The Graveney boat

ANGELA CARE EVANS and VALERIE H. FENWICK

We published in our last number (1971, 41, pls. I–II) a brief preliminary note by Mr Basil Greenhill, Director of the National Maritime Museum at Greenwich, on the finding and rescue excavation of this pre-Conquest boat from the Kent marshes. Now we have the promised further account from Miss Evans and Mrs Fenwick who directed work in the field at the request of the National Maritime Museum which financed the joint British Museum/National Maritime Museum project. Miss Evans, Research Assistant at the British Museum, is working on the detailed account of the Sutton Hoo ship for the first volume of the definitive publication of the 7th-century ship burial. Mrs Fenwick, who was also a member of Mr Bruce-Mitford's 1965/7 team at Sutton Hoo, is a Specialist Assistant transferred to the National Maritime Museum. She will be writing the official account of the Graveney Boat for the Museum publication which will cover the whole field of the archaeology, recovery, conservation and reconstruction of the vessel. Staffs of both Museums assisted throughout. (Plate I of our March number has been reprinted as plate XIII for ease of reference.)

In September 1970 part of a clinker-built boat was discovered accidentally during the excavation of a large drainage channel on Graveney Marshes. The boat lay under more than 2 m. of marsh clay on land belonging to Earl Sondes, whose agents gave Canterbury Archaeological Society permission to excavate. When the importance of the boat was realized, the Kent River Authority, who were undertaking the drainage scheme, delayed flooding the ditch for a week so that it could be fully recorded and lifted (Greenhill, 1971). The site (Grid. ref. 066639) is in the parish of Seasalter, 1·75 km. NE of Graveney Village, 5·7 km. NNE of Faversham and 1 km. from the present high water line in Whitstable Bay (FIG. 1). The drainage ditch here follows the line of an old water course and runs between two groups of mounds of artificial construction (FIG. 1). In 1955 M. W. Thompson (1956) examined some of the mounds and demonstrated their connexion with the medieval salt industry which antedated the building of the seawall in 1325. Before this imbanking it would seem that the area was drained by tidal creeks and was flooded at abnormally high tides. The creek which connected Graveney village to the sea is today represented by the southern section of White Drain and a portion of Hammond Drain. At one time, air photographs show, it entered the sea in the vicinity of 'The Sportsman'. The antiquity of Hammond Drain is confirmed by the absence, along the length that was re-cut in 1970, of any lower peat horizon comparable to that found elsewhere on the North Kent Marshes (Evans, 1953).

THE BOAT

When found it lay on a fairly even keel and was a little higher at the stern. PLATE XIII shows the lengthways twisting of keel and sternpost and the upper profile of the frames sagging slightly on each side of the keel. Most of the keel, the sternpost, and parts of eight strakes on each side were found. The total length surviving in the ground was 10 m., and the maximum surviving width 3·40 m. Parts of 9 floor frames were found in position. Additional fragments of frame 9 and a section of frame 10 were found at the damaged end of the boat, but could be replaced. Another frame lay outside the broken extremity but appeared not to represent frame 11. Eventually

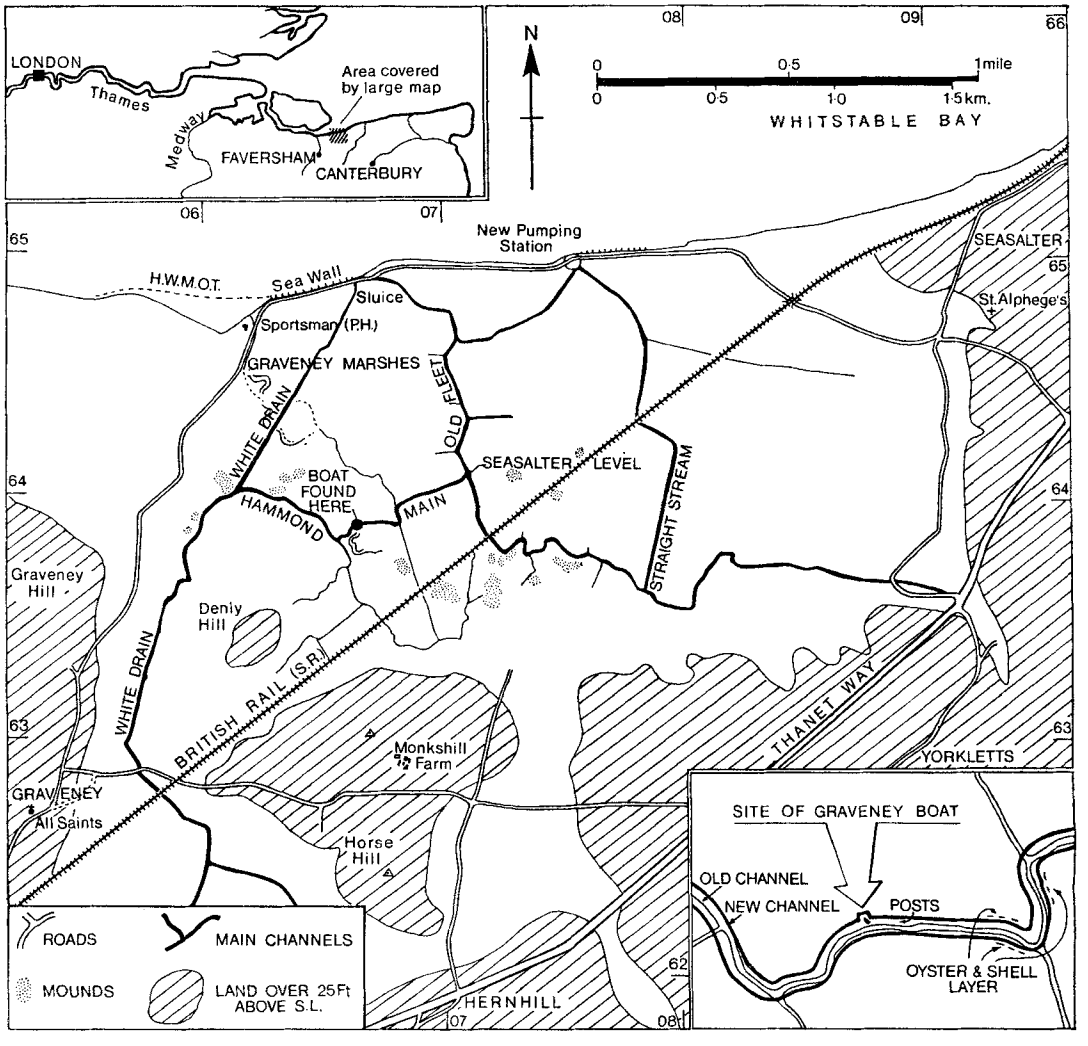

Fig. 1. Map showing site of the Graveney boat

it may be possible to relocate additional small fragments which were not in position and were not recorded during the initial clearing of the boat's fill.

The timber, apparently all oak,* was beautifully preserved, but small fragments left lying on the bank showed how much shrinkage would occur if the boat were allowed to dry out. The iron clench-nails which had fastened the strakes had almost completely rusted away but had left a clear impression of their form in the timber. However, the massive frames were still fastened to the skin of the ship by wedged treenails. Quantities of luting, probably cattle hair, still survived in the strake overlaps (lands) and was clearly visible, rusty and matted, against the dark timbers. This, and the supporting clay beneath the boat, was all that held the strakes together. One end of a three-strand rope, which was more than 2 m. long, was

* This and other analyses have unfortunately been held up by the postal strike.

attached to the sternpost. The other end disappeared into the side of the section and gave the impression that the boat was tied up at its moorings. A series of posts with pointed ends (FIG. 2) were found alongside the boat and strengthened the impression that she was berthed. Of the 12 posts that were recovered, a group of 6 (FIG. 1) were earlier dislodged dowstream from the boat by the operator of the mechanical excavator to whom they had looked like a jetty. Additional wood close to the starboard side of the boat in the form of a single layer of cut timbers, horizontal and parallel, were perhaps part of an original timber hard. Between frames 3 and 5 starboard a single layer of withies with cut ends lay parallel and closely massed (FIG. 2) and were later found to extend beneath the boat amidships. These two features are strikingly similar to the paths and platforms found by Thompson (1956, 52) beneath Mound B and led us to think that the boat had been dragged up to one side of the creek on to such a surface. The supposed hard lay approximately level with an horizon visible a little way downstream (FIG. 1) in the freshly cut side of the ditch, which consisted of a distinct layer of oyster and mussel shells. Several sherds from the base of a large medieval pot were recovered from it. This shelly layer marked the transition of the marsh clay from an orange-brown upper level to a dense blue-black whose surface quickly dried out to a pale buff. At the level of transition a ferruginous pan had formed, suggesting that this was an old ground surface. Thompson (1956, 52) found a similar transition and a scatter of oyster shells was apparently associated with an early phase of Mound B.

THE RESCUE EXCAVATION: PLANNING, RECORDING, CASTING

Our first priority was to keep the boat as wet as possible. It had been exposed for over ten days and, although carefully dampened and covered with polythene sheeting, the wood was still losing water rapidly. To minimize this, while planning and preliminary photography were taking place, circulating pumps were continually in use in lieu of an alternative water-supply. Consequently the bottom of the boat was invariably obscured by muddy water, the surface of the planking was covered by a fine gritty sludge and the ditch bottom around the boat quickly became a treacherous morass. Duckboards were subsequently laid outside the boat which was then completely enclosed by a canvas shelter. Lengths of foam-underlay protected the inside of the boat from Wellington boots, and fine sprays maintained it in a constant state of dampness.

It was necessary to clean the boat again, section by section, so that a detailed photographic record could be made by Mr Brian Tremain and so that Dymo labels could be attached to each piece of timber and to specific structural details of the ship.* After photographing and labelling was completed, silicon-bronze pins were gently knocked into the boat to mark the exact point at which the frames crossed each strake and the treenails holding the frames in position were sliced at their junction with the strakes using a sharp paint-scraper. The frames were then tilted sideways and their underside photographed before they were lifted out of the boat on supporting planks. The small quantity of debris that had accumulated under each frame was scraped up for laboratory examination. (Throughout we were indebted to Elizabeth Pye for her skilled assistance.)

While the frames were being removed and final labelling and recording was taking place, work began on an impression in plaster of Paris of the frameless interior of the boat. This was undertaken by conservation staff from the British Museum using the method they evolved at Sutton Hoo (van Geersdaele, 1969). After the plaster sections were lifted the runs of the lands were marked with brass pins and plank-joins and other features were planned. Although measurements for the basis of FIG. 2 had been taken, it was not ready in time to use in the field. Time simply did not permit the making of a second working plan so details were recorded on an earlier field plan

* For a full discussion of the excavation and recording of ships, see Fenwick and Evans, *International Journal of Nautical Archaeology*, 1, forthcoming.

GRAVENEY BOAT

PROVISIONAL PLAN BASED ON DRAWING BY P.R.V. MARSDEN

E.L. Eden del. 1971

0 1 Metre

STERN POST

Detached fragments

Osier rope

Under Strakes 7 and 6, pebbles, tile, Kentish rag and mortar

Axe cerfs

Rope fragments

Pebbles

Hole

Post 6 (pointed)

Post 4

Post 3

FRAME 10

FRAME 1

FRAME 2

FRAME 3

FRAME 4

FRAME 5

FRAME 6

FRAME 7

FRAME 8

FRAME 9

P8 P7 P6 P5 P4 P3 P2 P1

KEEL

S1 S2 S3 S4 S5 S6 S7

Post 1

Pebble

Pebbles

Single layer of withies extending beneath keel

Area 'A'

Post 2

Post 5

A B C D E F G H I J

STERNPOST

A–B

KEEL, NEAR

FRAME 7

C P3 P2 S.P. S2 S3 D

E P4 P3 P2 P1 S.P. S1 S2 S3 S4 S5 F

G P7 P6 P5 P4 P3 P2 P1 KEEL S1 S2 S3 S4 S5 S6 S7 H

FRAME 2

I P8 P7 P6 P5 P4 P3 P2 P1 KEEL S1 S2 S3 S4 S5 S6 S7 J

FRAME 6

Fig. 2. Plan of the Graveney boat made from measurements taken by P. R. V. Marsden with additions by the authors. The sternpost points NW

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which had been made in the opening phase of the excavation by Miss Louise Millard.

LIFTING THE BOAT

Although the Graveney boat had partially flattened out amidships, unlike the Skuldelev ships (Olsen and Crumlin-Pedersen, 1967), her strakes preserved much of their original curvature. Because of this, we felt it absolutely essential to try to preserve this curvature throughout the lifting operation and to avoid any undue stress on the fragile cellular structure of the wood. Therefore, as each strake was gently undercut using bare hands, a board of marine ply was cut to size and inserted beneath each plank (PL. XIV). Both plank and ply were then gently lifted on to a carrying-board (PL. XV), made ready with chocks to support the curve. Frayed plank-ends were secured with a webbing bandage (PL. XVI*a*). Each plank fragment on its supporting marine ply was wrapped in damp foam and put in polythene tubing, the ends of which were knotted to conserve moisture. For transport to the storage tank (specially constructed at Greenwich) cradles to support the curvature of the planks (PL. XVI*b*) were devised by Mr A. Oddy of the British Museum Research Laboratory, who took charge of all aspects of conservation. He was untiringly assisted by Mr R. Varrall and Mr J. Lees.

Because of the shortage of time and increasingly muddy conditions, a recording code on Dymo tape was evolved for the final labelling of the lifted planking.* This was supplemented by photographs in which the timbers were readily identifiable through the use of movable plastic letters and numbers and took the place of normal written records (PL. XVII*a*).

As the lifting of the planking was so successful, we decided to attempt to lift the broad keel-plank in one piece instead of cutting it into more manageable sections as was done in Roskilde fjord. While a trench was being cut waist deep along the starboard edge of the keel with a shallow one to port, a paper template of the upper surface of the keel was drawn and a rigid wooden coffin-like support was made from this. The slight curvature of the keel was packed with plastic foam and the rigid wooden 'coffin' was then set on top of the protected surface of the keel (PL. XVII*b*). Wooden battens projected downwards at 60 cm. intervals along its length and the keel was undercut at corresponding intervals so that a sandwich of marine ply, thick plastic foam and webbing could be pushed through and fastened to the battens. Because of the fragile condition of the vital scarf with the sternpost, an elaborate splint was bandaged into position using a massive plastering trowel to force the webbing strips through the mud. Finally a team in each trench undercut the keel simultaneously to port and starboard until it reached a point of balance on a narrow ridge of mud. The heavy keel was then rolled gently through 180 degrees down on to the arms of the starboard team and, inverted on top of its 'coffin', was carried by all hands to the top of the bank where it was cleaned and photographed before being wrapped in plastic foam and polythene tubing (PL. XVIII*b*).

PROVISIONAL DESCRIPTION OF THE BOAT

Only 10 m. of the boat survived but it can be estimated that the original length was more than 14 m. with a beam of less than 3 m. The plank keel (PL. XVIII*a*) is fish-shaped in plan with a shallow, bevelled rectangular lower profile (FIG. 2). It is calculated that its original length was approximately 7·5 m. and amidships it measured 44·5 cm. wide. It was about 7 cm. thick throughout its length. The lower profile tapers gradually fore and aft from its maximum width of about 14·5 cm. amidships. It expands suddenly at its short scarf with the sternpost to which it is fastened with a quincunx of rivets (PL. XVIII*c*). The horizontal scarf is only 24 cm. long. The sternpost is remarkable in shape and so far unparalleled; 90 cm. aft of its scarf with the keel plank, the tapering lower edge of the post turns through a sharp angle and forms a distinct heel (PL. XIX *a*,*b*). The upward curve of the cutwater is, therefore, in a converging line

* Throughout the operation we were greatly aided by the lights of the BBC 'Chronicle' team who made a detailed film record of the operation. They enabled us to continue working in poor light and after dark on several occasions.

with the inside surface of the sternpost, contrary, for example, to the Sutton Hoo ship where the stem and sternposts expand as the curve moves away from the scarf (Phillips, 1940, pl. XXXIV).* The sternpost is also remarkable for the two pairs of parallel grooves on its inner surface (PL. XIII and FIG. 2). The function of these grooves was to permit the use of through fastenings to secure the hood-end of garboard and second strakes. Basically this sternpost is plank-on-edge with the lower strakes meeting at a shallow angle. The difficulty of making a neat join of clinker-shell and sternpost is neatly solved. The aft extremity of each hood-end plank is cut off and the plank is carefully let into a rabbeted area in the plank above it, so that a continuous hood-end of uniform thickness is offered to the sternpost. This can be seen on the right of PL. XIV.

The 'painter' initially gave the impression that the stem post had been preserved, but it was soon found that the great majority of the plank-joins had their outer edges facing the surviving end which should thus be the stern of the vessel. The plank-joins are a simple scarf fastened by one, or exceptionally two, rivets. The planking was radially cut and averaged 2·8 cm. in thickness. The strakes are composite, the lower made up originally of four lengths of timber and the upper of perhaps five or six. Although only eight strakes survived, the upwards projection of the fifth frame on the port indicated that at least two strakes had been lost (PL. XIII). The strakes had been fastened at approximately 15 cm. intervals with round-headed iron nails. The shanks of circular section were clenched inside the boat over roughly square roves. The floor-frames are massive and closely spaced with an average distance of 48 cm. between them. They have a rectangular cross-section, are more than 20 cm. high over the keel and are between 9 and 14 cm. broad. Most are carefully nibbed over the strake-lands. They were fastened to alternate strakes by finely shaped treenails. These have faceted heads which projected outside the boat (PL. XVII*a*). In profile they resemble champagne corks. The inner ends which lay flush with the upper surface of the frames were neatly wedged. When the boat was excavated parts of 9 floor frames were found in place and a tenth was later fitted into position. However, extra treenail holes on the fourth strakes well aft of frame 1 showed the position of a further frame high in the stern. The abnormally large frame-space thus apparent between it and frame 1 may be due to the requirements of a steering system, and can be compared, for example, to the Gokstad ship (Nicolaysen, 1882, pl. 1). Frames 5, 6, and 7 have curious shallow rebates on their upper surface amidships which had been filled with roughly cut timber and treenailed in place. One possible explanation for these is that the boat was converted from sail and the rebates holding its mast partner were made good. However, normally it is the mast partner that is rabbeted. Rebates at the ends of some of the frames occur at different levels. They fall into two categories. Further investigation may show that the upper group housed a stringer or shelf. These rebates were treenailed. The occurrence of treenail holes immediately above the lower group, e.g. frame 2, strake 7 port, and not between the frames, show that futtocks originally continued the line of the floor frames. A significant feature is that the rebate seems to have housed the futtock without actually being fastened to it.

During the construction of the boat a luting of felted cattle-hair was inserted between sections, including the scarf of keel and sternpost which had no stopwater. Luting also filled plank joins and the lands between strakes. PLATE XX*a* shows how the metal fastenings perforated this layer. In some instances a luting-cove could be seen to run along the centre of the land. In addition to the luting, caulking of twisted hair was found in places.

DATE OF THE BOAT AND PARALLELS

In the bottom of the boat were found beach pebbles and shells, some fragments of Roman tile, sheep bones, some pieces of Kentish rag and some lava fragments. Similar material, and Kentish rag with mortar adhering to it, was found immediately outside the boat. Scattered

* This aspect of the Science Museum lines was confirmed by the re-excavations of 1965–7.

in the very bottom of the boat were 12 sherds of a fine, hard fabric, buff in colour and ungritted. These all came from one unglazed wide-mouthed vessel (FIG. 3). No sherds were apparently found outside the boat. Mr J. G. Hurst has very kindly examined the sherds and in his opinion the pot is definitely not Kentish but is probably from Belgium or France, 10th or 11th century in date, perhaps a little earlier.

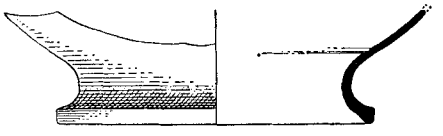

Fig. 3. Pot from the bottom of the boat ($\frac{1}{3}$)

Samples of wood were collected and were submitted to the British Museum Research Laboratory. Richard Burleigh has supplied the following note:

The radiocarbon dates have been obtained by liquid scintillation counting of benzene synthesized from two different, thoroughly pre-treated, wood samples taken from the planking of the Graveney boat:

BM–660	1080 ± 40 years BP (*c.* AD 870)
BM–661	1064 ± 54 years BP (*c.* AD 886)

Both results are the weighted mean values of several satisfactorily consistent repeat measurements of each sample. The dates were calculated from the 5568 year half-life for carbon-14 in conformity with standard practice and have been corrected for isotopic fractionation so that the error term, which is equivalent to 1 standard deviation, is derived solely from counting statistics.

These samples from the shell of the boat are from unknotted timber containing no heartwood. They refer strictly to the date when the timber was felled and do not necessarily date the construction of the boat. However, as the boat has no tingles or other repairs it is to be expected that two such closely related results do place its construction in the second half of the 9th century.

The boat showed no signs of the heavy wear visible in the Skuldelev Ships (Olsen and Crumlin-Pedersen, 1967, fig. 37), although the smoothed lower contours of the sternpost are consistent with considerable usage in estuarine waters with mud berths. Its sturdy construction suggests that it was a cargo boat and capable of crossing the Channel in the course of its trading, so the finding of possibly associated pottery with continental affinities is no surprise. Since sail was the preferred means of propulsion for cargo boats in this period, the midships rebates may have been designed to enable a mast step to be fitted over massive frames. If so, their blocking would indicate that the boat was converted into a barge later in her life.

There are no contemporary boats from the British Isles and no immediate parallel can be found on the continent. However, it must be remembered that local conditions and the specific purpose for which a boat is commissioned very largely dictate its design. Recent work in the sailing of flat-keeled boats has demonstrated that they can be sailed equally well with a following and a cross wind.* Lack of a projecting keel may signify no more than a requirement to sail in shallow waters or use tidal havens. Thus a supposed simple evolution from plank-keeled to deep-keeled craft is untenable. One must, equally, be wary of trying to make each boat found fit into a specific chronological stage in the development of boatbuilding. For example, if we take eight broadly contemporary boats, built for trade or fishing, and compare them with Graveney, we have a picture of nine different boats, although many features are paralleled. An incidental problem, too, is that with the exception of the most recently published material, the boats are not recorded in anything like adequate detail, but some comparable features are set out in the table opposite. The unifying principal here is of a broad-beamed, load-bearer of rigid construction compared with the light-weight flexible warship (e.g. the Gokstad and Oseberg ships and Skuldelev 3). It is clear that the Graveney boat has an interesting new combination of features. The heavy proportions and

* Information derived from conversation with the Scouts who sailed 'Imme Gram', the replica of the Ladby ship. (A.C.E.)

	Graveney	Chabrow III	Galtaback	Utrecht	Askekarr	Stettin	Skuldelev I	Rahlswiek II	Q 75
Date	870 ± 40	*c.* 1000	*c.* 1070	? 920 ± 45	*c.* 830	IX	1010 ± 100	? X	XI
Length	*c.* 14 m.	13·76 m.	13·10 m.	17·8 m.	16·5 m. +		16·1–16·5	9·5 m.	
Breadth	*c.* 3 m.	3·35 m.	3·60 m.	*c.* 4 m.	3·5 m.		4·4–4·8	2·5 m.	
L/B ratio	4·6 : 1	4 : 1	3·6 : 1	4·5 : 1			3·5 : 1	3·1 : 1	
Depth amidships	*c.* 90 cm.	*c.* 85 cm.	1·3 m.	45 cm.			1·8–1·9	90–100 cm.	
No. of frames	? 13	? 12	20	38	? 18	7+	14	9	16
Frame space	48 cm. av.	70–100 cm.	54 cm.		90 cm.		83–99 cm.	80–114 cm.	close
Cross section	10 × 20 cm.	heavy rectangular	heavy rectangular	rectangular	heavy rectangular	light square	heavy square	square	square
Nibbing	yes	yes	yes	no	no	yes	no	yes	no
Frame fastenings	knobbed treenails	treenails	treenails	treenails	treenails	treenails	treenails	knobbed treenails	iron nails
Continuing futtocks	yes	no evidence	no	no	yes	yes	yes	yes	no evidence
Rebates at different levels	yes	yes	no			yes	no		no
Limber Holes	yes	yes	yes	yes		no	yes	yes	yes
Keel shape	very expanded	expanded	slightly expanded	no keel	expanded	expanded	slightly expanded	expanded	expanded
Keel X section	flat	T-shaped	T-shaped		T-shaped	no evidence	domed and rebated	T-shaped	flat laminated
Mast step	possibly	no evidence	yes	yes	yes		yes	yes	
Stem/stern post	plank-on-edge	plank-on-edge	plank-on-edge		missing	no evidence	stem and stern piece	plank-on-edge	
No. of strakes	? 10	10	9		11 +	4 +	12	7	
Strake fastening	iron clench nails		iron clench nails	willow pegs	iron clench nails	wooden pegs	iron clench nails	wooden pegs	iron clench nails
Meginhufr	possibly		no	wales	yes		yes	no	
Luting cove	yes						yes		
Scarf	horizontal	uncertain	vertical		? vertical		vertical	vertical	horizontal
Heel	yes		no		no evidence	no evidence	no	uncertain	yes
Caulking	cattle hair	moss		moss		moss	animal hair	animal hair	

Fig. 4. Boats. Table of features for comparison. Chabrow III (Filipowiak, 1956); Galtabäck (Humbla, 1937); Utrecht (Philipsen, 1965); Äskekarr (Humbla, 1934); Stettin (Crumlin-Pedersen, 1969); Skuldelev I (Olsen and Crumlen-Pedersen, 1967); Rahlswiek II (Herfert, 1968); Q.75 (Crumlin-Pedersen 1969, and information supplied by G. D. van der Heide)

spacing of its floors and futtocks have previously been associated with post-Conquest boats (Olsen and Crumlin-Pedersen, 1967, 167). The Bayeux Tapestry boats have no heel and this feature previously made its first apparance in this country on medieval seals (FIG. 5*b*) and been found on a 13th-century ship in Holland.*

Preliminary work, therefore, suggests that the Graveney boat is a competently made example of a hitherto unrepresented class of boat of non-Scandinavian type. It is possible to see in her elements which anticipate the cog. Work now

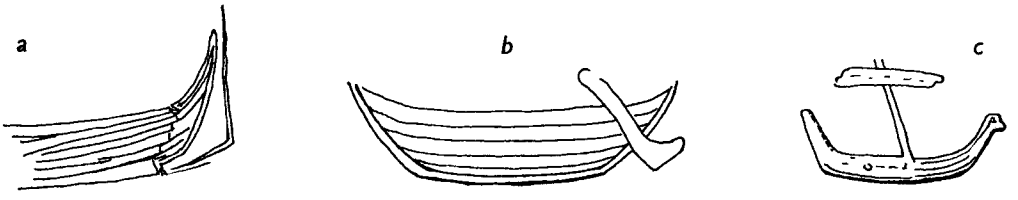

Fig. 5. (a) Engraving. Oseberg (after Crumlin-Pedersen 1968, 16). (b) Hull shown on impression of Dover seal of 1284. (c) Staplehurst (Scott Robertson, 1874, facing 191), since damaged

on an iron appliqué of perhaps 12th-century date later fitted on the south door of Staplehurst Church, (FIG. 5*c*). There are some Scandinavian representations, apparently showing chin and heel at an earlier date (FIG. 5*a* and Crumlin-Pedersen, 1968, 4). It is interesting that the seal impressions frequently also show rows of projecting treenail heads. Actual examples have in progress at the National Maritime Museum should show in great detail the techniques used in her construction and make it possible to reconstruct the missing portions.

* Wreck G.37. I am indebted to Mr G. D. van der Heide for information on this ship and on Q.75 (V.H.F.)

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PLATE XIII: THE GRAVENEY BOAT

The Graveney boat before the rescue operation. The Seasalter Level and medieval mounds can be seen beyond the upcast of Hammond Drain

See pp. 89–96

Photo: National Maritime Museum

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PLATE XIV: THE GRAVENEY BOAT

Lifting part of strake 3 starboard

See pp. 89–96

Photo: National Maritime Museum

PLATE XV: THE GRAVENEY BOAT

Carrying a length of planking—chocks support its curve

See pp. 89–96

Photo: National Maritime Museum

a

b

PLATE XVI

THE GRAVENEY BOAT

(*a*) *Binding a frayed plank*

(*b*) *Constructing plank-racks*

See pp. 89–96

Photo: National Maritime Museum

a

b

PLATE XVII

THE GRAVENEY BOAT

(*a*) *Field-recording: knobbed treenail projecting outside the boat*

(*b*) *Laying the cradle on top of the keel*

See pp. 89–96

Photo: National Maritime Museum

a *b* *c*

PLATE XVIII: THE GRAVENEY BOAT

(*a*) *Fish-shaped keel: sternpost scarf in foreground.* (*b*) *Inverted keel: splinted scarf in foreground.* (*c*) *Beneath keel: scarf with sternpost showing quincunx of rivets*

See pp. 89–96

Photos: National Maritime Museum

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a *b*

PLATE XIX: THE GRAVENEY BOAT

(a) Sternpost: scarf at bottom of photograph. (b) Sternpost scarf showing tapering lower edge of cutwater

See pp. 89–96

Photos: National Maritime Museum

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a

b

PLATE XX: THE GRAVENEY BOAT

(*a*) *Luting of animal hair pierced by clench-nails.* (*b*) *Withy rope found beneath the boat* (*14 cm. long*)

See pp. 89–96

Photos: National Maritime Museum

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