Replicas and wrecks from the Thames area

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TRIALS OF full-scale replicas of ancient craft can demonstrate their 'seaworthiness' and contribute to our knowledge of propulsion methods, as indicated by *Olympias*, the reconstruction of a Greek trireme[1]. 1987 also saw the adoption by the charity Marine Archaeological Surveys of a project to reconstruct a less sophisticated boat, the Clapton logboat, to eventually form a part of its future exhibition at Chatham Historic Dockyard on nautical archaeology and marine archaeological surveys.

The programme of reconstruction was inspired by the logboat replicas in use at the Lejre Prehistoric Research Centre in Denmark, and fired by requests for more research into the use of logboats[2] and the discovery of a logboat found just west of the River Lea at Clapton in 1987[3]. Only one end of the damaged hull survived, but sufficient remained of the boat for a reconstruction to be proposed (Fig. 1). The stern mirrors the narrower bow end in shape to give a reconstructed length of between 3.7 and 3.8m (12ft), a beam (breadth) of *c* 0.6 to 0.65m (2ft), and total depth amidships of between 0.4 and 0.42m (1ft 4in). It resembles a small punt-like craft, except that the bottom is more rounded, particularly towards the ends. Typologically it resembles finds from Waltham Cross and Walthamstow (Fig. 1), all three boats having a central ridge of wood forming a bulkhead of similar proportions[4]. The Clapton logboat was fashioned from a single moderately large oak (*Quercus robur* or *petraea*) which may have grown as hedgerow, on forest edge or in coppice woodland. While all sapwood had been removed, and the logboat had been regularly finished, it could be dendrochronologically dated to between AD 950 and 1000[5]. It is interesting that most 'dugout' boat finds that have been dated are either Saxon or medieval, and that they were still being built in some parts of Europe some 40 years ago[6].

The objectives of the replica project were manifold. Firstly the lost technology of logboat construction was to be investigated and the work documented in detail. Examination of the tool marks on the original suggested the use of several tools: thin-bladed axe, gouge or small gouge adze, medium-sized adze and at least one auger[7]. Detailed recording of every stage of the work would provide information on the number of man-hours required to construct such a craft in certain conditions, and contribute to an understanding of the level of labour investment involved. Once complete, its performance would be tested in terms of load-bearing, stability, and portage. The project was seen as one approach towards stimulating interest in early wood-working and basic craft techniques, and as an important educational focus for nautical archaeology, in particular for the young.

A Tree is found

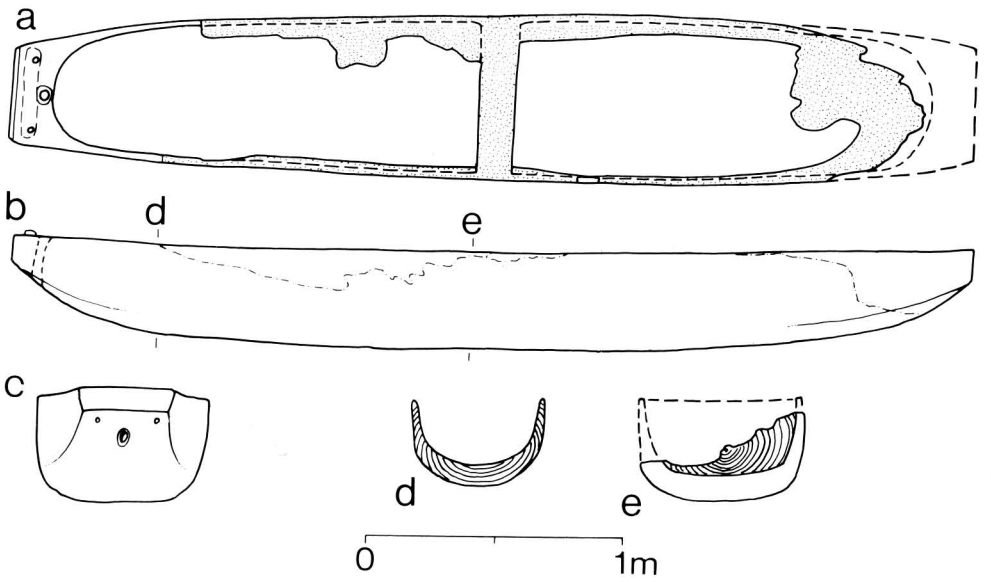
The first requirement was the location of an oak of sufficient size to allow an exact replica of the Clapton logboat. The hurricane that hit the south and east of England on Friday, 16th October, provided much raw material deserving rescue from the firewood pile, and the project became a reality with the donation of such an oak in woodland managed by James and Ruth Norman in Hayes (S.E. London). The tree was 166 years old, and had been felled by the gale in coppice woodland of medieval type, and was very similar to the parent tree of the original find. The woodland formed an ideal environment for the building in that it would have been general practice when working large, very heavy timber, and the use of original environments are prerequisites for the building of serious early boat replicas[8].

Toolkit

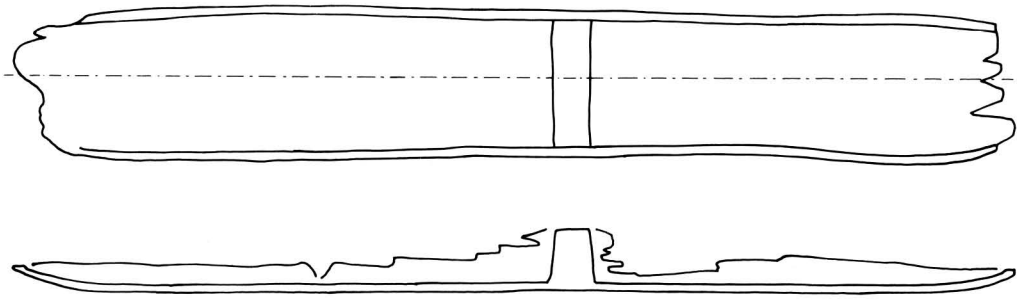
The work required the use of only those types of tools that were used on the original boat find, supplemented where no direct evidence existed by those for which evidence does survive on other late Saxon or Viking sites. The small side ground hatchet, gouge adze, and one of the adzes used resembled those used on the original, and the other tools were

1. *Olympias* was launched in Piraeus in 1987. Morrison, J. S. and Coates, J. F. 'The Athenian Trireme'*Int Journ Naut Archaeol* **16** (1987) 168-70.
2. Coles, J.*Experimental Archaeology* Academic Press, London, 1979.
3. A detailed account of the original find will appear in a forthcoming paper (Marsden, P. (ed.) 'The Clapton Logboat' *Int Journ Naut Archaeol*).
4. McGrail, S. *Logboats in England and Wales* BAR British Series 51, 1978. Also *Essex Naturalist* **12** (1901-2) 163; *Antiq Journ* **6** (1926) 147.
5. By I. Tyers, Museum of London.
6. McGrail,*op cit* fn 4.
7. See Goodburn, D. in Marsden *op cit* fn 3.
8. McGrail, S. *The Building and Trials of the Replica of an Ancient Boat: THE GOKSTAD FAERING* National Maritime Museum Monograph No. 11, 1974.

CLAPTON



WALTHAMSTOW



ROYAL ALBERT DOCKS

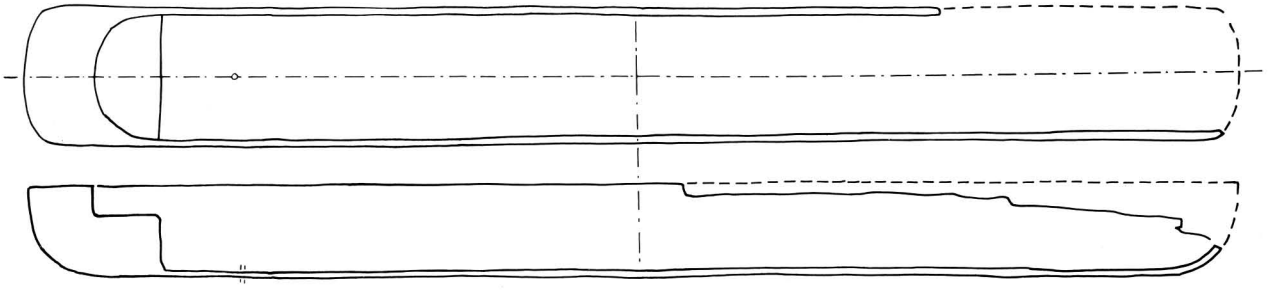


Fig. 1: Reconstruction of the Clapton Logboat (based on drawing by P. Marsden, Museum of London), and other logboat finds from the Lea at Walthamstow (length 15 feet) and Royal Albert Docks (redrawn from T. D. Kendrick 'Dugout canoes in the British Museum' *Antiq Journ* 21 (1941) 74-5.

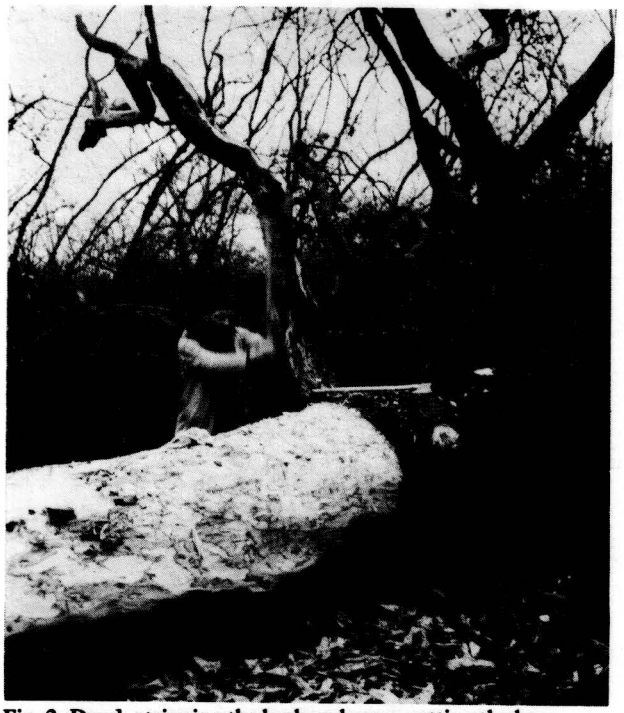


Fig. 2: Day 1, stripping the bark and cross-cutting the log.
(Photo: M.A.S.)

of the same general type as known late Saxon examples. No modern technology was resorted to except for the use of hand tapes to check the developing shape against that of the original. Charred sticks from the camp fire were ideal for marking the sappy oak, producing a bold line that could be easily seen in the poor winter woodland light. Symmetry and fairness of line were largely maintained by eye, within the confines of the reconstructed dimensions.

Summary of the stages of construction

1. Tree selected with an allowance for the removal of sapwood.
2. Bark and branches removed (Fig. 2).
3. Stem cross-cut most of the way through using large axes (Fig. 3).
4. Fashioning the boat in an upside-down position, most of the waste being removed from the future bottom with axes to crosscut and split out waste in large lumps.

Stages 2-4 were completed during the first weekend of work (2 6-hour days, with 2-3 volunteers working on the hull at any one time).

5. Sides of the future hull roughed out using axes.

Fig. 3: Cross-cutting the log to length and shaping outside.
(Photo: M.A.S.)

Fig. 4: Removing waste from the top using groove and splinter technique. (Photo: M.A.S.)

Fig. 5: Hollowing process begun using axe. (Photo: M.A.S.)

6. Sides and bottom roughly trimmed with side axes and adzes, and the roughed out hull severed from the parent log.

These two stages took the 2nd, 3rd and part of the 4th weekend to complete (four and a half 6½-hour days, with 2-3 volunteers working on the hull at any one time).

7. Two holes drilled through the bottom of the boat so that the thickness of the bottom could be gauged during the hollowing process.
8. Hull then rolled over by four people using poles and wedges. At this stage the hull must have weighed *c* 1.5 tons, given an assumed average weight of *c* 67 lbs per cubic foot for green oak.
9. Waste removed from the new top of the oak by cross-cutting and splitting out the waste in between with axes (Fig. 4).
10. The top of the hull then dressed down to just above the final top of the boat (the sheer) with adzes.

Stages 7-10 were completed during part of the 4th, the 5th, and part of the 6th weekend (6½-hour days, with no more than 2 people working at any one time on the log).

11. The shape of the boat in plan marked out with charred sticks.
12. The outside of the hull at sheer level trimmed using a cooper's broad axe (similar to the Saxon 'T' axe).
13. Rough hollowing started with cross cutting and splitting out between, using axes and hatchets. About three-quarters of the waste was removed in this way (Fig. 5).
14. The thickness gauge holes were searched for using the gouge adze. When found, final roughing out of the bottom could begin using hatchets and gouge adze.
15. Log rolled back onto its sheer for final shaping and smoothing of the bottom and sides (Fig. 6).
16. Log rolled over by two people and top of the outside shaved with keen side axes, used with a pushing motion.

(continued on p. 19)

Fig. 6: Final shaping of the bottom and sides.
(Photo: M.A.S.)

(continued from p. 10)

17 Inside of boat roughly finished using hatchets on the sides and bulkhead, and gouge adze on the bottom (Fig. 7).

18 At various stages the boat was smeared in animal fat or raw linseed oil to prevent over-rapid drying out that could occur between working visits.

19 Test launch. Named *Ravensbourne* after the stream running close to the construction site.

The above stages took place on 6th, 7th and part of the 8th weekends (4½ 7-hour days, with 2 or 3 people working on the boat at any one time.

20 Fine trimming and fairing of the inside and outside of the hull using a side-ground hatchet, ordinary large axe and the gouge and large adzes.

21 Boat hauled from the wood.

Including an additional two days of single-handed work spread over the duration of the project, a total of approximately 45 six and a half hour person-days were spent on the boat: a figure that is bound to be much higher than the time taken by a skilled team. A corrected guess for a skilled, fit worker would be a reduction to less than half the time to approximately 22 person days, or with regular rest days, 1 month's

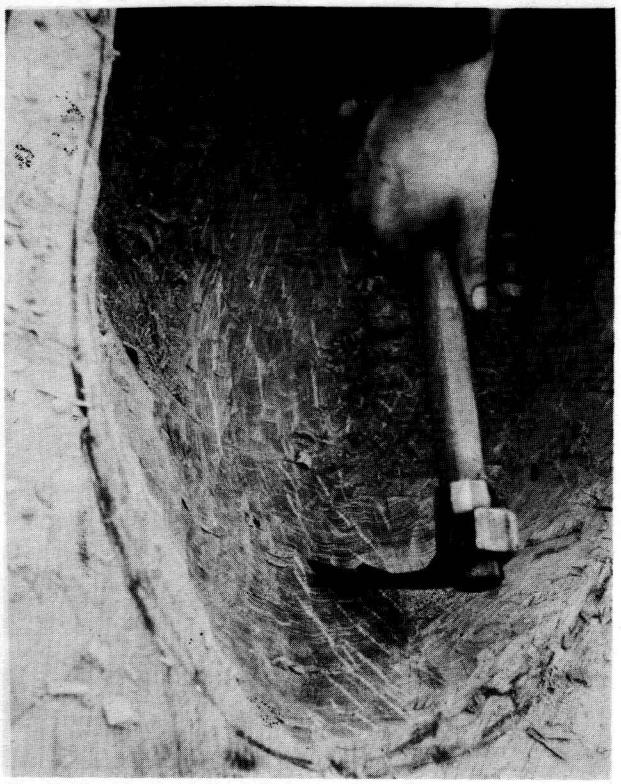


Fig. 7: Final hollowing of the bow using adze.
(Photo: M.A.S.)

work for one person (or more probably 2 weeks work for 2-3 people). The training aspect of the project reduced the value of the unweighted statistics, and it is hoped that the follow up project will be undertaken by a more skilled work team[9].

Launch

Before final finishing, the logboat was hauled over wooden skids from the place of manufacture to a small pond some 70m (240ft) away. On level ground, only four people were needed to pull it over the small logs and branches. Launched with one light person on board, it floated lower in the water than expected, due to its green condition (Fig. 8). The addition of further adults only slowly lowered it in the water, and a total of four moderately-built adults formed the maximum capacity in the very sheltered conditions of the pond. It could be argued that conditions on the Lea would be similar and that the launching crew could have paddled and poled its new boat to a convenient site away from the place of construction for slow seasoning and final finishing.

Standing up and punting was fairly easy despite the narrow beam of the boat, as the thick heavy ends helped to damp down pitching, and permit boarding end on. Punt poles were fashioned from ash donated by the Norman family, and several paddle replicas of the late Saxon oak paddle from Southwark[10] together with wooden bailers were made. Paddling was found to be most effective by one crew, sitting in the stern of the boat from where boat direction could be easily controlled. The most practical load would have been equivalent to two average-sized adults with some equipment. Freeboard (the height of the side above the water) was *c* 0.15m (6in) with one adult on board.

Replicas and wrecks

The Clapton logboat replica project is still under way, with serious trials planned for 1989, when the

9. A more detailed account of the project, with full details of methods and statistics recorded, will be published in due course. Plans are under way for a second replica, the Kentmere Boat, in 1989.

10. This find is due to be published in Marsden *op cit* fn 3.

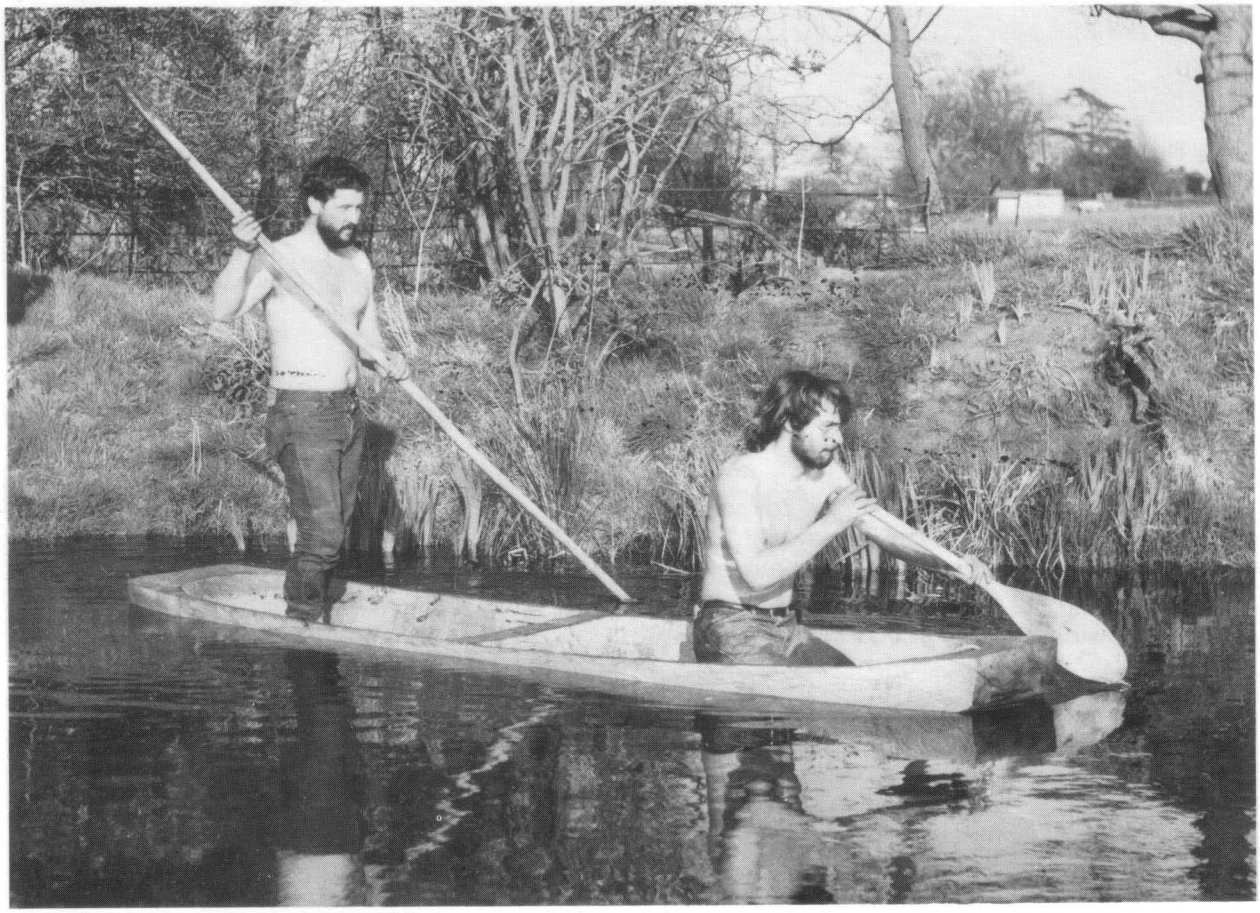


Fig. 8: First trials with punt pole and paddle.
(Photo: M.A.S.)

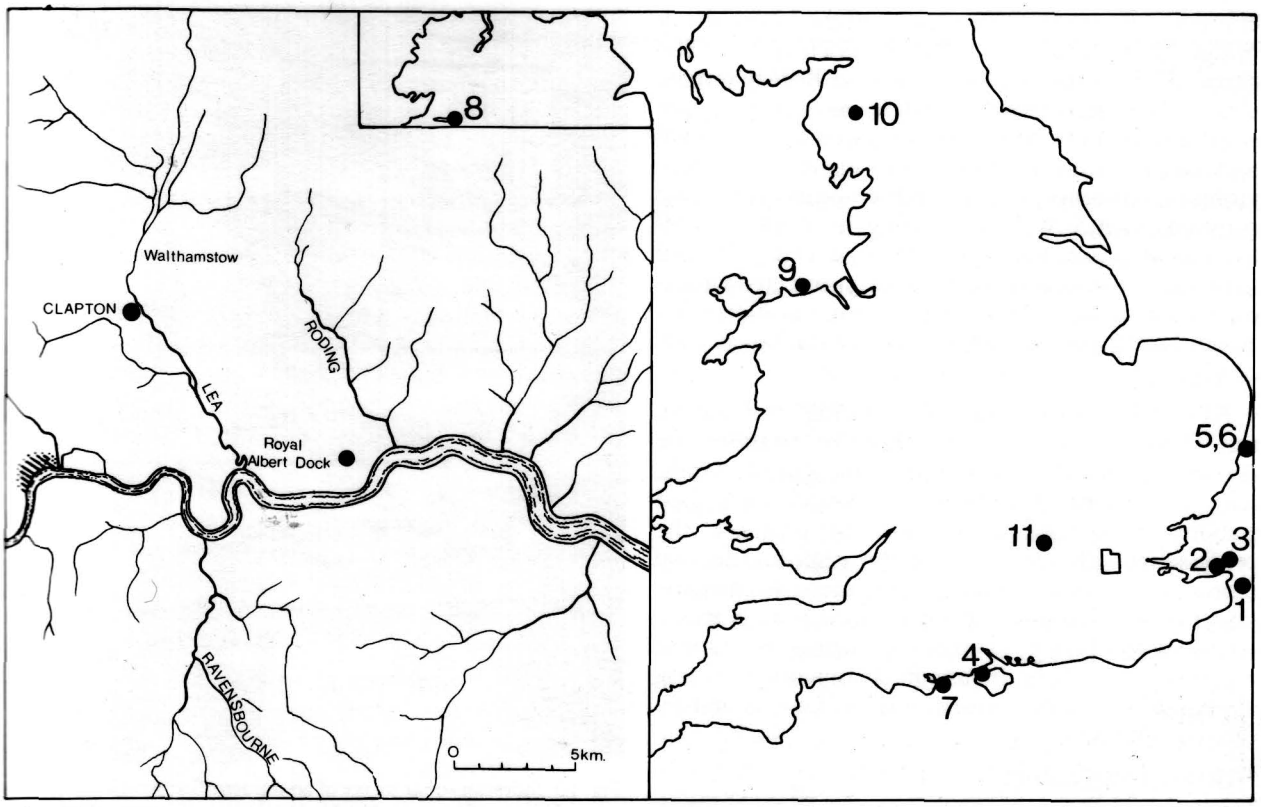


Fig. 9: Location map, and other projects by M.A.S.
1. Goodwin Sands 1983 (18th century wrecks)
2. Copperas Channel 1985 (unidentified site)
3. Margate Sands 1986 (four wrecks, one aircraft)
4. Yarmouth Roads 1986 (16th century wreck)
5, 6. Southwold 1986-7
(evaluation of area for medieval settlement and wrecks)
7. Studland Bay 1987 (16th century wreck)
8. Lough Erne 1987 (flying boats)
9. Rhyl 1987 (? early submarine)
10. Lake Ullswater 1987 (aircraft)
11. Henley Bridge 1988 (12th century bridge piers)

boat will have seasoned and the sides will have fully dried out. The educational potential of the work is now being developed by Marine Archaeological Surveys in one approach towards raising public awareness of our nautical heritage, and stimulating interest in archaeology beyond the foreshore. It is easy to imagine *Ravensbourne* and similar craft gliding downstream from Clapton and up the Thames to late Saxon London with farm produce or fish, or operating as a ferry amongst the marshy courses of the Lea – in either case a key function in the local economic system[11].

The location and evaluation of early water transport forms a key objective of the charity. It is the lack of information on underwater archaeological sites around Britain that obstructs the evolution of an effective structure for managing them as part of our heritage. M.A.S. has been engaged in survey work since 1983, using geophysical equipment such as sidescan sonar, sub-bottom profilers and magnetometers to build up detailed maps of particular offshore areas and their archaeological potential. Work began on the Goodwin Sands, and has now taken in sites in Northern Ireland, the Lake District and North Wales (Fig. 9). However the south-east forms a focus of its activities, and it now maintains its trihedral hull survey vessel at Chatham Historic Dockyard. Recent survey work has included two examinations off the Suffolk coast at Covehithe to follow up the discovery of two medieval side-rudders dated to between the 10th and 12th centuries, and evidence for possible submerged settlement[12]. Earlier this year the Charity completed a sidescan survey and video record of underwater features either side of Henley Bridge in support of work by the Oxford Archaeological Unit and Colin Fox who has been

11. Goodburn, D. 'Do we have evidence for a continuing Saxon boat building tradition?' *Int Journ Naut Archaeol* **15** (1986) 39-47.

12. Hutchinson, G. 'The Southwold side-rudders' *Antiquity* **60** No. 230 (1986) 219-21. M.A.S. Archive Report *Geophysical Interpretation of the Coastal Waters of Covehithe to Banacre Ness, East Suffolk* 1986.

examining the underwater remains of the 12th century bridge piers and associated wooden piles. The practical problems of survey work in British waters, even when restricted to single site survey, are considerable, and remote sensing is seen as an essential preliminary to diver inspection in many areas where visibility, currents and seabed mobility are never constant. M.A.S. will be directing its work in 1989 towards Pudding Pan, Margate Sand (Fig. 10) and the monitoring of conditions on two protected wrecks on the Goodwins: the Stirling Castle and Northumberland (ships-of-the-line wrecked in the Great Gale of 1703).

As seabed evaluation and monitoring continues in the Thames area, the group aims to establish the density and diversity of sites amid the shifting sands, with a long-term programme of research on seabed stability in specific areas, and to promote the professional archiving of data within regional sites and monuments registers. Such a programme is currently under review by a working party for the Joint Nautical Archaeology Policy Committee, which is putting together a number of discussion documents providing appraisals and recommendations for nautical archaeology in Britain[13].

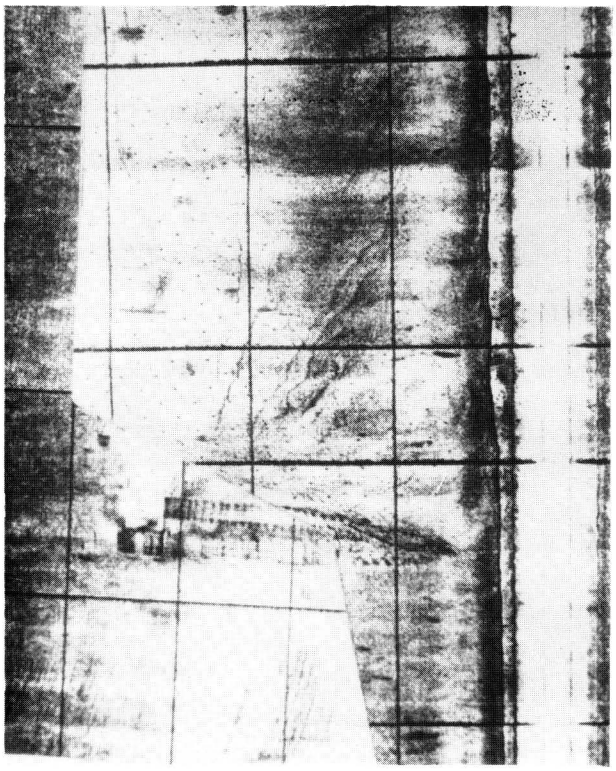


Fig. 10: Sidescan sonar image of an unidentified wreck emerging out of Margate Sand in the Thames Estuary. Without a national programme of survey and wreck management, such sites remain prone to escalating threats of indiscriminate salvage, erosion and decay, damage from dredging and mineral extraction, and souvenir hunting.

Acknowledgements

We would like to thank James and Ruth Norman for providing the raw materials and much advice; the many volunteers from the Institute of Archaeology and Passmore Edwards Museum, in particular J. Wallis; and the Passmore Edwards Museum for assistance in removing the finished boat from the wood. We are very grateful to Terry Monaghan of M.A.S. for making a video recording of the manufacturing process and editing the exhibition video, to volunteers from the Museum of London for helping to launch *Ravensbourne*, to staff of the DGLA and P. Marsden (Museum of London) for information on the original find, and to P. Marsden for permission to use his drawing of it.

13. The logboat currently features in an exhibition entitled *Logboats to Ships* at the North Woolwich Station Museum (extended P.E.M. exhibition).

Letter

The London Amphitheatre

Published information on the Roman amphitheatre recently discovered in London (*Current Archaeol* no. 109, 1988) suggests that it is a straightforward elliptical structure, stone built, on an E-W alignment with two entrances at opposing ends of the long axis and a masonry outer revetment wall. The simplicity of the morphology of the published ground plan leads one to believe that this is a structure associated with the civilian setttlement in Roman London, similar to other known amphitheatres such as Silchester, Dorchester, Chichester *et al.*

In fact examination of the known amphitheatres in this country shows that none of the two-entranced amphitheatres, which are associated primarily with civilian urban settlements, has a solid outer revetment wall. Indeed only one example, Silchester, shows any indication of ever possessing an outer revetment wall at all, and in this instance it was made of turves. Those with masonry outer revetment walls invariably have at least four entrance passageways. There are only two examples which display these characteristics, Chester and Caerleon, both of which are unequivocally military sites.

These are observable facts. The London amphitheatre lies, unusually, within the Roman town walls but this merely suggests that it had fallen into disuse, a common occurrence at other sites, when the walls were built. Given the proximity of the Cripplegate fort and the bath buildings in Cheapside it would perhaps be more consistent with the known facts to regard the London example as an adjunct of the fort rather than of the civil settlement. In which case the ground plan could reasonably be expected to approximate more to Caerleon than, for example, Silchester and, incidentally, light may be shed on the date of the Cripplegate fort.

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