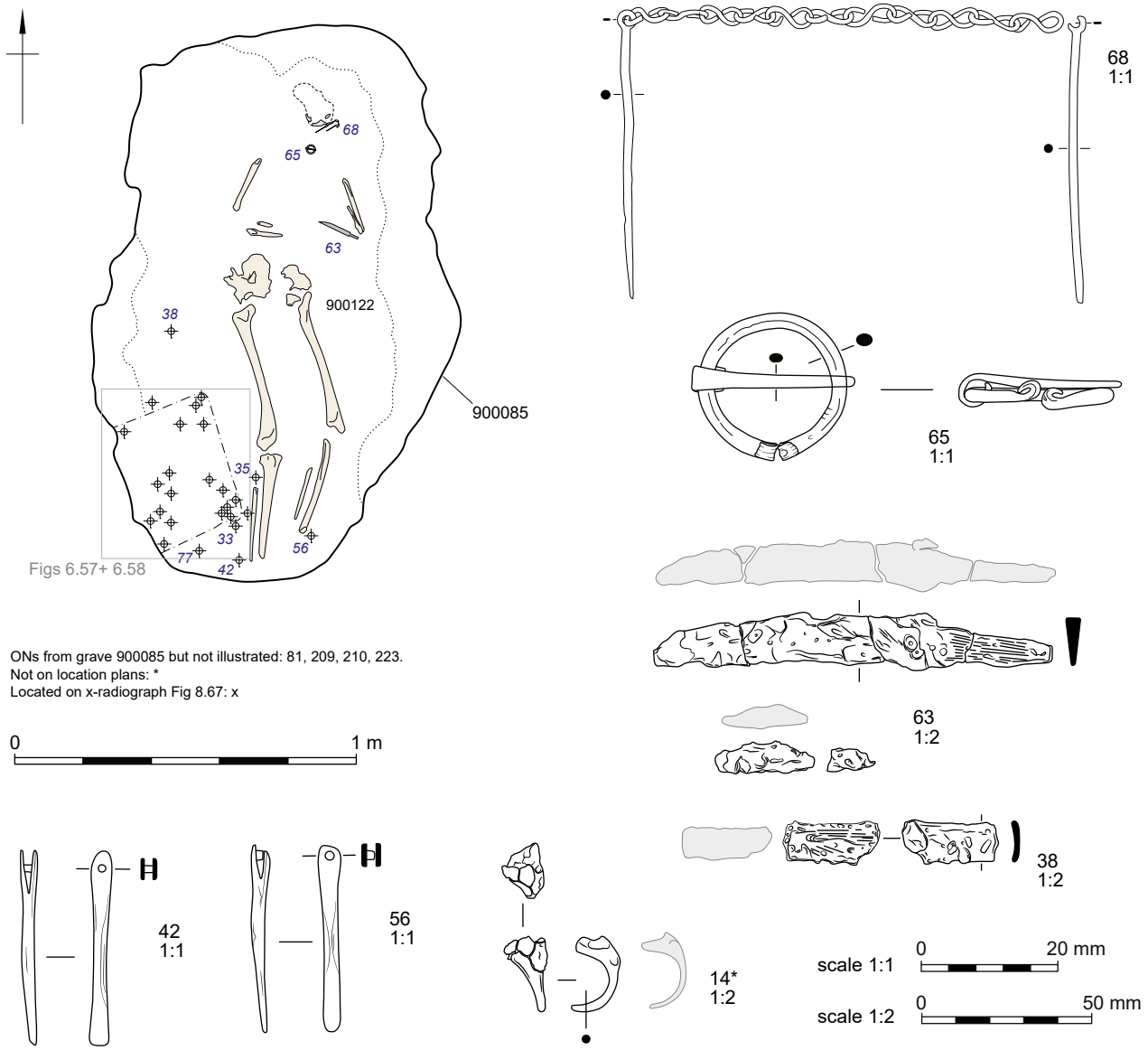


Figure 6.56 Grave 900085 with grave goods

ON 34: Iron strip, part of box: Short section of iron strip with square-section rivet at one end, extending 6.9 mm. Longitudinal wood grain along long axis one opposite side of rivet shaft/?head. Wt 4 g; L 29.3 mm, W 11.9–14.5 mm

ON 35: Iron strip, part of box: Short section of iron strip with square-section rivet in middle of one long side, extending 4.2 mm. Longitudinal wood grain along long axis. Wt 1 g

ON 36: Iron hinge, part of box: Quad 1, Spit 2 of micro-excavation of block from 900122
Loop hinge with narrow tip bent to form hooked oval loop orthogonal to plane of rectangular hinge plate with 1 ?nail extending 3.1mm from edge of plate. Inside with transverse alignment of longitudinal wood grain. Found vertically, with hooked loop facing into box. Wt 7 g; L 50.9 mm, W 12.8 mm

ON 37: Iron hinge, part of box: Quad 2, Spit 2 of micro-excavation of block from 900122. 2 fragments.
1) Loop hinge with tip bent to form tight circular loop in plane of hinge plate with 2 nails, lower nail extending 14 mm, loop bent outwards by *c.* 30°. Inside with transverse alignment of longitudinal wood grain
2) Strip/bracket with nail in straight end, broken across outer end which was bent at ?right angles. Wood grain longitudinal to length of strip (L 33.6 mm, W 12.7 mm). Wt 15 g; L 48.2 mm, W 17.8 mm

ON 40: Iron strip, part of box: Strip fragment with square-sectioned nail shaft extending both sides (4.5 mm and 17.7 mm). Wood grain on longer side running orthogonal to strip axis. Wt 4 g; L 19.8 mm, W 13.6 mm

ON 41: Iron hinge, part of box: Quad 3, Spit 2 of micro-excavation of block from 900122
Loop hinge with tip bent to form drop-shape loop in plane of hinge plate with 2 nails. Wt 12 g; L 59.7 mm, W 17.3 mm

ON 47: Iron corner bracket, from area of box, to l (W) of r leg, near W edge. Part of box: Corner bracket with circular-sectioned nail shaft extending 5.7 mm from straight end, broken across bend; subsquare-sectioned nail shaft fragment in other end. Two broken parts fit at angle of *c.* 75°.
Wood grain across shafts and back of strip in line with longitudinal axis of strip. Wt 6.92 g; L 46.3 mm, W 11.6–11.9 mm

ON 48: Iron nail? from area of box, to l (W) of r leg. Prob. part of box: Nail shaft, bent at right angles and tip bent inwards at *c.* 25°. Wood grain orthogonal to shaft axis. Wt 3 g; L 25.3 mm, D 23.4 mm

ON 50: Iron corner bracket, from area of box, to l (W) of r leg. Part of box: Corner bracket with rectangular-sectioned nail shaft extending 3.6 mm from rounded end, broken across bend; square-sectioned nail shaft fragment in other end. Two broken parts fit at angle of *c.* 75°. Wood grain across shaft in line with longitudinal axis of strip. Wt 5 g; L 51.3 mm, W 11.9 mm

ON 55: Iron binding strip, from area of box, to l (W) of r leg. Part of box: Quad 3, Spit 2 of micro-excavation of block from 900122. 2 fragments. Rectangular binding strip with rectangular-sectioned nail shaft extending from one end by 13 mm, other end has fragment of pear-shape-sectioned shaft/strip extending for 2.6 mm. Wt 3 g; L 36.8 mm, W 12.3 mm

ON 76: Iron looped pins, from area of box, to l (W) of r leg. Part of box?: 5 fragments from at least two looped pins (L >24.5 mm and 23.6 mm), both looped heads have fragments of rods through them. ?Hinge loops for lid handle? Wt 10 g

From area of box, to l (W) of r leg. Inside box

ON 77: Copper alloy strip loop, from area of box, to l (W) of r leg, poss. outside SE side of box. If inside box, from ?bag/pouch?: Strip loop with overlapping, originally riveted ends, rivet holes not aligned to corrosion pattern. Strip (W. 4.8–4.9 mm, T 0.5–0.6 mm). Smaller loop (D 9.6 mm, W 6.4 mm) had possibly been attached at junction. A second, broken loop (D 8.6 mm, W 6.1 mm) still attached on opposite side of oval loop, part of underlapping end visible on inside of loop. MPOR found with object. Wt 2 g; L 27.9 mm, D 24.5 mm

ON 78: Copper alloy fitting, from ?bag/pouch?: Rim clip made of a U-bent sheet, both long sides with 3 irregular tongue-shaped vandykes, all with perforation near the outer end (D c. 2.2 mm), rivet head still present on outer left vandyke; the ends of the outer vandykes on the inside both broken across the rivet holes. The rounded rim of the bend is curved on a circle of *c.* 300 mm radius. MPOR of ?leather preserved in between, but now loose. Wt 2 g; L 17.8 mm, W 25.3 mm

ON 79: Silver/?leather half loop strip ?amulet or fitting from ?bag/pouch?: Silver fitting with Cu alloy rivet, consisting of 2 half loops (L 10 mm and 8.3 mm, W 3.9 mm and 3.4 mm, T 0.4 mm and 0.3 mm) joined in 'L'-shape, with circular ?leather washer held by rivet; another ?leather fragment has imprint of Cu alloy rivet head near middle of what now looks like a half-circle fragment. Additional leather fragments, one with fly pupa case. Wt 1 g

ON 80: Iron corner bracket: Corner bracket with rectangular-sectioned nail shaft extending 6.3 mm from rounded end, other end broken across bend. Wood grain across shaft in line with longitudinal axis of strip. 3 fragments. Wt 3 g; L 37.6 mm, W 15.4 mm

ON 81*: Wood, unidentified object. Fragments of mineralised wood and soil matrix. Wt 6 g

ON 193 Copper alloy/leather fragments: collection of fragments, from ?bag/pouch?
1) Flat pentagonal-shaped sheet with irregular broken edges, base with possible square recess/hole in middle. Sheet 2 probably joins 1 at top of triangular side. L 28 mm, W 15.4 mm
2) Trapezoidal sheet fragment, might join 1 at narrowest side. L 14.7 mm, W 15.2 mm, T 0.3 mm
3) Folded tongue-shaped clip, tubular rivet through perforation near end, sheet at opposite side broken and missing; rivet (L 5.2 mm, D 2 mm) still surrounded by MPO leather remains. L 11.1 mm, W 5.8 mm
4) Tubular rivet. L 8.4 mm, D 1.7 mm
5) Staple fragment, bridge and part of one branch remaining. L 13 mm, H 4.8 mm, T 1 mm
6) ?Leather strip fragment. L 21.8 mm, W 5.6 mm, T 2.3 mm
7) ?Leather strip, 2 joining fragments. L 25 mm, W 6.2 mm, T 2.1 mm. Plus additional small leather and sheet fragments. Wt 6 g

ON 202: Fired clay spindlewhorl, plano-convex, with tightly spaced concentric lines around central hole (D 7.9–8.3 mm) covering entire top and part of hemispherical surface. Grey (reduced) fabric, 3/4 of convex area has lost surface. Inside box: Quad 2, Spit 5. Wt 24 g; D 35.4–36 mm, T 17.1 mm

ON 203: Fired clay spindlewhorl, plano-convex, with tightly spaced concentric lines around central hole (diam. 7.1–7.3 mm) covering only small part of convex surface, other areas appear intentionally smooth. Grey (reduced) fabric, more than 2/3 of convex area smooth/uneven but has not necessarily lost surface. Inside box: Quad 2, Spit 5. Wt 12 g; Diam. 30 mm, T 15 mm

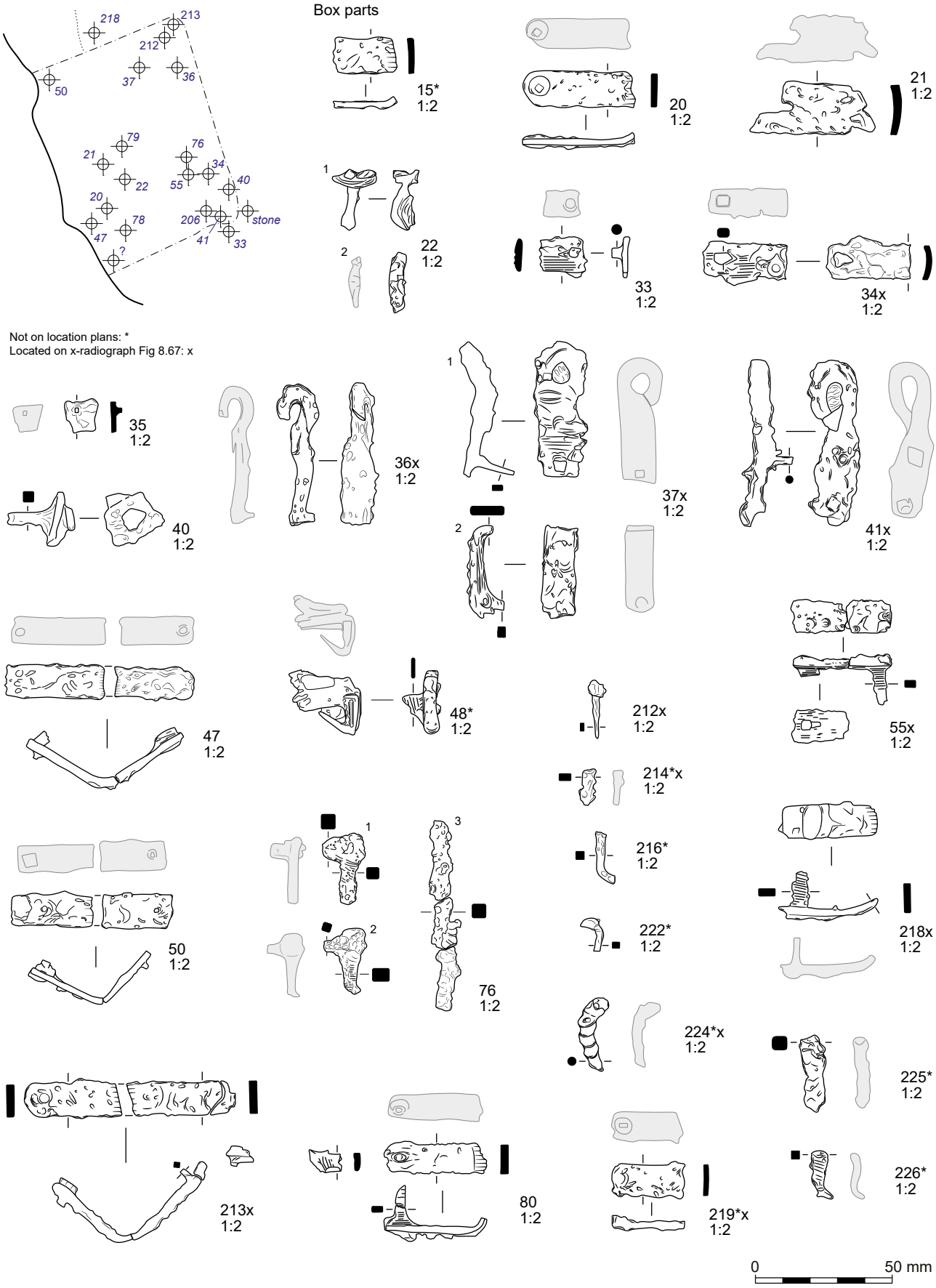


Figure 6.57 Other grave goods from grave 900085 (1)

ON 204: Silver/wood/?leather strip: Quad 4, Spit 4
1) Strip fragment with toothed long edges and arched cross-section. Wt 1 g; L 7.7 mm, W 3 mm, T 0.3 mm
2) Wood fragment (L 18.6 mm)
3) 5 fragments of ?leather with adhering soil

ON 205: Copper alloy wire: Quad 1, Spit 5; also scraps of organic material. Wire with narrower wire wound around (8.5 turns) one end, possibly creating a now broken loop? Tip of implement handle with loop for suspension? Wt 1 g; L 22.1 mm, W 4 mm, T 1.4 mm

ON 206: Copper alloy strip: Quad 4, Spit 4; copper alloy ribbons and associated organic remains. Strip fragments, the longest 3 conjoining form a U-bend, all with ring-and-dot punch decoration longitudinally along centre line; the largest fragment is bent at right angles with downward-facing end turned back out and up to form pinched hook. Another 3 fragments have fragmented holes, 2 of which still have tubular rivets in holes or associated with them. Numerous smaller fragments. 2 large wood fragments with longitudinal grain structure and some Cu alloy strip fragments adhering; both fragments also with imprints of metal strips (1: *c.* 40 x 22 mm with 15 x 3 mm woven textile; 2: 33 x 7–12 mm). Wt 3.7 g; D 9 mm

ON 207: Iron scrap: Quad 1, Spit 1; also scraps of mineralised wood. Angled fragment, one end more rectangular-sectioned, the other rounder. Wt 1 g; L 13.2 mm

ON 208: Iron nail: Quad 1, Spit 1. Nail with rectangular-sectioned shaft. Wood grain across shaft. Wt 1 g; L 14.2 mm

ON 209*: Iron scrap: Quad 1, Spit 1; scraps. Wt 1 g

ON 210*: Iron scrap: Quad 1, Spit 1; scraps. Wt 1 g

ON 212: Iron nail, part of box: Quad 1, Spit 4. Square-sectioned shaft and club-shaped head (appears like a Z-bent wire in x-radiograph). Wt 1 g; L 20.5 mm

ON 213: Iron corner bracket, part of box: Quad 1; Spit 5. Corner bracket, angled at 70°, both ends ? Rounded and with rectangular-sectioned nail shaft bases. Broken in half and on tip disintegrated but joining fragments. Wood grain direction longitudinal to long axis of bracket. Wt 6 g; L 33 mm, W 12 mm

ON 214 Iron nail, Quad 1, Spit 5. Nail shaft with square-sectioned shaft and wood grain across. Wt 1 g; L 12.8 mm

ON 216: Iron nail, part of box: Quad 2, Spit 2. Nail with square-sectioned shaft, L-bent and tip missing. Wood grain across. Wt 1 g; L 20 mm

ON 217: Copper alloy spindle hook: Quad 2, Spit 5. Spindle hook made of sheet metal folded to form square-sectioned shaft (folding seam still visible), hooked top has circular cross-section. Tapering to obliquely angled tip. Wt 1 g; L 17.8 mm, W 1.1–1.4 mm

ON 218: Iron strip, part of box: Quad 2, Spit 5. Rectangular strip, both ends broken, one with flat rectangular-sectioned nail shaft extending 12.4 mm with longitudinal wood grain across shaft in direction of long axis of plate. Other end has gentle inward bend. Wt 3 g; L 36.2 mm, W 11.8 mm

ON 219: Iron strip, part of box: Quad 2, Spit 5. Rectangular strip, both ends broken, one with nail shaft remains visible in x-radiograph. MPO wood grain but no indication of grain direction. Wt 2 g; L 26.2 mm, W 12.4 mm

ON 222: Iron nail/staple, part of box: Quad 3, Spit 2. Nail shaft with head at right angles/fragment of staple? Wt 1 g; L 12 mm, D 5.8 mm

ON 223*: Iron scrap: Quad 4; Spit 2. Wt 1 g

ON 224: Iron rod: Quad 4, Spit 4. Rod, circular-sectioned shaft with L-bent end. Wt 2 g; L 25.6 mm, W 5.8 mm

ON 225: Iron nail: Quad 4, Spit 5. Nail with square-sectioned shaft. Wt 1 g; L 27.2 mm

ON 226: Iron nail, part of box: fallen off surface during laboratory excavation. Nail with square-sectioned shaft and L-bent tip. Longitudinal wood grain across shaft. Wt 1 g; L 16.5 mm

ON 227*: Iron scrap, found sifting through soil afterwards. Wt 1 g; L 9.7 mm

Residual finds: 6 copper alloy pieces, 14 iron pieces and two silver pieces

Grave 900098 (burial 900100)

(Figs 6.59–60)

NNE–SSW; subrectangular, rounded head end, steep irregular sides, flat base; 1.74 x 0.87 m, 0.29 m deep (base at 88.35 m OD); fill 900099

Human bone: flexed on right side, L arm crossed over torso at waist, R arm loosely flexed with hand near knees; 80%; subadult 14–16 yr, male

Scientific analyses: DNA analysis, isotope analysis (Sr/O)

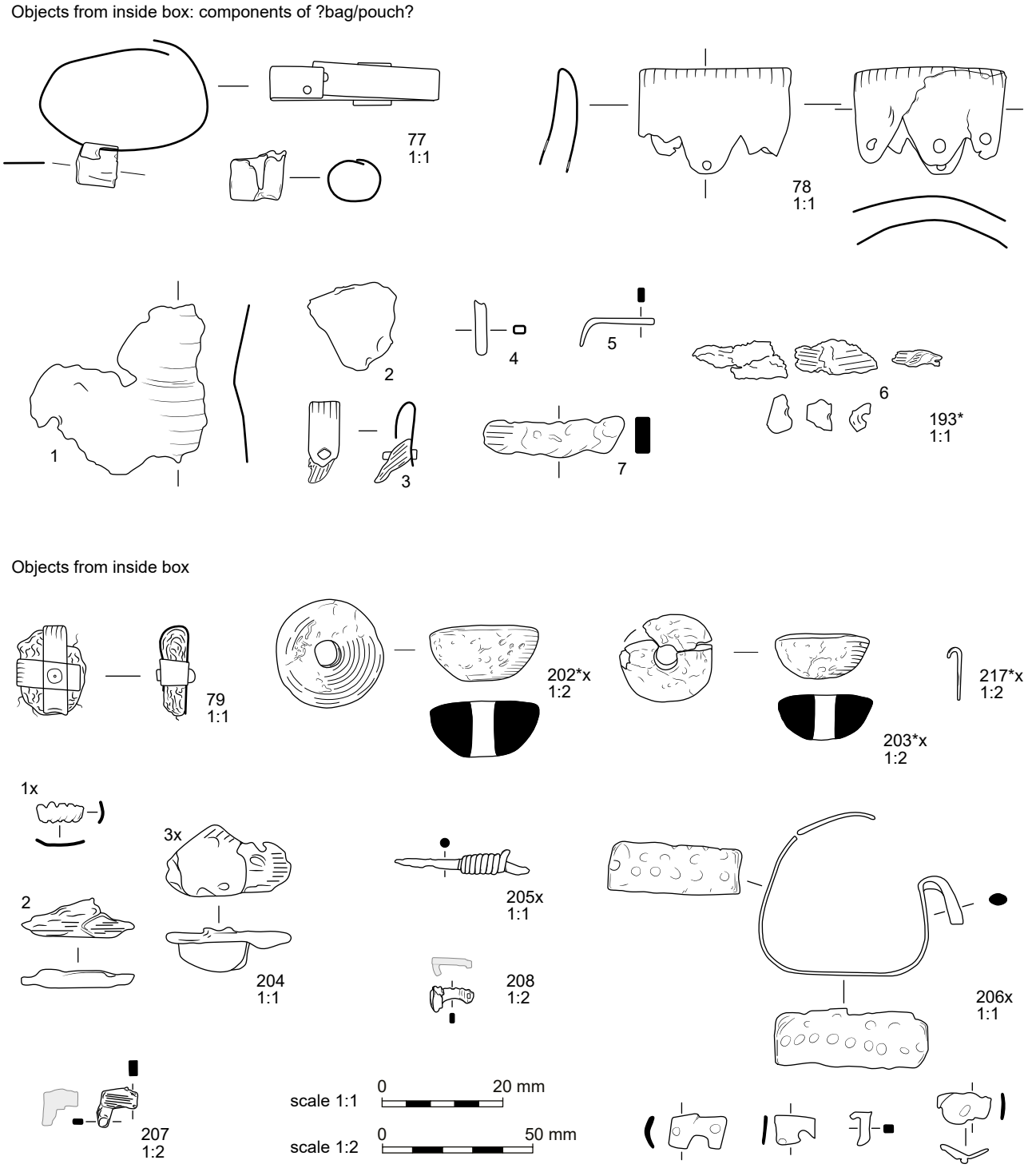


Figure 6.58 Other grave goods from grave 900085 (2)

Grave goods:

ON 43: Stone whetstone, *c.* 200 mm beyond (NE of) skull, between skull and NE edge of grave. Rectangular-sectioned; rounded trapezoidal in side view with smoothed edges, base slightly concave from use; both ends near base show scarring from use for ?pounding. Superficial crack around entire section on one corner, wider at top corner, but thinner elsewhere. ?Calcareous precipitate adhering to one side. Micaceous gritty stone (?Greywacke-grit?). Wt 340 g; L 137.1 mm, W 30.5 mm, T 40.7 mm. Fig. 8.65

ON 45: Iron rod, *c.* 150 mm W of crook of r arm. Fragment, uncertain cross-section (rectangular?); slightly curved, one end with fresh break (?could have fitted ON 49?), other slightly pointed. Wt 3 g; L 30.5 mm, W 6 mm, T 6.3 mm

ON 46: Iron strips and nail shafts, in middle/in front of abdomen NW of buckle ON 72. Description from x-radiograph: 3 flat strips (W. 3.6–3.7mm), one with rectangular-sectioned nail/rivet shafts either end, one (L 16.8 mm) slightly curved and at oblique angle, the other running at right angles to first. Wt 2 g; L >20 mm, W >21.4 mm

ON 49: Iron rod, *c.* 50 mm W of proximal end of r ulna. Fragment, uncertain cross-section (oval/rectangular?); curved at a radius of *c.* 75mm. One end with fresh break (??could have fitted ON 45?). Wt 12 g; L >101.5 mm, W 5.2–9.6 mm, T 5.5–6 mm

ON 51: Iron bracket, 120 mm W of middle of r humerus, N of ON 58. Flat rectangular cross-section, one in-turned arm preserved for *c.* 12 mm. All internal sides with mineralised wooden remains, grain running orthogonal to bracket; thicker, twig-like parts in lower corners. Wt 1 g; L 21.9 mm, W 6 mm, T 12.8 mm

ON 58: Iron bucket hoop, 120 mm W of middle of r humerus, S of ON 51. 6 fragments from large circular object/ring/hoop, all join. One area with curve up/down plane of hoop. Most of internal sides with mineralised wooden remains, grain running orthogonal to hoop, maintaining same direction in undulating part. Reconstructed D 170–180mm. Wt 80 g; D 180–185 mm, W 9.5–10.5 mm

ON 64: Iron seax, E of and parallel with r humerus. Tip off r pelvis, pointing SSE, edge ENE. Narrow blade with mineral replaced remains of ?leather sheath. Trapezoidal tang with clear remains of MPOR of horn handle, straight terminal to tang, no pommel; tang set in middle of blade with rectangular shoulder and choil. Parallel straight back and edge, back gently curving from last third to tip set up from edge *c.* 1/3 of blade width. Upper half of cutting edge has gentle concave curve. MPOR of leather/hide on blade
Høilund Nielsen type SX1a: Short/narrow seax. Wt 182 g; L 331 mm, W 29 mm; Blade L 241 mm, W 29 mm; Tang L 90 mm, W 11–19 mm

ON 72: Iron buckle, on area of missing lower ribcage and inside (W of) l humerus, pin pointing W. Oval buckle, with small folded plate (W 17.9 mm) whose sides might have been tapering towards back (now missing). Pin L 13.1 mm. Measurements taken from x-radiograph. Back appears to have mineralised ?wood all over, grain running longitudinally to direction of buckle/belt
Marzinzik ?Typegroup II.19 or II.24; Høilund Nielsen type ?Bu9. Wt 5 g; L >24.2 mm, W 24.6 mm



Figure 6.59 Burial 900100 (grave 900098), view from south-east (1 m scale)

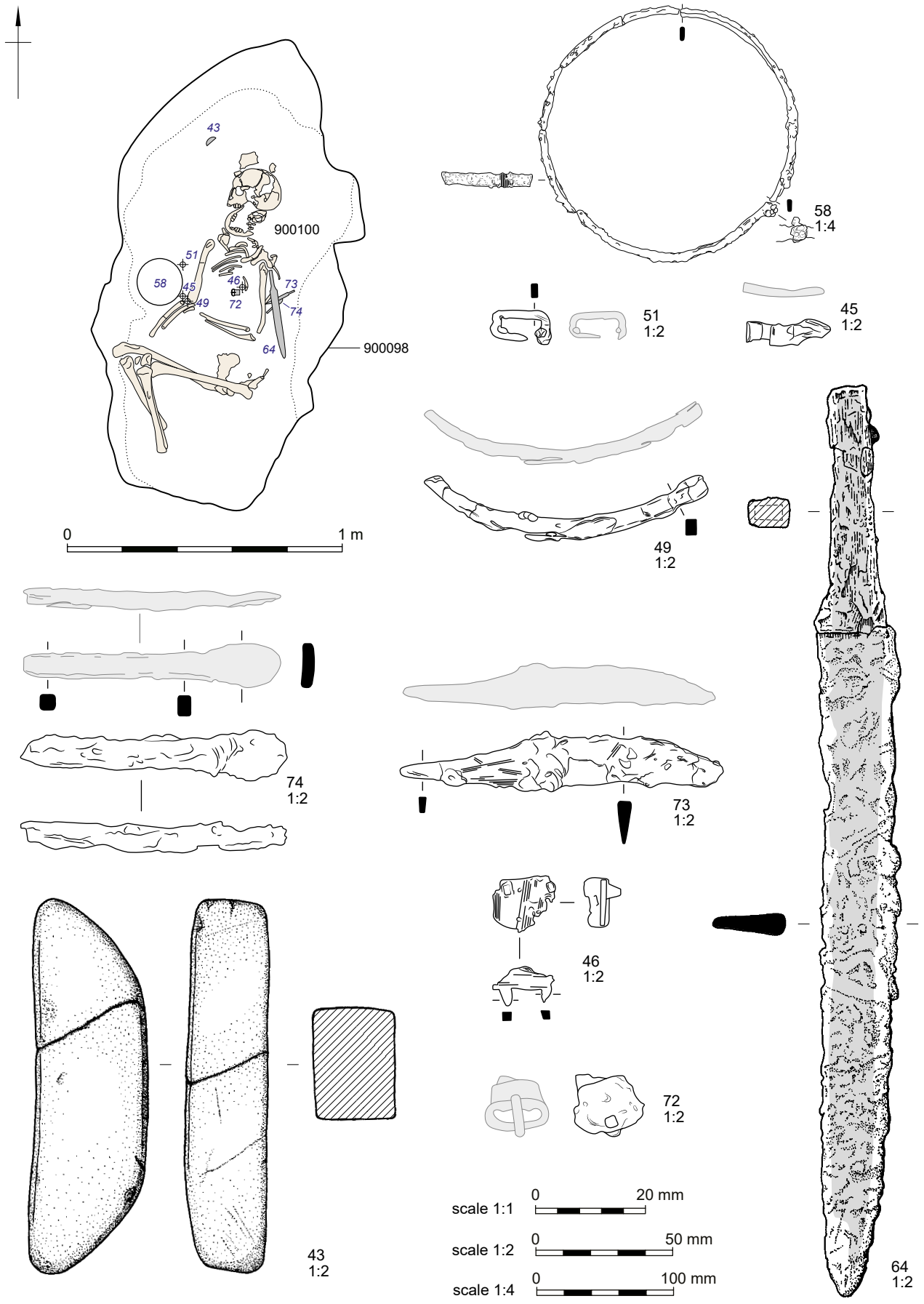


Figure 6.60 Grave 900098 with grave goods

ON 73: Iron knife, below and orthogonal to upper blade of seax ON 64 and N of spoon ON 74; tip pointing WbS, edge NbW, touching r humerus. Triangular whittle tang, set in middle of blade, flat choil and long shallow concave slope to rectangular shoulder, straight parallel edge and back, the latter curving down in last third to meet tip in line with edge. Blade covered in ?leather remains of sheath, tang with remains of ?horn handle
Drinkall D1. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 26 g; L 116.2 mm, W 18.6 mm

ON 74: Iron spoon, below upper blade of seax ON 64 and S of knife ON 73; bowl pointing WSW, touching r humerus. Ovoid-shaped slightly concave bowl (*c.* L 27mm, W *c.* 16mm) wider at the rounded tip, stem section near bowl rectangular, getting more square/oval higher up. Most of stem surface covered in MPOR (leather), possibly also on bowl. Tip of stem broken off and missing. Wt 17 g; L >95.1 mm, W 17.5 mm, T 10 mm

Phase: Failed radiocarbon date (GU67421)

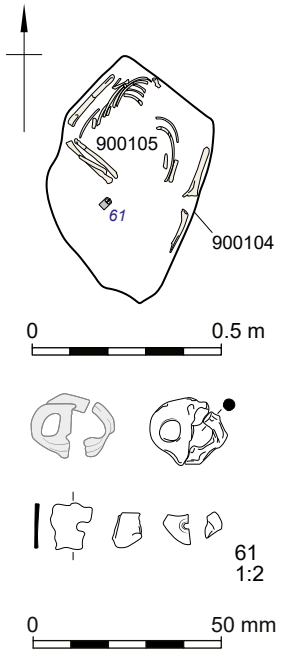


Figure 6.61 Grave 900104 with grave goods

Grave 900104 (burial 900105)

(Fig. 6.61)

N–S; unclear, 0.58 x 0.42 m, 0.05 m deep (base at 88.51 m OD); fill 900106. Grave truncates ring ditch 900066 and was truncated to the north by grave 900067 and to the south by grave 900114

Human bone: supine; 20% a.u.; juvenile/subadult >11.5–14.5 yr, female

Scientific analysis: DNA analysis, isotope analysis (Sr/O)

Grave goods:

ON 61: Iron buckle, ? in middle of missing lower abdomen, below (S) missing r wrist. Pin pointing NE, plate frags folded back, on top of buckle, i.e. outer edge also NE. 'D'-shaped frame and 4 fragments of folded ?rectangular plate
Marzinzik ?typegroup II.19 or II.24. Høilund Nielsen type ?Bu9. Wt 2 g, W 20.4 mm

Phase: Early Anglo-Saxon; 1525±21 BP – cal. AD 440–600 (SUERC-126516), *cal. AD 560–595 (68% probability)*

Grave 900114 (burial 900115)

(Figs 6.62–3)

NNE–SSW; sub-oval, steep straight sides, flat base; 1.6 x 0.7 m, 0.3 m deep (base at 88.52 m OD); fill 900116. Truncates grave 900104 to the north

Human bone: flexed to the right, hand crossed over right pelvis. Knees would have been up (propped by something?) and have slumped against side of grave; body slumped back into semi-supine position from original right side, head (& shoulders?) probably also resting on something (e.g., pillow) forcing head to slump forwards as it has; 90%; adult 50–60 yr, male

Scientific analyses: DNA analysis, isotope analysis (Sr/O, C/N)

Grave goods:

ON 53: Copper alloy buckle, at S end of grave, near comb, orientation ? Oval buckle with small, folded tongue-shaped (i.e. rounded edge opposite buckle) plate (L 21.9 mm, W 15.7 mm) and 1 ovoid-headed rivet near rear end of the plate. The front of the plate is decorated (see also ON 69) with faint incised lines forming a 2 mm-wide band of diagonal-hatched lines set 2 mm from the edge and a 3 mm-wide cross-hatched field *c.* 2 mm behind the double-forked base of gap for the 14 mm-long pin. Pin and open loop (L 11.2 mm, W 21.3 mm) move freely
Marzinzik type II.22a. Wt 2 g; L 30.9 mm, W 21.3 mm

ON 66: Iron handle, across r foot, curve towards ankle (WNW). Semi-circular handle with terminals looped sideways (Cook type c, but no twisting or widening/flattening in mid-section) forming open loops, both still with fragments of the extensions for suspension (Cook type II). The handle appears to have square to slightly rectangular cross-section (variation likely due to corrosion). Would fit vessel with diameter of *c.* 150 mm. Wt 35 g; L 161 mm, W 87.6 mm, T 5.6–6.9 mm

ON 71*: Iron knife, handle on r pelvis, tip missing but on upper r. femur, pointing WSW, edge SSE. Whittle tang, with parallel-sided blade. Not present in finds boxes; identified from photographs

Misc: Worked bone comb(s), at S end of grave, Misc#2 aligned NWbN/SEbS; Misc#1 ENE/WSW, ENE end near/touching r foot. Misc#2: Single-sided composite construction with two symmetrical curved side plates, the intact fragment has 3 iron rivets still in place, fixing ?3 tooth-plates (5 teeth/cm); 2 additional rivets among collection of degraded bone fragments. Surface completely degraded by pitted decomposition, obliterating any trace of decoration; only base of teeth remaining; no traces of cut marks on side plate visible, but they might have been obliterated

From the grave plan it appears the total length of the complete comb was >130 mm (measuring only 'Misc#2'; 'Misc#1' not shown, but probably second comb rather than part of Misc#2). Uncertain whether Misc#1 was single- or double-sided, but composite construction confirmed by 4 rivets visible in x-radiograph. Wt 15 g; L >72.4 mm, W >15.3 mm, T 16.8 mm

Iron nail, ? near skull? Nail shaft with ?'L'-shaped corrosion protrusion and tapering square-sectioned shaft (W below ?'L'-shaped corrosion protrusion 3.1–3.2 mm). Wt 1 g; L 26.2 mm, D 7.4 mm

Residual finds: 1 sherd of pottery (prehistoric), 3 iron pieces, and 124 pieces of animal bone

Figure 6.62 Grave 900114 with grave goods

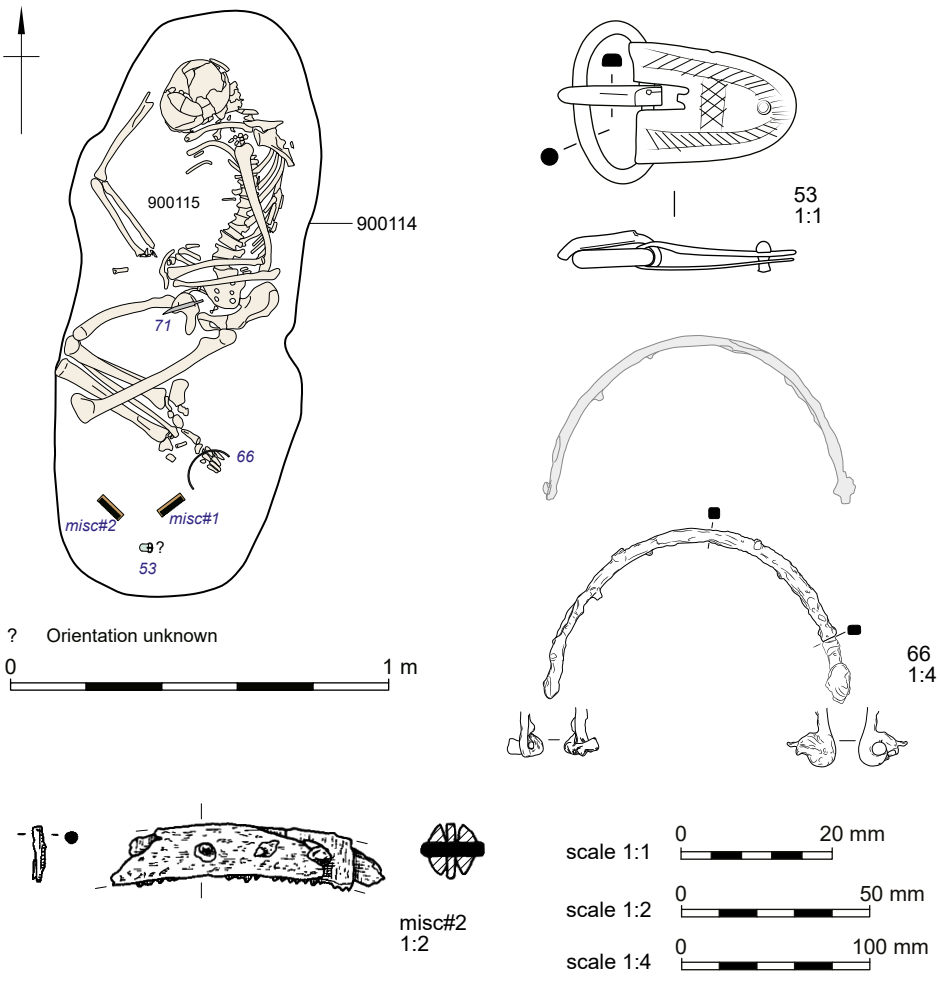




Figure 6.63 Burial 900115 (grave 900114), 1 m scale points to SSW

Grave 900131 (burial 900133)

(Figs 6.64–5)

NNE–SSW; oval, steep straight sides, flat base; 1.75 x 0.85 m, 0.15 m deep (base at 88.30 m OD); fill 900132

Human bone: flexed to the right, L arm flexed at elbow and overlaying abdomen at waist; R arm straight by side with hand beneath L knee; 85% adult 35–45 yr, male

Scientific analyses: isotope analysis (Sr/O)

Grave goods:

ON 82: Iron handle and fittings, near SW edge of grave cut, beyond lower legs. 14 fragments ?Bucket handle and suspension loops:
Two looped plates: 1) with pear-shaped loop and rectangular plate (visible in x-radiograph) with large fragment of wood, grain running orthogonal to plate; 2) with long open loop/hook and lozengiform plate which extends into rod-like end (broken off); 3–6) parts of handle for bucket with opening of *c.* 200 mm; D curved, round-sectioned rod, 1 element L 105 mm of 6 fragments, other L 122 mm of 3 fragments. Wt 48 g

ON 89: Copper alloy buckle, near and up from (NE of) r wrist, WNW of knife ON 90. Pin pointing N. 'D'-shaped, round-sectioned loop with folded rectangular plate (L 18.4–19.1 mm,

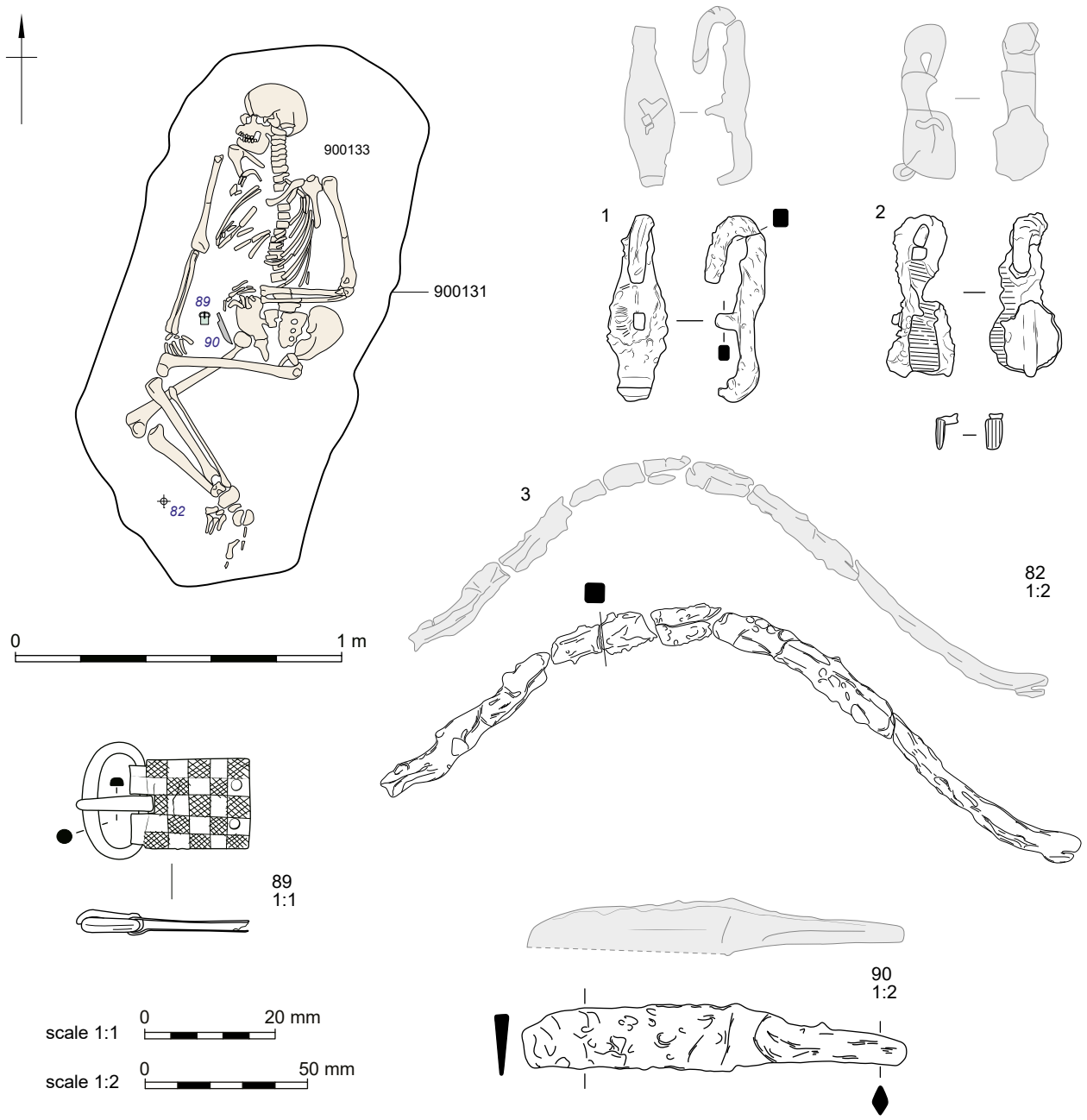


Figure 6.64 Grave 900131 with grave goods

W 14–14.3 mm) and 2 *endständige* rivet holes near the base, which has a slightly oblique angle. The front is decorated with a carefully laid out chequered pattern of 5 × 5 squares, alternating from the corners between cross-hatched and plain, the holes at the base are in plain fields. The loops holding the frame are slightly recessed from the edge of the plates. The 'D'-sectioned pin has a raised flat, rectangular area at its base. MPO remains of leather belt strap preserved between plates, and 2 small fragments have been collected separately (fallen out of the gap between the 2 plates?)
Marzinzik type II.24a. Wt 2 g; L 27.6 mm, W 17.9 mm

ON 90: Iron knife, at r hip and tip pointing SSE at proximal end of r femur, edge ?NE? E of buckle ON 89. Knife with trapezoidal whittle tang, small choil and very shallow concave shoulder to sloping back which curves down to ?reworked tip in centre line. X-radiograph shows distinct weld line between (?steel) edge and back in midline of blade, also visible on one side in corrosion pattern. The tip forms a blunt triangle. MPOR of ?horn handle and leather sheath
Drinkall A/D1. Evison 1/4. Blakelock & McDonnell B. Böhner C. Wt 29 g; L >116.1 mm, W 18 mm

Residual finds: 1 piece of iron

Phase: Early–Middle Anglo-Saxon; 1415±21 BP – cal. AD 600–660 (SUERC-126517); *cal. AD 635–655 (68% probability)*



Figure 6.65 Tomasz Radoń collecting soil samples from around burial 900133

Grave 900137 (burial 900139)
(Figs 6.66–9)
NE–SW; sub-oval, concave sides, flat base; 1.76 x 0.83 m, 0.18 m deep (base at 88.51 m OD); fill 900138

Human bone: flexed on right side, L arm bent at elbow across torso, R arm extended along R side; 80%; adult 30–40 yr, ?female

Scientific analyses: DNA analysis, isotope analysis (Sr/O)

Grave goods:

ON 83: Worked bone comb, diagonal to comb ON 94, starting at SE end of ON 94 running towards S across upper l tibia. Double-sided composite comb with connecting plates of bone with 'D'-shaped section (W 8.4–9.2 mm); possible decoration of zig-zag line in central section of plates. Antler tooth-plates with 4–5 teeth/cm, one with 3 complete teeth (tooth L 7.7 mm). Five cylindrical iron rivets preserved, one complete (L 12.7 mm, D 3.5–3.8 mm), apart from one end plate with off-centre hole, rivets are placed between plates. The other, fragmented end plate (L >30.7 mm) has sloping top and only one toothed side. Both end plates with straight outer sides. Entire surface, especially of bone connecting plates, heavily eroded. Wt 12 g; L *c.* 100 mm

ON 88: Copper alloy buckle, between straight lower r arm and r pelvis, *c.* 20 mm from centre of NE end of animal bone deposit 900152. Pin pointing to hand (SWbS). Buckle with high-oval loop and folded plate with 3 domed rivets set in triangular shape towards rear end of plate (L 18.7 mm, W 12 mm); top plate with stepped rear edge, i.e. it is square (L 13.4 mm) with a smaller square (L 5.2 mm, W 6 mm) extending from the middle of the rear edge; one rivet attached through small square, the other 2 in the inner corners of the larger. The lower plate is not stepped but instead the corners are tapered. Leather remains in space between plates
Marzinzik ?typegroup 23b-ii. Wt 2 g; L 25.8 mm, W 16.3 mm, T 3.7 mm

ON 92: Stone spindlewhorl, on inside of right pelvis, just below animal deposit 900151. Plano-convex, no visible decoration, slightly damaged one side near top. Central hole D 6.7 mm. White beige ?limestone/chalk. Wt 10.97 g; D 27.3 mm, T 12.9 mm

ON 93: Iron double-tanged bladed tool, parallel to r lower leg; starting at NW end of right tibia, extending towards middle of bone. Parallel-sided blade with both ends curved upwards to form narrow terminals/tangs, both broken; one end more angled and straighter, with the tang's outer edge curving inwards; the other end with a more convex rounded edge and tang pointing up at *c.* 85°. A now corroded and amorphous protrusion in the middle of the top side might have been a (?riveted) attachment/third, central tang, but x-radiograph not clear. Transverse-aligned MPO wood remains on tangs and along top edge. Wt 31 g; L 126.8 mm, T 13.5 mm, Blade W 18.4–20.4 mm

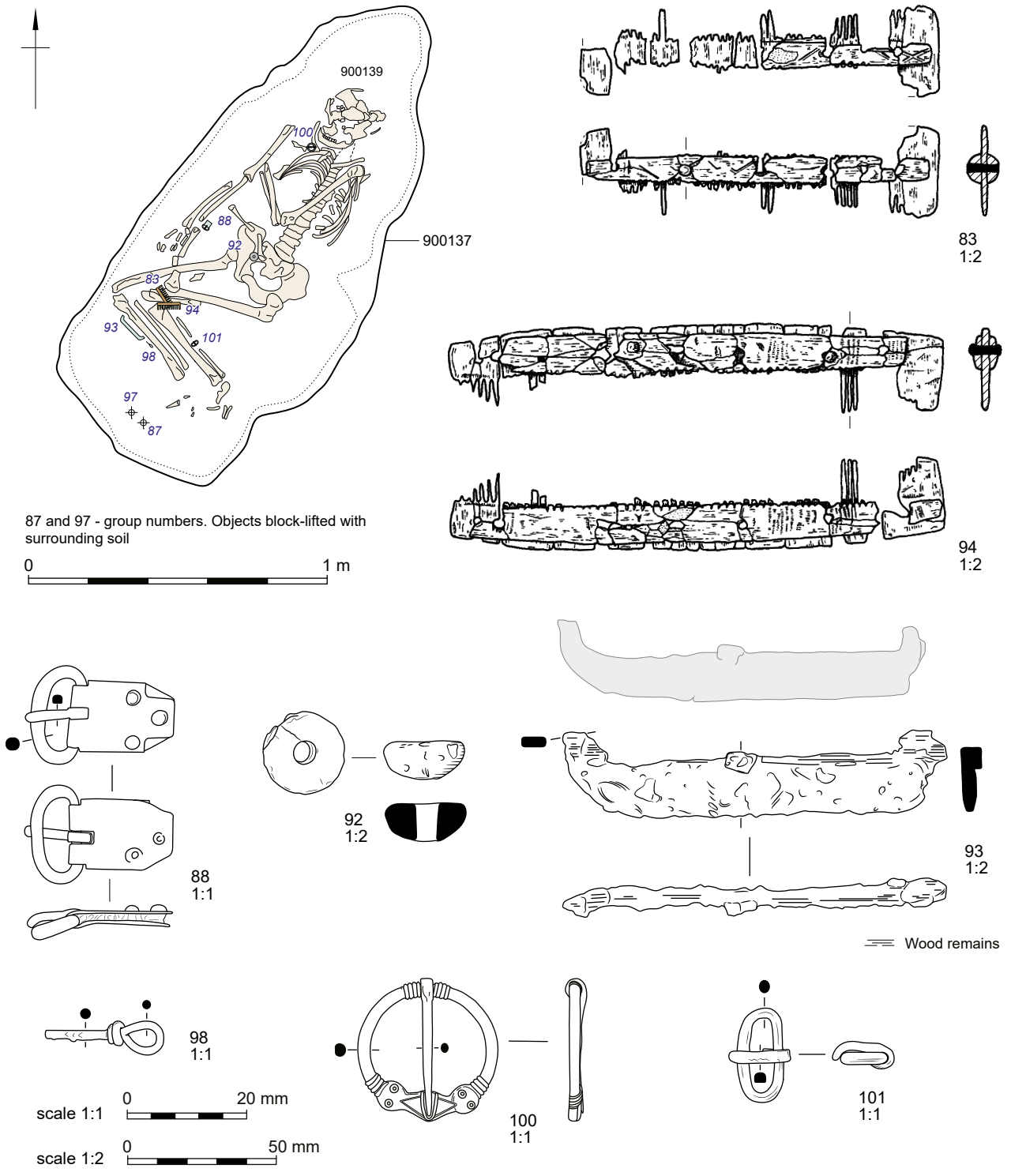


Figure 6.66 Grave 900137 with grave goods

ON 94: Worked bone comb, on lower l femur towards lower middle of r femur, just 10–20 mm N of l knee area. Hump-backed, singled-sided comb with 'D'-shaped connecting plates of bone decorated with groups of 4–5 transverse grooves. 4 teeth/cm, sawn when antler plates had already been fitted. One antler plate fragment (L 29 mm, W 9.1 mm, T 2.8 mm) with 3 complete teeth (tooth L 15.3 mm). An end plate has a slanting side, with narrower side near teeth, which are shortening to an uncut end (L. 6.9 mm). Numerous fragments of round-sectioned rivets, one still in place (L 11.85 mm). 7 (?8) rivets, placed centrally through plates at ends and in 2 central plates, others between adjacent plates. Wt 1 g; L c. 155 mm, W 29 mm

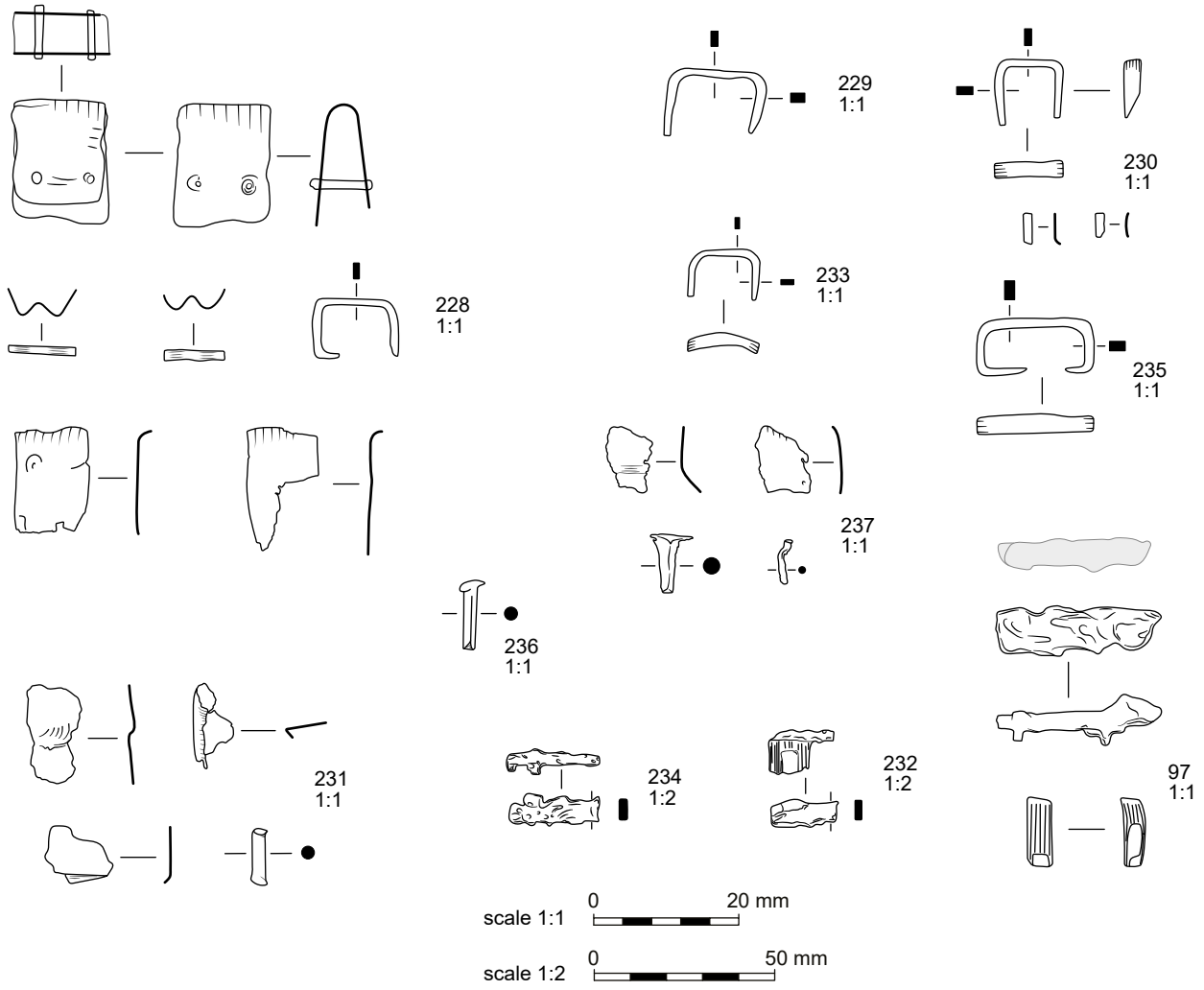


Figure 6.67 Other grave goods from grave 900137

ON 98: Copper alloy wire loop, just 10 mm l of SE end of ON 93. Looped end (L 11.2 mm) wound round stem in 2 twists, opposite end with start of curve (for ?loop) but broken. Wt 0.58 g; L 24.3 mm, W 7.2 mm, T 2 mm

ON 100: Copper alloy annular brooch, between r clavicle and upper r ribs. Pin pointing to l shoulder (SE). Moulded hoop (W 2 mm) of plano-convex cross-section, the back is plain. Between 2 stylised animal heads, each consisting of a group of 4 transverse moulded ribs, followed by a circular head with two ring-and-dot motifs for eyes and a triangular snout with edge-parallel lines joined in a chevron, the hoop has a triangular recess/bed with raised rim for the free-moving pin, which is attached to a narrower axis between 2 groups of 4 transverse moulded ribs. Outer diam./hoop W ratio=8.6%. Fig. 8.55
Høilund Nielsen BR3-e. Wt 1 g; L 23.4 mm, W 23.4 mm, T 1.5 mm

ON 101: Copper alloy buckle, resting on l fibula roughly in middle of bone. Pin pointing to heel (SE). High-oval/'D'-shaped loop, plain tongue and no back plate. Tongue base has rectangular cross-section. Slightly narrower axis with slanted terminals in centre (covered by pin). The loop has a double-convex rather than circular section at the front (where pin rests)
Høilund Nielsen Bu8. Marzinzik Typegroup 10d-ii. Wt 1 g; L 7.8 mm, W 15.9 mm

Group ON 87: fittings of a ?bag/pouch/?box? in the centre on SW edge of grave cut, extending 170 mm towards NE and 120 mm in width; block-lifted. Group number for block-lifted item – not weighed – see ONs 97, 228–237:
Sample 900216: 1. iron wire fragment, rectangular section (L 13 mm, W<2 mm), 2. amorphous iron frag.; L 170 mm, W 117 mm, T 30 mm

ON 97: Iron object, part of group 87, 3 fragments, L 22.8 mm, 9.3 mm and 9.2 mm. The smaller fragments are likely part of the same rod, the larger has one end with a possible rivet shaft extending to one side, i.e. possibly a clasp? Wt 0.63+0.11 g

ON 228: Copper alloy fitting, in centre on SW edge of grave cut, extending 170 mm towards NE and 0.12 m in width; block-lifted
1) Folded sheet clip with 2 tube rivets in corners of shorter side (L 15.9 mm, W 12.6 mm), retains fragments of MPO ?leather. X-radiograph shows 2 'W'-shaped strips in between

folds and staple just beyond outer edge of longer side of clip, plus additional fragments of broken ?clip next to side of this clip
2) 2 'W'-shaped strips, one broken, one complete (L 8.7 mm, W 1.4 mm, T 0.4 mm)
3) Rectangular staple, one in-turned tip, other broken (L 8.8 mm, W 11.3 mm)
4) 5 fragments of another ?clip; uncertain whether part of same item as join only between two smaller bits. Largest part (L 13.4 mm, W 9.3 mm) with rest of square/rectangular perforation. Wt 1 g

ON 229: Copper alloy staple, rectangular staple with straight, slightly tapering tips. Wt 1 g; L 9.1 mm, W 13.4 mm, T 0.9 mm

ON 230: Copper alloy staple with straight flat top and noticeably tapering arms and pointed tips Also includes 2 fragments of parallel-sided curved strip ('W'-shaped strips like ON 228?) and ?leather fragments. Wt 1 g; L 9 mm, W 9.3 mm, T 2.3 mm

ON 231: Copper alloy sheet clip fragments plus tubular rivet (L 8.1 mm, D 2–2.2 mm). Also includes fragments of MPO wood. Wt 1 g

ON 232: Iron staple with flat wide top, one end broken and missing, the other still inserted longitudinally in mineralised wood fragment. Wt 1 g; L >18.1 mm, W 5.7 mm

ON 233: Copper alloy of flat strip section and obliquely angled tips. Includes small MPO fragments. Wt 0.1 g; L 7.05 mm, W 9.86 mm, T 1.6 mm

ON 234: Iron staple with flat wide top, both ends broken but possibly present in fragments still inserted longitudinally in mineralised wood fragments. Wt 2 g; L 25.2 mm, W 6.2 mm, T 2.5 mm

ON 235: Copper alloy staple of flat strip section, in-turned tips, one obliquely angled- and one pointed end. Includes sheet fragment of irregular outline and small MPO fragment. Wt 1 g; L 7.7 mm, W 15.6 mm, T 2.05 mm

ON 236: Copper alloy tubular rivet with head slightly slanting to one side, other end shows manner of folding sheet to tube in 'G'-shape. Wt 0.07 g; L 9.74 mm, W 1.7–1.8 mm

ON 237: Various fragments:
1) Copper alloy sheet fragment with tubular rivet (L 7 mm, D 2 mm) still attached
2 and 3) Copper alloy sheet fragments
4) Copper alloy wire fragment (L 6.4 mm, D 1 mm)
5) Bone fragment with trabecular structure on one side, stained green
6) Corrosion fragment (Fe oxide?)
7 and 8) MPO fragments (?leather). Wt 1 g

Animal bone: ABG 900151 (sheep right forequarter – humerus, radius and ulna – juvenile animal); ABG 900152 (sheep left forequarter – humerus and radius – juvenile animal); ABG 900153 (sheep tibia and tarsals, juvenile animal); ABG 900154 (sheep-sized ribs, approx. 4–5 in total)

Residual finds: 2 sherds of pottery (prehistoric/Roman), 2 pieces of animal bone, 2 pieces of iron and 2 pieces of iron associated with ABG 900151

Phase: Early–Middle Anglo-Saxon; 1437±20 BP – cal. AD 600–650 (SUERC-126518), *cal. AD 635–655 (68% probability*)



Figure 6.68 Micro-excavation of bone combs ON 83 and ON 94 (grave 900137)



Figure 6.69 Burial 900139 (grave 900137), view from north-west (1 m scale)

Grave 900140 (burial 900142)
(Fig. 6.70)
SW–NE; subrectangular, rounded end at head, steep straight sides, flat base; 1.7 x 0.7 m, 0.3 m deep (base at 88.41 m OD); fill 900141. Grave truncates ring ditch 900066

Human bone: flexed right, arm crossed over upper body; 60%; adult 40+ yr, ?female

Scientific analyses: isotope analysis (Sr/O, C/N)

Grave goods:
ON 84: Iron strip fragment, behind l temple of skull. Strip fragment with one end broken at oblique angle, the other, shorter, bent at right angles and embedded in corrosion products. Wt 1 g; L 11.1 mm, W 6.8 mm
ON 85: Iron strip fragment, to r of throat. One straight (?broken) end and one rounded end embedded in cone-section-shaped corrosion products. Wt 1 g; L 10.4 mm, W 7.55 mm, T 5.08 mm
ON 95: Copper alloy/iron buckle, outside (NE) of middle of r radius at top of waist; pin pointing to elbow (SSE). Plain, folded, triangular copper alloy plate (L 39 mm, W 12.3 mm) with 3 rivets: 2 near buckle end with high cone-shaped heads, position of rivet hole at apex end obscured by corrosion products, but no rivet visible in x-radiograph. Front part of plate has circular protrusions following the shape of the rivet heads. Oval buckle (L 10.1 mm) with oval cross-section and recessed axis; pin (?Fe) obscured by corrosion products preserving remains of ?leather belt strap, found on rear of plate in area between axis and rivets and below apex rivet hole)
Marzinzik type II.23b-ii. Høilund-Nielsen type BU3-a. Wt 4 g; L 45.8 mm, W 17.7 mm
ON 96: Iron knife, above pelvis, handle pointing NNW to l ilium, tip SSE near r wrist, edge ENE to abdomen. Broad triangular whittle tang. Blade with straight back, curving down to tip in last 1/3; cutting edge corroded in first 2/3 of blade below handle, curves up to tip in middle of blade line; no shoulder or choil. MPOR of handle and ?leather sheath
Drinkall A1. Böhner A. Evison 1. Wt 24 g; L 135.5 mm, W 15.9 mm
Residual finds: 1 sherd of pottery (prehistoric), 9 pieces of iron, 1 piece of copper alloy and 4 pieces of animal bone

Phase: Early Anglo-Saxon; 1491±24 BP – cal. AD 550–640 (SUERC-126519), *cal. AD 555–590 (68% probability)*

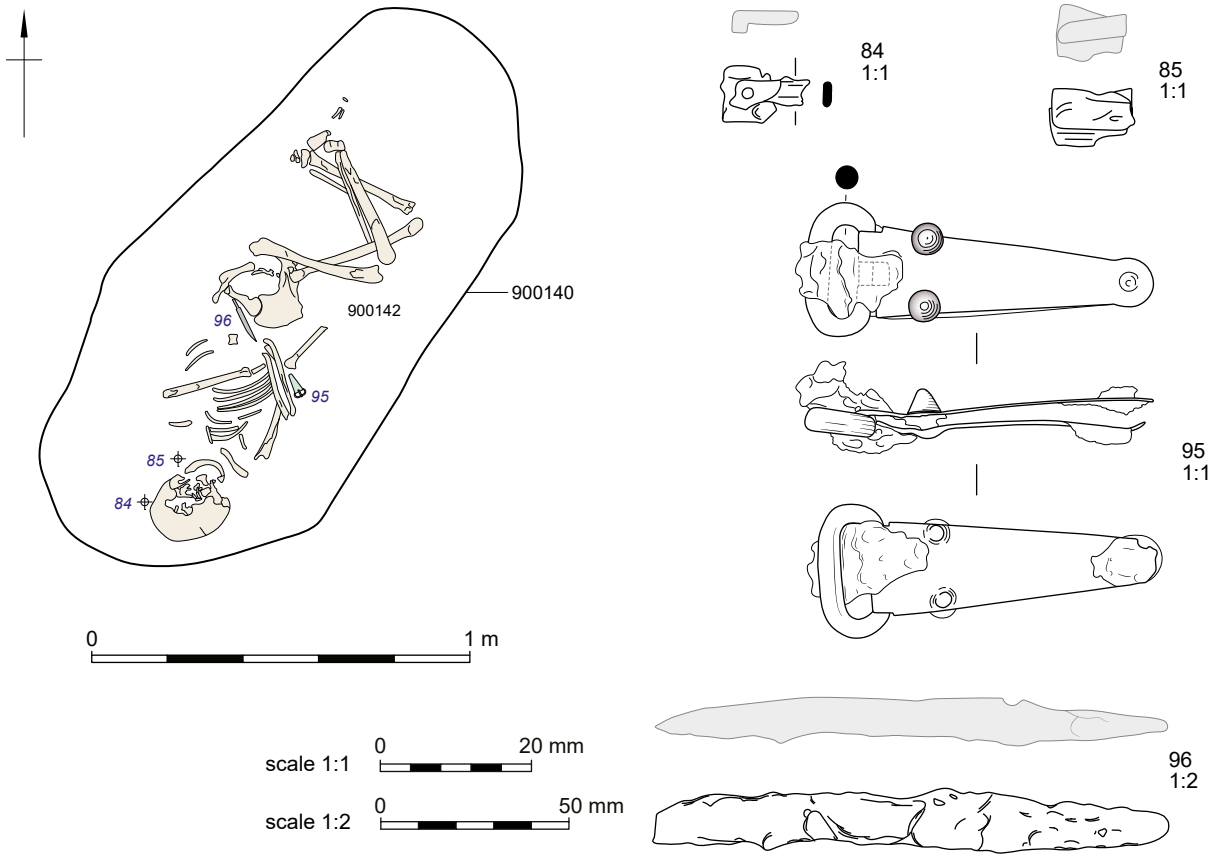


Figure 6.70 Grave 900140 with grave goods

Grave 900161 (burial 900163)
(Figs 6.71–3)
NNW–SSE; subrectangular, steep straight sides, flat base; 1.63 x 0.73 m, 0.24 m deep (base at 88.21 m OD); fill 900162

Human bone: tightly flexed (femurs at right angles to torso) on right side with torso slumped forward, left upper limb flexed at elbow while right is extended at side; 80%; subadult 14–16 yr, ?female

Grave goods:
N.B. ONs 112, 131, 146, 154–156, 160, 169 & 183 are illustrated by photographs only – see Fig. 6.72
ON 112: Whelk shell, in SE corner of grave, S of shell ON 155. Wt 62 g; L 78.1 mm, W 47.5 mm
ON 125: Copper alloy staple, near E side of grave, *c.* 160 mm below (S) of pelvis. Flat strip section and obliquely angled tips. Wt 1 g; L 7.6 mm, W 20.8 mm, T 2.4 mm
ON 126: Copper alloy staple, near E side of grave, *c.* 250 mm below (S) of pelvis. Double-U-bent (angled bends) strip with one pointed end bent inwards and one straight end cut to point with oblique angles (now broken). Wt 1 g; L 11.7 mm, W 23.2 mm
ON 127: Copper alloy repair patch, in SE corner of grave, S of shell ON 155. Made out of a folded piece of sheet metal (broken across bend) with parallel sides and tongue-shaped ends; one tubular rivet/pin still in hole, bent in half at right angle. MPO fragment of ?leather/??wood. Wt 1 g; L 15.4 mm, W 9.8 mm, T 0.3 mm
ON 129: Iron object, near E side of grave, *c.* 250 mm r (E) of l knee. 2 fragments: 1 strip fragment, 1 lump. Wt 1 g
ON 131: Coal, near E side of grave, *c.* 220 mm r (E) of l knee. Small lump. Wt 0.995 g; L 18.5 mm, W 15.6 mm, T 6 mm
ON 143: Worked bone/copper alloy pendant, in cluster of objects near E side of grave, *c.* 250 mm r (E) of l fibula. Made of a ?fragmented semi-circular antler disc, if not fragmented could have been intended to represent lunula shape? Surface extremely affected by leaching/acidic corrosion; hole (diam. 4.5 mm) in apex for attachment of copper alloy suspension ring (sliding-knot ring, diam. 21.3–23.6 mm), ends wound with 3.5 turns each. Probably part of chatelaine. Wt 5 g; L 50.8 mm, W 32.9 mm, T 5.2 mm
ON 145: Glass palm cup bottom, in cluster of objects near E side of grave, *c.* 250 mm r (E) of l knee. Concave inside, convex outside with remains of ring punty (diam. *c.* 14 mm) on apex and concentric striations, inner surface more glossy. Translucent turquoise glass with bubbly matrix and few inclusions. Wt 18.74 g; L 51.8 mm, W 44 mm
ON 146: Coal, in cluster of objects near E side of grave, *c.* 200 mm r (E) of l knee. Small lump. Wt 0.104 g; L 9.6 mm, W 7.7 mm, T 3.6 mm
ON 154: Coal, in cluster of objects near E side of grave, *c.* 200 mm r (E) of l knee. Small lump. Wt 0.14 g; L 9.1 mm, W 8 mm, T 3.6 mm
ON 155: Whelk shell, in SE corner of grave, N of shell ON 112. Wt 55 g; L 89.3 mm, W 54 mm
ON 156: Small stone pebble, in cluster of objects near E side of grave, *c.* 250 mm r (E) of l knee. Wt 0.27 g; L 9.3 mm, Diam. 5.6 mm, T 3.5 mm
ON 159.1: Copper alloy spindle hook, in cluster of objects near E side of grave, *c.* 200 mm r (E) of l knee. Made of sheet metal folded to form square-sectioned shaft (folding seam still visible), hooked top has circular cross-section, narrowing slightly before bend. Tapering to tip, which is missing.
MPOR fibres/?threads. Wt 0.18 g; L 21.3 mm, W 3.8 mm, T 1.25–1.5 mm
ON 159.2: Iron double-tanged bladed tool. Parallel-sided blade with both ends curved upwards to form narrow terminals/tangs, both broken; one end more angled and straighter, with the tang's outer edge curving inwards; the other end with a more convex rounded edge and tang pointing straight up. Blade W 10.6–16.4 mm
Transverse-aligned MPO wood remains on tangs and possibly along top edge. Wt 21 g; L 124 mm, W 37 mm
ON 169: Coal, below (S) of l ulna, midway between pelvis and r radius. Wt 0.91 g; L 14.2 mm, W 13.8 mm, T 9.5 mm
ON 170: Copper alloy chatelaine, in centre of area between r ilium, l femur and below r ulna. All chain links freely moving. Combined Wt 51 g; L >190 mm. Fig. 8.66
1) Joint chain with translucent clear white flat-convex/convex rock crystal bead (ON 170.12) with central hole for attachment of, now broken, sliding-knot wire ring suspended from 2 S-links and a smaller hooked S-link before joining S-link used as junction of 2 chain strands: one (L from junction 130 mm) consisting of figure-of-eight (f-o-e) links alternating with S-links, with at roughly every other join a broken f-o-e link extending beyond the length of the chain, the uppermost hooked S-link with remains of Fe ring; the second strand (L from junction 113 mm), with similar chain alternating between f-o-e and S-links, but apart from the joining link, no other link is broken

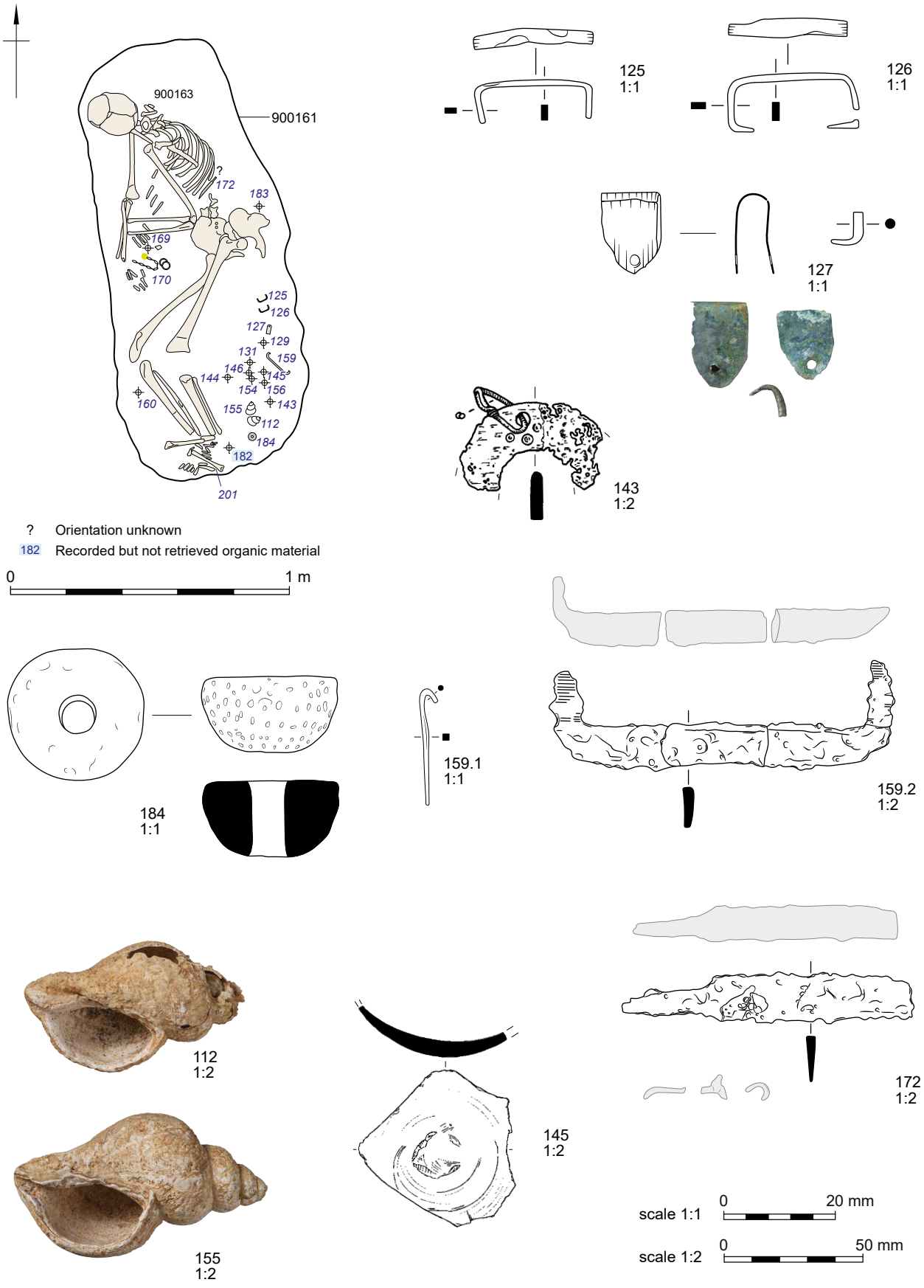


Figure 6.71 Grave 900161 with grave goods

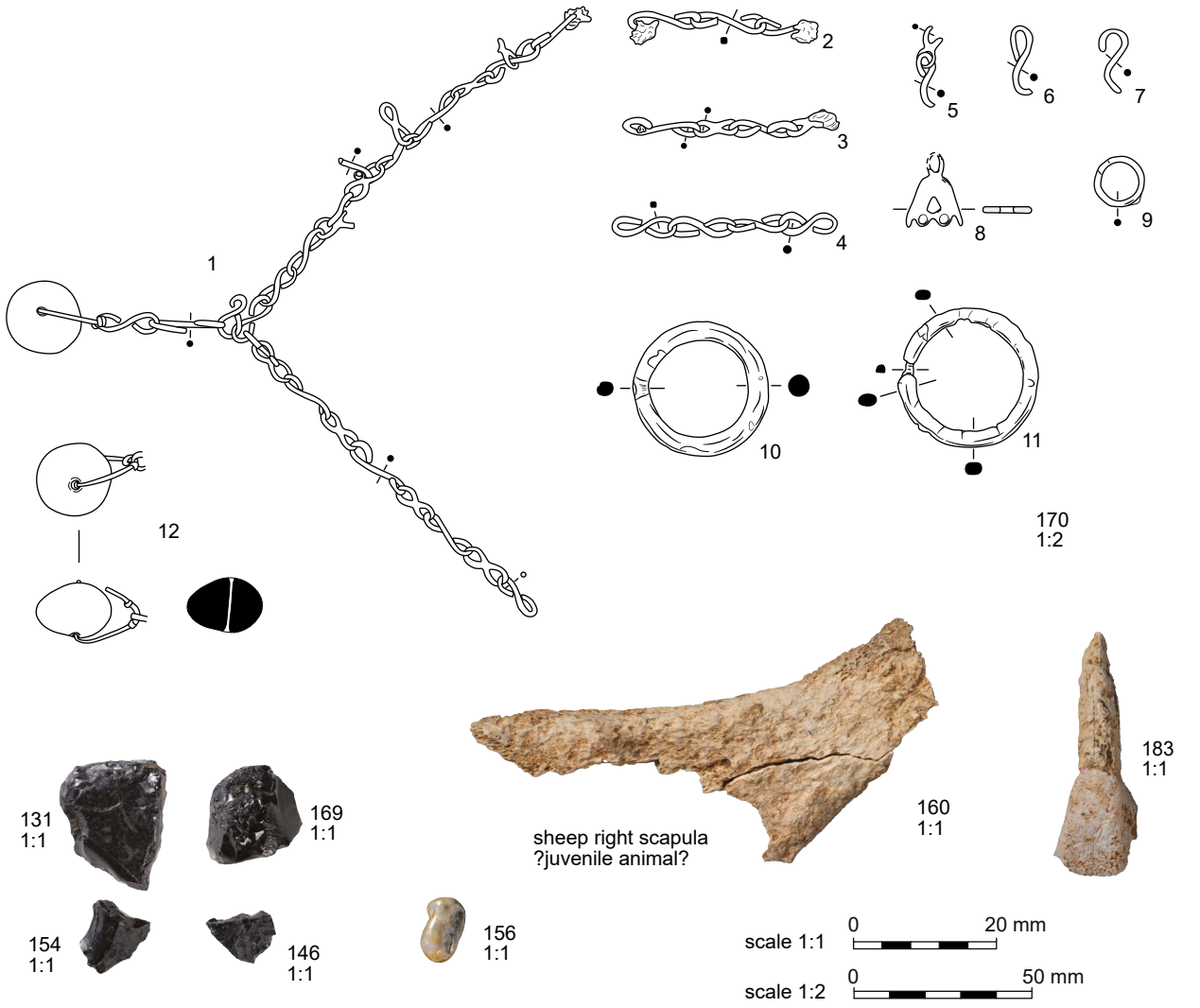


Figure 6.72 Other grave goods from grave 900161

2) Length of chain (L 53 mm) with 3 S-links, with the outer bends containing Fe link fragments
3) Length of chain (L 60 mm) with 4 links, alternating between S- and f-o-e links, with the outer f-o-e link containing Fe link fragments
4) Length of chain (L 63 mm) with 4 tight S-links
5) Broken S-link joined to broken f-o-e link (L 29 mm)
6) S-link, one broken bend, but fragments join (L 19 mm)
7) S-link, one broken bend, fragment missing (L 18 mm)
8) Triangular chain junction plate, top with worn-out and broken ovoid loop, base with 2 ring holes set below central ovoid perforation, corners with short extensions. Wt. 1.325 g; L 19.4 mm, W 15.4 mm, T 1.8 mm
9) Ring with round-sectioned hoop, at least 3 facets from wear visible on inside (from suspension of chain links?). Wt. 0.6 g; diam. 14–14.2 mm, hoop T 1–1.9 mm
10) Ring with solid, round-sectioned hoop with one wear facet (Wt. 17.042 g; diam. 37.6–37.7 mm, T 4–5.7 mm)
11) Copper alloy annular brooch, in centre of area between r ilium, l femur and below r ulna, lying below ring ON 170.10. Hoop with flat oval cross-section and recess for missing pin with MPO remains of ?leather strap (W 2.5 mm); at least 3 wear facets on inside of otherwise plain hoop (diam. 38.7–39.2 mm, W 3–5.1 mm, H 2.7–3.2mm). Outer diam./ hoop W ratio=13%. Wt 8.748 g
12) Rock crystal bead, below ring ON 170.10. Translucent clear white flat-convex/convex rock crystal bead with central hole for attachment of, now broken, sliding-knot wire ring. Wt *c.* 10 g; L 15.7 mm, W 20.9–21.5 mm

ON 172: Iron knife, above r ilium below l side of ribcage, aligned NE/SW, but precise orientation unclear. Triangular whittle tang (L 37.3 mm, W 10.3 mm), concave shoulder and slightly less concave choil; blade (L 66 mm) with back and edge more or less parallel, back curving

down to missing tip. MPO remains of handle appear to extend beyond shoulder. There might have been a groove below the back, running all the way to the beginning of the down turn to tip. MPO remains of leather sheath on at least one face. Part of broken off tip might be in box. Also contains 6 fragments, some of which might have been part of a ring/loop
Drinkall D1. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 16 g; L >103.3 mm, W 16.4–17.9 mm

ON 173*: Copper alloy ring, between r ilium and l side of ribcage. Possibly (?pen-)annular brooch? Identified from photos

ON 182*: Organic matter, at S end of grave, r (E) of feet and AB deposit (900201). Mass of unidentified organic material, not recovered or sampled

ON 184: Stone spindlewhorl, at S end of grave, r (E) of feet and AB deposit 900201. Hemispherical whorl with one flat, slightly uneven face, the domed surface has decoration of 6–7 more or less concentric levels of nicks (applied with ?knife tip). Light grey silty (?quartzitic) limestone. Hole diam. 5.6–6 mm. Wt 9.34 g; Diam. 23.6–24.3 mm, T 14.1 mm

Animal bone: ON 183 (cattle incisor). ON 160 (sheep right scapula, ?juvenile animal); ABG 900201 (sheep, pair of tibia, left astragalus and calcaneus, all from juvenile animal)

Residual finds: 9 sherds of pottery (7 Late Iron Age or Romano-British and 2 earlier prehistoric or post-Roman), 4 pieces of copper alloy, 6 pieces of iron



Figure 6.73 Detail of shells ON 112 and ON 155 and glass ON 145 in grave 900161 (0.08 m scale)

Grave 900172 (burial 900174)
(Fig. 6.74)
W–E; sub-oval, steep irregular sides, irregular/undulating base; 2 x 0.72 m, 0.13 m deep (base at 88.33 m OD); fill 900173

Human bone: flexed inhumation on right side, L upper limb flexed at elbow with L hand at right waist; R upper limb extended at side, hand on proximal R femur; 80%; adult 20–25 yr, male

Scientific analyses: isotope analysis (Sr/O)

Grave goods:

ON 109: Iron knife, on left pelvis, tip (NNE) at top of femur, edge pointing WNW. Triangular whittle tang (L 52.4 mm, W 11.6 mm) with rounded end, flat concave choil and more arched concave shoulder to blade with straight edge and back curving to tip in line with edge in smooth curve in last 1/3 of blade (L 119 mm). X-radiograph of blade shows very clear line of (?phosphoric) iron back and ?steel edge along centre line. MPO remains of wooden handle with longitudinal grain structure along length of tang. Leather remains of sheath on both sides of blade
Drinkall D2. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 46 g; L 171.3 mm, W 23.6 mm

ON 147: Iron nail. Nail shaft fragment, square-sectioned shaft. Longitudinal wood grain along length of shaft

ON 148: Iron nail, r of lower thoracic vertebrae. Shaft fragment, square-sectioned. Wt 1 g; L >22.2 mm, D 3.2–3.4 mm

ON 149: Iron nail, r of lower thoracic vertebrae. Fragment, head and tip missing, square-sectioned shaft. Longitudinal wood grain along length of shaft. Wt 1 g; L >23 mm, D 3.1–3.3 mm
ON 150: Iron nail, r of upper lumbar vertebrae. Tip fragment. Wt 1 g; L 8.6 mm, D 7.4 mm
ON 151: Stone whetstone, on r side of mid-chest. Irregular rectangular-sectioned with bevelled top; roughly trapezoidal outline with smoothed edges and slightly concave sides, base slightly convex but clearly smoothed from use; one, rounder end shows scarring from use for ?pounding. Larger, upper side has also been used for smoothing, other side with calcareous precipitate from halfway to top. Micaceous gritty stone (?Greywacke-grit?). Wt 140 g; L 123.3 mm, W 43.3 mm, T 18.4 mm
ON 152: Iron disc, at lower r ribcage. Fragment of disc (outer curve suggests 40 mm radius), edge slightly raised. Surface corrosion structure with inclusions of hammerscale flakes; dark grey; magnetic. Wt 43.5 g; L 68.8 mm, W 29.5 mm, T 9.7 mm. Fig. 8.71
Residual finds: 2 pieces of iron and 2 pieces of pottery (early prehistoric/post-Roman)

Phase: Early–Middle Anglo-Saxon; 1379±21 BP – cal. AD 610–670 (SUERC-126520); *cal. AD 645–660 (68% probability)*

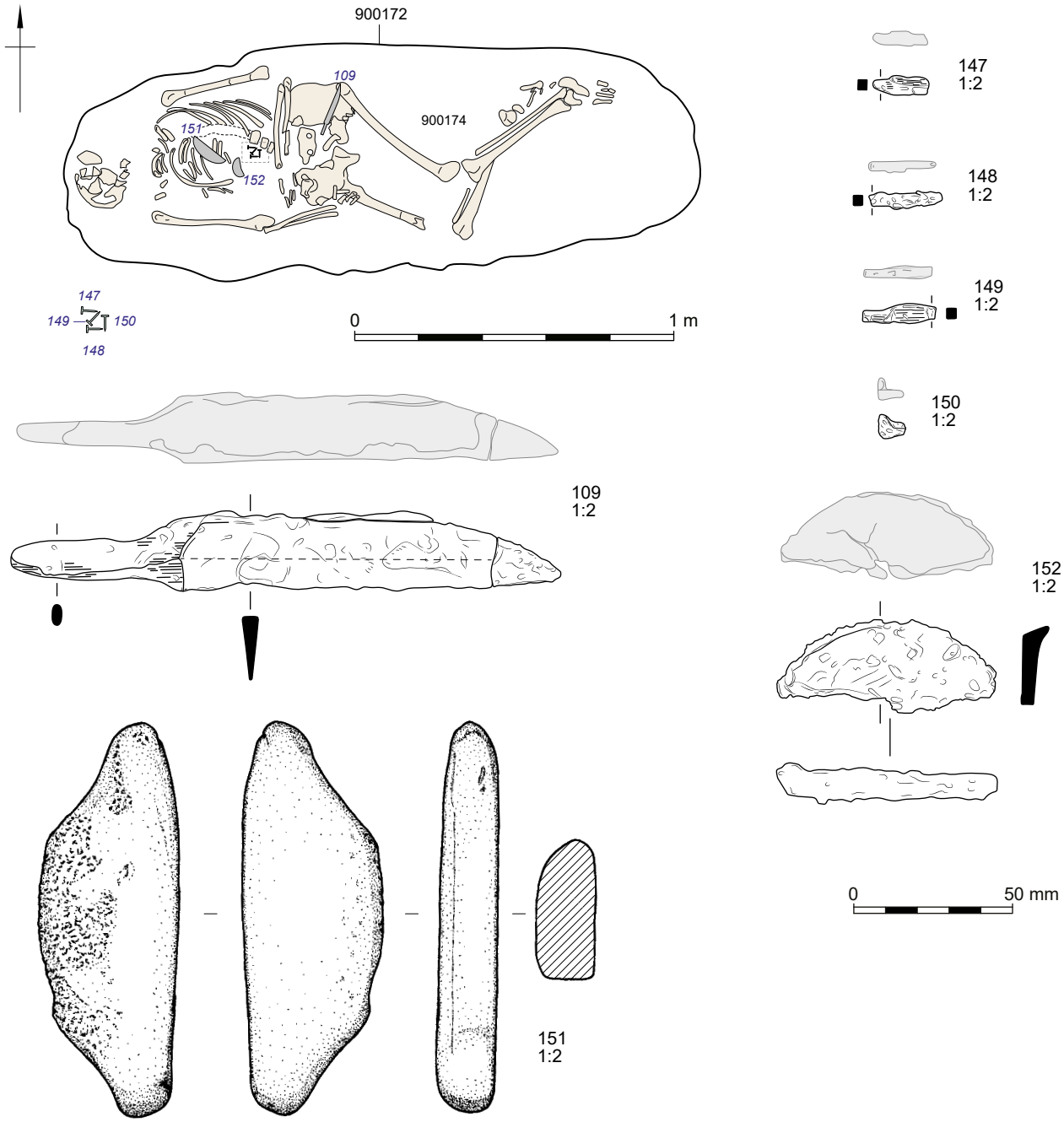


Figure 6.74 Grave 900172 with grave goods

Grave 900175 (burial 900177)
(Fig. 6.75)
NE–SW; subrectangular, rounded at foot end, steep straight sides, flat base; 1.74 x 0.78 m, 0.43 m deep (base at 88.24 m OD); fill 900176

Human bone: flexed to the right, with arms crossed over chest; 80%; adult 50+ yr, female

Scientific analyses: DNA analysis, isotope analysis (Sr/O, C/N)

Grave goods:
ON 118: Iron knife, near NE edge of grave cut beyond skull. Tip WbS, edge SbE. Whittle-tang knife. Two joining fragments; trapezoidal tang (L >22.8 mm) with MPO remains of ?wood/horn handle. Blade (L >50 mm) with sloping back and concave edge, tip missing
Drinkall ?A/D1. ?Evison ?2/?4. Ottaway E? Wt 12 g; L >72.8 mm, W 16.9 mm
ON 128: Iron nail, near SW edge of grave cut beyond lower legs. Flat, irregular octagonal head and square shaft. Driven through wood at oblique angle to longitudinal grain structure. The x-radiograph might show a Z-twisted thread loop near the broken tip. Wt 2 g; L 24.8 mm, D 9.3–13.1 mm
ON 142: Copper alloy repair patch, on/above disturbed lower legs. Made out of a folded sheet with parallel sides and obliquely angled ends; outer half shorter, two rivets set flush near its corners, left rivet is folded down at back, right rivet only extends as far as displaced sheet metal (H 1.26 mm). Wt 1.32 g; L 18.9–20.9 mm, W 12.8–13.1 mm, T 8.2 mm
ON 165: Fired clay spindlewhorl, *c.* 100 mm beyond (NNE) of skull. Plano-convex, with tightly spaced concentric lines around central hole (D 7.1–7.6mm) covering entire surface. Grey (reduced) fabric, 1/3 of convex area has lost surface. Wt 27 g; D 37–37.4 mm, T 17.3 mm
ON 166: Copper alloy buckle, *c.* 200 mm beyond (NE) of skull, next to ON 165. Frame pointing ESE. Buckle with high-oval, free-moving loop and recessed axis, held by high-rectangular folded plate (L 19.1 mm, W 21.1–21.4 mm; gap for leather belt 2.4 mm) which is recessed at the loop but does not have a gap for the pin. Instead, the pin is an integral non-moving part of a rectangular/slightly trapezoidal frame with a central bar, attached to the plate with 3 rivets, one, with a domed head, set at the end of the central bar at the junction with the outer transverse bar which extends beyond the base plate, the other 2 rivets are set flush in front of and on the raised square junction of the central bar with transverse bar at the front edge. The pin rises above the level of the frame. Pin and frame have a high plano-convex cross-section. Two additional dome-headed rivets are set in the outer corners at the rear edge of the base plate. ?Leather remains preserved between the two sheets of the folded plate. Wt 7.4 g; L 27.7 mm, W 27.6 mm, T 7 mm
ON 177: Glass cabochon in copper alloy mount, below and behind base of skull and beyond l clavicle. Plano-convex dark brown (but in transmitted light translucent dark amber with some quite large bubbles) glass disc (Wt 3.82 g; diam. 20.8–21.8 mm; T 5.8 mm), decorated with a cross-and saltire pattern of opaque yellow and base coloured S-twisted trails. The 4 trails have slightly rough surfaces (corrosion) but have been applied consecutively, creating a cross at a time; they have been melted into and are flush with the surface of the glass disc. The disc itself was mounted onto a copper alloy (?silver) baseplate (Wt 1.53 g; D 22.2–24.3 mm; T 0.5 mm) and held with a crenellated rim (H 2.7–3.3mm) soldered onto the rim of the baseplate. The subcircular baseplate's circumference is broken in several places, some of those corresponding to fragments of the rim; one *c.* 4 mm-wide area on the circumference extends slightly beyond the undamaged edge either side. A small point on the base (outside) marks the disc's centre. A beige substance adheres to *c.* 1/5 of the underside of the plate – leather remains (Wt 3.4 g; W >23.8 mm) in the finds box are all that has been preserved of this jewellery arrangement because it was in contact with the metallic baseplate. Fig. 8.57
Høilund Nielsen type PE9-d(?)

Animal bone: ABG 900175 (sheep lumbar vertebrae, juvenile animal); ABG 900176 (missing, cannot be identified from *in situ* photographs)

Residual finds: 1 piece of iron

Phase: Early–Middle Anglo-Saxon; 1431±24 BP – cal. AD 590–660 (SUERC-126521); *cal. AD 635–655 (68% probability)*

Grave 900184 (burial 900186=900199)
(Fig. 6.77)
NNE–SSW; sub-oval, steep straight sides, flat base; 1.52 x 0.9 m, 0.26 m deep (base at 88.46 m OD); fill 900185

Human bone: loosely flexed to the right; 30% a.u.l.; juvenile/subadult 12–15 yr

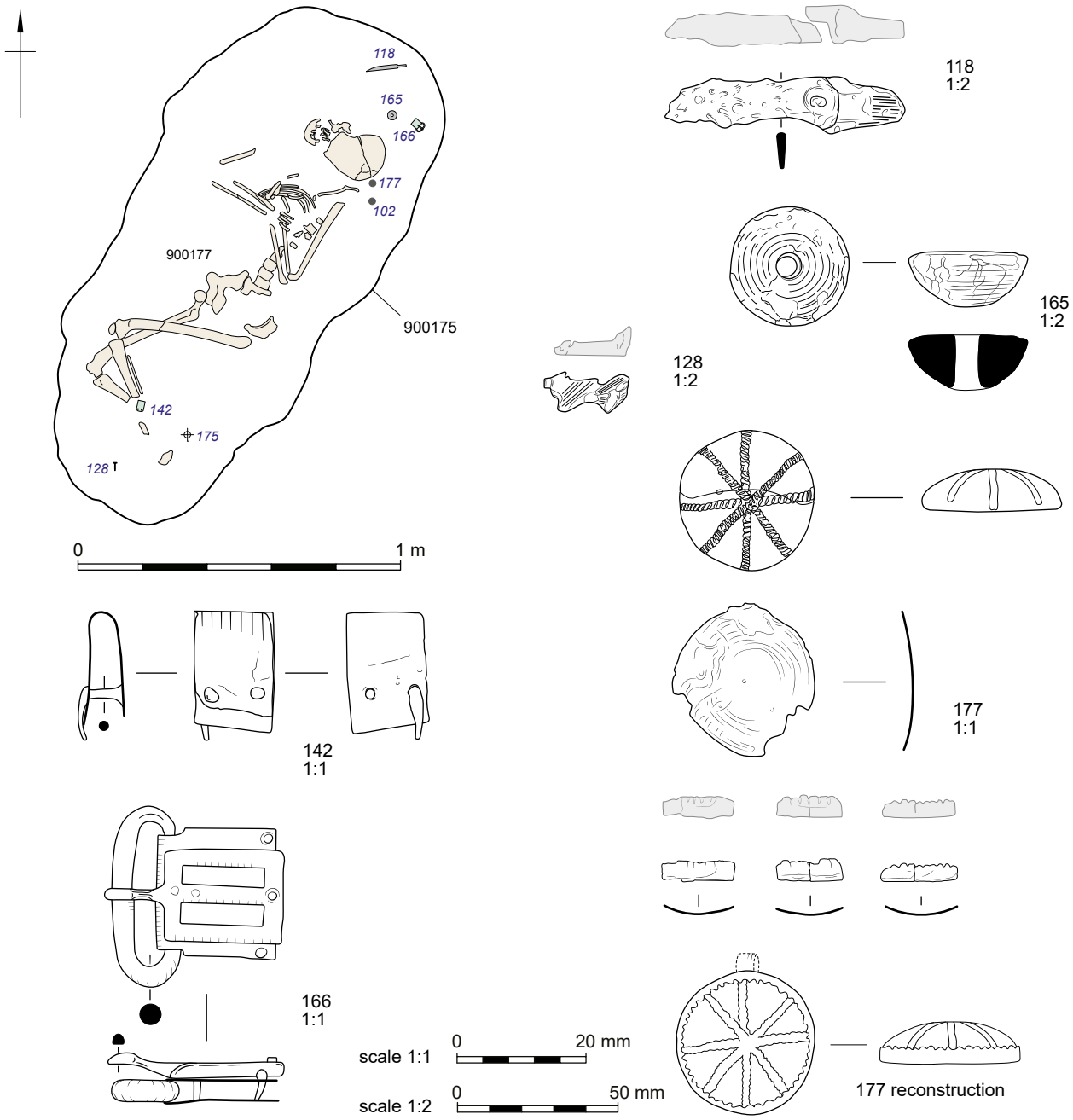


Figure 6.75 Grave 900175 with grave goods



Figure 6.76 Burial 900177 (grave 900175), view from south-east (1 m scale)

Grave goods from 900186:

ON 111: Iron knife, in NE quadrant of cut, N of l pelvis, tip WSW, edge SSE. Blade fragment, straight, slightly concave cutting edge and broad back curving down to missing tip which had probably been in line with edge
Drinkall ?D1. ?Evison 4. Blakelock & McDonnell B. Böhner C. Wt 16 g; L >69.6 mm, W 16.8 mm, T 5.1 mm

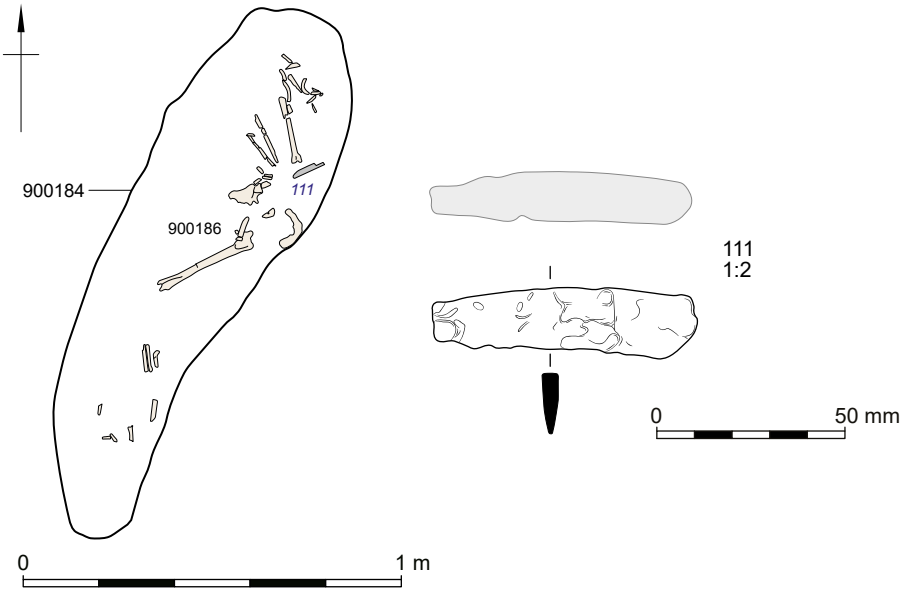


Figure 6.77 Grave 900184 with grave goods

Grave 900187 (burial 900189)
(Fig. 6.78)
N–S; irregular, irregular sides, irregular/undulating base; 1.04 x 0.57 m, 0.19 m deep (base at 88.42 m OD); fill 900188

Human bone: posture not discernible; 2% s.l. ; infant 2.5–3.5 yr, ?female

Grave goods:
ON 108: Copper alloy collar/staple, near NW corner of grave cut. Double-U-bent (angled bends) strip with both ends rounded and overlapping. Wt 1 g; L 13 mm, W 9 mm, T 3.1 mm
ON 113: Copper alloy staple, near NW corner of grave cut. Double-U-bent (angled bends) strip with one pointed end and one end cut off at oblique angle. ?Organic remains adhering to inside of staple? Wt 1 g; L 15.8 mm, W 7.3 mm, T 3.4 mm
ON 114: Amber bead, W of centre line in N quarter of grave. Subcircular bead with wedge-shaped cross-section, one side slightly convex; keyhole-shaped hole (?from wear). Wt 3.966 g; L 25.8 mm, W 22.3 mm, T 14.3 mm. Fig. 8.61
ON 116: Iron knife, NW of centre of grave. Tip WbN, edge SbW. Broad triangular whittle tang (L 49.8 mm), low convex-curved shoulder to blade (L 61.3 mm; W15.4 mm) with slightly sloping back, missing tip broken off; cutting edge curves up from flat choil to middle of blade. Organic remains of wooden handle clearly visible in large areas of tang
Drinkall A/D1. Böhner ?A. Evison 1/4?. Wt 16 g; L >111.1 mm, W 15.4 mm
Residual finds: 1 piece of iron and 4 pieces of copper alloy

Grave 900190 (burial 900191)
(Fig. 6.79)
NNE–SSW; subrectangular, steep straight sides, flat base; 1.6 x 0.94 m, 0.08 m deep (base at 88.48 m OD); fill 900192

Human bone: supine with slightly to the right tilt, lower limbs tightly flexed to the right, R upper limb extended with hand bones beneath the right pelvis; L upper limb loosely flexed at elbow, with forearm crossing abdomen and L hand overlaying right pelvis; 75%; adult 50+ yr, male

Grave goods:
ON 107: Iron buckle, upper left chest, on first rib. Orientation ? 'D'-shaped buckle with round-sectioned loop, no plate. Tongue appears to have slid onto the outer loop (position of pin rest). 2 fragments Marzinzik typegroup I.10d-i. Høilund Nielsen Bu8. Wt 1 g; L 13.4 mm, W 23 mm

ON 115: Copper alloy buckle, near spine above l pelvis. Pin pointing to right (WNW). 'D'-shaped loop (L 11.5 mm) and recessed, continuous axis. 'D'-sectioned tongue with square-sectioned anchorage. Also includes copper alloy top plate fragment (L >25.6 mm, W >16.2 mm) with 2 dome-headed rivets, on the inside of this plate there are two longitudinal parallel ribs *c.* 6 mm apart, prob. corrosion products of ?belt strap (MPOR) Marzinzik typegroup II.24, possibly type II.24a. Wt 5.05 g; L 14.2 mm, W 27.9 mm

ON 120: Iron knife, above l radius, tip pointing to hand (WbS), edge SbE (but almost vertical). Triangular whittle tang set in centre of blade, rectangular choil and shoulder, both had been covered by handle (L 60 mm), which extended 8 mm beyond choil/shoulder line, visible in corrosion products and x-radiograph. Blade with straight back and edge, both curving to tip in centre line
Drinkall A2. Evison 1. Böhner A. Wt 40 g; L 172 mm, W 22.5 mm

Residual finds: 1 piece of iron

Grave 900193 (burial 900194)

(Fig. 6.80)

WNW–ESE; subrectangular, straight vertical sides, flat base; 1.57 x 0.75 m, 0.4 m deep (base at 88.23 m OD); fill 900195

Human bone: tightly flexed to the left; 70%; adult 28–32 yr, ?female

Grave goods:

ON 117: Copper alloy sheet fragment, in cluster of objects near N edge of grave, W of l lower femur. Triangular sheet offcut, base with round edge (outer edge), both other edges irregular from breaking. Wt 0.07 g; L 8 mm, W 4.9 mm, T 0.4 mm

ON 119: Iron knife, in front (N) of chest pointing to abdomen. Tip pointing SE, edge SW. Slender triangular whittle tang (L 38 mm), no choil and straight shoulder at 90° angle (would have been entirely covered by horn handle, which extends onto blade by another 3 mm from top of shoulder near back; very clear line visible in corrosion products). Edge straight and back gently sloping down to tip in line with edge. Leather remains of sheath and horn remains of handle on both sides
Drinkall D1. Evison 4. Blakelock & McDonnell B. Böhner C. Wt 14 g; L 105.7 mm, W 13.8 mm

ON 121: Copper alloy repair patch, in cluster of objects near N edge of grave, W of l lower femur. Folded from rectangular sheet (T 0.3–0.5 mm), outer edges with holes in corners for tubular rivets, right head folded over, the left is slightly splayed but still open, its shaft reaching opposite hole, its tip bent at right angles on the outside; the left rivet broken before opposite side, but a bent tip present (no easy join apparent). MPO wood remains in box. Four additional sheet fragments include triangular shape like ON 117. Wt 2 g; L 16 mm, W 14.8 mm

ON 122: Copper alloy strip, in cluster of objects near N edge of grave, W of l lower femur. Sheet strip/?staple, top bar with one straight and one triangular side, one arm bent at right angle has blunt end, other arm and part of top missing. Wt 1 g; L 14 mm, W 2.7–6.3 mm, T 0.4 mm

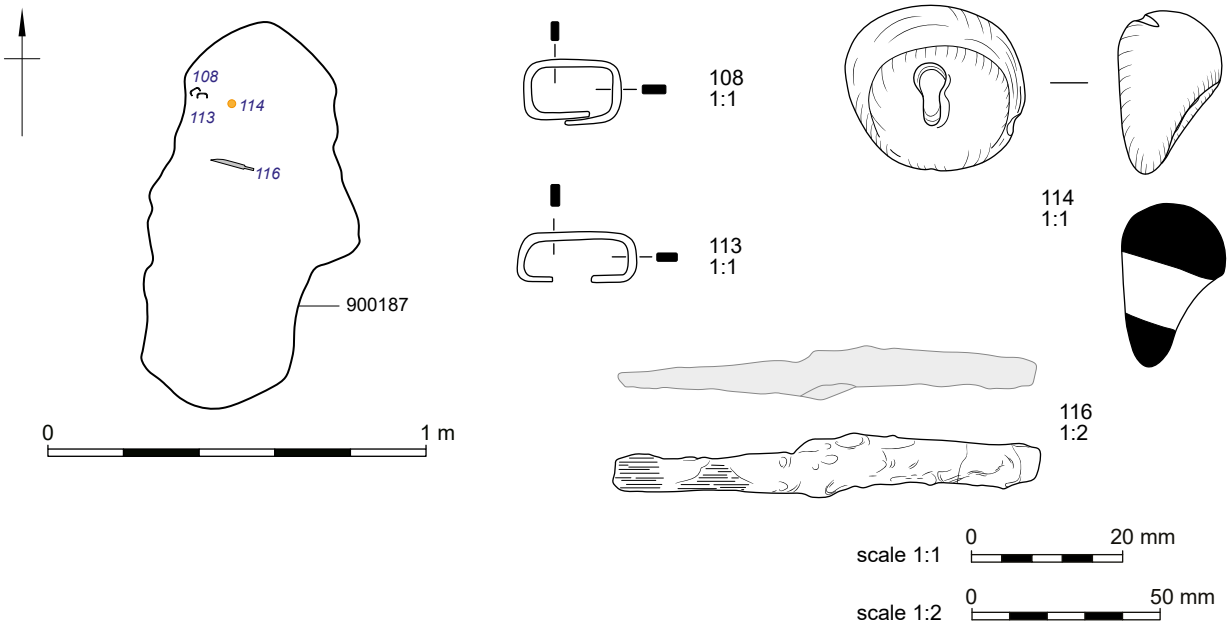


Figure 6.78 Grave 900187 with grave goods

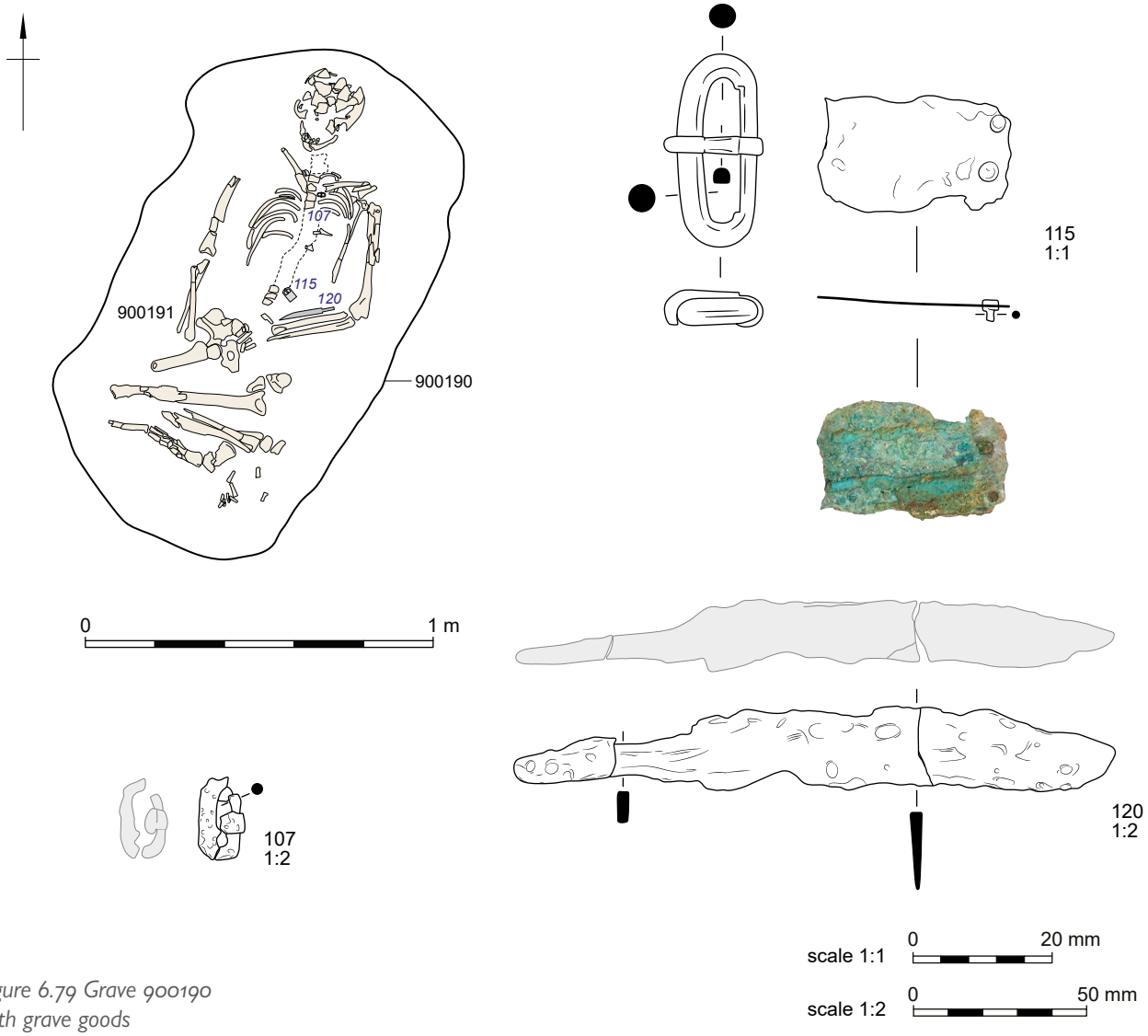


Figure 6.79 Grave 900190 with grave goods

ON 123: Copper alloy repair patch, in cluster of objects near N edge of grave, W of l lower femur
1) Repair patch folded from rectangular sheet (T 0.3–0.5 mm), outer edges with holes in corners for tubular rivets whose heads are spread out, the right one into flat triangles, the left is more bar-shaped, its shaft reaching opposite hole, its tip bent at right angles on the outside; the right rivet broken before opposite side, but a bent tip present (no easy join apparent). MPO wood remains on inside of bend
2) Iron staple fragments (3), flat rectangular-sectioned, MPO wood remains along 10.9 mm-long side, other side 12.3mm long. No obvious join for 2 fragments. Wt 2 g; L 16.7 mm, W 15.7 mm

ON 153: Copper alloy strip, described as 'attached to organic material', but location not recorded. Fine strip fragment, broken in half, but ends join. Wt 1 g; L 8.3 mm, W 2.7 mm, T 0.2 mm

ON 157: Iron buckle, in chest area, above (N) of r humerus. Pin pointing to r arm (SSE). Oval loop and folded rectangular plate, back plate appears tongue-shaped in x-radiograph, which also shows two rivets set inwards of corners far enough to reach back plate. Plate has recessed fold and rectangular gap for pin which does not extend beyond outer frame. MPO leather remains on both sides of buckle and plate
Marzinzik typegroup II.24b-i. Wt 5 g; L 26.7 mm, W 21.8 mm

ON 158: Copper alloy annular brooch, centrally in upper chest, neck area. Plain, round to oval-sectioned hoop (W 2.3–2.5 mm), plain round-sectioned pin with flat strip loop. Small, triangular casting fault (L. 1.45 mm) on inside of hoop. Outer diam./hoop W ratio=8.9%
Høilund Nielsen BR3-d. Wt 3 g; D 27.9–28.2 mm, T 1.9–2.6 mm

Animal bone: ABG 900124 (sheep l pelvis, ?adult animal. Pig l radius and ulna, juvenile animal); ABG 900164 (unidentifiable medium mammal-sized fragment)

Residual finds: 3 sherds of pottery of undetermined date

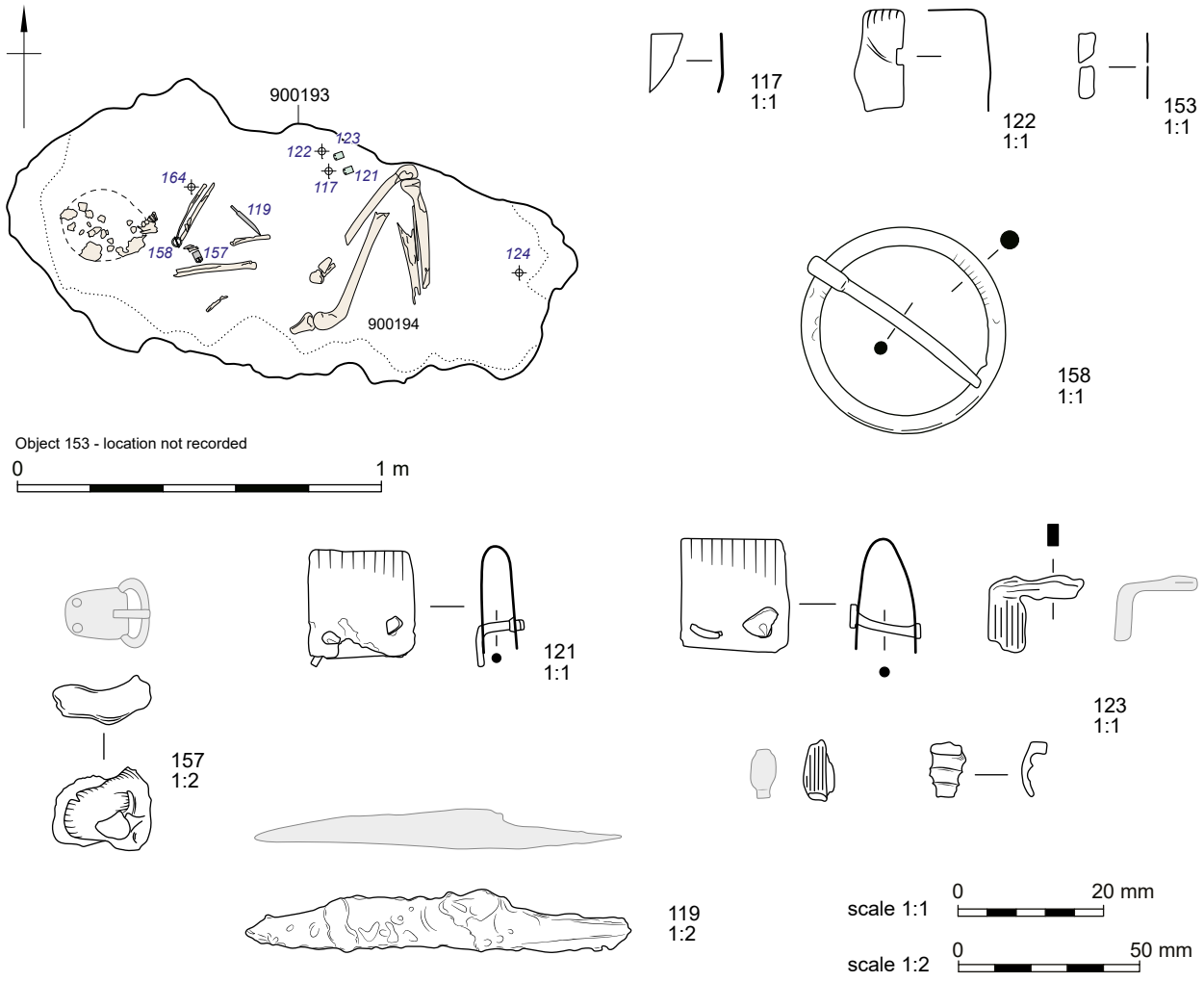


Figure 6.80 Grave 900193 with grave goods

Grave 900196 (burial 900197)
(Figs 6.81–2)
W–E; subrectangular, steep sides, flat base; 1.52 x 0.9 m, 0.38 m deep (base at 88.19 m OD); fill 900198

Human bone: tightly crouched to the left, right arm flexed at elbow and overlaying chest, L arm extended at side; 78%; adult 30–40 yr, male

Scientific analyses: DNA analysis

Grave goods:
ON 132: Iron staple, above l knee and N of l ulna. Rectangular parallel-sided bar, one arm embedded in corrosion products. Internal depth >11.1 mm. MPO wood remains orthogonally across inside of bar and arms. Wt 4 g; L 32.1 mm, W 7.5 mm, T 3.3 mm
ON 134: Iron staple, near (NW of) l elbow. Rectangular parallel-sided bar, one arm embedded in corrosion products. MPO wood remains orthogonally across inside of bar and arms. Wt 4 g; L 10.7 mm, W 7.1 mm, T 4.6 mm
ON 136: Iron bracket, near (S of) l elbow. Fragment, flat rectangular cross-section, two arms at right angles. Wt 1 g; L >18.7 mm, W 6.7 mm, T 4.8 mm
ON 138: Copper alloy repair clip, below (E) of r knee. Tongue shape, folded out of metal strip (T 0.6 mm) with rounded ends, front end splayed outwards. Round rivet holes (diam. front 1.4 mm, back 1 mm). MPO ?wood remains with transverse grain structure. Wt 1 g; L 19.4 mm, W 7.9 mm, T 4.3 mm
ON 139: Copper alloy repair clip, in area of lower legs. Tongue shape, folded out of metal strip (T 0.5 mm) with rounded ends. Round-sectioned, flat-headed rivet (diam. head 2.4 mm, back 2.34 mm, shaft 1.5 mm). Wt 1 g; L 14.5 mm, W 7 mm, T 5 mm
ON 140.1: Iron knife, in front of abdomen above r wrist, tip ?pointing to wrist (ESE), edge SSW. Low-set triangular whittle tang (W 16.4 mm), shoulder angled at *c.* 60°, horn handle continues

another 5 mm beyond where shoulder meets straight back which curves down in last 1/4 to missing tip, probably in line with straight edge which is slightly higher than handle. Blade L >86.5 mm. MPO remains of leather sheath and horn handle on both sides
Drinkall D1. ?Evison 4. Blakelock & McDonnell B. Böhner C. Wt 34 g; L >134.7 mm, W 17.9 mm

ON 140.2: Iron nails, associated with ON 140.1
1) Staple-like with flat tapering shaft, angled head and tip bent at right angle in opposite direction (L. 26.9 mm)
2) Nail with club-shaped head, rectangular-sectioned shaft and tip bent at right angles. L 17.3 mm
Both nails with MPO wood, longitudinal grain running orthogonal to shaft. Wt 2.4 g

ON 140.3: Iron staple, associated with ON 140.1 Flat strip section and obliquely angled tip, opposite tip missing. Wt 1.5 g; L 34.9 mm, W 6.1 mm

ON 141: Stone smoothing stone, placed on larger chalk lump, N of l ulna. Lump of quartzitic stone, outer side with convex profile, appears smoothed, other surfaces rough, broken, one with calcareous precipitate. Wt 14 g; L 30.2 mm, W 21 mm, T 16.6 mm

ON 161.1: Iron ferrule, below (E) of r knee. Tubular socket, slightly tapering socket (internal diam. 10 mm) appears to only extend about halfway down the cylindrical part, square-sectioned spike with blunted/rounded tip. Wt 38.1 g; L 119 mm, W 12.8–16.1; 6.3–7.2 mm

ON 161.2: Copper alloy repair clip, below (E) of r knee. Tongue shape, folded out of metal strip with rounded ends. Rivet with flat head, round-sectioned shaft, tip bent at right angles. Wt 0.6 g; L 17.9 mm, W 6.5 mm, T 3 mm

ON 162: Copper alloy staple, ?at E end of grave cut. Rectangular bar, arms at right angles and tips turned in at right angles. Internal gap 5.2 mm. MPO ?leather remains in box. Wt 1 g; L 18.5 mm, W 3.5 mm, T 0.7 mm

ON 163: Copper alloy staple, ?near NE corner of grave cut. Rectangular, slightly swollen bar, arms at right angles and tips (L both 8.9 mm) turned in at right angles. Internal gap 3.6–4.7 mm. Wt 1 g; L 25.8 mm, W 4.6 mm, T 0.9 mm

ON 167: Copper alloy staple, ?near NE corner of cut. Rectangular parallel-sided bar, arms at right angles and tips (L 4.9 mm & 6 mm) turned in at right angles. Internal gap 3.1–3.4mm. Wt 1 g; L 19.6 mm, W 2.2 mm, T 0.7 mm

ON 171: Copper alloy staple, near feet bones at E end of grave. Rectangular parallel-sided bar, arms at right angles and tips (L 5.7 mm & 8.1 mm) turned in at right angles. Internal gap 4–5.2 mm. Wt 1 g; L 22 mm, W 4.4 mm, T 1 mm

ON 174: Copper alloy 'W'-shaped strips, below (E of) r knee. 2 strips, both complete (L 7.2 mm & 7.7 mm, W 2.8 & 2.9 mm, T 0.4 mm & 0.3 mm). Wt 1 g

ON 178: Copper alloy staple, ?in area of r shin. Rectangular parallel-sided bar, arms at right angles and tips (L 2.3 mm and 3.8 mm) turned in at right angles. Internal gap 6–6.5mm. Wt 1 g; L 20 mm, W 3 mm

Animal bone: ABG 900180 (sheep ?r radius, ?juvenile animal); ABG 900181 (sheep r humerus, ?juvenile animal)

Residual finds: 8 pieces of iron and 1 sherd of pottery (possibly Roman)

Phase: Early–Middle Anglo-Saxon; 1412±24 BP – cal. AD 600–660 (SUERC-126525), *cal. AD 635–655 (68% probability)*

Grave 900205 (burial 900206)
(Fig. 6.83)
NNW–SSE; sub-oval, steep sides, flat base; 1.8 x 0.7 m, 0.23 m deep (base at 88.45 m OD); fill 900207

Human bone: torso supine, lower limbs tightly flexed to the right and drawn up, skull slightly slumped forward, possibly wedged up against head end of grave; L upper limb flexed at elbow with forearm crossing at waist and L hand above R pelvis; R upper limb extended along the R side of the body with hand overlaying R pelvis; 80%; adult 22–28 yr, ?male

Scientific analyses: isotope analysis (Sr/O)

Grave goods:

ON 187: Iron buckle, at top of chest, below (S of) jaw. Orientation ? Description from x-radiograph: Buckle with thin oval loop and rectangular plate, loop might have folded back onto plate
Possibly Marzinzik typegroup II.19a. Wt 7 g; L 36 mm, W 24.2 mm

ON 188: Copper alloy buckle, left of l sacral wing, pin pointing WNW. Tongue-shaped plate (L 12.7 mm, W 8.3 mm) and one flat-domed rivet, 'D'-shaped loop (L 6.3 mm) with recessed axis, ends join below 'D'-sectioned tongue with squared base
Marzinzik type II.22a. Wt 1 g; L 17.7 mm, W 11.7 mm

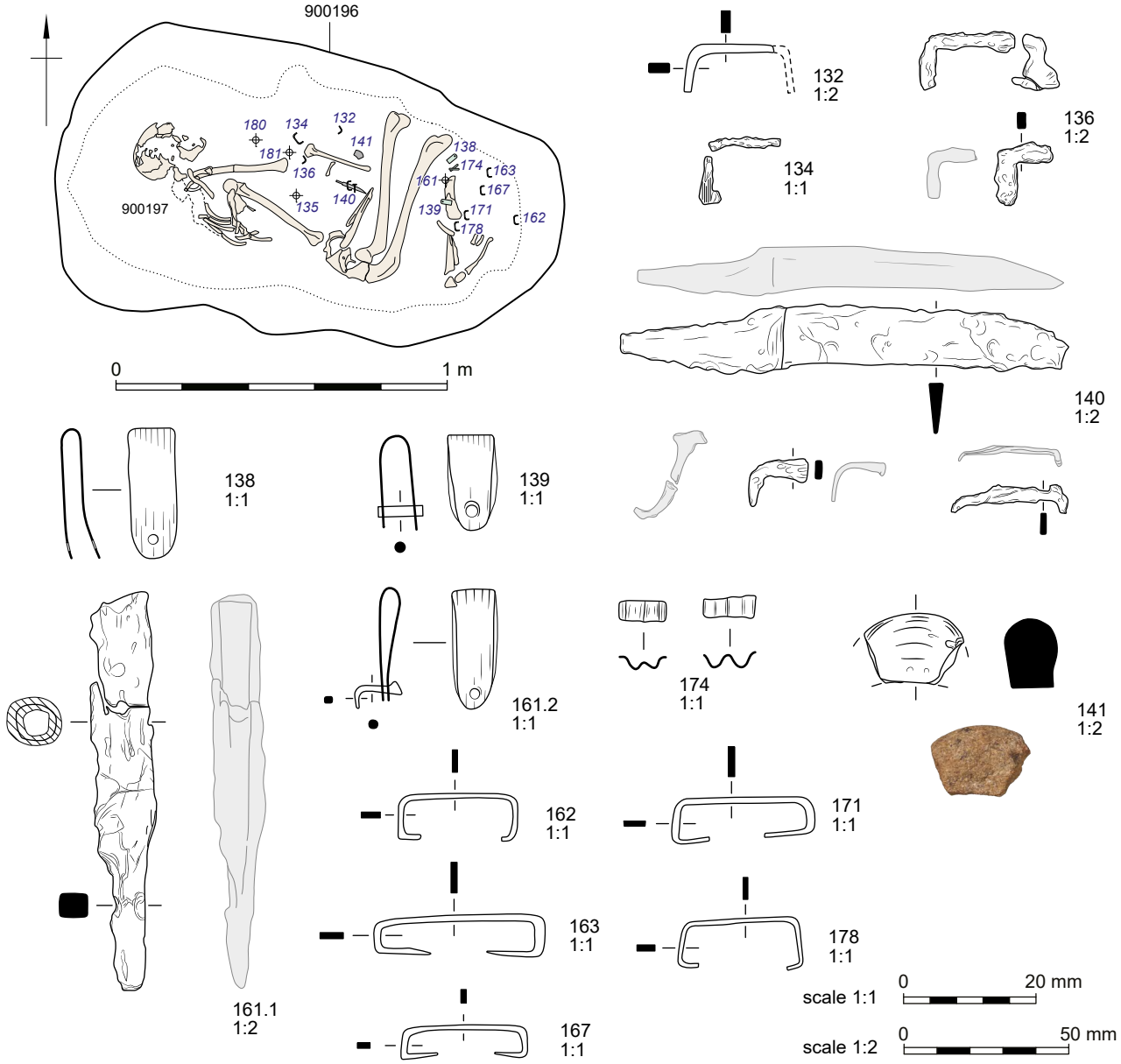


Figure 6.81 Grave 900196 with grave goods



Figure 6.82 Burial 900197 (grave 900196), view from south-east (1 m scale)

ON 189: Iron knife, at l waist, below (S of) l elbow and above l hip. Tip N towards elbow, edge W. Triangular whittle tang (L 36.6 mm, W 5.8–11.7 mm) set low; shallow concave choil and long obliquely sloped shoulder; blade (L 42 mm) concave edge and straight back, the latter abruptly curving down in last 1/4 to meet tip in line with edge. Blade has MPOR of ?leather, tang has ?horn handle
Drinkall E1. Blakelock & McDonnell B; ?Evison 4? Böhner C? Wt 14 g; L 78.6 mm, W 19 mm, T 6.5 mm

Residual finds: 2 copper alloy pieces, iron nail (shaft and tip? Wt 1 g)

Phase: Early–Middle Anglo-Saxon; 1365±20 BP – cal. AD 640–760 (SUERC-126526); *cal. AD 645–660 (68% probability)*

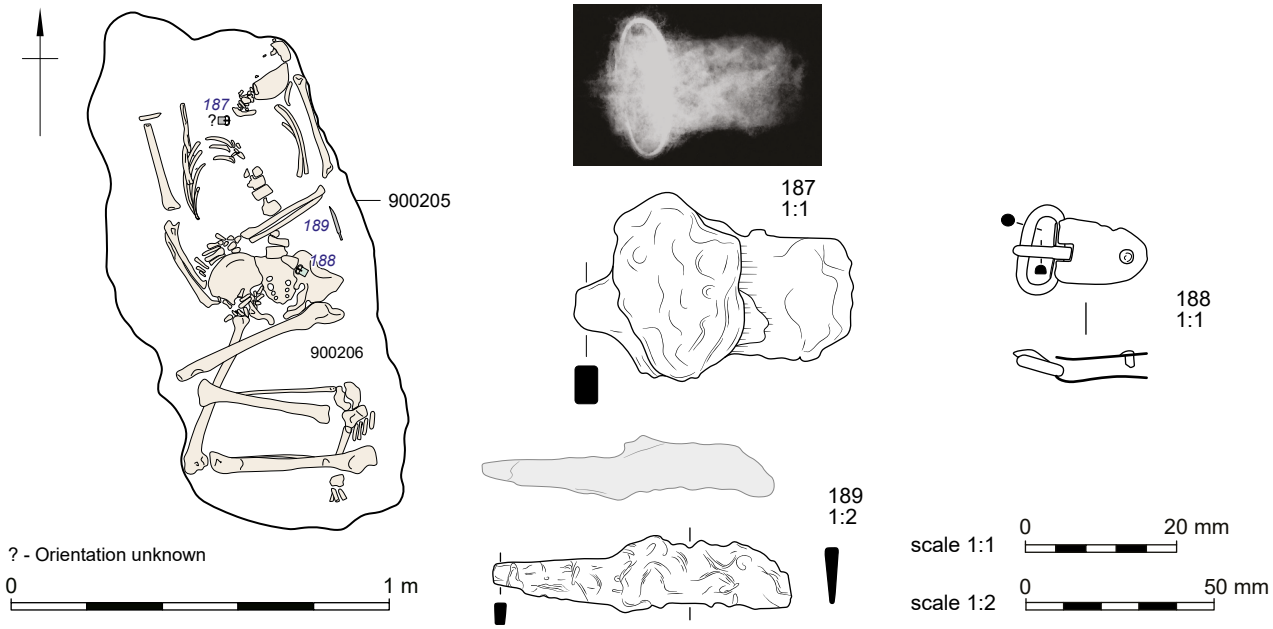


Figure 6.83 Grave 900205 with grave goods

Cheals Close

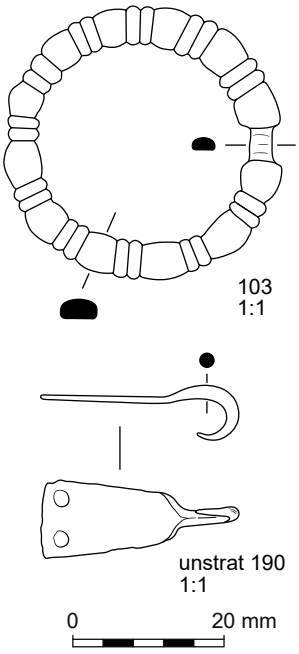


Figure 6.84 Other finds from Callow Carr

Prehistoric Finds

A small assemblage (13 pieces) of struck flint was recovered from Cheals Close. Although this was recovered from either the topsoil or cut features of probable or provably later date, the material adds to the impression of activity in the surroundings in prehistory.

Only one feature could have been prehistoric to judge by its finds assemblage: pit 180034 (1.7 m diam. x 0.35 m deep) adjacent to the central/southern site limit contained prehistoric pottery as well as animal bone and a piece of lead in its mid-greyish-brown silty sand fill. The presence of the lead might signal a later date, although an Iron Age date is not out of the question. Whichever, Cheals Close is not a site whose interest lies in its prehistoric component.

Romano-British Fields

The Interconnector crossed a field system of potential Romano-British date close to the stream at the eastern side of the site. Although Romano-British finds were the latest recovered from its components, dating evidence was on the whole sparse.

Ditch 180627 contained one piece of Romano-British CBM, two sherds of Roman pottery (one of which was a sherd of samian), along with animal bone. It formed a 'T'-junction with ditch 180626 to the west; this contained no finds save for

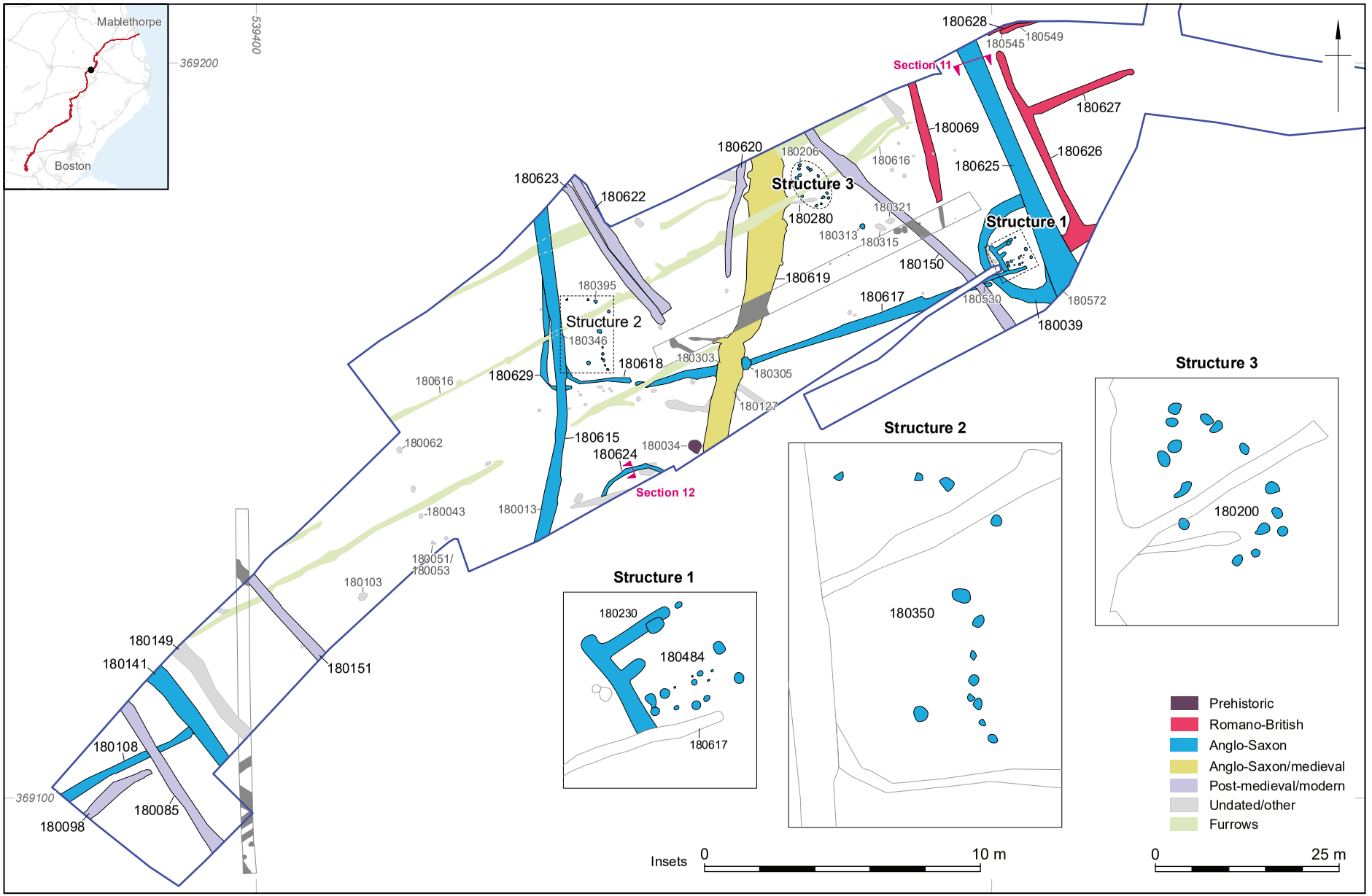


Figure 6.85 Cheals Close: plan showing all features

animal bone. A second 'T'-junction lay to the south, although little of it was seen because of the limits of the site and the presence of later features. No finds were recovered from this second cross-member.

Approximately 12 m to the west of ditch 180627 lay another potentially contemporary feature: ditch 180069 contained pottery of Romano-British date, along with animal bone, slag and lead.

A Romano-British date has been cautiously ascribed to two gullies at the northern edge of the site on the basis of their shared alignment with ditch 180627. Of the two, 180545/180549 was the earlier, having been recut on its northern side by 180628. No finds other than animal bone were recovered from this pair of gullies.

A brick of Romano-British appearance recovered from an isolated pit towards the western end of the site (180103: 1.4 x 1.08 x 0.28 m) provides further evidence of activity around the same time, even if the finds assemblage from the feature was chronologically mixed overall.

Anglo-Saxon Settlement

Cheals Close was one of the few locations on the Interconnector route where evidence of Anglo-Saxon settlement was recovered. The remains comprise the traces of three post-built structures and various ditches and gullies, as well as finds (largely ceramics), with much of the pottery coming from ditches of obviously later date. Four radiocarbon dates support the ceramic evidence in identifying Anglo-Saxon (*8th–9th century cal. AD*) activity on the site.

Structures and enclosure

Structure 1 (180230/180484)
Together, 'F'-shaped footings trench 180230 (8.0 x 1.0 x 0.4 m; Fig. 6.87) and posthole group 180484, located in the eastern part of the site, may represent a structure. The 20 postholes forming group 180484 were typically 0.35 m in diameter by 0.15 m deep, with 'U'-shaped profiles and grey sandy clay fills. They had an overall ENE/WSW alignment, which echoed the 'arm' of the 'F'-shaped footings trench 2 m to the north, suggesting an overall square form (approximately 4 m by 4 m) for the postulated building. No artefacts were recovered from these features. Although their date is uncertain, they appear to be relatively early for this site, as they are among the stratigraphically earliest features encountered. The building was probably partially enclosed by 'C'-shaped ditch 180039 (Fig. 6.88). This had a length of some 20 m, although it was less clear in the southern part. It had a shallow, dish-shaped profile (1.7 m wide by 0.29 m deep) and a sandy greyish-brown fill; the only find from it was a large fragment of iron.

Both 'C'-shaped ditch 180039 and footings trench 180230 had been cut by ENE/WSW-aligned gully 180617 (0.45–1 m wide by 0.1–0.25 m deep), which extended for 55 m across the site. Gully 180617 contained pottery of late 7th to early/mid-8th-century date, along with animal bone.

Structure 2 (180350)
After a gap of 0.5 m, the westward course of gully 180617 was continued by gully 180618 (0.59 m wide by 0.12 m deep), which at its western end appeared to turn to the north, although its original extent had been obscured by a later ditch (180615). Because of their proximity and similarity in form, a nearby 'hockey stick'-shaped gully (180629: 17.3 x 0.83 x 0.17 m) may have been associated with 180618, with one being a replacement of the other, but the disruption from ditch 180615 (which cut both) prevents any clarification. Both gullies 180618 and 180629 contained a brownish-grey silty sand fill, although that within 180629 was slightly darker, implying they did not fill up at the same time or by the same process.

It may be that together gullies 180617 and 180618/180629 defined the south-western part of a rectangular enclosure that occupied much of the central part of Cheals Close. A right-angled arrangement of postholes (collectively 180350) represents the second of the three structures exposed on the site. This would have stood in the corner of the proposed enclosure, and measured 10 m north–south by 6.2 m east–west. Any western side to the posthole structure would have been removed by ditch 180615, however. Alternatively, the postholes may have formed a fenceline that formed a subdivision within the proposed enclosure's south-western corner. Posthole group 180350 comprised 14 features; all were slight, generally around 0.35 m in diameter by 0.2 m deep. Two radiocarbon determinations from two different species of cereal grain from posthole 180395 date its infilling to the *8th–9th century cal. AD* (UBA-52907). No other dating evidence was obtained.

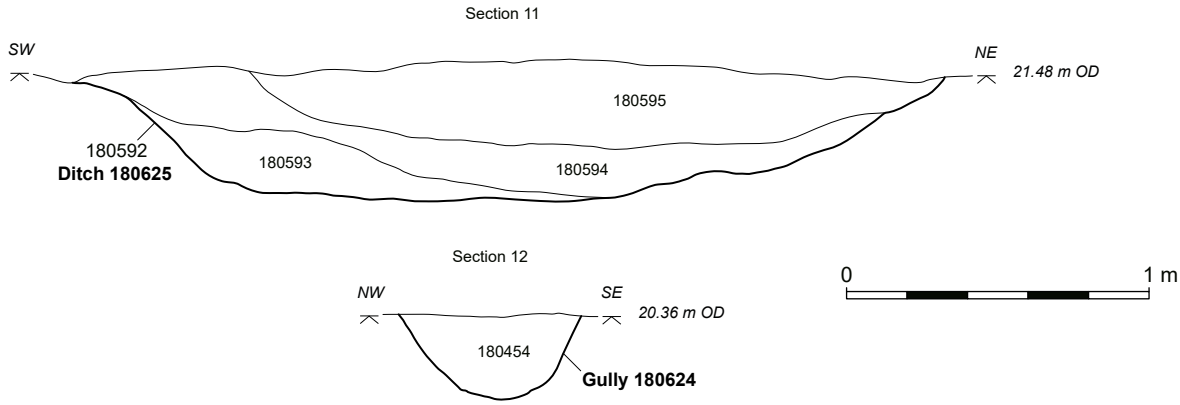


Figure 6.86 Cheals Close (sections)



Figure 6.87 'F'-shaped footings trench 180230, view from north-east (2 m scale, 1 m scale)

The eastern side of the enclosure may have been marked by a more substantial boundary: north-west to south-east-aligned ditch 180625 (> 37 x 2.9 x 0.6 m; Fig. 6.86.11). This also appeared to post-date 'C'-shaped ditch 180039, although no direct relationship was investigated. Ditch 180625 contained shell-gritted pot sherds of 8th-century date, animal bone and some worked flint.

Structure 3 (180200)

An oval arrangement of postholes (180200) close to the northern edge of site is thought to represent a third structure (Fig. 6.89). Its long axis was oriented north-west to south-east and it measured 6 m long by 3.2 m wide. Structure 3 comprised 15 postholes (typically 0.35 m diam. x 0.15 m deep); apart from a fragment of animal bone and a piece of lead alloy metalworking waste, all were artefactually sterile. The postholes were fairly irregularly spaced, with a 2 m-wide gap in the south-western corner, possibly signalling the former position of an entranceway. A pea (*Pisum sativum*) from posthole 180206 within this arrangement was radiocarbon dated to the Late Anglo-Saxon period (UBA-52958).

Other Anglo-Saxon features

Approximately 15 m to the south of the south-western corner of the Anglo-Saxon enclosure proposed above, other contemporary remains were recorded. Here, curvilinear gully 180624 extended beyond the southern edge of site. It may have formed a ring gully with an internal diameter of 10.5 m, although this is speculative, given how little was visible. The gully itself was 0.56 m

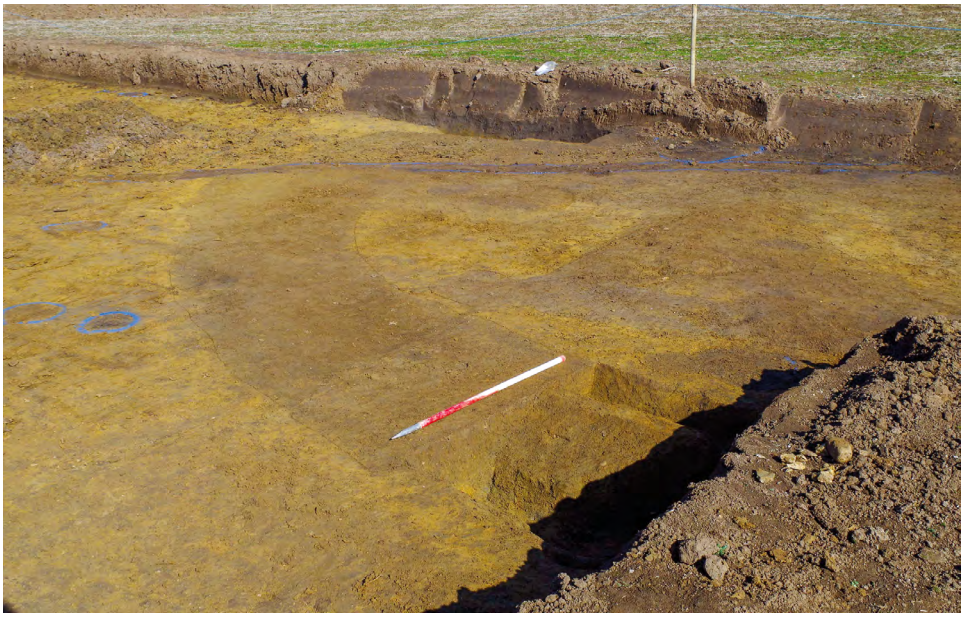


Figure 6.88 Ditch 180039, view from the south (1 m scale)



Figure 6.89 Structure 3 (posthole group 180200), view from the south-east (1 m scale)

wide by 0.23 m deep with a bowl-shaped profile (Fig. 6.86.12) and a mid-greyish-brown silty sand fill. The artefactual assemblage comprised a rim sherd from a pottery vessel of mid-8th to mid-9th-century date.

An isolated posthole (180313: 0.9 x 0.6 x 0.11 m) with a dark, charcoal-rich fill contained remains of rye (*Secale cereale*) that have been radiocarbon dated to *cal. AD 770–880* (UBA-52900), indicating it belongs to the site's Anglo-Saxon phase, and confirming the local cultivation of rye at that time.

Ditch 180141 crossed the site close to its western edge on a north-west to south-east alignment and contained a single pottery sherd of possible 8th-century date and four joining fragments of a loomweight of Anglo-Saxon appearance. With no later material from the feature, it is feasible that it was an element within an early medieval scheme of enclosure. Ditch 180141 cut ditch 180108 to the west, and as the two formed a 'T'-junction, it is possible that they had once been contemporary, albeit with the maintenance of 180141 continuing after 180108 had become infilled. Other than a broken flint flake, ditch 180108 was artefactually sterile. Ditch 180149 was parallel with ditch 180141, the two just 2–2.5 m apart, and both contained similar fills of greyish sandy clay. They may, therefore, have formed a double-ditched boundary, but with no finds other than animal bone from ditch 180149, this is uncertain.

The western side of the proposed Anglo-Saxon enclosure had been largely erased by later ditch 180615, which extended its line to the south. The enclosure's southern side (here marked by gully 180617) had been cut by the similarly aligned ditch 180619, which dominated the centre of the site. Ditch 180619 was the most substantial ditch excavated at Cheals Close (up to 4.5 m wide and 0.9 m deep) and produced a correspondingly large finds assemblage that included pottery of Romano-British, 8th-century and later medieval (late 13th–14th century) date, a ceramic loomweight and fragments of copper alloy. By contrast, the latest datable finds from ditch 180615 were Anglo-Saxon pottery. The construction of both 180615 and 180619 clearly marked the redundancy of the earlier layout of the site. One possibility is that these ditches were dug to separate the stream from cultivated land, and the shifting of the stream channel over time necessitated a renewal of the boundary. Both ditches eventually fell out of use, however. The remains of three or four furrows were recorded crossing the site on an ENE–WSW alignment, and one of these (180616) cut across ditch 180619 (no clear relationship could be discerned where the same furrow cut ditch 180615). The furrows are presumed to be medieval–post-medieval in date and supplied a small, mixed pottery assemblage of Anglo-Saxon and medieval sherds.

Post-medieval/Modern

After a period of possibly several hundred years, ditches were again dug on the site, with some of these (e.g., 180150, 180151, 180620, 180622/180623) clearly post-dating the furrows. The finds evidence is insufficient to provide a more precise date, however, as only animal bone was present in these features in any quantity.

Two ditches at the western end of the site can be said with more certainty to have formed part of a field system within the post-medieval period. The course and position of ditch 180085 match a field boundary shown on historical maps from the 19th century until at least the 1940s. It contained medieval pottery (late 13th–15th century), Romano-British CBM and a horseshoe from a modern heavy horse. Ditch 180098 followed a perpendicular alignment and its terminal appeared to respect ditch 180085. Although it does not appear on the historic mapping, its layout in relation to ditch 180085 suggests that it too was a modern feature.

The site was raked by modern land drains (not illustrated), their north-west to south-east alignment askew to the general grain of the site's historical boundaries, indicating that a further change in how the land is worked has occurred in more recent years.

Undated

An alignment of four pits/postholes (180062, 180043 and 180051/180053, plus one unnumbered) crossed the site on a NNW–SSE alignment towards the western end. The individual features were set 4–5 m apart; they had an average diameter of 0.6 m, with depths varying from 0.11 m to 0.32 m. The southernmost posthole appeared to have been replaced, but no relationship was visible between the two features (180051/180053), and no finds were present. It is possible these features represented a former fenceline.

Mown Rakes

Pre-Conquest Origins

Activity in this part of the landscape probably preceded the Roman Conquest, with curvilinear ditch 530296 (2.5 m wide by 0.51 m deep) in the centre of the Mown Rakes area forming an early focus (Fig. 6.94). This seemed to define part of a subcircular



Figure 6.90 Mown Rakes: site location and overview

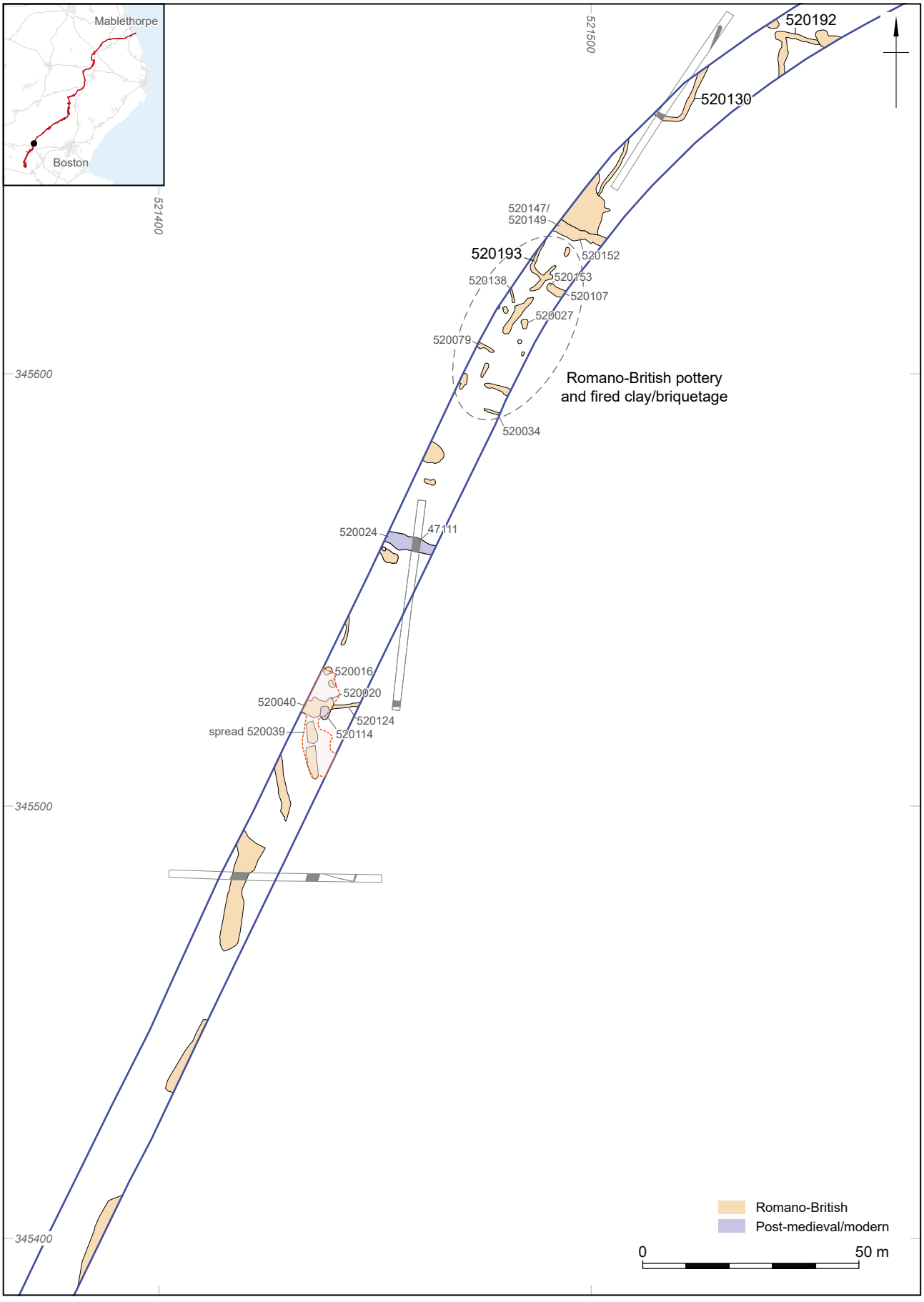


Figure 6.91 Mown Rakes: detail plan (northern area)

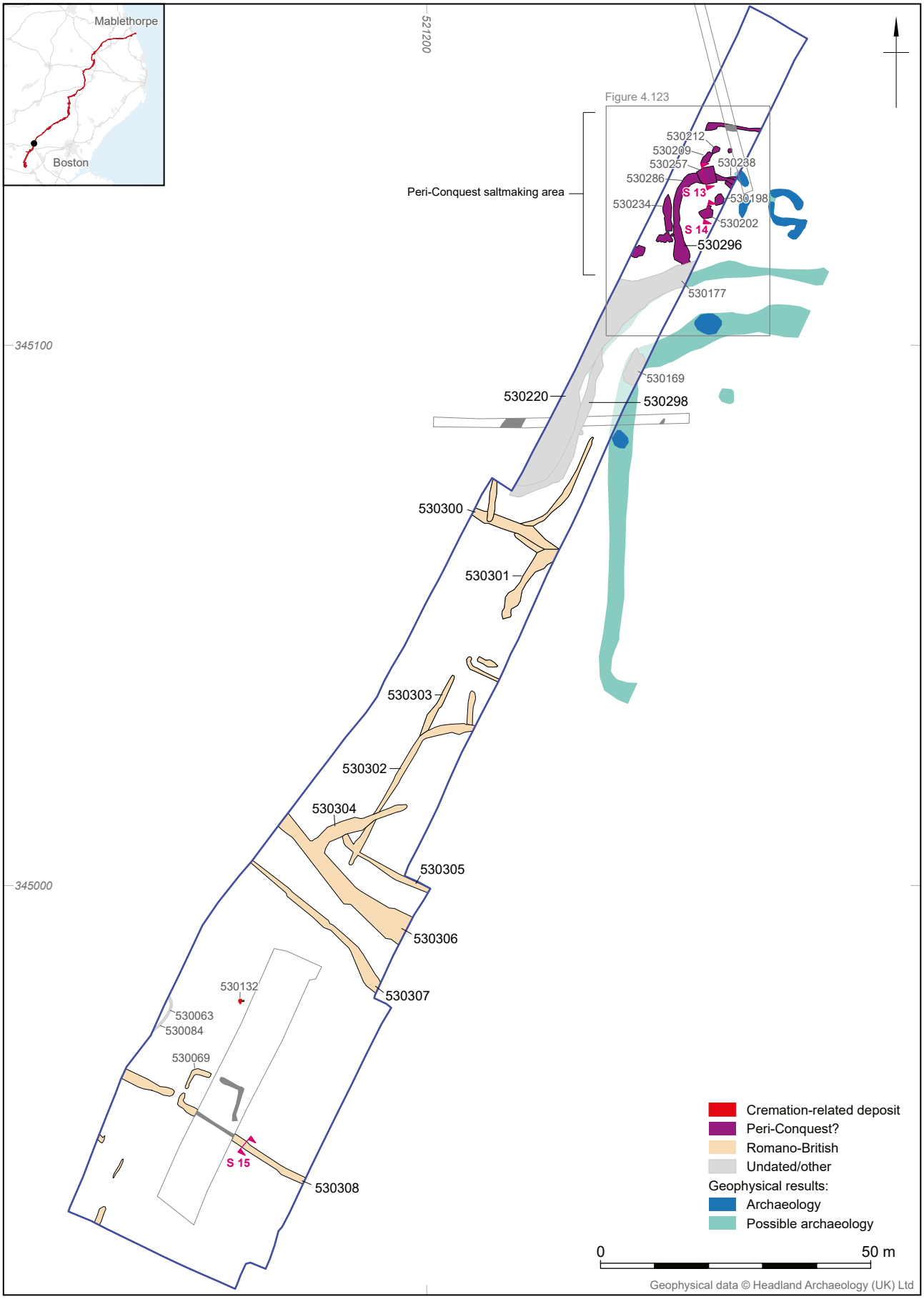


Figure 6.92 Mown Rakes: detail plan (central area)

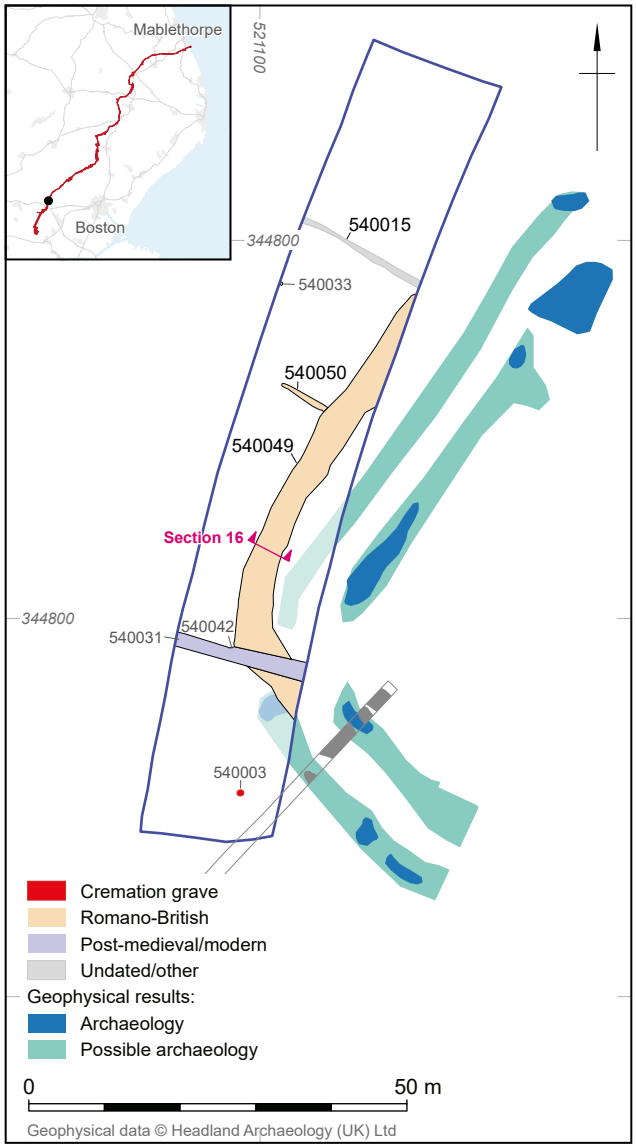


Figure 6.93 Mown Rakes: detail plan (southern area)

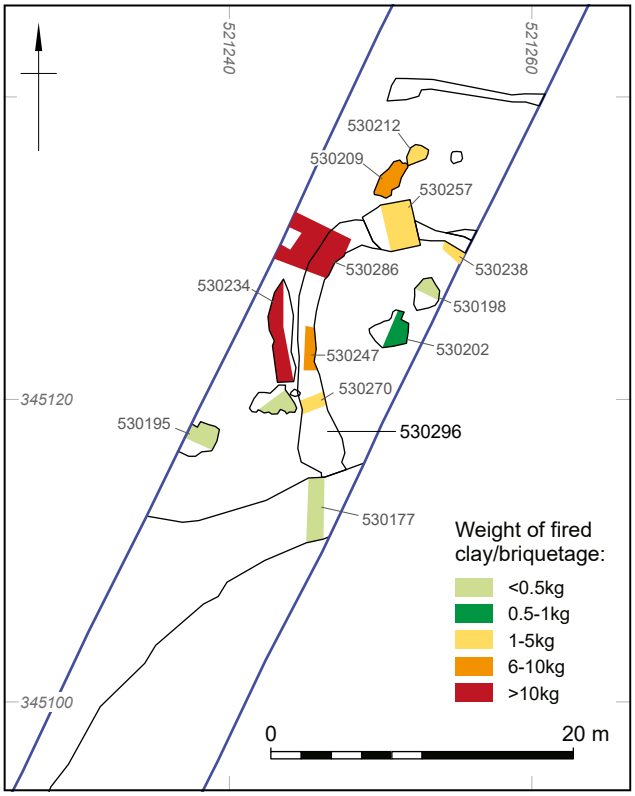


Figure 6.94 Mown Rakes: saltern area

enclosure that extended beyond the eastern site limits. It contained two sandy reddish-grey silt fills in most excavated slots, with some evidence of recutting. Three radiocarbon dates (FTMC-MB96-1, 1984±30, UBA-52951, 2037±25; UBA-52952, 2007±24) from two different types of material (charred *Bromus* sp. grain and wood charcoal) from the same fill of slot 530286 across this feature all straddle the Iron Age/early Roman transition, although when modelled (68% probability) have a pre-Conquest date range of *40 cal. BC–cal. AD 25*. A stratigraphically later fill from the same intervention returned a slightly later date: *cal. AD 25–125* (UBA-52888).

A shell-gritted sherd of prehistoric appearance found redeposited alongside later (Romano-British) sherds 190 m to the south in ditch 530308 could also signal an early presence on the site.

Saltmaking

The presence of briquetage suggests saltmaking was a key activity at Mown Rakes at the time indicated by the radiocarbon dates. Indeed, the dated *Bromus* sp. grain mentioned above (FTMC-MB96-1) was extracted from a piece of the saltmaking ceramic. Although briquetage was widely spread, it was focused on the area of the radiocarbon dated ditch (530296, Fig. 6.94) and five nearby pits – 530209 (Fig. 6.96), 530212, 530234, 530238 and 530257 – which together provided over 90% of the briquetage and fired clay from Mown Rakes. None of the pits contained pottery, so it is feasible that all belonged, with ditch 530296, to that part of the site's history that pre-dated the dispersal of Romano-British ceramics.

These pits were large (typically 1.5–3 m across), but relatively shallow (0.40 m). Some (530234, 530238 and 530257) cut the ditch (Figs 6.95.13 and 6.97) so could not have been functionally associated with its use, whereas those that did not cut the ditch may have been. Pits 530198 and 530202 (Fig. 6.95.14) were located within the area enclosed by the ditch, which does suggest a functional relationship between them and the ditch, and they also contained

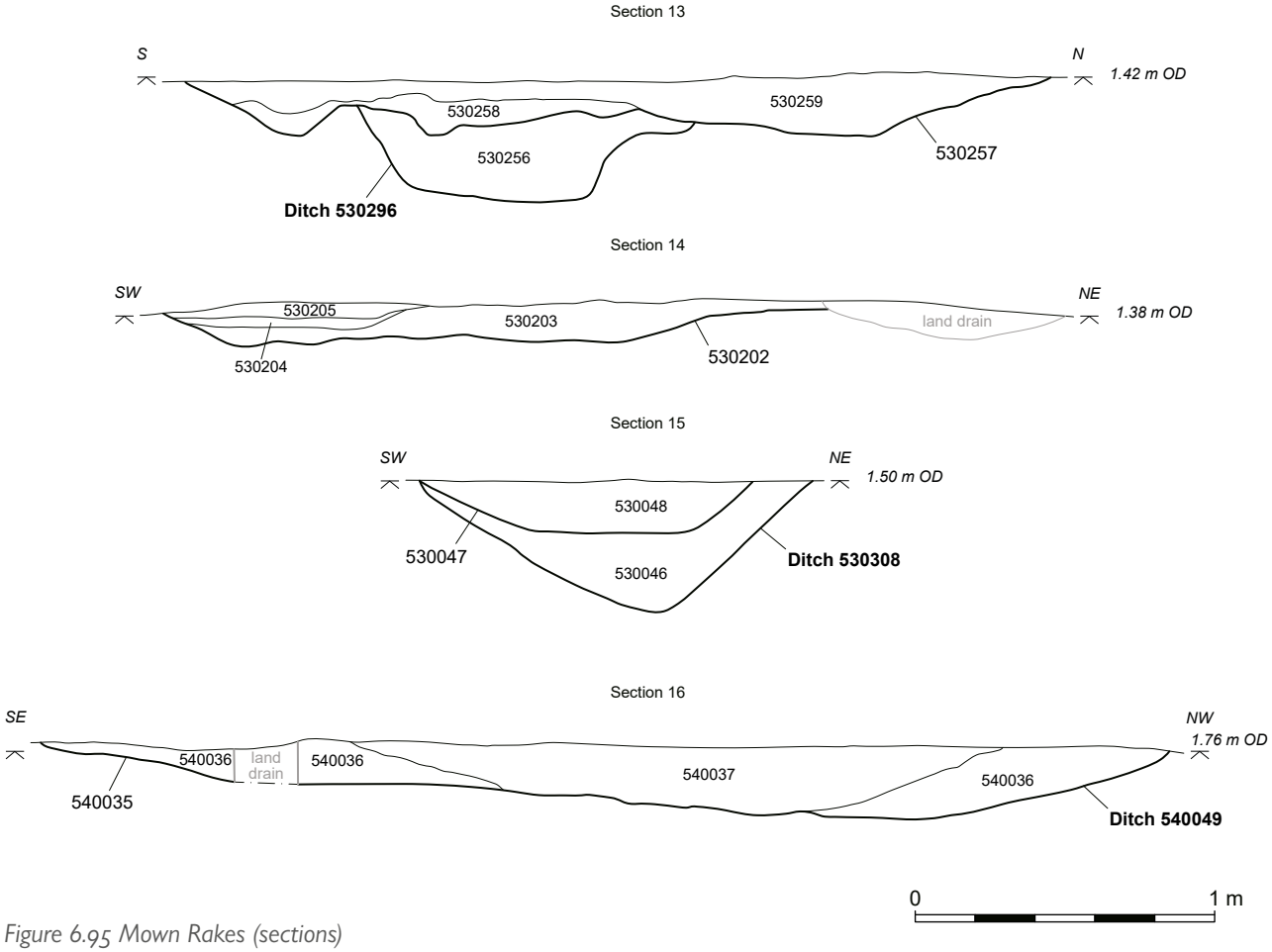


Figure 6.95 Mown Rakes (sections)



Figure 6.96 North-west-facing section of pit 530209 (1 m scale)



Figure 6.97 Pit 530238 with distinctive upper fill cutting ditch 530296, view from west

briquetage, albeit in smaller amounts than the other features described. All pits in this part of the site contained mid-reddish-grey sandy silt fills with charcoal. The upper fill of pit 530238 comprised a distinctive brick-red heat-affected clay.

To the immediate south of ditch 530296, a large meandering ditch (530298: >50 x 2.79 x 0.32 m) does not seem associated with the saltmaking activity and may have been later: it contained just three pieces of fired clay and had cut ditch 530296. A pond (530220: 30 x 10 x 0.65 m; Fig. 6.98) to the immediate west of the meandering ditch also lacked briquetage and so cannot be linked with the saltmaking, although the types of forams (single-celled organisms) recorded within the feature indicate brackish estuarine or marsh conditions in the past (BioChron 2025). The date of these features is, however, uncertain because of a lack of artefactual evidence. A smaller pond or waterhole, 530169 (5.36 x >3.06 x 0.49 m; Fig. 6.99) was located to the east of the meandering ditch. Animal bone was recovered from its dark brown sandy silt fill. These three features (530169, 530220 and 530298) were possibly components of a wider scheme of enclosure and water management, perhaps associated with the saltmaking activity. The geophysical survey evidence from the wider construction corridor suggests 530298 may have tracked around a rectangular enclosure partially seen to the east, with pit 530169 corresponding with the location of the enclosure itself (Fig. 6.92).



Figure 6.98 Pond 530220 and ditch 530298, view from south (2 x 2 m scales)



Figure 6.99 Pond 530169, view from the south-west (1 m scale)



Figure 6.100 South-west-facing section of pit 520027 (1 m scale)

Romano-British

Saltmaking

A second focus of saltmaking was present at Mown Rakes, 540 m to the north of that discussed above, in the northern of the three excavation areas (Fig. 6.91). This appears to have been a secondary concern, however, as just 3.8 kg of briquetage was found, in comparison to the over 50 kg collected from in and around ditch 530296 (see above). A second point of contrast was that the briquetage at the northern area was found alongside Romano-British pottery (mid-2nd–3rd-century where closely datable), suggesting it post-dated the main saltmaking activity around ditch 530296, potentially by a century or so.

Over 1 kg of briquetage was recovered from gully 520079/520138 (>4.15 x 0.7 x 0.33 m) which extended into the excavation area from the west. Most of the rest of the briquetage from the northern area was recovered from lozenge-shaped pits and short lengths of gully, such as 520193 (>13 x 0.83 x 0.26 m), 520027 (2 x 1.47 x 0.6 m; Fig. 6.100) and 520153 (>4.3 x 2.03 x 0.55 m). Again in contrast to the main saltmaking area, there was less evidence of heat-affected fills, with a mixture of dark and pale grey silty sands instead, suggesting these features contained redeposited debris from saltmaking, rather than the area representing a saltern itself.

A broadly east–west recut ditch (520152/520147) appears to have marked the northern boundary of the northern/mid-Romano-British saltmaking area. The original ditch was relatively large (2 m wide by 1 m deep) and had been recut by a slighter ditch (520147: 1.1 m wide by 0.4 m deep) on its northern side. Pottery of the mid-2nd–3rd century AD was recovered from both the original ditch and its recut, the latter also containing a *tegula* of mid-2nd to mid-3rd-century AD date and a hook-rimmed mortarium stamped with a die of the potter Sarrivs, dated to AD 135–165.

A third and decidedly minor concentration of briquetage (< 500 g) was found 85 m south of the northern concentration and came from pit 520016, a dark grey and orange mottled silty clay layer (520039), and east–west ditch 520040/520124. No pottery was found in association with these features, although the east–west ditch contained articulated cattle bone (skull, mandibles and upper vertebrae).

Cremated human remains

Two deposits with cremated human bone were found at Mown Rakes (see McKinley below). One lay in the central of the three excavation areas, the other was situated 213 m away, in the southern area. Both returned Romano-British radiocarbon dates.

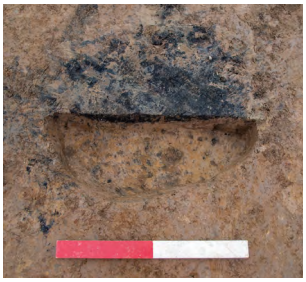


Figure 6.101 Cremation grave 540003 (0.2 m scale)

The northernmost was a cremation-related deposit (cremated human bone deriving from an adult aged 18–40 years) found in pit 530132 (0.92 x 0.6 x 0.15 m). The deposit comprised a brownish-black silt which contained frequent small fragments of bone and charcoal. Despite disturbance by ploughing and bioturbation, it provided a sizeable amount of cremated bone (161.4 g), although no artefactual evidence was recovered. Several possible stakeholes around the edges of the feature formed no obvious pattern and are thought to have been formed naturally by vegetation. A sample of cremated bone returned a radiocarbon date that, when modelled, appears mid-Romano-British (SUERC-126880).

The southern remains comprised a shallow grave 540003 (0.58 x 0.46 x 0.05 m; Fig. 6.101) containing an unurned burial and redeposited pyre debris. Animal burrowing had caused the partial spread of the material to the south-west. Most of the recovered human bone comprised small fragments, although there were some larger, more diagnostic pieces, such as teeth, in the north-western quadrant of the grave. The most identifiable bone fragments derived from an adult, possibly a male. Again, no datable artefacts were uncovered, with modelling of the radiocarbon result from the remains also indicating a mid-Romano-British date (SUERC-126881) and a period of *0–65 years* separating the deaths of the two individuals (see López-Dóriga below). Duplication of skeletal elements across the two features showed that they did not contain the remains of a single individual (see McKinley

below). Charcoal within the fill included large fragments of alder with evidence for insect burrowing. This would indicate the use of dead or rotten wood on the pyre, and a poor fuel source overall. The effects of this may be apparent within the bone, with some fragments being grey and others blue/black (i.e., not completely oxidised).

Field system

Given the narrowness of the Interconnector's stripped corridor it is difficult to gain much sense of the wider organisation of space at Mown Rakes, or what overall structures and divisions the exposed features formed part of. Some of the ditches and gullies, however, appear set out on a co-axial template (north-east to south-west/ north-west to south-east) and seem to offer glimpses of a gridded field system that once extended across the wider landscape.

Two right-angled ditches imply the presence of small rectilinear enclosures at the northern end Mown Rakes. A fragment of rim from a 2nd-century Black Burnished ware jar, along with animal bone, was found in the western example (520130: >30.2 x 1.26 x 0.24 m; Fig. 6.102). Its companion to the east (520192: >20 x 1.13 x 0.2 m) was undated, although it too contained animal bone.



Figure 6.102 Ditch 520130, view from the south-west (2 x 2 m scales)

Around 750 m to the south, to the immediate south of the peri-Conquest saltern area, the stripped corridor was crossed by several ditches on a north-west to south-east alignment (530300; 530305–530308), with one boundary running along the middle of the stripped area on a perpendicular orientation (defined by ditches 530301–530303). The cremation-related deposit described above (from pit 530132) lay in the middle of one of the potential fields created by these ditches.

A double-ditched boundary (530306 and 530307) may have formed the primary division, especially as its northern component was so substantial: 3.8 m wide by 0.9 m deep. No datable finds were recovered from either element, although a few sherds of Romano-British pottery were found in ditches 530300 and 530308; the most diagnostic wares span the late 1st to 3rd century AD. The perpendicular boundary line (530301–530303) contained pottery of a similar date. The various field system ditches at Mown Rakes therefore appear broadly contemporary and there was little sign of superimposition of boundaries. Ditch 530304 was the main exception and confirms some development of the arrangement over time. This lay askew to the co-axial template and cut ditches 530302 and 530305. Its southern end connected with 530306 (the northern side of the double-ditched boundary), the two appearing contemporary. The overall sequence may reveal that the perpendicular boundary line was a temporary subdivision.

Along with the cremation-related deposit, two other points of interest lay within the southern end of this arrangement. Ditch 530308 (>28 x 1.03 x 0.35 m; Fig. 6.95.15) had a small (9.5 x 6.7 m) rectilinear enclosure appended to its northern side. This subdivision is of unknown purpose, although both it and the longer ditch to which it was attached contained pottery dated to the 2nd or 3rd century. To the west of this, only partially exposed within the excavation area, was curvilinear gully 530063/530084 (>10 x 0.45 x 0.16 m). It may have defined a ring gully/roundhouse some 10 m in diameter but too little of it was seen to be sure, and it was artefactually sterile.

Finally with regard to field system elements at Mown Rakes, one turns to its southern limit, where a much larger curving ditch (540049: >58 x 2.93–4.62 x 0.17–0.49 m; Fig. 6.95.16) was exposed, continuing beyond the eastern site limit. It correlated with the geophysical data as the outer ditch of a possible double-ditched enclosure that mostly lay to the east of the scheme (Fig. 6.93). Recovered from its fills were animal bone, a piece of briquetage and a potsherd of late 1st to 2nd-century AD date.

Ditch 540049 cut a short length of gully (540050) which contained a single piece of pottery, a grey ware sherd datable only to the Romano-British period generally. The southern end of ditch 540049 had been cut by a modern ditch 540031/540042: see below), from which further Romano-British pottery was recovered, this material possibly having been disturbed from curvilinear ditch 540049.

Just to the north of ditch 540049, posthole 540033 and gully 540015 were both undated, and so not provably associated with the Romano-British field system at Mown Rakes.

Post-medieval/Modern

Beyond the ubiquitous impacts of the plough, there were few signs of any post-Roman activity on the site. A ditch (520024/47111; 3.1 x 0.72 m) on a broad east–west alignment matched a field boundary shown on 19th-century mapping; stoneware of 18th-century date recovered from the feature at the evaluation stage provides further evidence of its modernity.

A cow burial (520114; Fig. 6.103) found 40 m to the south had been cut by a ceramic land drain and was otherwise undated, but appears to have been a modern breed. A second ditch (540031/540042; 1.30 wide by 0.34 m deep) shown on 19th-century mapping and containing recent finds including a horseshoe was recorded at the southern end of Mown Rakes.



Figure 6.103 Cow burial 520114, view from the north (1 m scale)

Six Hundreds Drove

Earlier Romano-British Features

While most of the remains at the Six Hundreds Drove site appear to belong to a relatively narrow period between the mid-2nd and 3rd century AD, ceramic evidence suggests a few were a little earlier in date, containing as they did nothing later than pottery dating to between the 1st and 2nd centuries AD. These lay along a 100 m stretch in the middle of the site (Figs 6.105–6) and, while no overall pattern can be discerned in their arrangement, they provide a glimpse of the early enclosure of this part of the landscape.

Table 6.2 Earlier Romano-British features at Six Hundreds Drove (described in north–south order)

Feature	*Non-pottery finds, comments, etc*
Ditch 550523	Animal bone
Ditch 550538	Animal bone, iron/slag, worked bone point, structural briquetage; formed a right angle with ditch 550524
Ditch 550524	Animal bone; formed a right angle with ditch 550538
Ditch 550539	Animal bone; similar alignment to nearby ditches with later finds assemblages
Gully 550531	Animal bone; cut to the north by east–west ditch 550529, which contained 3rd-century sherds
Pit 550380	Animal bone including perforated sheep/goat metatarsal (possible weaving tool), fired clay

Overall, the earlier Romano-British features at Six Hundreds Drove were few in number and relatively slight in appearance. By contrast, the 2nd–3rd-century floruit of the site witnessed the expansion of enclosure at the site, with the setting out of numerous, more substantial, boundaries.

Romano-British Features: 2nd–3rd Century

The pond by the northern boundary
Pond 550022 (10.98 x 6.51 x 1.2 m) dominated the northern part of the Six Hundreds Drove site. A relatively large pottery assemblage was recovered from this feature (7 kg in total – around one-fifth of all pottery from Six Hundreds Drove). The ceramics chiefly derived not from the mid-orangey grey basal clay but an overlying dark blackish-grey clay. Much of the pottery assemblage appeared fresh, i.e., its final deposition occurred not long after it had been broken. Apart from a single intrusive sherd of medieval pottery, the latest material was of mid-2nd to early 3rd-century date. Within the sandy grey ware sherds were a significant quantity of misfired/overfired sherds, presumably from a nearby, but hitherto unknown, kiln (see Rowlandson below). It is possible that the pond itself had a role in pottery production, such as clay storage or processing ('puddling').

These finds-rich lower fills were overlain by loamier upper deposits that contained fewer Romano-British finds, and signs of more recent disturbance including the deposition of an asbestos-containing material, whose presence brought the investigation of the feature to a halt.

The pond occupied a local low point at around 1.3 m OD and four ditches and gullies drained into it, three from the south and one from the north. One of these (550514) contained pottery and this was also of mid-2nd-century or later date. This particular ditch had been cut at its northern end by one of a parallel pair of broadly east–west ditches (550511 and 550512; Figs 6.105 and 6.108) that formed the northern limit of the remains at Six Hundreds Drove. It is possible that they formed either a 9 m-wide trackway or double-ditched boundary, although there is insufficient resolution in the geophysical data from beyond the stripped area to be certain.

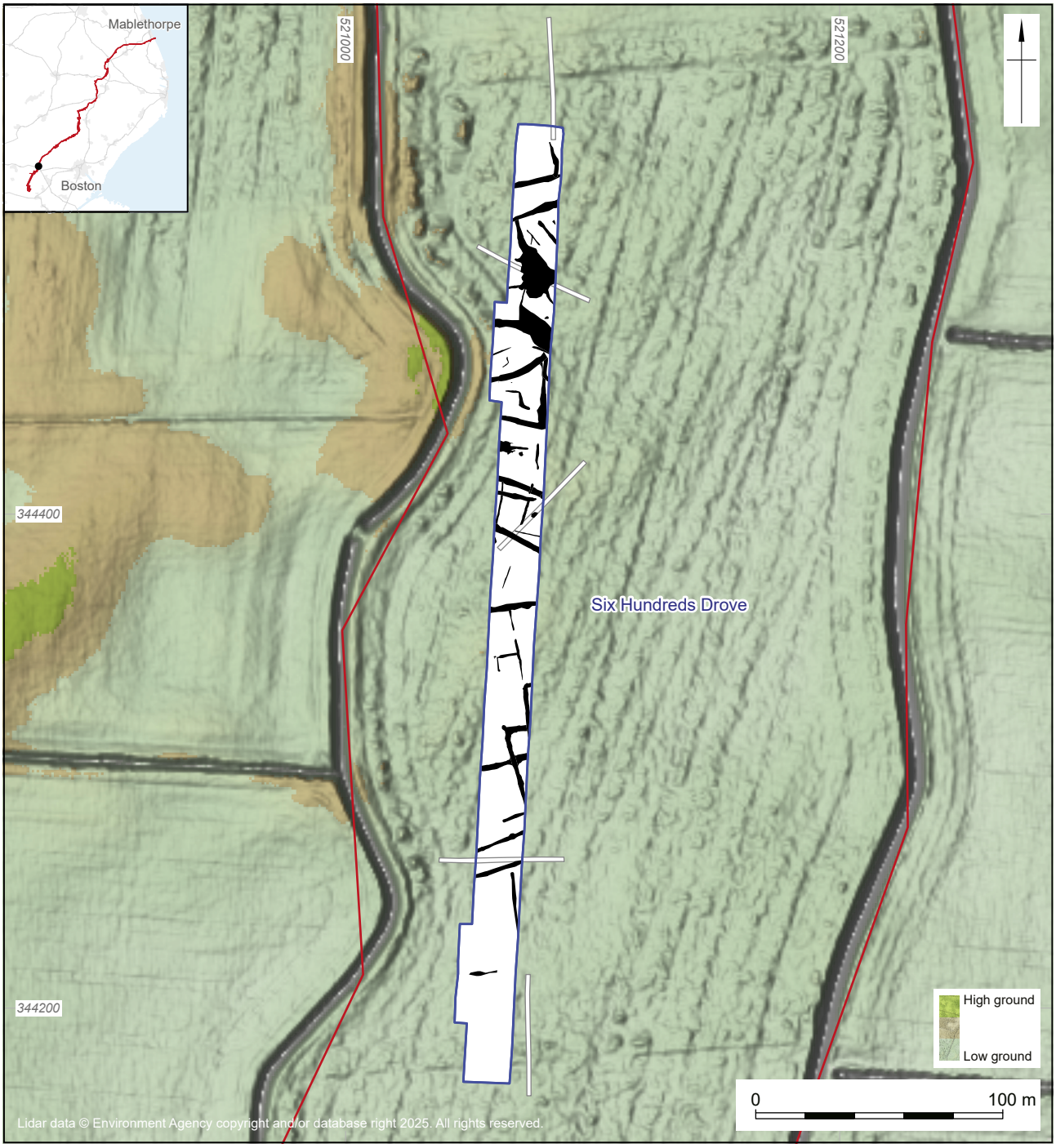


Figure 6.104 Six Hundreds Drove: site location and overview

Field systems

The majority of the features recorded at Six Hundreds Drove were ditches, many following an alignment that pivoted, very broadly, around east–west. The ditches were so close together that it seems unlikely that all were contemporary, as the intervening spaces would presumably have been too small for standard agricultural functions. Instead, it is thought that the remains represent the superimposition of various phases of enclosure. This occurred over a short period of time but there is insufficient resolution in the dating evidence, and a general lack of stratigraphic relationships, to allow the development of the site to be unpicked.

Some sense of the organisation of space on the site can be gained, however. Southwards from ditch 550529, over a distance of some 130 m, a more gridded scheme of land demarcation can be discerned. Here, a group of relatively narrow boundaries defined plots of land conforming to a co-axial, north-west to south-east/north-east to south-west grid.

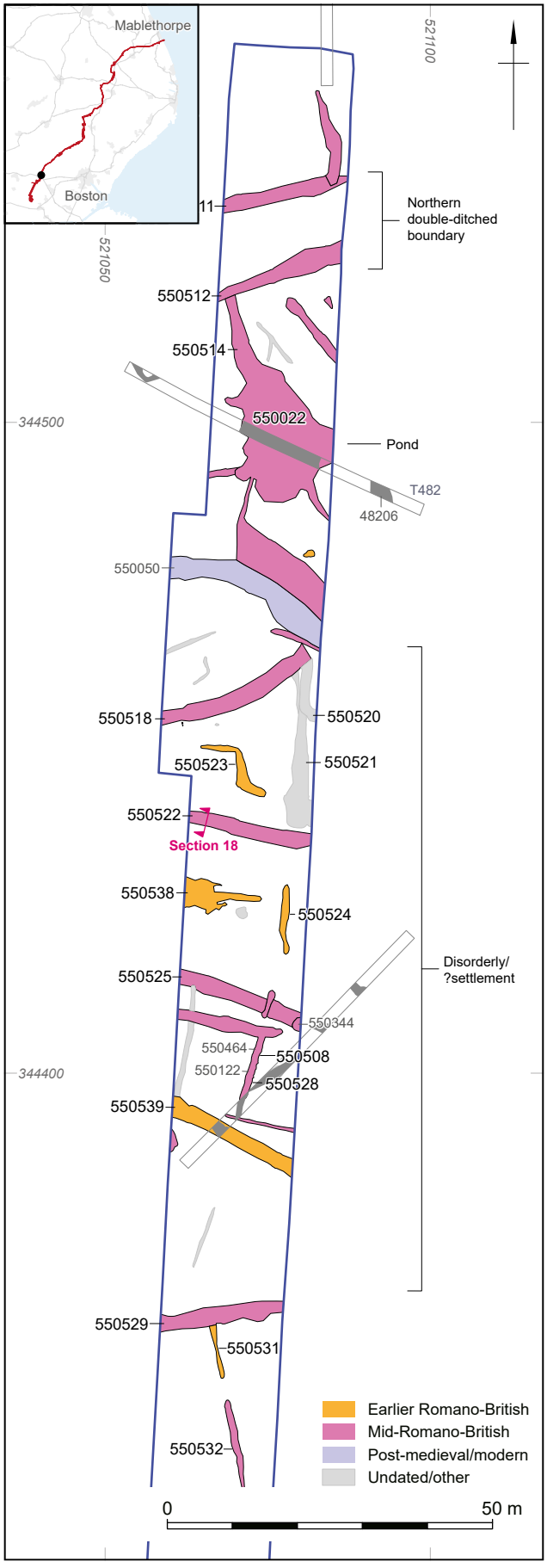


Figure 6.105 Six Hundreds Drove: detail plan (northern area)

Within this were some of the 1st to 2nd-century features described above, although most components of the gridded arrangement contained pottery of the same 2nd–3rd-century date as the site's main focus of activity. Clearly, not all of these features were contemporary, suggesting that the field system developed during the relatively short period that it was in use. For example, ditch 550532, which contained 2nd–3rd-century pottery, cut a perpendicular feature (ditch 550533) with pottery of the same date. A short distance to the south, the superimposition of three ditches (550537, 550535/550536 and 550534), all with middle Romano-British pottery, strengthens this sense of fairly rapid modifications to the layout of boundaries and use of space at Six Hundreds Drove. Within this part of the site, ditch 550535 supplied one of the very few coins from the Interconnector (a *sestertius* broadly of 1st to 3rd-century AD date). Ditch 550529 (2.5 m wide by 0.85 m deep; Fig. 6.107.17) was perhaps the most finds-rich feature within the gridded area: later 2nd–early 3rd-century AD pottery, animal bone, a worked bone handle, a copper alloy brooch and fired clay were recovered from it. The partial remains of calves were also found in two of the other ditches (550534 and 550536).

Around 125 m separated the gridded area of ditches and pond 550022. This part of the site was crossed by several ditches on a variety of alignments. No overall design is evident, and the arrangement instead resembles the product of continued ad hoc efforts to carve out divisions and subdivisions within the area of occupation and ensure they were drained and therefore workable. That some of the features were related to settlement is probable, as this part of the site seems to have been relatively intensively used, with the 100 m stretch from pond 550022 to ditch 550525 containing over 60% (by weight) of the total site finds assemblage. Deposition of finds seems to have been particularly focused on ditch 550538, which contained a wider range of material than many features, including Romano-British pottery (the most distinctive material being mid-1st to early 2nd-century AD in date and including samian), fired clay from some form of structure or hearth, animal bone, a bone object (possibly a pin-beater), and a formless lump of iron. Environmental samples from the feature were not notably rich but showed evidence of spelt wheat and barley and a diverse range of wild taxa. Some of the ditches in this area of potential settlement were quite substantial (550518, 550522 and 550525 were all over 2 m wide; Fig. 6.107.18) and also relatively finds-rich: ditch 550518 contained pottery, including samian, with an emphasis on the 2nd century AD, a copper alloy brooch (also 2nd-century AD), Romano-British glass, animal bone, a worked bone point and quern fragments. Ditch 550520's finds assemblage included pottery of the mid-2nd to early 3rd century, animal bone, a triangular perforated fired clay object and a possible quern fragment. Just to the east of the pond, the near-complete skeleton of a new-born foal was recovered from Romano-British (3rd century AD) ditch 48206, recorded at the evaluation stage, the feature lying beyond the limits of the excavation site.

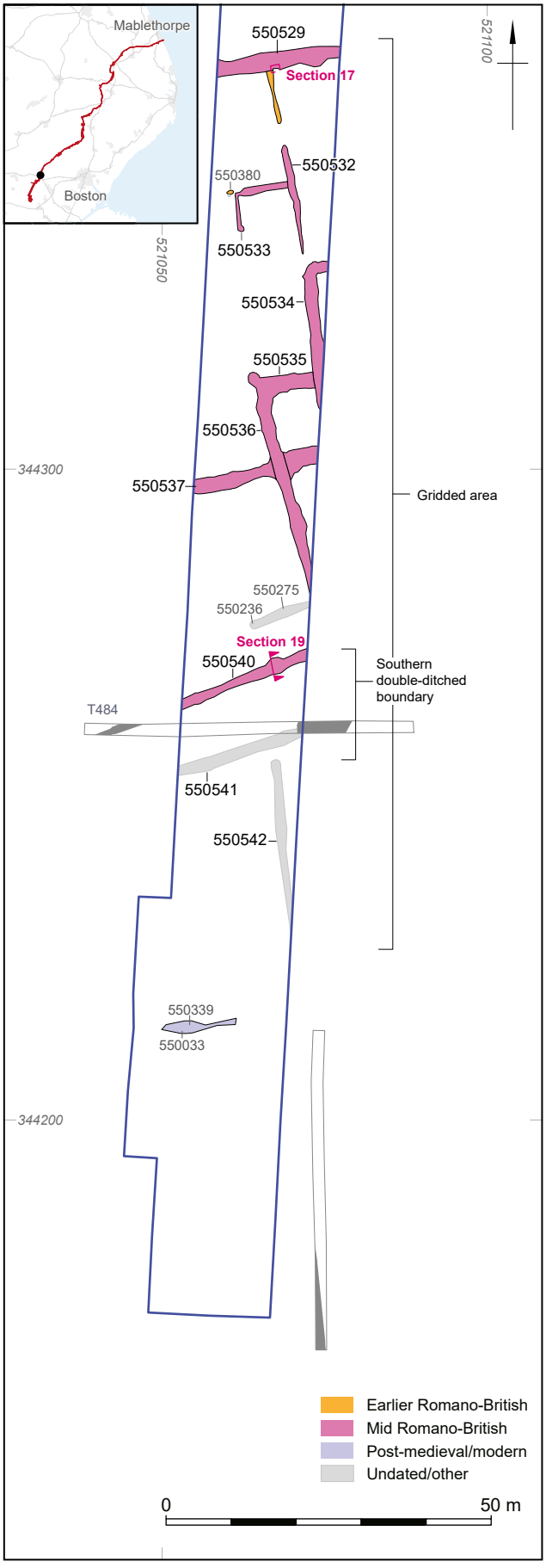


Figure 6.106 Six Hundreds Drove: detail plan (southern area)

Also within this likely settlement area lay north-east to south-west-aligned ditch 550508 (1 m wide by 0.28 m deep; Fig. 6.109). Four radiocarbon dates were obtained from this feature, on cereal grains and charcoal from exotic conifer species. The three radiocarbon dated cereal grains (UBA-52895, UBA-52896 and UBA-52897) came from the same fill in intervention 550122 and, when modelled, suggest a date of *cal. AD 120–235* for the infilling of the ditch. The probably imported conifer wood, found within an exceptionally rich assemblage of well-preserved charcoal in slot 550464, appears broadly contemporary (UBA-52953). As discussed in Volume 1, these dates imply expansion of cereal cultivation onto saline soils during the Romano-British period. The sides and base of the central part of ditch 550508 were riddled with stakeholes, although there was no order in their distribution, and they were not aligned to form a palisade or fenceline. Many, but not all, were visible on the surface of the ditch. Some had charcoal-rich fills, but the charcoal in the samples from the stakeholes was of the same composition as recorded in the overlying ditch fills; i.e., the stakes were not burnt *in situ*, but rather the charcoal-rich material in the ditch had made its way into the stakeholes.

An ENE–WSW 9 m-wide trackway or double-ditched boundary (defined by ditches 550540 and 550541; Fig. 6.107.19) may have been present at the southern end of the site, potentially mirroring a similar arrangement at the northern end. As at the northern end, this boundary defined the limit of the area of concentrated archaeological activity. The sense of these features being peripheral is reflected in their artefactual assemblage: a single sherd of Romano-British grey ware from its presumed continuation in evaluation trench 484 was the only dating evidence from ditch 550540, and ditch 550541 was artefactually sterile.

Post-medieval/Modern

A ditch and hedgerow (550050) investigated towards the north end of Six Hundreds Drove correlate with a curving field boundary shown on 19th-century mapping. The features contained residual late 2nd–3rd-century AD pottery, mid-17th to 18th-century pottery, modern glass bottles and clay tobacco pipe. Ditch 550033/550339 was found at the opposite end of the site and also matches the position and course of a mapped field boundary.

Undated

Six Hundreds Drove was a finds-rich site and most features contained dating evidence. Exceptions include ditches 550236/550275 and 550542, both found towards its southern end. To judge by their appearance, the undated features may well have been constructed during the Romano-British occupation of the site, although this cannot be confirmed.

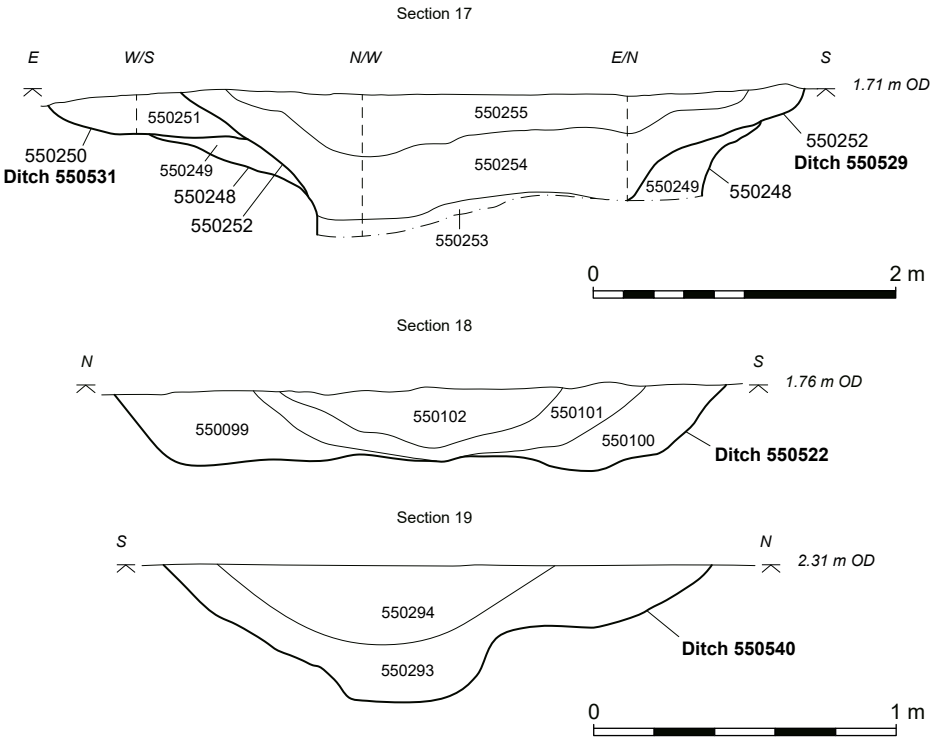


Figure 6.107 Six Hundreds Drove (sections)



Figure 6.108 East-facing section of ditch 550512 (1 m scale)

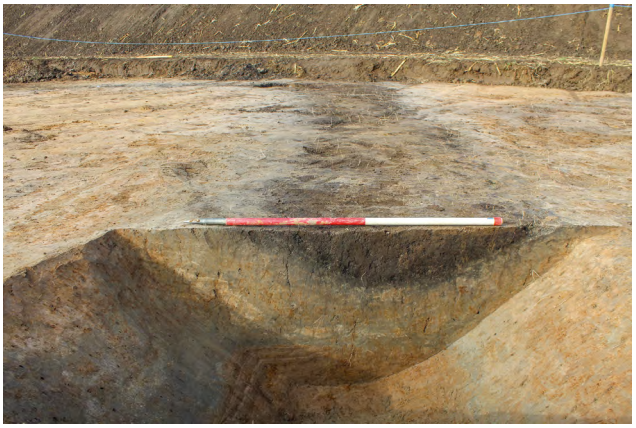


Figure 6.109 North-facing section of ditch 550508 (0.5 m scale)

Chapter 7
Radiocarbon Dating

Inés López-Dóriga

Introduction

Radiocarbon dates were obtained to clarify the chronology of the sites and some of the activities undertaken on them (principally plant processing and disposal of the dead), and to improve the understanding of the development of certain types of landscape, such as heathland. The dating also sought to refine understanding of the timing of the introduction of crops and significant taxa, such as spelt wheat, broad bean, rye, free-threshing/naked wheat and heather, as well as a non-native conifer.

Radiocarbon dates were also obtained as part of the geoarchaeological investigations on the scheme (see online data supplement, and summary in Volume 1, Chapter 4, Table 4.1).

Materials and Methods

A total of 89 radiocarbon samples from charred plant remains, wood charcoal, human bone, animal bone and carbonised deposits on pottery were submitted. A staged approach was adopted (Bayliss and Marshall 2022). During the assessment stage, a small number of samples refined the chronology of a number of key feature groups and provided a better understanding of the phases of activity at various sites; these initial dates informed the assessment and future dating strategy. A second stage involved the drawing up of specific research objectives, followed by the identification of the pool of suitable samples to address the research objectives. Staged submissions were undertaken as results were obtained.

Material was chosen for dating based on stratigraphic and technical criteria, such as the nature of the available samples, their potential for carrying associated offsets, and the association between them and the 'event' to be dated (see Waterbolk 1971). Where possible, short-lived entities (e.g., single grains, sapwood) were selected for dating. Multiple dates were obtained from some deposits to minimise the risk of an uncertain association between the material dated and the overall deposit, either due to possible residuality/intrusion phenomena (see Pelling *et al.* 2015) or old-wood effects on cremated bone (e.g., Olsen *et al.* 2013). Sample selection was undertaken by the project specialists (Lorrain Higbee, Ed Treasure, Inés López-Dóriga, Ceri Boston and Jacqueline McKinley).

The samples were submitted to the ^{14}Chrono Centre, Queen's University, Belfast (UBA), the Scottish Universities Environmental Research Centre (SUERC) and Vilnius Radiocarbon, Center for Physical Sciences and Technology (FTMC). The samples were pretreated following standard procedures and measured using Accelerator Mass Spectrometry (AMS), with further detail given in ^{14}Chrono (2019), Dunbar *et al.* (2016) and Vilnius Radiocarbon (2024).

For samples of unburnt bone, stable carbon ($\delta^{13}C$), nitrogen ($\delta^{15}N$) and sulphur ($\delta^{34}S$) values were measured by Isotope Ratio Mass Spectrometry (IRMS). All stable isotope values are expressed as parts per thousand (per mille, ‰). The stable isotope measurements were obtained on bulk collagen extracted as part of the radiocarbon dating process, in order to infer any potential reservoir effects affecting the dates. This complements the stable isotope studies (on carbon, nitrogen, sulphur, oxygen and strontium: see Appendix C).

The age ranges were calculated using the probability method with OxCal 4.4.4 (Bronk Ramsey 2009a) using the IntCal20 curve (Reimer *et al.* 2020) except where otherwise stated. Where a mix of the IntCal20 and Marine 20 (Heaton *et al*. 2020) curves was used, the British mainland average local reservoir offset (ΔR) value of -150 ± 52 (weighted mean of the 10 nearest values; see Reimer and Reimer 2017) was applied. Where appropriate, outliers were applied (Bronk Ramsey 2009b). Modern results were calibrated with Bomb21NH1, the post-atomic bomb curve for the Northern Hemisphere above 40° north (Hua *et al.* 2021). Diets with a substantial aquatic input (>10%, either freshwater or marine) can affect the radiocarbon ages of the different body parts of the sampled individuals, making them appear older than their real ages (this difference is known as a reservoir offset and can be of decades or centuries depending on the relevant local ΔR values, e.g., Cook *et al.* 2015). Human bone collagen with a $\delta^{13}C$ value above -20‰, accompanied by a raised $\delta^{15}N$ value, was taken to indicate a marine component in the diet; the percentage contribution of this marine component is calculated by linear interpolation (see Cook *et al.* 2015) between two end members, using end members of -21.0‰ (fully terrestrial) and -12.5‰ (fully marine) with an uncertainty of 10% applied. For samples interpreted as originating in the same event, the results are combined (function R_Combine) to run a χ^2 test (Ward and Wilson 1978).

The radiocarbon measurements are given in Tables 7.1–22. Calibrated date ranges are given at 95% confidence, with the end points rounded out to the nearest 10 years; modelled date ranges (posterior density estimates) are given in italics at 68% confidence, with the end points rounded out to the nearest five years. These are taken from the models given in Figs 7.1–12, where the distribution of calibrated date ranges is given in outline and the distribution of modelled date ranges in black.

Discussion of Results

A total of 78 samples were successfully measured and 11 failed because of an insufficient yield of carbon, which can be caused by degradation in the burial environment (e.g., sites located on acidic substrates, intermittent waterlogged conditions). The frequent mineral-coating on the charred plant remains and wood charcoal (see Chapter 8 below) suggests a fluctuating water table on many sites, which has a detrimental effect on collagen preservation. The results are presented and discussed below by excavation area, moving from north to south along the Interconnector's route.

Lincolnshire Marsh

Sea Bank Farm

Five radiocarbon dates were obtained (Table 7.1) to clarify the periods of pottery use, the features and the saltmaking activities in the area, since a mixture of pottery from two different periods was present. The results cluster in two phases, confirming activity during the middle/late Romano-British period and the Late Anglo-Saxon period (Fig. 7.1). The two measurements on charred residue from Roman pottery sherds were very similar but were modelled as a sequence based on their stratigraphic relationship. The results on remains from two different crop species in pit 200063 (UBA-52955 and UBA-52956) were successfully combined (χ^2 passed at df=1 t=0.5(5% 3.8)), suggesting that they could originate in a single event (e.g., collected as part of the same harvest) in the Late Saxon period.

White Crofts

Radiocarbon dating in this area sought to verify the age of important archaeobotanical assemblages and the chronology of the cemetery (Table 7.2). Unfortunately, four measurements failed, but the five results successfully obtained point to two separate phases of activity: the first in the middle/late Romano-British–Early Anglo-Saxon period, and the second in the Middle/Late Anglo-Saxon period (Fig. 7.2).

Table 7.1 Radiocarbon dating results for the Romano-British and Anglo-Saxon periods at Sea Bank Farm.

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*$\delta^{13}C$‰*	*$\delta^{15}N$‰*	*C/N*	*Calibrated date range (95% probability)*	*Combined/modelled date range (68% probability)*
UBA-54358	Alluvial deposit 200202, fill 200011	Charred residue from exterior of pottery sherd	1899±18	-24.14±0.20	9.78±0.30	9.48±1.16	cal. AD 80–220	*cal. AD 120–195*
UBA-54360	Palaeochannel 200200, fill 200044	Charred residue from exterior of pottery sherd	1895±19	-25.89±0.20	12.53±0.30	9.76±1.16	cal. AD 80–220	*cal. AD 160–215*
FTMC-MB96-4	Pit 200059, fill 200060	Charred plant remains: *Triticum spelta* grain	1791±30	-	-	-	cal. AD 210–350	*cal. AD 210–320*
UBA-52955	Pit 200063, fill 200064	Charred plant remains: *Hordeum vulgare* grain	1057±24	-	-	-	cal. AD 900–1030	*cal. AD 990–1020*
UBA-52956		Charred plant remains: *Triticum* sp. grain	1032±25	-	-	-	cal. AD 900–1040	

Note: The reported $\delta^{13}C$‰ values are measured by IRMS

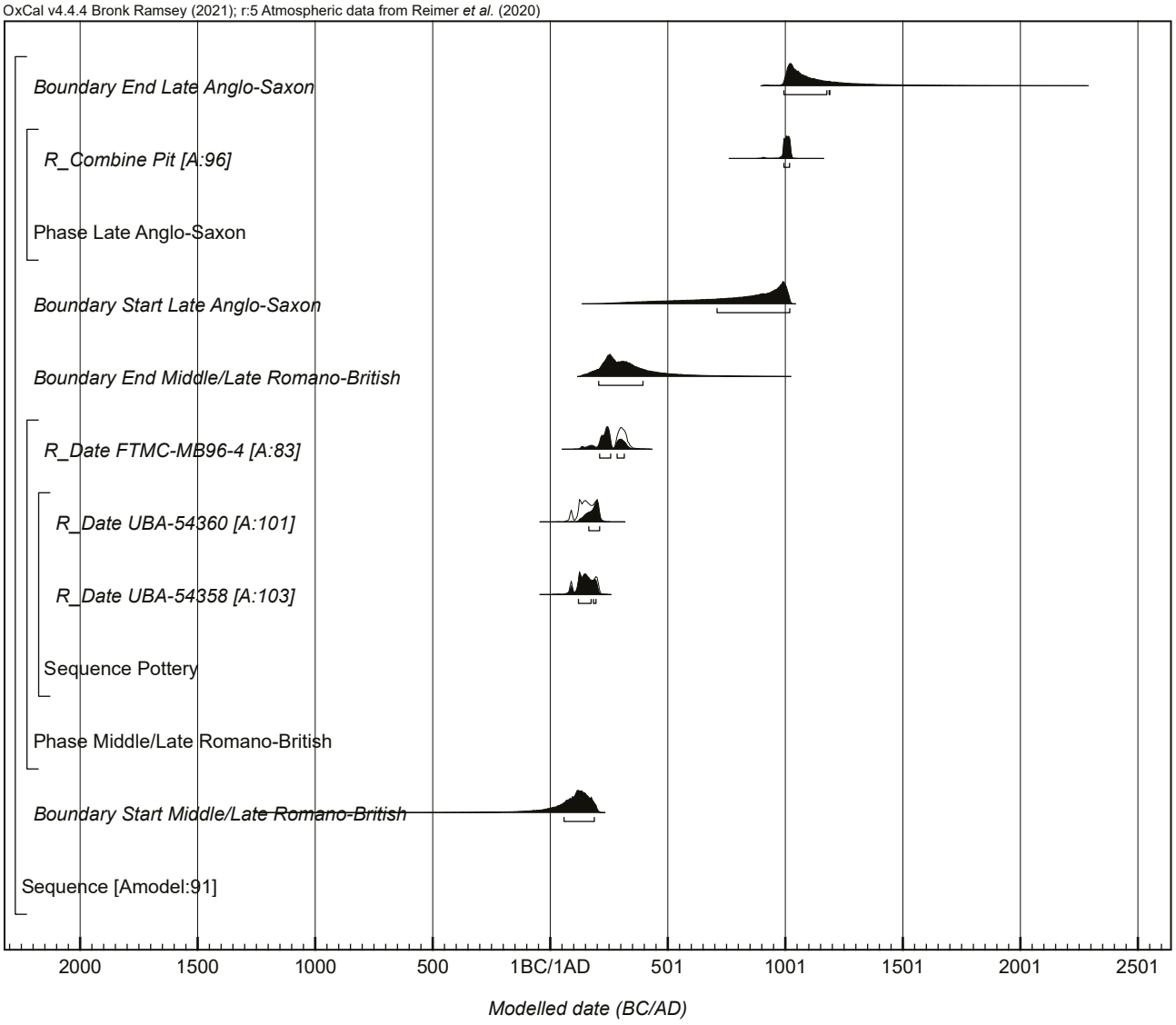


Figure 7.1 Sequential model of Romano-British and Anglo-Saxon activity at Sea Bank Farm

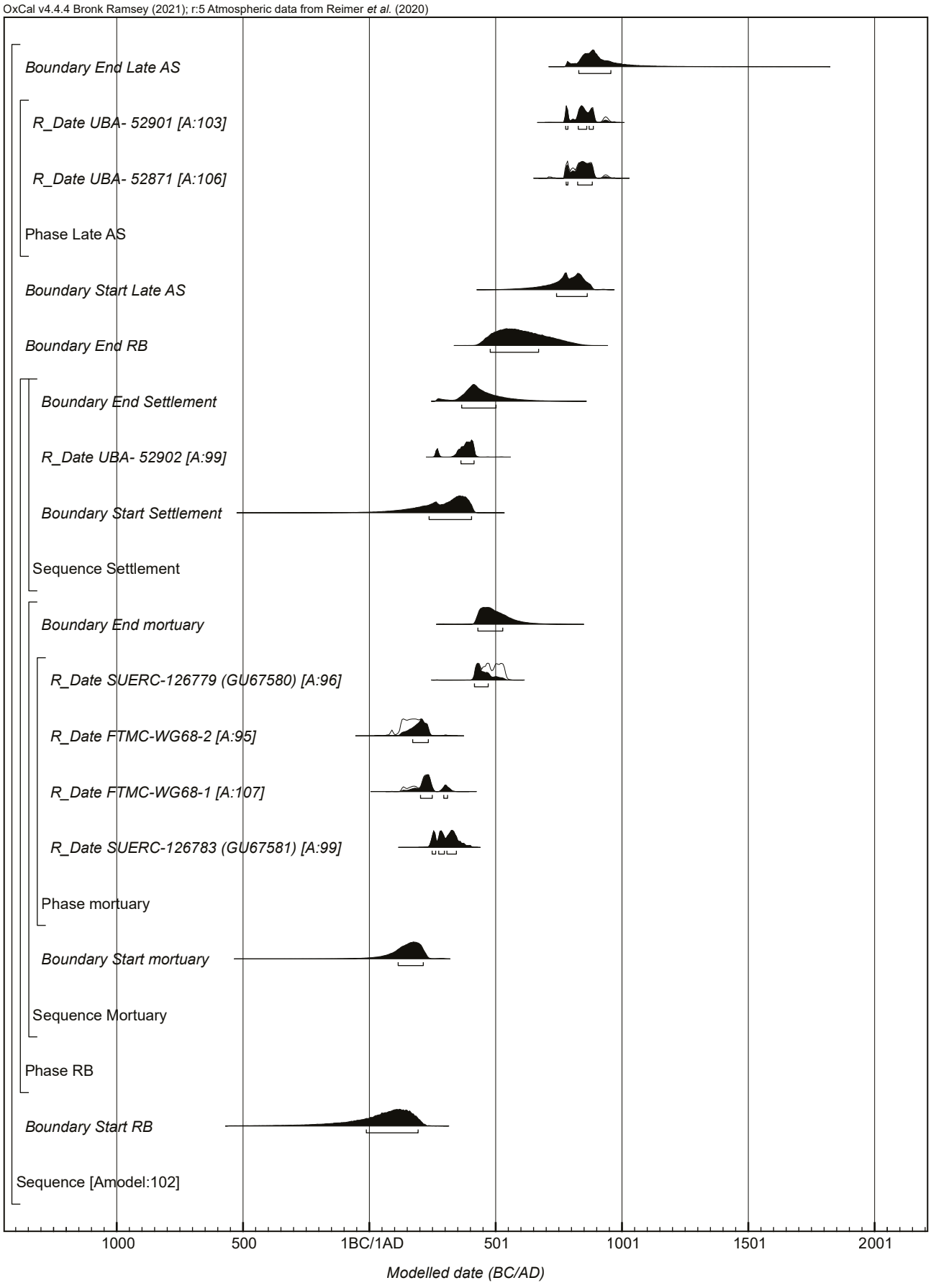


Figure 7.2 Model of overlapping Romano-British–Early Anglo-Saxon mortuary and settlement activities and sequential Middle/ Late Anglo-Saxon activities at White Crofts

Middle/late Romano-British–Early Anglo-Saxon

The model suggests that all the earlier activity in the area belongs to a single phase. However, while the cemetery is of a Roman tradition and most of the measurements fall within the middle/late Romano-British period, one of the radiocarbon dates (which is a *terminus post quem* or 'TPQ' – the earliest date possible – for another individual) extends into the 'Anglo-Saxon' period, suggesting continuity of traditions during the 5th century AD and possibly an absence of Anglo-Saxon peoples in the area. Following this model, the mortuary activity in the area is estimated to have started between *cal. AD 110–215* and ended *cal. AD 430–530*, having lasted *245–405 years*.

A pair of samples were submitted to determine the time range between the two individuals (301292 and 301293) whose remains were placed in a single grave. Measurements on one of the individuals (301292) failed twice (GU67579 and GU68528), so any further attempts were abandoned in light of ethical concerns over the destructive analysis of human bone. Stable isotope evidence (strontium and oxygen) indicated this individual was an outlier from western Britain or warmer climates abroad (see Moore and Montgomery, Appendix C). The accompanying disarticulated remains (301293) are likely older, as it is presumed, given the anticipated rate of decay of an unburied human corpse, that that person pre-deceased the individual represented by the *in situ* (articulated) remains. The radiocarbon measurement (SUERC-126779: 1602±24 BP) therefore serves as a TPQ for the articulated individual (301292), who must have been buried to a standard Romano-British mortuary tradition sometime after *cal. AD 415–505*.

The stable isotope values (δ^{13}C ‰ and δ^{15}N ‰) suggest no significant aquatic food sources were present in the diets of most of the sampled individuals, which is consistent with the stable isotope evidence obtained from ribs measured as part of the isotopic study. However, 'population-wide generalisations must be made with caution' (*ibid.*) and, since high values are present in one of the individuals, a reservoir correction has been applied in that case. The reservoir correction is based on the current available evidence (location of the site, average strontium values for measured individuals) and assumes the individual lived most of their life in mainland Britain and their aquatic dietary input is of marine origin; should any aspects of this assumption be incorrect, a different reservoir correction value may be applicable.

The charred plant remains in pit 300140 (UBA-52902) date to the same middle–late Romano-British period of activity, confirming settlement as well as mortuary practices in the area.

Table 7.2 Radiocarbon dating results for the Romano-British and Early Anglo-Saxon periods at White Crofts

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*δ^{13}C‰*	*δ^{15}N‰*	*δ^{34}S‰*	*C/N*	*C/S*	*N/S*	*% Marine*	*ΔR*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UB53369	Pit 301347, dog burial 301346	Bone (animal): dog skull (2 g)	-	-	-	-	-	-	-	-	-	-	-
UB54361		Bone (animal): dog left distal tibia fragment (1.2 g)	-	-	-	-	-	-	-	-	-	-	-
FTMC-WG68-1	Grave 301298, burial 301300	Bone (human): left femur (2.6 g)	1827±29	-20.67	-	-	3.21	-	-	-	-	cal. AD 130–320	*cal. AD 205–250*
FTMC-WG68-2	Grave 301319, burial 301320	Bone (human): left femur (2.5 g)	1874±29	-20.08	-	-	3.18	-	-	-	-	cal. AD 80–240	*cal. AD 180–240*
SUERC-126783 (GU67581)	Grave 301322, burial 301324	Bone (human): left femur (3 g)	1751±24	-19.9	11.1	2.2	3.3	558	171	13±10	-150±52	cal. AD 250–420	*cal. AD 235–300*
SUERC-126779 (GU67580)	Grave 301291, disarticulated remains 301293	Bone (human): left femur (2.3 g)	1602±24	-20.7	11.7	3.9	3.4	395	117	-	-	cal. AD 420–540	*cal. AD 415–505*
GU67579	Grave 301291, burial 301292	Bone (human): right femur (2.1 g)	-	-	-	-	-	-	-	-	-	-	-
GU68528		Bone (human): left femur (3.9 g)	-	-	-	-	-	-	-	-	-	-	-
UBA-52902	Pit 300140, fill 300141	Charred plant remains: *Hordeum vulgare* grain	1679±22	-	-	-	-	-	-	-	-	cal. AD 260–420	*cal. AD 360–415*

Note: The age ranges were calculated with OxCal 4.4.4 using the IntCal20 curve, except when a marine % has been noted, where a mix of the curves IntCal20 and Marine20 has been used. The reported δ^{13}C‰ values are measured by IRMS

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UBA-52871	Group 3211, pit 3059, fill 3057	Charred plant remains: *Triticum* sp. grain	1190±26	cal. AD 770–950	*cal. AD 775–885*
UBA-52901	Pit 5202, fill 5203	Charred plant remains: *Triticum aestivum/turgidum* grain	1174±21	cal. AD 770–950	*cal. AD 775–890*

Table 7.3 Radiocarbon dating results for the Middle/ Late Anglo-Saxon period at White Crofts

Middle/Late Anglo-Saxon

The measurements (UBA-52871 and UBA-52901) obtained on cereal grains from two pits provided consistent results which suggest a short span of activity of up to 35 years around the 8th to 9th century AD (Table 7.3, Fig. 7.2).

Ailby Lane

The five radiocarbon dating results from Ailby Lane fall into three distinct phases (Table 7.4, Fig. 7.3).

A single measurement on a hazel (*Corylus avellana*) nutshell fragment from possible fire pit 401016 (UBA-52870) confirms some of the significant archaeobotanical assemblages in the area dated to the Middle to Late Bronze Age, starting between *1390–1075 cal. BC* and ending by *1195–705 cal. BC*.

A second phase of activity in the Middle–Late Iron Age/early–middle Romano-British period occurred between *250 cal. BC–cal. AD 20* and *cal. AD 10–215*, with two measurements on charred roundwood (Maloideae – Apple subfamily) and hulled wheat chaff (FTMC-MB96-5 and FTMC-MB96-6) from two pits (400099, group 413000 and 400028, group 411000). The latter measurement was obtained on hulled wheat remains present residually in a typical early medieval archaeobotanical

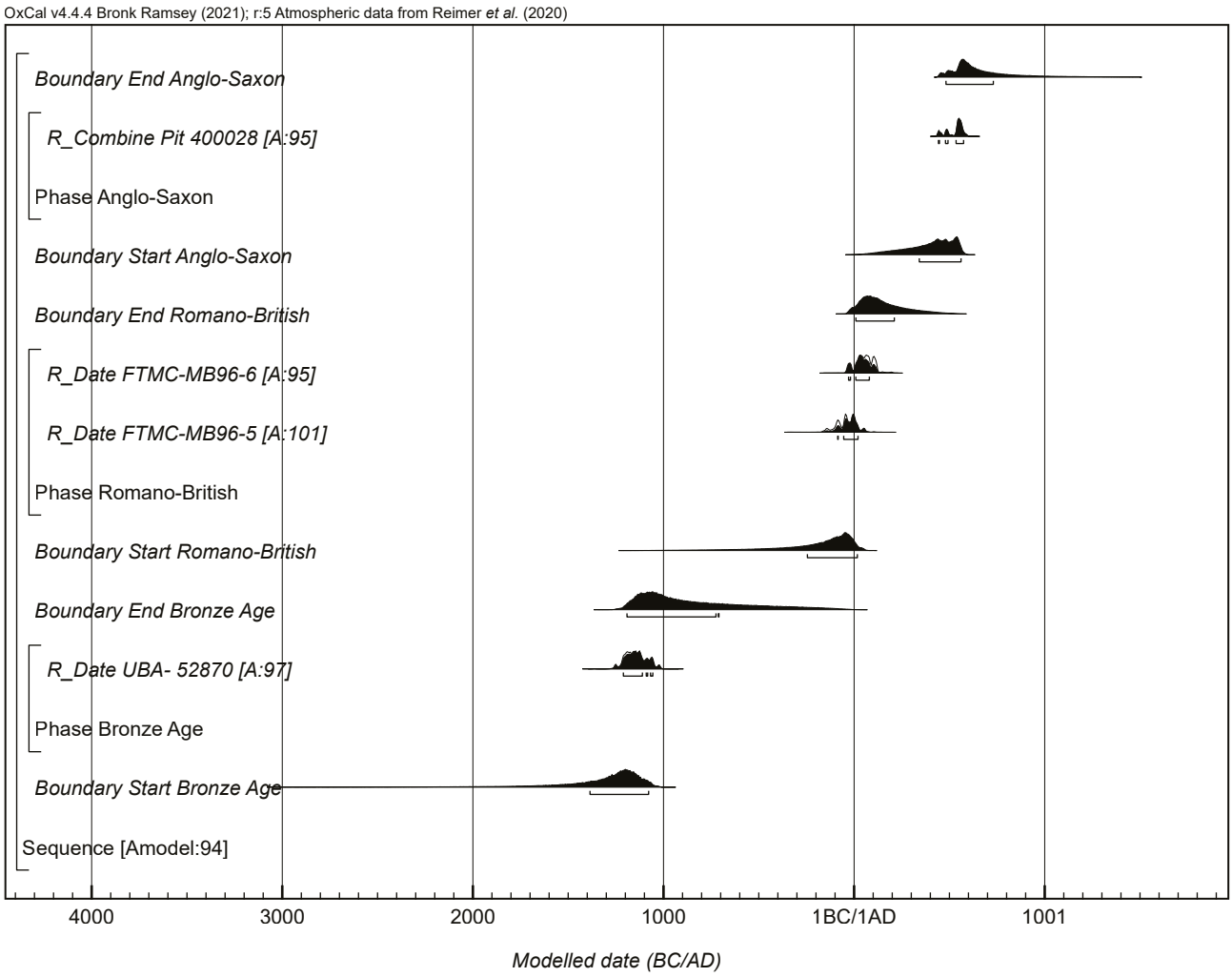


Figure 7.3 Model of three sequential phases of activity at Ailby Lane

assemblage and for which consistent Anglo-Saxon measurements were also obtained on other entities (see Chapter 8 below).

The final phase of settlement activity occurred in the Early Anglo-Saxon period, starting *cal. AD 340–565* and ending *cal. AD 480–735*. This estimate is based on a combined date of *cal. AD 440–575* (most likely *cal. AD 535–575*, at 55% of the probability) for the two measurements (UBA-52881 and UBA-52883: passing the χ^2 test at df=1, T=3, (5% 3.8)) obtained on a free-threshing/naked wheat (*Triticum aestivum/turgidum*) grain and a broad bean (*Vicia faba*) seed from sunken-featured building 411000. Residual remains from earlier activities in the area were also present in this feature (see above, FTMC-MB96-6).

Table 7.4. Radiocarbon dating results for Ailby Lane

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Combined/modelled date range (68% probability)*
Middle/Late Bronze Age					
UBA-52870	Pit 401016, fill 401018	Charred plant remains: *Corylus avellana* shell fragment	2943±29	1260–1050 cal. BC	*1215–1055 cal. BC*
Middle–Late Iron Age/early–middle Romano-British period					
FTMC-MB96-5	Pit group 413000 (pit 400099), fill 400101	Wood charcoal: Maloideae twig with 2 growth rings	2045±30	150 cal. BC–cal. AD 60	*90 cal. BC– cal. AD 25*
FTMC-MB96-6	Pit/SFB 411000 (pit 400028), fill 400029	Charred plant remains: *Triticum* sp. 2 glume bases + 2 spikelet fork fragments	1962±29	40 cal. BC–cal. AD 130	*30 cal. BC– cal. AD 85*
Anglo-Saxon					
UBA-52881	Pit/SFB 411000 (pit 400028), fill 400029	Charred plant remains: *Triticum aestivum/turgidum* grain	1572±27	cal. AD 430–560	*cal. AD 440–575*
UBA-52883		Charred plant remains: *Vicia faba* cotyledon (1/2 seed)	1505±28	cal. AD 480–640	

Wolds

Sutterby Field

Three measurements were obtained for settlement activities dating to the Middle–Late Iron Age/early Romano-British period in this area, which started *365–100 cal. BC* and ended by *35 cal. BC–cal. AD 180* (Fig. 7.4).

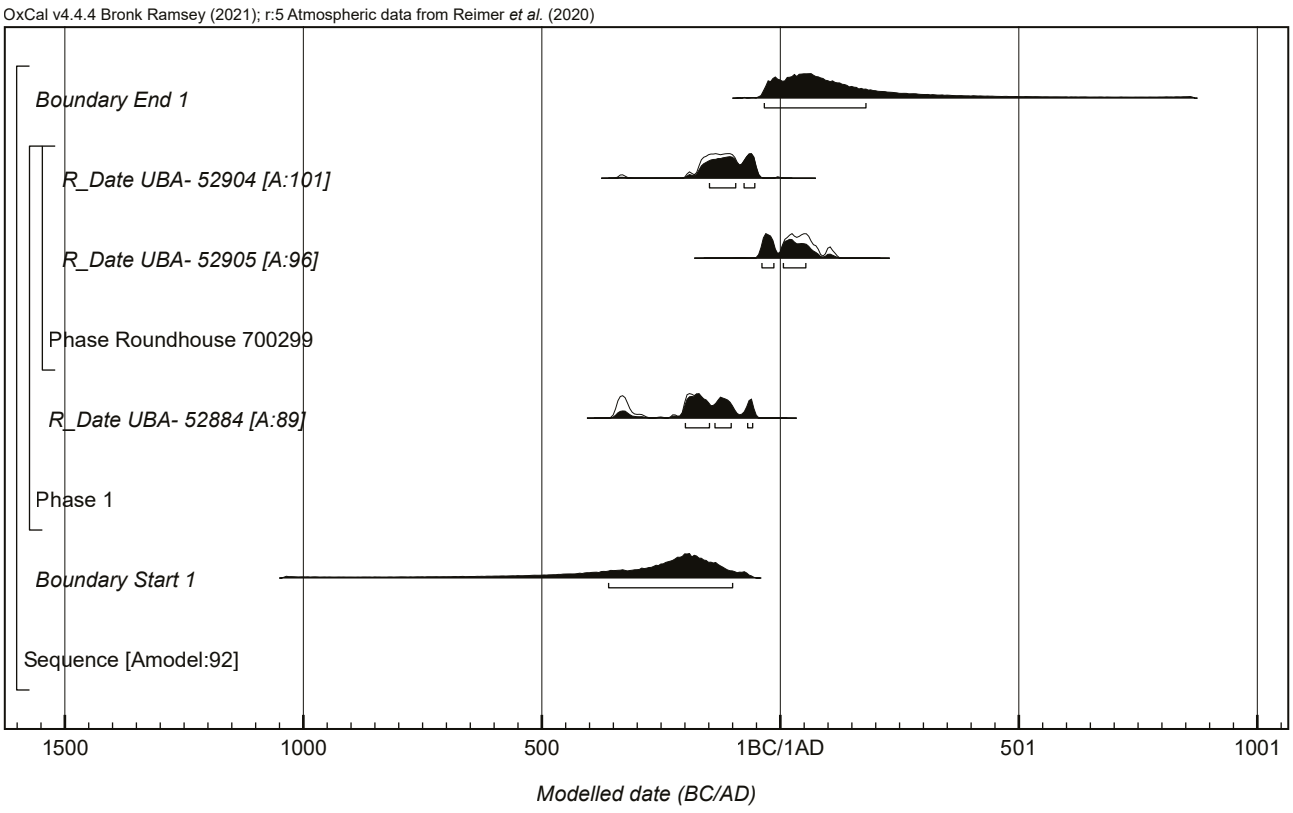


Figure 7.4 Simple phase model for activity in the Middle–Late Iron Age/early Romano-British period at Sutterby Field

The two measurements (UBA-52904 and UBA-52905) for barley (*Hordeum vulgare*) grains in a single deposit in roundhouse 700299 could not be successfully combined (failing the χ^2 test at df=1 T=12.919(5% 3.8)) suggesting they are not of the same age, so the deposit probably reflects the accumulation of crop-processing waste during the life of the structure (Table 7.5). Similarly, the measurement on a wheat (*Triticum* sp.) grain from ditch 700295 (UBA-52884) reflects the time in which domestic waste, produced elsewhere, was redeposited into the ditch together with other components.

Table 7.5 Radiocarbon dating results for the Iron Age/ Romano-British period at Sutterby Field

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UBA-52884	Ditch 700295 (slot 700255), fill 700256	Charred plant remains: *Triticum* sp. grain	2149±27	350–60 cal. BC	*115–20 cal. BC*
UBA-52904	Roundhouse ring gully 700299 (slot 700265), fill 700266	Charred plant remains: *Hordeum vulgare* grain	2106±24	200–50 cal. BC	*150–50 cal. BC*
UBA-52905		Charred plant remains: *Hordeum vulgare* grain	1984±24	40 cal. BC–cal. AD 115	*40 cal. BC–cal. AD 55*

Pitchmoor

Paired measurements were obtained on two different wheat grains from post-built structure 350100 (UBA-52898 and UBA-52899; Table 7.6). The measurements were successfully combined (passing the χ^2 test at df =1 T=1.6(5% 3.8)), suggesting the deposit comprises material originating in a single event between *410* and *230 cal. BC* (410–350 cal. BC, at 75%, the highest density of the 95% probability distribution), which may correspond to a conflagration of a store, in view of the exclusive presence of cereal grains and the absence of chaff (see Chapter 8 below). Poor preservation meant the grains could not be identified to species level but cultivation of both hulled wheat species (*Triticum dicoccum/spelta*) and naked wheat species (*Triticum* cf. *aestivum/turgidum*) is tentatively suggested, although wheat species identification based on grain morphology alone and in the absence of chaff is unreliable. Such an early date on a possible naked wheat grain is unusual and must be considered with caution, especially bearing in mind these caveats.

Walk Hill

The 11 measurements (Tables 7.7 and 7.8) from Walk Hill fall into three phases: Early Neolithic, Iron Age, and the Romano-British period (Fig. 7.5). Early Neolithic activity started *3690–3390 cal. BC* and ended *3600–3180 cal. BC*; Iron Age activity commenced *725–415 cal. BC* and lasted until *340–100 cal. BC*; Romano-British activity occurred between *cal. AD 105–215* and *cal. AD 260–375*.

Early Neolithic

The three Early Neolithic dates confirm activity during this period around pit group 800480, as suggested by the archaeobotanical evidence. The oldest date was obtained on a hazel (*Corylus avellana*) nutshell fragment from pit 800476 (UBA-52872). Paired dates UBA-52873 and UBA-52874 on material from pit 800332 are particularly important since internally consistent results were obtained for a barley grain and a hazel nutshell fragment (the χ^2 test passing at df=1 T=0.6(5% 3.8)), suggesting both resources originate in a single event between *3530–3375 cal. BC*. This provides evidence for the exploitation of cereals at an early date, being one of the earliest direct results for the country and the earliest in this area of England (Griffiths 2022).

Iron Age

The three dates for Iron Age structures (UBA-52903, UBA-52906 and UBA-52878) all point to a phase of activity between the 5th and the 2nd century BC. The function of these structures is uncertain but storage is a possibility, although not all may have been in use at the same time.

Table 7.6 Radiocarbon dating results for the Iron Age period at Pitchmoor

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Combined date range (95% probability)*
UBA-52898	Posthole group 350100, posthole 350091, fill 350093	Charred plant remains: *Triticum* cf. *aestivum/turgidum* grain	2319±30	460–230 cal. BC	*410–230 cal. BC*
UBA-52899		Charred plant remains: *Triticum* sp. (cf. *dicoccum/spelta*) grain	2265±30	400–210 cal. BC	

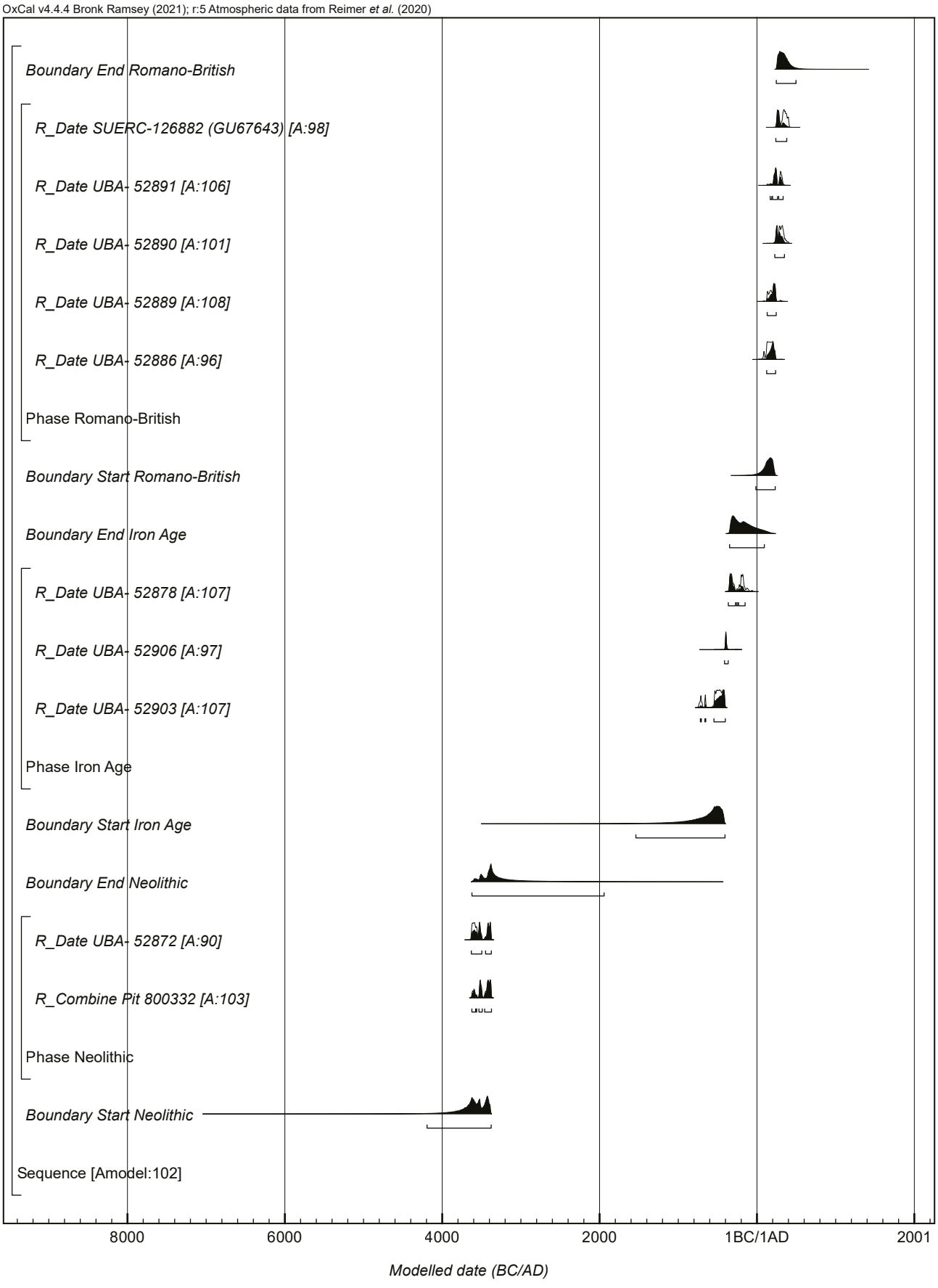


Figure 7.5 Model with three sequential Early Neolithic, Iron Age and Romano-British phases of activity at Walk Hill

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
Early Neolithic					
UBA-52872	Pit group 800480 (pit 800476), fill 800477	Charred plant remains: *Corylus avellana* shell fragment	4742±33	3630–3380 cal. BC	*3620–3380 cal. BC*
UBA-52873	Pit group 800480 (pit 800332), fill 800333	Charred plant remains: *Hordeum vulgare* grain	4730±32	3630–3380 cal. BC	*3530–3375 cal. BC*
UBA-52874		Charred plant remains: *Corylus avellana* shell fragment	4692±37	3620–3370 cal. BC	
Iron Age					
UBA-52903	Posthole group 800081 (posthole 800083), fill 800084	Charred plant remains: *Hordeum vulgare* grain	2424±22	740–410 cal. BC	*500–410 cal. BC*
UBA-52906	Posthole group 800065 (posthole 800093), fill 800016	Charred plant remains: *Triticum* sp. grain	2323±23	410–360 cal. BC	*405–385 cal. BC*
UBA-52878	Pit group 800099 (pit 800004), fill 800005	Charred plant remains: *Triticum* cf. *dicoccum* grain	2169±27	360–110 cal. BC	*355–190 cal. BC*

Table 7.7 Radiocarbon dating results for the Neolithic and Iron Age periods at Walk Hill

Romano-British

In the Romano-British phase, a result of *cal. AD 165–230* (UBA-52886) was obtained on a rhizome/tuber from a deposit with heather remains, which suggests heathland development and turf burning in this period. Further chronological evidence for heathland development has been obtained at Raithby Lane.

The two measurements on different wheat grains (UBA-52889 and UBA-52890) from the same deposit in ditch 800496 failed to combine (the χ^2 test fails at df=1 T=5.2(5% 3.8)), suggesting the ditch fill incorporates material of different ages, which is not unusual for such a deposit. Furthermore, the results suggest a different origin for the different wheat species, with the particularly noteworthy presence of naked/free-threshing wheat fairly early in the Romano-British period. This sample contained several morphologically comparable grains, making the taxonomic identification relatively secure (although chaff is not present).

A comparatively early result (UBA-52891) was also obtained on a rye (*Secale cereale*) grain from crop-dryer 800465. This crop became established in England in the Anglo-Saxon period (Carruthers and Hunter Dowse 2019) and has been securely dated as such at Cheals Close (see below); its presence in this Romano-British deposit relies on a single directly dated grain from a deposit where it was the only such grain identified, which suggests that its presence in this early period is probably incidental and likely not a main crop (see Chapter 8 below).

A fragment of human skull from a second crop-dryer (800089) was radiocarbon dated to the 3rd or 4th century AD (SUERC-126882). The human bone has a relatively high nitrogen value, but this is not accompanied by elevated carbon values and therefore an aquatic reservoir correction has not been applied.

Table 7.8 Radiocarbon dating results for the Romano-British period at Walk Hill

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*$\delta^{13}C$‰*	*$\delta^{15}N$‰*	*$\delta^{34}S$‰*	*C/N*	*C/S*	*N/S*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UBA-52886	Ditch 800488 (slot 800351), fill 800352	Charred plant remains: tuber	1883±28	-	-	-	-	-	-	cal. AD 80–230	*cal. AD 165–230*
UBA-52889	Ditch 800496 (slot 800464), fill 800010	Charred plant remains: *Triticum aestivum/turgidum* grain	1848±25	-	-	-	-	-	-	cal. AD 130–240	*cal. AD 175–240*
UBA-52890		Charred plant remains: *Triticum spelta* grain	1762±28	-	-	-	-	-	-	cal. AD 240–380	*cal. AD 235–320*
UBA-52891	Crop-dryer 800465, fill 800483	Charred plant remains: *Secale cereale* grain	1806±29	-	-	-	-	-	-	cal. AD 130–340	*cal. AD 210–310*
SUERC-126882 (GU67643)	Crop-dryer 800089, fill 800090	Bone (human): cranium fragment (2.4 g)	1726±27	-20.1	12	5.6	3.2	541	168	cal. AD 250–410	*cal. AD 245–345*

Note: The reported $\delta^{13}C$‰ values are measured by IRMS

Laboratory reference	Provenance	Material	Radiocarbon age (BP)	Calibrated date range (95% probability)
FTMC-ME96-1	Ring ditch 900066, fill 900179	Charred plant remains: *Triticum* sp. (cf. *dicoccum/spelta*) grain	3189±32	1510–1410 cal. BC
FTMC-ME96-2	Ring ditch 900066, fill 900171	Charred plant remains: *Corylus avellana* nutshell fragment (16 mm^2)	3770±32	2290–2040 cal. BC

Table 7.9 Radiocarbon dating results for the Early/ Middle Bronze Age period at Callow Carr

Callow Carr

Two main phases of activity were dated: Early/Middle Bronze Age and Anglo-Saxon.

Early/Middle Bronze Age

Two measurements (FTMC-ME96-1: 3189±32; 1510–1410 cal. BC and FTMC-ME96-2: 3770±32; 2290–2040 cal. BC) were obtained on charred plant remains from fills in barrow ring ditch 900066 (Table 7.9). Beaker pottery was also retrieved from the monument. Given the type of deposit, there was a high possibility that the ditch fills contained both residual and intrusive material. The radiocarbon dates are unsurprisingly not consistent and confirm this interpretation. However, they achieve the main aim of verifying the age of the individual remains, particularly the cereal grain – an important result in view of the rarity of cereal evidence in the area in the Bronze Age.

There are a few barrows visible as cropmarks near this example, including a well-known (and scheduled) monument at Ring Holt. A similar assemblage of charred plant remains to that at Callow Carr was also found in the fills of the ditch at Giant's Hill long barrow, in Skendleby, just 2.5 km to the east, where a number of radiocarbon dates span the second half of the 4th and late 3rd millennia (the earliest is OxA-641, 5450±80 BP and the latest CAR-816, 3830±60 BP). A period of re-use of this Neolithic long barrow at a similar time to the use of Callow Carr barrow was indicated by dates on deer antlers found at the base of the barrow ditch (BM-191, 4410±150 and BM-192, 4320±150), on aurochs bone from a layer in the ditch (BM-2346, 4120±45 BP), and on charcoal (CAR-818, 4450±70 BP; CAR-817, 4370±70 BP and CAR-816, 3830±60 BP) (Ambers *et al*. 1987; Evans and Simpson 1986).

Anglo-Saxon

For the cemetery at Callow Carr, which contained at least 22 graves, 12 samples were submitted and 11 successful dates were obtained, with insufficient carbon leading to one failure (on a subadult) (Table 7.10). Elevated nitrogen values are present in two individuals, but this is not accompanied by elevated carbon values and therefore an aquatic reservoir correction has not been applied.

Table 7.10 Radiocarbon dating results for the Anglo-Saxon cemetery at Callow Carr

Laboratory reference	Provenance	Material	Radiocarbon age (BP)	$\delta^{13}C$‰	$\delta^{15}N$‰	$\delta^{34}S$‰	C/N	C/S	N/S	Calibrated date range (95% probability)	Modelled date range (68% probability)
SUERC-126519 (GU67425)	Grave 900140, burial 900142	Bone (human): left femur (2.2 g)	1491±24	-20.4	11.8	3.5	3.3	565	174	cal. AD 550–640	*cal. AD 555–590*
SUERC-126516 (GU67422)	Grave 900104, burial 900105. Truncated by 900067	Bone (human): right humerus (2 g)	1525±21	-20.6	11	2.2	3.4	524	156	cal. AD 440–600	*cal. AD 560–595*
SUERC-126511 (GU67420)	Grave 900067, burial 900068. Truncates 900104	Bone (human): left femur (2.2 g)	1446±24	-20.3	12.7	6.2	3.4	567	168	cal. AD 580–650	*cal. AD 635–655*
GU67421	Grave 900098, burial 900100	Bone (human): right femur (2.6 g)	-	-	-	-	-	-	-	-	-
SUERC-126883 (GU67644)	Grave 900019, burial 900021 (two individuals)	Bone (human): right femur (3.2 g)	1358±27	-20.5	10.4	6.5	3.3	585	175	cal. AD 610–770	*cal. AD 640–660*
SUERC-126517 (GU67423)	Grave 900131, burial 900133	Bone (human): right femur (2.3 g)	1415±21	-20.4	10	0.6	2.9	345	118	cal. AD 600–660	*cal. AD 635–655*
SUERC-126526 (GU67429)	Grave 900205, burial 900206	Bone (human): right femur (1.9 g)	1365±20	-20.3	10.9	4.2	3.2	516	161	cal. AD 640–760	*cal. AD 645–660*
SUERC-126510 (GU67419)	Grave 900063, burial 900064	Bone (human): right femur (2.6 g)	1413±21	-20.7	10.9	5.3	3.1	426	139	cal. AD 600–660	*cal. AD 635–655*
SUERC-126525 (GU67428)	Grave 900196, burial 900197	Bone (human): left femur (4 g)	1412±24	-20.3	11.1	1.4	3.1	428	137	cal. AD 600–660	*cal. AD 635–655*
SUERC-126521 (GU67427)	Grave 900175, burial 900177	Bone (human): right femur (2.3 g)	1431±24	-21	12.2	-0.6	3.3	573	175	cal. AD 590–660	*cal. AD 635–655*
SUERC-126520 (GU67426)	Grave 900172, burial 900174	Bone (human): right femur (2.2 g)	1379±21	-20.7	10.6	0.7	2.9	369	128	cal. AD 610–670	*cal. AD 645–660*
SUERC-126518 (GU67424)	Grave 900137, burial 900139	Bone (human): left femur (2.3 g)	1437±20	-20.7	11.2	3.4	3.3	610	185	cal. AD 600–650	*cal. AD 635–655*

Note: The reported $\delta^{13}C$‰ values are measured by IRMS

Laboratory reference	Provenance	Material	Radiocarbon age (BP)	$\delta^{13}C$‰	$\delta^{15}N$‰	$\delta^{34}S$‰	C/N	C/S	N/S	Calibrated date range (95% probability)	Modelled date range (68% probability)
SUERC-108719 (GU63251)	Ditch 170152 (slot 170073), secondary fill 170074	Bone (animal): 2 dog lumbar vertebrae (1.2 g)	1981±31	-22.1	9.9	10.9	3.7	285	77	40 cal. BC–cal. AD 120	*40 cal. BC–cal. AD 60*

Note: The reported $\delta^{13}C$‰ values are measured by IRMS

Table 7.11 Radiocarbon dating results for the Iron Age activity at Partney Leys

With the exception of two instances of intercutting, where grave 900104 was cut by grave 900067 (SUERC-126516 > SUERC-126511) and grave 900114 (not radiocarbon dated), the graves do not have a stratigraphic relationship with each other. Within the group of dates without stratigraphic relationships, one of the measurements is clearly older (SUERC-126519) than the remainder, having a low agreement when modelled within the same phase, suggesting the individual in grave 900140 belongs to a different phase of activity. Thus, a sequential phase model is proposed, with an initial phase with the individuals in graves 900104 and 900140 (SUERC-126516) and SUERC-126519) having acted as 'founders' of the cemetery, and being buried in the second half of the 6th century. This is followed by a second phase with the burial of the other individuals, around the middle of the 7th century (between *cal. AD 625–650* and *cal. AD 645–665*), within a maximum of 30 years and in no discernible order (with the exception of a subadult, all the earlier measurements are on females but the later are on males; however, the sample is too small to ascertain whether this is a coincidence). According to the model (Fig. 7.6), the overall period of use of the cemetery was *between 65 and 115 years*.

Lymn Valley

Partney Leys

The sparse finds assemblage from ditch 170152 includes undated pottery, animal bone and a bone comb. The successful measurement on two articulated dog lumbar vertebra from the secondary fill of the ditch (Table 7.11) provides a date of *40 cal. BC–cal. AD 60* (SUERC-108719), prior to which the ditch must have been dug, although the length of time between the first event and the second is unknown.

Cheals Close

Seven samples were submitted to improve the understanding of the timing of the activities in this area; however, three failed because of insufficient carbon, two on animal bone (GU63252 and GU63253) and one on charred plant remains (UB52957) (Table 7.12).

Table 7.12 Radiocarbon dating results for the Anglo-Saxon activity at Cheals Close

The remainder of the samples, of charred plant remains (UBA-52900, UBA-52907, UBA-52908 and UBA-52958), provide results in the Middle/Late Anglo-Saxon period (Fig. 7.7). All the dated material originates from the fills of postholes, likely scattered in the area during the use of the structures and possibly infilling the postholes after the destruction

Laboratory reference	Provenance	Material	Radiocarbon age (BP)	Calibrated date range (95% probability)	Combined/modelled date range (68% probability)
GU63252	Ditch 180069 (slot 180066), fill 180068	Bone (animal): cattle tarsal (2.2 g)	-	-	-
GU63253	Gully 180617 (slot 180247), fill 180248	Bone (animal): sheep/goat radius shaft frag (1.1 g)	-	-	-
UBA-52900	Posthole 180313, fill 180314	Charred plant remains: *Secale cereale* grain	1247±27	cal. AD 680–880	*cal. AD 770–880*
UBA-52907	Posthole group (rectangular post-built structure) 180350, posthole 180395, fill 180396	Charred plant remains: *Hordeum vulgare* grain	1181±22	cal. AD 770–950	*cal. AD 780–880*
UBA-52908		Charred plant remains: *Triticum* sp. grain	1219±22	cal. AD 710–880	
UB52957	Posthole group (oval post-built structure) 180200, posthole180187, fill 180188	Charred plant remains: *Secale cereale* grain	-	-	-
UBA-52958	Posthole group (oval post-built structure) 180200, posthole 108206, fill 180207	Charred plant remains: *Pisum sativum* seed	1155±26	cal. AD 780–980	*cal. AD 775–895*

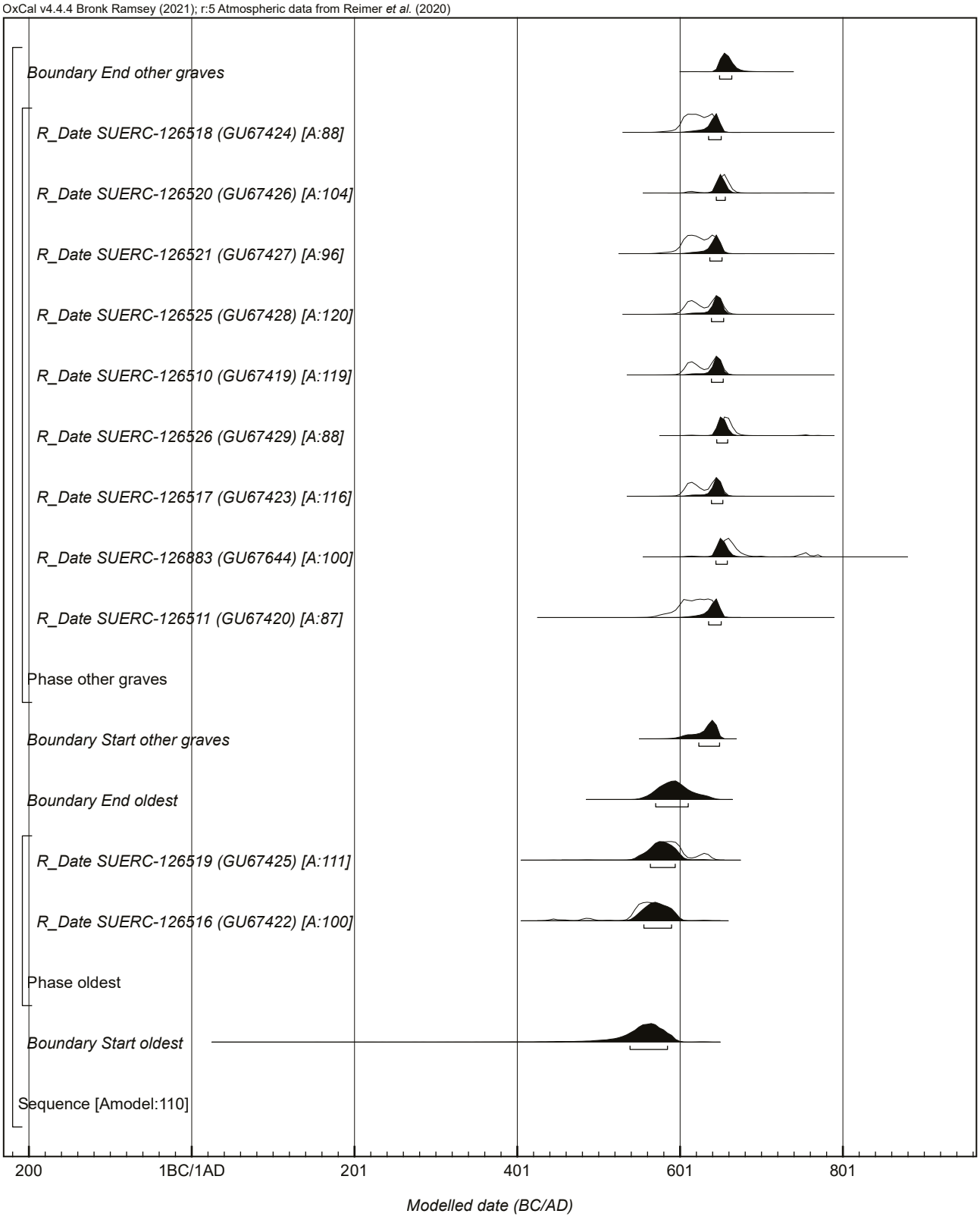


Figure 7.6 Sequential phase model for the Anglo-Saxon cemetery at Callow Carr

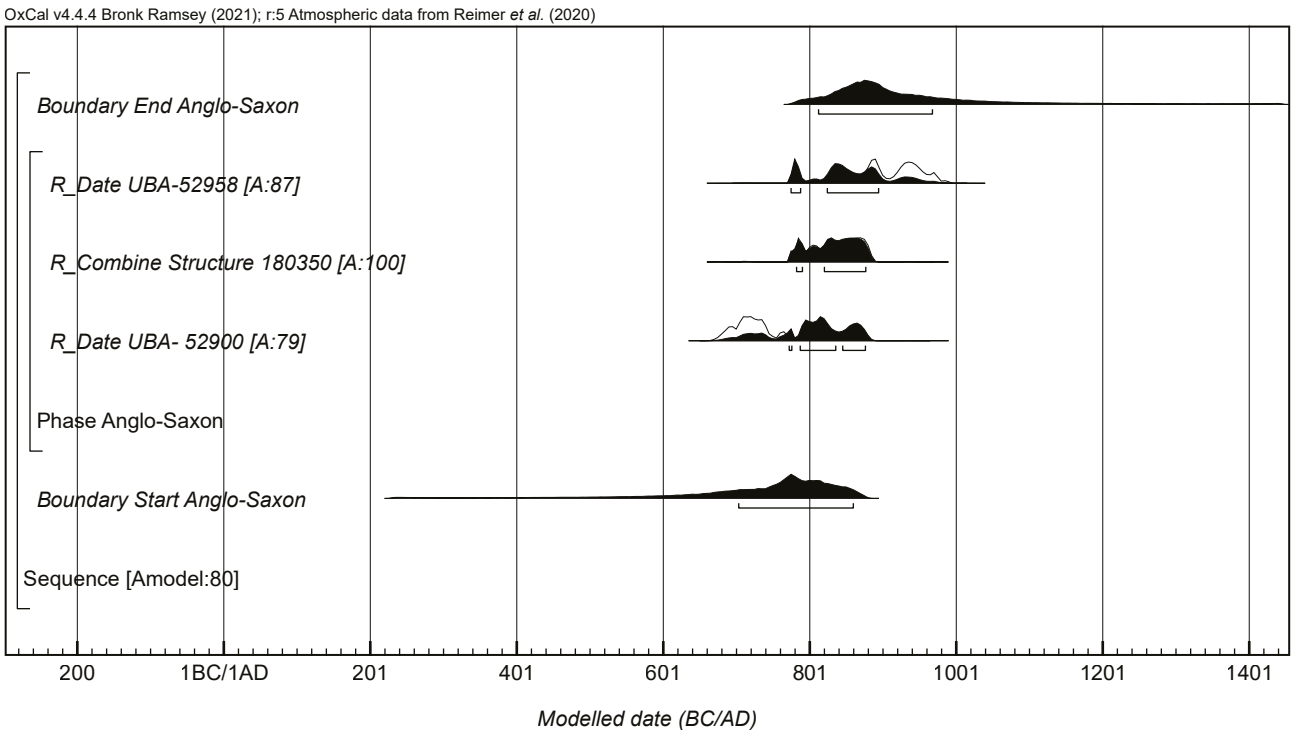


Figure 7.7 Simple phase model for the Anglo-Saxon activity at Cheals Close

of the structures, and therefore giving dates for the period of use of the structures, rather than their construction or abandonment. The two measurements from postholes in structure 2 (180350) (UBA-52907 and UBA-52908) have been successfully combined as *cal. AD 780–880* (χ^2 passed at df=1 T=1.5(5% 3.8)). The model suggests that activity in the area started *cal. AD 700–860* and ended by *cal. AD 810–970*.

Fourteen Acres

A single radiocarbon date was obtained (UBA-52875), confirming the seemingly early prehistoric remains in pit 370010 dated to the Middle/Late Neolithic (Table 7.13).

Raithby Lane

A radiocarbon date was obtained on a heather stem (FTMC-MB96-2), which confirms the establishment of heathland in the middle/late Romano-British period (Table 7.14).

Raithby Crossroads

The three radiocarbon samples from Raithby Crossroads were successfully measured (Table 7.15).

Two measurements on material from roundhouse ring gully 220117 provided inconsistent results: one was Neolithic (UBA-52909) and the other Iron Age (UBA-52910). It seems likely that the hazel nutshell fragment on which the former measurement was obtained is residual from other activity at the site (probable Bronze Age worked flint was also present in the deposit) and the later measurement on a wheat grain (UBA-52910) is a more accurate representation of the period of use of the structure. A similar Middle/Late Iron Age date (UBA-52885) was obtained for a wheat

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*
UBA-52875	Pit 370010, fill 370011	Charred plant remains: *Corylus avellana* shell fragment	4266±40	3010–2700 cal. BC

Table 7.13 Radiocarbon dating results for the Neolithic activity at Fourteen Acres

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*
FTMC-MB96-2	Ditch 380055, fill 380056	Wood charcoal: *Calluna vulgaris* type stem	1747±29	cal. AD 240–400

Table 7.14 Radiocarbon dating results for the Romano-British activity at Raithby Lane

Table 7.15 Radiocarbon dating results for the Neolithic and Late Iron Age activity at Raithby Crossroads

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UBA-52909	Roundhouse ring gully 220117 (slot 220003), fill 220004	Charred plant remains: *Corylus avellana* shell fragment	4949±31	3790–3650 cal. BC	-
UBA-52910		Charred plant remains: *Triticum* sp. grain	2193±25	360–170 cal. BC	*355–170 cal. BC*
UBA-52885	Ditch 220114 (slot 220081), fill 220082	Charred plant remains: *Triticum* sp. germinated grain	2081±27	180 cal. BC–cal. AD 10	*160–50 cal. BC*

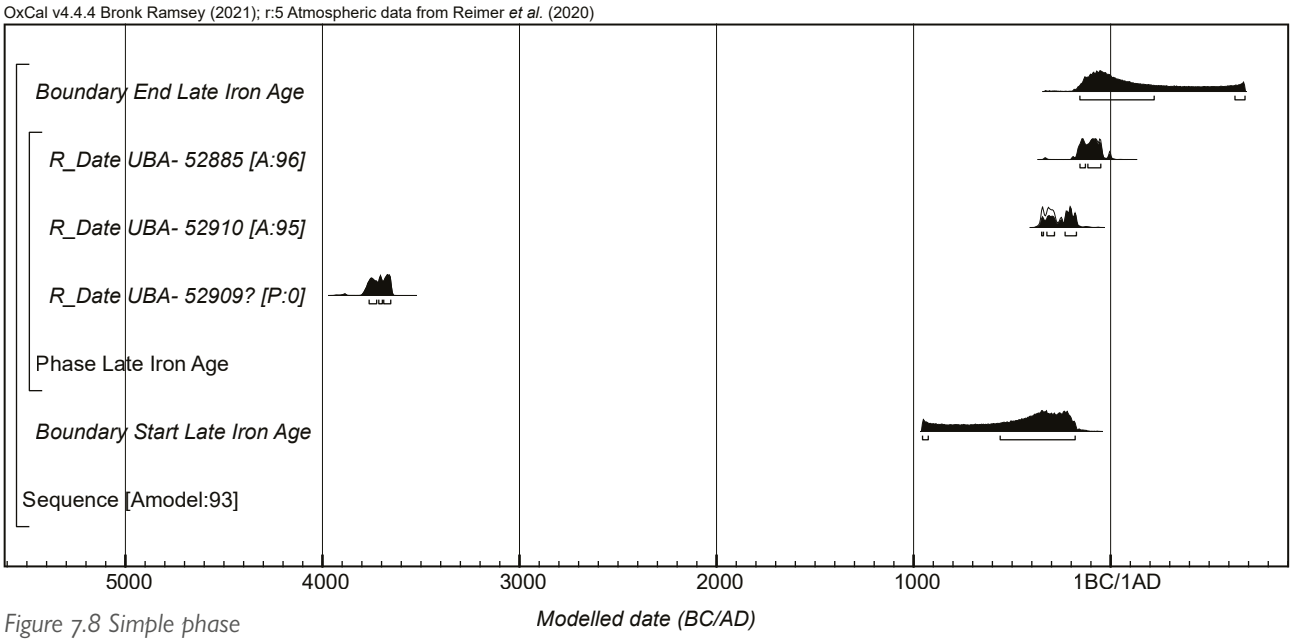


Figure 7.8 Simple phase model for the Neolithic and Iron Age activity at Raithby Crossroads

grain from ditch 220114 nearby. Both dates represent periods of activity in which cereal was processed, rather than gully or ditch construction or abandonment, and considering the hazel nutshell as an outlier, the model suggests the bulk of the activity in the area focused on the Late Iron Age and was relatively long-lasting, *50–220 years* (Fig. 7.8).

Fen-edge

Hagnaby Grange

A sample of a cattle mandible from ditch 400548 was submitted but failed because of insufficient carbon (GU63254). No further attempts were made. Agricultural/land management activities took place in the area sometime between the Middle Iron Age and early Romano-British period (Table 7.16), as revealed by results from the dating of a broad bean (*Vicia faba*) from gully 400561 (UBA-52876).

Magers Lane

The three samples submitted for radiocarbon dating were successfully measured (Table 7.17). Two measurements (UBA-52892 and UBA-52893) were obtained on remains from two different wheat taxa present in pit 300086 to investigate whether they were cultivated during the same period, but they provided inconsistent results: one of the measurements (UBA-52893) proved the naked wheat remains to be a modern intrusion. Middle/Late Iron Age measurements on charred plant material from deposits in pits 300038 and 300086 (UBA-52879 and UBA-52892) reflect the slow accumulation of settlement debris in the features after their abandonment, and are therefore indicators of activity in the area rather than indicating the time of pit construction or abandonment.

Table 7.16 Radiocarbon dating results for the Middle Iron Age–early Romano-British periods at Hagnaby Grange

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*
UBA-52876	Gully 400561 (slot 400065), fill 400066	Charred plant remains: *Vicia faba* seed	2044±28	150 cal. BC–cal. AD 60

The measurements confirm that these agricultural and other plant use activities in the area started in the Middle or Late Iron Age, *240–50 cal. BC* (Fig. 7.9). However, later Romano-British activity is also present at Magers Lane, as suggested by the pottery assemblage from other features.

Back Lane

The three samples from Back Lane were successfully measured (Table 7.18). The material was recovered from the fills of ditches, but the results are not useful for establishing the time at which the features were cut.

Dates in the Middle Bronze Age were obtained for the redeposited cremation-related remains in ring ditch 410125 (SUERC-126879); because of the exchange of carbon between the fuel (which could be an older carbon source) and the bone during the cremation process this measurement must be considered with caution as its real age could be younger than its radiocarbon age (*cf.* Olsen *et al.* 2013). Ring gully 410120 was infilled with material dating to the Middle–Late Iron Age (UBA-52911).

The measurement on waterlogged plant material from ditch 410021 (recut 410023) indicates a modern age (UBA-52954) for the latest fill, which suggests this post-medieval feature was in use until very recently or that it contains intrusive remains.

Staunch Farm

Two samples were submitted from Staunch Farm (Table 7.19) but insufficient carbon caused one failure (UB54359). The successful measurement (UBA-52877) confirms the Middle/Late Iron Age activities around ditch 310170.

Table 7.17 Radiocarbon dating results for the Middle/Late Iron Age activity at Magers Lane

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UBA-52879	Pit 300038, fill 300035	Charred plant remains: *Corylus avellana* shell fragment	2063±27 BP	161 cal. BC–cal. AD 10	*110–1 cal. BC*
UBA-52892	Pit 300086, fill 300087	Charred plant remains: 8 *Triticum* sp. glume bases	2081±29 BP	175 cal. BC–cal. AD 10	*120–40 cal. BC*
UBA-52893		Charred plant remains: *Triticum* cf. *aestivum* rachis internode	1.1318±0.0041 $F^{14}C$	cal. AD 1992–1994	-

Note: The age ranges were calculated with OxCal 4.4.4 using the IntCal20 and Bomb21NH1 curves

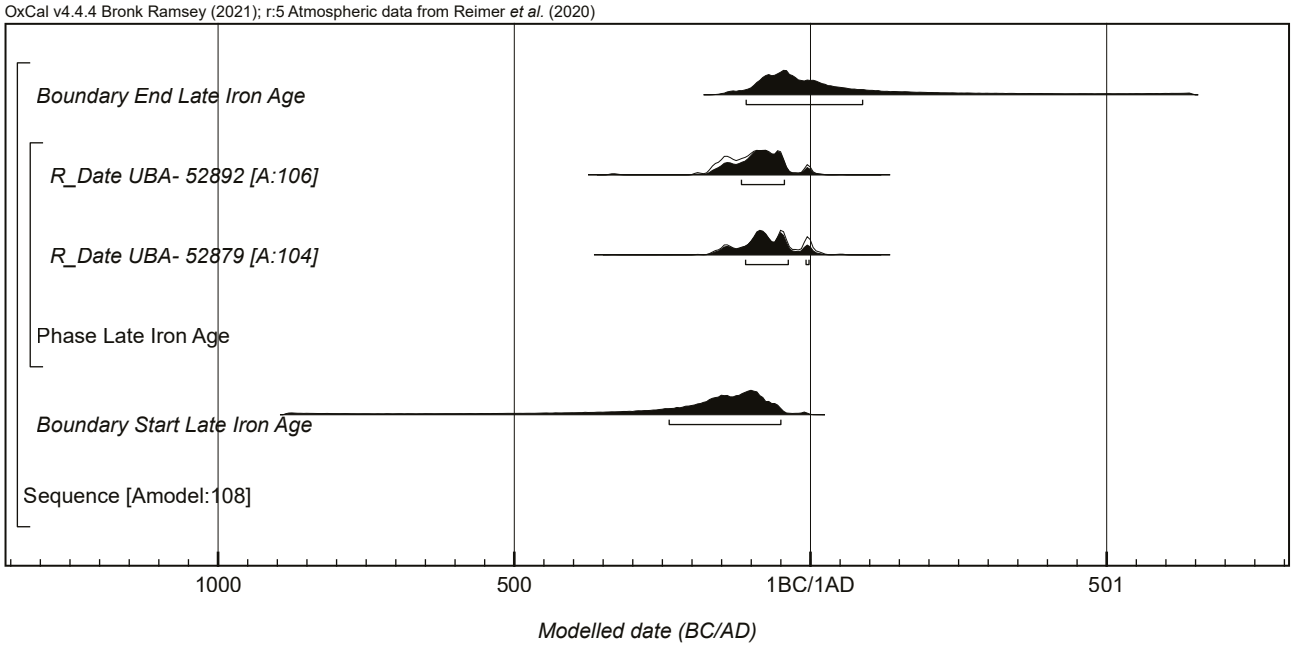


Figure 7.9 Simple phase model for the Middle/Late Iron Age activity at Magers Lane

Table 7.18 Radiocarbon dating results for the Middle Bronze Age and Iron Age activity at Back Lane

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age*	*$\delta^{13}C$‰*	*Calibrated date range (95% probability)*
SUERC-126879 (GU67640)	Ring ditch 410125 (slot 410049), fill 410050	Bone (cremated human bone): fragments (2.6 g)	3019±27 BP	-21.9	1390–1130 cal. BC
UBA-52911	Ring gully 410120 (slot 410037), fill 410040	Charred plant remains: *Hordeum vulgare* grain	2068±23 BP	-	160 cal. BC–cal. AD 10
UBA-52954	Ditch 410021 (recut 410023), fill 410024	Waterlogged plant remains: 2 *Sambucus nigra* seeds	1.488±0.0032 $F^{14}C$	-	cal. AD 1972

Note: The age ranges were calculated with OxCal 4.4.4 using the IntCal20 and Bomb21NH1 curves. The reported $\delta^{13}C$‰ values are measured by IRMS

Table 7.19 Radiocarbon dating results for the Iron Age activity at Staunch Farm

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*
UBA-52877	Ditch 310170 (slot 310046), fill 310048	Charred plant remains: 6 *Triticum* cf. *dicoccum* glume bases	2133±27	350–50 cal. BC
UB54359	Ditch 310170, fill 310094	Charred residue from interior of pottery sherd	-	-

Table 7.20 Radiocarbon dating results for the Late Iron Age–early/middle Romano-British activity at Mown Rakes

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age*	*$\delta^{13}C$‰*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
UBA-52951	Ditch 530296 (slot 530286), secondary fill 4/8 530215	Wood charcoal: *Quercus* sp. fragment with strong ring curvature, 2 growth rings	2037±25 BP	-	150 cal. BC–cal. AD 60	
UBA-52952		Wood charcoal: indet. twig, 1 growth ring	2007±24 BP	-	40 cal. BC–cal. AD 70	*40 cal. BC–cal. AD 25*
FTMC-MB96-1		Charred plant remains: *Bromus* sp. grain from briquetage object	1984±30 BP	-	40 cal. BC–cal. AD 120	
UBA-52888	Ditch 530296 (slot 530286), final secondary fill 8/8 530280	Charred plant remains: 7 monocotyledon stems	1930±27 BP	-	cal. AD 20–200	*cal. AD 25–125*
SUERC-126880 (GU67641)	Pit 530132, filled with redeposited pyre debris 530133	Bone (cremated human bone): 1.9 g	1886±27 BP	-23	cal. AD 80–230	*cal. AD 140–215*
SUERC-126881 (GU67642)	Cremation grave 540003, with unurned cremation remains and secondary pyre debris 540004	Bone (cremated human bone): 3.7 g	1834±27 BP	-21.1	cal. AD 130–310	*cal. AD 160–245*
FTMC-MB96-3		Wood charcoal: *Salix/Populus* sp. sapwood with bark	1956±29 BP	-	40 cal. BC–cal. AD 160	cal. AD 25–120 (outlier)
UBA-52894	Pit 530202, fill 530203	Charred plant remains: *Triticum aestivum/ turgidum* grain	1.1928±0.0042 $F^{14}C$	-	cal. AD 1985–1987	-

Note: The age ranges were calculated with OxCal 4.4.4 using the IntCal20 and Bomb21NH1 curves. The reported $\delta^{13}C$‰ values are measured by IRMS

Fens

Mown Rakes

Eight samples were submitted and dates were obtained for all (Table 7.20). With the exception of a modern outlier sample (UBA-52894), all the measurements fall within the Late Iron Age–early/middle Romano-British period (Figs 7.10–11).

Salt production

Three measurements were obtained from a briquetage-rich deposit in ditch 530296 (UBA-52951, UBA-52952 and FTMC-MB96-1), including one obtained on a grain extracted from a briquetage object (FTMC-MB96-1). The measurements were successfully combined as 2012±BP, passing the χ^2 test as df=2 T=1.9(5% 3.8). This deposit was a secondary fill (the fourth out of eight) in a stratigraphically earlier position to UBA-52888 (the top fill), so the two have been modelled as a sequence, giving a span

for ditch infilling of *0–25 years* and suggesting the beginning of salt exploitation probably occurred in the Late Iron Age, before the Roman occupation (Fig. 7.10).

Mortuary activity

The pair of measurements on cremated human bone and charred willow/poplar sapwood from grave 540003 (SUERC-126881 and FTMC-MB96-3) are not consistent (failed to pass the χ^2 test when combined, with df=1 T=9.490 (5% 3.8)), with the wood being considerably older, despite being a relatively short-lived tree taxon in which the outer rings were measured. This suggests the wood possibly originated in repurposed structural material or was present in bog-gathered material as fuel; in either case, sources of old carbon are likely present as fuel in the cremation process, and these can have a considerable effect on the radiocarbon ages of the cremated bone (e.g., Olsen *et al*. 2013).

It was initially thought that the remains of the individual buried in cremation grave 540003 could be part of the same individual whose redeposited cremated remains were found in pit 530132 (SUERC-126880). Although the detailed osteological analysis of both deposits has suggested this hypothesis is not sustainable (see McKinley

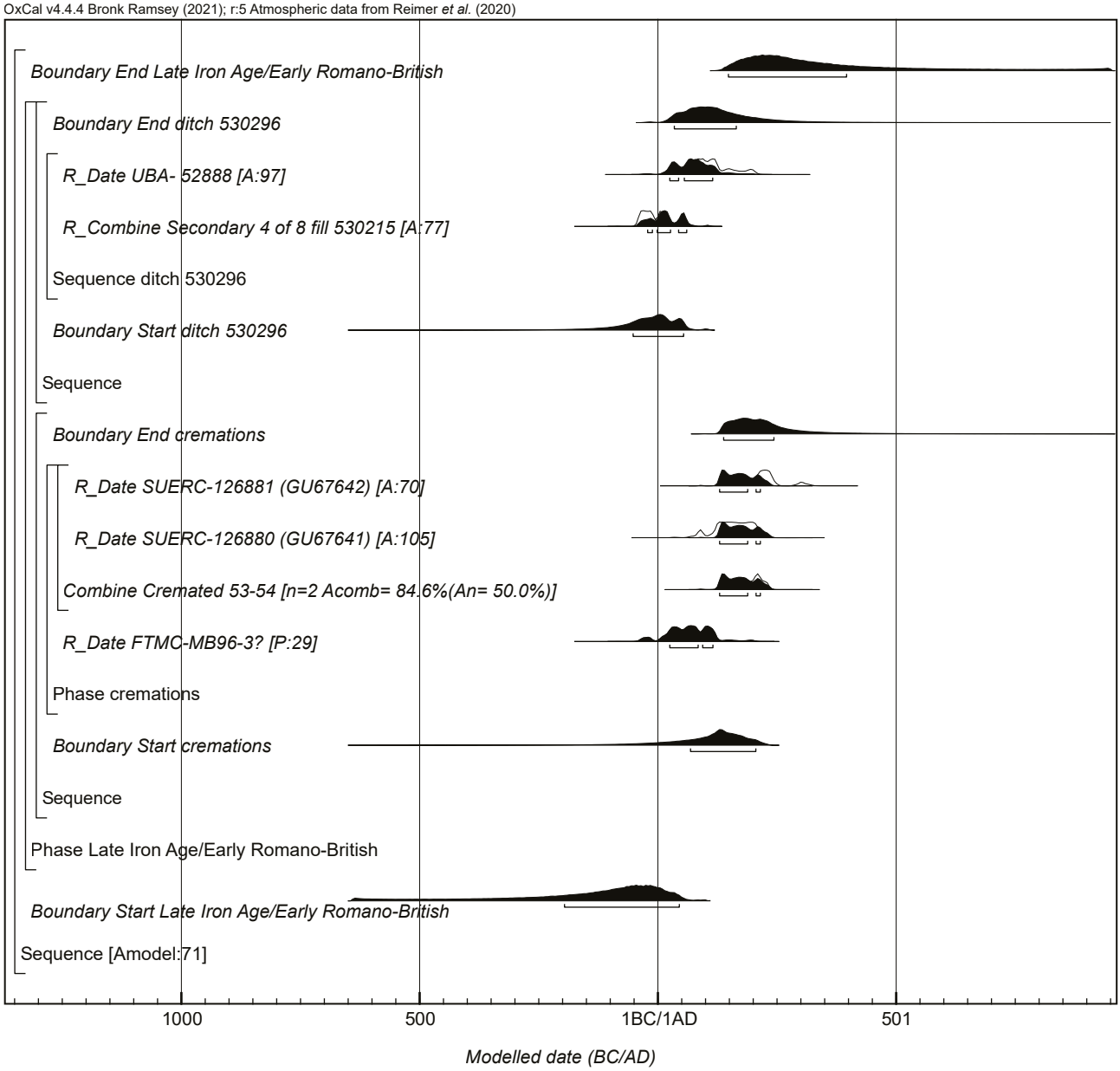


Figure 7.10 Sequential model for the Late Iron Age/Romano-British salt production activity at Mown Rakes

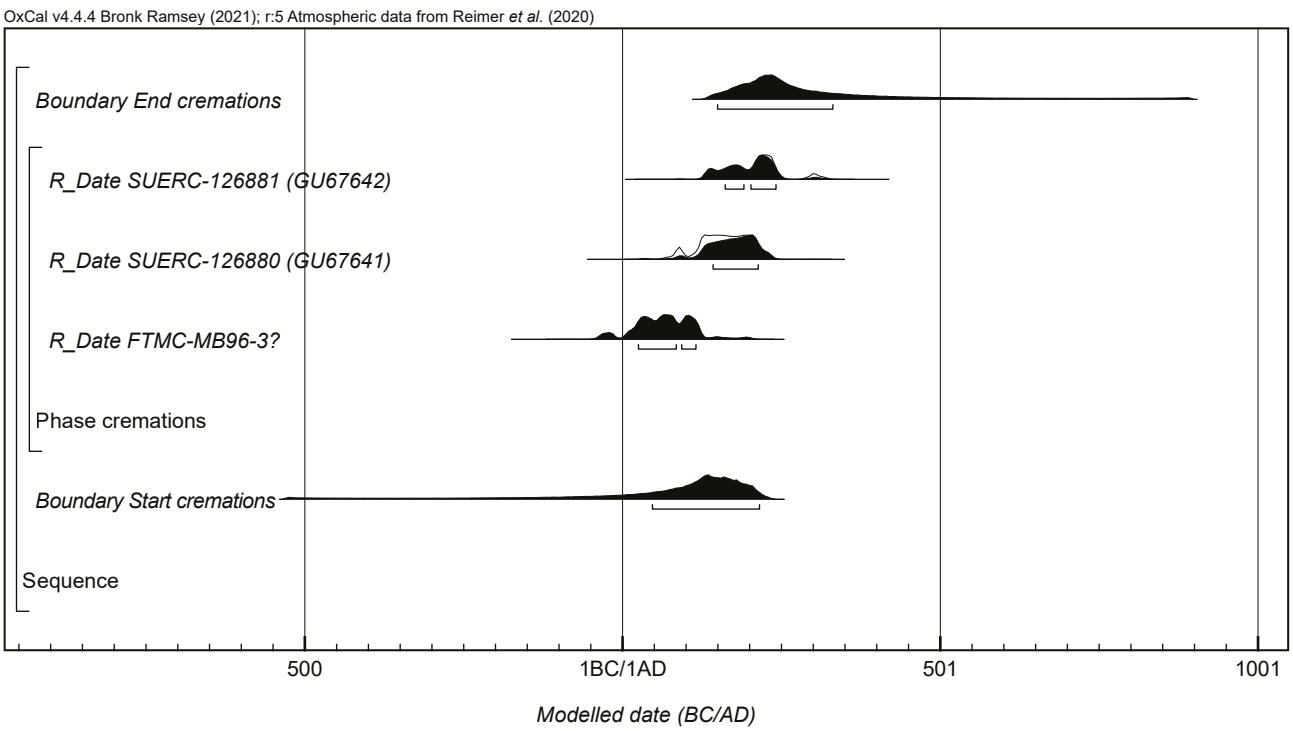


Figure 7.11 Outlier model for the Romano-British mortuary activity at Mown Rakes

below), the wood charcoal evidence has revealed strong similarities between the two deposits (see Treasure below). Both measurements were successfully combined as 1860±20 BP, cal. AD 130–230 (χ^2 test passed as df=1 T =1.9 (5% 3.8)), indicating that the individuals could have died within the same chronological event (i.e., not the same cremation process but within a few years, months or even days, which would not be distinguishable in radiocarbon ages). Both these measurements on cremated bone (SUERC-126880 and SUERC-126881) have been modelled in a charcoal outlier model to account for the possible old-wood effect, with the old-wood measurement (FTMC-MB96-3) rejected as an outlier (Fig. 7.11). The query *Difference* indicates a gap of *0–65 years* in the death between the two individuals, and the query *Order* that the individual in pit 530132 (SUERC-126880) is probably earlier than the individual in grave 540003.

Six Hundreds Drove

A sample of animal bone (GU63255) did not return a result, because of insufficient carbon and poor collagen preservation (Table 7.21). The four samples on charred plant remains from ditch 550508 were successfully measured (UBA-52895–7 and UBA-52953), providing radiocarbon dates for remains of archaeobotanical interest (different species of wheat and a non-native conifer), but also chronological information on the time of infilling of this ditch, which occurred between *cal. AD 185–340* (Fig. 7.12). The three measurements on material from the same fill (UBA-52895, UBA-52896 and UBA-52897) were successfully combined (χ^2 test passed at df=2 T=2.1(5% 6.0)), suggesting that it all originated from the same event and indicating the use of naked/free-threshing and hulled wheats at the same time.

Gibbet Hill

A late Romano-British date (SUERC-108720) was obtained on a sample (left humerus) taken from disarticulated human remains found in ditch 560024 (Table 7.22). The disarticulation of the remains suggests the measurement provides a date after which the ditch must have been dug, but the length of time between one event and the other is unknown.

A medieval/post-medieval date was obtained on a fragment of cattle bone from animal grave 560058 (UBA-53370).

Table 7.21 Radiocarbon dating results for the Romano-British activity at Six Hundreds Drove

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*Calibrated date range (95% probability)*	*Modelled date range (68% probability)*
GU63255	Ditch 550539 (slot 550206), fill 550207	Bone (animal): cattle lumbar vertebra (3 g)	-	-	-
UBA-52895	Ditch 550508 (slot 550122), top fill 550120	Charred plant remains: *Triticum spelta* grain	1837±29	cal. AD 130–310	
UBA-52896		Charred plant remains: *Triticum aestivum/turgidum* grain	1846±31	cal. AD 120–310	*cal. AD 120–235*
UBA-52897		Charred plant remains: 2 *Triticum* cf. *turgidum* rachis segments	1896±32	cal. AD 70–230	
UBA-52953	Ditch 550508 (slot 550464), top fill 550465	Wood charcoal: cf. *Picea* sp. stemwood	1816±27	cal. AD 130–330	*cal. AD 170–250*

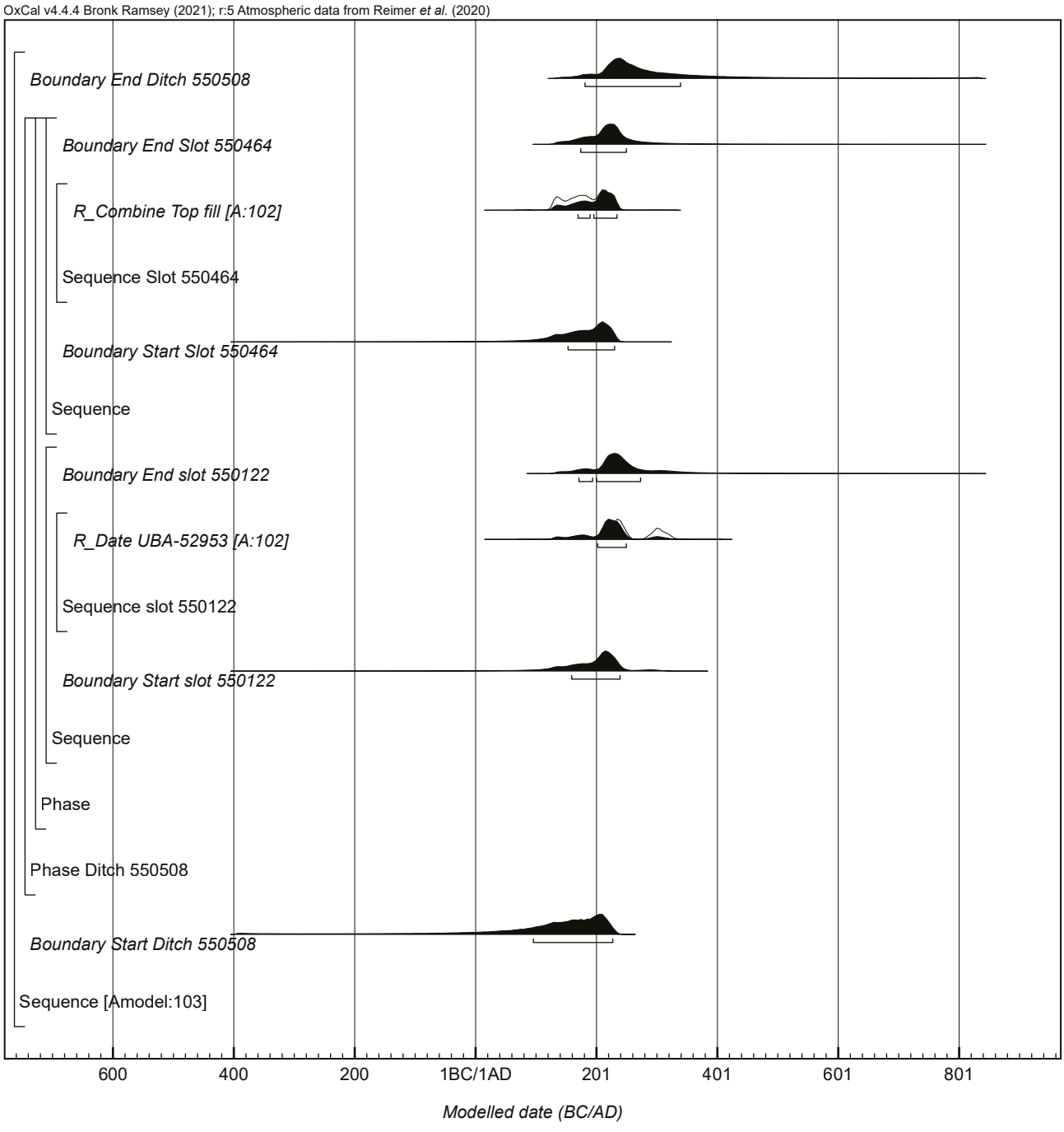


Figure 7.12 Phase model with two sequences for the Late Iron Age/Romano-British activity at Six Hundreds Drove

Table 7.22 Radiocarbon dating results for the Romano-British activity at Gibbet Hill

Laboratory reference	*Provenance*	*Material*	*Radiocarbon age (BP)*	*$\delta^{13}C$‰*	*$\delta^{15}N$‰*	*$\delta^{34}S$‰*	*C/N*	*C/S*	*N/S*	*Calibrated date range (95% probability)*
SUERC-108720 (GU63256)	Ditch 560024, burial 560025	Bone (human): left humerus (1.9 g)	1734±31	-21.3	10.2	-14.2	3.4	217	64	cal. AD 250–410
UBA-53370	Animal grave 560058, fill 560060	Bone (animal): cattle rib (2 g)	371±25	-22.5±0.14	9±0.14	-	3.2±0.6	-	-	cal. AD 1450–1630

Note: The reported $\delta^{13}C$‰ values are measured by IRMS

Chapter 8
Environment and Material Culture

Environmental Studies

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with contributions from Sander Aerts, Tom Hill and Matt Law

Introduction

This section presents the results of a range of studies undertaken on multiple strands of environmental evidence retrieved from the Interconnector investigations; the findings are discussed in Volume 1, Chapter 5. Following an assessment of 648 bulk sediment samples and the subsampling of monolith samples, a selection of materials was subjected to further analysis (Table 8.1). This section presents the most informative results of the analysis programme, and draws its conclusions based on the whole of the evidence (i.e., assessment and analysis. Data relating to the assessment phase is available online: https://doi.org/10.5284/1136099).

Table 8.1 Summary of types of samples and environmental evidence by site

Zone	*Landscape*	*Site*	*Fieldwork area (PXA name)*	*Civil parish*	*No. of samples*	*Plant remains*	*Wood charcoal*	*Molluscs*	*Insects*	*Microfossils*
1	Lincolnshire Marsh	ID1, evaluation trenches 52, 56, 72, 161, 211, 212, 213, 262, 292, 305 and 1309	N/A	N/A	19	✓ (CPR)	✓	-	-	-
		Sea Bank Farm	ID2	Sandilands	22	✓ (CPR)	✓	-	-	-
		White Crofts	ID3 + TWB3	Asserby	38	✓ (CPR)	✓		-	-
	Lincolnshire Marsh/ Wolds margin	Ailby Lane	ID4 West & ID16	Ailby South	45	✓ (CPR)	✓	-	-	-
2	Wolds	Ulceby Cross	Area 5	Ulceby with Fordington	12	-	-	✓	-	-
		Sutterby Field	Area 7	Langton by Spilsby	23	-	✓	✓	-	-
		Pitchmoor	Area 35	Langton by Spilsby	22	✓ (CPR)	✓	-	-	-
		Walk Hill	Area 8	Langton by Spilsby	91	✓ (CPR)	✓	-	-	-
		Callow Carr	Area 9	Dalby	13	-	-	✓	-	-
	Lymn Valley		Zone 2 trenches	N/A	31	-	-	-	-	-
		Partney Leys	Area 17	Langton by Spilsby	11	-	✓	-	-	-
		-	Area 33	Langton by Spilsby	5	-	✓	-	-	-
		Cheals Close	Area 18	Sausthorpe	40	✓ (CPR + WPR)	✓	-	-	-
		Fourteen Acres	Area 37	Sausthorpe	4	✓ (CPR)	✓	-	-	-
		-	Area 19	Sausthorpe	3	-	-	-	-	-
		-	Area 21	Raithby	2	✓ (CPR)	✓	-	-	-
		Raithby Lane	Area 38	Raithby	13	✓ (CPR)	✓	-	✓	-
		Raithby Crossroads	Area 22	Raithby	11	-	-	-	-	-
		Wood Hill	Area 12	Raithby	9	✓ (CPR)	✓	-	-	-
		Mardon Hill	Area 39	East Keal	1	-	-	-	-	-
		-	Area 28	East Keal	7	-	✓	-	-	-
		-	Area 34	East Keal	8	-	✓	-	-	-
	Fen-edge	-	Area 29	West Keal	6	-	✓	-	-	-
		Hagnaby Grange	Area 40	West Keal	36	-	✓	-	-	-
		Magers Lane	Area 30	Stickford	12	✓ (CPR)	-	-	-	-
		Back Lane	Area 41	Stickford	9	-	✓	-	-	-
		Staunch Farm	Area 31	Stickford	4	✓ (CPR)	✓	-	-	-
3	Fens		Trenches 350–546	N/A	18	-	-	-	-	-
			Area 52	Swineshead	18	-	-	-	-	-
		Mown Rakes	Area 53	Swineshead	44	✓ (CPR)	✓	-	-	✓ (P, D)
			Area 54	Swineshead	9	-	✓	-	-	-
		Six Hundreds Drove	Area 55	Swineshead	75	✓ (CPR)	✓	-	-	-
		Gibbet Hill	Area 56	Swineshead	3	-	-	-	-	-
		-	Area 57	Little Hale	2	-	-	-	-	-
		Bottom Close	Area 59	Little Hale	2	-	-	-	-	-
		North Ing	Area 60	Donington	7	-	-	-	-	-
		North Ing	Area 61	Donington	7	-	-	✓	-	-

Key: CPR = charred plant remains, WPR = waterlogged plant remains, pollen, D = diatoms, P = pollen, PXA = post-excavation assessment

Materials and Methods

The bulk sediment (flotation) samples and monolith samples were taken from a range of features across the sites. Plant remains, wood charcoal, molluscs, insects, pollen and diatoms were studied from these samples or their subsamples.

Unless otherwise stated (e.g., pollen sections), plant nomenclature follows Stace (1997) for wild plants, and traditional nomenclature (Zohary *et al*. 2012), for domesticates.

Plant impressions

Preliminary observations (see Thorp below) indicated the presence of possible plant impressions in a portion of the briquetage assemblages from several of the coastal marsh and fen sites (Sea Bank Farm, Mown Rakes and Six Hundreds Drove).

While novel technologies, such as microCT, have been used to identify plant remains within clays (Barron and Denham 2018), the established technique of taking casts of external impressions on clay objects remains informative (e.g., Arobba *et al*. 2017; Endo and Leipe 2022). Therefore, microCT and positive casts can be complementary techniques where plant remains are present within the clay matrix and on pottery surfaces. In this case, preliminary examination of the briquetage fragments revealed most impressions were on the surface rather than within the matrix, while preserved charred plant remains were present in a small proportion.

The technique for making positive casts of plant impressions in pottery remains essentially the same as originally described (Magid and Krzywinski 1995), but the potential to reach high-level taxonomic identifications has been magnified with the application of high-resolution silicone elastomer. The examination of the positive casts for taxonomic identification may be undertaken with low-power binocular microscopy (e.g., Arobba *et al*. 2017; Sureda *et al*. 2017), or aided with a Scanning Electron Microscope (SEM) for improved observation of morphological features (e.g., Endo and Leipe 2022).

Following the description and analysis of the briquetage assemblage by the pottery specialist, a selection of the clay elements was examined using a binocular microscope (10x magnification) for the preliminary identification and classification of plant impressions. A total of 196 clay objects were examined. Impressions were categorised as: irregular voids (unlikely to belong to plant macroremains); distinct vegetative plant parts (e.g., cereal stems, small leaf/glumes); and regular voids (e.g., rounded, elongated or oval, possibly belonging to seeds). Following this classification, clay elements with possible seeds (i.e., regular voids), which are the only taxonomically identifiable impressions, were separated for the obtention of positive casts.

The regular voids were cleaned and high-resolution silicone (Provil Novo, light viscosity, regular set) was applied with the help of a dispenser gun equipped with mixing tips and intra-oral tips. Once set and lifted from the pottery, the casts were examined under binocular microscopy at low magnification (10–40x) for the observation of the morphological and anatomical characteristics, following the standard methodology for the identification of charred plant remains (see below).

Plant remains

The bulk flotation samples were processed by standard methods on a Siraf-type flotation tank; the flot was retained on a 0.25 mm mesh, residues on a 1 mm mesh. The coarse fractions (4 mm) were sorted by eye and environmental material extracted from the residues was added to the flots.

For the assessment, abundance of remains was semi-quantified (C = <5, A = 10–29, A* = 30–99, A** = 100–500, A*** = >500) as an estimation of the minimum number of individuals and not the number of remains per taxa. Indicators of bioturbation were

also recorded: roots (as a %), and following the above scale of abundance, the presence of modern/uncharred seeds/chaff ('U'), mycorrhizal fungi sclerotia ('F', e.g., *Cenococcum geophilum*), shells of burrowing snails ('S', i.e., *Cecilioides acicula*), earthworm eggs ('E') and insects ('I'). These letter codes have been used within the tabulated data below.

For the analysis of the 123 assessed samples proposed for further study, all identifiable charred plant remains were extracted from the flot and the <4 mm residue fractions (or subsamples) using stereo incident light microscopy at magnifications of up to 40x. Except where otherwise stated, quantifications are given as MNI (minimum number of individuals) and are based on anatomy (generally whole items or the highest type of anatomical fragments; cereals, based on Antolín and Buxó (2011); glume bases and legume cotyledons divided by two), or size (hazel nutshell fragments, based on Antolín and Jacomet 2015). When only fractions of flots or residues have been fully extracted, the number of remains in the fractions has been multiplied to add to the total count of items per sample.

The identifications have been undertaken in consultation with a modern seed reference collection and specialised literature (e.g., Jacomet 2006). Plant nomenclature follows Stace (1997) for wild plants, and traditional nomenclature, as provided by Zohary *et al*. (2012), for cereals.

Wood charcoal

Wood charcoal was primarily recovered through the collection of bulk environmental (flotation) samples, although a small quantity was also collected by hand and through wet-sieving artefact samples. As part of the environmental assessment, the wood charcoal in 100 samples was examined to provide preliminary information on the nature and character the site assemblages (Wessex Archaeology 2023a–b). Forty-four samples were then selected for full analysis. The assessment and analysis results are combined in this chapter.

Wood charcoal fragments were extracted from the flots and the residues, and the volume (ml) of the fragments in each sample was recorded. Identification focused on fragments which were ≥4 mm in size, although smaller fragments were also examined (2–4 mm). To estimate the concentration of wood charcoal in each sample, the volume of wood charcoal (>2 mm) was divided by the original sample volume (l). The wood charcoal was identified through examination of the transverse, tangential longitudinal and radial longitudinal sections at up to 400x magnification with comparison to Wessex Archaeology's reference collection. Identification guides by Gale and Cutler (2000), Hather (2000) and Schweingruber (1990) were also consulted. The prefix 'cf.' has been used to denote a probable identification. Additional notes were made on other features where appropriate (e.g., growth ring curvature, radial cracking, vitrification, insect degradation, wood working marks, etc.). Growth ring curvatures were recorded following Marguerie and Hunot (2007) using the categories: 'weak', 'moderate', 'strong' and 'indeterminate'. Nomenclature follows Stace (1997). The term 'stemwood' is used to refer to mature wood.

The recording methods used in the assessment and analysis differed slightly, and these are outlined below:

- *Assessment:* 5–15 fragments were selected for examination from each sample. Where possible, fragments which clearly derived from a range of different taxa were selected for identification to provide information on taxonomic diversity. The data was not quantified, although notes were made on the relative abundance of different taxa where possible: '(+)' = present/not quantified, '+' = rare, '++' = common, '+++' = abundant
- *Analysis:* 25–100 fragments were randomly selected for examination from each sample. If a sample contained <25 fragments, all were examined. The resulting data was fully quantified (fragment counts)

Data analysis

To examine the relative abundance of different taxa within an individual sample or context, percentages were calculated based on fragment counts (i.e., the proportion of fragments examined which derive from individual taxa). A limitation of this approach

is that certain taxa are more likely to be preserved and identified in archaeological assemblages, and fragmentation patterns may also vary between taxa (Kabukcu and Chabal 2021). For example, because of the anatomical characteristics of oak (*Quercus* sp.), this taxon can be overrepresented in wood charcoal assemblages as it can produce a disproportionately large numbers of fragments when burnt or compressed (Chrzazvez *et al*. 2014). The second type of analysis is ubiquity (i.e., the proportion of samples in which individual taxa occur, expressed as a percentage). Ubiquity analysis does not take into account the number of fragments of individual taxa, but it can provide useful information on the presence/absence of individual taxa and how frequently they occur.

Pollen

A total of eight samples were submitted for pollen assessment, from the fill of an undated pond (530220) at Mown Rakes, which was sampled at regular (0.10 m) intervals.

Pollen preparations were undertaken by Quaternary Scientific, University of Reading, following the methodologies outlined by Campbell *et al*. (2016) and Moore *et al*. (1991).

A standard assessment of potential requires either a total of 10 microscope slide traverses, or a count of at least 100 total land pollen grains (TLP), excluding aquatics and spores (whichever comes first). During an assessment, comments relating to state of preservation are undertaken, while the presence of other visible microfossil features (charcoal, pre-Quaternary pollen and spores, other identifiable non-pollen palynomorphs such as dinoflagellate cysts, testate amoebae, etc.) is also summarised, if encountered.

Pollen nomenclature follows Moore *et al*. (1991) with the amendments suggested by Bennett *et al*. (1994).

Qualitative categories on the preservation of the pollen (abundance and diversity) were assigned to the samples. Abundance: if low, a sample was unlikely to provide an assessment count of 100 TLP during the set number of slide traverses (n. 10); if moderate, there is sufficient abundance for assessment purposes (>100 TLP). Diversity: number of different families/genera (and/or potential variation within a family, e.g., Lactuceae) encountered during the provisional assessment.

Molluscs

Eight samples from ditch fills (from White Crofts and Callow Carr) were submitted for analysis of non-marine molluscan shell assemblages. The samples derived from bulk sediment samples that had been processed using a Siraf-style flotation tank (Williams 1973). Of these, four samples were of washover ('flot') material only, while four included shell from the residue as well. Analysing shell from flots alone introduces biases as not all shells float. Typically, for example, the internal plates of the Limacidae slug family are less likely to float, although previous work has shown that it is difficult to anticipate which species will be under-represented in flots (Thomas and Zapata 2018).

Identification was carried out using a low-power binocular microscope. The author's reference collection was used for comparison. Identifications were made to species level where possible, although a small number of probable *Cepaea* shell apices could not be identified to species level and so are recorded as 'cf. *Cepaea* sp. fragments'. The two species of *Carychium* present in Britain cannot be reliably distinguished without dissecting the shell to reveal the columella. This has not been attempted here, and so all shells of this genus are recorded as '*Carychium* spp.'.

Minimum number of individuals (MNI) was determined by counting all intact shells and non-repeating elements (typically shell apex or body whorl with mouth) for each taxon in a sample and taking the highest number (Giovas 2009). An approach of sampling to redundancy (Lepofsky and Lertzman 2005) was taken, and so no more than 200

individual shells were counted per sample. This exceeds the redundancy threshold of 150 shells determined by Evans (1972). The subterranean snail *Cecilioides acicula* is likely to be a recent intrusion so was not included in the absolute quantifications, but its abundance was semi-quantified.

Ecological information about the species encountered is derived from Evans (1972), Kerney and Cameron (1979), Kerney (1999), Davies (2008), and Rowson *et al.* (2021). As an aid to interpretation, the taxa are tabulated in order of broad ecological preferences rather than evolutionary order. Such broad-level grouping risks masking finer details, so consideration has also been made of the ecology of individual species.

Snails of the genus *Cepaea* display different banding and colour morphs that may reflect a number of environmental factors (Cameron and Cook 2012; Currey and Cain 1968; Jones *et al.* 1977). Banding of intact *Cepaea* shells was recorded where possible.

Sample flots generally contained large masses of rootlets and, at Callow Carr, *Cecilioides* shells. These are indicative of an elevated risk that recent material has become incorporated into the sampled sediment (Pelling *et al.* 2015). Following Law (2020), the ratio of 'fresh' (translucent, or with the proteinaceous periostracum intact) to 'worn' (opaque, lacking periostracum) shells was estimated; and shells of *Helicella itala* were assigned to one of three qualitative preservation categories: type a (shell glossy with colouring intact), type b (shell dull but with colouration visible), and type c (shell entirely lacking colouration). Quantitative rates of weathering of *Helicella* shells are not available, and in any case are likely to be highly variable depending on burial conditions; however, the spread of different preservation categories affords some indication of likely temporal mixing.

Insects

Two samples were investigated for insect macrofossils.

One subsample from ditch 380253 at Raithby Lane was processed using the paraffin flotation method (Kenward *et al.* 1980). A 0.25 mm mesh was used to retrieve the floating material, and any remaining residue was washed through a 0.25 mm mesh. The processed flot was stored in industrial methylated spirit. One sample from ditch 180619 was wet-sieved over a 0.25 mm mesh and stored in water in cold storage.

A stereomicroscope was used to assess the material at up to 40x magnification. Selected insect sclerites were extracted for identification, predominately dorsal beetle (Coleoptera) sclerites. Identifications were aided by modern insect reference material held by the author and relevant literature where appropriate (e.g., Drost *et al.* 1992; Harde *et al.* 2021). Coleopteran nomenclature follows Duff (2018). The MNI (minimum number of individuals) was determined using the most abundant sclerite per taxon.

Results

Plant impressions

Of the four sites with briquetage, in only one (Mown Rakes) could plant impressions be positively identified (Table 8.2). The predominant types of plant remains present in briquetage are cereal or large grass grains, followed by vegetative plant parts, including herbaceous stems of which cereal culms comprise a large proportion.

Table 8.2 Briquetage plant impression analysis results

	Not identifiable	*Chaff*	*Grains*	*Taxa*
Sea Bank Farm	1	-	-	-
Mown Rakes	9	83	106	*Triticum spelta, Hordeum vulgare,* Triticeae, *Bromus* sp., Poaceae
Six Hundreds Drove	1	-	-	-

Plant impressions were observed in abundance in briquetage from this area. Examination of the matrix of the clay in broken fragments revealed preserved charred plant remains which included grains of brome (*Bromus* sp.); these were also among the identifiable impressions on the external surface of the clay objects. As to the impressions, where grains are present, these are largely dominated by brome, although cultivated cereals are also present (predominantly barley, *Hordeum vulgare*). Many of the grains, either brome or barley, were husked (within the spikelet fork).

Plant remains

Lincolnshire Marsh

Sea Bank Farm

Romano-British

A total of 22 sediment samples taken from layers in and around two palaeochannels were assessed; 11 provided sufficient remains for analysis and full quantification.

The composition of the assessed and analysed (Table 8.3) samples is relatively uniform, and there are no obvious differences according to the position of the samples in relation to the palaeochannel (Fig. 8.1).

The samples are relatively rich in cereal remains, particularly wheat chaff, mostly spelt, although barley and emmer grains are also present. Other cultivated plants include garden pea and broad bean, and potentially exploited wild plant resources include hazelnuts. All of these are represented in small numbers. Other common remains in the samples are roots, together with seeds from grassland plants such as grasses, vetches and trefoils/clovers/medicks, and wet substrate/wetland plants such as rushes. Other taxa of wet (e.g., sea-blite) or disturbed ground (e.g., cleavers, goosefoots, stitchworts) are also occasionally present.

Late Anglo-Saxon

Two samples of charred plant remains from pit 200063 were radiocarbon dated, providing consistent results of *cal. AD 990–1020,* which fall in the Late Anglo-Saxon period (UBA-52955: 1057±24 BP and UBA-52956: 1032±25 BP – see López-Dóriga above for further details on the radiocarbon measurements quoted in this section).

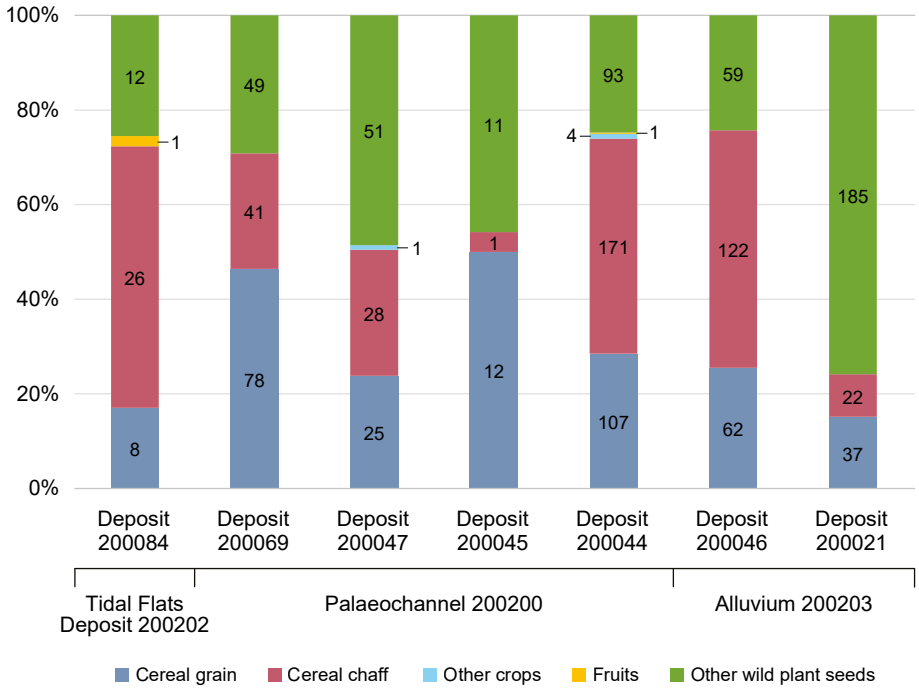


Figure 8.1 Proportions of different types of charred plant remains in the analysed samples from Sea Bank Farm

Table 8.3 Charred plant remains analysis: results from palaeochannels at Sea Bank Farm

Context			200084	200069	200047	200045	200044	200046	200021
Group			200202			200200			200203
Sample			1.5+1.6	5	2.8+11	10	2.5+2.6+9	2.2	4
Sample volume (l)			12	14	23	12	27	4	20
Flot volume (ml)			2	10	8	12	18	5	10
Bioturbation proxies			10%, U (A***)	15%, U (A**)	5%, U (A***)	50%, U (A**)	<1%, U (A**)	<1%	20%, U (A**)
Fragmentation index (MNI/NR)			0.61	0.49	0.61	0.67	0.54	0.49	0.77
Density (MNI/l)			3.92	12.00	4.57	2.00	13.93	60.75	12.20
Scientific name	*Common name*	*Plant part*							
Cereals									
Hordeum vulgare sl.	Barley	grain	-	3	6	1	35	2	7
Hordeum vulgare sl.	Barley	rachis segment	-	1	-	-	5	-	-
Hordeum vulgare var. *vulgare*	Hulled barley	grain	-	6	-	3	-	-	-
Triticum spelta	Spelt	grain	2	32	8	2	4	14	4
Triticum spelta	Spelt	spikelet fork	4	22	9	1	40	37	5
Triticum dicoccum	Emmer	grain	-	-	1	-	-	-	-
Triticum dicoccum	Emmer	spikelet fork	-	-	1	-	-	-	-
Triticum sp.	Wheat	grain	2	14	6	4	36	29	12
Triticum sp.	Wheat (hulled)	spikelet fork	22	18	18		124	85	17
Triticeae	Cereal	grain	4	23	4	2	32	17	14
Triticeae	Cereal	chaff	-	-	-	-	2	-	-
Other crops									
Pisum sativum	Garden pea	seed	-	-	1	-	4	-	-
Fruits									
Corylus avellana	Hazel	nut	1	-	-	-	1	-	-
Other wild plant seeds									
Ranunculus acris/ bulbosus/repens	Meadow/bulbous/ creeping Buttercup	seed	-	-	-	-	-	-	1
cf. *Suaeda sp.*	Sea-blites	seed	-	4	-	-	-	5	-
Chenopodiaceae	Goosefoot family	seed	-	1	-	1	8	2	7
Stellaria sp.	Stitchworts	seed	-	-	-	1	-	-	-
Rumex sp.	Docks	seed	-	1	-	-	1	-	1
Trifolieae	Trefoils/medicks/clovers	seed	3	2	7	2	20	-	33
Vicia/Lathyrus	Vetch/pea	seed	-	1	-	-	-	-	-
Vicieae	Vetch tribe	seed	2	8	9	2	21	9	7
Fabaceae	Legume family	seed	-	1	-	-	4	-	1
Plantago sp.	Plantains	seed	-	-	1	-	-	-	1
Plantago lanceolata	Ribwort plantain	seed	1	-	-	-	2	-	3
Odontites vernus	Red bartsia	seed	-	-	-	-	1	-	-
Galium cf. *aparine*	Cleavers	seed	-	7	-	-	-	-	-
Galium sp.	Bedstraws	seed	-	2	1	-	1	-	1
Centaurea sp.	Knapweeds	seed	-	-	-	-	2	-	-
Anthemis cotula	Stinking mayweed	seed	-	-	-	-	-	-	1
Asteraceae	Daisy family	seed	-	-	-	-	2	-	-
Cyperaceae	Sedges	seed	-	5	6	-	4	13	21
Cyperaceae	Sedges	seed coat fragment	-	-	1	-	-	-	-
Lolium/Festuca	Rye grass/fescue	grain	-	2	-	-	2	1	6
Poa/Phleum	Meadow grass/cat's tail	grain	1	1	1	2	8	2	26
Avena sp.	Oats	grain	-	1	-	-	-	-	-
Bromus sp.	Bromes	grain	3	3	6	-	1	-	1
Poaceae	Grasses	grain	-	2	3	1	3	-	17
Poaceae	Grasses	culm fragments	-	3	5	1	-	5	14
Poaceae	Grasses	culm base fragment	-	-	-	-	-	1	-
Indeterminata (charred)		root	2	3	11	-	7	18	24
Indeterminata (charred)		seed	-	2	-	1	6	2	19
Indeterminata (charred)		rhizome/tuber	-	-	-	-	-	-	1
Other (charred)		insect faecal pellet	-	-	-	-	-	1	-
NR			77	344	172	36	693	500	318
MNI			47	168	105	24	376	243	244

Table 8.4 Charred plant remains analysis: results from Romano-British features at White Crofts

Feature type			Ditch	Ditch	Ditch	Ditch	Ditch	Pit
Feature			301111	300263	300037	300003	300048	300140
Context			301112	300265	300038	300004	300049	300141
Group			301410	300500	300510	300524	-	-
Sample			39	49	41	43	42	31
Sample volume (l)			15	32	23	26	21	10
Flot volume (ml)			60	5	15	15	10	10
Subsample			25% cereal; 50% wild	-	-	-	-	-
Bioturbation proxies			10%, U (C), E	80%, U (A), E, I	50%, U (A*)	15%, U (A*)	80%, U (A*)	1%, U (C)
Fragmentation index (MNI/NR)			0.50	0.46	0.46	0.42	0.38	0.24
Density (MNI/l)			90.27	1.00	9.61	7.81	2.14	2.70
Scientific name	*Common name*	*Plant part*						
Cereals								
Hordeum vulgare sl.	Barley	grain	17	2	-	6	-	1
Hordeum vulgare var. *vulgare*	Hulled barley	grain	-	-	-	-	1	-
Triticum aestivum/ turgidum	Naked wheat	grain	8	-	-	-	-	-
Triticum spelta	Spelt	grain	158	-	9	19	3	-
Triticum spelta	Spelt	spikelet fork	184	4	30	29	5	-
Triticum spelta/ dicoccum	Emmer/spelt	grain	4	2	-	-	-	-
Triticum dicoccum	Emmer	grain	8	-	-	1	-	-
Triticum dicoccum	Emmer	spikelet fork	4	-	4	2	-	-
Triticum sp.	Wheat	grain	56	3	10	18	9	1
Triticum sp.	Wheat (hulled)	spikelet fork	340	9	139	77	13	-
Triticeae	Cereal	grain	181	4	18	39	8	16
Other crops								
Pisum sativum	Garden pea	seed	10	-	-	-	-	-
Vicia faba	Broad bean	seed	-	1	-	-	-	-
Fruits								
Corylus avellana	Hazel	nut	-	-	1	-	-	-
Crataegus monogyna	Common hawthorn	fruit	-	-	-	1	-	-
Other wild plants								
Chenopodium sp.	Goosefoots	seed	10	-	-	-	-	-
Chenopodiaceae	Goosefoot family	seed	6	-	-	-	-	-
Fallopia convolvulus	Black bindweed	seed	2	-	-	-	-	-
Rumex sp.	Docks	seed	30	1	-	-	1	1
Rumex acetosella	Sheep's sorrel	seed	6	-	2	-	-	-
Polygonaceae	Knotgrass family	seed	14	-	-	-	-	-
Raphanus raphanistrum	Wild radish	capsule	6	1	-	1	1	-
Trifolieae	Trefoils/medicks/clovers	seed	8	-	-	-	-	-
Vicia/Lathyrus	Vetch/pea	seed	12	-	-	-	-	1
Vicieae	Vetch tribe	seed	236	-	3	1	1	6
Apiaceae	Carrot family	seed	-	-	-	2	-	-
Odontites vernus	Red bartsia	seed	16	-	-	-	-	-
Galium cf. *aparine*	Cleavers	seed	4	-	-	-	-	-
Anthemis cotula	Stinking mayweed	seed	2	-	-	-	-	-
Carex sp.	Sedges	seed	-	-	1	-	-	-
Cyperaceae	Sedges	seed	4	1	-	-	1	1
Poa/Phleum	Meadow grass/cat's tail	grain	2	-	1	3	-	-
Avena sp.	Oats	grain	2	-	-	-	-	-
Bromus sp.	Bromes	grain	2	3	1	-	1	-
Avena/Bromus	Oats/bromes	grain	14	-	-	3	-	-
Poaceae	Grasses	grain	6	1	2	1	1	-
Poaceae	Grasses	awn fragment	2	-	-	-	-	-
NR			**2726**	**70**	**476**	**486**	**117**	**112**
MNI			**1354**	**32**	**221**	**203**	**45**	**27**

White Crofts

A selection of Romano-British and Anglo-Saxon samples have been analysed (Tables 8.4–5).

Romano-British

Six rich samples were analysed (Table 8.4) and found to be similar in their composition, dominated by cereal grains: one sample from early–mid-Romano-British ditch 301410, one from Romano-British ditch 300500, and three samples from late Romano-British features including ditches (300510, 300524, and 300529) and a pit (300140). The assessment of the remaining 20 Romano-British unanalysed samples indicated a similar but smaller array of remains.

Wheat is the most abundant cereal type; most was identified as spelt wheat where identification to species level was possible. Barley and emmer wheat are present in limited quantities.

Large-seeded grasses such as bromes and oats are prevalent among the wild taxa. Other remains include small-seeded grasses, sedges and wild radish seed capsules. Docks/sorrels (including black bindweed), red bartsia, cleavers, stinking mayweed, trefoils/medicks/clovers and vetches represent common arable weed seeds. Common hawthorn endocarp, a hazel nutshell fragment, garden pea and broad bean are also present. A barley grain from pit 300140 was radiocarbon dated *cal. AD 360–415* (UBA-52902: 1679±22 BP).

Anglo-Saxon

The charred plant remains from the two analysed samples from Anglo-Saxon pits in this area differ in composition and preservation (Fig. 8.2, Table 8.5), in spite of their identical probable date range: a radiocarbon date of *cal. AD 775–890* (UBA-52901: 1174±21 BP) was obtained on a naked wheat grain from pit 5202, while a wheat grain from pit 3211 was radiocarbon dated *cal. AD 775–885* (UBA-52871: 1190±26 BP).

The charred plant remains from pit 3211 form a relatively modest assemblage dominated by cereal remains, comprising barley and wheat grains, together with a single fragment of hulled wheat chaff, sloe or blackthorn stones (including one with rodent teeth marks), hazel nutshell and a few seeds from sedges, stinking mayweed, docks/sorrels, vetches and grasses. Mineralised remains (a culm fragment, nodules and worm cocoons) are abundant in this sample, and are present in the assessed samples from adjacent pits 3064 and 3077.

The sample from pit 5202 contained very abundant naked/free-threshing wheat and hulled barley grains (some shrivelled and puffed), chaff (rachis internodes and segments), and seeds from wild plant taxa. Wild plant taxa include common grasses, such as oats, brome and cat's tail/meadow grass, alongside sedges, rushes, vetches, docks/sorrels and other occasional remains (bedstraws/cleavers, bog bean, sea-blite, buttercups and species of the goosefoot family). An item of exceptional preservation was found: a mayweed seed head from which the recorded seeds had originated. Vivianite staining, suggestive of waterlogging and faecal matter, is observable in some of the charred plant remains.

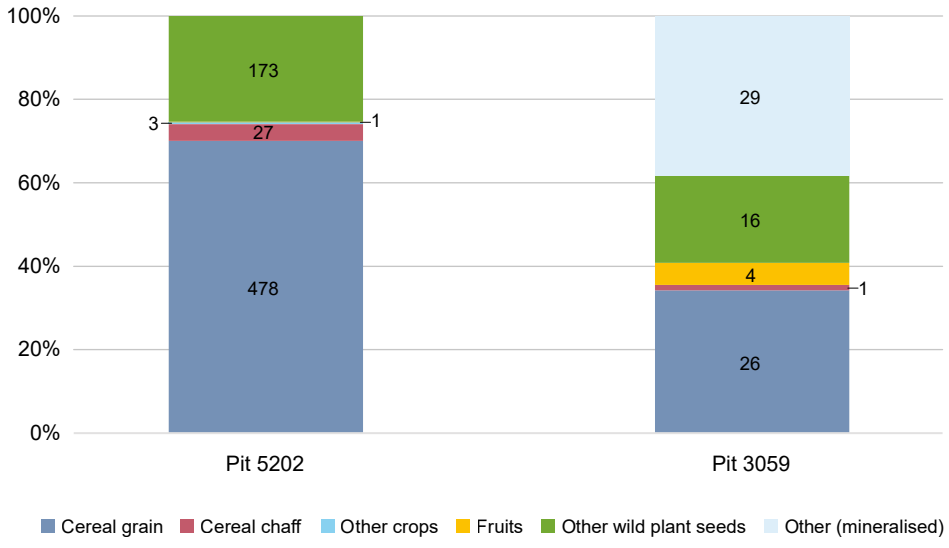


Figure 8.2 Proportions of different types of charred plant remains in the analysed samples from White Crofts

Table 8.5 Charred plant remains analysis: results from Midde–Late Anglo-Saxon pits at White Crofts

Feature			5202	3211
Context			5203	3057
Slot			3059	
Sample			5201	79
Sample volume (l)			20	46
Flot volume (ml)			220	40
Subsample			-	50% fine residue
Bioturbation proxies			<1%, U (C)	2%, U (A*), E
Fragmentation index (/NR)			0.69	0.63
Density (/l)			34.10	1.65
Scientific name	*Common name*	*Plant part*		
Cereals				
Hordeum vulgare sl.	Barley	grain	158	10
Hordeum vulgare sl.	Barley	rachis segment	4	-
Hordeum vulgare var. *vulgare*	Hulled barley	grain	2	-
Secale cereale	Rye	grain	5	-
Secale cereale	Rye	rachis segment	3	-
Secale/Triticum	Rye/wheat	grain	5	-
Triticum aestivum/ turgidum	Naked wheat	grain	198	3
Triticum aestivum	Bread wheat	rachis internode	20	-
Triticum sp.	Wheat	grain	38	7
Triticum sp.	Wheat (hulled)	spikelet fork	-	1
Triticeae	Cereal	grain	72	6
Other crops				
Vicia faba	Broad bean	seed	1	-
Linum usitatissimum	Flax	seed	2	-
Fruits				
Corylus avellana	Hazel	nut	1	1
Prunus spinosa	Blackthorn	fruit	-	3
Other wild plant seeds				
Ranunculus sardous	Hairy buttercup	seed	1	-
cf. *Suaeda* sp.	Sea-blites	seed	3	-
Chenopodiaceae	Goosefoot family	seed	1	-
Persicaria sp.	Knotweeds	seed	1	-
Polygonum sp.	Knotgrasses	seed	1	-
Rumex sp.	Docks	seed	1	3
Rumex type *acetosa/ crispus*	Sorrel/curled dock	seed	6	-
Erica sp.	Heaths	seed head	1	-
Trifolieae	Trefoil/medick/clover	seed	2	-
Vicia/Lathyrus	Vetch/pea	seed	1	-
Vicieae	Vetch tribe	seed	9	2
Fabaceae	Legume family	seed	2	1
Menyanthes trifoliata	Bogbean	seed	1	-
Galium sp.	Bedstraws	seed	2	-
Centaurea sp.	Knapweeds	seed	1	-
Anthemis type *cotula*	Stinking mayweed	seed	38	2
Anthemis type *cotula*	Stinking mayweed	seed head	1	-
Carex sp.	Sedges	seed	16	-
Cyperaceae	Sedges	seed	39	5
Poa/Phleum	Meadow grass/cat's tail	grain	1	-
Avena sp.	Oats	grain	11	-
Bromus sp.	Bromes	grain	2	-
Poaceae	Grasses	grain	16	-
Poaceae	Grasses	awn fragment	2	-
Poaceae	Grasses	culm fragments	5	3
Poaceae	Grasses	culm base fragment	1	-
Indeterminata (charred)		seed	8	-
Other (mineralised)		nodule (mineralised)	-	24
Other (mineralised)		earthworm cocoon	-	5
Other (charred)		insect faecal pellet	-	-
NR			**988**	**121**
MNI			**682**	**76**

Table 8.6 Charred plant remains analysis: results from features at Ailby Lane

Phase			Bronze Age	Early Anglo-Saxon
Feature			401016	400028
Context			401018	400029
Group			-	411000
Sample			401001	400002
Sample volume (l)			20	243
Flot volume (ml)			-	1000
Subsample			-	50% flot extracted, 100% scanned
Bioturbation proxies			-	5%, U (A*), E
Fragmentation index (MNI/NR)			0.26	0.52
Density (MNI/l)			0.50	3.70
Scientific name	*Common name*	*Plant part*		
Cereals				
Hordeum vulgare sl.	Barley	grain	-	215
Hordeum vulgare var. *vulgare*	Hulled barley	grain	-	227
Triticum aestivum/ turgidum	Naked wheat	grain	-	46
Triticum aestivum	Bread wheat	rachis internode	-	2
Triticum sp.	Wheat	grain	-	28
Triticum sp.	Wheat (hulled)	spikelet fork	-	6
Triticeae	Cereal	grain	-	76
Other crops				
Vicia faba	Broad bean	seed	-	9
Fruits				
Corylus avellana	Hazel	nut	5	2
Prunus spinosa	Blackthorn	fruit	-	1
Crataegus monogyna	Common hawthorn	fruit	5	-
Other wild plant seeds				
Persicaria sp.	Knotweeds	seed	-	2
Polygonum sp.	Knotgrasses	seed	-	2
Fallopia convolvulus	Black bindweed	seed	-	2
Rumex sp.	Docks	seed	-	10
Rumex acetosella	Sheep's sorrel	seed	2	
Vicieae			-	18
Fabaceae			-	2
Scandix pecten-veneris	Shepherd's needle	seed	-	2
Galeopsis sp.	Hemp nettles	seed	-	4
Galium sp.	Bedstraws	seed	-	3
Centaurea sp.	Knapweeds	seed	-	2
Avena sp.	Oats	grain	-	148
Bromus sp.	Bromes	grain	-	40
Avena/Bromus	Oats/bromes	grain	-	2
Poaceae	Grasses	grain	-	15
Poaceae	Grasses	culm fragments	-	14
Poaceae	Grasses	culm base fragment	-	4
Indeterminata (charred)		seed	-	6
Indeterminata (charred)		rhizome/tuber	-	6
Other (charred)		gall	-	2
Other (charred)		insect faecal pellet	-	2
NR			**38**	**1716**
MNI			**10**	**900**

Lincolnshire Marsh/Wolds margin

Ailby Lane

All but one of the samples from Ailby Lane contained charred plant remains, and most are rich in tubers/rhizomes, monocotyledon stems and seeds from grasses, sedges, blinks, buttercups, docks/sorrels and bedstraw/cleavers. These remains are likely indicative of heathland burning or turf extraction and exploitation (e.g., burning) activities and may date to the Late Iron Age/early Romano-British periods.

The two analysed samples from a Bronze Age pit and an Anglo-Saxon sunken-featured building were conspicuously different to each other and the samples from other features (Table 8.6, Fig. 8.3).

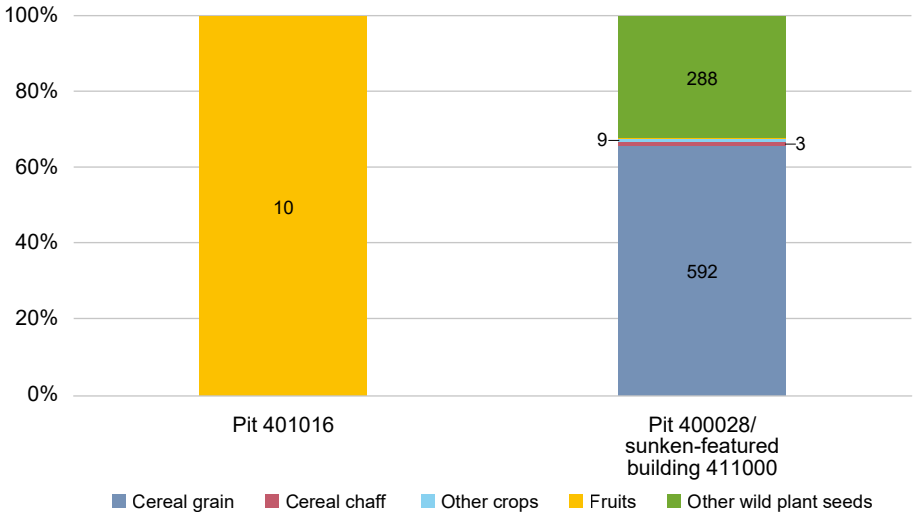


Figure 8.3 Proportions of different types of charred plant remains in the analysed samples from Ailby Lane

Middle to Late Bronze Age

The sample from pit 401016 produced a small number of charred plant remains, consisting of hawthorn stones and hazel nutshell. Two of the stones and one of the shells have rodent teeth marks (which would be compatible with vole), suggesting animal predation on a possible store of food or a possible natural origin for the assemblage. A Middle/Late Bronze Age radiocarbon date of *1215–1055 cal. BC* (UBA-52870: 2943±29 BP) was obtained for one of the hazel nutshell fragments.

Early Anglo-Saxon

The sample from sunken-featured building 411000 was rich in charred plant remains, particularly barley (identifiable to a hulled and dense-eared variety) grains (some of which had insect predation holes). Radiocarbon dates (see López-Dóriga above) of *cal. AD 440–575* were obtained on a naked wheat grain (UBA-52881: 1572±27 BP) and a broad bean cotyledon (UBA-52883: 1505±28 BP). Hulled wheats are also present in the deposit, but radiocarbon dating demonstrated they are Late Iron Age/Romano-British and residual from earlier activities in the area (FTMC-MB96-6: 1962±29 BP, *30 cal. BC–cal. AD 85*).

Wolds

Sutterby Field

Of the Iron Age samples from Sutterby Field, one moderately rich sample from a Middle to Late Iron Age ditch (700295) was analysed. The remainder of the assessed samples produced sparse remains, including barley, wheat, hazel nutshell fragments and vetches, as well as tubers/rhizomes. Two barley grains from assessed sample 700010 were radiocarbon dated as *150–50 cal. BC* (UBA-52904: 2106±24 BP) and *40 cal. BC–cal. AD 55* (UBA-52905: 1984±24 BP).

Cereals (Triticeae) grains are the most common type of remain in the material from ditch 700295 (Table 8.7), followed by barley and wheat. A limited amount of spelt wheat was recovered. Brome, hazel nutshell fragments and sloe stones are also present. One wheat grain was radiocarbon dated *115–20 cal. BC* (UBA-52884: 2149±27 BP).

Slot			700255
Context			700256
Group			700295
Sample			700017
Sample volume (l)			30
Flot volume (ml)			125
Bioturbation proxies			1%, U (A), S (A)
Fragmentation index (MNI/NR)			0.36
Density (MNI/l)			4.95
Scientific name	*Common name*	*Plant part*	
Cereals			
Hordeum vulgare sl.	Barley	grain	58
Triticum aestivum/ turgidum	Naked wheat	grain	1
Triticum spelta	Spelt	grain	5
Triticum spelta/ dicoccum	Emmer/spelt	grain	3
Triticum sp.	Wheat	grain	38
Triticeae	Cereal	grain	40
Fruits			
Corylus avellana	Hazel	nut	1
Prunus spinosa	Blackthorn	fruit	1
Other wild plants			
Bromus sp.	Bromes	grain	3
NR			**414**
MNI			**150**

Table 8.7 Charred plant remain analysis: results from Middle to Late Iron Age ditch 700295 at Sutterby Field

Pitchmoor

Charred plant remains were recovered in small amounts across many of the samples from pits and postholes in Pitchmoor.

Early to Middle Iron Age

Six rich samples of charred plant remains from posthole 350019 and posthole groups 350100 and 350190 (Table 8.8) produced barley grains, wheat including spelt and emmer, and considerable quantities of unidentifiable cereal (Triticeae) grains. A hulled wheat grain and a single tentatively identified free-threshing wheat grain from posthole group 350100 were radiocarbon dated to *410–230 cal. BC* (UBA-52899: 2265±30 BP and UBA-52898: 2319±30). However, given the unusually early date for a 'free-threshing wheat grain', it is likely the grain was hulled wheat misidentified during the assessment phase, a notion supported by the absence of any free-threshing wheat chaff within the sample. Small quantities of hazel nutshell fragments, docks, vetches, field madder, cleavers, oats and bromes are also present. Posthole group 350190 was not well dated and posthole 350019 contained handmade sherds of broadly prehistoric appearance, but the composition of the samples and their similarities with those from the radiocarbon dated group (350100), suggest all were of a similar Iron Age date.

Walk Hill

A large number of samples were collected from this area. The charred plant remains vary in quantity and preservation conditions and belong to three main phases of activity. The best-preserved samples from each period were selected for further analysis (Tables 8.9–14).

Early Neolithic

Five pits in pit group 800480 were sampled, with a selection of three samples fully quantified (Table 8.9).

The charred plant remains from these features were dominated by the remains of hazel nutshell fragments. Although these were relatively abundant, they were preserved in either too small a quantity or in too poor a condition, with abundant post-depositional fragmentation, to allow the application of detailed taphonomic analysis techniques (e.g., Bishop 2019; López-Dóriga 2015). However, most of the breakage patterns that could be observed, from one of the samples, were consistent with pre-charring fracture (López-Dóriga 2015). Remains of cereal grains, including wheat and barley, were also present in both assessed and analysed samples, and a direct radiocarbon date was obtained for one of the barley grains (UBA-52873: 4730±32 BP), which was consistent with a radiocarbon date on a hazel nutshell fragment (UBA-52874: 4692±37 BP) from the same deposit in pit 800332, combined as *3530–3375 cal. BC*. A further, similar radiocarbon date was obtained for a hazel nutshell fragment (UBA-52872: 4742±33 BP, *3620–3380 cal. BC*) from pit 800476. An apple/pear seed was also present in one of the samples.

Middle Iron Age to Romano-British

Five samples taken from Iron Age features were analysed; the assessed but not analysed samples of similar date produced barley, wheat (including spelt and emmer wheat) grains and glume bases, as well as wild taxa such as docks, grasses, trefoils/medicks/clovers and vetches. A wheat grain from assessed sample 800002 (taken from the south-western posthole of four-post structure 800065) was radiocarbon dated *405–385 cal. BC* (UBA-52906: 2323±23 BP). The analysed samples were taken from features including four postholes in two different groups (the four-post structure in group 800081 and four-post structure 800233), and a pit (800004) in a pit alignment (800099). Cereal grains are the most abundant type of remains, and include barley, wheat and a limited

Table 8.8 Charred plant remains analysis: results from Early to Middle Iron Age postholes at Pitchmoor

Feature			350091	350094	350097	350150	350170	350019
Context			350093	350096	350099	350151	350171	350020
Group			350100	350100	350100	350190	350190	-
Sample			350001	350002	350003	350005	350008	350021
Sample volume (l)			4	6	13	3	10	10
Flot volume (ml)			20	30	100	10	125	120
Subsample			-	50%	25% cereals	-	-	-
Bioturbation proxies			5%, U (A), S (A), I, E	5%, U (A), E, S (A*)	10%, U (A*), I, E, S (A**)	20%, U (B), E, S (A)	5%, U (B), I, E, S (A*)	1%, S (A*), U (A), E
Fragmentation index (MNI/NR)			0.38	0.28	0.29	0.26	0.25	0.41
Density (MNI/l)			10.75	29.67	19.77	4.67	16.60	4.50
Scientific name	*Common name*	*Plant part*						
Cereals								
Hordeum vulgare sl.	Barley	grain	9	24	28	-	8	1
Triticum cf. aestivum/ turgidum	Naked wheat	grain	1	-	-	-	-	-
Triticum spelta	Spelt	grain	4	10	24	-	23	4
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	-	12	1	6	1
Triticum dicoccum	Emmer	grain	-	2	-	-	-	-
Triticum sp.	Wheat	grain	11	66	86	5	43	22
Triticum sp.	Wheat (hulled)	spikelet fork	-	4	-	-	-	-
Triticeae	Cereal	grain	13	64	101	6	78	17
Fruits								
Corylus avellana	Hazel	nut	1	-	1	-	-	-
Crataegus monogyna	Common hawthorn	fruit	-	-	-	1	-	-
Other wild plants								
Rumex sp.	Docks	seed	2	1	-	-	-	-
Vicieae	Vetch/grass pea	seed	-	1	1	-	1	-
Sherardia arvensis	Field madder	seed	1	-	-	-	1	-
Galium cf. *aparine*	Cleavers	seed	-	1	-	-	1	-
Galium sp.	Bedstraws	seed	-	-	-	-	1	-
Asteraceae	Daisy family	seed	-	1	-	-	-	-
Eleocharis sp.	Spike-rushes	seed	-	-	-	-	1	-
Avena sp.	Oats	grain	-	-	1	-	-	-
Bromus sp.	Bromes	grain	-	2	-	-	-	-
Avena/Bromus	Oats/bromes	grain	-	-	2	-	1	-
Poaceae	Grasses	grain	1	2	1	1	2	-
NR			**112**	**633**	**898**	**53**	**664**	**109**
MNI			**43**	**178**	**257**	**14**	**166**	**45**

Table 8.9 Charred plant remains analysis: results from Early Neolithic pit group 800480 in Walk Hill

Feature			800332	800476	800478
Context			800333	800477	800479
Sample			800062	800078	800098
Sample volume (l)			32	12	29
Flot volume (ml)			20	80	100
Bioturbation proxies			5%, U (B), C, E, I	5%, U (C), E, I	<1%, U (C), E, I
Fragmentation index (MNI/NR)			0.24	0.08	0.11
Density (MNI/l)			0.22	1.75	0.72
Scientific name	*Common name*	*Plant part*			
Cereals					
Hordeum vulgare	Barley	grain	2	-	-
Triticum sp.	Wheat	grain	-	-	5
Triticeae	Cereal	grain	3	-	1
Fruits					
Corylus avellana	Hazel	nut	2	20	14
Maleae	Apple tribe	fruit	-	1	-
Other wild plant seeds					
Rumex sp.	Docks	seed	-	-	1
NR			**29**	**261**	**199**
MNI			**7**	**21**	**21**

amount of spelt wheat. Wheat chaff (glume bases and spikelet forks) is present. Grasses including rye grass/fescue, meadow grass/cat's tails, bromes, and oat in particular, are common. Hazel nutshell fragments, as well as seeds of black bindweed, sheep's sorrel, mallow, ribwort plantain, cleavers/bedstraws and vetches were also recovered. One tentatively identified emmer wheat grain from pit 800004 and one barley grain from posthole group 800081 were radiocarbon dated as *355–190 cal. BC* (UBA-52878: 2169±27 BP) and *500–410 cal. BC* (UBA-52903: 2424±22 BP) respectively.

Three early Romano-British samples, all from pit 800029, and three Romano-British samples (from pits 800025, 800407 and ditch 800497) were analysed. The remaining assessed samples are dominated by cereals remains (barley and wheat), but also include common wild taxa such as cleavers, docks, sedges, vetches and grasses. One indeterminate tuber from assessed sample 800093 was radiocarbon dated *cal. AD 165–230* (UBA-52886: 1883±28 BP). The analysed material produced a similar array of cereals to the Iron Age samples. Chaff remains are present, including barley rachis internodes, and a larger amount of wheat and spelt wheat glume bases. Free-threshing and emmer wheat grains were recovered from the Romano-British period samples in limited quantities. Wild taxa are represented by seeds including small nettle, knotgrass, docks, clovers, vetches, red bartsia, cleavers, daisies and sedges. Wild radish seed capsules and capsule fragments, hazel nutshell fragments, garden pea and broad bean are also present. Considerable quantities of Poaceae, oats/bromes in particular, were recovered from the Romano-British features (e.g., pit 800025).

Table 8.10 Charred plant remains analysis: results from Iron Age features at Walk Hill

Feature type			Pit	Posthole	Posthole	Posthole	Posthole
Feature			800004	800083	800204	800212	800212
Context			800005	800084	800205	800213	800214
Group			800099	800081	800233	800233	800233
Sample			800001	800015	800046	800047	800048
Sample volume (l)			15	32	32	16	30
Flot volume (ml)			10	25	110	5	25
Bioturbation proxies			60%, S (A*), U (B)	15%, U (A), E, I	1%, S (A*), U (C), I	50%, U (A), I	20%, U (A), I
Fragmentation index (MNI/NR)			0.49	0.34	0.45	0.32	0.37
Density (MNI/l)			2.80	1.06	14.78	1.63	4.63
Scientific name	*Common name*	*Plant part*	-	-	-	-	-
Cereals							
Hordeum vulgare sl.	Barley	grain	8	6	156	17	87
Triticum spelta	Spelt	grain	7	-	4	-	-
Triticum spelta	Spelt	spikelet fork	1	-	14	-	-
Triticum spelta/dicoccum	Emmer/spelt	grain	-	-	8	1	-
Triticum cf. *dicoccum*	Emmer	grain	2	-	-	-	-
Triticum sp.	Wheat	grain	6	7	94	-	6
Triticum sp.	Wheat (hulled)	spikelet fork	-	1	19	-	1
Triticeae	Cereal	grain	18	11	107	8	34
Fruits							
Corylus avellana	Hazel	nut	-	1	1	-	-
Other wild plants							
Chenopodiaceae	Goosefoot family	seed	-	-	1	-	-
Fallopia convolvulus	Black bindweed	seed	-	-	1	-	2
Rumex acetosella	Sheep's sorrel	seed	-	-	1	-	-
Malva sp.	Mallows	seed	-	1	-	-	-
Vicieae	Vetch tribe	seed	-	2	1	-	-
Plantago lanceolata	Ribwort plantain	seed	-	1	-	-	-
Galium cf. *aparine*	Cleavers	seed	-	-	5	-	1
Galium sp.	Bedstraws	seed	-	-	13	-	-
Lolium/Festuca	Rye grasses/fescues	grain	-	-	5	-	-
Poa/Phleum	Meadow grass/cat's tail	grain	-	1	-	-	-
Avena sp.	Oats	grain	-	2	27	-	1
Bromus sp.	Bromes	grain	-	-	3	-	-
Avena/Bromus	Oats/bromes	grain	-	-	8	-	4
Poaceae	Grasses	grain	-	1	4	-	3
Indeterminata (charred)		seed	-	-	1	-	-
NR			**85**	**99**	**1062**	**82**	**372**
MNI			**42**	**34**	**473**	**26**	**139**

Table 8.11 Charred plant remains analysis: results from Romano-British features at Walk Hill

Feature type			Pit	Pit	Pit	Pit	Pit	Ditch
Feature			800029	800029	800029	800025	800407	800474
Context			800030	800031	800082	800026	800408	800475
Group			-	-	-	-	-	800497
Sample			800003	800008	800007	800049	800057	800081
Sample volume (l)			1	1	2	16	28	32
Flot volume (ml)			2	2	13	40	20	15
Subsample			-	-	-	50%	-	-
Bioturbation proxies			1%, U (C)	80%, U (C)	25%, U (C)	5%, S (A*), U (C), E	60%, S (A), U (A), I	80%, S (A), U (A*)
Fragmentation index (MNI/NR)			0.48	0.79	0.36	0.44	0.39	0.51
Density (MNI/l)			760.00	22.00	116.00	27.31	2.04	2.81
Scientific name	*Common name*	*Plant part*						
Cereals								
Hordeum vulgare sl.	Barley	grain	154	2	35	95	3	11
Hordeum vulgare sl.	Barley	rachis segment	-	1	2	-	-	-
Triticum aestivum/ turgidum	Naked wheat	grain	-	-	-	12	-	-
Triticum spelta	Spelt	grain	4	1	3	20	-	1
Triticum spelta	Spelt	spikelet fork	-	-	-	4	2	5
Triticum spelta/ dicoccum	Emmer/spelt	grain	4	-	-	-	-	-
Triticum dicoccum	Emmer	grain	-	-	-	6	-	1
Triticum dicoccum	Emmer	spikelet fork	-	-	-	-	-	1
Triticum sp.	Wheat	grain	30	4	35	60	17	2
Triticum sp.	Wheat (hulled)	spikelet fork	2	1	3	9	2	22
Triticeae	Cereal	grain	89	1	50	152	17	14
Other crops								
Pisum sativum	Garden pea	seed	-	-	-	4	-	-
Vicia faba	Broad bean	seed	-	-	-	1	-	-
Fruits								
Corylus avellana	Hazel	nut	-	-	-	-	1	-
Other wild plants								
cf. *Urtica urens*	Small nettle	seed	4	-	-	-	-	-
Caryophyllaceae	Pink family	seed	-	-	-	-	-	1
Polygonum aviculare	Knotgrass	seed	-	-	1	-	-	-
Rumex sp.	Docks	seed	-	-	2	-	4	1
Rumex acetosella	Sheep's sorrel	seed	4	-	-	-	-	1
Polygonaceae	Knotgrass family	seed	-	-	-	-	-	1
Raphanus raphanistrum	Wild radish	capsule	8	-	7	-	-	-
Trifolieae	Trefoils/medicks/clovers	seed	-	-	1	4	1	-
Vicieae	Vetch tribe	seed	-	-	32	14	1	1
Odontites vernus	Red bartsia	seed	16	-	-	10	-	1
Galium cf. *aparine*	Cleavers	seed	4	-	-	4	-	1
Asteraceae	Daisy family	seed	8	-	-	-	-	-
Cyperaceae	Sedges	seed	4	-	-	-	2	-
Cyperaceae	Sedges	seed coat fragment	-	-	-	-	1	-
Lolium/Festuca	Rye grasses/fescues	grain	4	-	-	-	-	-
Poa/Phleum	Meadow grass/cat's tail	grain	-	-	-	-	-	3
Avena sp.	Oats	grain	16	-	2	2	-	1
Bromus sp.	Bromes	grain	4	-	-	8	-	-
Avena/Bromus	Oats/bromes	grain	-	-	-	23	-	3
Danthonia decumbens	Heath-grass	grain	-	1	-	-	3	2
Poaceae	Grasses	grain	21	-	1	5	-	4
Poaceae	Grasses	awn fragment	4	-	-	2	-	-
Poaceae	Grasses	culm fragments	-	-	-	C	-	-
Indeterminata (charred)		fruit	-	-	-	2	-	-
Indeterminata (charred)		thorn	-	-	-	-	1	-
Indeterminata (charred)		rhizome/tuber	-	-	-	-	2	13
NR			**795**	**14**	**479**	**1002**	**148**	**178**
MNI			**380**	**11**	**174**	**437**	**57**	**90**

Late Romano-British
A total of 18 samples from late Romano-British features at Walk Hill were analysed. These features include two crop-dryers (800465 and 800089), an adjacent large pit (800382), as well as various other features relating to the enclosure, including ditches (800491, 800493, 800495) and a pit (800038).

Crop-dryers 800465 and 800089 produced barley, wheat and spelt wheat grains, as well as poorly preserved grains that could not be identified. The samples feature generally higher proportions of cereal chaff – wheat glume bases and spikelet forks in particular – to cereal grains. The presence of detached coleoptiles, as well as germinated and ungerminated detached cereal embryos, particularly in the samples from crop-dryer 800089, should also be noted. A single rye grain was recovered from crop-dryer 800465. Additional remains include smaller quantities of wild taxa, such as goosefoots, docks/sorrels, black bindweed, vetches, trefoils/medicks/clovers, flax and fairy flax, henbane, selfheal, ribwort plantain, red bartsia, poppy and scentless mayweed, among others. Crop-dryer 800089 also produced relatively high numbers of grasses such as oats and bromes. One rye grain from crop-dryer 800465 was radiocarbon dated *cal. AD 210–310* (UBA-52891: 1806±29 BP).

The two samples from large pit 800382 produced very large numbers of wheat and spelt wheat chaff, the dominant type of remains by a large margin. Cereal grain remains are also numerous, and include barley, wheat and spelt wheat, as well as unidentifiable remains. Detached cereal coleoptiles and embryos are also present in smaller quantities. Grasses, including oats/bromes, are the most abundant of the wild taxa, the rest of which include a similar array to the other samples.

The remaining samples, from pit 800038 and ditches 800491, 800493, 800495 and 800496, are relatively similar to each other in their composition. Cereals include unidentifiable remains as well as barley grains and rachis segments. Spelt wheat is represented by both grains and chaff (i.e., glume bases and spikelet fork forms), but in all samples, chaff is considerably more abundant. A similar pattern characterises the wheat remains. Cereal coleoptiles are present, as are emmer grains, though in low numbers. The wild taxa in the samples are similar to those recovered from other features, and include goosefoots, black bindweed, docks, common pea, vetches, red bartsia and cleavers. Additional remains include the occasional hazel nutshell fragment and wild radish seed capsule fragments.
All samples produced grasses such as heath-grass, and most contain charred tubers/rhizomes. A free-threshing wheat grain and a spelt wheat grain from ditch 800496 were radiocarbon dated as *cal. AD 175–240* (UBA-52889: 1848±25 BP) and *cal. AD 235–320* (UBA-52890: 1762±28 BP).

Callow Carr
The samples from this area contained low concentrations of poorly preserved charred material, with mineral-coated plant remains (Table 8.15).

These comprise cereal grains, occasionally identified to wheat or barley, onion couch grass tubers and hazel nutshell fragments. The remains are likely to be residual from processing activities in the area or intrusive through a combination of recent agricultural activity and bioturbation. A Late Neolithic/Early Bronze Age radiocarbon date was obtained for the hazel nutshell (FTMC-ME96-2, 3770±32 BP, 2290–2040 cal. BC) and a Middle Bronze Age for one of the wheat remains (FTMC-ME96-1: 3189±32 BP, 1510–1410 cal. BC).

Lymn Valley

Cheals Close
The charred plant material from this area varies in condition from poorly to moderately well preserved, with some well-preserved examples in samples from Anglo-Saxon pits and postholes, which have been analysed.

Anglo-Saxon
Most of the samples taken in this area correspond to remains of Anglo-Saxon settlement activities. Charred plant remains are particularly abundant in a number of analysed samples from postholes (from two posthole groups), pits and ditches (Tables 8.16–7). The unanalysed samples from postholes contain similar but smaller and poorly preserved arrays of remains.

Table 8.12 Charred plant remains analysis: results from Late Romano-British crop-dryer 800465

Context			800484	800483	800483	800483	800483	800483	800467
Sample			800084	800085	800086	800087	800088	800089	800080
Sample volume (l)			36	2	2	2	2	2	28
Flot volume (ml)			25	10	2	5	4	5	15
Subsample			50% fine residue	-	-	-	-	-	-
Bioturbation proxies			5%, U (A), E, I	30%, S (A), U (C)	10%, S (A), U (C), I	5%, U (C), I	<1%, U (C)	5%, U (C), I	80%, S (A*), U (A*), E
Fragmentation index (MNI/NR)			0.48	0.30	0.42	0.88	0.32	0.49	0.55
Density (MNI/l)			2.64	35.00	24.00	7.50	16.50	24.00	2.18
Scientific name	*Common name*	*Plant part*							
Cereals									
Hordeum vulgare sl.	Barley	grain	10	6	3	1	1	2	2
Secale cereale	Rye	grain	-	-	-	-	-	1	-
Triticum spelta	Spelt	grain	6	11	6	2	2	-	1
Triticum spelta	Spelt	spikelet fork	7	3	1	1	2	5	1
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	2	-	2	-	-	2
Triticum dicoccum	Emmer	spikelet fork	-	-	-	-	-	1	-
Triticum sp.	Wheat	grain	11	10	3	1	3	4	5
Triticum sp.	Wheat (hulled)	spikelet fork	20	-	19	1	11	12	5
Triticeae	Cereal	grain	19	33	10	5	11	7	11
Fruits									
Corylus avellana	Hazel	nut	1	-	-	-	-	-	-
Other wild plants									
Chenopodiaceae	Goosefoot family	seed	-	-	-	-	1	-	5
Fallopia convolvulus	Black bindweed	seed	-	-	-	-	-	-	2
Rumex sp.	Docks	seed	2	-	-	-	-	-	4
Rumex acetosella	Sheep's sorrel	seed	-	-	-	-	-	-	2
Polygonaceae	Knotgrass family	seed	1	1	-	-	-	-	1
Malva sp.	Mallows	seed	2	-	-	-	-	-	-
Raphanus raphanistrum	Wild radish	capsule	-	-	-	-	-	1	-
Trifolieae	Trefoils/medicks/clovers	seed	-	-	-	-	-	-	4
Vicieae	Vetch tribe	seed	2	-	-	-	1	1	2
Linum catharticum	Fairy flax	seed	-	-	-	-	-	-	1
Apiaceae	Carrot family	seed	-	-	2	-	-	-	-
Hyoscyamus niger	Henbane	seed	1	-	-	-	-	-	-
Prunella vulgaris	Selfheal	seed	-	-	-	-	-	1	-
Plantago lanceolata	Ribwort plantain	seed	-	-	1	-	-	-	-
Odontites vernus	Red bartsia	seed	3	1	2	-	1	1	6
Galium sp.	Bedstraws	seed	2	-	-	-	-	1	-
Tripleurospermum inodorum	Scentless mayweed	seed	-	-	-	-	-	-	2
Asteraceae	Daisy family	seed	-	1	-	1	-	1	3
Cyperaceae	Sedges	seed	3	-	-	-	-	-	-
Poa/Phleum	Meadow grass/cat's tail	grain	-	1	1	1	-	-	-
Avena sp.	Oats	grain	-	1	-	-	-	-	-
Danthonia decumbens	Heath-grass	grain	2	-	-	-	-	1	-
Poaceae	Grasses	grain	-	-	-	-	-	4	2
Indeterminata (charred)		bud	1	-	-	-	-	-	-
Indeterminata (charred)		seed	2	-	-	-	-	-	-
NR			**200**	**237**	**115**	**17**	**102**	**97**	**110**
MNI			**95**	**70**	**48**	**15**	**33**	**43**	**61**

Table 8.13 Charred plant remains analysis: results from late Romano-British crop-dryer 800089

Context			800231	800090	800153
Sample			800092	800045	800037
Sample volume (l)			8	31	31
Flot volume (ml)			39	60	100
Subsample			25% fine residue	-	25% flot
Bioturbation proxies			1%, U (C), F, I	5%, S (A*), I	5%, U (A*), S (A), E
Fragmentation index (MNI/NR)			0.52	0.49	0.59
Density (MNI/l)			34.25	18.06	36.00
Scientific name	*Common name*	*Plant part*			
Cereals					
Hordeum vulgare sl.	Barley	grain	28	40	256
Hordeum vulgare sl.	Barley	rachis segment	4	3	4
Triticum spelta	Spelt	grain	15	80	24
Triticum spelta	Spelt	spikelet fork	40	21	32
Triticum spelta/ dicoccum	Emmer/spelt	grain	3	64	28
Triticum dicoccum	Emmer	grain	-	-	4
Triticum dicoccum	Emmer	spikelet fork	5	-	2
Triticum dicoccum/ monococcum	Emmer/einkorn	grain	1	-	-
Triticum sp.	Wheat	grain	64	110	196
Triticum sp.	Wheat (hulled)	spikelet fork	21	46	40
Triticeae	Cereal	grain	59	163	151
Other crops					
Linum usitatissimum	Flax	seed	-	-	4
Other wild plants					
Papaver sp.	Poppies	seed	-	-	12
Chenopodium sp.	Goosefoots	seed	-	-	20
Chenopodiaceae	Goosefoot family	seed	-	2	52
Caryophyllaceae	Pink family	seed	-	1	-
Dianthus sp.	Deptford/maiden pinks	seed	-	-	4
Fallopia convolvulus	Black bindweed	seed	-	-	4
Rumex sp.	Docks	seed	-	2	4
Polygonaceae	Knotgrass family	seed	-	1	-
Trifolieae	Trefoils/medicks/clovers	seed	1	1	60
Vicieae	Vetch tribe	seed	-	1	20
Linum catharticum	Fairy flax	seed	-	-	8
Apiaceae	Carrot family	seed	-	-	8
Plantago lanceolata	Ribwort plantain	seed	-	-	4
Odontites vernus	Red bartsia	seed	-	-	12
Rhinanthus minor	Yellow rattle	seed	-	-	8
Galium cf. *aparine*	Cleavers	seed	-	1	-
Lapsana communis	Nipplewort	seed	-	-	4
Leucanthemum vulgare	Oxeye daisy	seed	-	1	-
Tripleurospermum inodorum	Scentless mayweed	seed	-	-	4
Asteraceae	Daisy family	seed	-	-	16
Cyperaceae	Sedges	seed	-	2	12
Lolium/Festuca	Rye grass/fescue	grain	-	4	12
Avena sp.	Oats	grain	-	1	16
Bromus sp.	Bromes	grain	22	10	45
Avena/Bromus	Oats/bromes	grain	1	1	16
Danthonia decumbens	Heath-grass	grain	-	-	4
Poaceae	Grasses	grain	10	5	30
NR			**525**	**1141**	**1880**
MNI			**274**	**560**	**1116**

The cultivated plant remains comprise cereals, including grains and chaff from barley and wheat (naked/free-threshing wheat, particularly bread wheat), rye, and pulses such as garden peas, broad beans and vetches. Some hulled wheat chaff is present, but this is likely residual from earlier activities in the area (residual Roman pottery was also present in some features). Wild plant remains include seeds from a diversity of grasses, and docks/sorrels are particularly abundant, with occasional remains from other taxa such as wild radish, branched bur-reed, buttercups, parsley-pierts, knotweeds, goosefoots, sedges, crowfoots, oraches, and the mustard and pink families, among others. Small ergot sclerotia, hazel nutshell and elder seeds were also occasionally present.

Four radiocarbon dates were obtained on charred plant remains: a rye grain from posthole 180313 was dated *cal. AD 770–880* (UBA-52900: 1247±27 BP). Two charred plant remains from structure 2 (180350: a rectangular post-built structure) were also dated, providing consistent results of *cal. AD 780–880* on a barley grain (UBA-52907: 1181±22 BP) and a wheat grain (UBA-52908: 1219±22 BP). A final date of *cal. AD 775–895* was obtained on a garden pea (UBA-52958: 1155±26 BP) from structure 3 (180200: an oval post-built structure).

The assemblage is fairly consistent but broad differences can be appreciated in the material from some of the postholes and the material from ditches and pits. Although the small number of remains in some of the features makes this observation very tentative, it seems that with the exception of a single residual hulled wheat glume base, chaff is only present in pits and ditches and absent from postholes, while fruits, pulses and wild plant seeds (mostly possible sorrel/docks) are only present (and occasionally abundant) in postholes (Fig. 8.4).

Medieval and post-medieval

The samples from medieval and post-medieval ditches were generally poor. Waterlogged plant remains were present in one sample.

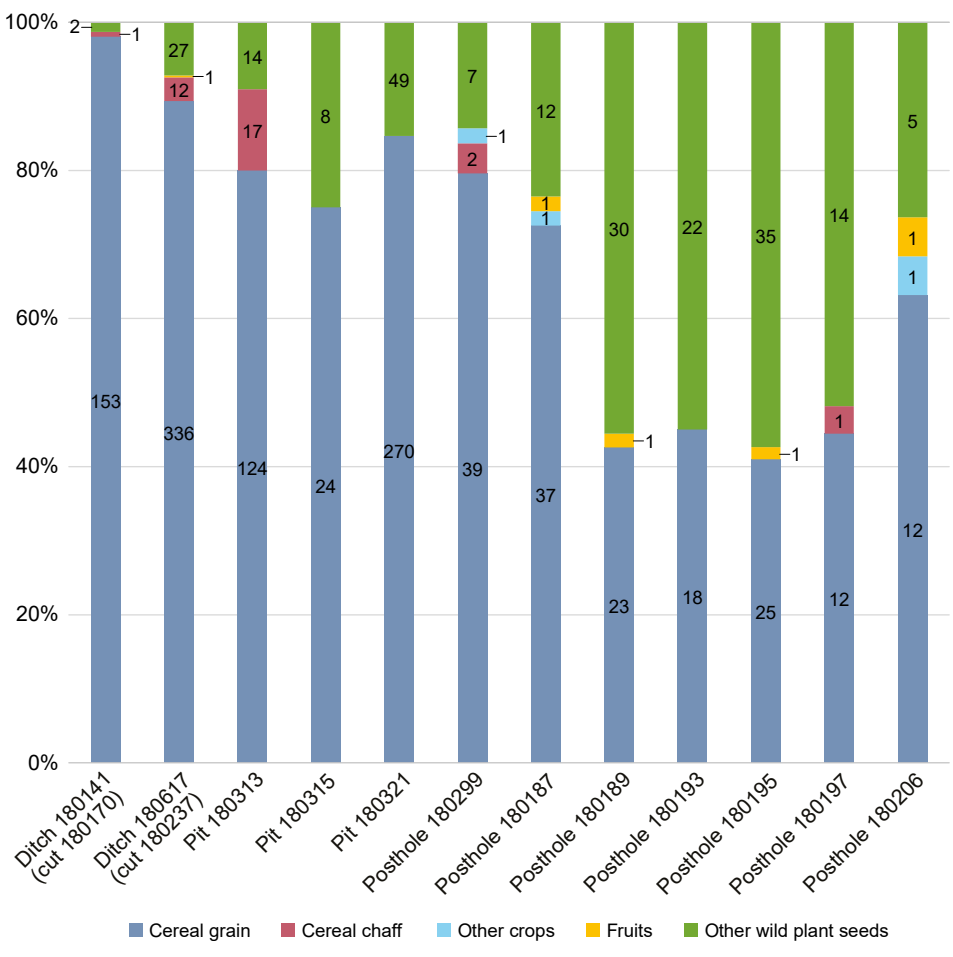


Figure 8.4 Proportions of different types of charred plant remain in the analysed samples from Cheals Close

Table 8.14 Charred plant remains analysis: results from late Romano-British pits and ditches at Walk Hill

Feature type			Pit	Pit	Pit	Ditch	Ditch	Ditch	Ditch	Ditch
Feature			800038	800382	800382	800389	800411	800376	800405	800464
Context			800039	800383	800384	800390	800412	800377	800406	800010
Group			-	-	-	800491	800491	800493	800495	800496
Sample			800050	800068	800066	800067	800072	800060	800061	800077
Sample volume (l)			15	34	36	38	29	28	32	28
Flot volume (ml)			20	100	50	30	30	15	20	15
Subsample			-	50%; 12.5% cereal	-	-	50% cereal	-	-	-
Bioturbation proxies			70%, S (A*), U (A), E, I	2%, S (A*), U (C), E	15%, U (A*), E	30%, S (A**), U (A*), E, I	15%, S (A), U (B), I	80%, S (A**), U (B)	70%, S (A), U (A*), I	30%, S (A*)
Fragmentation index (MNI/NR)			0.56	0.46	0.41	0.43	0.47	0.47	0.54	0.50
Density (MNI/l)			7.13	56.88	20.14	4.03	23.55	3.29	3.09	4.96
Scientific name	*Common name*	*Plant part*								
Hordeum vulgare sl.	Barley	grain	2	132	20	23	29	3	6	19
Hordeum vulgare sl.	Barley	rachis segment	-	6	3	1	2	-	-	-
Triticum aestivum/ turgidum	Naked wheat	grain	-	-	-	-	-	-	-	4
Triticum spelta	Spelt	grain	1	40	14	4	6	9	10	5
Triticum spelta	Spelt	spikelet fork	5	378	145	15	189	13	10	7
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	-	-	-	10	3	1	1
Triticum dicoccum	Emmer	grain	-	-	1	-	-	-	-	2
Triticum dicoccum	Emmer	spikelet fork	-	-	-	1	-	1	1	2
Triticum dicoccum/ monococcum	Emmer/einkorn	grain	-	-	-	1	-	-	-	-
Triticum sp.	Wheat	grain	9	304	72	13	96	4	8	19
Triticum sp.	Wheat (hulled)	spikelet fork	7	448	221	29	172	29	30	26
Triticeae	Cereal	grain	25	346	163	30	121	15	12	22
Other crops										
Pisum sativum	Garden pea	seed	-	-	1	3	-	-	-	1
Fruits										
Corylus avellana	Hazel	nut	-	1	1	1	-	1	1	-
Other wild plants										
Ranunculus sp.	Buttercup	seed	1	4	-	-	-	-	-	-
Chenopodium sp.	Goosefoot	seed	-	6	2	-	-	-	1	-
Chenopodiaceae	Goosefoot family	seed	-	4	4	-	2	-	-	1
Montia fontana	Blinks	seed	-	4	1	-	-	-	-	-
Stellaria sp.	Stitchwort	seed	-	2	-	-	-	-	-	-
Caryophyllaceae	Pink family	seed	-	2	-	-	-	-	-	2
Fallopia convolvulus	Black bindweed	seed	1	8	-	1	-	-	-	-
Rumex sp.	Docks/sorrel	seed	-	10	4	5	4	-	3	1
Polygonaceae	Knotgrass family	seed	1	-	3	-	-	-	2	-
Raphanus raphanistrum	Wild radish	capsule	-	-	-	-	-	1	1	-
Aphanes sp.	Parsley-piert	seed	-	-	-	-	-	-	1	-
Trifolieae	Trefoil/medick/ clover	seed	-	8	3	-	2	-	-	3
Vicia/Lathyrus	Vetch/pea	seed	-	2	1	-	1	-	1	-
Vicieae	Vetch/grass pea	seed	1	10	2	2	10	2	1	10
Plantago lanceolata	Ribwort plantain	seed	-	-	1	-	-	2	-	-
Odontites vernus	Red bartsia	seed	-	8	7	1	1	2	1	1

Feature type			Pit	Pit	Pit	Ditch	Ditch	Ditch	Ditch	Ditch
Feature			800038	800382	800382	800389	800411	800376	800405	800464
Context			800039	800383	800384	800390	800412	800377	800406	800010
Group			-	-	-	800491	800491	800493	800495	800496
Sample			800050	800068	800066	800067	800072	800060	800061	800077
Sample volume (l)			15	34	36	38	29	28	32	28
Flot volume (ml)			20	100	50	30	30	15	20	15
Subsample			-	50%; 12.5% cereal	-	-	50% cereal	-	-	-
Bioturbation proxies			70%, S (A*), U (A), E, I	2%, S (A*), U (C), E	15%, U (A*), E	30%, S (A**), U (A*), E, I	15%, S (A), U (B), I	80%, S (A**), U (B)	70%, S (A), U (A*), I	30%, S (A*)
Fragmentation index (MNI/NR)			0.56	0.46	0.41	0.43	0.47	0.47	0.54	0.50
Density (MNI/l)			7.13	56.88	20.14	4.03	23.55	3.29	3.09	4.96
Rhinanthus minor	Yellow rattle	seed	-	2	-	-	-	-	-	-
Sherardia arvensis	Field madder	seed	-	2	-	-	-	-	-	-
Galium cf. *aparine*	Cleavers	seed	-	2	1	1	1	1	-	1
Galium sp.	Cleavers/bedstraw	seed	-	2	-	-	-	-	-	-
Tripleurospermum inodorum	Scentless mayweed	seed	-	2	1	1	1	-	-	-
Asteraceae	Daisy family	seed	-	10	-	-	-	-	-	1
Carex sp.	Sedge	seed	-	-	1	-	-	-	-	-
Cyperaceae	Sedge	seed	8	12	9	7	7	-	-	-
Lolium/Festuca	Rye grass/fescue	grain	-	-	2	-	1	-	-	-
Poa/Phleum	Meadow grass/cat's tail	grain	-	6	6	1	2	-	-	1
Avena sp.	Oat	grain	-	40	7	1	2	-	1	2
Bromus sp.	Brome	grain	-	8	-	-	13	-	-	-
Avena/Bromus	Oats/brome	grain	-	44	6	-	-	4	4	3
Danthonia decumbens	Heath-grass	grain	2	8	4	2	1	1	1	2
Poaceae	Grasses	grain	2	21	8	-	2	1	1	3
Poaceae	Grasses	awn fragment	-	8	-	-	-	-	-	-
Poaceae	Grasses	culm fragments	-	-	-	C	-	-	-	-
Indeterminata (charred)		rhizome/tuber	42	46	11	10	8	-	2	-
NR			**191**	**4224**	**1757**	**353**	**1454**	**195**	**184**	**276**
MNI			**107**	**1936**	**725**	**153**	**683**	**92**	**99**	**139**

Table 8.15 Summarised results of the charred plant remains assessment of features at Callow Carr

Phase	*Feature type*	*Feature*	*Context*	*Group*	*Sample*	*Volume (sample - l, flot - ml)*	*Subsample*	*Bioturbation proxies*	*CPR abundance*	*CPR taxa*
Bronze Age	Barrow ditch	900134	900135	900066	900252	34, 50	50% fine residue	70%, S (A***)	C	*Corylus avellana*
	Barrow ditch	900169	900171	900066	900282	30, 25	-	70%, S (A***)	C	*C. avellana*
	Barrow ditch	900178	900179	900066	900283	29, 50	-	70%, S (A***)	B	*Triticum* sp., Triticeae, *C. avellana*
	Barrow ditch	900178	900180	900066	900284	34, 60	25% fine residue	70%, S (A***)	C	*C. avellana*
Romano-British	Trackway	900048	900051	900050	900059	30, 30	25% fine residue	80%, S (A***)	B	*Hordeum vulgare*, Triticeae, *Arrhenatherum elatius* ssp. *bulbosum*
	Trackway	900048	900052	900050	900060	31, 30	25% fine residue	80%, S (A***)	C	*Triticum* sp., Triticeae
A-S	Pit	900158	900160	-	900258	34, 100	-	<1%, S (A***)	C	Triticeae
-	Ditch	900003	900004	-	900001	33, 10	-	90%, S (A***)	C	Triticeae

Key: roots %, S = burrowing snails; scale of abundance: C = <5, B = 5–9, A*** = >500. CPR = charred plant remains. Note: assessed samples with no charred plant remains have been excluded from this table.

Table 8.16 Charred plant remains analysis: results from Anglo-Saxon postholes in structure 3 (180200) at Cheals Close

Feature			180187	180189	180193	180195	180197	180206
Context			180188	180190	180194	180196	180198	180207
Sample			180004	180005	180007	180008	180009	180013
Sample volume (l)			17	14	9	15	16	19
Flot volume (ml)			15	45	20	20	20	20
Bioturbation proxies			<1%, E	<1%, E	<1%, E	<1%, C, E	<1%, C, E	1%, E
Fragmentation index (MNI/NR)			0.42	0.69	0.75	0.56	0.37	0.63
Density (MNI/l)			3.00	3.86	4.44	4.07	1.69	1.00
Scientific name	*Common name*	*Plant part*						
Cereals								
Hordeum vulgare sl.	Barley	grain	6	6	3	4	-	2
Hordeum vulgare sl.	Barley	rachis segment	-	-	-	-	-	-
Secale cereale	Rye	grain	2	1	1	2	-	2
Secale/Triticum	Rye/wheat	grain	2	-	1	-	-	-
Triticum aestivum/ turgidum	Naked wheat	grain	6	-	2	5	1	-
Triticum sp.	Wheat	grain	-	6	2	2	3	4
Triticum sp.	Wheat (hulled)	spikelet fork	-	-	-	-	1	-
Triticeae	Cereal	grain	21	10	9	12	8	4
Other crops								
Pisum sativum	Garden pea	seed	-	-	-	-	-	1
Fruits								
Corylus avellana	Hazel	nut	1	-	-	1	-	1
Sambucus nigra	Elder	seed	-	1	-	-	-	-
Other wild plant seeds								
Ranunculus type *acris/ bulbosus/repens*	Meadow/bulbous/ creeping Buttercup	seed	-	1	-	-	-	-
Chenopodium sp.	Goosefoots	seed	-	-	-	1	-	-
Chenopodiaceae	Goosefoot family	seed	1	-	-	-	-	-
Persicaria sp.	Knotweeds	seed	-	-	-	2	-	1
Polygonum sp.	Knotgrasses	seed	-	-	-	2	-	1
Rumex sp.	Docks	seed	-	-	-	7	1	-
Rumex sp.	Docks	fruit	-	2	-	-	-	-
Rumex type *acetosa/ crispus*	Sorrel/curled dock	seed	4	25	18	19	13	-
Polygonaceae	Knotgrass family	seed	-	-	-	3	-	-
Raphanus raphanistrum	Wild radish	capsule	2	1	-	-	-	-
Vicieae	Vetch tribe	seed	1	-	-	-	-	-
Fabaceae	Legume family	seed	1	1	-	-	-	1
Carex sp.	Sedges	seed	2	-	-	-	-	-
Cyperaceae	Sedges	seed	-	-	4	1	-	1
Poaceae	Grasses	grain	1	-	-	-	-	-
Poaceae	Grasses	awn fragment	-	-	-	-	-	1
NR			**121**	**78**	**53**	**108**	**73**	**30**
MNI			**50**	**54**	**40**	**61**	**27**	**19**

Fourteen Acres

Pit 370010 contained abundant charred plant remains comprising hazel nutshell fragments, bedstraw/cleaver seeds and buds (Table 8.18). A radiocarbon date of 3010–2700 cal. BC (UBA-52875: 4266±40 BP) was obtained for one of the nutshell fragments.

Raithby Lane

The five analysed samples were taken from Romano-British ditches 380082, 380055, 380256 and 380261 (Table 8.19). The remaining samples that were assessed but not analysed included relatively low quantities of cereals (barley and wheat) as well as tubers/rhizomes and a limited array of common wild taxa (e.g., vetches, grasses, docks, sedges). One of the assessed samples (380010 from ditch 380253) contained a wider array of waterlogged remains, including taxa that are typical of wet environments (e.g., rushes, common nettle).

In addition to the unidentifiable cereal grains, barley grains and rachis internodes are prevalent in every analysed sample, as are wheat grains. Wheat chaff, including glume bases and spikelet forks, were recovered in relatively high proportions. Spelt wheat is represented by both cereal grains and glume bases, with larger amounts of the latter. Emmer wheat is present in only very small quantities in one sample.

Table 8.17 Charred plant remains analysis: results from Anglo-Saxon pits, a posthole and ditches at Cheals Close

Feature type			Ditch	Gully	Posthole	Pit	Pit	Posthole
Feature			180170	180237	180313	180315	180321	180299
Context			180171	180238	180314	180316	180322	180300
Group			180141	180617	-	-	-	180484
Sample			180019	180021	180036	180037	180038	180035
Sample volume (l)			32	34	37	27	13	
Flot volume (ml)			7	180	20	45	15	
Subsample			12.5% fine residue	12.5% fine residue	50% fine residue	-	25% fine residue	-
Bioturbation proxies			<1%, C, E, I	10%, C, E, I	<1%, E	5%, E	1%, E	<1%, E
Fragmentation index (MNI/NR)			0.67	0.56	0.78	0.63	0.70	0.66
Density (MNI/l)			4.88	11.06	4.31	0.86	11.81	3.77
Scientific name	*Common name*	*Plant part*						
Cereals								
Hordeum vulgare sl.	Barley	grain	30	52	39	11	69	12
Hordeum vulgare sl.	Barley	rachis segment	1	-	3	-	-	-
Secale cereale	Rye	grain	12	39	18	2	11	-
Secale cereale	Rye	rachis segment	-	-	14	-	-	1
Secale/Triticum	Rye/wheat	grain	39	28	11	-	21	5
Triticum aestivum/ turgidum	Naked wheat	grain	14	81	4	3	19	6
Triticum aestivum	Bread wheat	rachis internode	-	12	-	-	-	-
Triticum sp.	Wheat	grain	12	-	-	-	-	2
Triticum sp.	Wheat (hulled)	spikelet fork	-	-	-	-	-	1
Triticeae	Cereal	grain	46	136	52	8	150	14
Other crops								
Vicia faba	Broad bean	seed	-	-	-	-	-	1
Fruits								
Corylus avellana	Hazel	nut	-	1	-	-	-	-
Other wild plant seeds								
Claviceps purpurea	Ergot	sclerotium	-	-	2	-	-	-
Ranunculus sp.	Buttercup	seed	-	-	-	-	1	1
Ranunculus type *acris/ bulbosus/repens*	Meadow/bulbous/ creeping Buttercup	seed	-	1	-	-	-	-
cf. *Suaeda* sp.	Sea-blites	seed	-	-	1	-	-	-
Chenopodiaceae	Goosefoot family	seed	-	-	-	-	-	-
Persicaria sp.	Knotweeds	seed	-	1	-	-	1	-
Polygonum sp.	Knotgrasses	seed	-	1	-	-	1	-
Rumex sp.	Docks	seed	-	-	1	-	1	1
Raphanus raphanistrum	Wild radish	capsule	-	1	-	-	-	-
Brassicaceae	Mustard family	seed	-	-	2	-	-	-
Galium sp.	Bedstraws	seed	-	-	-	1	-	-
Anthemis type *cotula*	Stinking mayweed	seed	-	1	-	-	-	-
Cyperaceae	Sedges	seed	-	-	-	1	-	1
Poa/Phleum	Meadow grass/cat's tail	grain	-	1	-	1	-	-
Avena sp.	Oats	grain	1	1	-	-	-	1
Poaceae	Grasses	grain	-	16	6	5	45	2
Poaceae	Grasses	culm fragments	1	2	-	-	-	1
Sparganium erectum	Branched bur-reed	fruit	-	-	2	-	-	-
Indeterminata (charred)		seed	-	-	1	-	-	-
Indeterminata (charred)		thorn	-	-	1	-	-	-
NR			**234**	**667**	**198**	**51**	**455**	**74**
MNI			**156**	**374**	**157**	**32**	**319**	**49**

Table 8.18 Charred plant remains analysis: results from Middle–Late Neolithic pit 370010 at Fourteen Acres

Context			370011
Sample			370002
Sample volume (l)			5
Flot volume (ml)			60
Bioturbation proxies			<1%, U (C)
Fragmentation index (MNI/NR)			0.12
Density (MNI/l)			2.60
Scientific name	*Common name*	*Plant part*	
Corylus avellana	Hazel	nut	8
Galium sp.	Bedstraws	seed	3
Indeterminata (charred)		bud	2
NR			**108**
MNI			**13**

Table 8.19 Charred plant remains analysis: results from Romano-British ditches at Raithby Lane

Feature			380082	380055	380064	380064	380015
Context			380083	380056	380065	380066	380016
Group			-	-	380256	380256	380261
Sample			380007	380004	380005	380006	380009
Sample volume (l)			29	35	30	32	35
Flot volume (ml)			100	350	20	60	125
Subsample			50%	50%	50% fine residue	50%	50%
Bioturbation proxies			<1%, U (A*), E, I	<1%, U (A)	1%, U (A), E, I	5%, U (A), E, I	2%, U (A*), E, I
Fragmentation index (MNI/NR)			0.78	0.79	0.83	0.69	0.62
Density (MNI/l)			5.55	21.54	2.07	8.81	3.20
Scientific name	*Common name*	*Plant part*	-	-	-	-	-
Cereals							
Hordeum vulgare sl.	Barley	grain	65	70	12	14	22
Hordeum vulgare sl.	Barley	rachis segment	30	50	13	6	6
Triticum spelta	Spelt	grain	-	6	1	-	2
Triticum spelta	Spelt	spikelet fork	-	2	1	4	2
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	-	-	2	-
Triticum dicoccum	Emmer	grain	-	-	-	2	-
Triticum sp.	Wheat	grain	6	22	5	8	14
Triticum sp.	Wheat (hulled)	spikelet fork	1	6	3	23	31
Triticeae	Cereal	grain	25	45	9	29	17
Other crops							
Pisum sativum	Garden pea	seed	-	-	-	-	2
Fruits							
Corylus avellana	Hazel	nut	-	1	-	-	-
Other wild plants							
Ranunculus acris/ bulbosus/repens	Meadow/bulbous/ creeping Buttercup	seed	-	6	-	-	-
Ranunculus flammula	Lesser spearwort	seed	-	-	-	4	-
Montia fontana	Blinks	seed	-	4	-	-	-
Persicaria sp.	Knotweeds	seed	-	-	3	4	2
Polygonum sp.	Knotgrasses	seed	-	-	3	4	2
Fallopia convolvulus	Black bindweed	seed	2	-	-	-	-
Rumex sp.	Docks	seed	6	14	-	10	-
Rumex acetosella	Sheep's sorrel	seed	-	4	-	4	-
Potentilla sp.	Cinquefoils	seed	-	2	-	-	-
Trifolieae	Trefoils/medicks/clovers	seed	-	-	2	4	-
Vicieae	Vetch tribe	seed	-	2	-	4	2
Ajuga/Teucrium	Bugles/germanders	seed	-	-	1	-	-
Plantago sp.	Plantains	seed	-	-	-	8	-
Plantago lanceolata	Ribwort plantain	seed	2	2	-	-	-
Centaurea sp.	Knapweeds	seed	-	4	-	-	-
Tripleurospermum inodorum	Scentless mayweed	seed	-	-	-	2	-
Eleocharis sp.	Spike-rushes	seed	-	-	-	2	-
Carex sp.	Sedges	seed	-	8	-	16	-
Cyperaceae	Sedges	seed	-	24	2	12	8
Cyperaceae	Sedges	seed coat fragment	2	-	-	-	-
Lolium/Festuca	Rye grasses/fescues	grain	2	-	-	-	-
Poa/Phleum	Meadow grass/cat's tail	grain	-	-	-	4	-
Avena sp.	Oats	grain	2	4	-	4	-
Bromus sp.	Bromes	grain	-	12	-	6	-
Avena/Bromus	Oats/bromes	grain	-	4	2	-	-
Danthonia decumbens	Heath-grass	grain	-	22	2	10	2
Poaceae	Grasses	grain	2	10	2	12	-
Indeterminata (charred)		rhizome/tuber	16	430	1	84	-
NR			**206**	**956**	**75**	**408**	**182**
MNI			**161**	**754**	**62**	**282**	**112**

Context			220078
Sample			220006
Sample volume (l)			35
Flot volume (ml)			200
Bioturbation proxies			1%, U (A**), I, E
Fragmentation index (MNI/NR)			0.41
Density (MNI/l)			136.71
Scientific name	*Common name*	*Plant part*	
Cereals			
Hordeum vulgare sl.	Barley	grain	144
Triticum spelta	Spelt	grain	320
Triticum spelta	Spelt	spikelet fork	60
Triticum spelta/ dicoccum	Emmer/spelt	grain	784
Triticum dicoccum	Emmer	grain	96
Triticum sp.	Wheat	grain	984
Triticum sp. (hulled)	Wheat	spikelet fork	224
Triticeae	Cereal	grain	1002
Other wild plants			
Fallopia convolvulus	Black bindweed	seed	160
Polygonaceae	Knotgrass family	seed	16
Vicieae	Vetch tribe	seed	192
Bromus sp.	Bromes	grain	720
Poaceae	Grasses	grain	83
NR			**11560**
MNI			**4785**

Table 8.20 Charred plant remains analysis: results from Late Iron Age/early Romano-British pit 220077 at Raithby Crossroads

Grasses include rye grass/fescue meadow grass/cat's tail, and a considerable amount of oats/bromes. Additional plant remains comprise buttercups, hazel nutshell, blinks, knotweeds, docks, cinquefoil, trefoils/medicks/clovers, vetches, garden pea, ribwort plantain, cornflower, and – especially – sedges.

Raithby Crossroads

Charred plant remains and wood charcoal were present in all samples from this area, although in moderate numbers. Although precise phasing evidence is not available for many of the sparser deposits (Table 8.20), the remains are largely consistent with Late Iron Age/Romano-British activity. A selection of the richer samples has been analysed.

A nutshell fragment from one of the deposits (roundhouse ring gully 220117) was radiocarbon dated to the Early Neolithic period (UBA-52909 4949±31 BP, 3790–3650 cal. BC), indicating residual material from earlier activities in the area. A wheat grain with a date of *355–170 cal. BC* (UBA-52910: 2193±25 BP) from the same deposit is taken to be a more accurate representation of the period of use of the structure. A similar date (UBA-52885: 2081±27 BP), was obtained for a wheat grain from ditch 220114.

One sample from a Late Iron Age to Romano-British pit (220077) was analysed. Additional unanalysed assessed samples of similar date included only barley and wheat grains, hulled wheat glume bases, grasses, vetches and tubers/rhizomes. The analysed sample produced considerable amounts of cereal grains, including barley, wheat, spelt wheat and emmer wheat, as well as unidentifiable cereal grains. Many wheat and spelt wheat glume bases were also recovered. Wild taxa include only black bindweed, docks/sorrels, unidentifiable grasses, and large quantities of both vetches and bromes.

Wood Hill

Charred plant remains were present in the undated ditches from this area, in varying quantities. The remains include cereal and grasses, as well as docks. Two samples from a Late Iron Age ditch (120088) at Wood Hill were analysed (Table 8.21). A third assessed sample from the same ditch produced only sparse hazel nutshell and tubers/rhizomes. The analysed samples contained a few barley grains. Spelt and emmer wheat grains are also few in number, though glume bases were found in larger quantities. Similarly, wheat glume bases and spikelet forks occurred in a larger proportion than wheat grains.

Wild taxa include, but are not limited to, buttercups, goosefoots, blinks, knotweeds, docks/knotgrasses, trefoils/medicks/clovers, vetches, ribwort plantain, red bartsia, narrow-fruited cornsalad and sedges. The samples contained considerable quantities of large-seeded grasses such as oats/bromes, as well as grasses and cereal grains that could not be identified to the genus level. Wild radish seed capsules and capsule fragments and hazel nutshell fragments were also recovered.

Fen-edge

Magers Lane

Most of the samples from the site contained charred plant remains, albeit in varying quantities; deposits particularly rich in plant remains have been analysed (Table 8.22). The range of taxa across the assessed samples is relatively consistent; the cereals comprise barley and wheat. Other taxa include cultivated species such as garden peas/broad beans and the remains of wild plants such as hazel nutshell fragments. Most of the wild plant remains in the samples correspond to monocotyledonous stems, tubers/rhizomes and other seeds which may be present in turves (e.g., sedges, grasses, blinks).

Table 8.21 Charred plant remains analysis: results from Iron Age ditch 120088 at Wood Hill

Feature			120059	120071
Context			120060	120069
Sample			120008	120006
Sample volume (l)			32	10
Flot volume (ml)			40	30
Subsample			33% fine residue; 50% flot	-
Bioturbation proxies			1%, I, U (A)	<1%, U (A*), E
Fragmentation index (MNI/NR)			0.80	0.79
Density (MNI/l)			17.38	22.40
Scientific name	*Common name*	*Plant part*		
Cereals				
Hordeum vulgare sl.	Barley	grain	4	2
Triticum spelta	Spelt	grain	6	1
Triticum spelta	Spelt	spikelet fork	11	5
Triticum dicoccum	Emmer	grain	-	1
Triticum dicoccum	Emmer	spikelet fork	-	5
Triticum sp.	Wheat	grain	26	28
Triticum sp.	Wheat (hulled)	spikelet fork	19	27
Triticeae	Cereal	grain	28	10
Fruits				
Corylus avellana	Hazel	nut	-	2
Other wild plants				
Ranunculus sp.	Buttercups	seed	4	-
Chenopodium sp.	Goosefoots	seed	6	-
Chenopodiaceae	Goosefoot family	seed	6	8
Montia fontana	Blinks	seed	14	-
Caryophyllaceae	Pink family	seed	2	-
Persicaria sp.	Knotweeds	seed	2	13
Polygonum sp.	Knotgrasses	seed	2	13
Polygonum aviculare	Knotgrass	seed	2	-
Polygonaceae	Knotgrass family	seed	2	-
Raphanus raphanistrum	Wild radish	capsule	3	-
Trifolieae	Trefoils/medicks/clovers	seed	16	1
Vicieae	Vetch tribe	seed	8	4
Plantago lanceolata	Ribwort plantain	seed	4	-
Odontites vernus	Red bartsia	seed	2	-
Valerianella dentata	Narrow-fruited cornsalad	seed	8	-
Carex sp.	Sedges	seed	6	1
Cyperaceae	Sedges	seed	6	5
Arrhenatherum elatius var. *bulbosum*	Onion couch grass	bulb	-	1
Bromus sp.	Bromes	grain	77	35
Avena/*Bromus*	Oats/bromes	grain	16	7
Danthonia decumbens	Heath-grass	grain	4	1
Poaceae	Grasses	grain	52	26
Indeterminata (charred)		rhizome/tuber	220	28
NR			**692**	**285**
MNI			**556**	**224**

Middle to Late Iron Age

Two samples from Middle to Late Iron Age pits (300086, 300038) were analysed. Both are dominated by cereal chaff. Barley and free-threshing wheat rachis internodes, as well as wheat and spelt wheat glume bases and spikelet forks, were recovered, despite the absence of the grains of these cereals. The only other cereal remains recovered were unidentifiable fragments. Additional remains comprise hazel nutshell fragments, blinks, docks, oat/brome and heath-grass. Radiocarbon dates were obtained on one hazel nutshell fragment from pit 300038 (UBA-52879: 2063±27 BP, *110–1 cal. BC*), as well as on eight wheat glume bases (UBA-52892: 2081±29 BP, *120–40 cal. BC*), and a tentatively identified bread wheat rachis internode from pit 300086 was dated to around cal. AD 1992–1994 (UBA-52893: 1.1318±0.0041 FPM).

Late Romano-British

One sample from a late Romano-British ditch was analysed. The remainder of the assessed Romano-British samples produced limited assemblages, including barley and wheat grains and tubers/rhizomes, as well as common wild taxa such as grasses (including heath-grass and meadow grass/cat's tail), docks, sedges, vetches, blinks and buttercups, among few others. The analysed sample is from ditch 300149. The cereals are dominated by wheat and unidentifiable cereal grains. A limited number of barley and spelt/emmer wheat grains was also recovered. Charred tubers/rhizomes have a notable presence in the sample. Additional plant remains include seeds of docks, grass vetchling (cf. *Lathyrus nissolia*), vetches, red bartsia, nipplewort, sedges and bromes.

Table 8.22 Charred plant remains analysis: results from Iron Age and late Romano-British features at Magers Lane

Phase			MIA/LIA	MIA/LIA	LRB
Feature type			Pit	Pit	Ditch
Feature			300086	300038	300140
Context			300087	300035	300141
Group			-	-	300149
Sample			300006	300005	300011
Sample volume (l)			6	4	26
Flot volume (ml)			15	3	30
Subsample			-	-	50% fine residue
Bioturbation proxies			<1%, U (C), E	<1%, U (C), E, I	5%, U (C)
Fragmentation index (MNI/NR)			0.70	0.87	0.48
Density (MNI/l)			12.83	5.00	4.15
Scientific name	*Common name*	*Plant part*			
Cereals					
Hordeum vulgare sl.	Barley	grain	-	-	4
Hordeum vulgare sl.	Barley	rachis segment	5	-	-
Triticum aestivum	Bread wheat	rachis internode	1	-	-
Triticum spelta	Spelt	spikelet fork	2	-	-
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	-	3
Triticum sp.	Wheat	grain	-	-	28
Triticum sp.	Wheat (hulled)	spikelet fork	26	-	-
Triticeae	Cereal	grain	3	-	35
Fruits					
Corylus avellana	Hazel	nut	1	1	-
Other wild plants					
Montia fontana	Blinks	seed	6	-	-
Rumex sp.	Docks	seed	2	-	2
Lathyrus nissolia	Grass vetchling	seed	-	-	1
Vicieae	Vetch tribe	seed	-	-	3
Odontites vernus	Red bartsia	seed	-	-	1
Lapsana communis	Nipplewort	seed	-	-	1
Cyperaceae	Sedges	seed	-	-	8
Bromus sp.	Bromes	grain	-	-	1
Avena/Bromus	Oats/bromes	grain	1	-	-
Danthonia decumbens	Heath-grass	grain	11	1	-
Indeterminata (charred)		rhizome/tuber	19	18	21
NR			**110**	**23**	**223**
MNI			**77**	**20**	**108**

MIA = Midle Iron Age, LIA = Late Iron Age, LRB = Late Romano-British.

Feature			310046
Context			310048
Sample			310003
Sample volume (l)			26
Flot volume (ml)			35
Bioturbation proxies			1%, U (C), I
Fragmentation index (MNI/NR)			0.80
Density (MNI/l)			0.92
Scientific name	*Common name*	*Plant part*	-
Cereals			
Hordeum vulgare sl.	Barley	grain	2
Hordeum vulgare sl.	Barley	rachis segment	3
Triticum dicoccum	Emmer	grain	1
Triticum dicoccum	Emmer	spikelet fork	9
Triticum sp.	Wheat (hulled)	spikelet fork	3
Triticeae	Cereal	grain	2
Fruits			
Rubus sp.	Blackberry/raspberry	seed	1
Other wild plants			
Indeterminata (charred)		rhizome/tuber	3
NR			**30**
MNI			**24**

Table 8.23 Charred plant remains analysis: results from Middle to Late Iron Age ditch 310170 at Staunch Farm

Context			530203
Sample			530032
Sample volume (l)			40
Flot volume (ml)			60
Bioturbation proxies			5%, U (A), I
Fragmentation index (MNI/NR)			0.57
Density (MNI/l)			0.63
Scientific name	*Common name*	*Plant part*	
Cereals			
Triticum aestivum/ turgidum	Naked wheat	grain	2
Triticum spelta	Spelt	grain	3
Triticum sp.	Wheat	grain	9
Triticeae	Cereal	grain	7
Other wild plants			
Stellaria sp.	Stitchworts	seed	1
Polygonum sp.	Knotgrasses	seed	1
Polygonum aviculare	Knotgrass	seed	2
Poaceae	Grasses	culm fragments	C
NR			**44**
MNI			**25**

Table 8.24 Charred plant remains analysis: results from pit 530202 at Mown Rakes

Back Lane

Small numbers of charred plant remains and waterlogged plant remains were retrieved from this area. The charred plant remains comprise a few cereal grains and occasional wild plant seeds, stems and tubers/rhizomes. A barley grain from gully 410120 was radiocarbon dated (UBA-52911, 2068±23 BP, 160 cal. BC–cal. AD 10).

Three ditches contained waterlogged plant material, but all of this is likely to be of modern origin; a radiocarbon date was obtained on two waterlogged seeds of elder from ditch 410021, indicating the material dates to cal. AD 1972 (UBA-52954: 1.488±0.0032 FPM).

Staunch Farm

Middle to Late Iron Age

One sample from a Middle to Late Iron Age ditch (310170) was analysed. The remainder of the assessed samples produced sparse remains, including wheat and emmer wheat grains and hulled wheat glume bases, as well as various grasses, sedges, blinks, vetches and tubers/rhizomes.

The analysed sample was of limited interest (Table 8.23). Cereal remains include a few barley grains and barley rachis segments. A small number of emmer wheat grains, glume bases and spikelet forks, as well as two wheat glume bases, were also recovered. Additional remains include small quantities of unidentifiable cereal grain fragments, charred tubers/rhizomes, and a single blackberry/raspberry seed. Six tentatively identified emmer wheat glume bases from ditch 310170 were radiocarbon dated (UBA-52877: 2133±27 BP).

Fens

Mown Rakes

One sample from pit 530202 was analysed (Table 8.24). The remaining assessed samples produced limited remains, such as a few wheat and barley grains, culm fragments, tubers/rhizomes, oat, sedges, vetches, grasses and mints. Seven monocotyledonous stem fragments from assessed sample 530042 (uppermost fill of ditch 530296) were radiocarbon dated *cal. AD 25–115* (UBA-52888: 1930±27 BP).

The analysed sample also produced few remains, including free-threshing wheat and spelt wheat grains, as well as relatively small quantities of wheat and unidentifiable cereal grains. Additional remains include seeds of knotgrasses and blinks, as well as grass culm fragments, all of which occur in low numbers. A free-threshing wheat grain was submitted for radiocarbon dating, though this proved to be intrusive (UBA-52894: 1.1928±0.0042 FPM).

Six Hundreds Drove

A total of 33 samples from Romano-British features were analysed. The unanalysed assessed Romano-British samples produced remains including barley and wheat (including spelt wheat) grains, hulled wheat chaff, oat, hazel nutshell, cleavers,

grasses, vetches, trefoils/medicks/clovers, common pea, docks/sorrels, goosefoots and ribwort plantain. Complete spikelet forks are present in two of the samples. The analysed samples include 16 samples taken from ditch 550508, one each from ditches 550532 and 550533, and 15 from stakehole group 550528 (the last found in the base and sides of ditch 5505508).

The samples from ditch 550508 are characterised by large numbers of cereal grains and cereal chaff remains. Culm fragments are also abundant. While both wheat and barley are present, wheat is generally dominant. Among the wheat varieties identifiable to the species level, spelt wheat is the most abundant, with smaller numbers of emmer and free-threshing wheat. Of the chaff remains, wheat and spelt wheat glume bases (and spikelet forks) are particularly abundant, while emmer glume bases, as well as free-threshing wheat and barley rachis segments, are present to a lesser degree. The array of wild taxa includes buttercups, goosefoots, docks, trefoils/medicks/clovers, vetches, red bartsia, cleavers, stinking mayweed, scentless mayweed, sedges and grasses (e.g., rye grass/fescue, oats, bromes). A spelt wheat grain, a free-threshing wheat grain, and two tentatively identified rivet wheat rachis segments were radiocarbon dated (UBA-52895: 1837±29 BP; UBA-52896: 1846±31 BP; UBA-52897: 1896±32 BP).

The samples from stakehole group 550528 are less rich in cereals than those from ditch 550508. The majority produced a low number of barley, wheat and unidentifiable grains, and some contained a few spelt wheat grains. Tentatively identified emmer and free-threshing wheat grains are present in very low quantities. Chaff remains are also present in low numbers and follow a very similar distribution to the cereal grains. Culms (of grasses, unidentifiable), however, are very abundant in a number of the samples. Wild taxa are present in only low numbers and include single seeds of dock, trefoil/medick/clover, field gromwell, sedges, rye grass/fescue, brome, and two oats. Grasses are also present.

The material from ditches 550532 and 550533 is similar to that from 550508 and 550528. In addition to unidentifiable cereal grains, wheat and spelt wheat grains and glume bases are dominant. Barley is also present. Grasses including bromes, rye grass/fescue and meadow grass/cat's tails are prominent, as are trefoils/medicks/clovers and vetches. Additional taxa include cleavers, red bartsia, ribwort plantain, broad bean, common pea, sedges, docks, black bindweed, goosefoots, buttercups and seeds of the daisy and carrot families.

N.B. For key to letter codes used in the charred plant remains tables see note under *Plant remains* in *Materials and Methodology* section, above.

Early Romano-British

Two samples from early Romano-British ditch 550538 were analysed. In addition to unidentifiable cereal grains, barley grains are present, but not in large quantities. Wheat and spelt wheat are both present, with the number of glume bases exceeding the number of grains present in each instance. Other remains include buttercups, docks, numerous trefoils/medicks/clovers and vetches, garden pea, broad bean, hemlock and flax, as well as other common wild taxa such as sedges and red bartsia. Grass seeds are common, and include rye grass/fescue and meadow grass/cat's tails, as well as oats and bromes.

Table 8.25 Charred plant remains from Romano-British ditch 550508 (part 1: slots 550122, 550400, 550409) at Six Hundreds Drove

Slot			550122	550400	550400	550409	550409	550409
Context			550120	550447	550448	550410	550411	550423
Sample			550015	550063	550064	550029	550030	550041
Sample volume (l)			36	2	2	7	6	24
Flot volume (ml)			300	15	300	15	10	15
Subsample			6.25%	-	-	-	-	-
Bioturbation proxies			<1%, S (A*), U (A**)	<1%, U (A**)	<1%, U (C)	<1%, S (B), U (A*)	<1%, S (B), U (A*)	<1%, S (C), U (A*), E, I
Fragmentation index (MNI/NR)			0.70	0.38	0.51	0.61	0.58	0.49
Density (MNI/l)			8.97	15.00	393.33	19.00	15.50	2.13
Scientific name	*Common name*	*Plant part*						
Cereals								
Hordeum vulgare sl.	Barley	grain	10	1	24	11	22	18
Hordeum vulgare sl.	Barley	rachis segment	3	-	4	-	-	-
Triticum aestivum/ turgidum	Naked wheat	grain	3	-	-	-	-	-
Triticum cf. *turgidum*	Rivet wheat	rachis internode	2	-	-	-	-	-
Triticum spelta	Spelt	grain	2	1	132	1	2	1
Triticum spelta	Spelt	spikelet fork	23	3	46	10	5	4
Triticum spelta/ dicoccum	Emmer/spelt	grain	2	-	-	-	1	-
Triticum dicoccum	Emmer	grain	-	-	16	1	-	-
Triticum dicoccum	Emmer	spikelet fork	-	1	6	2	2	1
Triticum sp.	Wheat	grain	22	3	140	9	5	5
Triticum sp.	Wheat (hulled)	spikelet fork	95	12	80	27	29	5
Triticeae	Cereal	grain	11	3	120	13	5	11
Other wild plants								
Chenopodium sp.	Goosefoot	seed	4	-	-	-	1	-
Chenopodiaceae	Goosefoot family	seed	7	-	-	-	-	-
Stellaria sp.	Stitchwort	seed	2	-	-	-	-	-
Polygonum sp.	Knotgrass	seed	1	-	-	-	-	-
Polygonum aviculare	Knotgrass	seed	-	-	-	2	-	-
Rumex sp.	Docks/sorrel	seed	4	2	4	4	4	-
Polygonaceae	Knotgrass family	seed	-	-	-	1	-	-
Trifolieae	Trefoil/medick/clover	seed	1	-	-	2	-	-
Vicia/Lathyrus	Vetch/pea	seed	-	-	-	-	2	-
Vicieae	Vetch/grass pea	seed	4	1	-	2	3	-
cf. *Bupleurum* sp.	Hare's ear	seed	1	-	-	-	-	-
Odontites vernus	Red bartsia	seed	1	-	-	-	-	-
Anthemis cotula	Stinking mayweed	seed	3	-	-	-	-	-
Tripleurospermum inodorum	Scentless mayweed	seed	4	-	-	-	-	-
Asteraceae	Daisy family	seed	3	-	-	-	-	-
Eleocharis sp.	Spike-rush	seed	-	-	-	1	-	-
Cyperaceae	Sedge	seed	4	1	6	2	-	-
Lolium/Festuca	Rye grass/fescue	grain	8	1	-	-	3	-
Poa/Phleum	Meadow grass/cat's tail	grain	2	-	-	-	1	-
Bromus sp.	Brome	grain	63	-	-	13	3	3
Avena/Bromus	Oats/brome	grain	10	-	-	-	3	-
Danthonia decumbens	Heath-grass	grain	1	-	-	-	-	-
Poaceae	Grasses	grain	28	1	6	32	2	3
Poaceae	Grasses	culm fragments	A	-	A**	-	-	-
Indeterminata (charred)		seed	-	-	6	-	-	-
NR			**463**	**79**	**1164**	**218**	**161**	**104**
MNI			**324**	**30**	**590**	**133**	**93**	**51**

Table 8.26 Plant remains from Romano-British ditch 550508 (part 2: slots 550440, 550464) at Six Hundreds Drove

Slot			550440	550440	550440	550464	550464	550464	550464
Context			550441	550442	550443	550465	550466	550467	550494
Sample			550045	550044	550043	550067	550068	550069	550070
Sample volume (l)			25	30	6	7	28	20	31
Flot volume (ml)			25	35	160	300	3200	100	15
Subsample			-	-	50%; 25% cereals	12.50%	6.25%; 3.13% cereals	25% cereals	-
Bioturbation proxies			<1%, S (A), U (A*)	<1%, S (A), U (A*)	<1%, S (A), U (A*)	<1%, U (A*)	<1%, U (A*)	<1%, S (A), U (A**)	<1%, S (C), U (A*), I
Fragmentation index (MNI/NR)			0.38	0.57	0.39	0.67	0.54	0.64	0.51
Density (MNI/l)			3.36	26.53	261.83	606.57	282.86	17.05	1.26
Scientific name	*Common name*	*Plant part*							
Cereals									
Hordeum vulgare sl.	Barley	grain	23	12	46	136	960	168	21
Hordeum vulgare sl.	Barley	rachis segment	1	-	2	128	-	-	-
Triticum aestivum/ turgidum	Naked wheat	grain	-	-	-	56	6	-	-
Triticum spelta	Spelt	grain	6	10	60	40	544	4	1
Triticum spelta	Spelt	spikelet fork	2	133	237	220	64	1	-
Triticum spelta/ dicoccum	Emmer/spelt	grain	2	2	-	-	1056	-	-
Triticum dicoccum	Emmer	grain	2	-	-	-	1	-	-
Triticum dicoccum	Emmer	spikelet fork	1	2	-	-	-	-	-
Triticum sp.	Wheat	grain	9	87	350	164	3248	76	5
Triticum sp.	Wheat (hulled)	spikelet fork	12	248	245	640	200	15	-
Triticeae	Cereal	grain	23	54	446	206	1558	38	11
Fruits									
Corylus avellana	Hazel	nut	-	-	-	1	-	-	-
Other wild plants									
Ranunculus sp.	Buttercup	seed	-	-	-	8	-	1	-
Ranunculus acris/ bulbosus/repens	Meadow/bulbous/ creeping Buttercup	seed	-	2	2	-	16	-	-
Chenopodium sp.	Goosefoot	seed	-	7	8	-	-	1	-
Chenopodiaceae	Goosefoot family	seed	-	7	22	80	32	1	-
Stellaria sp.	Stitchwort	seed	-	-	-	16	-	-	-
Polygonum sp.	Knotgrass	seed	-	1	-	-	-	-	-
Rumex sp.	Docks/sorrel	seed	-	40	6	136	16	6	-
Polygonaceae	Knotgrass family	seed	-	1	4	-	-	3	-
Trifolieae	Trefoil/medick /clover	seed	-	6	2	16	-	1	-
Vicia/Lathyrus	Vetch/pea	seed	-	-	10	-	-	-	-
Vicieae	Vetch/grass pea	seed	-	14	12	72	-	1	-
Bupleurum sp.	Hare's ear	seed	-	-	2	-	-	-	-
Apiaceae	Carrot family	seed	-	2	-	32	-	-	-
Odontites vernus	Red bartsia	seed	-	2	2	16	-	-	-
Galium cf. *aparine*	Cleavers	seed	-	-	2	-	-	-	-
Anthemis cotula	Stinking mayweed	seed	-	-	-	80	-	-	-
Tripleurospermum inodorum	Scentless mayweed	seed	-	20	-	48	-	-	-
Asteraceae	Daisy family	seed	-	7	2	32	-	1	-
Juncus sp.	Rush	seed	-	-	-	-	-	-	1
Eleocharis sp.	Spike-rush	seed	-	-	2	-	16	-	-
Carex sp.	Sedge	seed	-	2	2	-	16	1	-
Cyperaceae	Sedge	seed	-	4	6	40	16	1	-
Cyperaceae	Sedge	seed coat fragment	-	-	-	-	-	-	-
Lolium/Festuca	Rye grass/fescue	grain	-	14	22	336	-	4	-
Avena sp.	Oat	grain	-	-	-	120	-	-	-
Bromus sp.	Brome	grain	-	33	17	876	120	6	-
Avena/Bromus	Oats/brome	grain	-	6	4	288	-	5	-
Poaceae	Grasses	grain	3	80	58	459	51	7	-
Poaceae	Grasses	culm fragments	-	-	A	A**	A**	A**	C
NR			**224**	**1395**	**4068**	**6384**	**14615**	**534**	**76**
MNI			**84**	**796**	**1571**	**4246**	**7920**	**341**	**39**

Table 8.27 Plant remains from Romano-British ditch 550508 (part 3: slot 550402) at Six Hundreds Drove

Context			550403	550412	550452	550453	550487
Sample			550049	550050	550051	550053	550052
Sample volume (l)			11	11	2	14	26
Flot volume (ml)			750	60	100	15	35
Subsample			25%	-	50% cereal	-	-
Bioturbation proxies			<1%, E	<1%, S (A*), U (A*), E, I	<1%, E, I	<1%, S (A), U (A**), I	<1, U (C), E, I
Fragmentation index (MNI/NR)			0.62	0.55	0.83	0.46	0.50
Density (MNI/l)			74.45	30.27	79.50	5.64	0.50
Scientific name	*Common name*	*Plant part*					
Cereals							
Hordeum vulgare sl.	Barley	grain	368	30	99	6	3
Triticum aestivum/ turgidum	Naked wheat	grain	8	-	-	-	-
Triticum spelta	Spelt	grain	16	4	6	-	1
Triticum spelta	Spelt	spikelet fork	-	32	1	10	-
Triticum dicoccum	Emmer	spikelet fork	-	-	-	1	-
Triticum sp.	Wheat	grain	208	76	20	5	2
Triticum sp.	Wheat (hulled)	spikelet fork	16	82	3	34	-
Triticeae	Cereal	grain	129	26	23	8	7
Fruits							
Corylus avellana	Hazel	nut	-	1	-	-	-
Other wild plants							
Chenopodiaceae	Goosefoot family	seed	-	4	-	1	-
Rumex sp.	Docks/sorrel	seed	8	1	1	3	-
Trifolieae	Trefoil/medick/clover	seed	-	2	-	-	-
Vicieae	Vetch/grass pea	seed	16	10	1	1	-
Odontites vernus	Red bartsia	seed	-	4	-	-	-
Galium cf. *aparine*	Cleavers	seed	-	1	-	-	-
Tripleurospermum inodorum	Scentless mayweed	seed	-	3	-	1	-
Asteraceae	Daisy family	seed	-	1	-	-	-
Cyperaceae	Sedge	seed	-	1	-	-	-
Lolium/Festuca	Rye grass/fescue	grain	-	3	-	1	-
Poa/Phleum	Meadow grass/cat's tail	grain	-	2	-	-	-
Avena sp.	Oat	grain	1	-	-	-	-
Bromus sp.	Brome	grain	24	27	-	5	-
Danthonia decumbens	Heath-grass	grain	16	-	-	-	-
Poaceae	Grasses	grain	9	23	-	3	-
Poaceae	Grasses	culm fragments	A*	A*	A**	A	C
NR			**1313**	**608**	**192**	**172**	**26**
MNI			**819**	**333**	**154**	**79**	**13**

Table 8.28 Charred plant remains analysis: results from Romano-British stakehole group 550528 (part 1) at Six Hundreds Drove

Feature			550427	550430	550434	550470	550472	550474	550478	550480
Context			550415	550418	550422	550471	550473	550475	550479	550481
Sample			550033	550036	550040	550072	550073	550074	550076	550077
Sample volume (l)			0.3	0.4	1	0.1	0.4	0.3	0.4	1
Flot volume (ml)			1	35	50	7	30	5	25	100
Bioturbation proxies			<1%, U (A)	<1, U (C)	<1%, U (B), E	<1%	<1%, S (C)	<1%	<1%	<1%
Fragmentation index (MNI/NR)			0.59	0.44	0.54	1.00	0.38	0.86	0.52	0.55
Density (MNI/l)			56.67	90.00	138.00	50.00	107.50	20.00	102.50	108.00
Scientific name	*Common name*	*Plant part*	-	-	-	-	-	-	-	-
Cereals										
Hordeum vulgare sl.	Barley	grain	-	10	21	-	8	1	9	8
Hordeum vulgare sl.	Barley	rachis segment	1	-	-	-	-	-	-	-
Triticum aestivum/ turgidum	Naked wheat	grain	-	-	-	-	-	-	-	2
Triticum spelta	Spelt	grain	-	4	-	1	2	1	11	-
Triticum spelta	Spelt	spikelet fork	1	-	1	-	1	-	-	-
Triticum spelta/ dicoccum	Emmer/spelt	grain	1	-	-	-	3	1	2	16
Triticum dicoccum	Emmer	grain	-	-	-	-	-	-	-	6
Triticum dicoccum	Emmer	spikelet fork	2	-	-	-	-	-	-	-
Triticum sp.	Wheat	grain	1	6	19	2	17	2	7	12
Triticum sp.	Wheat (hulled)	spikelet fork	4	-	2	-	1	-	1	-
Triticeae	Cereal	grain	1	14	21	2	9	1	10	10
Other wild plants										
Trifolieae	Trefoil/medick/clover	seed	-	-	-	-	-	-	1	-
Cyperaceae	Sedge	seed	-	-	1	-	-	-	-	-
Lolium/Festuca	Rye grass/fescue	grain	1	-	-	-	-	-	-	-
Avena sp.	Oat	grain	-	-	-	-	2	-	-	-
Bromus sp.	Brome	grain	-	-	3	-	-	-	-	-
Poaceae	Grasses	grain	1	2	1	-	-	-	-	-
Poaceae	Grasses	awn fragment	4	-	-	-	-	-	-	-
Poaceae	Grasses	culm fragments	-	C	A**	C	A**	A**	A**	-
NR			**29**	**81**	**128**	**5**	**114**	**7**	**79**	**99**
MNI			**17**	**36**	**69**	**5**	**43**	**6**	**41**	**54**

Table 8.29 Charred plant remains analysis: results from Romano-British stakehole group 550528 (part 2) at Six Hundreds Drove

Feature			550456	550458	550460	550468	550484	550488	550490
Context			550457	550459	550461	550469	550485	550489	550491
Sample			550056	550057	550058	550071	550059	550060	550061
Sample volume (l)			0.2	0.2	0.2	0.3	0.2	0.3	0.1
Flot volume (ml)			15	20	20	5	40	10	5
Bioturbation proxies			<1%	<1%	<1%	<1%, S (C), U (A), I	<1%	<1%	<1%
Fragmentation index (MNI/NR)			0.57	0.55	0.41	0.67	0.71	1.00	0.17
Density (MNI/l)			65.00	55.00	45.00	26.67	50.00	16.00	10.00
Scientific name	*Common name*	*Plant part*	-	-	-	-	-	-	-
Cereals									
Hordeum vulgare sl.	Barley	grain	7	5	1	-	5	-	-
Triticum spelta	Spelt	grain	-	2	2	1	-	2	-
Triticum spelta	Spelt	spikelet fork	1	1	-	-	-	-	-
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	1	-	1	-	-	-
Triticum dicoccum	Emmer	grain	-	-	1	-	-	-	-
Triticum sp.	Wheat	grain	-	-	2	1	1	-	-
Triticum sp.	Wheat (hulled)	spikelet fork	1	-	1	-	1	-	-
Triticeae	Cereal	grain	3	2	2	3	3	1	1
Other wild plants									
Fallopia convolvulus	Black bindweed	seed	1	-	-	-	-	-	-
Lithospermum arvense	Field gromwell	achene	-	-	-	-	-	1	-
Poaceae	Grasses	grain	-	-	-	2	-	-	-
Poaceae	Grasses	culm fragments	A*	-	A**	A**	A**	A**	A**
NR			**23**	**20**	**22**	**12**	**14**	**4**	**6**
MNI			**13**	**11**	**9**	**8**	**10**	**4**	**1**

Table 8.30 Charred plant remains analysis: results from Romano-British ditches 550532 and 550533 at Six Hundreds Drove

Feature			550201	550383
Context			550205	550384
Group			550532	550533
Sample			550016	550042
Sample volume (l)			33	35
Flot volume (ml)			25	60
Bioturbation proxies			60%, S (A*), U (A*), I	<1%, S (B), U (A**), E, I
Fragmentation index (MNI/NR)			0.64	0.62
Density (MNI/l)			6.27	18.37
Scientific name	*Common name*	*Plant part*		
Cereals				
Hordeum vulgare sl.	Barley	grain	10	8
Triticum spelta	Spelt	grain	30	6
Triticum spelta	Spelt	spikelet fork	2	26
Triticum dicoccum	Emmer	spikelet fork	-	1
Triticum sp.	Wheat	grain	14	101
Triticum sp.	Wheat (hulled)	spikelet fork	4	40
Triticeae	Cereal	grain	34	76
Other crops				
Pisum sativum	Garden pea	seed	2	-
Other wild plants				
Ranunculus sp.	Buttercup	seed	-	2
Ranunculus acris/ bulbosus/repens	Meadow/bulbous/ creeping buttercup	seed	-	3
Chenopodium sp.	Goosefoot	seed	2	4
Chenopodiaceae	Goosefoot family	seed	-	16
Fallopia convolvulus	Black bindweed	seed	4	-
Rumex sp.	Docks/sorrel	seed	6	16
Rumex acetosella	Sheep's sorrel	seed	2	2
Polygonaceae	Knotgrass family	seed	5	8
Trifolieae	Trefoil/medick/clover	seed	13	76
Vicia/Lathyrus	Vetch/pea	seed	-	3
Vicia sp.	Vetch	seed	1	-
Vicia faba	Broad bean	seed	-	1
Vicieae	Vetch/grass pea	seed	8	117
Scandix pecten-veneris	Shepherd's needle	seed	2	-
Apiaceae	Carrot family	seed	-	4
Plantago lanceolata	Ribwort plantain	seed	-	14
Odontites vernus	Red bartsia	seed	-	15
Galium cf. *aparine*	Cleavers	seed	-	4
Galium sp.	Cleavers/bedstraw	seed	-	2
Tripleurospermum inodorum	Scentless mayweed	seed	-	5
Asteraceae	Daisy family	seed	-	7
Eleocharis sp.	Spike-rush	seed	1	-
Carex sp.	Sedge	seed	4	10
Cyperaceae	Sedge	seed	4	17
Lolium/Festuca	Rye grass/fescue	grain	25	6
Poa/Phleum	Meadow grass/cat's tail	grain	7	5
Bromus sp.	Brome	grain	21	8
Poaceae	Grasses	grain	6	38
Poaceae	Grasses	culm fragments	-	C
NR			**322**	**1041**
MNI			**207**	**641**

Table 8.31 Charred plant remains analysis: results from early Romano-British ditch 550538 at Six Hundreds Drove

Feature			550193	550242
Context			550194	550243
Sample			550021	550022
Sample volume (l)			32	32
Flot volume (ml)			200	55
Bioturbation proxies			10%, U (A*), E, I, S (C)	20%, U (A), I, E
Fragmentation index (MNI/NR)			0.62	0.74
Density (MNI/l)			1.22	12.94
Scientific name	*Common name*	*Plant part*	-	-
Cereals				
Hordeum vulgare sl.	Barley	grain	6	12
Hordeum vulgare sl.	Barley	rachis segment	-	1
Triticum spelta	Spelt	grain	-	1
Triticum spelta	Spelt	spikelet fork	2	13
Triticum spelta/ dicoccum	Emmer/spelt	grain	-	3
Triticum sp.	Wheat	grain	5	17
Triticum sp.	Wheat (hulled)	spikelet fork	3	35
Triticeae	Cereal	grain	6	24
Other crops				
Pisum sativum	Garden pea	seed	-	1
Vicia faba	Broad bean	seed	-	1
Linum usitatissimum	Flax	seed	1	-
Other wild plants				
Ranunculus sp.	Buttercups	seed	-	1
Rumex sp.	Docks	seed	1	2
Trifolieae	Trefoils/medicks/clovers	seed	7	212
Vicieae	Vetch tribe	seed	3	16
Conium maculatum	Hemlock	seed	-	2
Plantago lanceolata	Ribwort plantain	seed	-	1
Odontites vernus	Red bartsia	seed	-	5
Eleocharis sp.	Spike-rushes	seed	-	2
Cyperaceae	Sedges	seed	2	2
Lolium/Festuca	Rye grasses/fescues	grain	-	5
Poa/Phleum	Meadow grass/cat's tail	grain	-	7
Avena sp.	Oats	grain	-	1
Bromus sp.	Bromes	grain	1	27
Avena/Bromus	Oats/bromes	grain	-	6
Poaceae	Grasses	grain	2	17
Poaceae	Grasses	culm fragments	C	C
NR			**63**	**561**
MNI			**39**	**414**

Wood charcoal

Over 2000 wood charcoal fragments were examined as part of the programme of assessment and analysis. The taxa identified are outlined in Table 8.32, with accompanying notes on the identifications.

All of the taxa identified are either native to Britain, or the identification categories include native species (e.g., plum is an introduced species, although it cannot be separated from blackthorn). An exception to this is spruce (*Picea* sp.), a non-native conifer species, which was recorded in significant quantities in Romano-British features at Six Hundreds Drove. It is difficult to securely distinguish the wood of larch and spruce, although the wood anatomy was generally consistent with a spruce species (Table 8.32). The most likely species is Norway spruce (*P. abies*) which has a natural distribution which extends over central Europe in mountainous areas, and across large areas of northern and eastern Europe (Hather 2000).

Preservation conditions were found to be highly variable across different areas of the scheme. In many cases, wood charcoal occured in low concentrations and the fragments are highly friable and mineral-coated, probably reflecting widely fluctuating

moisture levels in the features sampled and/or localised variations in burial conditions. In particular, wood charcoal preservation was often particularly poor at sites situated on the Fen-edge and in the Lymn Valley, and consequently a large number of the charcoal fragments in these areas could not be securely identified. In comparison, wood charcoal recovered from sites in the Lincolnshire Marsh, Fens and Wolds areas tended to be better preserved, although preservation conditions within these areas still varied considerably. Because of the poor condition of the wood charcoal, it was difficult to accurately record features such as growth ring curvature and other characteristics (e.g., number of growth rings, radial cracking, insect holes, fungal degradation etc.).

Table 8.32 Taxa identified in the wood charcoal assemblage, with notes on the identifications

Scientific name	*Name used in text*	*Comments*
Acer campestre	Field maple	Sole native species
Alnus glutinosa	Alder	Sole native species
Alnus/Corylus	Alder/hazel	Identification category used where poor preservation prevented a distinction between *A. glutinosa* (alder) and *C. avellana* (hazel)
Betula sp.	Birch	The two native tree species, *B. pubescens* (downy birch) and *B. pendula* (silver birch), cannot be distinguished through their wood anatomy
Betula/Alnus	Birch/alder	Identification category used where poor preservation prevented a distinction between *A. glutinosa* (alder) and *Betula* sp. (birches)
Calluna vulgaris	Heather	*C. vulgaris* (heather) is the most likely species. However, a secure distinction from *Erica* sp. (heaths) and other species within the Ericaceae (heather family) group is difficult for small stems
Cornus sanguinea	Dogwood	Sole native species
Cornus/Viburnum sp.	Dogwood/viburnum	Identification category used where poor preservation prevented a distinction between *C. sanguinea* (dogwood) and *Viburnum* sp. (viburnums)
Corylus avellana	Hazel	Sole native species
Fraxinus excelsior	Ash	Sole native species
cf. *Picea* sp.	Spruce	Non-native species. Difficult to securely distinguish from *Larix* sp. (larches). The wood anatomy was consistent with *Picea* sp: transition between the earlywood and latewood was gradual, the pits observed in the longitudinal ray tracheids were uniseriate (*cf.* Schweingruber 1990)
Maloideae	Hawthorn-type	This subfamily includes a range of native species which cannot be securely distinguished from their wood anatomy, including *Malus* sp. (apples), *Pyrus* sp. (pears), *Crataegus* sp. (hawthorns), and *Sorbus* spp. (whitebeams).
Prunus sp.	Cherry	Includes the native species *P. padus* (Bird cherry), *P. avium* (Wild cherry), and *P. spinosa* (Blackthorn), as well as plum (*P. domestica*), which is an archaeophyte. No distinction has been made between these species where fragments were too small or poorly preserved to be accurately identified to species level
Prunus cf. *spinosa*	Blackthorn	It is not possible to distinguish *P. spinosa* (blackthorn) and *P. domestica* (plum). The latter is considered to be an archaeophyte. It is possible that plum is present at some of the sites
Quercus sp.	Oak	The two native oak species, *Q. robur* (pedunculate oak) and *Q. petraea* (sessile oak), cannot be distinguished from their wood anatomy. All identifications of oak refer to the native deciduous species
Salix/Populus sp.	Willow/poplar	Difficult to distinguish *Salix* spp. (willows) and *Populus* spp. (poplars) through wood anatomy
Salix sp.	Willow	Distinguished from *Populus* spp. (poplars) by the presence of heterogenous ray cells
Sambucus nigra	Elder	Sole native species

The sections below outline the results by area and period, combining the evidence from both the assessment and the analysis.

Lincolnshire Marsh

Sea Bank Farm

Romano-British

Wood charcoal was examined in four samples taken from a palaeochannel/alluvium (Table 8.33). All contain very small quantities of highly fragmented (<4 mm) wood charcoal, with evidence for

oak and ash. Most the fragments appear to derive from stemwood. There are a few unidentified fragments of other taxa.

White Crofts

Romano-British
Samples from ditch 301410 and pit 300383 contain small to moderate quantities of wood charcoal which predominantly derives from oak, including both roundwood and stemwood (Table 8.34). Willow/poplar charcoal is present in the sample from ditch 301410, while two pits (3064, 3077) contain very small quantities of poorly preserved wood charcoal (oak, cherry).

Table 8.33 Wood charcoal from the Romano-British palaeochannel (200200) at Sea Bank Farm

Context	200046/4	200044	200044	200044
Sample	2.3	2.4	2.5	2.6
Sample vol. (l)	6	7	7	7
Wood charcoal vol. >2 mm (ml)	5	4	1	2
Fraxinus excelsior (ash)	(+)	-	-	(+)
Quercus sp. (oak)	(+)	(+)	(+)	(+)

Key: '(+)' = present, not quantified

Table 8.34 Wood charcoal from White Crofts

Phase	MRB	RB	RB	RB
Feature type	Ditch	Pit	Pit	Pit
Group	301410	-	-	-
Feature	301111	300383	3064	3077
Context	301112	300384	3062	3075
Sample	39	52	82	83
Sample vol. (l)	15	18	32	14
Wood charcoal vol. >2 mm (ml)	15	60	3	3
Prunus sp. (cherry)	-	-	-	(+)
Quercus sp. (oak)	++	++	(+)	(+)
Salix/Populus sp. (willow/poplar)	(+)	-	-	-

Key: '(+)' = present, not quantified; '++' = common

Lincolnshire Marsh/Wolds margin

Ailby Lane

Middle to Late Bronze Age
A single sample from pit 401016 contains extremely poorly preserved (heavily mineral-coated) fragments. Many of the fragments are unidentifiable, although most of the charcoal appears to derive from oak (stemwood). A charred hazel nutshell fragment from this feature was radiocarbon dated to the Middle to Late Bronze Age, *1215–1055 cal. BC* (UBA-52870; 2943±29 BP).

Late Iron Age
One sample was examined from pit 400099, part of pit group 413000 (Table 8.35). The feature contains a small quantity of well-preserved wood charcoal (stemwood, roundwood, twigs), with evidence for hazel, ash, hawthorn-type, cherry, oak, willow/poplar and heather. A Late Iron Age date was obtained on a hawthorn-type twig from one of the pits (FTMC-MB96-5; 2045±30 BP; *90 cal. BC–cal. AD 25*). Two further samples from ditches (409000, 402000) contain very low concentrations of wood charcoal (oak, alder, cherry, hawthorn-type).

Early–middle Romano-British
One sample was examined from ditch 416000, which formed part of a recut/extension to an 'L'-shaped enclosure. The sample contains very low concentrations of wood charcoal, with evidence for oak, field maple and other (unidentified) taxa.

Anglo-Saxon

A large and well-preserved assemblage of wood charcoal was recovered from sunken-featured building 411000 (Table 8.35). The main taxa present are field maple, cherry (probably blackthorn) and hazel. There are occasional fragments of other taxa, including elder, hawthorn-type, willow/poplar and oak. Notably, oak is only represented by a single small fragment of stemwood. Several pieces of charcoal have oblique cut marks, indicating that they have been lopped. In addition, there are occasional insect holes in the fragments; these may reflect the presence of deadwood or structural wood. Some of the wood charcoal within this feature may be residual from earlier activity in the Late Iron Age/early Romano-British period (see López-Dóriga above).

Table 8.35 Wood charcoal from Ailby Lane

Phase	MBA–LBA	LIA	LIA–ERB	LIA–ERB	ERB–MRB	AS
Feature type	Pit	Pit	Ditch	Ditch	Ditch	SFB
Group	-	413000	409000	402000	416000	411000
Feature	401016	400099	400012	400049	400032	400028
Context	401018	400101	400014	400027	400026	400029
Sample	401001	400011	400001	400005	400003	400002
Sample vol. (l)	20	9	26	25	23	243
Wood charcoal vol. >2 mm (ml)	40	15	3	15	70	1000
Acer campestre (field maple)	-	-	-	-	(+)	24
Alnus glutinosa (alder)	-	-	(+)	-	-	-
Calluna vulgaris (heather)	-	2	-	-	-	-
Corylus avellana (hazel)	-	1	-	-	-	17
Fraxinus excelsior (ash)	-	1	-	-	-	23
Maloideae (hawthorn-type)	-	8	-	(+)	-	9
Prunus sp. (cherry)	-	-	-	(+)	-	-
Prunus cf. *domestica/spinosa* (blackthorn)	-	1	-	-	-	18
Quercus sp. (oak)	15	10	(+)	(+)	(+)	1
Salix/Populus sp. (willow/poplar)	-	-	-	-	-	5
Sambucus nigra (elder)	-	-	-	-	-	3
Indeterminate – broadleaved sp.	9	2	-	-	-	-
Indeterminate – bark	1	-	-	-	-	-
Totals	25	25	n/a	n/a	n/a	100

Key: '(+)' = present, not quantified

Wolds

Sutterby Field

One sample from ditch 700295 produced a wheat grain radiocarbon dated to the Middle–Late Iron Age, *115–20 cal. BC* (UBA-52884, 2149±27 BP). The sample contains very low concentrations of highly fragmented charcoal, with evidence for oak and hazel (Table 8.36). In addition, there are several twigs of either dogwood or viburnum.

Other features sampled in this area also contain very low concentrations of wood charcoal, including a ditch (700302) and two pits (700024, 700171). The wood charcoal primarily derives from oak and ash, although there are occasional fragments of other taxa (hawthorn-type, field maple).

Pitchmoor

Wood charcoal was examined from a small number of features in this site, although the phasing is uncertain in some cases (Table 8.37). Two samples from a possible Early to Middle Iron Age four-post structure (350100) contain oak charcoal, including the possible remains of a charred oak post in one case (posthole 350097). A further sample from a prehistoric posthole (350019) also contains frequent oak charcoal.

Table 8.36 Wood charcoal from Sutterby Field

Phase	PRE	MIA–LIA	LIA	LIA
Feature type	Pit	Ditch	Pit	Ditch
Group	-	700295	-	700302
Feature	700171	700255	700024	700229
Context	700170	700256	700025	700230
Sample	700003	700017	700001	700007
Sample vol. (l)	34	30	31	31
Wood charcoal vol. >2 mm (ml)	2	3	2	1
Acer campestre (field maple)	-	-	-	(+)
Cornus sanguinea/Viburnum (dogwood/viburnums)	-	6	-	-
Corylus avellana (hazel)	-	6	-	-
Fraxinus excelsior (ash)	++	-	(+)	-
Maloideae (hawthorn-type)	-	-	-	(+)
Quercus sp. (oak)	-	8	(+)	(+)
Indeterminate – broadleaved sp.	-	5	-	-
Totals	n/a	25	n/a	n/a

Key: '(+)' = present, not quantified; '++' = common

Table 8.37 Wood charcoal from Pitchmoor

Phase	EIA–MIA	EIA–MIA	PRE	-	-
Feature type	Posthole	Posthole	Posthole	Pit	Posthole
Group	350100	350100	-	-	350190
Feature	350094	350097	350019	350127	350170
Context	350096	350099	350020	350128	350171
Sample	350002	350003	350021	350011	350008
Sample vol. (l)	6	13	10	11	10
Wood charcoal vol. >2 mm (ml)	3	40	60	3	35
Corylus avellana (hazel)	-	-	-	-	1
Prunus sp. (cherry)	-	-	-	(+)	-
Quercus sp. (oak)	(+)	++	25	(+)	23
Salix/Populus sp. (willow/poplar)	-	-	-	-	1
Totals	n/a	n/a	25	n/a	25

Key: '(+)' = present, not quantified; '++' = common

Walk Hill

Early Neolithic

Wood charcoal was examined from three pits (800332, 800476, 800478) which formed part of a group of features (800480) in the east of the site (Table 8.38). The samples contained small to moderate quantities of wood charcoal, although the material is quite highly fragmented (<4 mm). All of the samples are broadly similar in composition, and most of the wood charcoal derives from hazel stemwood and roundwood (60–80%). Some of the hazel fragments display evidence for insect degradation (small circular holes or voids), probably reflecting the use of deadwood as fuel. Other taxa identified include blackthorn, hawthorn-type, ash, oak and elm. The fragments of hawthorn-type charcoal are likely to derive from either apple or pear since charred apple/pear fruit fragments were recovered from pit 800476.

Table 8.38 Wood charcoal from Walk Hill (Early Neolithic)

Feature type	Pit	Pit	Pit
Feature	800332	800476	800478
Context	800333	800477	800479
Sample	800062	800078	800098
Sample vol. (l)	32	12	29
Wood charcoal vol. >2 mm (ml)	5	35	50
Corylus avellana (hazel)	17	20	15
Fraxinus excelsior (ash)	2	-	-
Maloideae (hawthorn-type)	1	-	6
Prunus cf. *spinosa* (blackthorn)	5	4	3
Quercus sp. (oak)	-	1	-
Ulmus sp. (elms)	-	-	1
Totals	25	25	25

Phase	IA	IA	IA	IA	LRB	LRB	LRB	LRB	LRB	LRB	LRB	LRB	LRB	LRB
Feature type	Posthole	Posthole	Posthole	Posthole	Ditch	Crop-dryer	Crop-dryer	Crop-dryer	Pit	Pit	Ditch	Crop-dryer	Pit	Ditch
Group	800081	800233	800455	800455	-	-	-	-	-	-	800496	-	-	800497
Feature	800083	800204	800451	800453	800389	800089	800089	800089	800038	800407	800464	800465	800382	800474
Context	800084	800205	800452	800454	800390	800153	800090	800231	800039	800408	800010	800467	800384	800475
Sample	800015	800046	800075	800076	800067	800037	800045	800092	800050	800057	800077	800080	800066	800081
Sample vol. (l)	32	32	15	10	38	31	31	8	15	28	28	28	36	32
Wood charcoal vol. >2 mm (ml)	4	5	25	30	3	30	20	20	5	3	<1	<1	1	1
Alnus glutinosa (alder)	-	-	-	-	-	-	-	-	-	-	-	-	-	(+)
Betula sp. (birch)	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Calluna vulgaris (heather)	-	-	-	-	7	-	-	-	5	1	(+)	(+)	(+)	(+)
Cornus sanguinea (dogwood)	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Corylus avellana (hazel)	2	2	-	-	2	1	11	3	2	5	-	-	-	-
Fraxinus excelsior (ash)	-	-	-	-	1	20	17	22	-	-	-	-	-	-
Maloideae (hawthorn-type)	-	6	-	-	1	-	-	-	-	2	-	-	-	-
Prunus sp. (cherry)	5	4	-	-	3	-	1	-	7	1	(+)	(+)	-	(+)
Prunus cf. *spinosa* (blackthorn)	-	-	-	-	-	1	-	-	-	2	-	-	-	-
Quercus sp. (oak)	15	11	++	++	7	1	21	-	7	5	(+)	(+)	(+)	(+)
Salix/Populus sp. (willow/poplars)	-	-	-	-	1	1	-	-	1	3	-	-	-	-
Sambucus nigra (elder)	-	-	-	-	-	-	-	-	3	-	-	-	-	-
Ulmus sp. (elm)	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeterminate – broadleaved sp.	1	1	-	-	3	-	-	-	-	5	-	-	-	-
Totals	24	24	n/a	n/a	25	25	50	25	25	25	n/a	n/a	n/a	n/a

Key: '(+)' = present, not quantified; '++' = common

Table 8.39 Wood charcoal from Walk Hill (Iron Age and Romano-British)

Iron Age

Wood charcoal was examined from two four-post structures (800081, 800233) and a further probable four-post structure (800455). These structures are poorly dated, although they are considered to be Iron Age in date. The samples typically contain small quantities of poorly preserved oak charcoal, including fragments of both stemwood and roundwood (Table 8.39). Some of the samples also contain frequent fragments of other taxa, including hazel, hawthorn-type, cherry and elm. The presence of elm charcoal in both the Early Neolithic and Iron Age features at this site is notable; there is a possibility that some of the wood charcoal has been reworked (intrusive or residual). This was the only Viking Link site from which elm charcoal was recovered.

Romano-British

Samples were examined from a range of features at this site, including crop-dryers, pits and ditches (Table 8.39). The wood charcoal is generally very well preserved, and a wide range of taxa are present, including ash, oak, alder, hazel, birch, heather, hawthorn-type, dogwood, willow/poplar,

elder and cherry. It was rarely possible to identify the cherry fragments beyond the level of genus, although blackthorn was noted in some cases. The analysis results from selected samples are outlined in Figure 8.5.

The three samples from crop-dryer 800089 contain small quantities of well-preserved wood charcoal, including some large (>10 mm) fragments. Most of the charcoal derives from oak and ash, although there is also evidence for dogwood, hazel, cherry/blackthorn and willow/poplar. Some of the ash fragments have clear diagonal cut marks, probably caused by an axe or another woodworking tool during branch lopping or tree felling. There is very little wood charcoal in the other crop-dryer (800465), and the fragments derive from oak, cherry and heather. A wide range of taxa are present in the other features sampled at the site (e.g., pit 800407, ditch 800389).

Lymn Valley

Cheals Close

Anglo-Saxon

Wood charcoal was examined from two post-built structures and a small number of other features (Table 8.40). All of the samples contained low to moderate concentrations of poorly preserved wood charcoal, with heavy mineral-coating observed on the fragments. Despite the poor preservation, the wood charcoal assemblage is relatively diverse in composition, with evidence for oak, ash, cherry (including blackthorn), hawthorn-type, hazel, alder/hazel and birch. In some cases, oak heartwood forms a significant component of the identified material (e.g., posthole 180187 in structure 3).

A further sample from possible Anglo-Saxon or medieval gully 180280 contains a large quantity of hazel roundwood (90%). It is possible that this material derives from coppiced stems, based on the diameter of the fragments. In comparison to other samples from this site, the wood charcoal from gully 180280 is particularly well preserved, perhaps further indicating that this feature dated to a different period.

Figure 8.5 Wood charcoal identifications from selected Romano-British features at Walk Hill (assessed samples are not shown)

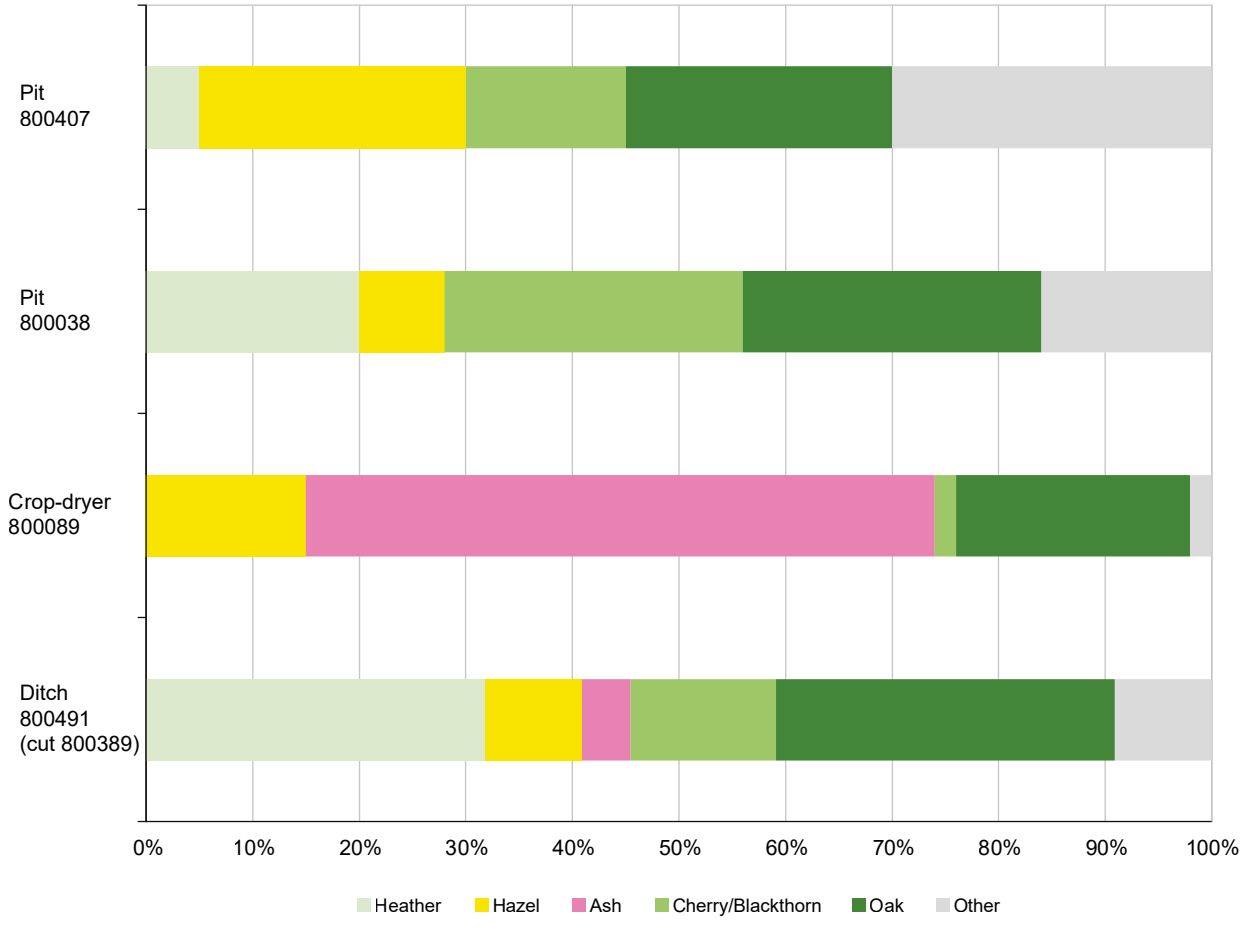


Table 8.40 Wood charcoal from Cheals Close

Phase	AS	AS	AS	AS	AS	AS	AS	AS/MED?
Feature type	Posthole (structure 3)	Posthole (structure 3)	Posthole (structure 3)	Posthole (structure 3)	Posthole (structure 3)	Posthole (structure 1)	Gully	Ditch
Group	180200	180200	180200	180200	180200	180484	180617	180280
Feature	180187	180189	180197	180199	180206	180299	180237	180278
Context	180188	180190	180198	180201	180207	180300	180238	180279
Sample	180004	180005	180009	180010	180013	180035	180021	180029
Sample vol. (l)	17	14	16	8	19	13	34	33
Wood charcoal vol. >2 mm (ml)	10	25	10	1	18	5	110	150
Alnus/Corylus (alder/hazel)	3	3	-	-	-	-	-	-
Betula sp. (birch)	-	-	-	-	(+)	-	-	-
Corylus avellana (hazel)	2	10	(+)	-	(+)	(+)	(+)	45
Fraxinus excelsior (ash)	-	4	-	-	-	-	-	-
Maloideae (hawthorn-type)	1	-	-	-	-	-	-	-
Prunus sp. (cherry)	1	-	-	(+)	-	-	(+)	-
Prunus cf. *spinosa* (blackthorn)	-	-	-	-	-	-	-	2
Quercus sp. (oak)	17	7	(+)	(+)	(+)	(+)	(+)	3
Indeterminate – broadleaved sp.	1	1	-	-	-	-	-	-
Totals	25	25	n/a	n/a	n/a	n/a	n/a	50

Key: '(+)' = present, not quantified

Fourteen Acres

Two samples from Mid- to Late Neolithic pit 370010 contain small to moderate quantities of wood charcoal, although the fragments are very poorly preserved and mineral-coated (Table 8.41). Most of the charcoal is from oak, and there are some fragments of heartwood. Other taxa include ash, alder and alder/hazel. The ash charcoal also derives from mature wood, and the growth rings are very narrow, suggesting very slow growth in poor or shaded conditions (e.g., unfavourable soils, cold weather, closed canopy woodland).

Raithby Lane

Nine samples were examined from a series of Romano-British ditches. In general, the concentration of wood charcoal in the samples is very low and the fragments are poorly preserved (Table 8.42). However, the sample collected from ditch 380055 contains abundant wood charcoal which is better preserved. A wide range of taxa are present in the assemblage from the site, with evidence for alder, hazel, heather, ash, hawthorn-type, oak, willow/poplar and cherry (including blackthorn) (Fig. 8.6).

Table 8.41 Wood charcoal from Mid- to Late Neolithic pit 370010 at Fourteen Acres

Context	370011	370012
Sample	370002	370003
Sample vol. (l)	5	3
Wood charcoal vol. >2 mm (ml)	45	95
Alnus glutinosa (alder)	3	-
Alnus/Corylus (alder/hazel)	1	(+)
Fraxinus excelsior (ash)	4	(+)
Quercus sp. (oak)	15	(+)
Indeterminate – broadleaved sp.	2	-
Totals	25	n/a

Key: '(+)' = present, not quantified

Heather twigs are very common, particularly in the sample from ditch 380055. Approximately 76% of the wood charcoal in ditch 380055 derives from heather, and many of the fragments appear to be root/basal twigs. This suggests that heather charcoal largely derives from turves, as opposed to above-ground stems (*cf.* Hall 2003). It was difficult to accurately record the proportion of heather in the samples since the twigs are very small (<2 mm). A large heather twig from ditch 380055 was radiocarbon dated to cal. AD 240–400 (FTMC-MB96-2; 1747±29 BP).

Raithby Crossroads

One sample from ring gully 220115, probably a roundhouse, contains relatively well-preserved wood charcoal, with evidence for a range of taxa including alder, oak, ash, cherry and hazel (Table 8.43). This structure dates to the Middle Iron Age; however, there was also some residual Neolithic and Bronze Age material in the ring gullies. Consequently, it is possible that some

Table 8.42 Wood charcoal from Raithby Lane

Phase	RB	RB	RB	MRB–LRB	RB	RB	RB	RB
Feature type	Ditch	Ditch	Ditch	Ditch	Ditch	Ditch	Ditch	Ditch
Group	380253	380256	380259	-	-	-	380261	380254
Feature	380155	380064	380071	380055	380082	380082	380015	380208
Context	380156	380066	380073	380056	380083	380084	380016	380209
Sample	380010	380006	380002	380004	380007	380008	380009	380013
Sample vol. (l)	16	32	33	35	29	30	35	28
Wood charcoal vol. >2 mm (ml)	5	30	15	200	50	25	60	120
Alnus glutinosa (alder)	9	-	-	8	-	-	(+)	-
Alnus/Corylus (alder/hazel)	-	-	4	-	-	-	-	-
Betula/Alnus (birch/alder)	1	-	-	-	-	-	-	-
Calluna vulgaris (heather)	-	8	7	76	11	++	+++	++
Corylus avellana (hazel)	2	4	1	4	-	-	-	(+)
Fraxinus excelsior (ash)	2	3	-	1	2	-	-	(+)
Maloideae (hawthorn-type)	-	-	-	3	-	-	-	(+)
Prunus sp. (cherry)	3	-	6	-	-	-	-	-
Prunus cf. *spinosa* (blackthorn)	-	1	-	-	-	-	-	-
Quercus sp. (oak)	2	6	3	2	7	(+)	-	(+)
Salix/Populus sp. (willow/poplar)	6	3	2	6	3	(+)	-	-
Indeterminate – broadleaved sp.	-	-	2	-	2	-	-	-
Totals	25	25	25	100	25	n/a	n/a	n/a

Key: '(+)' = present, not quantified; '++' = common; '+++' = abundant

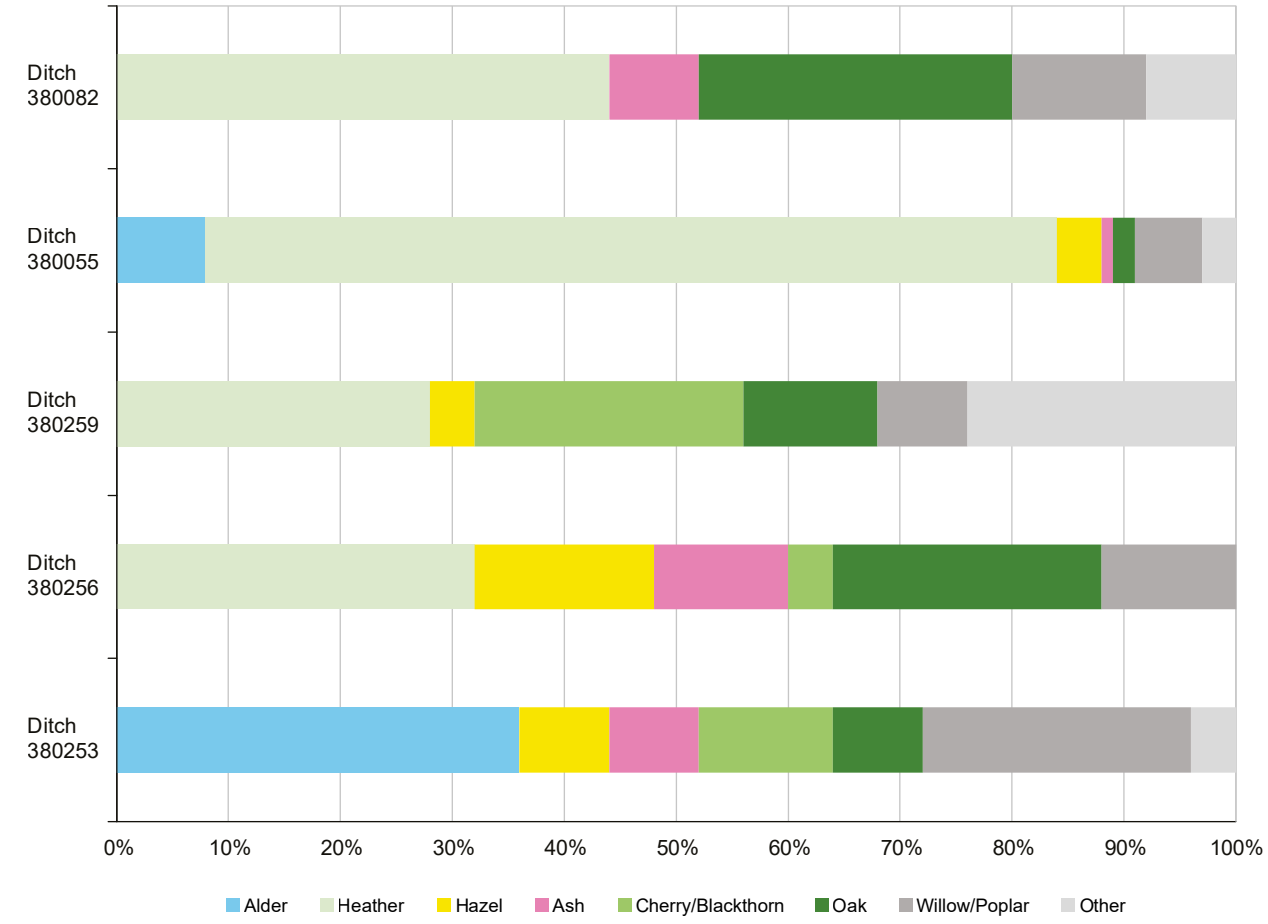


Figure 8.6 Wood charcoal identifications from selected Romano-British features at Raithby Lane

Table 8.43 Wood charcoal from Raithby Crossroads

Phase	MIA	PRE
Feature	Ring gully (roundhouse)	Ditch
Group	220115	-
Feature	220019	220064
Context	220020	220065
Sample	220003	220005
Sample vol. (l)	38	40
Wood charcoal vol. >2 mm (ml)	8	5
Alnus glutinosa (alder)	(+)	-
Corylus avellana (hazel)	(+)	(+)
Fraxinus excelsior (ash)	(+)	-
Prunus sp. (cherry)	(+)	(+)
Quercus sp. (oak)	(+)	(+)

Key: '(+)' = present, not quantified

Table 8.44 Wood charcoal from Wood Hill

Phase	LIA	LIA
Feature type	Ditch	Ditch
Group	120088	120088
Feature	120071	120059
Context	120069	120060
Sample	120006	120008
Sample vol. (l)	10	32
Wood charcoal vol. >2 mm (ml)	7	25
Acer campestre (field maple)	3	-
Alnus glutinosa (alder)	1	19
Corylus avellana (hazel)	1	-
Fraxinus excelsior (ash)	2	2
Maloideae (hawthorn-type)	-	1
Prunus sp. (cherry)	4	-
Quercus sp. (oak)	13	2
Salix/Populus sp. (willow/poplar)	1	1
Totals	25	25

of the wood charcoal is residual from earlier activity at the site. A sample from a further prehistoric curvilinear ditch (220064) contains a small quantity of wood charcoal (oak, cherry, hazel); it is possible that ditch 220064 is associated with the roundhouse.

Wood Hill

Two samples were examined from Late Iron Age ditch 120088 (slots 120071 and 120059, around 5 m apart). Both contain low concentrations of wood charcoal, although the fragments are generally very well preserved (Table 8.44). A wide range of taxa are present, including ash, hawthorn-type, oaks, willow/poplar, field maple, alder, hazel and cherry. The two samples differ in composition; alder is the dominant taxon in slot 120059, while the sample from slot 120071 is more mixed in character, with higher proportions of oak.

Fen-edge

Hagnaby Grange

Samples were assessed from a small number of Late Iron Age to early Romano-British features at this site, including a ring gully (400150), a gully (400561) and a pit (400559). The samples are similar in composition, and they contain low concentrations of poorly preserved wood charcoal which derives from oak, ash, cherry and alder (Table 8.45). In pit 400559, there were some relatively large (>10 mm) fragments of oak stemwood.

Magers Lane

Middle to Late Iron Age

One sample from pit 300086 contains a small quantity of wood charcoal which derives from a wide range of taxa, including field maple, alder/hazel, birch, heather, ash and oak (Table 8.46) The wood charcoal is highly fragmented, suggesting that it could have been exposed to weathering on the surface prior to burial.

Romano-British

A small quantity of poorly preserved (mineral-coated) wood charcoal was recovered from ditch 300149, containing evidence for oak, ash and willow/poplar (Table 8.46). Most of the charcoal derives from oak, and there are fragments of both roundwood and stemwood (including heartwood).

Back Lane

One bulk soil sample was assessed from ring ditch 410125 and found to contain a small quantity (65.9 g) of cremated human bone (Table 8.47). The sample contained abundant oak stemwood charcoal, although the fragments are in extremely poor condition. It was not possible to identify most of the fragments of wood charcoal because of their poor condition. A further sample from Anglo-Saxon ditch 410124 contained a small quantity of charcoal (oak, ash, alder/hazel, cherry).

Staunch Farm

Two samples from Middle to Late Iron Age ditch 310170, a large and finds-rich feature, contained small quantities of wood charcoal (Table 8.48). The wood charcoal fragments are relatively well preserved, and they derive from oak, birch, alder, ash, cherry and willow/poplar.

Table 8.45 Wood charcoal from Hagnaby Grange

Phase	LIA–ERB?	LIA–ERB	LIA–ERB	LIA–ERB	PRE?
Feature type	Pit	Gully	Gully (roundhouse?)	Pit	Pit
Group	-	400561	400150	400559	-
Feature	400036	400065	400047	400212	400106
Context	400037	400066	400048	400213	400108
Sample	400001	400006	400032	400039	400025
Sample vol. (l)	22	31	32	35	32
Wood charcoal vol. >2 mm (ml)	100	20	15	20	15
Alnus glutinosa (alder)	-	-	-	(+)	-
Fraxinus excelsior (ash)	-	(+)	(+)	(+)	-
Prunus sp. (cherry)	-	(+)	(+)	(+)	-
Quercus sp. (oak)	+++	(+)	(+)	++	(+)

Key: '(+)' = present, not quantified; '++' = common; '+++' = abundant

Table 8.46 Wood charcoal from Magers Lane

Phase	MIA–LIA	RB
Feature/deposit type	Pit	Ditch
Group	-	300149
Feature	300086	300140
Context	300087	300141
Sample	300006	300011
Sample vol. (l)	6	26
Wood charcoal vol. >2 mm (ml)	5	3
Acer campestre (field maple)	2	-
Alnus/Corylus (alder/hazel)	4	-
Betula sp. (birch)	2	-
Calluna vulgaris (heather)	1	-
Fraxinus excelsior (ash)	1	5
Quercus sp. (oak)	9	14
Salix/Populus sp. (willow/poplar)	-	2
Indeterminate – broadleaved sp.	6	4
Totals	25	25

Table 8.47 Wood charcoal from Back Lane

Phase	MBA	PRE
Feature/deposit type	Ring ditch/cremation-related deposit	Ditch
Group	410125	410124
Feature	410049	410033
Context	410050	410036
Sample	410004	410001
Sample vol. (l)	30	28
Wood charcoal vol. >2 mm (ml)	400	50
Alnus/Corylus (alder/hazel)	-	(+)
Fraxinus excelsior (ash)	-	(+)
Prunus sp. (cherry)	-	(+)
Quercus sp. (oak)	25	(+)
Totals	25	n/a

Key: '(+)' = present, not quantified

Table 8.48 Wood charcoal from Staunch Farm

Phase	MIA–LIA	MIA–LIA
Feature type	Ditch	Ditch
Group	310170	310170
Feature	310046	310049
Context	310047	310050
Sample	310002	310004
Sample vol. (l)	14	35
Wood charcoal vol. >2 mm (ml)	10	20
Alnus glutinosa (alder)	7	(+)
Betula sp. (birch)	3	(+)
Fraxinus excelsior (ash)	2	-
Prunus sp. (cherry)	-	(+)
Quercus sp. (oak)	6	(+)
Salix/Populus sp. (willow/poplar)	7	-
Totals	25	n/a

Key: '(+)' = present, not quantified

Fens

Mown Rakes

Cremation grave 540003 and pit 530132
Wood charcoal was examined from two Romano-British cremation-related features (Table 8.49). This included a pit (530132) which contained a small quantity of cremated human bone, and a cremation grave (540003) which contained an unurned burial. Both these features contain well-preserved wood charcoal (>10 mm fragments), and there are some clear similarities in the composition of the charcoal in the two deposits. All of the charcoal derives from alder and willow/poplar, with evidence for both roundwood and stemwood. Some of the fragments of willow/poplar are from sapwood (with bark), while the alder charcoal fragments display evidence for insect degradation (small holes/voids, charred frass). The similar characteristics of the charcoal in these two features may indicate that they are related to one another.

Saltmaking
Other features sampled in this area appear to be related to Late Iron Age–early Romano-British saltmaking. All of the samples are very similar in composition, and they contain small quantities of well-preserved wood charcoal which derives from alder and willow/poplar. A few fragments of ash charcoal are present in one sample.

Table 8.49 Wood charcoal from Mown Rakes

Phase	LIA–RB	LIA–RB	ERB–MRB	ERB–MRB	RB	RB	RB	RB	RB
Feature/deposit type	Pit	Pit	Cremation-related deposit	Cremation grave	Pit	Spread	Gully	Ditch	Ditch
Feature	530202	530238	530132	540003	520016	-	520153	520152	530069
Context	530203	530240	530133	540004	520017	520039	520089	520150	530072
Sample	530032	530030	530004	540001	520003	520008	520013	520017	530001
Sample vol. (l)	40	38	51	59	16	34	30	2	23
Wood charcoal vol. >2 mm (ml)	1	2	80	60	5	5	5	<1	5
Alnus glutinosa (alder)	(+)	-	18	42	-	(+)	-	(+)	(+)
Fraxinus excelsior (ash)	(+)	-	-	-	-	-	-	-	-
Salix/Populus sp. (willow/poplar)	-	(+)	29	4	(+)	++	++	(+)	(+)
Indeterminate – bark	-	-	3	4	-	-	-	-	-
Totals	n/a	n/a	50	50	n/a	n/a	n/a	n/a	n/a

Key: '(+)' = present, not quantified; '++' = common

Six Hundreds Drove
Wood charcoal was examined from a wide range of features dating to the earlier and later Romano-British period including ditches, pits, postholes and stakeholes (Table 8.50).

Earlier Romano-British (1st and 2nd centuries AD)
Samples from ditch 550538 contain very low concentrations of wood charcoal which is quite highly fragmented (<4 mm). The wood charcoal largely derives from alder and willow/poplar. It is likely that all of the willow/poplar charcoal derives from a willow species; the ray cells are distinctly heterogeneous, which is typical of willows, whereas the ray cells in poplars tend to be homogeneous.

Mid-/later Romano-British (2nd–3rd century AD)
An exceptional assemblage of wood charcoal was recovered from ditch 550508 (Fig. 8.7). The samples examined derived from four slots (550122, 550402, 550440, 550464) excavated across the feature, as well as a number of stakeholes (550528) found in the base and sides of the ditch.

Two of the samples from ditch slots 550402 and 550464 are particularly rich in wood charcoal, with around 1 litre recovered from ditch slot 550464. A wide range of taxa are present, including oak, ash, field maple, hawthorn-type, alder, hazel, elder and spruce. Most of the wood charcoal derives from ash and oak, although a significant quantity of spruce charcoal is present in one of the samples

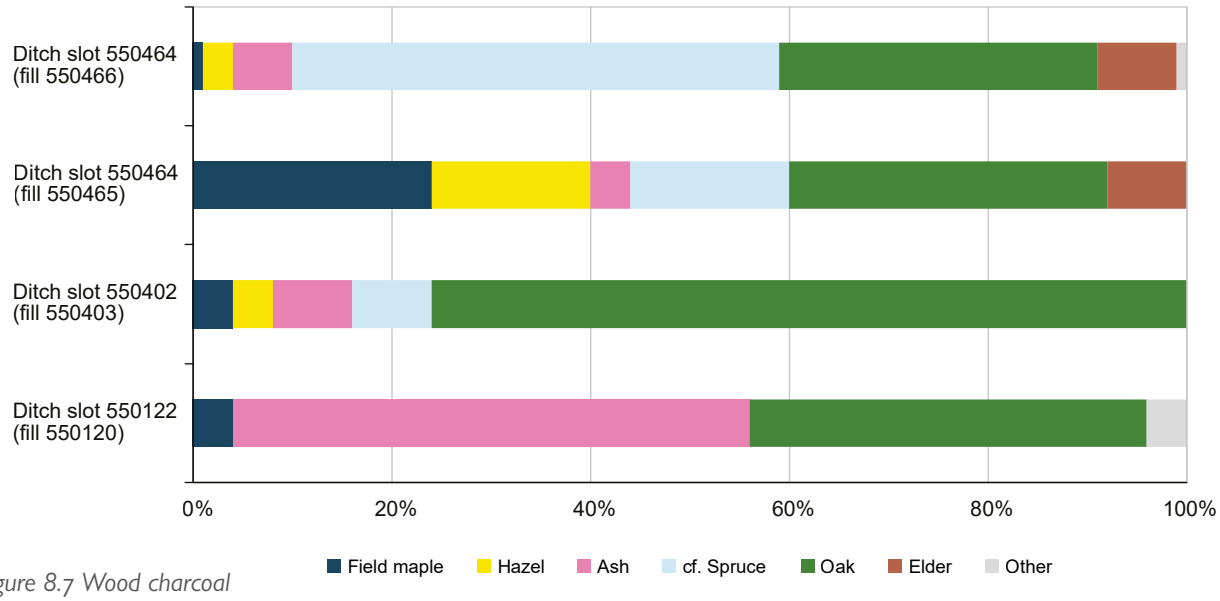


Figure 8.7 Wood charcoal identifications from ditch 550508 at Six Hundreds Drove

from the lower fill (550466) of ditch slot 550464. In comparison, spruce is rare in other samples from the ditch. A fragment of spruce charcoal was radiocarbon dated to the mid- to late Romano-British period, *cal. AD 170–250* (UBA-52953; 1816±27 BP).

The spruce charcoal is clearly concentrated within one area of the ditch, and it is likely that all of the fragments are from a single burnt timber. With the exception of one fragment of roundwood, all of the spruce charcoal derives from stemwood, and the fragments are often very large (>50 mm). Evidence for fungal degradation was often observed, and the fragments frequently had small holes or voids which were likely caused by a woodboring insect. Both of these factors suggest that the spruce charcoal derives from deadwood (or partially rotten wood). Given the proximity of the site to the former coastline, it is possible that the wood charcoal is from driftwood.

Some of the ash and oak fragments are exceptionally large. Oak stemwood fragments measuring over 50 mm in diameter are frequently present, and some of these clearly derive from worked wood. A small number of the oak fragments have 'squared-off' edges, suggesting they could be the remains of burnt structural timbers. Two large fragments of hazel stemwood in ditch slot 550464 also appear to have been worked.

Table 8.50 Wood charcoal from Six Hundreds Drove

Feature type	Ditch	Ditch	Ditch	Ditch	Ditch	Posthole	Ditch
Group	550508	550508	550508	550508	550508	550528	550538
Feature	550122	550402	550464	550464	550440	550434	550242
Context	550120	550403	550465	550466	550443	550422	550243
Sample	550015	550049	550067	550068	550043	550040	550022
Sample vol. (l)	36	11	7	28	6	0.5	32
Wood charcoal vol. >2 mm (ml)	70	400	130	1000	30	15	5
Acer campestre (field maple)	1	1	6	1	-	-	-
Alnus glutinosa (alder)	-	-	-	1	-	-	6
Corylus avellana (hazel)	-	1	4	3	(+)	-	-
Fraxinus excelsior (ash)	13	2	1	6	(+)	15	-
cf. *Picea* sp. (spruces)	-	2	4	49	-	-	-
Maloideae (hawthorn-type)	1	-	-	-	(+)	-	-
Quercus sp. (oak)	10	19	8	32	(+)	10	-
Salix/Populus sp. (willow/poplar)	-	-	-	-	(+)	-	16
Sambucus nigra (elder)	-	-	2	8	-	-	-
Indeterminate – broadleaved sp.	-	-	-	-	-	-	2
Indeterminate – bark	-	-	-	-	-	-	1
Totals	25	25	25	100	n/a	25	25

Key: '(+)' = present, not quantified; '++' = common

Other features
A few metres to the north-east of ditch 550508, one sample from pit 550344 similarly contains abundant, well-preserved wood charcoal, including numerous large fragments (>50 mm). There are some fragments of willow/poplar charcoal, but the sample was largely composed of ash and oak stemwood. Some of the oak and ash charcoal clearly derive from worked wood since the fragments have roughly square/rectangular edges. The wood charcoal recovered from pit 550344 and ditch 550508 is similar in character, and it is likely that these features were contemporary with one another. Other features sampled in this area (ditch 550383, pit 550106) contain low concentrations of wood charcoal which derived from willow/poplar and alder.

Pollen *by Tom Hill*
Pollen was found in limited abundance and diversity within the pond sequence at Mown Rakes in the Fens; abundance and floral diversity was found to vary between samples but was generally low: only one of the eight samples yielded sufficient pollen for assessment purposes, with grain corrosion commonplace (Table 8.51).

Only one of the eight pond samples returned a pollen count of >100TLP. Pollen presence was slightly better in the lower samples from within the sequence, with much more restricted assemblages encountered with height. The single sample in which pollen was relatively common was from 0.64–0.65 m below ground level – BGL – (530217), with the sample being dominated by herbs, typified by Poaceae (grasses) and *Plantago* undiff. (plantain), while Chenopodiaceae (goosefoots) and *Ranunculus* sp. (buttercup) were also common. Shrubs are restricted to *Corylus–Myrica* type (hazel or sweet-gale), while trees are represented by isolated grains of *Alnus* sp. (alder) and *Pinus* sp. (pine). Spores are rare, restricted to isolated spores of *Pteridium*, *Pteropsida* (monolete) undiff. (fern) and *Polypodium* (polypody). Aquatics, however, are relatively common, albeit only represented by *Myriophyllum* (water milfoil) and a single grain of *Sparganium emersum* type (bur-reed).

Although pollen is encountered in much lower numbers in the remaining samples, when present, a similar picture is evident, with herbs most common while shrub and tree pollen was found to be occasional or rare. Poaceae, Chenopodiaceae and *Plantago* undiff. appear most common with depth, while Lactuceae appears more common within the uppermost samples. However, the Lactuceae grains often appeared degraded, inferring potential biochemical alteration (but these could also be reworked older grains, commented on further below). Spores are typified by *Pteropsida* (monolete) undiff., which were super-abundant within sample 0.44–0.45 m BGL. Aquatics were present but relatively rare in the remaining samples, with *Myriophyllum* sp. and *Sparganium emersum* type most common, although a few grains of *Nymphaea* sp. (water lily) were observed with height.

Supporting microfossil evidence was relatively diverse. Charcoal was relatively common in most samples, as were pre-Quaternary pollen and spores, in addition to occasional dinoflagellate cysts in two samples towards the base of the sequence. Chlamydospores of cf. *Glomus* type were encountered in a number of samples, as were zygospores of *Mougeotia* sp. and occasional *Pediastrum* sp. *Thecaphora* sp. were also encountered on occasion. Grain degradation was also common, while most samples also contained grains displaying crumpling.

The single assessed sample (0.64–0.65 m) contained an assemblage suggesting an open landscape surrounding the feature, with some evidence of aquatic plants such as milfoils and bur-reed. While pollen was more restricted in the remaining samples, a similar picture is tentatively suggested. Supporting microfossil evidence includes *Mougeotia* and *Pediastrum*, which are also common in aquatic settings. The presence in relative abundance of pre-Quaternary pollen and spores, microcharcoal and *Glomus* sp. could infer the introduction of reworked sediments into the pond feature. The level of grain corrosion would also infer some post-depositional alteration, with many of the grains of Lactuceae encountered having exines that appeared amorphous/fused. This could either reinforce post-depositional alteration, or indicate that these grains are much older and are instead associated with the pre-Quaternary component of grains encountered.

Table 8.51 Pollen assessment results from pond 530220 in Mown Rakes

	Context	530219/530218					530217		530002
	Depth (mbgl)	0.15–0.16	0.25–0.26	0.35–0.36	0.44–0.45	0.47–0.48	0.54–0.55	0.64–0.65	0.73–0.74
	Alnus	-	-	-	1	-	1	1	4
	Betula	-	-	-	-	-	-	-	-
	Fraxinus	-	-	-	-	1	-	-	-
Trees	*Pinus*	-	3	1	4	1	3	2	4
	Quercus	-	-	-	-	1	-	-	1
	Tilia	-	-	-	-	-	-	-	1
	Ulmus	-	-	-	-	-	-	-	1
	Corylus–Myrica type	-	1	-	2	3	2	5	4
	Ericaceae undiff.	-	-	-	-	1	2	1	2
Shrubs	*Hedera helix*	-	-	-	-	-	-	-	-
	Ilex	-	-	-	-	-	-	-	-
	Salix	-	-	-	-	-	-	-	-
	Poaceae	-	1	2	7	13	15	39	15
	Poaceae >37µm	-	1	1	2	2	2	2	1
	Cyperaceae	-	1	1	6	1	4	2	2
	Apiaceae (Umbelliferae) undiff.	-	-	-	-	-	-	-	-
	Artemisia type	-	-	-	-	-	-	-	-
	Asteraceae	1	-	1	2	1	1	1	1
	Brassicaceae	-	1	-	-	-	-	-	-
	Caryophyllaceae	-	-	-	1	9	-	1	1
	Centaurea cyanus	-	-	-	-	-	-	-	-
	Centaurea nigra	-	-	-	-	-	-	-	-
	Chenopodiaceae	-	-	-	-	2	3	19	10
Herbs	*Cirsium* type	-	-	-	-	1	1	-	-
	Filipendula	-	-	-	-	-	-	-	-
	Hippophae	-	-	-	-	-	-	-	-
	Lactuceae	14	27	9	10	9	-	3	4
	Papaver	-	-	-	-	-	-	-	-
	Plantago undiff.	-	-	-	1	10	20	47	5
	Polygonum sp.	-	-	-	-	-	-	-	-
	Rubiaceae	-	-	-	-	-	-	-	-
	Ranunculus	-	-	-	-	-	2	9	-
	Rumex	-	-	-	-	-	-	-	-
	Thalictrum	-	-	-	-	-	-	-	-
	Urtica	-	-	-	-	-	-	-	-
	Dryopteris	-	-	-	-	-	-	-	-
	Polypodium	-	-	1	2	-	1	1	1
Spores	*Pteridium*	-	-	-	3	4	2	4	4
	Pteropsida (monolete) undiff.	3	22	63	655	15	4	1	7
	Sphagnum	-	-	-	1	-	-	-	1
	Myriophyllum sp	-	-	-	-	2	2	28	-
Aquatics	*Nymphaea*	-	3	-	-	-	-	-	-
	Sparganium emersum type	-	-	-	4	14	9	1	-
Charcoal		xxx	xx	x	xx	xxx	xx	xx	xxx
pre-Quaternary pollen & spores		xxx	x	x	x	x	xx	xx	xx
Dinoflagellate cyst		-	-	-	-	-	x	-	x
Glomus sp.		x	x	x	-	x	-	-	-
Mougeotia sp.		-	x	x	-	x	-	x	-
Pediastrum		-	-	x	-	-	-	x	-
Thecaphora sp.		-	-	-	x	x	-	-	-
Grain/spore crumpling		xx	x	x	-	x	x	x	xx
Grain/spore corrosion		xx	xxx	xxx	xxx	xxx	xx	x	xx
Abundance		low	low	low	low	low	low	mod	low
Diversity		low	low	low	mod	low	mod	mod	low

Key: Abundance: low = < 100 TLP (10 slides); mod = moderate (>100 TLP). x = rare, xx = occasional, xxx = common

Molluscs *by Matt Law*
Snail MNI values are presented in Table 8.52, alongside quantification of *Cepaea* banding morphs, estimated ratios of 'fresh' to 'worn' shells, and preservation categories for *Helicella itala*.

Shell was well preserved, with the majority intact, although the larger *Cepaea* shells were often fragmentary. This is likely to be the result of sediment compaction. In general, the ratio of 'fresh' to 'worn' shell was low despite the presence of other indicators of intrusive material. Conversely, *Helicella itala* type a was the most frequent preservation category in all samples from Callow Carr. This suggests that there is likely to be a degree of temporal mixing within the assemblages and, further, that the estimated ratio of preservation for all species may underestimate the degree of recent intrusion.

The mollusc assemblage highlights some clear differences in environment and hydrology of the sites.

Lincolnshire Marsh

White Crofts
Two samples were analysed from Romano-British ditches 300524 (fill 300004) and 301423 (fill 301276).

The sample from 300004 had low diversity, containing only five taxa, and with an MNI of 97. The sample was overwhelmingly dominated by two freshwater species, *Anisus leucostoma* and *Gyraulus crista*. Taken together, these species, alongside lesser numbers of the amphibious *Galba truncatula*, are suggestive of a swampy ditch, *Gyraulus* suggesting that the ditch held water throughout the year rather than drying in summer, although the other two species are more usually found in habitats that dry out. It may be that this fill represents conflation of a number of wetter and drier years. The other two taxa in the sample, *Vallonia* cf. *excentrica* and *Cochlicopa* cf. *lubrica*, are terrestrial species which probably represent an open environment close to the ditch.

The sample from ditch fill 301276 has three taxa recorded and 44 individual shells. Once again, *Anisus leucostoma* is dominant, alongside two *Cepaea hortensis* shells (one mid-banded and one five-banded, generally more common in open environments) and one *Vallonia costata*. The environment was likely one of seasonal flooding in a broadly grassy environment, although numbers are too low to carry secure interpretative value.

Callow Carr
Five samples were analysed from Bronze Age barrow ditch 900066. The sample from ditch fill 900135 yielded 15 taxa within a subsample of 200 individuals. Relatively high diversity and high numbers of individuals generally reflect stability, with slow rates of sediment accumulation allowing more species to become established and more shells to become incorporated into the sediment. The confounding effect of recent intrusions, evidenced by the presence of roots, *Cecilioides acicula* and *Helicella itala* type a, should not be overlooked, however. The assemblage is dominated by *Carychium* spp., with *Pupilla muscorum*, *Vallonia costata*, and *Vallonia* cf. *excentrica*. The latter three are species of open, grassland environments. The two species of *Carychium* in Britain are *C. minimum*, broadly associated with marshes and damp grassland, and *C. tridentatum*, associated with vegetable litter in woods or among turves. Both may occur together, so it is feasible both species are present here, although no other indicators of marsh are present.

Other components of the assemblage include further open country taxa (*Helicella itala*, *Vertigo pygmaea*) and a number of species representing a more shaded environment (*Aegopinella nitidula*, *Oxychilus cellarius*, *Perpolita hammonis*, *Discus rotundatus*, *Merdigera obscura*, *Trochulus hispidus*, *Punctum pygmaeum*), although none of these species are exclusively found in woodland, so this may be ungrazed tussocky grassland. The *Cepaea* shells are mixed, with one unbanded, one mid-banded, and two five-banded. Taken together, the evidence suggests a period of transition between a shaded and open environment, perhaps indicative of increased grazing. It is clear that the ditch was not subject to regular flooding while this sediment was accumulating.

Table 8.52 Mollusc analysis results from Romano-British deposits at White Crofts, Bronze Age deposits at Callow Carr and a Romano-British deposit at Magers Lane

Site	White Crofts – Romano-British				Callow Carr – Bronze Age			Magers Lane – Romano-British
Group	300524	301423			900066			300153
Feature	300003	301275	900134	900169	900178	300057		
Context	300004	301276	900135	900170	900171	900179	900180	300059
Sample	43	67	900252	900281	900282	900283	900284	300002
Fraction	Whole sample	Flot only	Whole sample	Flot only	Whole sample	Flot only	Whole sample	Flot only
Estimated proportion 'fresh':'worn' shell	00:01	00:01	01:20	01:20	01:20	01:20	01:20	00:01
Aegopinella nitidula	-	-	8	-	-	2	2	2
Oxychilus cellarius	-	-	4	-	1	3	2	3
Perpolita hammonis	-	-	1	-	-	-	-	-
Vitrea contracta	-	-	-	-	-	-	1	-
Discus rotundatus	-	-	6	1	3	2	4	-
Clausilia bidentata	-	-	-	-	1	-	1	-
Merdigera obscura	-	-	1	-	-	-	-	-
Cochlicopa cf. *lubrica*	1	-	-	-	-	-	-	-
Cepaea hortensis	-	2	4	-	-	-	-	1
cf. *Cepaea* sp. fragments	-	-	3	-	2	1	-	-
Limacidae	-	-	-	-	2	-	-	-
Punctum pygmaeum	-	-	8	-	6	-	-	-
Trochulus hispidus	-	-	16	1	26	8	1	6
Helicella itala	-	-	10	14	39	24	12	-
Pupilla muscorum	-	-	32	2	40	18	6	-
Vallonia costata	-	1	23	-	20	2	2	42
Vallonia cf. *excentrica*	4	-	25	2	49	41	7	8
Vertigo pygmaea	-	-	5	1	5	5		-
Carychium sp.	-	-	54	-	6	-	1	-
Galba truncatula	6	-	-	-	-	-	-	6
Anisus leucostoma	48	41	-	-	-	-	-	66
Gyraulus crista	38	-	-	-	-	-	-	-
Cecilioides acicula	-	-	++	+++	++	+++	++	-
Cepaea hortensis:								
– unbanded	-	-	1	-	-	-	-	-
– mid-banded	-	1	1	-	-	-	-	-
– 5-banded	-	1	2	-	-	-	-	1
Helicella itala type a	-	-	4	11	22	11	8	-
Helicella itala type b	-	-	3	5	14	6	4	-
Helicella itala type c	-	-	3	1	5	7	1	-
Count	97	44	200	21	200	106	39	134
Taxa	5	3	15	6	13	10	11	8

Key to scale of abundance: + = 1–10 items; ++ =11–20 items; +++ = 21–50; ++++ = 51–100

The sample from ditch fill 900170 contained only 6 taxa and 21 individuals. This is likely to reflect relatively rapid infilling. Fourteen of the shells are *Helicella itala*, of which 11 fell into the preservation category type a, and numerous *Cecilioides acicula* were present. This suggests that the temporal resolution of this assemblage is highly suspect, and no further interpretation should be made.

The sample from ditch fill 900171 yielded 13 taxa in a subsample of 200 shells. This is dominated by species reflecting open grassland (*Pupilla*, the *Vallonia* spp., and *Helicella*, although 22 of the 39 shells of the latter were assigned to type a). A small group of shade-demanding species are also present, so again this assemblage may reflect time-averaging across a period of transition. The shade-demanding taxa may also be favoured by the shadier conditions within the ditch itself.

The sample from ditch fill 900179 contained 10 taxa and 106 individuals, implying some degree of instability or more rapid infilling than 900171. The assemblage is one of open country, with *Vallonia* cf. *excentrica* clearly predominant. A number of these were juvenile shells, which may indicate *Vallonia* adopted an *r*-selection (high quantity) reproductive strategy as a response to an unstable environment. A small shade-demanding component is also present.

The sample from ditch fill 900180 yielded 11 taxa but only 39 shells, which may indicate increasing instability. Twelve of these were *Helicella itala*, of which eight could be assigned to type a. The temporal resolution of this sample is clearly suspect, and no further comment will be made.

Fen-edge

Magers Lane

A sample from Romano-British ditch fill 300059 has a slightly higher diversity, with eight taxa and an MNI of 134. *Anisus leucostoma* is dominant, alongside the terrestrial species *Vallonia costata*. *Gyraulus* is absent, although *Galba* is present. This combination is somewhat unusual as, of the three *Vallonia* species present in Britain, *V. costata* tends to be found in the driest habitats. However, it has occasionally been reported from marshes (Kerney 1999), although in those contexts it generally makes up only 10% of the assemblage (Evans 1972). The other taxa present represent a shaded habitat, perhaps rank vegetation rather than woodland, and indeed *V. costata* is also occasionally present in such habitats. The *Cepaea hortensis* shell is five-banded, a morph which tends to be more common in open environments. The likely habitat is of seasonal flooding within the ditch, with terrestrial snails able to live within the ditch during dry periods.

Insects *by Sander Aerts*

The insect remains were all preserved through waterlogging and are overall poorly to moderately well preserved.

Lymn Valley

Cheals Close

The material from ditch 180619 is limited. A pronotum fragment may belong to a synanthropic beetle in the weevil genus (*Sitophilus*), an invasive group of animals which is a common pest of stored cereal crops. However, poor preservation does not allow for certain identification. One pronotum of water scavenger beetles (Hydrophilidae) points towards a wet, and/or fouling habitat or rotting organic matter. One heavily degraded fragment of a leaf beetle (*Phyllotreta*) elytron was identified. This genus is abundant, and commonly found in archaeological contexts, and may be interpreted as a pest of mustard/rape (*Brassica* spp.) crops.

Raithby Lane

Romano-British ditch 380253 produced a poorly to moderately well-preserved insect assemblage. It includes mostly taxa which are commonly found on wet ground and near water margins, such as *Helophorus*, and possible *Hydrobius* and *Ochthebius* sclerite fragments, which are semi-aquatic in nature. Dung beetles (Aphodiidae) are commonly associated with pasture and grazing by large herbivores, and therefore an indicator of livestock being present nearby. Rove beetles (Oxytelinae) are associated both with damp, fouling habitats and dung and stable environments, where they hunt other invertebrate species.

The Worked Flint

Phil Harding

Introduction

Finds of struck flint provide the primary evidence of pre-Iron Age human activity along the land traversed by the cable route. There was a low-density spread of material across Zone 1 with rather more material from Zone 2 (even allowing for the differing length of the two zones), where assemblages included small collections from five Early Neolithic pits. No material was found in Zone 3, either collected by hand or recovered from soil samples.

The assemblage is tabulated by zone, artefact type and context in Table 8.53. Apart from the Neolithic pits, collections were dominated by poorly stratified groups containing residual material from ditches, predominantly of Iron Age and Romano-British date, pits, colluvium and undated buried soils; totals from these collections have been amalgamated as appropriate and shown by zone and the number of features in which they occurred.

Table 8.53 Flint assemblage by zone and feature type (N.B. no flint recovered from Zone 3)

Zone/feature type	No. of flint-bearing contexts	Flake core	Blade core	Bladelet core	Core fragment	Flake	Blade	Bladelet	Core rejuvenation tablet	Crested piece	Flanc de nucleus	Microburin	Scraper	Knife	Burin	Microdenticulate	Piercer	Notched piece	Projectile	Axe	Other tools	Misc. retouch	Angular shatter	Microdebitage	Grand total
Zone 1																									
Ditch	20	1				16	1						1		1		1					3		1	25
Pit	6	1				7																		3	11
Other	2					2																		2	4
Nat. feat. & unstrat.	7	1				9							3									1			14
Subtotal	*35*	*3*				*34*	*1*						*4*		*1*		*1*					*4*		*6*	*54*
Zone 2																									
Ditch	74	4	1	1	6	72	11	4	4		1	1	4	3				1	1		1	3	7	23	148
Neolithic pits																									
800332	1	1				5	3	1																	10
800363	1					2											1								3
800371	1					9	5	6								2								2	24
800476	1					7	1	2						1										5	16
800478	1					3						1	1										2		7
Other pits	15	1	1			6		5					1							1		1	2	2	20
Other features	12	1				4	2	1					1									1	1	4	15
Nat. feat. & unstrat.	48	12	10	1	2	113	46	5	2	1	2		8	1		1	6					10	17	2	239
Subtotal	*154*	*19*	*12*	*2*	*8*	*221*	*68*	*24*	*6*	*1*	*3*	*2*	*15*	*5*		*3*	*7*	*1*	*1*	*1*	*1*	*15*	*29*	*38*	*482*
Grand total	189	22	12	2	8	255	69	24	6	1	3	2	19	5	1	3	8	1	1	1	1	19	29	44	536

Note: no flint was recovered from Zone 3

Raw Material and Condition

Artefacts were frequently characterised by a thin, worn and often slightly battered cortex indicating that raw material was obtained from local fluvial gravel and/or Devensian till. This material was exploited extensively throughout the Mesolithic period and into the Neolithic (Conneller 2022, 77). It was of sufficiently good quality for tool manufacture but was frequently hampered by incipient thermal fractures. Flint may also have been eroded from spring heads and streams that flowed across the hard Chalk of the Lincolnshire Wolds approximately 10 km to the north (*ibid.*). Additional material may also have been sourced from the clay-with-flints outcrops overlying the Chalk on the western edge of the Wolds. Artefacts are predominantly unpatinated but more typically covered by a marked surface gloss. Apart from small collections from sealed pit deposits, individual artefacts consistently display post-depositional edge damage resulting from reworking in plough soil, confirming that the collections were rarely in their primary context.

The Assemblage

Collections from Zone 1 comprised undiagnostic flakes. This material has been assigned to the Late Neolithic/Bronze Age periods in the absence of diagnostic chronological or technological attributes. Artefacts were primarily recovered from subsoil and as material that had been reworked into Iron Age and Romano-British pits and ditches along the route. However, traces of early prehistoric activity are demonstrated by a possible burin (Fig. 8.8.1) likely to be of Mesolithic date, from Romano-British ditch 301403, and a Late Neolithic/Early Bronze Age scale-flaked knife from ditch 300508, both from White Crofts.

The most notable artefact concentrations were located along Zone 2. Quantification shows that blade/lets formed 32% of the combined flakes and blades/bladelets. Isolated examples were found in features of later prehistoric and Romano-British date wherever evaluation trenches and mitigation areas were excavated. Stratified collections were included in a cluster of five pits (group 800480) in the south-east part of Walk Hill. Well-prepared blades/bladelets were especially common in pits 800332 and 800476, which also contained associated core trimming waste. Pit 800371 in the north-west part of Walk Hill contained similar blades/lets and two microdenticulates (Fig. 8.8.2), one on a flake and one on a blade, both retaining a distinct gloss on their cutting edges. Retouched material included a scraper (Fig. 8.8.3) and a knife. The collective technological and typological attributes in these collections suggest that the pits are of Early Neolithic date, although a proximal microburin (Fig. 8.8.4) from pit 800478, a component of pit group 800480, hints at residual or transitional links with the Late Mesolithic period. The remaining pits in this cluster contained core trimming waste but are nevertheless likely to be contemporary. Associated features in this part of Walk Hill included pit/tree-throw hole 800308 and posthole 800085, which also contained solitary blades/bladelets, while an unfinished laurel leaf or leaf-shaped arrowhead (Fig. 8.8.5) from Romano-British ditch 800494 indicates activity beyond that represented by the pits.

The spread of Mesolithic and Neolithic material extends south from Walk Hill to sites at Partney Leys and Cheals Close and the surrounding area. Pit 9403 (in evaluation trench 94) contained the butt end of a Neolithic polished axe (Fig. 8.8.6), with a probable backed microlith (Fig. 8.8.7) dating to the Mesolithic period in ditch 180625 from the adjacent site at Cheals Close, and a Late Neolithic discoidal knife roughout (Fig. 8.8.8) from the topsoil at Partney Leys. Further south at Raithby Crossroads, a Mesolithic microburin from the terminal of roundhouse ring gully 220117, a broken knife that may be of Late Neolithic date from Iron Age ditch 220114, and an Early Bronze Age barbed and tanged arrowhead (Fig. 8.8.9; ON 220001) of Green's (1980) Sutton b type from ring gully 220117 indicate continuous human presence in this area. Several flake cores from Raithby Crossroads include a number of crudely worked examples incorporating

numerous miss-hits and an opportunistic core reduction strategy, techniques that are often cited to define later Bronze Age industries.

Various pits and ditches of Iron Age, post-medieval or uncertain date at Wood Hill produced 20 undiagnostic flakes, with a fragment of a probable broken Late Neolithic/ Early Bronze Age plano-convex knife from post-medieval ditch 120089. The lack of blades and dominance of flakes may suggest that the collection is contemporary with other Bronze Age material and features in the area.

Blades/bladelets were also recorded from four trenches at the Mardon Hill site, forming one of the largest groups of material from the route. This collection (37 pieces) included 12 blades/bladelets, a crested blade (Fig. 8.8.10), three blade cores – two with opposed striking platforms (Fig. 8.8.11) – and a core rejuvenation tablet. These artefacts were found in a remnant of colluvium which feathered out at the base of a slope into the natural geology (390003). Individual pieces were characterised by slight post-depositional edge damage which may result from slope movement. Despite the lack of securely stratified context, this group is likely to represent a discrete, contemporary assemblage.

Comparable material was also collected from the topsoil and subsoil of evaluation trenches beyond the spread of colluvium. This component included 12 blades/broken blades and a rejuvenation tablet (trench 124), an opposed platform blade core and two broken blades (trench 122), a blade core and two blades (trench 280), and two cores and a microdenticulate (trench 149). A blade and rejuvenation flake (ditch 14905), an opposed platform bladelet core (ditch 14908), and an opposed platform blade core (pit 14903) were also recovered from trench 149, but no chronologically diagnostic pieces were recorded from this spread of material which extended for approximately 200 m. The production of regular, carefully prepared blanks indicates a Mesolithic or Early Neolithic date, possibly the former, although a conflation of both periods cannot be discounted.

Twenty-five pieces of worked flint were found at Staunch Farm, at the southern extremity of Zone 2. Eleven, including five blades/bladelets, were recovered from a probable colluvium (310004) comparable with sediment at the Mardon Hill site. Four additional blades, also attributed to the Mesolithic or Early Neolithic periods, were found in associated features at Staunch Farm. A number of crudely worked flake cores, flaked using an opportunistic core reduction strategy, may be of later Bronze Age date.

Discussion

The worked flint assemblage from the project contains only a relatively small number of pieces but nevertheless documents continuous early prehistoric occupation of the local landscape. Traces of Mesolithic groups occupying open air sites extend into the Early Neolithic period when the archaeological record is enhanced by pits and monuments that marked the onset of more settled communities. Most flint artefacts were collected from the ploughsoil, with only a small number recovered from securely stratified contexts in pits. These assemblages can be supplemented by material preserved in colluvium, which may have undergone only limited movement from its point of origin. Microdebitage (chips), which is most susceptible to dispersal by post-depositional soil processes, including agriculture, is especially under-represented from all excavated contexts, most notably from environmental samples.

Most aspects of the *chaîne opératoire* are represented in those areas with the densest artefact concentrations. However, cortical pieces, representing the early stages of core reduction, are frequently under-represented, suggesting that core preparation may have taken place at the raw material source. The lack of closely dated features or undisturbed deposits containing *in situ* knapping debris has reduced opportunities to recover data reflecting detailed flint working strategies. A broad scheme-wide chronology has nevertheless been compiled using the small number of diagnostic, well-

stratified artefacts, supplemented by consideration of technological attributes. The patterns become more meaningful and provide a consistent pattern of activity when they are superimposed on the canvas of the wider landscape.

The largest part of the collection was distributed across the Wolds and Lymn Valley (Zone 2), which contrasts with fieldwork in the coastal Zone 1 to the north and, especially marked, with Fenland Zone 3 to the south, where no flint artefacts were found. However, the lack of large groups of material from the coastal marshes does not imply that these areas were sterile. Individual records of Mesolithic material from Burgh le Marsh and Skegness in the lower reaches of the Lymn valley, as documented by the Palaeolithic and Mesolithic lithic artefact (PaMELA) database (Wessex Archaeology and Jacobi 2014), hint at links to better-documented collections from the upper reaches of this river basin encountered in Zone 2. Similar thinly spread and contrasting patterns of Mesolithic and Early Neolithic artefacts have been noted in southern England, where prehistoric sites are plentiful on the South Downs but sparse along the coastal zone. However, fieldwork has demonstrated that these areas, which contained their own individual character and resources, extending to marine sources, were occupied at this time.

The most significant collections were found in Zone 2 and relate to the Mesolithic, probably Late Mesolithic, and Early Neolithic periods. Activity across this timespan is represented at Walk Hill, Cheals Close and Raithby Crossroads, all overlooking tributary streams of the River Lymn. The collections from Mardon Hill contained microdenticulates, which occur in both Mesolithic and Neolithic assemblages, but no microliths or microburins, type fossils of the Mesolithic period. However, the frequency of opposed platform cores suggests that this material is of more typical of Mesolithic technology. Furthermore, the material supplements existing records of Mesolithic material from the headwaters of the River Lymn: eight locations at East and West Keal where Early and Late Mesolithic microliths have been listed and approximately 26 records, also principally of microliths, in Salmonby (Wessex Archaeology and Jacobi 2014). These records are sufficiently nucleated to suggest that they were compiled from a single collector or project and represent only a small part of a much wider distribution. Further to the south, material from Staunch Farm may also owe its location to former stream courses. The relationship of Mesolithic sites with river courses is compatible with other drainage basins in Lincolnshire and with contemporary landscape use from other parts of the British Isles (Conneller 2022, 294). Survey of the Bain Valley, a tributary of the Witham approximately 12 km to the north-west of the Mardon Hill site, located five sites producing both Early and Late Mesolithic material (Prehistoric Lincolnshire 2023).

The onset of the Early Neolithic period is marked by technology, featuring blade production, that maintained established trends from the Mesolithic period. This continuity can make it difficult to separate these early prehistoric periods unless assemblages are accompanied by diagnostic implements, most notably leaf arrowheads or polished axes. Assemblages may also represent a palimpsest of multi-period activity at a traditional location. This issue is apparent with the Mardon Hill site, where much of the material is of probable Mesolithic date but may also include Early Neolithic pieces. The Early Neolithic period is also marked by the construction of causewayed enclosures, with examples at Barholm and Uffington in the county, and long barrow burial mounds, of which 11 examples are extant across the central and southern Wolds. The Giant's Hill barrow at Skendleby lies approximately 4 km south-east of Walk Hill. Pits, as depositories of domestic and ceremonial refuse, also feature in the corpus of Early Neolithic feature types. These time capsules, as excavated at Walk Hill, frequently contain a greater range of artefact types, including pottery, animal bone and charcoal, for study. Sites containing pit clusters are well documented in Lincolnshire, as at Tattershall Thorpe, only 12 km west of Mardon Hill and 20 km south-west of Walk Hill (Bradley *et al.* 1993). Similar patterns extend to the neighbouring counties of Cambridgeshire and Norfolk (Anderson-Whymark and Thomas 2012, fig. 15.1, 220).



Figure 8.8 Worked flint

No worked flint was recovered from sites identified in the Fens, providing an impression that this area was thinly occupied throughout the Mesolithic and Neolithic periods. However, the area contained a diverse and distinct range of raw materials and food resources which were fully exploited. Excavations have demonstrated that human activity represented by causewayed enclosures (Pryor 1998) and long barrows (Hodder and Shand 1988) was well established in the Fens by the Early Neolithic period. Occupation was most frequently located on high spots within the landscape (Pryor 2019) which has subsequently become inundated by rising sea levels, covering monuments and landscapes alike.

Flint working technology evolved during the Late Neolithic and Bronze Age periods into production of flake blanks. Production waste, which lacks distinct technological attributes, can be difficult to identify when it is present in small quantities or in isolation. Supplementary evidence including a discoidal knife and plano-convex knife provide the best evidence of Late Neolithic activity in Zone 2, while an Early Bronze Age barbed and tanged arrowhead marks the transition into the Early Bronze Age. These distinctive artefacts are frequently associated with Beaker burials but not exclusively so. Sutton b type arrowheads are the most prolific form in Lincolnshire (Green 1980, table VI.3) and across all parts of Britain. Early Bronze Age activity is sparsely represented in other parts of the route but occurs in Zone 2 where occupation throughout the Bronze Age is represented by formal field boundary ditch systems. Evidence of flint working at Raithby Crossroads is implied by flake cores employing an opportunistic core reduction strategy which incorporate numerous mis-hits, attributes that may indicate later Bronze Age industries. Excavations in the Fens have also confirmed that landscape occupation continued through into the Bronze Age (Pryor 2005).

Catalogue of illustrated flint
(Fig. 8.8)

1. Possible burin from Romano-British ditch 301403
2. Microdenticulate from pit 800371
3. End scraper from context 800479
4. Proximal microburin from pit 800478
5. Unfinished laurel leaf or leaf-shaped arrowhead from Romano-British ditch 800419
6. Butt of Neolithic polished flint axe from pit 9403
7. Backed microlith from ditch 180625
8. Neolithic discoidal knife roughout from Partney Leys topsoil
9. Early Bronze Age barbed and tanged arrowhead from ring ditch 220003
10. Crested blade from colluvium 390003
11. Opposed platform blade core from colluvium 390003

The Earlier Prehistoric Pottery

Elina Brook

Introduction

A very small quantity (53 sherds, 384 g) of pottery of earlier prehistoric date includes pieces of Beaker (Late Neolithic/Early Bronze Age) and Early/Middle Bronze Age date. Sherds have been examined under 20x magnification and assigned to fabric groups based on their dominant inclusions. This identified six broad groups: calcareous wares, grog-tempered, flint-tempered, sandy wares, rock-gritted and vesicular wares. Many fabrics contain mixtures of these components; detailed descriptions and quantification by fabric are given in Table 8.54. Alphanumeric codes were assigned with prefixes to clearly distinguish these codes from those of later periods (e.g., BKR for Beaker). Where possible, featured sherds were allocated a form type and other elements such as surface treatment, decoration or evidence of use were also recorded. This accords with a 'detailed record' of analysis as outlined by the national guidelines (Barclay *et al.* 2016). Overall condition is poor;

the assemblage is highly fragmented and most pieces have suffered considerable surface abrasion and edge damage.

Beaker (Late Neolithic/Early Bronze Age)

Twenty sherds were identifiable as Beaker. Eleven of these pieces (30 g) came from ring ditch 900066 at Callow Carr. Although no rims are present, all but two sherds are decorated with a range of toothed comb impressions and/or fine incised lines. Zonal decoration is visible on a fragment from deposit 900171 which combines a row of vertical toothed comb impressions, a pair of incised zig-zag lines and a double row of continuous horizontal toothed comb impressions (Fig. 8.9.1). Other sherds of note include two joining pieces from the base of a fine Beaker from deposit 900135. The wall flares outwards from the base and at least two opposing diagonal lines (in a 'v') of impressed toothed comb are visible immediately above the base.

The remaining sherds of Beaker were found residually within Anglo-Saxon graves 900019, 900067 and 900140 at Callow Carr. The largest fragment is a body sherd from the backfill of grave 900019 (Fig. 8.9.2). The exterior is decorated with a band of vertical lines, fringed above and below by zig-zag lines. The surface condition is poor and it is uncertain whether the lines were incised or made with a toothed comb. Grave 900067 contained body sherds in calcareous fabric BKR/C1 and grog-tempered fabrics BKR/G1 and G2. Three pieces have multiple lines of rectangular toothed comb impressions. In addition to these eleven sherds, a further four pieces (two each from ring ditch 900066 and Anglo-Saxon grave 900114) could also be Beaker. Those from the ring ditch are in grog-tempered fabric EP/RG1 with the reddish firing characteristic of Beakers and the exterior surface is decorated with multiple parallel lines made by either twisted cord or tooling. The fragments from Anglo-Saxon grave 900114 (grog-tempered fabric EP/G3) are decorated with at least two crude fingernail/tip impressions that are more typical of coarse Beaker ceramics.

Given the small size of these pieces, it is not possible to determine exactly how many vessels are represented. All (with the exception of the residual pieces from grave 900114) are likely to derive from fine Beakers. Given the absence of vessel profiles or more complete decorative motifs it is impossible to confidently place this small group within either Clarke's (1970) or Needham's (2005) classificatory schemes for Beaker ceramics within Britain, which also makes comparison with other assemblages problematic. The decorative elements on the two illustrated pieces share affinities with Clarke's motif Groups 2 and 3 (1970, appendix 1.4, motifs 17 and 27 respectively) both of which more typically have a northern concentration within Britain (*ibid*., 19–20). In particular, the motif seen on the fragment from grave 900019 (Fig. 8.9.2) is more commonly seen on Beakers within his Late Northern (N3) style group, among which examples from Norfolk, Suffolk and Cambridgeshire (*ibid*., figs 628, 632, 635 and 636) can be found. Beaker pottery has been found at a number of sites across the southern Wolds, most notably at West Ashby, which is situated just over 14 km to the west of Callow Carr. There a similarly fragmented collection of sherds was found within a range of deposits associated with a multi-phase barrow, for which the best parallels can be found among Clarke's Wessex/Middle Rhine and Northern Beaker groups (Manby 1985, 118). Smaller collections have also been found at Salmonby (Phillips *et al.* 1990) and Skendleby (May 1976, 61–3) located 8 km to the north-west and 3 km to the east of Callow Carr respectively.

Illustrated Beaker pottery

(Fig. 8.9)

1. Beaker; decorated body sherd, fabric BKR/G2, Pottery Record Number (PRN) 1711; Callow Carr, context 900171, slot 900169, ring ditch 900066
2. Beaker; decorated body sherd, fabric BKR/G1, PRN 1726; Callow Carr, backfill 900020, Anglo-Saxon grave 900019

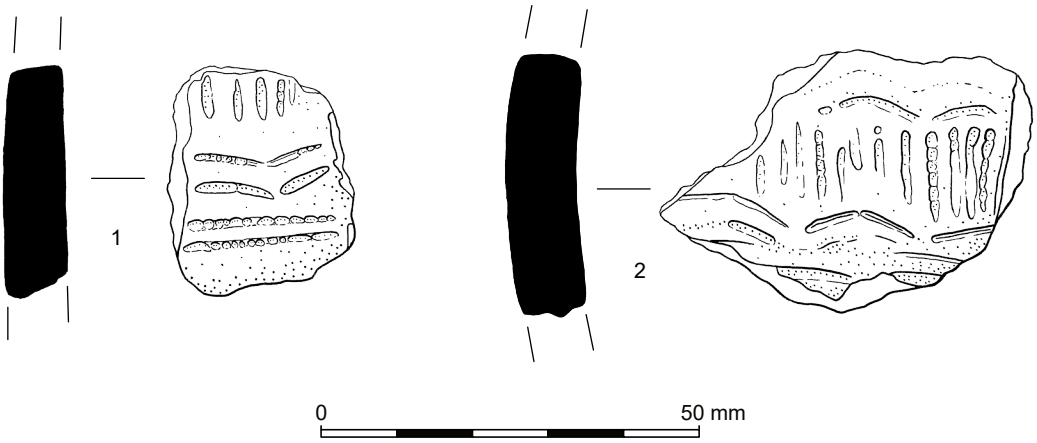


Figure 8.9 Beaker pottery

Bronze Age

Sherds of Bronze Age date came from two features, one recorded in evaluation trench 123 in the parish of East Keal (posthole 12312; 7 sherds, 131 g) and one at the Back Lane site in the parish of Stickford (ring ditch 410125; 10 pieces, 125 g). Six of the seven sherds from posthole 12312 derive from a vessel with a thick base in coarse grog-tempered fabric BA/G5. The interior surface of the base has multiple finger-tip/nail impressions; their frequency suggests that they may have been decorative rather than an accidental result of making the vessel. The remaining sherd is from the lower wall of a second, thinner walled, vessel in fabric BA/G4. Patchy soot adheres to its interior surface, indicating it may have been used for cooking or the preparation of food. The fabrics and firing of this group are characteristic of Early to Middle Bronze Age ceramics within the region. Decoration on the interior of bases is not particularly common during the period, but examples are known among other East Midlands assemblages such as those from Pasture Lodge Farm and Belton Lane, Grantham (Allen *et al.* 1987, fig. 15, 48 and fig. 17, 2), both in Lincolnshire, and on Ardleigh-style pottery from Essex and Suffolk (Brown 1999, fig. 64, 89 and fig. 77, 167), as well as Deverel-Rimbury-style pottery from elsewhere across southern Britain (Brook 2023; Cotton 2001; Morris 2018).

The sherds from ring ditch 410125 comprise plain body sherds and one base fragment in grog-tempered fabric BA/G4. Although the pale orange/pinkish firing of this group is typical of briquetage containers used in salt production, the concave curvature of the exterior wall of two joining fragments is not characteristic of the profiles of Bronze Age briquetage vessels found elsewhere in Lincolnshire (Cleal 2001a), and as a result they are included here as pottery. However, the possibility that these sherds may be briquetage cannot be completely discounted. The majority of pieces came from deposit 410050, which also contained a small quantity of cremated human bone which has provided a radiocarbon date of 1390–1130 cal. BC (SUERC-126879). Even though it is uncertain how securely this dates the deposit, the sherds themselves would not be out of place among later Middle Bronze Age or Late Bronze Age assemblages within the region (e.g., Cleal 2001b).

Other Early Prehistoric

The remaining sherds could only be assigned a broader early prehistoric date and comprise fragments in a range of quartz-gritted, grog-tempered, flint-tempered and vesicular wares (Table 8.54). The only diagnostic pieces are joining sherds from a rounded, out-turned rim in fabric EP/Q1 (Callow Carr ring ditch 900066). This rim form would not be out of place among earlier Neolithic assemblages, although such a suggestion is extremely tentative. Two thick-walled body sherds in a coarse vesicular

fabric (EP/VES1) found residually within Romano-British ditch 301415 at White Crofts could possibly date to the Early or Middle Bronze Age. A possible Bronze Age date may also be likely for the flint-tempered sherds found within ditches 410127 and 410107 at Back Lane and two sherds from tree-throw hole 220048 (one each in fabric EP/G3 and EP/VES2) at Raithby Crossroads.

Table 8.54 Early prehistoric pottery quantification and fabric descriptions

Fabric code	*No.*	*Wt (g)*	*Fabric description*
Beaker			
BKR/C1	4	7	Calcareous ware; sparse (5%), poorly sorted, sub-rounded/sub-angular soft white calcareous pieces (?limestone; 1–3 mm), sparse (3%) sub-rounded quartz (<2 mm) in a fine silty calcareous matrix
BKR/G1	5	26	Grog-tempered; moderate (10%), moderately sorted, sub-rounded/sub-angular grog (<1 mm), moderate (10%) sub-rounded iron oxides (<1 mm) and rare larger quartz grains (<2 mm) in a fine, slightly sandy matrix
BKR/G2	9	25	Grog-tempered; common (20%), poorly sorted, sub-rounded/sub-angular grog (<2 mm), sparse (7%) sub-rounded iron oxides (<1 mm) and rare (2%) rounded quartz grains (<2 mm)
BKR/G99	1	1	Miscellaneous grog-tempered ware
BKR/GQ1	1	4	Grog and sandy ware; moderate (10–15%), moderately sorted, sub-angular grog (<2 mm, rarely 4 mm), sparse (7%) sub-rounded iron oxides (<1 mm) and sparse (3%) sub-angular quartz/ite in a fine silty matrix
Bronze Age			
BA/G4	11	139	Grog-tempered; moderate (10%), poorly sorted, sub-rounded/sub-angular grog/clay pellets (<4 mm) in a slightly sandy matrix
BA/G5	6	117	Grog-tempered; moderate (15%), poorly sorted, sub-angular/sub-rounded grog (1–7 mm) and sparse (5%) sub-rounded iron oxides (<1 mm)
Early prehistoric unspecified			
EP/F1	2	19	Flint-tempered; moderate (10%), poorly sorted, sub-angular flint (<3 mm, rarely 6 mm), sparse (3%) large sub-rounded quartz (1-2 mm) in a slightly sandy matrix
EP/G3	3	8	Grog-tempered; sparse (7%), poorly sorted, sub-angular grog (<2 mm), sparse (5%) sub-rounded iron oxides (<1 mm) and rare (1%) flint (<3 mm) in a fine silty matrix
EP/Q1	6	5	Sandy ware; sparse (5%), moderately sorted, sub-angular quartz (?vein quartz; <3 mm), sparse (3%) fine quartz grains (<0.5 mm) in a silty matrix
EP/RG1	2	7	Rock-gritted; sparse (5%), moderately sorted, sub-angular rock (?sandstone; <3 mm), sparse (5–7%) sub-rounded iron oxides (<1 mm) and rare (2%), sub-angular/rounded grog/clay pellets (<1 mm) in a slightly sandy matrix
EP/VES1	2	21	Vesicular ware; moderate (15%), poorly sorted laminar voids (?leached shell; <6 mm), sparse (7%), sub-rounded iron oxides (<1 mm) in a slightly sandy matrix
EP/VES2	1	5	Vesicular ware; common (25%), moderately sorted, sub-angular and laminar voids (?leached shelly limestone; <3 mm) in a slightly sandy matrix
Total	*53*	*384*	

The Iron Age and Romano-British Pottery

Ian M. Rowlandson

Introduction

The pottery assemblage from the Viking Link scheme is of regional significance as it contains groups from a transect across a large portion of the Lincolnshire Marsh, the Lincolnshire Wolds, across the Lower Witham Valley and part of the Fens. The assemblages are a good representation of the Iron Age and Roman pottery in use on 'basic rural' or industrial sites in the region. The association of a number of the groups with salt production sites is also of interest.

As the project has investigated a transect across the county it was possible to look at differences between the distribution of fabrics. At the north end of the scheme, the

Zone 1 sites had a similar range of pottery to groups studied from the Grimsby and Market Rasen areas. It was noticeable that the Zone 2 sites on the southern Wolds and the gravel deposits to the south had a higher proportion of quartz sand-gritted Iron Age wares than those encountered by the author elsewhere in Lincolnshire, and this probably reflects the exploitation of the local clays. Equally there was a broader range of transitional grog-gritted wares and grey wares with light-fired cores from the Zone 3 excavations, reflecting greater access to pottery produced in the Lower Nene Valley, the Welland Valley near Stamford, and perhaps also from Northamptonshire in the Upper Nene Valley. A grey ware pottery production site was noted from the Six Hundreds Drove area that is a significant addition to the growing number of pottery production sites from Lincolnshire and noteworthy as few production sites are known from the Holland region of the county (Knight *et al*. 2012; Swan 1984).

A larger than expected quantity of Late Iron Age imported Gallo-Belgic wares (white ware and Terra Rubra) was recorded. This is of interest as they are seldom found outside the main Late Iron Age settlement foci such as Sleaford and Dragonby. The excavations from this scheme have shown that more examples of imported table wares found their way to humble rural sites in southern Lincolnshire in the 1st century AD than might have been expected.

One feature noted among this assemblage were 'halo' patterns of carbonised deposits on a number of large sherds, suggesting that they had been used as makeshift lids. Vessels repaired with metal cleats were noted from Magers Lane and Six Hundreds Drove, with a further vessel from the latter site having been repaired with pitch resin. Cooking residues were recorded on a range of vessels, and organic residue analysis (ORA) was undertaken to investigate the function of vessels from eight sites along the scheme (see Davis *et al.* below). This has informed our understanding of how vessels were used for cooking in this part of Lincolnshire, and the results can be compared with the results from assemblages already analysed from northern Lincolnshire, and any future studies.

Methodology

An archive was produced to comply with the requirements of the Study Group for Roman Pottery (Barclay *et al*. 2016; Darling 2004) using the codes and system developed by the City of Lincoln Archaeological Unit (Darling and Precious 2014). As the initial Zone 1 work was commissioned first, the project has been concorded to the fabric series developed by this author for northern Lincolnshire (Rowlandson and Fiske 2019b; 2023d; 2024a) rather than to the fabric scheme used for the Triton Knoll scheme (Rowlandson 2019a; Rowlandson and Fiske 2020b; 2020c). It should be noted that further subdivision of grey ware fabrics has not been attempted for this project in the absence of a scheme of analysis to confirm the preliminary identifications (e.g., Spoerry 2016).

Iron Age vessel attributes follow those established by Knight for the East Midlands (1998). Sherds of earlier prehistoric or broadly prehistoric date were characterised using the main inclusion categories from Knight (1998). In some cases, ambiguous handmade sherds have been attributed to basic inclusion-based codes when they might conceivably have been put in the specific Iron Age fabric groups had feature sherds been present. Rim equivalents (RE) and a maximum vessel count were undertaken (Pollard 1990). A tabulated summary by context, a sherd archive and the expansion of the fabric codes are presented as part of the assessment reports (Rowlandson and Fiske 2021a; 2023a; 2023b; 2023c). The pottery from the evaluation trenches has been discussed in the assessment documents by area but has been removed from the discussion for this volume, with the exception of pottery waste from the Six Hundreds Drove site.

The Pottery, by Ware Type

Non-soluble rock-gritted handmade wares

ETW2 Coarse non-soluble rock-gritted wares (Rowlandson and Fiske 2023d). The sherds from this fabric were all recovered from the White Crofts site, almost exclusively from contexts containing Roman pottery dating to the mid- to late 2nd century AD. All sherds were handmade featureless body sherds. When handmade rock-gritted wares are found in eastern Lincolnshire they are more typically of Iron Age date, although there are a few examples of handmade rock-gritted vessels from Roman sites, notably Stallingborough Hobson Way and possibly from Goxhill, but the dating of that vessel is uncertain (Rowlandson 2011a; Rowlandson and Fiske 2020d). Reconsidering the evidence from the Stallingborough Hobson Way site in light of finds from this project and Triton Knoll, it would appear likely that the large quantities of burnt earth on that site also related to salt production (Christie and Hogue 2025; Rowlandson 2019a). The ETW2 sherds may have been manufactured from the material in the local till deposits at, or near, the White Crofts site, and may represent rare examples of locally produced rock-gritted Roman vessels. It is also possible that they might be vessels traded along the coast from eastern Yorkshire, where this handmade tradition was more prevalent in the Roman period (e.g., Cumberpatch 2016). However, with further examples of handmade vessels from this project (see ETW4 and IASA?) and others from Stallingborough and the Triton Knoll scheme that probably represent limited *ad hoc* household pottery production at the coastal saltmaking sites, it is likely that the sherds from the White Crofts site represent vessels produced in the Roman period.

ETW4 Finer handmade non-soluble rock-gritted wares (Rowlandson and Fiske 2023d). The sherds in this group were also all recorded from the White Crofts site and included one body sherd from a context dated to the 2nd century AD or later, a sherd from an ovoid jar or beaker, and a miniature jar (Fig. 8.11.26). The miniature vessel, a crude, thick-walled, 'thumb pot'-type vessel, appears likely to be a local product. Pottery making using clay in vesicular briquetage fabrics has been noted on Late Iron Age sites at Ingoldmells (Allen and Knight 2001; Rowlandson 2019b; Rowlandson and Fiske 2024b) and a funnel in a Roman briquetage fabric is recorded from the Triton Knoll scheme (Rowlandson 2019a). The miniature jar here probably reflects the use of the local clay to make a small vessel form. If saltmaking moved to production in kiln-like features in the later Roman period, utilising lead pans as seen at the Triton Knoll scheme SMR06 site and in Middleton, Norfolk, then casually made vessels such as the illustrated example (Fig. 8.11.26) may have been made by the saltmakers. A ritual function for miniature Roman pots has been proposed by a number of authors (Graham and Graham 2009; Kiernan 2009) and this vessel may have had a similar use. A further handmade miniature jar with an everted rim was found placed within the saltern oven from the Triton Knoll SM06 site, where some form of 'closure ritual' might be proposed (Rowlandson 2019a).

ETW Miscellaneous non-soluble rock-gritted wares. Additional small quantities of these wares were attributed to this group from White Crofts, Wood Hill and Hagnaby Grange. Little more can be said about these small sherds.

IASST1 Coarse sandstone and quartz sand-gritted wares. A single large bowl with a wedge-shaped rim from Walk Hill was attributed to this group (Fig. 8.13.39). This vessel was from a group dated to the Iron Age. In contrast with a number of the rock-gritted vessels from Zone 1, this vessel may have been produced with inclusions of a local Cretaceous sandstone rather than with the material from the Pleistocene till 'boulder clay' that is present in the ETW2/4 fabrics.

Iron Age sand-gritted wares

IASA1 Coarser sand-gritted handmade wares (Rowlandson and Fiske 2023d). Small quantities of handmade sherds attributed to the IASA1 fabric group were recorded from Sutterby Field, Walk Hill, Raithby Crossroads, Area 28 and Back Lane. A few of the areas contained more substantial groups with diagnostic feature sherds. An assemblage from

Wood Hill included a necked jar and a jar with an everted rim and cordoned decoration. A necked jar or bowl of Late Iron Age date was recovered from Magers Lane. Small groups including a Scored ware sherd were recovered from Staunch Farm and Hagnaby Grange, these likely to be of Middle Iron Age date. It was noticeable that the majority of the sherds in this fabric group were recorded from the central section of the scheme, with many of the sites lying close to glacial sandy gravel deposits in the Lymn/Witham valley. The range of material in this fabric, and in the finer IASA2 group, was similar to some of the Iron Age groups recorded from other sites in the area, including Tattershall Thorpe and Salmonby (Chowne *et al.* 1986; Cleary *et al.* 2020; Elsdon 1996b).

The majority of the sherds in this group appear to be of Iron Age date, but an additional sherd from the White Crofts site may perhaps relate to the late Roman handmade vessels discussed above, rather than Iron Age activity.

IASA2 Finer sand-gritted handmade wares (Rowlandson and Fiske 2023d). The material from this group largely consists of the finer, later Iron Age Late La Tène II- or III-type wares recorded from the scheme. Examples of necked jars were recorded from the Walk Hill site (Figs 8.13.37–8), an ellipsoidal vessel with square-toothed rouletting and roundel stamps from Area 28, and a possible fragment from a lid from Magers Lane. A small quantity of sherds was attributed to this fabric group from the Ailby Lane site. The largest group was recorded from the Hagnaby Grange site and included a range of bead-rimmed jars, necked jars, and a necked carinated bowl with cordoned decoration (Fig. 8.16.52) likely to be of Late Iron Age date.

Small featureless body sherds attributed to the IASA2 group from the White Crofts site, all recovered from late Roman contexts, should be considered along with the IASA? (see below) and ETW2/4 wares recorded from that site as local production in the late Roman period rather than as Iron Age products.

IASA/IASA? Miscellaneous handmade sand-gritted wares. Further small quantities of handmade quartz-gritted sherds were recorded from Ailby Lane, White Crofts, Walk Hill, Wood Hill, Raithby Crossroads and Mown Rakes, but much of this material was undiagnostic and in poor condition. Notable groups included a jar with an externally bevelled rim from the Ailby Lane site and the everted-rimmed ovoid jars from Sea Bank Farm (Figs 8.10.13–14). It is now likely that these vessels, particularly the jars from Sea Bank Farm, relate to late Roman activity on the site and were possibly produced nearby in a similar fashion to the vessels discussed in the ETW4 fabric.

Iron Age shell-gritted or calcareous-gritted wares

IASH1 Coarse fossil shell-gritted handmade wares (Rowlandson and Fiske 2023d). Coarser shell-gritted handmade wares were the most common Iron Age fabric type recorded from the scheme. From Zone 2, nearly half of the pottery from Sutterby Field was attributed to the IASH1 group, including fragments of Scored ware likely to date to the Middle to Late Iron Age. The IASH1 fabric makes up nearly one-third of the sherds from the Wood Hill site, including a large Late Iron Age bowl with a wedge-shaped rim, and similar vessels were recovered from the Late Iron Age site at Raithby Crossroads. Small quantities of IASH1 were also recorded from early Roman deposits on the Magers Lane site. Hagnaby Grange also had a good range of Late Iron Age jars and large bowls with wedge-shaped rims attributed to the IASH1 fabric. The Zone 1 sites of Sea Bank Farm and White Crofts each had small quantities of IASH1 vessels likely to date to the 1st century AD, but the largest assemblage was recovered from Ailby Lane, where IASH1 was well represented with a range of Late Iron Age types including bead-rimmed jars (Figs 8.12.27–28), a jar with a wedge-shaped rim (Fig. 8.12.29) and a large bowl with a similar rim. The IASH1 fabric group was rare from Zone 3, where it is likely that activity began in the Flavian period. A large, Late La Tène III-type necked storage jar with stabbed decoration was recovered from Mown Rakes, but this vessel is of a type that continued in use until the end of the 1st century AD; a few body sherds were recovered from the Six Hundreds Drove site. The general pattern was of small

assemblages of predominantly Late Iron Age types from sites in Zone 1 and Zone 2, with limited evidence for the Scored ware types that are common indicators of Middle Iron Age activity in southern Lincolnshire (Daniel 2016; Knight 2002; 2010; Rowlandson 2017).

IASH2 Fine fossil shell-gritted handmade wares (Rowlandson and Fiske 2023d). Nearly all of the sherds attributed to this fabric group appear likely to have been produced in the Late Iron Age, but a few sherds were attributed a broader Middle to Late Iron Age date. Small numbers of sherds were recorded from the Sutterby Field, Area 34 and Ailby Lane sites. The largest quantity of sherds attributed to this fabric group was recorded from Ailby Lane, and included a carinated bowl with cordoned decoration and a necked jar (Fig. 8.12.30).

IASH3 Fine fossil shell and sand-gritted wares (Rowlandson and Fiske 2023d). Only four vessels were attributed to this fabric group, including a necked jar from Hagnaby Grange (Fig. 8.16.50) and a bead-rimmed jar and an everted-rimmed jar from Ailby Lane. A date in the early to mid-1st century AD appears most likely for the vessels in this group.

IASH5 Fine fossil shell-gritted ware with rare ferrous-rich inclusions (Rowlandson and Fiske 2023d). Sherds from 20 vessels were attributed to this fabric; where vessel type was discernible, they all appeared to be Late La Tène II/III-type necked jars or bowls, with some vessels showing some signs of burnishing or cordoned decoration. Small numbers of sherds were recorded from Ailby Lane, Wood Hill, Raithby Crossroads and Hagnaby Grange.

IASH6 Handmade finer shell-gritted ware with grog/clay pellets and low quantities of quartz inclusions (Rowlandson and Fiske 2023d). Small featureless body sherds were recorded from Magers Lane and Hagnaby Grange, and a necked jar or bowl from Area 29.

IASH7 Handmade shell-gritted ware with coarse shell and grog/clay pellets with low quantities of quartz (Rowlandson and Fiske 2023d). This fabric group was recorded from Magers Lane where forms included a large bowl with a wedge-shaped rim and a jar with an everted rim in groups dating to the Late Iron Age. At Hagnaby Grange, sherds from seven vessels were attributed to this fabric, with a jar with a flattened direct rim and a globular jar with an in-turned rim that could be broadly dated to the Middle to Late Iron Age.

IASH Miscellaneous fossil shell-gritted handmade wares. A small quantity of featureless body sherds in poor condition were recovered from Ailby Lane, these probably of Iron Age or early Roman date.

IALIM Handmade limestone-gritted wares. This fabric grouping was rare, with two sherds recorded from Sutterby Field and two from Walk Hill, both probably Iron Age in date. As the Viking Link scheme was located some distance away from the Jurassic outcrops of limestone, these Iron Age fabrics, occasionally seen among assemblages from the Ancaster to Grantham area, appear to be rare outliers.

Iron Age grog-gritted wares

IAGROG/IAGROG1 Handmade grog-gritted Iron Age wares. Grog-gritted wares made up a fairly small proportion of the Iron Age wares from the scheme, with small groups recorded from White Crofts, Wood Hill and Area 28. The most notable group was recovered from Ailby Lane and included a jar with a wedge-shaped rim from an early Roman group, as well as a small group of jars with in-turned rims similar to Challis and Harding's 'Barrel-shaped jar' grouping (1975). Vessels of this type can date from the Late Bronze Age to Iron Age, this group found with a possibly intrusive Roman sherd.

IAGROG2 Fine grog-gritted handmade wares. A small number of sherds were attributed to this fabric group; all were recovered from groups dated to the 1st century AD. Body sherds were found at the Wood Hill and Magers Lane sites, where a vessel

with cordoned decoration was noted. An unusual handmade jar or bowl with an in-turned rim was recovered from Hagnaby Grange (Fig. 8.16.53). Although this vessel was recovered from a feature containing pottery dating to the mid-1st century AD, it appears more likely to be a further example of a 'Barrel-shaped jar' most probably dating to the first half of the 1st millennium BC, along with the other post-Deverel-Rimbury-styled pottery recovered from the site.

Gallo-Belgic imported wares

GBWW Gallo-Belgic white wares (Tomber and Dore 1998, NOG WH3). These wares were imported into Britain in the later 1st century BC and continued in production in the 1st century AD (Timby and Rigby 2007), with beakers being the most common form type found imported into Lincolnshire. Sherds from two Cam. 113 butt-beakers (Hawkes and Hull 1947) were recorded from Late Iron Age groups from Area 28 and Hagnaby Grange.

Finds of Gallo-Belgic white ware vessels are rare from Lincolnshire and most typically associated with larger Iron Age settlement foci such as Ancaster, Sleaford or Dragonby, and sites with significant 1st-century AD occupation such as Old Winteringham, Lincoln Holmes Grain Warehouse and the Lincoln Eastern Bypass (Darling and Jones 1988; Darling and Precious 2014, 14–15; Doherty 2007; Elsdon 1996a; 1997; Rigby and Elsdon 1996; Rigby and Stead 1976, 130–3; Rowlandson 2012; Rowlandson 2023; Rowlandson and Fiske 2021b). However, a number of smaller rural sites are now producing evidence for distribution of Gallo-Belgic white wares away from the main settlement centres, such as the Hornsea 2 scheme, Spalding Clay Lane, Spalding Wygate Park and Low Burnham (Darling 2007b; Rowlandson 2011b; Rowlandson and Fiske 2020e; 2021b) and the sites from Viking Link.

TR Terra Rubra (Tomber and Dore 1998, GAB TR). These red-slipped table wares were imported from northern Gaul in the late 1st century BC until *c.* AD 70–80 (Timby and Rigby 2007). A sherd from a beaker with cordoned decoration, perhaps an example of a Cam. 76A-76B type, was recorded from Hagnaby Grange, and a fragment from a platter was recorded from Ailby Lane.

Finds of Terra Rubra are rare from the historic county of Lincolnshire, where major settlement foci at Ancaster, Sleaford, Kirmington, Old Winteringham and Dragonby have been the main findspots for the larger groups (Elsdon 1997; Rigby and Elsdon 1996; Rigby and Stead 1976; Timby and Rigby 2007; Todd 1981; Willis 1996). Smaller sites with Terra Rubra are extremely rare, with few examples that could be found from Lincolnshire – notably the sites from this project, Fonaby (Elsdon 1981), Langton by Wragby (Precious 2003) and an unusual site with both Terra Nigra and Terra Rubra from Tothby Lane, Alford (Rowlandson and Fiske 2022a). All of these 'rural' groups are represented by individual vessels and despite a fairly thorough literature search no other findspots are known to the author.

Willis, in his study of pottery assemblages dating to the 1st century AD from the east of England (1996), raised the point that imported wares in the late Pre-Roman Iron Age were rare. The increased number of rural sites that have been studied have brought only a few extra examples to light, suggesting that only small numbers of these imported vessels were dispersed beyond the main settlement foci. The significance of Gallo-Belgic imports has in part been skewed by the larger volumes of pottery recorded from the main settlement foci (Willis 1996, 217), but with an increasing number of rural sites investigated since 1996 by developer-funded archaeology there remain few examples of imported Gallo-Belgic wares from more basic rural assemblages. Further excavations at key high-status sites such as Leicester or at Scotch Corner only serve to confirm their unusual status and highlight the scarcity of these wares away from favoured 'elite centres' (see Buckley *et al*. 2021; Leary 2020; Willis 1996).

Miscellaneous prehistoric wares
The significant groups of earlier prehistoric pottery from this project have been discussed above by Brook. A further 579 small handmade sherds with a mean sherd weight of 5.58 g were recorded. A small number of fragments of handmade pottery were recorded in the archive following the codes established by Knight (1998). Many of these sherds, because of their condition, were of uncertain date. See assessment documents for further details (Wessex Archaeology 2023a; 2023b).

Transitional 'Iron Age tradition' wares
IAGR1 Native tradition grog/clay pellet-gritted ware (Rowlandson and Fiske 2023d). These vessels were wheel-made or wheel-finished. It is likely that broadly similar fabrics were made at a number of small production sites across the county in the 1st to mid-2nd century AD (Darling and Precious 2014, IAGR). This was the most numerous transitional fabric group from the scheme, followed by IAGR2. The majority of IAGR1 vessels were wedge-shaped jars or large bowls, with occasional examples of jars with everted rims, necked and cordoned jars (Fig. 8.24.100), lid-seated jars (Fig. 8.24.101) and large bowls with no neck (Fig. 8.10.12). An example of a comb-decorated storage jar was also recorded from Magers Lane. Examples of this fabric group were present across the scheme at all of the sites with early Roman activity. Further examples of this fabric grouping have been published from sites along the east coast of Lincolnshire (Rowlandson and Fiske 2023d; 2024a), where a similar range of forms was observed.

IAGR2 Native tradition shell-gritted ware with some quartz and grog/clay pellets (Rowlandson and Fiske 2023d). This fabric group was common on many of the sites from the project and succeeds the handmade Iron Age shell-gritted IASH1, with most IAGR2 vessels being wheel-made or wheel-finished. Examples of this fabric grouping have been recorded from the Hornsea One and Immingham A180 schemes where they were also common (Rowlandson and Fiske 2023d; 2024a). It appears likely that broadly similar fabrics within this group were produced in both the north and south of Lincolnshire. Illustrated vessels from this scheme include a jar with a wedge-shaped rim from Ailby Lane (Fig. 8.12.32) and another from the Magers Lane site (Fig. 8.17.62). This fabric group was also common at Walk Hill. Also attributed to this grouping, from the south of the county, were necked jars – similar to types known from Bourne and Morton Saltern – found at the Six Hundreds Drove site (Fig. 8.24.102), along with a channel-rimmed jar and a necked storage jar (JS52). Precious noted in the Morton Saltern report (2001) that these southern types probably preceded the development of the main phase of shell-gritted pottery production that developed at Bourne and probably other sites in the south of the county.

IAGR3 Native tradition coarse quartz-gritted ware (Rowlandson and Fiske 2023d). Vessels attributed to this fabric group were recorded from the north-east of the scheme at Sea Bank Farm and White Crofts, where examples of the Roxby type A lid-seated jar (J105) were noted.

IAGR4 Native tradition ware with common to abundant quartz sand and moderate to common grog/clay pellets (Rowlandson and Fiske 2023d). Forms in this fabric included examples of the lid-seated J105 (Rowlandson and Fiske 2023d, figs 4.3.6 and 4.5.30), a large bowl with a wedge-shaped rim (BNAT), and an example of a distinctive large, flanged bowl type (BFB412, Rowlandson and Fiske 2023d, fig. 4.76.67) from the Walk Hill site. A small group including a lug-handled jar was recovered from Mown Rakes and a larger group from Magers Lane, where forms included jars and large bowls with wedge-shaped rims, an everted-rimmed jar, and large bowls with no neck (BNNK). Vessels in this fabric grouping were probably more likely to have been produced in the early years of the 2nd century AD (Rowlandson and Fiske 2023d, 145); production sites in the Bain Valley including Tattershall Thorpe (Cleary *et al.* 2020), or perhaps the Market Rasen area, appear possible for some of the material from this project (Darling 2005b; n.d.).

IAGR/IAGR? Miscellaneous Iron Age tradition wares (Darling and Precious 2014). A small group of sherds that did not fit the main fabric subdivisions IAGR1–4 were

recorded in this group. The most notable were a jar with an everted rim and a lid-seated jar from Walk Hill that included some large glassy quartz inclusions similar to those seen in the local Spilsby Sandstones. Native tradition wares were produced at a number of sites across the county, and a variety of small-scale local production centres making a similar repertoire of forms in a diverse range of fabrics appeared in the 1st to the mid-2nd century AD (e.g., Cleary *et al.* 2020; Rowlandson 2008b; 2024b).

Amphorae

Only 35 amphora sherds from a maximum of 26 vessels were retrieved from the Interconnector route. There were few large fragments, cross-joining vessels between contexts, or rim sherds present from any of the sites. The presence of amphora sherds can be used to imply access to amphora-borne goods such as olive oil and wine. However, some caution should be exercised for rural sites in Lincolnshire with only a few fragments recovered, as amphora sherds had many re-use functions, e.g., as refilled containers, tools or, in the absence of building stone, for structural functions (along with re-used CBM) in buildings or hearths (see Peňa 2007). The small quantity of amphorae from Viking Link are what might be expected and is similar to a number of other groups studied by the author from Lincolnshire (Rowlandson 2019a; Rowlandson and Fiske 2018; 2020b; 2020c; 2023d). However, the absence of amphora sherds does not preclude the possibility that the inhabitants acquired smaller quantities of imported goods from larger settlement foci (Score 2010) and transported them to their 'basic rural' sites decanted into more perishable containers such as skins or barrels (Bidwell 2009; Brown *et al.* 2001). But as there has been little supporting evidence from ORA schemes thus far, it appears unlikely that the inhabitants of basic Roman rural sites had regular access to amphora-borne goods at their homesteads.

DR20 Dressel 20 type amphorae (Tomber and Dore 1998, BAT AM 1 and BAT AM 2). The majority of the amphora sherds were classified as Dressel 20 types from the ubiquitous globular Spanish Dressel 20 type typically produced to hold olive oil and other olive-based products. Nearly all of the sherds in this group were in the gritty early Roman fabric variant or the smoother buff-coloured variant more commonly associated with 2nd-century AD form variants. Only one example of the later, finer, mid-red/orange fabric (Tomber and Dore 1998, BAT AM 2) was recorded on the scheme, and this came from the Hagnaby Grange site. All the remaining sherds were recovered in small numbers from Sea Bank Farm, White Crofts, Ulceby Cross, Walk Hill, Six Hundreds Drove and trial trenches 262 and 483 (in Zones 1 and 3 respectively). Only one undiagnostic rim fragment was present, and many sherds were in poor condition. Use wear was not evident on many vessels but one handle fragment from Six Hundreds Drove appeared to be worn and possibly re-used as a rubber or a pestle, as has been observed on other fragments of amphora handles and feet (Croom 2001; Peňa 2007; Webster 1967).

GAU Gaulish amphorae (Darling and Precious 2014; Tomber and Dore 1998, GAL AM1). Three Gaulish amphora body sherds were recorded from the Sea Bank Farm and White Crofts sites from uncertain amphora forms, probably flat-bottomed Gauloise-type vessels.

AMPH Miscellaneous amphorae. Two small light-fired oxidised sherds, probably from Gaulish amphorae, were noted from Hagnaby Grange and trench 262.

Mortaria

MOLIN? Possible Lincolnshire mortaria. A single stamped sherd was recorded from Mown Rakes in a light-fired fabric (Figs 8.20.63 and 8.21). This border could not be identified by the author and may be from a production source in the Midlands, possibly Lincoln.

MOMH1 Mancetter-Hartshill mortaria with sandier fabric and 'mixed trituration grits' (as Pollard 1999, MO12). A single vessel from Sea Bank Farm was attributed to this fabric with a hooked rim and low bead, likely to date to the first half of the 2nd century AD (Gillam 1970, Type 242).

MOMH2 Mancetter-Hartshill mortaria with pipeclay fabric and fired clay trituration grits (as Pollard 1999, MO4). Small numbers of sherds were recorded in this fabric from Sea Bank Farm, a hammer-head type from White Crofts, a sherd from Walk Hill, and a triple-ribbed rim type from Six Hundreds Drove.

MOMH3 Mancetter-Hartshill mortaria with meta-sediment trituration grits and a sandy white fabric (Pollard 1999, MO19). Hook-rimmed mortaria of this type were recorded from Sea Bank Farm, Walk Hill and Mown Rakes, the latter with a stamp of die 4 of the potter Sarrivs (Figs 8.20.64 and 8.22). A single sherd was noted from White Crofts.

MONV Nene Valley mortaria (Tomber and Dore 1998, LNV WH). A single sherd from a Lower Nene Valley white ware mortarium was recovered from White Crofts towards the north-east end of the route.

MORT Miscellaneous mortaria. A small number of mortaria of uncertain production sources were recorded from White Crofts, Walk Hill, Magers Lane and Six Hundreds Drove. Of note were a heavily abraded rim fragment from Six Hundreds Drove that may have been a Gaulish import, and from Magers Lane a '*fecit*' stamped mortarium from a mortarium of G. Attivs Marinvs that was probably a Mancetter-Hartshill product (die 6/6A, Figs 8.17.55 and 8.18–19; see discussion below).

MOSP Swanpool mortaria (Tomber and Dore 1998, SWN WS). Two mortaria that were a good match for the products of the Swanpool kiln were recorded: a vessel with a reeded rim from Ailby Lane and a hammer-head type from Raithby Lane.

MOSPT Swanpool-type mortaria. Vessels in the Swanpool tradition, possibly from other production sources (Rowlandson and Fiske 2023d). The majority of the sherds were recorded from the north of the scheme: from White Crofts, Ailby Lane, Walk Hill and Raithby Lane. Diagnostic types were mostly bead- and flange-rimmed mortaria, with a single reeded rim type.

MOUNV Upper Nene Valley mortaria (Tomber and Dore 1998, UNV WH). A single sherd from a mortarium with white grog/clay-pellet inclusions and a lipped rim was recorded from Six Hundreds Drove (form Darling and Precious 2014, MFL). This type is known to have been produced in Northamptonshire. The presence of other light-fired grog-gritted wares BWHGR and BWHSY at Mown Rakes and Six Hundreds Drove provide further evidence of small quantities of pottery reaching the site from Northamptonshire (see below).

There were few mortaria from the project likely to date to the early Roman period. One hook-rimmed vessel from Six Hundreds Drove may have been a Gaulish import but was only represented by a small sherd in poor condition. A hook-rimmed mortarium stamped with die 6/6A of G. Attivs Marinvs that was produced in AD 110–130 at Mancetter (or perhaps Lincoln) was recorded from Magers Lane, a Mancetter-Hartshill hook-rimmed mortarium in the 'mixed trituration grit fabric' (Gillam 1970, type 242) from the Sea Bank Farm site, and a good range of hook-rimmed Mancetter-Hartshill mortaria were present at Mown Rakes, including a vessel with a Sarrivs stamp (Fig. 8.20.64). The range of material present highlights the importance of the Mancetter-Hartshill industry, also a feature of a number of sites studied by Hartley at Dragonby and Sleaford (Elsdon 1997; Parminter and Hartley 1996). A hook-rimmed mortarium with a fragment of a stamp, possibly from Lincoln (Fig. 8.20.63), also from Mown Rakes, was the only other vessel of note not from Mancetter-Hartshill likely to date to the 2nd century AD. The small quantity of Nene Valley mortaria from this project, despite the good range of Nene Valley grey wares present, is of interest.

In general, there were few mortaria retrieved, though Mancetter-Hartshill mortaria were well represented among the assemblage from the 2nd and 3rd centuries AD. The majority of the late Roman mortaria from the scheme were Swanpool types

recorded from the north of the scheme. The low level of Nene Valley mortaria present probably reflects the prevalence of Mancetter-Hartshill products in the 2nd and 3rd centuries AD, and the fact that the activity on the Fen sites of Mown Rakes and Six Hundreds Drove had ended by the late Roman period, before Nene Valley types became more common on sites in the south of the county such as Baston (Darling *et al*. 2020).

Other fine wares

MOSL Moselkeramik (Darling and Precious 2014; Tomber and Dore 1998, MOS BS). This fabric is considered to have reached Britain *c.* AD 180/190–250 from the Trier region and it is one of the more numerous imported fine wares from excavations at Lincoln (Darling and Precious 2014, 17–18). Nearly all examples recorded by the author from Lincolnshire were from Lincoln itself, with a limited quantity noted from roadside settlements such as Navenby (Rowlandson and Fiske 2024c). Examples are rare from basic rural sites, with occasional sherds recovered from coastal sites such as the Able UK scheme near North Killingholme (Rowlandson *et al.* 2017). Sherds from two beakers were recovered from Sea Bank Farm.

OXFIN Miscellaneous fine oxidised wares (Darling and Precious 2014). A small range of fine oxidised wares with red-orange fabrics were recorded from the project. The vessels included a carinated bowl from Sea Bank Farm, a bag-shaped beaker with diagonal comb stamping from Walk Hill, and a cornice-rimmed beaker and a large lid from White Crofts. These small sherds were probably all produced in the early to mid-Roman period. The low levels of fine oxidised wares of this type are what might be expected from basic rural sites in Lincolnshire.

LOND London ware (Darling and Precious 2014). A single fine grey ware sherd with combed line decoration was recovered from Six Hundreds Drove. Vessels with this type of decoration are known to have been produced in the Nene Valley (Perrin 1999), and with the exception of a few rare examples from Lincoln, mostly occur in the south of the county at sites such as Sleaford (Elsdon 1997; Rowlandson 2010), Grantham (Rowlandson and Fiske 2022b), Bourne (Darling 1997) and Stainfield (Davies 1995). The distribution suggests that many of these vessels may have been produced in the Nene Valley at sites noted by Perrin (1980) or reflect potters in southern Lincolnshire working in the Nene Valley 'London ware tradition' rather than the 'Parisian ware tradition'. An example of a London ware tradition more akin to examples from the south-east of England/London region was also noted from the Triton Knoll scheme (Rowlandson and Fiske 2023e; 2024a).

PART Parisian ware (Darling and Precious 2014; Tomber and Dore 1998, LMR FR). Small quantities of undecorated Parisian wares were recorded, mostly from the north-eastern end of the project, with examples from Sea Bank Farm, White Crofts, Walk Hill, Magers Lane and Raithby Lane. Forms present included poppy-head beakers and beakers with everted rims. These wares were known to have been produced at Market Rasen in the 2nd and 3rd centuries AD (Darling 2005b; Darling n.d.; Elsdon 1982; Samuels 1983; Veres and Rowlandson 2024a; 2024b).

GFIN Miscellaneous fine grey wares (Darling and Precious 2014). A large proportion of the fine grey wares from this scheme were not attributed to a specific fabric group. The material from Sea Bank Farm included a carinated beaker and a cornice-rimmed beaker (Fig. 8.10.1), with further sherds from the White Crofts and Ailby Lane sites. A bead-rimmed beaker and a poppy-headed beaker were found on the Walk Hill site and a platter came from Magers Lane (Fig. 8.17.56). Further small quantities came from Callow Carr, Raithby Lane and Hagnaby Grange. At the southern end of the scheme a bowl from Six Hundreds Drove (No. 73, not illustrated) and a beaker from Mown Rakes with an everted rim were recorded. The fabrics used for the production of beakers and bowls, and the sherds in this group, were probably mostly produced in Lincolnshire or the Nene Valley.

NVMIC Nene Valley mica-dusted ware (Darling and Precious 2014). Mica-dusted wares are unusual from Lincoln, but a vessel from Six Hundreds Drove mimicking samian form 31 (Figs 8.23.72 and 8.26) may be a Nene Valley product or imported from further afield.

MICA Miscellaneous mica-dusted wares (Darling and Precious 2014). One of the most surprising vessels from the scheme was the mica-dusted 'wine-strainer' form (Davies *et al.* 1994, fig. 116. 745, London form 9M46) from Six Hundreds Drove (Figs 8.23.71 and 8.25). The vessel had a fine oxidised mica-dusted fabric, possibly a continental import or from southern Britain, where local production was taking place at London in the Flavian to Trajanic period (Davies *et al.* 1994, LOMI). No examples of this type of vessel are known to the author from Lincolnshire, although a number of the mica-dusted bowls and dishes from Lincoln may also have been imported from London (*cf.* Darling and Precious 2014, no. 132–33; Davies *et al.* 1994, fig. 115. 740–741).

CC1 Nene Valley-type colour-coated wares with light-fired fabrics (see Cooper 2011; Fiske and Rowlandson 2023; Peachey 2012; Perrin 1999; Rowlandson and Fiske 2022c; Webster 1944). This group of colour-coated wares was the most numerous from the project. Recent work on pottery production sites near Lincoln, Swanpool, South Carlton and at Great Casterton has shown that a range of colour-coated wares were produced in similar fabrics in the Nene Valley and several sites in the East Midlands with access to light-firing clays.

Beakers were the most common form from the Viking Link scheme, with examples of rough-cast types recorded from Mown Rakes and Six Hundreds Drove that also had cornice-rimmed (Fig. 8.23.69) and everted-rimmed vessels with barbotine hairpin decoration (Fig. 8.23.70). The range of colour-coated wares from Mown Rakes and Six Hundreds Drove were types that might be expected from the mid-2nd to mid-3rd century AD, with a lipped bowl from Mown Rakes and a Castor box and a flagon from Six Hundreds Drove. Cornice-rimmed beakers and a funnel-necked beaker, but no diagnostically later forms, were recorded from Sea Bank Farm. The latest types were recorded from White Crofts, where examples of a straight-sided bead and flanged bowl, a hemispherical flanged bowl (B38), a funnel-necked beaker, and scale and folded beakers were present. This range of forms represents activity on the site into the late Roman period and is similar to late Roman groups recorded from coastal sites in north-eastern Lincolnshire (Rowlandson and Fiske 2024a; Rowlandson *et al.* 2017). It was noticeable that the limited range of colour-coated wares from Mown Rakes and Six Hundreds Drove perhaps reflects a limited supply of pottery from the Nene Valley. It is also a result of limited activity on the sites by the late Roman period when, after the end of Nene Valley grey ware production, bowls and jars became more commonly produced in colour-coated fabrics (Perrin 1999). This late Roman colour-coated repertoire has been observed at sites in the very south of the historic county of Lincolnshire at sites such as Baston, which was in the main sphere of the Nene Valley production sites (Darling *et al.* 2020), whereas sites on the northern Fen-edge such as Sleaford and Ancaster yielded few of the colour-coated necked jars and bowls that were commonplace in the Nene Valley (Fiske and Rowlandson 2023). These necked jar- and bowl-type vessels appear to be absent from the Viking Link assemblage because the sites at the south of the scheme had largely been abandoned by the late Roman period, and the late Roman activity at the north-east of the scheme at White Crofts lay outside the main area of distribution of pottery from the Nene Valley. Zone 1 sites received only the beaker and table ware colour-coated forms from the Nene Valley or Lincoln, with the local inhabitants utilising local grey ware jars (Fiske and Rowlandson 2023; Rowlandson and Fiske 2018).

CC2 Colour-coated wares with dark slips and red/orange slips typical of late Roman colour-coated beakers from Lincoln and the Nene Valley (Rowlandson and Fiske 2023d). A single sherd from a paint-decorated beaker was recovered from the White Crofts site.

CC3 Colour-coated wares with pale oxidised cores and orange or self-slipped fabrics (Rowlandson and Fiske 2023d). Sherds from three vessels were attributed to this fabric group, including a beaker from Walk Hill, a flagon or jar from Cheals Close and a paint-decorated beaker from Sea Bank Farm.

NVGCC Nene Valley Grey colour-coated ware (Darling *et al.* 2020; *cf*. Dannell *et al.* 1993). This grey colour-coated ware was known to have been made at Stanground in the early to mid-3rd century (Dannell 1973; Dannell *et al*. 1993). The deeper grey surfaces of this fabric give a metallic pewter-like finish, and it was commonly used to produce copies of samian bowl form 36 (B36), with a number being stamped. Examples of these stamped vessels have been noted from 'a wide area of the Fens' (Dannell *et al*. 1993, 91). Examples from this project consisted of a fragment from a B36 bowl from Mown Rakes and two bowls from Six Hundreds Drove, one a B38 bowl with barbotine leaf decoration. Both sites fit with the Fenland distribution known for this fabric.

SPCC Swanpool colour-coated ware (Darling and Precious 2014; Tomber and Dore 1998, SWN CC). Two straight-sided bead and flanged bowls were recorded from the Raithby Lane site. These vessels appear to be a good match with the 4th-century AD products of the Swanpool kilns (Webster and Booth 1947).

Oxidised wares

CR/CR? Miscellaneous white wares (Darling and Precious 2014). Small quantities of white ware were recorded from most of the sites that had early and mid-Roman activity, suggesting the inhabitants had access to table wares such as flagons. This fabric group probably includes vessels produced in Lincoln, the Nene Valley and possibly in the Mancetter-Hartshill area. Small quantities of white ware were recorded from Sea Bank Farm, White Crofts and Ailby Lane in Zone 1, and from Walk Hill, Magers Lane and Hagnaby Grange in Zone 2. White wares were most numerous among the Zone 3 assemblages from Mown Rakes and Six Hundreds Drove. Illustrated vessels include a flagon with an expanded top rim from Magers Lane (Fig. 8.17.57) and a pinch-necked flagon from Six Hundreds Drove with a batch mark (Fig. 8.23.74). Other notable vessels included segmental flanged bowls (BSEG) from Mown Rakes and Six Hundreds Drove, a type known to have been produced in the Nene Valley (Perrin 1999), and a necked jar from Six Hundreds Drove.

CR1 White wares, probably from Lincoln (*cf*. Tomber and Dore 1998, LTC WH). A single vessel was attributed to this fabric group from Partney Leys, probably a flagon.

OX/OX? Miscellaneous sandy oxidised wares (Darling and Precious 2014). Orange to red-fired oxidised wares were present in small quantities from several sites. These wares are not common from sites in the historic county of Lincolnshire, where reduced wares were favoured. A few early Roman pottery production sites including Dragonby (May 1996) produced oxidised wares in the early Roman period, such as the distinctive B321V bowl (Fig. 8.12.35) and hemispherical bowls (Fig. 8.12.34) recorded from Ailby Lane. A further hemispherical bowl from Sea Bank Farm is also illustrated (Fig. 8.10.2), probably representing an attempt to produce table ware to mimic samian form 37 prototypes. Sherds from a flagon, a necked jar or bowl and a bowl mimicking samian form 31 were also noted from Walk Hill. Examples of the OX fabric group were also more common in late Roman assemblages such as Raithby Lane, at a period when oxidised table wares were produced at a number of sites including Swanpool and Oxfordshire. A necked jar (J162) and a hemispherical flanged bowl (B38) were recorded from Raithby Lane.

OXC Coarse oxidised wares (Rowlandson and Fiske 2023d). A single coarse oxidised ware sherd was recorded from Raithby Lane, associated with pottery dating to the later 4th to early 5th century AD. This fabric appears likely to be the oxidised equivalent of GREYC (see below).

OXL Light-orange/pink oxidised flagon wares (Rowlandson and Fiske 2022c). Three vessels were attributed to this fabric group, all flagons or jars recovered from White Crofts and Magers Lane. A further tiny flake from Hagnaby Grange was tentatively attributed to this fabric group, although this may have been from an imported vessel.

OXWS Oxidised white-slipped wares (Darling and Precious 2014). Sherds from two vessels attributed to this fabric group were recorded, one from White Crofts and the other from Walk Hill. White-slipped sherds are rare from Lincolnshire as most flagons were manufactured using light-firing clays (*cf*. Darling and Precious 2014 fabric CR).

PARC Light-fired paint-decorated Parchment wares (Darling and Precious 2014). Sherds from two vessels were recorded from Mown Rakes, notably a segmental flanged bowl with red-painted 'sun motifs' on the flange formed by a dot encircled by smaller dots. Similar examples were manufactured in the Nene Valley, which would appear a likely source for this vessel (Perrin 1999).

PINK Pink Micaceous ware (Darling and Precious 2014). This early Roman fabric is known from Lincoln and was mostly used for the production of flagons. A single possible example of a sherd from a flagon or jar in this fabric was recovered from White Crofts. Finds of this fabric are rare outside Lincoln.

SPOXT Swanpool-type oxidised wares (Rowlandson and Fiske 2023d). Late Roman oxidised wares in the Swanpool self-slipped tradition were recorded from White Crofts, and included a hemispherical flanged bowl (B38); a bowl broadly mimicking samian form 36 (B36) came from Raithby Lane.

VRW? Verulamium region white ware (Darling and Precious 2014). Two small body sherds were recorded from Mown Rakes and a ring-necked flagon (Davies *et al.* 1994, London form 1BG) from Sea Bank Farm. A variety of stamped Verulamium white ware mortaria from the Fens were published over 50 years ago (Hartley and Hartley 1970), but few good examples of other types of Verulamium white ware vessels have been recognised from the Lincolnshire Fens and the broader county of Lincolnshire since. Small numbers of sherds have been recognised from Lincoln itself (Darling and Precious 2014, 75), and among larger collections studied by the author from Sleaford, Spalding, Grantham and the Horncastle Playing Fields site (Rowlandson 2010; Rowlandson and Fiske 2020a; 2022b; M. J. Darling, pers. comm. – site code HAWP06). A recent find from a rural site in Sibsey of a ring-necked flagon (Rowlandson 2024a) has added a further find spot. It might be expected that these flagons moved from London alongside mortaria and other wares such as samian, possibly Highgate Wood C beakers and other exotica that have been recognised within assemblages from recent investigations along the Lincoln Eastern Bypass scheme (Rowlandson and Fiske 2021c).

Reduced wares

BB1 Black Burnished ware 1 (Darling and Precious 2014). Black Burnished ware 1 types likely to be from south-east Dorset reached Lincoln in small quantities but are seldom found at other sites in Lincolnshire, which appears to have been well served by local grey ware pottery producers. Sherds from just over 20 BB1 vessels were recorded from across the scheme. A few small sherds were recorded from White Crofts, Walk Hill and Mown Rakes, but most of the sherds were recovered from Sea Bank Farm, where examples of a lipped bowl, a jar with an out-curved rim, and a jar with an everted rim and wavy line decoration, probably Hadrianic in date, were noted.

BB2/BB2? Black Burnished ware 2 (Darling and Precious 2014). A small quantity of BB2 body sherds were recorded from Walk Hill, but the majority of examples came from Sea Bank Farm. Most of the vessels recorded were bowls or dishes, including a bowl with a grooved rim, a bowl with a triangular rim, and bowls with rounded rims (BG225, as Gillam 1970, type 225). Although BB2 is seldom recorded from Lincoln or much of Lincolnshire (Darling and Precious 2014), there is a small but growing quantity of sherds from the east

coast, including a group from Wrangle (Darling and Precious 2001). The BB1 and BB2 material from Sea Bank Farm provides further examples of Black Burnished wares reaching Lincolnshire and suggests that the proximity to the coast brought the possibility of coarse wares being acquired from coastal traders, perhaps in exchange for goods such as salt.

BBT Black Burnished-type wares. A handful of sherds with a Black Burnished ware-type fabric that could not be attributed to the known BB1 production sites were noted from Magers Lane, Raithby Lane, Mown Rakes and Six Hundreds Drove. Notable examples were a jar with an out-curved rim and burnished lattice decoration from Mown Rakes (Fig. 8.20.68) and a spalled lipped bowl with burnished decoration from Six Hundreds Drove; the latter may have been a local product (Fig. 8.24.98).

BWHSY Burnt sandy white ware (Timby 2009). A single sherd from Six Hundreds Drove was attributed to this fabric, possibly from Northamptonshire.

DSSA/DSSA? Dark-surfaced grey wares (Rowlandson 2011c). Examples of dark-surfaced grey wares are typically dated to the mid-1st to mid-2nd century AD and represent a ware type produced at a number of sites in Lincolnshire. Examples from Zone 1 may represent the earlier range of pottery production in the Market Rasen area (Rowlandson and Fiske 2023b, GREY3). Examples from the Zone 1 sites White Crofts and Ailby Lane included a typical range of B334 carinated vessels (Fig. 8.12.36), the D452 dish, jars with everted rims, some with rustication, a lipped bowl and a bowl with a grooved rim – all types highlighted by Darling and Precious as the typical range of early Roman products common in the Lindsey region of Lincolnshire (2014, 136–9). Production in the Market Rasen area and no doubt closer to Lincoln appears likely.

At the southern end of the scheme there was a range of products more akin to examples published from Sleaford and types from the Sleaford Bonemill Lane kiln (Rowlandson 2008a; 2010; 2024b; *cf*. Elsdon 1997). Examples from Sleaford included a range of jars with cordoned and necked 'Belgic' styles, carinated vessels (Elsdon 1997, fig. 79. 399), copies of samian forms, Gallo-Belgic platter types, rusticated jars, bowls or strainers with reeded rims, and cheese presses. Although production is now known from Sleaford, in this period pottery was probably made at a variety of small-scale kiln sites (see also Rowlandson 2008b). Pottery in this fabric was well represented in the Walk Hill, Magers Lane and Hagnaby Grange assemblages (all Zone 2), with small quantities of B321V, B334, bead-rimmed necked jars (Fig. 8.17.58), a wedge-rimmed jar and everted-rimmed rusticated jars. From Zone 3 there were a few examples of the DSSA fabric group, with a small range of necked and cordoned jars, bowls that included a multi-cordoned/corrugated type similar to examples from Sleaford (Fig. 8.23.77), and a rusticated jar.

GROL Grey ware with sparse/rare ooliths (Rowlandson 2011c). A single everted-rimmed jar in this fabric was recorded from Mown Rakes (form as Darling and Precious 2014, no. 805). Examples of grey wares with calcareous ooliths are known from Navenby and Grantham (Rowlandson 2011c; Rowlandson and Fiske 2022b). Handmade wares with ooliths are common in the Ancaster area, which would appear to be the most likely source for the grey wares with ooliths from southern Lincolnshire.

GREY Miscellaneous sandy grey wares (broadly as Darling and Precious 2014). Pottery from this ubiquitous ware grouping was the most common from the scheme. Grey ware types are discussed on a site-by-site basis below. The grey wares from this scheme have not been subdivided in the same fashion as those from the Triton Knoll scheme (Rowlandson 2019c; Rowlandson and Fiske 2018; 2020b; 2020c). More detailed discussion is provided in the summary by site. Some broad themes can be observed if the vessels attributed to the GREY group are considered by Zone.

The grey wares from Zone 1

The range of forms from the north-east of the scheme appears similar to the range of fabrics and products produced at the Market Rasen kilns and in the surrounding area,

perhaps stretching as far north as Barnetby Top (Darling 2005b; n.d.; Samuels 1979; 1983; Veres and Rowlandson 2024a; 2024b). Similar observations have been made of the pottery published from the Hornsea One and Immingham A180 schemes (Rowlandson and Fiske 2023d; 2024a). At present there is limited evidence for pottery production along the east coast of Lincolnshire, but sites may have been lost to erosion, buried by silting or remain to be found. The small quantity of misfired pottery at Stallingborough is of interest but the industrial activity on that site, in light of recent finds, may mostly relate to late Roman salt production (Rowlandson 2011a). The visual similarity of the grey wares from the Zone 1 with products of the Market Rasen area makes it likely that those kilns, from the west of the Wolds, were the major source of coarse wares in this part of the Lincolnshire Marsh.

The grey wares from Zone 2

The grey ware from the Zone 2 sites had similarities with material from the Market Rasen area (Darling 2005b; n.d.; Samuels 1983; Veres and Rowlandson 2024a; 2024b) and the grey wares with more angular sand from the Tattershall Thorpe production site in the Bain Valley (Cleary *et al.* 2020). Both produced a similar range of forms, and no attempt was made to split these fabrics for this report.

The grey wares from Zone 3

The pottery from the Zone 3 sites was more difficult to characterise as there have been fewer Roman pottery kiln assemblages studied from the south of the county. It appears possible that some of the medium sandy grey wares recorded with the GREY code may have reached the site from adjacent counties. The grey wares from these sites may have been produced from a more diverse range of sources, but the presence of pottery waste from the Six Hundreds Drove site makes it possible that a proportion of the pottery present was made nearby. Other sources for the Zone 3 GREY vessels in the areas around Sleaford (Rowlandson 2024b), Bourne (Darling 1997) and perhaps Tattershall Thorpe (Cleary *et al*. 2020) are more likely, rather than looking exclusively towards Lincoln or Market Rasen as major sources of coarse ware for sites in the Fens (contra Gaunt *et al*. 2024). Without a more detailed scheme of fabric analysis supported by chemical and thin-section studies (e.g., Spoerry 2016) the replicable identification of grey ware fabrics and attribution to a production source for much of the Lincolnshire grey wares will remain a challenge (Darling 1989).

The pottery production waste from Six Hundreds Drove (see below) appears to have mostly been fired to a mid-grey surface colour and vessels had a medium sandy fabric. The range of misfired forms that could be recognised included:

- a dish with a grooved rim (DGR) Figs 8.23.85 and 8.28;
- a lipped dish or bowl (BFL) Fig. 8.24.98;
- a bowl with a reeded rim similar to Bourne types (BBN3) No. 86;
- jars with frilled decorations (BK120) Figs 8.23.88–89 and 8.30;
- jars or beakers with cordoned/corrugated profiles (JCOR) Fig. 8.24.91;
- jars or beakers with curved rims and scored horizontal grooves on the shoulder (JCUR) Figs 8.23.87, 8.24.93–95, 8.29 and 8.31;
- a necked jar (JBN3) Fig. 8.24.96.

Other forms from the site that had evidence for use such as a cheese press (Fig. 8.24.97) may have also been made on site, but this could not be confirmed. With the exception of the frilled BK120 form, which in Lincolnshire appears to be almost exclusively found and made in Lincoln, and the vessel with the corrugated or cordoned profile that is similar to a Nene Valley grey ware type, the other types appear broadly similar to the repertoire of the potters making shell-gritted wares at Bourne in the 2nd and 3rd centuries AD. The necked or curve-rimmed jars with shoulder grooves, the simple lipped bowl and the bowl with a reeded rim top all find parallels among the shell-gritted kiln material illustrated by John Samuels in his PhD thesis (1983), and unpublished notes on the industry put together by Barbara Precious for the Morton Saltern report

(2001). As such, this would appear to be the work of a potter looking to produce vessels that were commonly made by potters producing shell-gritted vessels at Bourne and in the Nene Valley, probably in the second half of the 2nd century AD or early in the 3rd century AD. The production of the BK120 form appears to be an unusual flourish but a very similar vessel has been illustrated from Tytton Lane, Boston (Rowlandson and Fiske 2019a, no. 6) that may be a product of the Six Hundreds Drove site. The more nondescript forms in a fairly ubiquitous 'medium sandy grey ware' will be more difficult to recognise on other sites, although revisiting collections from surrounding parishes may help. A jar with a curved rim and scored groove from the Holland Fen with Brothertoft Parish (Rowlandson and Fiske 2018, no. 16) and possibly vessels drawn from Sapperton (Samuels n.d., nos 33–6) appear similar, although as grey ware wasters are known from Bourne, there is no guarantee that similar grey ware vessels were not also produced at sites further west (Darling 1997). As such, a limited distribution of grey wares from the Six Hundreds Drove site might be anticipated in the Boston to Donington area but, in the absence of a detailed scheme of scientific analysis, it is difficult to establish whether the industry had a distribution beyond the site itself and a short period of production. There were no obvious examples of the illustrated pottery waste types from the neighbouring site at Mown Rakes.

GREYB High-fired late Roman grey wares (Rowlandson 2011a; Rowlandson and Fiske 2023d). These wares have been recorded from a range of sites in north-eastern Lincolnshire and production of at least a proportion of this material appears to have occurred in the late Roman period at Market Rasen (Veres and Rowlandson 2024a; 2024b). The sherds from this project were all recorded within the Sea Bank Farm and White Crofts assemblages, and comprise a typical range of late Roman forms such as curve-rimmed jars, Dales-type jars, a lug-handled jar, carinated vessels (Darling and Precious 2014, no. 1160), wide-mouthed bowls (BWM2-3), lipped bowls, plain rimmed dishes, and straight-sided bead and flanged bowls. GREYB types have been recorded at several sites from the latest part of the Roman period within this part of Lincolnshire, including Hatcliffe Top (Rowlandson and Fiske 2019b).

GREYC Coarse grey wares (Rowlandson and Fiske 2023d). The vessels attributed to this ware group all appear to be late Roman coarse quartz-gritted types reflecting local versions of the coarse quartz-gritted fabrics seen from Lincoln and the north often used for lid-seated jars (*cf.* Darling and Precious 2014, LCOA; Bidwell and Croom 2010). Production of similar wares occurred near Market Rasen at Linwood Warren (Samuels 1983), but other sites along the Wold edge also produced broadly similar wares. The Sea Bank Farm had a few examples of Dales-type jars and a lid-seated jar type, and a small range of GREYC vessels were present at White Crofts, including a lipped bowl, a Dales-type jar (Fig. 8.11.22) and double lid-seated jar. From Zone 2 there were examples of Dales-type jars from Walk Hill and a basal fragment from Magers Lane. The best assemblage was recorded from Raithby Lane where examples of straight-sided bead and flanged bowls (BFB), a bowl with an in-turned bead and flanged rim (Fig. 8.15.45), double lid-seated jars (Fig. 8.15.46) and Huntcliff-type lid-seated jars (Fig. 8.15.47) were all recorded. These forms represent a range of the latest types produced in Lincolnshire in the later 4th to early 5th century AD. Unsurprisingly, as activity on the Zone 3 sites appears to have ceased sometime in the 3rd century AD, no examples of the GREYC group were recorded from Mown Rakes and Six Hundreds Drove.

GREYS Grey ware with sparse to rare fossil shell. Grey wares including fossil shell were probably produced using Jurassic clays. Two body sherds were recorded from this scheme, one from White Crofts and the other from Walk Hill.

LEG? Lincoln Legionary grey ware (Darling and Precious 2014). One abraded body sherd with rouletted decoration recovered from Ailby Lane was considered to be either the Lincoln Legionary grey ware or Nene Valley grey ware (NVGW). Examples of Lincoln Legionary grey ware are rare outside Lincoln itself and the identification of this fabric is unusual away from military or major settlement foci (Rowlandson 2011c; 2019c). NVGW,

see below, might be a more likely identification as small quantities of this visually similar fabric were recorded from White Crofts and Sea Bank Farm.

NELGR North-east Lincolnshire early Romano-British wheel-made native tradition ware, a pale grey reduced fabric including grog which has been recognised in assemblages from Grimsby, Immingham and the Hornsea One scheme (Rowlandson and Fiske 2023d). A single jar with a wedge-shaped rim is illustrated from Ailby Lane (Fig. 8.12.33).

NVGW Nene Valley grey ware (Perrin 1999). Unsurprisingly, nearly all of the Nene Valley grey ware was recorded from the south of the scheme at Mown Rakes and Six Hundreds Drove. It has been noted by Precious on the basis of studying groups from other linear investigations across the county (*cf*. 2001) that Nene Valley grey wares are most commonly found in the south of the historic county of Lincolnshire, at sites such as Baston near Peterborough (Darling *et al*. 2020), with Sleaford representing the most northerly site where NVGW has been regularly found (Elsdon 1997; Rowlandson 2010) and only small quantities found further north (e.g., Navenby and Lincoln: Darling and Precious 2014; Rowlandson 2011c). Small quantities of NVGW sherds were noted from White Crofts and Sea Bank Farm at the north of the scheme; these were rare finds from this far north in Lincolnshire but, much like the BB1 and BB2 wares, probably represent vessels that were shipped along the coast. It was noticeable that Nene Valley grey wares were not recorded from any of the Zone 2 sites across the middle of the scheme spanning the Wolds and the Lymn Valley, where pottery products from the Market Rasen and Tattershall Thorpe production sites would have been more abundant.

NVGWC Coarser fumed grey wares with light-fired cores (Davies 1995; Precious 2001). Examples of this fabric group have been recorded from sites in the south of the county, and production sources in Lincolnshire utilising sandier iron-poor clays, such as those near Stamford, are possible (Rowlandson and Fiske 2022b). The range of forms suggests vessels were mostly produced in the 2nd century, although production possibly began in the later 1st century AD. Most sherds were recorded from Zone 3, with examples of a lipped bowl from Mown Rakes, jars (Figs 8.23.80–81), a rusticated jar and a lid (Fig. 8.23.79).

NVGY Early Roman grey ware fabric (Davies 1995; Precious 2001). This finer fabric was exclusively recorded from Zone 3 sites. A small number of body sherds were recorded from Mown Rakes, but most examples were recorded from Six Hundreds Drove, including a hemispherical cup (Fig. 8.23.75), a conical beaker form (BKC120), a cordoned beaker (BKCOR), necked jars and a rusticated jar (Fig. 8.23.76). The range of forms was similar to that seen from other sites in the area such as Morton Saltern (Precious 2001). A local or Nene Valley production source for this fabric appears most likely.

SLGY Early Roman grey ware fabric (Davies 1995; Precious 2001). A single sherd was recorded from Mown Rakes and two tiny scraps, one each from Sea Bank Farm and White Crofts, were tentatively attributed to this fabric, which has mostly been recognised in the south of the county, around Bourne.

Roman grog-gritted wares

BWHGR Northamptonshire type 'burnt' grog-gritted white ware (Timby 2009). A light-fired grog-gritted fabric with burnt surfaces known to have been produced in Northamptonshire. Examples include a lipped bowl from Mown Rakes (Fig. 8.20.66) and fragments from two vessels from Six Hundreds Drove, one most probably a jar with a rilled shoulder. This fabric type is rare from Lincolnshire but probably represents a small number of vessels from the Upper Nene Valley.

GROG Reduced sandy grog-gritted wares with grog/clay pellets, kiln-fired and wheel-made (Rowlandson and Fiske 2023d). Examples of this fabric type are known from Market Rasen and Tattershall Thorpe, where it was often used for larger jars and bowls. Examples of large bowls with no necks (Fig. 8.10.11), large bowls with wedge-shaped rims and the BFB412 large bowl type were recorded from the Zone 1 sites from

types known from Market Rasen and Tattershall Thorpe. In Zone 2, small numbers of sherds were recorded from Walk Hill, Fourteen Acres and Raithby Lane. Most of the assemblage from the Zone 3 site of Six Hundreds Drove was probably produced further south in Lincolnshire or neighbouring counties, with a more sophisticated range of bowls with cordons (Fig. 8.24.99), an everted-rimmed jar, a storage jar and a necked jar with combed wavy line.

Roman calcareous-gritted wares

CALC Miscellaneous calcareous-gritted wares. A single lid-seated Huntcliff jar was recorded from White Crofts. The vessel dated to the late 4th to early 5th century AD and appeared to have fossil shell or chalk burnt out from the fabric.

CALG Chalk or calcite-gritted ware. A single Huntcliff jar from Area 21 (Fig. 8.14.43) was attributed to this fabric that dated to the later 4th–early 5th century AD. This vessel was probably produced in the Vale of Pickering area.

DWNEL Dales ware with fossil shell and quartz sand inclusions (Rowlandson and Fiske 2023d). A small number of sherds from White Crofts including a Dales ware jar (JDW2) were attributed to this fabric. The fabric is similar to the north-western Lincolnshire products (DWSHT) in date and manufacturing style but was probably produced east of the River Ancholme and River Witham (Vince 2006).

DWSHT/DWSHT? Dales ware (Rowlandson and Fiske 2023d; Tomber and Dore 1998, DAL SH). The forms recognised from the scheme were nearly all examples of the typical JDW1 and JDW2 Dales ware jar form variants (Rowlandson and Fiske 2023d). Vessels were produced in this fabric in the 3rd to mid-4th century AD. Later wheel-made lid-seated and double lid-seated jars from the later 4th century AD that were included by Darling and Precious in their DWSH category (2014) have been isolated in the LRLS fabric group for this report. Most examples of the DWSHT fabric were recorded from White Crofts, including typical Dales ware lid-seated jars (e.g., Fig. 8.11.24) and the only bowl recorded from the scheme in this fabric (Fig. 8.11.23), with substantial groups from Sea Bank Farm and Walk Hill, with a handful of sherds from other Zone 2 sites. There were no examples of shell-gritted Dales ware from the Zone 3 sites. The absence of this fabric from Mown Rakes and Six Hundreds Drove is due to their location towards the southern edge of the regular distribution of Dales ware, as well as the fact that the sites fell out of use in the earlier 3rd century AD before Dales ware was widely distributed.

LRLS Late Roman Lincolnshire shell-gritted wares (Rowlandson and Fiske 2021c). As discussed above, this group isolated the distinctive suite of 'final Roman' wheel-made shell-gritted wares – known from sites such as The Park at Lincoln dating to the late 4th to early 5th century AD (Darling 1977; Darling and Precious 2014) – from the DWSHT shell-gritted wares. Small quantities of sherds were recorded from Walk Hill, including wheel-made copies of Dales ware jars (JDW2) and bowls with in-turned bead and flanged rims, and from White Crofts, including a straight-sided bead and flanged bowl and a double lid-seated jar (Fig. 8.11.25). The largest group was recorded from Raithby Lane, including double lid-seated jars (Fig. 8.15.48). No sherds were retrieved from Zone 3.

SHEL/SHEL? Miscellaneous shell-gritted wares. This fabric group includes much of the undiagnostic Roman shell-gritted pottery that could not be allocated to the other fabric groups, either because it was in poor condition or divergent from the main types. A small number of sherds were recorded from across the scheme. A notable small group of shell-gritted wares from Six Hundreds Drove, including a jar with a split rim (JBIF), a necked jar (Fig. 8.24.108) and a storage jar appears similar to wheel-made examples produced in the Nene Valley (Perrin 1999).

SLSHB Bourne-type shell-gritted wars (Precious 2001; Tomber and Dore 1998, BOG SH). This fabric is known to have been produced at Bourne (Samuels 1983) and other sites in the 2nd to 3rd centuries AD and probably developed from the potters producing

native tradition wares near Bourne in the early Roman period (Darling *et al.* 2020; see IAGR2 above; Precious 2001). A pattern of distribution of Bourne-type shell-gritted wares is beginning to appear, with limited evidence of these wares reaching Lincoln and Navenby, but with more consistent supply to sites in the Sleaford area (Darling and Precious 2014; Rowlandson 2011c; Rowlandson and Fiske 2018). To the north-east, small quantities reached the coastal sites at Sea Bank Farm, White Crofts and the northern end of the Triton Knoll scheme but are typically absent from the Grimsby/Cleethorpes area (Rowlandson and Fiske 2018; 2023d; 2024a). Examples of these types appear to have been most common in southern and south-western Lincolnshire near the known production source at Bourne (Darling *et al.* 2020; Rowlandson and Fiske 2022b; Samuels 1983). Most examples were recorded from Mown Rakes and Six Hundreds Drove, and necked jar types were most common (JBN3, Figs 8.20.65 and 8.24.106–107). Everted-rimmed jars (Fig. 8.24.105) and lipped bowls or bowls with grooved or reeded rims were also present at a number of sites (Figs 8.13.42 and 8.24.103–104). Most of the vessels submitted for ORA showed that these jars and bowls had contained ruminant carcass fats, suggesting that these shell-gritted jars may have been used for similar functions to the Dales ware jars that were more prevalent in northern Lincolnshire (Dunne 2023; Dunne and Evershed 2018a and 2018b; Rowlandson and Fiske 2023d; 2024a).

Site Summaries

The assessment documents preceding this publication provide a full context by context description of all of the Iron Age and Roman pottery from the scheme, including the evaluation trenches. The totals and a period summary are tabulated below (Table 8.55). This publication focuses on the more noteworthy groups (marked with an asterisk * in Table 8.55) and the assessment texts should be consulted for a description of the smaller assemblages not discussed here (Rowlandson and Fiske 2021a; 2023a; 2023b; 2023c).

Zone 1

A total of 4635 Iron Age and Roman sherds (82.587 kg, 75.67 RE, mean sherd weight 17.82 g) were recovered from Zone 1 mitigation areas, most notably from the Sea Bank Farm and White Crofts sites. The range of material is similar to a number of sites investigated as part of the Triton Knoll project and comparable coastal sites near Skegness and in the Skegness area (see discussion in Rowlandson and Fiske 2018; 2019a; 2020b; 2020c).

Sea Bank Farm

A total of 1781 sherds (37.087 kg, 34.32 RE, av. 20.82 g/sherd) were recovered from the Sea Bank Farm site at Sandilands. The sherds could be attributed to a maximum of 1440 vessels, with a mean sherd weight of 20.82 g.

The site is of interest as few mid–late Roman salt production sites have previously been recognised in Lincolnshire (Lane 2018), although examples are known from Norfolk (Darling 2001). A small but growing number of similar sites are now being excavated or re-assessed. This coastal assemblage represents activity in the mid-Roman period and shows similarities to an assemblage from Stallingborough Hobson Way (Rowlandson 2011a) and excavations on the Triton Knoll scheme (Rowlandson 2019a). Other coastal sites recently investigated, such as those on the Feeder 9 scheme at Goxhill, show a pattern of exploiting coastal resources on the East Lincolnshire coast, possibly including salt extraction (Rowlandson and Fiske 2020d). All three sites have similar palaeochannels and alluvial layers. The assemblage from this site is informative because of the good preservation of pottery, the carbonised deposits that survive on a number of vessels, and the white mineralised deposits on others that may have resulted from boiling up brine or silty residues. The sandy local grey wares that make up the majority of the pottery from this site are similar to those produced in the Market Rasen area to the west of the Lincolnshire Wolds, or perhaps to the east of the Wolds by potters with a similar repertoire (e.g., Darling 2005b; 2007a; n.d.; Rowlandson 2005a; 2005b;

Table 8.55 Summary of the Iron Age and Roman pottery assemblages by site (moving from north-east to south-west along the route)

Area	*Sherds*	*Weight (g)*	*Total RE*	*LBA?/Early Iron Age*	*Middle–Late Iron Age*	*Late Iron Age*	*Early Roman*	*Mid-Roman*	*Late Roman*	*Very late Roman*
Zone 1										
Sea Bank Farm*	1781	37088	34.31	-	-	-	?	✓	✓	-
White Crofts*	2056	34948	31.54			?	✓	✓	✓	✓
Ailby Lane*	782	10272	9.39	?	✓	✓	✓	✓	✓	-
White Crofts (wb)	16	279	0.43	-	-	-	-	✓	✓	-
Subtotal	*4635*	*82587*	*75.67*	-	-	-	-	-	-	-
Zone 2										
Ulceby Cross	9	62	0.11	-	-	-	✓	-	-	-
Sutterby Field	110	1117	0.25	-	✓	-	-	-	-	-
Pitchmoor	22	88	0.00	-	✓	-	-	-	-	-
Walk Hill*	924	16452	11.30	-	-	✓	✓	✓	✓	✓
Callow Carr	45	507	0.14	-	-	-	✓		-	-
Partney Lees	39	853	1.24	-	-	-	-	✓	-	-
Cheals Close	34	382	0.02	-	-	-	-	✓	✓	-
Fourteen Acres	5	116	0.24	-	-	-	✓	✓	-	-
Area 20	1	34	0.08	-	-	-	✓	-	-	-
Area 21*	31	624	0.43	-	-	-	-	-	✓	✓
Raithby Lane*	332	8517	6.37	-	-	-	-	?	✓	✓
Raithby Crossroads	95	653	0.52	-	-	✓	-		-	-
Wood Hill	107	886	0.48	-	?	✓	-	✓	-	-
Area 26	27	282	0.44	-	-	-	?	?	-	-
Mardon Hill	4	18	0	-	-	-	-	-	-	-
Area 28/34	57	726	0.28	-	-	✓	-	-	-	-
Area 29	6	61	0.20	-	-	✓	✓	-	-	-
Hagnaby Grange*	453	6852	4.60	✓	✓	✓	✓	-	-	-
Magers Lane*	457	9313	7.88	-	-	✓	✓	✓	✓	-
Back Lane	11	223	0	?	-	-	-	-	-	-
Staunch Farm	99	825	0.28	?	✓	-	-	-	-	-
Subtotal	*2868*	*48591*	*34.86*	-	-	-	-	-	-	-
Zone 3										
Mown Rakes*	469	10185	6.76	-	-	?	✓	✓	-	-
Six Hundreds Drove*	1831	42582	43.35	-	-	-	✓	✓	-	-
North Ing	16	331	0.12	-	-	-	✓	✓	-	-
Subtotal	*2316*	*53098*	*50.23*	-	-	-	-	-	-	-
Evaluation trenches	1065	15364	9.91	✓	✓	-	✓	✓	✓	-
Grand total	**10884**	**199640**	**170.67**							

* = more noteworthy pottery groups

2011a; Samuels 1983). It is noticeable that four of the six vessels submitted as ORA samples produced evidence of dairy fat and these vessels include large bowls (Fig. 8.10.6 and Fig. 8.10.11), a handmade jar (Fig. 8.10.13) and a cheese press (Fig. 8.10.10). Ruminant carcass fat was recorded from a carinated bowl (Fig. 8.10.4), which was probably used for stewing meat. The large bowl and strainer selected for ORA sampling appear to have been used for dairy processing in a fashion seen from other sites in the Lincolnshire region (Dunne 2023), but it should be noted that a number of the coarse quartz-gritted jars that were not subjected to ORA had carbonised residues surviving on their shoulders similar to those discussed by Dunne from the Hornsea One project (Dunne 2023), for example handmade jars (Fig. 8.10.13–14), shell-gritted Bourne-type jars and Dales ware jars. It appears likely, on the basis of their carbonised residues, that these vessels were the ones used for processing ruminant carcass fats among this assemblage. It is possible that had any of the quartz- and shell-gritted jars been selected for ORA, a wider range of uses would have been identified within this assemblage.

Sea Bank Farm: palaeochannels

A total of 346 sherds (12.674 kg, 9.23 RE) were recovered from palaeochannel features. The range of pottery predominantly dates to the mid-2nd to 3rd century AD. The vast majority of the assemblage comprises local grey wares, including a good proportion of large wide-mouthed bowl and kindred types (Figs 8.10.6, 7 and 9), lipped bowls and variants (Fig. 8.10.5), B33.4-type carinated vessels, necked jars, a jar with an out-curved rim, and a strainer. Reduced grog-gritted grey ware-type fabrics include an example of a large bowl (Fig. 8.10.11). The small numbers of samian sherds, Dressel 20 and Gaulish amphorae and colour-coated ware from the Trier region (MOSL) represent imports from the Continent. A limited range of regional imports from the Black Burnished ware 1 and 2 industries, a possible Verulamium white ware sherd and a sherd from a Mancetter-Hartshill mortarium were present (Fig. 8.10.3). A greater proportion of regional imports has been recorded from sites along the eastern coast than from inland 'basic rural' sites and this assemblage would fit this pattern (Darling and Precious 2001; Rowlandson and Fiske 2018). Other table wares include a small quantity of colour-coated sherds and local white ware. It is noticeable that there is a limited range of native tradition wares and small quantities of Dales ware, suggesting that the activity on the site was mostly in the later 2nd to early 3rd century AD. A few Bourne-type shell-gritted ware sherds are also of interest as this site lies towards the edge of the distribution of these wares.

The pottery was attributed to two palaeochannels (200108 and 200200). The high mean sherd weight (36.63 g), with limited evidence of abrasion or excoriation, suggests that much of the pottery was deposited in large fragments. Two large grey ware bowls show signs of being warped in firing and a further vessel was warped and overfired. Many of the vessels show signs of carbonised deposits, including a handmade jar (Fig. 8.10.14) and lipped bowls. At least five vessels, mostly large bowls, show internal white mineral deposits that could, for example, have resulted from boiling up urine or brine (e.g., Fig. 8.10.9 and Fig. 8.10.11). The quartz sand-gritted handmade jar (Fig. 8.10.14) is of interest as it is a rare example of a handmade jar in use in Lincolnshire during the later 2nd to earlier 3rd century AD. The form of the vessel is similar to some of the handmade 'proto-Dales ware' vessels seen in north-western Lincolnshire (e.g., Rigby and Stead 1976, fig. 79.6, and examples in Gregory 1996), but presumably produced on the east coast using the clays that had been typically used to make Iron Age fabrics ETW2 and ETW4 (Rowlandson and Fiske 2024a), and similar to other rare Roman examples from Stallingborough Hobson Way (Rowlandson 2011a). This vessel probably represents limited local 'household' pottery production, perhaps as a substitute for the shell-gritted vessels often used on other Roman sites of this period in Lincolnshire.

Sea Bank Farm: middle or late Roman (AD 120 to 410)

A further 193 sherds (3.421 kg, 3.04 RE) were recovered from features of middle or later Roman date, with most of the contexts dating to the later 2nd to 3rd century AD. All the material was recovered from pits, and the group has a far lower mean sherd weight (17.73 g) than the group from the palaeochannels. There are fewer fine wares among this assemblage, but small quantities of samian, fine grey ware and a possible colour-coated sherd are present. A small number of white ware sherds from flagons, a Mancetter-Hartshill mortarium and a Swanpool mortarium were recorded, but no amphora sherds. Single sherds of Black Burnished ware 1 and 2 were also noted. Grey ware makes up nearly three-quarters of the assemblage, and jars are better represented

among this group, along with examples of lipped bowls, a plain rimmed bowl, wide-mouthed bowls, a folded jar or beaker and a later Roman carinated vessel (Darling and Precious 2014, no. 1160). There are no examples of the straight-sided bead and flanged bowl which is typically a key indicator of activity in the late 3rd to 4th centuries AD in this part of Lincolnshire.

Fewer vessels among this group have carbonised deposits, but three jars – two grey ware and one Dales ware – have white mineralised internal residues. One grey ware jar shows signs of internal excoriation from cleaning or chemical processes, and internal use wear is evident on the Swanpool mortarium from grinding material against the trituration grits.

The remainder of the phased pottery, 849 sherds (13.455 kg, 15.92 RE), was attributed to flooding deposits that sealed the pits and one of the palaeochannels. This material contains a large assemblage with a lower mean sherd weight of 15.85 g. The contexts were mostly datable to between the late 2nd century AD and the 3rd–4th century AD, and likely contained a range of pottery that had been used during the occupation of the site.

Samian is present as a small proportion of the assemblage but includes a range of form 33 cups, bowls and decorated form 37 bowls, one with a mould-maker's stamp (samian report, this volume). Some of the earlier material present includes colour-coated rough-cast beaker, Dressel 20 amphora and early grey ware sherds in the DSSA and SLGY fabric groups. Other table wares include a white ware flagon (FTR11), fine grey ware beakers including one with a cornice rim (Fig. 8.10.1), a beaker with an everted rim in a Parisian ware fabric, and a carinated bowl in a fine oxidised fabric. Other table ware forms include a hemispherical bowl in an oxidised fabric mimicking samian form 37 (Fig. 8.10.2). Mortaria present consist of two vessels from the Mancetter-Hartshill industries: one with 'mixed trituration grits' (MOMH1, Gillam 1970, type 242) and another with fired clay trituration grits that has internal use wear and was burnt over the break (MOMH2).

It is notable that sherds from a maximum of 10 Black Burnished ware 1 vessels, mostly jars, and up to 14 BB2 vessels, mostly bowls (BG225, BGR and BTR types), are present among this group. This is unusual for inland rural sites in Lincolnshire and follows a pattern similar to that noted from the group recovered from Wrangle, Gold Dyke Bank, where high proportions of regional imports were noted (Darling and Precious 2001). Small quantities of Bourne-type shell-gritted wares are present and a very limited range of native tradition wares that may have been produced in the middle of the 2nd century AD (IAGR1 and IAGR2). Nene Valley grey ware and similar fabrics (NVGW, NVGWC) are only present in small quantities, reflecting the location of the site at the edge of the distribution of these types (Rowlandson and Fiske 2018). Dales ware is present in greater numbers in this group, perhaps reflecting the majority of the layers being deposited in the 3rd to perhaps the earlier 4th century AD. All the Dales ware forms are jars, with some showing signs of carbonised residues, suggesting their use in processing or cooking. Although none of the Dales ware jars from this site were sampled for ORA, examples analysed from elsewhere in Lincolnshire have commonly produced evidence for carcass fats (Dunne 2023; Dunne and Evershed 2018a; 2018b).

Grey wares are the most common type, with the majority attributed to the GREY group similar in fabric and form to types produced at Market Rasen. Forms include wide-mouthed bowls, oversized flanged bowls (BFB412), jars including a necked handled type (J162), carinated B334 types, and dishes including plain rimmed types, but no BFB straight-sided bead and flanged bowl types. A range of high-fired grey wares were recorded using the GREYB code, similar to those seen by the author from sites along the north-eastern Lincolnshire coast. The forms in this group comprise a typical late Roman repertoire with a plain rimmed dish, wide-mouthed bowls, lipped bowls and a jar with a curved rim. A further small group of coarse quartz-gritted late Roman jars were recorded in the GREYC group, including Dales-type jars and a jar with an undercut rim. A small number of large bowls and jars in the hard-fired grog-gritted grey ware fabric (GROG in this report) include an example of the oversized flanged BFB412 type. A grey ware cheese press (Fig. 8.10.10) and an early to mid-Roman lipped bowl type with carbonised residues (B318, Fig. 8.10.4) are also illustrated, and ORA samples produced evidence of dairy lipids and ruminant carcass fat respectively.

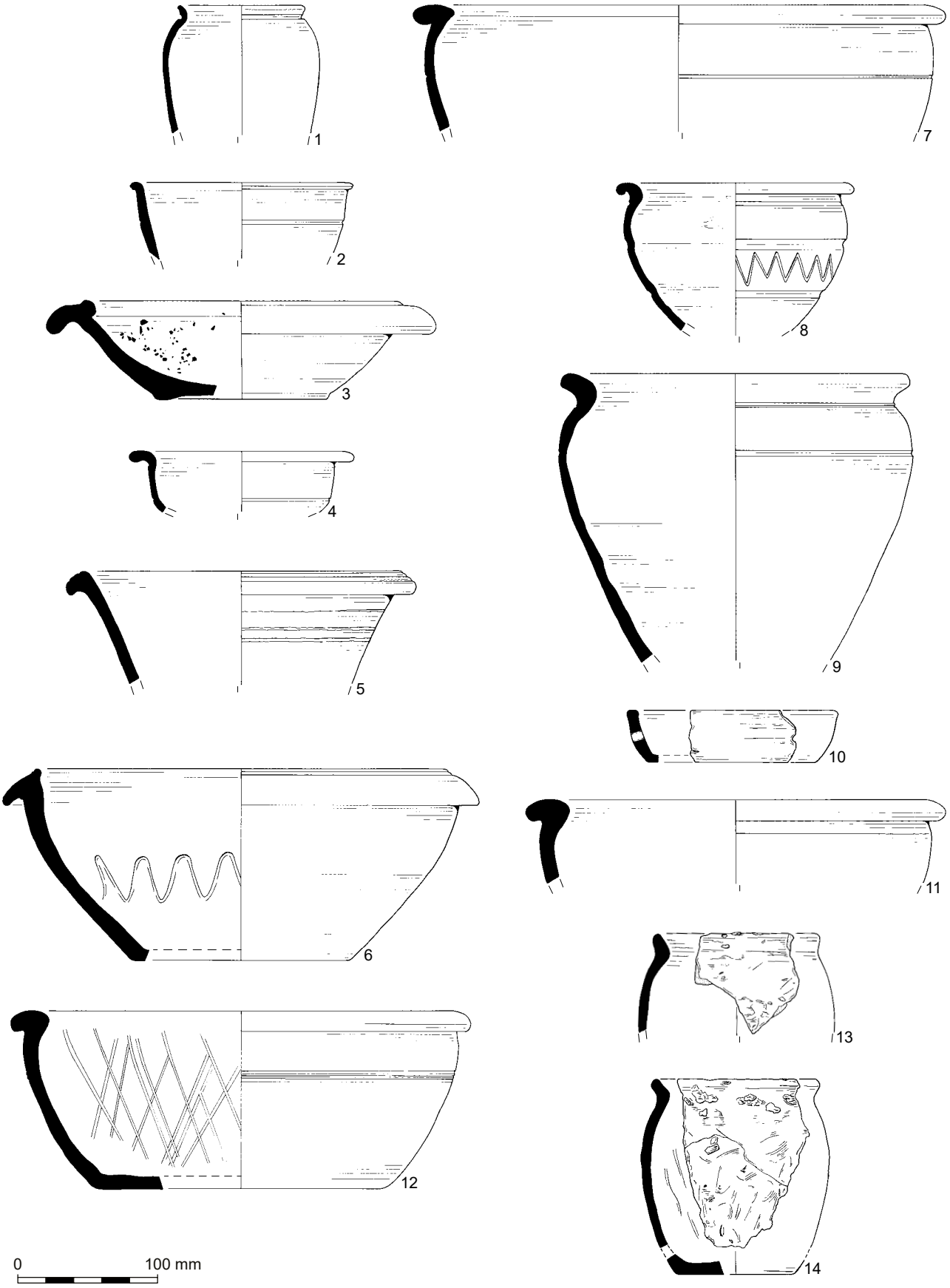


Figure 8.10 Sea Bank Farm illustrated vessels

Sea Bank Farm: illustrated vessels

(Fig. 8.10)

1. GFIN BKCOR. A fine grey ware beaker with a cornice rim. Alluvium 200203/layer 200043, D105A
2. OX B37. A hemispherical bowl in an oxidised fabric. Alluvium 200203/layer 200103. D109A
3. MOMH3 MHK. The rim and base from a Mancetter-Hartshill mortarium with fired clay trituration grits and a sandier fabric. Vessel has a similar form to an example published from Lincoln and a date of AD 140–180 might be expected for this vessel (Darling and Precious 2014, no. 1261b). Palaeochannel 200200, cut 200106, fill 200069, D099
4. GREY B318. A grey ware bowl with external carbon deposits. Numerous examples of this type are known from earlier Market Rasen kiln sites (*cf.* Darling 2007a; n.d.). The type has some affinity with early Roman carinated prototypes, and this example appears to have been used for cooking prior to breakage. Carbonised residues around the rim suggest that this carinated vessel had been bedded into the embers for use as a casserole (Cool 2006, 40). A lipped bowl from this site (BFL) also had similar cooking residues. ORA sample recorded ruminant carcass lipids, making cooking a stew containing beef or sheep/goat likely to be one of the last functions of the vessel. Alluvium 200203/layer 200043, D104, ORA VL03
5. GREY BREEDV. A large grey ware bowl of a type known from northern Lincolnshire including Market Rasen (Darling n.d., no. 100; *cf.* Rowlandson and Fiske 2023d, no. 41). Palaeochannel 200108, fill 200071, D106
6. GREY BFB412. A distinctive oversized bowl with internal wavy burnished lines. This type is known from a number of sites in Lincolnshire including Lincoln, Boston, Hornsea One Station Road and the Tattershall Thorpe production site (Cleary *et al.* 2020; Darling 1999, fig. 36.369; Rowlandson and Fiske 2023d, no. 67;). Palaeochannel 200200, fills 200010 and 200011, D088, ORA VL01
7. GREY BNNK. A large grey ware bowl. Palaeochannel 200200, fill 200010, D093
8. GREY BL. A large bowl with burnished wavy line decoration similar to examples from Roxby, Market Rasen and Hornsea Humberston Road (Darling n.d.; Rigby and Stead 1976, fig. 66.34 and 65.34; Rowlandson and Fiske 2023d, no. 21). Tidal Flat deposit 200202, layer 200081, D107
9. GREY BL. A large grey ware bowl with a scored horizontal groove and white internal mineral deposits. Palaeochannel 200200, fills 200010 and 200011, D094
10. GREY CHP. A grey ware cheese press, pierced pre-firing. ORA sample produced evidence of dairy lipids suggesting that the vessel had been used for cheese-making, in contrast to some samples from cheese presses studied from northern Lincolnshire that were found to have been utilised for straining carcass fats (Dunne 2023). Alluvium 200203/layer 200107, D110, ORA VL06
11. GROG BNNK. A large, reduced sandy grog-gritted bowl. The vessel was burnt and had white internal deposits. ORA sample produced evidence of dairy fats. Phase ID2 Palaeochannel 200200, fill 200095, D108, ORA VL05
12. IAGR1 BNNK. A native tradition large bowl with irregular internal lattice. Phase ID2 Palaeochannel 200200, fill 200024, D100
13. IASA? JEV. A handmade sand-gritted jar with an everted rim and thick external carbon deposits. ORA sample produced evidence of dairy fats. Palaeochannel 200200, fills 200010 and 200011, D092, ORA VL02
14. IASA? JEV. A handmade sand-gritted jar with an everted rim (broadly as Rigby and Stead 1976, fig. 79.6) and very thick external carbon deposits. Palaeochannel 200200, cut 200106, fill 200044, D097

White Crofts

A total of 2056 sherds (34.948 kg, 31.54 RE) were recovered from the White Crofts site near Asserby. This, the largest assemblage from Zone 1, includes a range of pottery dating from the 1st century AD until the end of the 4th century AD.

1st–2nd century AD

An assemblage of 105 sherds (1.250 kg, 1.24 RE) was recovered from features phased as 1st–2nd century AD, from a maximum of 38 vessels. The group has a fairly low mean sherd weight of 11.90 g with high levels of abrasion or excoriation noted from a few of the groups, notably the mixed assemblage from ditch 300515. A few sherds present may be of pre- or peri-Conquest date. Small quantities of many fabrics were noted, including a Dales-type jar from ditch 300515 that was probably intrusive within this phase. The usefulness of this assemblage lies in the range

of material present, including samian, a light-fired flagon in the PINK fabric (possibly a Lincoln product), transitional wares including a large native tradition bowl (BNAT), a small range of grey wares including a jar with countersunk lug-handles (JLH, Fig. 8.11. 21), and a few Iron Age handmade sherds (ETW2, IASA1 and IASH1). Little more can be said about this limited assemblage other than it suggests activity on this site had begun by the second half of the 1st century AD.

2nd–3rd century AD: Phase A
Only 33 sherds (0.456 kg, 0.17 RE) were recovered from features of this phase. The material was mixed. The pottery from the ditches and pits has a mean sherd weight of 13.81 g. The groups range in date from a handmade quartz-gritted sherd from ditch 301427 that may have been of prehistoric date, pit 301201, which was likely to date to the later 2nd to 3rd century AD, to gully 301414 that included a Swanpool-type mortarium with a bead and flanged rim likely to date to the late 3rd to 4th century AD.

2nd–3rd century AD: Phase B
Two hundred and twenty-nine sherds (3.758 kg, 1.71 RE) were recovered from features in Phase B of the 2nd–3rd-century activity at White Crofts. The group is relatively fresh, with a mean sherd weight of 16.41 g. The pottery was retrieved from three ditches: 301405, 301410 and 301425. With the exception of the pottery from context 301410, which includes sherds from a Dales-type jar and a sherd from the GREYB fabric group likely to date to the 3rd century AD or later, the majority was probably produced in the 2nd century AD. An unusual samian dish (see samian report, below) was recorded, as were sherds possibly from a Verulamium region white ware mortarium. Other imported pottery was uncommon, with a colour-coated rough-cast beaker of a type made near Lincoln and a grey ware beaker with a corniced rim the only other specialist table ware present. Grey wares were the most common fabric group, with most of the sherds from jars including one with rusticated decoration. Notable grey ware vessels include a narrow-necked jar with external carbonised deposits (Fig. 8.11.18) and a large jar (No. 20, not illustrated). Transitional IAGR1 and IAGR2 types are present, also mostly from large jars or bowls. The assemblage seems 'functional', with few specialist vessels present other than the unusual samian vessel.

2nd–3rd century AD: Phase C
Only 18 sherds (0.256 kg, 0.30 RE) were recovered from features of this phase. All of the pottery was recovered from ditches and had a mean sherd weight of 14.22 g. Most of the pottery was found in ditch 301409, and includes sherds ranging in date from the 2nd to 3rd century AD, including fine grey ware, transitional wares (IAGR2 and 3), shell-gritted Dales ware and a grey ware sherd attributed to the later Roman high-fired GREYB group. The sherds from this ditch are mostly abraded. A small handmade sherd of uncertain date was recovered from ditch 301419, and ditch 301423 contained a single grey ware sherd.

3rd–4th century AD
A total of 1461 sherds (27.025 kg, 26.15 RE) were recovered from features in the 3rd–4th-century AD phase of White Crofts. The mean sherd weight was relatively high at 18.50 g, although abrasion or excoriation was noted on over one-third of the sherds. The pottery ranges in date from the 1st century AD until the end of Roman pottery production in the later 4th to perhaps earlier 5th century AD. The pottery was recovered from ditches, pits, layers and a gully. Ditch 300522 contained the largest assemblage, with other good groups coming from ditch 300506 and spread 301426. As many of the groups are of mixed date, they do not offer great potential for statistical analysis but demonstrate that the site continued to receive pottery until at least the very end of the Roman period.

Most of the pottery from this phase dates to the mid-3rd to 4th century AD, with an element of earlier pottery also present. A few sherds of earlier fabrics such as CR, DSSA, transitional wares (IAGR1-3), a Gallic amphora sherd, handmade rock-gritted wares (possibly of Iron Age date) and the Late Iron Age sandy IASA2 fabric were also recorded. A good range of samian is present too (36 sherds), including decorated form 37 bowls and form 27 and form 33 cups.

The GREY and high-fired GREYB grey ware groups are well represented and include typical late vessels such as plain rimmed dishes, straight-sided bead and flanged bowls, wide-mouthed bowls

and Dales-type jars. An example of a later 4th-century bowl with an in-turned bead and flanged rim was recovered from pit 300245 (BIBF). A good range of lid-seated late Roman jars and small bowls was also recorded within the coarse GREYC group, including a double lid-seated jar (JDLS). Black Burnished ware 1 and Nene Valley grey ware are also present in small quantities.

Mortaria from the Nene Valley and Mancetter-Hartshill make up a very small proportion of this assemblage. A more diverse range of colour-coated wares is present from this phase than from the other sites, and includes beakers, a straight-sided bead and flanged bowl and a hemispherical flanged bowl (B38). This diversity was probably due to the later date of the assemblage when such vessels became more widely distributed from the Nene Valley. Examples of Swanpool oxidised table ware types also likely to date to the 4th century AD were recorded. A small range of fine grey wares, probably dating to the 2nd to 3rd century AD, are also present. Grey wares include a carinated vessel (Fig. 8.11.15), a plain rimmed dish (Fig. 8.11.16), a lid-seated jar (Fig. 8.11.19) and a coarse grey ware Dales-type jar (Fig. 8.11.22). A handmade rock-gritted miniature jar (Fig. 8.11.26), found in association with late Roman pottery, would appear to be a rare locally made late Roman handmade vessel.

Shell-gritted wares include a good proportion of shell-gritted Dales ware DWSHT (Figs 8.11.23–24) and the sandier shell-gritted variant occasionally recorded from eastern parts of Lincolnshire (DWNEL). Wheel-made shell-gritted wares used for the manufacture of the local 'double lid-seated' form, typical of the latest groups of pottery from Lincoln (Darling and Precious 2014, JDLS), were recorded using the LRLS fabric code. An example of a double lid-seated jar is illustrated (Fig. 8.11.25) that had evidence of ruminant and non-ruminant carcass fats. Other forms in this fabric group include a wheel-made straight-sided bead and flanged bowl (BFB). A calcareous-gritted Huntcliff jar, also likely to date to the late 4th to early 5th century AD, is a notable inclusion for a site so far south, although shell-gritted vessels in a similar form were also probably produced in northern Lincolnshire. The late range of pottery from this site has been seen at a number of other sites along the Lincolnshire coast, notably the assemblages from Barton-on-Humber and the Able UK scheme at Killingholme (Didsbury n.d.; Rowlandson *et al.* 2017; Steadman 1993), and this group is a good addition to the growing number of assemblages containing this type of pottery from the Lindsey area of Lincolnshire.

White Crofts: illustrated vessels

(Fig. 8.11)

15. GREY JBCAR. A grey ware carinated jar or bowl, very abraded. Ditch 300524, cut 300330, fill 300331, D119
16. GREY DPR. A grey ware plain rimmed dish. Ditch 300522, cut 300225, fill 300262, D118
17. GREY BEV. A grey ware bowl with an everted rim. A large proportion survived within a grave and is likely to date to the 4th century AD. Grave 301282, fill 301283 and SF3005, D126
18. GREY JNN. A grey ware jar with external carbon deposits. Ditch 301410, cut 301076, fills 301077, 301078 and 301079, D124
19. GREY J107. A grey ware lid-seated jar with external carbon deposits. Vessel is probably a 3rd-century AD type (Darling and Precious 2014, no. 1013). Ditch 300522, cut 300225, fill 300260, D116
20. GREY JL. Not illustrated. A large grey ware jar with a scored horizontal groove and scored wavy line. Ditch 301410, cut 301076, fills 301077 and 301078, D123
21. GREY JLH. A small grey ware lug-handled jar with countersunk handles, abraded. Ditch 300510, cut 300037, fill 300039, SF3000, D113
22. GREYC JDW1. A coarse grey ware Dales-type jar. Ditch 300506, cut 300013, fill 300012, D111
23. DWSHT BEX. A Dales ware shell-gritted bowl with an expanded rim. ORA produced evidence for animal fats. Ditch 301400, cut 301004, fill 301003, D122, ORA VL07
24. DWSHT JDW2. A shell-gritted Dales ware jar with carbonised deposits. Ditch 300522, cut 300225, fill 300260, D115
25. LRLS JDLS. A late Roman wheel-made shell-gritted double lid-seated jar with external carbon deposits. ORA produced evidence for ruminant and non-ruminant carcass fats. Ditch 301403, cut 301109, fill 301110, D125, ORA VL08
26. ETW4 JM. A miniature handmade jar with non-soluble rock grits. Found in association with late Roman pottery, probably a local product. Ditch 301400, cut 301004, fill 301003, D121

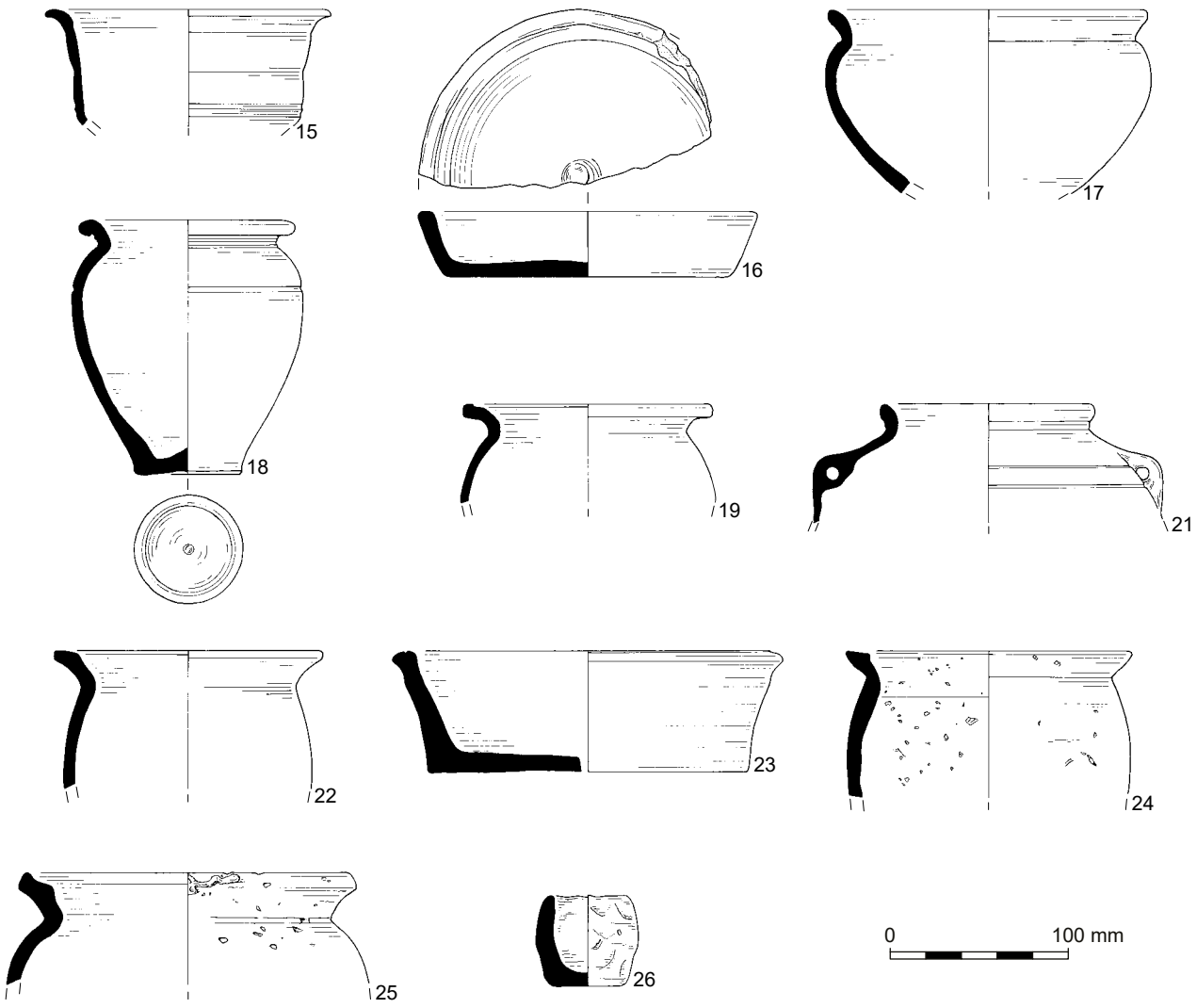


Figure 8.11 White Crofts illustrated vessels

Ailby Lane

The 782 sherds (10.273 kg, 9.39 RE) recovered from this site included some of the earliest pottery found in Zone 1. A small quantity of earlier prehistoric pottery was recorded and a further group, possibly dating to the later Bronze Age to earlier Iron Age period, was also noted. As groups of this period are generally rare from this part of the Lincolnshire coast (Knight 1994; 2002) it is an interesting addition, although the material is fragmentary. The range of Late Iron Age pottery present is broadly what might be expected from a coastal site, but the presence of a further fragment of Terra Rubra has added an additional findspot for this part of Lincolnshire and shows that a small quantity of imported fine wares reached basic rural sites as well as major settlement foci such as Sleaford. Other good groups included the material from ditch 416000, which had a range of pottery dating to the mid- to late 1st century AD.

The south-western part of this site supplied a few small assemblages dating to the early Roman period, with the addition of some later sherds and others possibly of Late Iron Age date. The small size of the assemblage and the high levels of abrasion limit its usefulness for further study. The presence of a few early Roman sherds including a D452 dish, transitional wares, and a small quantity of Late Iron Age pottery suggests activity on the site was mostly in the 1st century AD. The decorated samian Drag. 37 bowl fragment was most noteworthy (see samian report below). However, this small assemblage could be considered as a typical early Roman group from this part of Lincolnshire.

Ailby Lane: illustrated vessels

(Fig. 8.12)

27. IASH1 JBR. A handmade shell-gritted jar with a bead rim and external carbon deposits. Group 413000, pit 400164, fill 400165, D129
28. IASH1 JBR. A handmade shell-gritted jar with external carbon deposits. The vessel had evidence of ruminant carcass fats. Ditch 416000, cut 400217, fill 400218, D136, ORA VL11
29. IASH1 CPN. A shell-gritted handmade jar with a wedge-shaped rim. The vessel had evidence of ruminant carcass fats. Ditch 416000, cut 400217, fill 400218, D135, ORA VL10
30. IASH2 JNK. A fine shell-gritted necked jar from an early Roman group. The vessel had evidence of ruminant carcass fats. Ditch 416000, cut 400217, fill 400218, D134, ORA VL09
31. IAGR1 CPN. A grog-gritted transitional wares jar with a wedge-shaped rim. This vessel had external carbon deposits. Ditch 409000, cut 400003, fill 400004, D127
32. IAGR2 CPN. A shell-gritted transitional ware jar with a wedge-shaped rim and external carbonised deposits. Ditch 410000, cut 400178, fill 400179, D131
33. NELGR CPN. A transitional ware jar. Ditch 416000, cut 400217, fill 400218, D133
34. OX B37. A bowl mimicking samian form Drag. 37 in an oxidised ware fabric. Ditch 416000, cut 400217, fill 400218, D132
35. OX B321V. An oxidised ware bowl. Ditch 410000, cut 400178, fill 400179, D130
36. DSSA B334. A dark-surfaced grey ware carinated B334 vessel. Ditch 416000, cut 400143, fill 400142, SF40001, D128

Zone 2

The pottery from the Zone 2 sites was characterised by a number of smaller assemblages from across the Lincolnshire Wolds, Lymn Valley and northern Fen-edge. A total of 2868 sherds (48.591 kg, 34.86 RE, mean sherd weight 16.94 g) were recorded from the Zone 2 excavation sites. Many of the groups had low mean sherd weights and high levels of abrasion or excoriations, probably in part due to soil conditions as well as taphonomic processes.

Walk Hill

A total of 924 sherds (16.452 kg, 11.30 RE, mean sherd weight 17.81 g) were recovered. Radiocarbon dating confirmed a small number of the prehistoric sherds could be dated to the earlier Iron Age, but most of the pottery consists of a broadly typical range of later Iron Age to Roman wares for this part of Lincolnshire. The range of pottery extends from the 1st century AD until the very end of the Roman period. The quartz sand-gritted wares are well represented in the Iron Age pottery. As might be expected, there is a small but limited range of fine wares including samian, colour-coated wares and fine grey ware. A few sherds from amphorae and mortaria are also present, but the majority of the Roman pottery consists of grey wares, transitional gritted wares and later Roman shell-gritted wares. A small number of prehistoric pottery sherds were recorded; some had thin walls that were likely to be of Bronze Age date, but there are few diagnostic feature sherds and no decorated material, so the dating of these vessels is somewhat tentative. A few key groups are discussed here.

Ditch group 800488 yielded 81 Iron Age and early Roman sherds. The Iron Age sherds include quartz-sand- and limestone-gritted sherds, notably from a necked jar or bowl with a footring base and cordoned decoration and an external carbonised residue; ORA produced evidence for ruminant carcass fats (Fig. 8.13.38). Transitional wares include a grog-gritted jar with a lid-seated rim (J105) and native tradition ware jars (CPN141). Grey wares include a carinated jar or bowl in the DSSA fabric (as Rigby and Stead 1976, fig. 75.32) and a jar with an everted rim. The group probably dates to the late 1st to early 2nd century AD.

Gully 800489 included 41 sherds of Late Iron Age and early Roman pottery. The Iron Age vessels include two necked vessels with corded decoration in the IASA2 fabric group. One produced evidence of dairy lipids, the other vessel probably held ruminant carcass fats (Figs 8.13.37–38). A large bowl with a wedge-shaped rim in a sandstone-gritted fabric (IASST, Fig. 8.13.39) was also recorded. Small quantities of grey ware include a basal fragment in the DSSA fabric group and two necked jars in GREY fabric.

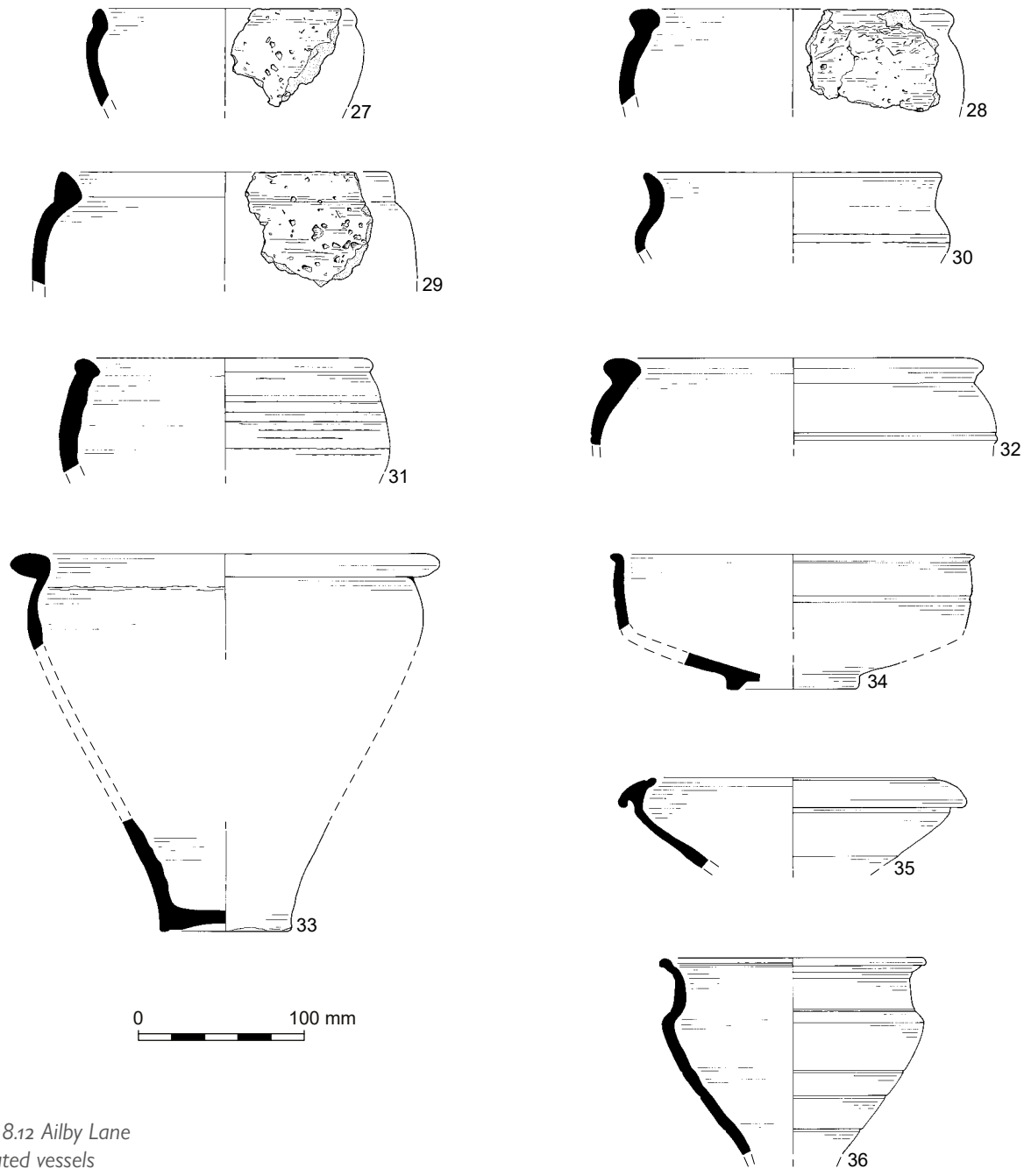


Figure 8.12 Ailby Lane illustrated vessels

A small number of sherds in the transitional IAGR1, IAGR2 and IAGR4 fabric groups were recorded, notably a lid-seated jar (J105). This pottery dates from the 1st to early 2nd century AD.

Ditch 800491 contained a mixed range of pottery comprising 327 sherds from a maximum of 294 vessels (5.128 kg, 3.43 RE). Iron Age pottery is restricted to a single sherd in the IASA1 fabric but a range of transitional IAGR1, IAGR2 and IAGR4 vessels is present, including a large bowl with a wedge-shaped rim (BNAT), a necked jar (JNK) and a large flanged bowl (BFB412). Mortaria include a burnt sherd of uncertain origin and a Mancetter-Hartshill mortarium with internal use wear (MOMH2). Two large fragments of Dressel 20 type amphorae were also recorded. Samian sherds include fragments from a form 33 cup and a decorated form 37 bowl. Fine grey ware sherds include a bowl and a poppy-headed beaker (GFIN and PART). A colour-coated beaker with barbotine decoration (CC3) and a colour-coated bowl (CC1) were the only other

specialist table ware sherds present. Four sherds of Black Burnished ware 1 include examples with burnished acute lattice decoration. Many of the grey wares present could be dated to the later 1st to 2nd century AD, including a segmental flanged bowl (BSEG), a lid-seated jar (J105) and a rusticated jar in the DSSA fabric group. Other grey wares present include a lug-handled jar, necked jars and lids in the GREY fabric group. The majority of the pottery can be dated to the later 1st to 2nd centuries AD, but some later material is present. Shell-gritted wares include Dales ware jars likely to date to the 3rd century AD or later. Grey ware plain rimmed dishes (DPR), a Dales-type jar (JDW2) and a Dales-type jar in a coarse grey ware (GREYC, JDW2) would also suggest a date in the later 3rd to 4th century AD. It is possible that this ditch remained open through much of the Roman period or was backfilled in the later Roman period with material also containing earlier pottery.

Pits 800407 and 800415 contained good late or 'final' Roman groups, including an example of a shell-gritted bowl with an in-turned bead and flanged rim, and late Roman wheel-made jars likely to date to the later 4th century AD. Their presence suggests activity continued on the site until the last phase of Roman pottery production.

A further sherd from a large jar with a sooting 'halo', probably from re-use as a lid, was also noted from pit 800380, along with a grey ware B334 carinated vessel (Fig. 8.13.40) that contained ruminant carcass fats. Examples of Dales ware jars and a Bourne-type jar and a bowl were recovered from the site; some had carbonised cooking residues. Bourne-type jars are rarely found this far north-east in Lincolnshire. The organic residue sample taken from one bowl (Fig. 8.13.42) produced evidence for ruminant carcass fats. The Iron Age vessels both showed ruminant dairy fats, with the Roman vessels all recorded as containing ruminant carcass fats. The small number of ORA samples from this site gives us a glimpse at how the vessels were used but, because of the small sample size, it is not safe to infer specialisation towards meat production in the Roman period.

Walk Hill: illustrated vessels

(Fig. 8.13)

37. IASA2 JBNK. A fine sand-gritted necked jar with cordoned decoration. Vessel is excoriated internally and the ORA sample suggested it had contained dairy products. Gully 800489, cut 800349, fill 800350, D029, ORA VL12
38. IASA2 JBNK. A fine sand-gritted necked jar or bowl. Vessel had external carbon deposits and the ORA sample suggested it had contained ruminant carcass fats. Gully 800489, cut 800349, fill 800350, also ditch 800488, cut 800351, fill 800352, D030, ORA VL16
39. IASST BNAT. A handmade sandstone-gritted large bowl. Gully 800489, cut 800374, fill 800375, D019
40. GREY B334. A grey ware B334 type carinated vessel. Vessel had contained ruminant carcass fats. Pit 800380, fill 800380, D021, ORA VL13
41. GREY B318. A carinated lipped bowl with external carbon deposits. Vessel had been used to heat up ruminant carcass fats. The cooking pattern evident on this vessel was like that discussed for another GREY B318 vessel from Sea Bank Farm (Fig. 8.10.4). Ditch 800490, cut 800330, fill 800331, D028, ORA VL15
42. SLSHB BBN3. A Bourne-type shell-gritted bowl; an unusual find from a site this far north-east. Vessel had been used to heat up ruminant carcass fats. Pit 800382, fill 800383, D022, ORA VL 14

Area 21

Only 31 sherds (0.624 kg, 0.43 RE, mean sherd weight 20.1 g) were recovered from features in Area 21, located in the parish of Raithby by Spilsby. The pottery was retrieved from ditches and layers and mostly dates to the late Roman period, including some types typical of the final phase of Roman pottery production. A grey ware bowl with an in-turned bead and flanged rim and a calcareous-gritted Huntcliff-type jar are the main vessels of significance, and it would appear that the site investigated here was a small part of a larger late Roman settlement. The Huntcliff jar (Fig. 8.14.43) is an unusual find for a site from this part of Lincolnshire and had been used for cooking or

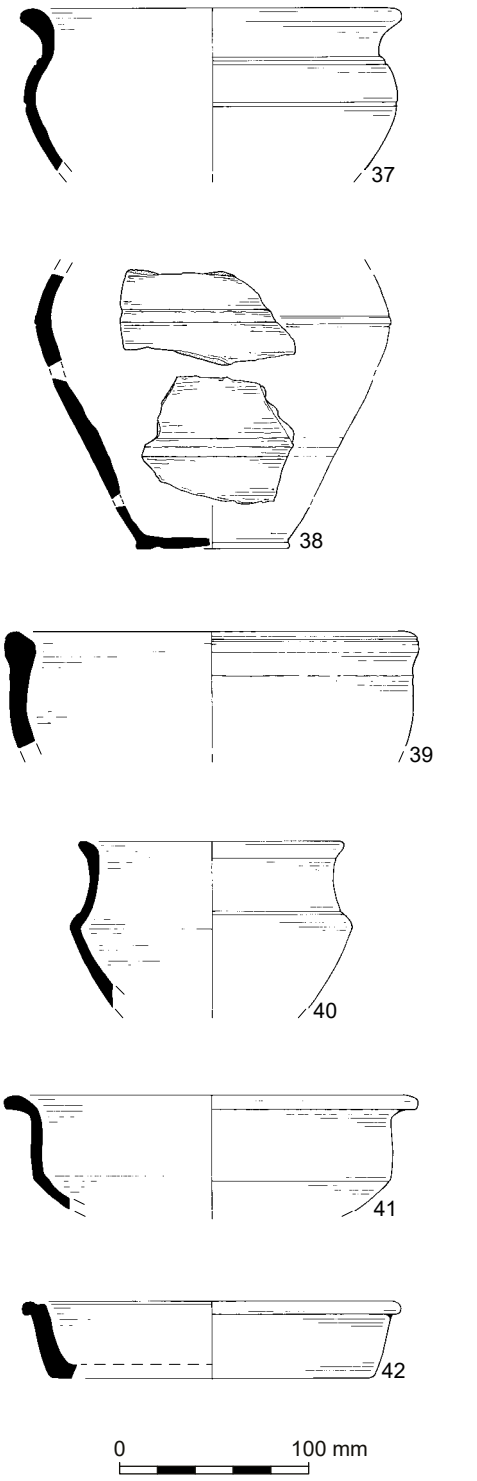


Figure 8.13 Walk Hill illustrated vessels

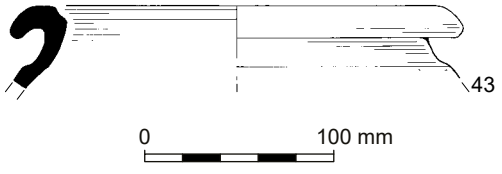


Figure 8.14 Area 21 illustrated vessel

boiling ruminant carcass products. It is possible that this vessel was produced in North Yorkshire and reached the site in the later 4th to early 5th century AD although, because of the condition of the sherd, it is uncertain whether it had the sparry mineral calcite inclusions typical of Huntcliff ware from that region (*cf*. Tomber and Dore 1998, HUN CG).

Area 21: illustrated vessel

(Fig. 8.14)

43. CALG JHUN. A calcareous-gritted Huntcliff jar. An unusual find this far south and west, although similar jars with shell-gritted fabrics were produced at Linwood Warren (Samuels 1983; Wilson and Wilson 2007). ORA indicates ruminant carcass fats. Ditch 210022, fill 210023, D001, ORA VL17

Raithby Lane

The total of 332 sherds (8.517 kg, 6.37 RE, mean sherd weight 25.65 g) includes a good range of late Roman pottery including examples of the key 'final' Roman indicators of activity at the end of the 4th century and the beginning of the 5th century AD. A small proportion of the material may relate to settlement in the mid-Roman period, perhaps including the pottery from groups 380251, 380252, 380257, 380261 and 380262, and features 2707, 380124, 380168, 380175 and 380179. However, these features are more broadly dated, largely on the basis of an absence of material that could be more closely dated than the later 2nd to 4th centuries AD. It was noticeable that no examples of the early Roman grey ware DSSA, native tradition wares (IAGR*) or diagnostic vessel forms were recorded here, suggesting that there was little or no pottery use on the site prior to the 3rd century AD. Only three heavily abraded samian sherds and a few fine grey ware sherds (PART and GFIN) appear likely to be of mid-Roman date, and it is possible that these sherds could also be dated to the 3rd century, or that they arrived on the site as heirlooms.

The range of pottery present is similar to that seen from other sites in the Lindsey region of Lincolnshire, with the products of the Swanpool kilns and Linwood Warren kilns (Samuels 1983; Webster and Booth 1947; Wilson and Wilson 2007) including examples of Swanpool-type mortaria, straight-sided bead and flanged bowls in the Swanpool-type colour-coated fabric, and a copy of a samian form 36 bowl in a Swanpool oxidised type fabric. Grey wares include straight-sided bead and flanged bowls (BFB), developed wide-mouth bowls (BWM3), jars with collared rims (JCR), and a lug-handled jar (JLH, as Darling and Precious 2014, no. 1055). Two shell-gritted Dales ware jars were noted, but most of the shell-gritted wares are wheel-made double lid-seated jar types typical of the latest deposits from Lincoln (LRLS, JDLS, Fig. 8.15.48 and No. 49), along with a few other sherds including a necked jar with an undercut rim similar to late Roman shell-gritted wares types produced in the South Midlands. The coarse grey wares recorded as GREYC from this

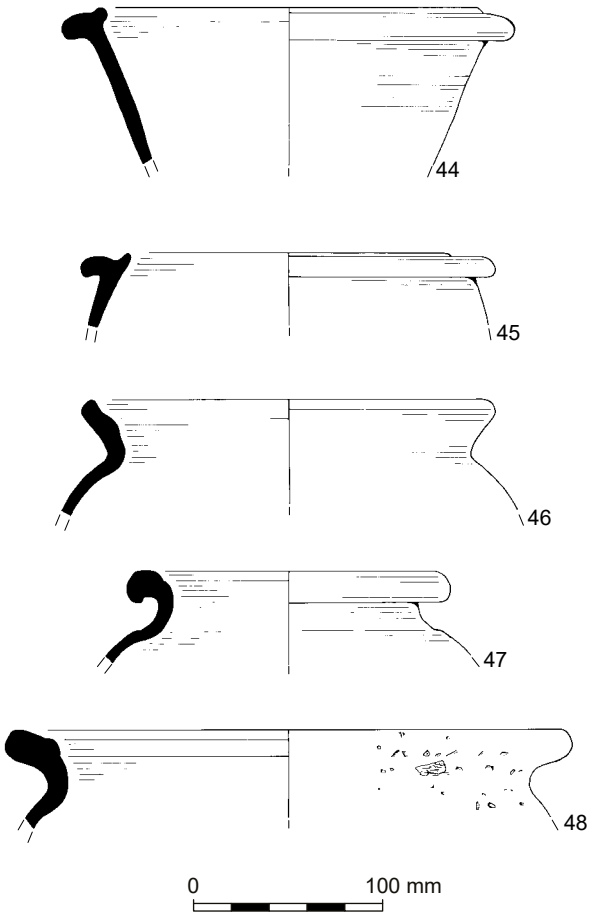


Figure 8.15 Raithby Lane illustrated vessels

site include a range of the forms typical at Swanpool in the Lincoln LCOA fabric and similar to those produced at Linwood Warren. The fabrics of these coarse quartz-gritted grey wares include the glassy quartz typically found in the Spilsby sandstone Greensand deposits and which may have been produced at Linwood Warren, or more likely, given the proximity to the southern edge of the Lincolnshire Wolds, by a more local kiln. The forms present include the key forms of straight-sided bead and flanged bowls (BFB, Fig. 8.15.44), bowls with in-turned bead and flanged rims (BIBF, Fig. 8.15.45), and a variety of lid-seated jars including JDLS (Fig. 8.15.46), JDW2 and JHUN Huntcliff-type copies (Fig. 8.15.47). A few sherds from colour-coated beakers and a Black Burnished ware 1-type bowl are also present.

ORA focused on this late group of pottery, with ruminant carcass fat recovered from the bowl with in-turned bead and flanged rim (Fig. 8.15.45), the coarse grey ware Huntcliff jar (Fig. 8.15.47) and a shell-gritted double lid-seated jar (Fig. 8.15.48). A coarse grey ware double lid-seated jar produced evidence for both ruminant and non-ruminant carcass fat, and the sample from a shell-gritted lid-seated jar (No. 49, not illustrated) produced no lipids, suggesting that it had not been used for cooking. No dairy residues were recorded from this small sample of Roman pottery dating to the very end of the 4th century or early 5th century AD, and the presence of non-ruminant fats from within one of the vessels is an interesting and unusual occurrence for a rural site in Lincolnshire.

Raithby Lane: illustrated vessels

(Fig. 8.15)

44. GREYC BFB. A straight-sided bead and flanged bowl with a coarse grey ware fabric. Vessel is very abraded. Ditch 380249, cut 380218, fill 380219, D018
45. GREYC BIBF. A bowl with an in-turned bead and flanged rim with a coarse grey ware fabric. Excoriated, with ruminant carcass fat residues. Ditch 380253, cut 380201, fill 380202, D016, ORA VL27
46. GREYC JDLS. A coarse grey ware double lid-seated jar. Very abraded. Ruminant and non-ruminant lipid residues were noted. Ditch 380253, cut 380151, fill 380152, D014, ORA VL25
47. GREYC JHUN. A Huntcliff-type lid-seated jar with a coarse grey ware fabric. Similar vessels were produced in eastern Yorkshire but more locally at Linwood Warren (Samuels 1983; Wilson and Wilson 2007). This vessel had external carbon deposits and ruminant carcass fat residues. Ditch 380258, terminal 380184, fill 380185, D015, ORA VL26
48. LRLS JDLS. A late Roman wheel-made shell-gritted double lid-seated jar. Vessel had external carbon deposits and ruminant carcass fat residues. Ditch 380253, cut 380201, fills 380202 and 380204, D017, ORA VL28
49. LRLS JDLS. Not illustrated. A late Roman wheel-made shell-gritted double lid-seated jar with a string-cut base. ORA found no lipid residues. Ditch 380107, fill 380108, D013, ORA VL24

Hagnaby Grange

A total of 453 sherds (6.852 kg, 4.60 RE, mean sherd weight 15.13 g) were recovered. The majority of diagnostic pottery dates to the later Iron Age to early Roman periods, although a few sherds may be of earlier date, including a 'barrel-shaped jar' with an in-turned rounded rim (Challis and Harding 1975) from ditch 400549. A shoulder sherd from a handmade quartz-gritted jar with stabbed decoration and a partially oxidised external surface was recovered from ditch 400315. This vessel appears similar to examples of the shouldered post Deverel-Rimbury styles (Barrett 1980, fig. 6.1), but some later Iron Age jars also have stabbed decoration.

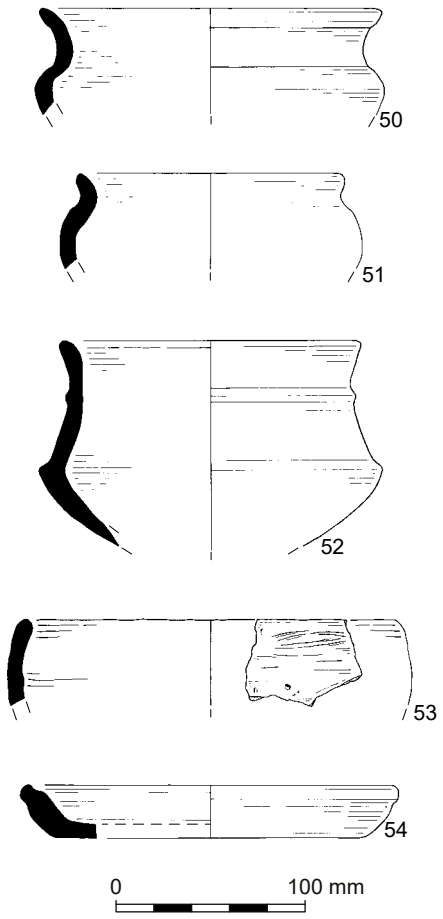


Figure 8.16 Hagnaby Grange illustrated vessels

The Iron Age pottery present mostly appears to date to the late part of that period. A radiocarbon date of 150 cal. BC–cal. AD 60 (UBA-52876) from gully 400561 appears to coincide with the date of the majority of the pottery. Scored ware sherds were recorded from ditch 400550 (above the alluvium) and pit 400193. Examples of the Scored ware surface treatment were noted; such treatment is typically seen among assemblages dating to the Middle Iron Age (Daniel 2016; Rowlandson 2017), although continued use of this technique into the later Iron Age has been proposed for some parts of the East Midlands (Knight 2002; 2010). The presence of sherds of Gallo-Belgic white ware and Terra Rubra was unexpected, and suggests that the inhabitants had access to imported table wares. A range of Late La Tène II/III fine wares and coarse wares with wedge-shaped rims also suggest activity on the site in the early to mid-1st century AD (Knight 2002). Illustrated vessels include a grog-gritted jar with an in-turned rim (Fig. 8.16.53), a necked shell-gritted jar (Fig. 8.16.50), a quartz sand-gritted jar with an everted rim (Fig. 8.16.51), and a necked bowl (Fig. 8.16.52).

The limited quantity of Roman pottery includes a rusticated jar, a jar with a bead rim, and a B334 necked vessel in the early Roman DSSA fabric. Other grey wares (GREY) include a B334 vessel and a copy of a Gallo-Belgic platter (PGB, Fig. 8.16.54). Among the other wares are transitional ware jars and large bowls, samian and an amphora sherd. A large sherd from an IAGR2 vessel that showed signs of a sooting 'halo' from re-use as a lid was also noted. Although there was only a small quantity of Roman pottery present, what little there is suggests that the site may have been occupied into the later 1st century AD.

Hagnaby Grange: illustrated vessels

(Fig. 8.16)

50. IASH3 JNK. A fine shell- and quartz-gritted necked jar. Ditch 400549, cut 400353, fill 400354, D026
51. IASA1 JEV. A coarse quartz-gritted jar, abraded. Ditch 400549, cut 400353, fill 400354, D027
52. IASA2 BNK. A fine quartz-gritted carinated bowl with cordon decoration. Ditch 400550, cut 400166, fill 400167, also ditch 400563, cut 400425, fill 400427, D023
53. IAGROG2 JIR. A fine grog-gritted jar with an in-turned rim and wiped external surface. Ditch 400549, cut 400353, fill 400354, D025
54. GREY PGB. A grey ware Gallo-Belgic-type platter, very abraded. Ditch 400549, cut 400353, fill 400354, D024

Magers Lane

A total of 457 sherds (9.313 kg, 7.88 RE, mean sherd weight 20.38 g) were recovered. This assemblage includes pottery from a range of ditches, pits and layers from a later Iron Age to Roman settlement. The majority of the pottery present dates to the 1st to 2nd centuries AD, with a few contexts containing types dating to the late Roman period. Radiocarbon dates from pits 300038 (UBA-52879) and 300086 (UBA-52892) fit with the presence of Late Iron Age-type wares on the site.

The mean sherd weight is higher than many of the other groups from Zone 2, with a number of vessels in fresh condition. It is noticeable that, for a rural site, there is a good range of fine 'table ware'-type vessels including Late La Tène II/III wares in small

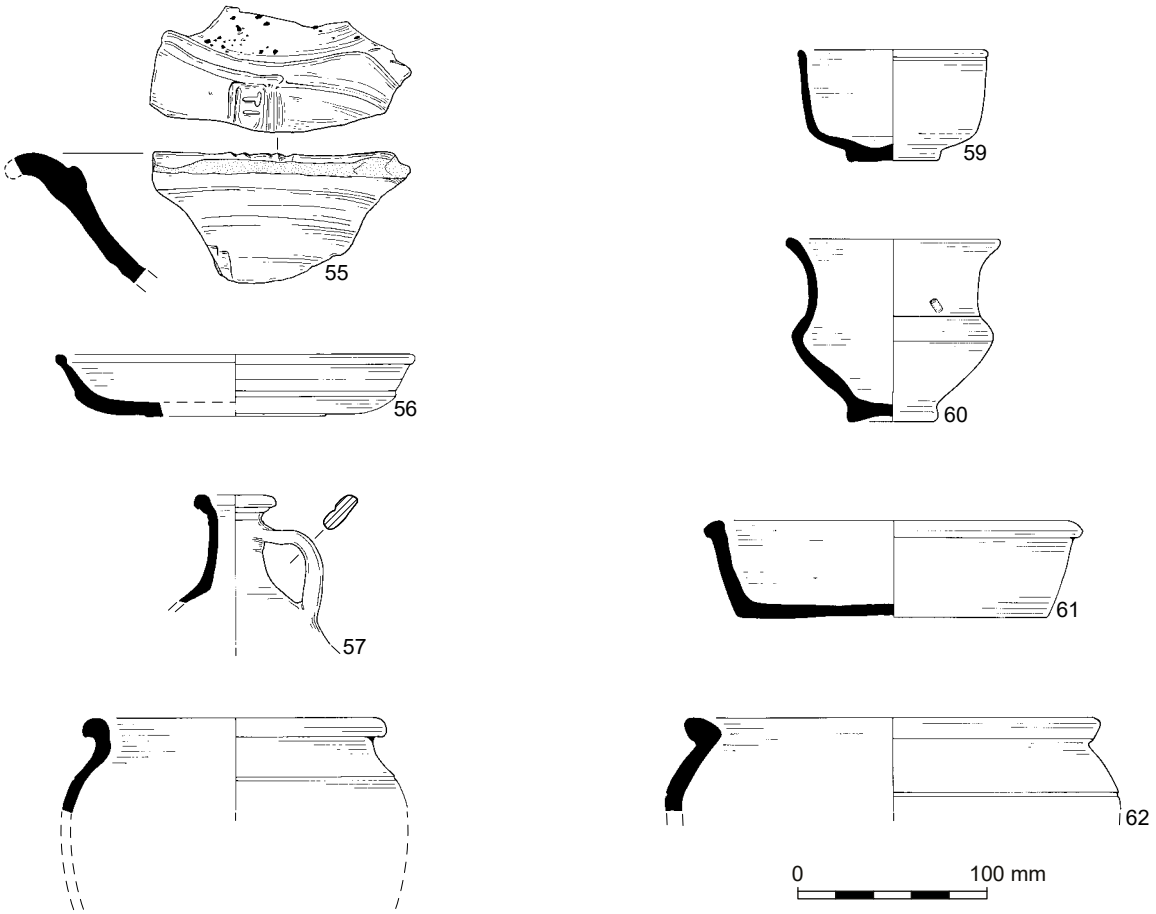


Figure 8.17 Magers Lane illustrated vessels

numbers, along with samian (some subject to repairs), white ware flagons (Fig. 8.17.57), a fine grey ware platter (Fig. 8.17.56) and a poppy-head beaker, early Roman bowls and carinated B334 necked vessels (Fig. 8.17.60), suggesting that the inhabitants had probably begun to dine at tables in a more 'Roman' style (Cool 2006). The majority of coarse wares are local grey wares (including the early DSSA type), native tradition coarse quartz-gritted wares and grog-gritted types. Unusual vessels like a grey ware hemispherical cup (Fig. 8.17.59) suggest that the site had a need for table ware vessels in the early Roman period beyond the decorative or curio interest of owning samian. A single sherd of Bourne-type shell-gritted ware was noted, but no Dales ware or late Roman shell-gritted types are present. However, a few of the grey ware types suggest that activity continued on the site until at least the late 3rd century AD. A stamped mortarium from the first half of the 2nd century AD is also noteworthy (Fig. 8.17.55). It is noticeable that there is also a high proportion of table ware vessels, including sherds from three B334 grey ware necked vessels, a grey ware bowl mimicking samian form 36, a poppy-head beaker in the PART fabric, the fine grey ware platter and hemispherical cup mentioned above, a samian form 33 cup and a grey ware B321V bowl. Repaired vessels including a samian bowl and a carinated grey ware B334 vessel suggest that the inhabitants of the site had a requirement for table wares that exceeded their ability to replace broken vessels with new ones. Coarse wares present include a typical range of transitional wares and grey ware including a necked jar (Fig. 8.17.58), rusticated jars and a few later grey ware forms (e.g., JCR).

As the assemblage contains a range of table ware forms it was targeted for ORA. It is noticeable that platter Fig. 8.17.56 and repaired B334 vessel Fig. 8.17.60 contained dairy residues and the sample from cup Fig. 8.17.59 produced evidence for ruminant carcass fat.

A transitional ware bowl (Fig. 8.17.61) and jar (Fig. 8.17.62) also contained carcass fat. The readings from the transitional ware jars and bowls are what might be expected, but the readings from the B334 vessel and cup are of interest, perhaps suggesting that broth or milk-based drinks were consumed. The high level of dairy residue from the fine grey ware platter suggests that it was also used for cooking for a period. The samples from these vessels highlight that vessels may have had multiple phases of use for different functions.

Magers Lane: illustrated vessels

(Fig. 8.17)

55. MORT MHK. A fragment of a retrograde 'Fecit' ('made it') counterstamp stamp survives on the rim near the spout. Vessel appears to have a similar light-fired fabric with mixed trituration grits to earlier Mancetter-Hartshill products. The die is heavily abraded, but the lettering appears similar to Die 6A of the potter G. Attivs Marinvs. Die 6/6A has been dated to AD 110–130. There are possibly faint traces of a diagonal bar border but this example either appears to be heavily abraded, poorly impressed, or perhaps a different die, and Amy Thorp has suggested Die 4A may be a better fit if the border may be a chevron scheme. G. Attius Marinus appears to have been a busy and prolific producer of mortaria across the period AD 80–130 with workshops at Radlett, Colchester and possibly Brockley Hill. Further production has been proposed at Mancetter-Hartshill, Little Chester and a possible site in Lincolnshire (Hartley 2022a; Hartley *et al.* 2022).

    Examples of Die 6/6A have been recorded from Scunthorpe; Barton-on-Humber; Elslack; Leicester; Lincoln (x2); Little Chester; Manchester (x2); Melandra Castle (x3); near Pocklington; Ribchester; and Scunthorpe (Hartley 2009; Hartley *et al.* 2022). The two examples from Lincoln include one vessel from an uphill site at the Water Tower that was found in 1910 and a further example in Lincoln Museum from Monks Road, Lincoln. As the Lincoln Technical College production site was also located on Monks Road (Baker 1937a; 1937b), this has raised the possibility that the potter also worked at Lincoln, or perhaps somewhere else in Lincolnshire if Die 7A from Torksey could be considered a Lincolnshire product (Hartley *et al.* 2022; Rowlandson 2015a).

    As part of a scheme of thin-section and ICPS-type chemical analysis including Lincoln Technical College, South Carlton, Castleford, Mancetter, Hartshill and Nene Valley kiln samples, three G. Attivs Marinvs vessels were also studied (Badreshany 2019). Examples of G. Attivs Marinvs stamped vessels of Die 4/4A (Rush *et al.* 2000, fig. 97.34a and b, fig. 87.4; Badreshany 2019, sample 53), an example of a G. Attivs Marinvs from Lincoln Water Tower found in 1910, Die 6/6A (Badreshany 2019, sample 43) and an example of Die 6 were subjected to ICPS-type analysis and were all found to chemically group more closely to samples from the Mancetter and Hartshill kilns than the samples from the Lincoln Technical College and South Carlton kiln sites. Regrettably, due to museum access issues at the time, it was not possible to include vessels from Little Chester in the analysis. This was unfortunate as recent excavations have taken the count of G. Attivs Marinvs stamped vessels from Little Chester up to seven, far more than are known from Mancetter and Hartshill (Hartley 2024). Hartley (*ibid.*) has highlighted that a number of the light-fired fabrics stamped by G. Attivs Marinvs from Little Chester appear macroscopically indistinguishable from those made at Mancetter-Hartshill and it appears likely he had workshops at both sites.

    The production source of the Magers Lane vessel is likely to be Mancetter-Hartshill or Little Chester, though perhaps other workshops producing similar fabrics, such as Rocester, are possible. Lincoln remains another possible source that has been mooted, but a broader scheme of scientific analysis would be needed to support this, incorporating the current vessel and samples from Little Chester that may yet be a better parallel (Hartley 1996; 2000; 2022b, 7; 2024; Hartley *et al.* 2022 dataset). Ditch 300153, cut 300057, fill 300059, D007 (Figs 8.18–9)

56. GFIN PGB. A fine grey ware Gallo-Belgic platter. Vessel had dairy residues. Ditch 300149, cut 300144, fill 300145, D012, ORA VL23

57. CR FTR11. A white ware flagon with an expanded top rim. Ditch 300153, cut 300057, fill 300059, D006

58. DSSA JBN3. A dark-surfaced grey ware necked jar with dunting cracks and external carbon deposits. Jar had ruminant carcass fat residues. Ditch 300153, cut 300057, fill 300060, D010, ORA VL21

59. GREY CHEM. A grey ware hemispherical cup. Ruminant carcass fat residues. Pit 300107, fill 300108, D011, ORA VL22

60. GREY B334. A small grey ware B334 carinated vessel. Two holes in the vessel suggest it may have been repaired with a rivet. Dairy residues were present. Ditch 300153, cut 300057, fill 300059, D004, ORA VL19
61. IAGR1 BFL. A transitional ware grog-gritted lipped bowl with external carbon deposits. Bowl had ruminant carcass fat residues. Ditch 300153, cut 300057, fill 300059, D003, ORA VL18
62. IAGR2 CPN. A transitional ware shell-gritted jar with a wedge-shaped rim and a scored horizontal groove. Jar had ruminant carcass fat residues. Ditch 300153, cut 300057, fill 300060, D009, ORA VL20

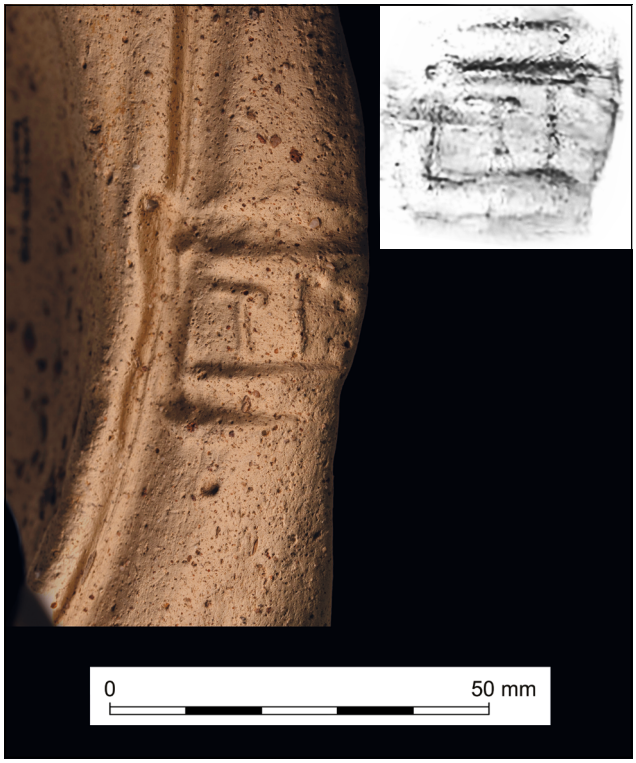


Figure 8.18 Multi-directional light composite of mortarium stamp from vessel 55 and inset showing rubbing of stamp



Figure 8.19 The mortarium stamp from vessel 55

Zone 3

A total of 2316 sherds (53.098 kg, 50.23 RE, mean sherd weight 22.93 g) were recovered from the excavation areas in Zone 3. The Mown Rakes and Six Hundreds Drove sites were in close proximity and appear to form a long swathe of activity in the parish of Swineshead. North Ing, in the parish of Bicker, produced a small group of mid-Roman pottery and was located adjacent to the Headland Archaeology investigations at Bicker Fen, and close to other excavations from the Triton Knoll scheme (Gaunt *et al.* 2024; Rowlandson and Fiske 2020c; 2023f).

The pottery from this group was fresher with a higher mean sherd weight than that seen from Zone 2. The higher proportion of pottery dating to the Roman period from Zone 3, and more favourable soil conditions for preservation, mostly explain this difference, although there were also a greater number of large feature sherds that contributed to the difference in mean sherd weight. The higher proportion of fresh groups of pottery from the Fenland sites from this project fits with the pattern of other assemblages seen by the authors at sites in the Boston area and from the 2017 Triton Knoll sites in the Langriville, Holland Fen with Brothertoft, and Bicker parishes (Rowlandson and Fiske 2018; 2019a; 2020c; 2023f). It is unclear why this occurs but it suggests that on these sites fresh material was disposed of in deep, often waterlogged ditches rather than being middened and subsequently redeposited. This may have had some significance as 'structured deposition' or may merely reflect a different strategy for rubbish disposal (see discussion of themes in Brown 2013; Chadwick 2008a; 2008b; 2009; 2019; Hill 1995). It is possible that elements of the Iron Age and Roman ritual practices encountered at 'watery places' such as Fiskerton may have been undertaken on domestic sites too (Darling and Field 2003; Field and Parker Pearson 2003).

Mown Rakes

A total of 469 sherds (10.205 kg, 6.71 RE, mean sherd weight 21.76 g) were recovered. The pottery was mostly found in ditches, pits gullies, a palaeochannel and a pond. Radiocarbon dates from the site suggest a fall in sea levels rendered the site inhabitable in the later Iron Age to early Roman period (ditch 530296: UBA-52888, UBA-52951, UBA-52952 and FTMC-MB96-1). This would fit with low levels of transitional wares and negligible quantities of Iron Age handmade wares. Further radiocarbon dates from cremated human bone from the site (SUERC-126880 and SUERC-126881) perhaps span the period of occupation

on the site as broadly Flavian to 3rd century AD. The assemblage from the central of the three separate excavation areas that make up the Mown Rakes site has a slightly later date range than that from the northern area. The significance of the central group is that it represents a fairly cohesive group of predominantly mid-Roman pottery from a salt production site.

The pottery from the northern part of Mown Rakes dates to the 1st to 3rd century AD. Although Nene Valley grey wares found on the site were produced deep into the 3rd century AD, there are no diagnostic forms among the assemblage to signal occupation into the mid- to late 3rd century AD. The presence of shell-gritted Bourne-type wares and the low levels of transitional grog-gritted wares suggest that most of the activity on the site occurred in the mid- to late 2nd century AD. Colour-coated wares appear to be restricted to rough-cast beaker types typically of 2nd-century AD date. Sherds of a white ware segmental flanged bowl were found within gully 520149 and ditch 520152. A range of sandy grey wares similar to those in use at Sleaford in the 2nd century AD were present, along with the Nene Valley-type grey wares seen on sites in the south of the county (Rowlandson 2015b; Rowlandson and Fiske 2019a).

Two stamped mortaria (Figs 8.20.63–64) are the most notable finds. A Bourne-type shell-gritted jar with carbonised deposits was selected for ORA and contained animal fats (Fig. 8.20.65). The other vessels of note from the northern part of Mown Rakes are a necked carinated jar or beaker similar to examples from Sleaford (Elsdon 1997, fig. 67.214), a large proportion of a transitional ware lug-handled jar, and a copy of a Nene Valley grey ware colour-coated bowl mimicking samian form 36, similar to examples produced at the Stanground kiln site in the early to mid-3rd century (Dannell *et al*. 1993). This colour-coated bowl was one of the latest types recovered from the site. It is noticeable that, despite the presence of this bowl, there are few Nene Valley grey wares from the northern part of Mown Rakes, a feature noted on the predominantly early Roman site at Morton Saltern (Precious 2001).

The assemblage from the central part of the site contains a slightly later range of pottery. Iron Age and Iron Age tradition wares are restricted to sherds from a Late La Tène III-style necked storage jar with stabbed decoration from tree-throw hole 530177 and a sherd from an IAGR2 vessel from ditch 530301. The majority of the shell-gritted jars were attributed to the SLSHB wheel-made Bourne-type shell-gritted ware category, suggesting a bias towards the 2nd to earlier 3rd century AD. There is a higher quantity of samian present, mostly form 33 cups. Other fine wares include a fine grey ware beaker with an everted rim (GFIN) and a rough-cast colour-coated beaker, a lipped bowl and a necked jar or bowl. Sherds from white ware flagons were also recorded. Nene Valley grey ware (NVGW) and Nene Valley-type coarser grey wares (NVGWC) are more numerous than in the northern area. However, the NVGW forms, including a necked jar (Fig. 8.20.67), a lipped bowl and a dish with a grooved rim, might all be safely dated to the Antonine period. No developed wide-mouthed bowls (BWM3) or straight-sided bead and flanged bowls (BFB) are present, or other types that would confirm a late Roman phase of activity. The range of pottery present could nearly all fit within the mid-Roman period (mid-2nd to mid-3rd century AD). It seems likely that new pottery ceased to reach the site at some point in the second half of the 3rd century AD. The necked shell-gritted storage jar attributed to the IASH1 fabric was perhaps a vessel produced in the 1st century AD, although the limited small quantities of early Roman NVGY and SLGY grey wares may suggest that this central part of Mown Rakes was marginal to an earlier phase of settlement. A Black Burnished ware 1 jar with an out-curved rim (Fig. 8.20.68) and the Nene Valley necked jar (Fig. 8.20.67) both contained evidence of mixed animal fats. A lipped bowl in a light-fired grog-gritted fabric (Fig. 8.20.66) is also of note and may represent an early Roman vessel from Northamptonshire (*cf*. Timby 2009).

Overall, the Mown Rakes assemblage provides a good comparison with those investigated from elsewhere along the scheme, other earlier excavations near the River Witham (Rowlandson and Fiske 2018), the Triton Knoll SMR01/TAM4 area (Rowlandson

and Fiske 2020c; 2023f), and perhaps also the Bicker Fen Convertor Station site (Gaunt *et al*. 2024; see pottery discussion in Volume 1, Chapter 5). The focus on activity perhaps beginning in the Flavian to Trajanic period then continuing into the early years of the 3rd century AD appears similar to a number of the sites located in this area.

Mown Rakes: illustrated vessels

(Fig. 8.20)

63. MOLIN? MHK. A hook-rimmed mortarium from a Midlands source. The vessel is stamped with a die with diagonal bar border. A parallel for this partial potter's stamp could not be found but a production source near Lincoln or Mancetter-Hartshill appears most likely. Ditch 520193, cut 520049, fill 520052, D031, Fig. 8.21
64. MOMH3 MHK. A hook-rimmed mortarium stamped with die 4 of the potter Sarrivs, dated to AD 135–165. This die, and presumably copied sister dies, were used by the workshop of Sarrivs at Mancetter-Hartshill, Rossington Bridge and Bearsden (Hartley 2001; Hartley 2016, 138–140; Hartley *et al*. 2022). The light-fired fabric of this example makes a Mancetter-Hartshill production source most likely. Ditch 520147, fill 520146, D036, Fig. 8.22
65. SLSHB JBN3. A Bourne-type shell-gritted jar with external carbon deposits. Unspecified animal fats were recorded from the organic residue sample. Gully 520107, fill 520108, D033, ORA VL29
66. BWHGR BFL. A light-fired grog-gritted lipped bowl. Ditch 530301, cut 530134, fill 530135, D038
67. NVGW JWM. A necked jar with burnished wavy line decoration. Perrin considers these types to be Antonine (Perrin 1999, 80). ORA produced evidence for unspecified animal fats. Ditch 530301, cut 530163, fill 530165, D039, ORA VL31
68. BBT JEVC. A jar with an out-curved rim in a Black Burnished ware-type fabric with burnished lattice and external carbon deposits. ORA produced evidence for unspecified animal fats. Ditch 530069, fill 530072, D037, ORA VL30

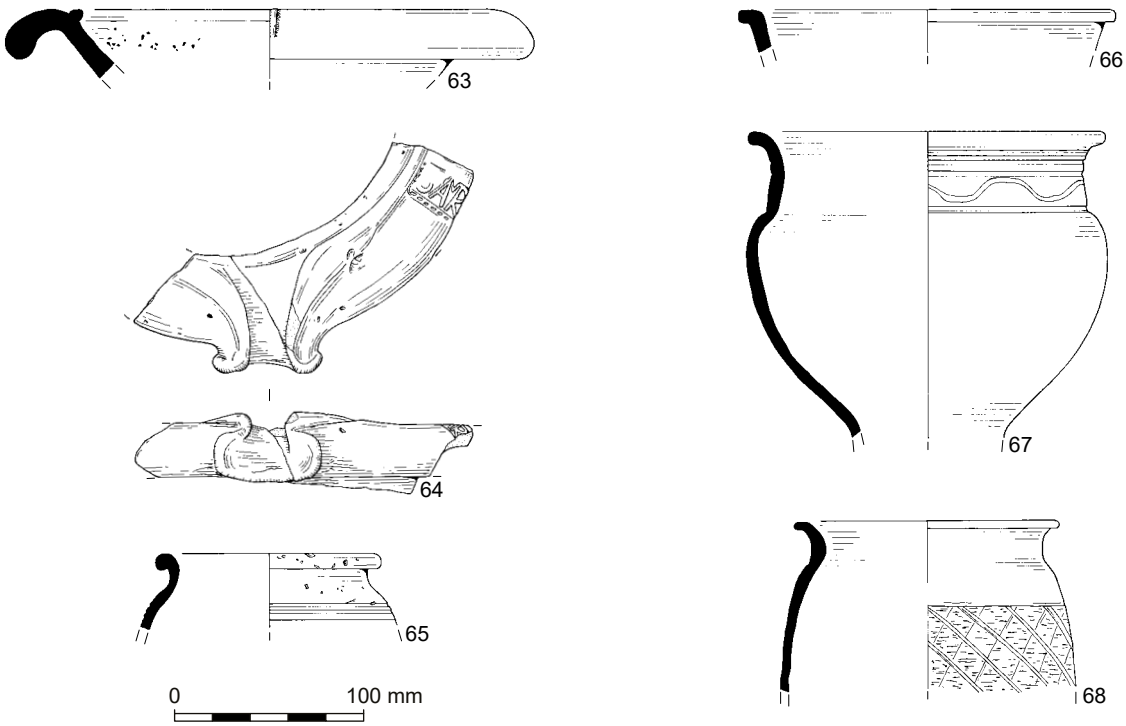


Figure 8.20 Mown Rakes illustrated vessels



Figure 8.21 The mortarium stamp from vessel 63, scale 1:1



Figure 8.22 The mortarium stamp from vessel 64, scale 1:1

Six Hundreds Drove

A total of 1831 sherds (42.582 kg, 43.35 RE, mean sherd weight 23.26 g) were recovered from the excavation, with a further 333 sherds (5.962 kg, 6.37 RE) from evaluation trenches 482, 483 and 484 within this area. Activity here appears to have begun in the mid- to late 1st century AD and continued until sometime in the first half of the 3rd century AD. The absence of any Late La Tène II/III 'fine ware' necked jars and bowls and the low numbers of transitional channel-rimmed jars and necked storage jars suggest that there was not a settlement prior to the Roman activity on the site. Grey ware pottery production appears likely to have taken place in the later 2nd century AD or perhaps into the earlier 3rd century AD. The overall date range of four radiocarbon dates (UBA-52895, UBA-52896; UBA-52897 and UBA-52953) from this site appears contemporaneous with the pottery assemblage. The site has some similarities in range of pottery, date, and perhaps function, to an assemblage recorded from Gold Dyke, Wrangle (Darling and Precious 2001) and other sites from the Viking Link and Triton Knoll schemes (Rowlandson 2019a; Rowlandson and Fiske 2018; 2020b; 2020c). The small but diverse range of fine ware from Six Hundreds Drove is noteworthy.

As the pottery was in good condition, considerable numbers of alterations were noted where material had been used, repaired or customised. Sherds from four shell-gritted jars from the site show signs of external 'salt-bleaching' and a further six vessels have internal white mineral deposits (including Fig. 8.23.80), suggesting the vessels may have been used for boiling brine or perhaps urine. Internal carbonised residues were noted on 25 vessels, internally on a further four vessels, and on sherds possibly re-used as lids. These deposits are mostly on medium-mouthed jars in the SLSHB, GREY or IAGR2 fabrics, although examples of Bourne-type bowls (BBN3) and a dish (D452) were also noted that may have been used for cooking or perhaps as lids.

The recent analysis of Roman pottery from a coastal marsh site with evidence for salt production at Goxhill, North Lincolnshire, showed that the inhabitants used the vessels with carbonised residues for intensively boiling up ruminant (cattle/sheep/goat) carcass fats for cooking or rendering purposes (Dunne and Evershed 2018a and 2018b; Rowlandson and Fiske 2020d). In northern Lincolnshire these carbonised residues have typically been recorded on Dales ware shell-gritted jars. On this site it appears that the Bourne-type shell-gritted jars were utilised for a similar function, with dairy fats being noted on the Nene Valley dish Fig. 8.23.78, grey ware bowl Fig. 8.23.84, and grey ware cheese press Fig. 8.24.97.

Two fine ware vessels, a Nene Valley dish (Fig. 8.23.78) and a samian bowl, had been repaired. A fragment from a grey ware cheese press appears to have been trimmed to a disc (Fig. 8.24.97), and use wear is evident on a samian cup base, internally on two mortaria and on a Dressel 20 amphora handle that may have been used as a pestle or rubber.

Pottery production took place near the site. No kiln was found but a large pond containing pottery waste suggests production occurred nearby, most probably in the second half of the 2nd century or early in the 3rd century AD. The saltmaking nearby at Mown Rakes and the ceramic production suggest a somewhat 'industrial' aspect to this

part of the landscape in the Roman period. Despite, or perhaps because of, this activity, the range of pottery from the site suggests the inhabitants had access to a range of fine wares, including an unusual mica-dusted 'wine-strainer' form not typically encountered in Lincolnshire but more common at sites in London, for instance. Some of the grog-gritted wares and a possible Upper Nene Valley mortarium may reveal trading routes upriver to the west.

Activity on the site appears to have finished sometime early in the second half of the 3rd century AD, as only a single Dales ware vessel was recognised, there being no examples of developed wide-mouthed bowls (BWM3) or straight-sided bead and flanged bowls (BFB), and colour-coated wares are restricted to types in circulation in the later 2nd to earlier 3rd century AD. This period of activity makes the site an excellent example of an early to mid-Roman industrial site from this part of Lincolnshire. The range of imports probably highlights direct links to a trading network looking towards London in the south and perhaps to the Upper Nene Valley area to the west, rather than an indication of being 'high status'. The site would have been linked to the seaways and riverine connections to the west and also to the north towards Lincoln. The commodity most likely to have been traded from the site would probably have been salt rather than the grey wares produced there. As part of exchanges, vessels such as the Verulamium region mortaria, and curios such as the mica-dusted 'wine-strainer', may have been off-loaded and used on this site rather than traded further afield.

It appears that the inhabitants were, or became, accustomed to a suite of table wares, as they attempted to repair a number of vessels on the site – notably a Nene Valley grey ware dish with birch bark tar repairs (No. 78), perhaps a vessel in use in the 3rd century AD, and also a samian bowl produced in the later 2nd century AD that was repaired with metal cleats. Examples of vessels with surviving evidence of birch bark tar used as an adhesive are known from a number of sites in the Roman period and later (see Marter Brown and Seager Smith 2012; Stacey *et al*. 2020). This perhaps reflects a change in availability of fine ware bowls and dishes to the site in the 3rd century AD, either as a result of a decline in the trade of samian ware or diminished access to traded goods in general. By the late Roman period it appears that the focus of settlement had moved elsewhere.

The key groups

Pond 550022 produced 391 sherds (max. 212 vessels, 8.800 kg, 9.79 RE) and the group contains pottery mostly dating to the mid-2nd to perhaps earlier 3rd century AD. A few smaller fragments of the native tradition ware, SLGY grey ware and a Verulamium region mortarium may be of early Roman date. Colour-coated wares are restricted to beakers, mostly rough-cast types of the 2nd century AD and a beaker with barbotine hairpin decoration. Other sherds of note came from white ware flagons, samian including a form 33 cup, a small amphora fragment, and a sherd from a white ware mortarium possibly from the Upper Nene Valley. Twenty sherds of Nene Valley grey ware, mostly from necked jars, and 14 sherds of the coarser light-fired grey ware NVGWC were also noted. Shell-gritted sherds were mostly Bourne-type shell-gritted wares (maximum 26 vessels), the majority of which were necked jars, and a typical bowl with a grooved rim (Fig. 8.24.103). Many of the sherds from the site are sandy grey wares recorded with the GREY code (max. 100 vessels, 180 sherds, 6.35 RE), with a significant quantity of pottery production waste, presumably from a kiln located nearby.

The group of misfired grey ware pottery from this feature group is of significance. Sherds from a total of 14 vessels show signs of misfiring. Four warped vessels were recorded from trench 482: three jars with scored wavy line decoration on the shoulders and a dish with a grooved rim and burnished decoration (Figs 8.23.85, 8.24.93 and 8.24.95). Six further grey ware vessels show signs of being overfired, one vessel showing signs of spalling, and a vessel with frilled decoration has patchy surface colours (Fig. 8.23.89). A further warped vessel, a necked jar with spalling (Fig. 8.24.96), and a Bourne-type bowl with a grooved rim were also recorded (GREY, BBN3, No. 86). Although broadly similar forms were produced in sandy grey ware fabrics at Tattershall Thorpe over 15 km away (Rowlandson and Fiske 2020d) and shell-gritted jars were produced at Bourne (Samuels 1983), no kilns are presently recorded from the Swineshead area (Swan 1984). It is possible, although

perhaps unlikely, that the grey wares from this scheme were not produced in the immediate vicinity, as no kiln features were recognised. Pottery waste was also recognised during the Triton Knoll SPE3 excavation near Anton's Gowt, where a misfired Black Burnished ware 1 type jar with dunting cracks was found (Rowlandson and Fiske 2020b). At present the exact location of the kiln(s) responsible for the production waste at Six Hundreds Drove has not been identified, but a new pottery production site in this part of Lincolnshire would not be surprising. The pond (550022) did contain a good range of misfired vessels along with other material more typical of the other wares in use on the site. The clay layers described at the base of the pond do have some similarities with clay found at the base of clay store/processing pits at Market Rasen (Pre-Construct Archaeology 2007; Rowlandson 2005a; 2005b; personal observation of the 'Tesco' MRH04 site). The combination of gully and large pit/pond may have been suitable for this function, and tanks for clay 'washing', 'puddling' or processing are known from a number of Roman pottery industries (*cf.* Peacock 1982, 52–55 and 120–2). It is possible that a kiln was situated just beyond the limits of the excavation area, and a proportion of the pottery production waste was backfilled into this nearby feature.

Ditch 550508 contained 198 sherds from a maximum of 58 vessels. The majority of the pottery from this group dates to the later 2nd to early 3rd century AD. Colour-coated beakers include a folded vessel with a curved rim and a scale and folded beaker, both likely to date to the 3rd century AD, and a cornice-rimmed vessel of probable 2nd-century AD date. A sherd from a samian form 33 cup, a Dressel 20 amphora sherd and small quantities of white ware and Nene Valley grey wares were also recorded. Sherds from eight vessels were attributed to the GREY group, including a sherd from a necked jar or beaker and a beaker with an everted rim. Twenty of the vessels were in ungrouped shell-gritted wares (SHEL), mostly from large jars, and a number of vessels show signs of white salt-bleaching on the surfaces and may have held boiling brine (Darling 2001). Nearly all the Bourne-type shell-gritted wares have carbonised deposits and include two necked jars (including Fig. 8.24.107) and a Bourne-type bowl with a grooved lip that had been used for heating ruminant carcass fats (Fig. 8.24.104).

Ditch 550518 contained 210 sherds from a maximum of 115 vessels that date from the mid-1st to the 2nd century AD, with a few vessels that may have been deposited in the early 3rd century AD. Samian forms present include a form 33 cup and a form 35 vessel, and there is a further example of a cornice-rimmed colour-coated beaker. The most notable inclusion is a mica-dusted 'wine-strainer' form (Davies *et al.* 1994, form 9M46) in a fine oxidised mica-dusted fabric, possibly a Continental import or from southern Britain; this, together with a sherd from a Verulamium white ware mortarium and a further sandy white ware segmental flanged bowl, may all have been transported to the site via London. A sherd from a powdery white ware mortarium was probably an import from northern Gaul. Sherds of the early Roman local NVGY fabric include a biconical beaker similar to Cam 120 (Hawkes and Hull 1947), probably manufactured in the 1st century AD. Body sherds from three Dressel 20 amphorae were also noted. A further Bourne-type shell-gritted jar shows signs of carbonised residues and had been used to heat ruminant carcass fats (Fig. 8.24.105). A small range of native tradition wares were present, mostly jars, one that had held ruminant and non-ruminant animal fats (Fig. 8.24.101). Grey wares include a range of cordoned jars (Figs 8.24.91–92), necked jars and a bowl with a split rim that had dairy fat residue (Fig. 8.23.84), all possibly of early Roman date. Fresh fragments from a Mancetter-Hartshill mortarium with a triple-ribbed rim and fired clay trituration grits (MOMH2, MTRB, Darling and Precious 2014, no. 1667) and a Nene Valley grey ware jar with a split rim suggest that ditch 550518 remained open until at least the late 2nd or perhaps the early 3rd century AD.

Ditch 550529 produced a group of 108 sherds from a maximum of 50 vessels dating to the later 2nd to early 3rd century AD. Notable inclusions from this group are a white ware pinch-necked flagon with a possible batch mark 'X' and a grey ware narrow-necked jar with carbonised deposits (the presence of which is not typical for this vessel type). ORA showed that this vessel had held animal fats (Fig. 8.23.90). A samian form 31 bowl, a Bourne-type shell-gritted bowl with carbonised residues, and small sherds from Dressel 20 amphorae were also recorded.

Ditch 550532 contained 34 sherds deposited in the late 2nd to 3rd century AD. Notable inclusions are an early Roman grey ware cup in the NVGY fabric (Fig. 8.23.75), an unusual jar in the NVGWC fabric with an internal white mineral deposit (Fig. 8.23.80), and a samian form 33 cup.

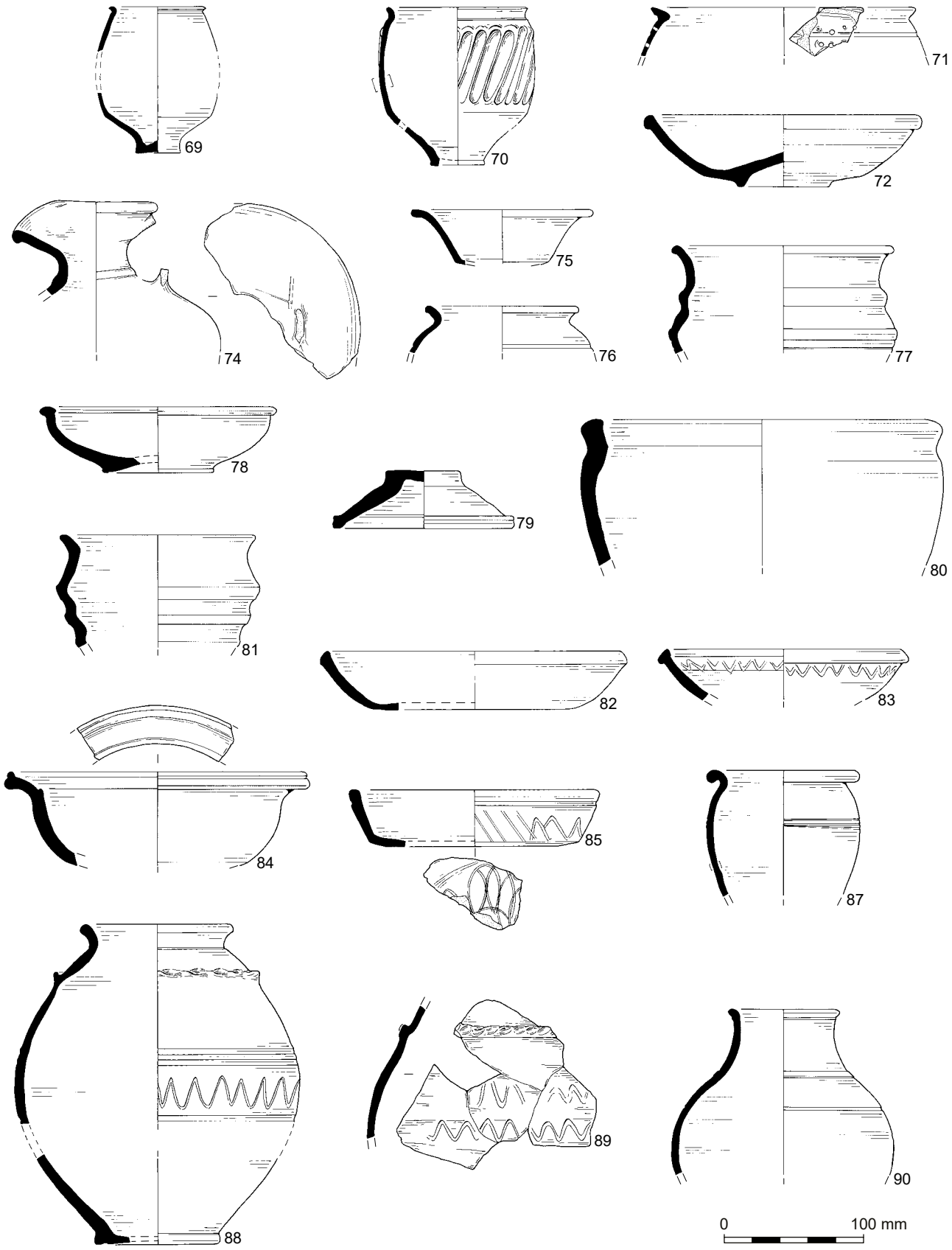


Figure 8.23 Six Hundreds Drove illustrated vessels (i): vessels 69–90

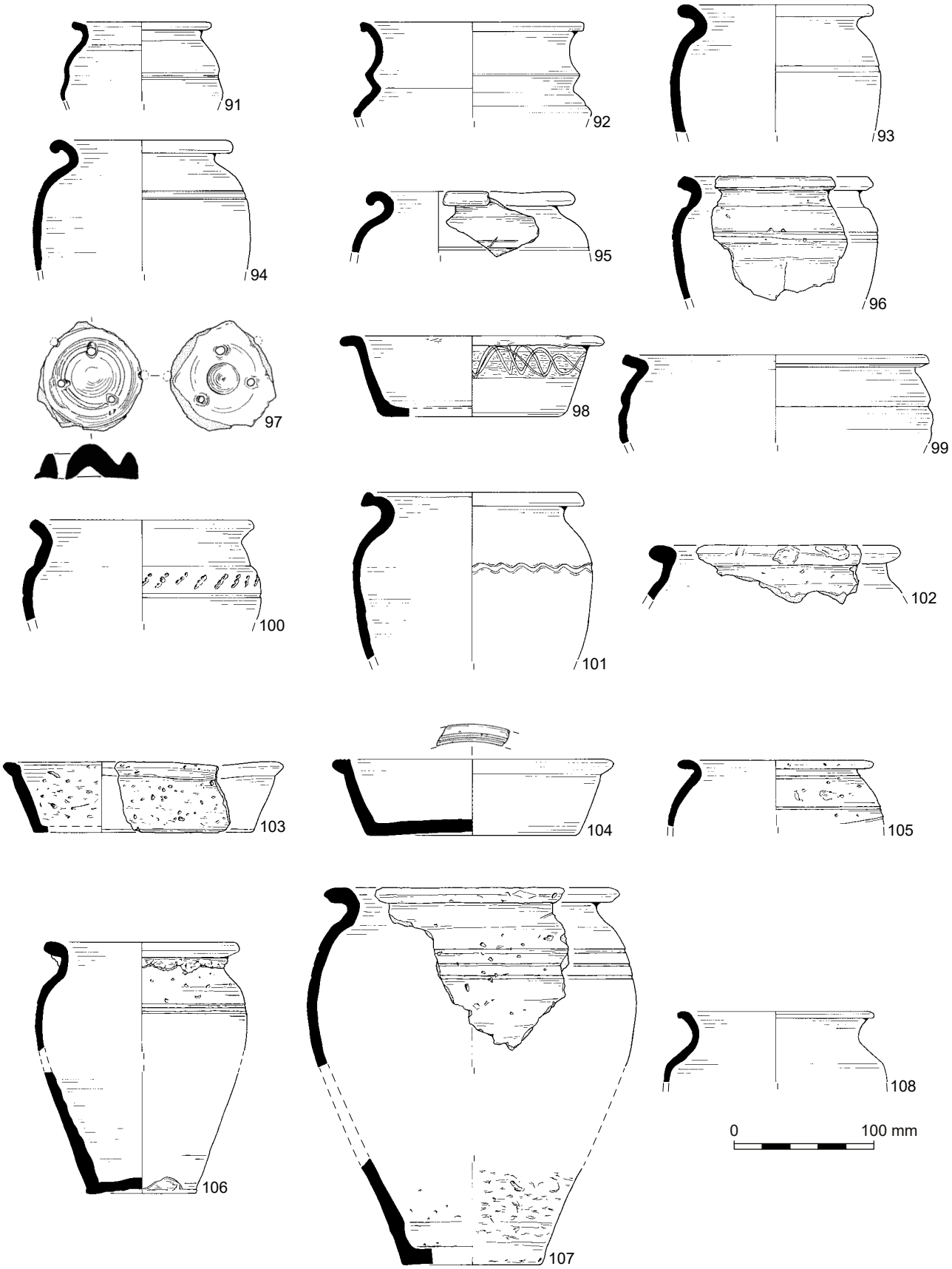


Figure 8.24 Six Hundreds Drove illustrated vessels (ii): vessels 91–108



Figure 8.25 Mica-dusted wine-strainer fragment No. 71.

Ditch 550534 contained 44 sherds, notably a mica-dusted bowl mimicking samian form 31 (Fig. 8.23.72), a samian form 31 that had been repaired, a form 38 bowl, and a large proportion of a shell-gritted Bourne-type jar with external carbonised residues that contained unspecified animal fats (Fig. 8.24.106). This group dates to the late 2nd to early 3rd century AD.

Ditch 550536 contained 87 sherds dating to the late 2nd to earlier 3rd century AD. This group includes the Nene Valley grey ware dish with a resin repair (Fig. 8.23.78), sherds from a large jar that appears to have been re-used as a lid (Fig. 8.23.81), and a necked jar with carbonised residues (Fig. 8.24.102). Other notable vessels include a Nene Valley grey colour-coated bowl mimicking samian form 36, fine grey ware and a sherd from a white ware vessel. Grey ware forms present include fresh fragments from a wide-mouthed bowl and a narrow-necked jar.

Ditch 550538 contained another large group (231 sherds), but this fresh assemblage could be dated to the mid-1st to early 2nd century AD. Noteworthy are the samian types present, including form 18 platters, a form 27 cup, and a bowl (see Thorp below). The early grey ware fabric NVGY was well represented, including sherds from a rusticated jar and a cornice-rimmed beaker. A range of vessels in the early Roman DSSA fabric includes cordoned jars (Fig. 8.23.77), rusticated jars and a necked jar. Examples of early Roman D452 type dishes in the GREY fabric (Figs 8.23.82 and 8.23.83) are also present. A large grog-gritted vessel is also noteworthy (Fig. 8.24.99). Other fine wares include a fine grey ware sherd decorated in the London ware style and a colour-coated rough-cast beaker that may have been produced in the mid-2nd century AD. This group is the best early assemblage from the site and shows that, in addition to the 'standard' grey wares and native tradition wares, in the early Roman period its inhabitants had better access to a supply of samian than might be expected, considering the rural nature of the site.

Other notable vessels include a parchment ware segmental flanged bowl with painted dot 'sun motifs' around the flange (ditch 550248), a lipped bowl in a Black Burnished ware-type fabric – possibly also a local product (Fig. 8.24.98), a Dressel 20 amphora handle that may have been used as a pestle (from topsoil), and a shell-gritted necked jar with carbonised residues that was one of the few jars that produced evidence of dairy lipids (Fig. 8.24.108, ditch 550248).

Six Hundreds Drove: illustrated vessels

(Figs 8.23 and 8.24)

69. CC1 BKCOR. A colour-coated cornice-rimmed beaker. Examples of this rim form are known to have been produced at Lincoln, South Carlton, Great Casterton, the Nene Valley and the Lower Rhineland. Ditch 550518, cut 550142, fill 550145, D056
70. CC1 BKEV. A colour-coated beaker with an everted rim and barbotine hairpin decoration, very abraded. Decoration similar to the 'hairpin' motif seen on vessels from Brough-on-Humber or examples from the Nene Valley; Darling notes parallels from a range of continental sites in Gaul (2005a, 85; *cf.* Perrin 1999, 120). Pond 550022, cut 550021, fill 550014, D040
71. MICA ST. A mica-dusted 'wine-strainer' form (Davies *et al.* 1994, fig. 116. 745, London form 9M46), possibly a continental import or from southern Britain, local production in London in the Flavian to Trajanic period. Spout is lost but the distinctive pierced shoulder was recovered. Ditch 550518, cut 550051, D041, VL34 (Fig. 8.25)
72. NVMIC B31. A mica-dusted bowl, possibly a Nene Valley product but similar in appearance and finish to an example published from Lincoln and attributed to the general MICA fabric group, so the fabric identification is tentative (Darling and Precious 2014, no. 126). Possible date in the later 2nd to 3rd century AD. Vessel had traces of ruminant carcass fats. Ditch 550534, cut 550226, fill 550227, D072, ORA VL44 (Fig. 8.26)
73. GFIN BR12. Not illustrated. A fine grey ware bowl (as Precious 2001, fig. 41.13). Ditch 550538, cut 550193, fill 550194, D061
74. CR? JUG. A white ware flagon with traces of a possible graffito or batch mark 'X' on the shoulder. Examples of this form are known from Lincoln and the South Carlton kilns



Figure 8.26 Mica-dusted bowl No. 72 including fabric images, surface (top) and fabric (bottom)

(Webster 1944), but other production sources including sites on the Continent are possible for this vessel. Unphased, ditch 550529, cut 550252, fill 550254, Do76

75. NVGY C. A cup in a fine, early Roman grey ware. This vessel has some similarities to samian prototypes (Webster 1996). Ditch 550532, terminal 550197, fill 550198, Do69
76. NVGY JRUST. An early Roman fine grey ware jar with rusticated surface treatment (not shown on this illustration). Ditch 550538, cut 550193, fill 550194, Do63
77. DSSA JCOR. A dark-surfaced grey ware jar with cordoned decoration (*cf.* Fig. 8.23.81). Vessels with a similar fabric and form to Fig. 8.23.77 are known from Sleaford, including the Bonemill Lane pottery production site (Elsdon 1997; Rowlandson 2024b). Ditch 550538, cut 550193, fill 550194, Do65
78. NVGW D. A Nene Valley grey ware dish with an attempted repair. ORA produced evidence for dairy fats and birch bark tar that was used as an adhesive as part of the repair. Ditch 550536, terminal 550195, fills 550196, 550327 & 550328, Do68, ORA VL42, (Fig. 8.27)
79. NVGWC L. A small lid in a coarse Nene Valley grey ware fabric. Ditch 550533, cut 550123, fill 550124, Do52
80. NVGWC J. An unusual large jar with white internal deposit, perhaps broadly similar to a vessel illustrated from Sleaford (Elsdon 1997, fig. 68.238). Ditch 550532, cut 550201, fill 550202, Do70
81. NVGWC JCOR. A small jar or beaker with cordoned or corrugated body. Ditch 550529, cut 550252, fill 550254, Do79
82. GREY D452. A grey ware dish with external carbon deposits. ORA unsuccessful. Ditch 550538, cut 550193, fill 550194, Do60, ORA VL41
83. GREY D452V. A grey ware dish with external burnished wavy line, a type produced by several kilns in northern Lincolnshire and perhaps elsewhere (Gregory 1996). Ditch 550538, terminal 550125, fill 550126, Do53
84. GREY B333. A grey ware bowl with a split rim, a typical form seen in northern Lincolnshire, East Yorkshire and further afield (Darling and Precious 2014). The ORA sample produced evidence for dairy fats. Ditch 550518, cut 550081, fill 550083, Do45, ORA VL36
85. GREY DGR. A grey ware dish with external burnished intersecting arcs on the wall and scrolls on the base. This vessel was warped and misfired. Likely local product. Pond 550022, cut 48210, fill 48211, Do2E (trench 482) (Fig. 8.28)
86. GREY BBN3. Not illustrated. A grey ware bowl similar to Bourne-type reeded-rimmed vessels (*cf.* Fig. 8.24.104) warped and misfired. Pond 550022, cut 550021, fill 550116, Do48
87. GREY BKCUR. A grey ware jar with a curved rim, probably also a local product. Pond 550022, cut 48210, fill 48211, Do6E (trench 482) (Fig. 8.29)
88. GREY BK120. A jar or beaker with a notched cordon and burnished with intersecting arcs,

similar to misfired vessel Fig. 8.23.89. Examples of this form are published from Lincoln (Darling and Precious 2014, no. 1080). The majority of examples of this form type were found in deposits dating to the mid- to late 3rd century AD, but examples are plotted from AD 160 onwards, perhaps fitting with the postulated period of pottery production on the Six Hundreds Drove site sometime in the later 2nd to earlier 3rd century AD. 'Smith god' pots are known to have been produced at Lincoln in a similar form (Darling and Precious 2014, nos 1407–10), but no decorated sherds were recorded from the Six Hundreds Drove site. Examples of this form are known from other sites in Lincolnshire, notably from Boston Tytton Lane (Rowlandson and Fiske 2019a, no. 6), and it is likely to have been produced at the Six Hundreds Drove site. Ditch 550050, fill 550066, D 042, ORA VL35

89. GREY BK120. A jar with frilled cordons and patchy surfaces, see discussion of Fig. 8.23.88. Pond 550022, cut 48210, fill 48211, D07E (trench 482) (Fig. 8.30)
90. GREY JNN. A grey ware narrow-necked jar with a cordon. Unusually for this vessel type it had external carbon deposits over a chipped rim; ORA suggested unspecified animal fat. This may be as a result of the vessel being utilised for cooking on an open fire as a secondary function, as narrow-necked jars seldom have carbonised residues. Ditch 550529, cut 550252, fill 550254, D077, ORA VL46
91. GREY JCOR. A jar with a corrugated or cordoned profile similar in form to examples from the Nene Valley (Darling *et al*. 2020, fig. 3.16.50; Perrin 1999, no. 21–25; *cf*. Fig. 8.23.81 above) where examples occasionally have slashed cordons. A vessel illustrated from the Bicker Fen Convertor Station excavations (Gaunt *et al*. 2024, fig. 20) may perhaps be an example of a body fragment from a beaker or jar with a similar profile with a narrow girth and slashed decoration on the cordons rather than a tazza. Ditch 550518, cut 550142, fill 550145, D058
92. GREY JCOR. A cordoned jar (*cf*. Fig. 8.23.77). Ditch 550518, cut 550081, fill 550083, also ditch 550055, fill 550066, D043
93. GREY JEVC. A grey ware jar with a warped rim, vitrified, scored horizontal groove. Pond 550022, cut 48210, fill 48211, D03E (trench 482) (Fig. 8.31)
94. GREY JCUR. A grey ware jar with scored horizontal groove, warped rim. Pond 550022, cut 48210, fill 48211, D04E (trench 482)
95. GREY JCUR. A misfired grey ware jar with scored horizontal groove, warped rim. Pond 550022, cut 48210, fill 48211, D05E (trench 482)
96. GREY JBN3. A spalled grey ware necked jar with post-breakage concretion, probably mineralisation from burial in waterlogged conditions. Pond 550022, cut 550021, fill 550116, D049
97. GREY CHP. A fragment from a grey ware cheese press with three pierced holes, possibly trimmed to a disc. ORA suggested it had been used for straining ruminant carcass fats. Unphased, Ditch 550521, cut 550323, D080, ORA VL32
98. BBT BFL. A Black Burnished ware-type bowl with burnished intersecting arcs, spalled. Ditch 550050, fill 550066, D044
99. GROG BCOR. A grog-gritted large bowl. Ditch 550538, cut 550193, fill 550194, D062
100. IAGR1 JCOR. A native tradition grog-gritted jar with a cordon and comb-stabbed decoration. Ditch 550538, cut 550193, fill 550194, D064
101. IAGR1 J105. A grog-gritted lid-seated jar with a scored wavy line. ORA sample had evidence for both ruminant and non-ruminant carcass fats. Ditch 550518, cut 550081, fill 550083, D046, ORA VL37
102. IAGR2 JBN3. A shell-gritted necked jar, perhaps similar fabric to transitional shell-gritted jars discussed by Precious from Morton (2001). Vessel had black deposits that may have been resin but the ORA sample produced no result. Ditch 550536, terminal 550195, fills 550327 and 550328, D082, ORA VL49
103. SLSHB BBN3. A shell-gritted Bourne-type bowl with a reeded rim. Ruminant carcass fats were recorded from the ORA sample. Pond 550022, cut 550021, fill 550116, D050, ORA VL38
104. SLSHB BBN3. A shell-gritted Bourne-type bowl with a reeded rim. This vessel had surviving external carbon deposits. Ruminant carcass fats were recorded from the ORA sample. Unphased, ditch 550508, cut 550122, fill 550120, D051, ORA VL39
105. SLSHB JEV. An everted-rimmed jar with external carbon deposits. Ruminant carcass fats were recorded from the ORA sample. Ditch 550518, cut 550142, fill 550145, D057, ORA VL40
106. SLSHB JBN3. A shell-gritted necked jar with a scored horizontal groove and external carbon deposits. Ruminant carcass fats and unspecified animal fats were recorded from the ORA sample. Ditch 550534, cut 550226, fill 550227, D071, ORA VL43
107. SLSHB JBN3. A shell-gritted necked jar with a scored horizontal groove and external carbon deposits. Unspecified animal fats were recorded from the ORA sample. Ditch 550508, cut 550402, fill 550453, D083, ORA VL50
108. SHEL JNK. A shell-gritted necked jar with external carbon deposits. This unusual jar was one of the few vessels with evidence for dairy processing. Ditch 550248, fill 550249, D075, ORA VL45



Figure 8.27 NVGWC dish No. 78 with remains of resin repair



Figure 8.28 Grey ware dish, No. 85



Figure 8.29 Grey ware beaker, No. 87



Figure 8.30 Frilled grey ware sherd, No. 89



Figure 8.31 Grey ware jar No. 93

Samian

Amy Thorp

Introduction

The assemblage was widely distributed (Table 8.56), but the largest concentrations (30 sherds or more) were found at Sea Bank Farm, White Crofts and Six Hundreds Drove. Two-thirds of the sherds were recovered from ditch and gully fills; ditches 300522 (White Crofts) and 300153 (Magers Lane) were the only features to contain more than 10 pieces. The condition of the material, however, is mainly good, with a mean sherd weight of 14.2 g, and significant abrasion limited to a few vessels. While all three key areas of manufacture are represented, those from Central Gaul predominate. Most are plainware vessels, with just 10 pieces from seven mould-decorated forms (Table 8.57).

Methodology

Fabric identifications were undertaken, after a small fresh break had been made, by examination using a x20 binocular microscope. Featured sherds were assigned a form type, referencing standard corpora where appropriate, and other variables such as decoration, condition, evidence of use and rim EVEs (Estimated Vessel Equivalents) were also recorded. Unless specified otherwise, all forms mentioned below are from the Dragendorff series. The overall level of recording accords with that of a 'detailed record' (Barclay *et al.* 2016, 14–5, section 2.4.6), aimed at characterising and quantifying an assemblage to as high a level as possible.

Further in-depth analysis was undertaken on the samian stamps and decorated fragments. Where possible, these pieces were attributed to individual potters or groups of potters. The dating framework refers to the sequence published in *Names on Terra Sigillata* (Hartley and Dickinson 2008). The full catalogues are available at the end of this report.

Results

The South Gaulish samian (20 sherds/166 g) is all likely to have been produced at La Graufesenque. These sherds were found in five areas (Table 8.56). The largest quantity was recovered from Six Hundreds Drove, with most sherds (eight pieces) found in ditch 550538; the well-preserved nature of the large mid-1st to early 2nd century AD group (231 sherds) from ditch 550538 stands out among the early material from this site (see Rowlandson above). Plainware vessels are limited to the more common cup and dish forms (Table 8.57). Just one form 15/17 or 18 dish has the end of a stamp surviving (Stamp cat. S6; Six Hundreds Drove). Small fragments from two form 37 bowls were also found in ditches 300524 (Decorated samian catalogue (Dec. Cat.) No. 1; White Crofts) and 409000 (Dec. Cat. No. 2; Ailby Lane). This small group has a Flavian to early Trajanic (*c.* AD 70–110) emphasis, with the latest being the form 18/31 dishes dating to AD 80–110.

The core component of the assemblage (124 sherds/1901 g) was sourced from the Central Gaulish production centres of Les Martres-de-Veyre and Lezoux. A few fragments from the Trajanic (AD 100–125) workshops of Les Martres-de-Veyre were found at four of the excavated sites (Table 8.56). The pieces are mostly from form 18 and form 18/31 dishes, with just a single example of a 33 cup (Table 8.57). Products of the Lezoux kilns (117 sherds/1842 g), active during the Hadrianic and Antonine periods (AD 120/125– *c.* 200), predominate (Table 8.56); these were retrieved from all but two areas and the largest quantities were from Sea Bank Farm, White Crofts, Magers Lane and Six Hundreds Drove. Plainware dishes/platter continue to be the most common form (Table 8.57), a pattern frequently seen in rural samian assemblages (Willis 2005, section 8.2.6). The form 18/31 series accounts for all but a few examples. The earlier form 18/31 and 18/31R dishes, of Hadrianic to early Antonine date, are marginally more common than their mid- to late-2nd-century form 31 dish and form 31R bowl counterparts. However, the remaining plainware dish and bowl forms (Table 8.57), mostly from Sea Bank Farm, are consistent with a late 2nd-century AD bias. Further plainware vessels in the Lezoux fabric are limited to form 27 and 33 cups. Form 27 cups went out of production *c.* AD 150–160, whereas form 33 is the most popular cup type

in the mid- and late 2nd century AD (Webster 1996, 38, 45). The incidence of just one form 27, versus 19 examples of form 33, therefore, is indicative of a late-2nd century AD bias to the group. A practically complete form 33 cup (five conjoining sherds) was recovered from ditch 170156 at Partney Leys, but the surfaces have suffered from post-depositional abrasion and the surviving slip is patchy. Mould-decorated vessels are also sparse, being limited to three small fragments of form 37 bowls (Dec. Cat. No. 3–6; Sea Bank Farm, White Crofts, and Walk Hill).

A small selection of the Lezoux vessels show evidence for use and curation. A form 33 cup from the same deposit shows signs of prolonged use, with stirring(?) marks visible on the interior edge of the base, the underside of its footring worn, and traces of a butterfly-shaped repair slot in the body. Three further vessels have evidence of repairs: a form 33 cup (ditch 301401, White Crofts), a stamped form 38 flanged bowl (Stamp cat. S5, Magers Lane; Fig. 8.32.1), and a form 18/31 dish (ditch 550534, intervention 550226, Six Hundreds Drove; Fig. 8.32.2). The repairs to the dish and bowl are extensive with a series of slots (five and three respectively) located around the vessels, and in the case of the bowl destroying most of the original potter's stamp.

Products from the East Gaulish production centres are very limited, with a combined total of eight sherds recovered from three areas (Table 8.56). Pieces of Rheinzabern plainware vessels predominate: two form 33 cups, a Curle 23 or Ludowici Tb variant dish (see unusual forms catalogue below), as well as an indeterminate bowl form. The remaining plainware fragment is a rim from a probable form 31 (R) bowl from Trier. An unusual find is a large sherd from a form 37 bowl from Blickweiler (Dec. Cat. No. 7, Sea Bank Farm; Fig. 8.32.3), with a mould-maker's stamp of L. A–L– dating to AD 140–80; this bowl is very well preserved, particularly in contrast to the other fairly scrappy decorated sherds in the assemblage. This is only the third vessel with this mould-maker's stamp to be recorded in Britain, with the main concentration of find spots in the middle and lower Rhineland (Hartley and Dickinson 2008, 31).

Overall, the assemblage contains an interesting range of samian vessels but is too small to conduct any statistical or functional analysis. The group provides evidence for occupation from the late 1st century to mid-3rd centuries AD, with the majority dating to the Hadrianic and Antonine periods. The distribution of the samian ware mostly amounts to a background scatter, with few concentrations in individual features apparent. The emphasis on plainware forms, and the presence of several repaired vessels, is in keeping with other rural assemblages (Willis 2005, table 45, chart 17). The small samian ware assemblage (66 sherds/1437 g) recovered from the Triton Knoll scheme, also in south-east Lincolnshire, is very similar in nature (Monteil 2024, 43–8).

Table 8.56 Quantification of samian by fabric (production area) and site area

	Production centre (fabric)													
Site area	*South Gaul*		*Central Gaul*				*East Gaul*						*Total*	
	La Graufesenque		*Les Martres-de-Veyre*		*Lezoux*		*Blickweiler*		*Rheinzabern*		*Trier*			
	No.	*Wt (g)*	*No.*	*Wt (g)*	*No.*	*Wt (g)*	*No.*	*Wt (g)*	*No.*	*Wt (g)*	*No.*	*Wt (g)*	*No.*	*Wt (g)*
Sea Bank Farm	-	-	2	14	26	278	3	56	2	16	-	-	33	364
White Crofts	3	21	-	-	36	495	-	-	1	11	1	8	41	535
Ailby Lane	1	2	-	-	-	-	-	-	-	-	-	-	1	2
Walk Hill	-	-	2	14	4	21	-	-	1	7	-	-	7	42
Partney Leys	-	-	-	-	5	147	-	-	-	-	-	-	5	147
Cheals Close	-	-	-	-	1	5	-	-	-	-	-	-	1	5
Raithby Lane	-	-	-	-	2	17	-	-	-	-	-	-	2	17
Hagnaby Grange	2	6	-	-	-	-	-	-	-	-	-	-	2	6
Magers Lane	3	16	-	-	14	293	-	-	-	-	-	-	17	309
Mown Rakes	-	-	1	2	4	30	-	-	-	-	-	-	5	32
Six Hundreds Drove	11	121	2	29	23	545	-	-	-	-	-	-	36	695
North Ing	-	-	-	-	2	11	-	-	-	-	-	-	2	11
Total	20	166	7	59	117	1842	3	56	4	34	1	8	152	2165

Table 8.57 Quantification of samian forms (all Dragendorff unless specified otherwise) by fabric and maximum vessel count (rim EVES)

Vessel type		*Production centre (fabric)*					
		South Gaul	*Central Gaul*		*East Gaul*		
	Vessel form	*La Graufesenque*	*Les Martres-de-Veyre*	*Lezoux*	*Blickweiler*	*Rheinzabern*	*Trier*
Cup	27	4 (0.22)	-	1 (0.12)	-	-	-
	33	-	1	19 (2.35)	-	2 (0.18)	-
	33 or 46	-	-	1	-	-	-
Plate/dish	15/17 or 18	1	-	-	-	-	-
	18	2 (0.11)	1 (0.05)	-	-	-	-
	18/31	3 (0.14)	2 (0.19)	7 (0.52)	-	-	-
	18/31 or 31	-	-	2	-	-	-
	18/31R	-	-	2 (0.06)	-	-	-
	18/31R or 31R	-	-	2	-	-	-
	31	-	-	8 (0.63)	-	-	-
	36	-	-	2	-	-	-
	Bet 049	-	-	1 (0.06)	-	-	-
	Curle 23 or Lud Tb var.	-	-	-	-	1 (0.08)	-
	Lud Tg	-	-	1 (0.08)	-	-	-
	Wa 79R	-	-	1	-	-	-
Plain bowl	31R	-	-	1 (0.27)	-	-	1 (0.07)
	38	-	-	3 (0.38)	-	-	-
Decorated bowl	30 or 37	-	-	1	-	-	-
	37	2	-	3	1 (0.07)	-	-
Total (max number)		12	4	55	1	3	1
Unspecified forms	bowl	-	-	2	-	1 (0.11)	-
	bowl/dish	-	-	1	-	-	-
	chips	5 sherds, 24 g	2 sherds, 10 g	20 sherds, 61 g	-	-	-

Samian potters' stamps

J. M. Mills

The following catalogue lists the identified potters in alphabetical order, followed by those not identified to a particular potter. Each entry gives: potter's name (i, ii etc., where homonyms are involved), die number, production centre (fabric codes), form (form codes). READING. Comment. Date range. Excavation references. Square brackets indicate missing letters.

S1. L. A–L– , 1a, Blickweiler, form 37. **L·A·L** (Hartley and Dickinson 2008, 31–32). An intra-decorative stamp. The only two British examples recorded are one in York Museum and one from No. 1 Poultry, London (*ibid.*). AD 140–180. Sea Bank Farm, ON 1, alluvium 200203, context 200021. (Dec. Cat. No. 7; Fig. 8.32.3)

S2. Priscus iii, 3b, Lezoux, form 33 (or 46). **[PRI]SCI·MA** (Hartley and Dickinson 2011a, 260–63). AD 160–200. Sea Bank Farm, palaeochannel 200200, fill 26203

Unidentified stamps

S3. ?Sextus v, 8b, Lezoux, form 31R. **SE[XTV]S ·F** (Hartley and Dickinson 2011b, 286–90). This stamp is abraded in the middle, it matches Sextus v, 8b except that the F appears to have longer horizontal strokes. *c.* AD 160–200. White Crofts, late Romano-British ditch 300522, cut 300225, fill 300260

S4. Lezoux, ?form 18/31 or 31. **M[** Very untidy lettering, marks or scratches suggest that the die may have been recut. The second letter is possibly an I or a T but is worn and the stamp is very unclear, perhaps unclean. Not identifiable. ?Antonine. Sea Bank Farm, topsoil 26200

S5. Lezoux, form 38. **]O·F** Abraded, especially over the first half of the stamp; furthermore, the middle of the stamp has been removed by a sawn repair slot, the sherd subsequently

broken. Mid- to late Antonine. Magers Lane, Romano-British ditch 300153, cut 300057, fill 300060. (Fig. 8.32.1)

S6. La Graufesenque, form 15/17 or 18. **]ONI** The O and the N have lost much of their slip and the top of the right-hand side of the N is damaged. It is possible that this stamp should be read **]ONI** and is an example of Pontus (Pontius)?, die 8e **[OFP] ONI** (Hartley and Dickinson 2011a, 170), but the damage to the stamp means that it is not possible to be certain of this identification, although a Flavian date is not in doubt. AD 70–100. Six Hundreds Drove, early or mid-Romano-British ditch 550538, cut 550193, fill 550194

Decorated samian catalogue

J. M. Mills

Abbreviations

KS: figures and motifs in Knorr and Sprater (1927)
O.: figure types in Oswald (1936–7)
Rogers: motifs in Rogers (1974)

South Gaul: La Graufesenque

1. Form 37. Sherd with three impressions of the ovolo used by M. Crestio and Crucuro (Dannell 1999, fig. 2.17, 257). AD 75–90. White Crofts, late Romano-British ditch 300524, cut 300232, fill 300233
2. Form 37. A small sherd with two incomplete and possibly over-struck ovolo impressions above a blocked-in line and part of the link between a pair of festoons. The ovolo is double-bordered with a narrow core, probably that seen on a bowl from Castleford (Dickinson and Hartley 2000, fig. 6, 18). AD 75–90. Ailby Lane, early Romano-British ditch 409000, cut 401010, fill 401008

Central Gaul: Lezoux

3. Form 37. A small panelled sherd with leaf Rogers H114 which was used by Doeccus. The large beads were also used by him. AD 160–200. Sea Bank Farm, palaeochannel 200200, fill 26203
4. Form 37. Sherd from the lower edge of the decorated zone, bound by a single plain line. Panelled decoration divided with vertical beaded borders with a small terminal rosette. The surviving elements include a small double-bordered medallion containing a smudged motif, perhaps a small mask; and the tail of right-facing dolphin O.2382. The dolphin was used by many potters but without more detail the sherd is difficult to attribute to a particular potter. Probably Antonine. Sea Bank Farm, alluvium 200203, context 200109
5. Form 37. Sherd from the lower part of a panelled design with nude man O. 638 and vase Rogers T35 and acanthus sprig Rogers K3 with a beaded border of large beads between. T35 was used exclusively by Casurius. AD 160–90. White Crofts, late Romano-British ditch 301401, cut 301132, fill 301130
6. Form 30 or 37. Small abraded sherd with small double-bordered ovolo with bent/slanting tongue to the left. The limited decoration includes a narrow serrated-edged leaf. Fine, pale fabric. ?Mid- to late Antonine. Walk Hill, late Romano-British ditch 800491, cut 800389, fill 800390

East Gaul: Blickweiler

7. Form 37. Rim, now in three sherds, with a L. A–L– mould-maker's stamp (S1) placed below the double-bordered ovolo and row of blocky beads. The ovolo band KS Taf. 82, 32 (Klumbach 1933, Eirestäb III), appears to be impressed in pairs; it occurs on a bowl in a related but unattributed style from Verulamium (Hartley 1972, 258, D.126). The decorated zone is quite shallow and is closed with a single inscribed line. The poinçons – a lion (a small version of O.1437; KS Taf. 78, 16), a crouching dog (O.2031, KS Taf. 79, 33) and the tail of another figure, perhaps a griffin facing right (O. 867; KS Taf. 77, 19) – are well-spaced. Between the lion and griffin, the mould-maker's stamp is placed horizontally just below the bead row. The lion occurs with the name stamp on a bowl from Butzbach (Müller 1968, Taf. 26, 683), and the lion and the hound appear together on a bowl with a different ovolo, attributed by Klumbach (1933, 5) to L. A–L–. AD 140–80. Sea Bank Farm, alluvium 200203, context 200021, ON 1. (S1; Fig. 8.32.3)

Unusual plain forms

J. M. Mills

1. Lezoux. Dish with 15 mm-wide horizontal, flat everted rim (diameter 220 mm) with a line/offset at the outer edge of the of the rim and at the wall–rim junction. The closest form is Bet 049 (Bet and Delor 2000, 468), although this example is without the barbotine

decoration of that form. Bet 049 is the dish form of cup Bet 048, a dish and cup set similar to Curle 23 (Oswald and Pryce 1920, pl. LV, 13) or and Drag. 46, but a set not often seen in Britain. Bet dates these forms to the second half of the 2nd to the first third of the 3rd century AD. A dish from the 2nd-century AD kilns at Heiligenberg with a flat rim may be similar variant (Forrer 1911, Taf. XIII, 13). AD 160–200. White Crofts, mid-Romano-British ditch 301410, cut 301076, fill 301078. (Fig. 8.32.4)

2. Rheinzabern. Dish with a short, thick everted rim (diameter 160 mm), finished to give a raised section along the centre of the rim, which is ornamented with barbotine leaves, of which only incomplete examples remain. A remarkably similar sherd was found at Norton-on-Derwent (Mills 2021, 84–5, fig. 106, PS3). The rim has more in common with the rims of straight-sided cups which were occasionally decorated '*en barbotine*' (Oswald and Pryce 1920, pl. LV, 24) than the more common Drag. 36 dish where the rim is usually hooked. This vessel must then be a variant of the Curle 23 (or Lud Tb) dish which was the companion form to the cup (*ibid*., pl. LIX). Not a common form, Stanfield illustrated two similar dishes from London (1929, fig. 10, 48 and 50), no. 50 being the most similar to this and the Norton vessel. Late 2nd–early 3rd century. Sea Bank Farm, topsoil 200000. (Fig. 8.32.5)

List of illustrated samian

(Fig. 8.32)

1. Form 38 flanged bowl with partial potter's stamp (S5) and three repair slots; Central Gaulish samian (Lezoux); Magers Lane, ditch 300153, cut 300057, fill 300060
2. Form 18/31 dish with five repair slots; Central Gaulish samian (Lezoux); Six Hundreds Drove, ditch 550534, cut 550226, fill 550227
3. Form 37 bowl with mould-maker's stamp (S1, Dec. Cat. No. 7); East Gaulish samian (Blickweiler); Sea Bank Farm, alluvium 200203, context 200021, ON 1
4. Bet 049 dish (Unusual plain form 1); Central Gaulish samian (Lezoux); White Crofts, ditch 301410, cut 301076, fill 301078
5. Curle 23 or Ludowici Tb variant dish (Unusual plain form 2); East Gaulish samian (Rheinzabern); Sea Bank Farm, topsoil 200000.

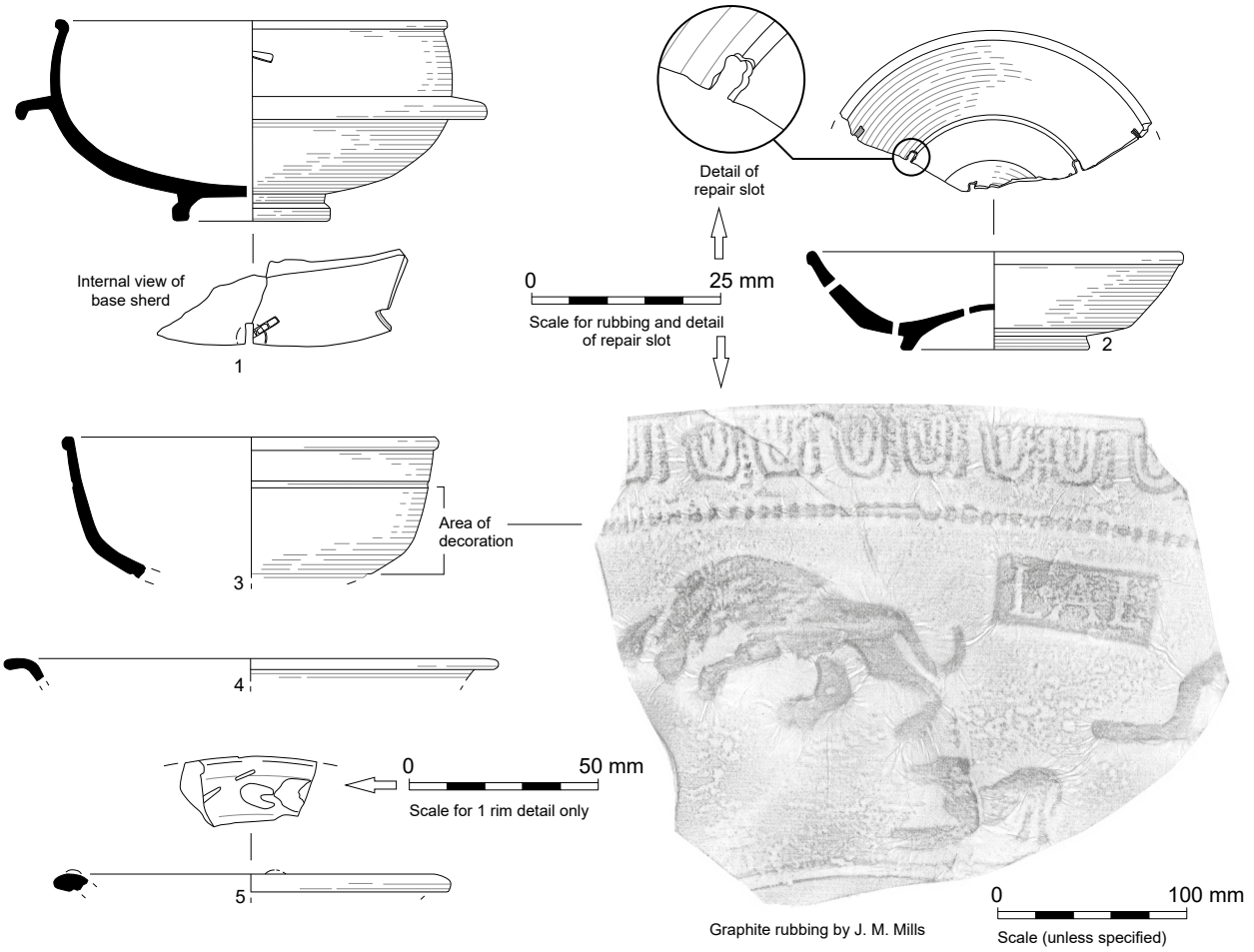


Figure 8.32 Illustrated samian

Lipid Residue Analyses of the Iron Age and Romano-British Pottery

Izzy Davis, Lucy J. E. Cramp, Isabel Wiltshire, Mélanie Roffet-Salque and Julie B. Dunne

Summary

Degraded animal fats were identified in all the vessels analysed, generally in exceptionally high concentrations. Very high lipid concentrations were recovered across the vessel forms that were analysed, with the highest characterised as dairy fat and recovered from a plate. The lipid recovery from the mortarium and a beaker, compared with cooking vessels (jars and bowls), was notably lower, as has been observed previously (e.g., Cramp *et al.* 2011).

Overall, jars and bowls contained the highest lipid contents, likely arising from the regular cooking of meat, predominantly from cattle/sheep/goat, although non-ruminant meat such as pig, and dairy products, were also less frequently processed. Biomarkers indicative of heating were also identified in a small number of the jar/bowl lipid extracts.

Dairy products were associated with the large bowls and one cheese press and most frequently recovered from the site of Sea Bank Farm, where four out of the five vessels that could be isotopically characterised were of dairy origin. As these were from two large bowls, a cheese press and a jar, it is possible that some if not all of these vessels had a specialised role in dairying. Otherwise the dairy residues were recovered from Six Hundreds Drove (bowl, dish and jar), a plate and bowl from Magers Lane, and a jar/bowl from Walk Hill.

Biomarkers of plant origin were only found in association with the mortarium, as has been observed elsewhere, and a bowl where birch bark resin was found in association with a bowl, which also contained a dairy residue.

Introduction

A total of 47 sherds were selected to investigate vessel use. These derived from: Sea Bank Farm (6 sherds); White Crofts (2); Ailby Lane (3); Walk Hill (5); Area 21 in the parish of Raithby (1), Magers Lane (6); Raithby Lane (4); Mown Rakes (3), and Six Hundreds Drove (17). Sherds include a range of vessel forms, predominantly jars and bowls, one mortarium sample, two cheese press samples and one strainer, and span the Iron Age to late Roman period. Lipid residue analyses and interpretations were based on established protocols (Correa-Ascencio and Evershed 2014; Evershed *et al.* 1990) and were in line with other recent published studies (e.g., Dunne 2023; Dunne *et al.* 2023). A full description of the methodology used, along with an expanded account of the results of the study, are presented in the online data supplement: https://doi.org/10.5284/1136099).

Results and Discussion

Recovery rate and lipid concentration

Archaeological lipids were recovered from all the sherds analysed. The recovery rate was 100%, defined as the proportion of sherds with ≥5 μg/g of lipid present. The concentration of lipids ranged between 46 μg/g and 145,420 μg/g. Of the 47 vessels analysed, 35 had high (≥500 μg/g) lipid concentrations. Both the recovery rate and the lipid concentrations recovered are exceptionally high and rarely encountered in archaeological assemblages.

High lipid concentrations were associated in particular with jars and bowls, while other vessel types, including beakers, large bowls, cups, the mortarium and strainer, yielded lower lipid concentrations. This is likely to be related to the mode of use of the jars and bowls, including regular use for cooking, which will mobilise lipids into the vessel

Table 8.58 Sample details and results of lipid residue analysis

Sample name	*Context*	*Vessel number*	*Vessel form*	*Lipid concentration (µg/g)*	*Molecular composition*	$\delta^{13}C_{16:0}$ (‰)	$\delta^{13}C_{18:0}$ (‰)	$\Delta^{13}C$ (‰) ($\delta^{13}C_{18:0}$ - $\delta^{13}C_{16:0}$)	*Interpretation (molecular and isotopic composition)*
Sea Bank Farm									
C-VIK0146	200010	VL01	Bowl – large	230	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 21, 22, 23, 24, 26; OH 18, 26, 28	-27.4	-32.3	-5.0	Dairy
C-VIK0147	200011	VL02	Jar	415	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 22, 24; OH 26, 28; APAA 18	-25.5	-28.8	-3.3	Dairy
C-VIK0148	200043	VL03	Bowl	429	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 22, 24; OH 26, 28	-27.0	-29.6	-2.6	Ruminant adipose
C-VIK0192	200011	VL04	Jar/bowl	464	FA 14, 16, 17, 18, 20	-	-	-	Animal fats
C-VIK0149	200095	VL05	Bowl – large	168	FA 14, 15, 16, 17, 18:1, 18, 20, 22, 24	-28.5	-33.6	-5.0	Dairy
C-VIK0150	200107	VL06	Cheese press	245	FA 16, 17, 18:1, 18, 20, 22, 24, 26	-27.9	-31.3	-3.4	Dairy
White Crofts									
C-VIK0151	301003	VL07	Bowl	5150	FA 14, 15, 16, 17, 18:1, 18, 19, 20	-	-	-	Animal fats
C-VIK0152	301110	VL08	Jar	18403	FA 14, 15, 16, 17, 18:1, 18	-27.8	-29.7	-1.9	Ruminant adipose
Ailby Lane									
C-VIK0153	400218	VL09	Jar	2864	FA 14, 15, 16, 17, 18:1, 18, 20; APAA 18	-28.8	-31.8	-3.0	Ruminant adipose
C-VIK0154	400218	VL10	Jar	34572	FA 14, 15, 16, 17, 18:1, 18; APAA 18	-28.7	-31.5	-2.8	Ruminant adipose
C-VIK0155	400218	VL11	Jar	4912	FA 14, 15, 16, 17, 18:1, 18, 19, 20; APAA 18	-27.6	-29.9	-2.2	Ruminant adipose
Walk Hill									
C-VIK0156	800350	VL12	Jar/bowl	5708	FA 14, 15, 16, 17, 18:1, 18, 20, 22	-28.0	-32.8	-4.8	Dairy
C-VIK0157	800380	VL13	Bowl	46	FA 16, 17, 18:1, 18, 20, 22	-29.2	-31.6	-2.4	Ruminant adipose
C-VIK0158	800383	VL14	Bowl	2116	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 22	-27.5	-29.9	-2.4	Ruminant adipose
C-VIK0159	800331	VL15	Bowl	279	FA 16, 17, 18:1, 18, 20, 22	-	-	-	Animal fats
C-VIK0160	800352	VL16	Jar/bowl	1942	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 22, 23, 24	-28.2	-30.9	-2.7	Ruminant adipose
Area 21									
C-VIK0161	210023	VL17	Jar	61186	FA 14, 15, 16, 17, 18:1, 18, 20	-28.5	-30.5	-1.9	Ruminant adipose
Magers Lane									
C-VIK0162	300059	VL18	Bowl	2499	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 21, 22, 23, 24, 26	-28.9	-31.4	-2.5	Ruminant adipose
C-VIK0163	300059	VL19	Bowl	807	FA 14, 15, 16, 17,18, 20, 22, 24, 26; OH 24, 26, 28	-28.8	-32.0	-3.2	Dairy
C-VIK0164	300060	VL20	Jar	534	FA 14, 15, 16, 17. 18:1. 18, 19, 20, 22, 24, 26	-28.6	-31.5	-2.9	Ruminant adipose
C-VIK0165	300060	VL21	Jar	6752	FA 14, 16, 17, 18:1, 18, 20	-28.1	-31.2	-3.1	Ruminant adipose
C-VIK0166	300108	VL22	Cup	1801	FA 16, 17, 18:1, 18	-28.9	-30.0	-1.1	Ruminant adipose
C-VIK0167	300145	VL23	Plate	145421	FA 14, 15, 16, 17, 18:1, 18, 20	-28.4	-32.1	-3.6	Dairy
Raithby Lane									
C-VIK0169	380152	VL25	Jar	1150	FA 16, 17, 18:1, 18, 20	-30.2	-30.8	-0.6	Non-ruminant/ruminant
C-VIK0170	380185	VL26	Jar	80654	FA 14, 15, 16, 17, 18:1, 18	-28.5	-30.7	-2.2	Ruminant adipose
C-VIK0171	380202	VL27	Bowl	1267	FA 16, 17, 18:1, 18, 19, 20, 22	-29.4	-31.3	-1.9	Ruminant adipose
C-VIK0172	380202	VL28	Jar	4289	FA 14, 16, 17, 18:1, 18, 19, 20	-28.6	-30.6	-2.0	Ruminant adipose
Mown Rakes									
C-VIK0173	520108	VL29	Jar	10539	FA 14, 16, 17, 18:1, 18, 19, 20	-	-	-	Animal fats

Sample name	*Context*	*Vessel number*	*Vessel form*	*Lipid concentration (µg/g)*	*Molecular composition*	*$\delta^{13}C_{16:0}$ (‰)*	*$\delta^{13}C_{18:0}$ (‰)*	*$\Delta^{13}C$ (‰) ($\delta^{13}C_{18:0}$ - $\delta^{13}C_{16:0}$)*	*Interpretation (molecular and isotopic composition)*
C-VIK0174	530072	VL30	Jar	108313	FA 14, 15, 16, 17, 18:1, 18	-	-	-	Animal fats
C-VIK0175	530165	VL31	Jar	822	FA 16, 17, 18:1, 18, 22, 23, 24, 26; OH 24, 26	-	-	-	Animal fats
Six Hundreds Drove									
C-VIK0176	550323	VL32	Cheese press	4578	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 22	-27.6	-30.0	-2.4	Ruminant adipose
C-VIK0177	550323	VL33	Mortarium	97	FA 16, 18:1, 18, 20, 22, 23, 24, 26; alkanes, 29, 31	-28.3	-30.4	-2.1	Plant resources, ruminant adipose
C-VIK0178	550051	VL34	Strainer	653	FA 16, 17, 18:1, 18	-27.6	-29.9	-2.3	Ruminant adipose
C-VIK0179	550066	VL35	Beaker	93	FA 16, 17, 18:1, 18, 20, 22, 24, 26	-	-	-	Animal fats
C-VIK0180	550083	VL36	Bowl	12652	FA 14, 15, 16, 17, 18:1, 18, 19, 20, 22	-27.7	-31.5	-3.8	Dairy
C-VIK0181	550083	VL37	Jar	14428	FA 14, 15, 16, 17, 18:1, 18	-26.3	-27.2	-0.9	Non-ruminant/ruminant fats
C-VIK0182	550116	VL38	Bowl	51815	FA 14, 15, 16, 17, 18:1, 18, 20	-28.1	-30.7	-2.7	Ruminant adipose
C-VIK0183	550120	VL39	Bowl	279	FA 14, 15, 16, 17. 18:1, 18, 19, 20, 21, 22, 23, 24, 25, 26	-28.0	-30.6	-2.5	Ruminant adipose
C-VIK0184	550145	VL40	Jar	11108	FA 14, 15, 16, 17, 18:1, 18	-28.6	-31.3	-2.7	Ruminant adipose
C-VIK0185	550328	VL42	Dish	7308	FA 14, 15, 16, 17, 18:1, 18; ω-hydroxy FA, 22; triterpenoids (lupa-2,20(29)-dien-28-ol, allobetul-2-ene); diacid 18, 20, 22	-28.1	-31.7	-3.5	Dairy and birch bark tar
C-VIK0186	550227	VL43	Jar	46640	FA 14, 15, 16. 17, 18:1, 18, 20	-28.4	-30.0	-1.6	Ruminant adipose
C-VIK0187	550227	VL44	Bowl	29459	FA 14, 15, 16. 17, 18:1, 18, 20	-27.3	-29.6	-2.3	Ruminant adipose
C-VIK0188	550249	VL45	Jar	2692	FA 14, 15, 16. 17, 18:1, 18, 20, 22, 24	-26.9	-31.5	-4.6	Dairy
C-VIK0189	550254	VL46	Jar	1086	FA 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24; OH 19	-	-	-	Animal fats
C-VIK0190	550327	VL48	Jar	1516	FA 14, 15, 16, 17, 18, 19, 20; OH 26	-28.0	-30.2	-2.1	Ruminant adipose
C-VIK0191	550453	VL50	Jar	54	FA 14, 16, 17, 18, 20	-	-	-	Animal fats
C-VIK0193	550254	VL47	Bowl	19954	FA 14, 16, 17, 18, 19, 20	-28.0	-31.1	-3.1	Ruminant adipose

Key: FA – fatty acid, OH – alcohol; APAA – ω-(o-alkylphenyl) alkanoic acids; diacid – dicarboxylic acid; number n and n:i acyl carbon number with zero or i degrees of unsaturation

walls. The highest lipid concentration (*c.* 150 mg/g sherd) came from a fine grey ware Gallo-Belgic imitation plate. This is exceptionally high and not readily explicable. There was some variability observed in the lipid concentrations recovered from assemblages from different sites; however, this could be influenced by the proportions of jars/bowls analysed from these sites (e.g., Mown Rakes, Raithby Lane).

Use of different vessel forms

All lipid extracts contained lipid profiles with similar fatty acid distributions, which were dominated by free fatty acids (principally $C_{16:0}$ and $C_{18:0}$), which are characteristic of degraded animal fats. $C_{18:1}$ fatty acids were present in low abundance in most samples. These are the main fatty acids present in fresh animal fats, but they are prone to oxidation and their low abundance confirms that the fats extracted are indeed archaeological. Extracts from several sherds include low abundances of a series of long-chain fatty acids (LCFAs), containing C_{20} up to C_{26} carbon atoms. These LCFAs likely originate from animal fats, incorporated via routing from the ruminant animal's plant diet (Halmemies-Beauchet-Filleau *et al.* 2013; 2014). *n*-alcohols (C_{26} and C_{28}) were identified in lower abundance in several samples (Table 8.58). The $\delta^{13}C$ values of the individual $C_{16:0}$ and $C_{18:0}$ fatty acids were determined by GC-C-IRMS to characterise the sources of the animal fats extracted from 38 vessels (Fig. 8.33). The $\delta^{13}C$ values obtained from fatty acids extracted from the sherds are plotted against the $\delta^{13}C$ values of modern reference fats from animals raised on a pure C_3 diet (Copley *et al.* 2003). Plotting the data as $\delta^{13}C_{16:0}$ against $\Delta^{13}C$ ($\delta^{13}C_{18:0} - \delta^{13}C_{16:0}$) values reduces localised

environmental influences and emphasises the metabolic origins of fats. The majority of the samples analysed (*n* = 28) have $\delta^{13}C$ values consistent with predominantly ruminant adipose-derived fats.

Biomarkers from other plant-derived origins, including resin markers and plant epicuticular waxes, were occasionally identified in association with animal fats, and are also discussed below.

Jars and bowls

As noted above, the jars and bowls sampled contained notably high concentrations of lipids, likely resulting from regular cooking of lipid-rich contents such as animal meats. Low concentrations of C_{18} ω-(*o*-alkylphenyl)alkanoic acids (APAAs) were detected in the residues of four jars/bowls (C-VIK0147, C-VIK0153, C-VIK0154, C-VIK0155). The heating of mono-, di- and triunsaturated fatty acids can lead to the formation of APAAs (Hansel *et al.* 2004) so the detection of C_{18} APAAs in these residues suggests that products containing unsaturated C_{18} fatty acids were cooked in these vessels, but this is not particularly diagnostic of the fatty acid origin.

The majority of the jars (*n* = 14) and bowls (*n* = 9) analysed have $\Delta^{13}C$ values indicative of adipose fats, primarily of ruminant animal origin (i.e., cattle, sheep, goat meat; Table 8.58; Fig. 8.33). The $\Delta^{13}C$ values of fats from two jars – C-VIK1069 (a coarse grey ware jar) and C-VIK0181 (an Iron Age tradition gritty jar) – indicate that products contained in these pots were predominantly non-ruminant fat (e.g., porcine, poultry) in origin, or arose from mixtures of ruminant and non-ruminant fats (Mukherjee *et al.* 2005, Mukherjee *et al*. 2008). Several other jar/bowl sherds (e.g., C-VIK0148, C-VIK0152, C-VIK0187) may have had smaller contributions of non-ruminant fats. This could be the result of multiple commodities being processed simultaneously or a change in vessel use over the course of its lifetime (Miller *et al.* 2020).

While the majority of animal fats from jars and bowls were from carcass fats, two bowls, two jars and a bowl/jar contained evidence for a dairy contribution to the fat. These derived from four different sites (Magers Lane, Six Hundreds Drove, Sea Bank Farm and Walk Hill). While the Iron Age-type sandy ware bowl/jar residue from Walk Hill was predominantly dairy in origin, the remaining vessels may also have been used for carcass fats during their lifespan.

Overall, there was excellent preservation of lipids from jars and bowls, indicating that primarily ruminant meat was processed in these vessels, with non-ruminant products occurring less frequently, and dominant in just two vessels, and evidence for a contribution of dairy products to a low number (five) of bowls and jars.

Dish

One Nene Valley grey ware dish (C-VIK0185) was sampled from Six Hundreds Drove. The lipid extract from this sherd was a dairy fat. However, the residue also contained biomarkers indicative of birch bark tar. These include triterpenoid compounds, such as lupa-2,20(29)-dien-28-ol and allobetul-2-ene, which form through the degradation of betulin, a characteristic compound of birch bark (Dudd and Evershed 1999; Regert 1996; 2004).

Cheese presses

Two sherds identified as cheese presses were sampled: C-VIK0150 (a grey ware fabric from Sea Bank Farm) and C-VIK0176 (also a miscellaneous grey ware fabric from Six Hundreds Drove). The 'cheese press' from Sea Bank Farm contained a low lipid content (245 µg/g) but was indeed of dairy origin (Fig. 8.33b). The 'cheese press' from Six Hundreds Drove contained a much higher lipid content (4578 ug/g) but it was of ruminant adipose origin. Two 'cheese presses' from the nearby Hornsea Cable project also showed carcass origins for the fats extracted (ruminant and ruminant/non-ruminant respectively; Dunne 2023). It is becoming apparent that this vessel form may not have had an exclusive association with dairying.

Large bowls

Two vessels characterised as 'large bowls' were included from the site of Sea Bank Farm. Both yielded residues of predominantly dairy origin. The three large bowls previously analysed from early Romano-British and 3rd-century AD contexts from nearby Humberston Road, Tetney, from the Hornsea Cable Route project, also all yielded dairy fats, suggesting that this form may have had a specialised function more widely (Dunne 2023). Like the dairy residue from the Sea Bank Farm cheese press (above), the lipid contents from the Sea Bank Farm large bowls were relatively low (168 and 230 µg/g respectively) compared with the three other jars and bowls from the same site (415–464 µg/g), and especially to jars and bowls from elsewhere studied here. This could relate to the way the vessels were used (e.g., less routine heating), but is difficult to assess with the relatively low number that could be sampled here.

Mortarium

One Mancetter-Hartshill mortarium fragment was analysed from Six Hundreds Drove. The lipid profile of this sherd (C-VIK0177) shows a relatively high abundance of even-numbered long-chain fatty acids (LCFAs), especially C_{24} and C_{26}. This may originate from leaf or stem epicuticular waxes (Kolattukudy *et al.* 1976; Kunst and Samuels 2003), or potentially suberin, an aliphatic polyester found in all plants (Kolattukudy 1980). Odd-chain *n*-alkanes (C_{29} and C_{31}) were also identified in C-VIK0177. Alkanes are also common components of leaf waxes, usually occurring in low concentrations, with long-chain *n*-alkane distributions in the range C_{25} to C_{35} (Chibnall *et al.* 1934; Eglinton and Hamilton 1967; Koch and Ensikat 2008). The presence of even-numbered long-chain fatty acids and *n*-alkanes in sample C-VIK0177 therefore strongly suggests the processing of leafy plants in this vessel. Previous work has shown a strong association between mortaria and plant processing/leafy plant residues (Cramp *et al.* 2011). However, the compounds are not diagnostic to families of plants and can only be used as a general indicator of plant processing.

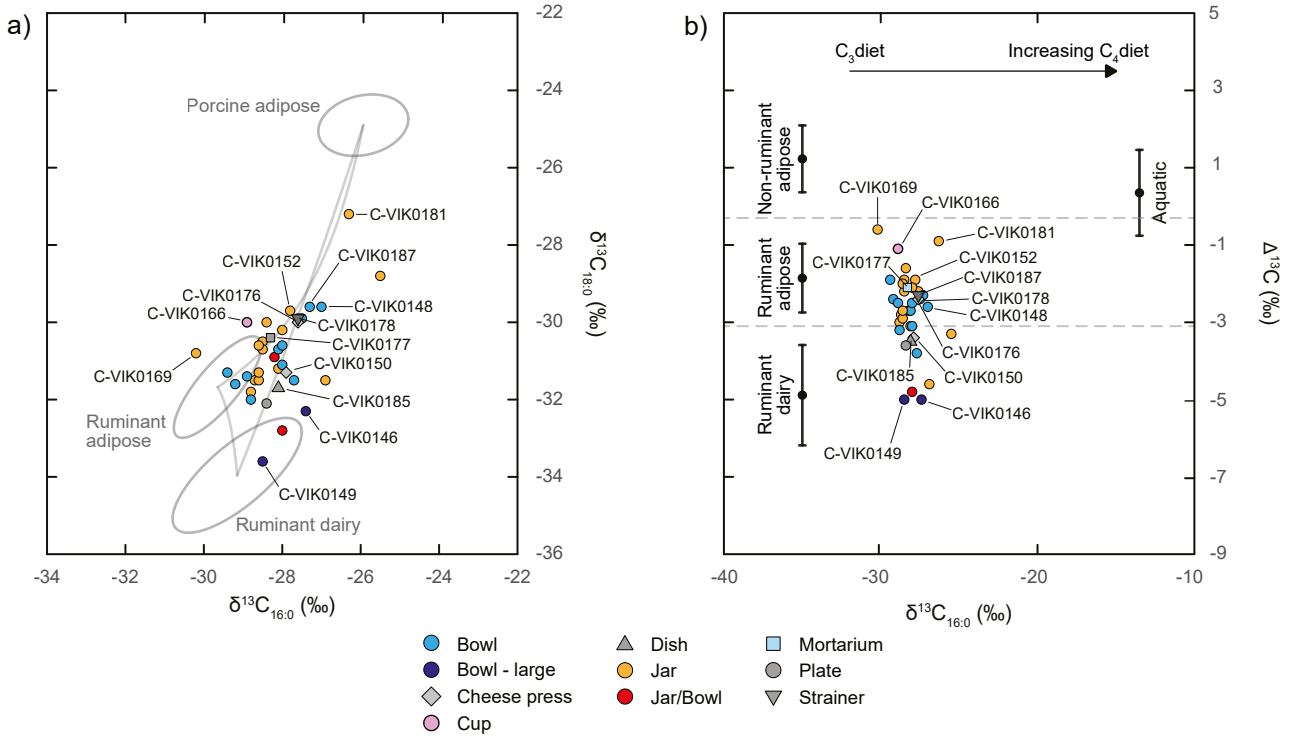


Figure 8.33 a) $\delta^{13}C$ values for the $C_{16:0}$ and $C_{18:0}$ fatty acids. The four fields correspond to the P = 0.684 confidence ellipses for animals raised on a strict C_3 diet in Britain (Copley et al., 2003). The $\delta^{13}C$ values obtained for the modern reference fats were adjusted for post-Industrial Revolution effects of fossil fuel burning by the addition of 1.2‰ (Friedli et al., 1986). b) Difference in the $\delta^{13}C$ values of the $C_{18:0}$ and $C_{16:0}$ fatty acids ($\Delta\ ^{13}C = \delta\ ^{13}C_{18:0} - {}^{13}C_{16:0}$) obtained for the archaeological fats. The ranges represent the mean ± 1 standard deviation of the $\Delta\ ^{13}C$ values for the global database comprising modern animal fats from different locations including: Britain (pure C_3 environment (Copley et al., 2003)), Kazakhstan (Outram et al., 2009), and Kenya and Libya (Dunne et al., 2012). Analytical precision is ± 0.3‰. Samples mentioned in the text are labelled

Cup, beaker and strainer
One miscellaneous grey ware beaker (Ailby Lane) and cup (Magers Lane) and a mica-dusted strainer (Six Hundreds Drove) were also sampled. The lipid recovery from the beaker was relatively low and could not be characterised beyond animal fat. The cup contained a high lipid content (1801 µg/g), identified as a ruminant adipose fat. The strainer contained a high lipid content (653 µg/g) and was also classified as a ruminant adipose fat (Fig. 8.33b).

Plate
A fine grey ware Gallo-Belgic imitation plate was included from Magers Lane. As noted above, the lipid content from this vessel was exceptionally high (145 mg/g). The lipids derived from a dairy origin. The association of this vessel form and fabric with exceptionally high concentrations of dairy fat would be very interesting to explore further with a wider sample set of this form.

Post-Roman Pottery

Jane Young with Johanna Gray

Introduction

This report is based on 807 sherds of certain post-Roman type and 17 further sherds of uncertain type or date, recovered from 201 deposits across 80 sites and trenches and as unstratified material. The post-Roman assemblage comprises 528 vessels (12.257 kg) of identifiable Anglo-Saxon to early modern type (Tables 8.59–60). The bulk of the pottery recovered is of medieval date, although the assemblage makes important contributions to characterisation of Saxon pottery in the county.

The Sea Bank Farm site in the parish of Huttoft marked the northernmost point on the scheme from which post-Roman pottery was collected, with the most southerly one being North Ing in the parish of Donington, in the district of South Holland. Lincolnshire has a complex localised ceramic sequence, especially in the period before the Black Death. The medieval pottery is not only influenced by the three main Lincolnshire fineware traditions centred on Bourne, Lincoln and Toynton All Saints, but also by regionally imported types from the eight main surrounding counties, or those brought in by coastal or river trade. The recovered Viking Link assemblages add greatly to our knowledge of post-Roman ceramic sequences and fabric types in use in the county, as several parishes and periods previously not represented in the ceramic record were investigated during the project. Much of the material recovered conforms to established views and assumptions of ceramic usage in the areas investigated; however, several new ware types and fabrics were encountered, the most notable of these being of Anglo-Saxon to Late Saxon date.

Table 8.59 Post-Roman pottery from Zones 1–3 summarised by ceramic period with sherd count, vessel count, weight in grams and REVE

Ceramic period	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
Uncertain date (UNCERTAIN)	17	11	121	0
Anglo-Saxon (ASAX)	142	37	1195	0.67
Middle Saxon (MSAX)	65	33	885	1.17
Late Saxon (LSAX)	72	32	674	1.21
Saxo-Norman (SNORM)	21	4	115	0.45
Early medieval (EMED)	34	10	1099	0.68
Medieval (MED)	272	243	3444	1.55
Late medieval (LMED)	58	56	1586	0.93
Post-medieval (PMED)	65	53	1461	0.83
Early modern (EMOD)	78	60	1798	0.47
Totals	824	539	12378	7.96

Ceramic period	*Zone1: Lincolnshire marsh*	*Zone 2: Wolds*	*Zone 3: Fens*	*Total*
UNCERTAIN	-	11	-	11
ASAX	23	14	-	37
MSAX	2	25	6	33
LSAX	31	1	-	32
SNORM	4	-	-	4
EMED	7	3	-	10
MED	63	180	-	243
LMED	12	42	2	56
PMED	5	31	17	53
EMOD	6	14	40	60
Totals	153	321	65	539

Table 8.60 Post-Roman pottery by zone, summarised by ceramic period with vessel count

Methodology and Terminology

The pottery has been recorded using the Lincolnshire post-Roman pottery codenames (expanded in Table 8.61 and available online as part of the Lincolnshire *Archaeology Handbook*, sections 13.4 and 13.5: Lincolnshire County Council 2019). Recording of the assemblage was in accordance with the guidelines laid out in Slowikowski *et al*. (2001) and the PCRG, SGRP and MPRG guidelines (2016). Vessel forms were identified using the Medieval Pottery Research Group's guide to the classification of forms (MPRG 1998; 2001).

Range and Variety

The post-Roman pottery recovered potentially spans the period between the 5th and 20th centuries, although almost half of the vessels recovered are of medieval type (243 vessels). Seventy-five identifiable ware types, most of which were probably produced within Lincolnshire, are present (Table 8.61).

The pottery described below was almost entirely recovered from cut features such as pits, ditches, field boundaries, gullies and postholes, or from topsoil and subsoil deposits. The assemblages are fairly typical for those recovered from rural sites in Lincolnshire, where it is at best unusual, but more commonly rare, to encounter well-stratified sequences. The condition of the assemblage is variable but little pottery that can be considered primary deposition was recovered and much of the medieval material shows plough abrasion. The fossil shell inclusions from many of the shell-tempered fabrics have been leached, or partially leached, away from vessel surfaces as a result of burial conditions. The estimated vessel equivalent (REVE) based on the percentage of rim present for each vessel is relatively low at 7.96, but typical for rural assemblages in Lincolnshire.

Uncertain date
Seventeen sherds representing 11 vessels remain of uncertain type or date despite exhaustive research (Table 8.62). They include six sherds from five handmade vessels not immediately diagnostic of any period (UHM). A single potentially wheel-thrown sherd from a small jar found on the Cheals Close site is of uncertain Roman or Middle Saxon date (RMSAX). Two wheel-thrown sherds in a fine reduced fabric are from a single small jar of Roman or Late Saxon date (RLSAX), while five other wheel-thrown sherds are from two vessels of Roman or Saxo-Norman type (RSN). Three abraded sherds are of potential Roman or medieval type (RMED).

Anglo-Saxon
Pottery of handmade Anglo-Saxon type amounts to 142 sherds from 37 vessels. The majority of these vessels were recovered from Ailby (Ailby Lane) parish, with other vessels from the Sausthorpe (Cheals Close), East Keal (Area 34), Langton by Spilsby (Pitchmoor), Stickford (Callow Carr and Back Lane) and Dalby (Callow Carr) parishes.

Table 8.61 Ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Full name*	*Earliest date*	*Latest date*	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
AMHTG	Alford Manor House-type Glazed ware	1175	1250	2	2	21	0
ASCALC	Anglo-Saxon Calcareous fabrics	450	800	6	2	9	0
BAMWTS	Bourne Area Medieval Wheel-thrown Shell	1180	1350	1	1	12	0
BERTH	Brown-glazed earthenware	1550	1950	14	5	306	0.17
BEVO1	Beverley Orange ware Type 1	1100	1230	1	1	4	0
BEVO2	Beverley Orange ware Type 2	1230	1350	1	1	2	0
BEVO2T	Beverley Orange-type 2 ware	1230	1350	2	2	8	0
BL	Black-glazed wares	1550	1950	17	16	725	0
BOU	Bourne D ware	1350	1650	1	1	9	0
BS	Brown stoneware	1680	1850	1	1	10	0
CELEMG	Coastal East Lincolnshire Early Medieval Glazed	1150	1230	1	1	11	0
CELEMHM	Coastal East Lincolnshire Early Medieval Handmade	1100	1230	4	3	58	0
CELMG	Coastal East Lindsey Medieval Glazed ware	1180	1350	8	3	42	0
CIST	Cistercian-type ware	1480	1650	1	1	3	0
CREA	Creamware	1770	1830	16	13	26	0.02
DST	Developed Stamford ware	1150	1230	7	1	18	0
ECHAF	Early to mid-Anglo-Saxon chaff-tempered ware	450	800	6	2	131	0
ELDOX	East Lincolnshire Dull Oxidised	1180	1350	19	16	434	0.17
ELEMCQC	East Lincolnshire Early Medieval Coarse Quartz and Chalk	1080	1230	8	1	215	0.1
ELLSG	East Lindsey Late Saxon Greyware	880	1030	2	1	30	0
ELLSGFE	East Lindsey Late Saxon Grey Sandy and Iron-tempered	880	1030	2	1	83	0.44
ELLSOX	East Lindsey Late Saxon Oxidised Sandy	880	1030	5	3	54	0
ELMAS	East Lincolnshire Medieval Abundant Shelly	1180	1300	1	1	11	0
ELMFQFE	East Lincolnshire Medieval Fine Quartz and Iron	1200	1400	2	2	74	0
ELWLSFGFE	East Lindsey Wheel-thrown Late Saxon Fine Grey Sandy and Iron-tempered	880	1030	2	2	33	0
EMLOC	Local Early Medieval fabrics	1150	1230	1	1	16	0.3
ENGS	Unspecified English Stoneware	1750	1900	4	4	659	0
ENPO	English Porcelain	1743	2000	6	6	10	0.01
ERRA	Erratic-tempered	450	800	8	5	77	0.14
ESAXLOC	Anglo-Saxon Local wares	450	650	89	19	767	0.26
ESAXSH	Anglo-Saxon Shell-tempered fabrics	450	650	17	1	146	0
ESGMI	Anglo-Saxon Grog and Mixed Inclusion fabrics	450	650	7	1	33	0.27
ESGS	Early to mid-Anglo-Saxon Greensand quartz-tempered	550	800	9	7	32	0
GRE	Glazed Red Earthenware	1500	1650	31	28	803	0.56
IPS	Ipswich ware	730	850	8	5	368	0.43
IPST	Ipswich-type ware	750	850	4	1	4	0.03
LKT	Lincoln kiln-type shelly ware	850	1000	5	2	55	0.05
LMLOC	Late Medieval local fabrics	1350	1550	3	3	26	0
LONS	London Stoneware	1670	1800	2	2	63	0.08
LSH	Lincoln shelly ware	850	1000	1	1	4	0
LSLOC	Late Saxon Local fabrics	850	1050	1	1	1	0
LSWA	Lincoln Glazed ware Fabric A	1100	1500	1	1	5	0
MAX	Northern Maxey-type ware	680	870	5	1	62	0.09
MAXEL	East Lindsey-type Maxey ware	700	850	42	21	324	0.42
MEDLOC	Medieval local fabrics	1150	1450	22	22	226	0.13
MEDX	Non-local Medieval fabrics	1150	1450	1	1	15	0
MINDUS	Unidentified medieval to post-medieval Industrial pottery	1100	1800	1	1	31	0
MSAXLOC	Local middle Saxon fabrics	700	850	1	1	1	0
NCBW	19th-century Buff ware	1800	1900	6	3	65	0
NOTS	Nottingham stoneware	1690	1900	9	4	173	0.08
PEARL	Pearlware	1770	1900	11	11	54	0.12
PGE	Pale Glazed Earthenware	1600	1750	3	3	234	0.1
POTT	Potterhanworth-type Ware	1250	1500	1	1	12	0
RLSAX	Roman or Late Saxon	50	1000	2	1	3	0
RMAX	Southern Maxey-type ware	650	950	5	4	126	0.20
RMED	Roman or medieval	40	1500	3	3	41	0
RMSAX	Roman or Middle Saxon	50	1000	1	1	12	0
RSN	Roman or Saxo-Norman	40	1200	5	2	19	0
SLIP	Unidentified slipware	1650	1750	1	1	10	0

Codename	*Full name*	*Earliest date*	*Latest date*	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
SLSNT	South Lincolnshire St Neots-type	980	1100	17	2	88	0.45
SLSQ	South Lincolnshire Shell and Quartz (generic)	1200	1500	1	1	8	0
ST	Stamford Ware	970	1200	3	1	13	0
STMO	Staffordshire/Bristol mottled-glazed	1690	1800	1	1	4	0
STSL	Staffordshire/Bristol slipware	1680	1800	2	2	12	0
SWSG	Staffordshire White Salt-glazed stoneware	1700	1770	3	1	2	0
TB	Toynton/Bolingbroke wares	1450	1750	18	18	719	0.73
TGW	Tin-glazed earthenware	1640	1770	2	2	4	0
THETT	Thetford-type fabrics	880	1150	1	1	14	0
TORK	Torksey ware	850	1100	5	2	17	0.05
TOY	Toynton Medieval Ware	1250	1450	209	188	2543	1.25
TOYII	Toynton Late Medieval ware	1450	1550	35	33	829	0.2
TPW	Transfer printed ware	1770	1900	6	6	35	0.1
UHM	Uncertain Handmade	0	1200	6	4	46	0
WEMS	Wheel-thrown Early Medieval Shell-tempered	1050	1220	12	2	777	0.28
WHITE	Modern Whiteware	1850	1900	8	4	64	0.06
WLSCS	Wheel-thrown Late Saxon Coarse Shell-tempered	880	1000	4	2	88	0.03
WLSG	Wheel-thrown Late Saxon Greyware (Lincoln/Thetford Type)	900	1030	2	2	45	0
WLSS	Wheel-thrown Late Saxon Shell-tempered	900	1030	10	5	102	0.23
WLSSFE	Wheel-thrown Late Saxon Shell and Iron-tempered (Lincoln Type)	900	1030	18	3	117	0.3
WLSSQ	Wheel-thrown Late Saxon Shell & Quartz-tempered (Lincoln Type)	900	1030	15	7	45	0.11
Total				*824*	*539*	*12378*	*7.96*

Table 8.62 Pottery of uncertain type or date, by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
RLSAX	2	1	3	0
RMED	3	3	41	0
RMSAX	1	1	12	0
RSN	5	2	19	0
UHM	6	4	46	0
Totals	17	11	121	0

Handmade Anglo-Saxon pottery was in use in Lincolnshire between the 5th and 8th centuries (Vince and Young 2009), but ceased to be the main type used by the earlier part of 8th century in most of the county with the introduction of the shell-tempered Middle Saxon Maxey-type wares. Extensive work carried out during the late 1980s and 1990s as part of the East Midlands Anglo-Saxon Pottery Project (EMASPP) identified the main types in use in Lincolnshire (Vince and Young 1991; 1994) and these were expanded during analysis of major groups at sites such as Flixborough (Vince and Young 2009), Quarrington (Taylor *et al.* 2003; Young 1996) and Barton (Young 2011), and more recent commercially recovered groups. Dating of individual finds lacking chronologically distinctive decoration or form is extremely difficult as most fabric types continue to be produced throughout the early and beginning of the Middle Saxon period, and traits such as the use of burnishing can be equally common on vessels of 5th-century date as on those belonging to the 8th century (Vince and Young 2009, 350). The group recovered from the Ailby Lane site is the only one where independent dating evidence, rather than ceramic typology, points to a mid-5th to 6th-century date (see Chapter 7 above).

Pottery identified at the assessment stage was easily assigned to existing ware groupings and is fairly typical of previous finds, as were the four new vessels found at Back Lane; however, the group recovered from Ailby Lane was problematic. Visually these vessels resemble Iron Age types found in East Lindsey and despite extensive research cannot be paralleled among previously recovered Anglo-Saxon material in the county, suggesting that they potentially represent a discrete localised production. A unique narrow cut flat-topped rim found on three vessels, each assigned to a different fabric grouping (confirmed by thin-section analysis: Wood 2025a), gave additional weight to this hypothesis. Vessels from this site were given individual site-based fabric numbers which were then grouped into existing broader types based

on the main fabric inclusions present. A detailed visual description of the individual fabrics can be found in the site archive.

The most common grouping to be recovered from the scheme is that of primarily quartz-tempered vessels (89 sherds from 19 vessels) considered to be of potentially fairly localised manufacture to their find spot (ESAXLOC). Individual fabrics vary across the county but their commonality lies within the quartz grains occurring, as they usually reflect a similar suite of rounding and size to that found in local pottery of other periods, as well as containing variable accessory minerals to be expected in the local clays. Two sherds from a jar recovered from Area 34 in the East Keal parish are from a jar of 5th- or 6th-century date with incised vertical and diagonal line decoration. Similarly decorated vessels are known at the Cleatham cemetery (Leahy 2007, fig. 43–44), although this vessel is most likely to have had a domestic use. Eight sherds from three undecorated vessels found at Back Lane contain rounded quartz grains typical of the medieval pottery found in the local area. The vessels all have variably burnished surfaces and include one identifiable medium-sized jar. A 5th- to 7th-century date is most probable for these vessels based on visual appearance alone. Three sherds from a large jar or bowl found at Cheals Close cannot be stylistically dated to closer than the 5th to 8th centuries, but the sherd was found associated with an 8th-century Maxey-type jar or bowl. The remaining 14 vessels of this type were recovered from sunken-featured building 41000 at Ailby Lane. These were divided into six site-based fabrics, mostly visually containing predominantly rounded quartz grains of variable size and frequency. All but one fabric grouping additionally contains variable frequencies of burnt out, flattened, carbonised vegetal voids (Vince and Young 2009, 346–347). Thin-section analysis (Wood 2025a) groups four of these fabrics into those containing sandstone and basalt inclusions (Group A with 73 sherds from 12 vessels). Firing seems to be variable, although sherds with reduced internal surfaces and oxidised or irregularly fired external surfaces seem to be most common. Manufacture and finishing are variable, with examples of vessels with smoothed and roughened external surfaces occurring in the same fabric group. Most sherds can only be attributed to a jar or bowl form but at least four jars of small, medium and large size occur, as does a small curve-sided bowl. The two rim types present are flat-topped, being similar to those found on early to mid-8th-century Northern Maxey-type ware jars and bowls.

Nine sherds are from five vessels in fabrics containing abundant grains of Greensand quartz (ESGS). No exact vessel forms are discernible and the recovered sherds are undecorated. The type is quite common in Lincolnshire, especially in the north of the county (Vince and Young 1991; 1994; Vince and Young 2009), and is found in groups of 5th- to 8th-century date. Four of the vessels were recovered from Pitchmoor, two from Callow Carr and one from Cheals Close.

Eight sherds, all recovered from the Ailby Lane site, are from seven vessels in two reduced erratic-tempered fabrics (ERRA). Visually, of all of the Anglo-Saxon vessels recovered from the site, these are least likely to have been previously identified as being of Saxon date. They appear visually to contain fragments of potential igneous rock, which was confirmed by thin-section analysis (Wood 2025a). One of the vessels can be identified as a small bowl with a simple rounded rim, otherwise the sherds are likely to be from medium-sized jars or bowls. The other rim present is of a narrow cut flat-topped type similar to those found on two of the ESAXLOC vessels.

Six sherds are from two vegetal-tempered vessels (ECHAF). Vessels primarily containing burnt out vegetal matter or voids are a fairly common find throughout the county and are found in groups of both Early and Middle Saxon date (Vince and Young 1991; 1994). Because of the low firing temperature of most vessels they are often found in an extremely fragmentary condition, but the four sherds from the flat base of a single jar or bowl found at Back Lane are in quite a stable condition. The thick-walled vessel has an internal soot residue and an internal surface bleached of colour. This surface phenomenon is often associated with salt-bleaching on saltmaking sites but also occurs

where salt may have been used in another industrial process (Rye 1981; Sherlock 1921). Two abraded and fragmentary basal sherds recovered from the Ailby Lane site are from a jar or bowl with a sagging base. Seven sherds are from a jar or bowl with a simple rounded rim. This vessel contains fragments of grog (ESGMI) identified during thin-sectioning (Wood 2025a). The internal and external surfaces of the vessels have been smoothed. While grog-tempered vessels of Anglo-Saxon date are not entirely unknown in Lincolnshire, they are extremely rare.

Seventeen sherds are from a single shell-tempered jar (ESAXSH) with incised two-line rising chevron decoration. Shell-tempered Early Saxon pottery is not common in Lincolnshire but has been found in the Sleaford area (Vince and Young 1991; 1994), in West Lindsey at the Cammeringham cemetery (Gray *et al*. 2021), and at Fillingham where it was found associated with Early Saxon vessels (Young 2000). This 5th- or 6th-century vessel found in the Langton by Spilsby parish (Pitchmoor) does have external soot residues, but this need not rule out a cremation use, as work by Perry has shown that a fair proportion of vessels found in some Lincolnshire cemeteries have evidence for use prior to being re-used as burial urns (Perry 2009). Six small and fragmentary sherds from a small jar and a jar or bowl are visibly calcareous-tempered (ASCALC); thin-section analysis shows these grains to be of dolomite origin (Wood 2025a).

Table 8.63 Anglo-Saxon pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
ASCALC	6	2	9	0
ECHAF	6	2	131	0
ERRA	8	5	77	0.14
ESAXLOC	89	19	767	0.26
ESAXSH	17	1	146	0
ESGM!	7	1	33	0.27
ESGS	9	7	32	0
Total	142	37	1195	0.67

Middle Saxon

Sixty-five sherds representing 33 vessels are of Middle Saxon type (Table 8.64). The majority of these sherds were recovered from Cheals Close (42 sherds from 21 vessels) and come from 21 vessels in a newly defined Maxey-type ware group (MAXEL). Addyman first defined shell-tempered Maxey ware as a Middle Saxon shell-tempered type based on pottery recovered from excavations at Maxey (Addyman 1964). Subsequent fieldwork showed that this tradition existed over much of Lincolnshire (Addyman and Whitwell 1970), Northamptonshire, Cambridgeshire and Bedfordshire, as well as extending into a few sites in peripheral counties, with notable groups occurring at York (Mainman 1993).

A more detailed examination of the fabrics and reassessment of the type (Vince and Young 1991; 1994; Young *et al*. 2005, 34–37) led to the isolation of two main traditions: Southern (as found at Maxey) – tempered with a shelly marl (RMAX); and Northern – tempered with a shelly limestone (MAX). A third grouping (MAXQ), a variant of Northern Maxey-type ware, was later defined at Quarrington, near Sleaford, Lincolnshire (Taylor *et al*. 2003; Young 1996). All Maxey-type pottery shares the presence of a dense, fossil shell filler, as well as manufacturing traits such as basic shapes and rim types, although it cannot be certain that they all follow the same chronological development.

Five sherds recovered from Cheals Close are from a single large, cylindrical jar or bowl in Fabric A (Fig. 8.34.1). Fabric A is the finest of the Northern Maxey-type (MAX) fabric groupings, and occurs early in the sequence, potentially dating to between the late 7th and early/mid-8th centuries. This highly fired vessel is typically thin-walled and competently manufactured, with the coils being carefully smoothed on the exterior surface and having traces of the diagnostic vertical finger impressions

Table 8.64 Middle Saxon pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
IPS	8	5	368	0.43
IPST	4	1	4	0.03
MAX	5	1	62	0.09
MAXEL	42	21	324	0.42
MSAXLOC	1	1	1	0
RMAX	5	4	126	0.20
Total	65	33	885	1.17

on the inside wall. The delicate rim is neatly cut flat with a tool or knife, leaving a characteristic inner and outer lip to the flat rim.

A single sherd found at North Ing containing visible fine punctate brachiopod fossil shell inclusions is from a large jar or bowl in the Southern Maxey-type ware tradition (RMAX). The vessel has a potential 8th to mid-9th-century date range and is typical of such vessels found in Lincolnshire. Three partially leached vessels found at North Ing containing voids from abundant medium-sized fossil shell temper have been confirmed by thin-section analysis (Wood 2025a) to form a separate fabric grouping (Fabric DON) within the Southern Maxey-type ware tradition. They appear to represent a different production centre for Southern Maxey ware than the more common finer fabric and are on the whole less competently made, with thicker walls and more evident coil manufacture than is perhaps usual for RMAX. They comprise a medium-sized jar or bowl and two large jars or bowls, one of which has a curved lug that has an unusually sharply cut flat-topped rim (Fig. 8.34.2). Two of the vessels recovered from North Ing certainly date to the 8th century, but a third is potentially of 8th to mid-9th-century date. Southern Maxey ware was the main Middle Saxon shell-tempered type recovered from Bicker Fen (Anderson 2024).

Forty-two sherds, all recovered from Cheals Close in the Sausthorpe parish and representing 21 vessels in three sub-fabric groups, form a new Maxey-type ware (East Lindsey Maxey-type ware). The type (MAXEL) is sufficiently different visually to classify it as a ware type rather than as a new fabric within the Northern Maxey ware range, and this was confirmed by thin-section analysis (Wood 2025a), but until further finds are made any comparisons of dating with the other Maxey-type wares are tentative. During extensive research at the analysis stage no parallels for the type could be found.

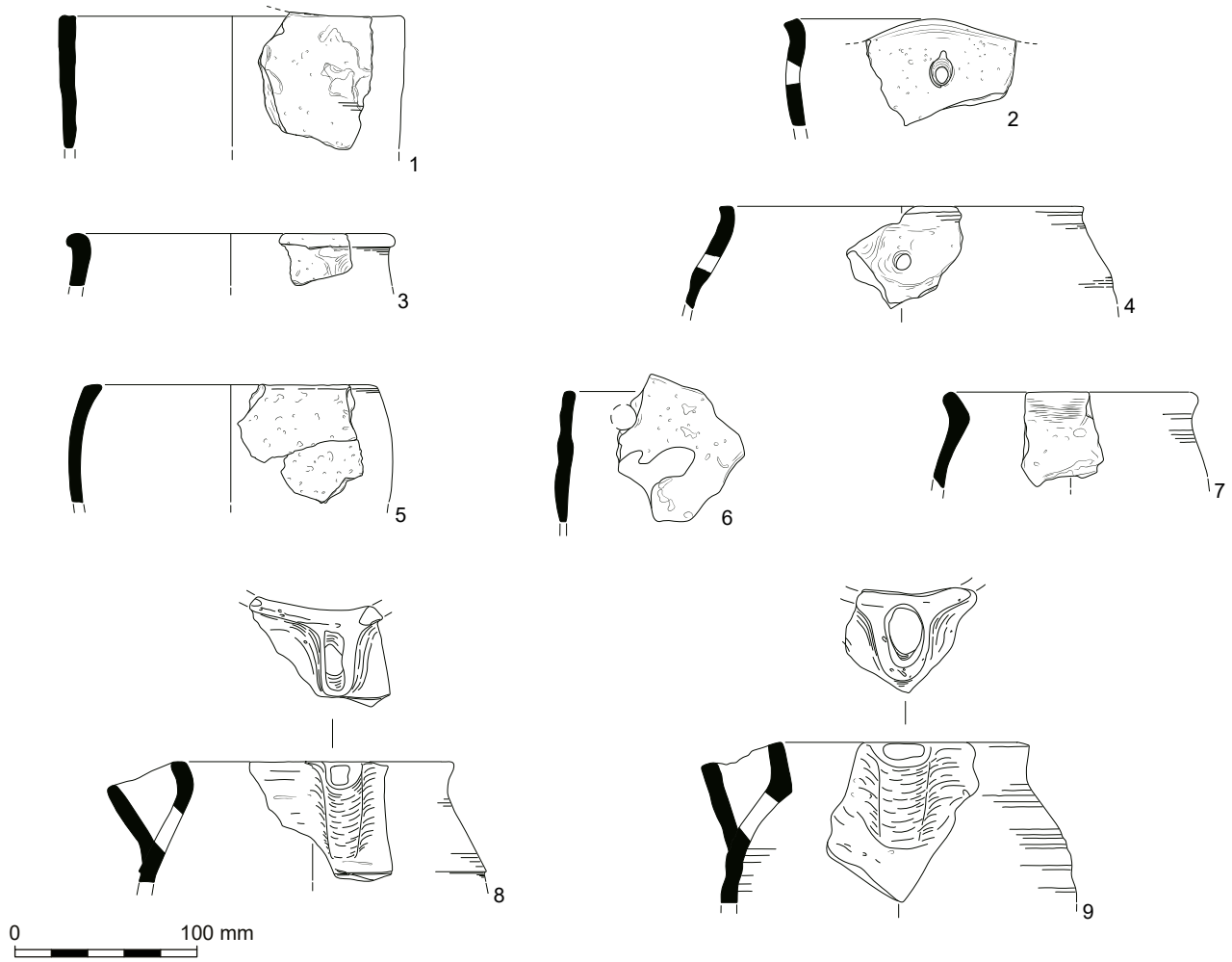
All recovered sherds are either completely or almost completely leached, so the fossil shell temper sizes and sub-fabrics rely mainly on measured voids. Sub-fabrics 1 (11 vessels) and 2 (8 examples) are almost equally represented, but Fabric group 3 is only represented by two vessels. It is the presence of Greensand quartz grains in Fabric 3, together with occasional fragments of flint, that strongly suggest a Lincolnshire Wolds source for this fabric. Thin-section analysis of Fabrics 1 and 2 suggests that there are valid geological differences between the coarser Fabric 1 and finer Fabric 2 vessels (Wood 2025a). Burnishing occurs on two of the vessels and this is an occasional but by no means uncommon finishing technique on Northern Maxey ware. Three of the five rims recovered are of the neatly cut flat-topped type typically found on Northern Maxey ware Fabric A and early Fabric B vessels (Fig. 8.34.4–6), suggesting an early to mid-8th-century date. A roughly finger-flattened example and one of rolled type (Fig. 8.34.3) can be paralleled in Northern Maxey ware Fabric B jars and bowls in general 8th-century deposits, but are never common (Vince and Young 2009, figs 12.19–12.21). The recovered bases are all flat and four of the vessels are lugged. The only lug present not purely represented by a hole or rim extension appears to be of triangular shape. Evidence from the rim extension to a large lugged curved jar/bowl (Fig. 8.34.6) probably also indicates this shape. The recovered vessels range from small to large-sized, although most sherds can only be attributed to jars or bowls. Four vessels, including an identifiable bowl, are of curved shape rather than the more traditional almost cylindrical shape associated with early to mid-8th-century jars and bowls; however, what was recovered of the other vessels was insufficient to determine body shape.

A small, leached shell-tempered sherd found at Cheals Close is of Lincolnshire Middle Saxon production (MSAXLOC). These vessels have a less dense shell temper than the Maxey-type wares (Vince and Young 2009, 356; 2012, 43–44) and do not follow similar vessel or rim shapes. Dating is between the 8th and mid-9th centuries.

Eight sherds of Ipswich ware (IPS) as defined by Blinkhorn (2012) from five vessels were recovered from Cheals Close, North Ing and Sea Bank Farm, with two of these vessels being visually atypical and only being confirmed as Ipswich ware products at the thin-section stage (Wood 2025a). The single sherd from Cheals Close is from a large jar or pitcher in a Group 2 fabric (*ibid*., 16), whereas the other sherds are in the finer Group 1 or Group 1/2 fabrics (Wood 2025a). A pitcher found at North Ing (Fig. 8.34.9) and the jar and pitcher recovered from Sea Bank Farm (Fig. 8.34.7–8) are in Group 1 fabrics, whereas the three oxidised sherds from a large jar or pitcher recovered from two deposits in North Ing fall between Blinkhorn's Groups 1 and 2. Blinkhorn dates Ipswich ware to between the mid-8th and mid-9th centuries with few chronologically distinctive attributes stated.

Four very small, reduced sherds in a micaceous fabric from a single jar or bowl found at Cheals Close do not easily visually fit into Group 1 or Group 2 fabrics as described by Blinkhorn and may be a product of kilns elsewhere (IPST). Despite Blinkhorn's survey concluding that Ipswich ware was solely made in Ipswich (2012, 25) a kiln producing Ipswich-type vessels of potential 8th- to 10th-century date has been discovered at Wreningham in Norfolk (Sudds 2016), while an IPST vessel found in the Croft parish in Lincolnshire has been determined not to be of Ipswich production (Wood 2024), suggesting that it is possible that other centres producing Ipswich-type vessels remain to be found (Wood 2025a).

Figure 8.34 Middle Saxon pottery (details in catalogue)



Catalogue of illustrated Middle Saxon pottery

(Fig. 8.34)

1. MAX Fabric A large cylindrical jar or bowl. Cheals Close, gully 180617, cut 180303, fill 180304
2. RMAX Fabric DON large lugged jar or bowl. North Ing, ditch 600244, cut 600015, fill 600018
3. MAXEL Fabric 2 large jar or bowl. Cheals Close, ditch 180619, cut 180127, fill 180129
4. MAXEL Fabric 2 large lugged jar. Cheals Close, ditch 180615, cut 180013, fill 180014
5. MAXEL Fabric 2 curved bowl. Cheals Close, gully 180617, cut 180530, fill 180531
6. MAXEL Fabric 2 large lugged curved jar or bowl. Cheals Close, ditch 180619, cut 180127, fill 180129
7. IPS jar. Sea Bank Farm palaeochannel 200200, deposit 200094
8. IPS pitcher. Sea Bank Farm palaeochannel 200108, deposit 200070
9. IPS pitcher. North Ing ditch 600245, cut 600006, fill 600007

Late Saxon

Seventy-two sherds from 32 vessels of wheel-thrown Late Saxon type in 13 ware types (Table 8.65) were recovered from sites in the Raithby (Raithby Crossroads) and Huttoft (trench 261 and Sea Bank Farm) parishes, with all but eight vessels being recovered from Sea Bank Farm. In his 1959 paper, Dunning (1959) described the four main Late Saxon wheel-thrown traditions in use in the area: shell-tempered St Neots ware (Addyman 1972), light-firing Stamford ware (Kilmurry 1980; Mahany *et al*. 1982), and reduced Thetford (Rogerson and Dallas 1984) and Torksey (Barley 1964, 1981) wares. It was not until the excavation in 1973 of a shell-tempered pottery kiln in the centre of Lincoln (Miles *et al*. 1989) that it became evident that the vast majority of late 9th- to early 11th-century shell-tempered vessels found in Lincolnshire were of Lincoln manufacture (LKT and LSH). Further study showed that these vessels differed not only in fabric but in manufacture, form and rim shapes and chronological use of decoration from the St Neots types. Study of then-available material (1990s) from around the county showed evidence for a 'daughter industry' in the Horncastle area and a number of other vessels potentially not produced in Lincoln (Vince and Young 1991; 1994). More recent work has shown widespread use (especially in the east of the county) of vessels produced in the Lincoln style but in variant fabrics (WLSS, WLSSFE and WLSSQ). Excavation at Sea Bank Farm produced sherds from two vessels in an entirely new, distinctive Lincoln-type shell-tempered ware (WLSCS).

Table 8.65 Late Saxon pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
ELLSG	2	1	30	0
ELLSGFE	2	1	83	0.44
ELLSOX	5	3	54	0
ELWLSFGFE	2	2	33	0
LKT	5	2	55	0.05
LSH	1	1	4	0
LSLOC	1	1	1	0
TORK	5	2	17	0.05
WLSCS	4	2	88	0.03
WLSG	2	2	45	0
WLSS	10	5	102	0.23
WLSSFE	18	3	117	0.30
WLSSQ	15	7	45	0.11
Total	72	32	674	1.21

Extensive work in the mid- to late 1970s by the author on the reduced (or occasionally oxidised) Late Saxon quartz-tempered pottery from the large Flaxengate assemblage (Adams Gilmour 1988) showed that almost all of the pottery from the county previously categorised as being of Thetford ware type (and occasionally as a Torksey product) in fact represented two main Lincoln industries operating in the late 9th- to early 10th- (LSLS) and late 10th- to mid-11th-century (SNLS) periods (Young *et al*. 2005, 44–47 and 77–81). Reduced-firing Lincoln-type vessels in quartz-tempered fabrics not visually identifiable as the main Lincoln ones have consistently been recovered from across most of the county, but few such as the Horncastle and North Lincolnshire types have been distinctive enough to be grouped into a specific ware type (Boyle and Young 2008; Collyer 2018). Excavation at Sea Bank Farm has surprisingly produced three new reduced-firing (ELLSG, ELLSGFE and ELWLSFGFE) and one oxidised-firing (ELLSOX) distinctive quartz-tempered types, suggesting the presence of previously undetected industries. The manufacture and general visual appearance of the three reduced groupings is similar to that of Early Stamford ware, while that of the oxidised vessels is more akin to Torksey ware.

Stamford ware was intensively studied in the late 1970s and divided into fabric groupings by Kilmurry (1980). A more rational grouping was made by Leach (1987), dividing the type into Early Stamford ware, a finer Saxo-Norman type and the commonly copper-glazed Developed Stamford ware of the mid-12th to early 13th centuries. No Early Stamford ware was recovered from any of the Interconnector sites and the only two Stamford ware vessels from the scheme are of mid- to late 12th-century date.

The recovered Late Saxon assemblage is small but, overall, the majority of sherds come from wheel-thrown shell-tempered vessels. Only three of these vessels could be directly identified as Lincoln products. Five sherds from two large in-turned-rim bowls of Lincoln Kiln Type (LKT) found at Sea Bank Farm date to between the early/mid- and late 10th century. The basal sherd of a Lincoln Shelly ware jar or bowl (LSH) in Fabric B is of potential late 9th- to 10th-century date.

An entirely new fossil shell-tempered fabric was recovered from Sea Bank Farm. The four wheel-thrown sherds are from two vessels in a coarsely shell-tempered fabric termed Wheel-thrown Late Saxon Coarse Shell-tempered (WLSCS). In Lincolnshire a few Middle Saxon fabrics have coarse fossil shell inclusions but otherwise coarse shell inclusions typify the medieval period between the late 12th and late 15th centuries. The recovered sherds are from a medium-sized jar of potential late 9th- to late 10th-century date and a large shallow in-turned-rim bowl (Fig. 8.35.12) of early/mid- to mid-10th-century type. A detailed visual fabric description can be found in the assessment report (Young 2023a) and a more scientific analysis by Wood (2025a), which indicates that the vessels are probably products of Lincoln kilns sited in the eastern part of the Lower City.

Three loose fabric groupings of primarily wheel-thrown shell-tempered vessels copying Lincoln-produced forms and decoration (WLSS, WLSSFE and WLSSQ) were recovered. Visually similar material commonly occurs on Late Saxon sites along the eastern side of Lincolnshire. The identification of vessels recovered from the current scheme as products of non-Lincoln production sites has been confirmed by thin-section analysis (Wood 2025a). Ten sherds are from four Wheel-thrown Late Saxon Shell-tempered jars and a jar or bowl (WLSS). This group represents shell-tempered vessels in the Lincoln style currently not thought to be manufactured within Lincoln. Four of the vessels can only be dated to between the late 9th and early 11th centuries, but one of the jars with bands of square roller-stamping on the shoulder is of late 9th- to mid-10th-century type. Eighteen sherds in a similar fabric – but also having an iron-rich content (WLSSFE) – are from two small and one medium-sized jar (Fig. 8.35.11). The two small jars are of late 9th- to early 11th-century date, but the medium-sized jar is decorated with a band of fine square roller-stamping around the shoulder suggesting a late 9th- to mid-10th-century date for the vessel. Fifteen sherds representing seven Lincoln-influenced vessels are in shell-tempered fabrics also having a high quartz content (WLSSQ). Similar fabrics were made in Lincoln but the quartz grains in these fabrics are quite dissimilar. The

sherds come from three jars, a large dish or shallow bowl (Fig. 8.35.13) and three jars or bowls. Most vessels can only be dated to between the late 9th and late 10th centuries, although the large dish or shallow bowl is most likely to date to no later than the mid-10th century, and one small jar might extend into the early 11th century.

Nineteen sherds representing twelve vessels are in seven quartz-tempered ware groupings, only one of which represents a known production site. Five sherds are from two small Torksey ware jars (TORK) of 10th-century type. Two wheel-thrown sherds in reduced mid-grey quartz-tempered fabrics are from medium-sized jars (WLSG); neither of these vessels falls within the range for other established fabrics, but in themselves they are not sufficiently distinctive to form separate new ware groupings. Their manufacture is typical of Thetford or Lincoln production. A flat basal sherd containing sandstone and basalt minerals (Wood 2025a) is of late 9th- to mid-10th-century type, while the other jar can only be dated to between the late 9th and late 10th centuries. A tiny sherd from a small probably wheel-thrown vessel in a light dull oxidised fine micaceous sandy fabric also containing rounded calcareous grains that might represent chalk is potentially of fairly local production (LSLOC) but is too small to independently classify.

The other eleven quartz-tempered sherds (all recovered from Sea Bank Farm) form four distinctive fabric groups. Inclusions in the fabrics visually suggest a potential East Lindsey source but further scientific work is needed to prove this assumption (Wood 2025a). Detailed visual fabric descriptions using a x20 binocular microscope are given in the assessment report (Young 2023a). Two sherds from a single small jar in a mid-grey fabric containing abundant mainly fine to medium-sized quartz grains and sparse rounded calcareous grains are of East Lindsey Late Saxon Greyware type (ELLSG). The vessel manufacture and visual appearance is similar to that of Early Stamford ware, suggesting a potential late 9th- to 10th-century date for the type. The recovered sherds have cracked during firing or post-firing usage and there is burning with soot residue over one broken edge. East Lindsey Late Saxon Grey Sandy and Iron-tempered ware (ELLSGFE) is of similar manufacture and general appearance and dating to that of ELLSG. The two recovered sherds are from a single medium-sized jar (Fig. 8.35.10) with a thick everted lid-seated rim. The fabric is not dissimilar to that of ELLSG but also includes moderate to common variable iron-rich grains. The two basal sherds of East Lindsey Wheel-thrown Late Saxon Fine Grey Sandy and Iron-tempered ware (ELWLSFGFE) come from a small jar and a jar or bowl. Again, visual appearance and manufacture are similar to that of Early Stamford ware production, although the date range for this type may be slightly wider at between the late 9th and early/mid-11th centuries. The reduced fabric contains abundant fine quartz grains below 0.2 mm and moderate to common fine iron-rich grains. Thin-section analysis of these three groups showed the ELLSG and ELWLSFGFE samples contain similar igneous and metamorphic grains, which are absent in the ELLSGFE sample (Wood 2025a).

The five East Lindsey Late Saxon Oxidised Sandy ware sherds (ELLSOX) represent three medium-sized jars in a medium to coarse quartz-tempered fabric. Thin-sectioning showed a sandstone and basalt fabric similar to that of the WLSG vessel investigated (Wood 2025a). The sherds are mostly fired to an oxidised mid-orange colour but there are some small areas of external reduction and one vessel is lighter in colour. Manufacture of these primarily wheel-thrown vessels is similar to 10th- to early 11th-century Torksey ware, although thin-section analysis detected coil construction on the submitted sherd (Wood 2025a). One jar has partially bleached white surfaces possibly suggesting salt-bleaching, while another appears to have cracked during firing or post-firing use.

Catalogue of illustrated Late Saxon and Saxo-Norman pottery
(Fig. 8.35)

10. ELLSGFE jar. Sea Bank Farm group 200203 alluvial layer, deposit 200018
11. WLSSFE jar. Sea Bank Farm group 200203 alluvial layer, deposit 200018
12. WLSCS large in-turned rim bowl. Sea Bank Farm gully 200204, fill 200055
13. WLSSQ large dish or shallow bowl. Sea Bank Farm pit 200063, fill 200064
14. SLSNT jar. Sea Bank Farm pit 200063, fill 200064

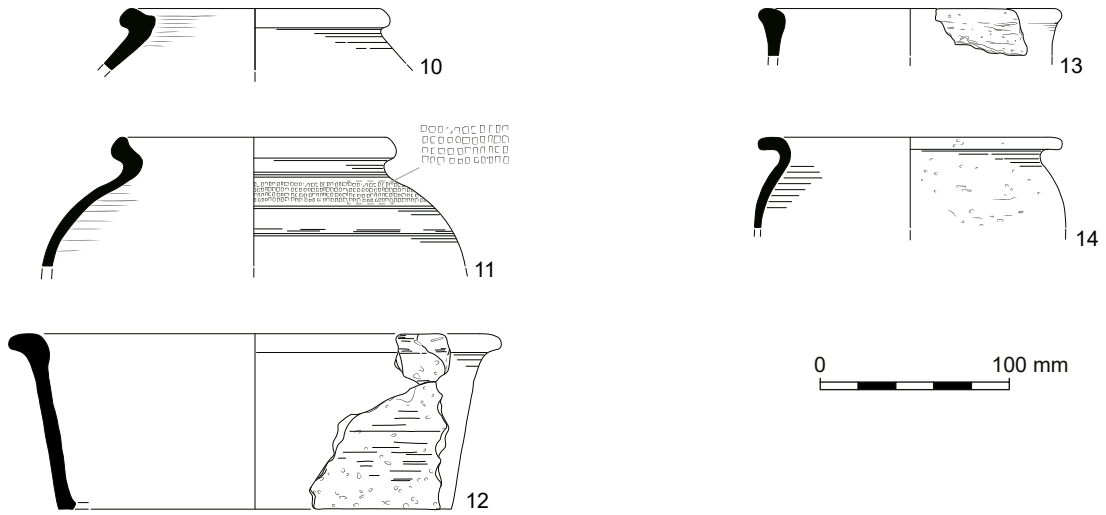


Figure 8.35 Late Saxon and Saxo-Norman pottery (details in catalogue)

Saxo-Norman

Twenty-one sherds representing just four vessels in three ware groups are of Saxo-Norman type. These ware types span either side of the Norman Conquest and it is difficult to closely date such vessels. Seventeen sherds are from two South Lincolnshire St Neots-type ware (SLSNT) jars of small and medium sizes. The medium-sized jar, represented by 16 sherds (Fig. 8.35.14), is of 10th- to early 11th-century type, whereas the small jar can only be dated to between the late 9th and early 11th centuries. This abundantly shell-tempered type visually and form-wise resembles typical St Neots ware products but appears to lack the punctate brachiopod or other typical fossils of the type. Most of the vessels found in the county are recovered from sites in South Lincolnshire, with occurrences becoming most common towards the South Lincolnshire/North Cambridgeshire border. Thin-section analysis has confirmed the lack of punctate brachiopod inclusions in the submitted sample (Wood 2025a).

Three glazed sherds of Stamford ware (ST) are from a single glazed jug or jar in Fabric C. The vessel is of mid- to late 12th-century type. A single sherd from a large jar or pitcher with direct finger-pressed decoration to the body of the vessel is of Thetford ware type (THETT). The vessel is in a fine sandy fabric fired to a brown colour and has black surfaces, suggesting that it may not be products of kilns in Thetford itself, although the fabric does suggest an East Anglian source. The vessel can only be dated to between the late 9th and pre-conquest mid-11th centuries.

Table 8.66 Saxo-Norman pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
SLSNT	17	2	88	0.45
ST	3	1	13	0
THETT	1	1	14	0
Total	21	4	115	0.45

Early medieval

Thirty-four sherds representing only ten vessels in seven ware groupings are of 'early medieval type'. Typically these industries developed between the late 11th and mid-12th centuries and declined by the early/mid-13th century in favour of 'medieval' types. Most of the sherds are from coarseware vessels such as jars or bowls tempered with fossil shell, quartz or calcareous grains, but a small number of glazed fineware forms also occur.

Four handmade sherds from three jars are in Coastal East Lincolnshire Early Medieval Handmade fabrics (CELEMHM). This handmade type can be dated to between the late 11th and early/mid-13th centuries and has only recently been defined. The vessels were

Table 8.67 Early medieval pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
BEVO1	1	1	4	0
CELEMG	1	1	11	0
CELEMHM	4	3	58	0
DST	7	1	18	0
ELEMCQC	8	1	215	0.10
EMLOC	1	1	16	0.30
WEMS	12	2	777	0.28
Total	34	10	1099	0.68

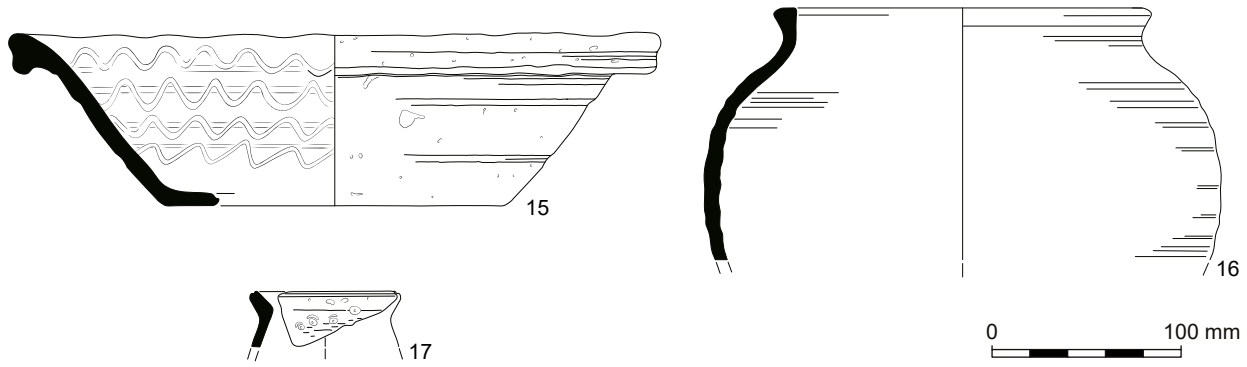
all recovered from trench 261 in Huttoft parish and may be a fairly localised product (Wood 2025b). Eight sherds from a single wheel-thrown jar also recovered from trench 261 (Fig. 8.36.16) are in a fabric tempered with coarse quartz and calcareous grains (ELEMCQC). The type has previously not been characterised, but occasional sherds have been noted in the east of the county. The fabric is not dissimilar to that of the more coarsely tempered CELEMHM fabric, but this vessel is clearly and competently wheel-thrown (Wood 2025b).

Twelve sherds are from two Wheel-thrown Early Medieval Shell-tempered vessels (WEMS) in a fabric similar to established Fabric A. Ten sherds are from an unusual, large, sloping bowl with four rows of incised wavy decoration on the internal surface and slightly pinched finger pressings on the upper rim edge (Fig. 8.36.15). Internal decoration such as this is rare, although the decoration on its own is a common early medieval type. The decoration and form suggest a 12th-century date. The other two sherds are from a large bowl or dish.

Ten glazed sherds are from four quartz-tempered vessels that include a regionally imported Beverley 1 (BEVO1) sherd in Fabric A from a small internally glazed jar or bowl. Beverley 1 ware was produced in Beverley through the 12th century into the earlier part of the 13th century (Didsbury and Watkins 1992; Watkins 1991), but the suspension glaze on this vessel indicates a mid-/late 12th- to early/mid-13th-century date. The sherd was recovered from trench 57 in the Rigsby with Ailby parish, where it would not be an uncommon find.

The other three vessels are of Lincolnshire production and include the rim from a small, spouted cup or jug with a splashed-type glaze (Fig. 8.36.17). The fabric suggests a general East Lincolnshire source (EMLOC), while the glazing and form point to a potential mid-12th- to mid-13th-century date. A sherd from a small wheel-thrown jug with a splashed-type glaze found in East Keal parish (Area 28) has tentatively been identified as being of mid-12th- to early/mid-13th-century Coastal East Lincolnshire Early Medieval Glazed ware type (CELEMG). Seven sherds found at the Fourteen Acres site in the parish of Sausthorpe are from a Developed Stamford ware jug (DST) of probable mid-/late to late 12th-century date.

Figure 8.36 Early medieval pottery (details in catalogue)



Catalogue of illustrated early medieval pottery
(Fig. 8.36)
15. WEMS large sloping bowl. Trench 261, ditch 26127, fill 26125
16. ELEMCQC large jar. Trench 261, ditch 26127, fill 26125
17. EMLOC small spouted jar or cup. Trench 122, topsoil 12200

Medieval
Two hundred and seventy-two sherds representing 243 vessels in 15 ware groupings (Table 8.68) are of medieval type and potential late 12th- to mid-16th-century date. Much of the medieval material is in an abraded to very abraded condition consistent with sherds usually recovered from ploughsoils. The medieval assemblage is dominated by vessels (209 sherds from 188 vessels) of Toynton Medieval ware-type (TOY). Few other major Lincolnshire (LSWA and POTT) or regional industries (BEVO2) are represented.

Numerous finds of wasters have been recovered from the villages of Toynton All Saints and Toynton St Peter in Lincolnshire but only one medieval kiln has been excavated (Healey 1975). The type was widely marketed not only in Lincolnshire but also to other areas both in England and on the Continent. Production of pottery continued in the area until the late 16th or early 17th centuries, although medieval-type vessels ceased to be made by the mid-16th century at the latest. At present the earliest kiln to have been excavated (producing Toynton Medieval type) is Kiln 1 known as the 'Roses' kiln (Healey 1975; 1984). The kiln is thought to have been operating during the late 13th and early 14th centuries (Aitken and Hawley 1966, 190–1), although stylistically earlier forms point to potential manufacture of the type before this date. Prior to the production of TOY there is evidence in the form of wasters for the production of unglazed and glazed vessels of late 12th- to mid-13th-century date in a Lincoln style (Young forthcoming). It has not been possible to isolate vessels of this type among the Viking Link pottery, but they may remain undetected amid the small and often very abraded miscellaneous ungrouped MEDLOC sherds. Several other production sites in Lincolnshire are indicated by the presence of Toynton Medieval-type (TOY) wasters at sites in Kirkstead, Boston and Ingoldmells (Young 2007).

Overall it is generally very difficult to date small undiagnostic Toynton Medieval ware body sherds, although there is a general trend towards higher-fired vessels, especially jugs, from the late 14th century onwards. The majority of vessels recovered from the Viking Link therefore can only be dated to the period between the late 13th and 15th centuries. Vessels found in Boston (Irving 2000, 38–41), including seconds or potential wasters with glaze over breaks (BOSTTT), are found associated with groups dating to as early as the mid- to mid-/late 13th century, but positive attribution of the type away from sites in Boston or the local area is usually difficult. Two sherds found in trench 261 and recorded as TOY have the potential to match the fabrics found at Boston (Wood 2025b). Eleven vessels are likely to have been produced at the 'Roses', or a similar early kiln of late 13th- to 14th-century production. Two vessels from trench 110 including a large jug with iron-rich applied decoration appear to be of 14th-century type, while 18 other vessels (mainly large jugs) have attributes that suggest a 14th- or 15th-century date. Two jugs found in trench 261 in a fresh condition are typical of 15th-century production and form-wise bridge the gap between medieval (TOY) and late medieval (TOYII) production, while a large jug and two large bowls belong to the period between the 15th and mid-16th centuries.

The majority of sherds recovered from the project are from small, medium or large-sized jugs, only two of which are decorated. Only 28 vessels are identifiable as jars of mainly medium size. Eleven large bowls can be identified, and this is perhaps a lower number than would be expected on rural sites where the vessels were typically used as 'milk pans' (Rudkin 1992). Less common forms include two drinking jugs, a pipkin and a miniature bowl.

A small and very abraded sherd from a jug is probably of Lincoln Glazed Ware Fabric A type (LSWA) and dates to the 13th or 14th century. Two sherds found at Huttoft

(trench 261) appear to be of Alford Manor House Glazed type (AMHG) but require further work for confirmation of the fabric type, as similar vessels are also found in the Louth area (Wood 2025b). The sherds are from medium-sized and large-sized jugs of late 12th- to mid-13th- and mid-/late 12th- to early/mid-13th-century date as suggested by the glazing (Young 2010).

Nineteen sherds representing 16 vessels were identified as being in six fabrics grouped together as East Lincolnshire Dull Oxidised type (ELDOX). These quartz-tempered vessels are in fabrics that fire to a dull orange to brown colour and are visually fairly distinctive as a group despite individual microscopic fabric differences (Wood 2025b). They are not particularly high-fired, and glazing is uncommon but mostly of a reduced suspension type. Twelve of the recovered vessels were found on sites in the East Keal (trench 122) or West Keal (Area 29, trench 132 and trench 300) parishes. Sherds come from a range of identifiable jugs and jars but also include a large sloping bowl and a dripping dish (Fig. 8.37.18). The type appears to date to between the late 12th and mid-14th centuries.

Two other previously defined types were also identified at the analysis stage. Eight sherds from three highly fired and well-executed jugs are of Coastal East Lindsey Medieval Glazed ware type (CELMG). Previously recovered vessels suggest a potential late 12th- to mid-14th-century date range centring on the 13th century and a potential coastal East Lindsey production (Wood 2024; 2025a). Two sherds from large and medium-sized jugs in fairly fine quartz-tempered fabrics with a high iron-rich content (Wood 2025b) are visually of East Lincolnshire Medieval Fine Quartz and Iron type (ELMFQFE). The type is likely to date to the 13th or 14th century.

Twenty-two sherds, each representing an individual quartz-tempered vessel, are of potential fairly local or at least within Lincolnshire production (MEDLOC). These vessels could not be further identified at the analysis stage despite extensive comparative work to previously excavated material. Visual and fabric differences render it impossible to further group these vessels meaningfully. It is possible that they originated from localised short-lived industries that until production evidence is found will remain without provenance. Few vessels are of note or can be closely dated because of a lack of decoration and chronologically distinctive form. Most sherds come from jugs or jars but a large sloping bowl of similar shape to those found in the medieval Toynton industries also occurs.

Regionally imported vessels are represented by three sherds, only one of which can be directly attributed to a production source. A tiny and much abraded sherd found at Ailby Lane is from a Beverley 2 vessel in late 13th- to mid-14th-century Fabric C ($BEVO_2$). This vessel would have been produced in Beverley itself (Didsbury and Watkins 1992; Watkins 1991), but two other sherds in variant fabrics ($BEVO_2T$) may be Lincolnshire or East Yorkshire products of potential 13th- to mid-14th-century date. Trench 281 in West Keal produced a body sherd from a jar in a fine sandy fabric containing aggregated iron-cemented sandstone grains that suggests it is a regional import from an unknown centre (MEDX). The jar can only be dated to between the 13th and 15th centuries.

Few fossil shell or calcareous-tempered vessels were recovered from the scheme. In most of Lincolnshire these vessels fulfil a significant coarseware domestic function between the late 12th and mid-14th centuries (or in the Lincoln area until the late 15th century), providing mainly large jars and bowls to complement the fineware glazed jugs and smaller jars or pipkins. This suggests that the local quartz-tempered industries were producing vessels to fulfil that function. This is certainly the case at Toynton All Saints by the early/mid-14th century. A single coarsely shell-tempered Potterhanworth sherd (POTT) is from a wheel-thrown jar of 13th- to 15th-century date. Another coarsely shelled wheel-thrown jar is of late 12th- to mid-14th-century Bourne Area Medieval Wheel-thrown Shell type (BAMWTS). A jar in an East Lincolnshire Medieval

Abundant Shelly ware fabric (ELMAS) is of late 12th- to 13th-century date, while the South Lincolnshire Shell and Quartz-tempered jar or bowl (SLSQ) is of potential 13th- to 15th-century date. A calcareous-tempered sherd, possibly with chalk (MINDUS), has been subject to intense heat and appears to come from a large vessel subjected to intense heat (Fig. 8.37.19), possibly an industrial base (a type of large jar form probably used with another vessel on top) similar to those produced at Potterhanworth between the 13th and 15th centuries (Healey 1988).

Table 8.68 Medieval pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
AMHTG	2	2	21	0
BAMWTS	1	1	12	0
BEVO2	1	1	2	0
BEVO2T	2	2	8	0
CELMG	8	3	42	0
ELDOX	19	16	434	0.17
ELMAS	1	1	11	0
ELMFQFE	2	2	74	0
LSWA	1	1	5	0
MEDLOC	22	22	226	0.13
MEDX	1	1	15	0
MINDUS	1	1	31	0
POTT	1	1	12	0
SLSQ	1	1	8	0
TOY	209	188	2543	1.25
Total	272	243	3444	1.55

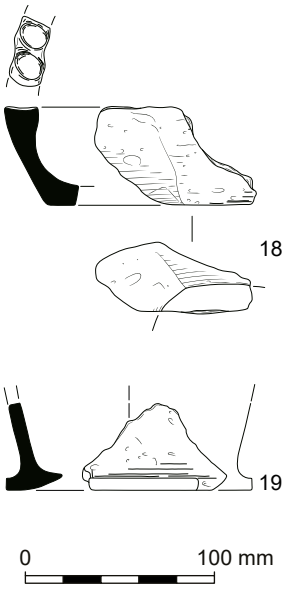


Figure 8.37 Medieval pottery (details in catalogue)

Catalogue of illustrated medieval pottery

(Fig. 8.37)

18. ELDOX oval dripping dish. Trench 300, furrow 30009, fill 30010
19. MINDUS industrial vessel. Trench 137, subsoil 13701

Late medieval to early post-medieval

Fifty-eight sherds representing 56 vessels of almost entirely Lincolnshire production are of late medieval to early post-medieval type (Table 8.69). The predominance of Toynton and Toynton/Bolingbroke types in this period is typical for the sites excavated. Further to the north of the county Humberware is often more common and to the south it is late medieval to early post-medieval Bourne ware that is more commonly in use.

Thirty-five Toynton Late Medieval-type (TOYII) sherds are from 33 vessels mainly comprising small to large-sized jugs and large-sized bowls. The type was mainly produced at Toynton All Saints in Lincolnshire between the mid-15th and mid-16th centuries, but was also manufactured at a number of other centres in the county including Bolingbroke, Coningsby and Tattershall. A small internally and externally glazed sherd from a specialised jug or jar recovered from Trench 290 in the Beesby with Saleby parish is the only unusual form to occur. The high incidence of large bowls (eight in total) and large jugs (nine examples) is typical for rural sites in the county. None of the vessels can be dated to closer than the mid-15th- to mid-16th-century date for the type.

Eighteen sherds, each representing an individual vessel, are of Toynton/Bolingbroke type (TB). The type was manufactured from the mid-15th century at the same centres as TOYII but evolves into a post-medieval type after the mid-16th century – and probably

continues to be made up to the mid-18th century at Bolingbroke, although production elsewhere probably does not survive into the second half of the 17th century. The majority of recovered sherds come from large bowls (12 examples) but a small jug, three jars and a drinking jug were also identified. Heavy wear around the rim and or external basal edges is apparent on many of the vessels, possibly indicating a long period of heavy domestic use. Most of the vessels stylistically pre-date the 17th century, with at least two, including an unusual drinking jug of Humberware shape, being of mid-15th- to mid-16th-century type. It is interesting that the provenance of 10 of the recovered vessels lies within the Stickford parish.

An abraded sherd from a small jug or jar is a mid-15th- to 16th-century product of kilns in Bourne, Lincolnshire (BOU). Three sherds are from unidentified Lincolnshire production sites (LMLOC). They come from a jug, a small bowl and a jug or jar. All date to the 15th or 16th century. The only regional import is a small sherd from a Cistercian ware posset pot of mid-/late 15th- to 16th-century date. The sherd is too small to be certain of provenance but the vessel is either an East Midlands or Yorkshire product.

Table 8.69 Late medieval pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
BOU	1	1	9	0
CIST	1	1	3	0
LMLOC	3	3	26	0
TB	18	18	719	0.73
TOYII	35	33	829	0.20
Total	58	56	1586	0.93

Post-medieval

Sixty-five sherds representing 53 vessels in eight ware groupings are of post-medieval type (Table 8.70). Thirty-one sherds from 28 Glazed Red Earthenware vessels (GRE) were recovered, with ten of these vessels being found in East Keal parish (Areas 28 and 34 and trenches 122, 298 and 326), where coarse earthenware production took place into at least the early 19th century (Brears 1971, 194). This earthenware type first appears in mid-16th-century deposits in East Anglia and Lincolnshire and reflects Flemish or Dutch influence. It continues to be manufactured well into the 18th century in several counties, including Lincolnshire. Identified production sites in Lincolnshire include Boston, Bolingbroke, Grimsby and Toynton St Peter.

Most of the identifiable vessel forms recovered from across Viking Link are large bowls, with a small number of jars also occurring. The only unusual vessel forms recovered are two colanders of mid-16th- to 17th-century date. A jar found in trench 261 in the Huttoft parish and a jar or bowl recovered from West Keal (trench 281) are of early type, possibly dating to the mid-16th century, and are similar to waste found at Toynton St Peter. The West Keal vessel has cracked during firing and may represent a second or functional waster. Five vessels are of late 17th- to mid-18th-century date and were probably made at Bolingbroke. Most of the other vessels can only be generally dated to between the mid-16th and 17th or even 18th centuries. Three Pale-glazed Earthenware sherds (PGE) from large bowls (a type often made at the same centres as the GRE vessels) are of varying mid-17th- to 18th-century date, with at least two of the vessels likely to have been made at Bolingbroke.

Twenty-five sherds from 16 vessels are black (BL) or brown (BERTH) iron-glazed earthenwares of mid-16th- to 18th-century date. By the mid-17th century these iron-glazed wares form the most common coarse earthenware type to be found in most of the county. They were manufactured at a number of centres and include vessels with a variety of both coarse and fine fabrics. A similar pattern of iron-glazed vessels to that occurring in the St Paul-in-the-Bail well (Young 2008, 30–35 and table 4) and other

mid-16th- to 18th-century groups in Lincoln is usually found in East Lincolnshire. By the mid-17th century iron-glazed vessels (mainly BL) in similar fabrics to that of the Glazed Red Earthenwares (alongside which they were probably produced) and predominantly in the form of cups or mugs are replaced by fine and coarse Staffordshire/Derbyshire-type products. A wider range of vessel form types intended for beverage consumption and serving, food preparation and storage, as well as domestic vessels such as chamber pots, are found among these Staffordshire/Derbyshire products. Towards the end of the 17th century there is a gradual increase in Lincolnshire-produced vessels, often reflecting local production, and by the late 18th century they dominate the iron-glazed types in East Lincolnshire. These more local industries are conservative, mainly producing large storage jars and large multi-functional bowls that change little in form or manufacture over a long production period. Three of the four cups recovered from sites investigated during the project are of mid- or late 17th- to 18th-century Staffordshire/Derbyshire type, as is the only chamber pot identified. Most of the jars and bowls, however, are Lincolnshire products and are mainly later in date. The only sherd of potential late 16th- to mid-17th-century date and Glazed Red Earthenware type is from a jug or jar recovered from Area 29 in West Keal.

Two Staffordshire-type Slipware sherds (STSL) are from slip-decorated press-moulded dishes of late 17th- to 18th- and 18th-century type. Another sherd from a press-moulded dish in a fine red fabric may be of Yorkshire or Sunderland production (SLIP). The 18th- or 19th-century dish has a thick internal white slip with marbled manganese decoration. A single Staffordshire-type Mottled ware sherd of late 17th- to 18th-century date is from a cup. Two well-abraded small Tin-glazed Earthenware sherds (TGW) are from vessels of 17th- or 18th-century date.

Table 8.70 Post-medieval pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
BERTH	14	5	306	0.17
BL	11	11	88	0
GRE	31	28	803	0.56
PGE	3	3	234	0.10
SLIP	1	1	10	0
STMO	1	1	4	0
STSL	2	2	12	0
TGW	2	2	4	0
Total	65	53	1461	0.83

Table 8.71 Early modern pottery by ceramic codenames summarised by ware type with sherd count, vessel count, weight in grams and REVE

Codename	*Total sherds*	*Total vessels*	*Total weight*	*REVE*
BL	6	5	637	0
BS	1	1	10	0
CREA	16	13	26	0.02
ENGS	4	4	659	0
ENPO	6	6	10	0.01
LONS	2	2	63	0.08
NCBW	6	3	65	0
NOTS	9	4	173	0.08
PEARL	11	11	54	0.12
SWSG	3	1	2	0
TPW	6	6	35	0.10
WHITE	8	4	64	0.06
Total	78	60	1798	0.47

Early modern

Seventy-eight sherds representing 60 vessels are of 18th- to 20th-century early modern type (Table 8.71). Only two sites (Area 50 and Area 51) produced more than a few sherds at most and neither of these assemblages is remarkable. While most of the vessels recovered are industrially manufactured fine earthenwares or stonewares, a small number of coarse earthenwares of probable Lincolnshire production were found.

Principal Sites

The post-Roman pottery discussed here was recovered from three principal sites investigated along the Interconnector (Table 8.72). The 269 sherds recovered from these sites represent 105 vessels of Anglo-Saxon to early modern type and one of uncertain date. None of the assemblages are large but all three have important implications for pottery studies in Lincolnshire as they have produced Saxon types previously not encountered in the area.

Sea Bank Farm

This site produced a group of 86 sherds of post-Roman date from 32 vessels of Middle Saxon to early modern type (Table 8.73). This small group is important as it has added five previously unencountered Late Saxon ware types to those known in the county and possibly suggests a number of new production sites (or one producing several types) in East Lindsey. Most of the Late Saxon pottery shows evidence for exposure to extreme heat, with a few sherds additionally having evidence for salt-bleaching. The wide range of Late Saxon pottery types found might be explained by the importance of the site in saltmaking and the proximity to the coast.

Table 8.72 Post-Roman pottery from Sea Bank Farm, Ailby Lane and Cheals Close by ceramic period with vessel count

Site	*UNCERTAIN*	*ASAX*	*MSAX*	*LSAX*	*SNORM*	*EMED*	*MED*	*LMED*	*PMED*	*EMOD*	*Total*
Sea Bank Farm	-	-	2	24	1	-	4	-	-	1	32
Ailby Lane	-	23	-	-	-	-	12	1	2	1	39
Cheals Close	1	2	25	-	-	-	6	-	-	-	34
Total	1	25	27	24	1	0	22	1	2	2	105

Table 8.73 Post-Roman pottery from Sea Bank Farm by ceramic period summarised by ceramic codename with sherd count, vessel count, and weight in grams

Ceramic period	*Codename*	*Total sherds*	*Total vessels*	*Total weight*
MSAX	IPS	2	2	114
LSAX	ELLSG	2	1	30
LSAX	ELLSGFE	2	1	83
LSAX	ELLSOX	5	3	54
LSAX	ELWLSFGFE	2	2	33
LSAX	LKT	5	2	55
LSAX	LSLOC	1	1	1
LSAX	TORK	5	2	17
LSAX	WLSCS	4	2	88
LSAX	WLSG	2	2	45
LSAX	WLSS	5	1	56
LSAX	WLSSFE	16	1	106
LSAX	WLSSQ	14	6	43
SNORM	SLSNT	16	1	83
MED	ELDOX	1	1	85
MED	MEDLOC	1	1	9
MED	TOY	2	2	28
EMOD	BL	1	1	10
Total		86	32	940

Palaeochannel

Deposit 200094 in palaeochannel 200200 produced a rim sherd from an oxidised Ipswich ware jar (Fig. 8.34.7) with external carbonised deposits and an internal white, possibly calcareous deposit. There is slight wear around the inner rim edge of the jar suggesting that it had been in regular use. The vessel should fall within the conventional mid-8th- to mid-9th-century dating for Ipswich ware. The other sherd found in this layer is from a Wheel-thrown Coarse Shelly ware jar also with an internal calcareous deposit. This jar is of potential late 9th- to 10th-century type, although the only other vessel found on this site in the ware is of early/mid- to late 10th-century type. It may be coincidental that the Ipswich ware jar has a similar internal deposit to that found on the Late Saxon vessel, or it may suggest continued use or re-use of a residual vessel.

The single sherd recovered from deposit 200070 in palaeochannel 200108 is from an Ipswich ware pitcher (Fig. 8.34.8) of potential mid-8th- to mid-9th-century date. The rim sherd is undecorated and the applied bridge spout comes directly off the simple slightly everted rim.

Post-Roman

Six sherds recovered from within alluvial deposit 200203 are from three Late Saxon vessels. Three sherds from a large Lincoln Kiln-type in-turned-rim bowl date to between the early/mid- and late 10th century. The sherds have external soot staining and have been burnt post-firing, including across broken edges. The internal surface of the bowl has been leached of the fossil shell temper because of the containment or heating of an alkaline or acidic liquid. The other sherd is from a small East Lindsey Late Saxon Greyware jar with a firing or post-firing crack due to exposure to extreme heat. There is obvious burning to the sherd and soot residue over a break. The manufacture of this jar is similar to that of Early Stamford ware, suggesting a late 9th to 10th-century date for the vessel. A tiny wheel-thrown sherd from a small vessel in an unidentified light-firing dull oxidised micaceous fabric is of uncertain type but probable late 9th- to 10th-century date and Lincolnshire production. These vessels appear to have been used in association with a high-temperature activity, probably between the early/mid- and mid-10th century.

Layer 200018, also in alluvium 200203 deposits, produced a group of 40 Late Saxon sherds representing 14 vessels in 8 ware types. Two Lincoln Kiln-type sherds are from a large in-turned-rim bowl of early/mid- to late 10th-century type. The internal fossil shell inclusions have been leached away during use. Five sherds are from two small Torksey ware jars of 10th-century type. One jar has external soot and carbonised deposits, while the other has wear marks around the inner and outer rim edges, possibly due to the use of a lid. A single Wheel-thrown Late Saxon Shell-tempered ware jar is represented by five sherds. The internal fossil shell inclusions have been leached away and there are external soot and unidentified brown deposits, especially under the rim. The vessel has obviously been subjected to a high temperature. A very similar jar represented by 16 sherds is in a similar but iron-rich fabric (WLSSFE). This jar (Fig. 8.35.11) also has leached internal shell inclusions and an external carbonised deposit. The bands of square roller-stamped decoration on the shoulders of these jars suggest a late 9th- to mid-10th-century date. Four sherds from two medium-sized jars and two jars or bowls are in Wheel-thrown Late Saxon Shell and Quartz-tempered fabrics. Two of the vessels appear to have been burnt and have evidence for salt-bleaching. Of the other two vessels, one has internal leaching while the internal and external surfaces of the jar have been leached. The type is of late 9th- to 10th-century date. A Wheel-thrown Late Saxon Greyware sherd in a light-firing reduced fabric is from a jar. The flat base suggests a late 9th- to mid-10th-century date. Two sherds in newly defined East Lindsey Late Saxon Greyware with Iron are from a single medium-sized jar with a thick everted lid-seated rim similar to that found on some Early Stamford ware vessels (Fig. 8.35.10). The vessels have cracked during firing or exposure to a high temperature and have a carbonised deposit externally under the rim. A wear mark around the inner rim edge of this late 9th- to 10th-century jar suggests that a lid may have been used at

some point. Five sherds from three medium-sized East Lindsey Late Saxon Oxidised ware jars are of late 9th- to 10th-century type. There are areas of reduction on two of the jars and one has white internal and external bleaching possibly related to saltmaking. One jar has cracked during firing or post-firing exposure to intense heat. This group most probably belongs to the period between the early/mid- and mid-10th century and seems to suggest association with a high-temperature activity, possibly saltmaking, although the salt-bleaching could also be explained by the heating of brine during a food-salting process.

Late Saxon

Gully 200204 produced four sherds of Late Saxon pottery from two vessels. Three sherds are from a single large shallow Wheel-thrown Late Saxon Coarse Shell-tempered in-turned-rim bowl (Fig. 8.35.12). This fabric has not been encountered previously but the rim type is typical of Lincoln shell-tempered bowls of early/mid- to late 10th-century date, although the shallow shape of the bowl is uncommon beyond the mid-10th century. The internal surface has been leached of fossil shell inclusions, presumably due to use. A small body sherd is from a Wheel-thrown Late Saxon Greyware jar of unspecific type. There is some attrition to the internal wall of the vessel, again suggestive a specific use for the jar. An early/mid- to mid-10th-century date for these vessels and a possible connection to the saltmaking industry on the site is likely.

A group of 28 sherds from four vessels of Late Saxon type and one of Saxo-Norman type were recovered from pit 200063. Sixteen sherds come from a single South Lincolnshire St Neots-type ware jar (Fig. 8.35.14) of potential 10th- to early 11th-century date. The thin rim favours a 10th-century date for the jar which has a thick external carbonised deposit below the rim and has been exposed to a temperature high enough to cause decomposition of the fossil shell inclusions (above 900 °C). Two sherds are from East Lindsey Wheel-thrown Late Saxon Fine Grey Sandy and Iron-tempered vessels of potential late 9th- to early/mid-11th-century date. One sherd is from a small jar while the other is from a jar or bowl with deposits of an uncertain nature over all surfaces. Seven sherds are from a large Wheel-thrown Late Saxon Shell and Quartz-tempered dish or shallow bowl (Fig. 8.35.13) with an internal carbonised deposit and external soot residues. The internal surface of the vessel has also been completely leached of the fossil shell inclusions. Three further sherds in this fabric are from a jar or bowl with evidence for salt-bleaching. This group is certainly of 10th-century date, with the presence of a shallow bowl or dish favouring a mid-10th- or earlier date.

Ailby Lane

One hundred and seventeen post-Roman sherds recovered from the Ailby Lane site are from 39 vessels of Anglo-Saxon to early modern type, of which 23 are handmade Anglo-Saxon vessels (Table 8.74). This includes 97 sherds from 22 vessels of previously unrecorded fabric type and visually not conforming to material to be expected in the local area.

Table 8.74 Post-Roman pottery from Ailby Lane by ceramic period summarised by ceramic codename with sherd count, vessel count, and weight in grams

Ceramic period	*Codename*	*Total sherds*	*Total vessels*	*Total weight*
ASAX	ASCALC	6	2	9
ASAX	ECHAF	2	1	14
ASAX	ERRA	8	5	77
ASAX	ESAXLOC	76	14	660
ASAX	ESGMI	7	1	33
MED	BEVO2	1	1	2
MED	MEDLOC	1	1	2
MED	TOY	11	10	148
LMED	TOYII	1	1	16
PMED	GRE	3	2	165
EMOD	BL	1	1	10
Total		117	39	1136

Two small basal sherds from a single handmade Anglo-Saxon Vegetal-tempered jar or bowl were recovered from boundary ditch 410000 (fill 400104 of ditch segment 400145). The type dates to between the 5th and 8th centuries in Lincolnshire but the sagging base suggests a possible 7th- or 8th-century date for the vessel.

Sunken-featured building

Two fills of sunken-featured building 411000 produced a total of 97 sherds from 22 vessels of handmade Anglo-Saxon type. No cross-deposit sherds were noted but the individual groups are likely to be contemporary. The vessels were divided into 12 site-based fabrics and further grouped into five major handmade Anglo-Saxon types (see above). The most common group is that of vessels tempered with quartz grains that would be expected to occur in local fabric of any ceramic period. The other vessels are in vegetal-tempered, calcareous-tempered, grog-tempered and erratic-tempered fabrics. The peculiarity of visual and fabric appearance of these vessels may be due to discrete local production(s) not previously encountered. No sherds are decorated and the few rims that are present in the group are of simple rounded or flat-topped type. Stylistically, the three narrow and neatly cut flat-topped rims are similar to those found on pre-mid-8th-century Northern Maxey ware jars and bowls in Fabric A. Thin-section analysis has shown each identically produced rim at Ailby Lane is in a different fabric (Wood 2025a). Potentially, Northern Maxey Fabric A may date to as early as the late 7th century, although no independently dated groups have yet been recovered. This ideally could suggest a neat transitional late 7th-century date for the Ailby Lane group from quartz-tempered to shell-tempered vessels. However, the returned radiocarbon dates (UBA-52881 and UBA-52883) for fill 400029 are too early to support this supposition and instead suggest a mid-5th to 6th-century date for the group. The only vessel forms to be determined are jars of medium and large size and two small bowls. The presence of soot residues suggests the use of some vessels for cooking, and the large jar has heavy internal attrition, as is often found on large Late Saxon Thetford-type storage jars, and is a possible indication of alcohol production (Perry 2011; 2014).

Cheals Close

This area produced 66 sherds of certain post-Roman type and one of uncertain Roman or Middle Saxon date from a total of 34 vessels, most of which date to the Middle Saxon period (Table 8.75). The pottery was recovered from 17 deposits across the area with only one deposit (180038 – a fill of ditch 180619) producing more than three vessels. With the exception of six medieval vessels the pottery is of Middle Saxon or handmade Anglo-Saxon type.

Forty-two of these sherds from 21 vessels are in a newly defined Maxey-type ware (MAXEL). The fabrics of this East Lindsey Maxey-type suggest that it may have been produced in the Horncastle area. Finds in Horncastle itself suggest local production of a Late Saxon Greyware Thetford-type and shell-tempered Late Saxon Lincoln types. Dating

Table 8.75 Post-Roman pottery from Cheals Close by ceramic period summarised by ceramic codename with sherd count, vessel count, and weight in grams

Ceramic period	*Codename*	*Total sherds*	*Total vessels*	*Total weight*
UNCERTAIN	RMSAX	1	1	12
ASAX	ESAXLOC	3	1	21
	ESGS	3	1	8
MSAX	IPS	1	1	14
	IPST	4	1	4
	MAX	5	1	62
	MAXEL	42	21	324
	MSAXLOC	1	1	1
MED	ELMFQFE	1	1	18
	TOY	6	5	34
Totals		67	34	498

in this report assumes that the type roughly follows the chronological progressions of Northern Maxey-type ware and that the recovered vessels are most likely to be confined to the 8th century (Vince and Young 2009).The lack of large or well-stratified groups precludes closely dating individual groups; however, the presence of a vessel stylistically of late 7th- to early/mid-8th-century type and two vessels of post-mid-8th-century Ipswich type suggest more than a single short phase of Middle Saxon activity.

Gully 180617 produced 13 Middle Saxon sherds from two Maxey-type vessels found in segments 180303 and 180530. The five sherds recovered from segment 180303 are from a single large cylindrical jar or bowl (Fig. 8.34.1) in Northern Maxey-type ware Fabric A. Fabric A occurs early in the sequence at Flixborough (Vince and Young 2009), potentially dating to between the late 7th and early/mid-8th centuries, although at present there is little direct dating evidence for a late 7th-century date. This highly fired vessel is typically thin-walled and competently manufactured, with the coils being carefully smoothed on the exterior surface and having traces of the diagnostic vertical finger impressions on the inside wall. A delicate rim is neatly cut flat with a tool or knife, leaving a characteristic inner and outer lip. The other eight sherds (section slot 180130) come from a curved bowl in East Lindsey Maxey-type ware Fabric 2 (Fig. 8.34.5). The neatly cut flat-topped rim potentially also suggests an early date for the vessel, possibly between the early and mid-8th century.

The six sherds recovered from two slots across ditch 180625 are from two East Lindsey Maxey-type ware vessels. Five sherds found in segment 180572 are from a single large jar or bowl in Fabric 2. The vessel has partial internal soot residues and is most likely to be of 8th-century date. The other sherd recovered from this ditch (segment 180592) is in Fabric 3. It is too small to identify vessel form and is covered in concretions that include the broken edges. External soot residues suggest that it may have been used over an open flame.

Other Anglo-Saxon features

Gully 180624 produced four sherds from a single Ipswich-type (IPST) jar or bowl with a simple rounded rim. Finds of Ipswich ware in the county are thought to date to no earlier than the mid-8th century and the type to extend into the mid-9th century. If this is a local (or regional) copy then a similar date range can be assumed.

A single sherd from a small East Lindsey Maxey-type ware jar or bowl in Fabric 1 was recovered from ditch 180141. The vessel is curve-sided and the external surface has been heat-affected.

Two sections across ditch 180615 produced a total of seven East Lindsey Maxey-type ware sherds from five vessels. Five sherds found in slot 180013 come from two large lugged vessels with flat-topped rims, of which one is identifiable as a jar (Fig. 8.34.4) and one a medium-sized jar or bowl with a probable triangular-shaped lug. The other small sherd from this deposit is from a jar or bowl. Two sherds found in section slot 180346 are too small to determine vessel type.

Three sections dug across ditch 180619 produced a total of 26 sherds from 16 vessels. The 12 sherds found in section slot 180037 are from eight East Lindsey Maxey-type ware vessels, one large Ipswich ware jar or pitcher and a sherd from a small quartz-tempered jar of uncertain Roman or Middle Saxon date (RMSAX). The eight East Lindsey Maxey-type ware vessels are all in Fabric 1 and include a range of large and medium-sized jars or bowls of which one is lugged. One of the large jars or bowls has external burnishing and the two smallest vessels are curve-sided. The Ipswich ware vessel suggests a mid-8th-century or later date for deposition. If this small group is contemporary it most probably belongs to between the mid- and late 8th century. Slot 180127 produced nine sherds from three East Lindsey Maxey-type ware jars or bowls in Fabrics 1 and 2. Seven of the sherds are from a single large vessel with a rolled rim (Fig. 8.34.3), while another large vessel in Fabric 2 has a neatly cut flat-topped rim and

is lugged (Fig. 8.34.6). The lug appears to be of triangular shape. At present it is only really possibly possible to suggest an 8th-century date for the vessels but the neatly cut rim possibly indicates a pre-mid-8th-century date for that vessel. The five sherds found in section slot 180485 come from three vessels of mixed type. Three tiny and very abraded sherds are from a vessel tempered with Greensand quartz grains (ESGS). This handmade type was in use in Lincolnshire between the 5th and 8th centuries. A tiny sherd from a local Middle Saxon shell-tempered vessel (MSAXLOC) can only be dated to within the Middle Saxon period. The other sherd found in this deposit is from the base of a jug of probable late 13th- to 14th-century date in a fine quartz and iron-tempered fabric (ELMFQFE).

Post-Roman Pottery from elsewhere along the Interconnector

Post-Roman pottery sherds were recovered from four other principal sites, along with 22 secondary and minor sites, and 45 evaluation trenches, and are not discussed in detail in this report. The material encompasses 16 parishes with few interventions producing more than 10 sherds of pottery, most of which were recovered from topsoil and subsoil deposits. The largest group was recovered from trench 261 in the Huttoft parish (74 sherds from 50 vessels of mainly medieval date). These sites are tabulated by vessel count within each ceramic period (Table 8.76). More detailed information on the pottery by site sequence is available in the assessment reports (Young 2023a–c) and within the archive. Of note are the small Middle Saxon assemblages from North Ing, five Anglo-Saxon vessels from Pitchmoor, and the medieval pottery from trench 261.

Table 8.76 Post-Roman pottery from elsewhere along the Interconnector, by ceramic period with vessel count

Area	*UNCERTAIN*	*ASAX*	*MSAX*	*LSAX*	*SNORM*	*EMED*	*MED*	*LMED*	*PMED*	*EMOD*	*Totals*
White Crofts	-	-	-	-	-	-	3	3	1	1	8
Sutterby Field	-	-	-	-	-	-	-	-	-	1	1
Pitchmoor	-	5	-	-	-	-	-	-	-	-	5
Callow Carr	-	2	-	-	-	-	-	-	1	1	4
Partney Leys	4	-	-	-	-	-	1	-	1	-	6
Fourteen Acres	-	-	-	-	-	1	8	-	1	-	10
Area 19	-	-	-	-	-	-	2	-	1	-	3
Area 20	-	-	-	-	-	-	1	-	-	-	1
Raithby Lane	2	-	-	-	-	-	-	-	-	1	3
Raithby Crossroads	-	-	-	1	-	-	2	-	-	-	3
Area 11	-	-	-	-	-	-	-	-	1	-	1
Wood Hill	-	-	-	-	-	-	-	-	-	1	1
Area 25	-	-	-	-	-	-	1	-	-	-	1
Area 34	1	1	-	-	-	-	12	1	1	1	17
Area 28	-	-	-	-	-	1	27	3	5	-	36
Area 29	-	-	-	-	-	-	23	2	3	-	28
Magers Lane	1	-	-	-	-	-	6	1	1	1	10
Back Lane	-	4	-	-	-	-	-	-	-	1	5
Area 31	2	-	-	-	-	-	-	-	-	-	2
Area 50	-	-	-	-	-	-	-	-	4	15	19
Area 51	-	-	-	-	-	-	-	-	5	17	22
Mown Rakes	-	-	-	-	-	-	-	1	1	3	5
Six Hundreds Drove	-	-	-	-	-	-	-	1	3	-	4
Area 57	-	-	-	-	-	-	-	-	2	2	4
North Ing	-	-	6	-	-	-	-	-	2	3	11
Zone 1 trenches (n = 8/100)	-	-	-	7	3	7	42	4	2	2	67
Zone 2 trenches (n = 37/239)	-	-	-	-	-	1	91	35	16	7	150
Totals	10	12	6	8	3	10	219	51	51	57	427

Fired Clay

Amy Thorp

Introduction

The assemblage (6765 pieces, 76.78 kg) was found widely distributed over the scheme (Table 8.77). By far the largest concentration (79% of the total by weight), however, was at Mown Rakes. Substantial quantities (more than 3 kg) were also found at Sea Bank Farm and Six Hundreds Drove.

The fabrics are mostly sandy (ranging from fine to coarse) with ferruginous pellets, occasional flint, and variable levels of organic matter in a micaceous clay matrix. Many fragments are extremely friable because of the large quantities of organic matter and poor wedging of the fabric. Variable firing is evident, with orange/red and buff/brown the most common colours; a few pieces have an unoxidised (dark grey) core. A small proportion (58 pieces/604 g) are in a comparable fabric with additional chalk inclusions. A more distinct subset of sand and shell-tempered fabrics (503 pieces/2383 g) are apparent, many of which are in very poor condition, with the shell partially or completely leached. These shelly fabrics are generally fired to a buff/brown colour.

Around three-quarters of the assemblage by count (just under half by weight) consists of abraded, featureless fragments. Some pieces have flattish surfaces and are probably derived from the linings of ovens or hearths. This includes some fragments with withy impressions, indicating the use of light, wooden frameworks to support the structure(s) during construction and initial drying/firing. The material from Sutterby Field, Walk Hill, Magers Lane, Back Lane and Staunch Farm (as well as Areas 11, 25 and 34) consists entirely of featureless fragments, with nothing diagnostic recovered.

Table 8.77 Quantification of fired clay by site

Site	*No.*	*Wt (g)*
Sea Bank Farm	395	5417
White Crofts	171	2028
Ailby Lane	35	295
Zone 1 misc.	31	1215
Sutterby Field	12	49
Walk Hill	40	1759
Cheals Close	18	620
Raithby Crossroads	14	249
Area 11	2	19
Area 25	1	20
Area 28	5	22
Area 34	41	197
Hagnaby Grange	87	1272
Magers Lane	3	14
Back Lane	1	9
Staunch Farm	4	42
Mown Rakes	5725	60456
Six Hundreds Drove	163	3080
Bottom Close	3	5
North Ing	2	2
Unstratified	12	11
Total	6765	76781

Illustrations of selected pieces of briquetage and other fired clay items are presented in Appendix E.

Briquetage

The more diagnostic elements of the assemblage provide consistent evidence for salt production. A few briquetage objects were found at the northern extremity of the scheme (Sea Bank Farm), but the majority were recovered from the southern end (Mown Rakes, Six Hundreds Drove and Bottom Close). The activity at Mown Rakes was focused on six features: ditch 530296 and five nearby pits (530209, 530212, 530234, 530238 and 530257). A total of 5310 fragments (54.9 kg) were retrieved from these six features, accounting for 91% (by weight) of the fired clay from Mown Rakes. Patches of salt colours (mostly pink/lilac but sometimes deep purple and grey) and a white coating are common on pieces throughout these groups. The white coating or 'skin' is often seen on salt vessels, resulting from soluble salts being drawn to the surface during the drying process (Lane and Morris 2001, 41). The presence of these salt deposits is an indication of briquetage re-use and the intensity of saltmaking activity (*ibid*., 112).

Salt production in the Fens has been recognised at a wide range of sites. An extensive catalogue of this material has been produced (Lane and Morris 2001) and, where

possible, parallels to this type series are highlighted. Briquetage form types were split into three classes in the Fenland survey: supports, containers and structural material. All these classes are apparent in this assemblage, but the supports are by far the most numerous and well preserved.

Fragments of hand-squeezed briquetage supports were found in all four areas (Sea Bank Farm, Mown Rakes, Six Hundreds Drove and Bottom Close). These objects, though irregular/roughly formed, fall into distinct groups/subdivisions. Roughly cylindrical objects with round/oval ends are the most numerous category at these sites. Measurement of complete examples indicates that they cover a wide range (length 35–80 mm; diameter 20–50 mm), but clusters are evident at either end of this range. Strong parallels are apparent with the early Romano-British clip/spacer and pedestal types in the Morton Fen Saltern assemblage (ibid., 114–15).

These cylindrical objects have been subdivided based on key features. Those with a lipped end (Fig. E.1.1–10) are the most ambiguous in function, the lip having formed either from being 'clipped' onto the rim of a container or pressed against the base of a container. Differentiating between such clip/spacers or pedestals is not clear cut, particularly when more or less identical in form and size (Lane and Morris 2001, 114–15, types CL1 and PD2). Those with two lipped ends (Fig. E.2.11–15), however, are more likely to have been used to clip or brace between the rims of two vessels (*ibid*., 114, type CL2).

The remaining sub-classes of cylindrical objects are probably pedestals. Flat-topped (Fig. E.3.16–20) and angled-top (Fig. E.4.21–28) types were probably utilised to support the bases of troughs/pans (similar to Lane and Morris 2001, 115, types PD2 and PD3). A more irregular form with a slightly angled top (pit 530238; Fig. E.5.29) may have had a comparable function but this is the only example. Types with a channel end (Fig. E.6.30–47), and with both a channel end and a lipped end (Fig. E.7.48–63), resemble pedestals used to separate two tiers of vessels (Lane and Morris 2001, 43, type PD10). The lips and 'channels' were formed by being pressed against the evaporation containers; the shape of the channels is especially variable, ranging from very shallow to slightly deeper concave depressions. Several small/disc-like cylindrical objects (Fig. E.8.64–68) were also recovered from gully 520138, pit 530209 and ditch 530296 (intervention 530286) at Mown Rakes, and ditch 550533 at Six Hundreds Drove. Most have lips or rectilinear impressions on the underside and are comparable to disc pedestals at Morton Fen (*ibid*., 115, PD12) used to support the bases of pans and/or pressed onto a brick support.

Half-cylindrical hand-squeezed objects, mostly with a flattened end (10–20 mm wide; Fig. E.9.69–Fig. E.11.96) but occasionally with a rounded end (Fig. E.11.97), are also present in large quantities. The best-preserved examples were concentrated in pits 530209, 530212 and 530234. A half-cylindrical example with a pinched 'ridge' (ON 530023; Fig. E.11.98) from pit 530238 might also be a related type. An exact parallel for these pieces has not been located, but a paddle-shaped support (*ibid*., 43, OB1) bears some resemblance. A use as a stabiliser or spacer would appear the most likely function; the flattened ends are, however, consistently thin and vulnerable to breakage so would have been unlikely to take much weight.

Further hand-squeezed clips/spacers are apparent but very variable in their form. One identifiable group, however, are probable 'bridging' types (Fig. E.12.99–Fig. E.13.108) used to brace or space between containers (*ibid*., 114–15, types CL3 and CL6). A second distinct group are small irregular-shaped lumps of clay (Fig. E.14.109–121), which may have been used to stabilise or as spacers between objects. There are several examples where two of the small lumps have been wedged together/fused. Three objects are the only examples of the third group: one with a 'pinched'/triangular sectioned end (pit 530238; Fig. E.15.122), one with a cylindrical base with squared-off interior (pit 530238; Fig. E.15.123), and one irregular-shaped example with multiple depressions (ditch 530296, intervention 530286; Fig. E.15.124). Orientation of these one-off objects is unclear, and they could have functioned equally as clips/spacers or pedestals.

Large/more substantial pedestals or supports are limited in number. This may be down to poor preservation but could also be partly chronological. Two semi-complete (one complete side survives in both cases) 'horned' pyramidal pedestals (pit 530257 and ditch 530296, intervention 530247; Fig. E.16.125–126) are comparable to those in the Middle/Late Iron Age assemblage from Market Deeping (*ibid*., 260, nos 12–16). Sizeable fragments (several bases and a near-complete side) from ditch 530296 are very likely to have originated from further pyramidal pedestals. Pieces of large, roughly cylindrical (diameter range 45–100 mm) pedestals (pit 530234 and ditch 530296) are also present. A square-based object (Fig. E.17.127), which tapers to a rectangular top creating a trapezoidal profile, is more likely to be a Roman tapering brick (*ibid*., 116, BK1) than a pedestal.

The remaining briquetage objects are more tentatively identified. Several pieces of perforated objects (ditch 530296, intervention 530286) could originate from rods (*ibid*., 198, fig. 67, no. 17) or perforated pyramidal pedestals (*ibid*., 260, fig. 90, no. 13). A series of corner fragments (pit 530234 and ditch 530296) are potentially from firebars/bricks but could also be the edges of further pedestals. Two triangular objects (pit 530238 and ditch 530296, intervention 530286; Fig. E.18.128–129) are reminiscent of spacers or wedges, but no exact parallels have been identified. Finally, a small fragment with a raised ridge (pit 530209; Fig. E.18.130) might be part of a brick clip (*ibid*., 115, CL7), where clay is squeezed between the base of a container and the top of a support.

Structural fragments, probably primarily pieces of hearth floor, were recovered from palaeochannel 200200 at Sea Bank Farm, ditch 530296 and pits 530209, 530234, 530238 and 530257 at Mown Rakes, as well as ditch 550538 and pond 550022 at Six Hundreds Drove. Most of these pieces have one or more flattish surfaces and are up to 85 mm thick. One piece (ditch 530296, intervention 530286) also has the scooped edge of a perforation. A few fragments have impressions on the underside, suggesting the use of a light wooden framework to support the structure. Patches of salt colours (pink/lilac) and white residue, mainly on the top surface, remain common. Some fragments may also derive from platforms or wall slabs (e.g., Lane and Morris 2001, 116–17).

Pieces of briquetage containers (543 sherds/2851 g) were retrieved from 11 features, primarily located at Mown Rakes (pits 520020, 520027, 530202, 530209, 530212, 530234, 530238 and 530257, as well as ditch 530296) with a few fragments from pond 550022 and ditch 550537 at Six Hundreds Drove. Unlike the briquetage objects, which occur solely in the organic tempered fabric, a range of sand- and shell-tempered fabrics are also present. Organic fabrics have occasionally been 'layered' over the edge of sand/shell fabrics (e.g., Fig. E.19.131), possibly as a form of luting. The overall range of fabrics is typical of that previously observed on Fenland sites (Williams 2001, 472). The use of calcareous-gritted or shelly limestone fabrics is particularly long-lived, dating back to the Bronze Age (Lane and Morris 2001, 269). The preservation of these briquetage container and/or trough fragments is extremely poor, but a few 'cut' rims and parts of two bases survive (Fig. E.19.131–139). Wall thickness of the container/trough fragments is highly variable, ranging between 5 and 20 mm. The base/lower body of one vessel (Fig. E.19.132) is the only example which probably represents the re-use of a pottery vessel for the purpose of saltmaking.

For a few objects, the link with saltmaking activity is slightly more conjectural. Three unusual ellipsoid clay 'pebbles' (Fig. E.20.140–142) of unknown purpose were recovered from tree-throw hole 530104, pond 530220 and ditch 530301 (intervention 530129) at Mown Rakes. Briquetage at Morton Fen includes fragments of what appear to be fired clay spheres (Lane and Morris 2001, 117, type P/S), possibly used as weights or sinkers for determining the depth of brine in tanks. These examples, however, are perforated for suspension and it is difficult to envisage a solid object, even with a string wrapped around it, working in the same manner. However, another solid fired clay ellipsoid of comparable size was recently recovered alongside briquetage objects at Heckington Fen (Wessex Archaeology 2023c).

A small, pinched, slightly tapered rod (Fig. E.21.143), reminiscent of a 'pin', was recovered from alluvial deposit 200203 at Sea Bank Farm; this same deposit also contained the cylindrical hand-squeezed briquetage clips/spacers or pedestals. Comparable objects were found among briquetage at Morton Fen and interpreted as extremely small clips (Lane and Morris 2001, 117, type PIN). Finally, pieces of probable plates/discs were identified in the topsoil and alluvial deposit 200203 at Sea Bank Farm, sunken-featured building 411000 at Ailby Lane, ditch 530296 and pits 520020, 520027, 530202 and 530238 at Mown Rakes, as well as ditch 550538 at Six Hundreds Drove. These fragments, with two parallel surfaces, are mostly relatively thin (15–20 mm) and there is one thicker example (30 mm). Two examples also have concave edges creating a 'pulley' appearance (ditch 530296, intervention 530286; Fig. E.22.144–145).

The range of briquetage types known from the region begins to diversify considerably in the period prior to the Roman conquest (Lane and Morris 2001, 396–397), probably resulting from salt production being raised to the level of individual workshops from that of a household industry. The narrowness of the Interconnector's stripped corridor makes it difficult to gauge the overall organisation of the industry here, but the multiplicity of briquetage types is certainly apparent. The earlier forms are more akin to Late Iron Age traditions, as observed for example at Cowbit and Market Deeping (*ibid*., 13–63 and 262–78). However, strong parallels are also present throughout the briquetage assemblage with the early Romano-British material from Morton Fen (*ibid*., 99–133). A similar balance of material is also apparent from the assemblage at Ingoldmells (*ibid*., 410–424). A series of radiocarbon dates were also obtained from the briquetage-rich deposit in ditch 530296, confirming a Late Iron Age date for the beginning of salt production (see López-Dóriga above).

Other Objects

Further portable objects are very limited and primarily of Iron Age or Romano-British date. Pieces of a clay mould (pit 400117) and crucible (pit 400115; Fig. E.23.146) were recovered from a group of 15 associated pits (collectively 413000) at Ailby Lane. The crucible is of a triangular form, of probable Iron Age date, comparable to examples found at Old Sleaford (Robbins and Bayley 1996, 3–5). Part (five fragments, three conjoining) of a probable oval slingshot was also retrieved from a furrow at Area 28. Slingshots like this were potentially used for hunting small game, such as birds (Poole 1984, 398).

Fragments of three reliably identified, and five more tentative, perforated triangular objects were recovered from pit 200041 at Sea Bank Farm, ditch 301400 at White Crofts, layer 400405, ditch 400545 and gully 400554 at Hagnaby Grange, ditch 530270 at Mown Rakes, and ditches 550520 and 550527 at Six Hundreds Drove. Perforated triangular objects are a well-known form, common in Late Iron Age contexts and remaining current well into the 2nd century AD (Wild 2002, 10). Traditionally, they have been interpreted as loomweights used in textile weaving but it is now considered more likely they were bricks associated with ovens, hearths and/or kilns, perhaps used as linings or pedestals (Lowther 1935; Poole 1995; 2015). A kiln at Newton on Trent had several fragments of such triangular loomweights used as kiln furniture (Field and Palmer-Brown 1991, 49). In the case of the fragment from Mown Rakes, prominent patches of salt colours and white residue on the surface suggest it was used in the saltmaking process.

Later objects are limited to fragments from two loomweights of probable Anglo-Saxon date recovered from ditches 180141 and 180619 at Cheals Close. Three key types of circular clay loomweights (annular, bun-shaped, and intermediate between the two) have been recovered in large numbers from Early, Middle and Late Anglo-Saxon settlements such as Flixborough (Loveluck 1998, 156–57; Walton Rogers 1997, 1753). The examples here, however, are too poorly preserved to determine their overall shape and type.

The Animal Bone

L. Higbee

Introduction

A total of 15,517 fragments (154,079 kg) of animal bone were recovered from the Interconnector, the majority by hand and the remainder via sieving. Once refits and associated bone groups (hereafter ABGs) are accounted for this is reduced to 10,957 fragments. Most of the identified bones came from deposits of Romano-British date, with notable concentrations from Sea Bank Farm and White Crofts, both in the Lincolnshire Marsh (Zone 1), from Walk Hill in the Wolds (Zone 2), and from Six Hundreds Drove in the Fens of Zone 3 (Table 8.78). The site at Hagnaby Grange on the Fen-edge of Zone 2 is the only site with significant quantities of bone from both Iron Age and Romano-British contexts. Relatively large amounts of bone were also recovered from Anglo-Saxon and later features at Cheals Close, also in Zone 2. The other sites provided little in the way of identifiable animal bone.

Table 8.78 Summary of animal bone assemblage

Zone	*Landscape*	*Site*	*Total identified*	*Total unidentifiable*	*Overall total*	*Comments*
Zone 1	Lincolnshire Marsh	Sea Bank Farm	163	238	401	mostly middle–late RB or from palaeochannels and alluvium
		White Crofts	714	1360	2074	mostly middle–late RB
	Wolds margin	Ailby Lane	23	10	33	mostly Late IA–early RB or early–middle RB
	N/A	Evaluation trenches	39	26	65	mostly Anglo-Saxon or medieval
Zone 2	Wolds	Ulceby Cross	2	9	11	all from RB trackside ditch
		Sutterby Field	47	69	116	mostly IA or Late IA–early RB
		Pitchmoor	9	34	43	mostly undated
		Walk Hill	172	533	705	mostly late RB
		Callow Carr	21	23	44	mostly from Anglo-Saxon graves, few from BA barrow
	Lymn Valley	Partney Leys	11	15	26	mostly medieval and RB
		Cheals Close	257	3677	3934	mostly Anglo-Saxon or later
		Raithby Lane	5	17	22	all RB
		Wood Hill	27	92	119	all IA or prehistoric
	Fen-edge	Hagnaby Grange	377	867	1244	mostly IA and RB
		Magers Lane	39	71	110	mostly RB
		Back Lane	1	3	4	BA or prehistoric
		Staunch Farm	57	161	218	mostly IA or prehistoric
	N/A	Minor sites	42	64	106	-
		Evaluation trenches	4	18	22	Late IA–early RB
Zone 3	Fens	Mown Rakes	77	172	249	mostly RB
		Six Hundreds Drove	348	887	1235	mostly RB
		Gibbet Hill	2	2	4	includes med/post-med animal burial
		Bottom Close	2	0	2	undated
		Minor sites and eval. trenches	67	103	170	mostly post-medieval–modern
Totals			2506	8451	10957	

Methods

The assemblage was analysed following current guidelines (Baker and Worley 2019) and the following information recorded where applicable: species, element, anatomical zone (after Cohen and Serjeantson 1996, 110–12; Serjeantson 1996, 195–200), anatomical position, fusion state (after O'Connor 1989; Silver 1969), tooth eruption/wear (after Grant 1982; Halstead 1985; Hambleton 1999; Payne 1973), butchery marks (after Lauwerier 1988; Sykes 2007), metrical data (after Payne and Bull 1988; von den Driesch 1976), gnawing, burning, surface condition, pathology (after Vann and Thomas 2006) and non-metric traits. This information was directly recorded into a relational database and cross-referenced with relevant contextual information.

The entire assemblage has been quantified in terms of the number of identified specimens present (or NISP). The minimum number of individuals (or MNI), minimum number of elements (or MNE) and meat weight estimates (or MWE: following Boessneck *et al.* 1971; Bourdillon and Coy 1980; Dobney *et al.* 2007; O'Connor 1991) are presented for key periods. The live weights used to estimate MNE are 275 kg for cattle, 37.5 kg for sheep and 85 kg for pig.

Caprines (sheep and goat) were differentiated based on the morphological criteria of Boessneck (1969), Halstead *et al.* (2002) and Payne (1985). The majority of the positively differentiated caprine bones belong to sheep and this term will therefore be used throughout the report to refer to all undifferentiated caprine bones.

Results

Preservation, fragmentation and gnawing

The bones from each context were graded on a scale of 1–4, where 1 is good preservation and 4 very poor. In instances where preservation varied within a single context more than one grade was assigned. This broad comparison indicates that most ditches contained residual fragments that are more weathered than others from the same context, while the preservation condition of bones from pits was generally more consistent within each deposit. This basic pattern is common and perhaps unsurprising given the functional difference between these main feature types, with ditches dug and often maintained as open features for long periods, slowly accumulating surface detritus or reworked/redeposited material, whereas pits are more frequently dug or re-used specifically for waste disposal.

Each identified bone was also graded. The poor burial environment (e.g., soil pH and hydrology) has significantly affected the assemblage; indeed, almost 60% of identified bones show some degree of damage (Table 8.79). In most instances this has resulted in a brittle texture to the bones, usually associated with a degree of flaking to the cortical (outer) surface. In the most severe cases, the underlying structure is also affected, and fragmentation rates are high as a result. The latter is generally compounded by significant edge abrasion, making the reconstruction of individual elements difficult. Only 41% of identified bones were classified as in good condition, meaning little or no sign of weathering was detected.

Local variations in bone preservation were noted across the scheme due largely to differences in geology, with the best-preserved bones recovered from sites in the Lincolnshire Marsh and Fens than elsewhere, while sites with poor preservation were recorded on the margins of the Wolds at Ailby Lane and Cheals Close.

As indicated above, a high rate of fragmentation was recorded due to poor preservation. On a basic level this is demonstrated by the difference between the total count and NISP, which indicates that only 23% of the total number of fragments recovered are identifiable to species (Table 8.79). The percentage varies significantly from one site to another, with lower rates recorded at several on the Wolds and in the Lymn

Table 8.79 Summary of animal bone preservation

Zone	Landscape	Site	% of total					
			Good	*Fair*	*Poor*	*V. poor*	*Gnawed*	*NISP*
Zone 1	Lincolnshire Marsh	Sea Bank Farm	33	66	1	-	2	41
		White Crofts	42	57	1		3	34
	Wolds margin	Ailby Lane	9	17	35	39	-	70
	N/A	Evaluation trenches	70	30	-	-	1.5	60
Zone 2	Wolds	Ulceby Cross	-	-	100	-	-	18
		Sutterby Field	59	37	4	-	0.8	40
		Pitchmoor	11	45	44.5	-	-	21
		Walk Hill	52	48	-	-	4	24
		Callow Carr	17	78	5	-	-	48
	Lymn Valley	Partney Leys	89	11	-	-	4	43
		Cheals Close	7	49	44	-	0.2	7
		Raithby Lane	-	-	-	100	-	23
		Wood Hill	56	44	-	-	0.8	23
	Fen-edge	Hagnaby Grange	29	52	15	4	1.3	30
		Magers Lane	22.5	78	-	-	-	35
		Back Lane	-	100	-	-	-	25
		Staunch Farm	11	64	20	5	0.9	26
	N/A	Minor sites	45	41	14	-	-	40
		Evaluation trenches	-	100	-	-	-	18
Zone 3	Fens	Mown Rakes	58	35	7	-	2	31
		Six Hundreds Drove	66	34	-	-	2	28
		Gibbet Hill	100	-	-	-	-	50
		Bottom Close	50	-	50	-	100	100
		Minor sites and eval. trenches	80	20	-	-	-	39
Total % overall			41	50	8.2	0.8	6.4	23

Table 8.80 Number of identified animal bones present (or NISP) by phase

Species	*Preh/BA*	*IA*	*LIA/ERB*	*RB*	*ERB*	*EMRB*	*MRB*	*MLRB*	*LRB*	*A-Sax*	*Med*	*PM/M*	*Undated*	*Total*
Cattle	33	72	51	259	26	29	32	12	325	60	89	51	84	1123
Sheep/goat	29	61	47	226	17	34	18	12	211	40	34	23	122	874
Pig	3	7	6	28	1	6	3	-	56	11	12	4	19	156
Horse	9	13	6	59	2	16	2	-	48	9	9	11	16	200
Dog	1	2	1	5	1	2	4	-	9	-	1	-	-	26
Fox	-	-	-	-	-	-	3	-	10	-	-	-	-	13
Cat	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Red deer	-	-	-	-	-	-	1	-	15	-	1	-	-	17
Roe deer	1	-	-	-	-	-	-	-	1	-	-	-	-	2
Deer	-	1	-	-	-	-	-	-	1	-	-	-	-	2
Rabbit	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Hare	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Mole	-	-	-	-	-	-	-	-	4	-	-	-	-	4
Field vole	-	1	1	3	-	-	-	-	3	1	-	-	-	9
Domestic fowl	-	-	-	1	-	-	-	-	5	-	-	2	-	8
Goose	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Duck	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Raven	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Crow/rook	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Passerine	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Scad	-	-	-	-	-	2	-	-	-	-	-	-	-	2
Eel	-	-	-	-	-	-	-	-	-	18	-	-	-	18
Gadid	-	-	-	-	-	-	-	-	-	-	-	-	4	4
Amphibian	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Total identified	76	157	112	583	47	89	64	24	693	139	149	91	246	2470
Total unidentifiable	197	424	162	1611	98	167	286	28	1439	210	3217	168	480	8487
Overall totals	273	581	274	2194	145	256	350	52	2132	349	3366	259	726	10957

Valley, including the large assemblage from Cheals Close, and higher rates elsewhere, particularly at Sea Bank Farm and White Crofts on the Lincolnshire Marsh, and Hagnaby Grange on the Fen-edge.

Canid gnaw marks were recorded on approximately 6% of identified bones (Table 8.79). The overall rate is low, but no doubt reflects the generally poor condition of the assemblage, notably the loss of cortical bone and edge abrasion that has effaced some of this evidence. The percentage of gnawed bones from each site is similarly low, at less than 1–4% of identified bones, with the highest rates recorded at Walk Hill and Partney Leys.

Zone 1

Lincolnshire Marsh
(Table 8.81)

Sea Bank Farm
Bone was recovered from several pits of middle/late Romano-British date. The few identified bones are all from cattle and sheep, with pathological changes noted on a cattle pelvis. An area of eburnation on the pubis part of the acetabulum (or joint surface) is typical of osteoarthritis, which is more common in older cattle, particularly those used for traction. Single sheep and pig bones came from two Anglo-Saxon features.

Most of the animal bones came from two palaeochannels and associated alluvial deposits of uncertain date but potentially post-Romano-British. Approximately 75% of the identified bones are from sheep; they include a wide range of elements, mostly from adult animals, but also several lambs, including neonates. The other identified bones are mostly from cattle; they include a neatly portioned scapula with filleting marks along the blade from alluvium 200203. In addition, a few pig and horse bones were also recovered, together with the ulna from a crow (or rook). Butchery marks, including fine knife cuts from skinning, were recorded on a horse metacarpal. This particular example is sawn through the distal shaft and represents the first stage in a reduction sequence to produce a cylinder of bone out of the shaft for use as raw material for bone-working.

White Crofts
The relatively large quantity of animal bones recovered from this area mostly derives from contexts of late Romano-British date. The small groups from other phases, including those of earlier Romano-British date, provide little insight into the livestock economy. The only points of interest are two dog ABGs from ditches of middle Romano-British date and a small number of eel vertebrae from Anglo-Saxon pit 3211, one of the few instances of fish remains from the whole assemblage (Table 8.80).

The large late Romano-British component largely derives from ditches, with notable concentrations from 300521, 301403 and 301416, along with spread 301426. Mixed deposits of bone waste were recorded from most features, although the two largest groups (ditch 301416 and spread 301426) included more elements from primary butchery (e.g., heads and feet) than later stages in the carcass reduction sequence (see O'Connor 1993).

Cattle bones dominate (51% NISP), the majority from subadult and adult animals (MWS E–I), although some juveniles and calves (MWS B–C) were also noted, suggesting perhaps a mixed husbandry strategy that included dairying but with most emphasis placed on beef from older animals and the necessity to maintain older animals for traction. The use of cattle for this purpose can result in pathological changes to some elements, typically the main weight-bearing bones. A notable example came from ditch 300521; this comprised the distal end of a metacarpal with asymmetric condyles (Fig. 8.38). The splayed ?medial condyle also shows severe signs of eburnation, which reflects bone-on-bone contact and is an indication of joint pathology, specifically osteoarthritis. There is also irregular new bone across the surface of the shaft above. Sheep were of secondary importance (at 38% NISP) and managed for wool, as suggested by the mortality profile, which shows a predominance of animals past the optimum age for meat production (MWS E–F), as well as an older cohort likely to have been used for breeding purposes (MWS G–H).



Figure 8.38 Romano-British cattle metacarpal from White Crofts with pathological changes

Both main livestock are represented by an array of elements indicating that whole carcasses were processed nearby. The distinct pattern of butchery marks recorded on several cattle scapulae indicates that shoulder joints were processed for longer-term storage (see Dobney 2001; Dobney *et al.* 1996). The evidence includes trimming around the glenoid cavity, trimming or removal of the spine, and filleting marks along the blade, either on the lateral or medial aspect.

Pig bones are a minor component of the assemblage, but there is enough evidence based on the range of elements to indicate that whole carcasses are represented. Most of the bones are from juvenile or subadult animals (MWS B–C, and E), but a few neonatal bones were also identified, providing some evidence for local rearing. Horse bones are another minor but significant component of the assemblage and although disarticulated, several small groups of associated bones were noted, including a right forequarter from ditch 300521. Two sawn pieces of horse long bone shaft were also recorded, the distal end of a femur from the same ditch as the articulating bones, and a metapodial from ditch 300522. These represent off-cuts from bone-working. There is limited evidence for local horse breeding, as suggested by the presence of at least one bone from a juvenile animal.

Red deer antler was recovered from three ditches; two are small pieces and the third a large cache from ditch 300521, comprising several complete tines from multiple sets of antlers, as well as a beam and crown. The latter came from a single ditch slot but an additional piece of shed antler beam with brow tine was recovered from an adjacent slot. The cache undoubtedly represents raw material intended for further working but only one piece shows signs of slight modification. A roe deer pelvis was also recorded.

The partial skeleton of a dog was found in ditch 301403. The bones are highly fragmented and the ditch heavily truncated, which has removed whole areas of the skeleton, notably the skull. However, it is possible to determine that the remains are from a small to medium-sized adult animal. In addition, a few disarticulated dog and fox bones were recovered from a handful of other features. Rarer components include a few bird bones, mostly domestic fowl but also duck and one bone from a raven, along with small mammals and amphibians.

Ailby Lane

Several fragments of mandible from both cattle and sheep, plus a radius from the latter, came from Late Iron Age–early Romano-British ditch 409000. A few bones were also recovered from Anglo-Saxon sunken-featured building 411000, but the majority came from features of early–middle Romano-British date. Most of the identified bones are from cattle; they include several loose teeth, a mandible, humerus and metacarpal, all in poor condition. Apart from a fragment of sheep radius, the other elements are all teeth, and include examples from sheep, pig and horse.

Table 8.81 Summary of animal bones (by NISP) from the Lincolnshire Marsh

Species	*Preh*	*LIA/ERB*	*RB*	*ERB*	*EMRB*	*MRB*	*MLRB*	*LRB*	*Sax*	*Med*	*PM*	*Undated*	*Total*
Cattle	7	4	2	18	5	32	12	245	18	2	5	27	377
Sheep/goat	2	3	1	9	5	18	12	180	10	5	2	88	335
Pig	1	-	1	1	-	3	-	52	6	-	-	12	76
Horse	-	1	-	-	4	2	-	41	2	2	-	5	57
Dog	-	-	-	-	-	7	-	8	-	-	-	-	15
Fox	-	-	-	-	-	3	-	9	-	-	-	-	12
Cat	-	-	-	-	-	1	-	-	-	-	-	-	1
Red deer	-	-	-	-	-	1	-	14	-	1	-	-	16
Roe deer	-	-	-	-	-	-	-	1	-	-	-	-	1
Deer	-	-	-	-	-	-	-	1	-	-	-	-	1
Mole	-	-	-	-	-	-	-	1	-	-	-	-	1
Field vole	-	-	-	-	-	-	-	3	-	-	-	-	3
Domestic fowl	-	-	-	-	-	-	-	5	-	-	-	-	5
Goose	-	-	-	-	-	-	-	-	-	1	-	-	1
Duck	-	-	-	-	-	-	-	2	-	-	-	-	2
Raven	-	-	-	-	-	-	-	1	-	-	-	-	1
Crow/rook	-	-	-	-	-	-	-	-	-	-	-	1	1
Eel	-	-	-	-	-	-	-	-	18	-	-	-	18
Amphibian	-	-	-	-	-	-	-	1	-	-	-	-	1
Total identified	10	8	4	28	14	67	24	564	54	11	7	133	924
Total unidentifiable	7	4	16	35	4	286	28	987	52	5	8	202	1634
Overall totals	17	12	20	63	18	353	52	1551	106	16	15	335	2558

Zone 2

The Wolds
(Table 8.82)

Ulceby Cross
Two fragments of cattle bone came from trackway 500061. The bones, a shaft fragment from a tibia and part of a metatarsal, are in poor condition; however, the metatarsal shows signs of having been processed for marrow (i.e., split lengthways).

Sutterby Field
Most of the animal bones came from ditches and pits attributed an Iron Age (700300 and 700302) or broadly prehistoric (700171/700197 and 700297) date. The identified bones largely comprise elements from cattle and sheep, which are present in similar amounts. The restricted range of sheep elements, mostly loose teeth and fragments of tibia shaft, suggests a degree of sample bias caused by poor preservation. However, similar bias is not apparent for cattle, which are represented by a wider range of elements, including some less robust parts that do not generally survive in poor conditions. Two largely complete horn cores were found, together with several mandibles retaining teeth, and elements from both the axial and appendicular skeleton, including two that show signs of butchery. According to the limited fusion and tooth wear data, both juvenile and adult cattle are represented. Iron Age posthole 700281 also contained several sheep bones, including a pair of humeri and associated right ulna, and the femur from a perinatal lamb. Single elements from a pig, horse and dog were also identified. A few additional cattle and sheep bones came from Late Iron Age–early Romano-British roundhouse gully 700299 and two features of uncertain date.

Pitchmoor
Fragments of animal bones were recovered from a handful of features, and apart from three sheep elements (foot bones and a loose tooth) from Anglo-Saxon pit 350119, the majority are

from discrete features of uncertain date. All the identified bones are from cattle and sheep; they include several loose teeth, part of a cattle mandible and a humerus.

Walk Hill

Little can be gleaned from the small collection of identified bones, most of which are from the two main livestock, and of Iron Age and early Romano-British date. Several show evidence of canid gnawing and/or butchery. Three sheep mandibles, all from adults aged 3–4 years, were recorded. The most interesting aspect of this material is the butchery evidence noted on a dog ulna from early Romano-British ditch 800488. Several fine knife cuts on the lateral side of the proximal end provide evidence that dog carcasses were utilised, with these marks caused during dismemberment of the forelimb. Whether this was undertaken to provide meat during a particularly lean period, or to provide other commodities (e.g., fat, sinew) is open to speculation. Skinning marks were also recorded on a horse bone recovered from another context.

Most of the animal bones came from features of late Romano-British date, primarily ditches but also a few pits. Cattle bones dominate and all parts of the beef carcass are present. A large group of disarticulated cattle bones, including several scapulae derived from at least four animals, were recovered from pit 800314, part of group 800498. Most of the cattle bones are from subadult and young adult cattle, plus a few from young calves (MWS B, D–E and G). Butchery marks were recorded on two of the cattle bones, and pathological changes generally associated with traction animals were also noted on a first phalanx from this feature.

The other identified bones are mostly from sheep, which are represented by loose teeth and a small range of post-cranial elements, in particular humeri, radii and tibiae. These are mostly from juvenile and subadult animals. The late Romano-British assemblage also includes a few bones from pig and horse, with single elements from dog, fox and red deer. The latter is represented by the proximal end of a metatarsal from pit 800314 and provides limited evidence for the hunting of wild game. A few small mammal and fish bones were also recovered.

Callow Carr

Two cattle bones – a tibia and metatarsal – and a pig tooth were recovered from Bronze Age ring ditch 900066, together with several small unidentifiable fragments. Most of the animal bones came from inhumation graves of Anglo-Saxon date; some are incidental inclusions in the backfill (e.g., graves 900060, 900067, 900070, 900114, 900140 and 900205), but others represent grave goods in the form of food offerings. These associated animal bone groups (or ABGs) were found in five (23%) of the 22 graves uncovered, all but one associated with the remains of females. All apart from one are joints from juvenile sheep (graves 900137, 900161, 900175, 900193 and 900196); the other example is a pork joint (grave 900193). These were placed around the grave, often overlying or adjacent to the skeleton. Joints from the forequarters appear to have been preferentially selected; details are provided in the grave catalogue and plans.

Table 8.82 Summary of animal bones (by NISP) from the Wolds

Species	*Preh/ BA*	*IA*	*LIA/ERB*	*RB*	*ERB*	*LRB*	*A-Sax*	*Undated*	*Total*
Cattle	5	13	2	7	8	80	4	6	125
Sheep/goat	4	17	3	4	8	31	14	4	85
Pig	1	1	-		-	4	2	3	11
Horse	1	-	-	2	2	7	-	-	12
Dog	-	1		-	1	1	-	-	3
Fox	-	-		-	-	2	-	-	2
Red deer	-	-		-	-	1	-	-	1
Mole	-	-		-	-	3	-	-	3
Field vole	-	-		-	-	2	-	-	2
Total identified	11	32	5	13	19	131	20	13	244
Total unidentifiable	12	52	22	25	63	449	19	34	676
Overall totals	23	84	27	38	82	580	39	47	920

The Lymn Valley
(Table 8.83)

Partney Leys
The largely complete skeleton of an immature dog aged 5–8 months was recovered from ditch 170152. A radiocarbon date obtained on a sample of vertebra provided a Late Iron Age–early Romano-British date (Table 8.83). Although not fully grown, it is clear from the size of the bones that these are the remains of a very gracile animal of diminutive stature. The skull is fragmented and incomplete, but the basic morphology is paedomorphic (i.e., relatively short and broad, with a rounded cranium and no sagittal crest). The long bones, which are straight and thin-walled, with low mid-shaft diameter indices, further indicate that this was a lap dog rather than the brachymel, or 'dwarf hound' types (see Teichert 1987) more commonly found on Late Iron Age and Roman sites in Britain. The latter were used for hunting (see for example, Baxter 2006; Cram 2000; Harcourt 1974), while lap dogs are generally considered to have been companion animals often kept by the elite. A few cattle and horse bones were also recovered from a medieval ditch.

Cheals Close
Several bones were recovered from prehistoric pit 180034; these include fragments of cattle maxilla and mandible, a sheep metacarpal, a dog humerus, two horse bones and a couple of loose teeth. Pathological changes resulting from soft tissue damage were noted around the proximal articular surface of one of these elements, a first phalanx.

Most of the Romano-British animal bones came from ditch 180069, which contained mixed waste from different stages in the carcass reduction sequence (O'Connor 1993, 56, table 1). Most of the identified bones are from cattle; they include fragments of skull with the horn cores attached, several semi-complete mandibles and a range of post-cranial elements, some of which show signs of butchery. A few sheep bones, and single elements from pig and horse, were also recorded. Filleting marks were noted on a horse scapula from ditch 180069.

The animal bones recovered from Anglo-Saxon features are mostly from cattle, with some sheep, and a few bones from pig and horse. Cattle are represented by an array of mostly post-cranial bones from adult animals, although a few mandibles and loose teeth were also found. Tooth wear indicates a range of ages from juvenile to old adult, which suggests a mixed husbandry strategy. Sheep are represented by an overabundance of loose teeth relative to post-cranial bones, which gives a slightly false impression of their relative overall importance to the livestock economy. The limited age information suggests these were mostly young adults, aged around 3–4 years, that were potentially maintained for a range of commodities including wool. The presence of a complete sheep horn core from ditch 180141 indicates that these were a horned breed. Little can be gleaned from the small number of pig and horse elements found, most of which are cranial fragments including several loose teeth. In addition to the above, a couple of eel vertebrae were retrieved from sample residues.

Large amounts of bone came from ditch 180619, which held a mixed finds assemblage that included medieval material. Again, cattle bones dominate, followed by sheep and then pig. Both cattle and sheep are represented by a range of elements; however, cranial and foot bones are more numerous than other elements. This suggests that while the ditch deposits contained waste of mixed origin, the majority derived from primary butchery. Most of the bones from the two main livestock are from adults, but a few calf bones were also noted. Single bones from a horse, hare and goose were also identified.

The animal bones from post-medieval/modern ditches are all from livestock, particularly cattle. The range of elements indicates a similar pattern of deposition to the previous phase. A few bones were also recovered from features of uncertain date. The basic composition of this material is similar to that from the main phases.

Raithby Lane
A sheep ankle bone and several loose teeth from sheep, as well as cattle, were recovered from three Romano-British ditches.

Wood Hill
A small number of bones were recovered from Iron Age ditch 120088 and several broadly dated prehistoric linear features. With the exception of three horse bones, all are from livestock. Little further information can be gleaned from these scant remains.

Minor sites (Areas 19, 28–9 and 33–4)
Of the relatively minor sites investigated, Area 28/34 produced the most animal bones, most of which came from medieval ditches. Cattle bones dominate and the range of elements indicates that the bones largely derive from meat consumption. A few sheep and horse bones were also found; the latter includes a small group of articulating limb elements from a ditch at Area 28. A single dog canine was also recorded.

Little additional material was recovered from these other areas, although the remains of a juvenile sheep from a pit at Area 19 are of note. The burial is largely complete with the exception of the skull and mandibles, which have been removed by later activity. The condition of the bones and their relatively large size indicates that the remains are those of an improved breed and therefore of post-medieval or later date.

Table 8.83 Summary of animal bones (by NISP) from the Lymn Valley

Species	*Preh*	*IA*	*LIA/ERB*	*RB*	*A-Sax*	*Med*	*PM/M*	*Undated*	*Total*
Cattle	6	8	1	20	35	87	29	19	205
Sheep/goat	5	9	3	6	14	29	7	10	83
Pig	1	1	-	1	3	12	3	-	21
Horse	7	-	-	3	5	7	-	2	24
Dog	1	-	1	-	-	1	-	-	3
Hare	-	-	-	-	-	1	-	-	1
Goose	-	-	-	-	-	1	-	-	1
Total identified	20	18	5	30	57	138	39	31	338
Total unidentifiable	87	66	14	107	139	3212	122	121	3868
Overall totals	107	84	19	137	196	3350	161	152	4206

The Fen-edge
(Table 8.84)

Hagnaby Grange
Relatively large amounts of animal bone were recovered from this area. A small number came from features of prehistoric and Late Iron Age to early Romano-British date, mostly ditches but also two roundhouse structures and several pits. The identified bones are mostly from adult cattle and sheep. The broad range of elements is consistent with deposits of mixed waste, perhaps with a slight bias towards bones derived from the initial stages of carcass processing (i.e., mostly cranial fragments and foot bones). Indeed, several bones show evidence of butchery relating to dismemberment. Several disarticulated horse bones came from ditches; all are from adult pony-sized animals. A few pig bones, two elements from a dog and a small piece of deer antler were also found.

Most of the animal bones came from ditches and gullies of Romano-British date, with the single largest concentration from ditch 400549. Sheep bones dominate, followed by cattle, then horse and pig. Several complete cattle mandibles were recovered; these are from subadult to senile animals. The limited age information for sheep, much of which relates to the less accurate method of epiphyseal fusion, indicates that most were maintained into adulthood. The broad range of sheep and cattle bones is consistent with local processing of carcasses and their consumption. By way of contrast, the rather limited range of horse bones indicates that these primarily derive from the initial stages of butchery, principally skinning, with cut marks recorded on a metatarsal. A few dog bones were also found. An additional small number of bones came from a post-medieval gully and several undated features.

Magers Lane
A few cattle bones, and single elements from a pig and horse came from three features of Late Iron Age–early Romano-British date. The other bones came from Romano-British ditches, notably 300153; a few of these potentially dated to the later part of the period. Most of the small number of identified bones derive from sheep, including several long bones from a neonatal lamb. Cattle are largely represented by waste elements from primary butchery such as mandibles and foot bones, and horse by a few disarticulated post-cranial bones, several of which are largely complete. A single pig canine tooth, from a sow, was also found.

Back Lane
A horse tooth and a small, unidentifiable fragment came from prehistoric ditch 410127. In addition, two poorly preserved, unidentifiable fragments were recovered from Bronze Age ring ditch 410125.

Staunch Farm
A small amount of animal bone was recovered from features of broadly prehistoric date. Most of the identified elements are from sheep and cattle, with high numbers of loose teeth recorded. Several of the cattle bones show signs of butchery, and there is also indirect evidence for horn-working in the form of a sawn basal section of horn core still attached to a right frontal bone. A large piece of roe deer antler from a two-point crown was also found.

The single largest concentration of animal bones came from Iron Age ditch 310170. Equal numbers of cattle and sheep bones were recovered from this feature. The small number of loose teeth and post-cranial elements provide few additional details, although charring on the proximal end of a cattle scapula provides evidence that some meat joints were roasted on the bone. A few horse bones were also recovered from the ditch, they include fragments of femur, tibia, metapodial and a few loose teeth. Single elements from a pig and rodent were also found. Part of a cattle metatarsal came from Late Iron Age–early Romano-British ditch 14007. A small number of cattle and other bones came from undated features.

Table 8.84 Summary of animal bones (by NISP) from the Fen-edge

Species	*Preh/ BA*	*IA*	*LIA/ ERB*	*RB*	*EMRB*	*PM/M*	*Undated*	*Total*
Cattle	15	51	38	87	1	1	5	198
Sheep/goat	18	35	32	108	-	-	8	201
Pig	-	5	6	15	-	-	-	26
Horse	1	13	4	25	1	-	1	45
Dog	-	1	1	3	-	-	-	5
Roe deer	1	-	-	-	-	-	-	1
Deer	-	1	-	-	-	-	-	1
Total identified	35	106	81	238	2	1	14	477
Total unidentifiable	91	307	117	582	0	0	24	1121
Overall totals	126	413	198	820	2	1	38	1598

Zone 3

The Fens
(Table 8.85)

Mown Rakes
A small number of identified bones came from features of Late Iron Age–early Romano-British date. Most derive from sheep and a few from cattle, with single elements from a horse and vole. Little can be gleaned from these scant remains, and a cattle ABG from ditch 520040 is the only point of interest. This comprises the skull, mandibles, hyoid and first two cervical vertebrae (i.e., atlas and axis) from a subadult animal aged 30–36 months (MWS E).

Most of the animal bones came from broadly dated Romano-British features, notably ditches. Apart from a single horse third phalanx, the bones all derive from livestock, with cattle bones dominant, followed by sheep, but few pigs. Both main livestock are represented by a range of body parts

derived from different stages of carcass processing, although the dataset for cattle is slightly skewed towards waste elements from primary butchery, perhaps reflecting the more peripheral location of the investigation area away from domestic activity. A small group of sheep bones from ditch 520153 potentially derive from the same animal. Age information is limited and apart from a few juvenile cattle elements, including two mandibles at MWS D (18–30 months), most are from adult livestock.

Animal bones were also recovered from two post-medieval/modern ditches and several undated features. Of note are two ABGs comprising the truncated but largely complete (minus the skull) skeleton of an immature cow aged 12–18 months from pit 520114 and the articulated left hindquarter from a pony-sized equid of approximately 12 hands from gully 520034.

Six Hundreds Drove

The animal bones mostly derive from Romano-British features. Cattle were clearly the most important livestock, with relatively large numbers of bones recovered, followed by sheep, then pig. These mostly derived from mixed deposits of waste, with larger concentrations from some ditches, notably 550518 and 550538. A discrete deposit of butchery waste (i.e., heads and feet) from the initial stages of processing beef carcasses came from ditch 550525.

Several ABGs were also recorded from Romano-British ditches. These comprise the partial remains of a calf from ditch 550534, a small articulated group of calf bones from ditch 550536, and the semi-complete skeleton of an immature horse aged less than 18 months (after Habermehl 1975) from ditch 48206. A few dog bones were also found including two bones from a neonate puppy, as well as several bird (domestic fowl and passerine), rodent and fish (scad cf. horse mackerel) bones. The latter potentially provide indirect evidence for the consumption of garum, a condiment made from fermented fish, especially mackerel.

The composition of the animal bones from unphased features is similar to those from the Romano-British phase, but also includes a single rabbit bone. Of note are three bones from a particularly large horse from the topsoil.

Gibbet Hill

The semi-complete skeleton of a calf aged 1–8 months (mandible wear stage B, after Halstead 1985) was found in a shallow purpose-dug pit (560058). A radiocarbon date on a sample of rib proved a medieval/post-medieval date (see Table 7.22). In addition, a cattle atlas vertebra was recovered from the recut of Romano-British ditch 560024/560034.

Bottom Close

A few small, poorly preserved bone fragments came from two undated features, ditch 590050 and ring gully 590097. These comprise shaft fragments from a sheep femur and pig radius, plus a rodent long bone and fish vertebra.

Table 8.85 Summary of animal bones (by NISP) from the Fens

Species	*LIA/ERB*	*RB*	*EMRB*	*A-Sax*	*PM/M*	*Undated*	*Total*
Cattle	4	143	23	3	16	23	212
Sheep/goat	7	107	29	2	14	7	166
Pig	-	11	6	-	1	4	22
Horse	1	29	11	2	11	8	62
Dog	-	1	2	-	-	-	3
Rabbit	-	1	-	-	-	-	1
Field vole	1	3	-	1	-	-	5
Domestic fowl	-	1	-	-	2	-	3
Passerine	-	1	-	-	-	-	1
Scad	-	-	2	-	-	-	2
Gadid	-	-	-	-	-	4	4
Total identified	13	297	73	8	44	46	481
Total unidentifiable	5	881	163	1	38	91	1179
Overall totals	18	1178	236	9	82	137	1660

Period and landscape overview

The minimum assemblage size required to provide an accurate overview of the livestock economy for any given site/period are combined NISP and MNI counts (i.e., cattle+sheep+pig) of 300 and 30 respectively (Hambleton 1999, 39–10; also see Albarella 2019). When broken down by period (Table 8.80) or landscape zone (Tables 8.81–5), only the Romano-British component fits this basic criterion and even then, it is necessary to combine subsets of data for comparison. Consequently, any changes to the livestock economy or husbandry strategy over time, or differences between landscape zones during the same period, are more difficult to define. The following sections provide a broad overview of each main period, highlighting the main concentrations of activity within the landscape, and where appropriate, providing an interpretation of the evidence.

Prehistoric and Bronze Age

Prehistoric features were recorded in two of the three zones, although the majority containing animal bones came from Zone 2, particularly sites in the Lymn Valley and the Fen-edge, notably at Hagnaby Grange and Staunch Farm. The small assemblage of animal bones mostly derives from cattle and sheep, with some horse and one or two elements from pig, dog and roe deer (antler). The limited age information indicates an emphasis on adult cattle and sheep, potentially for secondary products. A sawn cattle horn core from Staunch Farm provides limited evidence for horn-working activity at this site.

A horse first phalanx from Cheals Close that shows signs of a healed fracture affecting the proximal joint is also of note. This takes the form of new bone formation on the posterior and medial sides of the proximal phalanx, and around the joint margin, as well as eburnation on its articular surface. The most likely cause of this injury is a torn ligament or muscle that may have resulted from a fall.

Several refitting fragments of cattle tibia shaft, and a few loose pig teeth from the maxilla of the same animal, came from the Bronze Age barrow ring ditch 900066 at Callow Carr. This feature became the focus for burial during the Anglo-Saxon period.

Iron Age–early Romano-British

Iron Age features were recorded from the Wolds to the Lymn Valley/Fen margin, while features dated to the transition period were more widely dispersed along the route, although the highest concentration for both periods was at Hagnaby Grange. Probable continuity of occupation can be demonstrated at many of the sites, often extending into the middle Romano-British period, sometimes later, but in most instances the datasets are too small for comparison.

Cattle and, to a lesser degree, sheep dominate the small assemblage of bones from Iron Age contexts. The emphasis on cattle-farming is, however, more apparent on sites on the Fen-edge, with larger assemblages (Table 8.84). Here, both main livestock are represented by an array of body parts from separate stages in the carcass reduction sequence. This evidence is consistent with livestock having been slaughtered and butchered nearby and the meat distributed locally as part of a self-sufficient economy. The limited age information from epiphyseal fusion and mandibles indicates that cattle on the Fen-edge were slaughtered either at the optimum age for meat (MWS E–F) or as much older animals past their prime (MWS H–I). This pattern could indicate that older cattle were kept for dairying or traction, the latter as part of a mixed rural economy also involving arable cultivation. Sheep, on the other hand, were mostly slaughtered for meat at 1–3 years, potentially after one or two wool clippings, but this is based on very limited data.

Pig is a minor component of the Iron Age assemblage, as is the case for all periods. This probably reflects the generally open nature of the landscape, which is unsuitable for large-scale pig-farming. Horse bones were found on sites on the Fen-edge but not

at other sites. All are disarticulated bones from ditches, most derived from adults, although the femur from a juvenile was recorded from Staunch Farm. A couple of dog bones and a small piece of deer antler were also found, and some rodent bones (field vole) recovered via sieving.

A similar pattern of relative frequencies is apparent for the Late Iron Age–early Romano-British component of the assemblage, although the dominance of cattle is less pronounced for the larger Fen-edge dataset, principally Hagnaby Grange (Table 8.84). Again, the range of body parts is suggestive of on-site carcass processing and distribution as part of a self-sufficient economy. Age information is limited but suggests an emphasis on adult livestock culled for meat. Small numbers of pig and horse bones were also recovered, the majority from the Fen-edge, as well as single elements from a dog and rodent (field vole).

The lap dog remains radiocarbon dated to the Late Iron Age–early Romano-British period (SUERC-108719) from ditch 170152 at Partney Leys is perhaps the most significant ABG from the Interconnector, the others mostly represented by small groups of articulated bones or later burials of livestock within the landscape. The distinct morphology of the dog bones indicates that this animal was very small and gracile, and unlikely to have survived without human intervention; such animals were generally kept as companions by the wealthier in society. Their bones are more often recovered from towns and villas, or in association with female burials, and rarely from low-status agricultural sites such as this (Baxter 2006, 20–1).

Romano-British

Most of the animal bones came from features of late Romano-British date or broadly dated to the period (Table 8.80). At Six Hundreds Drove and Magers Lane, both of which produced small amounts of bone, the broad Romano-British phasing applied masks a degree of refinement which is brought out in the site narrative. This overarching bias precludes detailed analysis of the dataset to look for chronological changes, and it also limits comparison with the preceding Iron Age dataset, which is itself small and broadly dated. In the following sections, certain subsets of data have been combined to overcome small sample size, with the focus on the large late Romano-British dataset and a broader overview of the period.

Early–middle Romano-British

Much of the animal bone evidence for the first half the Romano-British period came from the coastal marsh and Fens, notably at White Crofts and Six Hundreds Drove, the former also providing a relatively large late Romano-British dataset for direct comparison at a single location (Tables 8.81 and 8.85).

The small combined dataset from the various early to middle Romano-British phases (Table 8.80) is dominated by cattle bones, which account for 52% NISP, followed by sheep at 42% and then pig. A slightly different picture is evident at different locations; for example, on the coastal marsh, the livestock economy follows the overall trend, but on the Fens the emphasis appears slightly more focused on sheep-farming. At both main sites mentioned, the bones came from mixed deposits of waste derived from different stages in the sequence of carcass reduction from primary butchery to consumption. Butchery evidence is limited but includes skinning, dismemberment, filleting and processing for marrow. The limited age data suggests that most cattle were slaughtered as adults, although some elements from younger animals, including calves, were also recorded (e.g., MWS C, E–F). Most sheep were slaughtered at 2–4 years of age (MWS E–F) and a few as lambs (MWS B).

Of the limited range of other animals recorded from earlier Romano-British contexts (Table 8.80), horse is the most common, with the majority from sites in the Fens (Table 8.85). The disarticulated elements all derive from ditches and are from adult, pony-sized animals. At Walk Hill in the Wolds, butchery evidence was noted on single elements from a horse and dog (see above). It is also worth highlighting the rare

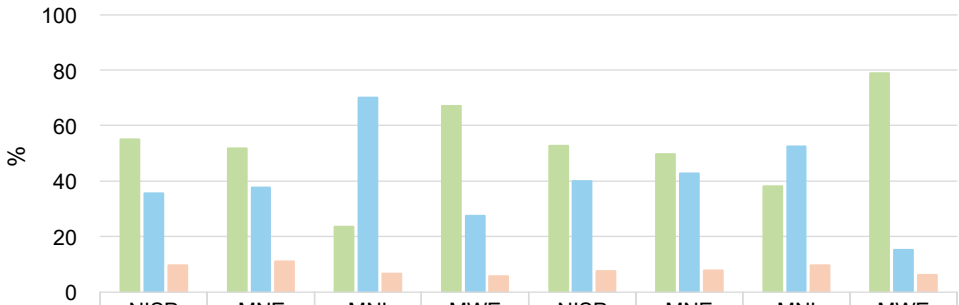
occurrence of both cat and fish bones from these earlier Romano-British contexts. The latter provides potential indirect evidence for the availability and consumption of garum.

Middle–late Romano-British

Sea Bank Farm was the only site where a coherent phase of activity and features dated to the middle–late Romano-British period could be clearly identified. Features of late Romano-British date were recorded in the Lincolnshire Marsh and Wolds, at White Crofts and Walk Hill (Tables 8.81–2). Summaries for all these sites are provided above and an overview of the late Romano-British evidence is given in the following section.

A clear emphasis on cattle-farming is apparent at both White Crofts and Walk Hill, reflecting a continuation of this tradition from the earlier part of the period at the former site. Cattle bones account for 55% NISP and approximately 52% MNE from late Romano-British contexts (Fig. 8.39). The proportion of sheep and pig bones is also consistent using these methods of quantification, with the former of secondary importance to the livestock economy. This basic pattern is repeated at each of the sites. However, a different emphasis is apparent from the MNI results, which shows that there were considerably more sheep (at 70% MNI) than other livestock. Discrepancies of this nature between different methods of quantification are common and often reflect the fact that MNI to some extent mitigates the bias caused by fragmentation, including butchery, which generally affects the larger bones of cattle more than sheep. In instances such as this, the MNE result, which also takes account of fragmentation, provides the most accurate representation of relative importance (Hambleton 1999, 35). The significance of cattle is perhaps best demonstrated by the sheer quantity of meat they provide relative to other livestock. Indeed, beef formed 67% (by MWE) of the meat consumed during the late Romano-British period.

Figure 8.39 Relative frequency (by NISP, MNE, MNI and MWE) of Romano-British livestock



	Late Romano-British				Romano-British (all phases)			
	NISP	MNE	MNI	MWE	NISP	MNE	MNI	MWE
Cattle	55	51.7	23.4	67	52.7	49.6	38.1	79
Sheep	35.6	37.5	70.2	27.4	40	42.7	52.4	15
Pig	9.4	10.8	6.4	5.6	7.3	7.7	9.5	6

Epiphyseal fusion data (Table 8.86) is limited but for late Romano-British cattle it demonstrates a clear emphasis on older animals (Fig. 8.40). The pattern is similar for sheep with most slaughtered over the age of two years, albeit based on limited data. A more accurate picture can be gleaned from the mortality profile reconstructed from mandibles retaining two or more teeth with recordable wear (Figs 8.41–2). For cattle, this shows a gradual kill-off rate among younger age classes, a peak at MWS E, followed by more moderate peaks at MWS F–G (Fig. 8.41). Cattle slaughtered at MWS E represent the oldest of those selected for prime meat, while the older cohort is likely to have been maintained as breeding stock and for traction. The expansion and intensification of arable cultivation, and its influence on cattle husbandry strategies at this time, has been widely demonstrated (for a summary see Allen 2017, 112–3). The key change noted is generally an increase in the age at which cattle were slaughtered for meat because of the necessity to maintain large numbers of mature animals for traction. Pathological changes noted on three cattle bones, one each from Sea Bank Farm, White Crofts and Walk Hill, are likely to be related to this type of use. The presence of calves could also indicate that dairying played a minor part in the husbandry strategy, although this is based on limited data.

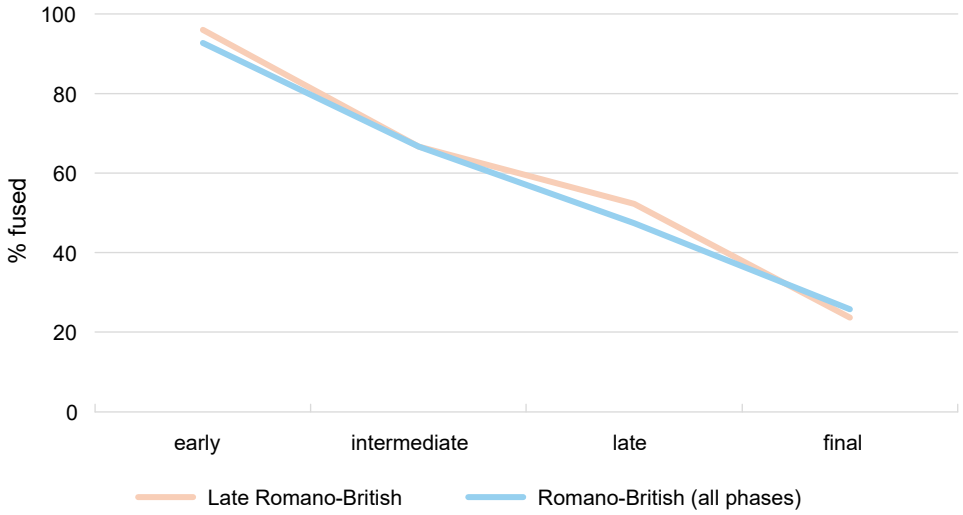


Figure 8.40 Mortality curve for Romano-British cattle based on epiphyseal fusion

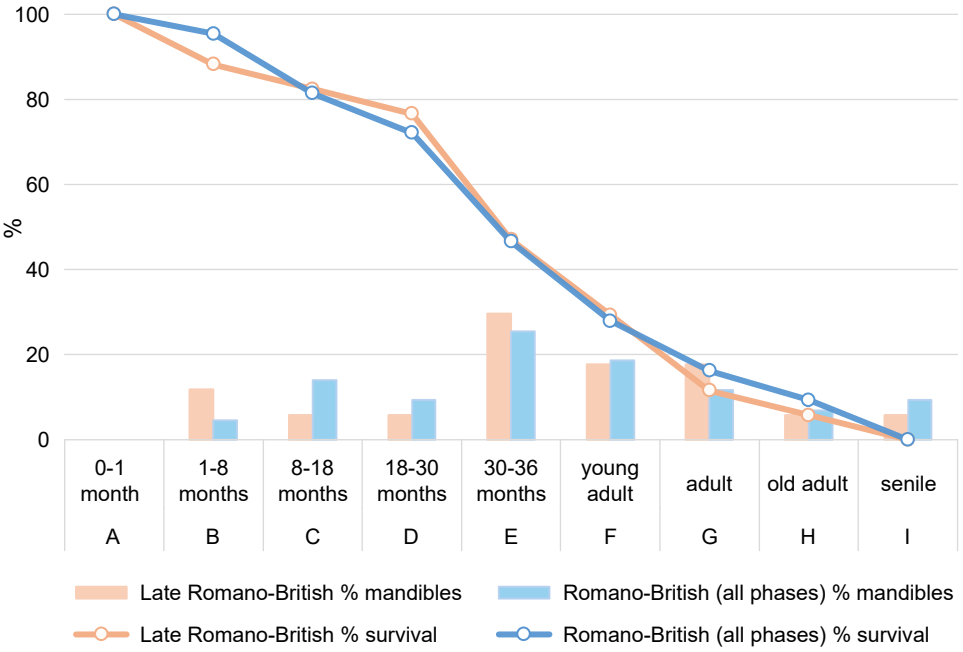


Figure 8.41 Mortality profile for Romano-British cattle based on mandibular wear stage (sample size late RB = 17, RB all phases = 43)

Table 8.86 Epiphyseal fusion of post-cranial elements. Fusion categories after O'Connor (1989). Fused and fusing epiphyses are amalgamated. Only unfused diaphyses, not epiphyses, are counted

Species	*Fusion category*	*Late Romano-British*			*Romano-British (all phases)*		
		F	*UF*	*%F*	*F*	*UF*	*%F*
Cattle	early: 12–18 months	48	2	96	90	7	92.7
	intermediate: 2–2½ years	18	9	66.7	38	19	66.7
	late -3½–4 years	12	11	52.2	19	21	47.5
	final: 5 years+	9	29	23.7	16	46	25.8
Sheep	early: 10 months	15	1	93.7	37	3	92.5
	intermediate I: 13–16 months	6	1	85.7	9	5	64.3
	intermediate II: 1½–2 years	13	-	100	23	15	60.5
	late: 3 years	2	3	40	3	12	20
	final: 4 years+	10	2	83.3	13	7	65
Pig	early: 1 year	-	-	-	7	2	77.8
	intermediate I: 2 years	-	-	-	4	-	100
	intermediate II: 2¼ years	-	-	-	1	2	33.3
	late: 3½ years	-	-	-	-	6	0
	final: 4 years+	-	-	-	-	8	0

For sheep mandibles (Fig. 8.42), the dataset shows a high mortality rate at MWS F, indicating that the husbandry strategy was focused on wool rather than meat production. The presence of older animals at MWS G–H supports this interpretation. Secondary peaks at MWS D–E suggest that some prime meat was also available, this cohort probably largely made up of male castrates that had already provided one or two wool clippings.

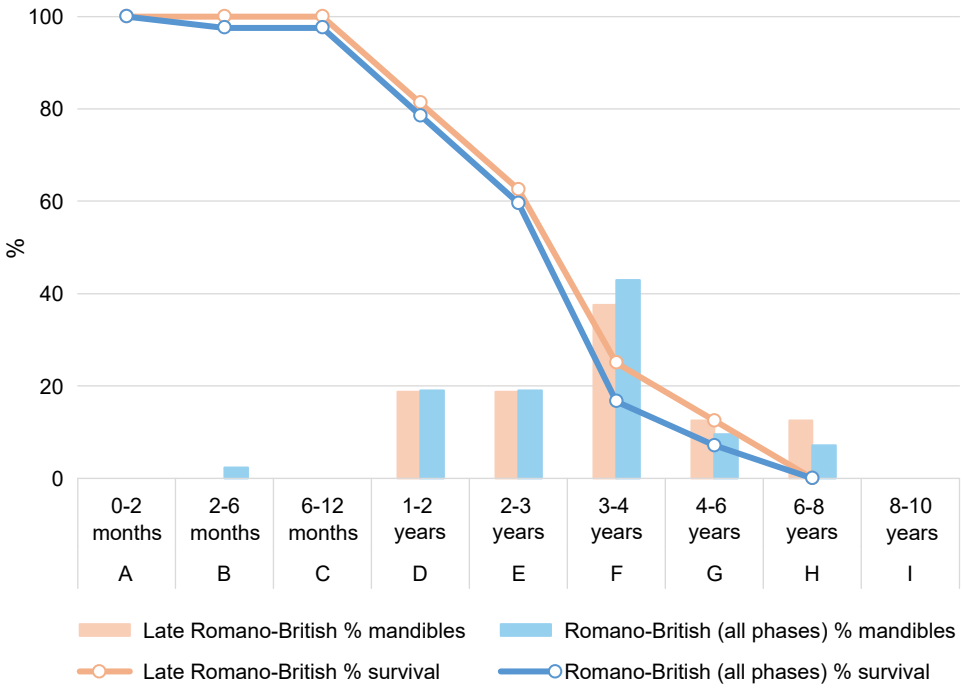


Figure 8.42 Mortality profile for Romano-British sheep based on mandibular wear stage (sample size late RB = 16, RB all phases = 42)

All parts of the beef and most parts of the mutton and pork carcass are represented in the late Romano-British assemblage (Figs 8.43–4). Cattle mandibles, sheep tibiae and pig scapulae are the most commonly occurring elements. It is perhaps also noteworthy that the meatier parts of the carcasses are also well represented. These common elements generally show a good survival and recovery rate in most assemblages (Hambleton 1999, 30–1). Loose teeth (especially incisors and deciduous/permanent fourth premolars) and small bones from the ankle and foot, by contrast, are either absent or under-represented because of differential hand-recovery, which to some extent has been mitigated by sieving. The low counts for vertebrae are probably a consequence of the recording methods used and the often fragmented condition of these elements. The body part data for cattle and sheep is consistent with mixed deposits of waste derived from the localised slaughter and processing of carcasses, as well as meat consumption. At White Crofts, there was some evidence for larger-scale butchery events in the form of concentrations of waste (e.g., heads and feet) from the initial stages of carcass processing deposited in two ditches (see above). There is, however, nothing to suggest that select meat joints were either traded or procured as part of a wider economic system, although participation in such trade and exchange is highly likely.

Butchery marks are present on a small number of elements, the majority recorded on cattle bones (Table 8.87). The evidence indicates that cleavers were used to dismember carcasses and reduce major joints into smaller portions suitable for cooking (for stages see O'Connor 1993, 65, table 1; Rixon 1988, 49). A distinct array of marks was noted on several cattle scapulae from White Crofts in the coastal marsh and one from Walk Hill, providing limited evidence for the processing or procurement of cured shoulder joints of beef (see above). Very little evidence was recorded for skinning or processing for marrow. The skinning and filleting marks noted on horse bones from these sites is also highlighted in the above site summaries.

Estimated shoulder heights for late Romano-British livestock range from 1.1–1.29 m for cattle, 0.54–0.66 m for sheep and 12.2–15 hands for horse. Interestingly, the estimates

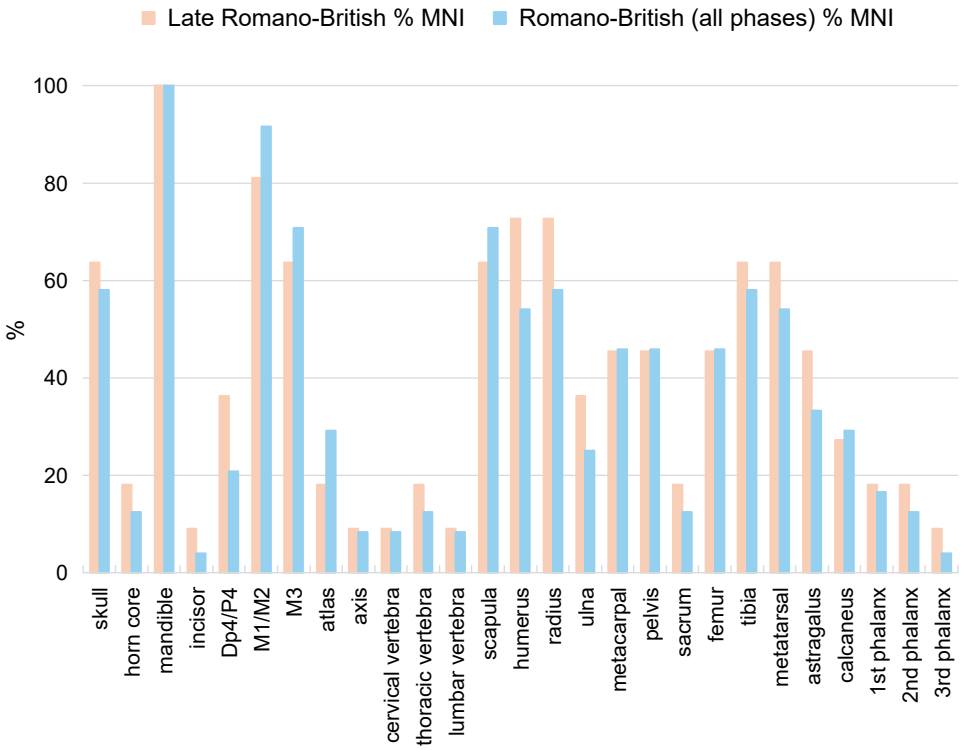


Figure 8.43 Romano-British cattle body part representation expressed as a percentage of MNI in relation to the most common element. Note that both loose teeth and those retained within mandibles are counted, therefore the total may differ from NISP

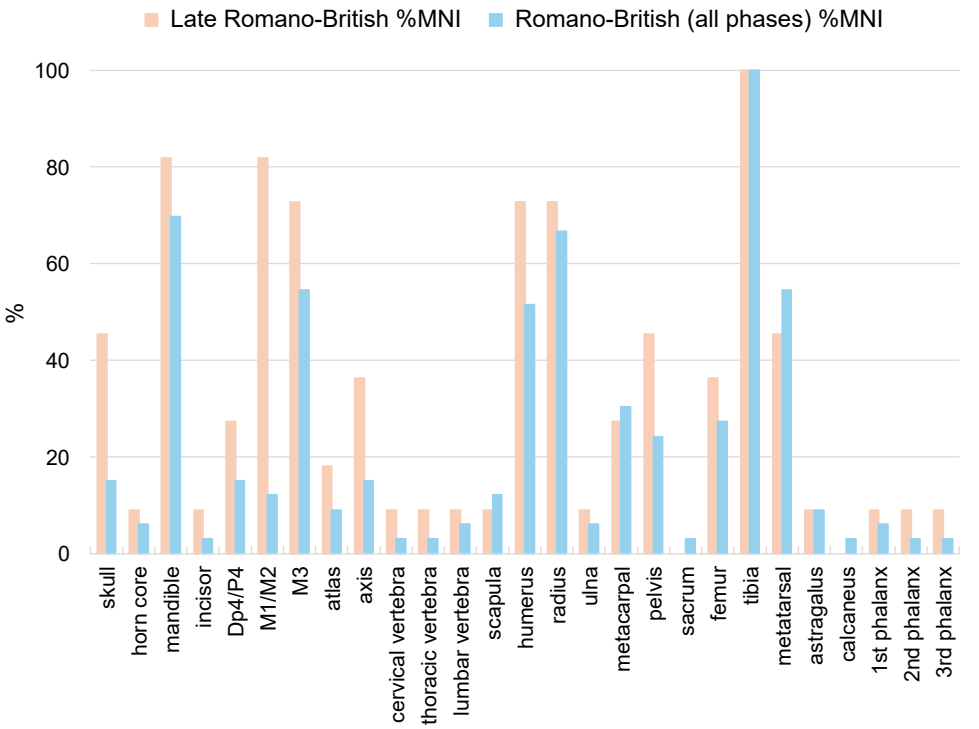


Figure 8.44 Romano-British sheep body part representation expressed as a percentage of MNI in relation to the most common element. Note that both loose teeth and those retained within mandibles are counted, therefore the total may differ from NISP

for horse, while based on limited data, indicate two distinct groups characterised by small ponies (below 13 hands) at Walk Hill on the Wolds, and larger ponies and small horses (14.2–15 hands) at White Crofts on the Lincolnshire Marsh. The ponies are similar in size to those recorded from Iron Age sites (Maltby 1996, 23), while the larger horses compare well with those from other sites (Allen 2017, 129; Foster 2024). Further consideration of the biometric dataset for livestock is provided in the overview section below.

Overview of Romano-British phases

The following overview incorporates all Romano-British phases, including the bones from broadly dated contexts not covered in the previous section. Most of the broadly

dated animal bones derived from Six Hundreds Drove and Mown Rakes in the Fens, and Hagnaby Grange on the Fen-edge.

Taken as a whole, the Romano-British component accounts for 47% of the total assemblage; all of the landscape zones crossed by the Interconnector contained Romano-British sites with relatively large concentrations of animal bone. Continuity of occupation/activity during the Romano-British period can be demonstrated in a few locations, but only at White Crofts was a continuous sequence recorded. However, in all cases the earlier subsets of data are too small for comparison, and the same issue precludes broader comparison, both between periods and within the wider landscape.

Livestock economy and husbandry

The Romano-British livestock economy was one based primarily on cattle-farming, which account for approximately half of all livestock based on NISP and MNI (see Fig. 8.39), followed by sheep at about 40%, and then pig. The MNI result shows a reversal in the relative importance of the two main livestock, with more sheep present than cattle. The overall patterns indicated by these three methods of quantification are not too dissimilar to those established for the late Romano-British component, however for MNI the dominance of sheep is less pronounced. One possible reason for this difference is that the bones from earlier and broadly dated contexts are less fragmented than those from the late Romano-British contexts, potentially due to changes in butchery, particularly in the processing of cattle carcasses in later phases, but this is pure conjecture, given the broad phasing assigned to much of the combined dataset. The importance of cattle over sheep is, however, clearly defined by the volume of beef (79%) provided by a smaller number of animals (Fig. 8.39). The same basic pattern and emphasis on cattle over other livestock (according to NISP) was recorded for each landscape zone, except on the Fen-edge, notably at Hagnaby Grange, where sheep predominate.

The mortality profiles reconstructed from the combined dataset closely mirror those for the late Romano-British phase (Table 8.86; Figs 8.40–2). This indicates an emphasis on adult livestock, suggesting that cattle were largely managed for traction and sheep for wool, with meat production a secondary consideration. It is, however, unlikely that the husbandry strategy remained the same over the entire Romano-British period, but given the shortcomings of the dataset, notably the small sample from earlier contexts, this cannot be demonstrated. The intensification and expansion of arable cultivation in the later Romano-British period influenced livestock farming strategies, particularly in relation to cattle, and necessitated the retention of greater numbers of traction animals.

Carcass processing

The array of body parts from the combined dataset also closely resembles that of the late Romano-British period, particularly in relation to the most commonly occurring elements (Figs 8.43–4). This indicates that once again the bones largely derive from mixed deposits of waste resulting from different stages in the process of carcass reduction (see O'Connor 1993, 65, table 1). For pig, the mandible is the most common element, followed by scapulae, which are more numerous in the late Romano-British assemblage. There are no obvious trends in the data for locations with larger datasets that could point to wider trade or exchange of certain joints, but this is often difficult to discern.

The combined dataset for butchery adds little to the overall picture outlined above, with low numbers of marks recorded due largely to the poor condition of bones and high rates of fragmentation. There is limited evidence for skinning, with cut marks associated with this process recorded on two skulls, a mandible and a metacarpal. However, the principal use of cleavers to dismember and portion carcasses, as well as to split bones for marrow, is confirmed, particularly in relation to the processing of cattle carcasses (Tables 8.87–8). These were reduced by chopping through major points of articulation, the most recorded locations being the proximal radius/ulna and distal tibia. The latter was undertaken to detach the feet just above the ankle (i.e., on the distal tibia), although this was occasionally achieved by severing the ankle tendons with a knife. Filleting marks were recorded on a small range of elements; the most interesting aspect is the evidence for specialist techniques in the form of cured shoulder joints of beef. Most of

the scapulae with this characteristic combination of marks came from late Romano-British contexts and have been described in the relevant section; two further examples came from earlier deposits.

Size and confirmation of livestock

One of the principal means of assessing improvements of livestock is to look at evidence for an increase in the size or confirmation (i.e., structure/stature). Again, this type of analysis is hindered

Table 8.87 Summary of Romano-British butchery by number of bones

Period		*Late Romano-British*			*Romano-British (all phases)*		
Species		*Cattle*	*Sheep*	*Horse*	*Cattle*	*Sheep*	*Horse*
Implement	Cleaver	22	7	1	44	8	2
	Knife	16	4	4	28	7	8
	Saw	-	-	1	-	-	1
Type	Disarticulation	14	7	1	31	10	1
	Portioning	8	2	-	15	2	-
	Marrow	4	-	-	9	-	-
	Skinning	3	-	2	4	1	4
	Filleting	7	2	1	11	3	3
	Skinning/filleting	2	-	1	2	-	2
	Other	-	-	1	-	-	1

Table 8.88 Summary of butchery for Romano-British cattle by number of bones

Element	*Disarticulation*		*Portioning*	*Filleting*	*Skinning*	*Marrow*
	Cleaver	*Knife*	*Cleaver*	*Knife*	*Knife*	*Cleaver*
Skull	-	-	-	-	2	-
Mandible	-	1	-	1	1	-
Axis	-	1	-	-	-	-
Atlas	1	-	-	-	-	-
Thoracic vertebra	-	1	-	-	-	-
Lumbar vertebra	-	-	1	-	-	-
Scapula	2	-	1	5	-	-
Humerus	1	-	4	2	-	-
Radius	6	-	3	1	-	1
Ulna	2	-	-	1	-	-
Metacarpal	3	1	-	-	1	-
Pelvis	1	-	-	-	-	-
Femur	-	1	2	2	-	1
Tibia	4	1	4	4	-	4
Metatarsal	2	-	-	-	-	4
Astragalus	-	3	-	-	-	-
Calcaneus	-	1	-	-	-	-
First phalanx	-	1	-	-	-	-
Total	22	11	15	16	4	10

by the lack of adequate subsets of data from all phases of Romano-British activity and indeed other periods. To overcome this shortfall, the combined biometric dataset for this period has been assessed using the log ratio technique (Davis 1996). This method allows measurements taken on the same plane (i.e., length, width and depth) to be grouped and compared to a known standard. For this purpose, the mean values for the Iron Age–early Romano-British period have been applied, in the expectation that this will highlight any changes resulting from improvements in husbandry. A basic assessment of the raw dataset is also provided.

Shoulder height estimates for the two main livestock (1.1–1.29 m for cattle and 0.54–0.66 m for sheep), indicate little variation in overall size beyond that associated with sexual dimorphism, although in the case of sheep, the wider range of values may also indicate the presence of different breeds. These were small, slender animals like most cattle and sheep found at Late Iron Age and Romano-British sites (Allen 2017, 99 and 106). Summary descriptive statistics for the most common measurements (i.e., 10 or more records) are provided in Table 8.89. Measurements taken on the third molar are common for both main livestock, but unlike post-cranial bones, teeth respond slowly to changes in the overall size of animals through artificial selection and improvements in husbandry (e.g., nutrition). This means that any increase in size over time is more likely to be due to the introduction or evolution of authentically different genotypes. Comparison of length and width measurements with the Iron Age–early Romano-British dataset, based on the range of values and mean, indicates that no discernible increase in the third molar occurred between these periods. The post-cranial elements, which are all major weight-bearing bones, show some overlap in size range with the earlier dataset, but in many instances the upper size range and mean are greater. Most of the standard deviations (SD) and coefficients of variation (CV) are low, indicating cattle and sheep of uniform size. However, the very high values for certain cattle measurements, namely astragalus length (Gli) and tibia breadth (Bd), demonstrate considerable size variation within the sample. Size differences due to sexual dimorphism may account for some of this variation, but a slight increase in the size and confirmation of cattle and sheep over time may also be factor.

The apparent size increase noted above is confirmed by the results of the log ratio technique (Figs 8.45–6). The plots show a normal distribution, this is most apparent for the larger samples of length and width measurements. Many of the measurements are comparable to the Late Iron Age–early Romano-British standard ('0') but the majority are larger. Width measurements for both main livestock show the greatest variation, and depth for sheep also differs considerably from the standard. This pattern suggests that although there was little overall change in the shoulder height of Romano-British cattle and sheep, they were stockier than their Late Iron Age–early Romano-British equivalents.

Table 8.89 Summary descriptive statistics for Romano-British cattle and sheep bones/teeth

Species	*Element*	*Measurement*	*Iron Age–early Romano-British*				*Romano-British (all phases)*				
			Min.	Max.	Mean	N	Min.	Max.	Mean	SD	CV
Cattle	Third molar	L	30.1	37.3	33.8	20	29.5	39.2	34.5	2.2	5.2
		W	11.2	15.8	12.8	22	11.2	16.8	12.8	1.7	3.1
	Astragalus	Bd	35	39.6	36.2	12	36.6	43.7	40.2	2.1	4.8
		Di	31.8	34	33	10	33.3	37.3	35.2	1.2	1.6
		Gli	57.6	60.3	58.6	10	59.3	69.8	62	3.1	10.7
	Tibia	Bd	52.2	60.5	55	10	51.3	70.1	55.6	5.8	37.5
Sheep	Third molar	L	18.3	22.6	20.2	31	17.4	22.6	20.5	1.1	1.4
		W	6.8	8.5	7.5	31	6.7	9.4	7.9	0.5	0.3
	Humerus	BT	25.5	-	-	14	24	31.9	27.7	2.4	6.2
		HTC	12.9	-	-	14	11.5	15.9	13.5	1.4	2.2
	Tibia	Bd	19.2	-	-	14	21.4	28.1	25.9	1.7	3.3

KEY: Bd – distal breadth; BT – breadth of the trochlea; CV – coefficient of variance; Di – depth of the lateral half; Gli – greatest length of the lateral half; HTC – minimum diameter of the trochlea; L – length; N – number; SD – standard deviation; W – width

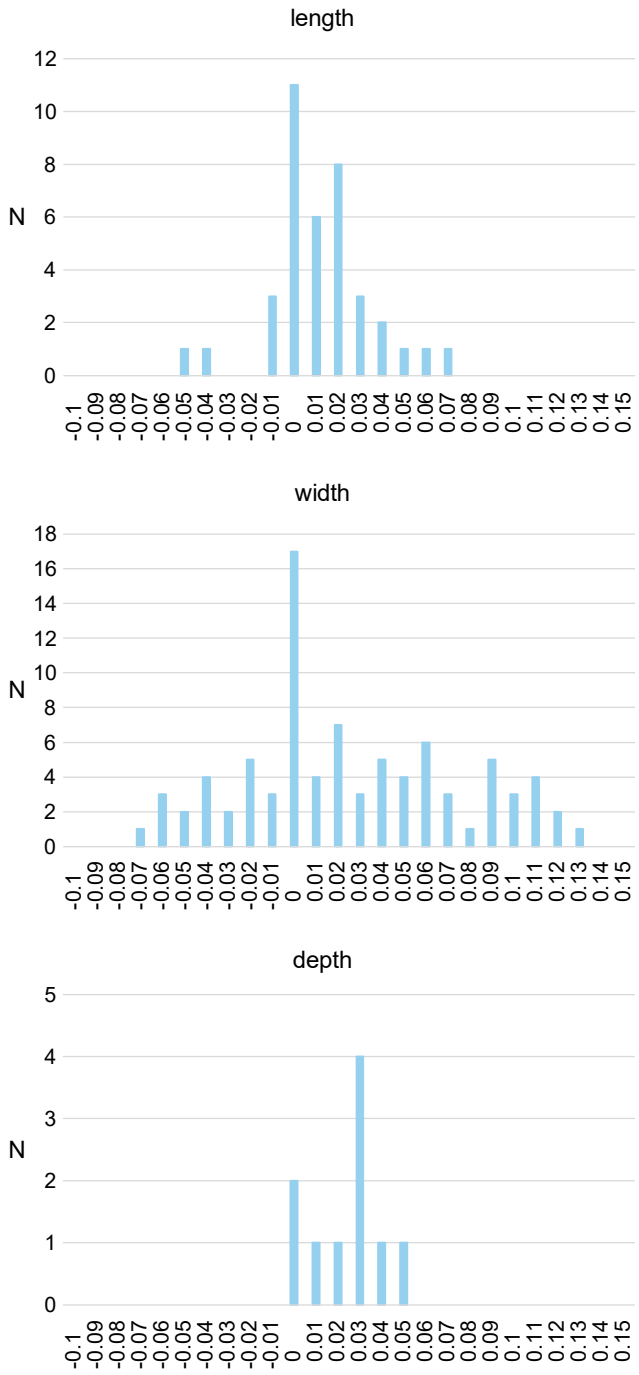


Figure 8.45 Log ratio distribution for Romano-British cattle bones and teeth

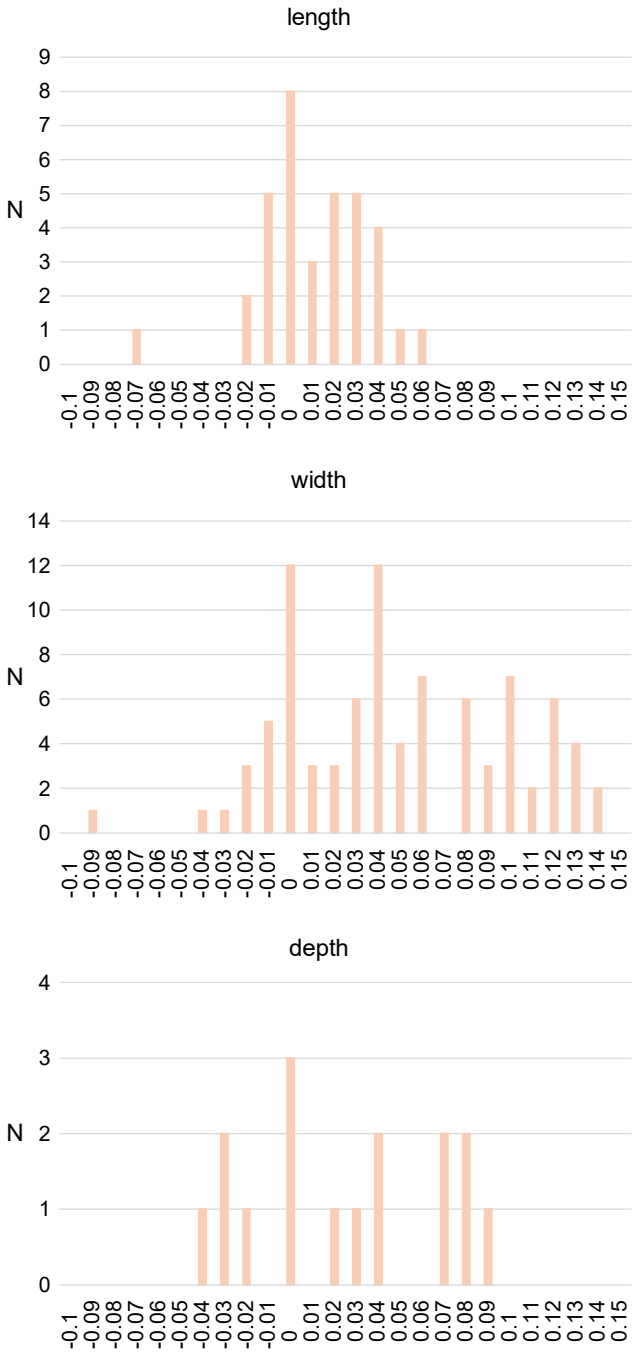


Figure 8.46 Log ratio distribution for Romano-British sheep bones and teeth

Anglo-Saxon

Most of the animal bones from this period came from ditches and pits at Cheals Close in the Lymn Valley (Table 8.83), with small amounts from a handful of features on the Marsh, Wolds and Fens. Overall, cattle bones dominate the Anglo-Saxon assemblage, and this is the case at sites in all the above-mentioned landscape zones, apart from the Wolds (Table 8.82). However, the apparent emphasis on sheep in the Wolds cannot be taken as representative of the wider livestock economy because most of the bones came from the cemetery at Callow Carr and represent grave goods. The clear selection of meat joints, mostly lamb and mutton, is likely to have been based on cultural as well as socio-economic factors. The larger assemblage from Cheals Close, while itself quite small and fragmentary, does at least suggest a clear emphasis on cattle-farming,

although additional details are lacking. Mandibles from cattle of prime meat age and mature adults are present (MWS E–F and H), but the numbers are too small to provide an accurate indication of the husbandry regime. Little can be gleaned from the small collection of sheep elements, which is heavily biased by an abundance of loose teeth.

Minor components of the Anglo-Saxon assemblage include pig and horse; these are scattered more widely along the route and provide few additional details. The eel bones from one of the pits at White Crofts on the Marsh, mentioned above, do not necessarily represent food remains, since this species can be found in ditches as well as streams and rivers inland.

Medieval and later
The medieval part of the assemblage largely derives from the Wolds/Lymn Valley margin (Tables 8.80 and 8.83), notably at Cheals Close and one of the minor sites (Area 28/34). The clear emphasis on cattle-farming potentially reflects a continuation of established farming traditions. Most parts of beef carcass are present, with mixed deposits of waste recovered from most features. At Cheals Close, however, the largest groups of cattle bones (from slots across ditch 180619) include proportionally more elements from the primary butchery stage. Few bones show signs of butchery, although there is some evidence that long bones were processed for marrow. Most of the cattle bones derive from adult animals, and a few from juveniles and calves. The dataset of age information is limited but would be consistent with a focus on dairying.

Sheep were of secondary importance after cattle and are also largely represented by bones derived from the initial stages of carcass reduction. The emphasis on adult sheep also points to the importance of secondary products (i.e., wool) at this time. At least some of the sheep were horned, as indicated by the recovery of a large horn core from a ram at Cheals Close. Minor components of the medieval assemblage include pig, horse and a few other species.

The small post-medieval/modern assemblage, which mostly derives from ditches in the Lymn Valley and the Fens, notably at Cheals Close and North Ing, is also dominated by cattle bones, followed by sheep (Tables 8.80, 8.83 and 8.85). Little additional information can be gleaned from the evidence but both main livestock are represented by a wide range of elements, including several cattle mandibles from juvenile and subadult animals. Calves are also represented and include a burial (560058) from Gibbet Hill in the Fens. The bones are also larger than those from earlier contexts, reflecting the general increase in size of improved later breeds of livestock. Minor components include pig, horse and domestic fowl.

Unphased
Bone was also recovered from a range of undated or insecurely dated features across the scheme, although the largest group came from a series of palaeochannels and alluvial deposits at Sea Bank Farm on the Lincolnshire Marsh, potentially of post-Roman date (Tables 8.80–1). This is summarised above and characterised by high numbers of sheep bones, whereas the smaller groups from other landscape zones, notably on the Wolds/Lymn Valley margin and Fens, have higher cattle bone counts.

Discussion

Livestock economy and husbandry
As has already been mentioned, little emphasis can be placed on any conclusions drawn from small subsets of data since these are unlikely to provide an accurate picture. The Romano-British assemblage, however, is of adequate size for detailed consideration, albeit without the benefit of suitable chronological refinement. On this basis, it is possible to determine that the local livestock economy was one based primarily on cattle-farming. Sheep were of secondary importance and pig a minor consideration.

This appears to have been the case for all phases of activity from the prehistoric to the post-medieval/modern period. The same basic pattern has been recorded widely across the region; it is, however, worth emphasising that at Iron Age, Anglo-Saxon and later sites the relative proportion of sheep to cattle is generally higher than during the Romano-British period (Albarella 2019; Allen 2017, 94–97; Hambleton 1999, 46; Holmes 2017). Local examples that demonstrate these trends include the sites at Bicker Fen (Foster 2024), Quarrington (Rackham 2003), and a little further away at Orton Hall Farm (King 1996), along with excavation areas along the Hornsea wind farm cable route in northern Lincolnshire (Higbee 2023, 257, table 6.5).

The emphasis on adult livestock indicates that meat production was not the main objective; instead a mixed husbandry strategy was adopted during the Romano-British period. This provided meat and dairy products for local consumption, as well as surplus that could be traded more widely, including wool. Both animal and dairy fats (lipids) were recorded on pottery from various locations along the route, most notably on several large bowls and a cheese press from Sea Bank Farm (see Davis *et al.* this volume). An increase in the age at which cattle are slaughtered for meat is generally considered to indicate the necessity to retain greater numbers of older animals for traction due to the intensification and expansion, including into more marginal land, of arable cultivation (Albarella 2007, 396–9; Dobney 2001; Maltby 2016; Van der Veen and O'Connor 1998). Pathological changes recorded on several cattle bones from Romano-British contexts provide additional evidence for the use of cattle for traction at three sites along the route.

Biometric analysis of Romano-British cattle and sheep bones has revealed that these were slightly stockier than their Iron Age counterparts; however, regionally there is little evidence for significantly larger, improved breeds of livestock at this time (Albarella 2019, 104; Allen 2017, 102; Harman 1996), a notable exception being Orton Hall Farm in Cambridgeshire (King 1996). This is in stark contrast to sites further south, where there are clear increases in the stockiness of cattle (Albarella *et al.* 2008, 1844–6; Murphy *et al.* 2000, 36–9). These larger, stronger cattle were no doubt more efficient as traction animals, particularly in areas of intense cereal cultivation (Allen 2017, 104). The largest cattle most probably derived from continental Europe and are likely to represent imported breeding stock (Albarella *et al.* 2008, 1833). Locally, however, these basic improvements do not seem to have been long-lived, with smaller cattle recorded from Anglo-Saxon sites in the region, including Bicker Fen (Foster 2024).

Carcass processing and specialist butchery

All parts of the carcasses from the three main livestock are present and the bones mostly derive from mixed deposits of waste from different stages in the reduction sequence (O'Connor 1993, 56, table 1). The only exception to this is the deposit from Romano-British ditch *550525* at Six Hundreds Drove in the Fens, which largely comprises butchery waste. The general composition of the Romano-British assemblage is consistent with the type of settlement and land-use prevalent in the area at this time, which was generally small-scale and rural in character. The animal bone evidence certainly seems to fit this overall view with locally raised livestock slaughtered and butchered close to settlements in order to meet the needs of the community, and potentially surplus for wider trade and exchange with other settlements in the wider landscape. The procurement of cured beef joints from professional urban butchers (see below) provides some indication that this was the case.

Much of the butchery evidence recorded on Romano-British bones relates to the processing of cattle carcasses, using cleavers. Cleavers were the butchery tool of choice for professional butchers operating in urban area and military sites (Maltby 2007), allowing carcasses to be processed quickly and more efficiently, resulting in a distinct pattern of marks (Seetah 2006; 2007). These tools were not widely available in rural areas, where the style of butchery employed was more in keeping with Iron Age methods, and predominantly involved the use of knives (Allen 2017, 121). It would be a

mistake to place too much emphasis on the apparently ubiquitous use of cleavers for carcass processing at Viking Link, particularly given the poor condition of much of the animal bone, which has undoubtedly effaced most of the finer details such as cut marks. Indeed, little can be gleaned from the scant butchery evidence, particularly given this apparent bias; however, one aspect is worthy of further comment.

The distinct array of butchery marks noted on several cattle scapulae from Romano-British contexts at White Crofts in the coastal marsh, as well as one from Walk Hill in the Wolds, indicates that some joints were cured for longer-term storage. The evidence includes trimming of the shoulder blade and cut/nick marks across its surface, resulting from filleting meat off the bone. This type of specialist butchery technique is more commonly found in urban assemblages; however, blade-trimmed cattle scapulae are often recovered from some rural settlements (Maltby 2016, 793). Where the scapulae are punctured through the distal blade – damage caused by the insertion of a butcher's hook– it is likely that the cured joints were procured from professional urban butchers and imported to rural settlements (Allen 2017, 122; Dobney *et al.* 1996, 27; Maltby 2010, 287; O'Connor 1988). This is difficult to confirm because none of the scapulae from White Crofts or Walk Hill are complete; all are represented by the proximal end, the distal blade largely absent or highly fragmented. However, the alternatives – local processing, or itinerant butchers pursuing their trade in the countryside – seem unlikely. The former would require using an alternative method of curing that could be achieved without hanging joints, while evidence for the latter is rare (Allen 2017, 121).

The presence of cured shoulder joints of beef on rural sites, as here, generally provides evidence of wider provisioning and involvement in trade/exchange. It may also be significant that most of the scapulae came from the Lincolnshire Marsh, where briquetage at Sea Bank Farm evidenced local production of salt, a valuable commodity and one used to preserve meat. This said, no evidence for specialist butchery practices was found among the animal bones from the complex farmstead at Bicker Fen (Foster 2024), which is closer to the focus of saltworking sites, including Mown Rakes (see Thorp this volume).

ABGs and Anglo-Saxon grave goods

Five of the 22 Anglo-Saxon graves recorded at Callow Carr contained food offerings in the form of meat joints, the majority from juvenile sheep, or hoggets (e.g., ewes and tups aged 11–24 months). The selection shows a strong preference for shoulder joints, notably from the right forequarters. These are present in four of the five graves, sometimes paired with other meat joints (i.e., hind shank, leg, loin and rib), and in one instance (grave 900137) with the left shoulder joint from the same animal (see grave catalogue). The economic loss represented by the sacrifice of juvenile sheep to provide prime meat as sustenance for both the living and the dead is understandable in this context, given their secondary importance after cattle, as is the selection of high-value meat joints as grave goods. Mortuary feasts are common in many cultures and archaeological evidence varies across different periods, but often only part(s) of the animal are included, the rest most probably distributed among the mourners (Rainsford 2021, 156–7).

Animal remains are relatively rare from Anglo-Saxon inhumation graves but are often found in cremation burials as pyre goods (Bond 1996; Rainsford 2021). Indeed, a recent survey of 43 Anglo-Saxon inhumation cemeteries found that only 41 burials from 10 sites included graves that contained placed deposits of animal bone, approximately 1% of the total number of burials surveyed (Rainsford 2017; 2021, 149). The survey also found that while almost all the animals selected were domesticates, sheep remains were the most common. Most of these derive from three cemeteries in the east of England, namely Lakenheath, Suffolk (*ibid*.,), Castledyke South, Lincolnshire (Nicholson 1998) and Oakington, Cambridgeshire (Rainsford 2018; Taylor *et al*. 1998). At both Lakenheath and Castledyke single or multiple meat joints from sheep and cattle, typically shoulder joints of hogget and beef ribs, as well as whole chickens, were recorded from graves. These were predominately placed in the graves of males at Lakenheath and females at Castledyke, the latter clustered together within part of the cemetery (Lee 2007). At Oakington the forefeet from juvenile sheep

were found in the graves of females and children, including a small cluster of three. The practice of placing sheep feet, which are usually discarded at the primary butchery stage, within the grave is unparalleled elsewhere, suggesting that it may have had a more abstract symbolism than the high-value food offerings at other sites (Rainsford 2018; 2021). There are obvious similarities between the animal remains from graves at these sites and Callow Carr, although no obvious spatial patterning was observed beyond perhaps the pair of adjacent graves (900193 and 900196) on the north-west side of the barrow. This said, the rarity of animal remains from Ango-Saxon inhumation graves indicates that this mortuary tradition was not widely practised and perhaps that the associated beliefs were only relevant to a small part of the community (Rainsford 2021, 155).

Human Bone

The Human Bone from White Crofts

Ceridwen V. Boston

Introduction

Ten inhumation burials, two of which also contained redeposited bone, were found dispersed across adjacent fields towards the western end of the site. Radiocarbon dates on bone samples from four graves indicate that the burials were made over an extensive period from the mid-Romano-British to early post-Roman/Anglo-Saxon periods (mid-2nd–mid-6th centuries; see López-Dóriga above), indicating considerable longevity of Romano-British burial customs in the area.

Methodology

Osteological analysis followed standard protocols (Buikstra and Ubelaker 1994; Mitchell and Brickley 2017). Age was estimated using recognised methods (AlQahtani *et al.* 2010; Brooks and Suchey 1990; Buckberry and Chamberlain 2002; Lovejoy *et al.* 1985; Maresh 1955; Meindl and Lovejoy 1985; Miles 1963; Schaefer *et al.* 2009; Scheuer and Black 2000). Adult sex was estimated from skeletal morphology (Buikstra and Ubelaker 1994, 16–21; Ferembach *et al.* 1980) and metrics (Bass 1995); degrees of certainty are expressed as defined, probable or most likely (latter two denoted '?' or '??' in Tables 8.90–1).

Stature was calculated from regression formulae devised by Trotter and Gleser (1958) and Trotter (1970). Skeletal non-metric traits followed Berry and Berry (1967) and Finnegan (1978). The severity of dental calculus was scored using Brothwell (1981, 155) and periodontal disease using Ogden (2008). Cortical bone preservation was recorded using McKinley's 0–5 grading system (2004a).

Stable isotope analysis (Sr and O) by the AIPRL team explored childhood provenance in 2 Romano-British individuals from White Crofts and 10 Anglo-Saxon individuals from Callow Carr (see below), and diet in 4 from the former and 13 from the latter. Sulphur values were also measured in the cases that were radiocarbon dated (Appendix C).

A summary of the osteology results is presented in Table 8.90. Details are held in the site archive.

Results

Disturbance and condition

Surviving grave depths ranged from 0.01–0.23 m (mean 0.15 m), and although truncation probably negatively affected bone survival in the shallowest graves, there is little correlation between grave depth and overall condition.

Fluctuating water levels so close to the lower-lying parts of the Lincolnshire Marsh were probably the most significant taphonomic factor in chemical leaching of bone.

Little trabecular bone survives, and cortical bone surfaces are largely destroyed (between Grades 3 and 5). Outlier 301038 is the worst preserved, comprising only a few degraded scraps of lower limb bone shaft. By contrast, a redeposited vertebral fragment in grave 301036 is well preserved (Grade 1). Skeletal completeness is similarly affected: six are less than 25% complete, four 25–50% complete, while two are 50–75% complete. The redeposited 5th–6th-century remains within grave 301291 comprise part of a cranial vault and a largely complete left femoral shaft (Grade 3), clearly deliberately selected elements for inclusion in the grave. The two elements directly overlay burial 301292 and were not clustered together, suggesting that they had been placed within the grave at the time of burial (prior to backfilling) rather than, for instance, inserted into a small scoop cut into the grave backfill at a later date. Two samples from the underlying male (burial 301292) were submitted for radiocarbon dating, although both failed, meaning the full chronology of the burials within this grave was not established. Overall poor bone survival in this assemblage severely limited its osteological potential.

Demography

A minimum of 12 Romano-British–post-Roman/Anglo-Saxon individuals were identified, including one from each of the graves, one represented by a redeposited fragment of cervical vertebra within grave 301036, and another by the redeposited remains from grave 301291 described above (Table 8.90). Given the poor bone preservation, sex estimation was somewhat tentative, but it does appear that males predominate: one male, four probable males and two possible males to one female. Two others could not be sexed. The redeposited cranium in grave 301291 is possibly female.

Table 8.90 Summary of osteological analysis of the human remains from White Crofts

Context	*Cut*	*Date*	*Deposit type*	*Quantification*	*Age/sex*	*Pathology*
301037	301036	?RB	R (grave fill)	<1% (1 x C frag)	>12 yr	-
301038		?RB	inh. burial	<1%	>10 yr	-
301279	301277	?RB	inh. burial	2% u.l.	subadult/adult >15 yr	-
301284	301282	?RB	inh. burial	35%	adult 40–50 yr ??male	DEH; dental calculus
301287	301285	?RB	inh. burial	20% s.u.l.	adult 30–40 yr ??male	dental calculus
301292 *^{14}C (failed x2), Sr/O, C/N*	301291	?early post-Roman	inh. burial	60%	adult 45–60 yr ?male	dental caries; calculus; amtl; extramasticatory wear; ddd – C x 1; enth – *linea asperae*, ischial tuberosity; pnb – tibiae
301293 *^{14}C*		early post-Roman	R (grave fill)	10% s.l.	adult 18–35 yr ??female	-
301300 *^{14}C, Sr/O*	301298	E–MRB	inh. burial	20%	adult 35–50 yr ?female	dental caries; amtl
301303	301302	RB	inh. burial (coffined)	10% a.u.l.	adult >20 yr ?male	-
301320 *^{14}C*	301319	E–MRB	inh. burial	45%	adult 40+ yr ?male	calculus; enth – *linea asperae*
301324 *^{14}C, Sr/O*	301322	RB	inh. burial	60%	adult 25–35 yr male	dental calculus; caries; ddd – C x 2; joint trauma – right ankle; enth – right patella & calcaneus, *linea asperae*; ?spondylolysis – L5
301341	301343	?RB	inh. burial	30%	adult 22–30 yr ?male	amtl; enth – *linea asperae*

Key: ^{14}C – radiocarbon dated; C/N – carbon & nitrogen isotopes; Sr/O – strontium & oxygen isotopes; s.a.u.l. – skull/axial skeleton/upper limb/lower limb (where all four areas of skeleton not represented); E–MRB – early–middle Romano-British; RB – Romano-British; C/L – cervical/lumbar vertebrae; amtl – antemortem tooth loss; ddd – degenerative disc disease; DEH – dental enamel hypoplasia; enth – entheseal changes; inh. – inhumation; pd – periodontal disease; pnb – periosteal new bone; R – redeposited; MV – morphological variation

Of the *in situ* remains, eight are adult, and two could not be more specifically aged than >10 or >15 years, but grave dimensions do suggest adult burials. Three males were less than 40 years of age and three were older adults, while the only probable female was 35–50 years and an unsexed individual was >20 years. The redeposited remains were adult, with the cranium aged 18–35 years.

The lack of immature burials and the predominance of males is inconsistent with the normal mixed age and sex demographic of the small late Romano-British assemblages so commonly found close to rural settlements in the late Romano-British countryside (Smith 2018a, 251). It is possible that the remains of shallower immature interments were lost to truncation, and that sex estimation of the worst-preserved skeletons is erroneous. As the burial ground was only partly excavated, it is possible that demography of the excavated remains does not represent the entire cemetery assemblage. Alternative scenarios, such as a settlement of retired Roman soldiers within the potential *territorium* of the colonia of Lincoln, is not supported by the young ages of several of the males, while an alternative quasi-military interpretation of this being a group of late/post-Romano-British militia raised to defend the 'Saxon Shore' of Lincolnshire (see Green 2020, 32) is unlikely given the wide spread of radiocarbon dates, some of which pre-date this period.

The only *in situ* female (301300) is one of two individuals that the isotopic analysis shows had non-local childhood origins – probably western Britain. The other (male 301292) may also have grown up in western Britain or in a warmer clime abroad (Appendix C). Although this might imply that they migrated to the area together, their graves were not in close proximity, and contemporaneity appears unlikely. The female died *cal. AD 205–250* (FTMC-WG68-1) and while direct radiocarbon dating of the male failed, the radiocarbon evidence indicates he was buried sometime after *cal. AD 415–505* (see López-Dóriga above). The only other individual to be isotopically tested was the male from grave 301322 (SUERC-126783: *cal. AD 235–300*), situated south of the other graves, who showed a local signature. Three tightly clustered parallel graves (301277, 301302 and 301343) probably represent broadly contemporaneous burials, possibly comprising individuals from the same household or family.

Metrics and non-metric traits

Poor preservation precluded most metrical analysis, including stature estimation. The right and left platymeric indices in the possible male from grave 301282 (70.2 and 72.1, respectively) fall within the platymeric range (marked anteroposterior flattening of the proximal femoral shafts). The left platycnemic index in probable male 301292 (68.6) falls within the mesocnemic or intermediate range of tibial shaft flattening. Although the specific cause of these plastic changes is not well understood, they appear to be influenced by biomechanics, environment and lifestyle (Ruff *et al.* 2013).

Bone preservation is too poor to identify the usual range of non-metric traits, bar one femur with a hypotrochanteric fossa (the result of strenuous *Gluteus maximus* muscle pull where it inserts into the bone at this point).

Pathology

Dental and skeletal pathological changes were noted in seven individuals (Table 8.90). Explanation of conditions also present in the Callow Carr Anglo-Saxon assemblage may be found in that section. Recognition of pathological lesions in the White Crofts assemblage was severely limited by poor bone survival. Twelve partial dental spaces/sockets and 73 permanent teeth (32 maxillary, 41 mandibular) survived (most alveolar bone, tooth roots and enamel surfaces were damaged). True prevalence rates (TPR) of common dental diseases are given but the sample size is too small to have any statistical validity. Five tooth crowns are carious (TPR 6.9%), 34 have slight to moderate calculus deposits (TPR 46.6%), 5 had been lost *ante mortem* (TPR 41.7%) and 1 crown shows slight dental enamel hypoplasia (TPR 1.4%).

Soft tissue trauma is apparent in the right ankle joint of male 301324 (probably a severe sprain) from prominent 'frilly' osteophytosis on the anterior distal tibial joint surface

margin and corresponding talar joint. There is also a suggestion of vertical crushing of the talus and calcaneus (possible 'lover's tryst' fracture' from landing onto the heel in a fall from a height; Galloway 1999, 211), but poor bone preservation made confident diagnosis impossible. The fifth lumbar vertebra in the same individual is likewise damaged and incomplete but the neural arch is separate from the body at the *pars interarticularis* – a feature of spondylolysis (Waldron 2009, 151).

Entheseal changes (largely roughening or bony ridging at muscle insertion sites) indicate muscle tearing from repetitive and/or strenuous exercise. Prominent *linea asperae* on the posterior femoral shafts are present in four males (at the insertion of the *Vastus* muscles of the thigh), while two of these individuals also had tendon damage elsewhere on the lower limbs.

Healed periosteal new bone (fine new bone deposited on or beneath the outermost bone layer or periosteum) covered the anteromedial aspect of the tibial shafts of the older male (burial 301292). The most common site for this lesion, it may be due to localised trauma and/or infection or venous ulceration associated with poor peripheral circulation (Weston 2008).

It was possible to observe degenerative disc disease in the cervical vertebrae of two males (three of the four cervical bodies present; Table 8.90).

Concluding remarks

Few rural late Romano-British inhumation cemeteries are known from Lincolnshire (Smith 2018a, 225), with the possible exceptions of those at Rectory Road, West Deeping (Monument Record ML183504) and at Winterton near Scunthorpe (Allen Archaeology 2015; Current Archaeology 2018). This dearth is most marked in eastern Lincolnshire, particularly in the Lincolnshire Marsh (Smith 2018a, 225), probably reflecting the limited archaeological excavation in that region until recently. Thus, the small burial group from White Crofts is a valuable addition.

Burial practices at White Crofts are typical of the national pattern of rural late Romano-British tradition of dispersed singletons or small nucleated grave groups located within the farmed landscape (Pearce 1999; Smith 2018a, 249–252). With the exception of a cluster of three tightly spaced graves, the White Crofts group is scattered across several adjacent fields and burial was undertaken over a long period, with radiocarbon dates showing they spread over several centuries, the latest extending into the 6th century. Continuity of Romano-British culture into the post-Roman period in Lincoln and north-eastern Lincolnshire is recognised from documentary, linguistic and archaeological evidence, suggesting that rather than disintegrating following the withdrawal of Roman authority and in the face of Anglo-Saxon invasion, a post-Roman regional government or political authority (centred in Lincoln) – probably the polity of *Lindes* – continued to function until the end of the 6th century AD (Green 2020, 56–77). Consequently, continuity of an (albeit altered) Romano-British way of life, including in burial practice in this region, is not surprising, particularly in this remote setting.

Late Romano-British rural cemeteries usually lie close to a farmstead and are assumed to contain the inhabitants (Pearce 1999; Smith 2018a, 249–252), but at White Crofts the largely adult male composition does not support this interpretation. Incomplete excavation of the whole burial group and the potential taphonomic obliteration of shallower graves of immature individuals might in part explain this anomaly, but the broad date range – with not all burials being contemporaneous – will also have been a factor. However, the possibility of differential burial practices according to sex, and specific social groups – such as militia – cannot be fully dismissed.

The Human Bone from Callow Carr

Ceridwen V. Boston

Introduction

The majority of the human remains from the Interconnector derived from the Middle–Late Anglo-Saxon inhumation cemetery (6th–7th century AD) at Callow Carr, where the remains of 23 *in situ* burials and redeposited bone of another individual were found at a Bronze Age round barrow.

Methodology

Analysis of the remains was carried out using the same methodology as that used for the study of the White Crofts burials (see above). In accordance with accepted practice, osteological sexing of immature individuals was not attempted (Brickley and McKinley 2004, 21; Mitchell and Brickley 2017, 34). However, the sex of non-adults at Callow Carr was established from amelogenin peptide analysis by AIPRL, Durham University, and six were sexed using aDNA by the Crick Institute (denoted and ^{P} and ^{D} respectively in Table 8.91).

A summary of the osteology results is presented in Table 8.91. Details are held in the site archive.

Results

Disturbance and condition

Surviving grave depth varied between 0.05 m and 0.43 m. Horizontal truncation of more superficial skeletal elements was evident in shallower graves – e.g., burial 900104 (0.05 m deep) and 900060 (0.1 m deep). There was little intercutting between graves, with the exception of grave 900104 where the skull and cervical vertebrae had been truncated by grave 900067 to the north and the lower limbs by grave 900114 to the south. The missing bone elements were not recovered within the backfill of the later graves. Animal burrowing was responsible for disturbance in a minority of burials.

Hostile burial conditions (possibly due to easy percolation of ground water through the porous chalk substrate) resulted in moderate to marked chemical leaching of all skeletons, although the extent is very variable between individuals. Root etching is also widespread. Cortical bone preservation was graded as 3 in five, 4 in thirteen and 5 in five individuals. Marked trabecular bone destruction resulted in particularly poor preservation of the axial skeleton and long bone epiphyses, curtailing metrical and pathological analysis in many individuals. Bone brittleness led to considerable fragmentation (mostly recent breaks), which also adversely affected metrical analysis potential. In most cases, skeletal completeness was most affected by chemical destruction, with the worst preserved being the infant in grave 900187, which was recognised only from tooth crowns and degraded long bone scraps recovered with an amber bead during environmental sampling of the grave backfill. Less than 25% of two other skeletons had survived, while three burials comprised only 25–50% of the skeletal remains. The remainder were considerably more complete, with eight skeletons being 50–75% complete and nine more than 75% complete.

Demography

A minimum of 24 individuals were recovered: 23 *in situ* burials within 22 graves and redeposited bone of another individual within the subsoil (Tables 8.91–2). Where known, osteological sex appears to be consistent with gendered grave goods. Sex distribution across the whole assemblage is fairly even (11 females:10 males), while in the adults, there are slightly fewer females than males (6:8). This proportion is very different from the sexed adults of Scremby (29 females:8 males), although female predominance in the latter may be due to greater truncation of more superficial, supine male burials and the better survival of deeper, flexed female ones (H. Willmott, pers. comm. April 2023). This association of body position and sex was not noted at Callow Carr (see grave catalogue). A less marked female predominance was noted in several other Early–Middle Anglo-Saxon inhumation assemblages, such as Adwick-le-Street, South Yorkshire (N = 30 sexed adults; Egging Dinwiddy 2016), Castledyke South,

Table 8.91 Summary of osteological analysis of the human remains from Callow Carr

Context	*Cut*	*Deposit type*	*Quantification*	*Age/sex*	*Pathology*
900001	topsoil	R	<1%	adult 20–26 yr	-
900021 ^{14}C, *Sr/O*	900019	inh. burial	60% s.u.l.	subadult 14–16 yr female^{D}	dental calculus; DEH; *cribra orbitalia* & *femoralis*; nbd, ??brucellosis – L5 body; spondylolysis – L5; MV – bipartite Inca bone, multiple lambdoid ossicles & at asterion, left acetabulum ?abnormally shallow, shovelled incisors
900047		inh. burial	30% s.u.l.	juvenile 5.5–7.5 yr male^{D}	MV – multiple large lambdoid ossicles; shovelled incisors
900062	900060	inh. burial	20% a.u.l.	adult >19 yr	-
900064 ^{14}C	900063	inh. burial	70%	adult 30–40 yr ??male	dental calculus; periapical abscess; DEH; chipped upper incisors & RL7; endocranial nbd; MV – palatal torus
900068 ^{14}C	900067	inh. burial	60% a.u.l. a) C x 4; teeth x 7, rib = ?900105	adult 40–50yr ??female	spondylolysis – L5; spondylolisthesis – L2 & 3; ?fracture – left radial head & patella; enth – deltoid tuberosities, supracondylar ridges, left radial tuberosity, *M. Brachialis*, right ischium, *linea asperae*, Soleal lines; op – T, L, S1, ribs; ddd – L5 & S1
900071	900070	inh. burial	55%	adult 40+ yr ?male	dental caries; calculus; endocranial nbd; oa – left hip; op – right hip, left rib; MV – femora very platymeric
900080	900079	inh. burial	80%	adult 20–30 yr ?female	DEH; dental calculus; retained deciduous canine & unerupted permanent canine; chronic maxillary sinusitis; *cribra orbitalia*/orbital nbd; Sch – T9–12; enth – humeri; costoclavicular syndesmosis damage – clavicles; MV – retained deciduous canine with UR3 impaction, asymmetrical nasal root
900100 ^{14}C, *Sr/O*	900098	inh. burial	80%	subadult 14–16 yr male^{D}	dental calculus; ectocranial nbd – right temporal bone/temporomandibular joint, right mandible; MV – Wormian bones
900105 ^{14}C, *Sr/O*	900104	inh. burial	20% a.u. = 90115a = 90068a	juvenile/subadult 11.5–14.5 yr female^{P}	dental calculus
900115 *Sr/O, C/N*	900114	inh. burial	90% a) hand bones x 2 = ?900105	adult 50–60 yr male^{D} a) >12 yr	dental calculus; pd; DEH; depressed cranial fracture – left parietal, partial avulsion fracture – left auricular surface; frontal sinusitis; left & right orbital lesion/*cribra orbitalia*; Sch – T6–L4; op – ribs, distal femora, olecranons, right MtC1 head, C/T/L/S bsm, af; oa – ribs 6 & 7; costoclavicular syndesmosis damage – right clavicle; enth – left & right rib tubercles, left lesser humeral tubercle, right radial tubercle, *linea asperae*, Soleal lines; hyperflexion – left elbow; MV – bipartite Inca bone, shovelled second incisors, ossified thyroid cartilage
900122	900085	inh. burial	40%	adult 22–32 yr ??female	dental calculus
900133 ^{14}C, *Sr/O*	900131	inh. burial	85%	adult 35–45 yr male	dental calculus; dental caries; periapical abscess; DEH; perimortem SFT – C2–6; healing spondylolysis – L3; *osteochondritis dissecans* – right humerus; pnb – left tibia; oa – c-v; Sch – T x 5; op – femoral heads, T x 1; costoclavicular syndesmosis – left clavicle; enth – hand PP & MPs, *linea asperae*, Soleal lines; MV – lambdoid ossicles, occipital bunning, Eagle's syndrome – left temporal bone
900139 ^{14}C, *Sr/O*	900137	inh. burial	80%	adult 30–40 yr female^{D}	dental calculus; caries; DEH; orbital nbd; HFI; spondylolysis – L5; ?brucellosis – L6; op – ribs, Ts; MV – shovelled incisors; diminutive upper M3s & UL2; humeral supracondylar ridges; lumbarisation/additional 6th L; ossified thyroid cartilage
900142 ^{14}C, *Sr/O*	900140	inh. burial	60%	adult 40+ yr ?female	dental calculus, particularly left side – ?facial nerve palsy/dental disease; extramasticatory wear; ?early HFI; endocranial nbd; op – C2 dens; oa – L x 4; MV – humeral supracondylar ridge
900163	900161	inh. burial	80%	subadult 14–16 yr ?female	dental calculus; DEH; right mastoid process anomalous shape – ?developmental; spondylolysis – L5; MV – acetabular crease
900174 ^{14}C, *Sr/O*	900172	inh. burial	80%	adult 20–25 yr male	chronic frontal & maxillary sinusitis; Sch – T10; MV – M3 agenesis/non-eruption
900177 ^{14}C, *Sr/O, C/N*	900175	inh. burial	80%	adult 50+ yr female	amtl; dental caries; dental calculus; periapical abscess; DEH; *cribra orbitalia*; enth – left radial tuberosity, hand phalanges, soleal lines, *linea asperae*; parturition scars – pubes; SDJD & oa – lower T; op – right acetabulum, T, L
900186/900199	900184	inh. burial	30% a.u.l.	juvenile/subadult 12–15 yr	–
900189	900187	inh. burial	2% s.l.	infant 2.5–3.5 yr female^{P}	–
900191	900190	inh. burial	75%	adult 50+ yr male	amtl; dental calculus; dental caries; pd; periapical void; endocranial nbd – occipital bone; HFI; ?avulsion fracture – left mandible; spondylolysis & secondary oa – L5; anomalous articulation, ??cervical rib – C7/T1; op – T, L; oa – L; ddd – T; op – ribs, acetabula, femoral condyle; enth – *linea asperae*, M. *Gluteus minimus*, right Achilles tendon; MV: M3 impaction, M3 enamel pearl, cervical rib – C7/T1, ?lumbarisation – 6th L
900194	900193	inh. burial	70%	adult 28–32 yr ?female	MV – I2 shovelled incisors
900197 ^{14}C	900196	inh. burial	78%	adult 30–40 yr male^{D}	amtl; dental calculus; pd; frontal sinusitis; Sch – T9; ?ankle trauma – nbd – right talar & calcaneal joint surfaces; op – dens, L5; MV – ?lumbarisation, pointed lower T bodies
900206 ^{14}C, *Sr/O*	900205	inh. burial	80%	adult 22–28 yr ?male	DEH; *cribra orbitalia* – orbits; enth – Soleal lines; MV: shovelled second incisors

Key: ^{D} – DNA sample; ^{P} – peptide sample; ^{14}C – radiocarbon dated (including C, N & S isotopes); C/N/Sr/O – carbon, nitrogen, strontium, oxygen isotopes; inh. – inhumation; R – redeposited; s.a.u.l. – skull/axial skeleton/upper limb/lower limb (where all four areas of skeleton not represented); C/T/L/S – cervical/thoracic/lumbar/sacral vertebrae; MtT/P – metatarsal/phalangeal; af – articular facet; amtl – ante mortem tooth loss; bsm – body surface margins; c-v – costovertebral; ddd – degenerative disc disease; DEH – dental enamel hypoplasia; enth – entheseal changes; HFI – hyperostosis frontalis interna; IP – intermediate phalange; nbd – new bone deposition; op – osteophytes; oa – osteoarthritis; pd – periodontal disease; pnb – periosteal new bone; po – porosity; Sch – Schmorl's nodes; SFT – sharp force trauma; MV – morphological variation

Barton-on-Humber, Lincolnshire (N = 120; Boylston *et al.* 1998) and Sewerby, East Yorkshire (N = 23; Hirst 1985, 34), where the female:male ratio ranged between 1.4 and 1.6:1. However, the converse was true at Norton (N = 71; Marlow 1992), where there were slightly more males (0.9:1). Thus, the sex distribution at Callow Carr is unusual but not unique and may reflect differing local burial traditions of ethnically diverse Anglo-Saxon groups. However, the sample size is very small (as are some of the above assemblages). In addition, the burial ground was not excavated in its entirety, and zoning by sex – a feature present in other Conversion-period cemeteries (Buckberry 2000a, 201, 227) – is possible.

Small sample size also precluded detailed age distribution analysis, but no obvious difference in adult age-at-death between the sexes was noted (Table 8.92), but in the immature remains four of the five sexed individuals are male. Seven individuals are immature (29.2%), the youngest being 3–4 years. The absence of newborns or younger infants may be due to truncation of their shallower graves – a common feature of Anglo-Saxon cemeteries (Buckberry 2000b) – or to different cultural perceptions and funerary treatment of newborns and young infants in death. A surprisingly high proportion of the Callow Carr assemblage is aged 12–16 years (three females and one male). A similar peak in mortality in this age category was present at Castledyke South and Norton (Boylston *et al.* 1998, 223; Marlow 1992, 109). Anglo-Saxon grave goods suggest that 10–12 years marked the transition to adulthood in both sexes in Anglo-Saxon society (Crawford 1999, 48), and perhaps greater risks associated with early 'adult responsibilities' (e.g., childbearing and warfare) resulted in their early demise. There is a peak age-at-death of Callow Carr adults of both sexes of 28–45 years, with only three conclusively surviving beyond 50 years (Tables 8.91–2). A redeposited third molar in subsoil 900001 was that of a young adult.

The cemetery was not excavated in its entirety, limiting interpretation of demography. Although 7th–8th-century burial grounds are typically much smaller than their predecessors – usually <100 graves (Bennet 2009, 27–28) – and probably represent only one or a few localised settlements (Lucy 2000, 124), they are generally larger than the 22 graves recorded in this cemetery e.g., Scremby: 49 (Willmott *et al.* 2024); Adwick-le-Street, 37 (Egging Dinwiddy 2016) and 149+ at Rothley, Leicestershire (Inskip 2016).

Table 8.92 Summary of the age and sex distribution of the Callow Carr Anglo-Saxon assemblage

Age	*In situ*	*Redeposited*
infant 3–4 yr	1 (1F)	
juvenile 6–8 yr	1 (1M)	
juvenile/subadult 12–15 yr	2 (1F, 1?sex)	
subadult 14–16 yr	3 (1F,1?F,1M)	
Subtotal	7 (3F, 1?F, 2M, 1 ?sex)	
adult 20–35 yr	5 (2?F,1??F,1M, 1?M)	1 (?sex)
adult 30–45 yr	4 (1F, 2M, 1??M)	
adult 40–55 yr	1 (1??F)	
adult 50–65 yr	1 (1M)	
adult >18 yr	1 (?sex)	
adult >40 yr	2 (1?F,1?M)	
adult >50 yr	2 (1F, 1M)	
Subtotal	16 (2F, 2?F, 2??F, 5M, 2?M, 1??M, 2 ?sex)	1 (?sex)
Total	23 (5F, 4?F, 2??F, 7M, 2?M, 1??M, 2 ?sex)	1 (?sex)
Grand total	24 (5F, 4?F, 2??F, 7M, 2?M, 1??M, 3 ?sex)	

Key: F – female; M – male; ?sex – unknown sex

Samples from Callow Carr have been supplied to the Francis Crick Institute for inclusion in its *aGB 1000 Ancient Genomes from Great Britain* project. The results were not available at the time of the preparation of the current publication, but it is hoped they will further our understanding of relatedness between individuals within the cemetery. Preliminary findings indicate a maternal relatedness between the boy from grave 900019 (burial 900047) and the adult female from grave 900137 (burial 900139), who were located 10.3 m apart, and possibly between the boy and the subadult female buried with him in the double grave (900019) (Table 8.91; Fig. 6.43), but results indicate that they are definitely not siblings. The subadult female may also be maternally related to the adult female from grave 900137, but not in the same way as the boy (T. Booth, pers. comm. September 2024).

Metrics

Stature estimation was possible in one adult female and four males (Table 8.93). The female stature is slightly greater than contemporaneous female means such as 1.6 m at Castledyke South (Boylston *et al.* 1998, table 6), 1.64 m at Norton (Marlow 1992) and nationally (1.61 m; Roberts and Cox 2003, 220). The male mean is slightly higher than in the Adwick-le-Street males (1.73 m; Egging Dinwiddy 2016), at Castledyke South (1.72 m; Boylston *et al*. 1998, table 6) and the Anglo-Saxon national average of 1.72 m in Roberts' and Cox's sample (2003, 220), but slightly lower than Rothley, Leicestershire (1.75 m; Inskip 2016). Stature is widely used as a yardstick for the general health of a population, particularly the nutritional status of individuals in their growing years, but is also very influenced by genetic potential (Floud *et al*. 1990, 18). The greater stature of the Callow Carr individuals tentatively suggests better general health than their peers, but may also reflect genetic diversity between different groups in eastern England.

Table 8.93 Stature estimation and metrical indices by sex in the Callow Carr adults (N = 16)

	Male/female	*No. of elements*	*Range*	*Mean*
Stature	M	4	1.70–1.77 m	1.74 m (5' 8")
	F	1	1.66 m	1.66 m (5' 5")
Platymeric	M	14	57.2–98.6	75
	F	13	73.3–87.3	77.7
Platycnemic	M	10	63.4–75.9	69.4
	F	7	72.1–79.3	75.7
Robusticity (femur)	M	2	119.2	119.2
	F	2	115.4	115.4

There is considerable variation in platymeria (reflecting anteroposterior flattening of the proximal femoral shaft) within the assemblage (Table 8.93). The means of both sexes fall within the platymeric range and are slightly more platymeric than at Adwick-le-Street (83.4 and 79.4, respectively: Egging Dinwiddy 2016) but less than at Rothley, The Grange (female 79.5, male 77.7: Inskip 2016).

Platycnemic indices (reflecting mediolateral flattening of the tibial shaft) ranged from mesocnemic to eurycnemic in both sexes (Table 8.93), but the female mean (75.7) is eurycnemic while the male mean of 69.4 is mesocnemic. At Adwick-le-Street, the female mean was 72.8 and the male was 75.9 (Egging Dinwiddy 2016, 94), the two figures being respectively lower and higher than their equivalents at Callow Carr.

Mean robusticity (reflecting the relative size of the femoral shaft), unsurprisingly, was higher in the two males than in the two females measured. These values show fewer sex differences than at Adwick-le-Street, where females were markedly more gracile – 121.9 and 106.4 (Egging Dinwiddy 2016), and conform with the observed tendency of several Callow Carr females to be of fairly robust build, as were most of the men.

Table 8.94 Non-metric traits observed in the Anglo-Saxon assemblage (N = 19)

Trait	*n*	*N*	*Trait*	*n*	*N*
Metopism	0	13	Supracondylar process	5	19
Supraorbital notch	9	14	Septal aperture (humerus)		5
Supraorbital foramen	2	13	Acetabular crease	8	21
Zygomaticofacial foramina multiple	4	13	Allen's fossa	0	3
Parietal foramina plural	0	7	Poirier's facet	2	4
Sutural bone/s at lambda	2	7	Plaque	0	3
Sutural bones – lambdoid suture	5	10	Hypotrochanteric fossa	6	20
Sutural bones – bregma	0	6	Exostosis in trochanteric fossa	5	19
Sutural bones – coronal	0	8	Third trochanter	6	17
Sutural bones – epipteric	1	1	Squatting facets – medial	0	3
Sutural bones – asterion	1	2	Squatting facets – lateral	1	3
Double condylar facets	0	6	Vastus notch	0	4
Precondylar tubercle	0	4	Os trigonum	0	10
Occipital bunning	1	10	Medial talar facet	0	3
Auditory torus	0	10	Lateral talar extension	0	5
Mastoid foramen (extrasutural)	1	10	Inferior talar articular surface	2	5
Plural mental foramen	0	19	Anterior calcaneal facet double	3	6
Mandibular torus	3	22	Anterior calcaneal facet absent	0	5
Mylohyoid bridge	4	14			
Palatine torus	0	1			
Teeth – enamel pearl	1	223			
Teeth – shovelling	8	15			

Key: n – number of traits observed; N – number of landmarks present

Non-metric traits

Non-metric traits are anatomical variations that confer no significant adaptive advantage on the individual. Some are inherited, while others are the result of habitual physical activities, or a combination of intrinsic and extrinsic factors. The Viking Link sample size is too small for statistical validity but the frequency of observed traits is presented in Table 8.94 (see also Table 8.91).

Noteworthy is the relatively high proportion of crania with lambdoid ossicles, including two bipartite Inca bones (subadult female 900021 and adult male 900115; Fig. 8.47). More common in native American and Sub-Saharan crania, Inca bones are fairly rare in modern Europeans, with UK rates ranging from 2 to 5% (Hanihara and Ishida 2001). The occurrence of this usually rare trait in the Callow Carr assemblage suggests familial links between the two individuals. In addition, the crania of both individuals buried in grave 900019 show multiple large lambdoid ossicles and shovelled incisors, while one male (burial 900115) displays the latter, as does the female from grave 900137 who is maternally related to the boy from grave 900019 (see above). In total, this variant (mostly in I2) is present in individuals from six of the *in situ* burial remains and in redeposited teeth from the subsoil (TPR 14.6%; 8/55). Other dental anomalies (Tables 8.91 and 8.94) were observed in the remains of two other females and three males.

Cranial anomalies include Eagle's syndrome – an abnormally long styloid process of



Figure 8.47 Male 900115: Bipartite Inca bone (arrow), a trait shared with female 900021

the temporal bone – in an adult male (900133; left 33.3 mm, right incomplete), and asymmetric and anomalous morphology of the right mastoid process of a subadult (900163). With the exception of spondylolysis (see below), there are few midline defects, exceptions being abnormal articulation in the incomplete C7 or T1 of an older male (900191), which suggests a cervical rib, and a sixth lumbar vertebra (possibly due to lumbarisation but the sacra are too damaged to be sure) in this and one other male (burial 900197).

Pathology

Dental disease

Dentition is present in nine females and nine males: 223 permanent mandibular teeth and 170 sockets, and 223 maxillary teeth and 116 sockets, respectively. There are also 22 deciduous teeth and one socket. No dental disease was observed in the deciduous dentition.

Most dental diseases are commonly linked to a diet including carbohydrates (particularly simple sugars) and to poor oral hygiene (Hillson 1996, 285–6), with oral bacteria breaking down food residues to form a corrosive plaque (calculus), which may lead to caries and gum disease (periodontal disease), abscess formation and/or *ante mortem* tooth loss (AMTL). The last may also result from dental trauma. Dental enamel hypoplasia occurs in the developing tooth crown due to an interruption or slowing of normal enamel deposition, usually as a result of prolonged episodes of illness or malnutrition in the first six or seven years of life (*ibid*., 130), appearing as pits or depressed lines in the enamel surface. Since enamel does not remodel, these defects remain as permanent markers of childhood stress episodes.

The true prevalence rates (TPRs) of dental lesions in the Callow Carr assemblage were compared with Early and Middle Anglo-Saxon assemblages from Lincolnshire and Yorkshire and with the average of multiple early medieval/post-Roman assemblages of the period (Table 8.95). The Callow Carr caries rate is similar to the Castledyke South assemblage, lower than Adwick-le-Street, but slightly higher than the two other Yorkshire assemblages and the national mean. The calculus rate also falls within the range seen at other sites, being lower than Castledyke South, but is higher than Adwick-le-Street and the national mean. However, the periapical voids or abscess rate is

Table 8.95 Prevalence rates (TPRs) of dental pathology in the permanent erupted dentitions of Callow Carr (N = 18) and other Anglo-Saxon (post-Roman/early medieval) assemblages.

Assemblages	*Caries*	*Calculus*	*Periapical voids*	*Periodontal disease*	*AMTL*	*DEH*	*Reference*
Callow Carr	5.3% (24/446)	30.5% (136/446)	4.9% (14/286)	20.6% (59/286)	2.4% (7/286)	5.4% (24/446)	
Castledyke South, Lincs	5.2% (111/2134)	46% (978/2149)	0.8% (22/2731)	-	7.7% (209/2731)	9% (197/2189)	Boylston *et al.* 1998
Adwick-le-Street, S. Yorks	9.80% (64/655)	25.80% (169/655)	2.8% (11/389)	20% (78/389)	3.8% (15/389)	17.6% (117/665)	Egging Dinwiddy 2016
West Heslerton, N. Yorks	2.4% (41/1733)	-	0.2% (3/1667)	-	1.2% (20/1667)	-	Cox 1999
Norton, Teesside	3.4%	-	0.7%	-	4.1%	-	Marlow 1992
British sites (multiple)	4.2% (1636/38911)	39.2% (1399/3567)	2.8% (1145/41705)	-	8% (3330/41400)	7.4% (384/5167)	Roberts and Cox 2003, 190–4

Key: AMTL – antemortem tooth loss; DEH – dental enamel hypoplasia



Figure 8.48 Female 900142: Very heavy unilateral calculus deposition on the left teeth, possibly due to a facial nerve palsy



Figure 8.49 Male 900115: Partial avulsion fracture (arrow) of the right sacroiliac joint margin of male 900115

much the highest. AMTL is the lowest of these assemblages, bar West Heslerton, Yorkshire. Data for periodontal disease was restricted to Adwick-le-Street, which shows a similar rate. Although the small sample size of Callow Carr does make such interpopulational comparisons statistically questionable, it is nevertheless interesting that disease prevalences lie within the ranges seen elsewhere, except for the occurrence of periapical voids, which is higher.

Overall, these rates indicate fairly good dental health, presumably through the lack of simple sugars (restricted to seasonal fruits and honey) in their mixed agrarian diet. Occlusal wear from grit introduced during grain processing may have exercised a protective effect on caries development, as food was less likely to become trapped between cusps and cause decay, but in this assemblage, attrition is not marked enough to expose the root canal, which may lead to periapical abscess formation and AMTL.

Extremely heavy calculus deposition is evident on both the left upper and lower teeth of an older female (burial 900142), including covering the occlusal surfaces of the molars (Fig. 8.48), while very little calculus is present on the right teeth. This indicates an abnormal chewing pattern using only the right side of the mouth, while food pooling in the left side after swallowing results in heavy calculus formation (Molek *et al.* 2024). This one-sided chewing may be habitual, or an effort to avoid chewing with painful teeth and gums, or may indicate neuromuscular injury, such as facial nerve palsy/Bell's palsy or stroke that adversely affects mastication and/or the swallow reflex. In this individual, dental disease could not be excluded because of extensive post-mortem damage.

Trauma

Three definite and two probable fractures were noted in three adults, plus six spondylolytic lesions described below. There is a shallow, well-healed depressed cranial fracture (37 x 28 mm) involving the outer table and diploë of the left parietal bone of an older male (burial 900115). He also displayed a very unusual partial avulsion of the anterior margin of the auricular surface and adjacent bone of the right ilium (Fig. 8.49). There is a clear partial separation of a 'U'-shaped 'tag' of bone (20 x 2 mm) from

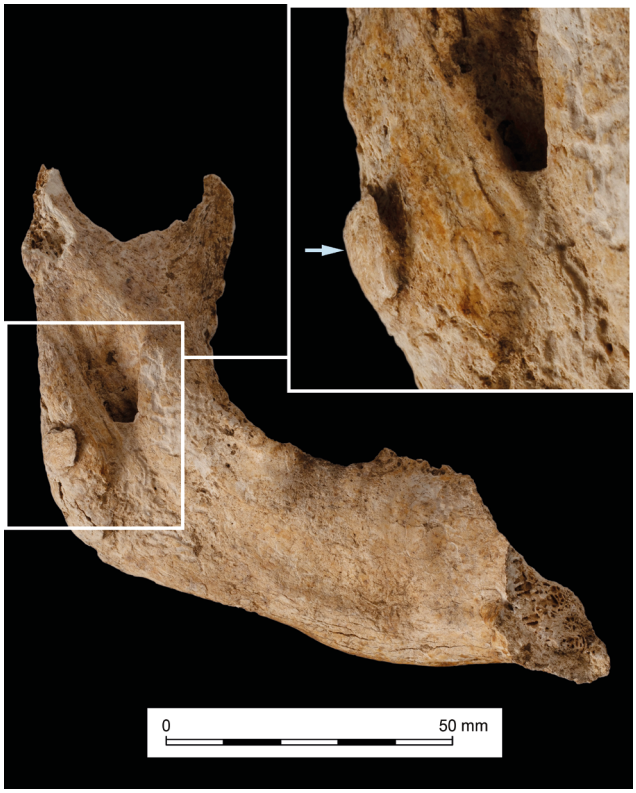


Figure 8.50 Male 900191: Lingual view of the partial avulsion fracture (arrow) of the left mandibular ramus; also note recent antemortem tooth loss of molars; Inset: close-up of lesion

its original position – probably disruption caused by contraction or shearing of the anterior sacroiliac ligament, which holds the joint in articulation and is seminal to pelvic ring stability. Such ligamentous injuries are unusual but are often associated with pubic ramus fractures, and some dangerous 'open book' fractures of the pelvic girdle usually associated with high-energy collisions (Steinke *et al.* 2014). Unfortunately the right pubis had not survived for examination. The most probable scenarios in this case are a high-level fall, or crush injury involving livestock. The dense, smooth edges of the fracture indicate advanced healing.

Another unusual probable partial unilateral avulsion fracture is present on the lingual aspect of the left mandibular ramus of an older male (burial 900191), distal to the mylohyoid foramen and approximately 100 mm superior to the mandibular angle (Fig. 8.50). Here too, a small 'U'-shaped tag of bone (8 x 7 mm) has been separated from its normal position but remains partly attached to the rest of the ramus. The *Medial pterygoid* muscle inserts into the mandible at this point, and the lesion may represent partial avulsion of the tendon.

A possible partial fracture or crack in the left radial head was noted in an older female (burial 900068), who also has a probable transverse depressed linear fracture line of the left patella joint surface in the transverse plane. Unfortunately, both elements are too damaged to be confident of the diagnoses.

The right superior talar joint surface and the corresponding subtalar joint surfaces of an adult male (burial 900197) show unusual granularity (possibly an overlying layer of very fine new bone) and small islands of more dense new bone suggesting ankle joint trauma (possibly a sprain with inflammation and/or bleeding within the capsule). The distal tibia and fibula were too damaged to explore associated entheseal changes.

Spondylolysis

Spondylolysis is the separation or fracture of the neural arch from the vertebral body at the *pars interarticularis* (Waldron 2009, 151), most commonly in L5. Structural instability from this separation may cause the vertebral body to slip forwards on the one below (spondylolisthesis), causing back pain and neurological complications (*ibid*., 153). In palaeopathology, spondylolysis is often considered a dysplastic developmental anomaly, while in modern medical literature it is regarded principally as an adolescent stress fracture from acute or repetitive hyper-extension (back-bending) or lower back rotation (Sakai *et al.* 2010), but has been associated with evolutionary spinal structural adaptions to bipedalism (Plomp *et al.* 2022). Thus, inherited propensity and specific physical activity (and probably an interaction of the two) may affect its expression.

Four Callow Carr females and two males each have one lumbar vertebra with spondylolysis (CPR or per capita rate of 26.1%; 6/23) – of L3 in one (TPR 7.1%; 1/14), and of L5 in four cases (TPR 30.7%; 4/13). While most were well-healed lesions, the fracture surfaces of L5 in a subadult female (burial 900021) and the left of L3 in an adult male (burial 900133) were still healing at the time of death. Altered body mechanics is suggested by pseudo-facets and altered neural arch morphology in the L2 and 3 bodies of an older possible female (burial 900068), who also had L5 spondylolysis. Fracture instability is indicated by eburnation of the fractured surfaces of L5 (secondary osteoarthritis) in an older male (burial 900191).

The notably high spondylolysis TPR, particularly in females, exceeds the prevalence noted elsewhere in Anglo-Saxon assemblages, e.g., Bulford (10.1%) and Tidworth (8.8%) in Wiltshire (Robertson and Boston forthcoming), and Butler's Field, Lechlade, Gloucestershire (5.4% of L4 and 5; Harman 1998), but is lower than the rate of 35.7% in the small assemblage from Twyford,

Winchester, Hampshire (Egging Dinwiddy 2011), while at Castledyke South, 10.1% of spines were affected (Boylston *et al.* 1998, 29). The reason for this very high prevalence among Anglo-Saxons, especially in females, is unclear. Everyday farming activities involving twisting of the lower spine (e.g., scything, threshing and shovelling) are all possible (although slightly later images depict these as male activities), as are recreational activities (e.g., acrobatic dancing and tumbling). While males performing both activities are recorded in historical sources (Levick and Williamson 1995), little has been written on female forms of entertainment in this period.

Sharp force trauma

Probable perimortem sharp force trauma to the back of the neck of the male (900133) from grave 900131 is indicated by a near vertical but slightly inferomedial-superolaterally directed slice through the posterior aspect of the right neural arches of C2–4 and nicking of the spinous processes of C5–7 (Fig. 8.51). Although parts of the atlas, skull base and right temporal bone are missing/damaged, the occipital bone, which would have been hit had the man's head been upright, showed no sign of injury. The aligned cut marks are consistent with a single blow to the back of the neck, made with a sharp, heavy blade (probably a sword or possibly a seax rather than a knife), while the man's head was bowed forward. The direction of the blow appears to have been upwards towards the head, with the assailant being positioned behind and slightly to the left (forehand blow) or behind and slightly to the right (backhand blow). This injury is most likely to have been delivered when the victim was on all fours or almost prone. The longitudinal axis of the blow up the spine does not suggest an attempt at decapitation (e.g., in an execution), where the blow usually transversely bisects the neck (horizontally). Thus, the injury is more likely to have occurred in a brawl or skirmish, possibly as the victim was trying to escape.



Figure 8.51 Male 900133: Posterior aspect of the cervical vertebrae showing a series of perimortem cut marks (arrows) made by a single longitudinal blow to the back of the neck; inset: close-up of cutmarks on C3–5

Osteochondritis dissecans

Osteochondritis dissecans is the necrosis (death) of a discrete area of cartilage and bone of a convex joint surface due to shearing of the blood vessels that supply it. The condition is the result of repeated micro-trauma or acute trauma to the joint during strenuous use, particularly in childhood and adolescence (Waldron 2009, 153–4). A smooth round depression with several fine radiating fractures on the inferoposterior aspect of the trochlea of the right humerus indicates such a healed elbow injury in the male who later suffered sharp force trauma (burial 900133).

Entheseal changes and syndesmosis damage

Bony ridging and/or abnormal porosity at the point of tendinous insertions, or entheses, in nine individuals probably reflects trauma to that particular tendon as a consequence of acute injury or repetitive physical activities. Both sexes were affected, reflecting a physically active, probably agricultural, lifestyle. Cavitations and ridging in the rhomboid fossa of the medial clavicles indicate damage to the costoclavicular ligament that inserts at this point. These lesions are present bilaterally or unilaterally in two males and one female (burials 900115, 900133 and 900080; TPR 16.7%; 4/24: Table 8.91).

Parturition scars

Moderate dorsal pubic pitting, previously known as parturition scars, is present on the pubes of an older female (burial 900177). Although their direct association with pregnancy and childbirth has been questioned (Cox 2000), such pitting is principally found in adult females and probably is the result of localised ligament damage associated with difficult labour (Roberts and Manchester 2005, 33).

Metabolic disease

Orbital lesions including cribra orbitalia

Cribra orbitalia is widely thought to develop in childhood from a deficiency in iron (Stuart-Macadam 1991), folic acid and/or vitamin B12 (Walker *et al.* 2009), most commonly the result of inadequate dietary intake, impaired gut absorption or excessive expenditure (e.g., in haemorrhage, enteric parasitic infestations or haemolytic disease, such as malaria) (Roberts and Manchester 2005, 231). Anaemia associated with *Plasmodium vivax*, a mild form of malaria, has been mooted as a cause of *cribra orbitalia* in Eastern England in the Anglo-Saxon period, being more significant in fenlands than in higher, drier environments, such as the Wolds (Gowland and Western 2012). *Cribra femoralis*, sieve-like lesions on the anterior femoral neck, is also associated with anaemia. However, where orbital lesions are slight and well-healed, it is often difficult to differentiate between *cribra orbitalia* and new bone deposition associated with other deficiency diseases, such as scurvy or rickets (Brickley 2018).

Three females, one possible female and a male all show slight, well-healed orbital lesions (Stuart-Macadam 1991, Stages 1–2) (TPR 47.4%, 9/19; CPR 21.7%, 5/23). This is comparable to the TPR of 25% of Middle Anglo-Saxon burials at Stoke Quay, Ipswich (Loe 2020), but much higher than the 3% at Castledyke South (Boylston *et al.* 1998). Distinguishing between *cribra orbitalia* and scurvy was problematic in three of the Callow Carr individuals, but in a subadult female (burial 900021), co-occurrence of orbital lesions and bilateral *cribra femoralis* makes anaemia more probable. Although very slight in expression, the rate of orbital lesions in this assemblage is high, but the sample size is really too small for meaningful interpretation.

Hyperostosis frontalis interna

Hyperostosis frontalis interna (HFI) is principally found in post-menopausal females, suggesting sex hormonal mediation, but has also been linked to female obesity, metabolic syndrome and hyperandrogenism (Western and Bekvalac 2020, 144), and to some inherited disorders (She and Szakacs 2004). In males, it appears to be associated with prolonged oestrogen stimulation, such as in modern males with atrophied testes (Hershkovitz *et al.* 1999) and in pre-pubescent castrates' skeletons (Belcastro *et al.* 2011). However, HFI has also been linked to a diet high in animal products and low in cereals (Szeniczey *et al.* 2019). The condition is largely asymptomatic.

The frontal bones of a female, a possible female and a male adult (TPR 20%, 3/15) showed changes suggestive of early development of HFI: slight endocranial thickening and several small raised, dense nodules (burials 90139 and 90191), and slight endocranial thickening but no nodules (burial 900142). The first is unusual in also having markedly cross-sectional thickening of the element due to expanded but well-organised diploë (i.e., is not Paget's disease).

Endocranial new bone deposition

New bone deposition on the endocranium or inner surface of the cranial vault is an inflammatory response to intracranial bleeding associated with trauma, scurvy or inherited coagulopathies, to infection (such as encephalitis or meningitis) or, more rarely, to brain tumours (Lewis 2004). Well-healed lesions are present in three males (burials 900064, 900071 and 900191) and one female (burial 900142), all located on the cruciate eminence of the occiput, and two also on the frontal bone and terminal branches of meningeal vessels (suggesting intracranial bleeding, possibly scorbutic).

Infection

Periosteal new bone, probable infection

Periosteal new bone deposition (pnb) is a non-specific bony reaction to a wide range of disorders, including bony infection, trauma, bleeding (e.g., in scurvy), venous ulceration and chronic systemic inflammatory disorders (Weston 2008). The cause of pnb is thus difficult to unpick. The condition is usually a fairly common lesion on archaeological bone, but widespread taphonomic damage to most bone surfaces of the Callow Carr assemblage precluded its identification, except in one male (burial 900133), where striated pnb (healing) overlay the medial aspect of the left tibial mid-shaft. Localised infection is the most probable cause.

A small patch of grey porous new bone on the right mandibular ramus of the subadult male from grave 900098 (burial 900100) near the socket of the third molar was just beginning to remodel at time of death (early healing). This may be associated with inflammation associated with M3 eruption, but further very fine active new bone was also present on the right temporal bone immediately posterior to the temporomandibular joint. The cause of these changes is very unclear but may be associated with inflammation associated with mastication on that side.

Chronic sinusitis

Cold, damp climate, poor air quality (particularly from smoke of indoor domestic or industrial fires), irritants from the processing of cereals and textiles or from metalworking, and chronic upper respiratory tract infections may induce chronic inflammation of the mucosal linings of the frontal and maxillary sinuses (Roberts and Manchester 2005, 174). This inflammation stimulates fine cobweb-like new bone deposition on the sinus walls and base. The maxillary sinuses of a female (900080) and the frontal sinuses of two males (900115 and 900197) show healed new bone.

Possible brucellosis

Brucellosis is a highly infectious bacterial zoonotic infection acquired by humans living in close proximity to infected domestic animals, or through contact with or consumption of contaminated body products (Corbell 2006, 13–17). Its presence in a farming community is thus not altogether surprising. Sufferers experience acute or sub-acute intermittent or remittent outbreaks of fever, malaise, exhaustion, joint pain and/or anorexia, which may severely impair their ability to function (*ibid*., 5–6). The condition targets multiple bodily tissues, including bone and joints in 40% of cases, particularly the lower vertebrae, causing back pain and sciatica (*ibid*., 6).

There is widespread taphonomic damage of the vertebral bodies of the female from grave 900137 (burial 900139) but the surviving anterior margin of the superior end plate of the sixth lumbar (L6) appears crenulated because of penetration by multiple small cysts or abscesses. The posterior end plate is roughened and partly overlaid by new bone also punctuated by numerous small smooth-walled lesions (cysts or abscesses). Subtle increased granularity and possibly fine new bone was noted on the inferior end plate, particularly on the left side, but the first sacral body is normal. Unfortunately, the L6 anterior body had not survived. Marginal end plate destruction by abscesses is a feature of brucellosis (Buikstra 2019, 421), although diagnosis is tentative given the poor preservation.

Active but remodelling new bone deposition on the anterior body of L5 in a subadult female (burial 900021) also suggests infection (Fig. 8.52). Unfortunately, this partial element is the only surviving lumbar body in this individual and the end plates are largely destroyed. Reactive bone (lysis and active new bone) is also present on the posterior aspect of the neural arch. The anterior sacrum is unaffected. Although brucellosis is a possible cause, other bacterial infections to be considered are haematogenous staphylococcal or streptococcal infections, and enteric tuberculosis.



Figure 8.52 left: Female 900139: anterior view of L5 body showing marginal destruction of end plate margin by small abscess formation – possible brucellosis; (right) Female 900021: fine active new bone (arrow) on the anterior fifth lumbar body – possibly early-stage brucellosis or other infection

Joint disease

Degenerative joint disease

Degenerative joint disease (DJD, particularly the spine (SDJD), is one of the most common pathological changes in archaeological human bone. It may be identified from osteophytosis (new bone laid down on joint surfaces or margins), joint surface pitting and eburnation or polishing (Waldron 2009, 27). The last develops from bone-on-bone friction, following destruction of the overlying cartilage (Rogers and Waldron 1995, 35–6; Waldron 2009, 24–28) and is pathognomonic for osteoarthrosis (OA). DJD is usually the result of joint wear-and-tear with advancing age, but its development may be accelerated by repetitive use or damage. Osteophytosis and OA may also develop to stabilise a joint following trauma and or altered body mechanics (Waldron 2009, 24). However, the latter in specific joints is influenced by diverse interacting factors, such as sex, body mass, genetic predisposition, activity and lifestyle (Roberts and Manchester 2005, 138; Waldron 2009, 24–28). Skeletal evidence of intervertebral disc disease, in the form of pitting and new bone on the end plates (degenerative disc disease (DDD) or *spondylosis deformans*), and herniation of the disc, usually in adolescence (Faccia and Williams 2008) – manifesting as end-plate depressions known as Schmorl's nodes – are also generally common.

Table 8.96 TPRs of spinal degenerative joint disease in Callow Carr assemblage (subadult and adult). Number affected/total numbers present; TPRs given in brackets

Vertebrae	*No. of vertebrae*	*Schmorl's nodes*	*Degenerative disc disease*	*Osteoarthritis*	*Lone osteophytes*	*Lone pitting*
Cervical	75	0/41 (0%)	0/41 (0%)	0/75 (0%)	10/75 (13.3%)	2/75 (2.7%)
Thoracic	147	18/58 (31%)	0/58 (0%)	3/147 (2%)	13/147 (8.8%)	3/147 (2%)
Lumbar	66	4/31 (12.9%)	0/31 (0%)	4/66 (6.1%)	15/66 (22.7%)	2/66 (3%)
1st sacral	16	0/11 (0%)	1/11 (9.1%)	0/16 (0%)	2/11 (18.2%)	0/11 (0%)
Total	304	22/141 (15.6%)	1/141 (0.7%)	7/304 (2.3%)	40/299 (13.4%)	7/299 (2.3%)

Table 8.97 Extra-spinal degenerative joint disease in the Callow Carr assemblage; showing total joints present and total affected by side.

Element		*Count*		*Total*
		Left	*Right*	
Ribs	Total	29	32	61
	OP	4	5	9
	Pitting	1	-	1
Acromioclavicular	Total	1	0	1
	Pitting	1	-	1
Elbow – humerus	Total	6	1	7
	OP	1	-	1
Elbow – ulna	Total	6	2	8
	OP	1	1	2
Hand – metacarpophalangeal	Total	11	11	22
	OP	1	-	1
Hip – pelvis	Total	13	14	27
	OP	3	3	6
	Pitting	-	1	1
Hip – femur	Total	9	10	19
	OP	2	1	3
	EB	1	-	1
Knee – femur posterior surface	Total	2	2	4
	OP	1	1	2
Knee – medial tibia	Total	6	4	10
	OP	1	-	1
Foot – calcaneus	Total	3	2	5
	OP	-	1	1

Key: EB – eburnation; IP – interphalangeal; OP – osteophytes

Poor trabecular bone preservation at Callow Carr adversely affected the survival of the axial elements and joint surfaces, with many of the vertebrae – particularly the bodies – and extra-spinal joint surfaces being incomplete (Tables 8.96–7). Hence, although Schmorl's nodes and degenerative disc disease TPRs and other prevalences were calculated, the rates presented are probably erroneously low. Bone preservation and the small sample size make interpretation problematic, particularly interpopulational comparisons, but suffice to say that overall SDJD is not marked, probably reflecting the fairly young age distribution of the assemblage. Osteophytosis occurs most in the lower spine but largely comprises only slight to moderate lipping. Pitting is uncommon, while OA is present only in seven vertebrae as small areas of eburnation. Unusually, there is no cervical disc disease, with only one S1 showing such changes. The TPR of Schmorl's nodes (present only in T6–L5) is fairly high, with lesions in four males and one female (Tables 8.91 and 8.96). This suggests habitual spinal loading principally, but not exclusively, in males from a young age – probably from agricultural activities involving carrying heavy loads.

Very few extra-spinal joints survived, so meaningful interpretation of TPRs of extra-spinal degenerative joint disease and skeletal patterning was not possible (Table 8.97). The only OA present is as a large area of eburnation and osteophytosis on and around the left femoral head of an older male (burial 900071), with corresponding degeneration changes in the acetabulum.

Concluding remarks

Although more than 80 Anglo-Saxon cemeteries have been excavated in Lincolnshire (White 1980), many are earlier (5th–earlier 6th century) and were excavated in the 19th and earlier 20th centuries before osteology was established as a discipline. Consequently, modern comparative osteological studies are few. Scremby, the most recently excavated, albeit slightly earlier assemblage from the Wolds (Brundle 2019), has considerable comparative potential but has yet to be formally analysed at the time of writing. Both sites are typical of the widespread Anglo-Saxon inhumation burial tradition of smaller cemeteries that gradually replaced the large cremation cemeteries from the later 5th century AD. They also follow the tradition of being sited on prehistoric monuments, particularly Bronze Age barrows – a phenomenon of at least a quarter of burial grounds of this period (Williams 1998). Although not excavated in its entirety, the dearth of grave intercutting at Callow Carr, the generous spacing between burials and the mix of ages and sexes suggests a relatively small, short-lived burial ground of an extended family or local community over a few generations. Certainly, although isotopes suggest short distance transhumance, all but one appears to have lived out their lives in the local area, and those buried at Callow Carr probably represent the dead of a nearby settlement and/or neighbouring farmsteads. Relatedness will be explored further using aDNA, but shared anatomical variants do suggest familiarity between at least some individuals in the assemblage.

Understanding the health of the Callow Carr assemblage was limited by poor bone preservation. However, surviving lesions suggest that general health is comparable with other broadly contemporaneous assemblages further north, with the few fractures and soft tissue trauma in both sexes probably the result of a physically strenuous agrarian lifestyle. There is limited evidence of dietary deficiencies and low infection rates, although spinal lesions in two individuals suggest possible brucellosis – not entirely surprising in communities working and living closely with animals. In contrast to the above, perimortem sharp force trauma to the back of the neck of male 900133 presents a less peaceful image, with the assault resulting in his death immediately or shortly afterwards.

Non-cemetery Human Bone and Aspects of the Mortuary Rite

Jacqueline I. McKinley

Introduction

Redeposited unburnt human bone was recovered from three non-cemetery contexts at Walk Hill and Gibbet Hill, and cremated human bone from three contexts at Back Lane and Mown Rakes (Table 8.98).

Table 8.98 Summary of non-cemetery human bone

Context	*Feature*	*Deposit type*	*Quantification*	*Age/sex*	*Pathology/pyre goods/condition*
			Unburnt bone		
Walk Hill					
800010	ditch 800496, slot 800464	R	frag. left humerus	neonate	2, slightly eroded, dark staining
800090	crop-dryer 800089	R	4 joining frags occipital vault	adult 35–55 yr ?male	slight hypervascularity – exocranial surface 2–3, eroded/abraded
Gibbet Hill					
560025	ditch 560024	?placed deposit	left humerus	adult >20 yr ??male	0–1; chop & filleting cut marks, 'polished' appearance to cortex
			Cremated bone		
Back Lane					
410050	ring ditch 410125, slot 410049 (0.25 m)	crd inc. fuel ash	65.9g	adult >30 yr	osteoarthritis – ?1st MtT/P joint; osteophytes – IP joint (hand)
Mown Rakes					
530133	530132 (0.15 m)	crd –?rpd	161.4 g	1) adult 18–30 yr ?2) neonate/infant	MV – Wormian bone 0.8 g animal (*sp.* unknown, mammal)
540004	540003 (0.05 m)	unurned burial + rpd	300.6 g	adult >20 yr ??male	5.7 g animal (*sp.* unknown, mammal)

Key: crd – cremation-related deposit; IP – interphalangeal; MtT/P – metatarsal/phalangeal; MV – morphological variation; R – redeposited; rpd – redeposited pyre debris; sp. – species

At Walk Hill, fragments of single skeletal elements were retrieved from an enclosure ditch lying on the eastern margins of a Romano-British enclosure complex, and from the upper fill within a crop-dryer situated some 75 m to the north-west (Fig. 6.34). A Romano-British date was attributed to both features, with the late Romano-British radiocarbon date obtained from a human bone sample from the crop-dryer being commensurate with that of the pottery recovered from the same fill. Some 33.5 km to the south, at Gibbet Hill, most of a left humerus was recovered from a ditch fill, having potentially been deliberately placed on a stabilisation horizon following some initial infilling. The ditch followed the southern margins of a roddon at – and potentially marking – the boundary between the inhabitable dry land to the north and the Fenland to the south (see Fig. 4.40 in Volume 1). No dating evidence was recovered from the ditch or within the immediate vicinity, excluding the remains of a medieval calf burial. Consequently, a sample of the human bone was submitted for radiocarbon analysis and returned a late Romano-British date (see López-Dóriga above).

The date of the three deposits from Back Lane and Mown Rakes was also confirmed by radiocarbon analysis of cremated bone samples from each context. The Middle Bronze Age remains from the former comprised bone and fine-particle fuel ash redeposited in the upper fill of a ring ditch – possibly the remains of a barrow (see Fig. 4.6 in Volume 1). Further south at Mown Rakes, the remains of an unurned burial with a secondary deposit of fuel ash lay 215 m to the south of a fuel-ash-rich cremation-related deposit which probably comprised pyre debris, potentially dumped into a pre-existing feature (Figs 6.92–3). Both, in common with other features in this area, are Romano-British in date.

Methods

Recording and analysis of the cremated bone followed the writer's standard procedures (McKinley 1994, 5–6; 2004a). Age and sex (unburnt and cremated bone) was estimated following standard methods (Beek 1983; Buikstra and Ubelaker 1994; Gejvall 1981; Scheuer and Black 2000). Varying levels of confidence with regard to estimate of sex are denoted as '?' (probable) and '??' (most likely). Non-metric traits were recorded according with Berry and Berry (1967) and grading of the unburnt bone preservation



Figure 8.53 Composite image adult left humerus (Gibbet Hill, context 560025): dorsal view (left) showing fine 'filleting' marks at proximal and distal ends, and anterior view (right) showing chop mark at distal end. Scale for detail only

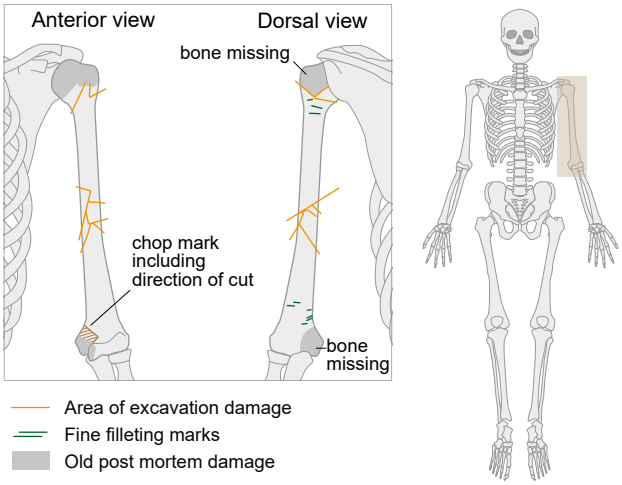


Figure 8.54 Annotated image of left upper limb showing location of deliberate human manipulation (chop and filleting marks) and post-mortem damage

with McKinley (2004b, fig. 6). Comment on the cremated animal bone was made by Lorrain Higbee. A summary of the results is presented in Table 8.98; full details are held in the archive.

A sample from the humerus (560025) was submitted to the Cardiff University Bioarchaeology laboratory (CUBA) for histological analysis; a summary version of their report is presented in Appendix D and the full report is available in the online data supplement: https://doi.org/10.5284/1136099). Comment on the isotopic data collected during radiocarbon analysis was provided by Dr Joanna Moore of the Archaeological Isotope and Peptide Research Laboratory (AIPRL), Durham University.

Results

Taphonomy and ancient modification

The unburnt bone all derived from well-sealed deposits, and the broken edges with no adjoining fragments comprised old dry-bone breaks. In contrast with the remains from the Callow Carr Anglo-Saxon cemetery (where the graves were cut through and backfilled with either chalk bedrock or ring ditch fills) and the White Crofts Romano-British cemetery (burial environment of heavy silty clay prone to periodic flooding; see Boston above), the non-cemetery bone is in relatively good condition, with only slight–moderate surface erosion/abrasion of that from Walk Hill (Grades 2–3).

The humerus from Gibbet Hill is almost complete and in good condition (Grades 0–1). There is clear evidence for deliberate human manipulation of the bone while in a 'green' state – i.e., post-mortem but prior to skeletalisation – and subsequent curation of the dry-bone element. A chop mark on the anterior medial shaft, adjacent to the articular surface (elbow joint), would probably have removed part of the medial epicondyle – suggesting dismemberment of the left arm (in the absence of the forearm bones the full nature of the action cannot be confirmed). Presenting as a 16 x 14 mm smooth/sharp surface and angled at 15–20° to vertical, the cut commenced 15 mm superior to the epiphyseal line and would have extended across the area of the epicondyle (inconclusive because of post-mortem damage). The steep angle suggests a blow directed downwards and medially, made with a sharp blade (Figs 8.53–4). Further manipulation, indicative of defleshing, is revealed by the presence of numerous short (4–8 mm) shallow/fine cuts – filleting marks – at the proximal and distal ends of the dorsal surface of the shaft. A minimum of three cuts were observed at the proximal end, immediately adjacent to the capsule and at the inferior margin of the *teres minor* muscle attachment (action linked to movement in the shoulder joint, rotation and adduction of the arm), the angle in each case ranging from horizontal to 10° to vertical. Four small cuts – set at a 5–10° angle to horizontal – were observed on the medial margin of the distal shaft,

situated at the inferior margins of the attachment for the medial head of the *triceps* (acts to extend the forearm), with two further horizontal cuts higher up and towards the lateral margins of the shaft, and again along the edge of the *triceps* attachment. The severing of these muscle attachments would have helped hasten the separation of the upper arm from the shoulder and the forearm elements. The shaft has a slightly polished appearance along most aspects, suggesting it was subsequently – as dry bone – subject to curation. The combination of deliberate human actions affecting this bone evoke the possibility that its presence in this ditch – set in a liminal location adjacent to what might have been viewed as a 'dangerous' and unpredictable Fenland environment – did not comprise an accidental deposition, but a premeditated and potentially 'protective' placement. Such actions demonstrate the shifting roles of human remains and their continued relevance within the living community.

The results of the histological analysis of the humerus undertaken by CUBA corroborate and enhance the 'biography' of the mortuary behaviour indicated by the macroscopic changes observed (Appendix D). The evidence indicates there was no primary soil inhumation, rather that defleshing and dismemberment probably occurred following a period of 'sheltered storage' of the body – sufficient to allow for early stages of putrefaction – with the possibility that that preliminary rite could have occurred in an anoxic environment such as a bog or wetland, i.e., one readily accessible in the Fenland adjacent to which the bone was finally deposited.

The features containing the cremated remains had survived to varying depths ranging from 0.05 m to 0.25 m. Very little or no bone was evident at surface level in any of the features, suggesting minimal horizontal truncation (i.e., no bone lost via this mechanism). Cremation grave 540003 had been subject to animal burrowing, which could have removed some of the fill, and there is some suggestion of bioturbation (root action) affecting the deposit in pit 530132. The bone recovered from the 1 m investigative slot through the ring ditch at Back Lane was not observed in excavation, nor was the potential nature of the deposit recognised. Consequently, it cannot be confirmed that the bone/deposit was recovered in full and it appears likely that some bone will have been missed. The bone is generally in good visible condition, but the less well oxidised material is slightly eroded and there is very little trabecular bone (commonly subject to preferential destruction in adverse burial conditions such as the clay silts and sands at Back Lane and Mown Rakes), with most comprising the more robust compact bone.

The individuals

A minimum of three Romano-British individuals are represented among the non-cemetery unburnt bone. Although the cranial fragments from Walk Hill and the humerus from Gibbet Hill both appear to derive from an adult male, the substantial distance between the two deposits (33.5 km) render it highly unlikely that they derived from the same individual.

A minimum of three, possibly four individuals are represented among the cremated remains; one Middle Bronze Age and two, potentially three, Romano-British. Although the nature of the deposit from pit 530132 at Mown Rakes is inconclusive (see below), the remains clearly did not derive from the same cremation as those buried in grave 540003 some 215 m to the south, as there is duplication of specific skeletal elements (notably the right temporal area of the skull) between the two deposits. The potential for a second individual within the deposit from pit 530132 is based on the presence of a few very thin fragments of cranium (5% of all cranial fragments by count), which are markedly out of kilter with the many others recorded. These fragments likely derive from a neonate or young infant, though whether they originated from the same pyre as the adult – given the uncertain nature of the deposit – is debatable, if probable.

Few pathological lesions were observed. Very slight hypervascularity was noted in the exocranial surface of the occipital vault fragments from crop-dryer 800089. The potential causes for an increase in vascular activity in the cranium include metabolic conditions

such as iron deficiency anaemia and scurvy (vitamin C deficiency). The former reflects a deficiency in iron-rich foods such as red meat and legumes, though parasitic infection of the gut can also be a major contributory factor (Roberts and Manchester 2005). Scurvy reflects a lack of fresh foods and/or loss of nutrients due to prolonged storage or over-cooking (Boston 2014, 91–94; Roberts and Manchester 2005, 234–237; Stirland 1988, 93–94). Both conditions could re-occur on a seasonal basis and/or when adverse conditions prevailed. Lesions indicative of osteoarthritis were seen in one foot joint of the cremated adult from Back Lane. The same individual had slight osteophytes (marginal new bone) – largely reflective of age-related wear-and-tear where they occur as lone lesions (Rogers and Waldron 1995) – in one hand joint.

Wormian bones (extra ossicle in the lambdoid suture – as seen in the cremated adult from pit 530132) comprise a relatively common morphological variation which can, in some cases, reflect the influence of environmental as well as genetic factors.

The carbon and nitrogen isotopic values recorded for the humerus from Gibbet Hill are consistent with the Romano-British data from the White Crofts cemetery and across Britain; a $\delta^{13}C$ value of -21‰ and a $\delta^{15}N$ value of 10.2‰, indicating a terrestrial C_3 diet with no evidence for the consumption of significant quantities of marine protein. The low $\delta^{34}S$ (sulphur) value of -14.2‰ is commensurate with that of individuals living in coastal regions or areas dominated by a marine carbonate terrain (chalk or limestone) and consistent with local origins on the Lincolnshire Wolds. However, it does contrast with the sulphur isotope ratios observed in those from the White Crofts cemetery to the north (see above and Appendix C), who have significantly lower $\delta^{34}S$ values likely reflecting their living in such close proximity to the marshland.

Cremation technology and aspects of the mortuary rite

The cremated bone from the Bronze Age deposit is almost universally white in colour, the high level of oxidation indicated (Holden *et al.* 1995a and b) demonstrating an effective cremation process with sufficient time, temperature and oxygen supply to complete combustion. Common variations in colour were observed in the bone from both Romano-British deposits, with blue and grey hues recorded in between nine and ten skeletal elements (involving all four skeletal areas), and charred (black) bone present in both cases (two to four elements). Only parts of any one element were affected, but numerous cranial fragments were involved in one instance (530133) and the core of the lower limb fragments in the other. No specific problems with the cremations are indicated, but parts of the head or legs might have suffered oxygen deprivation due to being closely wrapped in items of fur or leather such as a cap or cloak. The inclusion of the lumbar area of the spine (black in both cases) might signal the presence of a robust cross-pyre support in this central area (e.g., a heavy plank), insulating the spine from both the fire below and the surrounding oxygen supply.

Variations in levels of oxidation are a relatively common feature of Romano-British cremations, occurring in some 53.8% of deposits made in towns – such as those from Anchor Street in Lincoln (McKinley 2003) – and 44.8% of those in rural locations (McKinley 2008b). In the latter study, body mass was implicated as a major contributory factor (associated with the quantity of fuel and burn time). Temporal variations in practice between the prehistoric and Romano-British period are implicated in the Interconnector assemblages, and while this might signal a variation in attitudes or technique, it could also reflect a practical issue, with there being greater demands on potentially depleted fuel supplies in the later period. However, the degree of oxidation attained may have been regarded as of little or no consequence where the requisite was for the 'magic' of transformation of the body from one state to another.

Only the deposit from grave 540003 can be confidently described as formal burial remains – the other two probably represent deposits of pyre debris – consequently, only the former warrants comment regarding the quantity of bone recovered. Even here, it is likely that some bone will have been lost through taphonomic processes

(see above) and, as is generally the case, the weight presented should be viewed as a minimum of that deposited at the time of burial. The recorded weight represents around 19% of the average expected from a modern adult cremation (McKinley 1993a) and falls in the lower range of those observed elsewhere for the period (McKinley 2004c, table 6.6). Weights in the lower range (<500 g) were also recovered from Anchor Street and Newland Street West, Lincoln (McKinley 1998; 2003).

Full recovery of the cremated bone from the pyre site for inclusion within the burial was not a prerequisite of the rite and a wide range of bone weights are frequently observed. The fate of the bone not collected for formal burial undoubtedly also varied. Numerous examples demonstrate that large quantities might be left among the pyre debris, thereafter deposited in a variety of settings (Barber and Bowsher 2000, 62–66; McKinley 2000; 2013; 2017; Polfer 2000), as appears to have been the case at Back Lane and Mown Rakes. Other bone was probably subject to 'curation' of some form – with the added potential for later deposition of 'commemorative' deposits in the same or some other location to that in which the cremation was undertaken/the formal burial made – or scattered in various locations within the landscape (McKinley 2006; 2013). The low weight seen at Mown Rakes may reflect an emphasis placed on the dispersed distribution/deposition of this portable and divisible material.

The majority of the bone from the Romano-British burial was recovered from the 10 mm sieve fraction (47% by weight) and that from the two other deposits from the 5 mm (47–50%). The maximum fragment sizes showed a similar variation (56 mm from the burial, 28–40 mm from the other two), all being relatively small. A variety of factors can affect the surviving fragment size of cremated bone – rendered extremely brittle by the cremation process (dehydration and oxidation) – including the nature of the burial environment and mode of deposition. The acidic soil matrix at both sites will undoubtably have had a detrimental effect on the bone. The type of deposit might also be significant, with the deposits of pyre debris subject to heavier manipulation and more repeat handling than the bone collected for burial, leading to greater fragmentation. The figures, while falling at the lower end of the range frequently observed in archaeological material (pers. obs.), are not unusual given the aforementioned factors.

Fragments from all four skeletal areas (skull, axial skeleton, upper and lower limb) were among the 32–49% (by weight) of the bone from each context identified to skeletal element (maximum from grave 540003). The proportions from each area varied between the deposits – the axial elements in each case being, as is often observed, well below the 'norm' because of taphonomic factors (widespread trabecular component). The proportions from grave 540003 fell closest to the 'norm' (McKinley 1994, 6), in this case with a bias towards lower limb elements at the expense of the axial skeleton (17% skull, 1% axial, 20% upper and 62% lower limb).

The small bones of the hands and feet, together with tooth roots found in the absence of the supportive structures (tooth sockets), regularly feature among the remains of cremation burials, and their frequency of occurrence offers an indication of the mode of recovery employed in the collection of bone from the pyre site for burial (McKinley 2004c, 299–301). Relatively few of these elements were recovered from the deposits at Back Lane (6) and Mown Rakes (18 and 11) with most, proportionate to the overall weight of bone collected in each case, being found in deposit 530133 (>twice as many as from grave 540003). This suggests – at least for the Romano-British cremations (given that the Bronze Age example is probably incomplete) – that individual bone fragments were recovered by hand from the pyre site for burial, focusing on the more readily accessible larger bones, with more of the small elements remaining among the pyre debris (*ibid*., 300–1). Comparative data for the period presents a variable picture and is currently insufficient to demonstrate any consistent regional variations, though few small elements were observed in the Newland Street West burial remains (McKinley 1998), suggesting that site witnessed a similar mode of recovery to that seen here. There is no evidence to suggest deliberate selection of specific skeletal elements for burial or removal for distribution elsewhere.

Pyre goods, in the form of very small quantities of cremated animal bone were recovered from the Romano-British deposits (Table 8.98); species identification was not possible beyond 'medium-sized mammal'. The recovered data will inevitably represent a minimum in terms of both quantities and frequencies. There is marked intra-site variation in frequency in the Romano-British period, where pig and domestic fowl generally comprise the most popular species as, for example, at Anchor Street and Monson Street, Lincoln (McKinley 1993b; 2003; 2004c; 2006). It is probable that this material represents the remains of food offerings placed on the pyre with the deceased, though it might also have been related to funerary feasting.

The presence of fuel ash – presumably pyre debris – within all the deposits containing cremated bone indicates that pyre sites were probably located relatively close to the place of deposition of the remains (McKinley 2004a; 2013; 2015). The deliberate inclusion of pyre debris in the fills of cremation graves is frequently observed in most temporal phases in which the mortuary rite was practised, such deposits generally being made secondary to the burial (McKinley 1997; 2004c, 304–6; 2008b). It is unclear whether this action represented a practical 'cleaning-up' process or a deliberate part of the rite, e.g., the 'closure' of the grave. Redeposited pyre debris might also be found in both pre-existing and apparently specifically excavated features – the former potentially being the case at both Back Lane and Mown Rakes.

The majority (81% by weight) of the cremated bone from pit 530132 was collected from the western half of the feature and from the upper two-thirds of the 0.15 m-deep fill. There had been a level of bioturbation (root action), potentially resulting in some redistribution of the archaeological materials, but the limited distribution of the bone – particularly its absence from the lower 0.05 m depth of the cut – suggests pyre debris with fragments of fired clay from the base of the pyre site, was all deposited into a pre-existing feature, the fuel ash having 'bled' into the adjacent soil matrix. A substantial proportion (78% by weight) of the bone from grave 540003 (0.58 x 0.46 m, 0.05 m deep) was also recovered from the western half, though in this instance the bone (doubtless held in an organic container of some form) lay directly on the base of the cut with pyre debris deposited around it.

Concluding remarks

Numerous prehistoric mortuary assemblages are found to feature evidence for excarnation and curation, including the recovery of human remains in various stages of 'fragmentation' (e.g., McKinley 2008a; Walker 1984, 455; Whimster 1981, 178, 183–4). Such finds are commonly linked with settlements or enclosures in the Iron Age (Harding 2016, 269) and frequently feature specific skeletal elements or parts thereof, the skull predominating. The late Romano-British date of the humerus from ditch 560024 is intriguing, the practice having strong 'Iron Age' connotations. It is, however, now accepted that some Iron Age funerary traditions involving mortuary treatments which left no *in situ* burial remains probably continued into the Romano-British period, especially in rural areas such as the eastern Fenlands; 'the more *integrated* [present writer's italics] mortuary practices of the Iron Age continued to be prevalent throughout much of the countryside of the Roman province, even into the later Roman period' (Smith 2018a, 231). Such activities are likely to have included forms of excarnation where the remains would eventually be dispersed by human or natural actions, and potentially, 'display' of the dead (*ibid.*, 276–7). Evidence for disarticulated human bone from Romano-British sites is relatively widespread (*ibid.*, figs 6.54 and 6.55), though in many cases – including most of the 60% of such sites on farmsteads – such finds occur within the confines of inhumation cemeteries or areas with evidence for formal interments, and most probably represent disturbed burial remains. There are, however, numerous instances of redeposited bone being recovered from field ditches and other locations, as at Gibbet Hill. Structured/placed deposits featuring 'odd arrangements of artefacts and ecofacts' have been recognised, with human remains featuring in deposits at approximately 16% of the sites within Smith's review, including those of mid–late Romano-British date (2018b, 184–191, figs 5.58 and 5.59).

Evidence for deliberate human manipulation – hastening the process of excarnation, and subsequent 'curation' including handling of the bone as is indicated in the remains from Gibbet Hill – is, however, less common. Indications of the deliberate 'breaking-up' of a late Romano-British human corpse and its subsequent deposition among an extensive earlier spread of animal bone – potentially from feasting – were recorded at High Post in Wiltshire, possibly representing a mid-stage in an extended mortuary process (McKinley 2011). Elsewhere in Lincolnshire, evidence indicative of repeated handling and human modification – possibly associated with the bone being used as a tool – was observed on an almost complete late Romano-British right tibia recovered from a ditch fill at Station Road, Grimsby (McKinley 2023, pl. 6.7). There was no evidence for the complex mortuary treatment seen at Gibbet Hill in this case, but rites involving some form of excarnation cannot be discounted. The latter activity might also have been in operation at Moor House, London (Butler 2006, 38–44), where canid gnawing to mid-Romano-British human remains demonstrated the exposure of corpses at some stage, either deliberately or due to burial remains having been 'washed out' of parts of the cemetery by the adjacent stream. 'Cut marks' were noted on four of the redeposited disarticulated bones, which were variously described as being caused by a cleaver/axe/knife and interpreted as suggestive of defleshing of previously exposed bodies (*ibid*., 40 and 42). However, this description does not quite tally with that by the osteologist who describes the 'chop marks' as being similar to those caused by a mattock, and appears to attribute them to damage caused during later quarrying on the site (Dodwell 2006).

The potential origins of the other non-cemetery unburnt bone remain unclear. There is no evidence to suggest that the various features from which the remains were recovered had cut through *in situ* burial remains – though the possibility of bone remaining unexcavated in the ditch fills adjacent to the excavated areas cannot be dismissed, and the graves of neonatal infants were often very shallow and potentially readily eradicated. It seems likely that the skull elements from the crop-dryer at Walk Hill were subject to some form of excarnation, and it might be that, as with the humerus, it had previously been subject to curation and possibly deliberately 'placed'.

The recovery of human remains from Romano-British crop-dryers/kilns is, if not common, at least a well-recorded phenomenon. Philpott suggested that burials made within corn-dryers – such as the late Romano-British example from Eyewell Farm, Chilmark, Wiltshire (Fitzpatrick and Crockett 1998), cut though the demolition debris infilling the flue – were in someways disrespectful to the deceased or their families (Philpott 1991, 232), but such was not necessarily the case. The use of crop-dryers/kilns as suitable features in which to make 'structured deposits' has been recorded from sites across the Late Iron Age and Romano-British periods, with a marked rise in the late Roman phase (Philpott 1991, 57; Smith 2018b fig. 5.54, 186–89). Although considerably less common than animal bone, human remains (generally individual skeletal elements or partial remains) were found in around one-sixth of such deposits (from various features, not just kilns/crop-dryers), e.g., the skull and a cranium of early and mid-Romano-British date recovered from the ritual shaft within the sanctuary complex at Springhead in Kent (Andrews *et al.* 2011, 80–5). Such deposits are believed to have marked significant stages in the use of a feature, including 'closure events'. Examples from crop-dryers include various fragments of late Romano-British human bone from High Post, Wiltshire, including a canid-gnawed scapula (indicative of exposure), cranial elements burnt as dry/semi-dry bone (?secondary mortuary treatment potentially with other ritual connotations) and an almost complete cranium – the latter possibly representing a 'placed deposit' (McKinley 2011; Powell 2011, pl. 17).

Smith's (2018a) review of rural Romano-British sites indicates a dearth of human remains – both burial remains and disarticulated human bone – from large swathes of Lincolnshire/the Fenlands (figs 6.8 and 6.15), especially in the late phases, with find sites for disarticulated bone concentrated in the north around the Humber (fig. 6.54). Smith, among others, suggests that the Romano-British dead in the Fenlands were disposed of in ways 'that have left little archaeological evidence' (*ibid*. 233). Some of the finds from the sites recorded here, particularly from Gibbet Hill, provide a rare and important insight

into what is likely to have represented one of several, often archaeologically inaccessible, mortuary rites practised in this shifting watery and enigmatic Fenland landscape.

The Grave Finds from Callow Carr

Jörn Schuster

Methodology

The objects were examined visually and, where required, with hand lenses (4x and 8x magnification). Basic type identifications such as 'pin' or 'nail' were recorded. Broad period dates attributed to the finds are based on the intrinsic dates of the finds established by comparison to known parallels and typologies. Object identification, measurements and descriptions were entered into an Excel spreadsheet (available in the archive). Recommendations for mineral remains analysis, additional x-radiography and conservation treatment (cleaning/stabilisation/reconstruction) as well as illustration have been considered and, where deemed necessary, noted in the spreadsheet. Object Numbers allocated during the excavation started at '900001', and this is reflected in the archive, but for the sake of simplicity they are presented below as starting at '1'.

The assemblage of small finds will be presented according to an amended subdivision into function groups (Table 8.100) that has been used for a number of recently published cemeteries, for instance Pewsey (Annable and Eagles 2010), Collingbourne Ducis (Egging Dinwiddy and Stoodley 2016, 104) and Barrow Clump (Stoodley 2019, 227). It is based on Stoodley's (1999, 16) analysis of a national sample of Anglo-Saxon cemeteries, for which he used a coarser division of categories more suited to the analysis of grave finds. For a discussion of the use of functional categories see e.g., Crummy (1983, 5–6) or Feugère (2018, 38, fig. 6; 57–9).

Table 8.99 Number of objects per material

Material	*Total*
Gold/garnet	2
Amber	1
Silver/amber	1
Silver/?leather	4
Glass/silver/leather	1
Glass	3
Copper alloy	83
Copper alloy/ iron	2
Copper alloy/leather	8
Copper alloy/glass/leather	1
Iron	116
Stone	8
Coal	4
Chalk	1
Other ceramic	6
Shell	2
Wood	8
Worked bone	4
Worked bone/copper alloy	1
Organic matter	1
Grand total	257

Where possible, the objects will be linked to the typology developed by Karen Høilund Nielsen (2013) for the extensive research project *Anglo-Saxon Graves and Grave Goods of the 6th and 7th Centuries AD: a chronological framework* (abbreviated henceforth as A-S CF), which is based upon the finds from 643 burials from 224 Anglo-Saxon sites (Bayliss *et al.* 2013, 4); radiocarbon determinations for that project were carried out on 98 burials (Hines 2013b), forming the basis of the chronological model. Other typologies will be drawn upon in the discussion where necessary.

In this report, and following Stoodley (1999, 75), the terms masculine and feminine will be used to refer to the culturally defined category of gender, whereas male and female refer to the biological sex as established by the osteological analysis (see Boston above).

Introduction to the Assemblage

The 257 objects considered here were recovered from 26 contexts. They include items made of gold, silver, copper alloy, iron, amber, garnet, glass, ceramic, stone (including rock crystal), coal, worked bone and shell, as well as composites of some of these materials; a detailed breakdown is provided in Table 8.99. The vast

majority came from the 22 graves excavated at Callow Carr arranged on and next to a pre-existing Bronze Age barrow mound. All the graves contained objects, and of the 23 inhumation burials (MNI 24, see Boston above) 22 were found with at least one item. The exception is the apparently unaccompanied 5.5–7.5-year-old child (burial 900047) in grave 900019, which also contained the burial (900021) of a subadult 14–16-year-old possible female with the largest assemblage of precious metal objects from the entire site.

Five objects were found in non-funerary contexts, including one unstratified item: copper alloy hooked tag ON 190. One of the objects, copper alloy annular brooch ON 103, was recorded as coming from the subsoil (900001) and surveyed as coming from the north-east corner of the cut of grave 900190, to the left of and level with the skull. Although their exact grave association might remain questionable, these two objects can intrinsically be dated to within the date range of the occupation of the cemetery. The remaining three iron objects are intrinsically undatable; they are: strip fragment ON 104 from the subsoil, nail ON 19 from track 900050, and an irregular sheet fragment (ON 105) from layer 900165 associated with the barrow.

The number of objects will by necessity be a somewhat arbitrary figure as for some items the quantification of their constituent components is debatable. This is perhaps best exemplified by the 12 components of chatelaine ON 170 from grave 900161. Among those are 10 entries for items (mostly lengths of chain) recovered as part of the block-lifted chatelaine, as well as a rock crystal bead and an annular brooch. Being joined by the multi-stranded chain with numerous links, the chain would have been deposited by the mourners at the graveside as one object, yet it generated almost 5% of the small find records during excavation and subsequent analysis.

Mindful of these caveats, an overview of the various objects subdivided into the aforementioned function groups is presented in Table 8.100. In the following discussion, each group is further divided into object types and, where necessary, various subtypes and variants for a detailed consideration of an individual object's typology, chronology, distribution and cultural affinity. The group 'fittings' was added to include nails, staples, repair clips and similar objects whose purpose is not always certain.

Two small abraded pottery sherds of a local fabric, dated to the 5th to 8th centuries, were found in two graves (900067 and 900137; see J. Young above); based on their size it is unlikely they were deliberate vessel deposits. Animal bone representing the remains of placed deposits of meat (mostly joints), were recorded in five graves (graves 900137, 900161, 900175, 900193 and 900196; see Higbee above). Neither category is included in the quantifications in Tables 8.99–100, but both will be considered as part of the analysis of the deposition and burial rites.

Function group	*Total*
Jewellery/dress accessories	35
Personal equipment	85
Vessel/grave furnishing	71
Tools	14
Weaponry	1
Metalworking	1
Fitting	15
Uncertain	35
Grand total	257

Table 8.100 Number of objects per function group

On the whole, the preservation condition of the assemblage can be described as fair to poor, with most of the silver and glass objects slightly better preserved, and the copper alloy and iron generally more affected by corrosion.

Material Culture

Jewellery/dress accessories

Sixteen of the 22 accompanied graves contained items that can be classed as jewellery or dress accessories, and within this group, the 16 buckles represent the most numerous object type. Additionally, a copper alloy annular brooch (ON 103; Fig. 6.84) was found in the topsoil in the vicinity of grave 900190 (?beyond its north-east corner, level with skull) in a location that would be within the confines of the grave cut.

Brooches

Of the seven (probably eight) copper alloy brooches found at Callow Carr, four have an annular and three a penannular hoop, while no bow brooches were recorded (Table 8.101).

Only six brooches have been included in the category of jewellery/dress accessory, as annular brooch ON 170.11 from grave 900161 had been integrated into the array of chatelaine elements and is thus categorised under 'personal equipment'. It was found in the area between the right ilium, left femur and below the right ulna of a subadult (14–16-year-old) probable female 900163. The apparently undecorated brooch ON 170.11, with a recess for its missing pin, was recorded as lying below – and thus probably fulfilling a similar function to – ring ON 170.10. The brooch had most likely been attached to the chatelaine with a strap which, based on the mineral preserved organic remnants, was probably made of leather; a similar attachment is presumed for the ring, but no such remains were observed. A possible second (?pen)annular brooch (ON 173) might have been located on the opposite side of the body (900163). The object was recorded as lying between the right ilium and the left side of the ribcage and is visible in several photographs and the site drawing but was subsequently lost. Like the brooch integrated into the chatelaine, the position of this brooch would be different to the other brooches from Callow Carr. Because of these uncertainties, ON 173 was included in the quantifications of the function groups as uncertain.

Table 8.101 Brooch types and burial information. Brooch type after Høilund Nielsen 2013

ON	*Grave*	*Brooch form*	*Type*	*Diameter in mm*	*Age group*	*Age*	*Sex*
170.11	900161	annular	?	38.7–39.2	subadult	14–16	?f
unrecorded		(?pen)annular	?				
103	near/in gr. 900190	annular	BR3-b	37.3–38.2	adult	50+	m
158	900193	annular	BR3-d	27.9–28.2	adult	28–32	?f
100	900137	annular	BR3-e	23.4	adult	30–40	f
2	900019	penannular	BR3-f	24.9–25.5	subadult	14–16	f
32	900079	penannular	BR3-f	23.3–24.3	adult	20–30	?f
65	900085	penannular	BR3-f	21.2–21.6	adult	22–32	??f

The remaining three annular brooches are distinguished by the decoration of the hoop and its size. The above-mentioned ON 103 was recovered from the topsoil above grave 900190, possibly beyond or – as shown on the grave plan – what on further examination turned out to be within the north-east corner of the grave cut, level with the skull of the adult 50+-year-old male buried in this shallow, plough-damaged grave. With its bead-and-reel decoration, the brooch belongs to Høilund-Nielsen type BR3-b, which dates to phases AS-FB to AS-FE (*c.* AD 510–650). Leeds classed it as his type f, which is especially common in the area either side of the Humber (Leeds 1945, 47–9, fig. 29. See also Geake 1997, 54, map 20, emphasising the frequency of all forms of annular brooches in this area). With a diameter between 37.3 and 38.2 mm, ON 103 belongs to the larger examples (Geake 1997, 52–3, table 4.11). The association of the brooch with an older male is unusual, as annular brooches have previously been associated exclusively with female burials (see e.g., *ibid*., 54). One explanation for this unusual association could be if the brooch had been ploughed out from one of the adjacent graves near the eastern, extended boundary of the excavation trench, where a male association would appear to be less likely since two out of three burials in the immediate vicinity were female or displaying feminine gender (female: grave 900175; feminine: grave 900060; male: grave 900205). On the other hand, at Cleatham, Lincolnshire, two annular brooches were found with male burials, one with an iron pin under the jaw of an older adult from grave (hereafter 'gr.' for sites other than Callow Carr) 01 at that site and another with a copper alloy pin with an adult male (gr. 17, Høilund-Nielsen type BR3-d) (Leahy 2007, 144, table 44, 175, fig. 79, 179, fig. 83). Another burial, sexed as male, from Blewburton Hill, Berkshire, gr. 3, contained an iron annular brooch near the left temporal bone and a plain disc brooch on the left

shoulder, as well as an iron buckle, a knife and a sheep pelvis (Dickinson 1976, vol I, 147, vol II, 46). It is also worth noting that a small 'D'-shaped buckle without plate (ON 107, see below) was found on the upper left of the chest on the first rib of the male burial in grave 900190, where it might well have served a function similar to most of the brooches at Callow Carr.

A plain-hooped version of Høilund-Nielsen type BR3-d with a copper alloy pin (ON 158) was found centrally in the upper chest area of the adult (28–32-year-old) probable female in grave 900193. The type was dated to *c.* AD 555–685 (phases AS-FC–FE), and the nine examples included in the A-S CF again reflect the distribution focus on the Humber area (Høilund Nielsen 2013, 223; Hines 2013b).



Figure 8.55 Brooch ON 100

The last of the annular brooches (ON 100; Fig. 8.55) was found just below the right shoulder of a 30–40-year-old female in grave 900137. With its two stylised opposing animal heads, it belongs to Høilund Nielsen type BR3-e, which can be made with one or two pairs of opposing heads and for which a more restricted chronological range has been established in the A-S CF, covering the period AD 625–650 to 660–685 (phase AS-FE); the modelled radiocarbon date for the Callow Carr burial (*cal. AD 635–655*) appears to correspond with the earlier part of this phase. The four examples included in the A-S CF all come from East Yorkshire (Hines 2013b), but examples with one pair of opposing heads have been reported from Searby in Lincolnshire (Leeds 1936, 100, pl. 27, 45), 48 km north-west of the site, as well as from Faversham in Kent (Smith 1912, pl. facing p. 152).



Figure 8.56 Top and oblique views of brooch ON 2

The three penannular brooches from graves 900019, 900079 and 900085 present a more uniform picture compared to the annular brooches. All are made of copper alloy and have more or less circular-sectioned hoops with flattened ends curled up onto the ring. Only the little-worn brooch ON 2 (Fig. 8.56) from the richest grave (900019) at Callow Carr has a notable decoration, consisting of six groups of four transverse lines; a similar decoration might have been present on ON 32, but only one group of lines is now visible 4 mm above the right end, while brooch ON 65 only has a rather obscured decoration of two faint converging lateral lines on the underside of the curled pin socket.

Penannular brooches with their ends curled back up onto the ring belong to Fowler's type C. The basic form has a long currency, going back to at least the early 1st century AD and continuing into the 7th century (for a summary of the development of penannular brooches of Fowler type C and their use in the Anglian and Saxon areas in Germany and Denmark, see Schuster 2006, 50–1). Booth identified three groupings within that range, covering the 1st/early 2nd, late 3rd to early 5th and 6th to 7th centuries, attributing the gap between the second and third group to problems with the dating of 5th-century material (A. L. Booth 2014, 54 fig. 2.1, 145; Fowler 1960, 164ff). The A-S CF attributes Høilund-Nielsen type BR3-f to phases AS-FD–FE, *c.* AD 580–640 to 660–685. The modelled radiocarbon date for grave 900019

(*cal. AD 640–660*) sits well within the later part of this date range, and the combination with a set of chain-linked pins (ON 68, see below) in grave 900085 provides a date covering the second and third quarters of the 7th century. The fact that all three penannular brooches at Callow Carr were found singly likewise points to a later stage of the period under consideration (Geake 1997, 54). A re-use of Roman penannular brooches, as has for instance been discussed for at least some of the examples from Morning Thorpe (Mackreth 1987, 165; see also discussion of his type PEN c2.d1–3 in Mackreth 2011, 208–9), is rather unlikely at this site as the brooches show little wear, but the (possibly residual) inclusion of one half of a Roman finger-ring in grave 900085 (see below) militates against complete certainty in this regard.

The cemetery at Callow Carr has augmented the number of penannular brooches with ends curled back onto the ring from Lincolnshire Anglo-Saxon cemeteries considerably, with only two previously known, from Sleaford and Ruskington (White 1988, 12, fig. 4.6; 14, fig. 6.3, after Mackreth 2011, database). Finds of other types of penannular brooches from Anglo-Saxon contexts in Lincolnshire have been summarised by Drinkall and Foreman (1998, 356–8) and Leahy (2007, 146–7).

Although the sample size is too small to be statistically relevant, it appears that the diameters of the penannular brooches from Callow Carr are inversely related to the ages of their female wearers, whereas no such patterning is apparent with the annular brooches (Table 8.101). However, the tendency of smaller diameters for penannular brooches compared to the annular ones follows the pattern observed by Geake (1997, 53, table 4.11).

Necklaces

Apart from an intriguing glass cabochon in a copper alloy setting from grave 900175 and an amber bead which could have been located in the area of the head in grave 900187, grave 900019 is the only one possibly furnished with a necklace with multiple components, including a silver-set amber cabochon, two gold-set garnets and two glass beads. However, none of these burials can be interpreted as providing unequivocal evidence of the wearing of a necklace. Additionally, a rock crystal bead was found as part of the chatelaine in grave 900161; it will be discussed under 'personal equipment'.

Possible pendant or applied decoration

A most unusual set cabochon (ON 177, grave 900175), made of translucent dark amber glass decorated with a cross-and-saltire pattern of yellow and body-colour S-twisted trails, was mounted onto a copper alloy baseplate with a crenellated collet that had been soldered onto the edge of the plate (Fig. 8.57). While the glass appears dark brown/almost black in reflective light, in transmitted light it is dark amber-coloured with some quite large bubbles (1–2 mm) in the glass matrix. The baseplate would originally have been of subcircular shape, but its circumference is now damaged in several places, and some of those damaged areas correspond to the shape of still extant rim fragments. One 4 mm-wide area on the circumference extends slightly beyond the undamaged edge either side, possibly indicative of a suspension loop originally extending from this area.

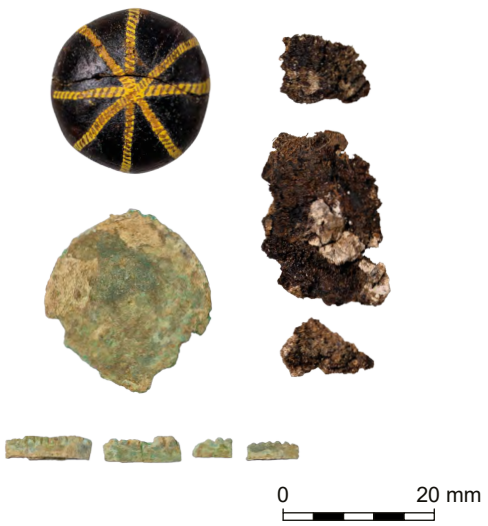


Figure 8.57 Cabochon ON 177 and remnants of mount, including fragments of crenellated collet, base plate and fragments of organic material (?leather)

The mount was found together with (and possibly placed onto) a fragment of organic material, most likely leather, below the head of the 50+-year-old female burial 900177. One of the recovered fragments of organic material was more than 23.8 mm wide and has been preserved because it was in contact with the metallic baseplate. A beige substance adheres to approximately a fifth of the underside of the plate. It was not possible to establish whether this substance was a glue used to fix the metal mount to the ?leather fragment, perhaps after the above-mentioned suspension loop had been damaged. A rather speculative explanation would be to explain this arrangement as having decorated a bag or pouch, or perhaps even a leather

headband or cap. Alternatively, and perhaps slightly less speculative, the leather might have belonged to a different item placed next to the head and unrelated to the mounted cabochon, which could have been the only gem of a necklace that had slipped to the side of the neck and behind the skull, if there was indeed a suspension loop.

Although there are a considerable number of decorative jewels made of various materials like (precious) stones, glass and amber mounted in a variety of metal settings (see e.g., Høilund Nielsen 2013, 213–4, types PE9a-f), no exact parallel for this object is yet known. Therefore, the glass cabochon and its setting will require separate consideration.

An almost identical plano-convex glass cabochon comes from Little Carlton, around 15 km to the north of the site. Compared to ON 177, slight differences exist in the manner in which the individual arms of the cross-and-saltire pattern were applied. At Callow Carr, the four twisted strands were laid across the centre, while at Little Carlton eight twisted strands were applied radially from the centre and not smoothed into the body; the lower cross consists of two blue arms with white twist and two green or body-coloured arms with white twist, while at Callow Carr all four arms are body-coloured with yellow twist; at Little Carlton yellow twist is only used for the upper cross. The object lacks any form of setting and was thus described as a 'gaming piece' (Heaser, pers. comm. 9 November 2023). The decoration with its twisted glass trails is reminiscent of annular twist beads which are an autochthonous Anglo-Saxon late 7th/early 8th-century type found widely distributed in southern and eastern England as well as Yorkshire and southern Scotland (Heaser 2025, 125–29). The cross-and-saltire motifs on the glass cabochon from Little Carlton and on ON 177 might be deliberately chosen symbols in an age of religious transition, especially when considering the potential Christian associations for at least some of the phases of the high-status site at Little Carlton (Willmott and Daubney 2020; Willmott and Wright 2021). A similar cross-and-saltire motif is also found on one of the exquisite drop-shaped gold and glass cabochon pendants which is part of the necklace from Harpole, Northamptonshire, with its unequivocally Christian symbolism (Hilts *et al.* 2023).

Metal mounts with crenellated collets have been found with and without loops. An example without an obvious loop comes from Chamberlains Barn II, Bedfordshire, gr. 32 (Hyslop 1963, 180, fig. 12.32,3b). The bead held in this mount is described as 'ring-shaped, clear pale green glass, broken and mounted in silver'. The illustration suggests that the silver mount was attached to a plate and the silver collet has a crenellated upper rim. It was suggested in the report that as only two of the beads had been threaded onto rings and one ring had a bead strung across it while the other had no obvious means of attachment, they might have been sewn onto the dress (*ibid*., 179). Grave 138 at Finglesham, Kent, included a pendant of an oval glass cabochon set in a mount with 'scalloped' edge and a backplate and loop that was made in one piece from bronze sheet (Hawkes and Grainger 2006, 98, 279, fig. 2.117, 138, 2.6). The Callow Car plate would be of a similar type of collet-and-loop construction, if the damaged extension on its rim does indeed indicate the presence of a loop. The Finglesham pendant has been classed as Høilund-Nielsen type PE9-d, but her type definition is based more on the colour of the cabochon than the construction of the setting. Type PE9-d has been dated to phases AS-FD–FE (AD 580–640 to 660–685), and the modelled radiocarbon date of *cal. AD 635–655* for grave 900175 corresponds largely to the later part of the earlier phase. Other pendants with crenellated (or toothed) collets are known: in copper alloy from Twyford School, Hampshire, gr. 1071 (Schuster 2011a, 86, fig. 7, 130), and in silver from Cow Low, Derbyshire (Leeds 1936, 109, fig. 23a; Ozanne 1962, 27, fig. 11e). For the most recent reconsideration of Cow Low, see Brown 2024, 241–2, table 2), and – in gold – from Chartham Downs, Kent (Leeds 1936, pl. 29a), and Barfreston Down, gr. 34 (Høilund Nielsen 2013, 214, fig. 5.171 top), although the latter shows a separate loop. Crenellated or dog-tooth settings or collets can also be seen on some of the gem settings of the great gold cross from the Staffordshire Hoard (Blakelock and Fern 2019, 163, fig. 3.72; Fern 2019, 98, fig. 2.73, 100–1), as well as on the central gem setting of the Sarre brooch (Haith 1991, 48–9, pl. 31a).

Pendants set with amber or garnet

Grave 900019 contained the (probably plough-damaged) remains of a 14–16-year-old female individual as well as a 5.5–7.5-year-old male (who is maternally related to the 30–40-year-old female in grave 900137), but only the subadult female was furnished with grave goods. Apart

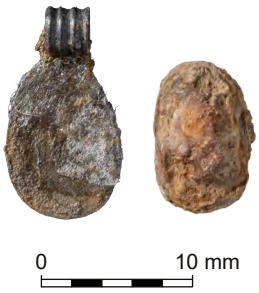


Figure 8.58 ON 186: Silver pendant backplate with amber setting

from the penannular brooch ON 2 (see above), the other five objects recovered from the grave could all have been part of a necklace comprising a silver-set amber cabochon pendant, two gold-set garnet pendants and two glass beads. The precise locations of these components and their sequence remains unknown as all elements were recovered from soil samples, but the pendants were recovered from samples in the areas of the skull and chest.

Silver-set amber cabochon ON 186 has an oval backplate with a four-ribbed strip loop that had been soldered onto the plate from the back (Fig. 8.58); however, it was no longer possible to establish whether the loop had been fitted as a repair of an integral loop that had broken off or whether this was the initial intention. The amber cabochon was held by a plain strip collet. The piece of amber was cut to an oval shape and a plano-convex cross-section; its surface is now uneven with several large spalls due to post-depositional leaching, but it is likely that it originally had been smoothed. No exact morphological parallel exists for ON 186 and its material combination, but grave 1227/SG 82 at Melbourn provides a good comparison for the pendant, although there it is made in copper alloy for a round blue glass cabochon, and the loop is integral to the back plate (Duncan *et al.* 2003, 80, fig. 16, SG 82, 4). Such pendants imitate the more exquisite pendants made in gold, morphologically similar to pendants like Brook Street gr. 23, Winchester, which had been repaired in antiquity and is unfortunately lacking its gemstone (Biddle 1975, 306, fig. 13, 1; Hawkes 1990, 630, fig. 168, 1958); Chartham Downs, Burial 14 (Høilund Nielsen 2013, 213, fig. 5.170; type PE9-a); Sibertswold gr. 172 (*ibid*., fig. 5.175; type PE9-f) and Harford Farm gr. 33, which has an oval garnet intaglio in a gold setting (Penn 2000, 121, fig. 96, gr. 33.3; type PE9-b).

The two gold and garnet pendants (ONs 191 and 238) were essentially made in a similar manner to each other; their difference in shape is owed to the different outlines of the semi-precious stones held in their respective gold settings: sub-trapezoidal for the former and more rectangular with rounded corners for the latter (Fig. 8.59). Both have a triple-ribbed suspension loop joined to the back plate; the method used for this join as well as the beaded wire around the collets is likely to have been some form of reaction soldering as there is no visible solder in the join.



Figure 8.59 Gold and garnet pendants ON 191 (l) and ON 238 (r)

Reaction soldering was the customary method for precious metal soldering in most cultures well into the 11th/12th century and continued to be used for granulation and filigree work until the beginning of the 17th century (Wolters 1996, esp. 196. See also Schuster 2006, 129–30). Reaction soldering is probably a translation of the German '*Reaktionslöten*'. Other terms for this bonding technique are 'fusion welding' (Untracht 1985, 348), 'eutectic bonding', 'autogenous welding' or 'diffusion bonding' (Coatsworth and Pinder 2002, 98). A clearer distinction between these different techniques is provided by Perea and Armbruster (2011, 166):

a) brazing, generally involving an Au-Ag-Cu (but also Au-Ag) ternary alloy – or filling material or solder – that melted at a temperature lower than the parts to be joined; b) fusion bonding, using no solder but heating the worked piece to a temperature just below its melting point enabling gold atoms to move in between the interface in order to produce a metallic join; and c) reaction soldering using copper salts.

With regard to the latter, Blakelock and Fern (2019, 141) use the term 'organic soldering', as such copper oxides or salts were usually applied in an organic compound like quince juice.

Both pendants have a collet holding the gemstones in place, and both collets are surrounded by beaded gold wire; the only difference between the two pendants is the manner in which the wire is applied: in ON 191 one wire is wound around the collet two and a half times, creating the impression of three concentric wires, whereas in ON 238 there are three separate wires applied concentrically. SEM-EDS analysis of both cabochons has confirmed their identification as garnets (Pearce 2024a). Based on the CaO-MgO and MnO-MgO wt% ratios of the semi-quantitative SEM-EDS results, the garnet from ON 191 is assumed to originate from Northern India/Rajasthan, while ON 238 is likely to come from Sri Lanka (Pearce 2024b). For a discussion of the possible trade links involved in the supply of garnet to Anglo-Saxon England see Hamerow (2017).

Gold and garnet pendants have been found in a number of female adult and infant burials with ornate necklaces indicative of high wealth (Geake 1997, 40), for instance Brook Street gr. 23, Winchester (Biddle 1975, 306, fig. 13, 2 and 3; Hawkes 1990, 630, fig. 168, 1960 and 1963), Galley Low, Derbyshire (Ozanne 1962, 27, fig. 11f; 30), Boss Hall gr. 93, Ipswich (Scull 2009, 43, fig. 2.20, 17–8), Desborough, Northamptonshire (Evans 1991, 28, pl. 13), Westfield Farm gr. 1, Ely (Lucy *et al.* 2009, 86, fig. 3, 3) and, most recently, Harpole in Northamptonshire (Hilts *et al.* 2023), the last four all with more or less overtly Christian symbolism including a cross. Considering their construction, the two Callow Carr pendants would not appear out of place on the Desborough necklace (upper-right pendant) were it not for the detail of the loops, which have three ribs at Callow Carr, whereas the Desborough pendant has five (the other loops are more ornate with filigree applications). Three-ribbed loops appear to be present on the two Winchester pendants, which both have less complex beaded wire trim.

Høilund Nielsen's typology distinguishes the various pendants by the material of the setting, and those containing garnet or glass form her type PE9-b (Høilund Nielsen 2013, 214, fig. 5.171) which has been assigned to phases AS-FC–FE, *c.* AD 555–685. The modelled radiocarbon date of *cal. AD 640–660* for the Callow Carr grave falls within the later part of the proposed date range.

Of the 21 examples of pendants of type PE9-b listed in the A-S CF sample (Hines 2013b), 12 were found in Kent, with the remainder distributed in a loose scatter from Wiltshire and Hampshire in the south to the Midlands and East Anglia (see also Geake 1997, 40, map 9, but note different type definition), but they clearly are a rarity in contemporary 7th-century Lindsey; however, similar techniques have for instance been used to set some of the pendants from Sheffields Hill (now Sawcliffe), Roxby cum Risby (Leahy and Williams 2001, 312, fig. below; Leahy 2023, 22 top left).

Glass beads

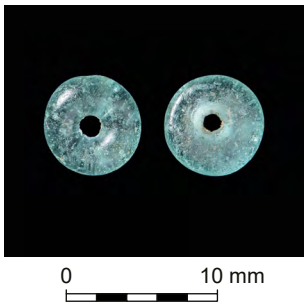


Figure 8.60 Glass beads ON 192.1 and 2

The two glass beads (ON 192.1 and 2), found with the young woman in grave 900019, are both nearly identical translucent light blue/turquoise doughnut beads of asymmetrical cross-section (Fig. 8.60). They have small central perforations, reminiscent of having been produced by piercing a piece of molten glass on a flat surface (Heaser, pers. comm. November 2024; Heaser 2025, 53. Haworth 2018, 245). Doughnut beads are an Anglo-Saxon type with few, if any, direct continental precursors (Brugmann 2004, 41, 63; Heaser 2025, 71). Brugmann assigned doughnut beads to her Final Phase combination group C, which she dates from around AD 650 to the end of furnished burial rite (*ibid*., 41, 58, 70). The A-S CF included doughnut beads in phases AS-FD and FE, covering a slightly wider date range (*c.* AD 580–640 to 660–685), and when wire rings with a bead (Høilund Nielsen 2013, 217 type WR4) are included, this range could extend even further, although this is due to Melbourn SG089, an outlier in the middle of the 6th century (Bayliss et al. 2013, 367). The type has a wide distribution from the south and Kent via the Upper Thames and Severn Valleys, the Midlands and East Anglia to the Humber and North Yorkshire (Brugmann 2004, 88, fig. 43; Hines 2013b). Recent finds have extended the distribution into south-west England, with examples from Locking Parklands, Somerset (Rainbird *et al.* 2023, 127, table 3), Bulford grs 8358, 8380, 8449 and 8562, and Tidworth grs 1186 and 1331, both Wiltshire (Schuster forthcoming).

Amber bead



Figure 8.61 Amber bead ON 114

A large, subcircular amber bead with wedge-shaped cross-section (ON 114; Fig. 8.61) was found in grave 900187. The bead has a pronounced keyhole-shaped perforation. Its dimensions (25.8 x 22.3 x 14.3 mm) would count as 'extravagant' at Dover Buckland II (Brugmann 2012a, 94).

While necklaces with large numbers of amber beads are considered to be a type-fossil of the 6th century – see for instance the 77 amber beads from later 6th-century grave 2756 at Cliffs End Farm, Kent (McKinley *et al.* 2014, 251–3, fig. 7.16; 265, pl. 7.3) – this reduces to one or two after the beginning of the 7th century and continuing to the end of the accompanied burial rite, as exemplified by Marina Drive, gr. E2, where one bead was found as part of a necklace combined with a reliquary (work-)box (Geake 1997, 47–8; Matthews 1962, 31, 38, fig. 4, 1 and 8).

One large, irregular(wedge)-shaped amber bead of the 70 amber beads found in 6th-century gr. 168 at Castledyke South, Barton-on-Humber, has a keyhole-shaped perforation which has been attributed to either wear from the necklace string or the hole having been drilled twice (Drinkall and Foreman 1998, 84, 194, fig. 108, 2.87). As this possibly female individual was aged between 35

and 45 years, a wear-pattern like this could have developed during her lifetime, whereas it is unlikely that this was the case for the 2.5–3.5-year-old girl at Callow Carr. Here, an interpretation as a grave gift by an older member of her family would appear more likely, concurring with Brugmann's analysis of the beads at Dover, Buckland II (Brugmann 2012a, 96–7).

The only human remains from grave 900187 comprise five tooth crowns and petrous bones. The position of bead ON 114 might have been near the head of the infant as several of the five teeth from the grave were recovered from a soil sample together with the bead. The bead was located less than 100 mm south-east of two copper alloy staples (ONs 108 and 113) near the north-west corner of the grave cut. Such staples are frequently interpreted as being used on leather goods and could potentially be related to a small leather bag or pouch, which could have contained the bead. Alternatively, a use on a veil has been proposed, anchoring tie-bands, 'either on the veil itself or on a cap or on a coif or cap over which the veil was draped', strengthening 'the point at which a woven band separated from the veil or coif edge and became a tie-fasten at the back of the neck' (Walton Rogers 2007, 159). A similar situation to grave 900187 was observed at Great Chesterford, gr. 36, where two such staples were found to the left of the skull of a female juvenile (4–6 years) and a flat amber bead was found to the left of the chin (Evison 1994, 147, fig. 27, gr. 36,1b).

In Geake's sample, amber beads are frequently found in graves of younger individuals from the 7th/8th century (7 out of 24 burials with amber from individuals younger than 12 years; Geake 1997, 47. Geake speaks of the 'Conversion period' – for her definition see Geake 1997, ch. 1. For a recent consideration of the terminology of early medieval England see Scull *et al.* 2024, 3–4). The association with younger individuals is an observation previously asserted by Meaney (1981, 67). However, this pattern is not universal, as for instance at Dover Buckland II, where no amber beads were found in graves of infants or juveniles after *c.* AD 580 at all, and overall, more than 60% of the individuals buried with amber beads were young adults (31%) or adults (29%) (Brugmann 2012a, 96–7, fig. 4.19 and table 4.9).

Meaney (1981, 67–71) and Geake (1997, 47) discuss the amuletic use of amber and the possibility that during the course of the 7th century, amber increasingly acquired magical connotations because of the possible cessation of its organised export from the Baltic to western Europe.

Buckles

Of the 35 items recorded as jewellery and dress accessories, the largest individual object type is made up of 16 buckles which were recovered from 13 graves. Graves without buckles cluster in the southern and western part of the small cemetery, while in the eastern half, only graves 900060 and 900067 are without a buckle (Fig. 8.62). Considering the placement of some of the buckles in relation to the bodies of the deceased (Fig. 8.63), some buckles found at the neck might have had similar functions to a brooch, fastening a cloak rather than a belt, and it is possible that some buckles placed to one side of the skull, near a lower leg or beyond the feet might instead have been used as fasteners for bags or pouches and would thus belong with the category personal equipment; however, it is of course possible that an unworn belt had been placed in such a position. As it has not been possible to resolve the exact functions of these buckles, they have all been included in the quantification for jewellery/dress accessories.

Nine buckles were made of copper alloy, a tenth copper alloy buckle had an iron pin (possibly a repair), and six were entirely made of iron (Table 8.102). While the ten copper alloy buckles are evenly split between male and female graves, four iron buckles have been found in male graves and only two in female ones. The table shows the buckles sorted according to Marzinzik's (2003) classification, which distinguishes between buckles without (Class I) and with plates (Class II) before subdivision into more closely defined types and variants. Where possible, identifications according to the typology developed for the A-S CF have also been included (Høilund Nielsen 2013, 136–47).

Only two of the buckles have no plate and both belong to Marzinzik typegroup I.10d of 'D'-shaped to oval buckles, which is subdivided into those made of iron (I.10d-i; ON 107) and of copper alloy (I.10d-ii; ON 101). Both variants are dated from the late 5th/early 6th to 7th century, although Marzinzik's early dates for the copper alloy variant are based

Table 8.102 Buckle types at Callow Carr

ON	*Grave*	*Age group*	*Age*	*Sex*	*Material*	*Width (mm)*	*Marzinzik type & date range*	*H N type*	*^{14}C cal. AD (modelled 68%)*
107	**900190**	adult	50+	m	Fe	23.0	Typegroup I.10d-i 2/2C5-C7	Bu8	-
101	**900137**	adult	30–40	f	CuA	15.9	Typegroup I.10d-ii 2/2C5-C7	Bu8	*635–655*
187	**900205**	adult	22–28	?m	Fe	*c.* 12.0	Typegroup II.19a 3/3C5-2/3C7	-	*645–660*
188	**900205**	adult	22–28	?m	CuA	8.3	Type II.22a C6–C7	-	*645–660*
*53	900114	adult	50–60	m	CuA	15.7	Type II.22a C6–C7	-	-
157	900193	adult	28–32	?f	Fe	17.7	Typegroup II.22/24 C6–C7	-	-
95	900140	adult	40+	?f	CuA/Fe	12.3	Type II.23b-ii 3/3C6-C7	?Bu3-a	*555–590*
88	**900137**	adult	30–40	f	CuA	12.0	?Type II.23b-ii 3/3 C6–C7	-	*635–655*
61	900104	juvenile/subadult	11.5–14.5	f	Fe	20.4	?Typegroup II.19 or II.24	?Bu9	*560–595*
72	900098	subadult	14–16	m	Fe	24.6	?Typegroup II.19 or II.24	?Bu9	-
57	900070	adult	40+	?m	Fe	22.8	Type II.24a 3/3 C6–mid C8	Bu7	-
*89	900131	adult	35–45	m	CuA	14.3	Type II.24a 3/3 C6–mid C8	-	*635–655*
115	**900190**	adult	50+	m	CuA	>16.2	Type II.24a 3/3 C6–mid C8	-	-
17	900063	adult	30–40	??m	CuA	13.0	Typegroup II.24b-i <2/3 C6–C7	-	*635–655*
*69	900079	adult	20–30	?f	CuA	11.0	Typegroup II.24b-i <2/3 C6–C7	-	-
166	900175	adult	50+	f	CuA	27.6	?Typegroup II.24	?Bu7	*635–655*

KEY: * = plate decorated with incised line decoration; < = may start earlier.
Graves containing two buckles are given in **bold**. Graves of males/possible males have grey fill. Buckle typology after Marzinzik 2003 and Høilund Nielsen 2013 (H N). Width shows loop width for Marzinzik Class I buckles and plate width for Class II.

on the date range for the cemetery at Appledown, West Sussex, where four of the five examples were found unstratified and only one, from cremation gr. 159, was dated to the 7th century, similar to an example from Castledyke South gr. 129 (Drinkall and Foreman 1998, 179, fig. 93, gr. 129,2; Marzinzik 2003, 31). Based on her analysis, Marzinzik was able to refute the claim that smaller buckle size equates to a later date and instead emphasises the significance of the material in this regard, with copper alloy buckles tending to be later and also more frequently being found in female graves (*ibid*., 32). Buckle ON 101 from grave 900137 supports these observations and adds a well-dated mid-7th-century example from a female burial, which, among other objects, also included a second buckle (ON 88, see below) as well as an annular brooch of Høilund Nielsen type BR3-e (ON 100, see above). The iron buckle ON 107 from male grave 900190 was combined with copper alloy buckle ON 115 of Marzinzik typegroup II.24 and knife ON 120, all with date ranges that overlap in the 7th century. Buckles of typegroup I.10d-i are predominantly distributed in the south and south-east of the country (Marzinzik 2003, 284, map 10), whereas only two come from Lincolnshire sites: Castledyke South, gr. 19 (Drinkall and Foreman 1998, 145, fig. 59, gr. 19,3) and Fonaby, gr. 41 (Cook 1981, 39, fig. 14, gr. 41,6).

The following 14 buckles (Table 8.102) all have a plate for their attachment to the (belt-) strap. Like the previous two buckles, ON 187 was found in a male grave (900205) containing two buckles. With its rectangular plate it belongs to Marzinzik typegroup II.19a, ranging in date from the later 5th to the second third of the 7th century, making the Callow Carr buckle one of the later examples. With 119 specimens in her sample, it is a relatively widespread form, found from the south and south-east of England, although not Kent (but there are two of the copper alloy variant), via the Midlands to Northumbria; the combined typegroup II.19 represents the majority of buckles with plates in the Midlands, the north-east of England, East Anglia and Wessex. The iron variant is relatively evenly split between male and female graves. In Lincolnshire, eight examples, predominantly from 7th-century graves, were found at Castledyke South (grs 29, 33A and B, 63, 69, 115, 126 and 171) (Marzinzik 2003, 46–7, 205–6, 298, map 24). Two unstratified examples come from Fonaby (*ibid*., 206) and one from Cleatham, gr. 40 (Leahy 2007, 150, table 51, 191, fig. 95, gr. 40,2). ON 187 was found at the neck of the 22–28-year-old man in grave 900205. As the other buckle in that grave, ON 188, was found in the waist area, ON 187 might well have functioned as a fastener for a

cloak, similar to the situation with buckle ON 107 in male grave 900190 and Castledyke South gr. 4, sexed as female but gendered male (Drinkall and Foreman 1998, 98, fig. 11, 4, 138, fig. 52, gr. 4; Marzinzik 2003, 51). Walton Rogers lists several graves (including Castledyke South grs 4, 127, 132, 155 and 183) from her dress regions 1 and 2 where a buckle was found high on the chest, dated to the late 6th to 7th century, but all come from female burials (although see comment on Castledyke South gr. 4, above: Walton Rogers 2007, 172–3, fig. 5-33). The associated garment fastened in this manner is suggested to be a cape made of animal skin, and although she discusses men's cloaks and capes, the fasteners employed for these garments include brooches and penannular brooches but no buckles (*ibid*., 206–9). Buckle ON 107 without plate (see above) could have functioned like a (pen)annular brooch, thus providing a link to the way female cloaks were fastened.

Grave 900205 also contains one (ON 188) of the two copper alloy examples of Marzinzik typegroup II.22a of buckles with small tongue-shaped plates. The other (ON 53) comes from grave 900114, where it was found lying beyond the feet; it is one of three buckles with a plate decorated with a pattern of incised lines (see below). ON 188 has the smallest plate of all buckles from Callow Carr, measuring 12.7 mm long by 8.3 mm wide and thus almost half the size of ON 53 as well as the six examples of the form included in Marzinzik's sample, whose plate widths range between 14 mm and 19 mm (Marzinzik 2003, 48). Although located to the left of the left sacral wing of the 22–28-year-old probable male in grave 900205, because of its size it is at least worth considering whether this small buckle had been used to close some form of bag or pouch rather than a belt, but apart from a knife at the left waist, the above-mentioned buckle ON 187, which was found below the jaw, and the lower shaft and tip of a probable nail from the grave fill, there are no other finds indicative of either a belt or a bag/pouch. Marzinzik (*ibid*.) observed that four out of the six in her sample came from graves where another buckle would have been used for the main belt. The date range of the type covers the 6th and 7th centuries, with a buckle from Ipswich Buttermarket gr. 1356, with a *terminus post quem* in the 670s, representing one of the latest of the type and from that cemetery (*ibid*.; Scull 2009, 259, 270). Apart from one example from Mill Hill in Kent, the other examples come from East Anglia and the East Midlands (Marzinzik 2003, 300, map 26); there are also two examples from Flixborough, one of which was from a ditch fill dated to between the late 7th and mid-9th century (Rogers 2009, 22–3, fig. 1.9, 116 and 121). Another possible function for ON 188 could be the use on a seax sheath like at Ford barrow II, Laverstock, Wiltshire, where two small silver buckles with rectangular plates were fitted alongside numerous rivets and edge clips along the upper seam of the leather-covered wooden sheath (Musty 1969, 105–7, fig. 5h, fig. 6h1). However, this is admittedly less likely at Callow Carr, given the lack of most of the components apart from the buckle, unless the intention had been to signify a sheath and seax by the inclusion of the single buckle as a *pars pro toto*.

The upper part of the iron plate of buckle ON 157 from grave 900193 has a tongue-shaped end, which would allow including it in Marzinzik typegroup II.22a, but it is fixed to its straight-edged lower part with two iron rivets near its round rear edge, which would be more in keeping with type II.24a. This and its combination with annular brooch ON 158 (see above) suggests a date range from the latter half of the 6th to the 7th century.

The next two buckles, ON 95 and ON 88, share a triangular arrangement of the rivets on the plate but are otherwise distinguished by differing plate shapes. ON 95 was found below the right elbow of the 40+-year-old probable female in grave 900140. Morphologically, it can probably best be accommodated within Marzinzik's typegroup II.23b-ii of 'other buckles with triangular copper alloy or silver plate'. It finds its best comparison, or – perhaps better – template, in a buckle from Dover Buckland gr. 56, which, however, included additional mounts and fittings made from a greater variety of metals, including tinned and silvered copper alloy as well as silver (Evison 1987, 232, 302, fig. 32, 6–11; Marzinzik 2003, 50, 449, pl. 127 top). In contrast, the Callow Carr buckle is made of copper alloy and features a so far unique pair of quite pronounced conical rivets where other buckles usually have less pronounced dome-headed rivets. The construction

of the Buckland buckle is slightly different in that it has a hollow-backed front plate, whereas the Callow Carr buckle's is flat. Unlike the Buckland buckle, no decoration has been found on ON 95. In Høilund Nielsen's typology, the Buckland buckle has been grouped in type Bu-3a, which also includes the well-known, figuratively decorated buckle from Finglesham gr. 95, as well as the richly geometrically decorated example from gr. 159 of the same cemetery, which does have a rather different loop attachment of cast hinges and a separate iron hinge pin (Hawkes and Grainger 2006, 264, fig. 2.102, 7, 286, fig. 2.124, 4). ON 95 has a tongue made of iron, and it is possible that it was fitted as a repair for an erstwhile tongue with mushroom-shaped tongue base, common on the non-ferrous buckles with triangular plates, although it is equally possible that the iron tongue was the original intention. If so, the construction of ON 95 would be more closely comparable to the iron buckles like Marzinzik type II.23a or Høilund Nielsen type Bu3-g, and particularly the example from Castledyke South gr. 94 with copper alloy rivets (Drinkall and Foreman 1998, 168, fig. 82, 2; Marzinzik 2003, 49). Ultimately, the forms go back to continental templates, but the treatment evident in the buckles from Callow Carr and Castledyke South shows a certain regional idiosyncrasy.

Buckle ON 88 with its triangularly arranged rivets, which are more tightly clustered near the plate's rear edge, is more loosely related to the series of buckles with triangular plates, and the right-angle stepped treatment of the inner edge appears, so far, to be unique for a buckle plate. A link to the above-mentioned belt set from Dover Buckland gr. 56 might exist in the two morphologically similar belt mounts, whose stepped corners are, however, rounded where the Callow Carr buckle has right angles (Evison 1987, 302, fig. 32,7 and 9). A double-tongued buckle with an iron plate and three garnet cabochon-covered rivets with gold filigree collars and corners treated similarly to the mounts from the above-mentioned grave at Ford (Musty 1969, 105, fig. 5d, pl. 27b) provides a link with the largest group of buckles at Callow Carr, those with small, usually rectangular plates of Marzinzik typegroup II.24 (see below); among those buckles there are also two of type II.24a, from Worthy Park, Hampshire, gr. 68 and Lechlade, Gloucestershire, gr. 86, which have three similarly but less neatly arranged rivets towards their rear edges (Marzinzik 2003, 456–7, pls 134, 4 and 135, 3 left).

The two buckles ON 88 and ON 95 were both found with certainly (grave 900137) and probably (grave 900140) female burials, an association which is unusual in graves with triangular-plate belts. While grave 900137 has an assemblage with a female bias, including a spindlewhorl (ON 92) and annular brooch (ON 100), as well as the above-mentioned oval buckle ON 101, the assemblage from grave 900140 is less distinct, with only the buckle and a knife as well as three unidentified iron fragments. Marzinzik reports that only 3 of the 19 triangular belt plates in her sample were found in female graves (4 from undetermined graves) (Marzinzik 2003, 50), while of the 27 specimens (excluding clasps Bu3-e and fittings Bu3-i) included in the A-S CF, only 4 come from burials with female gender bias (of the 18 sexed burials, there is only 1 female, plus 5 undetermined) (Hines 2013b).

Marzinzik's typegroup II.23b-ii dates to the later 6th to later 7th century; those of her type II.23a might continue slightly later (Marzinzik 2003, 49–50). Høilund Nielsen type Bu-3a has been assigned to phases AS-MC–D and AS-MF (AD 545–565 to 580–610, and 610–645 to 660–685), whereas the iron type Bu3-g belongs to AS-MC with a more restricted range of AD 545–565 to 565–595, which happens to correspond very well with the modelled date for grave 900142 of *cal. AD 555–590* (68% probability). (For more restricted ranges for selected graves with this buckle type see Bayliss *et al.* 2013, 332, table 6.13; 487.) The modelled range for grave 900137 places buckle ON 88 before and around the mid-7th century. The two forms of interest here are predominantly found in southern and south-eastern England and East Anglia, with only one example from north of the Humber at Norton, Teesside (Marzinzik 2003, 301, map 27).

The remaining eight buckles all have more or less rectangular plates. At least five can be attributed to two of the subtypes of Marzinzik's typegroup II.24, one might be loosely associated, while two iron buckles (ON 61 and 72) are too fragmentary to

allow distinguishing between this group and typegroup II.19. In Høilund Nielsen's typology, such buckles have been combined in type Bu9 of 'buckles with folded backplate and plain tongue other than Bu7', a basic form that extends across Marzinzik types II.18a, 19–20 and 24a-b, and which are ubiquitous both in England and on the Continent. It was observed that iron buckles are more common in male than female graves (Høilund Nielsen 2013, 146). At Callow Carr, both buckles were found with juvenile/subadult individuals: ON 61 in female grave 900104, with a modelled radiocarbon date of *cal.* AD 560–595 (68% probability), and ON 72 in male grave 900098, which is the only grave with a weapon, short/narrow seax ON 64 of Høilund Nielsen type SX1a, indicative of an equally early date of AD 525–595 (AS-MB–C), while both the knife ON 73 and spoon ON 74 in grave 900098 would be more in keeping with a 7th-century date (see below).

The five buckles of Marzinzik's typegroup II.24 can be subdivided into those with a small rectangular plate (type II.24a), and those with small, strip-like plates (type II.24b-i). Only in the iron example of type II.24a, ON 57, which – in keeping with the pattern observed in Marzinzik's sample – also has the widest plate, are three '*endständige*' rivets placed along the rear edge, whereas all others have only two rivets (Marzinzik 2003, 51). While she points out that type II.24b-i does not usually include buckles with '*endständige*' rivets, one such example from Castledyke South gr. 155 provides a very close comparison to ON 69, although it has three rivets (Drinkall and Foreman 1998, 186, fig. 100, gr. 155,1). Both also share a decoration of cross-hatched ribbons, which will be discussed further below. An interesting distinction emerges in terms of the use according to sex between the three Lincolnshire cemeteries with buckles of typegroup II.24 subtypes of interest here. At Callow Carr, four of the five clearly identifiable buckles were found with male burials (Table 8.102), whereas for the five examples (all type II.24a) at Cleatham, this ratio is inverted (Leahy 2007, 150, tables 51–2), and at Castledyke South the ratio is almost evenly split (type II.24a: 3 female, 4 male, 1 indet; type II.24b-i: 1 male, 2 female: Marzinzik 2003, 123–5, 218, 221). The number of rivets at the three sites is similarly at variance: of the five buckles at Callow Carr, four have two rivets and one has three. At Castledyke South, there is a slight dominance of three-rivet plates (6 of 12), plus one with four rivets, over two-rivet plates (5 of 12); at Cleatham, there are three two-rivet and two three-rivet plates.

Høilund Nielsen has defined the subset of type II.24a buckles with three rivets as type Bu7, with date ranges covering phases AS-MC–F and AS-F D–E (AD 545–565 to 660–685, and AD 580–640 to 660–685). Marzinzik discusses dates mainly from the late 6th to 7th centuries, with occasional extension into the first half of the 8th. Type II.24b-i has a similar range, although the majority are of 7th-century date, with only a few reaching back into the earlier 6th century (Marzinzik 2003, 51). The two radiocarbon dated examples from Callow Carr (ON 89 and ON 17) were most likely deposited before or around the middle of the 7th century. Typegroup II.24 shows a fairly even distribution across Anglo-Saxon England, particularly in the central South and East Anglia, with only Castledyke South and now also Cleatham and Flixborough providing examples from Lincolnshire of the types of interest here; type II.24b-i is preferred in the north of England (*ibid*., 52, map 28). The local patterning in the use of such buckles by the two sexes could be interpreted as evidence for the expression of a very local, community-based identity through the adaptation of material that is available in wider parts of the region and beyond.

While most buckles have plain folded plates, three share a decorative element of cross-hatching arranged in bands (ON 53 and ON 69) or as a chequerboard of cross-hatched squares alternating with plain fields (ON 89). This is a rare decoration which can, however, be found locally on examples of typegroup II.24 at Castledyke South (grs 18 and 155: Marzinzik 2003, pls 132 and 140), as well as Polhill, Kent, gr. 103S (*ibid*., pl. 136), on a remarkable copper alloy openwork buckle from a male burial at Bury St Edmunds, Suffolk, Northumberland Road gr. 3 (Evison 1963, 74, fig. 18 bottom; West 1998, 129, fig. 13, 6), which will be discussed again below, and on the back plate of an

otherwise more ornate buckle of type II.14a (late 5th–early 6th century) from Pewsey, Wiltshire (Marzinzik 2010, pl. 7; 54, 205, fig. 49, gr. 22,4); a strap-end from Empingham II gr. 50 similarly displays a transverse cross-hatched ribbon between two parallel lines (Marzinzik 2003, pl. 158). One of the buckle mounts from Swallowcliffe Down, Wiltshire, shows a decoration of four diagonally divided squares, creating a saw-tooth pattern which was applied in a similar manner (Speake 1989, 62–3, figs 54, o and 56). This rather delicately applied form of pattern can be difficult to identify in assemblages that have undergone only minimal cleaning; even x-radiography does not necessarily reveal it, especially if the contrast has been set to penetrate the usually thicker buckle, or the buckle plate is not in focus because of adhering concretions.

The most ornate buckle found at the site is ON 166 from the well-furnished burial of a 50+-year-old woman in grave 900175 which, among other items, also contained the mounted glass cabochon ON 177. With its rectangular plate, it would not be out of place in Marzinzik type II.24b-ii or Høilund Nielsen type Bu7; however, it is set apart by the construction of its fixed pin, which is an extension of the central, longitudinal bar of a rectangular triple frame. As this combination of these two elements appears so far to be unique, they will be examined separately. The effect of the frame construction is comparable to the rear part of the buckle from Bury St Edmunds, mentioned above, but achieved in a different manner as that plate does not have a frame attached by rivets; instead, at Callow Carr, the upper part of the folded plate has three rectangular openings with cross-hatched bands either side of the central opening and a row of '*endständige*' rivets, as well as another row of rivets with silver filigree collars across the middle of the plate. In her discussion, Evison (1963, 43; see also West 1998, 129, fig. 13, 6) compares the openings in the Bury plate to the garnet inlay of an iron buckle

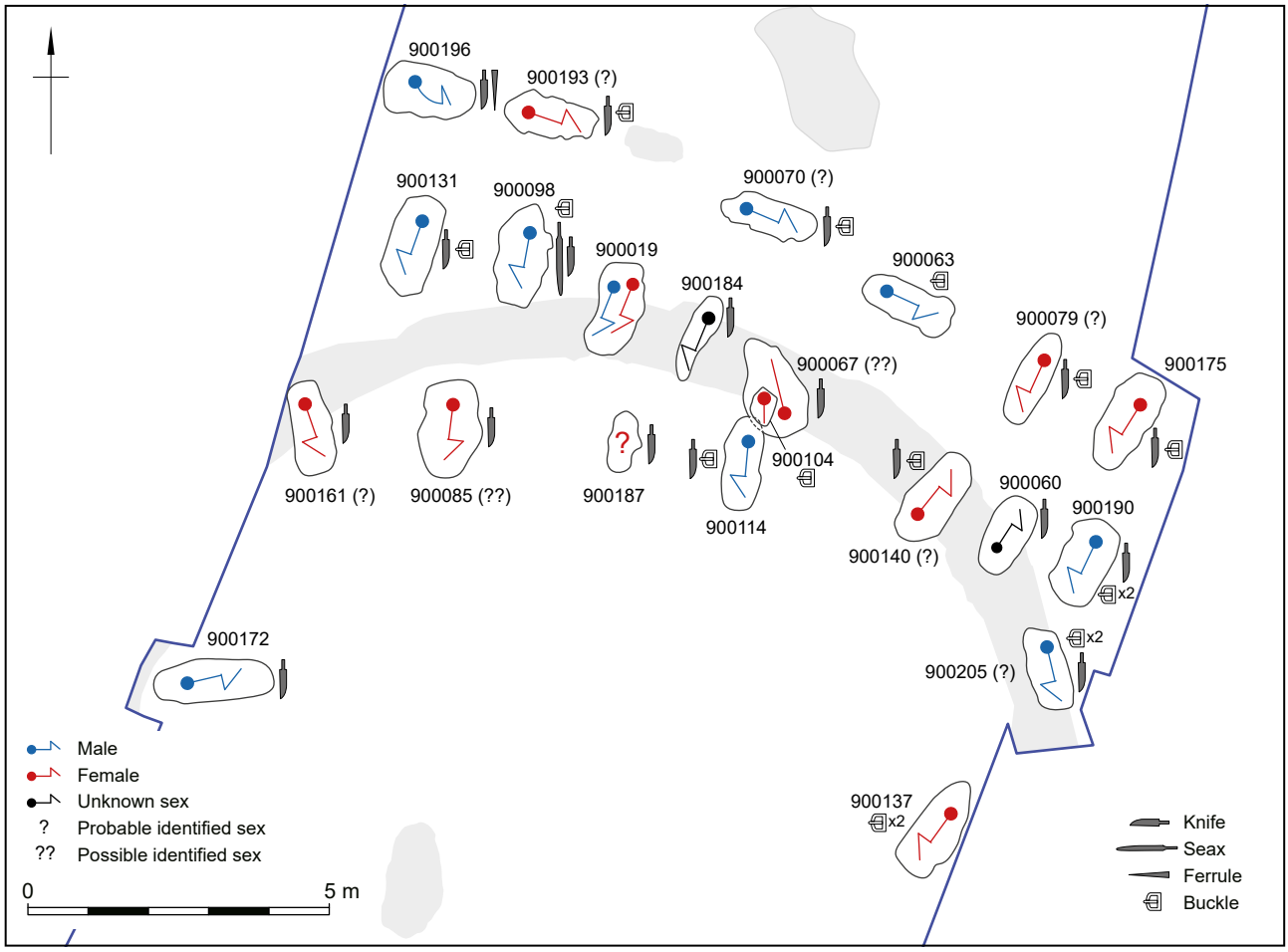


Figure 8.62 Distribution of buckles and knives at Callow Carr

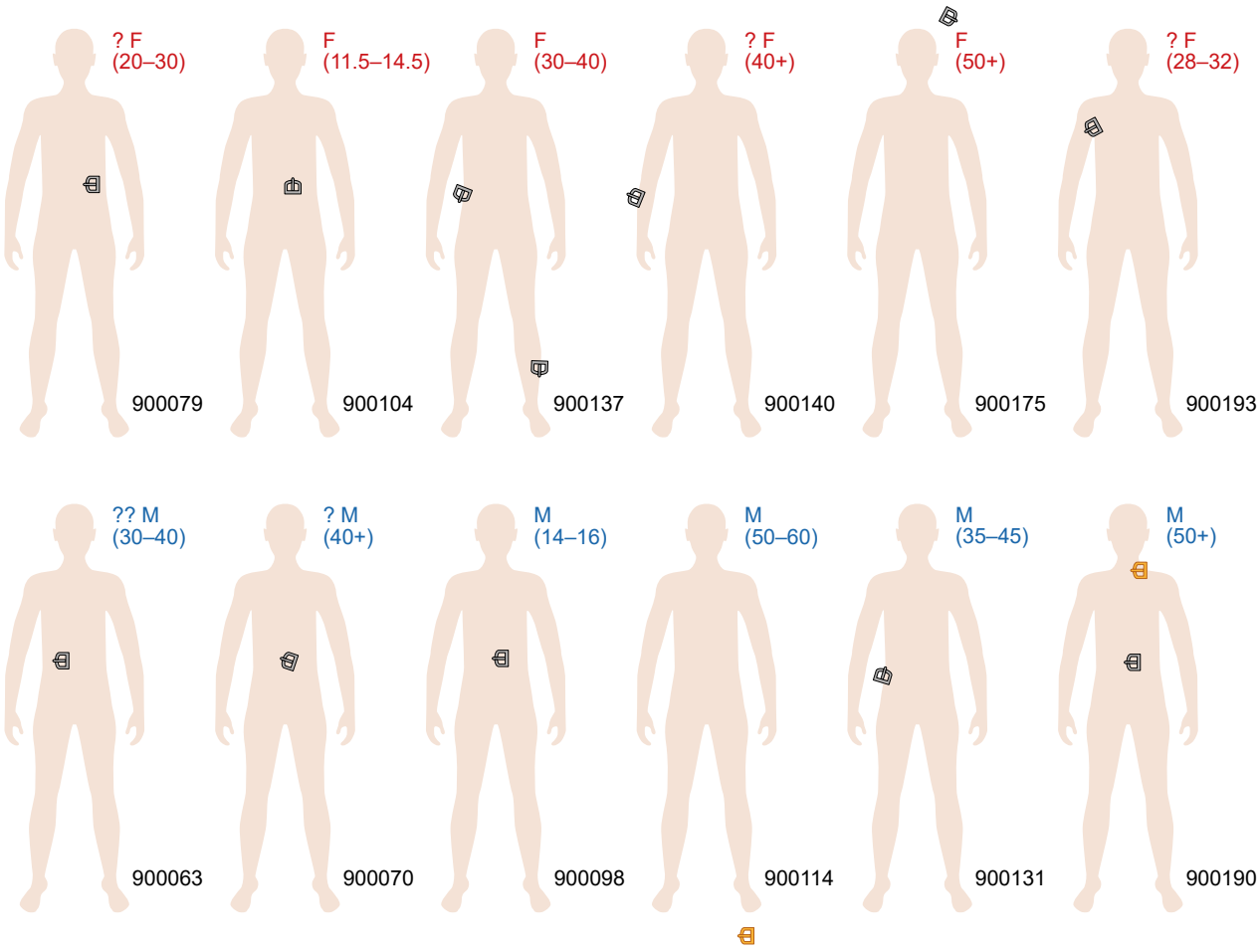


Figure 8.63 Positions of buckles in relation to bodies

from Kingston Down, Kent, gr. 244, and the cross-hatch decoration to the herring-bone-shaped wire inlay (Evison 1955, 32–34, fig. 5, pl. 9a). The buckle from Finglesham gr. 62, with high triangular openings in the plate, represents a stage in the development from the Kingston Down to the Bury plate (Hawkes and Grainger 2006, 253, fig. 2.91, 62A, 4). The evolution of the cross-hatch decoration also provides an explanation as to the origins of the decoration for the buckles discussed above. In her discussion of the possible precursors and inspiration of openwork buckles of her type II.26, in which she refers to the buckle from Bury St Edmunds, among others, Marzinzik (2003, 53, 84) rejects the suggestion of an influence of late Roman forms in the development and prefers a closer relation to chronologically closer openwork plates and fittings from the Continent. However, the more complex construction of ON 166 might have been a stage in the evolution of Bu7 buckles like the example from Bury to those of type II.26.

The construction of the fixed pin can be compared to two iron buckles of Marzinzik type II.22b-ii from Buttermarket, grs 2203 and 4054 (Scull 2009, 199, fig. 3.46, 1; 208, fig. 3.55, gr. 4054,2), and a buckle with tongue-shaped plate from Finglesham, gr. 31, a variant of type II.22a with tongue-shaped plate (Hawkes and Grainger 2006, 245, fig. 2.83, 31.3). The latter grave has been assigned to phase AS-FE (AD 625–650 to 660–685: Bayliss *et al.* 2013, e-fig. 7.3), while grave 900175 has a modelled date of *cal. AD 635–655*.

Lace tags/aglets

Two graves each contained a pair of copper alloy lace tags or aglets: 900070 of a probably male adult (40+ yrs) and 900085 of a possibly female adult (22–32 yrs). With their width below 4 mm, they fit Geake's definition of being strap-ends below 10 mm in width and thus small enough to be termed lace tags (Geake 1997, 64). Although in both graves the feet were largely or entirely missing, the lace tags were found at the foot end, and particularly in the woman's grave the association of one lace tag per foot is still relatively obvious as

the tags were found at the distal ends of the right fibula (ON 42) and left tibia (ON 56), respectively. Both pairs would essentially have looked very similar to one another, featuring a narrow tongue-shaped outline with waisted middle, but they were constructed differently. The pair from grave 900070 (ONs 62 and 67) had a front and back plate joined by a rivet near the straight proximal end, while the pair from grave 900085 had a flat open socket with a tubular rivet each; seam lines on the top (ON 42) and bottom of the lace tags in that grave show that they had initially been made like cone-shaped lace tags which had subsequently been flattened, probably intentionally to achieve the waisted outline.

Lace tags have been found with burials of both sexes, and there does not appear to be a strong gender correlation for the different types either. They have been found in different positions, including at the hip in women's graves, e.g., Ipswich, Buttermarket gr. 1356 (Scull 2009, 198, fig. 3.45, 9; for purse strap), and at the feet as seen here. In the latter position, no more than two examples have been found in any one grave, suggesting that they were used for some form of leggings or shoe fastening where one end of the lace was fixed (Geake 1997, 65; Walton Rogers 2007, 134).

A very close comparison for the pair of lace tags from grave 900085, which also contained a set of linked pins (see below, ON 68), both morphologically and in the position near both ankles, was found at Castledyke South, gr. 15, with the burial of a 35–45-year-old woman (Drinkall and Foreman 1998, 38, 143, fig. 57, gr. 15,2), which similarly included one of a pair of linked pins. The combination with a pair of linked pins suggests a date for the grave in phase AS-FE, *c.* AD 625–650 to 660–685.

Pins

A pair of copper alloy chain-linked pins (ON 68) was found in grave 900085, in the left area of the neck, below the jaw and about 50 mm above penannular brooch ON 65 placed in the middle of the upper chest area. The pair belongs to Ross type LXIV.ii.d of 'eyelet linked pins', a variant of the cast-linked subtype (Ross 1991, 262–3, fig. 5.31g). As mentioned above, a combination of lace tags and linked pins was also seen at Castledyke South, gr. 15, although there the burial only contained one of a presumed pair of pins, featuring a small collar below the eyelet and therefore belonging to Ross type LXIV.ii.b (Drinkall and Foreman 1998, 38, 143, fig. 57, gr. 15,2; Ross 1991, 576; Ross 1998, 271). Geake, however, does not include these pins in her sample of linked pins and treats them as single (1997, 36). In the A-S CF, all linked pin suites have been combined into Høilund Nielsen type PI2-a (Høilund Nielsen 2013, 225, fig. 5.213), which also includes Ross's subtype LXIV.i of composite pins that are often more ornate and for which he has proposed date ranges in the second half of the 7th century, while the cast variants of type LXIV.ii continue into the 8th century (Ross 1991, 264–7). The A-S CF places linked pin sets in phase AS-FE, roughly covering the half-century around the mid-7th century, with only the single pin – but probably originally part of a set of composite Ross type LXIV.i.e pins – from Castledyke South, gr. 183 in A-S FD (Hines 2013b, e-fig. 7.3).

Linked pins are found from Wessex to the Upper Thames, Kent and East Anglia, with fewer finds from the Peak District and Lincolnshire; five of the six examples Ross lists of his type LXIV.ii.d come from Kent and one from Derbyshire (Geake 1997, 36, 208, map 6; Ross 1991, 578–9, map 5.15). The linked pins from Flixborough include six examples of the form found at Castledyke South grs 15 and 46, Ross type LXIV.ii.b, but all have been found residually in later layers (Rogers 2009, 36; 62, fig. 1.26 type LIN1). In view of the rarity in the Germanic world of linking a pair of pins with a chain, this phenomenon, which also included the wearing of chain-linked brooches, probably has Mediterranean, Roman, Romano-British and Byzantine antecedents (Geake 1997, 112; Hilgner 2019). Ross (1991, 403–9, but see also Geake 1997, 36) has discussed the use of linked pins and has provided good arguments for suggesting that sets found in the upper chest area, as at Callow Carr, were intended to secure a veil. In her discussion of the veil, Walton Rogers does not touch upon linked pins but discusses the use of single pins for Migration-period dress (Walton Rogers 2007, 157–67, but see reconstruction of veils with pin suites in Hilgner 2019, 202, fig. 7, using Walton Rogers' original templates). Hilgner discusses

linked pin suites, and in particular those made of precious metals and gemstones, as one of the markers of a female religious elite during the 7th century, with sets found in rural cemeteries possibly indicating small female religious communities outside monasteries, although they could equally well 'represent the secular counterparts to the first generations of abbesses: females from a prosperous kin group following the given paths for a secular career within their social stratum – outside of the Church, but highly influenced by its cultural values and ideas' (Hilgner 2019, 203 with further literature).

Iron object ON 24 was found in grave 900070, in the chest area above the middle of the right humerus of a 40+-year-old probable male. Its round-sectioned shaft has a flat oval head which appears to have been perforated, and remains of a suspension loop are visible in the x-radiograph. The lower part of the shaft and tip are missing. The identification of this object is insecure, and it might have been a pin or some form of suspended implement handle. If a pin, it could have been an iron version of Ross type XVI.i of short spatulate-headed pins with circular head-plate. The type probably dates to the later 6th and possibly the early 7th century and the few examples listed by Ross are predominantly from south-central England, with one from Ruskington in Lincolnshire (Ross 1991, 196–8, fig. 5.16, d and e, map 5.7; see caveats on the identification of possible iron version of pins, *ibid*., 16–7). At Cleatham, remains of what looks like iron pins found on the upper body were interpreted as being in keeping with female dress, although the burial in one instance (gr. 43) was that of a male individual (Leahy 2007, 149).

Finger-ring

Grave 900085 contained an iron finger-ring (ON 14), with only one half of its hoop and bezel still preserved. The exact location of the ring within the grave was not established, but it was recorded as associated with burial 900122, a possible female adult (22–32 years). The form of the ring can best be compared to Roman finger-rings of Hellenistic origin, Guiraud type 1a or c, which would have held a setting of stone or a convex glass paste. In Gaul, where just under 30% of these finger-rings were made of iron, such rings went out of use by the second half of the 1st century AD (Guiraud 1989, 180, fig. 10c). An example from Hod Hill in Dorset would support this dating, although the form of the bezel points to the expanding hoops of 2nd-century rings (Manning 1985, 78 pl. 33, J8). The inclusion of antique objects that are significantly older than the actual date of the burial is a well-known phenomenon in Anglo-Saxon graves (see e.g., Costello 2020; 2023; Costello and Williams 2019; Geake 1997, 113; Sherlock 2016; White 1988).

Because of the fragmentary nature of the finger-ring and the fact that its exact location is unknown, it is not impossible that it found its way into the grave fill as a residual find. On the other hand it is interesting to note that finger-rings in Anglo-Saxon graves are predominantly associated with female individuals, and in most cases only one ring was worn (Stoodley 1999, 35; 187, table 1), mostly on the left hand (Geake 1997, 57).

Personal equipment

Knives and sheaths

Of all grave goods, a knife was the most common item worn by or placed in the grave with the body at Callow Carr (Fig. 8.62). A total of 18 knives were recorded from as many graves; knife ON 71 from grave 900114 was not available for analysis but its chronological and associated burial details will be included in the following considerations.

All 18 knives from Callow Carr are of whittle tang construction, which from the end of the Roman period, throughout the Anglo-Saxon period and well into the medieval period is the almost exclusively used method of fixing a handle to a knife tang. Then scale tang knives become increasingly common again in the 14th century (see Schuster *et al.* 2012, 146). Instances of Anglo-Saxon knives where handles have tangs with rivet holes, as well as instances of actual scale tang knives, have been gathered by Riddler (2016, 45–51).

The knives will be considered on the basis of Evison's typology developed for the Dover Buckland I cemetery (Evison 1987, 113, text fig. 22) but including the adaptations used by Drinkall for the assemblage from Castledyke South (Drinkall and Foreman 1998, 279–283, fig. 136), which substitutes Evison's type number 1–6 with the letters A–F and adds an adapted version of size ranges based on blade lengths and widths first suggested by Härke (1989, 144, table 1; and with slightly varied ranges, Härke 1992, 91, table 5. For a thoughtful overview of how knife typology evolved in this country and in comparison to the Merovingian area on the continent, see Riddler 2016).

With nine individuals (including one indeterminate with a probable chatelaine suite, i.e., of probably feminine gender), marginally more women than men (eight) were buried with a knife (Table 8.103). This was also noted in a number of other cemeteries in Lincolnshire and north of the Humber listed by Drinkall, including Sewerby in East Yorkshire (12 women, 7 men, 6 unsexed) and Norton, Teesside (32 women, 9 men, 7 unsexed), as well as for the 6th-century burials at Castledyke South (7 women, 2 men), whereas there the ratio significantly changes with the inclusion of the Castledyke South 7th-century burials (13 women, 31 men, 14 unsexed; Drinkall and Foreman 1998, 282). This trend has been noted by Stoodley for cemeteries from northern England (49% females, 24% males; Stoodley 1999, 44, 46, fig. 37). It appears to be a regional difference compared to his national sample (44% male, 33% female; *ibid*., 30–1, fig. 25), in which he observed that the emphasis on male knife provision also increases over time (*ibid*., 37, fig. 32), an observation that has recently been highlighted again by Riddler in his comparison of cemeteries across East Anglia and Kent (Riddler 2016, 42–5, tables 4–5).

While the length of the blade has frequently simply been taken as the total length of the knife without the tang (Härke 1989, 144), it became clear that when considering the assemblage from Callow Carr this line could be placed at various points because in many instances the place where a knife's shoulder reached the full width of the blade at the back is at a point either further forwards or backwards compared to where the choil meets the cutting edge. In order to achieve consistency, it was decided to measure blade lengths from the point where the handle ended on the blade, which was usually visible in the x-radiographs. The handle edge extending beyond the tang onto the blade was, for instance, also observed at Snape gr. 2 and on several of the knives from Coddenham, both Suffolk (Filmer-Sankey and Pestell 2001, 23, 122, fig. 80G; Penn 2011, 64–5), and at Castledyke South this was the case with 16 out of the 84 knives (Edwards and Watson 1998, 283).

Only blade size ranges 1 (L 40–99 mm; W 9–22 mm) and 2 (L 100–129 mm; W 14–23 mm) are present at Callow Carr (Table 8.104). The largest knives (ONs 109 and 120) were found in graves 900172 and 900190, with the burials of a 20–25- and a 50+-year-old man, respectively. This conforms to a broadly observed trend, both nationally (Härke 1989, 145, fig. 1; Riddler *et al.* 2016, 42–3, fig. 9 and table 3) as well as regionally at Castledyke South (Drinkall and Foreman 1998, 282, table 23), for male adults to be accompanied by larger knives, although at Callow Carr this is replicated only within size groups 1 and 2 (Table 8.104). A similar observation was made at Cleatham, where knives of size group 3 were also lacking (Leahy 2007, 173).

Table 8.103 Sex associations of knives

Sex	*Count*	*Graves*
Female	2	900175, 900187
Female?	4	900079, 900140, 900161, 900193
Female??	2	900067, 900085
?	2	900060 (feminine gender), 900184
Male	6	900098, 900114, 900131, 900172, 900190, 900196
Male?	2	900070, 900205
Total	18	18

Table 8.104 Knife size and sex association

Blade L min	*Blade L (max)*	*Blade L (average)*	*Width (average)*	*Tang L (average)*	*Count*
42.0	118.9	74.8	17.7	40.5	All (n=16)
42.0	118.9	80.6	19.4	46.6	Males (7)
50.0	88.0	65.5	16.1	40.5	Females (7)

Typologically, the knives show little variation (Tables 8.105–6). Most belong to type D with a back that curves down to the tip in line with the straight cutting edge. The three examples from graves with radiocarbon determinations (graves 900172, 900196 and 900205) all have modelled date ranges in the decades around the middle of the 7th century, which also applies to the two examples classed as type A/D from graves 900131 and 900175. With these two knives, both the back and the cutting edge curve towards the tip, but it was no longer possible to determine whether the curved edge was an artefact of prolonged use or whether it was made in this way from the outset (Riddler 2016, 39). There is nothing in the assemblages from the graves without radiocarbon dates to suggest substantially different date ranges; however, the knife that accompanied the little girl in grave 900187 was the only grave good present, and consequently her burial cannot be dated more precisely than the general date range of the two forms, which covers the 5th to 7th centuries (Evison 1987, 115; Drinkall and Foreman 1998, 281).

Of the two type A knives, ON 96 comes from grave 900140 and was combined with a buckle Marzinzik type II.23b-ii. It has a modelled date of *cal. AD 555–590* (68% probability).

Table 8.105 Knife types and sex association

	A1	*A2*	*A/D1*	*D1*	*D2*	*E1*	*Total*
Sex							
F	-	-	2 (66%)	-	-	-	2
F?	1 (100%)	-	-	3 (33.3%)	-	-	4
F??	-	-	-	1 (11.1%)	-	1 (50%)	2
?	-	-	-	2 (22.2%)	-	-	2
M	-	1 (100%)	1 (33.3%)	2 (22.2%)	1 (100%)	-	5
M?	-	-	-	1 (11.1%)	-	1 (50%)	2
Total	1 (5.9%)	1 (5.9%)	3 (17.6%)	9 (52.9%)	1 (5.9%)	2 (11.8%)	17

Table 8.106 Knife types and age group association

	A1	*A2*	*A/D1*	*D1*	*D2*	*E1*	*Total*
Age group							
2	-	-	1 (33%)	-	-	-	1
3	-	-	-	1 (11.1%)	-	-	1
4	-	-	-	2 (22.2%)	-	-	2
5	-	-	-	4 (44.4%)	1 (100%)	1 (50%)	6
6	-	-	1 (33%)	1 (11.1%)	-	-	2
7	1 (100%)	-	-	1 (11.1%)	-	1 (50%)	3
8		1 (100%)	1 (33%)		-	-	2
Total	1 (5.9%)	1 (5.9%)	3 (17.6%)	9 (52.9%)	1 (5.9%)	2 (11.8%)	17

Age groups after Stoodley 1999, 105: 1. 0–1 year; 2. 1–7 years; 3. 7–15 years; 4. 15–20 years; 5. 20–30 years; 6. 30–40 years; 7. 40–50 years; 8. >50 years

In grave 900190, a 50+-year-old man was accompanied by two buckles of Marzinzik typegroups I.10d-i and II.24, respectively, as well as the knife; while nothing would speak against a similar date, the date ranges of the objects cover the 5th to 7th, possibly even the early 8th centuries.

The two knives of type E (ONs 16 and 189) have a straight back with a distinct angle down to the tip in line with the cutting edge. They come from graves 900067 and 900205, the burials of a possible female 40–50-year-old and a possible male 22–28-year-old individual. Both have modelled date ranges in the decades around the middle of the 7th century, which accords well with the ranges established for the type so far in Kent and East Anglia (Evison 1987, 115; Riddler 2016, 38) as well as at Castledyke South, although there one was also found in gr. 10, which was dated to the late 5th/6th century (Drinkall and Foreman 1998, 281).

No preference according to sex is evident for any of the knife types (Table 8.105), whereas the two type A knives were only found with older individuals (Table 8.106).

Evidence for mineral replaced organic remains suggestive of the presence of leather sheaths was found on 12 knives (ONs 3, 16, 23, 39, 63, 73, 90, 96, 172, 109, 119, 140.1); however, none seem to have been preserved well enough to allow commenting on sheath construction. Furthermore, it is possible that in some instances the remains belong to leather belts or straps that came into contact with an unsheathed knife. Remains of organic handles were found on 13 knives (ONs 3, 16, 23, 39, 63, 73, 90, 109, 116, 118, 119, 140.1, 189); while it was not possible to conclusively distinguish between wood and horn in most cases, ON 63 from grave 900085 could have had a horn handle secured with a wooden wedge. Horn is frequently found to be the more common material for Anglo-Saxon knife handles, compared to bone or wood (*cf.* Riddler 2016, 46 with further literature). At Castledyke South, 72 knives had horn handles, while only one was found with a handle made from hazel wood (Edwards and Watson 1998, 283). Similarly, most knives found with inhumations at Spong Hill had horn handles (21, plus one probable, and only one of wood; Hills *et al.* 1984, 157, appendix I).

A strap loop with two oval plates (ON 75) was recorded in grave 9000070 (40+-year-old probable male) at the right elbow and below the cutting edge of knife ON 23. A large fragment of leather could have been part of a strap, or the sheath. A good comparison was found as part of a seax sheath at Ford, Laverstock, Wiltshire (Musty 1969, 107, fig. 6, h2), as well as strap loops considered to have been part of chatelaines at Dover, Buckland I grs 134 and 155 (Geake 1997, 281, fig. 4.17 bottom). Given the male burial and the association with the knife, the seax sheath is more likely for ON 75. In grave 900196, two nails (ON 140.1.1–2) and a staple (ON 140.3) were found together with knife ON 140.1 accompanying a 30–40-year-old man. At least two of the fittings had remains of wood, but whether these belonged to a leather- or hide-lined scabbard (which would be unusual for an Anglo-Saxon knife) or to an entirely separate object could not be established.

Mindful of the greater propensity of post-depositional movement for knives worn at the waist or hip in flexed or crouched burials, which is the norm at Callow Carr, some patterns can be discerned despite the small sample size (Fig. 8.64). It appears that women were buried with knives worn or placed at their left hip or waist in six out of eight burials; in one case the knife was placed to the right and above the head of the 50+-year-old woman in grave 900175, while the position of the knife accompanying the 2.5–3.5-year-old girl in grave 900187 was probably somewhere in the middle of the body but because of the poor bone preservation cannot now be determined any more closely. Grave 900060 with the body of a 19+-year-old of feminine gender had a knife placed at the pubis. There is no discernible pattern as to the orientation of the blade tip or cutting edge. The left side was similarly preferred for the knife in male burials (again six out of eight), but there is greater variety in the locations, including beyond the elbow of the 14–16-year-old boy in grave 900098, where the knife was probably placed as part of a belt suite which also included seax ON 64 and iron spoon ON 74. Two men had a knife at their right

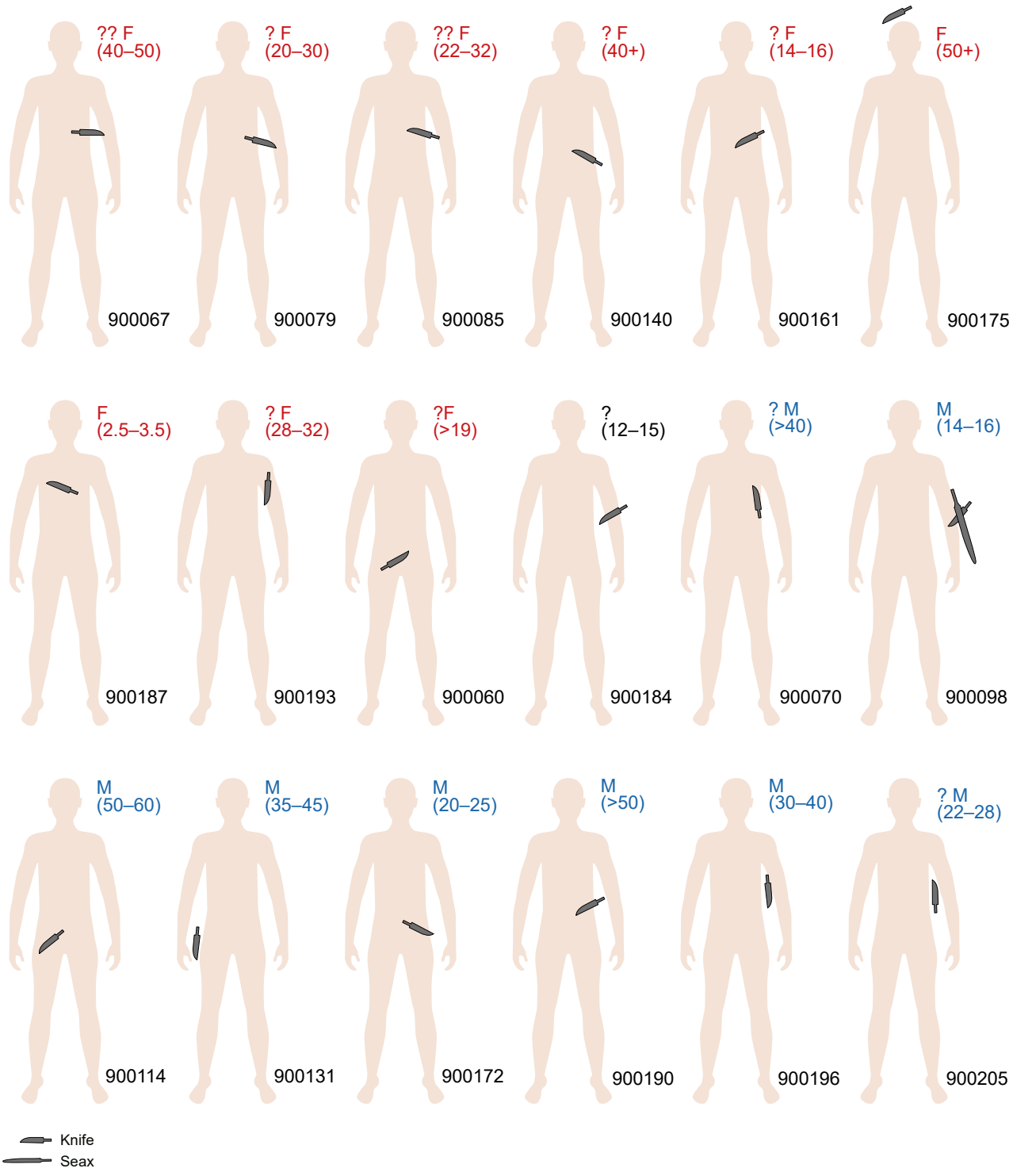


Figure 8.64 Positions of knives in relation to bodies

side – the 50–60-year-old in grave 900114 and the 35–45-year-old in grave 900131. The preference for the left side of the body was also observed at Castledyke South, and given the larger numbers recorded at that site, it was possible to show that men had their knives at their waists more often than the women, who wore them more frequently at the hip, which was explained by the knife having been worn suspended from a chain or a low-slung belt (Drinkall and Foreman 1998, 282–3, table 24).

Among the peculiar groupings of coupled depositions in adjacent graves, which were observed in different permutations at each corner of the main three rows of graves at Callow Carr (see below), is the similarity of the knife placement along the lower chest/waist with the blade pointing down and the cutting edge towards the body in graves 900193 and

900196, a probable female 28–32-year-old and 30–40-year-old man, who were both buried flexed or crouched facing NNE next to each other at the western end of the north row.

Whetstones

Two whetstones (ONs 43 and 151) were found, in graves 900098 and 900172, both made of a micaceous gritty stone, possibly Greywacke-grit (identification by author, no specialist analysis). Both burials were of male individuals, aged 14–16 and 20–25 years old, respectively. When viewed from the side, the whetstones have more or less trapezoidal-shaped outlines, which are slightly concave in ON 151. While their sides show evidence of smoothing from use, both ends of ON43 and one end of ON 151 exhibit traces of scarring which suggests that the stones had also been used for a pounding or hammering action (Fig. 8.65). In grave 900098, ON 43 was deposited in an isolated position in the north-east corner beyond and to one side of the skull, but the burial was well furnished, accompanied by several iron objects including a belt buckle, probable iron-bound vessel, knife, spoon and a seax. The stone in grave 900172 lay on the ribcage of the man, not far from what appears to be a smithing hearth bottom (ON 152, see below); other objects include a knife on the pelvis and a cluster of nails in the area of the abdomen.



Figure 8.65 Whetstone ON 43

The Callow Carr whetstones are similar to the four examples from Castledyke South in being more irregularly shaped or slab-like (Drinkall and Foreman 1998, 284), rather than bar-shaped hones like three of the four examples found in urns at Cleatham (Leahy 2007, 201–2, fig. 103). The Castledyke hones came from the graves of teenagers (grs 18A, 151 and 188) and one adult (gr. 125); grs 18A and 125 are thought to have been male. A flat, elongated oval whetstone was found in the later 6th-century weapon-grave 24 at Fonaby (Cook 1981, 27, fig. 8, 15). While this might show a regional male bias in the deposition of whetstones, Geake also noted examples from female graves, including Camerton, Somerset, gr. 95 and Galley Low, Derbyshire (Geake 1997, 96). She suggests that the number of whetstone burials might have increased in the Conversion period. Callow Carr adds two further examples to this proposition, with grave 900172 radiocarbon dated to *cal. AD 645–660* (68% probability), while grave 900198 could belong to the later 6th century based on seax ON 64 (see below), although spoon ON 74 (see next section) would suggest a date towards the second half of the 7th or even early 8th century, thus indicating that the seax was an heirloom by the time it was deposited.

Spoon

Iron spoon ON 74 was found below the upper part of the blade of seax ON 64 and next to knife ON 73 in grave 900098, the burial of a 14–16-year-old boy. Its ovoid-shaped, slightly concave 27 mm-long bowl is wider at the rounded tip. Most of the stem surface and possibly also the bowl was covered in leather remains. The tip of the robust square- to rectangular-sectioned stem is missing.

Among the small inventory of spoons from Anglo-Saxon graves, ON 74 finds its closest comparisons at Finglesham, gr. 180 (Hawkes and Grainger 2006, 293, fig. 2.131, 6.6i) and, with similar dimensions but a round-sectioned stem, Buckland I, gr. 75 (Evison 1987, 309, fig. 38, gr. 75, 3c). Geake's sample suggests that small spoons (she lists seven made of iron and three of bronze, plus four Roman or Roman-influenced tinned or silvered bronze or silver spoons) are a grave good of the second half of the 7th century and possibly the early 8th. They are frequently found as part of chatelaine groups, especially the iron examples. Only at Holborough, Kent, gr. 7, was a bronze spatula found in a male grave, which also contained a sword, shield and spear. The distribution is biased

towards the South East, especially Kent (Geake 1997, 97–8, map 59 and fig. 4.41). The Callow Carr assemblage is thus clearly an exception, and its association with the knife and seax poses the question whether the object was intended to take the function of a spatulate tool, which is a type of object that has frequently been found in close association with knives and in many contexts even indicating the use of the same sheath (*ibid*., 93).

Combs

All three or probably four combs found at the site were severely affected by decomposition and had completely degraded surfaces obliterating any or most traces of decoration that might originally have been present. They were recovered from graves 900114 and 900137, and in both graves the two combs were placed at more or less oblique angles to one another. In the former, containing the burial of a 50–60-year-old man, the approximately 150 mm-long remains recorded as misc#1 were found lying near or touching the right foot and are likely to belong to a composite comb with symmetrical side plates. This was, however, not available for study. An x-radiograph shows four rivets, but no further detail is visible and it was not possible to ascertain whether it was of single- or double-sided construction. A second, extant single-sided comb (misc#2) was found lying at right angles to comb misc#1. Misc#2 is also of composite construction, with two symmetrical curved side plates; the intact fragment has three iron rivets still in place, fixing ?three tooth-plates (five teeth/cm), but both are too degraded to determine whether the plates were made of bone or antler. Comb ON 94 from grave 900137 is another single-sided comb, found on the lower left femur of a 30–40-year-old woman and lying diagonally to double-sided comb ON 83. It has 'D'-shaped connecting plates decorated with groups of four to five transverse grooves. Its teeth had been sawn when antler plates had already been fitted, and its seven (possibly eight) rivets are placed centrally through the end plates and in two of the central plates while in all others they are between adjacent plates.

Although the shape of the end plates is no longer clear in comb misc#2, the two extant single-sided combs can be compared to a hump-backed winged comb from York, 46–54 Fishergate, from a context dated to the first 'part' of the 8th century, and Rogers refers to a similar comb from a 7th-century cremation grave at Loveden Hill, Lincolnshire; the form is generally considered to belong to the Early and Middle Anglo-Saxon periods (Rogers 1993, 1395–6, fig. 679, 5698 and fig. 681). The hump-backed combs in Geake's sample have been assigned to the late 7th and early 8th century (Geake 1997, 63–4). At Burwell, Cambridgeshire, a comparable comb from an Early Anglo-Saxon context was found in gr. 32 under the right forearm of an adult female with infant; in gr. 83 one was found on the chest of a middle-aged woman, and in gr. 121 another example was laid across the ankles of a female skeleton (Lethbridge 1931, 52–3, fig. 25, 1; 65, fig. 34; 68–9, figs 36.5 and 37). A winged single-sided hump-backed comb from the later-7th-century 'princess' grave at Westfield Farm, Ely, was found among a group of objects deposited in a casket or tray to the left of the right shoulder of the 10–12-year-old individual (Lucy *et al.* 2009, 87, fig. 3, 14). Only two single-sided combs, both dated to the 7th century, were found at Castledyke South, in gr. 13 laid across the ankles of a young woman, and in gr. 129 at the right shoulder of a 45+-year-old man (Drinkall and Foreman 1998, 288–9).

The other comb, ON 83 in grave 900137, is of double-sided composite construction and might have had a zig-zag decoration on one or both connecting plates. The five preserved iron rivets are placed between plates, apart from one end plate with an off-centre hole, a detail also observed in the better preserved and more ornate comb from Castledyke South gr. 183 (*ibid*., 287, 199, fig. 113, 2). Both end plates have straight back edges. Double-sided combs with cylindrical-section undecorated plates are a common form from the late 5th into the 7th century, both in Anglo-Saxon as well as in Merovingian contexts (Riddler and Trzaska-Nartowski 2013, 139–40; see also Geake 1997, 63). The radiocarbon modelled date for grave 900137 is *cal. AD 635–655* (68% probability).

Both Geake and Stoodley note that combs are more frequently found in female than male graves, and Stoodley observed combs in male graves only in his later date groups 4 to 6, covering the range AD 525–725/750 (Geake 1997, 63–4, map 29; Stoodley 1999, 30, fig. 26; 38, fig. 32).

Ferrule

In grave 900196, a 119 mm-long ferrule with tubular socket (ON 161.1) was found below the right knee of the 30–40-year-old man, in close proximity to the tongue-shaped 'repair' patches which have been interpreted as elements of a possible leather pouch or bag placed next to the lower legs (see above). Sockets of this form for spears were grouped as 'type a' by Swanton and broadly dated between the 5th and 7th centuries, but he acknowledges their long but variable currency from the Late Iron Age to the 11th century (Swanton 1966, 456–9, fig. 108a; see also Baumgarten 2016, 19–20, Abb. 5a). A combination similar to grave 900196 was found at Dover Buckland II, gr. 249C, but there, the spear was complete with spearhead, the ferrule positioned upside down at the left lower leg, and the repair clips and staples found next to the skull were probably part of a wooden vessel (Parfitt and Anderson 2012, 466, fig. 10.13e; 532, fig. 10.79). A comparable socket was found in early 6th-century gr. 24 at Fonaby with a spearhead Swanton H1/Høilund Nielsen type SP2-b1b and another H2 spearhead (Cook 1981, 27, fig. 8, 5; Swanton 1973, 192, fig. 77c). However, given the lack of a corresponding spearhead in grave 900196, it is questionable whether ferrule ON 161.1 was placed in the grave as a *pars pro toto* representation of a spear and, following the argument rehearsed by Baumgarten (2016, 39–41) that the interpretation of a socket is dependent upon its context, it is perhaps more likely that it fortified a crutch or walking stick for the man who suffered from an ankle joint trauma (possibly a sprain with inflammation and/or bleeding within the capsule, see Boston above), rather than serving other possible uses such as pilgrim staff, staff of office/sceptre (*Schulzenstab*), spear/flagstaff socket or peasant weapon.

Chatelaines

Two graves contained chatelaines or elements of chains with objects attached to them, which were usually worn suspended from the waist. The interpretation is certain for grave 900161 and probable for grave 900060.

The chatelaine (ON 170) in grave 900161 was located in the area between the right ilium, the left femur and below the right ulna of a 14–16-year-old probable female. While it is likely that it had been worn suspended from a belt, which would have had to be tied rather than buckled as no buckle was found (but see below), it is not impossible that it was placed in that position during the burial. The chatelaine is composed of various individual components (Fig. 8.66), including a chain (ON 170.1) made up of 'S'-shaped links alternating with figure-of-eight links. One half of the chain is intersected at roughly every other join with a broken figure-of-eight link extending beyond the course of the chain; four of these links are still extant and probably functioned as the joins for suspension chains like that for rock crystal bead ON 170.12, which is suspended from a sliding-knot ring attached to the main chain by an S-linked join. Out of three additional lengths of chain of the same construction (ON 170.2–4), two have remains of iron corrosion in one or both outer loops. The position along the chain of three additional S-links (ON 170.5–7), a triangular openwork pendant or chain junction plate (ON 170.8) and a small ring ON 170.9 could not be established, but large ring ON 170.10 and annular brooch ON 170.11 both lay approximately halfway along the length of the chain without intersection links. They might have been attached by leather straps or strings to the chain or suspended from the belt next to the chain. It is also possible to use two rings fixed next to each other as a belt or strap fastener, but there is no circumstantial evidence in this case to support this possibility; an example could be the two iron rings accompanying an adult female burial from Blacknall Field, Pewsey, Wiltshire, gr. 50 (Annable and Eagles 2010, 226, fig. 59, gr. 50,10a; 229).

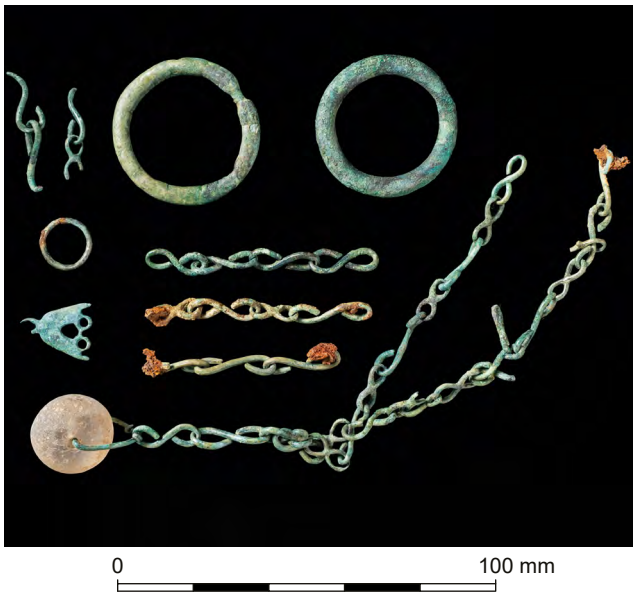


Figure 8.66 Chatelaine ON 170

The construction of the chain entirely made of copper alloy appears to belong to a less common form; Geake observed that in most of the 124 graves containing chatelaines in her sample, these were made of iron (Geake 1997, 57). A comparison for the construction of the chain comes from St Mary's Stadium, Southampton gr. 5510, but there the S-links appear to have been made of iron (author's interpretation of illustration conventions) and the figure-of-eight links of copper alloy (Loader 2005, 43, fig. 26, 504, 63–4); the combination of iron and copper alloy links is also known from Bulford, Wiltshire, gr. 8260 (Schuster forthcoming). In Lincolnshire, in the chatelaine from gr. 77 at Castledyke South, the burial of a 12–13-year-old individual, possibly female based on the grave goods, all links appear to be 'S'-shaped (Drinkall and Foreman 1998, 165–6, figs 79–80, 4 and 5; 285). The chatelaine chain from Cleatham gr. 50 was made of iron and appears to have included both S- and twisted figure-of-eight links; it was found near the left hip of a female young adult (Leahy 2007, 160, 196, fig. 100, gr. 50,4), i.e., similar to Callow Carr.

The probable chain junction plate (ON 170.8) is of a more unusual form but might be comparable to a triangular copper alloy chain distributor (referred to as a girdle hanger in the catalogue) from Finglesham gr. 157, which has three holes in its base with remains of iron links (Hawkes and Grainger 2006, 285, fig. 2.123, 3.8). Another openwork chain distributor of slightly more elaborate form comes from Dunstable, Marina Drive F2 (Matthews 1962, 40, fig. 5, 6). Further examples of roughly triangular junction plates without openwork decoration from Kent come from Kingston grs 50 and 142, and Chartham Down (Meaney 1981, 149, fig. 7.a, 2 and 4; 151, fig 7.c). At Harford Farm, Markshall, Norfolk, gr. 18, a three-stranded chain distributor was formed like a hemispherical cap with two lugs and a central loop (Penn 2000, 112, fig. 87, 8c). It was found along the lower left edge of the coffined grave, probably at the height of the knees (*ibid*., 18, fig. 25). All these grave assemblages have now been dated to phase AS-FE (AD 625–650 to 660–685) (Bayliss *et al.* 2013, e-fig. 7.3).

These suspension devices have been influenced by more ornate and slightly larger girdle hangers from continental 7th-century graves (Geake 1997, 57), e.g., near Mainz (Lindenschmidt 1858, vol. 1, Heft. 4, Taf. 7, 4), or Kirchheim am Ries gr. 326 (Martin 1997, 355, Abb. 392a and b). Considering the delicate dimensions of annular brooch ON 170.11, an alternative interpretation for the object might be that it was a pendant attached to the chatelaine, comparable to two morphologically similar items from Guilton, Kent, grs 27 and 13 (Meaney 1981, 149, fig. 7.a, 6–7).

Annular brooch ON 170.11 has been discussed under brooches (see above). The re-use of annular brooches on chatelaines had been observed at Burwell, Cambridgeshire, gr. 76 (Lethbridge 1931, 62–3, fig. 32, 4; 1936, 27–9). A similar, presumably secondary use of an annular brooch was noted at Dover, Buckland I, gr. 127, where a profiled annular brooch without pin, much like ON 103 from the vicinity of grave 900190 at Callow Carr, was part of a chatelaine including several rings (Evison 1987, 243, 323, fig. 52, 127.4; Geake 1997, 54), and use on a chatelaine was also suggested for three brooches from Monkton, Kent, gr. 12 (*ibid*.). At Garton Slack II, East Yorkshire, gr. 7, one of two annular brooches was found in a bag collection at the feet (*ibid*.).

Given the undecided identification of probable chain junction plate ON 170.8, globular rock crystal bead ON 170.12 is the only certain attachment of the chatelaine group. Meaney (1981, 81–2, 90–6) suggests an amuletic function for rock crystal, and considering the lack of any 'functional' attachments, it is feasible that the entire object had a symbolic function as discussed by Geake (1997, 58). According to Huggett (1988), rock crystal beads are often shaped and faceted, but globular forms do exist. The majority belong in the 6th century, and they are found predominantly in central and eastern England and less so in Kent and south-east England, which is the opposite for crystal balls; the latter are all considered to have been imported (possibly from Scotland, Germany and Switzerland) because of the lack of suitably sized raw material in England (Huggett 1988, 70–1, figs 4–5).

The probable chatelaine in truncated grave 900060 is represented by a smaller number of individual elements, the most obvious of which is copper alloy figure-of-eight link ON 18 with a fragment of iron rod attached, and – in decreasing probability – copper alloy ring loop ON 6, hook ON 5 and rod fragment ON 4, perhaps an implement handle. All these objects were found in a zone across the middle of the grave that also included seven strip fragments (ON 25, see below), which could belong to a stave-built vessel, as suggested by the mineral preserved wood remains. Based on the figure-of-eight link ON 18, the chatelaine chain would appear to have belonged to one of the common forms composed of rod links joined by smaller links.

Although chatelaines comprising chains with long rod links do occasionally occur in 6th-century graves, they are more common during the 7th century, particularly the later part and into the early 8th, as suggested by their frequent association with reliquary (work-)boxes. They are distributed throughout Anglo-Saxon England with a clear focus in Kent (Geake 1997, 57–8, map 24).

Hooked tag

Found unstratified, ON 190 is a hooked tag with a plain subtriangular or rather trapezoidal plate (Fig. 6.84). For attachment, it has two rivet holes near the corners of the base.

Hooked tags occur in two distinct periods: the early medieval, Middle to Late Anglo-Saxon period and the early post-medieval period (Flynn and Geake 2016; Read 2008). The early medieval forms are characterised by attachment holes within the plates. In Read's (2008) typology, ON 190 belongs to his early medieval Class A, Type 1. A more detailed typology by Lewis and Naylor (2013) classes undecorated triangular examples as type B1.x. A similarly undecorated and morphologically close example was metal-detected at Little Carlton (PAS LIN-0D4449). Read Class A, Type 1 has been recorded in clusters in southern England, East Anglia, Lincolnshire and North and East Yorkshire, with loose distribution in the south-east Midlands (PAS database search June 2025: https://finds.org.uk/database/search/map/objecttype/HOOKED+TAG/broadperiod/EARLY+MEDIEVAL/description/Class+A+Type+1). Records from excavated grave contexts are far fewer (Geake 1997, 66; Hines 2013b), but include two mid/late 7th-century graves at Castledyke South: in gr.16, two copper alloy tags (with three holes each) were found overlying the skull and the upper chest/neck area of an approximately 6–7-year-old possibly female individual; and one silver example was found, probably disturbed, over the right foot of a 17–25-year-old female in gr. 183, which among other objects also contained a reliquary box, a comb and a chatelaine (Drinkall and Foreman 1998, 143, fig. 57, gr. 16,1 and 3; 200, fig. 114, 12). While the situation in gr. 16 at Castledyke South was initially interpreted as suggestive of a function to secure some form of headgear or veil (*ibid*., 271), hooked tags have more recently been interpreted as fasteners for purses (Walton Rogers 2007, 134, fig. 4.22 bottom). In the A-S CF, hooked tags (Høilund Nielsen 2013, 228, fig. 5.218; type HT) have been assigned to periods AS-FC and FD, which would equate to *c.* AD 555–650 (Hines 2013b, e-fig. 7.3). However, it is clear that this only covers the beginning of the early hooked tags, which is probably more likely to have started in the 7th century and continues in more elaborate shapes into the 11th century (see e.g., at Flixborough: Thomas 2009).

Unfortunately, the Callow Carr example adds no further detail to the dating nor the use of the form, but it is likely that it had been ploughed out from a grave.

Antler disc

The semi-circular antler disc with a copper alloy sliding-knot suspension ring (ON 143) was found close to the two whelk shells in grave 900161. Its surface is extremely degraded and it was not possible to establish beyond doubt whether a lunula was the originally intended shape or whether it was remodelled after breaking. Antler rings, although usually complete, are a common element of chatelaines (Meaney 1981, 140–1), seen locally at Castledyke South gr. 183 (Drinkall and Foreman 1998, 199, fig. 113, 9; 285). At Callow Carr, however, the object was found on the opposite side of the grave near the right lower leg

and was probably contained in a bag collection. At Dover Buckland II, Riddler observed that the two antler burr discs came from 6th-century graves, although they are usually associated with 7th-century graves in England (Riddler 2012c), like the one mentioned from Castledyke South which has been dated to phase AS-FD, *c.* AD 580–640 to 625–650 (Bayliss *et al.* 2013, e-fig. 7.3).

Shells

Two whelk shells (ONs 112 and 155) were part of an array of 16 objects (see below) in grave 900161. They are not as common in Anglo-Saxon graves as cowrie shells, but one was part of a presumed box group placed in front of and above the forehead of a 35–45-year-old woman in the 7th-century gr. 11 at Castledyke South; the box also contained a pair of shears, two iron latchlifters, a polychrome glass bead, a chalk spindlewhorl and a knife, as well as a piece of gold wire and an unset garnet (Drinkall and Foreman 1998, 37; 142, fig. 56; Geake 1997, 284, fig. 4.20 bottom left). Geake (*ibid*., 62) suggested that the whelk shell in that grave was a substitute for a cowrie shell, thus emphasising the potential amuletic character of its inclusion in the bag group, rather than as a symbolic food source as has been posited for other types of seashells. Meaney points to the fertility symbolism of cowrie shells in Anglo-Saxon contexts which appears to have retained its acceptability into the Christian era (Meaney 1981, 123–7).

Bags

Possible pouches or bags in graves 900070 and 900085 were indicated by finds of strap loops, clasps, staples and studs, often with mineral preserved organic remains of possibly leather and/or wood. Two groups of objects from graves 900137 and 900196 will be discussed at the end of this section, as their function could not be established beyond doubt; they could feasibly fall into the grave furnishings rather than the personal equipment category as it is at present impossible to determine whether they belong to bags/pouches or were part of some form of container or vessel. Additionally, a cluster of finds in chatelaine grave 9000161 will be considered in regard to possibly having been contained in a bag.

The fittings possibly belonging to a soft container in grave 900070 were all recorded in an area of less than 200 mm^2 between the northern edge of the grave cut and beyond the right elbow of the 40+-year-old possible male burial. They comprise two composite studs with domed heads (ONs 26 and 70) as well as two clasp sets (ONs 27 and 30). While wooden fragments were collected with some of these objects, they appear to belong to recent roots, whereas mineral preserved remains, possibly of leather, were found adhering to ONs 26, 27 and 30 (ID by S. Harrington). The clasp sets can be compared to similar finds from Bekesbourne I, Kent, gr. 30; Burwell, Cambridgeshire, grs 3 and 6 (Geake 1997, 293, fig. 4.29 top); and Finglesham, gr. 180 (Hawkes and Grainger 2006, 292, fig. 2.130, 8.2). At Melbourn, Cambridgeshire, SG93 (Duncan *et al.* 2003, 87, fig. 21, SG93.5), similar items were interpreted as strap stiffeners. While such clasps can function as closing mechanisms for wooden boxes, occasional associations with leather or textile have been taken as evidence for their use on flexible bags or pouches. All are indicative of a date in the latter half of the 7th century (Geake 1997, 81).

Inside the wooden box deposited in the south-west corner of grave 900085 (see below), left of or to the west of the right leg of the 22–32-year-old possible female, a number of copper alloy fittings (ONs 77, 78, 193.1–5) and one made of silver (ON 79) were found in association with mineral preserved fragments of leather, including two leather strip fragments (ON 193.6–7) plus additional smaller fragments. As their exact position was not recorded, it is now impossible to establish their relation to each other, but it is feasible that they might have been part of some form of leather container or perhaps several composite items combining the use of metal fittings and leather. While strip loop ON 77, which has a smaller loop loosely attached to it (this could have been secured with the rivet at the larger loop's junction), could have been the neck of a leather bottle, ON 78 looks more similar to vessel clips usually associated with wooden vessels (see below), and the smaller strip clips like ON 79 and ON 193.3 could have reinforced strap junctions. At

Castledyke South, gr. 124 contained fittings associated with a horn drinking vessel which include a copper alloy strip loop, secured by a long spike rather than a rivet, and a folded clip; the vessel, which accompanied an unsexed but possibly female individual aged over 45, would have been more sturdy than that indicated by the Callow Carr fittings (Watson 1998; Drinkall and Foreman 1998, 177, fig. 91, gr. 124,2). A more convincing interpretation as a vessel fitting has been suggested for a double strip fitting with an orthogonally attached loop from Barrington A gr. 66, associated with the male burial in the double grave (Malim and Hines 1998, 70, 121, fig. 3.53, gr. 66A.3).

The potential identification of leather remains associated with ON 79 has informed its interpretation presented above. However, based on a group of comparable objects, mainly from Lincolnshire and one from East Yorkshire, the object could alternatively have functioned as an amulet. A strikingly similar object was found in grave 18 at Welbeck Hill, Irby on Humber, Lincolnshire (Meaney 1981, 59–61, fig. II.s), but the organic item held by the silver strips arranged in a similar manner to ON 79 consisted of a coiled wood shaving; a second such coil was recorded from grave 41 and identified as not coniferous. Both graves belonged to well-furnished adult women and dated to the mid-6th to early 7th century. Similar wood coil amulets, both identified as possible oak, were found at Sewerby, East Yorkshire, gr. 54, from a similarly dated grave, and Fonaby, Lincolnshire, gr. 4; both bindings, made of bronze, were too corroded to provide a clear indication of their construction. The Welbeck Hill and Sewerby examples were probably worn as pendants on a necklace (*ibid*. Cook 1981, 83, 21, fig. 5, gr. 4,5; 64, pl. 6A).

Additionally, a number of objects should at least be mentioned in the consideration of possible soft containers from the site, although their attribution is even less secure. An unstratified hooked tag (ON 190, discussed above) was of a form probably attributable to a use on pouches/bags and could come from a disturbed grave. The previously mentioned buckle ON 53, placed below the feet of the male burial in grave 900114, may well have been associated with another pouch or bag; it was found in close proximity to the remains of at least one, possibly two composite bone and antler combs which could have been kept in the bag. A similar function of closing a bag could apply to copper alloy ring ON 170.10 and annular brooch ON 170.11, both found together in close proximity to the chatelaine in grave 900161 (see above).

At the foot end of graves 900137 and 900196 there were clusters of staples, repair clips with tubular rivets and – intriguingly – each grave also included small 'W'-shaped copper alloy strips. Located at opposite ends (south-east and north-west, respectively) of the excavated cemetery, both burials were of individuals aged 30–40; grave 900137 that of a woman, 900196 of a man, both with modelled radiocarbon dates of *cal. AD 635–655* (68% probability). Object group ON 87 in grave 900137 was confined to an area of approximately 170 x 120 mm, aligned approximately NNE–SSW on the centre line of the burial, and included ONs 97 and 228–37. ON 228 is a sub-cluster of objects comprising a 12.6 mm-wide folded sheet clip with leather remains as well as four 'W'-shaped strips and a staple, both wide enough to extend around or through material approximately 6 mm wide. Copper alloy staple ON 230 also has leather remains, while copper alloy clip ON 231 and iron staples ONs 232 and 234 were longitudinally inserted into wood fragments. The presence of leather has influenced the interpretation as bag elements, but at Castledyke South, Drinkall with Watson (Drinkall and Foreman 1998, 295) considered the use on a wooden vessel for a copper alloy strip with possible leather remains from gr. 158.

In grave 900196, a similar array of fittings were found, in this case all made of copper alloy, including tongue-shaped 'repair' clips ONs 138, 139 and 161.2; staples ONs 162, 163, 167, 171 and 178, and two 'W'-shaped strips (ON 174). At only 6.5–7.9 mm wide, the clips were more delicate than those from grave 900137. The objects were located in an area measuring 250 x 300 mm on and beyond the lower legs and feet at the eastern end of the left-facing crouched burial. The clips and 'W'-shaped strips were all aligned on or near the leg, while the staples were found in a rough alignment a further 100

mm towards the foot end, and staple ON 162 150 mm further out. If all these items were indeed fitted to one object, the clips could perhaps indicate a wood-reinforced lid or flap for a leather bag: possible wooden remains were found with clip ON 138, and possible leather remains with staple ON 162. The internal gaps, the area between the staple bar and the in-turned tips, ranges between 3.1 mm and 6.5 mm, with a gradation increasing from north-east to south-west.

While the use of large numbers of staples can be shown on purse lids like Finglesham gr. 82 (Hawkes and Grainger 2006, 260, fig. 2.98), the purpose of the 'W'-shaped strips remains enigmatic; maybe they were part of a clip-closure mechanism for a bag lid, but how the strips were attached and how the mechanism would have achieved a secure closure remains as yet unexplained. Apart from the examples found at Callow Carr, similar strips have also been described at Castledyke South, grs 30 and 183 (Drinkall and Foreman 1998, 148, fig. 62, 1; 199, fig. 113, 4; 295); in the former at the right shoulder of a 45+-year-old woman, in the latter at the left shoulder of the rich burial of a 17–25-year-old young woman, possibly associated with vessel repair clips from the same grave. At Lechlade, Gloucestershire, gr. 137, a 'W'-shaped strip was found on the left foot of an 8–9-year-old child (Boyle *et al.* 1998, 237, fig. 5.84, gr. 137,3 left). While Castledyke South gr. 30 belongs in the 7th century and gr. 183 is phased to AS-FD (Bayliss *et al.* 2013,e-fig. 7.3), and thus commensurate with the Callow Carr dating, the only other items accompanying the child at Lechlade were several mussel shells (*Unio pictorum*), but based on its orientation, the grave has been assigned to the Final Phase group of the cemetery (Boyle *et al.* 2011, 133, 137, tables 9.1–2).

The last grave that might have been furnished with a bag or pouch is grave 900161, where a possibly female 14–16-year-old was buried with an array of 16 objects that were clustered to the right of her slightly flexed legs in the south-east corner of the grave, covering an area of approximately 0.55 m north–south and 0.3 m west–east. The objects found in this area include two staples and one 'repair' clip (ONs 125–7), which – given they were found next to each other – could perhaps indicate the area where a flap or straps were attached, similar to the bags in graves 900137 and 900196; other objects from here comprise two whelk shells (ONs 112, 155); three small lumps of coal and one small stone pebble (ONs 131, 146, 154, 156) each weighing less than 1 g; antler disc ON 143, glass vessel bottom ON 145; spindle hook ON159.1; double-tanged bladed tool ON 159.2; stone spindlewhorl ON 184; and four small unidentifiable iron fragments (ON 129). At the very end of the grave cut, to the right of the feet, a mass of unidentified organic material (ON 182) was recorded but not sampled. Whether this or some or all of the other items were indeed gathered in a bag has to remain speculation.

Grave furnishing: boxes and containers

Box

The remains of a wooden box were found in the south-west corner of grave 900085, left of or to the west of the right leg of the 22–32-year-old possible female. In plan, the discolouration of the box covered an area of around 400 x 300 mm, and it was 80 mm high. It was possible to block lift approximately half of the box, and it is thus possible to understand some aspects of its construction (Fig. 8.67). Elements identified as being structural parts comprise four corner brackets (ONs 47, 50, 80, 213), three loop hinges (ONs 36, 37.1, 41), binding strips (ONs 15, 20, 21, 33–35, 40, 55, 218, 219), two looped pins with attached rod fragments (ON 76), as well as individual nails (ONs 208, 212, 214, 216, 224–6), including one with a rove (ON 22) and one which might have been a staple (ON 222). Loop hinge ON 36 was found vertically at or near the north-eastern corner of the box, 80 mm further in from corner bracket ON 213, with the hooked loop orthogonal to the plane of the plate and facing into the box. The other two hinges have their loops bent in the plane of the plate, and as they were found horizontally lying inside the area of the box, they appear to have been attached to the lid. The various flat binding strips suggest that the box had been reinforced with additional strips, either to join panels constructed out of more than one plank or perhaps to protect the edges.

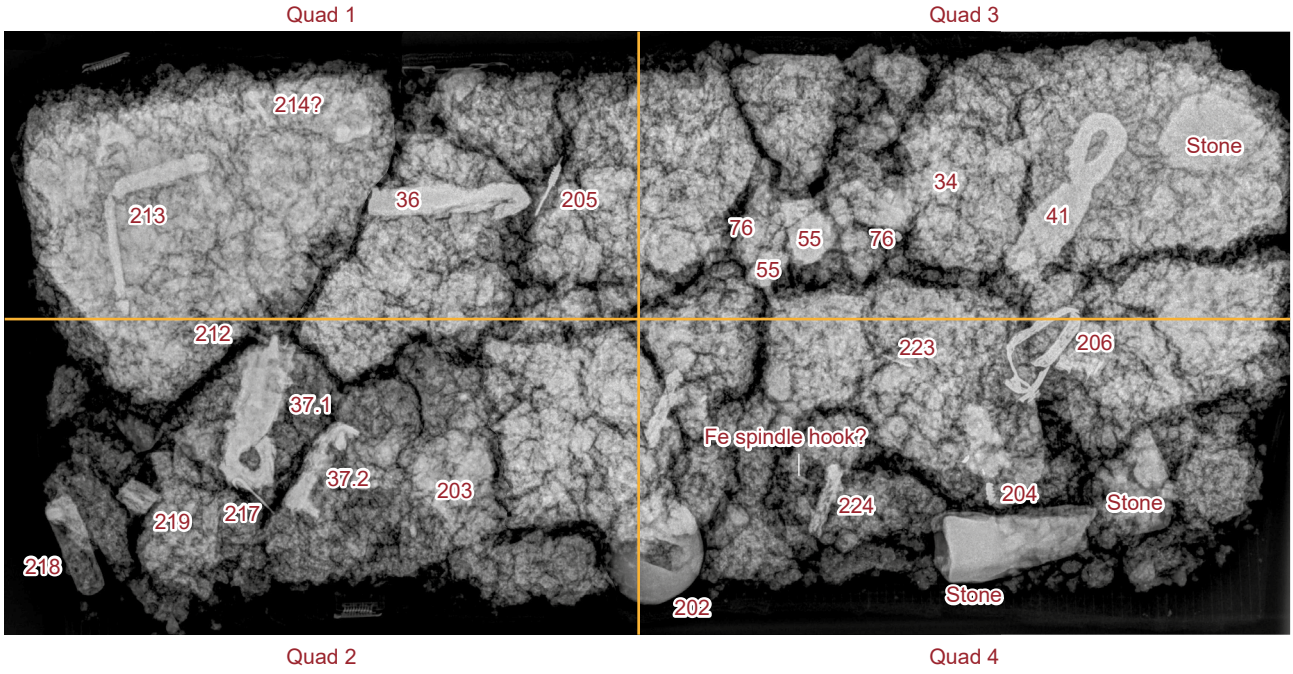


Figure 8.67 X-radiograph of eastern half of block-lifted box in grave 900085 with identified objects marked

The two looped pins ON 76 could have been part of a possible lid handle, but its form could not be reconstructed.

It is unclear whether a number of silver and copper alloy strip fragments (ON 204) were part of decorative strips fitted to the outside of the box, or whether they were part of its contents. They were found together with preserved wood fragments, and the largest wood fragment (from ON 206) had a textile fragment adhering to it, while several others showed imprints from where the strips had been fitted to the wood. The strips were decorated with lines of ring-and-dot punch decoration along their centre lines, and some of the fragments had rivet holes with tubular rivets. One end of the largest strip from ON 206 was folded to create a pinched hook. Similar strips, although without the hooked end, were found at Didcot, Oxfordshire, gr. 2, on the right femur and knee area of an adult female, but their function remains uncertain (Boyle and Mudd 1995, 229–230; 249, fig. 93, 5–7).

No obvious locking mechanism, like loop and hook or a lock, similar to Dover Buckland I grs 35, 43 or 55 (Evison 1987, 100–3, textfigs 17–18, fig. 21, 25 and 30) or Buckland II gr. 353 (Parfitt and Anderson 2012, 496, fig. 10.43, 353.g10), was found. The mechanism would have been placed against the edge of the grave cut and could have deteriorated beyond recognition or consisted of organic material, e.g., a leather or rope strap and a wooden toggle, or a simple wooden bolt lock (*cf.* Evison 1987, 100). Of the eight graves with evidence for a box at Castledyke South, the potential presence of a box without other metal fittings was suggested for gr. 1 on the basis of a barrel padlock, the only locking mechanism from that site, and in gr. 11 because the position of objects, including, among other items, a chalk spindlewhorl and a pair of shears, were considered indicative of a rigid container rather than a bag (Drinkall and Foreman 1998, 138, fig. 52, gr. 1,1; 142, fig. 56). Five Castledyke South graves contained fittings hinting at the presence of boxes (*ibid.*, 296–7). The four corner brackets from gr. 35 suggest that at least one of the corners of the box made of flat sawn ash planks had a possibly stepped rebated butt-joint, and a possible lid handle was suggested on the evidence of the looped pins from gr. 77, alongside the obvious drop handle from gr. 183 (*ibid.*, 151, fig. 65, gr. 35,1.1–9; 166, fig. 80, gr. 77,6–7; 198, fig. 112, gr. 183,1; 296).

While the majority of graves with wooden boxes date to the 7th century, they start in the early 6th century in Kent, with examples from Dover Buckland and St Peter's Tip in phase AS-FB, joined in the subsequent phase by Holywell Row gr. 31 and Burwell gr. 76 in East Anglia (Bayliss *et al.* 2013, e-fig. 7.3; Geake 1997, 82). All the graves containing

boxes at Castledyke South date from the 7th or late 7th century, and at Callow Carr the combination with a penannular brooch and a pair of chain-linked pins (ONs 65 and 68, see above) accords well with the majority (n=29) of the 39 box graves included in the A-S CF placed in phases AS-FD and AS-FE (Bayliss *et al.* 2013, e-fig. 7.3 gr. 183 AS-FD, gr. 31 AS-FE; Drinkall and Foreman 1998, 297).

There is a clear focus of box graves in East Kent, and to a lesser extent in East Anglia, with smaller numbers in Wessex, the Peak District and either side of the Humber estuary (Geake 1997, 82, map 47).

Compared to the most common dimensions of the 52 boxes and caskets in Geake's sample (L 300 x W 200 x H 200 mm; Geake 1997, 81), the box in grave 900085 was longer and wider but might have been considerably compressed. Unfortunately, the type of wood could not be identified. Only a quarter of the boxes in Geake's sample contained now identifiable items, which led her to suggest that most boxes were deposited empty, despite considering the potential loss of organic material (*ibid*., 82) – that this suggestion is not unfounded has been suggested by various authors (e.g., Lucy 1997, 163; Stoodley 1999, 91), and it is exemplified by the two exquisite wooden boxes from the 3rd–5th-century cemetery at the Fallward on the German North Sea coast, which were empty despite the exceptional preservation of other organic materials in the cemetery (Schön 1995, 25, 61; 1999, 67, 85). The contents of the box at Callow Carr, including two – probably functional – spindlewhorls, each with spindle and spindle hook, have a clear female gender bias, tallying with the possible female sex of the inhumation. This concurs with Geake's observation that caskets are most often found in adult women's graves (Geake 1997, 82), whereas Stoodley observed a male bias in his sample (Stoodley 1999, tables 1, 2 and 14). At Castledyke South all boxes were associated with adult women apart from one found with a child. In contrast to Callow Carr with the box at the foot end, of the five graves with recorded locations, four were found near the skull, and the above-mentioned padlock was found near the left hip (Drinkall and Foreman 1998, 296–7).

Table 8.107 Non-ceramic vessels found at Callow Carr

Grave	*Age group*	*Age*	*Sex (gender)*	*Material*	*Vessel form*	*Vessel element and ON*	*^{14}C cal. AD (modelled 68%)*
900161	subadult	14–16	?f	Glass	?palm cup	bottom, 45	-
900070	adult	40+	?m	CuA	?bucket	U-shaped rim sheet, 8	-
900060	adult	>19	?(?f)	Fe	bucket	? hoop fragments, 25	-
900063	adult	30–40	??m	Fe	bucket	3 hoops, 11	*635–655*
900079	adult	20–30	?f	Fe	??bucket	3x rod frags, bracket, clip 54	-
900098	subadult	14–16	m	Fe	bucket	hoop, 58, ?hoop, 45 & 49, bracket, 51	-
900114	adult	50–60	m	Fe	bucket	handle, 66	-
900131	adult	35–45	m	Fe	bucket	handle & loops, 82	*635–655*
900175	adult	50+	f	CuA	cup/bowl	repair patch, 142	*635–655*
900193	adult	28–32	?f	CuA	cup/bowl	sheet 117; patches/strips 121–3, ?153	-
900196	adult	30–40	m	Fe	??bowl/??board	staples 132, 134; bracket 136	*635–655*

Vessels

Nine graves contained evidence for some form of non-ceramic vessel (Table 8.107). Their distribution within the cemetery is shown in Fig. 8.68.

A glass vessel fragment (ON 145) was found with the 14–16-year-old girl in grave 900161. It lay in the cluster of objects near the right side of her left knee. The fragment is made of translucent turquoise glass with a bubbly matrix and with remains of a ring punty (diam. 14 mm). It could have been from a 7th-century palm cup bottom (*cf*. Evison 2008, 15–6, fig. 19, 94–5).

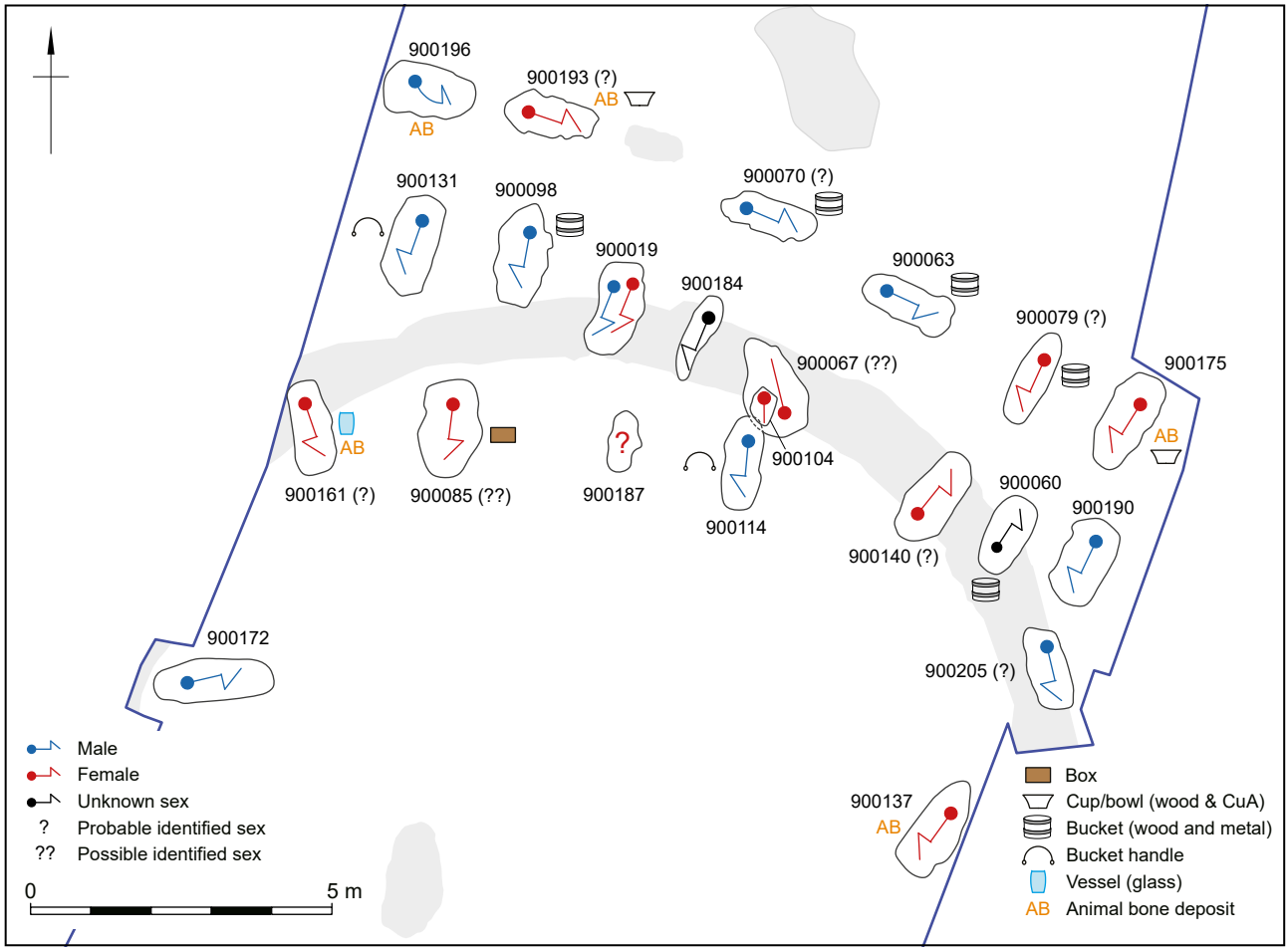


Figure 8.68 Distribution of vessels and animal bone deposits

Buckets

A copper alloy strip fragment (ON 8) was located 0.4 m north of the north-eastern edge of grave 900070, containing the burial of a 40+-year-old probably male individual, and recorded as associated with the grave. The fragment has a 'U'-shaped profile, is distorted and torn and without discernible rivet holes. It could be the rim of a stave-built bucket whose rims are mostly held in place by riveted 'U'-shaped clips (*cf.* Cook 2004, 110–5, figs 8–13).

The remains recovered from the other seven graves suggest the deposition of various forms of wooden vessels with metal fittings. Evidence for iron-bound stave-built vessels like stoups or buckets was found in six graves (Table 8.107), which were predominantly for male individuals, apart from unsexed grave 900060 probably accompanied by a chatelaine, and thus likely the burial of a >19-year-old female, and the probably female individual in grave 900079. The seven iron strip fragments (ON 25) found in grave 900060 could belong to one or more hoops of a stave-built vessel, as all had remains of transverse wood grain structure on their inner sides. The fragments, found in the centre of the grave close to the remains of the possible chatelaine, provide no guide to the size of the vessel, which is lacking a handle.

By contrast, three iron hoops (ON 11) were found behind the left heel of a 30–40-year-old possibly male individual in grave 900063. The hoops were stacked one on top of the next. Again, no handle was found and the vessel could be a handleless bucket or stoup, although it is possible that the unidentified fragments ONs 9 and 10, which were found with the hoops, could have been part of an otherwise lost handle or rim fixture. The hoops' flat-sectioned profile suggests they belong to Cook type C, which usually is butt-jointed as is the case for hoops 2 and 3 (Cook 2004, 36), whereas x-radiography suggests that hoop 1 has a lap join held by a flat-headed rivet. Despite distortion, presumably caused through post-depositional compression, it appears that the uppermost hoop 1 had a slightly smaller diameter, suggesting a conical vessel shape similar to the iron-bound buckets in Lechlade gr. 200 without any skeletal remains (Boyle *et al.* 1998, 261), or Dover Buckland I gr. 53, found with a 20–30-year-old woman, phased to AS-FD (Evison 1987, 300, fig. 29, 7; Bayliss *et al.* 2013, e-fig. 7.3).

The five iron fragments (ON 54) of a possible bucket, comprising three rod/?handle fragments, a bracket and a clip, were found next to the left foot of the probably female 20–30-year-old individual in grave 900079, who was furnished with four spindlewhorls as well as a knife, a penannular brooch and a buckle.

The fragments of another probably butt-jointed hoop (ON 58) were found next to the right humerus of the 14–16-year-old boy in grave 900098, the only weapon grave at Callow Carr, containing a seax. The hoop could have bound a vessel with a diameter of around 170–180 mm. Most of its internal sides had mineralised wooden remains with transverse grain structure. Two further curved rod fragments (ON 45 and 49) and a bracket (ON 51) could have been other parts of the bucket.

Graves 900114 and 900131 both contained iron handles. The handle (ON 66) from the former grave, found across the right foot of a 50–60-year-old man, is straight, rectangular-sectioned and has open looped terminals that are hooked sideways (Cook 2004, 39–40, fig. 5c), still with remains of the bucket handle extensions which would have reached above the rim (type II; *ibid*., 37, 39, fig. 7b). It would fit a vessel with a diameter of some 150 mm. A cluster of iron fragments (ON 82) in grave 900131 lay beyond the lower legs of a 35–45-year-old man. They comprised a probable bucket handle made of a round-sectioned rod, which would have fitted a vessel with an opening of about 200 mm, as well as two looped plates for the handle's attachment, one of which has a pear-shaped loop and rectangular plate, the other with a long open loop and a more lozengiform plate. The loops can best be compared with one from the Runden Berg bei Urach, in south-west Germany, for which Koch cites comparisons from Great Moravian and Viking contexts (Koch 1984, 173 with notes 23–4; Taf. 65, 7).

As no direct evidence for bucket hoops was found in either of these graves, it is impossible to decide whether only the handles were deposited or whether the buckets had been bound with organic hoops. Conversely, none of the three graves with evidence for the body of the bucket contained evidence for a handle. For Lincolnshire, the presence of five iron-bound (or iron-handled) buckets from one cemetery is remarkable as the total number of buckets generally is not very high. Cook only lists nine potential vessels from six sites, and they are more frequent south-east of a line between the Wash and the Severn, with clusters for iron-bound vessels in the Upper Thames area and East Anglia (Cook 2004, 24, map 1; 28–9, maps 2–3; 71–3). None of her Lincolnshire examples are exclusively iron-bound, and only two tubs, from Loveden Hill and from 7th-century gr. 103 at Sleaford in the south of the county, had fittings including both iron and copper alloy (*ibid*., map 3 and nos 140 and 142). Two additional copper alloy mounts, probably from wooden buckets, were identified in urns 371 and 566 at Cleatham (Leahy 2007, 217).

Wooden cups, bowls or boards

Graves 900175 and 900193, with the burials of women aged 50+ and 28–32, respectively, probably contained wooden cups or bowls, which is suggested by the presence of repair clips or patches and possibly small sheet fragments found in close proximity. In contrast to some of the clips and brackets discussed under 'bags' (see above), which can be morphologically indistinguishable from the repair patches used on cups and bowls, the exclusive presence of wood among the mineral replaced remains observed on these items has been taken as indicating the presence of rigid vessels rather than soft receptacles (*cf*. Geake 1997, 92). It is, of course, possible that some of the clips from the extended clusters, like that in grave 900161, had in fact been used on wooden vessels.

Repair patch ON 142 in grave 900175 was found on or above the disturbed lower leg and not far from a deposit of animal bone. In grave 900193, ONs 117, 121–3 (and possibly 153) were recorded in a cluster near the lower left femur.

Two iron staples and a bracket (ONs 132, 134 and 136) were found beyond the lower left arm of the 30–40-year-old man in grave 900196, while animal bone deposits 900180–1 were found close by in front of his upper arm; a possible explanation for the fittings could be that they were part of a wooden vessel or board on which the meat joints might have been placed in his grave.

There appears, then, to exist a distinct contrast in the provision of vessels based on biological sex, with metal-bound bucket-type vessels being predominantly found with men (five male, one ?female,

one ?feminine), while the glass palm cup fragment and the two possible wooden cups/bowls come from women's graves (Table 8.107). There is no clear lateral preference, but seven vessels were found near the lower legs or feet, two of the other four in front of the abdomen, and one behind the lower back; the association in grave 900070 is insecure. In contrast to this, at Castledyke South nine of the twelve vessels were found with women, preferentially on the left side of the body but in various positions; bias in favour of women was also observed at Sewerby (4 f, 1 m, 1?), with vessels placed at the feet, and at Norton (3 f) by the head or upper body (Drinkall and Foreman 1998, 296).

Geake found that although the buckets in her sample were not in themselves an identifier of gender, they were found with at least one gender-identifying object, showing a fairly even split of nine found with women and eight with men. All the female graves in her sample date to the late 7th or early 8th century (Geake 1997, 92, but see phasing for Melbourn 9 and Buckland I 53 in AS-FD), while at Callow Carr the dates fall generally slightly earlier, towards the early and mid-7th century.

Tools

The objects discussed under this category appear to be predominantly related to the sphere of textile production, and apart from the smoothing or 'slick' stone ON 141 all were found accompanying female burials.

Spindlewhorls

Nine spindlewhorls were recovered from five graves (Table 8.108; Figs 8.69–70); six were made of fired clay, mainly a reduced grey ware, two were made of stone, and one of worked bone. All are of plano-convex form, which was the dominant form either side of the Humber in Yorkshire and Lincolnshire between the 7th and 10th centuries. Those with a more or less hemispherical shape with one flat surface belong to Walton Rogers' form A1. Whorls with two flat surfaces belong to her form A2, which might apply to two of the four whorls from grave 900079, but this is difficult to ascertain now as their preservation condition has affected their shape (Walton Rogers 1997, 1738–41; 2007, 24; 2009, 283). Apart from stone whorl ON 92 from grave 900137, which shows no visible decoration, all other spindlewhorls of form A1 are decorated, predominantly with concentric circles covering either their entire surface (ONs 31, 165), the flat top and parts of the convex surface (ON 202), or all or parts of the convex surface (ONs 59.1, 203); that latter decoration is also found on probable A2 whorl ON 59.2. Spindlewhorl ON 184 from grave 900161 is decorated by six to seven concentric zones of nicks, perhaps applied with a knife tip.

Table 8.108 Spindlewhorls from graves at Callow Carr. Form after Walton Rogers 1997, 1738–42, figs 806–9; 2007, 25, fig. 2.18

Object no.	*Grave*	*Material*	*Form*	*Weight (g)*	*Diam.*	*Height*	*Hole diam.*	*Age group*	*Age*	*Sex*
31	900079	ceramic	A1	>31.7	42.5	16.8	7.6–8	adult	20–30	?f
59.1		ceramic	A1	>16.8	36	18.1	7.6–9.8			
59.2		ceramic	?A2	>3.7	>23.1	10.6	>6.4			
60		bone	A1/A2	>6.5	32.8–34.5	14	10.7			
202	900085	ceramic	A1	24	35.4–36	17.1	7.9–8.3	adult	22–32	??f
203		ceramic	A1	12	30	15	7.1–7.3			
92	900137	stone	A1	11	27.3	12.9	6.7	adult	30–40	f
184	900161	stone	A1	9.3	23.6–24.3	14.1	5.6–6	subadult	14–16	?f
165	900175	ceramic	A1	27	37–37.4	17.3	7.1–7.6	adult	50+	f

Concentric circle decoration is also present on several of the (usually lathe-turned) stone spindlewhorls from Flixborough, where they were found in contexts dating between the late 7th and early 11th centuries (Walton Rogers 2009, 284, fig. 9.3, 2515, 2521, 2525, 2537), as well as at 16–22 Coppergate in York, where form A whorls have an 8th–10th-century bias; a flat form B stone whorl from that site has scattered nicks applied to its side (Walton Rogers 1997, 1737–8, fig. 806, 6536–7; 1740, fig. 808, 6557). At Cleatham – where 62 spindlewhorls were recorded from urn graves and three found unstratified but none

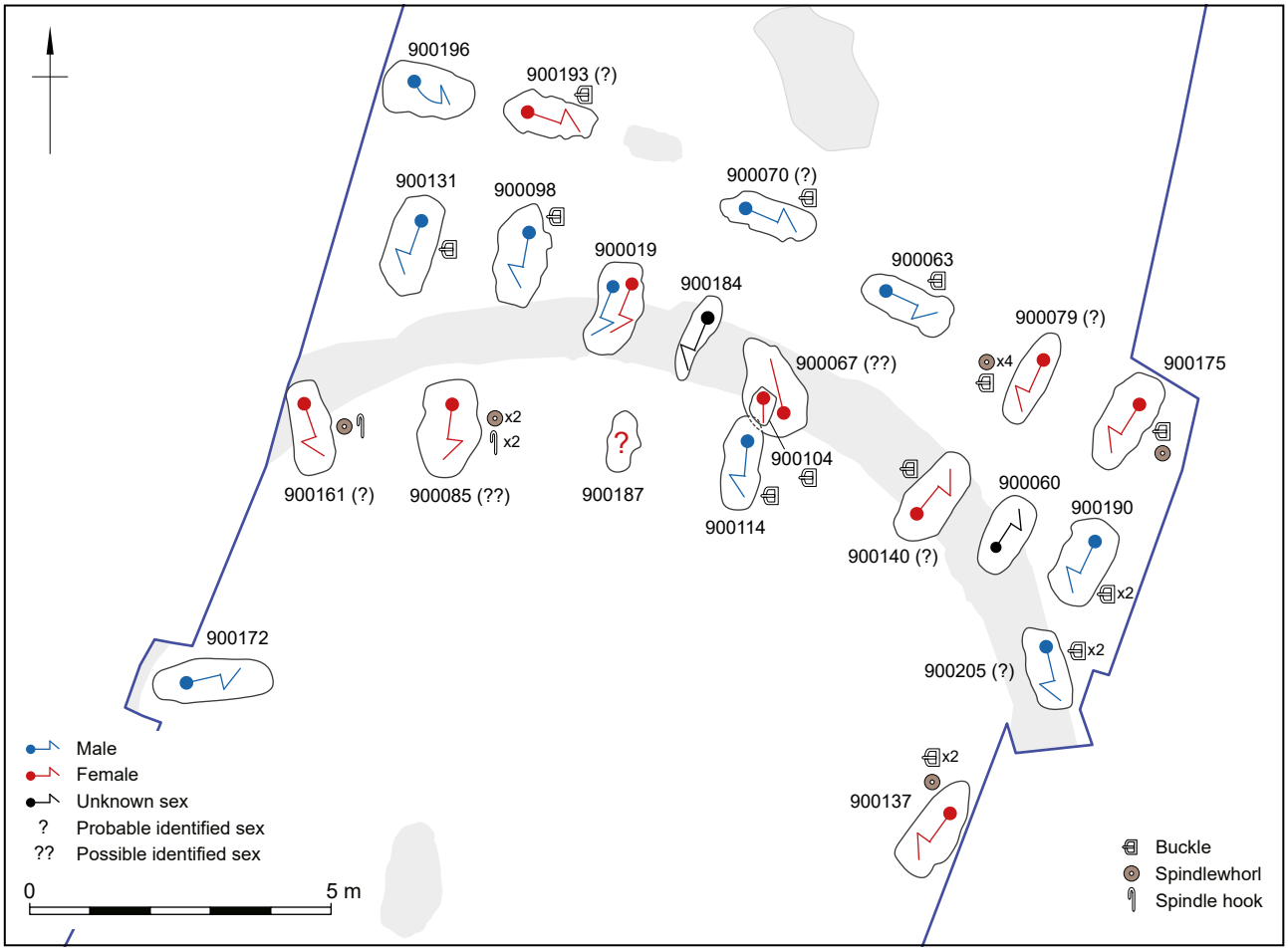


Figure 8.69 Distribution of spindlewhorls, spindle hooks and buckles

from the inhumation graves – decoration of concentric circles covering the entire body is present on chalk and bone whorls of barrel or globular forms B1 and B2 (Leahy 2007, 209–11, fig. 106), and also occurs on form C at 16–22 Coppergate (Walton Rogers 1997, 1739, fig. 807). One of the two spindlewhorls found in 6th-century graves in the cemetery at Fonaby, from gr. 28, was an undecorated form A1 type, while gr. 39 contained a fine, flat bun-shaped shale whorl with ring-and-dot decoration on its convex horizontal sides (Cook 1981, 31, fig. 10, gr. 28,2; 39, fig. 14, gr. 39,3). Only three spindlewhorls were found at Castledyke South, in grs 11 (7th century), 17B (late 7th century) and 142, made of chalk, stone and bone, respectively; all were undecorated and more or less hemispherical, thus of form A1 (Drinkall and Foreman 1998, 294).

The proportion of inhumation burials furnished with spindlewhorls at Callow Carr is surprisingly high (5 out of 23, 22%), compared to the other two Lincolnshire cemeteries mentioned above (Fonaby: 2 out of 49, 4%; Castledyke South: 3 out of 196, 1.5%). Though they were exclusively found with female individuals at Callow Carr and Fonaby, the whorl from gr. 142 at Castledyke South might have been associated with a male. While spindlewhorls are usually placed singly or in pairs, predominantly in female graves (Walton Rogers 2007, 23), Long Wittenham I gr. 150 has three (Stoodley 1999, 44), and grave 900079, with four whorls, contains an unusually large number.

The placement of the spindlewhorls at Callow Carr (Figs 8.69 and 8.70) possibly points to a variety of reasons for their inclusion in the five graves. From their combination with the two extant and one deduced spindle hooks (see below), the whorls in grave 90085, placed in a box (Fig. 8.67), and in the adjacent grave 900161 probably in a bag, it seems likely that fully functional tools complete with probably wooden spindles had been deposited. In both graves the containers were found at the foot end of the grave, similar to Dover Buckland I gr. 60, where two spindlewhorls were placed in a box to the left (west) of the crossed feet of the female burial (Evison 1987, 112, 344,

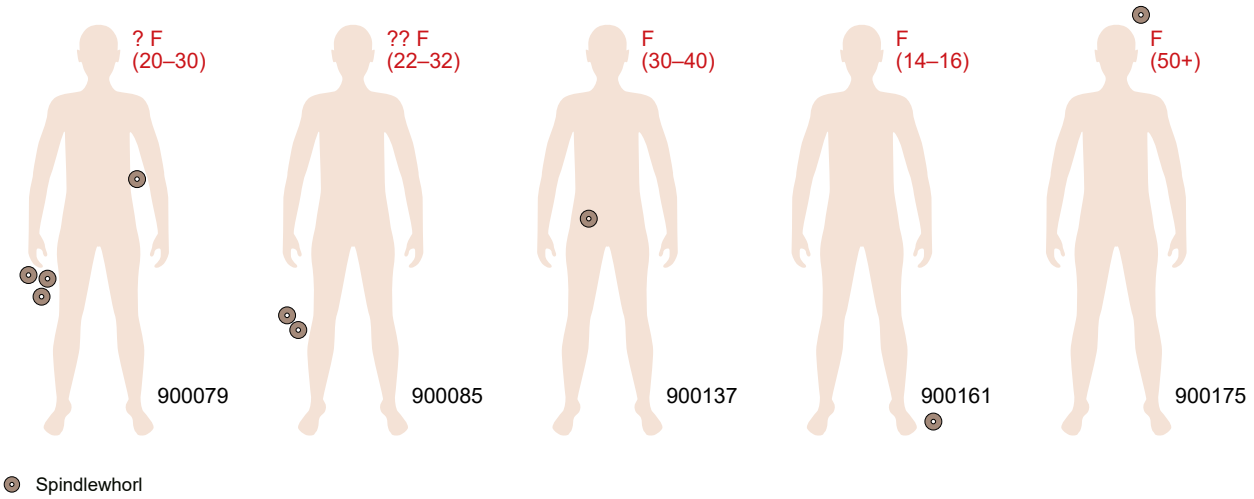


Figure 8.70 Positions of spindlewhorls in relation to bodies

fig. 73). At the earlier, nearby cemetery of Scremby, a stone spindlewhorl was similarly found near the right foot of an adult female (SK17) who was accompanied by, among other items, a ring of African elephant ivory radiocarbon dated to the mid-5th to mid-6th century (Hemer *et al.* 2023, fig. 2). For whorls found in the hip area, it has been suggested that these could relate either to functional spinning tools (i.e., whorl plus spindle) tucked into a belt, e.g., at Castledyke South gr. 17B (Drinkall and Foreman 1998, 294), or – if intentionally placed without spindle – they could have been used as toggles substituting a belt buckle or replacing a buckle to close a bag (Geake 1997, 59–60). At Callow Carr, one (ON 31) of the four whorls from grave 900079 was found at the left hip, and in grave 900137 ON 92 was found on the inside of the right pelvis. The former grave also contained one and the latter two belt buckles, one of which lay near the left hip, and it is likely that they, rather than the whorls, functioned as the belt fasteners. In grave 900175, whorl ON 165, buckle ON 166 and knife ON 118 were found beyond the left side of the skull of the 50+-year-old woman, suggesting that a belt group had been placed above her head.

Apart from bone whorl ON 60 and ceramic example ON 59.1, all other whorls have spindle hole diameters below 9 mm, which has been identified as typical for Early and Middle Anglo-Saxon whorls (Walton Rogers 2009, 283). The introduction of hemispherical spindlewhorls in England has been linked to a second wave of Anglo-Saxon textile industry, from around AD 500, which also introduced ZS twill fabrics (Walton Rogers 2007, 106–7, fig. 3.36; 229). Callow Carr has added an important regional assemblage of hemispherical spindlewhorls closely datable to the decades around the middle and the later 7th century (see discussion in Geake 1997, 59, and Brown 1975, 193).

Spindle hooks

Along with the whorls, two graves (900085 and 900161) also contained small copper alloy spindle hooks. ON 217 in grave 900085 was found inside the wooden box deposited to the left of the lower right leg of the 22–32-year-old possible woman, perhaps additionally contained within a leather bag or pouch; a second hook is visible in the block-lifted part of the box (Fig. 8.67), but in contrast to the copper alloy hook, which has a very strong contrast in the x-radiograph of the block, the second hook had not been found during the subsequent investigation and might have been nothing more than the 'ghost' of an iron example that had completely disintegrated. Had it been present, both the spindlewhorls contained in the box would have been equipped with spindles with a hook. In grave 900161, a similar hook (ON 159.1) was found in a probable bag collection to the right of the left knee. Although both the extant spindle hooks from Callow Carr are rather small, 17.8 mm and 21.3 mm respectively (see range of late 1st century BC to early 1st century AD spindle hooks from the Magdalensberg, Austria: Gostenčnik 2001, 573, Abb. 1, esp. M17–18), they could have been functional when inserted at the top end of a spindle. An example of a preserved top end of a wooden spindle with a copper alloy hook had been found in a Migration-period grave at Fraugde, Fyen, Denmark, which also

contained a stone spindlewhorl (Müller 1911, 10, fig. 54. For a discussion of metal spindle hooks see Schuster 2006, 66–7, and more recently Thuaudet 2020).

An iron pin with a hooked end was found at the right waist in Finglesham gr. 69 and a bone spindlewhorl near the left waist (Hawkes and Grainger 2006, 257, fig. 2.95, gr. 69,4.1 and 69,2). A further example comes from the much-disturbed gr. 1331 (ON 92) of the cemetery at Tidworth, Wiltshire (Schuster forthcoming). Although these examples could provide comparisons from Anglo-Saxon England, it is difficult to be certain about the interpretation with finds from disturbed graves, as such pins, with their opened loops, could easily have been re-used or deliberately repurposed hook-headed or loop-headed pins of Ross's types XVII and XVIII, mainly dated to the later 5th to 6th century (Ross 1991, 198–204, figs 5.17–18.a-e). The simple form of spindle hooks discussed here will require confirmation through associated finds, as exemplified by an object from Castledyke South gr. 147, where an interpretation as a spindle hook could be considered for a hooked vessel repair (Drinkall and Foreman 1998, 185, fig. 99, gr. 147,1.1). The object was found together with other fragments indicative of a repaired wooden vessel, but no textile-working tool, thus making the former interpretation more likely, although a single spindle hook could have been included as a *pars pro toto* to represent an entire set of spinning equipment (S. Harrington, pers. comm.). Besides, it is perfectly feasible to use a spindle without a metal hook or even a hook carved into the end of the wooden spindle (see Walton Rogers 2007, 22–3, figs 2.15–6), as evidenced by the lack of such hooks in the other three graves with spindlewhorls at Callow Carr.

Double-tanged bladed tools

Two parallel-sided bladed tools (ONs 93 and 159.2) with ends turned up at a right angle were found in female graves 900137 and 900161. The former was placed parallel to the right lower leg, while the latter was found 200 mm to the right of the left knee; it is possible that both had been part of object collections probably contained in bags or pouches placed across or behind the lower legs. The upturned ends are mostly covered in mineral preserved wooden remains with transverse-aligned vessel structures; on ON 93 this structure extends onto the blade back, and this might also have been the case for ON 159.2. A now corroded and amorphous protrusion in the middle of the back of ON 93 might have been a third, central tang or a possibly riveted attachment, although the x-radiograph suggests that it could be a corrosion artefact. The function of these two objects is not entirely clear, but based on morphological comparisons potential uses include activities related to making fire (firesteel/pursemount), leatherworking (slicker) or textile processing (flax break or smoothing iron).

The interpretation as a firesteel or pursemount could be entertained by comparison to Merovingian examples of such objects whose primary purpose has been suggested by Brown to be that of firesteel, even if they were attached to a tinder pouch (Brown 1977, 460. See also the careful argument in support of a firesteel use by Vrielynck and Dumont 2019). While the forms in Brown's discussion are predominantly the more ornate types with buckles and animal-headed terminals, the undecorated Anglo-Saxon examples in Geake's sample are all made of iron, largely of forms with more or less triangular backs and curved or curled-in terminals, and predominantly dated to the later 7th and early 8th centuries (Geake 1997, 79–80). There are, however, a number of Merovingian pursemounts (or *Taschenbügel*) forms that bear a morphological resemblance to the two Callow Carr objects, e.g., Koch's southern German type M26, equivalent to Friedrich type Taschenbügel3, dated to the first half of the 6th century (Friedrich 2016, 125; Koch 2001, 61–2). Given the fragmentary nature of the tip of the tangs on ON 93, it cannot be excluded that they continued to curve inwards like some examples of Vrielynck and Dumont type B13 with a date range from the later 6th into the later 7th century (Vrielynck and Dumont 2019, 20, fig. 19; 22). Contrary to the situation in England, where firesteels can accompany both sexes, pursemounts and firesteels are male grave goods on the Continent (Geake 1997, 80; Vrielynck and Dumont 2019, 22).

A possible use related to the – according to Krohn (1998, 36) male-dominated – leatherworking sphere is offered by comparison to slickers or sleakers: bladed leatherworking tools used for currying the hides after tanning (Goodall 2011, 67, 70–1, fig. 6.1, esp. E4–5). Four such implements were found at Flixborough in contexts dated to the mid-9th and mid-10/early 11th centuries (Ottaway 2009, 279, fig. 8.1, 2473).

In a carefully considered study, based on an assemblage of 105 examples from socially elevated Merovingian female grave contexts from France, Germany and Switzerland, Abert *et al.* (2020) reviewed the possible functions for blades with two or three tangs measuring between 105 mm and 267 mm long, which at different points in time have included: double-handled knife, kitchen knife, bread knife, scraper or flaxbreak, as well as the above-mentioned firesteel or pursemount. Based on structural details and ethnographic comparisons, they have been able to confine the use of such objects, for which they propose the term 'fibre iron', to the preparation of textile fibres. Depending on whether it was gripped by a side handle or by the back, the object could be used either to crush the flax stems to detach the last woody residues, or to scrape the fibres to soften them. As both leather- and flax processing was physically demanding, Abert *et al.* wonder whether it was really practised by women of elevated status, or whether the inclusion in richer female graves was symbolic of textile working practised by woman of all ranks, comparable to that proposed for weavers' shears.

Considering the transverse-aligned wooden fibres, which indicate a transverse-aligned handle of unknown length, an interpretation as leather or textile tools appears more likely for the tanged blades, and given their placement in female graves at Callow Carr, both containing a stone spindlewhorl, a textile processing function in accordance with Abert *et al.* (2020) offers a more likely explanation.

Smoothing or 'slick' stone

A fragmented lump of quartzitic stone (ON 141) was found on a larger chalk lump outside the left ulna of the 30–40-year-old man in grave 900196. Its outer side with convex profile has a smoothed surface and it might have been used as a smoothing or 'slick' stone. A potential use could have been for flattening linen, like an example recorded from a period-3 context (mid- to late 9th/early 10th century) at 16–22 Coppergate, York (Walton Rogers 1997, 1779, 1777, fig. 827, esp. 6579).

Weaponry

Seax

Seax ON 64 was found alongside the right humerus of the 14–16 year-old boy in grave 900098, above knife ON 73 and iron spoon ON 74. The location of the three artefacts, as well as belt buckle ON 72 in the middle of the chest, would be commensurate with the seax, knife and spoon being attached to the belt strap, but its position appears too high to suggest the combination had been worn on the body, and it is perhaps more likely that it had been placed on top of the body after the boy had been laid to rest in the grave. Organic remains preserved on the tang indicate a horn handle had been fitted, and the remains on the blade show that the weapon had been placed in the grave in its leather or hide sheath. The upper half of the cutting edge below the handle displays a gentle concave curvature from sharpening. The dimensions of the blade identify it as a short/narrow seax of Høilund Nielsen type SX1a, phased to AS-MB–C in the A-S CF, providing a date of AD 525–595 (Høilund Nielsen 2013, 190–4).

Stoodley noted an increase of seax deposition over time in his sample, with numbers increasing within the range of his date groups 3 to 6 (475 to 600–625 to 725/750) from two to five, with more than three-quarters recorded with male individuals, predominantly in Kent and Wessex, and just under 6% with females (only in Kent) (Stoodley 1999, 29–30, fig. 23; 187, table 2; 190, table 6; 194, table 10). None of the 12 individuals with biological age determinations out of the 15 individuals with type SX1a seaxes included in the A-S CF was found to be younger than 20–25 years old, but other types did also occur with young adults

only marginally older, particularly at St Mary's Stadium, Southampton (Hines 2013b); all were found with male grave assemblages, and only the very fragmentary remains from St Mary's Stadium gr. 5488 were sexed as possibly female (McKinley 2005, 48, table 4; 42, fig. 25). Of the 36 male grave assemblages with seaxes in Geake's study, only Polhill, Kent, gr. 9 included the burial of a subadult male of similar age to the young boy from grave 900098. The combination of seax and vessel, as suggested by the presence of iron hoops and other bucket elements (see 'buckets' above), was similarly found to be very rare, much in contrast to that of sword and vessel(s), and seaxes were found to be mainly distributed south of a line between the Wash and the Severn estuary (Geake 1997, 72, 74, 241, map 39; Lucy 2000, 138, fig. 5.8b).

Metalworking

A broken disc-shaped object
Jörn Schuster and Peter Crew

A fragment of a tangential section of an iron disc (ON 152; Fig. 8.71), with flakes of hammerscale embedded in its surface, was found at the lower right ribcage of the 20–25-year-old man buried in grave 900172, not far from a cluster of nails (ON 147, see below) and whetstone ON 151 (see above). Its dimensions are 68.8 x 29.5 x 9.7 mm, it has a weight of 46.2 g, and it is magnetic. Much of the thickness is due to secondary corrosion products and the disc as forged would probably have been around 5 mm thick. If it had been intended to be a complete circle it would have been about 85 mm in diameter with a total weight of around 280 g, giving a density of about 6 g/cm^3. One interesting feature is the presence of hammerscale on its surfaces. Normally this would be brushed off by the blacksmith, prior to more forging, but the disc had clearly broken, perhaps because of slag or a fault in the metal, so it was not finished. Forging a lump of iron to a thin sheet is one of the trickier jobs for a blacksmith, and it is of some interest that the remaining part of the disc was deemed worthy of deposition with the burial.

Forge debris such as smithing hearth bottoms has been recorded from many Anglo-Saxon occupation sites (e.g., Carlton Colville, Suffolk: Cowgill 2009, 254–6; Rendlesham, Suffolk: Keys in Scull *et al.* 2024, 178; Bishopstone, East Sussex: Thomas and Ottaway 2008, 343). Hamerow (2006, 17–8), when considering special deposits in Anglo-Saxon settlements, noted the inclusion of smithing hearth bottoms in the higher fills of Grubenhaus GH 42 at Mucking, but there seem to be no mentions of the deliberate placement of such objects in a grave in this country. However, Tobias (2021) notes the deposition of slag in the grave of two 5th-century children at Bregenz, Austria, as well as the widespread occurrence of slag deposits in graves of the Pre-Roman Iron Age Jastorf culture (northern Germany, southern Jutland, eastern Poland. For a critical appraisal of the term 'Jastorf culture', see Martens 2014), where the slag deposits are interpreted as relating to a smith, or – when found with a female burial – to a close relative. Furthermore, Tobias refers to medicinal treatises by the 1st-century AD Pedanius Dioscorides who mentions the healing properties of slag, metal production debris and metallic ores (Tobias 2021, 57–8 with notes 412–5).



Figure 8.71 Fragment of iron disc with hammerscale ON 152

Perhaps the disc fragment had been included in this grave as a memento of the man's erstwhile occupation. The burial has a modelled radiocarbon date of *cal. AD 645–660* (68% probability), i.e., contemporary with the smith's grave at Tattershall Thorpe in the south of the county (Hinton 2000), where the extensive assemblage appears to provide a significantly clearer indication of the person's profession but did not include forge debris.

Fittings

The 13 objects included in this category comprise nails and staples for which no obvious purpose could be established. The two copper alloy staples ON 108 and ON 113 have been discussed in connection with the amber bead and a possible headdress for the little girl in grave 900187 (see 'necklaces' above). A potential function related to the covering of knife ON 140.1 has been explored for two iron nails (ON 140.1.1–2) and a staple (ON 140.3), which were found accompanying a 30–40-year-old man in grave 900196 (see 'knives and sheaths' above).

The remaining eight objects are all nails, placed either singly in the grave (CuA: ON 7, grave 900060; Fe: grave 900114; Fe: ON 128, grave 900175; Fe: grave 900205), or in a cluster as in grave 900172, where four iron nails were found in the chest area of a 20–25-year-old man. One of the nails in the cluster (ON 147), as well as ON 128, had mineral preserved wood remains, and ON 7 had a bent shaft, thus indicating some unknown structural function for the nails, whereas the nail shaft in grave 900114 was found possibly near or with the skull of the 50–60-year-old man. The location of the nail shaft in grave 900205 was not recorded. Nails could, of course, have been employed in the construction of coffins, and the presence of coffins in Anglo-Saxon graves should not be discounted on the basis of a small number of nails alone as they could have been constructed without the use of nails, in keeping with the general picture of Anglo-Saxon carpentry and timber working (cf. Evison 1987, 100). While a structural purpose or function as a makeshift pin for a garment or a shroud would thus provide a possible explanation for a nail (as discussed for the possible suspended implement handle ON 24 in grave 900070, see 'pins' above), an alternative interpretation could be that of an apotropaic nail. The concept of such nails is well known from Classical antiquity (e.g., Alfayé Villa 2010) as well as Roman contexts in Britain (e.g., Black 1986, 223; Dungworth 1998, 153; Schuster 2010, 21, fig. 10, 19597; 2011b, 278; Seager Smith 2009, 37). However, there is an increasing corpus of individual nails from Anglo-Saxon cemeteries for which ritual or magical properties as apotropaic amulets to ward off evil has been considered. Single or small groups of nails which could be interpreted in this way are known from graves at St Mary's Stadium, Southampton (Birbeck 2005, 38, fig. 21; 41); Pewsey, Wiltshire (Annable and Eagles 2010, 264, fig. 72; 266); Twyford School, near Winchester (Schuster 2011a, 116); Eton Rowing Course, Boveney (Boyle *et al.* 2002, 33 fig. 3.5); and Boss Hall, Ipswich (Scull 2009, 111–2).

Uncertain

Most of the unidentified items have already been mentioned in the preceding discussion, and only a small number of the remainder require further comment.

Chalk ball

A naturally formed chalk ball was recovered from a sample taken in the area beyond the lower legs of the 19+-year-old probably feminine individual in grave 900060. Usually larger chalk balls (around 80 mm) are well known from Neolithic contexts (*cf.* Teather 2008, 198–9). A 28 mm-diameter chalk ball from a 13th–14th-century context at the Hospital of St John at Northampton was interpreted as a ball or marble (Brown 2021, 234). Meaney studied the occurrence and amuletic and/or magical associations of quartz pebbles and items of white material, including chalk, from Anglo-Saxon contexts, but while she lists several examples of spherical pebbles of clear or milky quartz, she only mentions beads or whorls made of chalk. The use of such white materials became more widespread in the 7th century (Meaney 1981, 88–98), but because of the lack of any obvious modification it is impossible to assess whether this chalk ball represents a deliberate addition to the variety of objects of white material imbued with similar properties, whether it was simply selected and placed as a curio for its roundness by the mourners at the burial, or noted for the same reason when the sample was processed.

Lumps of coal

In contrast to the white chalk ball in the previously discussed grave, four small, amorphous, shiny black lumps of (probably bituminous) coal were found in grave 900161

with the burial of a possibly female 14–16-year-old. Three of the lumps and a stone pebble (ONs 131, 146, 154, 156) have already been mentioned as they were found in the area of a possible pouch or bag behind her legs (see 'bags' above); the fourth lump (ON 169) was found below her left ulna, midway between pelvis and right radius. As this is the only grave at Callow Carr in which such coal lumps were found, it is likely that they were deliberately included rather than being part of the natural geology. They could thus be part of Meaney's category of mineral amulets (Meaney 1981, 71–5), but whether they were included because they were thought to be imbued with protective, amuletic or magical properties in any way similar to the properties ascribed to jet and other black substances, like Kimmeridge shale, lignite, 'gagates' and 'achates', is impossible to ascertain. Perhaps they were used as a substitute for the sprinkling of charcoal or burnt grain into female graves together with potsherds, as noted at Castledyke South, possibly as a symbolic act (Drinkall and Foreman 1998, 332).

Brackets/staples
Two much-corroded iron strip fragments (ONs 84–5), possibly parts of small brackets or staples, were found behind the left temple of the skull and to the right of the throat of a 40+-year-old probably female individual in grave 900140. Their function remains unknown, but they may have been part of some form of head covering similar to that discussed for the small girl in grave 900187 (see 'amber bead' above).

Implement handle
The identification of ON 24 (grave 900070) is insecure, but it could have been a pin or a handle for a (?toilet) implement which has subsequently been used as a pin to fix a garment or perhaps a shroud (see 'pins' above).

Wire loop
Short lengths of copper alloy wire with a loop created by winding the end of the wire back onto itself were found in female graves 90085 and 900137. In grave 900085, ON 205 lay in the north-east corner of the box to the left of the feet of the 22–32-year-old possible female. In grave 900137, wire loop ON 98 was found next to double-tanged bladed tool ON 93 alongside the middle of the right tibia. It is unclear whether these two items were simply damaged but clearly still valued suspension loops or whether they were re-used implements in their own right. Similar implement handles with suspension loops were found at Finglesham, Kent, gr. 174 (Hawkes and Grainger 2006, 291, fig. 2.129, 1.4) and Melbourn, Cambridgeshire SG82 (Duncan *et al.* 2003, 80, fig. 16, SG 82, 9).

Discussion

Chronology and phasing of the graves
Table 8.109 gives an overview of the object combinations in the 22 graves. It is not intended to provide quantifications of the finds recorded per grave but rather to combine the individual elements of some of the composite objects like necklaces, chatelaines, boxes or bags and note their presence or absence. In conjunction with Table 8.110, which shows the elements included in the phasing assigned to a given grave, it provides the basis for the phasing of the cemetery. Stratigraphic relationships are only available for three graves (900067, 900104 and 900114), and this low density of burial is commensurate with a rural burial ground (*cf*. Scull 2001, 71). Human bone from 11 graves yielded radiocarbon determinations. While the assemblage discussed in the previous section ranges in date from the 1st to the 8th century AD, the object combinations in the graves reduces this range to between the middle or later 6th to the later 7th or early 8th century. Based on the modelled radiocarbon dates, it is likely that this range did not extend beyond the third quarter of the 7th century. The period of use of the cemetery is likely to have lasted no longer than approximately 80–100 years. It is possible to distinguish two phases: phase 1 dates within the second half of the 6th century, and phase 2 covers several if not all decades in the first three quarters of the 7th century. Based purely on the object date ranges for buckles ONs 61 and

Table 8.109 Combinations of finds present in graves. Elements of composite items (presence marked by •) in italics

	F	*?*	*??m*	*??f*	*?m*	*?f*	*??f*	*M*	*F*	*M*	*M*	*F*	*?f*	*?f*	*M*	*F*	*?*	*F*	*M*	*?f*	*M*	*?m*
	900019	*900060*	*900063*	*900067*	*900070*	*900079*	*900085*	*900098*	*900104*	*900114*	*900131*	*900137*	*900140*	*900161*	*900172*	*900175*	*900184*	*900187*	*900190*	*900193*	*900196*	*900205*
Brooch, annular	-	-	-	-	-	-	-	-	-	-	-	1	-	?	-	-	-	-	1	1	-	-
Brooch, penannular	1	-	-	-	-	1	1	-	-	-	-	-	-		-	-	-	-	-	-	-	-
Necklace	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	-
Cabochon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Pendant (Ag, amber)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pendant (Au, garnet)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bead, glass	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bead, amber	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Buckle	-	-	1	-	1	1		1	1	1	1	2	1	-	-	1	-	-	2	1	-	2
Lace tag/aglet	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linked pin set	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Finger-ring	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Knife	-	1	-	1	1	1	1	1	-	1	1	-	1	1	1	1	1	1	1	1	1	1
Whetstone	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Spoon	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Comb	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-
Ferrule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Chatelaine	-	•	-	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-
Bead	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Brooch	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Ring loop	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Fig-of-8 loop	-	•	-	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-
Hook	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hooked tag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antler disc	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Whelk shell	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
?Bag/pouch	-	-	-	-	•	-	•	-	-	-	-	?	-	?	-	-	-	-	-	-	-	-
Clasp	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stud/rivet	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Staple	-	-	-	-		-	-	-	-	-	-	6	-	2	-	-	-	-	-	-	5	-
Strap loop	-	-	-	-	1	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
Repair clip	-	-	-	-	-	-	-	-	-	-	-	1	-		-	-	-	-	-	-	3	-
Repair patch	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Fitting	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Strip	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Wire	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-

	F	*?*	*??m*	*??f*	*?m*	*?f*	*??f*	*M*	*F*	*M*	*M*	*F*	*?f*	*?f*	*M*	*F*	*?*	*F*	*M*	*?f*	*M*	*?m*
	900019	*900060*	*900063*	*900067*	*900070*	*900079*	*900085*	*900098*	*900104*	*900114*	*900131*	*900137*	*900140*	*900161*	*900172*	*900175*	*900184*	*900187*	*900190*	*900193*	*900196*	*900205*
Box	-	-	-	-	-	-	•	-	-	-	-	?	-	?	-	-	-	-	-	-	-	-
Binding strip	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hinge	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corner bracket	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Looped pins	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fitting	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nails	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nail &rove	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strips	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Palm cup bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Bucket	-	•	•	-	•	?	-	•	-	•	•	-	-	-	-	-	-	-	-	-	-	-
Hoops	-	-	3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bucket parts	-	1	-	-	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Handle	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
Bracket	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Vessel repair patch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-
Rod	-	1	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staple	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Animal bone deposit	-	-	-	-	-	-	-	-	-	-	-	•	-	•	-	•	-	-	-	•	•	-
Double-tang tool	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-
Smoothing stone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Spindle hook	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Spindlewhorl, stone	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-
Spindlewhorl, bone	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spindlewhorl, clay	-	-	-	-	-	3	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Seax	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metalwork ?billet/bar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Collar/staple	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-
Nail	-	1	-	-	-	-	-	-	-	1	-	-	-	-	4	1	-	-	-	-	1	1
Chalk ball	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coal lump	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-
Pebble	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Half-loop strip fitting	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Implement handle	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sheet fragment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Strip	-	-	-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-
Misc. object, organic	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Misc. object, iron	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-

Table 8.110 Dating of the graves based on grave goods date ranges compared to modelled radiocarbon dates (68% probability). Phasing based on combination of object date ranges and radiocarbon dates.

Grave	*Phase*	*Date*	*Dating evidence (stratigraphic relation underlined)*	*Modelled radiocarbon date*
900019	2c	LC6–LC7	Penannular brooch, Au-garnet pendants, glass beads	*cal. AD 640–660*
900060	2	LC6–LC7	Knife	-
900063	2a	<2/3C6–C7	Buckle, iron-bound bucket	*cal. AD 635–655*
900067	2b	LC6–LC7	Cuts grave 900104: knife	*cal. AD 635–655*
900070	2c	2/2C7	Bag clasps, lace tags, knife, buckle	-
900079	2b	LC6–LC7	Penannular brooch, buckle, knife, spindlewhorl	-
900085	2c	2/4–3/4C7>	Linked pins, penannular brooch, lace tag, knife, whorl	-
900098	2c	2/2C7–EC8	Spoon, knife, buckle, seax	-
900104	1	LC5–C7>	Cut by grave 900067 and 900114: buckle	*cal. AD 560–595*
900114	2a	MC6–EC8	Cuts grave 900104: bucket handle, buckle, comb	-
900131	2b	LC6–LC7	Buckle, knife	*cal. AD 635–655*
900137	2b	2/4–3/4C7>	Annular brooch, buckles, double-tanged bladed tool	*cal. AD 635–655*
900140	1	MC6–LC7	Buckle, knife	*cal. AD 555–590*
900161	2b	LC6–LC7	Knife, double-tanged bladed tool, palm cup bottom	-
900172	2c	LC6–LC7	Knife	*cal. AD 645–660*
900175	2b	4/4C6–3/4C7	CuA-mounted glass cabochon, spindlewhorl	*cal. AD 635–655*
900184	2	LC6–LC7	Knife	-
900187	2b	<C7	Amber bead, knife	-
900190	2	<LC6–LC8>	Buckles, knife	-
900193	2a	MC6–LC7	Annular brooch, knife, buckle	-
900196	2b	LC6–LC7	Knife	*cal. AD 635–655*
900205	2b	LC6–MC7	Knife, buckles	*cal. AD 645–660*

KEY: C – century; L – late; M – mid; 2/3 – 2nd third; 2/2 – 2nd half; 4/4 – 4th quarter etc; < – or before; > – or later. Hence <LC6–LC8> is 'late 6th century (or before) to late 8th century (or later)'

95 and knife ON 96 – the objects from the two graves in phase 1, arrived at through comparison to other published material – the assemblage need not necessarily have been dated this early, and it is only the modelled radiocarbon dates which suggest an end for phase 1 before the end of the 6th century.

The subdivisions a to c for phase 2 should be seen as suggestions rather than firm dating evidence; they were added to reflect the tendencies in the established date ranges to extend before or after the radiocarbon ranges. When plotted on the cemetery plan (Fig. 8.72), however, phase 2c forms a noticeable cluster in the western centre, while there might be another grouping of the two phase 1 – and two out of the three phase 2a – graves slightly to the east. There does not appear to be a temporal element to the variations in burial positions, notably the four (north-west to south-east-oriented) western graves in the northern row and the seemingly isolated grave 900172 in the south-west.

Burial practices

Apart from small, mineral preserved remains of textiles on some of the objects found in the graves (see Harrington below), the objects themselves are the only other evidence for the reconstruction of the dress styles in which the population at Callow Carr buried their dead. The only dress object types represented by more than just a couple of examples are the narrow range of buckles, which were found with 13 out of 23 burials (56.5%), and the even more restricted range of only 7 brooches from as many burials (30.4%). This is a reflection of the date range of the cemetery's use, which largely, if not entirely, encompassed the period around or after the generally observed change in dress fashion at the end of the later 6th/early 7th century (Lucy

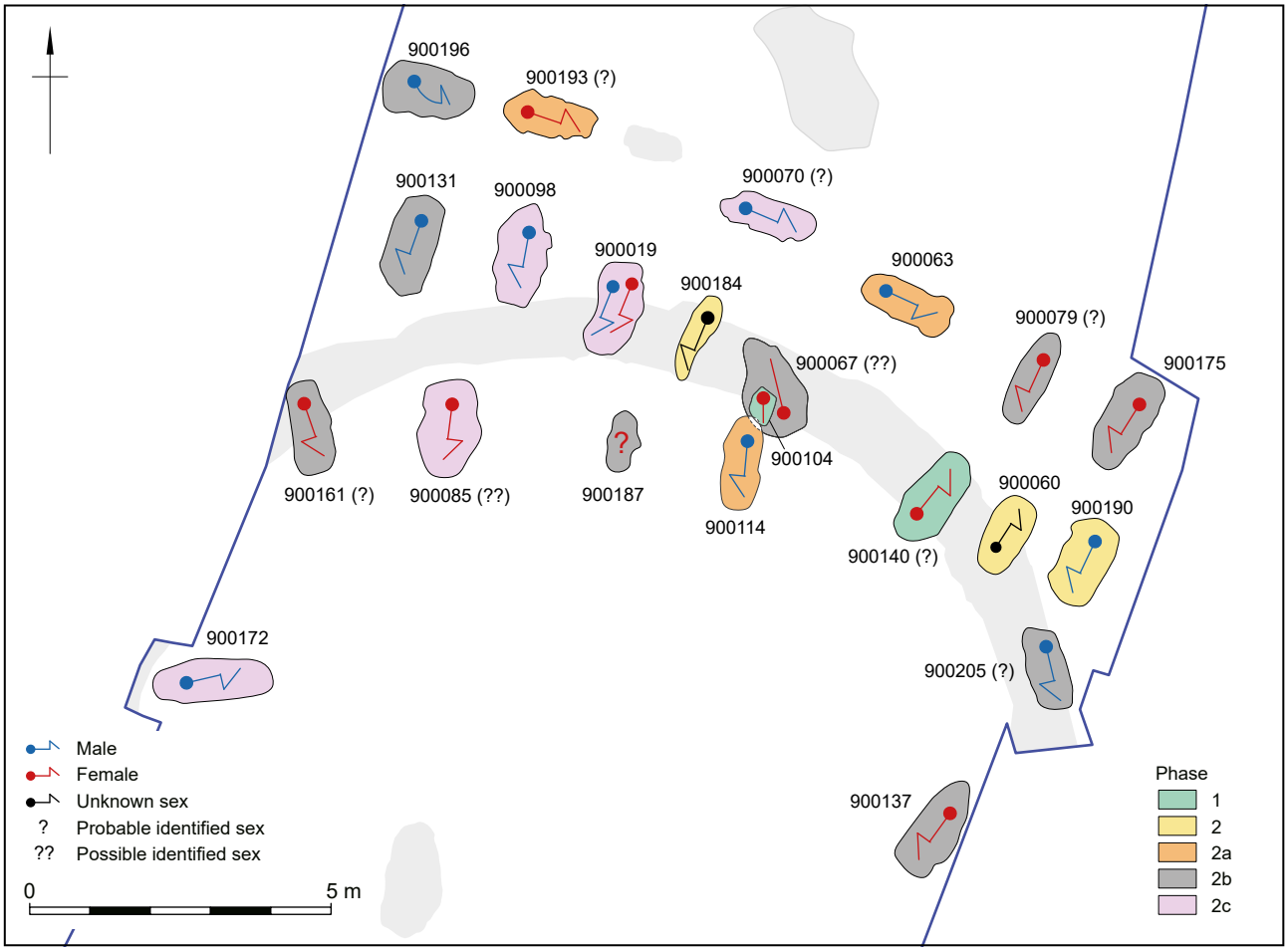


Figure 8.72 Phased cemetery plan

2000, 25; Walton Rogers 2007, 244). The proportion of belt-furnished graves (56.5%) is noticeably higher than at Castledyke South, where 49 out of 201 graves contained a total of 57 buckles (24.4%; Drinkall and Foreman 1998, 271–2). It is similarly higher than the 10–35% recorded by Walton Rogers for her dress regions 1, 2 and 3 (Anglo-Saxon England beyond Kent; Callow Carr is in region 1, which 'includes the later Northumbrian kingdoms [Bernicia and Deira], Mercia, Lindsey and East Anglia': Walton Rogers 2007, 232–3, fig. 6.2), and also surpasses the 40–47% noted for Kent. It has to be borne in mind that these figures cover both the Migration period and the 7th century. At a ratio of nine buckles from male to seven from female graves, there is a slight bias, as also observed by Stoodley (1999, 34), but not enough to support the finding that buckled belts became noticeably rarer in women's graves in the later period (Walton Rogers 2007, 219). This could be an expression of a more conservative attitude favouring the retention of certain forms of dress accessories peculiar to a small community like Callow Carr, although it did obviously not extend to large bow brooches or ostentatious bead necklaces, which are known in larger quantities from Castledyke South (25% of graves; Drinkall and Foreman 1998, 259) or nearby Scremby (Brundle 2019).

Given the frequency of burials accompanied by knives (n=18 from 18 graves) and buckles (n=16 from 13 graves) at Callow Carr, it is not surprising that these two object types also account for the most common object combination, which was found in ten graves, with six male and four female burials, while 'buckle only' burials were recorded with one male and two females, and 'knife only' with two males and four females (Fig. 8.62).

On the basis of his national sample, Stoodley concluded that the knife and buckle combination functioned as a replacement for the indication of maleness once weapons were no longer habitually placed in graves by the 7th century, and that in the course of the century this trend intensified (Stoodley 1999, 35; 37, fig. 32; 49; 190, table 7). For

Kent and East Anglia, this pattern was confirmed in studies by Riddler (2012a, 130; 2012b, 171; 2016, 44–5) and Penn, who suggested that 'knife and buckle' burials

> *were a distinct burial type, and may denote 'unweaponed' males, who were nevertheless entitled to accompanied burial. This may imply that the knife (and buckle), seen also as part of burials with weapons or dress-fittings, was a near essential element of dressed burial, even when most other objects ceased to be buried (Penn 2000, 55–6; 2011, 65).*

The deviation from this national trend (emphasising 'maleness' through knife and buckle combinations) apparent in the Callow Carr assemblage was also observed in a comparison of burials at Sleaford, in south-west Lincolnshire (mostly 6th-century) and Kingston Down, Kent (6th- and 7th-century); while a small number of male and female graves at Sleaford had this combination, it was found to be an overwhelmingly male equipment at Kingston Down (Brenan 1991, 90-3; after Penn 2000, 55–6). It is possible that the more equal treatment of knife and buckle combinations is related to the observation based on the Castledyke assemblage that male burials appeared very infrequently furnished with weapons when compared with other cemeteries, which appears to be a distinctive trait of material from Lindsey (Drinkall and Foreman 1998, 331).

An interesting placement of buckles was noted with the male individuals in graves 900190 and 900205, who both wore one of the two buckles accompanying each burial at the neck; but while this is not unknown in Walton Rogers' dress regions 1 and 2 (essentially the Midlands and further north), it generally occurs with women, although one individual from Castledyke South was sexed female but gendered masculine (see 'buckles' above).

Clear, or clearer, indicators of gender at Callow Carr are tools related to textile production, which were exclusively found in the graves of osteologically sexed females (Table 8.108). Brooches, bar one from grave 900190, were predominantly found in graves osteologically sexed as female, as were the necklace and individual amber bead.

Counter to regional and national trends, there is a notable difference in the provision of vessels based on biological sex, with metal-bound bucket-type vessels predominantly found with men (five male, one ?female, one ?feminine), while the glass palm cup fragment and the two possible wooden cups/bowls come from women's graves (Table 8.107). The vessels were also usually placed near the lower half of the body, and from other regional comparisons it appears that local customs rather than wider trends were followed when deciding which sex would be furnished with what kind of vessel and where it would be placed (see 'vessels' above). One of the males, the 35–45-year-old man in grave 900131, who was found with a bucket handle, is the only individual to have suffered a sharp force trauma to the back of the neck (see Boston above); his grave is distinguished from all others in the cemetery in that it is the only one in which the body had been covered with chalk stones (fill 900146) before the grave was backfilled (fill 900132).

Both the whetstones were found with male burials aged 14–16 and 20–25 years old, respectively. Drinkall discusses the possibility that whetstones might have been used as a marker of culturally defined maturity, as spearheads might have done in the 6th century (Drinkall and Foreman 1998, 331). There might be a bias towards male burials for the deposition of whetstones in Lindsey, but they were also found with female burials in other parts of the country, including Somerset and Derbyshire (see 'whetstones' above).

Placed deposits of animal bone were recorded from five graves (900137, 900161, 900175, 900193 and 900196), i.e., nearly 22% of all graves; the deposits were mostly joints of lamb and mutton, with grave 900193 additionally furnished with a pig joint (see Higbee above). The distribution of these deposits within the cemetery is somewhat peculiar in that it more or less occurs in all four corners of the area uncovered during the excavation, with the exception of grave 900172, which is located slightly to the south-west of the main cluster of graves (Fig. 8.68). Whether or not there is any intention or meaning behind this remains unknown, not least because the cemetery probably extends beyond the excavated

boundaries to the east and west. There is a clear bias towards female burials, with only the animal bone in grave 900196 deposited with a male (30–40-years old); by contrast, there is no discernible bias regarding the age of the deceased. All five graves with animal bone deposits are well furnished with grave goods, and in the case of grave 900175, which contained mounted glass cabochon ON 177 with its cross-and-saltire decoration, a possible Christian significance has been discussed (see 'necklaces' above). The situation at Callow Carr is different to that at Castledyke South, where a wider range of species was observed (Nicholson 1998), as well as to that observed by Geake in her national sample, where she found that food offerings occur fairly evenly across Anglo-Saxon England, both in well-furnished graves as well as in graves with none or only one or two additional objects, and without a discernible gender bias. Food offerings occurred until the end of furnished burial, but based on her sample she was unable to establish whether their frequency increased or decreased from the Migration period into the Conversion period (Geake 1997, 98–9, map 60). Three of the graves (900137, 900175 and 900196) have been radiocarbon dated to *cal. AD 635–655* (68% probability), and based on the associated grave goods the other two graves are also likely to date to the 7th century (Table 8.110).

With regard to the box in grave 900085 and its contents of two apparently usable spindles – including whorls and hook – it is interesting to note Drinkall's notion that the deposition of boxes in graves might hint at the increasing significance of movable property in 7th-century graves (Drinkall and Foreman 1998, 331). At Castledyke South, craft tools occur occasionally in female 7th-century graves. Their placement in receptacles suggests that they were not directly related to costume, and it was suggested that the inclusion of textile-working equipment might indicate an enhanced economic importance of this presumably predominantly female craft (*ibid*., 332). After placement in grave 900085, the lid of the box would have opened into the grave, thus potentially allowing onlookers standing on the western edge of the grave to look inside the box.

Displays of interpersonal relationships

A notable pattern of pairings in object placements is apparent in all four corners of the cemetery. In all cases adjacent burials were either furnished with a conspicuously similar group of objects and/or the objects were placed on or around the body in a similar manner. For instance, the women in graves 900085 and 900161 at the west end of the southern row were both buried with spindlewhorls and spindle hooks (Fig. 8.69). Another pairing involving spindlewhorls appears at the opposite side of the site in adjacent graves 900079 and 900175 at the east end of the northern row, where both women were also buried with buckles.

At the western end in the north row, a possible similarity exists in the placements of the knives in graves 900193 and 900196, where a woman and a man were buried flexed and crouched, respectively, facing NNE next to each other (Fig. 8.62). Both knives were found on their upper left side, cutting edges facing the ribcage, with the blades pointing towards the feet (Fig. 8.64). Although the position in relation to the body is not unique, knives in that position and pointing towards the feet are only seen in these two graves. While this observation is predicated by the caveat that object positions are affected by post-depositional processes, both graves were additionally furnished with animal bone deposits, which is otherwise only observed in three other graves in the other corners of the cemetery (Fig. 8.68).

Two burials furnished with two buckles, one at the waist and one at the neck, as well as a knife, were located in adjacent male graves 900190 and 900205 at the eastern end of the middle row. The only other double-buckle grave (900137, female), but this time without a knife, is also located in this part of the cemetery, just 2 m SSW of grave 900205.

These groupings are perhaps expressions of family or kin relationships; however, it was not possible to confirm this with the help of the six samples submitted for aDNA as the groupings had not been recognised at the time of sample extraction (graves 900019 [both individuals], 90098, 900114, 900137 and 900196). Instead, the preliminary

results (see Boston above) show a maternal relationship between the young boy in grave 900019, the only individual apparently buried without any grave goods, and the 30–40-year-old woman in grave 900137. The boy is possibly also related to the teenage girl (900019) buried next to him, who was furnished with the richest assemblage from the entire site, including the silver–amber and gold–garnet pendants. In contrast to this, his was the only burial not accompanied by any (surviving) object.

Heirlooms

Seax ON 64 placed in the grave of the 14–16-year-old boy in grave 900098 was possibly about a century old when he was buried in the later 7th century. In a recent discussion of the well-established phenomenon of placing potentially curated objects in Anglo-Saxon graves, Costello and Williams draw attention to the fact that not only Roman (like the finger-ring in grave 900085) but also earlier Anglo-Saxon objects were employed in this practice. A notable local example of a Roman 'heirloom' item, and its value for the community for this very reason, is the enamelled cup from the grave of a young woman at the nearby but earlier cemetery of Scremby (Willmott *et al.* 2024). According to Costello and Williams (2019, 116–7), such objects could range from 'simple or commonly used items such as beads or pottery or other vessels, to more precious items such as gold pendants and ivory bag rings' (e.g., Huggett 1988, 68–9; but see recent studies demonstrating that contemporary African ivory was used: e.g., English 2024; Hemer *et al.* 2023), and '"heirlooms" share in being important in social, economic, political and religious terms to the people who owned, curated, and continued their circulation beyond their utility or exchange value (Lillios 1999)' (Costello and Williams 2019, 116–7). Grave 900098 also stands out in the combination of a seax with a wooden bucket, which was found to be very rare in contrast to that of a sword and a vessel, and seaxes are generally more common in southern England.

Grave orientation and changing customs

The layout of the cemetery and the predominance of a northerly orientation of the burials have been described above. The following discussion, however, begins with the five burials on a westerly alignment, four of which are in the northern row (from east to west: graves 900063, 900070, 900193 and 900196), with grave 900172 slightly isolated in the south-western corner of the cemetery. Apart from grave 900193 with a probably female burial, all others in this grouping are male. All these burials are flexed, except for the 30–40-year-old man in grave 900196 who is the only crouched individual in the cemetery; graves 900063 and 900172 are facing a southerly direction, the others in a northerly direction.

West–east aligned graves are a common feature in Anglo-Saxon cemeteries, accounting for one-third of the total in 5th/6th-century burial grounds and increasing to slightly more than half in the later-period cemeteries. Preferred orientations could be linked to a wide variety of factors, such as age and sex, orientation towards a dominant landscape feature, as well as local traditions and individual factors (Lucy 2000, 130–2). Arguments for and against the division of furnished Conversion-period graves into pagan and Christian on the basis of the presence of grave goods and west–east alignment, as well as other factors, have been summarised by Geake and dismissed as unusable. While she posited that the identification of personal Christian acceptance was perhaps irrelevant for investigations of wider social trends, it also appears that these factors do not allow us to establish whether or not individuals at Callow Carr were Christian (Geake 1997, 132. See also Hines 2013a, 548; on orientation see e.g., Rahtz 1978). In the case of the above-mentioned graves on a westerly alignment, there is nothing in the individual assemblages of grave goods that would support this notion. On the other hand, the only object with potential Christian symbolism or associations, the glass cabochon with cross-and-saltire motif (ON 177), was found with the burial of an older woman in grave 900175, which was oriented NNE–SSW and additionally furnished with knife, buckle, spindlewhorl, possible wooden vessel and animal bone deposit as well as one iron nail. Likewise, there is nothing overtly Christian about north–south aligned grave 900085, where a 22–32-year-old woman was buried wearing a linked pin set – recently discussed as a potential marker of an emerging

religious elite (see 'pins' above) – and with a wooden box containing, among other items, two usable spindles placed next to her feet.

Rather than seeking to interpret traits observable in individual graves as proof, or otherwise, it is perhaps more prudent to see them as aspects of the wider social trends mentioned by Geake. The population at Callow Carr was evidently in contact with the wider Anglo-Saxon world, both locally and regionally, as is apparent from small details of cross-hatching decoration of some of the belt buckles, to spindle technology that included hooks common on the Continent but (almost) unknown in Anglo-Saxon England, and even more ostentatiously in the necklace of the teenage girl in grave 900019. This necklace links her to a horizon of burials of a socially elevated echelon of society that had access to gemstones from India and Sri Lanka, which reached England through networks linking through the Mediterranean and Merovingian Francia. Although caveated by the unfavourable preservation condition of the iron loops associated with the handle for an iron-bound bucket in the assemblage of the 35–45-year-old man buried in grave 900131, which find their closest comparisons at the Runde Berg bei Urach in south-west Germany, it is intriguing to note that the isotope results for this individual suggest a foreign origin in Germany or France (see Appendix C).

Perhaps, then, the cross-and-saltire cabochon, with its closest comparison at the high-status site at Little Carlton (Willmott and Daubney 2020; Willmott and Wright 2021) some 15 km further north, provides a first inkling of the changing religious landscape after the conversion of Lindsey in the 630s (Hines 2013a, 550), while the establishment of the monastery at Partney, 5 km to the south, sometime in the 660s or 670s (Coppack 2010, 208) is temporally close and potentially also linked to the abandonment of burial at Callow Carr.

The Textile Fragments from Callow Carr

Sue Harrington

Catalogue of textile fragments

Grave 900067 (burial 900068)

Knife ON 16

Degraded mineral preserved textile is present, dispersed over one face of the knife. It has no clear distinguishing features, although it may have been a medium/coarse-weight cloth. The largest area is perhaps only 3 x 3 mm at the junction with the ?bone/wood covered tang. The textile appears to run at right angles to the length of the knife blade, which was located horizontally at the waist, and appears consistent with a formal arrangement of the body. The knife had a leather/hide sheath, noticeable on different areas of the blade and possibly underlying the textile fragments. Working from the associated grave images for information, it appears that the textile was on the underside of the knife, in contact with a clothed body, rather than from a body covering.

Grave 900098 (burial 900100)

Buckle loop and plate ON 72

An area of 23 x 22 mm of mineral preserved textile is present on the flat ?underside of the buckle loop and fragmentary plate (Fig. 8.73a). The textile lies at a slight diagonal to the length of the buckle, which is assumed to be aligned horizontally with the body, although the exact orientation of the artefact on the centre of the chest of the deceased is not determinable from the documentation. The textile is medium/coarse weight, with a count per cm in System I (warp threads) of 12 z-spun, s-spun and unspun threads, each with a consistent diameter of 0.8 mm. The sequence of spun threads appears to be z,z,u,u,z over 4 mm in the central section, with the s-spun threads as outliers to this. Nothing could be seen of System II (weft threads), although the SI threads appear to interleave with one another. This data is interpreted as evidence for a substantial decorative tablet-woven braid, although the exact pattern and number of tablet holes could not be determined. One area (on the left of the image) has z- and s-spun threads of the same diameter that present as a coarse 2/2 twill (both systems visible) suggesting a cloth to which the braid was attached.

Grave 900140 (burial 900142)

Buckle loop and plate ON 95

There are two areas of mineral preserved textile on the underside of ON 95 (Fig. 8.73b). Textile fragment A is 8 x 8 mm and is located at the junction of the loop and plate. It has no recordable

features but appears similar to textile fragment B, which is located over the rivet at the end of the triangular plate. This has an area of 8 x 8 mm in a single layer and is a closely woven, balanced plain weave, with tightly spun threads, z-spun in both systems, with a count of 14/14 per cm.

Grave 900161 (burial 900163)
Copper alloy spindle hook ON 159.1
A tiny area of degraded mineral preserved fibres/?threads, perhaps indicating an open woven structure, but with no recordable details.

Grave 900193 (burial 900194)
Buckle loop and plate ON 157

An area of 5 x 6 mm square of very degraded mineral preserved ?textile is present on the buckle tongue. It has no distinguishing features and its relationship to ?leather/hide ?belt is not determinable. Even less distinguishable areas of the same colour are present on the buckle plate. The area of ?textile is on the upper face of the artefact, potentially from a sleeve of the folded-in arms of this tightly flexed body.

Grave 900205 (burial 900206)
Buckle loop and plate ON 187
This artefact has mineral preserved organic remains on both faces, but these are not readily identifiable. On one side there is a 0.8 mm diameter z-spun thread of unknown fibre (visible in the centre of ON 187 and as a detached fragment; Figs 8.73c–d), perhaps indicative of binding the artefact to the ?cloth or as a floating thread from a decorative cloth. The folds in the organics suggest a clump of relatively fine cloth crumpled together.

Discussion

The small corpus of textile fragments comes from six separate graves, accompanying variously aged male and female bodies, surviving on four buckles and a knife. Textile can survive well even in such poor soil contexts as were present on this site, but the small sizes of the objects, particularly the copper alloy ones, militate against extensive survival and against clear identification of the fibre, cloth type and purpose. This is clear in the case of ON 159.1 from grave 900161, which is not discussed further here. All fragments were mineral preserved, and this has allowed for some determination of spin direction, weave and thread count per centimetre, but there were no extant fibres present for identification, although it is to be expected that the cloths would be of animal (mainly wool) and plant fibres (linen, hemp). Seventh-century cloths tend to be finer and have more complex weaves than 6th-century ones and the original presence of embroidery cannot be ruled out, although not visible here (Lester-Makin 2019). Likewise, the presence of imported silk threads is very difficult to establish, although assumed to be present in higher-status burial.

Nevertheless, this small corpus does have parallels from other contemporary burial sites that aid conjectural identification. Cloth overlying artefacts at the waist, as with ON 16/grave 900067, is a frequent find for simply garbed bodies prepared for burial, perhaps mainly male bodies but not invariably, and has many parallels elsewhere in the Anglian region (Harrington forthcoming a). The textile on the outer face of ON 157/grave 900193 may be from burial clothing, as suggested by the retained arm position of the skeleton, although another possibility is that it came from a covering over the body as part of the closure of the burial. Complex layers of textile are occasionally recovered from inhumations (Harrington, forthcoming b). An interpretation of the textile surviving on the underside of ON 95/grave 900140 – a well-woven cloth in a single layer – also suggests it is from clothing. From the accumulation of fragmentary data from burials, a plain, well-woven over-shirt can be posited for this type of evidence.

The textile traces on ON 187/grave 900205 are difficult to interpret given the unusual position of the artefact at the neck, although this was possibly the result of disturbance to that part of the grave. Occasionally it can be suggested that additional buckles might be used to hold a body wrapping in place to make the package more manageable (Harrington

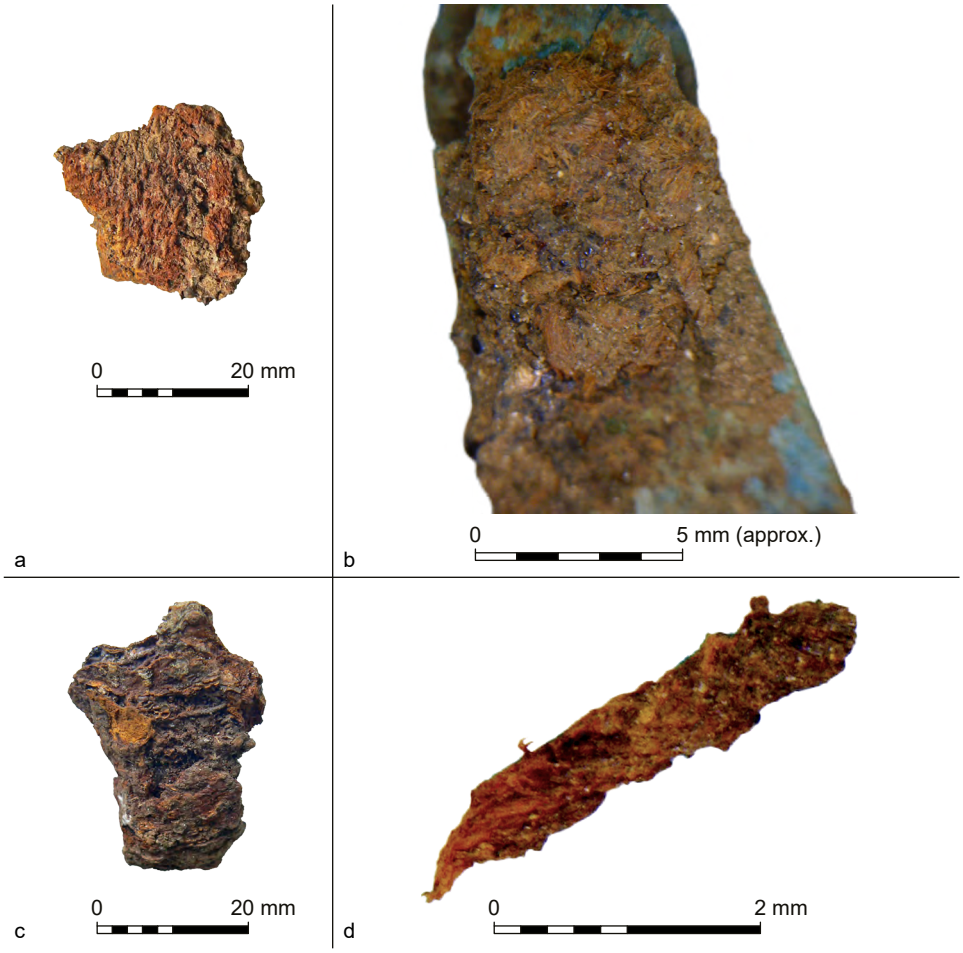


Figure 8.73 Mineral preserved organic remains from Callow Carr. a) ON 72 Grave 900098. Tablet-woven braid to centre, twill weave to left; b) ON 95 Grave 900140; c) ON 187 Grave 900205. Detached thread located vertically at centre of image; d) ON 187 Grave 900205. Detached thread at 50x magnification showing tight z-spin

forthcoming a), but here we have a fine textile with multiple layers, although without distinguishing features. No firm conclusions can be drawn about the use of this cloth.

The final textile fragment, on ON 72 in grave 900098, offers a speculative interpretation, but on a slightly firmer footing. The location of ON 72 at the chest centre may the outcome of post-depositional disturbance moving it away from the waist, but the body appears still to be constrained and may be close to its original placement. In any case, the textile on the underside – a tablet-woven braided edge to a twill garment – is not commonly associated with buckles except in infrequent circumstances. This combination of weave types is more usually found on the back of brooches, particularly annulars placed in pairs at the shoulders of female bodies (Harrington 2024). The unusual content of this burial, particularly the seax and iron spoon, prompts wider investigation. An initial interpretation was that this was a border edging to a wrap-over jacket or cloak, as illustrated on the gold foil figures of Late Iron Age Scandinavian costume iconography that depict both male and female figures (Mannering 2017). Penelope Walton Rogers discussed this garment type from 7th-century male burials, where braid has been identified on centrally placed buckles, identifying it as a wrap-over fighting jacket, clasped by a belt around the waist, similar to that shown on the spear dancers on the Sutton Hoo helmet plaques, although these latter had more elaborate decoration in the braids (Walton Rogers 2007, 210–3). Her reconstruction of the costume of the male from the late 6th/early 7th-century burial mound at Taplow (*ibid*., 216, fig. 5.64), showing a knee length, gold-edge braided garment, would suggest links to Kent and by extension to Francia and the wider context of northern Europe. Gale Owen-Crocker (2004, 180) suggests that this garment type was well-established in Germanic costume in the Migration period. She references (*ibid*.) a fragment of silver foil from an antiquarian-excavated, 7th-century burial mound at Caenby, Lincolnshire, depicting a man in a similar costume.

Of the three burial contexts that Penelope Walton Rogers had personally identified as hosting textile fragments from this type of garment, a tablet-woven band running vertically down the body behind the buckle, that from Castledyke South, Lincolnshire, is the closest geographically to Callow Carr. There, grave 126 is the simply furnished burial of a supine male aged 17–25 (Drinkall and Foreman 1998, 71), buried in a coat or jacket of linen 2/2 twill with a 3/1 patterned border of braid (Walton Rogers 1998, 279). The buckle at the waist caught the vertical line of the braid and overlaid a fragment of the garment underneath as it was wrapped over the body. The two other examples of this garment are from Buckland, Dover, Kent, both male weapon burials datable to the period of the late 6th to mid-7th centuries (Brugmann 2012b, 323–357). ON 72 is unusual in having caught the braid edge attached to a fragment of the main garment cloth and retained the curvature of the garment from further up the chest, hence its slight diagonal alignment. The function of this buckle remains uncertain, however, although it may have related to a strap to support the adjacent seax. How the garment wrapped over the body might be determined by examining the exact orientation of the buckle loop and plate – was it wrapped left edge over right, or vice versa as was the case for the man in Castledyke South grave 126? (Walton Rogers 1998, 279).

Male burial costumes are difficult to determine even from among the textile remains of sites with better preservation than is the situation at Callow Carr. Nevertheless, the small corpus of fragments makes a significant contribution to understanding of the distribution of one particular garment used in burial. That a second example of a wrap-over jacket should also come from Lincolnshire highlights the importance of this excavated material and the wider context of this burying community.

Other Finds

Non-cemetery Metalwork

Katie Marsden

This section represents a round-up of the metalwork recovered from the Interconnector beyond the Anglo-Saxon cemetery at Callow Carr. The 381 metal objects (295 iron, 44 copper alloy, 42 lead/lead alloy), were recovered from 22 areas along the route. The most prolific were White Crofts in Zone 1 (53 objects) and Cheals Close in Zone 2 (58 objects), but half the sites produced fewer than 10 items each. In general, the objects are in poor, highly fragmented condition. The more diagnostic pieces of Romano-British, Anglo-Saxon, medieval and post-medieval date predominantly consist of small, casually lost items, such as coins, hobnails, personal objects and small tools. However, the bulk of the assemblage (78% by count) consists of modern or undatable items, the details of which are contained in the project archive.

Prehistoric

Staunch Farm

A tiny copper alloy annular bead (ON 310001), measuring just 3 mm in diameter, came from prehistoric occupation layer 310012. Such beads are known from all periods extending from the Iron Age to modern but although its small size means the possibility of it being intrusive cannot be entirely ruled out, this example is considered likely to be contemporary with the deposit in which it was found.

Romano-British

Sea Bank Farm

A broken fragment from a probable radiate or *nummus* (ON 4) came from Tidal Flat deposit 200202. It can only be broadly dated to the 3rd or 4th centuries AD.

Feature	*Object no.*	*Denomination*	*Weight (g)*	*Details*
Ditch 3205	91	contemporary copy, *nummus*	1	House of Constantine, FEL TEMP REPARATIO (emperor spearing fallen barbarian) reverse type
Ditch 300510	31	*nummus*	2	House of Valentinian, possibly Gratian. GLORIANO VISAECVLI (emperor with standard and shield) reverse type; uncertain mint
Ditch 300519	3003	radiate	2	Uncertain issuer; standing figure with possible cornucopia (possibly PROVIDENTIA AVG)
Ditch 300521	37	radiate	2	Uncertain issuer, standing figure reverse
Ditch 300529	33	*nummus*	2	Uncertain issuer, standing figure reverse
Ditch 301402	55	contemporary copy, *nummus*	1	Contemporary copy of a *nummus* (small flan), standing figure reverse
Ditch 301154	61	radiate	1	Uncertain issuer and reverse
Colluvial deposit 301426	53	radiate	2	Probable empress issue, not further defined.

Table 8.111 The coins from White Crofts

Ailby Lane

One arm of a pair of copper alloy tweezers came from ditch recut 416000. Such items were used by both sexes for the removal of unwanted facial and body hair and are known from both the Romano-British and Anglo-Saxon periods. However, the associated finds, particularly the pottery from this ditch, suggest that these tweezers are of early to middle Romano-British date.

White Crofts

Most of the metalwork from this site is of late Romano-British date, but a Colchester-derivative type brooch (ON 44), of mid-1st to 2nd-century AD date, was found residually in ditch 300522.

A group of eight copper alloy coins comprises four 3rd-century AD radiates and four 4th-century *nummi* (Table 8.111). All are in poor condition, and only two are even broadly identifiable, issued by emperors of the Houses of Constantine (ON 91) and Valentinian (ON 31). All are likely to be casual losses, although the House of Valentinian coin carries traces of mineral replaced organic remains, possibly the result of being deposited within or adjacent to textiles.

The largest group of Romano-British metalwork comprised 19 fragmentary iron nails from graves 301302 (4) and 301319 (15) at White Crofts. All are of 'standard' form (Manning 1985, 134, type 1b) with round, flat heads and tapering, square-sectioned shanks. The nails from grave 301302 were positioned with two at the head and two at the foot, indicative of a wooden coffin nailed at either end and maybe jointed elsewhere. Those from grave 301319 were found clustered around the head, with only one along one edge of the grave. Instead of a wooden coffin, this positioning may suggest that a small wooden box had been deposited as a grave offering in this area. A minimum of 23 clenched iron hobnails found around the feet of the man buried in this grave indicate that he was wearing nailed shoes/boots with soles 8–10 mm thick and was therefore probably fully dressed (Philpott 1991, 147) at the time of burial.

Part of a flat, plain, copper alloy bracelet (Fig. 8.74.1, ON 3006) was found on the right arm of the woman buried in grave 301298. A fragment from a second bracelet (ON 30), formed from two or three strands of copper alloy wire twisted around a central core, came from ditch 300510. Both types probably belong within the 4th century AD when the fashion for wearing such items was at its peak (Cool 2010, 297).

Area 21

The blade of an iron knife or small cleaver, possibly of Romano-British date, came from the subsoil of this area, which lay in the parish of Raithby in Zone 2. The blade (80 mm long, 32 mm wide) has a straight back in line with the tang.

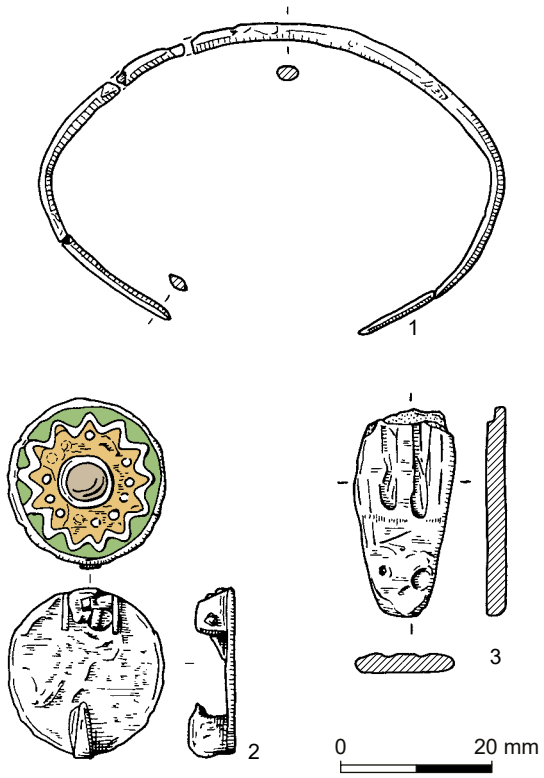


Figure 8.74 Other metalwork (non-Callow Carr)

Six Hundreds Drove
The three copper alloy objects from this site all belong to the early part of the Romano-British period. Although surviving in particularly poor condition, a possible Hod Hill brooch (ON 550020) was found in ditch 550529, while a second brooch (ON 550012) came from ditch 550518. This circular disc brooch (Fig. 8.74.2) is of 2nd-century AD date. Corrosion from its iron pin has obscured most of the plate but it appears to be decorated with a series of repeating chevrons around a central pellet. The triangular cells around the circumference are filled with green enamel, while red enamel survives in small patches within some of the inner chevrons.

The third object, a copper alloy *sestertius* coin (ON 550001), came from ditch 550535. It survives in poor condition and can therefore only be broadly dated to the 1st to 3rd centuries AD.

Anglo-Saxon
Excluding the cemetery at Callow Carr, just four identifiable Anglo-Saxon metal objects were recovered.

White Crofts
A copper alloy strap-end (ON 93, Fig. 8.74.3) from ditch 3082 is broadly rectangular with a rounded terminal in the form of a stylised animal head. It probably falls within Thomas's (2003) class A strap-ends – those with a split end, a tapering plate and a zoomorphic terminal, but even after cleaning, any decoration held within the two indented rectangular panels on the body of the strap-end remains indistinct, preventing more precise identification.

Ailby Lane
The lower part of a copper alloy girdle hanger with closed terminals (Felder 2015, 10, fig. 3, group B) and annular punch and rocker-arm decoration was found in sunken-featured building 411000. Such objects are of 5th- or 6th-century date and, from a study of their occurrence in burial contexts, were generally worn on the left hip of adult women to communicate the wearer's social and individual identity (*ibid.*, 4 and 12).

Cheals Close
A pair of copper alloy tweezers with flared terminals (ON 180023) was found in ditch 180615. This form is typically Anglo-Saxon, with examples recorded at Flixborough (Evans and Loveluck 2009, fig. 1.12, 215 and 220/221).

Six Hundreds Drove
Although found in Romano-British ditch 550527, a corroded but broadly rectangular iron fitting with a rounded terminal is reminiscent of Anglo-Saxon strap-ends.

Medieval and post-medieval

Ulceby Cross
Chronologically diagnostic medieval items include a horseshoe nail of 'fiddle key' type (Goodall 2011, 364, fig. 13.1) from quarry 500036. Although not intrinsically datable, a horseshoe with a small flan from post-medieval/modern ditch 500099 at this site would not be out of place among horseshoes of the 13th and 14th centuries AD (*ibid.*, 271, fig. 13.4), while a corroded iron sheet fragment from ditch 500060 may derive from a medieval buckle plate.

Cheals Close
A small, whittle-tang knife (ON 180002) with a narrow blade and a concave back from Romano-British ditch 180069 is of broad medieval date (Goodall 2011, 106, fig. 8.2, J). A small fragment of lead alloy (weighing just 7 g) with a 'D'-shaped cross-section from ditch 180615 may derive from a window came, used to hold the glass in the windows of significant buildings (e.g., churches, manor houses, etc.), from the medieval period onwards.

Ailby Lane
A small (26 x 8 x 1 mm), copper alloy hooked clasp (ON 83), was found in the topsoil. It is decorated with an openwork design of a chequered lozenge, variously interpreted as a thistle, pineapple or pinecone (Read 2008, 104, class E, nos. 402/3), and is of early post-medieval date.

Other post-medieval, modern and undated metalwork from elsewhere along the route includes fasteners, nails and horseshoes. These were thinly spread, and typically derived from topsoil or the fills of ditches recorded on historical mapping; details are available in the archive. Undiagnostic scraps of copper- and lead-working waste (6 g and 20 g respectively) were recovered from ditch 300531, silting deposit 301426 and the subsoil at White Crofts, with further lead-working waste (127 g) from Anglo-Saxon posthole 180193, medieval ditch 180619 and an unstratified find (ON 180003) at Cheals Close.

Marine Shell
Kevin Trott

Introduction
The marine mollusc shells (1551 items, 24.1 kg) were assessed to provide an indication of the preferred species and size classes utilised in the human diet. Marine molluscs are a valuable food resource as they are rich in proteins and generally available all year round. The range of molluscan fauna also indicates the habitat and environmental conditions from which they were obtained, and as there is usually little doubt that marine molluscs were brought to site by human activities (Deith 1985), the nature of the human foraging activity can be inferred from the species present.

Methods
Common whelk, mussel and cockle shells were measured across their major axis. The oysters, which dominate this assemblage, had the measurement of both the length and width of each valve recorded (Winder 1992a, 194–6). Any incomplete mollusca were noted as present, but no further analysis was undertaken.

The shells were also checked for indications of interactions with other species, such as the parasitic infestation of oysters (Winder 1992b, 17), as well as any signs of tools being used to either prise the shells open or to extract their meat (Winder 1992a).

Species range
The assemblage includes oysters (*Ostrea edulis*), common whelks (*Buccinum undatum*), mussels (*Mytilus edulis*) and cockles (*Cerastoderma edule*), the proportions varying from site to site; these are considered individually below. Overall, however, the common whelks, mussels and cockles were probably readily collected from the shoreline. The oysters, which grow sub-littorally in UK waters (Haywood *et al*. 1996; Yonge 1949), were obtained from beds in creeks and estuaries.

Sea Bank Farm
A total of 808 shells (15.5 kg) were recovered from pit group 200201, palaeochannels 200108 and 200200 and Tidal Flat deposit 200202, and were accompanied by artefacts that included pottery of mid–late Romano-British date. Oysters (*Ostrea edulis*) made up the majority. This species can regularly grow up to 97 mm in diameter, but those found

here average 52 mm across, with their annual growth bands suggesting the vast majority were harvested after around four to seven years of growth.

The majority of both left and right valves are generally wide and flat, indicating a very low-energy, fine-sediment habitat, although occasional irregular valves (some with scars or fused valves from other oysters, indicative of clumping groups), indicate growth in more gravelly or stone-rich habitats. Some of the oyster, mainly right valves, also exhibit small burrows from the marine worm *Polydora ciliata*. This worm is predominantly encountered on hard sandy or clay grounds in warm shallow waters, suggestive of the Humber estuary. The presence of at least 61 examples of spat (young, underdeveloped oysters) would suggest individual selection of oysters based on size was not undertaken, rather implying that some form of dredging was undertaken (Winder 2017, 247) during the mid–late Romano-British period on both naturally overcrowded beds and on groups of oysters in non-competing habitats.

The ratio of both left and right oyster valves is broadly equal among the measurable shells, strongly suggestive of the disposal of both preparation and consumption waste. This is also evident from the number of (mainly right) valves exhibiting damage or V- or W- shaped notches to the outer lip or near the hinge, resulting from the extraction of the meat. Examples of both right and left valves exhibiting heat scorching, sooting or, in a few cases, more intense burning, were also noted, but it remains uncertain whether this occurred during food preparation or after the valves had been discarded.

Only six oysters (all from palaeochannel 200200) retained the left and right valves intact, which suggests that dead or bad oysters were recovered along with the live ones and subsequently discarded. A programme of refitting was implemented to identify any additional matching valves, but only two others were found, both among the shells from layer 200202. The presence of Bryozoa or sea mat, along with common acorn barnacles (*Balanus perforatus*) on the inside of mainly left valves, provides further indication of the recovery of both dead and live oysters during dredging operations on rough substrates.

Enough oyster valves were found in the palaeochannels to provide an estimation of the weight of the wet meat obtained from them, using the methods and data described by Winder (1980, 121–2). Her measurements of modern oysters give a standard deviation of 5.3 g of meat per oyster, so multiplying this by the number of non-conjoining/matching oyster valves indicates that a weight in the region of just 5.1 kg was obtained from the shells in these deposits; this weight and its nutritional value would rapidly reduce if the meat was cooked prior to consumption.

Three common whelk (*Buccinum undatum*) shells were found in palaeochannel 200200 and pit 200041; all are incomplete with only one length (69 mm) measurable (palaeochannel 200200). Complete cockle valves (*Cerastoderma edule*) from palaeochannel 200200 and layer 200202 indicate a mean length of 27 mm, with a meat value of a mere 2 g. These molluscs would have been foraged from an intertidal sand or fine gravel environment, while whelks are usually associated with rocky, gravel or sandy environments and feed on cockles and worms etc. It is possible for these species to have been recovered from a low tide environment in the Humber, with the whelks collected while raking cockles for consumption.

White Crofts

The 717 shells (8.3 kg) from this site were again dominated by oysters. Measurable valves were mainly recovered from the mid–late Romano-British ditches and pits. On average, the shells were 92 mm across. The majority are generally wide and flat, indicating a very low-energy, fine-sediment habitat, although a small percentage of valves (5%, from ditches 300520 and 300525) are irregular, and exhibit other fused left and right valves indicative of natural clumping. When young spat oysters settle from their free-swimming stage and attach themselves to an object on the seabed, their form

can be affected by the shape of and space around this object as they grow. Clumping can also occur when many young oysters settle onto the same object and compete for growing space (Winder 1992a, 196). However, the presence of spat valves indicates that the molluscs were obtained from a healthy, breeding population, although the spat were probably obtained accidentally while dredging the adult oysters.

The ratio of both left and right oyster valves is broadly equal, which is strongly suggestive of the disposal of both preparation and consumption waste. This is also evident from the number of (mainly right) valves exhibiting damage or 'V'-shaped notches to the outer lip or near the hinge, resulting from the extraction of the meat. Based on the standard deviation of modern oyster meat weight (Winder 1980, 121–2), the shells provided a yield of approximately 2.1 kg of wet meat. Heat scorching, sooting or, in a few cases, intense burning is apparent on both right and left valves, but it is again uncertain whether this occurred during food preparation or after the valves had been discarded.

Four common whelks (*Buccinum undatum*) were recovered from ditches 301401 (two), 300510 and 300522, along with common cockles (*Cerastoderma edule*; ditches 300506 and 300526) and a mussel (*Mytilus edulis*) shell from ditch 300522. Whelks are usually associated with rocky, gravel or sandy environments and feed on cockles, worms, etc. It is possible that these molluscs were recovered from a low tide environment along the eastern seaboard of Lincolnshire, with the whelks collected while raking cockles for consumption.

Walk Hill

The left valves from oysters (*Ostrea edulis*) dominated the limited assemblage from Walk Hill (9 of the 11 measurable valves). These usually saucer-shaped valves are commonly associated with consumption waste, with the flatter, smoother right valves, not well represented here, being considered to represent preparation waste.

The three left valves from ditch 800489 were associated with pottery of early–mid-Romano-British date and fell within a size range of 88–90 mm. Larger (100 mm across; one, infested with *Cliona celata*) and smaller (68 mm across; 3, one with impressions of other oysters on the outside) left valves came from ditch 800488 of similar date. One left shell was found in ditch 800491, while one slightly distorted right valve was found in pit 800498; both features are of late Romano-British date. Undated layer 800325 also produced a single left valve with an infestation of *Polydora hoplura*.

Zone 2 Area 28

The single cockle valve (*Cerastoderma edule*) from a furrow at this minor and unillustrated site would have been collected from an intertidal sandy or gravel environment.

Six Hundreds Drove

A single right oyster (*Ostrea edulis*) valve was recovered with mid–late Romano-British ceramics in ditch 550532. The size of this valve suggests it was a juvenile of under 2 years, and larger than spat size. Also recovered from this feature was a juvenile common whelk (*Buccinum undatum*) that was originally obtained from rocky gravelly strata at extreme low water of spring tides. The small size suggests it was probably recovered either as bait or accidentally.

North Ing

Two right mussel valves (*Mytilus edulis*) from Romano-British ditch 610101 would have been collected from rocky middle and low shorelines and may provide evidence of food waste.

Discussion

Overall, the marine shell assemblage indicates a strong preference for the consumption of oysters. Those consumed at Sea Bank Farm and White Crofts during the mid–late Romano-British period show significant size differences given the similar ages of the oyster when harvested. This could indicate declining stocks or other problems in the source area, probably the Humber estuary and/or its related tributaries, where suitable

areas of low tidal energy and fine-sediment habitats are still present today, but the nature of any such problems remains an avenue for future research.

The cockles, whelks and mussels were probably sourced along the eastern seaboard of Lincolnshire. Their low numbers at these sites indicate that these species were never consumed or otherwise utilised (e.g., as fishing bait) to any appreciable extent. Some (e.g., the whelks) may, indeed, have been collected accidentally while foraging for other species such as cockle, but all were probably consumed or utilised once collected.

Almost all the marine shell was recovered from deposits of Romano-British date, with none found on the most active Iron Age sites. This conforms to a known pattern within central/southern England, where there was little apparent consumption of seafood in prehistory, but a marked increase following the Roman occupation (Willis 2007). This shift in consumption habits may well have been accompanied by changes in how the sea itself was conceptualised, and speaks of broader changes within cultural attitudes to the landscape that seemingly permeated even rural native sites (*ibid*.).

Worked Bone

Mark Stewart

After refitting, the 30 pieces of worked bone derive from 20 individual objects dispersed at a low density across numerous excavated areas. The majority are from features of Romano-British date, but possible Iron Age and Anglo-Saxon objects are also included. The condition of this assemblage is generally rather poor and secure identifications are therefore often difficult, but there appears to be a bias towards objects associated with textile manufacture. Diagnostic pieces which allow a more refined dating are rare; most pieces are dated by the associated ceramics and, therefore, residuality is possible in some cases.

Late Iron Age and Romano-British

Sea Bank Farm

A 'metapodial tool' (Fig. 8.75.1) was recovered from alluvium 200203. This type of object encompasses many subtle variations in form which are sometimes interpreted as implying differing uses, but they are most commonly thought to be employed as bobbins by weavers. This example is formed of three refitting fragments of sheep/goat metatarsal with a surface gloss over the remaining shaft and a potentially artificial perforation in the articular surface. It is the only example found on the Interconnector route to exhibit distinct radial scratches/grooves on the proximal medial surface, thought to result from contact with the thread. Such objects are particularly well documented in Iron Age assemblages from Danebury, Maiden Castle and Glastonbury, but Romano-British examples have been found in Lincolnshire, at sites such as Lincoln's lower city defences (Mann 1999, fig. 81, 102) and at Dragonby (Taylor and May 1996, 353–7, type 4), as well as further north at South Shields Roman fort, Tyne and Wear (Allason-Jones and Miket 1984, fig. 2.24), for example.

White Crofts

The largest group of worked bone objects was found at this site towards the north of the scheme, in features dating to both the early and later phases of the Romano-British period.

Two bone pins provide the only examples of items of personal adornment in this material. A complete pin (Fig. 8.75.2; ON 3) was recovered from a dumped deposit of early Roman date in palaeochannel 200200. It is formed from a fragment of cattle-sized long bone, highly polished along the entire length of the tapering shaft and with a single groove carved just below its conical head. This is a common, distinctly early Roman form (Greep 1996, 345) with direct parallels from several sites in Lincolnshire including Winterton Roman villa (Stead 1976, fig. 107, 84), the lower defences of Lincoln (Mann 1999, figs 69 and 71) and Dragonby (Greep 1996, fig. 3). Pins of this size (98 mm

long) are generally considered to be hairpins but may also be used to secure items of clothing. The second pin fragment (in two refitting pieces) from the same deposit lacks any classifiable features, but it seems probable that this too is early Roman in date.

Two objects from 2nd to 3rd-century AD ditches 301410 and 300506 have tentatively been identified as pin-beaters, used in textile manufacture (Sellwood 1984, 382–387). Each one is a shaped segment or shaft fragment of cattle or sheep long bone, roughly pointed at one or both ends, and exhibiting the highly polished surfaces thought to result from their use in compacting the weft threads on an upright loom. One example (Fig. 8.75.3) has cross-hatched decoration but neither, even following examination at 40x magnification, retain the scratches or grooves often exhibited by these tools. The other (Fig. 8.75.4) is thoroughly and evenly blackened; while this may be incidental, it is possible that this results from a purposeful attempt to harden the bone, or even to mimic jet (L. Higbee, pers. comm). Very similar examples have been recovered from Dragonby (Taylor and May 1996, fig. 14.4).

A large distal fragment of red deer antler collected from late Romano-British silting deposit 301426 has been sawn off across the beam where it forms a junction with the final two tines (now missing their tips), and has a rectangular socket, scorched from heat-softening, cut central to the beam and penetrating fully through it. The result is a robust, two-pronged tool hafted at a perpendicular angle (Fig. 8.75.5), which was almost certainly designed to function as a hoe, although it might have been used as a rake or pitchfork. A more common, though slightly different example that exploits the lower region of the antler, was found at Dragonby (Allason-Jones and Miket 1984, fig. 2.1); exact analogies are less common, but one found at Eggington in Bedfordshire (MacGregor 1985, fig. 95) is very similar.

A further (fragmentary) example of an object made from the beam of a red deer antler was found in early Romano-British ditch 300515. This small segment (Fig. 8.75.6) has been worked to a smooth surface finish and is most likely to derive from a tool handle, the central perforation a socket for the insertion of a tanged implement. While there are few published examples from Lincolnshire, comparable objects have been recorded within the broader region (e.g., Browning *et al.* 2021, 225; Greep 1998, fig. 121, 149).

Three additional pieces are minimally modified and presumably unfinished artefacts of unknown purpose, although each might fit one or more of the categories discussed above. These comprise fragments of cattle bone from late Romano-British ditch 300522, sheep tibia from early Romano-British pit 300053, and cattle long bone from late Romano-British pit 300245. Although these are difficult to identify, all are of an appropriate scale to be intended as pins. If indeed unfinished items, they indicate the local production of at least some artefacts of bone.

Walk Hill

Three refitting fragments of red deer antler from later Romano-British pit 800399 form an incomplete beam segment which has been sawn off immediately below the crown (Fig. 8.75.7). This object is of uncertain function but could be either the remnant of a decorative fitting or a tool handle. A small (5 mm diameter) hole on the surface presumably results from the insertion of a rivet.

Partney Leys

One of the best-preserved objects, recovered from Romano-British ditch 170152, is a finely worked antler weaving comb (Fig. 8.75.8), used to beat in the weft on the loom. This is a relatively squat implement with 13 short (7 mm), widely spaced teeth and a tapering handle with a perforation to allow suspension from a belt or rack. All surfaces retain a slight gloss and two of the teeth have notable grooves worn into them. In the assemblage from Danebury, Hampshire, these grooves, formed at the same point along the length of the teeth and orthogonal to the length of the comb, have been interpreted as the possible result of the implement being used on its side, at right angles to the weave, in a way analogous to a pin-beater (Sellwood 1984, 377).

Such objects, although more frequently made from animal bone, are relatively common during the Iron Age but become quite rare in Roman Britain (Greep 1998, 279). A similar example of Iron Age date was found at South Shields Roman fort (Allason-Jones and Miket, 1984, fig. 2.23), and analogous early Romano-British examples (though of bone) have been found in Leicester (Browning *et al.* 2021), Castleford (Greep 1998, fig. 122, 156), and at Binchester Roman fort (Bevan 2010, fig. 106, B74). This example is likely to be contemporary with the Romano-British activity at Partney Leys but the possibility that it is a residual Iron Age artefact cannot be entirely excluded.

Hagnaby Grange

Two items from Late Iron Age–early Romano-British ditch 400549 are short fragments of cattle long bones, minimally modified with regions of surface bevelling and acutely truncated ends (Figs 8.75.9–10). These could be intended pins or pin-beaters abandoned during manufacture, although they bear some resemblance to objects often interpreted as double-ended pegs (e.g., Crummy 1983, fig. 194). The attribution of date to these artefacts is intrinsically difficult but there seems no good reason to doubt their contemporaneity with the ditch in which they were found, particularly given the strength of other evidence for occupation in this area around the time of the conquest.

Six Hundreds Drove

A group of four artefacts collected from the southern part of the route include another 'metapodial tool', from earlier Romano-British pit 550380 (Fig. 8.75.11). This example, made from a sheep/goat metatarsal with a single perforation through the proximal articular surface and a pronounced surface gloss over much of the shaft, is well-paralleled among the type 4 tools from Dragonby (Taylor and May 1996, 353–7).

A piece recovered from a ditch containing large amounts of early Romano-British pottery (550538) may be another example of a pin-beater (Fig. 8.75.12). This is the central portion of a sheep/goat tibia shaft fragment with sufficient surviving to show a pronounced narrowing towards a presumed point and with a notable gloss across the entire surface. A ditch of middle Romano-British date (550529) date contained the distal portion of a horse metatarsal which has had the proximal end removed with a saw and a large (17 mm diameter) hole carved into the resultant surface (Fig. 8.75.13). A lump of heavily corroded iron remains in this perforation, clearly indicating that this is the handle for an iron tool. The shaft of the bone is highly polished from use, but the degree of smoothness noted is best explained as the result of additional shaping for ease of handling.

A small (75 mm long) fragment of cattle-sized long bone from a ditch of early or middle Romano-British date (550518) may be a 'point tool', a class of object interpreted in a number of ways (Fig. 8.75.14). This example has been worked to a rough tip at one end, and equally crudely rounded off at the other to produce what is perhaps best described as an awl.

Anglo-Saxon

Cheals Close

Two worked bone objects were collected, both from Anglo-Saxon features. One, from ditch 180625, is a fragment from the proximal end of a cattle-sized metatarsal with a perforation in the centre of the articular surface (Fig. 8.75.15). Although it survives in particularly poor condition, with little of the shaft remaining, it appears to be slightly tapered. This is probably another tool handle; the perforation seems likely to be intended for the insertion of a tanged metal implement.

Another metapodial tool was recovered from pit 180305 (Fig. 8.75.16). This example utilises an almost complete sheep/goat metatarsal and has two perforations, one on the proximal articular surface and a second, which is rather uncommonly positioned, through the anterior surface of the distal end of the shaft. No traces of gloss or additional modifications are evident, but its surface condition is particularly poor.

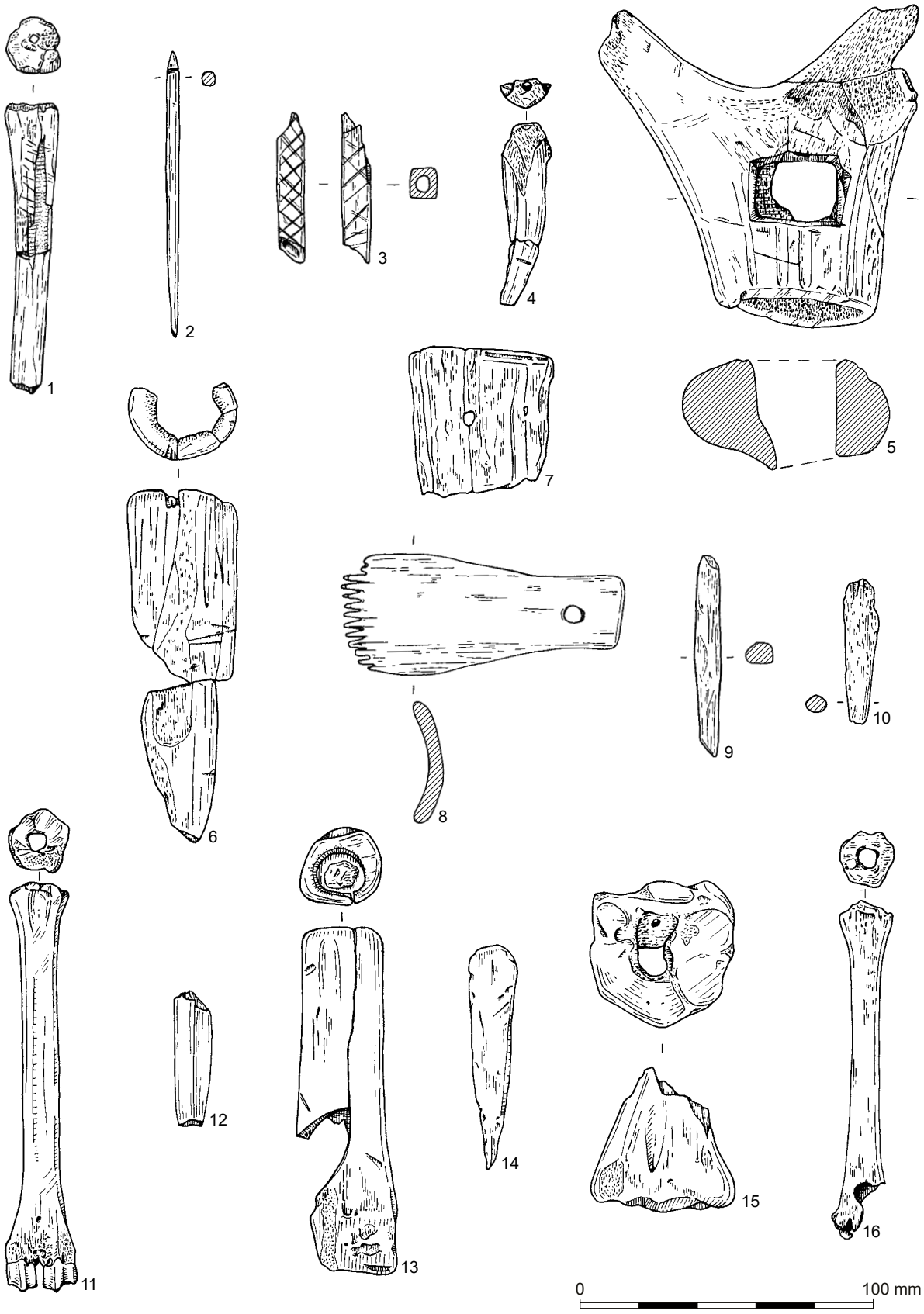


Figure 8.75 Worked bone

Discussion
The worked bone assemblage is small, poorly preserved and very thinly distributed along the route of the Interconnector. The only group of any size (nine pieces) derives from White Crofts, an area providing evidence for substantial Romano-British occupation. The material recovered here attests to activity including textile manufacture, agricultural work and general rural husbandry, but also includes the only examples of items of personal adornment. The composition of the assemblage is fairly typical of material found in small Romano-British rural settlements and is indicative of domestic, household-level activities that would have been practised by many members of the community. Several pieces are only broadly dated as Romano-British, but objects from the earlier and later parts of the period are represented.

The worked bone from all other areas is of essentially similar character, and most is also of Romano-British date. The antler comb from Partney Leys provides evidence for textile manufacturing; it was recovered from a ditch containing a lap dog burial radiocarbon dated to the Late Iron Age–early Romano-British period (SUERC-108719) and so may have been either a residual find or a somewhat late/unusual example. The two objects from Cheals Close are likely to be of Anglo-Saxon date.

Stone
Mark Stewart

The assemblage of worked/utilised stone comprises 34 pieces. All but one undiagnostic fragment from Anglo-Saxon grave 900196 at Callow Carr are either clearly, or very likely to be, of Late Iron Age or Romano-British date, and almost all fall into one of four major object types: querns, hones, processors (rubbers/pounders/hammers) and 'decorative' items.

Iron Age
A large piece of coarse sandstone with a dished, ground surface forming part of a probable saddle quern was found in Romano-British ditch 402000 at Ailby Lane. Such querns are rather rare beyond the earlier part of the Iron Age, and it is possible that this item is contemporary with the small amount of residual Iron Age/prehistoric pottery found alongside it, particularly given the potential for expedient use of the local sandstones.

A possible pounder or hammer formed from a very hard, indurated sandstone pebble fragment (possibly broken from use) with one flattish, abraded surface was recovered from Iron Age enclosure ditch 700300 at Sutterby Field. Tools such as these may have performed a number of tasks but could have been used to pound both organic and inorganic materials. This example would be ideal for use in flint knapping and may therefore be a residual earlier prehistoric find.

Two flat fragments of jet were recovered from ditch 310157 of possible Iron Age date at Staunch Farm. One retains sufficient edges to infer a polygonal shape and has an unfinished perforation on one side, and the other unshaped piece has two unaligned and similarly abandoned perforations. The purpose of these pieces is unclear, but they may have been intended as decorative items.

A fragment of partially burnt sandstone recovered from pond 550022 at Six Hundreds Drove has two surfaces worked to a polish and might be a further example of a saddle quern, but the lack of any surviving edges means this should remain a tentative identification. This may represent another, potentially residual, Iron Age example, although it was found dumped alongside several kilograms of middle Romano-British pottery and one of the Roman querns mentioned below.

Romano-British
A single artefact was collected from Sea Bank Farm at the northern limit of the

Interconnector route. This is a flake of shale from a perforated, domed object which may be part of an adapted lathe core; it was recovered from palaeochannel 200108, and alongside a sherd of Saxon pottery, but this is considered to be intrusive within a feature otherwise associated with middle Romano-British pottery. Although this is the only such object, it is possible that it indicates local shale-working somewhere beyond the limit of investigation.

A fist-sized pebble of cemented, quartz-rich sandstone with one flattish, heavily abraded surface was found in the topsoil at Ailby Lane and is another example of a simple pounder/hammer.

The largest group of worked stone was recovered from White Crofts and includes 10 Mayen lava stone rotary quern fragments found in late Romano-British ditch 300519. These are in poor condition with no refitting pieces, so it is unclear if they derive from a single or multiple object(s). Two objects classed as hones were recovered, both from Romano-British ditches. The first, found in ditch 300529, was formed from a small piece of indurated sandstone with smoothed, concave surfaces clearly indicative of such use, and the second (from ditch 300524) was a less clearly identified, hard, fine-grained, and naturally rounded cobble of black stone which, though possibly derived from local mud/siltstone, might be a glacial drop-stone originating some distance away. A further piece retains surfaces perhaps more indicative of use as a rubber. This is a fragment of cemented, quartz-rich sandstone which has two flattened, highly polished surfaces which was recovered from middle Romano-British ditch 300506. A subrectangular fragment of fine-grained, indurated sandstone from the same ditch (context 300153) shows areas of severe abrasion consistent with use as a pounder or hammer. One object, possibly a gaming counter (Fig. 8.76.1), was recovered from middle Romano-British ditch 301410. This is a flat, round piece of indurated sandstone (32 mm in diameter) which has small regions of surface polish surviving.

The only example of a hone to exhibit some evidence for having been shaped prior to use is a wedge-shaped piece of indurated sandstone from Romano-British ditch 530302 at Mown Rakes (Fig. 8.76.2). This has two very smooth surfaces, and a slightly waisted groove on one edge, possibly used for sharpening points.

Two small fragments (one retaining traces of the surface grooves) from a rotary quern made of Millstone Grit were found in pond 550022 and ditch 550518 at Six Hundreds Drove, both features also containing middle or late Romano-British pottery. Two other pieces probably from coarse sandstone rotary querns were recovered, one also from ditch 550518, and one from ditch 550520, again of middle or late Romano-British date. Although these are only small pieces, approximate measurements indicate that thickness ranges between 40 and 75 mm and diameters between 400 and 500 mm.

Anglo-Saxon

A small, broken fragment of stone (ON 141), weighing just 14 g, was collected from grave 900196 at Callow Carr. It shows some signs of having been deliberately shaped and would have functioned as a smoothing stone (see Schuster above; Fig. 6.81).

A group of five (four refitting), small fragments from a single Mayen lava quern stone were found in ditch 180619 at Cheals Close. Not enough of the edge of this object survives to estimate its diameter.

Discussion

The stone assemblage is small, often poorly preserved and rather thinly distributed along the length of the Interconnector. As with the worked bone, the largest group dates to the Romano-British period and was found at White Crofts, an area providing evidence for substantial occupation during this period. None of these objects are complete enough or sufficiently diagnostic to date accurately, but their ceramic associations suggest a middle–late Romano-British date. The material recovered here essentially relates to grain processing

and general rural husbandry and echoes the worked bone assemblage in being typical of household-level domestic activity in such rural settlements. The stone collected from the other areas is of similar character, although it also includes a small amount of jet and shale which may have been worked locally during the Iron Age and Romano-British periods.

Most of the raw material was available locally; this includes the sandstone, much of which appears very likely to derive from the Spilsby formation, and the shale and jet which derives from the Kimmeridge Clay. However, some is clearly imported from further afield. The Millstone Grit originates from Derbyshire 100 km west, and the Mayen lava stone derives from the Rhineland Palatinate area of Germany, a source utilised throughout the Romano-British and early medieval periods.

Ceramic Building Material

Mark Stewart

A small assemblage of ceramic building material (CBM) totalling 204 pieces was recovered. This material predominantly comprises small, frequently featureless fragments of brick and tile distributed at a low density along the route of the Interconnector. Chronologically, the assemblage is approximately evenly split between Roman, medieval/post-medieval and modern examples (the last not discussed here).

Romano-British

Much of this material (41 pieces) consists of small fragments from the smaller, thinner brick types (*bessales*, *pedalis* and *lydion*) along with several forms of tile.

A total of six pieces of brick, three fragments from box-flue tiles (*tubulus*), three pieces from *tegula* roof tiles and four featureless fragments were recovered from the middle–late Romano-British ditches and pits at Sea Bank Farm, White Crofts and Ailby Lane, all in Zone 1.

Three pieces of brick, seven featureless fragments and a piece of *tegula* were collected from the ditches and pits at Walk Hill, Cheals Close and Raithby Lane in Zone 2. The *tegula* fragment from ditch 380260 at Raithby Lane has an unusual triangular flange (Fig. 8.76.3) The abraded condition of four additional fragments (one flat – trackway 900050 – and three featureless pieces from the fills of grave 900067 and pit 900158) from Callow Carr indicates that all are residual in the contexts in which they occur.

Seven pieces of brick, three pieces of *tegula* and an unidentified flat fragment in a typically Romano-British fabric were found in features of various dates at Mown Rakes and Six Hundreds Drove in the Fens of Zone 3. One *tegula* fragment from ditch 520147 retains its lower cutaway, in this instance indicative of a mid-2nd to mid-3rd-centuryAD date (Warry 2006, fig. 1.3, type C56).

Medieval/post-medieval

This material (45 pieces) consists largely of brick fragments and roof tiles, although several probable paving bricks are also included. The roof tiles are difficult to date with certainty as their fabric and form remains essentially unchanged from the 12th to the 20th centuries.

Six evaluation trenches in Zone 2 produced eleven roof tile fragments and nine pieces of brick, most collected from the topsoil. Seven further roof tiles and seven brick fragments were recovered from sparsely distributed features of almost certain post-medieval date between Callow Carr and Back Lane in Zone 2. Also included among the finds from this area are three possible paving brick fragments which appear to have been re-used to help form field drains. A single piece of probable post-medieval roof tile was found as a residual object in a modern ditch at Mown Rakes in Zone 3.

Discussion

The assemblage is small, fragmentary and widely dispersed. There are no instances in which its occurrence appears to correlate with other evidence for buildings of any period in the close vicinity. This indicates that its presence almost certainly results from its importation in already-fragmentary form for use as, for example, hardcore, paving or drain construction, or accidental incorporation into the domestic refuse often used as manure.

Glass

Mark Stewart

Excluding pieces from funerary contexts (see Schuster above), only a small (115 pieces), thinly distributed glass assemblage was recovered. Most dates to the post-medieval or modern periods but some Romano-British and Anglo-Saxon material is also present. Some window glass and two glass beads were identified, but most pieces are from vessels which, after accounting for refitting fragments, represent no more than 30 individual objects.

Single, small fragments of cast, pale blue-green window glass of 1st to 3rd-century AD type were found in pit 200059 and palaeochannel 200200 at Sea Bank Farm. Both features also contained middle Roman pottery.

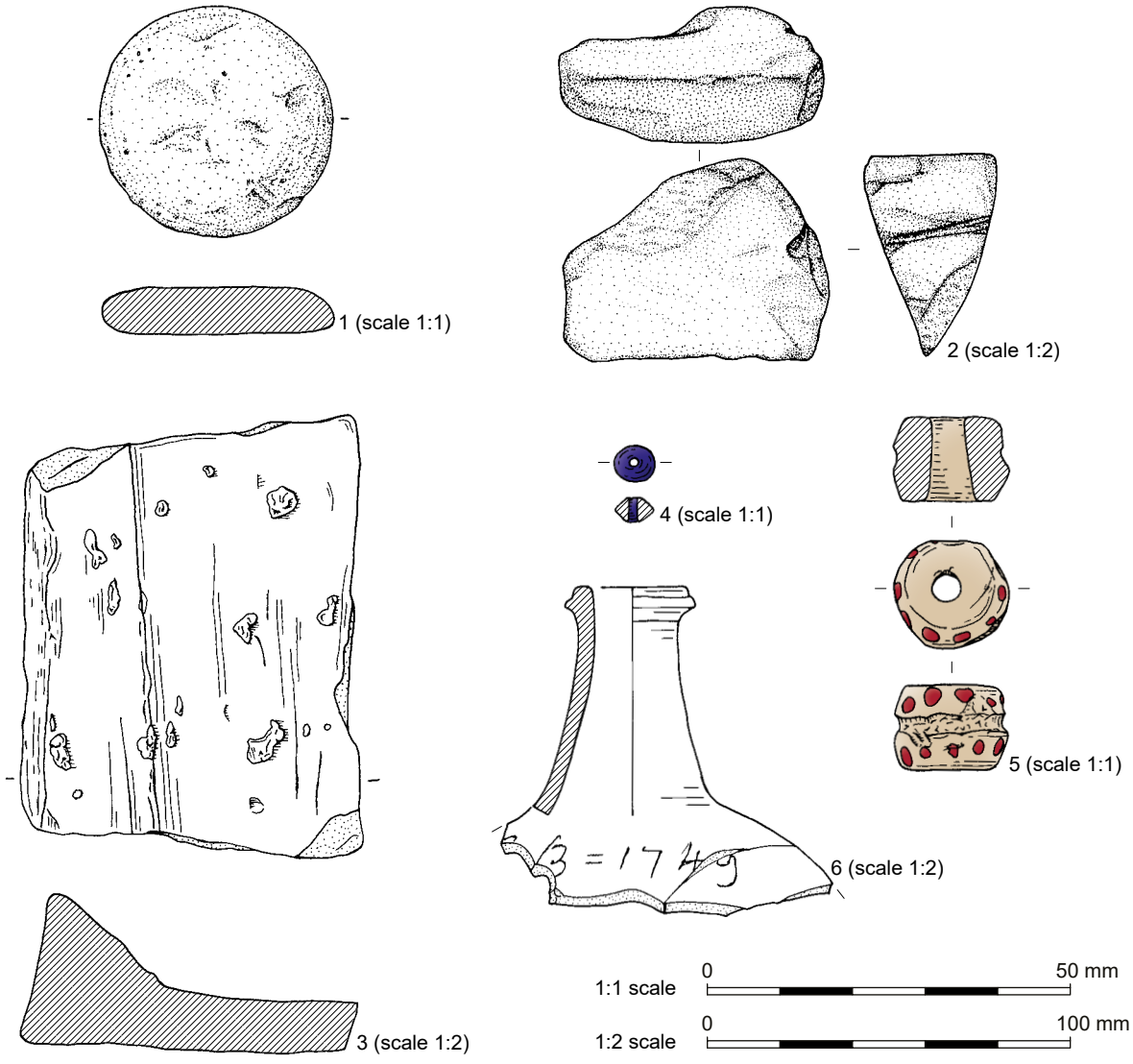


Figure 8.76 Miscellaneous stone, CBM and glass finds

Four pieces were found at White Crofts; these consist of a colourless, fire-rounded rim fragment from a 2nd–3rd-century AD cylindrical cup (Price and Cottam 1998, 99–101) from ditch 300506; a fragment from a mid-1st to late 2nd-century AD blue-green square bottle (*ibid*. 195) found residually in late Romano-British ditch 300523; and two small scraps from late Romano-British ditches 300522 and 301400.

In Zone 2, a small fragment, possibly part of the vertical or diagonal base ring from a brown glass vessel, was found in curvilinear gully 400554 at Hagnaby Grange, and a piece of yellow glass from a thin-walled but otherwise unidentified vessel form came from ditch 300153 at Magers Lane.

Four fragments from Six Hundreds Drove comprise two pale green fragments from an unidentified form, a piece from a blue-green chain handle from a jug or bottle found in pond 550022, and a piece from a square, blue-green bottle from ditch 550518.

Two glass beads provide the only evidence of personal adornment among the glass objects. One of these, a dark blue example of a biconical form (Fig. 8.76.4) found in a ditch at Zone 2 Area 21, is typical of the Roman period (Guido 1978, 97, figs 37.12 and 37.13). Its small diameter (5 mm) strongly implies a late Romano-British date, consistent with the pottery found in association with it.

The second example was found in the topsoil of trench 322 near Raithby Crossroads. This is an off-white, cylindrical example with circumferential rows of red marvered dots separated by a shallow channel which presumably also once held a trail of colour (Fig. 8.76.5). This object is of a type popular in the late 6th to mid-7th centuries AD. It is closely paralleled by an example from Faversham (Sue Heaser, pers. comm.).

Almost all of the glass attributed to the post-medieval and modern periods derives from vessels, mostly bottles. Details are available in the archive, with one small but unusual group meriting mention here.

Sixteen fragments of green glass derived from four wine bottles of the same date were recovered from ditch 600250 at North Ing. Among these are 10 refitting pieces from the neck and rim of a late 17th/early 18th-century 'onion' bottle; one piece has '] B = 1749' scratched onto the surface (Fig. 8.76.6). This is a very unusual feature and of obscure purpose; in fact, it seems to represent a unique example for vessels of this form (Nigel Jeffries, pers. comm). It would perhaps appear to refer to a date, but if so, it would post-date its manufacture, and implies a period of curation and re-use.

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Appendix A
Gazetteer of Minor Sites

Details of the remains uncovered at the following sites are obtainable from the post-excavation assessments (Wessex Archaeology 2023a–b), which have been uploaded to the Archaeology Data Service, or from the project archive, which has been deposited with Lincoln Museum under accession number LCNCC:2019.168 and site code VIK19.

Table A.1 Minor Sites

Site name	*Civil parish*	*NGR*	*Summary of remains and dating*
TWB1	Mablethorpe and Sutton	553274, 379807	Blank
ID1 Sandilands	Sandilands	552152, 379255	Blank
TWB2	Mablethorpe and Sutton	551829, 379225	Blank
TWB4	Beesby with Saleby	547967, 378236	Blank
TWB5	Beesby with Saleby	545914, 378058	Blank
ID4 East	Rigsby with Ailby	543754, 377253	Undated ditch and two pits
Area 36	Langton by Spilsby	540049, 369581	Undated features
Area 33	Langton by Spilsby	539685, 369270	Undated ditches and pits
Area 19	Sausthorpe	539096, 368798	Pit with struck flint, undated features
Area 20	Sausthorpe	538649, 368552	Medieval and undated features
Area 21	Raithby	537770, 368444	Furrow, prehistoric pit, ditches and gullies of Romano-British and uncertain date
Area 11	Raithby	537153, 366477	Furrows
Area 24	West Keal	537446, 365404	Undated ditch
Area 25	East Keal	537478, 364969	Furrows and undated postholes
Area 26	East Keal	537456, 364667	Furrow and undated gully
Area 28/34	East Keal	536948, 362434	Various linear and discrete features, small assemblage of often redeposited prehistoric/ Iron Age, medieval and post-medieval artefacts
Area 29	East Keal	536294, 362097	Furrows and prehistoric or Romano-British features
Area 50	Holland Fen with Brotherford	525085, 349184	Post-medieval/modern ditches
Area 51	Amber Hill	521820, 346131	Post-medieval/modern ditches
Area 57	Little Hale	518698, 340112	Post-medieval/modern and undated linear features
Area 58	Little Hale	518578, 339988	Modern ditches

Appendix B
Summary of Iron Age–Romano-British Pottery Fabrics and Forms

This appendix provides a quantified summary of all the Iron Age and Roman pottery fabrics and forms from the Interconnector; please consult the assessment texts for summaries of this data on a site-by-site basis (Rowlandson and Fiske 2023a and 2023b).

Table B.1 Summary of Iron Age–Romano-British pottery fabrics

Fabric code	*Fabric group*	*Fabric details*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
SAM	Samian	Undifferentiated	3	0.03%	13	0.01%	0
SAM?	Samian	Undifferentiated	2	0.02%	24	0.01%	7
SAMCG	Samian	Central Gaulish	115	1.06%	1812	0.91%	439
SAMCG?	Samian	Central Gaulish	1	0.01%	28	0.01%	17
SAMEG	Samian	East Gaulish	9	0.08%	103	0.05%	48
SAMLM	Samian	Les-Martres-de-Veyre	8	0.07%	60	0.03%	28
SAMSG	Samian	South Gaulish	19	0.17%	165	0.08%	65
AMPH	Amphora	Miscellaneous amphorae	3	0.03%	108	0.05%	0
DR20	Amphora	Dr 20 amphorae	29	0.27%	3476	1.74%	17
GAU	Amphora	Undifferentiated Gaulish amphorae	3	0.03%	36	0.02%	0
MOLIN?	Mortaria	Lincoln mortaria	1	0.01%	353	0.18%	39
MOMH1	Mortaria	Mancetter-Hartshill mortaria: As Leicester MO12	1	0.01%	80	0.04%	15
MOMH2	Mortaria	Mancetter-Hartshill mortaria: Meta sediment trits; Leicester fabric MO4	13	0.12%	1376	0.69%	86
MOMH3	Mortaria	Mancetter-Hartshill mortaria: Meta sediment trits; Sandy white fabric Leicester MO19	16	0.15%	1360	0.68%	80
MONV	Mortaria	Nene Valley mortaria	1	0.01%	46	0.02%	0
MORT	Mortaria	Mortaria; undifferentiated	4	0.04%	278	0.14%	12
MOSP	Mortaria	Swanpool mortaria	3	0.03%	124	0.06%	10
MOSPT	Mortaria	Swanpool type	14	0.13%	259	0.13%	27
MOUNV	Mortarium	Light fired Upper Nene Valley	2	0.02%	31	0.02%	4
MOVR	Mortaria	Verulamium region mortaria	9	0.08%	178	0.09%	2
MOVR?	Mortaria	Verulamium region mortaria	3	0.03%	41	0.02%	0
GBWW	Import	Gallo-Belgic white wares	4	0.04%	24	0.01%	25
GBWW?	Import	Gallo-Belgic white wares	3	0.03%	9	0.00%	0
GFIN	Fine	Miscellaneous fine grey wares	87	0.80%	764	0.38%	116
LOND	Fine	London wares	1	0.01%	3	0.00%	0
MOSL	Import	Rhenish; from Trier	4	0.04%	3	0.00%	0
PART	Fine	Parisian type wares	47	0.43%	293	0.15%	24
TR	Import	Terra rubra	25	0.23%	57	0.03%	2
CC1	Fine	Colour-coated fabric 1	150	1.38%	1198	0.60%	308

Fabric code	*Fabric group*	*Fabric details*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
CC1?	Fine	Colour-coated fabric 1	1	0.01%	16	0.01%	0
CC2	Fine	Dark colour-coat and red fabric – late Roman fabric	1	0.01%	2	0.00%	0
CC3	Fine	Colour-coated with a pale orange fabric	3	0.03%	28	0.01%	0
NVGCC	Fine	Nene Valley grey colour-coated ware	5	0.05%	103	0.05%	15
NVMIC	Fine	Nene Valley colour-coated with mica overslip	5	0.05%	228	0.11%	62
SPCC	Fine	Swanpool colour-coated	2	0.02%	33	0.02%	11
SPOXT	Oxidised	Swanpool-type oxidised wares	6	0.06%	362	0.18%	42
BWHGR	Oxidised	Northamptonshire type 'burnt' grog-gritted white ware	4	0.04%	47	0.02%	5
BWHSY	Oxidised	Burnt sandy white ware	1	0.01%	8	0.00%	0
CR	Oxidised	Roman cream wares (various)	170	1.56%	1583	0.79%	320
CR?	Oxidised	Roman cream wares	20	0.18%	463	0.23%	98
CR1	Oxidised	Cream ware: Site fabric 1	4	0.04%	312	0.16%	0
MICA	Oxidised	Mica-dusted	3	0.03%	31	0.02%	27
OX	Oxidised	Misc. oxidised wares	100	0.92%	1082	0.54%	94
OX?	Oxidised	Misc. oxidised wares	55	0.51%	303	0.15%	22
OXC	Oxidised	Coarse oxidised	1	0.01%	36	0.02%	0
OXFIN	Oxidised	Fine oxidised fabric	13	0.12%	200	0.10%	36
OXL	Oxidised	Light oxidised fabrics	8	0.07%	94	0.05%	0
OXL?	Oxidised	Light oxidised fabrics	1	0.01%	3	0.00%	0
OXWS	Oxidised	Oxidised with white slip	2	0.02%	3	0.00%	2
PARC	Oxidised	Parchment; cream painted red; unknown source/s	5	0.05%	84	0.04%	14
PINK	Oxidised	Pink micaceous flagons etc. Lincoln	1	0.01%	54	0.03%	0
VRW?	Oxidised	Verulamium region white ware	3	0.03%	22	0.01%	3
BB1	Reduced	Black burnished 1, unspecified	36	0.33%	383	0.19%	76
BB2	Reduced	Black burnished 2	30	0.28%	372	0.19%	103
BB2?	Reduced	Black burnished 2	3	0.03%	11	0.01%	0
BBT	Reduced	Black Burnished-type copies	31	0.28%	626	0.31%	120
DSSA	Reduced	Early–mid Roman sandy ware	320	2.94%	4091	2.05%	496
DSSA?	Reduced	Early–mid Roman sandy ware	16	0.15%	215	0.11%	53
GREY	Reduced	Miscellaneous grey wares	4429	40.69%	87839	44.00%	8505
GREY?	Reduced	Miscellaneous grey wares	125	1.15%	1279	0.64%	112
GREYB	Reduced	High fired late Roman greywares	244	2.24%	5532	2.77%	309
GREYC	Reduced	Coarse Greyware	133	1.22%	3067	1.54%	345
GREYS	Reduced	Misc grey ware fabrics with rare shell	2	0.02%	17	0.01%	0
GROG	Reduced	Grog-tempered wares	211	1.94%	6375	3.19%	309
GROL	Reduced	Grey sand-tempered with calcareous ooliths	3	0.03%	51	0.03%	7
IAGR	Reduced	Native tradition/transitional gritty wares	19	0.17%	313	0.16%	13
IAGR?	Reduced	Native tradition/transitional gritty wares	5	0.05%	57	0.03%	13
IAGR1	Reduced	Iron Age tradition 'Gritty': Site fabric 1	307	2.82%	9144	4.58%	479

Fabric code	*Fabric group*	*Fabric details*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
IAGR2	Reduced	Iron Age tradition 'Gritty': Site fabric 2	397	3.65%	10111	5.06%	359
IAGR3	Reduced	Iron Age tradition 'Gritty': Site fabric 3	42	0.39%	638	0.32%	56
IAGR4	Reduced	Iron Age tradition 'Gritty': Site fabric 4	68	0.62%	2977	1.49%	234
IASA	Reduced	IA-type sandy wares	27	0.25%	160	0.08%	11
IASA?	Reduced	IA-type sandy wares	26	0.24%	389	0.19%	43
IASA1	Reduced	Iron Age Sandy: Site Fabric 1	298	2.74%	3889	1.95%	103
IASA2	Reduced	Iron Age Sandy: Site Fabric 2	126	1.16%	1594	0.80%	113
LEG	Reduced	Lincoln 'Legionary'-type cream/light grey	1	0.01%	18	0.01%	0
NARR?	Reduced	Nar Valley wares – reduced	1	0.01%	27	0.01%	0
NELGR	Reduced	North East Lincolnshire Early Roman wheel-made 1	8	0.07%	332	0.17%	18
NVGW	Reduced	Nene Valley grey ware	160	1.47%	4161	2.08%	390
NVGW?	Reduced	Nene Valley grey ware	7	0.06%	91	0.05%	21
NVGWC	Reduced	Nene Valley grey ware coarse sandier	63	0.58%	1881	0.94%	162
NVGY	Reduced	Earlier Nene Valle grey ware – Precious 2001	38	0.35%	766	0.38%	81
SLGY	Reduced	Early South Lincs grey ware – Precious 2001	7	0.06%	50	0.03%	0
CALC	Calcareous	Misc. calcareous	1	0.01%	22	0.01%	7
CALG	Calcareous	Calcite tempered	1	0.01%	69	0.03%	13
DWNEL	Calcareous	Dales ware – North East Lincolnshire	3	0.03%	26	0.01%	6
DWSHT	Calcareous	Dales ware type	427	3.92%	5266	2.64%	550
DWSHT?	Calcareous	Dales ware type	1	0.01%	85	0.04%	10
IALIM	Calcareous	Iron Age limestone-tempered	4	0.04%	74	0.04%	0
IASH	Calcareous	Native tradition shell-tempered	5	0.05%	26	0.01%	0
IASH?	Calcareous	Native tradition shell-tempered	3	0.03%	30	0.02%	0
IASH1	Calcareous	Iron Age Shell-Gritted: Site Fabric 1	428	3.93%	6171	3.09%	280
IASH2	Calcareous	Iron Age Shell-Gritted: Site Fabric 2	45	0.41%	545	0.27%	135
IASH3	Calcareous	Iron Age Shell-Gritted; Site Fabric 3	10	0.09%	117	0.06%	29
IASH5	Calcareous	Iron Age Shell-Gritted; Site Fabric 5	31	0.28%	183	0.09%	44
IASH6	Calcareous	Iron Age Shell-Gritted: Site Fabric 6	36	0.33%	221	0.11%	2
IASH7	Calcareous	Iron Age Shell-Gritted: Site Fabric 7	38	0.35%	587	0.29%	36
LRLS	Calcareous	Lincolnshire Late Roman Shell-gritted wheel-made	61	0.56%	2085	1.04%	154
SHEL	Calcareous	Miscellaneous undifferentiated shell-tempered	296	2.72%	5006	2.51%	143
SHEL?	Calcareous	Shell-gritted	5	0.05%	80	0.04%	0
SLSHB	Calcareous	Bourne shell-gritted	399	3.67%	9235	4.63%	797
ETW	Rock temper	Erratic pebbles broken up as temper	2	0.02%	15	0.01%	0
ETW?	Rock temper	Erratic pebbles broken up as temper	1	0.01%	8	0.00%	0
ETW2	Rock temper	Erratic pebbles broken up as temper	5	0.05%	48	0.02%	0
ETW4	Rock temper	Erratic pebbles broken up as temper, finer than ETW2	3	0.03%	117	0.06%	24
IAGROG	Grog	Iron Age grog-tempered wares	76	0.70%	693	0.35%	51
IAGROG1	Grog	Iron Age grog-gritted wares – Site fabric 1	3	0.03%	15	0.01%	0

Fabric code	*Fabric group*	*Fabric details*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
IAGROG2	Grog	Iron Age grog-gritted wares – Site fabric 2	14	0.13%	245	0.12%	32
IASST	Rock tempered	Sandstone- and grit-tempered	2	0.02%	84	0.04%	8
CP	Prehistoric?	Clay pellets	61	0.56%	377	0.19%	2
CPIV	Prehistoric?	Clay pellets with indeterminate voids	66	0.61%	387	0.19%	19
FL	Prehistoric?	Flint	13	0.12%	99	0.05%	0
IV	Prehistoric?	Indeterminate voids	160	1.47%	680	0.34%	14
LI	Prehistoric?	Limestone including oolitic	9	0.08%	16	0.01%	0
QU	Prehistoric?	Quartz-gritted	183	1.68%	1286	0.64%	25
QUFL	Prehistoric?	Quartz- and flint-gritted	1	0.01%	14	0.01%	0
QUIV	Prehistoric?	Quartz-gritted with voids	118	1.08%	642	0.32%	17
RO	Prehistoric?	Misc. rock-gritted	1	0.01%	16	0.01%	0
SH	Prehistoric?	Fossil shell-gritted, date uncertain	15	0.14%	89	0.04%	8
MISC	Misc	Misc. uncategorised	117	1.09%	754	0.37%	8
FCLAY	Fired Clay	Fired clay	34	0.31%	177	0.09%	0
FCLAY?	Fired Clay	Fired clay	27	0.25%	181	0.09%	0
CBM?	CBM	Ceramic building material	2	0.02%	14	0.01%	0

Table B.2 Summary of Iron Age–Romano-British pottery forms

Form	*Form type*	*Form description*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
A	Amphora	Unclassified form	35	0.32%	3620	1.81%	17
BK	Beaker	Unclassified form	67	0.62%	233	0.12%	2
BK?	Beaker	Unclassified form	7	0.06%	11	0.01%	0
BK120	Beaker	Necked jar/beaker as D&P corpus (Darling and Precious 2014) No. 1076–1086	20	0.18%	645	0.32%	81
BKBAG	Beaker	Baggy	8	0.07%	111	0.06%	4
BKBB	Beaker	Butt beaker	5	0.05%	28	0.01%	25
BKBR	Beaker	Bead rim	3	0.03%	32	0.02%	32
BKC120	Beaker	Sharp carination as CAM120	8	0.07%	164	0.08%	0
BKCAR	Beaker	Carinated	1	0.01%	10	0.01%	0
BKCOR	Beaker	Cornice rim	26	0.24%	144	0.07%	167
BKCUR	Beaker	Curve-rimmed form	26	0.24%	257	0.13%	100
BKEV	Beaker	Everted rim	49	0.45%	350	0.18%	288
BKFN	Beaker	Funnel necked; form unknown	2	0.02%	6	0.00%	19
BKFO	Beaker	Folded; indeterminate type	7	0.06%	63	0.03%	0
BKFOC	Beaker	Folded; with curved rim	10	0.09%	79	0.04%	34
BKFOS	Beaker	Folded scaled beaker	3	0.03%	7	0.00%	0
BKNK	Beaker	Necked	34	0.31%	186	0.09%	35
BKPH	Beaker	Poppy-head beaker	29	0.27%	153	0.08%	20
BKRC	Beaker	Roughcast	18	0.17%	94	0.05%	0
36	Bowl	Samian form – see Webster 1996	6	0.06%	90	0.05%	14

Form	*Form type*	*Form description*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
37	Bowl	Samian form – see Webster 1996	9	0.08%	102	0.05%	10
38	Bowl	Samian form – see Webster 1996	13	0.12%	351	0.18%	38
B	Bowl	Unclassified form	34	0.31%	853	0.43%	89
B?	Bowl	Unclassified form	1	0.01%	9	0.00%	0
B31	Bowl	Imitation samian form 31	7	0.06%	264	0.13%	79
B318	Bowl	Flared rim as Petch 1960 fig.7.23	8	0.07%	189	0.09%	58
B321V	Bowl	As Coppack 1973 fig. 5.11	2	0.02%	116	0.06%	26
B333	Bowl	Bifid rim as Gillam 301	1	0.01%	124	0.06%	14
B334	Bowl	Carinated jar/bowl (flat cordon as D&P 1157–9)	96	0.88%	1684	0.84%	321
B36	Bowl	Copy of Samian form 36	4	0.04%	265	0.13%	63
B37	Bowl	Hemispherical possibly imitating samian 37	27	0.25%	317	0.16%	33
B38	Bowl	Imitation samian 38	5	0.05%	175	0.09%	25
BBN3	Bowl	Bourne type with single grooved rim as Samuels 1983 fig. 214.61–3	13	0.12%	556	0.28%	87
BCAR	Bowl	Carinated	31	0.28%	503	0.25%	41
BCOR	Bowl	Cordoned	6	0.06%	313	0.16%	38
BEV	Bowl	Everted rim	33	0.30%	499	0.25%	65
BEX	Bowl	Expanded rim	3	0.03%	359	0.18%	29
BFB	Bowl	Bead and flange bowl	15	0.14%	538	0.27%	130
BFL	Bowl	Flange rimmed (e.g. Gillam 1970 Types 218–220)	139	1.28%	4781	2.39%	1048
BG225	Bowl	Rounded as Gillam 1970 No. 225	21	0.19%	406	0.20%	118
BGR	Bowl	With grooved rim	6	0.06%	204	0.10%	64
BIBF	Bowl	In-turned bead and flange Swanpool D13-23	20	0.18%	525	0.26%	68
BIBF?	Bowl	In-turned bead and flange Swanpool D13-23	3	0.03%	72	0.04%	17
BNK	Bowl	Necked	42	0.39%	682	0.34%	75
BPR	Bowl	Plain rimmed	7	0.06%	216	0.11%	44
BR12	Bowl	Imitation samian Ritterling 12	1	0.01%	18	0.01%	12
BREEDV	Bowl	Reeded rim variant	1	0.01%	134	0.07%	21
BSEG	Bowl	Segmental Gillam 294–5	10	0.09%	262	0.13%	64
BTR	Bowl	Triangular rimmed (e.g. Gillam 1970 Types 222–3)	18	0.17%	348	0.17%	135
BFB412	Bowl – large	Bead and flange – large as Darling 1999 fig. 36.369	12	0.11%	1751	0.88%	75
BFLL	Bowl – large	Flange rimmed	6	0.06%	392	0.20%	57
BHER	Bowl – large	Hooked everted rim (Rigby & Stead 1976 fig. 64.4)	1	0.01%	54	0.03%	4
BL	Bowl – large	Large	44	0.40%	3698	1.85%	118
BNAT	Bowl – large	Native tradition bowl e.g. D&P No. 700	76	0.70%	2994	1.50%	301
BNN	Bowl – large	Large bowl with no neck	1	0.01%	125	0.06%	17
BNNK	Bowl – large	Large bowl with no neck	23	0.21%	2331	1.17%	208
BWM	Bowl – large	Wide-mouthed; D&P No. 1225–30	43	0.40%	1674	0.84%	252
BWM1	Bowl – large	Wide-mouthed; D&P No.1225–7	78	0.72%	3844	1.93%	535
BWM2	Bowl – large	Wide-mouthed; D&P No. 1228	11	0.10%	810	0.41%	128

Form	*Form type*	*Form description*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
BWM3	Bowl – large	Wide-mouthed; D&P No. 1229–30	67	0.62%	2267	1.14%	193
18/31-31	Bowl/dish	Samian form – see Webster 1996	10	0.09%	92	0.05%	11
18/31-31R	Bowl/dish	Samian form – see Webster 1996	1	0.01%	1	0.00%	0
BD	Bowl/dish	-	134	1.23%	3608	1.81%	72
BD?	Bowl/dish	-	1	0.01%	15	0.01%	0
BDPR	Bowl/dish	Plain rim	4	0.04%	45	0.02%	15
CLSD	Closed	Form	1398	12.84%	28041	14.05%	10
27	Cup	Samian form – see Webster 1996	5	0.05%	35	0.02%	41
33	Cup	Samian form – see Webster 1996	34	0.31%	473	0.24%	255
C	Cup	Unclassified form	3	0.03%	45	0.02%	16
CHEM	Cup	Hemispherical as Rhenish G210 etc.	4	0.04%	92	0.05%	34
18/31	Dish	Samian form – see Webster 1996	9	0.08%	178	0.09%	40
18/31R	Dish	Samian form – see Webster 1996	11	0.10%	279	0.14%	17
31	Dish	Samian form – see Webster 1996	11	0.10%	350	0.18%	104
31R	Dish	Samian form – see Webster 1996	1	0.01%	10	0.01%	0
79R	Dish	Samian form – see Webster 1996	1	0.01%	8	0.00%	0
D	Dish	Unclassified form	12	0.11%	421	0.21%	123
D452	Dish	as Gillam 337 GB Cam 16 copy	21	0.19%	563	0.28%	132
D452V	Dish	In-turned bead rim	2	0.02%	44	0.02%	12
DGR	Dish	Grooved rim	23	0.21%	784	0.39%	232
DPR	Dish	Plain rim	35	0.32%	1345	0.67%	309
F	Flagon	Unclassified form	42	0.39%	353	0.18%	0
F?	Flagon	Unclassified form	10	0.09%	367	0.18%	0
FR	Flagon	Ringed	18	0.17%	81	0.04%	17
FTR11	Flagon	Top-rimmed (as Webster 1949 fig. 13.64)	4	0.04%	196	0.10%	253
FJ	Flagon/jar	Unclassified form	34	0.31%	545	0.27%	0
JUG	Flagon/jug	Pinched neck	13	0.12%	365	0.18%	92
CPN	Jar	Native tradition	56	0.51%	1560	0.78%	330
CPN140	Jar	Native tradition – Darling and Jones 1988 fig. 7.55	4	0.04%	277	0.14%	34
CPN141	Jar	Native tradition – Darling and Jones 1988 fig. 7.53	3	0.03%	222	0.11%	15
CPN67	Jar	Native as D&P 2014 No. 721	1	0.01%	135	0.07%	14
J	Jar	Unclassified form	464	4.26%	8871	4.44%	1132
J?	Jar	Unclassified form	16	0.15%	262	0.13%	35
J105	Jar	Lid-seated; as Rigby and Stead 1976 Roxby form A	77	0.71%	1181	0.59%	249
J107	Jar	Lid-seated as Coppack 1973 fig. 7.48	29	0.27%	172	0.09%	32
J162	Jar	Narrow-necked; as D&P 968	3	0.03%	57	0.03%	53
JBIF	Jar	Bifurcated rim	6	0.06%	269	0.13%	53
JBN3	Jar	Bourne type jar no. 3; Bolton 1968 fig. 1.1	183	1.68%	5613	2.81%	711
JBR	Jar	Bead rimmed	19	0.17%	266	0.13%	105
JCH	Jar	Channel rim – Iron Age type	9	0.08%	123	0.06%	65

Form	*Form type*	*Form description*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
JCOR	Jar	Cordoned	26	0.24%	503	0.25%	145
JCR	Jar	Collared rim as Swanpool type C40-1	13	0.12%	837	0.42%	160
JCUR	Jar	Curved	13	0.12%	207	0.10%	100
JCYL	Jar	Cylindrical	2	0.02%	72	0.04%	7
JDLS	Jar	Double lid-seated	40	0.37%	1633	0.82%	139
JDW	Jar	Dales ware	1	0.01%	82	0.04%	14
JDW1	Jar	Dales ware, as Gillam 157	82	0.75%	1099	0.55%	422
JDW2	Jar	Dales ware, as Monaghan JD2 form (Monaghan 1997)	40	0.37%	1104	0.55%	328
JEB	Jar	External bevel	1	0.01%	5	0.00%	4
JEV	Jar	Everted rim	160	1.47%	2909	1.46%	752
JEVC	Jar	Everted rim- curved as Gillam type 135	71	0.65%	1130	0.57%	341
JH	Jar	Handled	8	0.07%	324	0.16%	0
JHER	Jar	Hooked everted rim (Rigby and Stead 1976 fig. 64.4)	5	0.05%	128	0.06%	40
JHUN	Jar	Huntcliff	6	0.06%	317	0.16%	68
JIR	Jar	In-turned rim	29	0.27%	584	0.29%	98
JL	Jar	Large	175	1.61%	12238	6.13%	171
JLH	Jar	Lug-handled	92	0.85%	2338	1.17%	220
JLS	Jar	Lid-seated	30	0.28%	838	0.42%	188
JNK	Jar	Necked	164	1.51%	2673	1.34%	878
JNN	Jar	Narrow-necked	82	0.75%	1896	0.95%	608
JRUST	Jar	Rusticated	72	0.66%	684	0.34%	25
JS	Jar	Storage	28	0.26%	3966	1.99%	37
JS52	Jar	Storage (form as Webster 1949 fig.12.48)	34	0.31%	1299	0.65%	38
JSCHR	Jar	Storage jar as Darling 2009 fig. 46.4 with rounded rim & int. channel	13	0.12%	256	0.13%	6
JUP	Jar	Upright rim	1	0.01%	13	0.01%	6
JUR	Jar	Undercut rim	1	0.01%	20	0.01%	6
JWM	Jar	Wide-mouthed as RPNV 3-5	29	0.27%	903	0.45%	46
JBK	Jar/beaker	Small jar or beaker	16	0.15%	253	0.13%	30
JBKCAR	Jar/beaker	Carinated	3	0.03%	75	0.04%	19
JBKEV	Jar/beaker	Everted rim	4	0.04%	31	0.02%	35
JBKFO	Jar/beaker	Folded; indeterminate type	17	0.16%	131	0.07%	0
JBKNK	Jar/beaker	Necked	26	0.24%	185	0.09%	189
JB	Jar/bowl	Unclassified form	133	1.22%	2436	1.22%	407
JBCAR	Jar/bowl	Carinated	12	0.11%	126	0.06%	11
JBEV	Jar/bowl	Everted rim	2	0.02%	134	0.07%	18
JBL	Jar/bowl	Large	268	2.46%	11814	5.92%	149
JBNAT	Jar/bowl	Native tradition	12	0.11%	971	0.49%	47
JBNK	Jar/bowl	Necked	121	1.11%	1893	0.95%	408
L	Lid	Unclassified form	16	0.15%	513	0.26%	142

Form	*Form type*	*Form description*	*Sherd*	*Sherd %*	*Weight (g)*	*Weight %*	*Total RE %*
LTR	Lid	Lid triangular rim	4	0.04%	110	0.06%	18
LD	Lid/dish	Unclassified	7	0.06%	138	0.07%	34
BX	Misc.	Castor box	5	0.05%	27	0.01%	11
CHP	Misc.	Cheese press	4	0.04%	184	0.09%	13
CRUC	Misc.	Crucible	5	0.05%	23	0.01%	2
JM	Misc.	Miniature jar form	1	0.01%	82	0.04%	24
ST	Misc.	Strainer	6	0.06%	58	0.03%	27
M	Mortaria	Unclassified form	18	0.17%	606	0.30%	0
MBF	Mortaria	Bead-and-flange rimmed	5	0.05%	135	0.07%	20
MFL	Mortaria	Flange rimmed as Gillam 246	3	0.03%	87	0.04%	12
MHH	Mortaria	Hammerheads as Gillam 279–84	3	0.03%	599	0.30%	37
MHK	Mortaria	Hook-rimmed as Gillam 237–45	26	0.24%	2139	1.07%	140
MRR	Mortaria	Reeded rim	8	0.07%	128	0.06%	11
MTRB	Mortarium	With triple-ribbed rim	3	0.03%	414	0.21%	55
OPEN	Open	Misc. open form	16	0.15%	271	0.14%	6
18	Plate	Samian form – see Webster 1996	6	0.06%	43	0.02%	38
P	Plate	Misc. plate form	1	0.01%	11	0.01%	0
PGB	Plate	Gallo-Belgic imitation	3	0.03%	102	0.05%	35
-	Unknown	Form uncertain	4899	45.01%	39431	19.75%	131

Appendix C
Summary of Multi-Isotope Analysis

Joanna Moore and Janet Montgomery

Introduction

Multi-isotope analysis (carbon and nitrogen and strontium and oxygen) of cortical bone and teeth was undertaken to examine the diet and mobility of three Romano-British/post-Roman individuals from White Crofts and nine Anglo-Saxons from Callow Carr (denoted *C/N, Sr/O*, and/or ^{14}C in Tables 8.90 and 8.91). Carbon, nitrogen and sulphur isotope values from all but one of these individuals and an additional two Anglo-Saxons were obtained by the Scottish Universities Environmental Research Centre AMS Laboratory, Glasgow (SUERC) during the process of radiocarbon dating (denoted ^{14}C in Table 8.90). Carbon and nitrogen isotope analysis of cortical bone of one further Anglo-Saxon individual, and rib samples of one Romano-British and three Anglo-Saxons, as well as the strontium and oxygen isotope analysis, was undertaken by Durham University's Isotope Laboratory (AIPRL). Results of sulphur isotope analysis on the three Anglo-Saxon rib samples was obtained at the University of Bradford. The following report summarises the methods, results and analysis of these combined data. A full technical report is included in the online data supplement: https://doi.org/10.5284/1136099.

Methods and Materials

Dietary Reconstruction

Isotopic analysis of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) is a well-established technique for the reconstruction of diets of past populations using archaeological teeth and bones (DeNiro and Epstein 1978; Kohn 1999; Richards *et al*. 2006; Schoeninger *et al*. 1983). It informs on the types and quantities of food resources utilised by an individual or population, and is particularly useful in distinguishing between the consumption of marine versus terrestrial resources, and that of C_3 versus C_4 plants (Lee-Thorp 2008; Mays and Beavan 2012) and the animals that ate such plants (Ambrose *et al.* 1997; Beaumont *et al.* 2013; Camin *et al.* 2008). Inferences on socio-economic and cultural influences associated with dietary practices may be made, as well as identifying foreign influences on diet from C_3/C_4 plant consumption.

As long bones tend to provide an average of the dietary protein consumed during approximately the last 25 years of life, they give an indication of diet during later adolescence and early adulthood, while ribs, with their faster turnover rates, give an indication of diet during the last 1–5 years before death (Cox and Sealy 1997; Parfitt 2002).

Cortical bone from three Romano-British and 14 Anglo-Saxon individuals, and rib bone samples from one of the former and three of the latter, were prepared and analysed using accepted procedures developed by the AIPRL laboratory (see full report for methodological details).

Assessing Geographic Origins

The utility of the isotopic analysis of sulphur ($\delta^{34}S$) is based on the principle that the $\delta^{34}S$ value in any given location will be distinctive to that local area (Nehlich 2015).

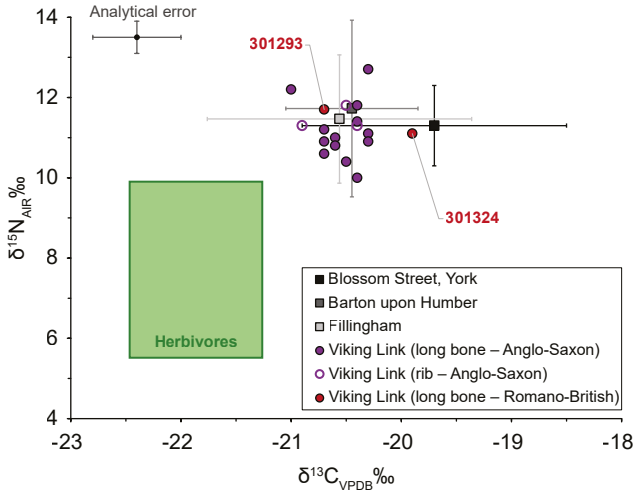


Figure C.1 Mean $\delta^{13}C$ and $\delta^{15}N$ data from the Viking Link Romano-British/post-Roman and Anglo-Saxon cortical bone and rib samples, shown alongside contemporaneous data from Lincolnshire and North Yorkshire (Müldner and Richards 2007; Eckardt et al. *2015; Macpherson 2005). Faunal data from West Halton, Lincolnshire (Macpherson 2005). All ranges shown to 1 sd*

These values may remain uniform over large geographic areas or vary significantly over smaller distances (Krouse 1991). Each area's $\delta^{34}S$ signature derives from the various sulphur contributions from that locale's atmosphere, hydrosphere, lithosphere and biosphere (Peterson and Fry 1987). The bioavailable sulphur of a region passes through the food chain, with studies suggesting little meaningful fractionation of sulphur as it ascends (Jay *et al.* 2013; McCutchan *et al.* 2003; Richards *et al.* 2003). Therefore, the values of an individual's tooth and bone collagen act as a record of the environment where that individual sourced their food and is useful in gaining insight into mobility (particularly in identifying 'non-local' or 'migratory' individuals).

The sulphur isotope data from long bone samples from two Romano-British/post-Roman and 13 Anglo-Saxon individuals were produced at SUERC (excluding one of each group that failed), following the method outlined in Dunbar *et al.* (2016). Additional sulphur data for three Anglo-Saxon rib samples were produced at the University of Bradford. Results are presented in Table C.1 and plotted in Figure C.3 alongside comparative human and faunal data from a similarly dated site in the region.

Strontium isotopes offer a direct link between an individual and their geographic origin as it is derived from local geology (Evans *et al.* 2012). Assuming that the majority of a population's food and drink is sourced locally, the strontium isotope composition in human skeletal material should reflect the bioavailable strontium isotope ratios in their region of origin (Montgomery *et al.* 2007). A second premolar of three Romano-British/post-Roman individuals and nine second premolars and four third molars of nine Anglo-Saxon individuals were sampled for strontium and oxygen. The analytical results are presented in Table C.3, and shown together with the oxygen isotope data in Figure C.4.

Oxygen incorporated into hydroxyapatite is predominantly derived from ingested fluids, the isotopic composition of which fluctuates because of climatic and environmental variables, such as temperature, rainfall, altitude and latitude (Darling *et al.* 2003). Therefore, oxygen isotopes ($\delta^{18}O$) measured in human tissues are an indirect reflection of the local meteoric water composition (Kohn 1996). Other factors can influence the values, requiring the application of regression formulae (Chenery *et al.* 2012; Fricke *et al.* 1995), including culturally mediated behaviour, and consequently, interpretation must be performed with caution (Brettell *et al.* 2012; Camin *et al.* 2008; Daux *et al.* 2008).

Results and Interpretation

Carbon and nitrogen isotopes results could not be obtained from cortical long bone and rib samples of one Romano-British/post-Roman individual (301292) and from cortical bone of one Anglo-Saxon (900100). Results of the analysis of the other two Romano-British/post-Romans and 14 Anglo-Saxons are presented in Table C.1 and plotted in Figure C.1 alongside contemporaneous human data from the wider region. Results by sex are presented in Figure C.2. The long bone $\delta^{13}C$ values range from -21.0 to -19.9‰ (mean = -20.5 ± 0.2‰) and the $\delta^{15}N$ values range from 10.0 to 12.7‰ (mean = 11.2 ± 0.7‰). This indicates that all individuals of both time periods ate a similar, long-term diet of predominantly terrestrial C_3 protein from plants and animals, some animal protein (e.g., milk, cheese, meat), but little to no input from marine resources. This type of diet is consistent with other Roman and Anglo-Saxon populations in north-east England (Fig. C.1), across Britain and in some European countries (Herrscher *et al.* 2001; Leggett and Lambert 2020; Macpherson 2005; Varano *et al.* 2020). When compared by sex, there was no significant difference in mean $\delta^{13}C$ values (males = -20.5 ± 0.2‰ and females = -20.6 ± 0.3‰), but the females did have slightly higher $\delta^{15}N$ values than the males (males = 10.8 ± 0.4‰ and females = 11.8 ± 0.7‰),

Table C.1 Mean sulphur, carbon, and nitrogen isotopes of the bone collagen for the Romano-British/post-Roman (N = 3) and Anglo-Saxon individuals (N = 14)

Period	Burial	Element	Long bone collagen			Rib collagen		
			$\delta^{15}N$ (‰)	$\delta^{13}C$ (‰)	$\delta^{34}S$ (‰)	$\delta^{15}N$ (‰)	$\delta^{13}C$ (‰)	$\delta^{34}S$ (‰)
Romano-British/post-Roman	301292	Femur	F	F	F	F	F	F
	301293	Femur	11.7	-20.7	3.9	-	-	-
	301324	Femur	11.1	-19.9	2.2	-	-	-
Anglo-Saxon	900021	Long bone	10.4	-20.5	3.3	-	-	-
	900064	Femur	10.9	-20.7	5.3	-	-	-
	900068	Femur	12.7	-20.3	6.2	-	-	-
	900100	Femur	F	F	F	-	-	-
	900105	Humerus	11.0	-20.6	2.2	-	-	-
	900115	Femur	10.8	-20.6	5.3	11.3	-20.4	-1.1
	900133	Femur	10.0	-20.4	0.6	-	-	-
	900139	Femur	11.2	-20.7	3.4	-	-	-
	900142	Femur	11.8	-20.4	3.5	-	-	-
	900174	Femur	10.6	-20.7	0.7	-	-	-
	900177	Femur	12.2	-21.0	-0.6	11.3	-20.9	0.8
	900191	Femur	11.4	-20.4	6.9	11.8	-20.5	2.5
	900197	Femur	11.1	-20.3	1.4	-	-	-
	900206	Femur	10.9	-20.3	4.2	-	-	-

Key: - = not analysed; F = sample failed

which were statistically significant ($t(6) = -2.72$, $p = 0.034$). This may suggest that female diets included higher trophic levels foods than the males, such as freshwater fish and pork.

Rib samples from three Anglo-Saxon older adults allowed for comparison of adolescent/early adulthood diet with that in later life (Table C.1). The mean $\delta^{13}C$ and $\delta^{15}N$ values for each of the samples were within ~0.5‰ of each other, suggesting a very similar and stable long-term diet for all three individuals. This is supported by the enamel $\delta^{13}C$ results, which indicate a terrestrial diet based on C_3 plants and animals during childhood.

Mobility was explored using results of strontium and oxygen analysis of three Romano-British/post-Roman and nine Anglo-Saxon samples (Tables C.2–3, and Figs C.4 and C.5). Results suggest that the majority of individuals had grown up in the local area, but that three individuals (Romano-British/post-Roman male 301292, Romano-British female 301300 and Anglo-Saxon male 900133) grew up elsewhere. Although burial 301292 has an oxygen isotope ratio consistent with Lincolnshire, the strontium isotope ratio is too high ($\delta^{18}O_{phos}$ of 0.7122) for the region and more consistent with a location with much older geology, such as south-west England, Wales and Scotland. A $\delta^{18}O_{phos}$ value of 18.6‰ in male 301300 is more typical of values obtained from more westerly parts of the British Isles, such as Winchester, Gloucester, and Ireland (Chenery *et al.* 2010; Eckardt *et al.* 2009; Evans *et al.* 2006; Wilson and Standish 2016), as well as warmer continental regions of the Roman Empire, such as Italy and Spain (Emery *et al.* 2018; Moore 2019; Prowse *et al.* 2007).

The strontium value in the second premolar of Anglo-Saxon male 900133 suggests that he spent his early childhood in a region with older geology and a colder climate, such as north-eastern Britain or, possibly, Northern Europe (e.g., Germany or France). The third molar strontium value suggests that he moved to a region with a similar geology

Table C.2 Summary of the carbon and oxygen isotope ratios from Romano-British/post-Roman (N = 3) and Anglo-Saxon (N = 13) tooth enamel samples

Period	*Burial*	*Tooth*	*$\delta^{13}C_{VPDB}$ carbonate measured ± 0.2 (1 sd) ‰*	*$\delta^{18}O_{VPDB}$ carbonate measured ± 0.2 (1 sd) ‰*	*$\delta^{18}O_{VSMOW}$ carbonate calculated ± 0.2 (1 sd) ‰*	*$\delta^{18}O_{VSMOW}$ phosphate calculated ± 0.3 (1 sd) ‰*	*$\delta^{18}O_{VSMOW}$ precipitation calculated ± 0.5 (1 sd) ‰*
	301292	PM2	-15.0	-4.4	26.4	17.5	-6.7
Romano-British/post-Roman	301300	PM2	-14.3	-3.4	27.4	18.6	-5.1
	301324	PM2	-14.3	-5.0	25.8	16.9	-7.7
	900021	PM2	-14.7	-4.6	26.1	17.3	-7.1
		M3	-15.1	-4.9	25.8	17.0	-7.5
	900100	PM2	-16.2	-4.9	25.8	17.0	-7.6
	900115	PM2	-14.8	-4.3	26.5	17.6	-6.6
		M3	-15.0	-4.9	25.9	17.0	-7.5
	900133	PM2	-15.9	-5.4	25.3	16.4	-8.4
Anglo-Saxon		M3	-15.2	-5.7	25.0	16.1	-8.9
	900139	PM2	-15.1	-4.3	26.5	17.7	-6.5
		M3	-15.4	-4.0	26.7	17.9	-6.1
	900142	PM2	-15.7	-4.3	26.5	17.7	-6.5
	900174	PM2	-15.3	-4.3	26.5	17.7	-6.5
	900177	PM2	-15.7	-4.2	26.6	17.7	-6.4
	900206	PM2	-15.1	-4.3	26.5	17.6	-6.6

Key: PM2 – second premolar; M3 – third molar. $\delta^{18}O_{VSMOW}$ carbonate calculated using Sharp (2007), $\delta^{18}O_{VSMOW}$ phosphate calculated using Chenery *et al.* (2011), and $\delta^{18}O_{VSMOW}$ carbonate calculated using Sharp (2007) precipitation calculated using Daux Eq. 6 in Chenery *et al.* (2011)

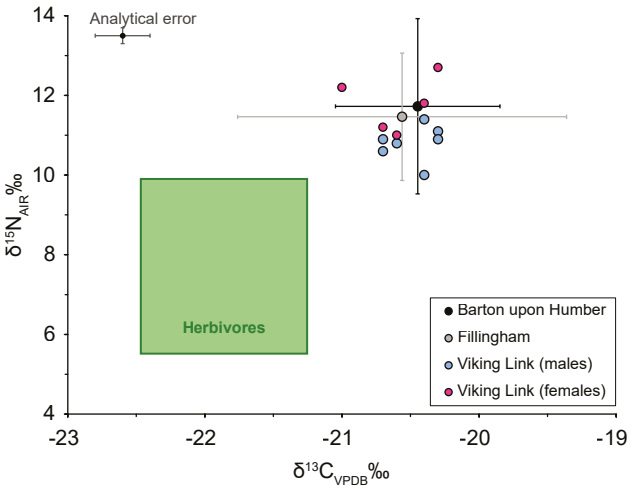


Figure C.2 Viking Link Anglo-Saxon $\delta^{13}C$ and $\delta^{15}N$ data in males and female (N = 13), shown alongside contemporaneous data from Lincolnshire and North Yorkshire (Eckardt et al. *2015; Macpherson 2005). Faunal data from West Halton, Lincolnshire (Macpherson 2005). All ranges shown to 1 sd*

to Lincolnshire between the ages of 8.5 and 15.5 years. However, these values are not consistent with the other individuals from the assemblage, who have higher oxygen isotope ratios.

The sulphur isotope ratios from the cortical bone of the Anglo-Saxon individuals are lower than expected for a population living near the coast or in a region of the Wolds dominated by Chalk, and are more consistent with sourcing foods or grazing their animals on wetland terrains, such as the Lincolnshire Fens. These low sulphur isotope values are somewhat contradictory to the carbonate-derived strontium values. A possible explanation is that this group may have lived towards the south of the Wolds in a region of more mixed geology.

Table C.3 Summary of the strontium isotope ratios from Romano-British/post-Roman (N = 3) and Anglo-Saxon (N = 13) tooth enamel samples

Period	*Burial*	*Tooth*	*$^{87}Sr/^{86}Sr$*	*2 SE*
Romano-British/post-Roman	301292	PM2	0.712213	0.000011
	301300	PM2	0.709635	0.000009
	301324	PM2	0.709481	0.000011
Anglo-Saxon	900021	PM2	0.709836	0.000008
		M3	0.709717	0.00001
	900100	PM2	0.709233	0.000009
	900115	PM2	0.709052	0.000009
		M3	0.709100	0.000009
	900133	PM2	0.709527	0.00001
		M3	0.710559	0.000011
	900139	PM2	0.708997	0.00001
		M3	0.708976	0.000012
	900142	PM2	0.709012	0.000007
	900174	PM2	0.709093	0.00001
	900177	PM2	0.710107	0.00001
	900206	PM2	0.709687	0.00001

Key: 2 SE – 2 standard error; M3 – third molar; PM2 – second premolar

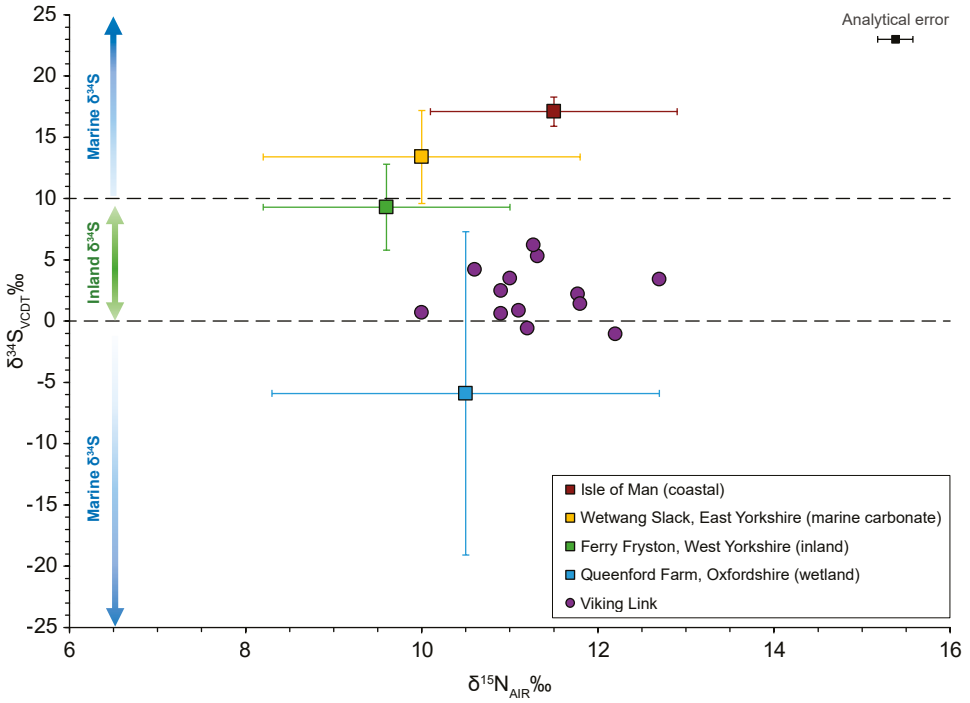


Figure C.3 Mean $\delta^{15}N$ and $\delta^{34}S$ data from Anglo-Saxons of Viking Link (N = 13), shown alongside comparative human and animal data from sites in Britain (Hemer et al. 2014; Jay and Richards 2007; Jay et al. 2013; Nehlich et al. 2011). All ranges shown to 2 sd

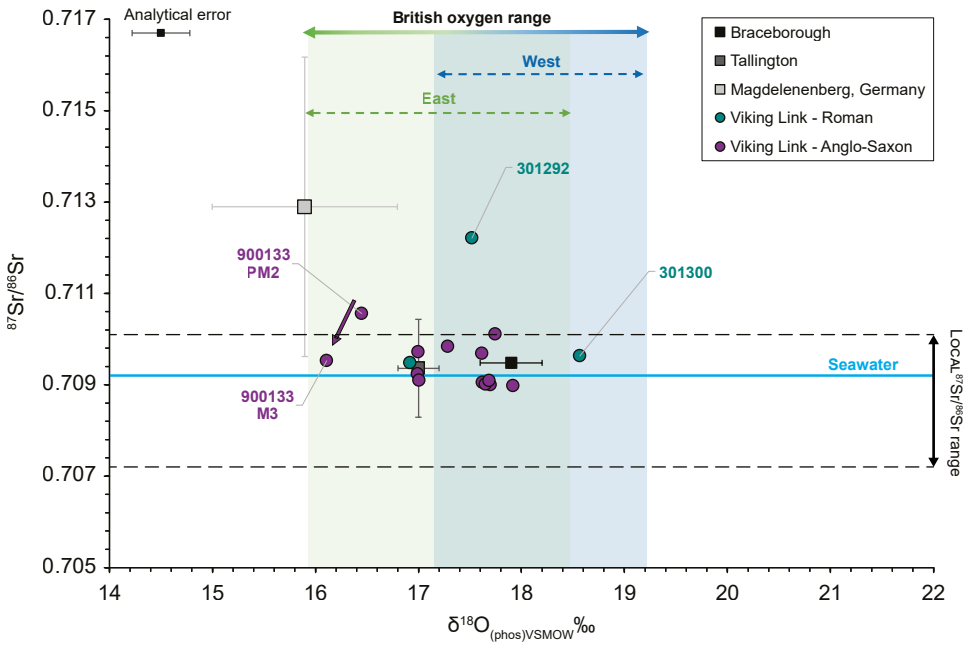


Figure C.4 Viking Link Romano-British/post-Roman (N = 3) and Anglo-Saxon strontium and oxygen isotope data (N = 13) alongside contemporaneous populations in Lincolnshire and Germany (Macpherson 2005; Oelze et al. 2012; Montgomery et al. 2019). The horizontal dotted lines represent the bioavailable strontium isotope range for Lincolnshire (Evans et al. 2023). The shaded green and blue boxes represent the 2 sd oxygen isotope range expected for Britain (Evans et al. 2012)

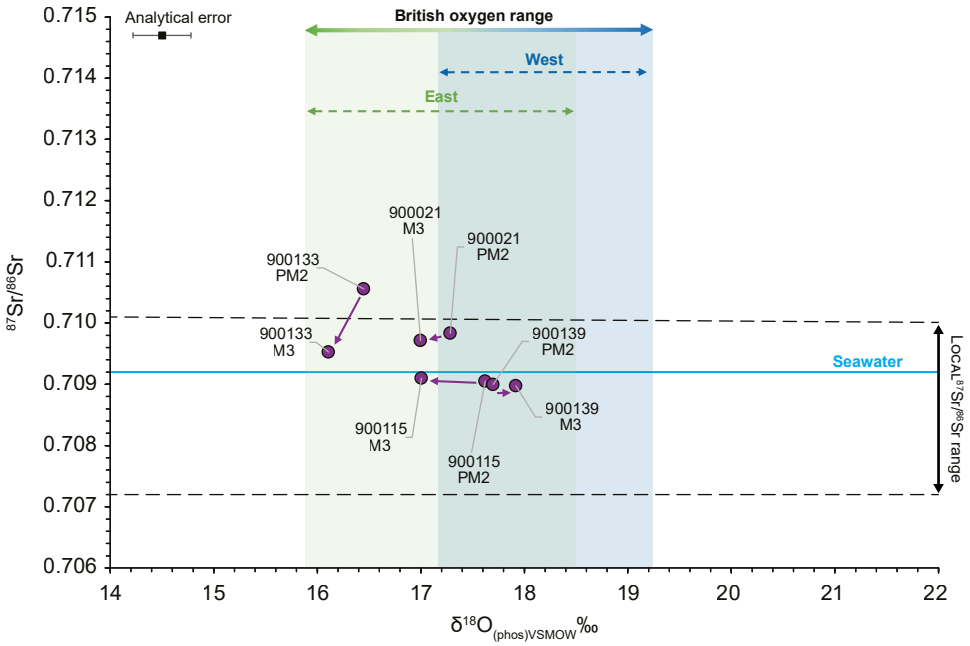


Figure C.5 Viking Link strontium and oxygen isotope data for paired teeth from four Anglo-Saxon individuals. The horizontal dotted lines represent the bioavailable strontium isotope range for Lincolnshire (Evans et al. 2023). The shaded green and blue boxes represent the 2 sd oxygen isotope range expected for Britain (Evans et al. 2012)

Appendix D
Histological analysis of the Romano-British humerus from Gibbet Hill

Ciara O'Brien Butler and Richard Madgwick

Introduction

The redeposited left humerus recovered from ditch 560024 at Gibbet Hill, attributed a Romano-British date via radiocarbon dating (see López-Dóriga above), had been subject to human manipulation indicative of defleshing, dismemberment and curation (see McKinley above). Histological analysis was performed on a sample of the bone to assess the microscopic preservation and to explore the post-mortem history of this isolated element.

There remains considerable debate over the interpretative potential of histotaphonomic data, principally surrounding the origin of the collagenolytic bacteria that cause bioerosion. Some researchers believe bacteria to be entirely of exogenous origin, deriving from the burial environment, and thus variation in preservation relates to the soil character rather than to mortuary rites. Others consider that bacteria frequently have an endogenous origin (from within the body), deriving from the guts, and therefore their capacity to bioerode bone is directly linked to mortuary practices. In this case, mummification and excarnation via exposure inhibit bioerosion, leaving well-preserved microstructure, whereas primary inhumation, which allows putrefaction and gradual soft tissue decay, causes poor microstructural preservation. A summary of current debates can be found in Booth *et al*. (2022; 2024), Mavroudas *et al*. (2023), Schotsmans *et al*. (2024) and Turner-Walker *et al*. (2023). The writers believe there is strong evidence for the impact of mortuary practice on histological preservation and very little correlation with soil matrix; consequently endogenous gut bacteria have an important role in patterns of preservation (see Booth *et al*. 2024). Further work is required to clarify the range of factors that can affect variation in preservation, however, and it is possible that interpretative revision will be required in the future.

Sections from femoral diaphyses are traditionally used for diagenetic studies: they comprise dense cortical bone, which is preferential for measuring microbial post-mortem alteration; they are the closest long bone to the gut and therefore most likely to be affected by endogenous microbial activity (Bricking 2022); and repeat sampling of the same area controls for potential differences in diagenesis of skeletal elements (Hollund *et al*. 2012; Jans *et al*. 2004; Nielsen-Marsh and Hedges 2000). These factors must be borne in mind when interpreting the results from Gibbet Hill; however, as the humerus is a similar long bone and is also in relative proximity to the gut, the differences should be minimal.

Methods

A transverse section of the bone sample (1 x 1 cm) was cut using a diamond wheel, then placed in a cylindrical mould and labelled. A solution of EpoFix resin mixed with EpoFix hardener (25:3 ratio) was used to embed the sample and support structural integrity without contaminating the microstructure. The sample was placed in a Nucerite desiccator vacuum chamber to minimise air pockets within the resin and left for 24 hours to harden. Thin sections (80μm thick) were cut from the sample using a REHA-tech RMS16G3 annular diamond-saw microtome and mounted on VWR 90 glass slides using Entellan New mounting medium (Merck Chemicals – synthetic polymers suspended in xylene with a refractive index similar to glass, protecting the sample from contamination), covered with a glass cover slip, and left to cure for 24 hours.

The thin section was analysed using a Keyence VHX-7000 digital microscope with transmitted light at 50x, 100x, and 200x magnification, and fitted with a polarised lens to facilitate assessment of collagen birefringence. Digital micrographs of various aspects of the microstructure, including periosteal surface, centre cortex, medullary surface and any other features of note, were captured using the digital microscope camera (a full image record is presented in the online data supplement: https://doi.org/10.5284/1136099).

Table D.1 Oxford Histological Index (OHI) after Hedges et al. *(1995) and Millard (2001)*

OHI score	*% of microstructure remaining*	*Description*
0	<5%	No original features identifiable except Haversian canals
1	<15%	Small areas well-preserved bone present or lamellate structure preserved by the pattern of destructive foci
2	<50%	Some well-preserved bone present between destroyed areas
3	>50%	Larger areas well-preserved bone present
4	>85%	Bone fairly well preserved with minor amounts of destroyed areas
5	>95%	Very well preserved, similar to modern bone

The percentage of microstructure remaining was assessed using the Oxford Histological Index (OHI; Table D.1), with the lowest score representing complete destruction of microstructure, consistent with archaeological inhumation, and the highest indicating perfect preservation, similar to a fresh cadaver. When possible, the specific type of microscopic focal destruction (MFD) was identified, the four main types comprising: Wedl tunnelling, linear longitudinal, budded, and lamellate (Brönnimann *et al*. 2018; Delannoy *et al*. 2018). Wedl tunnelling is considered to be strictly exogenous and indicative of exposure to an aquatic environment, whereas the other (non-Wedl) types of bacteria originate either from within the body (endogenous) or the soil environment (exogenous). The amount of non-Wedl MFD can be used to assess early post-mortem treatments such as exposure or a change of environment.

The adjacent arrangement of collagen fibres in cortical bone microstructure results in light refraction at perpendicular planes (Bromage *et al*. 2003; Schultz 1997). When viewed with cross-polarised light, well-preserved bone appears as alternating light and dark bands, a property known as birefringence, representing a useful proxy for collagen preservation. High birefringence usually corresponds with good microstructure preservation, indicating preservation of collagen proteins within the bone. However, some external (non-biological) factors can cause loss of birefringence, even when microstructure is otherwise well preserved through processes of chemical hydrolysis (e.g., low-heat burning or intense cycles of wetting and drying; Bricking 2022). The Gibbet Hill sample was examined using a polarising lens to determine the extent of collagen birefringence and given a rating of absent, low, medium, or high, in addition to the OHI score.

Results

The preservation of the Gibbet Hill sample is excellent overall, in many areas close to that of a fresh cadaver but with some limited bacterial and fungal attack in parts. The OHI score is a high 4, corresponding to slightly less than 95% well-preserved bone with minor amounts of destroyed areas. Birefringence is high throughout most of the sample, apart from a small area along the periosteum and in isolated patches of bioerosion within the cortex and trabeculae, indicating very good levels of collagen preservation. An orange and reddish-brown staining is present along the periosteal and endosteal surface, generally correlating with areas of bioerosion. The middle cortex appears largely well preserved and unstained. The microstructure of osteons, osteocyte lacunae and Haversian canals is still clearly visible throughout much of the sample.

Small areas of microfocal destruction can be seen, concentrated in the periosteal and endosteal regions, demonstrating some inhibited endogenous bacterial attack despite the

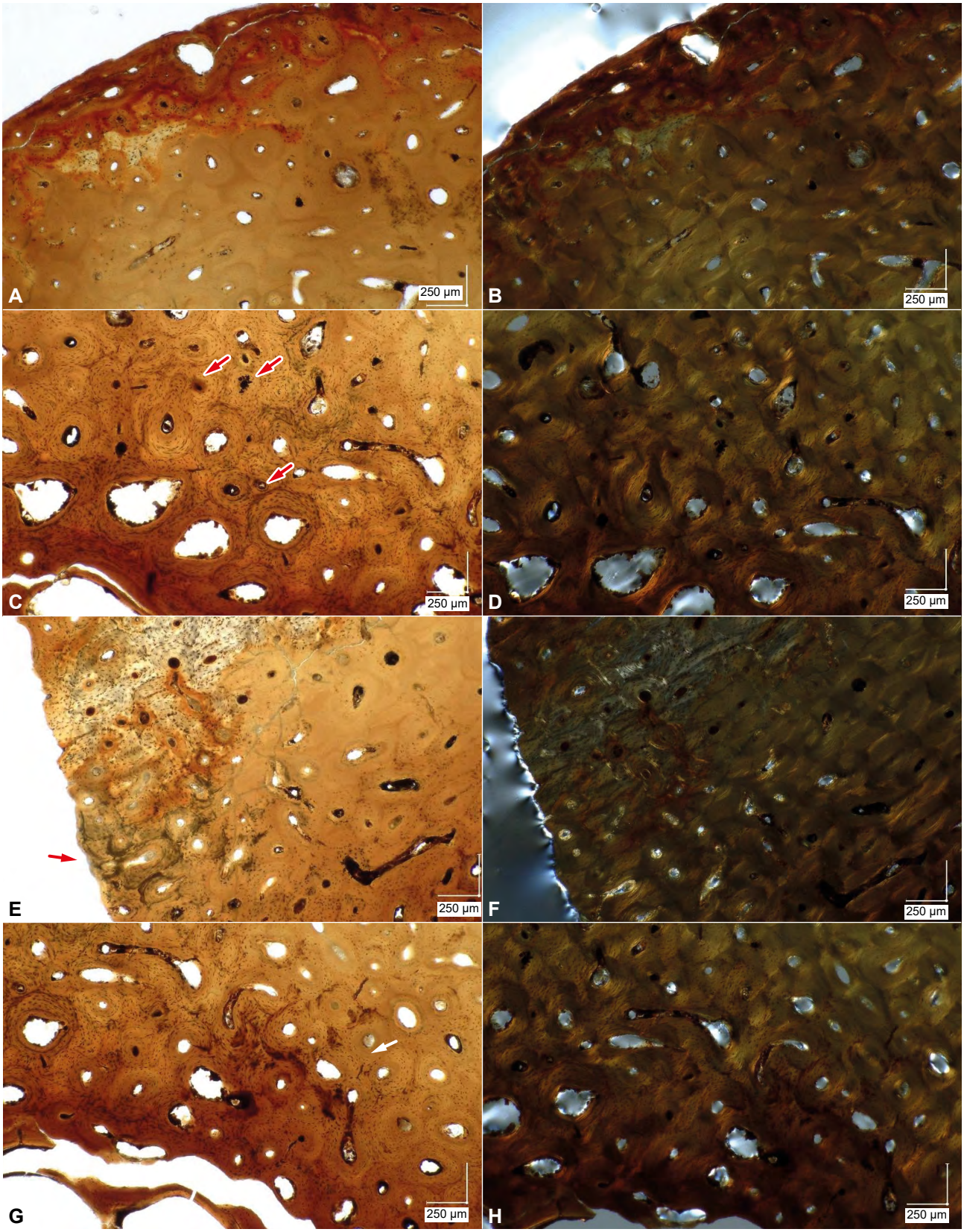


Figure D.1 Micrographs at 100x magnification. A) Periosteal aspect showing MFD concentrated in the periosteum with smaller, isolated areas within the cortex. B) Periosteal aspect under polarised light showing high collagen birefringence corresponding to areas of well-preserved bone. C) Trabecular aspect showing arrested MFD of various forms highlighted by arrows. Dark inclusions within trabeculae are also visible. D) Trabecular aspect under polarised light showing mostly high collagen birefringence. E) Cortex showing a restricted area of non-Wedl MFD highlighted by the arrow. F) Cortex under polarised light showing lower collagen birefringence in the area of bacterial attack. G) Trabecular aspect showing a restricted area of non-Wedl MFD highlighted by the arrow. H) Trabecular aspect under polarised light showing lower collagen birefringence in the area of bacterial attack

overall high levels of preservation (Fig. D.1). All forms of non-Wedl MFD were observed, with exogenous mineral precipitation within the Haversian canals and trabeculae indicating liquid infiltration (Fig. D.1). Some probable fungal tunnelling is also observable (Fig. D.2). The presence of Wedl MFD suggests a wet or waterlogged environment, although there is some ongoing debate about the cause of these phenomena, thus complicating their interpretation (Thompson *et al.* 2024). Defects consistent with both Wedl type 1 and 2 were observed (Fig. D.2); Wedl type 1 appears as sinuous, transversely oriented branching defects and type 2 as enlarged canaliculi. In this case, Wedl type 1 tunnelling often originates from Haversian canals, and neither form of Wedl MFD appears to be strongly associated with the bacterial bioerosion described above. Wedl tunnelling is mostly concentrated in a single patch of cortex shown in Fig. D.2, though there are some smaller possible areas of fungal attack in other parts of the sample.

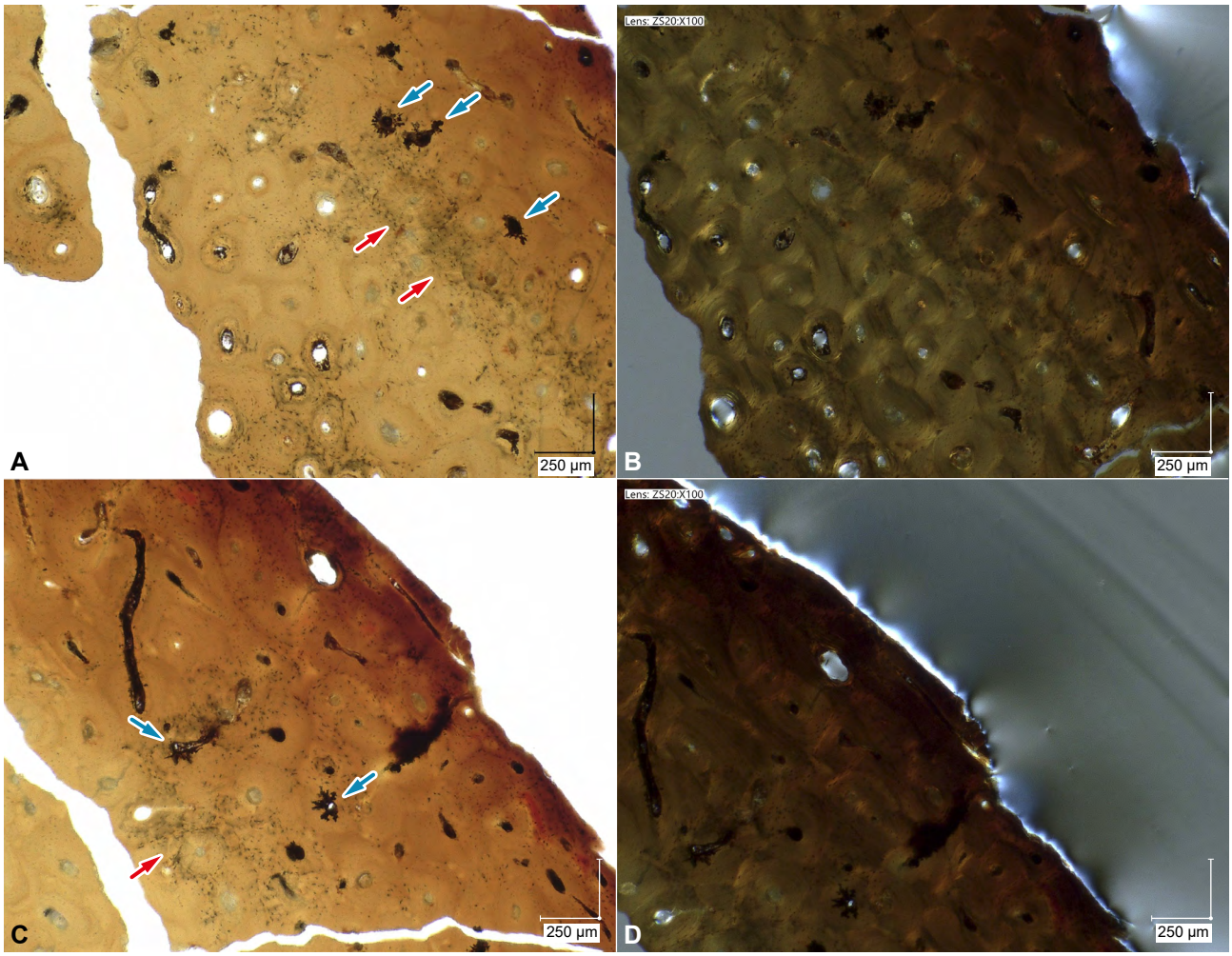


Figure D.2 Micrographs at 100x magnification. A) Cortex showing Wedl type 1 (blue arrows) and type 2 (enlarged canaliculi) (red arrows). B) Cortex under polarised light at 100x magnification showing high collagen birefringence corresponding to areas of well-preserved bone. C) Periosteal aspect showing Wedl type 1 (blue arrows) and type 2 (enlarged canaliculi) (red arrows). D) Periosteal aspect under polarised light showing moderate collagen birefringence.

Discussion

The results show the bone is well preserved, indicating that decomposition did not occur in a manner consistent with primary soil inhumation. Levels of microstructural preservation of the Gibbet Hill humerus are also better than those previously interpreted as 'protected exposure' burial, e.g., in a cave or covered pit, as has been suggested for mid-ranging OHI scores of 2–3 (T. Booth 2014, Booth and Madgwick 2016). Little to no bacterial attack has previously been interpreted as indicating

funerary rites which rapidly removed soft tissue, such as dismemberment, defleshing and excarnation, or inhibited bodily decomposition, such as mummification (Booth 2016; Booth *et al*. 2015; Jans *et al*. 2004; Nielsen-Marsh *et al*. 2007). Given the evidence of cut marks on the humerus from Gibbet Hill, defleshing and/or dismemberment soon after death provides the most likely explanation for the high levels of histological preservation. However, there are still some areas of debate regarding the timing and extent of endogenous bacterial attack, and the bone also exhibits fungal tunnelling, which may indicate a more complex post-mortem history. Several, not necessarily mutually exclusive, scenarios may also be responsible for the preservation seen here.

Recent experimental work suggests that very limited attack occurs in the first 24 months post-mortem, in some instances at least, and visible diagenesis may take years rather than months to occur in some environments (Mavroudas *et al.* 2023). This suggests that if the bone was immediately removed and defleshed it might be expected that no bacterial attack would have occurred. Consequently, the presence of some limited bacterial attack might be evidence that the element did undergo some level of putrefaction and potentially suggests a complex mortuary process such as sheltered storage (allowing some bacterial attack during putrefaction) prior to removal of the element. There is also evidence that some bacterial attack could be exogenous (Eriksen *et al.* 2020; Kendall *et al.* 2018; Turner-Walker 2019), though the effects of this are likely to be limited in comparison to endogenous bacteria (Booth 2017). This could explain the presence of minor MFD in a defleshed or dismembered element such as that from Gibbet Hill.

High OHI scores can also be the result of primary deposition in an anoxic environment such as a bog or wetland, as such environments inhibit osteolytic bacteria (Booth 2016; Turner-Walker and Jans 2008). Although the cut marks on the humerus indicate defleshing, it is not possible to rule out a period of anoxia early in the bone's post-mortem history on the basis of histology alone. The presence of probable Wedl MFD, as well as mineral deposits within canals and trabeculae, indicate that the element did spend time in a waterlogged burial environment, though the aetiology and classification of Wedl tunnelling in bone is disputed to some extent (see Kendall *et al.* 2018). The saprophytic fungi which cause Wedl tunnelling are dependent on environmental factors like the presence of oxygen and a certain level of humidity (20%; Jans *et al.* 2002), so this further suggests episodic waterlogging rather than an anoxic environment. The Wedl MFD observed may have occurred in the context of the bone's final deposition, rather than be related to its early post-mortem history, though it is not possible to conclude this with any certainty. On the other hand, several studies have found an association with delayed burial or sub-aerial exposure, presumably because this facilitates access to fungal spores in the air (T. Booth 2014; 2016; Booth and Madgwick 2016; Brönnimann *et al.* 2018), so this may be consistent with a period of sheltered storage.

A more confident interpretation is hampered by the fact that no comparative contemporaneous animal bone samples were available, which might have helped to separate out those features related to the depositional environment and those related to the early post-mortem history of the humerus. Despite this, the histological and osteological evidence are consistent, and taken together are evidence for an extremely unusual burial practice for this date, especially the evidence of curation, which suggests a long period between death and final deposition.

Appendix E
Illustrated Briquetage and Other Fired Clay

List of illustrated briquetage

(Figs E.1–22)

Cylindrical support with single lipped end (clip/spacer or pedestal)

1. Ditch 530296, cut 530286, fill 530215, ON 530022
2. Ditch 530296, cut 530247, fill 530248
3. Pit 530212, fill 530214
4. Pit 530212, fill 530214
5. Pit 530234, fill 530235
6. Pit 530238, fill 530240, ON 530008
7. Pit 530257, fill 530259
8. Gully 520138, cut 520138, fill 520139
9. Gully 520138, cut 520138, fill 520139
10. Gully 520138, cut 520138, fill 520139

Cylindrical support with two lipped ends (clip/spacer)

11. Pit 520076, fill 520074
12. Pit 530209, fill 530211
13. Ditch 530296, cut 530247, fill 530248
14. Ditch 530296, cut 530247, fill 530248
15. Ditch 530296, cut 530247, fill 530248

Cylindrical support with flat top (pedestal)

16. Pit 530209, fill 530211
17. Pit 530209, fill 530211
18. Pit 530212, fill 530214
19. Pit 530238, fill 530240, ON 530018
20. Pit 530257, fill 530259

Cylindrical support with angled top (pedestal)

21. Ditch 530296, cut 530247, fill 530248
22. Ditch 530296, cut 530247, fill 530248
23. Pit 530209, fill 530211
24. Pit 530209, fill 530211
25. Pit 530209, fill 530211
26. Pit 530209, fill 530211
27. Pit 530209, fill 530211
28. Gully 520138, cut 520138, fill 520139

Cylindrical support with slightly angled top (pedestal)

29. Pit 530238, fill 530240

Cylindrical support with single channel end (pedestal)

30. Ditch 550537, cut 550244, fill 550245
31. Pit 530212, fill 530214
32. Pit 530257, fill 530259
33. Pit 530257, fill 530259
34. Pit 530257, fill 530259
35. Pit 530257, fill 530259
36. Ditch 530296, cut 530286, fill 530206
37. Ditch 530296, cut 530286, fill 530215
38. Ditch 530296, cut 530247, fill 530248
39. Ditch 530296, cut 530247, fill 530248
40. Ditch 530296, cut 530247, fill 530248
41. Ditch 530296, cut 530247, fill 530248
42. Ditch 530296, cut 530247, fill 530248
43. Ditch 530296, cut 530247, fill 530248
44. Pit 520027, fill 520028
45. Pit 520027, fill 520028
46. Ditch 520153, cut 520153, fill 520087
47. Hedgerow 520194, cut 520136, fill 520137

Cylindrical support with a channel end and a lipped end (pedestal)

48. Pit 530209, fill 530211
49. Pit 530209, fill 530211
50. Pit 530209, fill 530211
51. Pit 530209, fill 530211
52. Pit 530209, fill 530211
53. Pit 530238, fill 530240
54. Pit 530238, fill 530240
55. Pit 530238, fill 530240
56. Pit 530257, fill 530259
57. Ditch 530296, cut 530247, fill 530248
58. Ditch 530296, cut 530247, fill 530248
59. Gully 520138, deposit 520042
60. Gully 520138, deposit 520042
61. Gully 520138, deposit 520042
62. Pit 520067, fill 520069
63. Ditch 520193, cut 520049, fill 520053

Cylindrical disc-shaped support (pedestal)

64. Pit 530209, fill 530211
65. Pit 530209, fill 530211
66. Pit 530209, fill 530211
67. Ditch 530296, cut 530286, fill 530215
68. Ditch 530296, cut 530286, fill 530215

Half-cylindrical support with flattened end (stabiliser/spacer)

69. Pit 530209, fill 530211, ON 530021
70. Pit 530209, fill 530211
71. Pit 530209, fill 530211
72. Pit 530209, fill 530211
73. Pit 530209, fill 530211
74. Pit 530209, fill 530211
75. Pit 530209, fill 530211
76. Pit 530209, fill 530211
77. Pit 530209, fill 530211
78. Pit 530209, fill 530211
79. Pit 530209, fill 530211
80. Pit 530212, fill 530214
81. Pit 530212, fill 530214
82. Pit 530212, fill 530214
83. Pit 530212, fill 530214
84. Pit 530212, fill 530214
85. Pit 530212, fill 530214
86. Pit 530212, fill 530214
87. Pit 530212, fill 530214
88. Pit 530212, fill 530214
89. Pit 530212, fill 530214
90. Pit 530212, fill 530214
91. Pit 530212, fill 530214
92. Pit 530212, fill 530214
93. Pit 530212, fill 530214

94. Pit 530212, fill 530214
95. Pit 530212, fill 530214
96. Pit 530212, fill 530214

Half-cylindrical support with rounded end (stabiliser/spacer)

97. Pit 530212, fill 530214

Half-cylindrical support with pinched edge (stabiliser/spacer)

98. Pit 530238, fill 530240, ON 530023

Bridging support (clip/spacer)

99. Pit 530234, fill 530235
100. Pit 530234, fill 530235
101. Pit 530238, fill 530240
102. Pit 530238, fill 530240
103. Ditch 530296, cut 530286, fill 530206
104. Ditch 530296, cut 530286, fill 530206
105. Ditch 530296, cut 530286, fill 530206
106. Ditch 530296, cut 530286, fill 530215
107. Ditch 530296, cut 530286, fill 530215
108. Ditch 540049, cut 540027, fill 540029

Irregular-shaped support (stabiliser/spacer)

109. Pit 530209, fill 530211
110. Pit 530209, fill 530211
111. Pit 530209, fill 530211
112. Pit 530209, fill 530211
113. Pit 530209, fill 530211
114. Pit 530209, fill 530211
115. Pit 530212, fill 530214
116. Pit 530212, fill 530214
117. Pit 530212, fill 530214
118. Pit 530212, fill 530214
119. Pit 530212, fill 530214
120. Pit 530234, fill 530235
121. Ditch 530296, cut 530247, fill 530248

Other clip/spacer or pedestal

122. Pit 530238, fill 530240, ON 530009
123. Pit 530238, fill 530240
124. Ditch 530296, cut 530286, fill 530215

'Horned' pyramidal pedestal

125. Pit 530257, fill 530259
126. Ditch 530296, cut 530247, fill 530248

Roman tapering brick

127. Pit 530234, fill 530235

Triangular object (?spacer/wedge)

128. Pit 530238, fill 530240
129. Ditch 530296, cut 530286, fill 530206

Brick clip

130. Pit 530209, fill 530211

Briquetage vessel

131. Rim fragment with 'luted' edge; ditch 530296, cut 530286, fill 530206
132. Base (?re-used pottery vessel); ditch 530296, cut 530286, fill 530206
133. 'D'-shaped/oval base; ditch 530296, cut 530286, fill 530215
134. Rim fragment; pit 530202, fill 530203
135. Rim fragment; pit 530209, fill 530211
136. Rim fragment; pit 530238, fill 530240, ON 530007
137. Rim fragment; pit 530238, fill 530240
138. Rim fragment; pit 530238, fill 530240
139. Rim fragment; pit 530238, fill 530240

Ellipsoid clay 'pebble'

140. Tree-throw hole 530104, fill 530105
141. Pond 530220, fill 530217
142. Ditch 530301, cut 530129, fill 530130

Pinched, tapered rod ('pin')

143. Alluvium 200203, fill 200103

Clay disc

144. Ditch 530296, cut 530286, fill 530215
145. Ditch 530296, cut 530286, fill 530215

List of illustrated other fired clay objects

146. Triangular crucible; pit 400115, context 400116

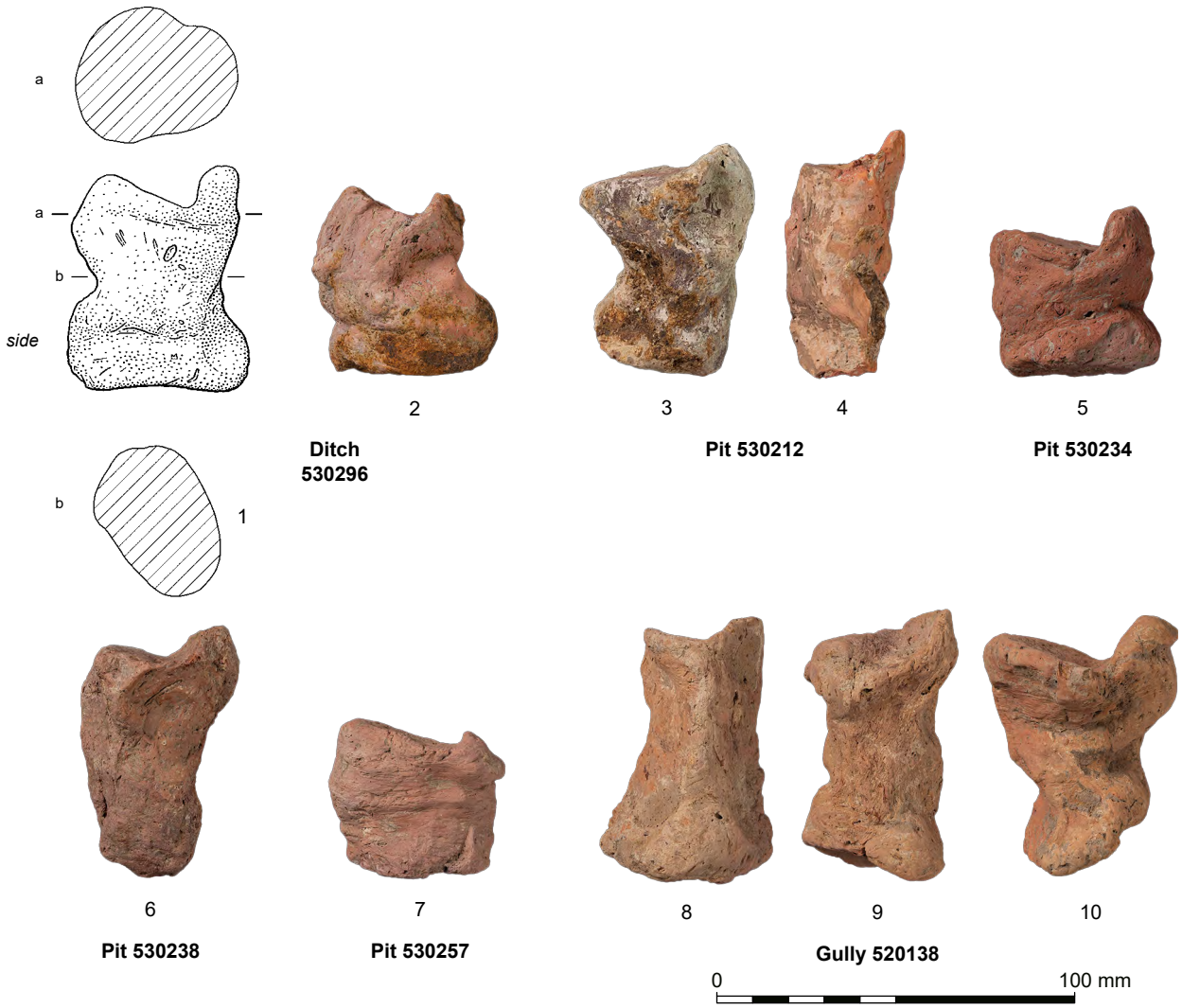


Figure E.1 Cylindrical supports with single lipped end (clip/spacer or pedestal)

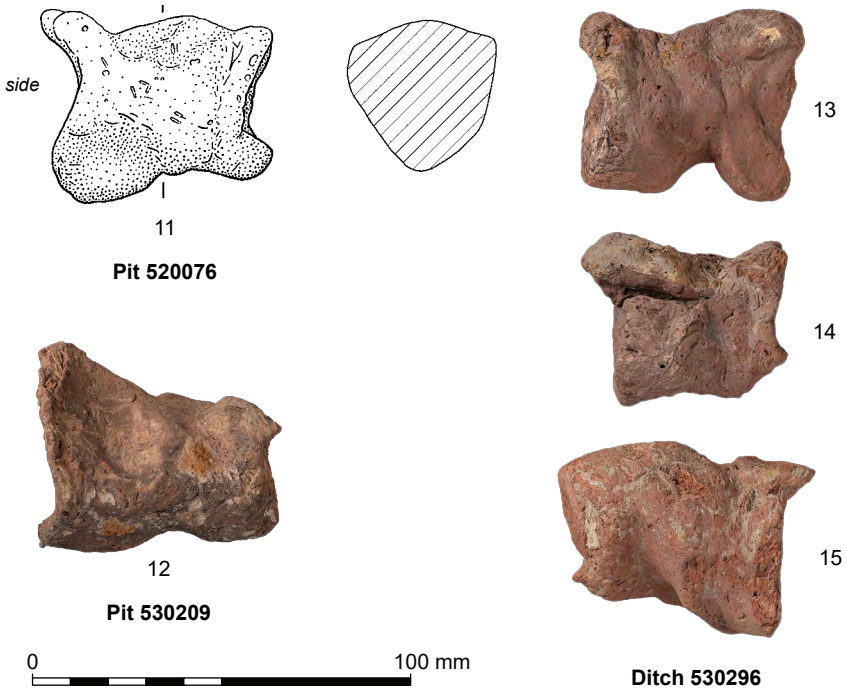


Figure E.2 Cylindrical supports with two lipped ends (clip/spacer)

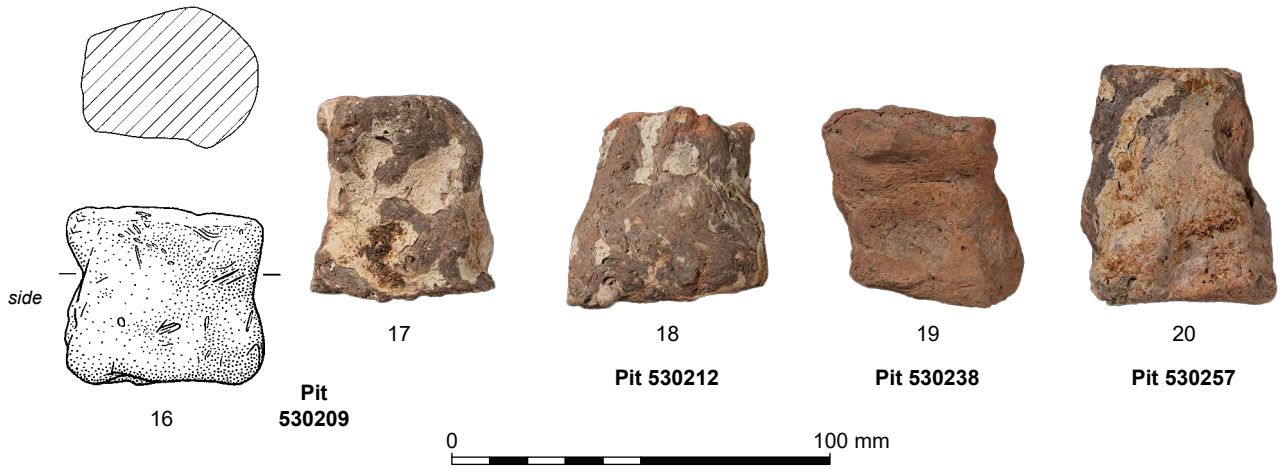


Figure E.3 Cylindrical supports with flat top (pedestal)

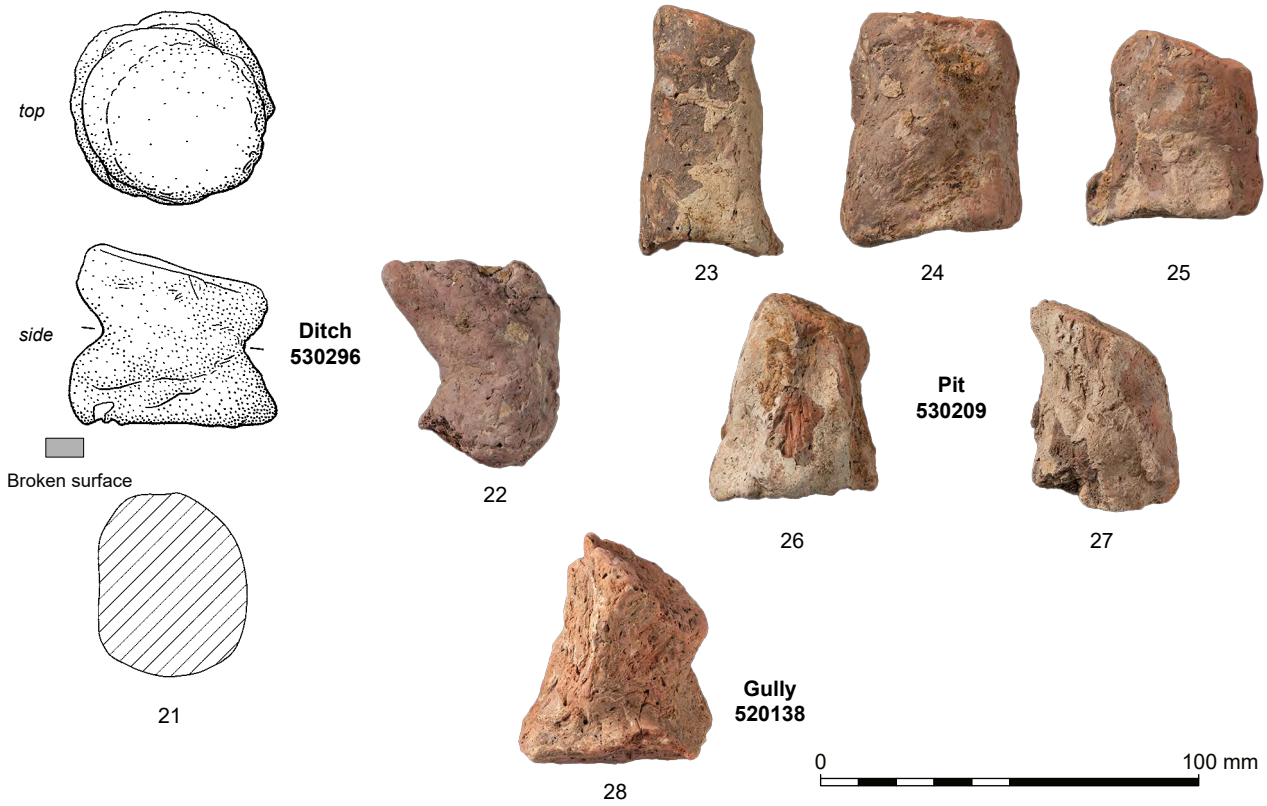


Figure E.4 Cylindrical supports with angled top (pedestal)

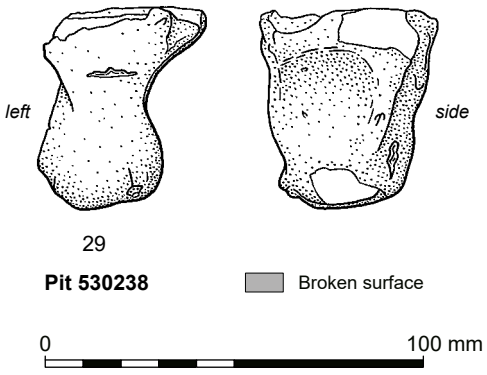


Figure E.5 Cylindrical support with slightly angled top (pedestal)

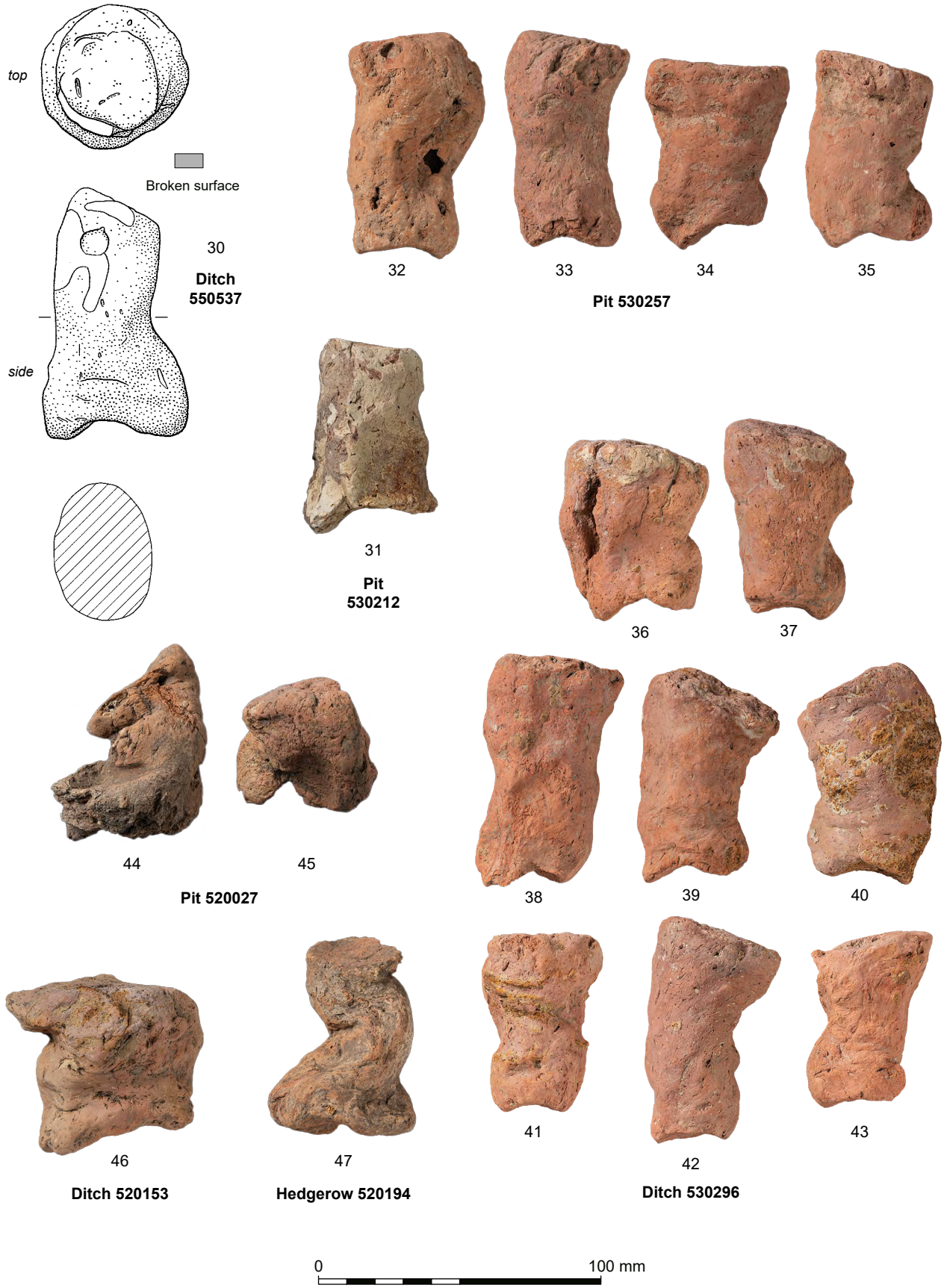


Figure E.6 Cylindrical supports with single channel end (pedestal)

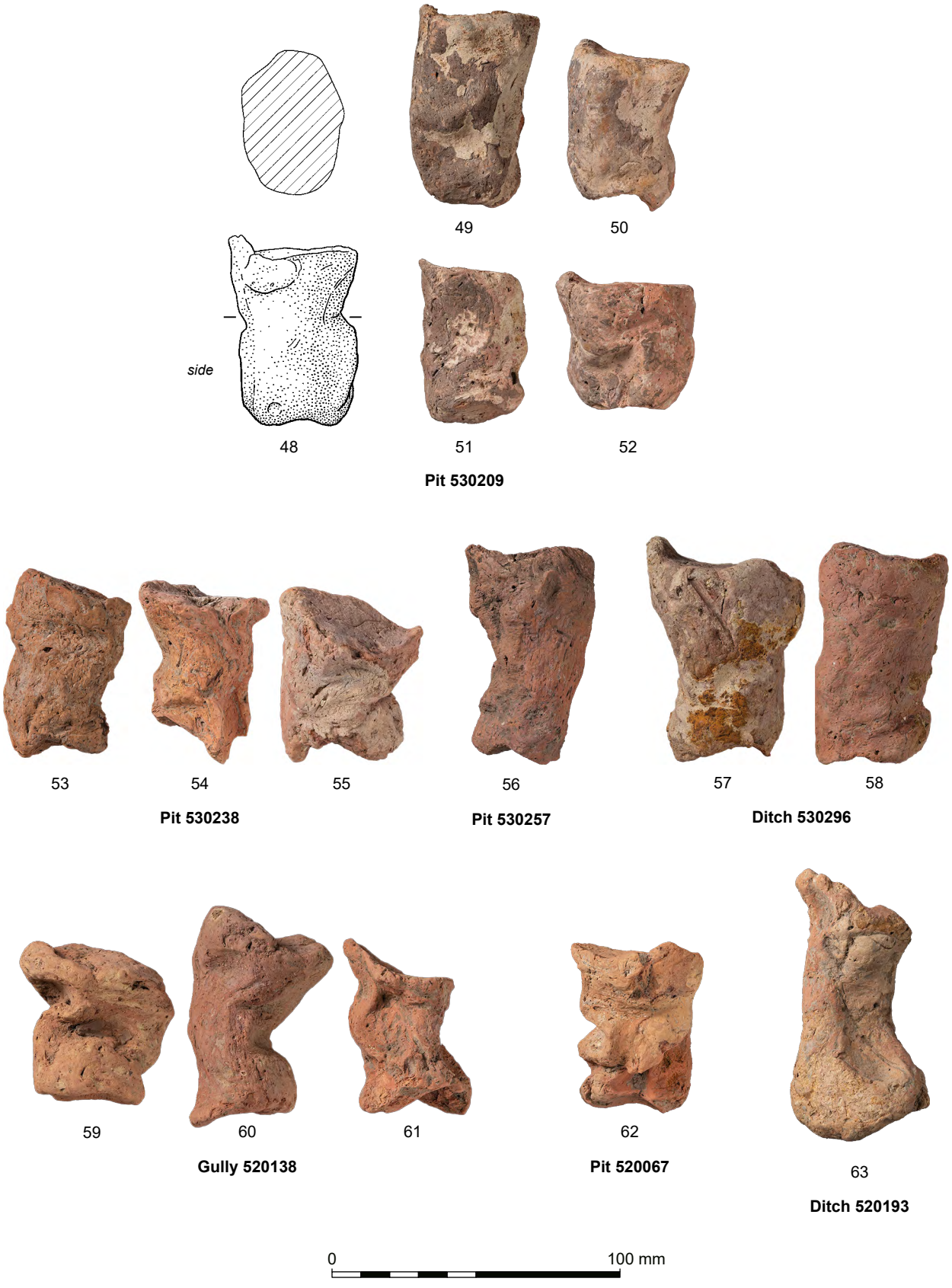


Figure E.7 Cylindrical supports with a channel end and a lipped end (pedestal)

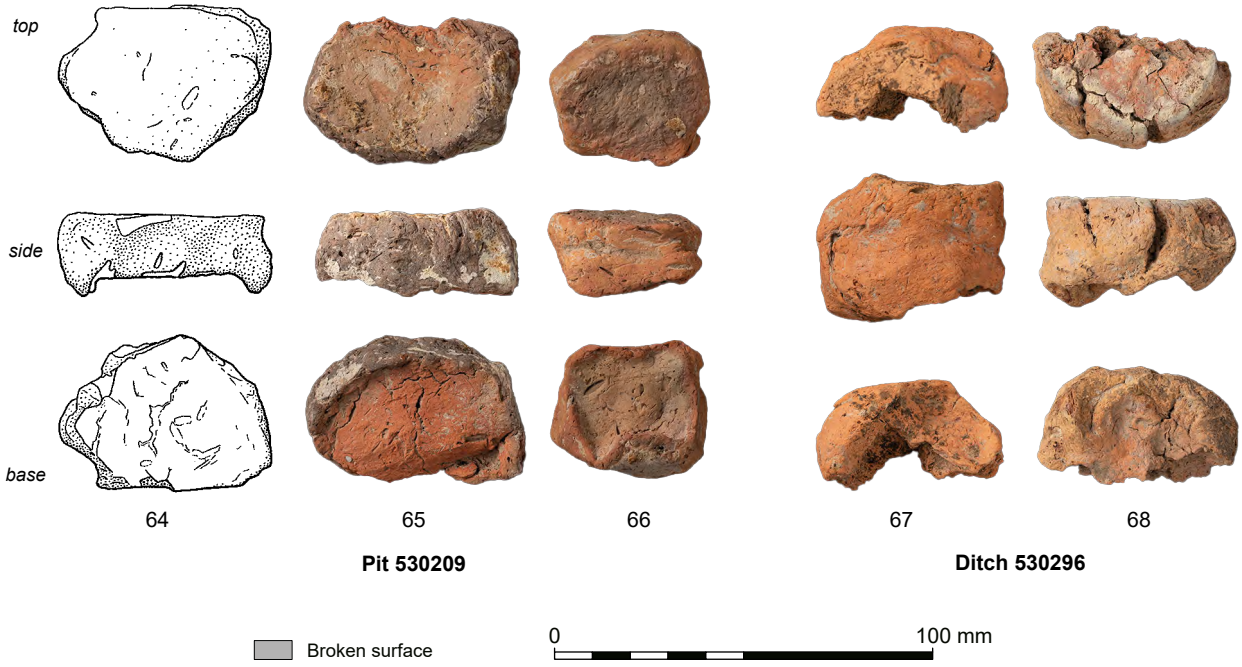


Figure E.8 Cylindrical disc-shaped supports (pedestal)



Figure E.9 Half-cylindrical supports with flattened end (stabiliser/spacer)

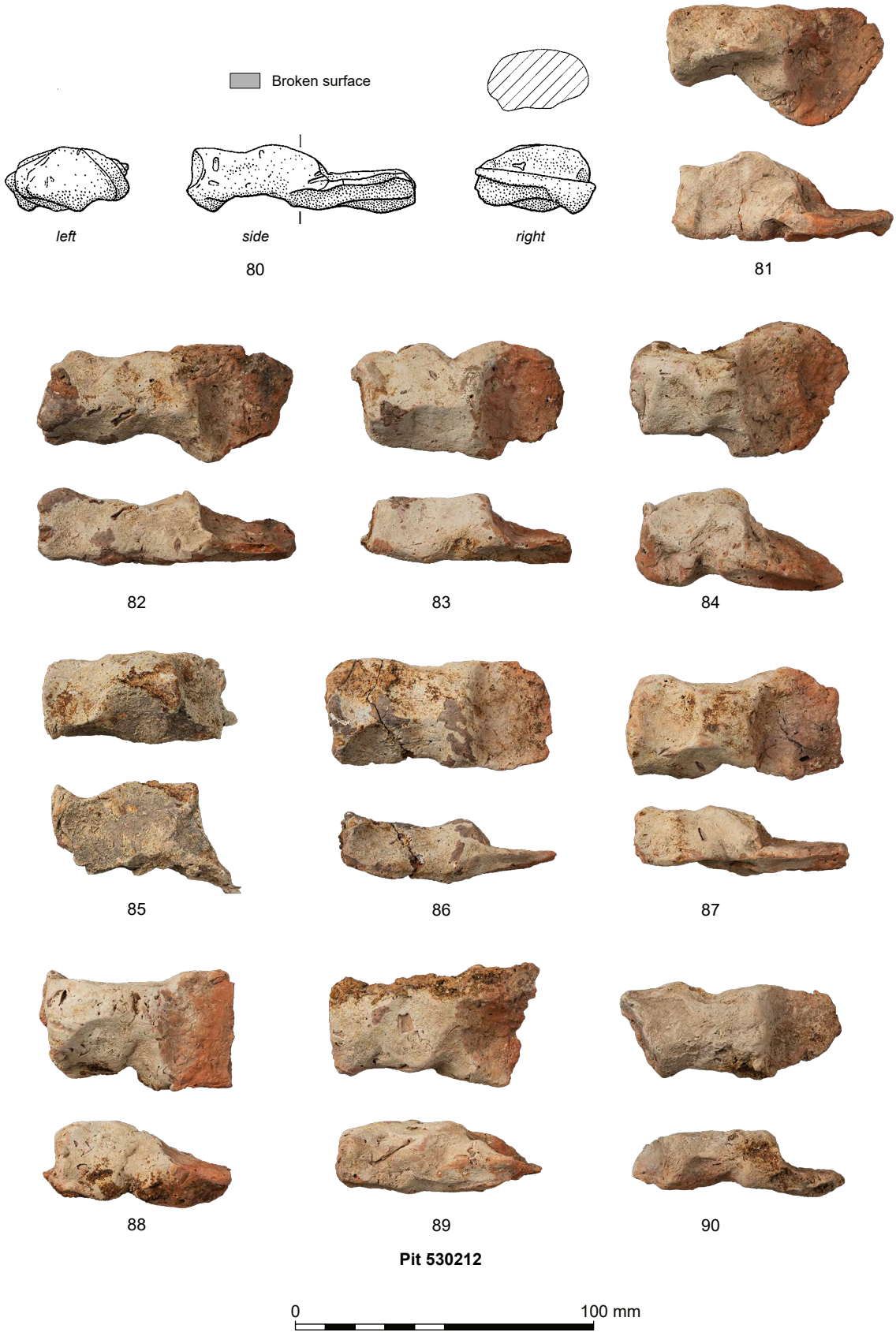


Figure E.10 Half-cylindrical supports with flattened end (stabiliser/spacer) cont'd

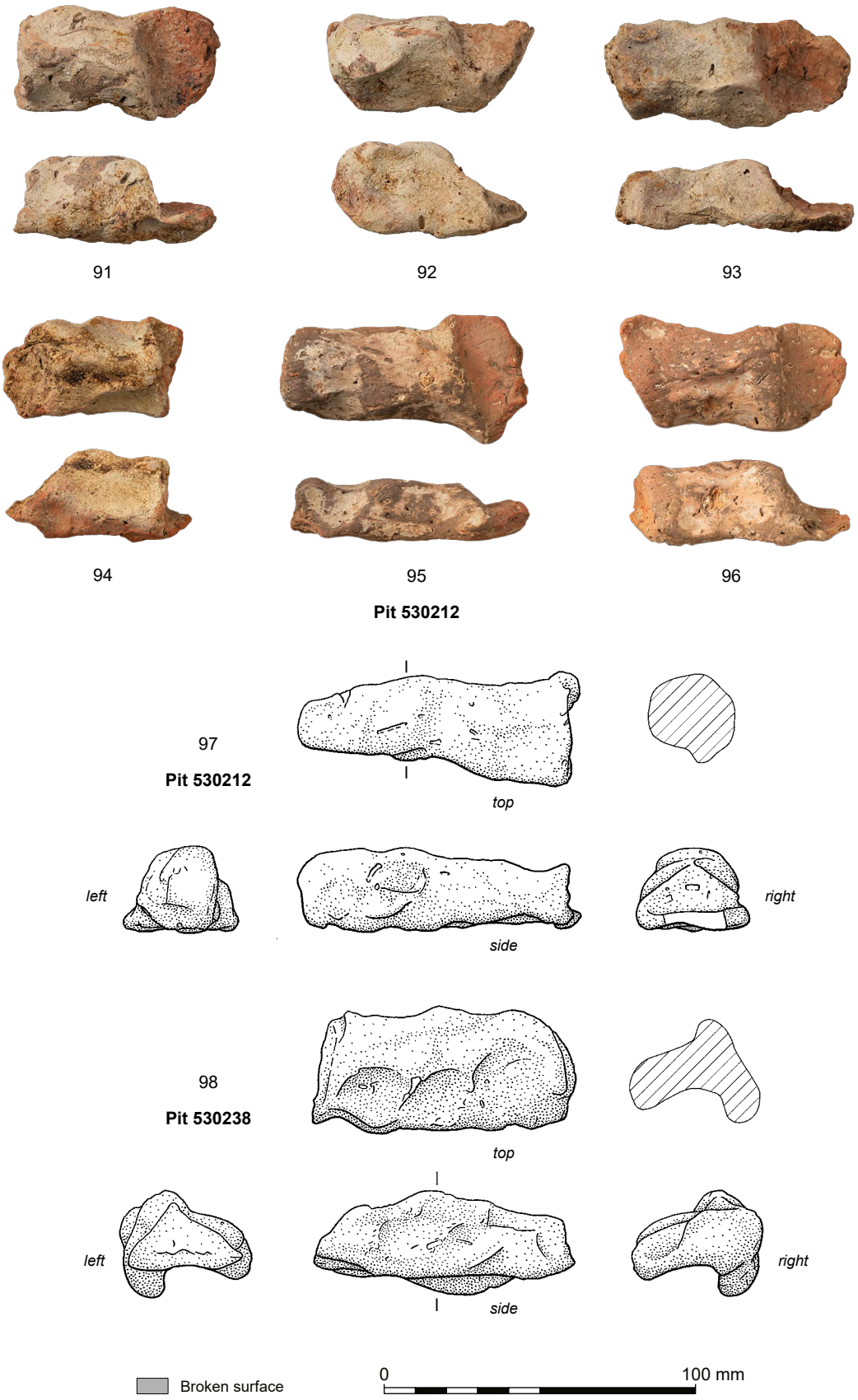


Figure E.11 Half-cylindrical supports (stabiliser/spacer) with flattened end (91–96), with rounded end (97) and pinched edge (98)

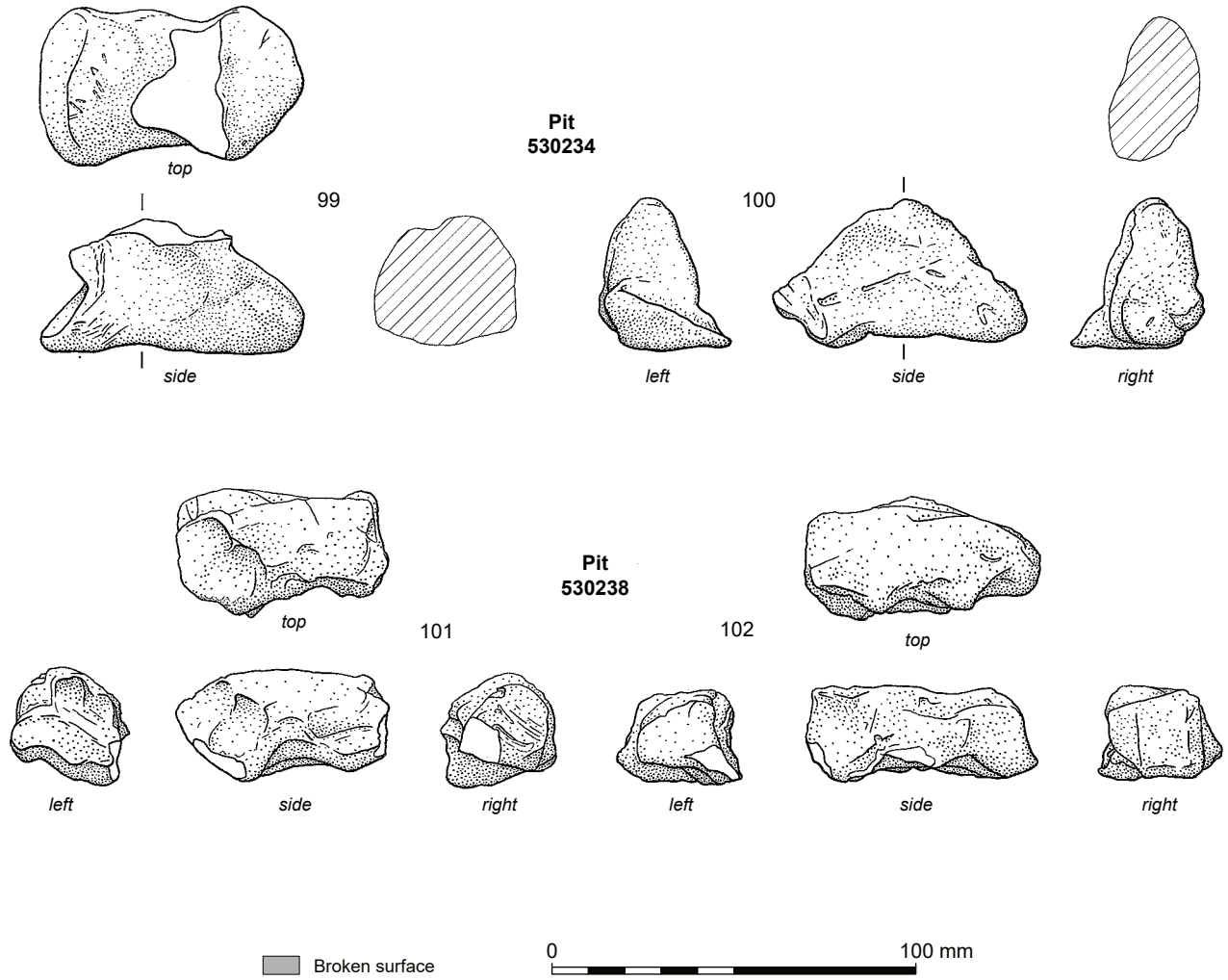


Figure E.12 Bridging supports (clip/spacer)

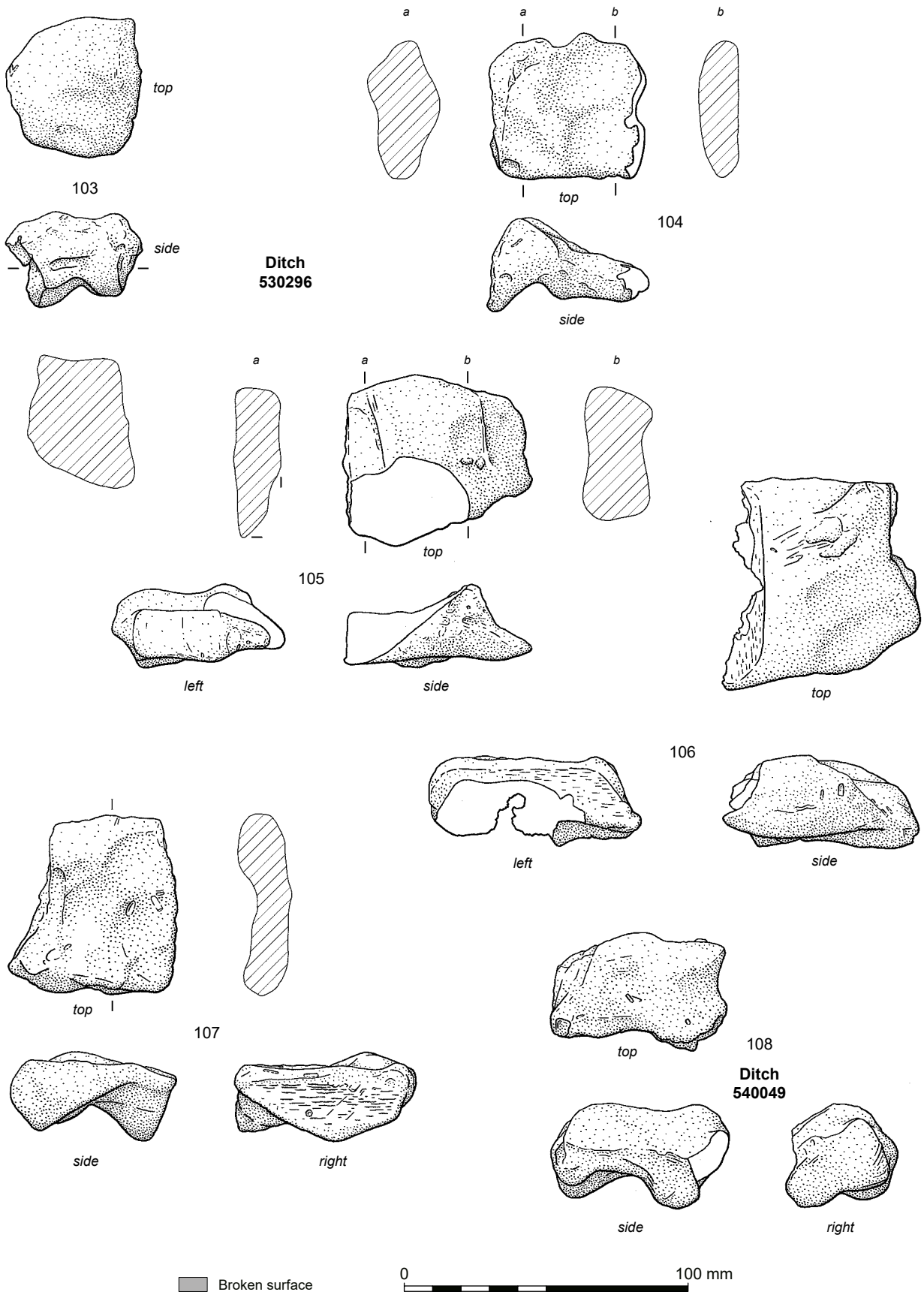


Figure E.13 Bridging supports (clip/spacer) cont'd

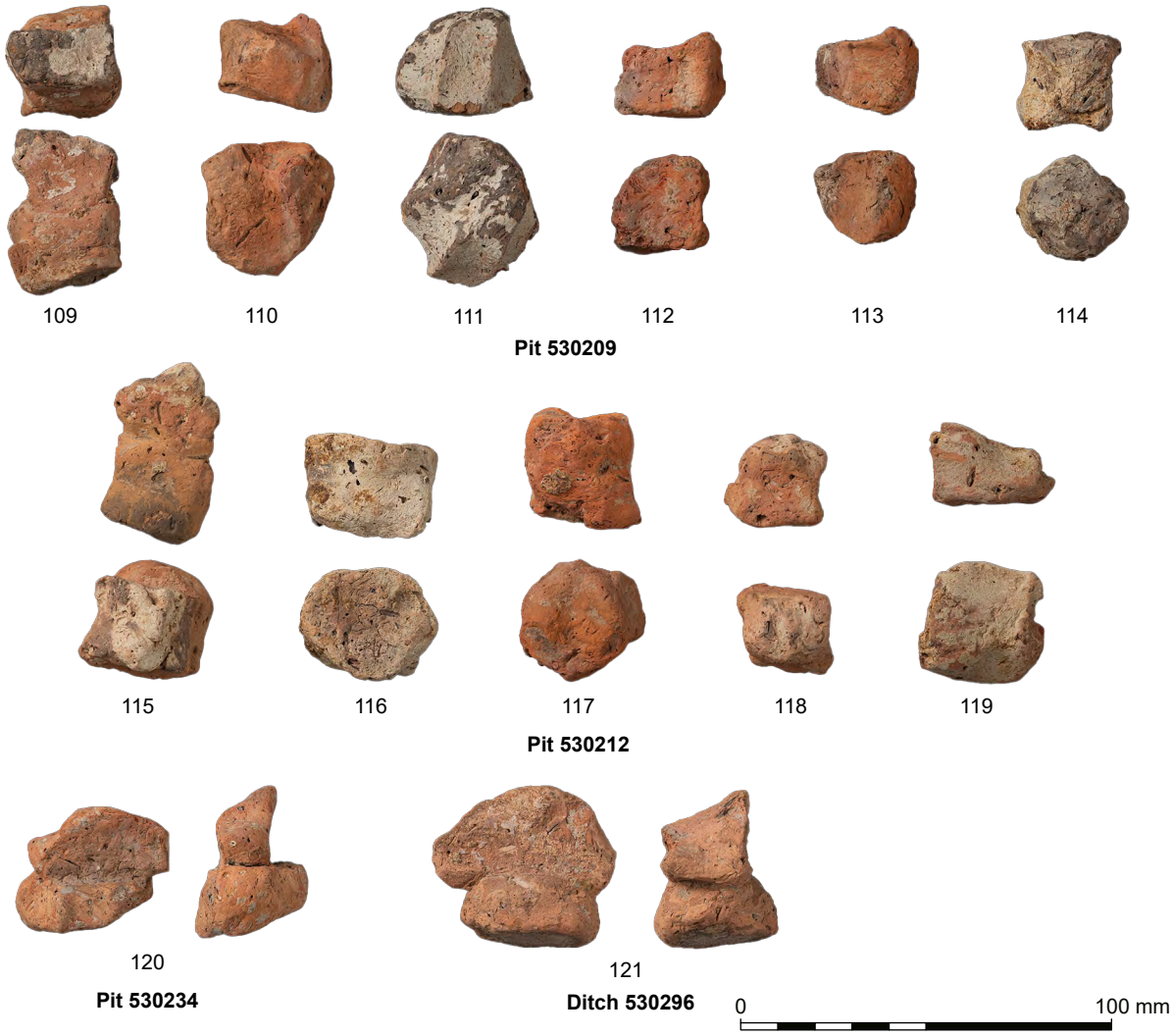


Figure E.14 Irregular-shaped supports (stabiliser/spacer)

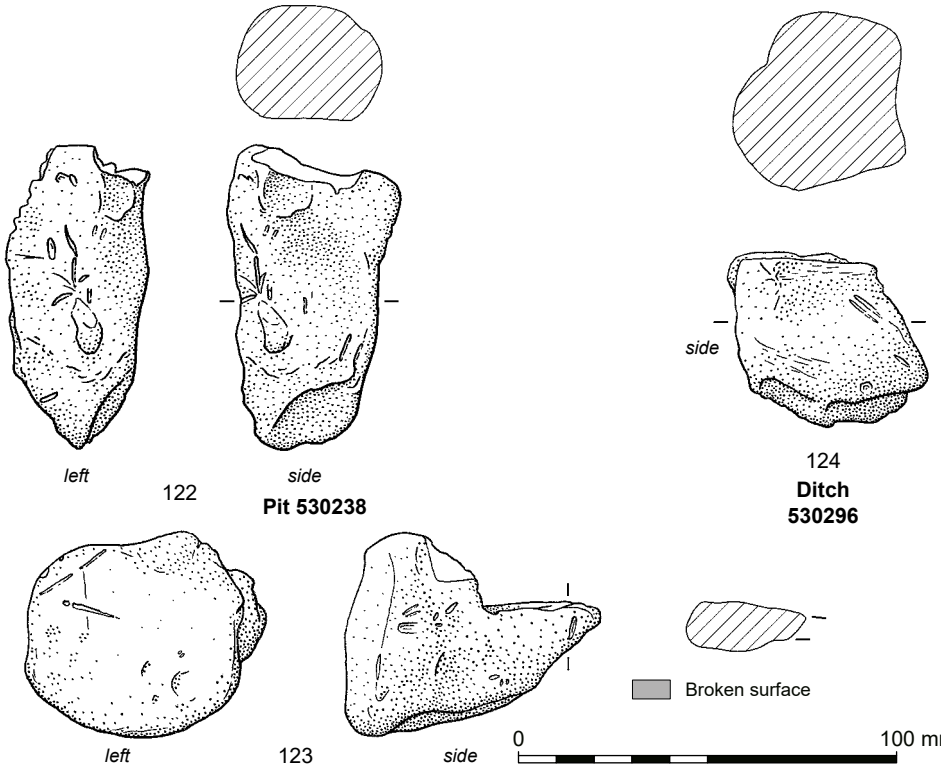


Figure E.15 Other clip/spacer or pedestals

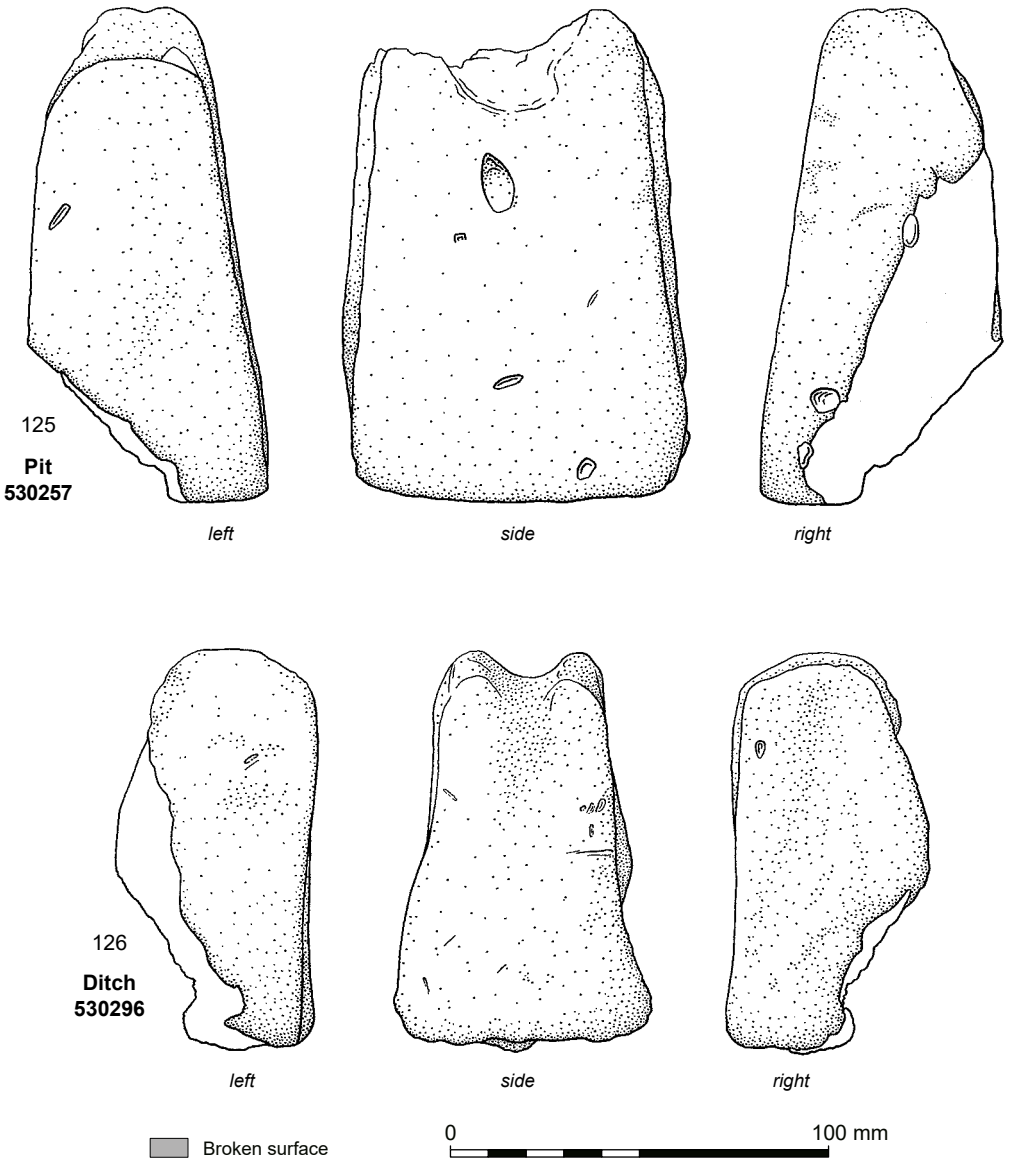


Figure E.16 'Horned' pyramidal pedestals

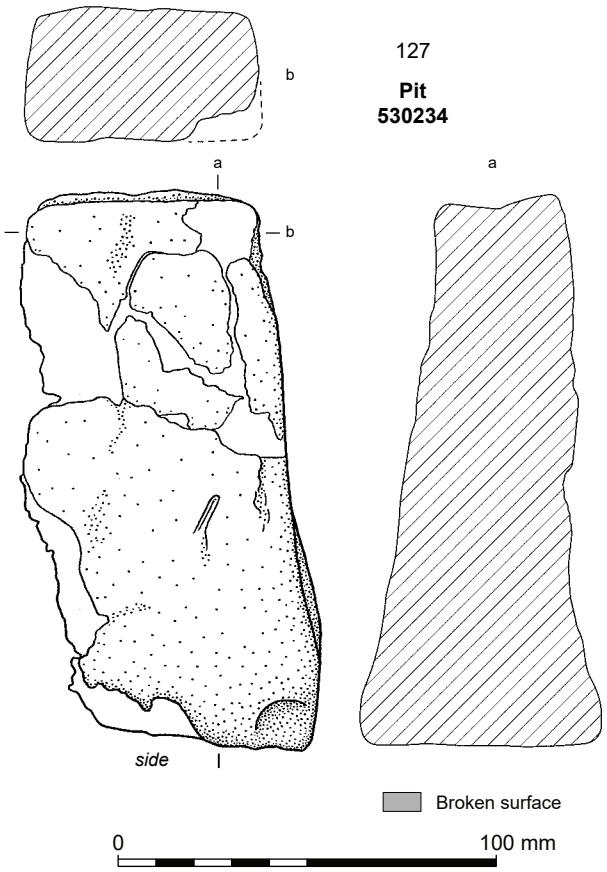


Figure E.17 Roman tapering brick

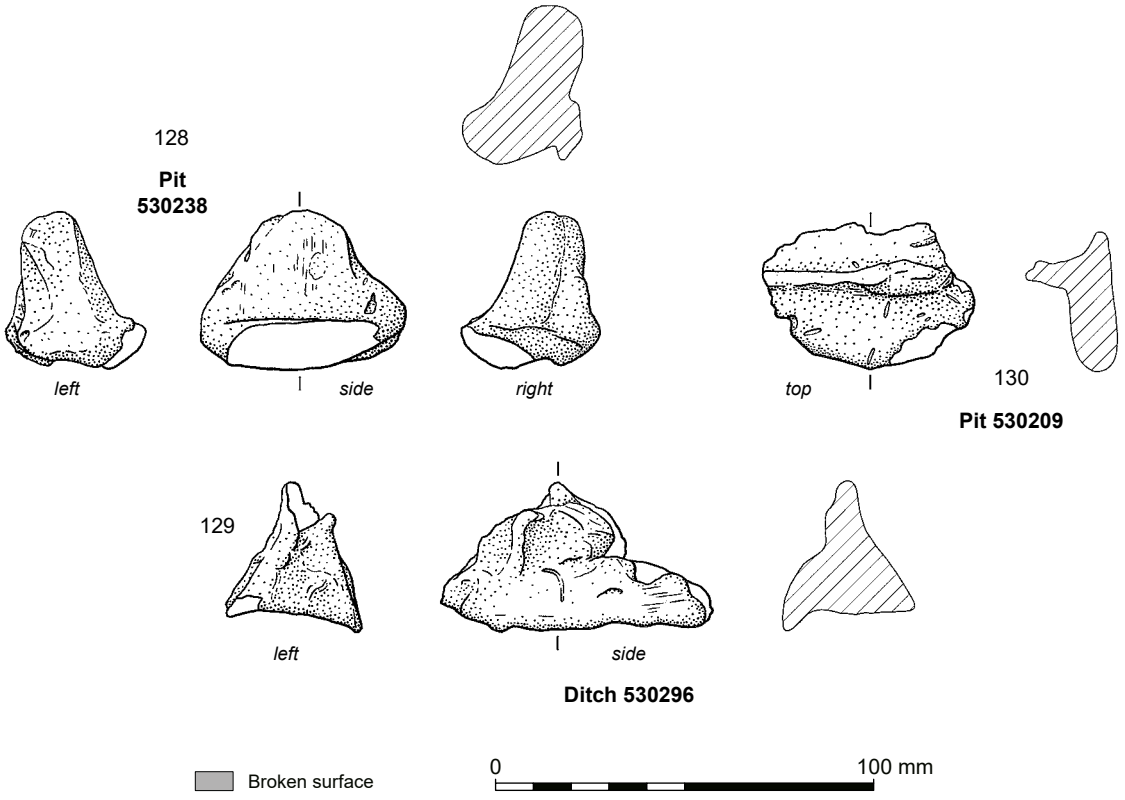


Figure E.18 Triangular objects (?spacer/wedge) (128–130) and brick clip (130)

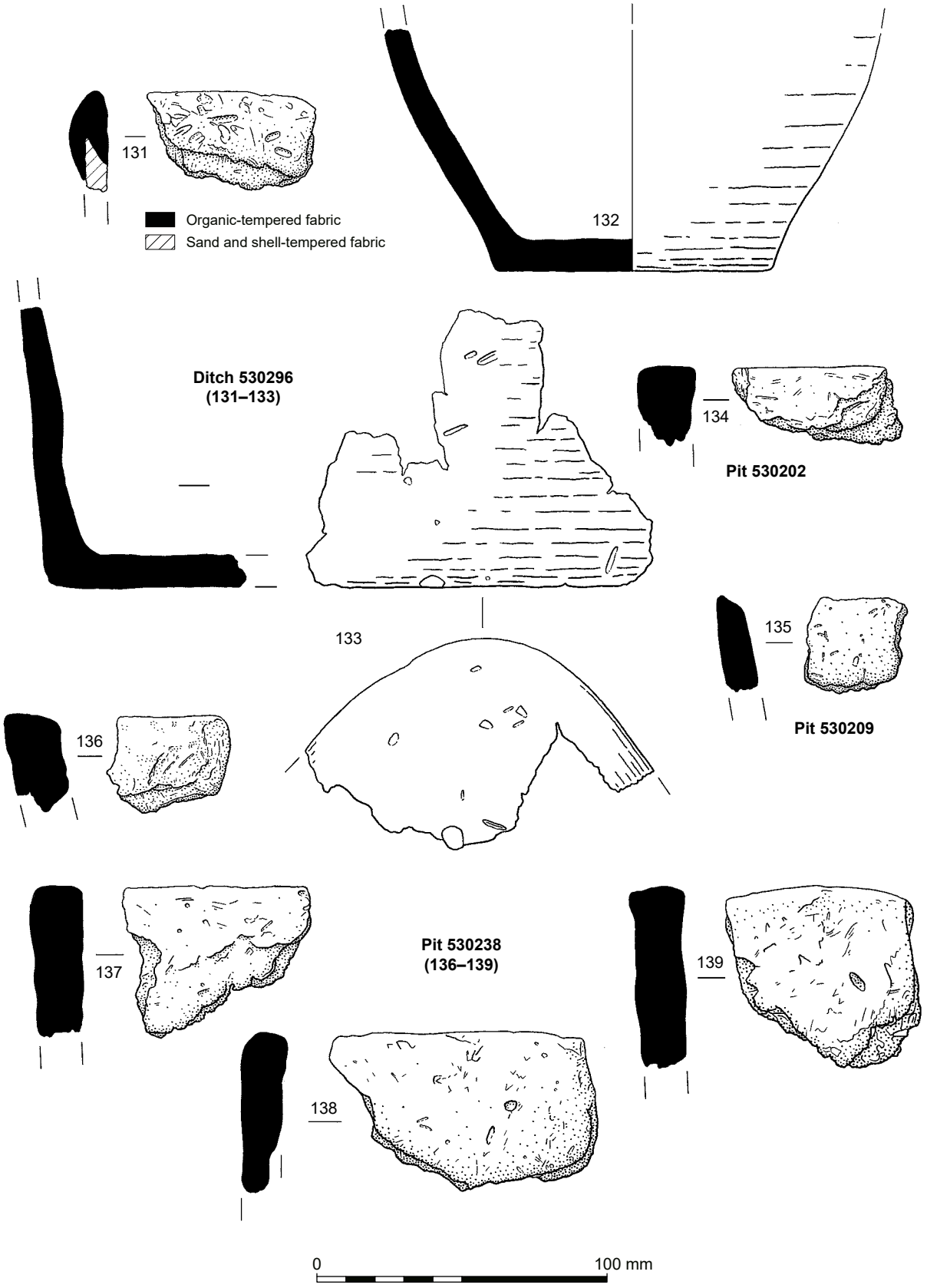


Figure E.19 Briquetage vessels

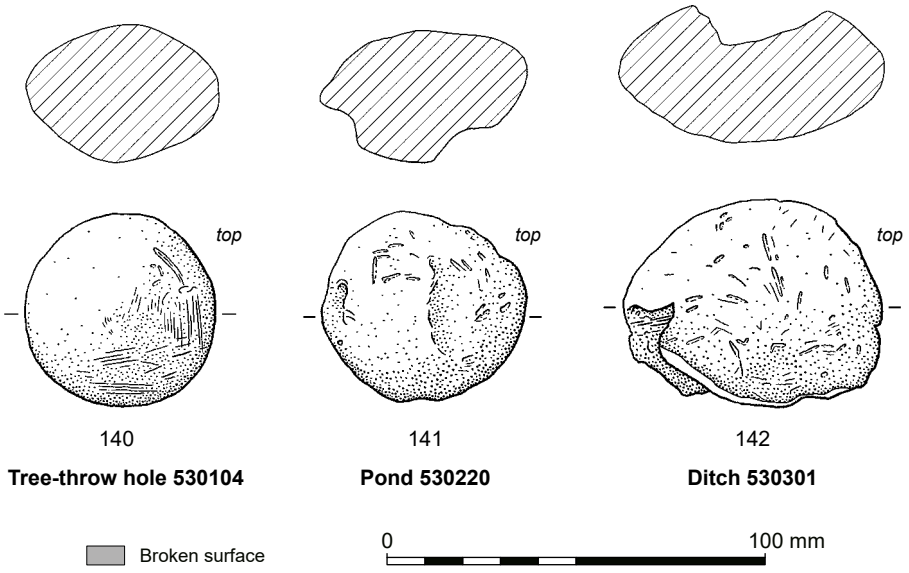


Figure E.20 Ellipsoid clay 'pebbles'

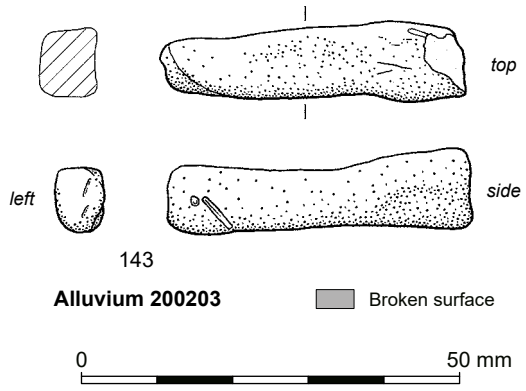


Figure E.21 Pinched, tapered rod ('pin')

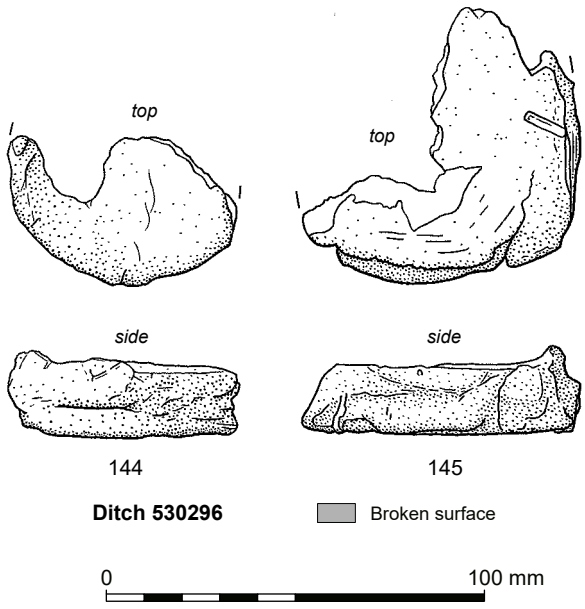


Figure E.22 Clay discs

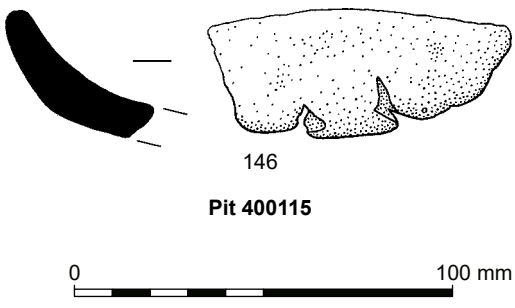


Figure E.23 Iron Age triangular crucible

Index

Nicola King

Numbers in *italic* denote pages with figures, **bold** denote pages with tables.

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The construction of the Viking Link power cable, which connects the electricity grids of Great Britain and Denmark, has led to the archaeological study of a 67 km-long transect across south-eastern Lincolnshire. The results augment the existing picture of the richness of the archaeological record for the Lincolnshire Wolds and within the valley of the River Lymn, but have also led to the discovery of new clusters of activity in previously little-explored parts of the Lincolnshire Marsh and around the northern Fen margin. Small rudimentary farmsteads and field systems of Romano-British date were widely dispersed across the landscape and form the most common type of site, with earlier remains being few in number but including a small worked flint assemblage, Neolithic pits, at least one Bronze Age barrow and several Iron Age roundhouses. The most significant discovery, however, is a small cemetery serving a local community within this part of the Anglo-Saxon kingdom of Lindsey in the 6th and 7th centuries AD. This is the first Anglo-Saxon cemetery from the southern Lincolnshire Wolds to have been excavated and fully published in the modern era. The overall value of the Viking Link investigations lies, however, in how the combined evidence sheds new light on the long-term development of the regional historical landscape.

This volume contains the results of the excavation of the most significant sites along the cable route, and presents the results of the specialist analyses of the human remains and the artefactual and environmental data collected from the project overall. It supplements Volume 1, which introduces the topographic, historical and geoarchaeological context of the landscapes crossed by the cable route, and which also contains a summary and discussion of the project results.

The two volumes may be seen as a companion piece to the Wessex Archaeology monograph *The Archaeology of the Hornsea Project One Offshore Windfarm Cable Route*, a similar and near-contemporary linear scheme in the north-eastern part of the county. Together, the projects demonstrate how recent renewables infrastructure projects have led to major advances in the understanding of the archaeology of Lincolnshire.





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VikingLink