Ancient Monuments Laboratory
Report 116/93

CARPENTRY DETAILS OF MINERAL PRESERVED WOOD ON IRON COFFIN FITTINGS FROM THWING, NORTH YORKSHIRE

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Summary

This report includes a discussion and catalogue of the wood preserved on the fittings of 28 Anglican coffins from this site. It was possible to identify specific joints used in their construction and put forward reconstructions for three different coffins.

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Carpentry details of mineral preserved wood on iron coffin fittings from Thwing, North Yorkshire.

During excavation of the Anglian cemetery at Thwing 28 sets of coffin fittings were retrieved. These comprised hinges, locks and decorative corner brackets and are themselves discussed in detail by P.Ottoway in the excavation report. The C14 dates for the site are between 700-900 AD. On many of these items wood grain could clearly be seen in the iron corrosion, and it has been possible to not only identify the species used for the original coffins but also to suggest the construction of some. Details of mineral preserved wood on individual coffin fittings can be found in the accompanying catalogue.

The coffin fittings were examined in two groups. The first was conserved and brought to my attention by Margaret Brookes (York Archaeological Trust Laboratory), and an initial report was produced on this material (Watson 1985). In the light of this work subsequent seasons material was examined after conservation by Helen Cox (Doncaster Conservation Laboratory).

All the wood traces have been preserved by iron corrosion products, which have either coated or replaced the structure making it impervious to attack by microorganisms (Keepax 1975). Although the wood itself has been chemically and physically altered there is still enough detail to merit examination with a hand lens or a binocular microscope (Watson & Edwards 1990). Using such methods it was possible to identify the ring porous woods and to record their grain orientation.

Construction of the coffins.

Most of the coffins were identified as being made of oak with one possibly of ash, although this is more likely to be a replacement board. Possible dowels or tenons have also been identified, but not enough evidence was preserved to indicate which of the two was the preferred form of fixing. Only two examples were recognised and one of these was made from oak and the other of willow or poplar (it is impossible to distinguish between these woods microscopically). These woods were readily available in Anglian Yorkshire and were frequently used by carpenters of the period.

Most of the planks appear to be of radially split timber (Darrah 1982), with the possible exception of Grave 29 (T85 J9 F33) which may have been made from tangentially split or flat sawn timber. The thickness of the boards is fairly consistant at 20-30mm for all the coffins. For individual coffins, however, the range is usually much narrower, suggesting that the boards were carefully trimmed to an almost uniform thickness before use.

By taking detailed measurements and noting the grain orientation of the wood preserved on the metalwork it has been possible to identify a number of different joints used in the construction of specific coffins, such as the use of rebated butt joints and mitred joints for the corners. The wood preserved on the hinges indicates how the lid was attached. There is little evidence as to how the base

was attached to the sides. In two instances lines of nails were found but they had no wood preserved on them. The other coffins must have been pegged together or the base rebated into the sides, but no evidence remains to suggest which of these alternatives might have been used. The nomenclature of the joinery is based on Milne (1982).

Occasionally both nails and pegs have been used for securing joints (Grave 21C), and this suggests repair rather than standard construction - maybe this coffin was a re-used chest rather than made primarily for burial.

Rebated Butt Joint

This type of joint is basically a simple butt joint, but with the side or end boards rebated. The rebates presumably helped to key the two boards together during fixing with dowels or tenons. The use of dowels or pegs is more likely as in the examples from Barton-on-Humber (see below) and St. Cuthbert's coffin (Hewett,1985).

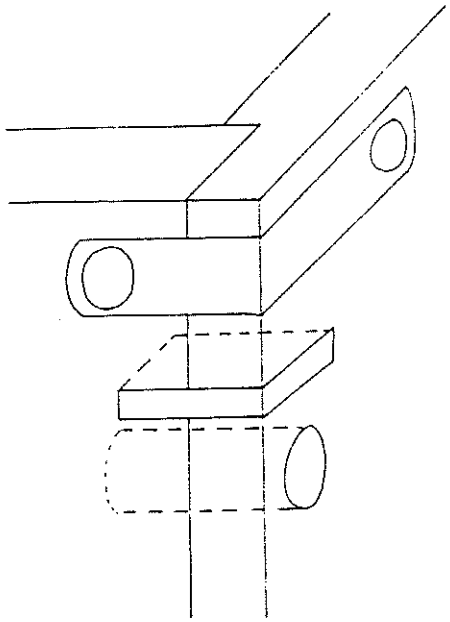

Figure 1. Rebated butt joint illustrated with corner bracket, tenon and dowel that could have been used for fixing.

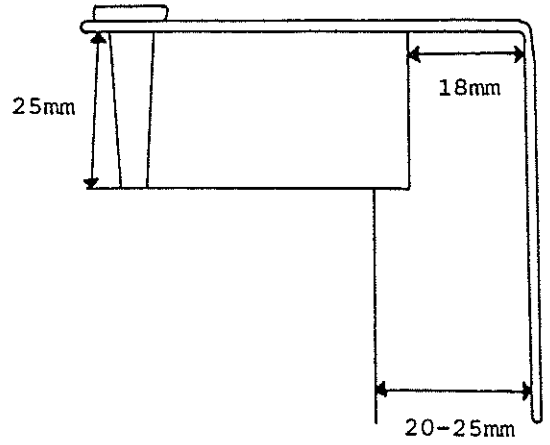

Figure 2. Reconstruction of half joint from coffin T83 J9 F15.

Mitre Joint

A mitre joint is where two timbers are joined at a 45° angle. This type of joint also requires consolidation with dowels or tenons. Again it is assumed that dowels would have been preferred, but free tenons have been found securing mitre joints in a small casket from Finglesham, Kent.

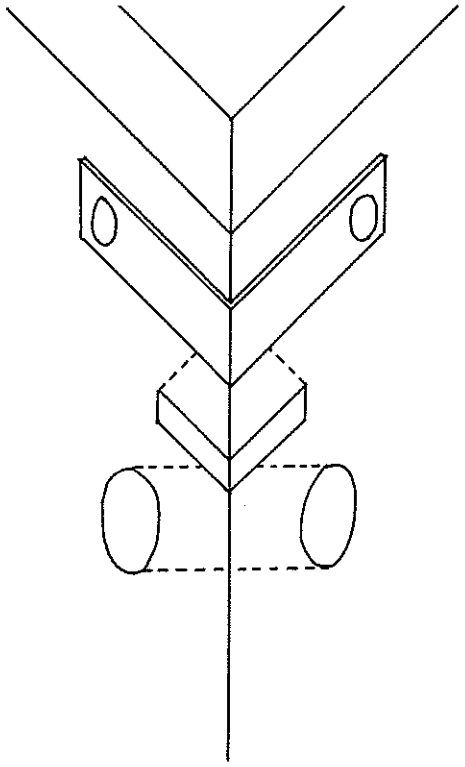

Figure 3. Mitre joint with corner bracket, tenon and dowel that might have been used for fixing.

Lid attachment

Details as to how the lid was attached to the back can be seen on the large iron hinges. The lid was hinged to the back by two loop-ended straps, the loop of the back strap being firmly embedded into the edge of the back board. Because of the hinge arrangement the lid of the coffin must have been flush with the top of the back board. As the oak lid would have been very heavy it has been assumed that most of its weight would have been supported by the other three sides, rather than just the hinges and hasp.

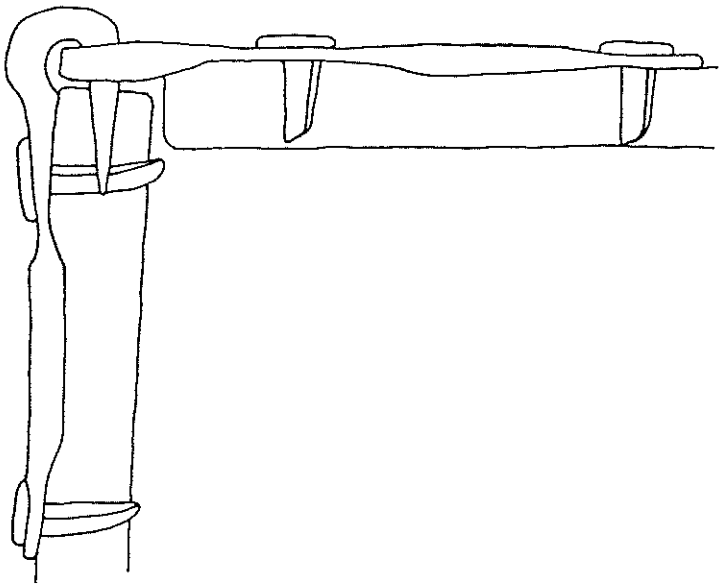

Figure 4. Reconstruction of hinge arrangement, based on coffin T83 J9 F18.

Attachment of base to sides

Only from grave 51 is there evidence for the attachment of the sides to the base. In this example the base board was nailed to the sides, and then 3 nails were used to secure the side to the end. Grave 50 also had a line of nails which may have been used to attach a side to the base. For the other coffins there is no evidence to suggest how the base was attached to the sides, but almost certainly one of two methods is likely to have been employed. The base could simply have been pegged to the sides with angled dowels (Fig.5), like the coffins from Barton-on-Humber, or rebated into the sides (Fig.6), similar to St. Cuthbert's coffin (Hewett, 1985).

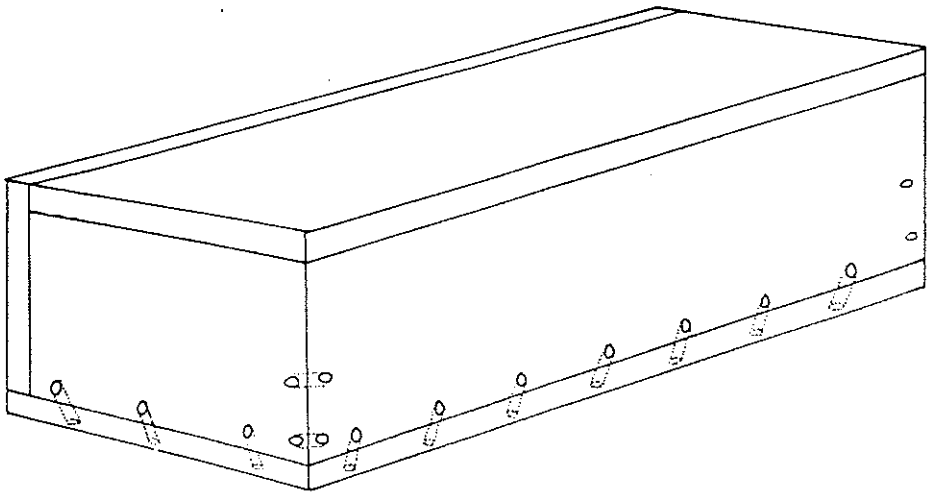

Figure 5. Base simply attached by angled dowels.

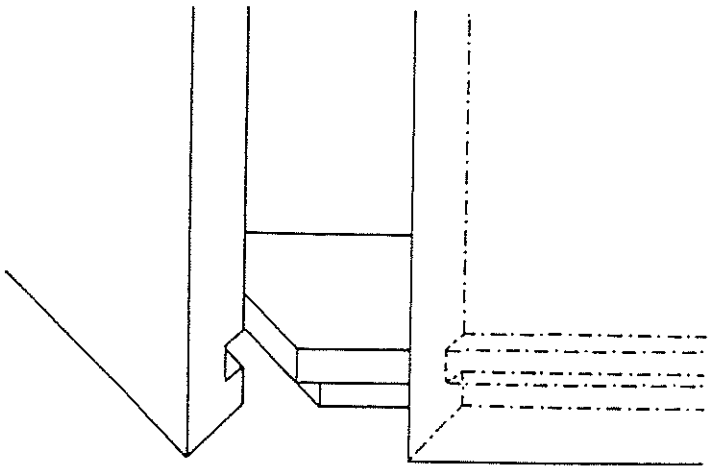

Figure 6. Inserted base viewed from a mitred corner.

Reconstruction of specific coffins

Grave 21C T83 J9 F15

Wood grain preserved on the metal fittings suggests the use of a rebated butt joint at front/side corner and possible evidence for use of oak dowels on the rear/side corner. This coffin may have been repaired with iron nails.

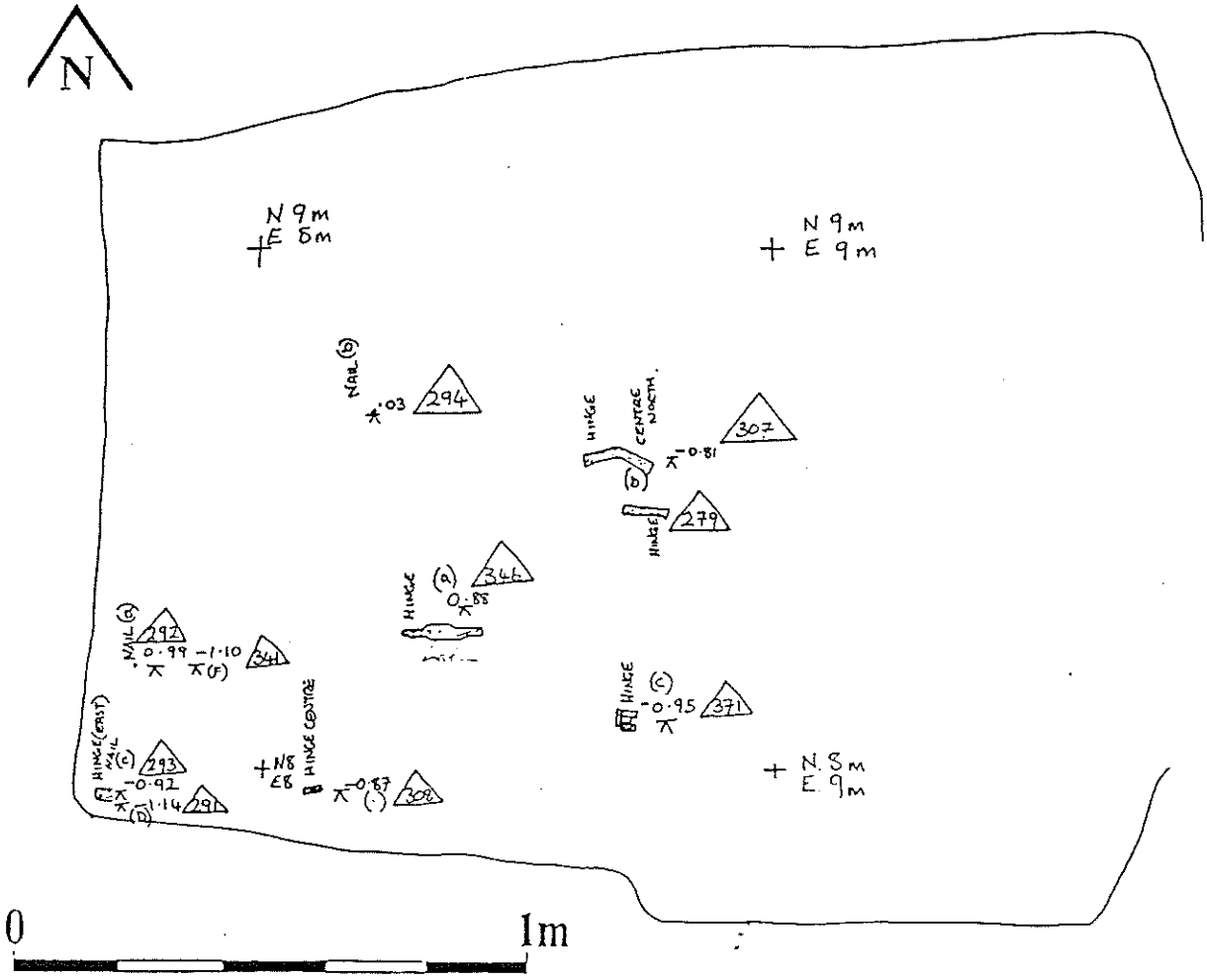

Figure 7. Grave plan.

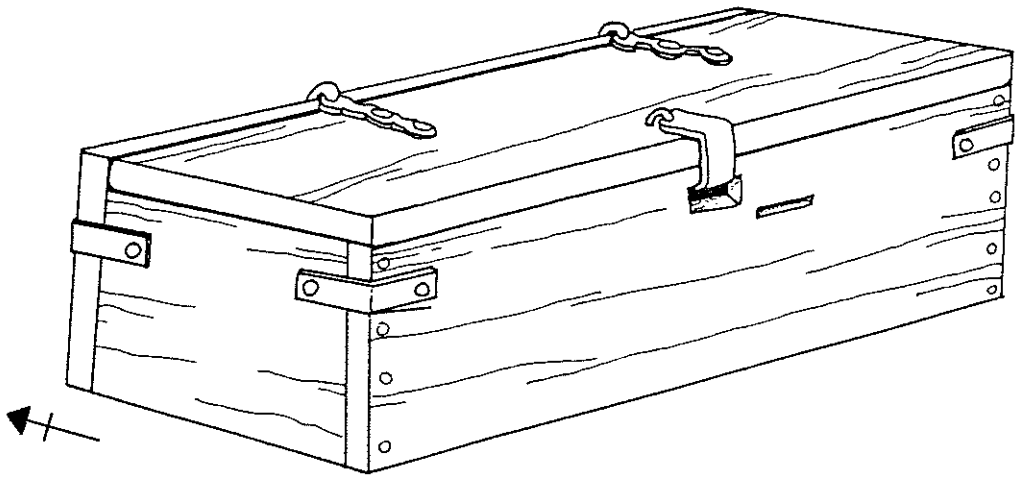

Figure 8. Reconstruction of coffin.

Grave 15A T83 J9 F18

On the metalwork from this coffin there is evidence for mitred joints on the rear corners, on the same side as the hinges, and rebated butt joints at the front. This may mean that the lid rested only on the front side of the coffin. There appear to be four brackets at the footside and only two at the head - possibly two are missing.

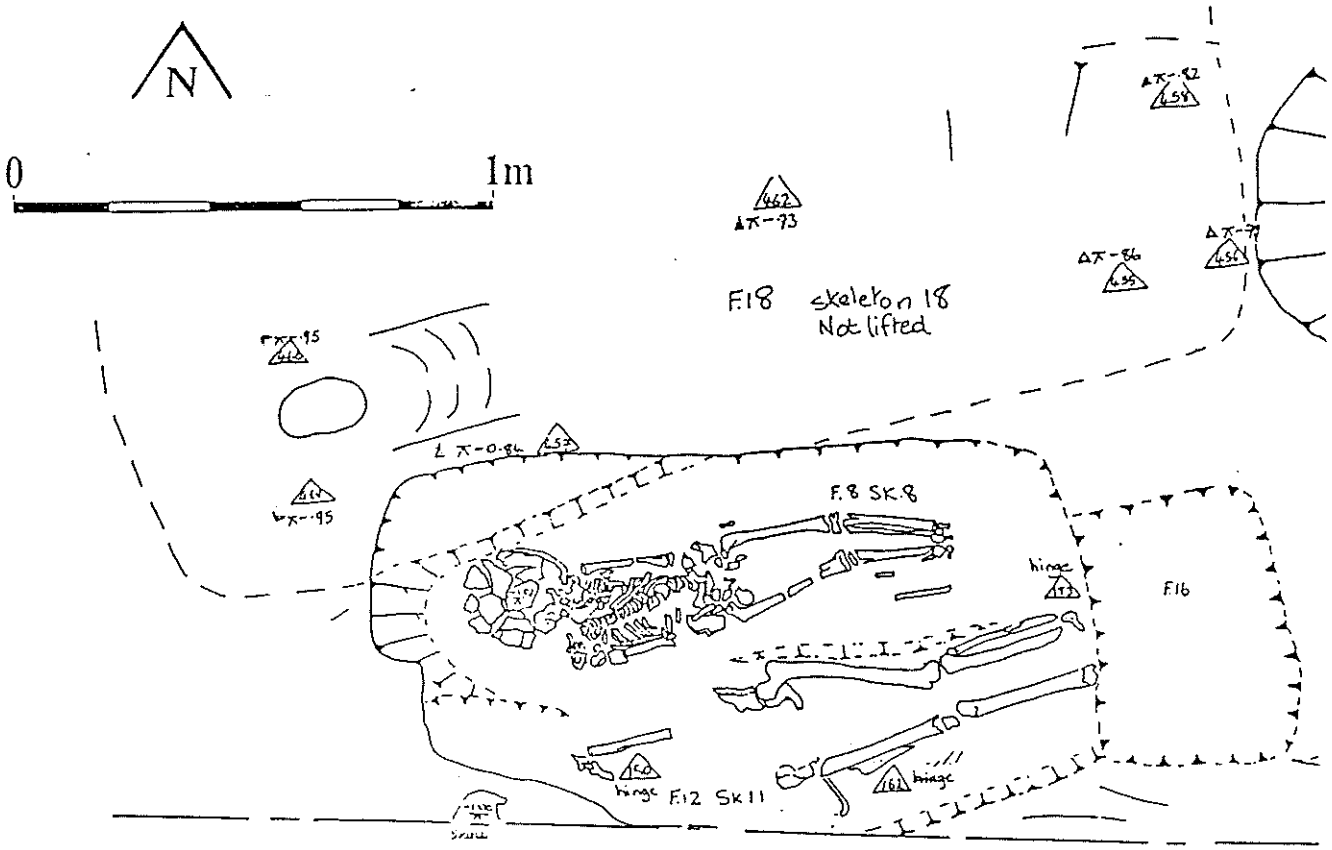

Figure 9. Grave plan.

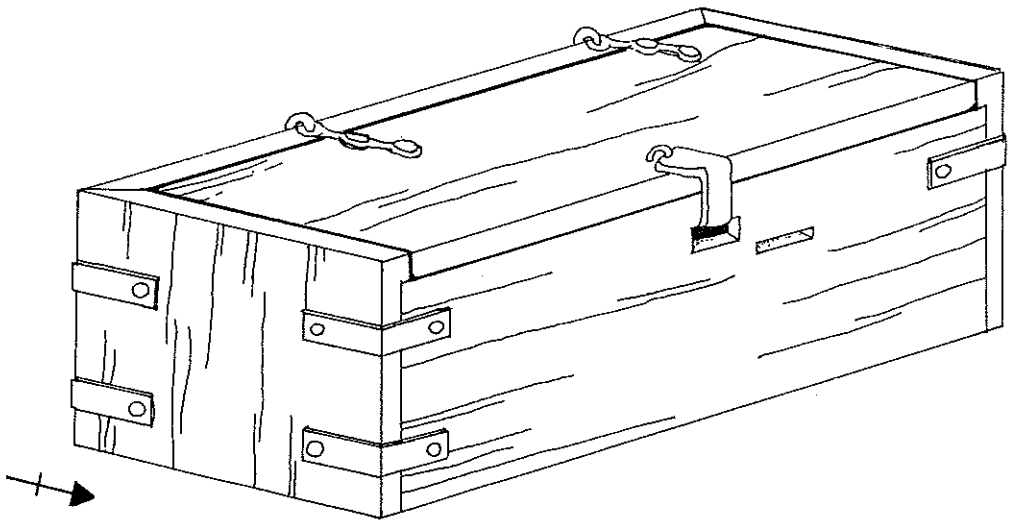

Figure 10. Reconstruction of coffin.

Grave 29 T85 J9 F33

This grave was disturbed, but wood preserved on the fittings suggest that this coffin may have been made from flat sawn planks rather than radial split timbers.

Grave 61 T85 K9 F9

This coffin has evidence for the use of both half and mitre joints. Unfortunately, as the grave was badly disturbed it is impossible to determine which side they correspond to. I would therefore suggest the use of mitre joints for rear corners and rebated butt joints for the front, as in figure 10. Alternatively the fittings could have been mounted on a coffin like figure 11, with rebated butt joints at the rear and mitres at the front corners. At least one end board appears to have its grain orientated vertically.

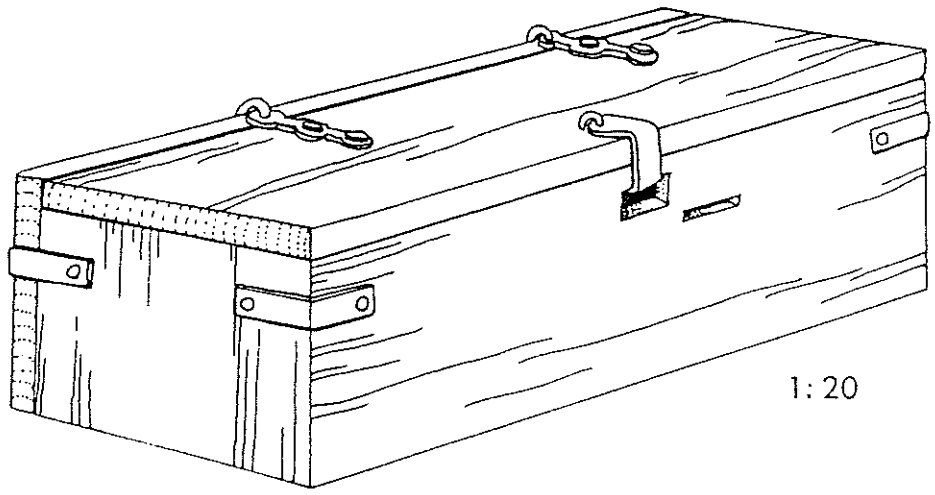

Figure 11. Reconstruction of coffin.

Discussion

The carpentry evidence presented in this study indicates that the Thwing coffins were made with a high degree of craftsmanship, certainly when compared to surviving examples such as St Cuthbert's coffin, and waterlogged Anglo-Saxon coffins from the excavations at St Peter's church, Barton-on-Humber.

According to Hewett (1982, 1985) St Cuthbert's coffin, which is dated as A.D. 698, was made from 7 radial surface oak boards. The base was housed into the two ends and the sides rebated (half joints) and pegged to both. There was an internal cover beneath the lid, and the lid itself has carved decoration.

I have examined some of the coffins from St Peter's church,

Barton-on-Humber, and they appear to be made from 6 radial split oak boards that have been pegged together. Instead of rebating the sides to house the end boards and base, all the boards were positioned on end on the base board, and pegs were used at an angle to hold them together. This group of coffins is thought to be contempory with the Anglo-Saxon foundations of the church, but I'm not aware of the specific date range.

On the basis of the Barton and St Cuthbert's coffins it is quite likely that the joints on the Thwing coffins were pegged rather tenoned together. However, from the same period there is evidence for the use of tenons to consolidate mitre joints on a small casket found in a grave from Finglesham, Kent (Watson forthcoming), so this possibility cannot be overlooked. The general quality of the carpentry found in the Thwing coffins would probably favour the use of rebated bases rather than base boards pegged to the sides. Obviously given the number of coffins found on the site it is of course possible that both types are represented.

The closest parallels for their construction are to be found at Dacre, Cumbria and Monkwearmouth, Northumberland; but these coffins are also only represented by their iron fittings. In the case of the Monkwearmouth coffins the lid arrangement has been found to be the same as the Thwing examples (P.Clogg pers. comm.). Unfortunately there was no evidence for the type of joints used on the sides and base. This group of coffins also appear to be made from trimmed radial split timbers and have a C7th-C9th date.

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Catalogue of examined material

Grave 2 [T77 J9]
I123 [86]
Hinge with no traces of mineral preserved wood. The lock plate has oak preserved on it, but there is no indication of the grain direction.

Grave 7A [T83/5 J9 F14/3]
I171 [229]
Iron coffin hasp with mineral preserved wood which indicates that the lid was originally made from an oak board with a radial surface.

I180 [153]
Corner bracket with mineral preserved wood which may represent a mitred joint, but not enough wood has been preserved to be certain.

Grave 8 [T85 J9 F22]
I64 [277]
Iron knife on the bottom of a coffin with the remains of mineral preserved oak on one side, which originally had a radial surface.

Grave 9A [T83 J9 F8]
I130/2 [150 183]
Two iron hinges with mineral preserved oak. These indicate that the lid was approximately 22mm, and the back board a minimum of 18mm. Originally the lid had a radial surface.

Grave 10 [T85 J9 F20 GrSk 8]
I295 [236]
Lock bolt with mineral preserved oak, which originally had a radial surface. Attachment for the bolt to the coffin board indicates that the front had a minimum depth of 17mm.

I147 [164]
Hinge with mineral preserved wood. Both the backstrap and top have the remains of oak which originally had a radial surface. The depth of the lid was approximately 15-16mm. The hinge has corroded together in a collapsed position which indicates that it can only have been lightly corroded when the wooden boards rotted and collapsed.

Grave 15A [T83/5 J9 F18] (see figs. 9 and 10)
I285, 289 [462]
Iron lockbolt and stapled hasp with wood preserved on the attaching staples for both these fittings which indicates the thickness of the lid as 25mm, and the front board as 27mm.

I138-9 [455, 457]
Two iron hinges with mineral preserved wood which suggests how

the lid was hinged to the back board and is the basis of the reconstruction (see figure 4.). The depth of wood preserved on one of the nails indicates that the back board was 25mm thick.

I176-180 [456, 458, 459, 461]
Four iron corner brackets with mineral preserved wood which suggest the use of mitre joints for at least two of the corners.

I181 [161] * suitable for publication photo.
Corner bracket with mineral preserved wood, originally oak boards with radial surfaces. Evidence for a probable mitre joint, which may correspond to the front and end board. If this is the case the preserved traces indicate that the front board was approximately 22mm thick at this point and the end board 23mm. It is also possible to note that the end board has the grain running vertically.

I182 [162] * suitable for publication photo.
Corner bracket with mineral preserved wood probably corresponding to the back and end board. Evidence for a butt joint between the two sides, which may have originally been rebated to facilitate fixing by tenons or dowels, but there is no indication of the actual depth of the back board. The end board at this point is 26mm thick, with vertical grain.

The wood preserved on all the fittings was oak, and all the five boards represented originally had radial surfaces.

Grave 21C [T83/5 J9 F15] (see figs. 7 and 8)
This is a double grave, so the fittings could in fact belong to two coffins. Even if they represent only one coffin, it appears to have been repaired with iron nails, and the ash board may be a replacement.

I133-135 [308, 371]
Two iron hinges with mineral preserved oak. These indicate that both the back board and lid were 20mm thick, and originally had a radial surface. The lid was hinged to the back in the same arrangement as T83 J9 F18, see figure 4.

I84 [291]
Iron nails with mineral preserved wood where the grain runs along the shanks. This may indicate the original use of oak dowels, which may have been reinforced with nails.

I179 [307]
Iron corner bracket with mineral preserved wood which suggests that a rebated butt joint may have been used for the corners, see figure 2. The depth of wood preserved on one of the nails is 25mm, and this probably indicates the thickness of the end or back board.

I239
Fragment of a corner bracket with mineral preserved wood, probably of ash (Fraxinus sp.) which originally had a radial surface.

Grave 23B [T85 J10 F17]
I298 [312]
Complete lock bolt and lock plate with mineral preserved oak, which originally had a radial surface. Unless the bolt sits in a recess, the front of the coffin was about 23mm thick. Small hinge with top spike fitting into the back board.

I258 [295]
Possible hasp with mineral preserved wood to a depth of 20mm, which probably corresponds to the thickness of the lid.

I149 [278]
Top part of hinge with mineral preserved wood to a depth of approximately 20mm, which originally had a radial surface. Probably corresponds to the lid.

I211 [296]
Half of a corner bracket with no mineral preserved wood, but the depth of the nail is 15mm.

Grave 29B [T85/6 J9 F33]
I155 [307]
Hinge fragments which indicate that the back board was approximately 20mm thick, and the lid had a minimum depth of 18mm.

I299 [316]
Lock bolt and plate with mineral preserved oak, but not enough preserved to suggest the orientation of the board.

I299 [316]
Large plate with mineral preserved oak, which originally had a tangential surface. The board it was originally attached to has a minimum depth of 15mm.

I195 [336]
Corner bracket with mineral preserved oak, which originally had a radial surface. There is not enough wood preserved to indicate the type of joint used.

I199 [30]
Corner bracket or hasp with mineral preserved oak and the board originally had a radial surface.

Grave 30 [T85 J9 F31]
I157 [311]
Complete hinge with mineral preserved oak. The back board was approximately 22-23mm thick and originally had a radial surface. The staple of the back strap folds back into the edge of the board.

[317]
No mineral preserved wood remaining on this coffin fitting.

I255 [318]
Miscellaneous fragments with mineral preserved oak, and the boards originally had a radial surface.

Grave 34 [T86 J9 F34]
I164 [2]
Hinge with mineral preserved wood. The backstrap indicates a minimum depth for the back board of 18mm. The top strap indicates that the lid had a depth of 22mm, and was made from oak which originally had a radial surface.

I165 [3]
Complete hinge which indicates that the back board was approximately 20mm thick.

Grave 42 [T85 K10 F6]
I297 [294]
Lock bolt with mineral preserved oak, which originally had a radial surface. A depth of approximately 16mm of wood is preserved, and this can be taken as a minimum thickness for the front of the coffin.

Grave 45 [T86 K9 F21]
I166 [5]
Complete, but collapsed hinge, with mineral preserved wood which indicates that both the lid and back were made from oak boards which originally had radial surfaces. No indication of the depth of either board.

I167 [6]
The top strap of this hinge gives a minimum depth for the lid of 21mm.

I13 [26]
Coffin fitting with mineral preserved wood but not sufficient to comment on.

Grave 47B [F1]
I141 [536]
Iron hinge with mineral preserved oak and giving the minimum depth for the back board as 18mm. The board has a radial section.

Grave 51 [T86 K9 F24]
I301 [8]
Lock bolt and hasp has no mineral preserved wood, but the split spiked loop on the hasp indicates that the lid was approximately 23mm thick.

I217 [12]
Hinge with mineral preserved wood which indicates that both the lid and back were made from oak boards that originally had radial surfaces. At these points the back had a depth of 26mm and the lid 22mm.

Grave 55A [F3]
I136 [392, 426]
Two iron hinges with mineral preserved oak. These give a minimum thickness for the back board as 18mm, and for the lid as 15mm.

393
Iron lockbolt and stapled hasp give a minmum thickness for the front of the coffin as 18mm. Originally the board had a radial surface.

I288 [364]
Split spiked loop, possibly used to attach the stapled hasp to the coffin lid, and indicates that the lid was 15mm thick at this point.

Grave 60 [T85 K10 F5]
I148 [233]
Hinge with mineral preserved wood which indicates that the lid was made from oak that originally had a radial surface.

I210 [276]
Hasp with mineral preserved wood which indicates that the front board had a minimum depth of 14mm and originally a radial surface.

Grave 61 [T85 K9 F9]
I185 [290]
Corner bracket with mineral preserved wood with evidence for a rebated butt joint. The end board has a minimum depth of 21mm, and a radial surface with the grain running horizontal.

I296 [291]
Lock bolt with no mineral preserved wood on it, but an intact split spiked loop used to attach it to the front gives the thickness of this board as 19mm.

I153 [302]
Part of the hinge with mineral preserved wood that probably corresponds to the lid. This has a depth of 15mm, and the original board had a radial surface.

I186 [315]
Corner bracket with mineral preserved wood, on one bar the grain is orientated along its length, and on the other is possibly perpendicular to it. No joint details for this corner.

I190 [322]
Corner bracket with mineral preserved wood. One bar has the remains of radial surface oak with the grain orientated along the length, the other has the grain perpendicular to the axis of the bar. Possibly a mitred joint was used for this corner.

I160 [323]
Complete hinge with mineral preserved wood corresponding to both the lid and back board. The lid has a depth of 19mm. The back

board appears to have a tapering section, which was 18mm thick at the top and only 12mm thick about a third of the way down. This suggests that the board was originally made from a radially split plank.

Grave 64 [T85 K9 F8]
I206 [165]
Possible hasp with mineral preserved wood suggesting that the lid may be 15mm thick.

I294 [166]
Lock bolt with mineral preserved oak, which originally had a radial surface. Minimum depth for the front coffin board is 18mm.

I183 [167]
Strap with mineral preserved oak which originally had a radial surface.

I184 [168]
Corner bracket with mineral preserved oak, originally had a radial section with the wood grain orientated along the axis of the bracket.

F2
Iron fitting with mineral preserved oak.

F5 535
The lock bolt has mineral preserved oak which gives a possible depth for the front as 23mm. Nail with two different woods preserved- one with grain orientated along the shank was made of willow (Salix sp.) or poplar (Populus sp.) and could be the remains of a dowel.

F9 161
Hinge with mineral preserved oak giving a minimum thickness for the back board as 20mm. The board has a radial surface.

T83 F11 368
Complete hinge, but no mineral preserved wood remaining.

T85 K10 F4 Sk 21 314
Hasp, but no mineral preserved wood.