

BARROW CLUMP,
FIGHELDEAN, WILTSHIRE
INVESTIGATIVE CONSERVATION OF
ANGLO-SAXON METALWORK

ARCHAEOLOGICAL CONSERVATION REPORT

Zara Peacock



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Investigative Conservation of Anglo-Saxon Metalwork

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Summary

This report covers the investigation, conservation, and analysis of metal artefacts from a sixth century AD Anglo-Saxon cemetery. Metalwork was found in association with thirteen inhumations, and the significant artefacts are discussed in relation to their function, typology and condition. XRF analysis has been undertaken to classify the copper alloys used, and the mineral preserved organic materials have been identified by microscopy.

Keywords

Copper Alloy

Iron

Mineral Preserved Organic

Conservation

Early Medieval

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Introduction

Fieldwork was undertaken at Barrow Clump, Figheldean, Wiltshire, in 2003 and 2004, as part of a project to investigate the effect of badger damage on ancient monuments. In addition to the Neolithic phase of the site, an Anglo-Saxon cemetery was discovered, of 13 inhumation burials in 12 graves. The majority of finds consisted of iron and copper alloy, although a number of glass and amber beads were also found. These beads have already been investigated and conserved, by Gao (2006a; 2006b). The range of artefacts found at this site is typical of a sixth century Anglo-Saxon cemetery in southern England (Stoodley 2006, 29-37).

Condition of the metalwork

The survival of some of the metalwork has been relatively poor due to the alkaline chalk conditions combined with the physical damage from badger burrowing and vegetation rootlets. X-radiographs suggested that the ironwork was badly corroded, with little or no metal surviving in some artefacts. As a result some objects have been disfigured by corrosion, in addition to being obscured by soil and chalk deposits. Overall, the condition of the copper alloy was better, except for a few objects which were fragmentary, demineralised, and extremely fragile.

Mineralised organic materials survive adjacent to the metal surfaces, and in particular, textile fragments were found on dress accessories. A variety of other mineralised organic materials survive although they are not extensive (Fell and Watson 2006, 27).

Summary of conservation

1. Artefacts had been previously X-rayed to determine initial condition.
2. A shield boss was excavated from a soil block .
3. Artefacts were examined by the textile specialist (Penelope Rogers) to determine the extent of mineralised remains, and to identify where further clarification was necessary.
4. Optical microscopy (up to 40x magnification) was employed to recover information on individual finds and on grave groups in order to facilitate study, description, and illustration. Investigative conservation used to aid object and typological identifications which contributes to understanding construction and relationship within the burial.
5. X-ray fluorescence was used to indicate copper alloy types, and to identify surface coatings such as gilding.
6. Scanning electron microscopy (SEM) was used to identify mineral preserved organics, such as the wood on the shield boss.

Investigative Conservation

Finds associated with Skeleton 6000

This skeleton is of an adult in an extended supine position, orientated west (Figure 1). Grave goods found in association with this skeleton (Table 1) suggest a female burial however disturbance of the grave is high (see project archives).



Figure 1: Skeleton 6000 (photo: project archives)

Table 1. Finds associated with Skeleton 6000

SF No.	Object	Comments	Conservation Treatment
200304401	Copper Alloy great square-headed brooch	A few detached fibres	See text
200304402	Copper alloy saucer brooch	Similar design to 200304403. Badly decayed textile fibres only.	See text
200304403	Copper alloy saucer brooch	Similar design to 200304402. Badly decayed textile fibres only	See text
200304404	Copper alloy spoon	Incised crescent decoration Fibre visible around top of handle	See text
200304405	Iron horse bit	Badly decayed fibres only	See text
200304408	Iron ring	Badly decayed leather fibres only. Similar to 4414. Possibly part of horse furniture?	Excess soil removed
200304414	Iron ring	Badly decayed leather fibres only. Similar to 4408. Possibly part of horse furniture?	Excess soil removed

200304415	2 Iron fragments	Badly decayed fibres only. Possibly part of a belt buckle.	Excess soil removed Rejoined with HMG Paraloid B72 (commercial strength)
200304416	Iron ring		No remedial work required.
200304418	Copper alloy Penannular brooch	Single fibre visible	No remedial work required
200304419	2 Iron fragments	Badly decayed fibres only. Similar to 4427. Fragments don't appear to join each other, or 4427. Possibly part of horse furniture?	Excess soil removed
200304427	2 Iron fragments	Badly decayed fibres only. Fragments don't appear to join each other, or 4419. Possibly part of horse furniture?	Excess soil removed
200304451	11 Iron fragments	Badly decayed fibres only x4 pieces join and x 3 pieces join. Similar but larger than 4408/4414. Possibly part of horse furniture?	Excess soil removed. Not rejoined as will not make stable joins.
200304527	2 Iron fragments	Sheet and small tack	No remedial work required
200304528	Iron fragments		No remedial work required
200304531	Iron fragments		No remedial work required
200304533	Iron sheet		No remedial work required
200304534	Iron fragments	Badly decayed fibres only	Excess soil removed
200304536	Iron fragments		No remedial work required
200304550	Iron fragments	Badly decayed fibres only	No remedial work required
200304551	Copper alloy fragment		No remedial work required
200304552	Copper alloy fragment		No remedial work required
200304554	Iron shaft		No remedial work required
200304555	Copper alloy strip	Fragment with iron rivet	No remedial work required
200304556	Iron fragments		No remedial work required
200304557	4 Iron sheet fragments		No remedial work required
200304558	Copper alloy fragments		No remedial work required
200304559	Copper alloy strip	Rim like fragment?	No remedial work required
200304560	Iron	Badly decayed fibres only	Excess soil removed
200304561	Iron fragments		No remedial work required

SF200304401 Great square-headed brooch

This example has been identified as a Great Square-Headed Brooch (Stoodley 2006, 30) which “is a bow brooch, with a pin fixed at one end behind a quadrangular headplate, separated by a bow from a rhomboidal footplate behind which is the catch for the pin” (Hines 1997, 4).

Square-headed brooches were worn by women, being a practical dress fastener, probably on a peplos-type dress, and a likely symbol of wealth and rank (Hines 1997, 280). These brooches are most commonly positioned high up on the front of the body and are frequently found with a pair of brooches worn on the shoulder. This example was found with two saucer brooches, but the positions of these brooches are irregular as the square-headed brooch was found between the shoulder and hip and one saucer brooch was on the skull. It is possible that the clothing was rearranged during burial, or that not all three brooches fastened the same garment, as it is possible that square-headed brooches were used to fasten an additional piece of clothing over the dress, possibly a shawl or a cloak (cf. Hines, 1997, 283). A small area of mineral preserved textile was found on the pin mount.

This example (Figure 2) has a rectangular headplate (with no top knob or lower borders), where the frame takes the form of eight masks with a linear hole between each, and the upper corners have a stylised face and two circular holes. The headplate inner has another mask figure and a curvilinear pattern. The bow is decorated with a continuation of this pattern. The footplate upper borders are square with a similar curvilinear pattern and two punch holes, and the side lobes repeat the stylised face design. It is possible that the holes were not only part of the design, but that they were also used to attach the brooch to the fabric, as the brooch would be quite heavy to wear (cf. Hines 1997, 293). The inner panel and frame has the same design as on the headplate inner, and is bisected by the footplate bar, which may represent a sword. Finally, the footplate ends in a terminal lobe with the stylised face design.



Figure 2: Great square-headed brooch

The brooch is broken into two pieces below the side lobes, but it was repaired in antiquity. This type of brooch is of a form datable to the first half of the sixth century AD, but the fact that it has been repaired suggests that it is more likely to date to the middle or second half of the century (Stoodley 2006, 31). The catchplate has also become detached from the body of the brooch, as this was added after the brooch had been cast (cf. Hines, 1997, 205). XRF analysis suggests that the leaded bronze catchplate was held in place with a tin solder onto the bronze body, and that it was mercury gilded.

Excess soil and corrosion products were removed mechanically where possible, while 30% v/v formic acid in distilled water was used where more stubborn corrosion remained. It was decided that there was no need to rejoin the object as more information could be gained on the repair, and future analytical investigation would be possible.

SF200304402 and SF200304403 Saucer brooches

Saucer brooches are found with females, the vast majority of whom were in late adolescence or adulthood (Dickinson 1993, 38). This type of brooch was usually worn in pairs, one on each shoulder, presumably on a peplos-type dress (Lucy 2000, 36). The brooches shown in Figures 3 and 4 were most probably cast from a two piece mould of



Figure 3: Gilded saucer brooch (SF200304402 front and back).



Figure 4: Gilded saucer brooch (SF20004403) with iron corrosion.

wood, clay, bone, or wax, before being 'chip carved' with a geometric design. This type of design suggests a date of the late sixth century AD as earlier examples tend to be based on animals (Dickinson 1993, 13-34). The brooches were then mercury gilded, as indicated by XRF analysis. Further analysis on the nature of the copper alloy suggests that SF200304402 is a gunmetal, while SF200304403 is either a bronze or a gunmetal. The pin is missing on both examples, but iron corrosion containing mineral preserved textile, which is particularly evident on SF200304402, suggests that an iron pin would have been present.

Excess soil and corrosion products were removed mechanically where possible, while 30% v/v formic acid in distilled water was used where more stubborn corrosion remained. The gilding has survived well on both brooches, but to a slightly lesser extent on SF200304403. Overall, they are in a good physical condition.

SF200304404 Spoon

This decorated spoon (Figure 5) was found in three pieces: handle, bowl, and bowl fragment. The bowl of the spoon is very thin and fragile and was probably broken during excavation. However, the bowl and handle appear to have become detached during use, as three punch holes with a remaining fibre suggests that it was repaired in antiquity. The small fragment was replaced in the bowl with HMG Paraloid B72 (acrylic copolymer), however, the handle and bowl were not rejoined as the joint would soon fail if handled as the bowl is extremely fragile.



Figure 5: Spoon showing break and possible repair with punch holes and remaining fibre.

The handle has an incised crescent decoration on the upper surface, and initially, it was thought that the spoon was a copper alloy with a possible white metal surface. However, XRF analysis detected relatively high levels of silver, suggesting that the spoon was in fact made of a debased silver. It has been suggested that this type of item had an amuletic function (Meaney 1981), whether being Roman or early Anglo-Saxon, and were often hung from the waist (Lucy 2000, 44). This is possible as a fibre was found in the loop on the end of the handle, and it was positioned near the right hip. Similar spoons are often found in Kent cemeteries, so it is possible that the presence of this type of spoon in Wiltshire suggests wider contacts (Stoodley 2006, 30).

SF200304405 Horse Bit

This snaffle bit (Figure 6) is made up of jointed links, or 'cannons', fastened with a swivelling joint to the cheek piece which takes the basic form of a ring (cf. Clarke 1995, 43).



Figure 6: Iron horse bit with areas of mineral preserved leather.

The straps of the headstall and reins would then be attached to the rings, holding the bit in place in the horse's mouth (Clarke 1995, 43). This can be seen in the areas of leather which remain on the bit. One of the rings is in good condition, and still rotates; however, the other is broken into three pieces with one piece being corroded within the link loop. The 'cannons' were originally articulated, but have now become corroded and no longer move. Excess soil and corrosion products have been removed to clarify these joints and allow the construction to be seen. Horse furniture is often associated with male graves (Hines 1989, 35), so it may be considered unusual to find such an object amongst female artefacts in this grave.

SF200304418 Penannular brooch

This type of brooch uses a simple design for dress fastening where a pin is hooked on a metal ring, and the pin passes through the gap, securing a fold of the fabric (Bayley 2004, 185). On this example (Figure 7) the pin is missing, but the fact that the terminals are bent back onto the oval ring, and have two short punch marked lines suggests that this is an example of a Fowler's type D (Hull's type P.4) (Hattatt 1994, 298) which uses the decoration of the terminals for classification (Bayley 2004, 185). Specific dates can not be given to each type; it is only possible to suggest that this type of penannular brooch was in use from the first century AD until the fourth century AD (Hattatt 1993, 185).

XRF analysis suggests that the copper alloy was bronze. The condition of the brooch is relatively poor as it is flaking in some areas. It is likely that the brooch originally had an iron pin as small areas of iron corrosion product remain. In these areas mineral preserved fibres can be seen.



Figure 7: Penannular brooch with mineral preserved fibre.

Finds associated with Skeleton 6002

This skeleton is of an adult in an extended supine position orientated north-west (Figure 8). The finds associated with this skeleton (Table 2) suggests a male burial (see project archives).



Figure 8: Grave showing skeleton 6002 (photo: project archive)

Table 2. Finds associated with skeleton 6002

SF No.	Object	Comments	Conservation Treatment
200304469	Iron Shield Boss	Some textile visible on the inside.	See text
200304470	Iron Spearhead	Badly decayed fibres only	See text
200304471	Iron stud	Badly decayed fibres only. Wood impression on shaft. Similar to 4472, possibly shield board stud.	Excess soil removed
200304472	Iron stud	Badly decayed fibres only. Wood impression on shaft. Similar to 4471, possibly shield board stud.	Excess soil removed
200304481	Iron knife	Badly decayed fibres only. Small area of mineral preserved wood. Small fragment of bone.	Excess soil removed
200304482	Iron sheet fragments	badly decayed fibres only	No remedial work required
200304497	Iron stud	Similar to 4471, 4472, so may also be shield board stud.	Excess soil removed
200304499	Iron stud & 2 fragments	Badly decayed fibres only. Mineral preserved wood visible. Similar to 4471, 4472, so may also be shield board stud.	Excess soil removed

200304529	Iron fragments		No remedial work required
200304538	Iron fragments		No remedial work required
200304539	Iron fragments		No remedial work required
200304543	Iron ball		No remedial work required
200304544	Iron fragments		No remedial work required

SF200304469 Shield Boss

This shield boss was found in fragments above the vertebra of the skeleton just below the skull. It was block lifted from the grave. The soil block was x-rayed to determine the contents and condition on the boss (Figures 9 and 10). This revealed that the boss was relatively complete, that there were possibly four or five rivets, two of which were *in situ*, and that the apex was not tinned or silvered. It also showed that there was an additional piece of metal which jutted out from beneath the flange. A side view X-radiograph (Figure 10) showed that the grip appeared to have been pushed up inside the cone. The boss was freed from the soil block, then inverted and placed in supportive mount to allow the interior to be excavated (Skinner 2003, 2). The iron is corroded with many areas of concreted soil and chalk nodules, but it is relatively stable, and no further remedial work has been required.

The shield boss has been classified as a Dickinson and Härke Group 3 (Stoodley 2006, 30). Shield bosses of this type have convex cones, straight walls, overhanging carinations, and five flange rivets of medium to large diameter, and the majority have a small iron disc shaped apex (Figure 11). Dickinson and Härke (1993, 15) suggest a date for this type of shield boss to start in the sixth century AD, continuing into the seventh century AD. The boss may have been made in one piece by splitting a single billet, or rod, of iron, which is further suggested by the fact that the apex is integral (Stansfield Type A) (cf. Dickinson and Härke 1993, 32).

On the inside of the boss the iron grip is broken and has become detached, and only one rivet remains *in situ*, but it is possible to suggest the original position of the grip (Figure 12). From the portion of grip which remains it is likely that it is a short grip that is flat with expanded terminals (cf. Dickinson and Härke Type Ia1) (1993, 24). Furthermore, due to the presence of mineralised wood on the front of the grip, on the inside of the boss, it is possible to suggest that it is a complex handle, which was supplemented by a wooden handle. Also, this type of handle usually had an additional leather or textile wrapping around the handle and grip, and a small area of textile on the grip may confirm this (cf. Dickinson and Härke 1993, 36). The grip and its handle are usually attached by two rivets to the back of the wooden shield board at right angles to the wood grain (Dickinson and Härke 1993, 41). It is likely that the grip was held vertically as the grain needed to be horizontal to the angle of the sword strike to survive the blow. Although the handle of this example was attached by two rivets, the grip appears to be parallel with the grain. From this it may be possible to suggest that the owner was left-handed, as if attacked by a right handed opponent it is likely the shield was twisted so that the grip is held horizontally in the right hand and therefore the grain is in the correct position to repel the blow (cf. Watson 1994, 39). More conventionally, the grip appears to be in an off-centre position across the hand hole which allows the knuckles to have more room than the fingers, giving a better grip. It is usually accompanied by an oval, D-shaped, or figure-of-eight hole in the board (Dickinson and Härke 1993, 42). The shield board was usually

covered front and back in leather, which is confirmed by the presence of compacted leather above the mineral preserved wood under the detached grip rivet.

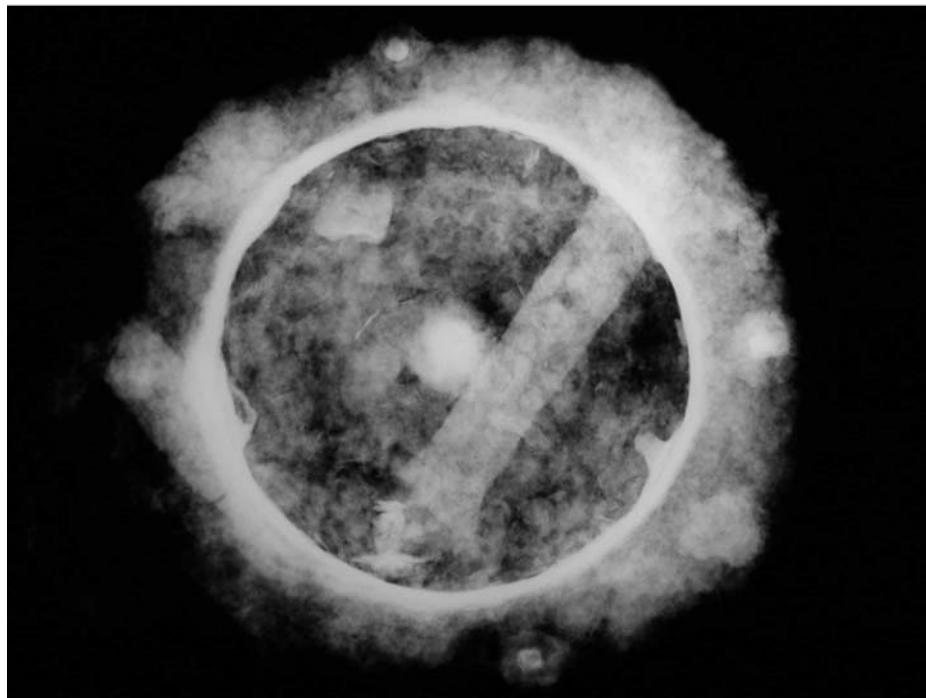


Figure 9: X-radiograph showing rivets and grip. Image: L. Skinner

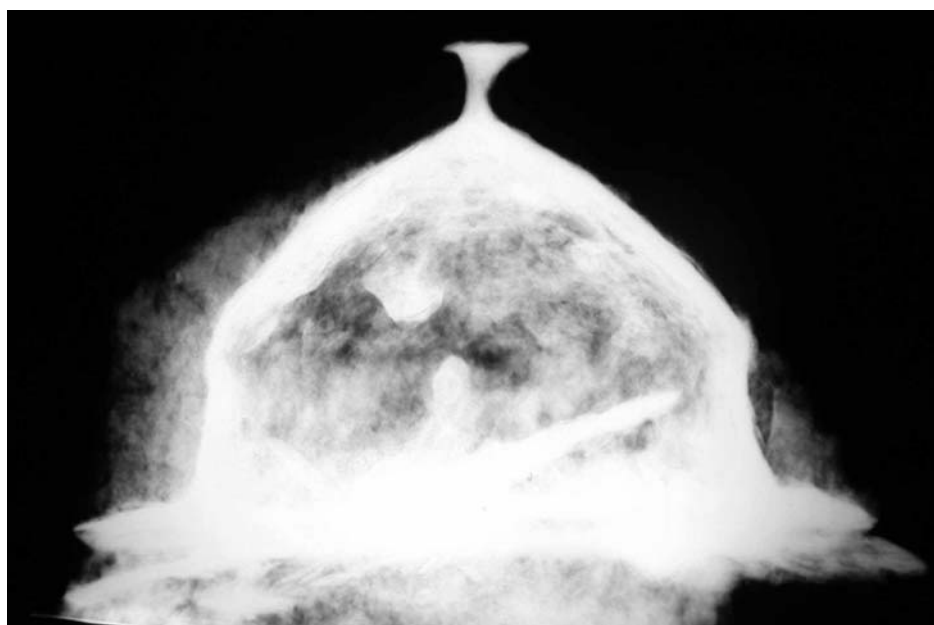


Figure 10: X-radiograph showing side view. Image: L. Skinner



Figure 11. Shield boss in profile. The additional pieces of metal can again be seen attached to the underside of the flange.



Figure 12. Inside the boss, showing original position of grip (now broken) and mineral preserved wood and textile. The metal fragments in the upper right hand corner appear unrelated to the boss.

From the grave plans it is possible to note a pair of studs (SF200304471 and SF200304472) which are likely to have come from the shield board. The approximate size of the shield can be taken from the position of these shield studs (Watson 2001, 4). From this it is possible to suggest that the shield board had a minimum diameter of approximately 0.74m, which is central to Dickinson and Härke's range of between 0.42 and 0.92m (1993, 45). It was also possible to suggest from these studs that the board was approximately 10mm thick (Watson pers. comm.). The average thickness at the centre of a board is 7.5mm (Dickinson and Härke 1993, 47), but it has not been possible to suggest a definite measurement for this example other than that it is likely to be recessed, being less than the 10mm including the leather (Watson pers. comm.). Shield boards were traditionally made from lime (*Tilia sp.*), but examples identified from archaeological sites have found that willow (*Salix sp.*) or poplar (*Populus sp.*) were more common (Watson 1994). SEM examination (Figure 13) shows that the shield board was made from willow or poplar (J. Watson pers. comm.) – two woods cannot easily be distinguished by microscopy.

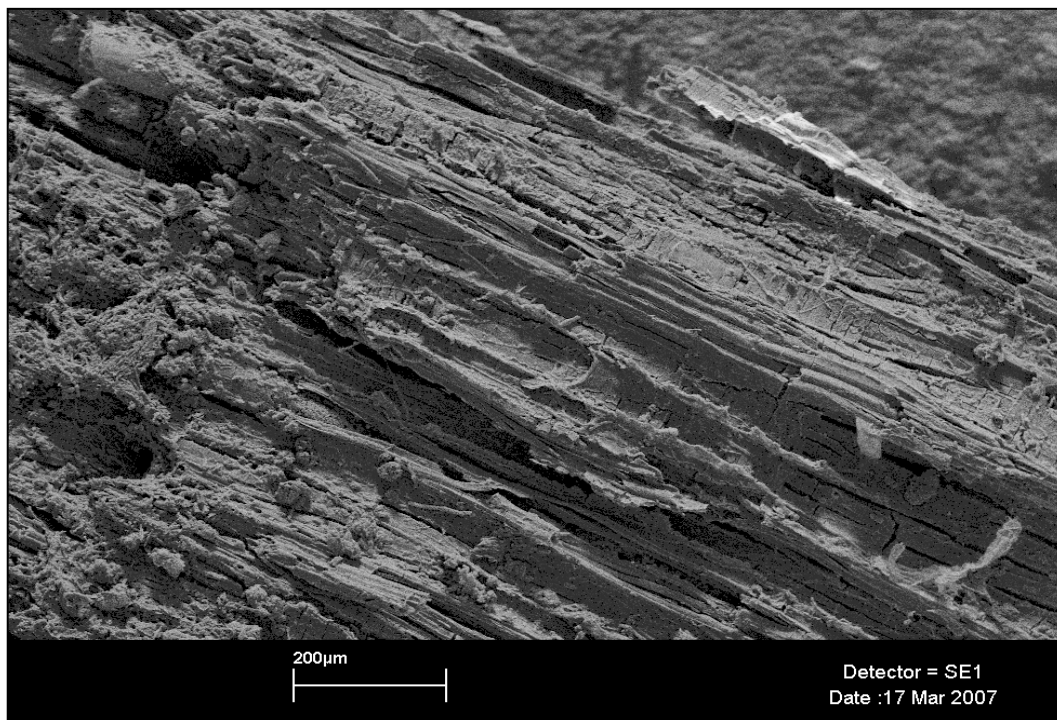


Figure 13: SEM image showing that the shield board is made of willow or poplar.

It has not been possible to identify the two extra pieces of metal attached to the flange. The smaller, linear, piece has an area of textile, which has been identified as a 2-2 twill, possibly being wool (J. Watson pers. comm.). The function of these metal pieces is unclear as they do not appear to be associated with the boss or other shield fittings. It is possible that they are from another object, the remainder of which has not survived.

SF200304470 Spearhead

Excess soil and corrosion products were removed mechanically to reveal the areas of textile, leather, and wood which remained (Figure 14). Two small areas of textile are

visible on the surface of the blade, which may be associated with a wrapping, but as the blade was found close to the shoulder it is possible that it is a piece of the clothing. A trace of leather has been found on the exterior of the shaft, possibly in the form of wrapping or rings. The presence of leather is further suggested by the presence of four pupae cases (and an organic stem) on the edge on the shaft (J. Watson pers. comm.) Mineral preserved wood found around the cross pin in the shaft has been identified as possible hazel (*Corylus sp.*), shown in Figure 15, and made from mature timber rather than a sapling of few years' growth (J. Watson pers. comm.).



Figure 14: Mineral preserved wood remaining the shaft of the spearhead.

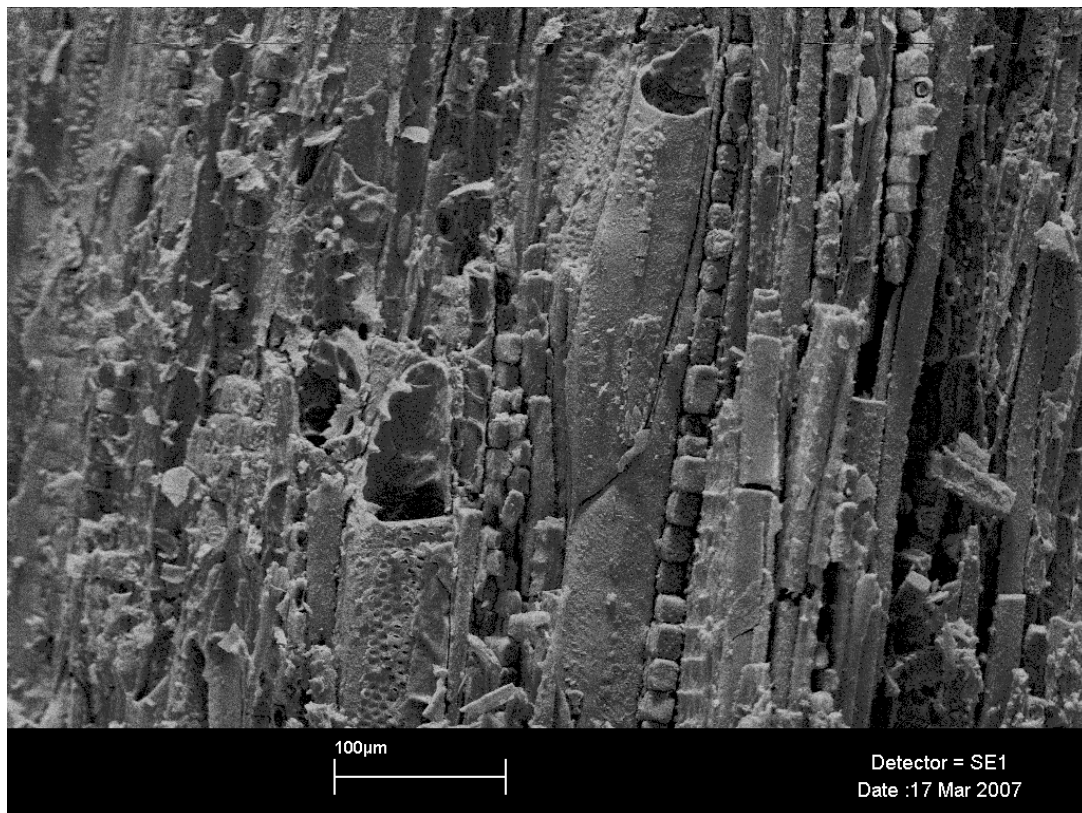


Figure 15: Mineral preserved wood from the spearhead socket, possibly hazel.

The spear has been classified as being a Swanton H1 or transitional H1/H2 (Stoodley 2006, 30) which consists of an angular blade with a concave curve above the angle (Swanton 1974, 18). The spearhead is approximately 220mm in length which leads to the suggestion that it may be a transitional type between the H1 which is the smallest, measuring between 170 and 220mm long, and the H2 between 220 and 350mm in length. The characteristic concavity is often more pronounced on the H1 type and less so on the H2, (Swanton 1974, 18) but with the level of corrosion it is difficult to distinguish between the two. Both of these types were in use between the fifth and sixth centuries AD (Swanton 1974, 119).

SF200304481 Knife

This Evison Type I (Stoodley 2006, 30) knife blade has a curved back and a slightly worn cutting edge (Evison 1987, 113). On the tang there is an area of mineral preserved horn. There is also a small fragment of bone associated with this object. On the grave plan the object was found near the left arm, and it has been suggested that knives could be worn either up the sleeve or strapped to the forearm (Evison 1987, 115).



Figure 16: Knife blade with evidence of mineral preserved organic material.

Finds associated with Skeleton 6003/6004

The features of this double burial are not as clear as the others. It is probably an adult and child, possibly orientated south-west in an extended supine position, shown in Figure 17 (see project archives). The finds associated with this grave are shown in Table 3.



Figure 17: Skeleton 6003/6004 (photo: project archive)

Table 3. Finds associated with skeleton 003/6004

SF No.	Object	Comments	Conservation Treatment
200304485	Copper alloy cosmetic brush	Incised line decoration. Fibres not fully visible. Possibly fibre on join of large ring.	Corrosion product removed where possible.
200304486	Iron buckle	Badly decayed fibres only.	Not possible to join fragments
200304488	Copper alloy ring	Badly decayed fibres only	No remedial work required
200304489	Copper alloy plate	Badly decayed fibres only. Has 3 holes, but no apparent decoration. Similar to 4500.	Not possible to remove all soil
200304490	Copper alloy bracelet	One strip folded over onto its self. No apparent decoration. Joins 4493.	Too fragile to remove all corrosion products
200304491	Iron terminal	Badly decayed fibres only. Similar to 4492, 4502, 4503, 4504	No remedial work required
200304492	Iron object	Badly decayed fibres only. Similar to 4491, 4502, 4503, 4504	No remedial work required
200304493	Copper alloy bracelet	Joins with 4490, but in better condition.	No remedial work required
200304500	Copper alloy & iron strip	No decoration. Similar to 4489.	Excess soil removed
200304501	Copper alloy bracelet	Similar but smaller than 4490/4493	Too fragile to remove all corrosion products

200304502	Iron object	L shaped. Similar to 4491, 4492, 4503, 4504	No remedial work required
200304503	Iron object	Similar to 4491, 4492, 4502, 4504	No remedial work required
200304504	Iron object	Badly decayed fibres only. Similar to 4491, 4492, 4502, 4503.	No remedial work required
200304506	Copper alloy saucer brooch	See text	See text
200304509	Iron object	Badly decayed fibres only. Similar to 4491, 4492, 4502, 4503, 4504, 4510, 4511, 4512	No remedial work required
200304510	Iron object	Badly decayed fibres only. L shaped. Similar to 4491, 4492, 4503, 4504, 4509, 4511, 4512	No remedial work required
200304511	Iron fragment	Badly decayed fibres only. Similar to 4491, 4492, 4503, 4504, 4509, 4510, 4512	No remedial work required
200304512	Iron object	Badly decayed fibres only. Similar to 4491, 4492, 4503, 4504, 4509, 4510, 4511	No remedial work required
200304518	Copper alloy saucer brooch	See text	See text
200304519	Iron buckle	Similar to 4486	Excess soil removed
200304523	Iron fragments	Some textile	No remedial work required
200304524	Iron fragments	badly decayed fibres only	No remedial work required
200304525	Iron nail shaft		No remedial work required
200304530	Iron fragments		No remedial work required
200304532	Iron fragments		No remedial work required
200304540	Iron strips		No remedial work required
200304542	Iron nail shaft		No remedial work required
200304548	Iron fragments		No remedial work required

SF200304485 Cosmetic Brush

XRF analysis suggests that the copper alloy of this cosmetic brush (Figure 18) is a leaded brass.



Figure 18: Cosmetic brush with mineral preserved fibre on the larger ring.

The sheet metal is shaped to form a tubular casing within which a bound bundle of animal hairs would have been held in place. The exterior has horizontal incised line decorations at repeating intervals. There are two interlocking rings attached to the top of the tube, and a surviving fibre suggests that this may have been suspended, possibly with other toilet items.

SF200304506 and SF200304518 Saucer brooches

These saucer brooches (Figures 18 and 19) are similar to SF200304402 and SF20030440, but are in worse condition. SF200304506 is in better condition and the majority of the gilding still remains, although it has become detached in some areas. On SF200304518, only a small amount of gilding is visible, and much of the surface is obscured by a mineral preserved organic material, which might be human skin (J. Watson pers. comm.).



Figure 18. Gilded saucer brooch (200304506) in relatively poor condition.

Figure 19. Gilded saucer brooch (200304518) in poor condition, covered possibly by mineral preserved skin.

XRF analysis of both brooches proved inconclusive due to the deteriorated condition, meaning that they could only be classified as copper alloy. Both brooches have large areas of iron corrosion on the reverse, where the iron pin would have been. Slight traces of mineral preserved textile impressions are visible in this corrosion.

Excess soil and corrosion products were removed mechanically where possible, but where harder corrosion remained, 30% v/v formic acid in distilled water was used. The use of acid was not possible on all areas of SF200434506 due to the loose gilding which would have detached.

Finds associated with Skeleton 6006

This skeleton is of an adult in an extended supine position, orientated west (Figure 20). Grave goods found in association with this skeleton (Table 4) suggest a female burial, but disturbance of the grave is high (project archives).



Figure 20: Skeleton 6006 (photo: project archive)

Table 4. Finds associated with Skeleton 6006

SF No.	Object	Comments	Conservation Treatment
200434641	Copper alloy disc brooch	Badly decayed fibres on reverse. Also x2 bone and x1 textile fragment.	Excess soil removed
200435020	Iron sheet fragment		Excess soil removed
200435043	Iron fragment		No remedial work required

SF200434641 Disc brooch

This type of brooch is round, cast, and often has a decorated surface. These forms were produced as early as the second half on the fifth century, but production and deposition continued into the first half of the sixth (Stoodley 2006, 31). Usually they are of a uniform size, ranging between 26mm and 45mm, with an average of 36mm (Lucy 2000, 34), this example having a diameter of approximately 38mm.

On this example (Figure 21) there are 5 dot and ring marks, where the central dot is pierced, and around the edge are small crescent shaped incisions. Although the surface has corroded, areas of possible original patina remain. XRF analysis suggests that the surface may have been tinned. On the reverse the pin is missing. The presence of iron corrosion products with mineral preserved textile impressions suggests that the pin was made of iron.



Figure 21: Disc brooch showing ring and dot decoration, and large area of iron corrosion on the reverse.

Finds associated with Skeleton 6007

This skeleton is of an adult in an extended supine position, orientated west (Figure 22). Disturbance of the grave is high, and it has not been possible to suggest a gender from the goods found in association with the skeleton (see project archives). The finds associated with this grave can be seen in Table 5.



Figure 22: Skeleton 6007 (photo: project archive)

Table 5. Finds associated with Skeleton 6007

SF No.	Object	Comments	Conservation Treatment
200434690	Copper alloy Roman 'Two Piece Colchester' brooch	Some areas of corrosion but some original patina remains.	Excess soil and corrosion product removed
200434693	Iron nail/pin		No remedial work required
200434706	Iron knife blade tip	Poor condition	Excess soil removed

SF 200434690 'Two piece Colchester' brooch

This bow brooch has been identified as being a 'Two Piece Colchester' (also known as Hulls's Colchester BB Type) based on typological comparisons (J. Bayley pers. comm.). This type of brooch has a continuous curved bow, wide wings, and a deep catch plate. As for the pin mechanism, the brooch body was cast with a central vertical lug to the rear which has been pierced to form two holes. The lower one holds an axis bar, around which a separate spring is coiled, then the chord is passed through the upper one, and wound in the opposite direction, leaving a length to become the pin, as suggested in Figure 23. This type of brooch was common during the second half of the first century AD, and range from between 30mm and 75mm in length (Hattatt 1994, 88).

The Barrow Clump example is approximately 50mm, and shows little moulded decoration, only two incised lines at the end of each wing.

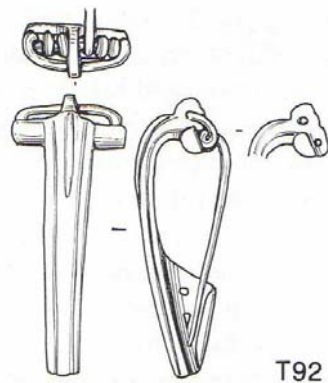


Figure 23: Example of 'Two Piece Colchester' brooch mechanism (Bayley 2004, 158).



Figure 24: 'Two Piece Colchester' brooch with modified springs and pin.

However, it appears that the brooch was modified and/or repaired in antiquity as the pin mechanism is different from what has been described above (Figure 24). The original one piece spring mechanism which fitted in the slightly concave wings has been replaced by an oversized pin, which appears to be from a hinged type brooch as it has a flattened edge. It is possible that the axis bar and spring on the left hand side is original, but the wire on the right is possibly too thick to pass through the upper hole, and possibly why it has just been wrapped around to stop the axis bar sliding out. The length of the pin is not straight as it has probably been bent slightly to allow it to flex when opening and closing the brooch (J. Bayley pers. comm.). XRF analysis showed that the brooch was made from leaded bronze, as expected (Bayley 2004, 155), but the springs and pin were found to be bronze.

Finds associated with Skeleton 6008

This skeleton is an adult in an extended supine position, orientated south (Figure 25). Disturbance of the grave is high, and again it has not been possible to suggest a gender from the goods found in association with the skeleton (see project archives). The finds associated with this grave are shown in Table 6.



Figure 25: Skeleton 600 (photo: project archives).

Table 6. Finds associated with Skeleton 6008

SF No.	Object	Comments	Conservation Treatment
200434711	Copper alloy Roman 'Trumpet' brooch		Excess soil removed
200434712	Iron strip		No remedial work required
200434713	Iron buckle	Badly decayed fibres only	No remedial work required

SF200434711 'Trumpet' brooch

This type of bow brooch (Figure 26) has an expanded head, similar to that of the bell of a trumpet (Bayley 2004, 92). On the Barrow Clump example, the moulding is slightly less prominent at the back.

The widened head covers a spring attached to a single lug by an axis bar with a wire head loop. The head loop is absent on this example, but this feature would be likely to have originally been present (J. Bayley pers. comm.), as suggested in Figure 27. This type of brooch is dated to between the mid first century AD and the late second century AD (Hattatt 1993, 105), and they are usually made from brass or gunmetal (Bayley 2004, 155). XRF analysis shows that the brooch is made from brass.



Figure 26: 'Trumpet' brooch SF200434711, with characteristic moulding.

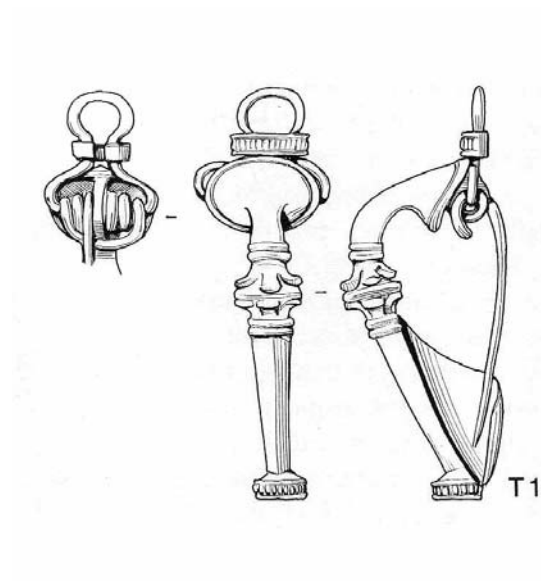


Figure 27: Diagram of 'Trumpet' brooch with head loop (Bayley and Butcher 2004, 161).

Finds associated with Skeleton 6012

This skeleton is of an adult in an extended supine position, orientated north-east (Figure 28). Disturbance of grave was low and grave goods found in association with the skeleton (Table 6) suggest a female burial (project archives).



Figure 2.: Skeleton 6012 (photo: project archives).

Table 6. Finds associated with Skeleton 6012

SF No.	Object	Comments	Conservation Treatment
200434968	Copper alloy knife guard		No remedial work required
200434972	Iron buckle	Badly decayed fibres only	No remedial work required
200434977	Iron ring		No remedial work required
200434978	Copper alloy binding		No remedial work required
200434979	Copper alloy strip		No remedial work required
200434980	Copper alloy strip		No remedial work required
200434981	Copper alloy cosmetic brush	Fibres not easily visible. Incised line decoration.	Excess soil and corrosion product removed.
200434982	Iron pin fragment	Joins 5045. Badly decayed fibres only.	No remedial work required
200434983	Iron buckle		4 fragments rejoined with HMG Paraloid B72 (commercial strength)
200434984	Iron knife		Excess soil and corrosion product removed
200434986	Copper alloy applied disc brooch	Heavily corroded. In poor condition.	No remedial work carried out as too fragile
200435009	Copper alloy wire		No remedial work required
200435012	Iron Fragment		No remedial work required
200435013	Iron Fragment		No remedial work required
200435014	Iron Fragment		No remedial work required

200435045	Iron pin fragment	Joins 4982. Badly decayed fibres only.	No remedial work required
200435046	Iron Fragment		No remedial work required
200435047	Iron Fragment	Badly decayed fibres only	No remedial work required
200435048	Iron Fragment		No remedial work required
200435049	Iron rivet		No remedial work required
200435050	Handle fragment?		No remedial work required
200435051	Copper alloy strip		No remedial work required
200435053	Iron Fragments		No remedial work required
200435055	Iron Fragment		No remedial work required

SF200434981 Cosmetic brush

This cosmetic brush is larger than the other (SF200304485), and without the interlocking rings, but has a similar linear decoration (Figure 29). XRF analysis suggests that the copper alloy is likely to be bronze. It is possible to see some fibres that remain inside the tube, but it is not possible to remove them for sampling without destroying them.



Figure 29: Bronze cosmetic brush.

SF200434984 Knife

This knife (Figure 30) has been classified as being an Evison Type 2 (Stoodley 2006, 30) with a straight back and a curved cutting edge (cf. Evison 1987, 113). On this heavily worn blade, textile impressions are visible on the remains of the mineral preserved leather sheath, while mineral preserved horn also survives on the tang.



Figure 30: Iron knife with remnants of mineral preserved organics.

SF200434986 Applied brooch

The applied form of disc brooch has a repoussé decorated foil mounted onto a back plate. A separate strip could be fitted as a rim (Dickinson 1993, 13). This style starts early, before the mid-fifth century and lasts through the sixth century.

The Barrow Clump example is in poor condition (Figure 31), and although the base is largely complete, the catch plate is loose. XRF analysis suggests that the disc is gunmetal, and that the grey and white accretions are the remains of an applied tin foil with a lead solder. As with this example, these brooches have often lost their foil decoration meaning that they can not be classified (Dickinson 1976, 100-1). It is likely that the pin was made of iron as iron corrosion products survive around the area of the pin mount.



Figure 31: Applied disc brooch, in poor condition.

Finds associated with Skeleton 6013

This skeleton is an adult in an extended supine position, orientated south (Figure 32). Grave goods found in association (Table 7) suggest a female burial, but disturbance of the grave is high (see project archives).



Figure 32: Skeleton 6013 (photo: project archives).

Table 7. Finds associated with Skeleton 6013

SF No.	Object	Comments	Conservation Treatment
200434997	Iron knife blade	In 2 pieces. Probable horn handle.	Excess soil removed
200434998	Copper alloy Roman 'T-shaped' brooch	Has 3 small rectangular areas of enamel: 2 red, 1 blue.	Excess soil and corrosion product removed
200434999	Iron pin fragments	Badly decayed fibres only	Excess soil removed
200435015	Iron fragment		No remedial work required
200435016	Copper alloy sheet		No remedial work required
200435018	Iron fragment		No remedial work required
200435019	Copper alloy sheet		No remedial work required
200435044	Iron fragment	badly decayed fibres only	No remedial work required
200435100	Iron buckle	Textile present but badly decayed fibres only	Not possible to rejoin
200435101	Copper alloy applied disc brooch	In poor condition. Textile present but badly decayed fibres.	Excess soil removed

SF200434997 Knife

This knife has been identified as being Evison Type 3 (Stoodley 2006, 30) with an angled back and a curved cutting edge (cf. Evison 1987, 113). The knife is broken into two pieces between the blade and the tang (Figure 33). Mineral preserved organic horn is visible on the tang, while it is possible that there are remnants of a leather sheath on the blade. Disturbance of the grave was high but the plan indicates that the knife was found near a bone of upper body, so a small fragment of bone which is attached to the tang may be human.



Figure 33: Broken iron knife with horn handle.

SF200434998 'T-shaped' Brooch

This type of brooch (Figure 34) is the second most common form of early bow, dating from the late first century AD until the middle of the second century AD, and characterised by a tapering bow and wide wings, with a foot knob being frequent (Hattatt 1993, 87-88). The majority of these brooches are hinged, where the wings form a narrow tube which holds the axial bar, around which the pin is held. XRF analysis indicates that this brooch is made from a leaded bronze, like the majority of this brooch type (cf. Bayley 2004, 167).

It is common for this type of brooch to have enamel decoration in simple lozenge, rectangular or triangular cells (Bayley 2004, 167). A Champlevé technique was widely used, where a design is scooped out of a copper ground and then filled with enamel and fired, fusing the enamel so that it is flush with the metal. On the Barrow Clump example (Figure 34) there are three rectangular enamelled cells below the mid bow moulding, two red and one blue. XRF analysis of the opaque red enamels has shown a high lead content, which may be because it is a leaded glass, and it has also been suggested that lead was added to help form a better bond between enamel and metal (Bayley 2004, 46). It is likely that the colourant was copper oxide as under reducing conditions it will produce a dull red colour (cf. Newton and Davison 1989, 58). XRF analysis of blue enamel suggests that the colourants were copper, cobalt, and manganese.



Figure 34: 'T-shaped' brooch with enamel decoration

SF200435101 Applied brooch

As with the similar style brooch SF200434986, this example (Figure 35) is also in poor condition as only a portion of the disc remains. The construction is similar in that the catch plate is made of a separate piece which is added after casting, before the foil decoration. The disc is very thin and fragile, being covered in a greyish concretion. XRF analysis suggests that the surface was covered with a tin foil soldered on with lead.



Figure 35: Applied disc brooch in poor condition.

Other Contexts

Spearhead SF200304218

This spearhead is from an unstratified area (Table 8, Figure 36). It was found outside a badger set and it is not known from which grave it came (see project archives).

Table 8. Spearhead 20034218)

SF No.	Object	Comments	Conservation Treatment
20034218	Iron spearhead	No evidence of MPO textiles	Excess soil and corrosion product removed

There are no traces of mineral preserved organics, only an imprint of the wood remains in the shaft. The cross pin is still visible in the shaft. The spear has been classified as being a Swanton H1 (Stoodley 2006, 30) which consists of an angular blade with a concave curve above the angle. This type of spearhead is the smallest, between 170 and 220mm long, often with a clear concave shape, and were in use between the fifth and sixth centuries AD (cf. Swanton 1974, 119).



Figure 36: Unstratified spearhead SF200304218

X-ray fluorescence (XRF) Analysis

X-ray fluorescence analysis (XRF) was carried out on the copper alloy finds, excluding fragments, to identify the general composition of the objects and confirm the presence of surface coatings. Objects were analysed using an EDAX-EAGLE II spectrometer at 40kV and 260mA in a non-vacuum atmosphere, for a live time of 50 seconds. Where possible, analyses were made at areas where there was least corrosion. The results are summarised in Table 9.

XRF is advantageous for these objects as it is a non-destructive qualitative technique used to identify the elements present. It is not possible to carry out quantitative analysis as XRF can only provide analysis of the surface, which on an archaeological object is corroded and does not reflect the base metal. Furthermore, the composition of the metal may differ from manufacture as deposition may have caused differential leaching of elements such as tin, zinc, and copper. As a result, the following findings of copper alloy type are indications based on qualitative results only.

Nomenclature

Rather than copper being used in its pure form, it was usually alloyed with other metals to give a range of properties. As a result, each alloy is slightly different and can be divided into similar categories. The standardised nomenclature uses modern metallurgical names for alloys which is largely applicable to objects of all periods (Bayley 1991, 14). For the purposes of this discussion the following classifications of copper alloy types will be used:

Bronze: an alloy containing copper and tin.
Brass: an alloy containing copper and zinc.
Gunmetal: an alloy containing copper and significant amounts of both zinc and tin.
(Leaded: an alloy which contains more than a few percent lead.)

The divisions between these types can be represented in Figure 37, where the nearer a point is to the corner, the higher the relative amount of that element in the alloy (Bayley 1991, 14).

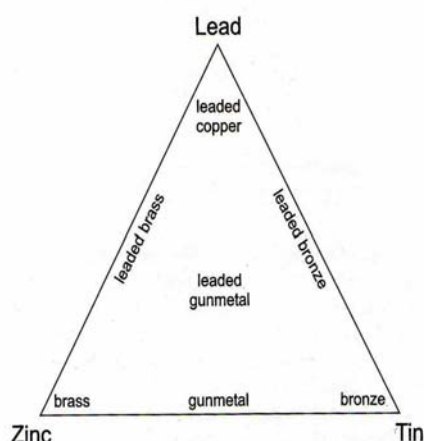


Figure 37: Ternary Diagram with alloy names superimposed (Bayley 1991, 14).

XRF Conclusions

Although XRF analysis has its disadvantages, it has proved useful, particularly in identifying surface coatings. Without this technique it would be difficult to confirm tin foil and lead solders, and to suggest how the gilding had been applied. Although the results for the

copper alloy core are less conclusive, it has also been useful to suggest a classification of alloy as this provides further information for typological comparison.

Table 9. Summary of XRF results

Find No.	Object	Area	Elements Detected*	Alloy Type	Other Components
200304401	Great Square Headed Brooch	Brooch	Cu, <u>Sn</u> , Pb, Zn	Bronze	Mercury gilding
		Catch-plate	Cu, <u>Pb</u> , Zn	Leaded Brass	Tin solder on pin
		Repair	Cu, <u>Sn</u> , Pb, Zn	Bronze	
200304402	Saucer Brooch	Brooch	Cu, <u>Sn</u> , <u>Zn</u> , Pb	Gunmetal	Mercury gilding
200304403	Saucer Brooch	Brooch	Cu, <u>Sn</u> , <u>Zn</u> , Pb	Bronze/ Gunmetal	Mercury gilding
200304404	Spoon	Spoon	Ag, <u>Cu</u> , Sn	Debased Silver	
200304418	Penannular Brooch	Brooch	Cu, <u>Sn</u>	Bronze	
200304485	Cosmetic Brush	Brush	Cu, <u>Zn</u> , Pb, <u>Sn</u>	Leaded Brass	
200304506	Saucer Brooch	Brooch	Cu, <u>Sn</u> , <u>Pb</u> , Zn	Copper Alloy**	Mercury gilding
200304518	Saucer Brooch	Brooch	Cu, <u>Sn</u> , <u>Pb</u>	Copper Alloy**	Mercury gilding
200434641	Disc Brooch	Brooch	Cu, <u>Sn</u> , Pb, Zn	Tinned Bronze	
200434690	Roman 'Two Piece Colchester' Brooch	Brooch	Cu, <u>Sn</u> , <u>Pb</u>	Leaded Bronze	
		Left Spring	Cu, <u>Sn</u> , Zn, Pb	Bronze	
		Right Spring	Cu, <u>Sn</u> , Zn, Pb	Bronze	
		Pin	Cu, <u>Sn</u> , Pb	Bronze	
200434711	Roman 'Trumpet' Brooch	Brooch Pin	Cu, <u>Zn</u> Cu, <u>Sn</u> , Pb, Zn	Brass Bronze	
200434968	Knife Guard	Guard	Cu, <u>Sn</u> , Pb, Zn	Bronze	
200434981	Cosmetic Brush	Brush	Cu, <u>Sn</u> , Pb, Zn	Bronze	
200434986	Applied Disc Brooch	Brooch	Cu, <u>Pb</u> , Sn, Zn	Gunmetal	Applied tin with lead solder
200434998	Roman 'T-shaped' Brooch	Brooch Pin	Cu, <u>Sn</u> , <u>Pb</u> Cu, <u>Sn</u> , Pb	Leaded Bronze Bronze	See text for enamels
200434968	Applied Disc Brooch	Brooch	Cu, Zn, Pb	Brass	Applied tin with lead solder

* Elements present in relatively high levels (except copper in copper alloys) are underlined.

** Corrosion was too prevalent to determine alloy type.

Conclusion

Investigative conservation has been beneficial for the metal finds from the Anglo-Saxon burials from Barrow Clump because information has been extracted regarding their function, construction, and typology. Conservation was carried out with the policy of minimum intervention, meaning that much of the work consisted of only removing excess soil and chalk to allow better visual interpretation of the objects. Similarly, no area of metal or fibres have been coated or consolidated, which makes future analytical study possible. Objects where remedial conservation was required have been noted in the preceding tables, but again this has been minimal. XRF analysis has also provided further useful information by suggesting surface treatments and copper alloy type, which has been particularly relevant in brooch typology. Overall, the impact of badger damage appears to vary between grave, and it is likely that this has affected skeletal remains more than artefacts.

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