

THE COUNTY HALL SHIP

BY PETER R. V. MARSDEN

INTRODUCTION

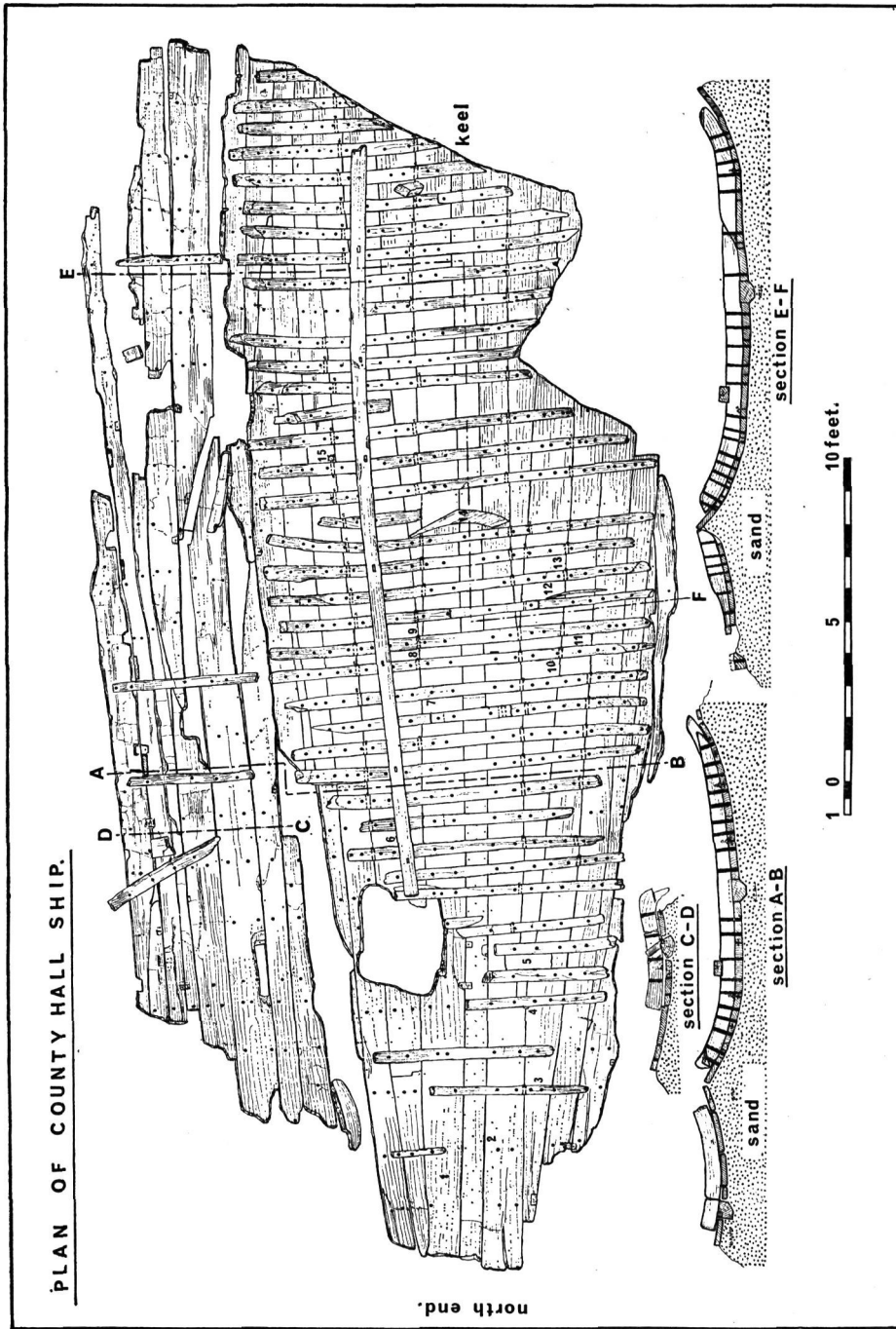
The ship was discovered on the site of the County Hall, London, in the early part of 1910. The site lies on the south bank of the Thames, between Westminster Bridge and Charing Cross railway bridge. At the time, the London County Council, 'having regard to the great importance' of the wreck, had it excavated, and, on 25 October 1910, resolved to have it removed to one of the vaults of the then new County Hall, where its timbers were treated for preservation. On 1 August 1911 the Council decided to offer the ship to the London Museum on permanent loan. The offer was welcomed by the trustees of the Museum, and the ship is now exhibited in a special annexe there.

A pamphlet was published by the London County Council dealing exclusively with the ship, and a second edition of this was published in 1912. It was entitled *Ship of the Roman period discovered on the site of the new County Hall*, and was written by W. E. Riley, Architect of the Council, and L. Gomme, Clerk to the Council. The former gave an excellent description of the remains, which has been used here with a few alterations and additions, while the latter wrote a chapter entitled 'Historical Notes', where it was argued that the County Hall ship was 'one of Allectus's vessels that endeavoured to escape in the fight of London, but was overtaken and destroyed' by the fleet of Constantius in 296 A.D. This is a conjecture entirely unsupported by the evidence⁽¹⁾ and it is not pursued here. The pamphlet has long been out of print, and a re-publication of the report, bringing it up to date, is now overdue. I am most grateful to the Clerk of the London County Council for permission to quote extensively from its pamphlet, and I am indebted to Miss Jean Macdonald of the London Museum, for her help in many ways. The London County Council is to be congratulated on its quick appreciation of the importance of the ship, and for ensuring its complete publication and preservation.

DESCRIPTION OF THE SHIP (see Fig. 1)

The remains of a ship of the Roman period (end of the 3rd century A.D.) were discovered in February 1910, but could not be uncovered until the summer. It lay N.E.-S.W., with its north end towards the shore, 21 ft. 6 in. below the level of Belvedere Road, 350 ft. north of Westminster Bridge approach, and 300 ft. east of the Embankment retaining wall. Because it is not possible to tell which end was the bow and which the stern, compass points are referred to throughout this report. For explanations of the ship-building terms used in this paper, the reader is referred to the glossary at the end (p. 117).

The preserved portion of the ship is built of oak throughout. Three fragments from different parts of the ship (i.e. keel, plank and rib) have been identified by Dr. Metcalfe of the Royal Botanic Gardens, Kew, Surrey, as being from one of the species *Quercus robur* or *Quercus petraea*. These two species grow in central and northern Europe, but not in Mediterranean lands.



Key:

1. Coin of Carausius
2. Paste bead
3. Coin of Tetricus under rib.
4. Piece of pottery under rib to cover hole in plank.
5. Clay packing to stop leak, covered with oak board one inch thick.
6. Pulley block under keelson.
7. Ram's horn.

8. Piece of pottery.
9. Part of brooch in limber hole.
10. Piece of pottery
11. Coin of Allectus
12. Belaying pin
13. Large iron nail.
14. Detached rib.
15. Large flint embedded in planking.

Fig. 1

The vessel is carvel-built, and the measurements of the remains *in situ* were approximately 38 ft. in length and 18 ft. in width, but as a considerable portion of the south end is missing, it is difficult to determine its original size (see *Plate 1(a)*). As far as can be judged however, it would appear to have been between 60 and 70 feet in length with a beam of between 15 and 16 feet, and with a depth of at least 6 feet.

The keel (*Fig. 2, A*) is straight and measures $8\frac{1}{2}$ in. in width, and $6\frac{1}{2}$ in. in thickness, chamfered on both lower edges to 3 in. on the flat. Along the centre of the upper face of the keel, are numerous $\frac{5}{8}$ in. trenails (wooden pegs). These appear for a distance of about 12 ft. from the north end of the remains, but none were found beyond this. It has been suggested that these were to hold a false keel, but this would be possible only if the trenails go right through the keel—a point which it is not possible to ascertain. Draw-tongued joints were used to secure the garboard strakes to the keel at intervals of about 6 in., the oak tongues being 5 in. by $2\frac{1}{2}$ in. by $\frac{1}{4}$ in. and secured with $\frac{5}{8}$ in. trenails. This method is also used for fixing the strakes to one another. The joints and construction throughout indicate the vessel as a fine piece of carpentry, and no caulking of the seams apparently was necessary. Near the north end the upper face of the keel is $\frac{3}{4}$ in. above the general surface, but at a distance of about 7 ft. it becomes flush. The garboard strakes are 3 in. in thickness, and from 13 to 15 in. in width. The remainder of the strakes average $10\frac{1}{2}$ to 15 in. in width, and in thickness those near the keel are 3 in., thinning down to 2 in. at the sides. They are long planks commencing with a feather heading (*Fig. 2, B*), widening to the centre and scarfed (*Fig. 2, C*) in places.

Very little iron was used in the construction. One instance noted is that where each strake starts with its feather head, a large headed nail is driven into the board already fixed (*Fig. 2, B*). The nail was probably used for extra strength as otherwise this portion of the joint would be weak.

The portion remaining of the east side is much damaged, and has been severed from the main structure. In this section is a fender or wale, 6 in. square, for protecting and stiffening the side of the vessel (*Fig. 2, D*), and also for receiving cross-bearers which probably carried a deck. At centres of about 3 ft. notchings $6\frac{1}{2}$ to $7\frac{1}{2}$ in. long, $3\frac{1}{2}$ in. deep, and $1\frac{1}{2}$ in. wide, were found on its top surface (*Fig. 2, E*). The end of two cross-bearers or deckbeams were discovered in the wale, each being fixed by two iron nails.

The side keelson (*Fig. 2, F*) is housed on to the ribs on the east side, 2 ft. to 3 ft. from the keel, but the corresponding one on the west side is missing. It measures $5\frac{1}{2}$ in. in width by $3\frac{1}{2}$ in. in thickness. Iron nails were used for fixing it in position, and at intervals of about 3 ft. mortices are cut, probably to hold timber uprights or stanchions to support the cross-bearers. The mortices measure about $2\frac{1}{2}$ in. long, $1\frac{1}{2}$ in. wide, and $1\frac{1}{2}$ in. deep.

Most of the ribs near the north end are lost, but the broken trenails remain showing their position. These give the distance of about 1 ft. 9 in. from centre to centre of rib. This dimension decreases at a distance of 6 ft. from the north end of the remains, where the ribs average 10 in. from centre to centre, which dimension generally holds, except at a distance of about 22 ft., where there is a space of 1 ft. 5 in. on the west side. No trenails in the strakes were found to indicate that a rib had been fixed here.

The ribs are about $4\frac{1}{2}$ in. broad, $6\frac{1}{2}$ in. deep, and are cut to shape, every alternate rib being carried up the sides. Knee timber, or timber cut to the natural curve of the grain, has generally been used in the construction. One length of rib was found following the grain of the wood (*Fig. 2, D; Plate 1(b)*); it evidently belonged to the side of the vessel;

its upper end curves round and continues with a tenon which was probably fixed into a waling piece, possibly the gunwale, above the deck level.

The ribs and strakes are fixed together by oak trenails $1\frac{1}{2}$ in. in diameter, averaging about 6 in. centre to centre, but no regular pitch was observed. Where the keel is raised above the garboard strakes, the ribs are slightly notched, but in no case are the ribs fixed

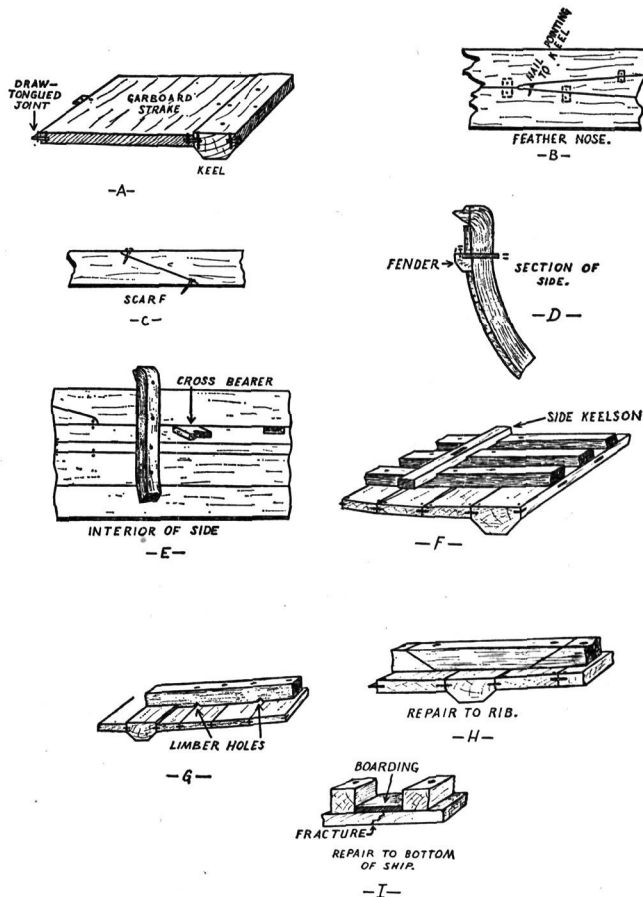


Fig. 2

Sketches to illustrate the construction of the ship. *Not drawn to scale.*

to the keel (*Fig. 2, G*). A length of curved rib was discovered in the bottom of the vessel (*Fig. 1, no. 14*). It thins off to a feather point at one end; one face is straight for a length of 1 ft. 8 in. It is either a portion of a lap joint, or the end of a rib, which feathered off against an upright bulwark. Two limber holes (*Fig. 2, G*) are cut into the underside of the ribs on either side of the keel; these holes permitted the bilge water to flow, probably to a position near the centre of the vessel where the water would be more accessible for throwing overboard.

Evidence of damage and repair is apparent. Three of the ribs have had their centre portions renewed (*Fig. 2, H*). The boards in many places show signs of fracture, and above

these are short lengths of thin oak boards (*Fig. 2, I*) In one case a sherd of Roman black pottery was tightly wedged and embedded in stiff clay beneath a rib. On further examination it was found to be filling a hole at the end of a feather head of one of the lower strakes. In spite of every precaution, these joints were evidently a source of weakness. Several large iron nails were found driven through the strakes into the ribs, most probably for the purpose of superseding broken trenails.

A large hole is shown on the plan near the north end. The cause of this fracture is not clear, but below the vessel and 2 ft. away from the hole, a portion of timber was found, measuring 2 ft. 5 in. long, and 10 in. in diameter, which may have been part of a mast. It is therefore possible that the hole was caused by the breaking of the mast.

EVIDENCE FOR DATE

The ship was covered by 7 ft. of silt and 14 ft. of made ground, but at other points near the ship, the silt amounted to 14 ft., and the made ground 7 ft. The vessel was lying on top of a stratum of sand and gravel, and from the deposit of shelly sand which had drifted under the curved portions, it may be concluded that it sank in a quiet pool at the edge of the river. It is probable that at this period the river was a clear, running stream, as not only did the vessel rest on clean sand, but there was a deposit of about $3\frac{1}{2}$ in. of sand inside it.

The objects found inside the ship include: bronze coin of Tetricus the Elder (Emperor in Gaul) 270–273 A.D., discovered beneath the rib nearest the north end; bronze coin of Carausius (Emperor in Britain) 287–293 A.D., also beneath a rib; bronze coin of Carausius (Emperor in Britain) 287–293 A.D.; bronze coin of Allectus (Emperor in Britain) 293–296 A.D., (both of these latter coins were lying directly on the bottom of the ship); portions of Roman hob-nailed shoes and fragments of leather; several fragments of Roman pottery which agree with the date given by the coins; two light blue gaming counters; iron nails of various sizes; an oak pin encrusted with iron oxide; an oak pin burnt at one end; bones of domestic and wild animals, including a tusk of a boar and a fragment of an antler; a block to contain two pulleys (*Fig. 3, No. 2*) and a belaying pin (?) (*Fig. 3 No. 1*) found between the ribs beneath the keelson (both have been identified as Ash (*Fraxinus* sp.) by the Director of the Royal Botanic Gardens, Kew); several large rounded stones, each about 3 lb. in weight, one of which was partly embedded in a strake (one of these stones, preserved at the London Museum, is a septarian nodule from the London Clay).

Clearly the coins are the principal objects for dating, and these show that the ship sank after 293 A.D., but probably not long after that date. The fragment of a coarse, grey ware flanged bowl (*Fig. 3, No. 3*) found inside the ship agrees with this dating.

PRESERVATION

As a matter of historical interest, the method of preserving the timbers of the ship should be recorded, but it must be noted that the method employed in 1911 probably would not be used today. When found, the timbers were in a soft and waterlogged condition. On drying a detached fragment it was found that the wood toughened, but shrank and cracked very considerably. After experimenting it was found that a treatment of several coats of glycerine gave the best results. A total of thirteen coats of glycerine were given to the timbers, and this kept them sufficiently damp to shrink slowly and give

tenacity to the wood. The last two coats contained mercuric chloride, to act as a preservative and to prevent the growth of fungi, and in all $5\frac{1}{4}$ cwt. of glycerine were absorbed by the timbers.

REMOVAL FROM THE SITE

As the decision of the London County Council to remove the vessel was not given until October 1910, the difficulty of removal had been increased by the construction of a

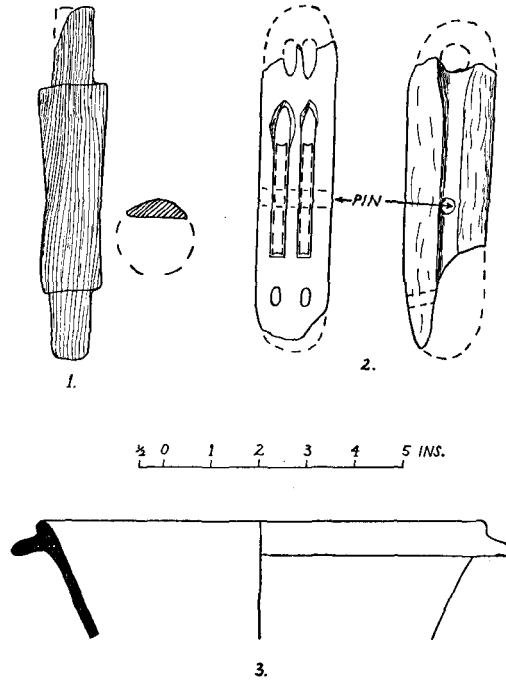


Fig. 3

concrete raft round the vessel. The timbers were so fragile and soft that they could, at that time, be cut like cheese. It was possible to lift the vessel only as a whole; any other process would have destroyed it.

A strong cradle was therefore built under the largest portion. Wood runners 14 in. by 6 in. and 40 feet long, were first sunk on either side to about 2 ft. below the lowest part of the vessel. On these runners longitudinal bearers were placed, by removing the sand below the vessel at intervals until the whole had been placed in position. Packing pieces cut to shape were inserted between the bearers so that the boarding of the vessel should rest upon them. The whole framing was bolted together and felt inserted between the bearers, and runners, to reduce vibration on removal. The weight of the ship and the cradle was calculated at 10 tons. Lifting jacks were used to raise it out of the excavation to the level of the raft, which was 6 ft. above where the ship lay. It was then conveyed on rollers to one of the vaults where it remained until its subsequent removal to the London Museum on 24 August 1911.

RECONSTRUCTION AND NOTES

The plan (*Fig. 1*) shows that the preserved portion of the ship lay at about the middle of the vessel, extending for some distance towards the north end. It can be seen that the strakes are curving in towards that end; and also the beginning of the rise of the keel towards that end has been noted. The east side of the ship had fortunately collapsed outwards, thus ensuring its preservation, and it is not difficult to reconstruct it onto the main portion of the vessel. As the missing west side would have conformed in shape to the east, a complete cross-section of the ship can be drawn (*Fig. 4*). This shows that the ship had a beam of 15–16 ft. and a depth amidships of probably little more than 6 ft.

Every alternate rib was carried up the east side and fortunately the upper end of one of these has been preserved. The end of the rib curves out beyond the side of the ship and

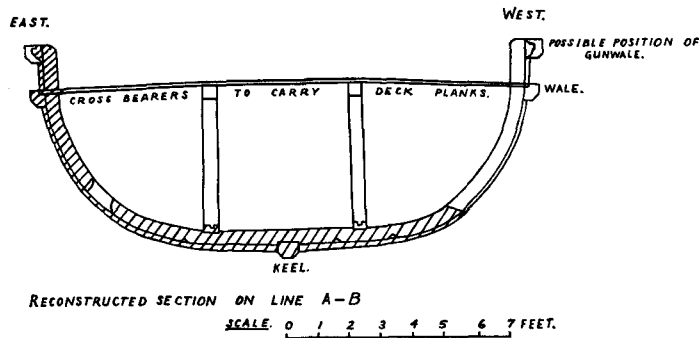


Fig. 4

terminates with a tenon (*Fig. 2, D; Plate 1(b)*). If all of the other ribs which continued up the side terminated in the same way, then it is possible that the tenon fitted into a mortice in the gunwale. Below the missing gunwale there is a wale into which the ends of the deck-beams fitted. The deck-beams are rather small in section but the frequency at which they occur—at intervals of less than 3 feet—would compensate for their small dimension. The distance between the deck-beams corresponds with the distance between the mortice-holes in the side keelson, which presumably held the bottoms of a series of upright stanchions supporting the deck-beams.

There is little evidence to show how the ship was propelled. There is, however, no arrangement for rowing on the preserved east side, and this fact, together with the size of the vessel, the discovery of a pulley block, and what were thought to be part of a mast and a belaying pin, indicates that the ship was probably propelled by sail.

The characteristic features of the construction of the County Hall ship are the carvel build and the draw-tongued joints by which the planks are held to each other and the keel. It is interesting to compare this construction with the many wrecks of the Roman period which have been investigated in the Mediterranean area. The most important Mediterranean wrecks include the Albenga ship,⁽²⁾ the Lake Nemi ships and boats,⁽³⁾ the Grand Congloué ship, the Titan ship, the Draumont ship, the Mahdia ship, the Monaco ship,⁽⁴⁾ the Chretienne 'A' ship,⁽⁵⁾ and the recently discovered Fiumicino ships and boats. Like the County Hall ship, all of these Mediterranean vessels were carvel-built and their strakes were held together by draw-tongued joints.

Recent research has been carried out into the question of exactly how the Mediterranean ships were built. It has now been shown⁽⁶⁾ that the shell of the ships was constructed first, and that the ribs were inserted after. In some of the ships the nails holding the planking to the ribs had been driven through draw-tongued joints showing that the planking had been in position before the ribs.

There is no record to show that the excavators of the County Hall ship found any of the trenails, which held the planks to the ribs, driven through draw-tongued joints. However, there is sufficient other evidence to show that the ribs of the ship had been inserted *after* the shell of the vessel had been constructed. Firstly, the plan of the ship shows that there are some instances where the rib had overlaid draw-tongued joints (*e.g.* below the sites of the ribs first and second from the north end of the wreck), and if the planking had been attached to a pre-erected framework of ribs, then surely the ship-builder would have made his draw-tongued joints elsewhere than beneath the ribs. Secondly, had the ribs been erected first, then one would have expected them to have been attached to the keel, but instead the keel was only attached to the planking, by draw-tongued joints. And thirdly, in the original report it is stated that 'where the keel is raised above the garboard strakes, the ribs are slightly notched (beneath)'. The notches can only be explained if they are minor alterations to fit in with the variations in the previously constructed shell of the ship.

The species of timber used to construct the County Hall ship shows that the vessel was not built in the Mediterranean area, but somewhere in northern Europe. The method by which the ship was constructed appears to have originated in the Mediterranean area, and there is no evidence to show that this method of construction was used in northern Europe before the Roman occupation. This means that the ship-builder who was responsible for the construction of the County Hall ship was well acquainted with the Mediterranean method of shipbuilding, and in fact may have been of Mediterranean origin.

It has been suggested that the County Hall ship was a barge⁽⁷⁾, but since the discovery of the ship, two further vessels of the same period have been found in London, both of which were barges. These other vessels, found at New Guy's House in 1958 (see the following paper) and in the river Thames at Blackfriars in 1962, had an entirely different shape and construction from the County Hall ship. Each had a wide flat bottom, and the Blackfriars ship had no keel. Unfortunately it is not known if the New Guy's House boat possessed a keel, but the Blackfriars ship shows that the barge shape was known at that early date. A barge normally works in rivers and estuaries, and the main purpose of the flat bottom is to enable the barge to sit upright on the river bed at low tide. The rounded bottom and projecting keel of the County Hall ship, however, show that the vessel was not a barge. The shape of the bottom is more like those of Roman merchant ships in the Mediterranean, and it would probably be more correct to say that the County Hall ship was a sea-going merchant ship, which, owing to its small size, was probably largely confined to coastal work.

The size of a ship is shown by its tonnage, and there are various formulae for working this out. For the purpose of uniformity the formula used here is which has already been used in connection with an ancient ship in use in the Mediterranean.⁽⁸⁾

$$\frac{\text{Length of keel} \times \text{beam} \times \frac{1}{2} \text{ beam}}{94} = \text{tonnage}$$



Photograph: London County Council

General view of the County Hall ship *in situ*



Photograph: London County Council

The County Hall ship: end of rib, and broken end of deck-beam

PLATE 1



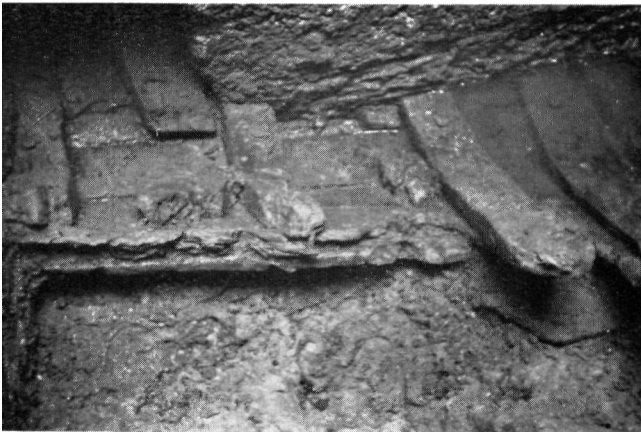
Photograph: A. L. Tucker

(a) The New Guy's House boat: Cutting II, north end of boat



Photograph: A. L. Tucker

(b) The New Guy's House boat: Cutting II, showing loose floor planks



Photograph: A. L. Tucker

(c) The New Guy's House boat: Cutting II, after removal of loose floor planks



Photograph: Guildhall Museum

(d) The New Guy's House boat: Samian Ware vase, Déchelette form 72, from Cutting IV, level V

As the length of the County Hall ship appears to have been about 60–70 ft., it is reasonable to assume that the length of the keel was in the region of 50 ft. The formula then becomes:

$$\frac{50 \times 15 \times 7\frac{1}{2}}{94} = 59 \text{ tons}$$

Because the length of the keel is not exactly known, this tonnage figure is only a rough estimate, but it is sufficient to give the approximate size of the ship.

We are now in a position to compare the County Hall ship with those in use in the Mediterranean during the Roman period. Recent research⁽⁹⁾ has established that most of the Roman merchant ships in the Mediterranean were between about 70 and 340 tons, but that occasionally ships of well over 1000 tons were built for special purposes. The County Hall ship therefore falls into the smallest class of merchant ship, and it gives us a more complete view of the construction of one of these vessels, than has hitherto been discovered.

GLOSSARY

Carvel construction. The planking of a ship laid edge to edge.

Caulking. The wadding driven into the seams between the planks to make them watertight.

Ceiling. The inside planking of a ship.

Clenched nail. A nail which has been driven through the planking and rib and the pointed end bent down against the inner face of the rib.

Garboard strake. The first line of planks laid on a ship's bottom next to the keel.

Keelson. In this case a longitudinal timber resting on the ribs at the bottom of the vessel, but not in the centre.

Side frame. A rib attached to the side of a ship only.

Strake. A line of planks running the length of a vessel.

Trenail. A wooden peg.

Wale. A heavy strake running fore and aft below the gunwale.

NOTES

- 1 *London in Roman Times*, 1946, London Museum, p. 154.
- 2 N. Lamboglia and F. Benoit, *Scavi sottomarini in Liguria e in Provenza*, 1953.
- 3 Guido Ucelli, *Le Navi di Nemi*, 1950.
- 4 F. Benoit, *L'épave du Grand Congloué à Marseille*, 1961.
- 5 F. Dumas, *Épaves antiques*, 1964.
- 6 L. Casson, 'New light on ancient rigging and boat-building', *The American Neptune*, vol. XXIV, no. 2 (April, 1964), p. 88.
- 7 G. S. Laird Clowes, *Sailing ships, their history and development*, 1959, p. 29.
- 8 L. Casson, 'The Isis and her voyage', *Transactions of the American Philological Association*, vol. LXXXI, 1950, p. 55.
- 9 L. Casson, 'The size of ancient merchant ships', *Studi in onore di Aristide Calderini e Roberto Paribeni*, vol. 1, 1956, p. 236.