

INVESTIGATION INTO THE HULL OF WRECK B (THE "POZZINO") IN THE GULF OF BARATTI - LIVORNO - ITALY

The remains of the boat lie on the seabed in two separate sections, from 20 to 30 cm apart, with one partly over the other.

The first section includes the keel, both extremities of which are visible, to which, are attached at the prow end the garboards and part of the second strakes. The group of timbers lies at an angle of 40° leftwards.

The second section includes the remains of the left side, and a large part of the skeleton and the remains of the inner planking are firmly attached to it. The section lies horizontally on the sea bottom and covers the first section for more than 6 metres. The break and the superimposition of the two sections are due to the original shock and not to a rotting process. The edges of the broken sections are in an excellent state of preservation. The tenons are cut clean and many of the nails in the frame are pulled out. Evidently the boat opened up as it hit the seabed, or else the shock that caused the sinking was so violent as to separate it into two parts.

Analysis of the various parts of the craft.

INNER PLANKING: Among the large quantity of stray timbers which are inside the craft, many, to judge from the way they were shaped and the manner or their nailing, must have belonged to the inner planking and the movable timber ledging, whilst a considerable number are still clearly *in situ*. The inner planking that is still in position includes movable planks laid longitudinally to the centre line of the ship, from 1 to 2.5 metres in length, 18 to 23 cm in width and 3 to 4 cm thick. Towards the centre of the boat they are held in position by two half-round ceilings, of 6 cm in diameter, which are fixed to the frames by slender copper nails.

The central timber ledging includes movable planks laid crosswise to the ship's centre line and with an unvarying length of 70 cm, except for those at the far end of the stern which have a trapezoidal shape and whose length diminishes to 30 cm. Their width is 20 cm and their thickness 3. Some of them exhibit small holes to facilitate their removal.

Among this timber ledging, to the left of the line of the keel, and at a point corresponding to frames 44 and 40, there is a rectangular hole bounded by small planks which are nailed to the floor timbers: this hole gives access to the bilge. The reinforcing planks show clear signs of having had some splintess removed with an axe, and the bilge had an outer cover of lead which was not nailed down. The bilge in question was for collecting water and a pump has probably been removed from it.

SKELETON: The keelson, which measures 14.5 cm in width and is 6 cm thick, is visible at the extremities of the hull, whilst in the centre it is hidden by the timber ledging. It has some small holes, one of which is situated towards the prow end and measures 6 X 8 cm and two towards the stern of more or less similar dimensions. To stern it has become detached from the frames and it is somewhat corroded. In at least one case it lies inside a notch of 1 cm in depth which was made in a frame, and it is held in position there by a wooden lock pin which has a copper nail running through it.

Of the first frames of the prow only the floor timbers have been preserved: two of these timbers have the watercourse in a central position and so are not connected to the keel, the third is flat but no nails are visible. The other three discovered in the prow area are very thin, rectangular in section (height 8.5 cm, width 7.5 cm) but not fashioned in conformity with the frame of the classical period.

The first of them consists of the floor timber (length 100 cm, height 22 cm, width 8 cm) which is fixed to the keel by a copper nail and to the keelson as described before. The 1st futtoks are butted to it and they are fixed to the planks by a wooden lock pin crossed through by a copper nail which enter it from the outside and is beaten back.

The radiographic investigation of a fragment of frame 44 has allowed us to determine that the copper clamps found in the bottom of the wreck and coming from the upper surface of the frames are nothing but bent-back portions of the nails which reinforce the wooden lock pins that join the frames to the planking: due to the effect corrosion, these have taken on a symmetrical shape so as to allow them to be mistaken for objects complete in themselves.

The other two prow frames have the same dimensions and positioning but the butting between the floor timber and the 1st futtock is not visible and all the signs are that they were hewn out of a single trunk of residual length 265 cm.

The frames visible to stern are laid in two different ways: the smaller ones (56 X 8 cm) are perpendicular to the keel while there are two bigger ones which were fashioned in such a way that they could be positioned with a marked sterward inclination. One of these is *in situ* and is apparently part of a single piece consisting of floor timber and knee, of which only the right hand one has been damaged by teredo. The other one has strayed and consists of floor timber and right-hand knee hewn from a single timber and has a scarf joint for joining to the left-hand knee which is *in situ* joined to the side. Neither of the two is joined to the keel but only to the outer planking by wooden lock pins reinforced by long beaten-back copper nails.

The intervals between the frames which are perpendicular to the keel are from 16 to 18 cm: and the positioning of the two unusually shaped stern frames gives the impression of a long tapering forward thrust.

OUTER PLANKING: The garboards are broadly trapezoidal in section, with a curved inside surface. They are from 18 to 20 cm wide and 5 cm thick. They have mortises which are 6.5 cm wide and 5 cm apart: towards the prow they are connected to the keel and to part of the second strakes.

The planks are from 20 to 22 cm wide to prow and from 16 to 18 to stern: their thickness is a constant 4 cm and they are smeared with vegetable resin on the inside.

The mortises are 5 cm wide and 0.5 cm in thickness and they are spaced apart from 5 to 7 cm in the prow and are displaced along the width of the planks: they occur in greater concentration in the stern and they are placed over each other at least two points.

The tenons are trapezoidal and positioned in the mortises with great precision. Some have two lock pins and in some instances the lock pins have copper nails through them.

A stray fragment of planking, whose original position is not known, displays a slanting mortise which is longer than normal and extends into half the thickness of the planking itself, a clear indication of the planking having been replaced.

At the far stern end the planking terminates with a slanting cut and has mortises in the short side also: it is clear that this is the point where the side of the boat terminates and that the joints were for union with the sternpost.

The hypothesis of a square stern which was first put forward cannot yet be excluded although the latest findings prompt us to greater caution.

KEEL: In the last two metres of the prow the keel becomes a great deal thinner finishing up only 4 cm thick at the head whilst its unchanging dimensions are: height 17 cm, width 18 cm with the rabbets 3 cm deep. On the other hand to stern the dimensions are height 17 cm, width 14 cm with the rabbets 3 cm. At both the extremities the mortises are 5 cm and they take tenons 0.5 cm thick. They are spaced out from 5 to 7 cms. The keel is unvariably trapezoidal in section and despite the fact that no traces of any fixing of the posts remain we may surmise that the prow was of cut-water type on account of the progressive tapering of the keel and the total absence of upward curvature.

LEAD COVERING: All the hull below the water line was covered with a lead sheeting of little less than a millimetre in thickness and nailed down with the classical large-headed small copper nails of square section. At the very end of the prow the sheeting increases conspicuously in thickness until it reaches 7 mm, as if it was a reinforcement to substitute the cut-water ram.

PIECES OF WOOD OUTSIDE THE GROUND PLAN OF THE CRAFT: Towards the prow end, under the side and unconnected with it there are a small beam, a plank and a half finished trunk of 12 cm diameter. It may be that the prow was reinforced from the outside but it is not a case of double planking for the keel has only a single rabbet.

Under the left stern side and not connected to it there are two beams, one of which is rectangular in section and may be a corner of the stern of a part of the rudder, and the other of which is rounded in section and has a square joint at one extremity (the other extremity is not visible) and its bark still on it: we are probably dealing here with a "soufflage". Under the side, about 80 cm from the keel, there is a second beam similar to the aforementioned and under that there is a large plank with two small joints and this may be the remains of the blade of a rudder or planking from the right side which slipped down during the shipwreck, or else a part of the superstructure. There are even more pieces of wood of some substance under the step of posidonia roots and there may be pieces of sternpost amongst them.

SHIP'S EQUIPMENT: Inside the craft there were some objects belonging to the ship's equipment amongst which a block and some metallic concretions.

The block lay between the keel and the ship's side, under a frame, evidently having ended up there during the shock of the sinking. It is formed of its main part which is made of a wood of yellowish colour measuring 14 X 18 X 9,2 cm and is hollowed out like a snatch-block in which is inserted a wheel of dark wood 7 cm thick and 14 cm in diameter. The extremity towards the wheel has a cog and there are several notches and channelings in the main part. It is a fixed tackle attached to the hull which can be used for the manoeuvring of the mast and sails, for a loading hook or even for the rudders.

Two of the concretions were X-rayed but with little success since numerous fragments of lead sheeting were enclosed within them.

The first one, recovered in 1989, is 30 cm in length, and contains the imprint of an iron bar bent into the shape of a ring at one end, curved asymmetrically, and broken off at the other end, as if it were a hook which had been severely deformed by traction and flattening.

The second one is bigger (160 cm) and also contains pottery and wood fragments. It lay across the line of the ship about 4 m from the prow. The calk is of a rectangular piece of iron with a mean section of 3 X 10 cm and it is sufficiently visible in X-ray to determine that it is the shaft of an iron anchor.

CONCLUSION

The remains of the wreck lie on the seabottom for a full 12 metres in length and a little less than 3 metres in width. They may therefore be attributed to a boat of some fifteen metres, of elegant shape, with a cut-water prow, an extended and somewhat raised stern, and built not far from its place of sinking. It was certainly driven by sails (the small hole on the keelson towards the prow is sufficient to hold a small detachable mast) but there are not enough indications to exclude oars as a means of propulsion.

The external planking is markedly robust in nature and had already undergone repair, and this contrasts with an essential, light inner skeleton: in this respect it does not conform to the classical rules of construction technique.

As has already been suggested (see *Tropis III*) we may venture the hypothesis that it is a local craft built for purposes only with difficulty demonstrable outside the sphere of supposition.

The wreck, which is dated in the second half of the second century B.C., was investigated by the Soprintendenza Archeologica Toscana during three

seasons of excavation work in 1982, 1989 and 1990, which were carried out under the scientific direction of DRS Francesco Nicosia and Antonella Romualdi and the technical direction of underwater archaeologists Dr. Enrico Ciabatti and Dr. Edoardo Riccardi.

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Photo. Soprintendenza Archeologica Toscana

CAPTIONS

1. The Gulf of Baratti during rough seas from the necropolis of Populonia.
2. Fragment of a wooden statuette (4cm).
- 3-5. Chest of metal vases and wooden containers for spices or cosmetics, during excavations.
4. One of the stones found amidst the cargo and probably lost by the Urinatores.
6. The 5th floor timber connected to the left side and the keel, with the garboards, moved by about 20 to 30 cm.
- 7-8. The extremity of the prow.
9. Plan of the prow.
10. The run of the keel.
11. Mortises in the garboard at the prow end.
12. Frames.
13. Radiography of a frame with clinched copper nail.
14. The keel towards stern.
- 15-16a. The left side towards stern and the keel.
- 16b. View from above with the frame from a different angle.
17. Plan of the stern section.
- 18-19. Photomontage. The complete plan.
- 20-21. The pulley block found in the stern.
22. The type of ship.

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Fig. 1



Fig. 2



Fig. 3





Fig. 4



Fig. 5

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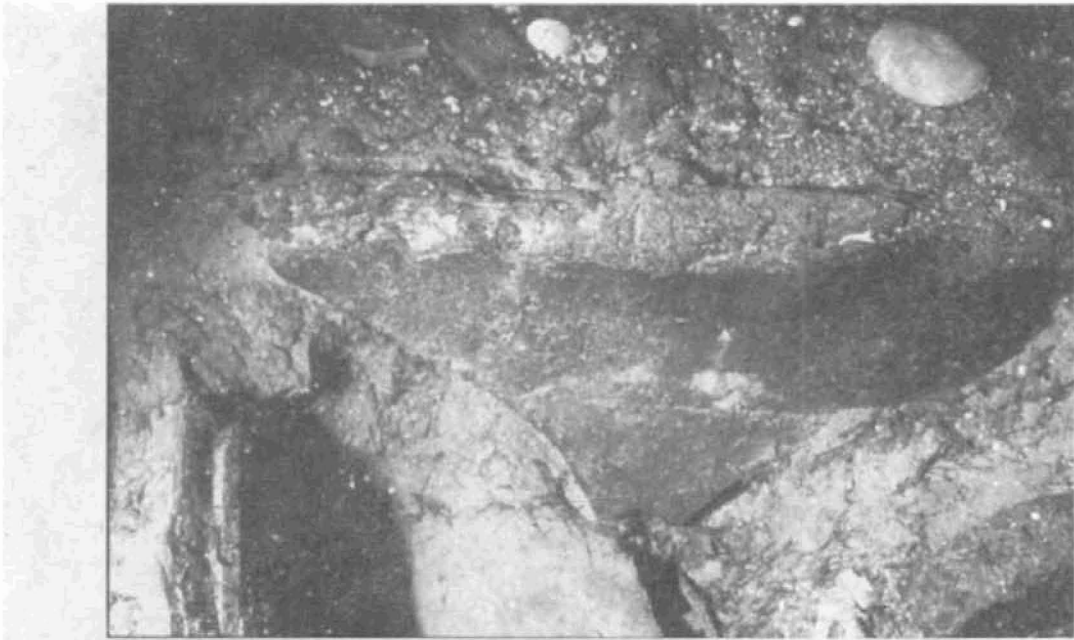


Fig. 6

Fig. 7



Fig. 8



Fig. 9

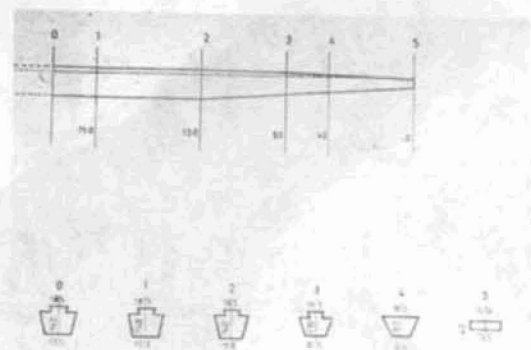
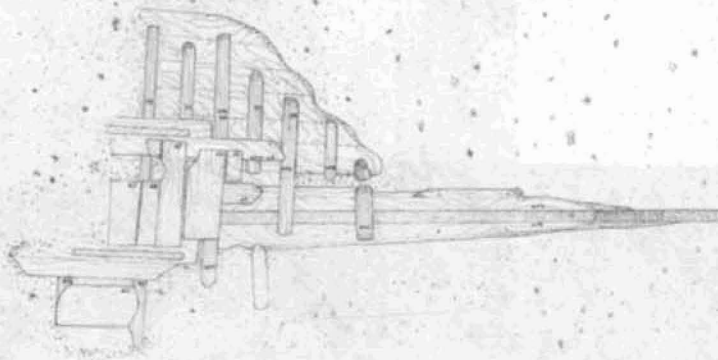


Fig. 10

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Fig. 11



Fig. 12

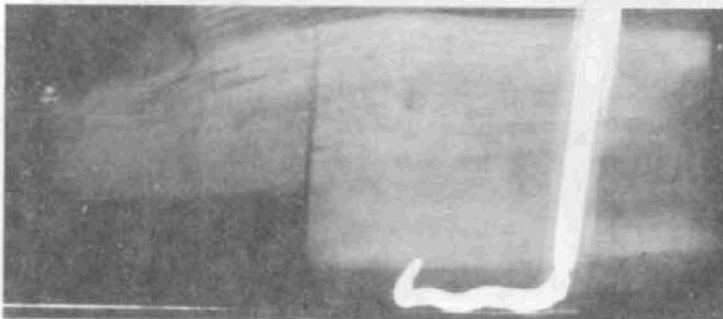


Fig. 13



Fig. 15



Fig. 14

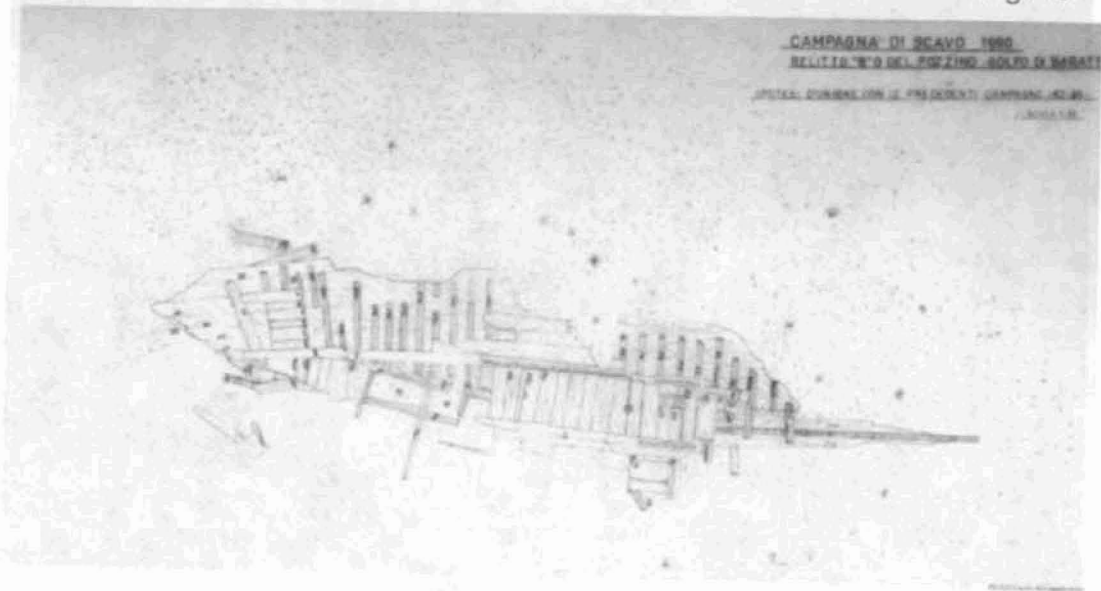
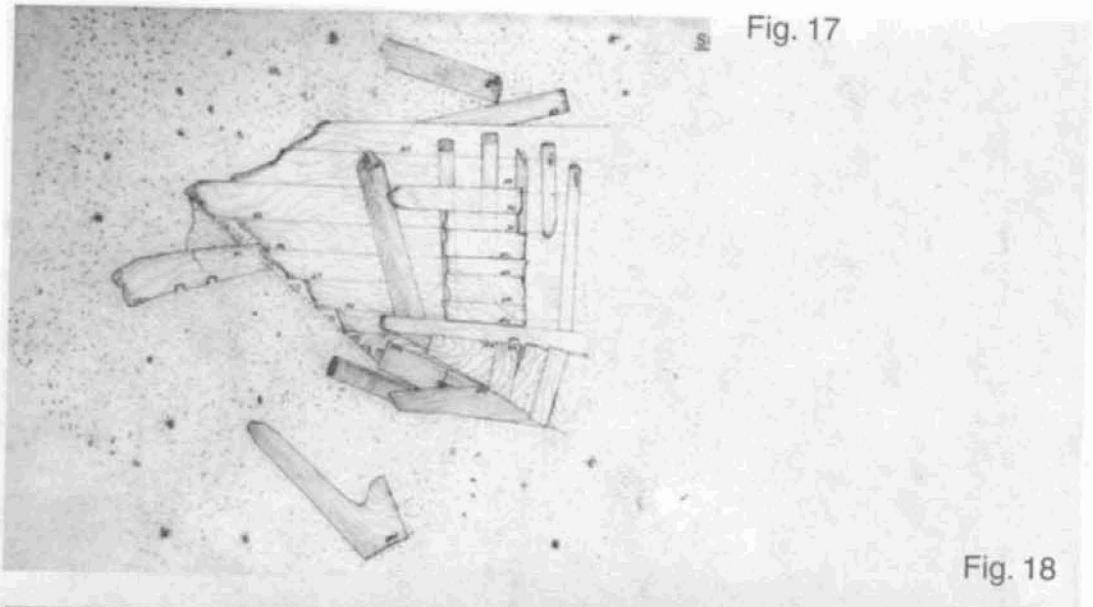
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Fig. 16a

Fig. 16b







ΑΠΕΙΚΟΝΙΣΕΙΣ ΠΛΟΙΩΝ ΣΕ ΤΟΙΧΟΓΡΑΦΙΕΣ ΣΤΟ ΝΑΟ ΚΟΙΜΗΣΗΣ ΤΗΣ ΘΕΟΤΟΚΟΥ ΚΑΛΑΜΠΑΚΑΣ

Σε μια επίσκεψή μου στα μοναστήρια των Μετεώρων τον Απρίλιο του 1985, παρατήρησα σε τοιχογραφίες απεικονίσεις πλοίων, οι οποίες παρουσιάστηκαν στο ΙΙΙ Συμπόσιο Ναυπηγικής στην Αρχαιότητα, που πραγματοποιήθηκε στην Αθήνα στο Ίδρυμα Ευγενίδου από 24-27 Αυγούστου 1989. Στην ίδια επίσκεψη, παρατήρησα επίσης τοιχογραφίες με απεικονίσεις πλοίων και στο Ναό της Κοίμησης της Θεοτόκου στην πόλη της Καλαμπάκας, οι οποίες αποτελούν το θέμα της σημερινής παρουσίασης.

Στην αρχαιότητα στη θέση της σημερινής Καλαμπάκας, βρισκόταν το Αιγίνιο. Στο Μεσαίωνα η πόλη λεγόταν Σταγοί και κατά την τελευταία περίοδο της Τουρκοκρατίας (ΙΗ' αιώνας) πήρε το όνομα Καλαμπάκα¹.

Οι Σταγοί που αναφέρονται ως Επισκοπή από 9ο μ.Χ. αιώνα² είχαν καθεδρικό Ναό την Κοίμηση της Θεοτόκου, ο οποίος βρίσκεται στο κέντρο περιπόου της σημερινής πόλης. Η σημασία του Ναού αυτού για τη βυζαντινή και μεταβυζαντινή τέχνη είναι πολυσήμαντη.

Για το Ναό της Κοίμησης της Θεοτόκου δεν έχει γραφεί ειδική μελέτη. Όσοι σε μελέτες τους για τα βυζαντινά μνημεία ανέφεραν τη Βασιλική της Καλαμπάκας, τόνισαν τον άμβωνα που υπάρχει στο μέσο του κυρίως Ναού³ και για το λόγο αυτό θεώρησαν ότι το μνημείο ανήκει στους παλαιούς χρόνους⁴ ή βασιζόμενοι στα αναγραφόμενα στο Χρυσόβουλλο του Αυτοκράτορα Ανδρόνικου⁵ θεώρησαν το Ναό ως κτίσμα του ΙΓ' αιώνα⁶ ή πολύ προγενέστερο⁷.

Η βυζαντινή Βασιλική της Κοίμησης της Θεοτόκου ανηγέρθηκε στο χώρο παλαιοχριστιανικού Ναού που καταστράφηκε⁸. Ο σημερινός Ναός είναι Βασιλική βυζαντινών χρόνων 30X13μ., που χωρίζεται σε τρία κλίτη, έχει δυο νάρθηκες, δηλαδή εσωτερικό νάρθηκα ή Λιτή και εξωνάρθηκα. Κατά μήκος του νότιου κλίτους εκτείνεται ανοικτή στοά. Το μέσο κλίτος της Βασιλικής είναι ψηλότερο.

Οι μεγάλες επισκευές του ναού έγιναν το 1573, οπότε ολόκληρος τοιχογραφήθηκε εκ νέου⁹. Ιδιάζον στοιχείο της Βασιλικής της Καλαμπάκας είναι ο χωρισμός των κλιτών με τοίχους, τρόπος που απέχει από τη συνήθη εναλ-