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Summary

This report discusses the examination of organic material preserved by contact with metalwork from this seventh to early eighth century cemetery. Cemeteries of this date with associated grave goods are uncommon, and this one gave us the opportunity to examine objects with a distinct continental influence. Unfortunately the preservation of the organic material was poor and few examples could be identified to species level. On the macroscopic level, sufficient organic material was preserved to record the decoration and construction of many items particularly the belts, shields and seax scabbards.

Keywords

Anglo-Saxon
Iron
Copper Alloy
Mineral Preserved Organic Material

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Mineral preserved organic material from St Stephen's Lane and Buttermarket, Ipswich.

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Over eighty objects from this small Anglo-Saxon cemetery have organic material preserved on them by metal corrosion products. These remains have been examined in detail and the results are presented below. Most of the objects are personal items such as knives, buckles and the contents of purses, along with a few weapon groups. The date of this cemetery ranges from the 7th to the early 8th centuries.

All the objects were conserved at Norwich Castle Museum, but some items needed further conservation to reveal the mineral preserved organic material and other details and this work was carried out at the Ancient Monuments Laboratory. Initial examination was undertaken at Ipswich, and further work was carried out in collaboration with C.Scull when the material was transferred to the AML.

Organic material associated with the metalwork

In damp conditions most metals will corrode and the resulting corrosion products will stain any adjacent organic material. When buried, organic material impregnated with metal salts cannot readily be broken down by soil micro-organisms, and over long periods this material will become chemically altered by these minerals (Keepax, 1975). The sandy soils in Ipswich, especially in association with the inhumations, have provided a particularily aggressive environment for the metalwork, and as such have promoted the large scale preservation of organic material for study.

Mineral preserved organic material is more common on ironwork as this metal corrodes more rapidly than copper, lead or silver alloys. Iron preserved organic material is heavily impregnated with corrosion, and in some cases the whole structure has become replaced by iron salts while the organic component has dissolved away. On the other hand organic material preserved by copper corrosion still resembles the original material, which is sometimes stained green. Wood has been preserved by both iron and copper corrosion, with varying degrees of replacement. Hard animal tissue such as bone and horn are poorly preserved.

Fresh and waterlogged organic materials are identified by examining their microscopic structures and this is also true for mineral preserved examples. It has been possible to distinguish between most materials such as horn, bone, wood, leather and textile with the aid of a hand lens or low powered incident light microscope. Some traces of leather on knife blades and buckles are poorly preserved, and these objects have been recorded in a separate study by E.Cameron and G.Edwards. The identifications recorded below

were made as an initial survey of the material and formed the basis of the further work. For the most part identification of wood species was achieved by observing gold coated specimens in the Scanning Electron Microscope (Watson, 1988). Where this technique has been used a sample number is quoted in the catalogue. The organic materials from St. Stephen's Lane and Buttermarket sites appear very granular at high magnifications, resulting in a poor rate of identification of the wood species (fig. 1).

A large range of organic materials were recognised and these are best discussed under their object types, along with any comments on reconstruction. All the materials recorded here, with the exception of sweet chestnut, were readily available in Anglo-Saxon England and Europe; so it has not been possible to isolate any imported items on the basis of species identification. Sweet chestnut is presumed to have been introduced into this country during the Roman occupation, so this object could have been produced locally or be a continental import.

Insect puparia were found on a number of the objects, and these have been reported on separately by G. Turner-Walker.

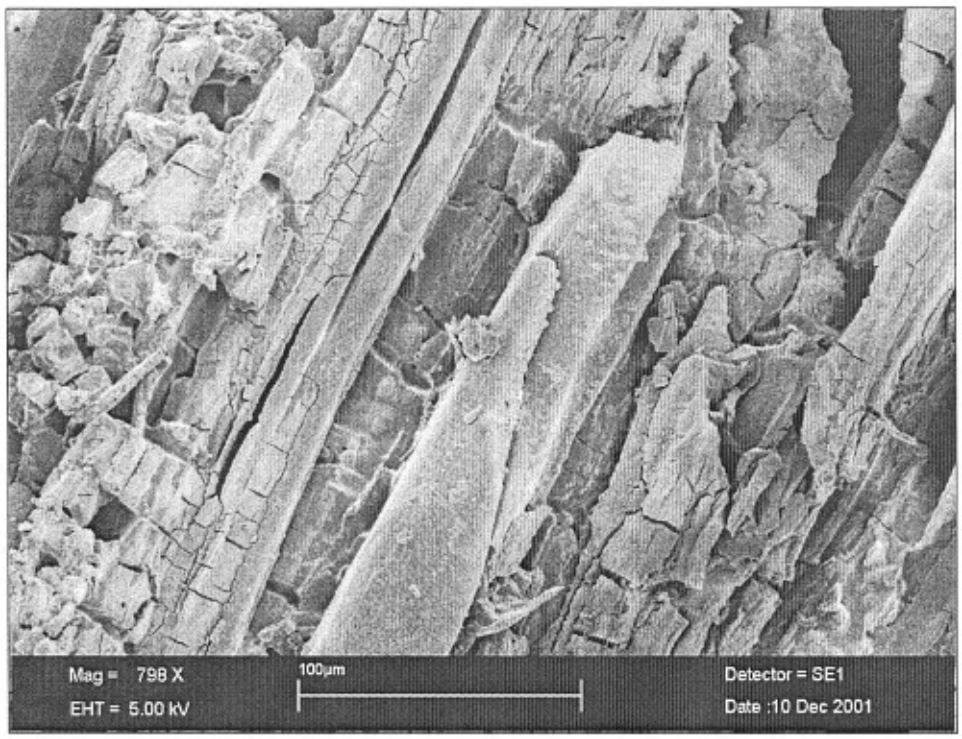

Figure 1. Electron micrograph of mineral preserved wood from awl tang (grave 4152:2 77292F), birch.

Knives

Twenty-one knives have been examined and seventeen have horn handles. Eighteen of these knives have traces of organic material on their blades which may be the residues of leather sheaths. Leather has not been well preserved on the metalwork from this site, for further details see report by E. Cameron and G. Edwards on this material.

Buckles

There are nine iron and eight copper alloy buckles from the site, all with mineral preserved organic material. My initial examination of this material suggested that ten have the remains of leather belts. Please refer to E. Cameron and G. Edwards on the preservation of skin products on the site.

Grave 1356 (3.7561/F) produced a rather unusual iron buckle that on further examination was found to have a cabochon garnet backed with gold foil and mounted on the buckle tongue (fig.4). The buckle-plate was decorated with brass rivets, and the surface had been tinned. Originally this buckle possibly resembled a silver-gilt type, especially with the addition of the garnet on the tongue (fig.2). The end of the leather belt passes through the loop, is held in place by the tongue and is then pulled back over the tongue so as not to obscure the garnet (see fig.3).

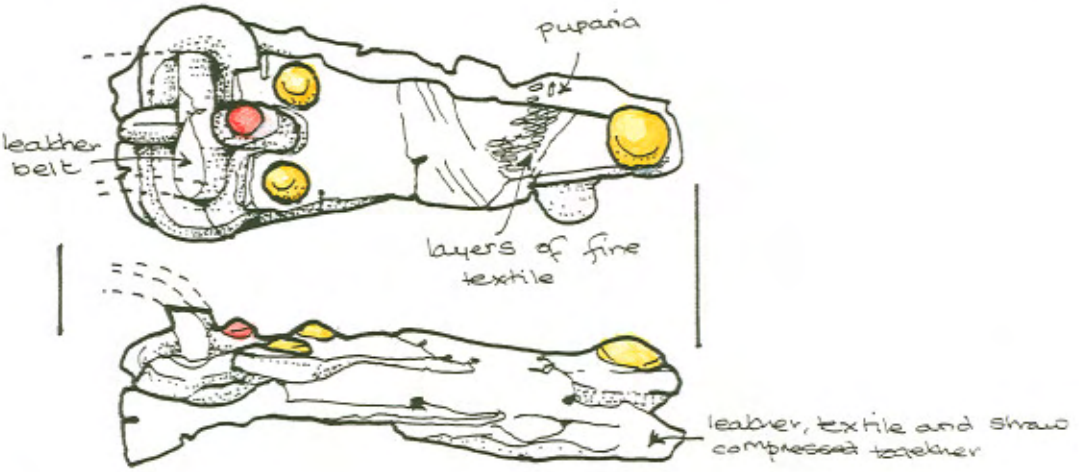

Figure 2. Tinned iron buckle decorated with a garnet and brass rivets and position of mineral preserved organic material. Actual size.

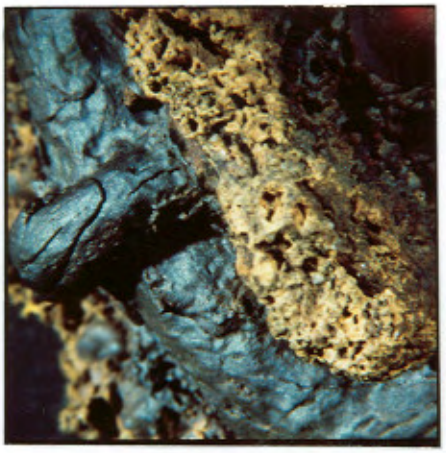

Figure 3. Remains of leather belt.

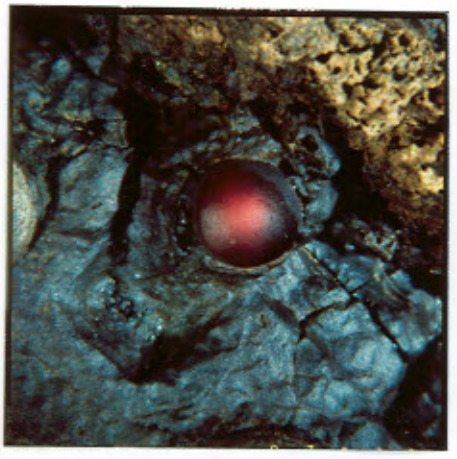

Figure 4. Cabochon garnet backed with gold foil.

Seaxes

There are three burials which had seaxes deposited in them, graves 1306, 2297 and 3243.

1306:16.3325/F
This seax has the remains of a single piece horn hilt, with grain aligned parallel to tang. The scabbard appears to be a made from a piece of leather held together along one edge by a line of small copper alloy rivets and decorated copper alloy studs which act as a reinforcement for the scabbard at the cutting edge. The thickness of the leather suggests that cattle hide might have been used, but no grain pattern remains to confirm this. The scabbard was originally decorated on one side with incised lines at the tip (see fig.5).

For further details of this scabbard see report by E. Cameron (2000).

2297:1.8853-4/F
This seax has few organic remains on it to suggest what the hilt and scabbard might have been like. A fragment of ash was found on the blade but this may have come from the coffin or grave cover as seaxes rarely have composite scabbards unlike swords.

3243:4,5.6795/F
Seax with single piece horn handle. At the shoulder there seems to be the remains of a copper alloy collar/scabbard mouthpiece, which can clearly be seen on the X-radiograph although it is now in a fragmentary condition. On the blade are the remains of the leather sheath, which is joined along the cutting edge by a close line of copper alloy rivets. On one side it is clearly decorated with horizontal lines framed on the back with two vertical lines which appear to have been cut into the leather (see fig.6). This seax and it's scabbard closely resembles one from Harford Farm, Norfolk (Penn, 2000; Watson, 1992).

On the whole seaxes have single piece horn hilts, just like knives, rather than composite hilts made from various materials, which are associated with swords.

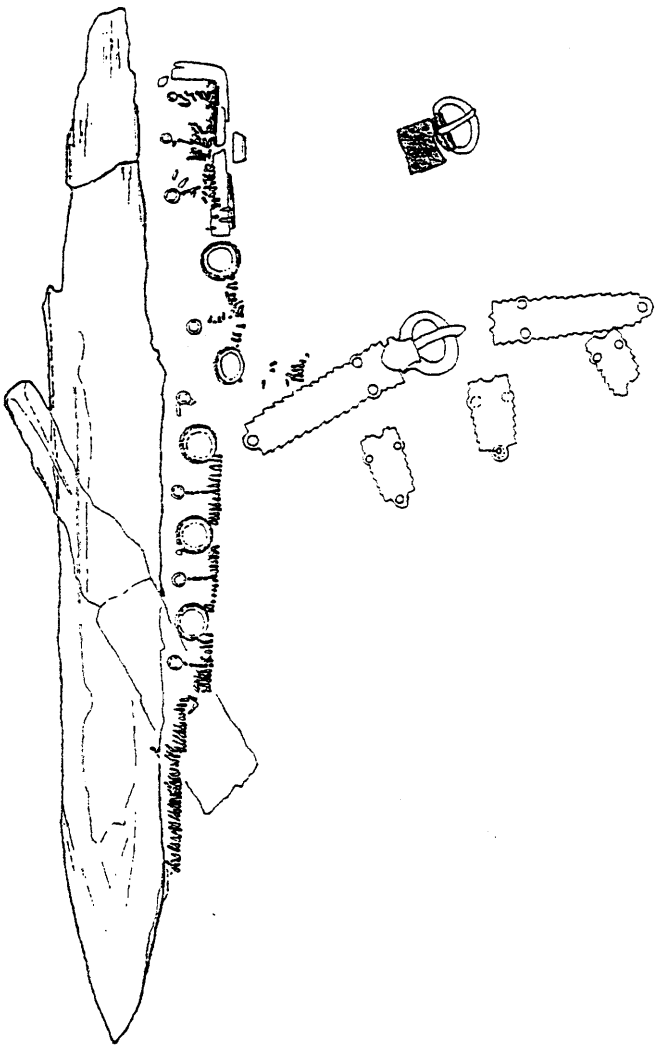

Figure 5. Seax from grave 1306 with belt set and knife in position as found. Drawn 1:4 by K. Morton

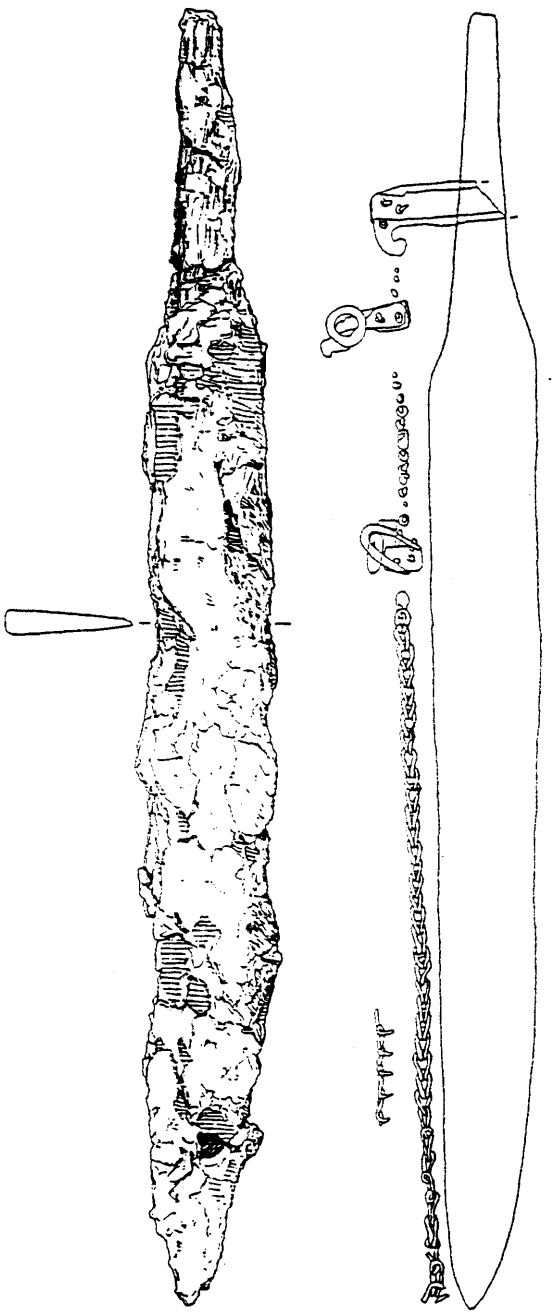

Figure 6. Seax from grave 3243. Drawn 1:2 by K. Morton

Shields

There are only two shields from this cemetery and both haves traces of the original shieldboard. Wood remains are clearly visible on both, 1306:2 was made of alder and 3659:1 made of ash. Both these woods have been recorded for use as shieldboards, although they are less common than willow, poplar or lime (Watson, 1995). Both have evidence to suggest that they were leather covered, without which the thin wooden board would split during use.

Unfortunately it has not been possible either to record, or estimate, any of the dimensions of the shieldboard 1306:2. There are no outer studs on the rim or a soil stain to suggest the diameter, and the thickness of the board at the boss flange is taken from the incomplete stud shank. The shield from grave 3659 had a minimum diameter of 540mm from the position of studs 3658:6,7, and would have been between 13.3-18.5mm thick at these positions. As the shieldboard is only around 10mm thick at the shieldboss flange, it may indicate that the wooden board was rebated to take the boss.

The evidence for the grip construction remains on both sets of shield fittings. On 1306:2 the grain direction of the wood runs in different directions on the boss flange and the iron grip, which indicates that two separate pieces of wood must have been used with the wooden grip slotted into rebates in the front of the shield board (Dickinson and Härke, 1993). The shield 3659:1 has a cut out type grip, where the wooden grip is integral to the shieldboard.

Both the shield bosses have the remains of straw and reeds on the front, which may be indicative of a lining or covering of this material within the graves. This is especially true for grave 1306, where both the front and back of the shield has these remains.

Cat.No.	Boss group	Board details	Diam.	Depth at flange	Depth at stud
Gr. 1306: 2 3324,8814/F	-	Both shield board and grip made from alder. The wooden grip has been inserted into the front of the shield board.	-	> 9.5mm	-
Gr. 3659:1 8970, 8826/F	7	Shield board made from ash. The wooden grip is integral to the shield board.	>550mm	c.10mm	c.18.5mm

Abbreviations

TLS - wooden board has a tangential surface RLS - wooden board has a radial surface
Boss group and grip type according to Dickinson and Härke (1993).

Table 1. Summary of the organic material on the shields

Spears

Three spears were recovered from two graves in this cemetery. Two spearheads were recovered from grave 1306. One was hafted with ash, which is the normal wood for this purpose, and the very large spearhead was hafted with either beech or wild cherry both of which are an unusual choice. Neither of these woods are as flexible as ash, but both are excellent for wood turning. Maybe this large spear was more symbolic or ornamental rather than functional, especially as the whole assemblage from this grave appears to have a continental influence? The spear in grave 3659 is only represented by a ferrule, in which the shaft remains could not be identified.

Containers

Box

There is the possibility that the two glass palm cups from grave 1306 were originally packed in a wooden box, but the only evidence for this is an iron ring with mineral preserved wood on the attached split spiked loop. This was found within a glass palm cup, and the wood was found to be maple, a wood commonly used for boxes and caskets. The iron ring mounted in this way is a typical type of handle used on the sliding lid of a box, like the example from Dover, grave 143 (Evison, 1987). The choice of a tangential wood surface also fits in with the ring being mounted on a box lid, as this surface shows off the figure of the grain to best advantage, which in the case of maple is very attractive. Also packed with this object is a fragment of fleece, which may have been used as a protective wrapping for the palm cups inside the wooden box.

Purses

There are few purse groups from the site and these are discussed elsewhere as they are mainly made from textile and leather components. The purse from grave 1356:4 had a kidney-shaped lid stiffened with wood, but unfortunately this couldn't be identified.

Other types of containers

There are two possible vessels from the site, from graves 2339 and 4275. Fragments of copper alloy sheet from grave 2339 are probably all that remains of a lathe-turned maple bowl with rim clips. In grave 4275, fragments of copper alloy sheet with fibres preserved on them may represent all that remains of some other type of container, this time possibly made from leather.

Coffins

Several of the graves have been recorded as having soil stains representing coffins or chambers, but only 1306 has been positively identified as having an ash coffin. It is assumed that all coffins were made of oak, but in fact ash has frequently been used as well.

Tools

Three awls have been recovered (1356:11; 3362:2; 4152:2), two had wooden handles, only one could be identified and was found to be birch. Most Anglo-Saxon tools tend to have either wood, bone or antler handles which sets them apart from the knives which usually have horn handles.

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* sample taken for identification

Grave 968

1.3221/F
Iron knife with mineral preserved organic material, some random material possibly straw. May have a trace of the handle, but this is too degraded to identify the material. No obvious sign of a sheath.

2.8803, 8827/F
Iron knife in two pieces, with traces of leather sheath and folds of textile on blade, and remains of the horn handle on the tang.

3.1937, 1938/C
Copper alloy buckle with mineral preserved organic material but unidentifiable.

4.3222/F
Iron buckle with a long thin plate. Passing through the loop and over the plate are the remains of a decorated leather belt. Fragment of copper alloy strip may be remains of a strap end. No mineral preserved organic material remains between the plates, but presence of numerous pupa cases may indicate that originally there had been a leather belt.

5.1069/C
Piece of decorated copper alloy, made of folded sheet, maybe a lace tag. Not bone.

4506
Iron nail with no mineral preserved organic material.

4512
Iron nail with no mineral preserved organic material.

Grave 1306

1.3223/F
Large iron spearhead with mineral preserved wood in socket, *Fraxinus* sp. (ash) made from mature timber. Found outside coffin stain.

2.3324,8814/F
Shield boss and grip with mineral preserved organic material Appears to have the wooden* part of the grip inserted between the shield board* and the boss, with wood grain along the length of the grip but perpendicular to the grain of the shield board. There appears to be mineral preserved leather between the shield board and the boss which suggests that the front at least was covered in this material. The grip is also

covered in strawlike material. Front of boss is covered in long stems rather than wood, may be reeds? Both the shield board and grip are made of *Alnus* sp. (alder).
SEM B664- shield board, B665- grip

5.8802/F
Iron ring attached by a split spiked loop to a piece of wood c.10mm thick. Board originally had TLS surface*, and was probably made from *Acer* sp. (maple).This was found within a glass palm cup, and could be all that remains of a wooden box containing the two palm cups.
B487

6.3226/F
Large iron spearhead with mineral preserved wood in socket*; *Fagus* sp. (beech) or *Prunus* sp. (wild cherry).
B488

7.8815/F
Iron knife tang with mineral preserved horn handle, and belongs with knife under seax.

8.9105/F
Very small fragment of iron with mineral preserved wood, *Castanea* sp. (sweet chestnut).

9.1717/C
Copper alloy buckle with mineral preserved leather on reverse.

11.1718/C
Small copper alloy belt plate with mineral preserved leather.

14.1722/C
Copper alloy buckle with mineral preserved leather around loop. 1717,1718, 1722 probably belong to a baldric

15.9106/F
Iron strapend found underneath the seax.

16.3325/F
Iron seax with mineral preserved organic material. Has the remains of a single piece horn hilt, with grain parallel to tang. Scabbard appears to be a made from a piece of leather held together along one edge by decorated copper alloy fittings - this suggests that the blade must have a single edge, and these fittings act as a reinforcement for the scabbard at the cutting edge. The thickness of the leather suggests that cattle hide might have been used, but no grain pattern remains to confirm this. The scabbard was originally decorated on one side with incised lines at the tip.

Also traces of wood that may have belonged to the base of the coffin*, probably *Fraxinus* sp. (ash), according to K. Wardley's notes the grain of this was aligned lengthwise with the grave.

Reference to compact white material over hilt, but couldn't see any thing that looked like this on the object.

Sample Q is horn not wood.

1726
Copper alloy stud associated with seax, fibrous organic material is present around the shank which is most likely to be leather from the scabbard.

Grave 1356
1.8812/F
Iron knife with mineral preserved horn handle and traces of leather sheath.

2.7562/F
Iron knife blade with possible leather sheath.

3.7561/F [950584]
Iron buckle and plate with mineral preserved organic material. The counter plate is decorated with three copper alloy studs, dome-headed, and slight traces of a white metal coating which XRF analysis suggests was tin. A cabochon garnet has been mounted on the tongue, backed with gold foil. The tongue itself pierces what was probably a leather belt, around 4mm thick, but the remains are very degraded. On the front of the counter plate a few broken threads are preserved. On the reverse of the buckle are layers of organic material including very degraded leather, textile and fragments of pupae cases.

4, 7-9 : Remains of a purse with kidney-shaped lid. The lid is incomplete, having been cut by a later pit.

4. 938,1919-20/C
Curved copper alloy mounts which were on a leather covered wooden object*. Min. 5mm thick. Wood not well enough preserved to identify species.
B489

7.1929/C
Small triangular copper alloy mount with no remaining mineral preserved organic material.

8.1930/C
Small copper alloy buckle and plate with mineral preserved leather between plates. leather c.1.5mm thick.

9.1931/C
Copper alloy strap end with leather, c.1mm thick, preserved in cleft.

10.1932/C
Copper alloy mount with no mineral preserved organic material. This item was found in the purse and is thought to be scrap.

11.8813/F
Iron awl found within purse, has remains of the wooden handle but these were too degraded to identify species.
SEM B491

Grave 1760
1.4700/F
Iron knife with the remains of a horn handle, and traces of leather on the blade.

Grave 1988
1.9048/F, 2.1268/C
Small copper alloy buckle corroded onto the loop of an iron buckle, both appear to have traces of separate leather belts.
The two iron straps, 3 and 4, are part of the coffin or chamber.

3.4822/F
Nailed iron strap with mineral preserved wood but not enough to identify species. Probably associated with 5013.

4.5013/F
Nailed iron strap with mineral preserved wood, not enough to identify but at least 17mm thick. Also clench nail with 22mm of wood preserved between ends*, *Fraxinus* sp. (ash).

Grave 2203
1.5853/F
Iron buckle with mineral preserved textile on all surfaces along with other organic material between the plates that may be leather.

2.7753/F
Iron object with no mineral preserved organic material.

Grave 2297
1.8853-4/F
Iron seax with mineral preserved organic material. Wood scabbard: *Fraxinus* sp. (ash). There were no signs of fleece or leather preserved on the sample, which would have confirmed it as being part of the scabbard.

2.6787/F
Piece of iron preserved leather and textile, also includes a small iron buckle with the

tongue missing.

3-6.1604-1608/C
Copper alloy buckle and belt fittings all have traces of mineral preserved leather, one piece of which is over 5mm thick and suggests the use of cattle hide. 1608 has a knot of leather through the end this is made up of a strip c.7m wide and over 1mm thick.

Grave 2339
2411,8804/F
Iron knife with a horn handle and possible traces of a leather sheath.

2.2827/C
Various iron and copper alloy fragments excavated from a soil block. All have traces of wood and some possibly leather, were originally thought to be part of a purse but now it seems more likely to be a lathe-turned vessel with two rim clips.
* K iron binding on wood with a flap of leather folded over the iron. Wood was too degraded to identify.
* H copper alloy mount on wood, *Acer* sp. (maple).
H B492, K B493

Grave 2365
6526 [found in backfill 0.2m above grave floor]
Iron plate with rivet holes, reverse covered in random straw-like material.

Grave 2946
1.6796/F
Iron knife with horn handle and possible traces of leather sheath.

Grave 2962
17.8827/F
Also associated with knife (18) are small rod fragments which belong to an iron key or latchlifter, and have textile preserved on them.

18.8828/F
Iron knife with mineral preserved horn handle and leather sheath.

19.8827/F
Attached on one side of knife (18) is a long tapering square sectioned object which may have originally been a strap end.

Grave 3243
1,2.7102/F
Two iron staples with mineral preserved wood*, possibly *Acer* sp. (maple). The most complete example was used to join two pieces of wood together as the grain on both sections is not identical, but both have a tangential orientation

4,5.6795/F
Seax with a hilt made from a single piece of horn. At the shoulder there was possibly a copper alloy collar/scabbard mouthpiece. On the blade are the remains of the leather scabbard, which is joined along the cutting edge by a close line of copper alloy rivets. On one side it is clearly decorated with horizontal lines framed on the back with two vertical lines which appear to have been cut into the leather.

Grave 3362
2.7059/F
Very fine iron awl with organic handle, but not identifiable.

3.1627/C
Copper alloy pin on fragment of wood, but not identifiable.

Grave 3571
2.7761/F
Iron knife with tang with traces of mineral preserved horn. Has the remains of a leather sheath with textile on one side.

3.9047/F
Iron knife blade with remains of leather sheath.

Grave 3558
1.1837/C
Copper alloy pin with possible threads along its length.

Grave 3659
1.8970,8826/F
Iron shield boss with mineral preserved wood on flange, *Fraxinus* sp. (ash). Also appears to have leather between the iron and wood. Grip has wood with grain perpendicular to its axis, which suggests that it was cut out from the shield board rather than inserted. Outside of boss has random organic material, possibly plant stems or straw.

2.8972/F
Shield studs with 13.3mm thickness of wood preserved*, *Fraxinus* sp. (ash) with a radial surface. But no sign of leather preserved between the iron and wood.

3.8973/F
Shield stud with 18.5mm thickness of wood, *Fraxinus* sp. (ash) with a radial surface.

4.8971/F
Iron knife with horn handle, cut from the apex of the horn with the horn tip towards the blade end of tang. Also has traces of leather sheath.

5.8806/F
*Iron ferrule originally found alongside the cutting edge of the knife. Has mineral preserved wood in socket, but too degraded to identify species.
SEM B494

6.1898/C
Copper alloy buckle and plate with possible remains of leather belt.

Grave 3686
1.7226/F
Possibly an iron purse ring, with fine weave textile on reverse.

Grave 3871
1.8805/F
Iron knife with mineral preserved horn handle and leather sheath. On one side of the handle is an area of random organic material, possibly straw.
Sample D is bone, cancellous tissue possibly from the femur.

2.1894/C
Copper alloy buckle and plate with traces of leather belt on reverse of plate.

3.1895/C
Copper alloy belt fitting with possible leather on the reverse and straw preserved on the heads of the iron fittings.

4.1897/C
Copper alloy belt fitting with possible leather on the reverse and straw on the heads of the iron rivets.

5.1896/C
Copper alloy finger ring with no mineral preserved organic material.

Grave 3889
1.7410/F
Iron knife with horn handle*, the surface of which has been cut across the laminated structure so that during the process of decay these layers have opened out giving a fibrous appearance. There are also fragments of a leather sheath.

B495

Grave 4054
1.7314/F
Iron knife with mineral preserved horn handle and traces of leather sheath. The leather is not clear because it is overlain with crushed textile.

Grave 4152
1.7306/F
Iron knife with mineral preserved horn handle and leather sheath. Sheath covers much of handle.

2.7292/F
Iron awl with wooden handle, possibly *Betula* sp. (birch).
B496

3.7313/F
Iron buckle with mineral preserved leather.

Grave 4251
1.1728/C
Copper alloy wire rings with mineral preserved organic material.

2.1753/C
Copper alloy fragments with mineral preserve textile.

1728/C
Copper alloy pennannular brooch with fragment of bone.

Grave 4269
3.8420/F
Iron buckle and plate, with organic material between the plates which is not very clear but in this position most likely to be leather as it is 3.6mm thick. On top of the front plate are traces of a skin-like material with hairs, and on top of that and over the loop are textile remains.

Grave 4275 [Rectangular coffin stain - coffin possibly ash cf 8808 below]
1-45.4343/F
Soil block containing base silver pendants/beads, one (G,21) of which has a fine plain weave textile preserved on the back. Also found with them a group of silver rings and pendants with possible textile (1913, 28-30), and 2 copper alloy pins, which may have belonged to the brooches.

46.8807/F
*Iron knife with mineral preserved horn on tang and remains of leather sheath on blade and extending over the handle.

47.8816-23/F
Fragments of iron and girdle hangers with mineral preserved textile. Broken and incomplete iron chatelaine.

8823 also has a fragment of horn preserved on one side, probably part of knife handle or related to 1933/4.

47.8808/F
Iron ring with possible girdle hangers covered in mineral preserved textile. A fragment of possible *Fraxinus* sp. (ash) is preserved on one side.

47.8825/F
Curved iron bar with fragments of leather preserved over it. At one end there appears to be a collar of antler. On one side are fragments of wood.

48-50.1933,4/C
Fragments of copper alloy sheet with mineral preserved fibres, probably represent all that remains of an organic container, maybe leather, with copper alloy mounts.

4.1933 – fragments of copper alloy sheet with mineral preserved horn. The grain follows the narrow edge of the strip, but one cannot tell if the horn was originally on the inside or outside of the metal, or even if the strip was curved.

Grave 4344
1.7667/F
Iron knife with horn handle. Puparia on both sides of the blade may indicate that the knife was originally in a leather sheath.

2.7668/F 4349
Iron buckle with coarse textile on reverse. Some puparia near the tongue as well as compacted organic material which may be the remains of a leather belt.

3.7669/F 4349
Disc-headed iron rivet originally mounted on organic material c.5.7mm thick. Nothing remains of this material except several puparia between the head and possible washer, which may suggest leather.

Grave 4543
1.8053/F
Iron knife with mineral preserved horn handle and possible leather sheath.

Grave 4995
1.8476/F
Iron knife with mineral preserved horn handle and no definite signs of a leather sheath, but textile preserved on both sides of the blade. The surface of the handle has been cut across the natural laminations, these have now started to separate and appear fibrous like wood.