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**Summary**

Report on the organic material preserved by contact with metalwork from this 6th to early 7th century cemetery. The different organic materials were preserved in a highly variable condition, wood and textiles were well preserved whereas leather was less well defined, bone and antler were non-existant except where directly in contact with corroded iron. The six sets of shield fittings had sufficient organic material preserved on them to provide valuable information on their original construction.

**Keywords**

Iron
Copper Alloy
Mineral Preserved Organic Material
Wood
Leather
Antler

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The finds from this cemetery are of 6th to early 7th century date, but artefacts from grave 93 appears to be early 8th century. All the material was first examined in the Archaeology dept. at the County Council offices, Ipswich. Most of the material has been conserved by Karen Wardley and Gordon Turner-Walker, both at the Castle Museum, Norwich. The objects were then transferred to AML for further work while Chris Scull reported on them.

E.Crowfoot covers the textiles in a separate report, and Caroline Cartwright has examined the bulk of the material from grave 93 during conservation at the British Museum.

**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 particularly aggressive environment for the metalwork, and as such have promoted the large scale preservation of organic material for study even though the skeletons are practically non-existent.

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 - this mainly applies to bone or antler. In only a few instances copper corrosion has replaced the organic material. Wood has been preserved by both iron and copper corrosion, with varying degrees of replacement. Hard animal tissue such as bone, antler and horn is poorly preserved and in the case of horn is only seen preserved in iron corrosion products. The preservation of leather is particularly poor on the metalwork from Boss Hall, and Esther Cameron and Glynis Edwards have discussed the condition in more detail.

Examining their microscopic structures identifies fresh and waterlogged organic materials 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. For the most part identification of

wood species was done by observing either thin sections of lightly coated material or gold-coated specimens in the Scanning Electron Microscope (Watson, 1988a). Where the latter technique has been used a sample number is quoted in the catalogue.

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 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.

**Shields**

Six sets of shield fittings were recovered, all with traces of organic materials relating to the original shield boards and these are summarised in the table below. This clearly illustrates that there is no relationship, for this site at least, between boss type, grip construction and wood species. Chris Scull has attributed the boss groups.

The six shields are made from five different woods, two of ash and one of willow or poplar, beech, birch, and possibly lime. The ash shield boards are fitted with different types of boss, so there can be no correlation between choice of wood and boss for this group. All these woods have been used for shield boards on other sites (Watson, 1995).

The shield boards mainly have tangential surfaces, and the boards themselves are usually less than 13mm thick. This uniformity suggests that the boards were carefully trimmed to shape by hand probably using fine tools such as a drawknife. The depth of wood on the boss flange from grave 51 is very thin, and may indicate that the shieldboard was recessed to take boss so that the upper surface of the flange was level with the leather covered shieldboard.

All the shields were examined to see how the grips were attached based on the Dickinson and Härke typology (1992), and there appears to be 5 of the cut-out type and one example where the wooden grip was rebated into the front of the shield board (Gr.96).

| Grave | Board details | Handle | Diameter | Thickness at boss | Thickness at fitting |
|---|---|---|---|---|---|
| 74 | Ash (oblique RLS). Leather on front and back. Grip bound with leather strips. | Cut out | <700 mm | 6 mm | 9 mm |
| 87 | Willow or poplar (TLS). Leather on front. Grip bound with leather strips. | Cut out | >400 mm | 9 mm | 12 mm |
| 95 | Lime (TLS). Leather on front. | Cut out | <700 mm | | 11 mm |
| 96 | Beech (TLS). Leather on front and back. Leather and leather strip on grip. ?Strap | Rebated | >400 mm | | 13 mm |
| 152 | Ash (oblique TLS). Leather on front. Leather strip on grip. ?Strap | Cut out | >400 mm | 6 mm | 8 mm |
| 315/1 | Birch (TLS; grip oblique TLS). Leather on front and back. Leather strips on grip. | Cut out | <700 mm | 11 mm | |

TLS = board has a tangential surface; RLS = board has a radial surface.

*Table 1. Summary of shield construction.*

All the shields had traces of leather on the boss flange and underneath the shield studs, indicating that leather had been applied to both the front and back of the shield board (Fig.1). Some of the shield boards are less than 10mm thick in places and would have shattered during combat without the leather covering to reinforce the structure.
In most cases the leather on both sides of the wooden board are of different thickness – usually the reverse is thicker. The reason for this variation is unclear, maybe split skins or different animal species were used. Possibly thinner skins were easier to decorate by embossing, or took dyes better. Maybe a thicker skin on the reverse adds to the overall strength of the shield. The same variation in leather thickness' was also noticed on many of the shields from Edix Hill, Barrington, Cambridgeshire (Watson, 1998).

*Figure 1. Leather underneath shield stud Gr 94:47 WILD 98:6*

*Figure 2. Possible resin used to join the leather to the wooden shield board on G.96:47 WILD 98:5*

Evidence as to how leather is attached to the wooden shield board rarely survives, and the shields from Boss Hall follow the same pattern with the exception of the shield from grave 96. On examination of the shield studs, a glassy layer between the leather and wood can be seen, which might be the traces of a resin (Fig. 2, WILD 98:5)

The approximate size of the shields was taken from position of shield studs, which makes this figure their minimum diameter. As they range from 0.4 - 0.7 m across, they fit well within the range of 0.42 - 0.92m as discussed in Dickinson and Härke (1992). This places four in the small group range (graves 74, 87, 96, & 152) and the other two are considered large (graves 95 & 315). Although Härke suggests a relationship between size and date in his *corpus* of shields, this does not appear to be the case with this group.

There is evidence to suggest that the shield from grave 96 originally had a carrying strap about 3mm thick and attached to the shield with small iron buckles (Fig.3), very like one from Barrington, Cambs, (Gr.46) and others from Lowbury Hill and Dover II (Evison, 1987). Carrying straps for shields have regularly been noted and are usually seen as a strap of leather pulled over the grip and unrelated to grip bindings (Dickinson &Härke, 1992).

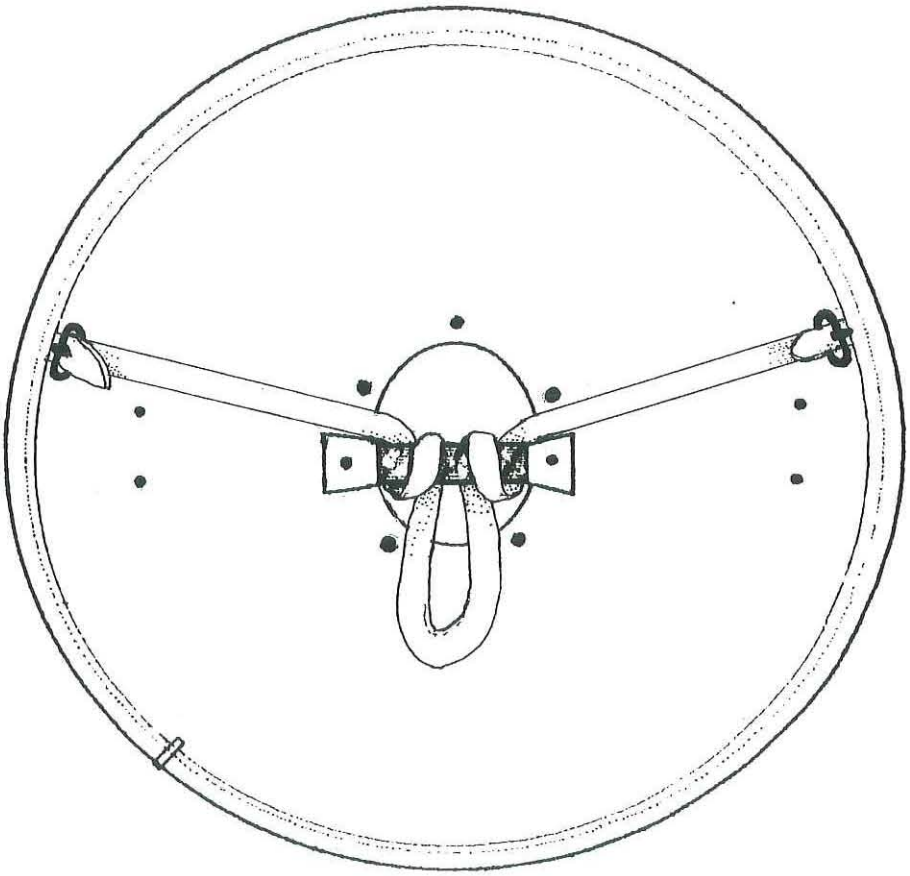

*Figure 3. Shield with carrying strap attached with buckles, Gr.96.*

## Spears

There appear to be nine spears from Boss Hall, represented by nine spearheads and two ferrules, all with wood remains in their sockets. Four different wood species have been used, ash, alder, hazel, and willow or poplar. Four spears have ash hafts, three of which have been cut from mature timber and one has a ferrule – this is the traditional choice of wood for Anglo-Saxon spears. Two spears have alder hafts, and two others are made from hazel. The final spear was made from willow or poplar, cut from a sapling, and has a ferrule as well as a spearhead.

On the X-radiograph, one of the spearheads appears to have non-ferrous metal coating on the rivet heads (grave 74:78).

## Knives

Around 20 iron knives have been examined on which a large variety of organic materials have been preserved in the corrosion products. Sixteen have the remains of their original handles and of these fourteen were found to be horn, one possibly bone or antler and one of wood – ash.

Initially it was thought that seventeen knives had traces of leather on their blades, but the preservation of leather on metalwork from this site is rather poor and has been the subject of further study by E.Cameron and G.Edwards, and reported on elsewhere. Evidence of the construction of knife sheaths is rare, but the knife from grave 95 seems to have the remains of stitching along the blade edge.

Two of the knives are closely associated with strike-a-lights. The knife and strike-a-light from grave 51 seem to have been placed together in a wooden box within the grave. The same objects from grave 74 appear to have been in a purse along with plant stems that may have served as tinder.

## Shears

One set of shears was found and these have traces of leather on the outer surfaces, suggesting that they were originally in a leather case.

## Containers

### Purses

There appears to be evidence for purses in five of the graves from this site; graves 74, 94, 96, 301, 313. As these all appear to be just traces of leather on metalwork, they are discussed in more detail by E.Cameron and G.Edwards. The purse or pouch found in grave 74 (67F) is particularly interesting as it contained a knife, strike-a-light and miscellaneous plant stems that may been used as tinder. Purses containing these items have been found at Field Farm, Wilts (Watson, 1988b) and Snape, Suffolk (Fell, 1996).

The purse group from grave 94 (83, 84) is a complicated assemblage of iron latchlifters and a knife wrapped in textile, presumably inside a leather purse. The group also contains an iron buckle that may have been used as a fastening.

**Vessels**

One vessel mount from grave 315 with wood remains, these were found to be willow or poplar and the grain orientation indicated that the bowl must have been lathe turned.

**Box**

In grave 51 fragments of wood have been preserved on the iron strike-a-light and are probably the remains of a box for this object. The wood was found to be maple or birch, both woods have been used for box manufacture. As there are no obvious box fittings were associated with this group, one cannot be certain that a box existed. On the other hand the metal additions used on Anglo-Saxon boxes are often decorative rather than functional, and it is perfectly acceptable to have a box without nails, hinges or even a handle, that resemble old fashioned wooden pencil cases with a sliding lid. Similar types of boxes have been reconstructed from their metal additions at Dover (grave 143, Evison, 1987) and Mucking, cemetery II (grave 621, Hirst, forth), but the basic box construction would be the same.

**Antler comb**

A single antler comb was found in grave 315:106F, and all that remains of it is a set of iron rivets which indicates that the side plates were 5mm thick and with toothplates of 3mm (Fig.6). The acid soils at Boss Hall have all but dissolved any evidence for boney tissue so that only antler in direct contact with the iron rivets has been preserved. Combs in this condition have also been found at Harford Farm, Norfolk (Watson, 2000) and Snape, Suffolk (Fell, 1996).

*Figure 4. Three sections of antler preserved on one of the iron rivets. WILD 98:11*

**Miscellaneous**

In addition to the organic material associated with specific objects, random organic material like straw was found on many items. Such materials were probably used to line the graves or placed on top of the body before interment. Covering graves with straw, or branches in leaf, greatly accelerates the decomposition of the body (Mant, 1987), which would have contributed to the corrosion of metalwork and the preservation of absorbent organic materials.

Fly pupae cases have been preserved in the corrosion products on the metalwork in several graves, and these can give an indication of the burial conditions and customs, these have been reported on elsewhere by Gordon Turner-Walker.

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# Catalogue of examined material

* sample taken
GE - Glynis Edwards

**Grave 13** NS
9, 13/7914F
Iron knife blade with remains of leather underneath the textile (GE). The tang has mineral preserved organic material, probably horn that has been attacked by micro-organisms.

10/7914F
Small iron buckle with remains of leather belt.

11/7914F
Small iron buckle with the possible remains of a leather belt.

12/7914F
Iron knife with the possible remains of a leather sheath (GE), underneath very degraded textile. There are also traces of horn on tang.

**Grave 16** NS
8/7914F
Iron buckle with traces of a leather belt, but in a poor condition, and some textile preserved on the loop.

**Grave 32** F
11/7914Cu
Fragments of a copper alloy wristclasp with no organic remains, but a small patch of solder.

12/7914Cu
Fragment of decorated disc with traces of white metal. No mineral preserved organic material.

13/7914Cu
Pair of copper alloy wristclasps with stitching remains, possibly loose 3-ply cord? Appears to have decorative bars soldered to the front of both halves of the wristclasp.

14/7914Cu
Copper alloy coin pendant with remains of the suspension cord between the two holes.

14/7914F
Iron buckle with traces of a leather belt passing through the loop and over the tongue. There are also fragments of textile, probably a twill, on both sides.

15/7914F
Fragment of iron ring or buckle loop with spun threads visible.

16,17/7914F
The x-radiograph suggests that these items are just iron pan?

**Grave 51** M
21/7914F
Iron spearhead with mineral preserved wood in socket*, *Fraxinus* sp. (ash) from mature timber. Also has wood on underside of socket*, probably *Fraxinus* sp. (ash).

52/7914F
Iron brooch spring, but with no visible textile remains.

53/7914F
Iron knife and strike-a-light corroded together. The knife has a horn handle and a compacted deposit, possibly leather, on the blade which could be the remains of a sheath or purse. On top of the strike-a-light is mineral preserved wood* with a radial surface, possibly the base of a box made from *Acer* sp. (maple) or *Betula* sp. (birch).
SEM B765

54/7914F
Small iron buckle, but no recognisable organic material now remains other than a fragment of bone on the underside.

55/7914F
Catch-plate of an iron brooch, probably joins with 52.

**Grave 74** M [large chamber grave with 4 burials side-by-side and cremations round it]
18/7914F*
Iron ferrule with mineral preserved wood in socket, probably *Salix* sp. (willow) or *Populus* sp. (poplar) possibly from coppiced timber. In which case this probably belongs with spearhead 77.
SEM B570

24/7914F
Iron knife with horn handle and in its leather sheath, which is very fibrous with no grain surface remaining. On one side there is textile on top of the leather sheath.

38-41/7914F
Iron shield fittings with mineral preserved organic material. Boss has leather preserved between the wood and iron rim. Shield board appears to be *Fraxinus* sp. (ash) with

oblique radial surface suggesting the use of flat sawn planks. Boss attached to leather covered shield board by copper alloy rivets with copper alloy washers, which have mineral preserved organic material to a depth of 5.9mm. The leather on the back of the shield is 2.4mm thick and approximately 1mm on the front.

Grip has same mineral preserved organic material preserved on it as the boss flange (both wood and leather) and this suggests that the board had 'D'-shaped cut outs with the iron grip mounted on top. On the outside of the grip are remains of three leather strips between 4.5 and 6.5mm wide and less than 2mm thick, which were probably some form of binding.

Boss has mineral preserved wood on front*, but not sufficient to identify, which may be part of a floor or ceiling of a chambered grave or coffin.

38F Shield stud with leather preserved on the underside of the head, about 1mm thick, and with wood remains on the shank.

39F Shield stud with remains of the shield board and a fine twill on the front. The thickness of the shield at this point is 8.7mm, with the leather on the front around 1mm.

40F Shield stud with a thin layer of leather between the head and wood, around 1mm thick. Patch of clear textile on the front.

41F Shield stud with only leather preserved on it.

42/7914F
Iron knife with mineral preserved horn handle and leather sheath (confirmed by GE). The layers of the mineral preserved horn exhibit the cone-within-a-cone arrangement, which indicates that it was fashioned from the apex of a horn. On one side there is textile preserved on top of the sheath.

Corroded onto the blade is an iron buckle.

59/7914F
Iron knife with a horn handle, and fragments of the leather sheath (GE) at the shoulder and underneath textile. Has mineral preserved textile on both sides on top of the sheath. The original shape of the handle can be seen at the shoulder, where an oval-shaped void has been left in the iron corrosion.

60/7914F
Iron knife with horn handle and leather sheath. On top of the sheath there is coarse textile on both sides and a fragment of horn. The horn possibly belonged with knife 59, as both have very flat laminations, or it could be all that remains of a simple drinking horn?

61/7914F
Iron bar with mineral preserved leather along its length, possibly a type of purse ring.

67/7914F
Iron knife and strike-a-light/purse mount corroded together. Leather appears to be

preserved on both sides along with small pupae cases and plant stems, it seems likely that both were in a leather bag of some kind. Knife also has a horn handle. There is mineral preserved wood on one side of the strike-a-light, as it is slightly curved it probably belongs with one of the spear shafts - has been removed.

68/7914F
Iron buckle loop with mineral preserved leather over tongue, and crushed textile on the loop along with pupae cases (GE).

69/7914F
Copper alloy decorative stud with mineral preserved leather on reverse, c.2mm thick.

77/7419F
Iron spearhead lying across head of grave. Has mineral preserved wood in socket*, but no signs of any mineral preserved organic material on outside. The spearhead was hafted with *Salix* sp. (willow) or *Populus* sp. (poplar).

78/7914F
Iron spearhead with mineral preserved textile in various places along one side. Wood* in socket, *Fraxinus* sp. (ash) fashioned from mature timber with agrowth of 3 rings over 1cm. [GTW noted silver foil over rivet, but has not been cleaned or analysed]

79/7914F
Iron spearhead with textile on the outside of the socket, and a fragment of mineral preserved organic material* which may be wood from an adjacent spear shaft (78), *Fraxinus* sp. (ash). Also has mineral preserved wood in socket*, *Corylus* sp. (hazel). Inside socket SEM B571

20/7914Cu
Decorated copper alloy sheet with fold of leather - 3 layers.

35/7914Cu
Copper alloy buckle with white metal on both loop and tongue, and associated with fragments of iron preserved leather.

51/7914Cu
Copper alloy stud with white metal on front. On reverse has the possible remains of a 2 ply cord, which may go round the shank - this could be a fastener for a purse.

52/7914Cu
Swastika shaped stud with silver overlay soldered onto the front. It was mounted onto leather, c.2mm thick, with a single shank.

**Grave 87** M [double burial M and F]
19/7914F
Large spearhead with mineral preserved wood* in socket, *Fraxinus* sp. (ash).

20,31,32,56-58/7914F
Shield fittings with mineral preserved organic material. On shield boss rim studs have copper alloy washers on inside and a depth of 9.1mm. Board possibly has a tangential surface. Traces of leather between wood and iron on both rim and studs, indicating that both the front and back of the shield was covered in leather about 1mm thick on the front and possibly the same for the back.

56 Iron stud with only leather preserved underneath the head.

*57 Iron stud, with mineral preserved straw on the front.

58 Grip appears to be cut out from the shield board, with leather on outside which were possibly three binding strips, 18mm wide and up to 2mm thick, that were wound round both the metal and wood. Shield board was made from *Salix* sp. (willow) or *Populus* sp. (poplar).
SEM B658

31 Depth of stud is around 12mm and incomplete, the wooden part of the shield board is around 8.5mm thick.

32 Iron shield stud with leather on the front of the board around 1mm thick, and the back possibly 2mm thick. The depth of wood at this point is 7.2mm.

33/7914F
*Iron socket with mineral preserved wood, *Fraxinus* sp. (ash).

62/7914F
Large iron ring with textile preserved on both sides that could possibly be a coarse tablet braid. In places the textile is overlain with leather. On reverse are the remains of a copper alloy plate, and opposite to this a piece of mineral preserved horn - which could be related to a knife handle.

63/7914F
Iron ferrule, with mineral preserved wood in socket, possibly *Fraxinus* sp. (ash).

64/7914F
Iron buckle with remains of leather belt. Large area of textile on reverse.

66/7914F
Iron knife with remains of leather sheath, mineral preserved organic material on tang but not recognisable.

**Grave 93** F, early C8th
25/7914F
Iron knife blade with remains of leather sheath overlain with textile. At the shoulder of the blade are traces of the horn handle.

26/7914F
Iron lozenge shaped fitting with mineral preserved textile on the reverse.

**Grave 94** F
21,22/7914Cu
Two copper alloy brooches with textile preserved by the iron pins.

65/7914F
Large iron dress pin with mineral preserved textile and leather or skin on one side - but no sign of this material now.

82/7914F
Iron ring with textile preserved on one side.

83, 84/7914F
Group of iron latchlifters which appear to have possible textile overlain with leather - could this be a purse. The group includes an iron knife with a horn handle. An iron buckle with the possible remains of a leather strap, c.2mm thick. All the items appear to be wrapped in textile and plant stems, with leather on top.

**Grave 95** M
22/7914F
Iron spearhead with mineral preserved wood in socket*, probably *Alnus* sp. (alder). Has mineral preserved textile on one side only.
SEM B715

23/7914F
Shield boss with leather between wood and iron. Wooden* shield board has a tangential surface, and possibly made from *Tilia* sp. (lime). Grip appears to be cut out type. Fragment of textile on on one of the rivets attaching the grip. On X-radiograph two of the rivets appear to have non-ferrous metal on them.
SEM B659

35-6/7914F
Two shield studs with mineral preserved leather and wood. May have non-ferrous metal or organic material on the front.
35 Wood is 9.6mm thick.
36 Total thickness of shield at this point is 11.3mm, with the wood 8.5mm.

43-4/7914F
Two shield studs, but need cleaning to reveal mineral preserved organic material.
43 Total thickness of shield at this point is 11.2mm, with the wood 7.2mm, leather on front c.2mm, and back 3.5mm.
44 Wood 8.3mm. thick.

37/7914F
Iron nail with leather preserved on the underside of the head and textile on top.

Incorporated with the textile are fragments of miscellaneous stems etc. No wood on shank.

51/7914F
Iron knife has the remains of a horn handle and leather sheath, with textile preserved on one side. Some threads are preserved along the cutting edge of the blade, which might be stitching used to join the sides of the leather sheath, but on the other hand they maybe be traces of the textile (GE).

34/7914Cu
Iron buckle loop with a copper alloy plate. Possibly 2 thicknesses of leather are preserved between the plates, both c.2mm thick. On both sides are areas of iron preserved textile.

**Grave 96** M
45/7914F
Iron spearhead with mineral preserved wood in socket*, *Corylus* sp. (hazel). Fragments of mineral preserved straw around the top of the socket.
SEM B716

46-50/7914F
Iron shield fittings with mineral preserved organic material.

46 Shield boss with leather preserved between the wood and rim. Wooden shield board*, made from *Fagus* sp. (beech), has tangential surface. Has copper alloy studs and rivets. Small fragment of wood on button, but too small to sample.

Has inserted grip with grain along axis of iron part, and the grain of the shield board at right angles to it. Leather is preserved underneath the wood, and is c.2mm thick. On the reverse are the remains of a leather strap along part of the grip, c.13.3mm wide and approx. 2mm thick, and this is partly covered by another piece of leather grain side towards the metal.

Fragment of mineral preserved leather of which only the outer edges survive, it is around 3.5mm thick with wood grain preserved on one side. This piece of leather probably comes from the reverse of the shield, as the leather on this side is thicker than the front.

Iron knife with wooden handle, *Fraxinus* sp. (ash), which extends over the shoulder of the blade and the edge can easily be seen on one side. There are the remains of a possible leather sheath on the blade. There may be some very degraded textile on top of the leather, but with no spin or weave details (GE).

47 Complete shield stud with all layers of the shield board preserved on it. The thickness of the shield at this point is 11.9mm, made up of wood 5.5mm, and leather on front around 2mm, leather on back 3.1-2mm. The thickness of the leather on the reverse varies because the edges of the copper alloy washer bite into it, so that it is widest over the iron rivet. There appears to be a layer of resin/glue between the leather and wood on the reverse, to a depth of around 1.3mm.

Associated with the shield stud is an iron buckle with remains of the leather strap, c.3mm thick, passing through the loop, but much damaged by airbrading (GE). Large area of mineral preserved textile on the reverse.

48 Complete stud which suggests that the shield was c.12.9mm thick at this point. Wood is 5.2-5.9mm, leather on the front 2mm. There appear to be three layers of organic materials between the wood and the copper alloy washer on the reverse. The middle layer seems to be leather, just over 2mm thick, and between the wood and this layer possible resin or glue around 1.5mm thick. Between the leather and the washer is an indistinct organic material which could be another layer of leather 3.3mm thick.

49 Complete shield stud which indicates that the total thickness of the shield board at this point is 14.6mm. Wood is 10.0mm, front leather c.2mm, back leather 4mm. Possible layer of resin between the wood and leather on the reverse c.1.8mm thick.

There is a small buckle corroded to the reverse of this stud, which has the remains of a leather strap nearly 3mm thick passing through the loop, and textile on the loop. The front of the buckle faces the reverse of the stud, in more or less the same position as the buckle on 47. Are both buckles part of the shield, maybe attaching some form of carrying strap?

50 Complete shield stud, giving a total depth for the shield at this point of 11.3mm. The wood is 7.2mm, leather on the front c.1mm, on the back the leather is 2mm.

**Grave 97** F
28/7914Cu
Copper alloy ring with no organic remains.

29/7914Cu
Copper alloy tube with no mineral preserved organic material remaining.

30/7914Cu
Small copper alloy buckle with no organic remains.

32/7914Cu
Iron pin for brooch 31, covered in mineral preserved textile.

36/7914Cu
Copper alloy annular brooch with remains of iron pin and possible textile.

80/7914F
Iron knife with possible traces of horn preserved on the tang, but these are very indistinct. The leather sheath is quite well preserved towards the tip of the blade, but no obvious sign of a join.

81/7914F
Associated with 28-30. Possibly a purse group containing girdle hangers with mineral preserved textile, a knife with horn handle and leather sheath, and a copper alloy strap end. Leather also appears to be preserved in places over the textile.

**Grave 147** NS
70/7914F
Iron knife with leather sheath folded over the blade edge at the shoulder [confirmed by GE]. The leather is very degraded and mostly covered in sand and textile. There are possible traces of a horn handle. Fragments of plant stems, or straw, and textile on one side of the blade.

**Grave 150** F
23/7914Cu
Copper alloy cruciform brooch with iron pin and mineral preserved textile.

25/7914Cu
Copper alloy cruciform brooch with iron pin. Has been conserved, and mineral preserved textile only remains as a few loose fragments.

71/7914F
Iron knife with horn handle and leather sheath.

72/7914F
Iron object with mineral preserved leather preserved between two thin iron plates in which one can possibly see the collagen bundles in cross section - may be part of a buckle plate. Textile is also preserved on one side.

**Grave 152** M
73,75,76/7914F
*Iron shield boss and studs with mineral preserved organic material. Leather has possibly been preserved between the wood and iron rim, and is c.1mm thick. Shield board made from *Fraxinus* sp. (ash), with an oblique tangential surface.

Grip appears to be the cut out type. As there is no wood on the central part of the grip, only at the edges, maybe it wasn't present originally. Leather and fragments of bone are preserved on the outer side of the grip including part of a leather strap 7mm wide and 1.5mm thick.

76. The stud suggests that the thickness of the shield at this point is 8.3mm.

74/7914F
Iron buckle with possible traces of a leather belt (GE). Textile is preserved on one side of the loop and wood on the other, possibly *Fraxinus* sp. (ash) so is probably part of the shield.

85/7914F
Iron knife with slight traces of mineral preserved organic material, textile on the tip and possibly bone or antler on the tang but it is difficult to tell if this is part of the handle - no longer present.

**Grave 301** F
40/7914Cu
Copper alloy annular brooch with iron pin on which textile is preserved.

41/7914Cu
Copper alloy girdle hanger with iron preserved threads around top.

49/7914Cu
Copper alloy annular brooch with iron pin on which textile is preserved.

50/7914Cu
Copper alloy cruciform brooch, gilded and has terminals with soldered metal overlay - possibly silver. Has iron pin with mineral preserved textile.

92,94/7914F
Iron knife with mineral preserved horn handle and leather sheath up to 3.5mm thick in places (confirmed by GE).

90,91,93,95-7/7914F
Iron girdle hangers with miscellaneous organic material preserved including leather, stems, straw or roots.

**Grave 313** F
98/7914F
Large iron dress pin with mineral preserved textile, along with miscellaneous other organic material including plant stems, and associated beads - 2 amber and a faceted jet one.

228A
Knife with horn handle extending over blade, with the edge clearly visible on one side. Remains of leather sheath covered in pupae cases including some near adult beetles.

338
Soil block containing chatelaine and knife:

B. latchlifters with mineral preserved textile and miscellaneous organic materials.

C. Fragments of 2 copper alloy strap ends that were mounted onto leather c. 1.5mm thick. Other plant material is preserved on the surface.

D. 2 blocks of decuprified copper alloy lace tags/strap ends with no organic material preserved between the plates - could be the remains of one object or fragments of 2.

E. Associated with the iron ring is a very damaged buckle with an iron loop and copper alloy plates. One piece of leather is preserved between the plates which is about 4mm thick, so quite likely to be of cattle hide.

F. Small copper alloy stud mounted on leather 2.5mm thick.

H. Iron fitting covered in a fine weave textile and some seeds.

J. Fragment of copper alloy strap end with iron rivet.

K. Iron fitting covered in miscellaneous organic materials including plant stems and possibly seeds.

**Grave 315** M and possibly F
100-1, 108/7914F
Set of shears in a leather case.

102
Textile and wood associated with an iron "staple" from the area of the coffin. Wood is probably *Salix* sp. (willow) or *Populus* sp. (poplar) and could have come from a lathe-turned vessel rather than a coffin.

103/7914F
Spearhead socket with mineral preserved wood, *Fraxinus* sp. (ash) from mature timber.

104/7914F
Iron knife with a horn handle, but no trace of a sheath. Fold of textile preserved on tip of blade not the handle as in E.Crowfoot's report.

105/7914F
*Fragmentary shield boss with mineral preserved organic material. Appears to have leather between the wood and rim, and this also appears to extend into the cone. Rivets on rim have copper alloy washers, and indicate that the shield is 10.6mm thick at this point. The shield board is made from *Betula* sp. (birch), with a tangential surface.
Upper side of boss is covered in a mass of stems or straw.
SEM B660

The grip is the cut out type, and wood grain preserved in the centre suggests that it was integral with the shield board. On the grip leather is preserved between the wood and the metal. The outside of the grip is bound with leather strips, three can be distinguished which are 13.4mm wide and up to 2mm thick, with textile on top of that. Leather also covers the stud which attaches the grip to the shield board - these may represent a carrying strap.

106/7914F
Two iron rivets with mineral preserved bone or antler, probably all that remains of a composite comb. Both have three different sections of bone or antler preserved on them which indicates that the side plates are 5mm thick and the tooth plate is 3mm.

Fragment of iron ring with textile.

Fragment of knife blade with the remains of a leather sheath.

Possible fragment of a shield boss flange, with leather preserved on both sides. Diamond-shaped cleat with rivet, from area of coffin stain which has leather preserved on one side and various organic materials including plant stems on the other.

107/7914F
Iron dress pin with textile on one side, and straw or fleece on the other - check with SEM.

**Unstratified** [Grave 1]
86/7914F
Iron spearhead with mineral preserved wood in socket*, probably *Alnus* sp. (alder). There are a few fragments of straw-like material on the outside of the socket.
SEM B764

87/7914F (possibly part of G.315:103/7914F)
Iron spearhead with mineral preserved wood in the socket, probably *Fraxinus* sp. (ash) from mature timber.

88/7914F
Iron knife with the possible remains of a leather sheath, and textile remains overlying it on one side.