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PUBLISHER

NIKOS TSOUCHLOS
4 Al. Soutsou Str., Athens 106 71, Greece

EDITOR

YANNIS VICHOS
3 Mitropoleos Str., Athens 105 57, Greece

EDITORIAL ADVISORS

WILLIAM PHELPS
YANNOS LOLOS
4 Al. Soutsou Str., Athens 106 71, Greece

EDITORIAL COMMITTEE

HARALAMBOS KRITZAS
ALEXANDRA MARI
HARALAMBOS PENNAS
YANNIS VICHOS

Designed on a Macintosh II fx

Technical Advisor: Nootropia Ltd
4 Marni Str., Athens 104 33, Greece

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ADDRESS: ENALIA
4 AL. SOUTSOU 106 71
ATHENS - GREECE
Tel: (30 1) 36 036 62, Fax: (30 1) 64 50 033
Email: vichosgroup@ath.forthnet.gr

Underwater Archaeology in Greece

Conclusions and Proposals

The importance of underwater archaeology is now generally accepted by the world of scholarship and learning. Its potentialities are recognised by serious archaeologists, who have understood the significant role it will play in the future of archaeological research. It is unnecessary here to repeat the well-known arguments, since even in Greece underwater archaeology has now finally established its place in the archaeological field. It may, however, be useful to signal its shortcomings and the difficulties it confronts in this country, be it only from the limited platform of an editorial note, in the hope that it will provoke wider discussion and agreement on the part of all the authorities and individual research organisations concerned.

Some thirty years have passed since underwater archaeological research took its first hesitant steps in the 1960's. In the next decade it found its feet with the foundation in 1973 of the Hellenic Institute of Marine Archaeology, a private organisation, and in 1975 with the creation by the Ministry of Culture of the Ephorate of Underwater Antiquities. By the end of the 1980's the Institute finally embarked on a series systematic excavations, and thus we entered the last decade of the century with more than four full campaigns under way in different parts of Greece. It is disappointing, however, to find that we are evolving at an almost Darwinian pace, measured in decades. Even more disappointing is the absence of vision, planning and organisation, as well as a complete lack of interest on the part of the Ministry of Culture in Greek underwater archaeology, in spite of all the occasional spasmodic outbursts contrived to create an impression. A further indication is the government's total indifference to the work of HIMA.

One serious problem is the unavailability of any form of university training that includes special courses and research for the future archaeologists who will be called on to enter the world of underwater archaeology. Nor is there any provision for the training of specialists and technicians (topographers, architects, geologists, biologists, electrical engineers, doctors, photographers) to complement the archaeologists in their underwater excavations. For it is obvious that merely teaching these people to dive is not going to render them competent to carry out this kind of work.

The existing infrastructure for the conservation, restoration and display of underwater finds is rudimentary; there is a shortage of resources, means, competent specialists and particularly of proper workshops. At present there are three laboratories for the conservation of underwater finds. The first, belonging to the Underwater Ephorate, where underwater finds from all over Greece are sent for treatment, is choked for lack of space and in spite of the heroic efforts of the Ephorate conservationists, the struggle is an unequal one: the available space is cramped, the facilities minimal, the personnel few, and the volume and variety of the finds enormous. There is also, of course, the laboratory in the Niokastro at Pylos, but it is under-used. The third one, set up by HIMA in the Spetses Museum, is fully occupied in treating the

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Two stone pyramidal anchors raised from the Antidragonera wreck site in 1996.
(Photos: N. Tsouchlos, K. Petrinos).

material from the Dokos and Iria wreck sites. The huge work of conserving and restoring these finds falls solely on the Institute, with very little assistance from the Ministry of Culture, apart from the provision of the space, basic facilities and the loyal support of the Museum staff. The Institute, however, in complying with all the legal requirements, expects active support and not bureaucratic impediments, especially since the finds are, after all, the property of the state.

Nor does the government show any interest in creating a proper archaeological museum in which to house and display exclusively underwater antiquities.

Another problem is that the crucial matter of the safety of the divers, archaeologists and technicians, as well as of their care in the event of an accident. This is still treated in an amateurish way, with a lack of decompression chambers, doctors and diving supervisors.

This is the situation today, beset with an inadequate infrastructure and non-existent public training. The only two bodies, the one state and the other private, responsible for conducting underwater archaeological research in Greece are without resources and battling to accomplish their task by their own individual efforts alone, obliged to stretch the working hours of the personnel of the Underwater Ephorate and dependent on the voluntary contribution of the labour and personal sacrifices of the members of HIMA.

Over all this, however, there hangs one fundamental question: do we want to carry on serious underwater archaeological research in Greece? Because if so, there is only one thing to be done: we must sit down and discuss it. We need to exchange opinions, to profit by the experience of other countries, to lay out plans of action and priorities, and finally to submit all our proposals to the government. In this way we may succeed in mapping out a national policy for marine archaeology in Greece as well as a legal framework for the protection and display of underwater antiquities.

It is our belief, in spite of the lack of infrastructure and organisation in this country, and even with the meagre financial means at our disposal, that such a scheme can be made to function creatively, if only there is correct planning in depth, and if HIMA and the state generally will translate into action their will for the advancement of this branch of archaeological science, which is so important for us on both a scientific and national level.

We believe the time is now ripe for every archaeologist engaged in the underwater sector, both within the Archaeological Service and outside it, as well as for those bodies, both state and private, whose goal is its furtherance, to offer to assist HIMA with their knowledge and experience. The ministry, in its turn should utilise its own political, scientific and administrative potential to create a new realistic framework within which this important branch of archaeology may make effective and lasting progress.

Nikos Tsouchlos
July 1995

POINT IRIA WRECK (1992)

I. EXPLORATORY SURVEY

Haralambos Pennas
Yannis Vichos

After the preliminary inspection of the wreck site in 1990 and the extensive survey of the seabed made in 1991, during which most of the surface finds were recovered, a small team from the Institute carried out an exploratory survey of the site in October 1992.

The purpose was to collect more information in preparation for the systematic excavation planned for the summer of 1993.

The team consisted of Haralambos Pennas, archaeologist, Nikos Tsouchlos, technical director and president of HIMA, Yannis Vichos, archaeologist and general secretary of HIMA, Phaidon Antonopoulos, diving supervisor, Christos Agouridis and Dimitris Kourkoumelis, HIMA archaeologists, and Yorgos Vosyniotis, chemist. The team was accompanied by Vaso Penna, archaeologist and member of HIMA, Adonis Kyrou, journalist and archaeological investigator, the skipper of the trechandiri Kalokyra, Dionysis Lekas, and lastly, Christina Penna.

After the Kalokyra was anchored over the site, four dives were made in and around the area of the wreck. A large lekane fragment with a wide flat rim (A21; Fig. 1) was discovered and brought to the surface. Its position was about 12 m ENE of mark 6 on the perimeter line and outside it, at a depth of 18 m. The ring base of a bowl or basin was also found at a depth of about 20 m, and ENE of the main site part of a skyphoid vase with a horizontal handle. The whole of the vase has survived, but the rest of it is still buried in the sand. A little further east was the neck of a probable 3rd c. BC Cypriot amphora. Part of a small conical cup with a disk foot (A22, Fig. 3a) was also found 15 cm WNW of mark 4 on the perimeter line. A small trial pit some 20 cm deep was dug by hand into the sand at this point. The sand was coarse and thin, but became more compact further down. A sherd of triangular shape from a medium sized vessel was found in the area.

Exploration continued to the east of the wreck site following the shoreline at depths of from 10 to 6 m with the intention of finding the triangular stone anchor with three holes discovered by Haralampos Kritzas in 1971. On this occasion, however, the search proved fruitless.

The divers also made test probes with a thin bronze tube in the bottom within the main area of the wreck to a depth of about 80 cm, and another hand-dug trial pit to a depth of 50 cm, which showed that the sand stratum was deep.

With a view to organising the excavation scheduled for the following summer (1993), the members of the team went by road to the beach at Iria to study the feasibility of setting up a land base for the expedition.

The possibility of anchoring and mooring the Kalokyra in the small artificial harbour at Iria was also investigated.

In the afternoon the Kalokyra sailed for Spetses with the two finds that had been recovered, accompanied by the archaeologists in the team. The finds were delivered to the Spetses Museum for care and conservation by the team of HIMA technicians led by the conservator from the 1st Ephorate of Byzantine Archaeology, Theophano Saramandi.

II. THE POTTERY

Yannos G. Lolos

The fragments A21 and A22 recovered during the 1992 survey were found on the south side of the main concentration of pottery, one of them within the delimited area and the other outside it. A provisional examination and dating of the two sherds show that they cannot be connected with the Cypriot shipwreck. Like other pottery from the survey carried out in the previous year (Pennas, Vichos and Lolos 1995, 8), these two fragments form part of the large body of pottery, chiefly from later periods, that is visible in different places on the seabed around Point Iria and which must represent the remains of other wrecks or fortuitous jetsam from passing vessels.

A21 (Fig. 1)

Part of the rim and wall of a lekane with a broad rim (Fig. 1). Pres. h. about 10 cm; estimated diam. of rim 40 cm; w. of rim 3.8 cm; max. th. of rim 1.6 cm. Fine, light brown clay. Strongly everted lip of triangular section with a flat top. There is a groove on the inside at the junction of the rim and the wall. Below the rim is a row of oblique shallow incisions with an average length of 1.5 cm. There is also a horizontal incised line on the inside 1.6 cm below the top the rim.

Lekane A21 can be safely dated to a broad Classical-Hellenistic horizon. Its general form may be compared to varieties of lekanes belonging to the late 5th and the 4th c. BC from major sites like the Athens Agora (cf. Sparkes & Talcott 1970, 364-365, nos. 1819, 1834-1837, pls. 85-87). Parallels from the Peloponnese include a handleless lekane from a late 5th c. BC well at Corinth (Pease 1937, 299, 300, no. 188, fig. 32: 188, and here, fig. 4), and another from a Hellenistic tomb (ca. 200 BC), excavated by the Honorary Ephor of Antiquities G. Papathanasopoulos at the site of Tsopani Rachi near Tragana in West Messenia (at present on display in Case 9 of the Pylos Museum).

A22 (Figs. 2a, 2b)

Part of a shallow conical cup with a disk foot (Figs. 2a, 2b). H. 1.9, diam. base 3.1 cm, fine clay, with red surfaces and grey core.

The complete profile is preserved from rim to base. The shape, which is slightly asymmetrical, has a general similarity to the widely diffused type of Mycenaean handleless conical cup (Furumark 1941, fig. 15, shape 204). The disk foot, however, and the type of clay rule out a Late Mycenaean date, and it must belong to the post-Mycenaean period.

During 1992-93 conservation work and the study of the Cypriot and Mycenaean pottery recovered from the Iria wreck during the October 1991 survey continued.

It should be mentioned here that the stirrup jar A8 (Pennas, Vichos and Lolos 1995, 9-10, figs. 4, 8a) is very probably of Cretan origin, and this will hopefully be confirmed by the forthcoming

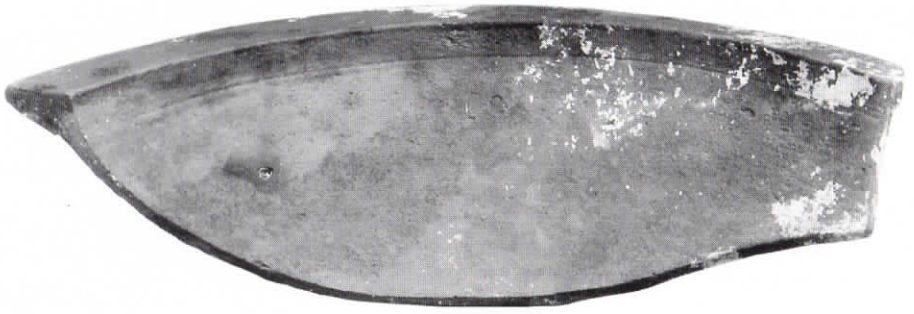

Fig. 1. The lekane A21 from the Point Iria wreck site. (Photo: N. Tsouchlos)

petrographic analysis of the clay. Recent petrographic analyses of the clay of tall coarse-ware stirrup jars from different sites on the Greek mainland and the Aegean by Dr Peter Day and his colleagues, in conjunction with the results of other earlier studies, have shown that Crete was one of the principal sources, if not the principal one, of these vases during the Late Mycenaean period. Stirrup jars (called chlareis in the Linear B texts) of different sizes and varieties, were the usual containers used for transporting oil, both plain and perfumed, in the long-distance Cypromycenaean trade. This is clear from their wide circulation in the Eastern and Central Mediterranean in the period between 1400 and 1200 BC, as well as from their presence in the cargo of two other well-known Late Mycenaean wrecks at Akrotirion (Ulu Burun) and Cape Gelidonia on the south coast of Asia Minor.

The on-going study of the pottery recovered during the 1991 survey further establishes the Aegean character of the two large undecorated transport vessels in the wreck cargo, the partly preserved two-handled jars A3 and A6:1 (Pennas 1992, 41, fig. 3; Pennas, Vichos and Lolos 1995, 9, figs. 1, 8c), which appear to be made of the same clay. Apart from their presence among the pottery from the Iria wreck, this type of jar with an oval body and two horizontal cylindrical handles on the shoulder also occurs among the material from Chamber Tomb II in the Mycenaean cemetery at Prosymna in the Argolid (Blegen 1937, fig. 430).

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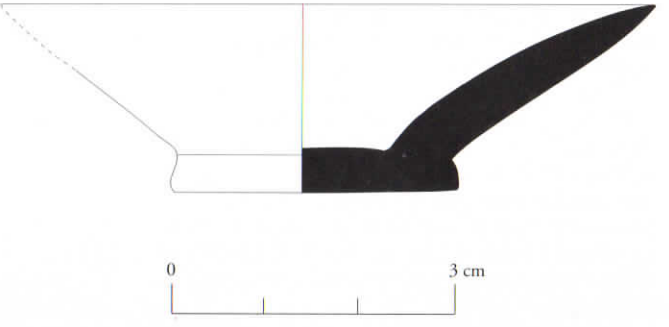
Fig. 2a.
Cup A22 from the Point Iria wreck site.
(Photo: N. Tsouchlos)

Fig. 2b.
Section of cup A22..
(Profile: A. Mari)



POINT IRIA WRECK (1993)

I. EXCAVATION AND RESULTS

Haralambos Pennas

Yannis Vichos

The first full excavation season at Point Iria, after the exploratory survey in 1990 (Pennas 1990: see bibliography on p. 31) and the two preliminary seabed surveys in 1991 and 1992 (Pennas, Vichos & Lolos 1995, 1996: see bibliography on p. 31), lasted from 2 July until 11 September 1993.

The main HIMA team consisted of the excavation director, Haralambos Pennas, the assistant director Yannis Vichos, the technical director Nikos Tsouchlos, the diving master Phaidon Antonopoulos, Yannos Lolos in charge of the pottery, and the archaeologists Dimitris Kourkoumelis, Stella Demesticha, David Conlin, Thanos Aronis-Webb, Roxani Margariti, Christos Agouridis, Elina Stamatatou, Yiorgos Valvis, Alexandra Mari, Haralambia Kenti and Dimitra Mytilinaiou. The technical staff included the architects Vassilis Koniordos, Yannis Baltsavias and Marianna Teske, the mechanical engineer Stavros Vosyniotis, the chemist Yiorgos Vosyniotis, the physicist Jason Lykourezos-Koriolano, the archaeological conservators Anita Moraïtou and Theofano Saramandi and the technicians and divers Petros Vakondios, Panos Pantazis, Nikos Miliadis, Edward Moore and Ileana Antonopoulou. The photography and photographic plotting were carried out by the American professional photographer Kyle Jachney and Nikos Tsouchlos.

The rest of the excavation personnel consisted of Thanasis Siafakas, skipper of the diving boat Siomos (provided by Kostas Nizamis of the Greek Diving Centre), Dionysis Lekas, skipper of the Kalokyra (provided by Adonis Kyrou) and a cook.

Between 2 and 15 July technicians, members of the HIMA team under the direction of Nikos Tsouchlos, Yannis Baltsavias and Petros Vakondios transported and assembled the land installations for the expedition base camp on an empty piece of reclaimed land on the edge of the sea in the settlement of Paralia Irion. The camp consisted of tents, two caravans, a commercial container (supplied by Nikos Koutsourakis, kitchen, showers washbasins, toilets and a water and electricity supply system (Fig. 1).

Meanwhile a succession of trips were made to fetch equipment and material from Athens and the HIMA storeroom at Ermioni, and a compressor for filling the diving cylinders with air was installed.

Over the next few days the diving boat Siomos arrived, the HIMA floating platform was towed into place and anchored over the site of the wreck, close to the tip of Point Iria, with mooring lines to the rocks on the shore (Fig. 2).

On Friday 16 July the topographical and archaeological work began. The following tasks were accomplished during the 1993 season:

- The re-establishment of the perimeter line around the wreck on the 1991 marks.

Under Koniordos's supervision the ropes delimiting the perimeter of the main cargo concentration were repositioned along with those dividing the perimeter into three separate sectors (SI, SII and SIII: see the plans on pp. 8-13).

- A sea bottom search, marking, photography, video recording and plotting of the finds visible inside and outside the perimeter.

The seabed was examined inside and outside the perimeter area to a distance of 150 m ENE, about 60 m NNW, and 10 m NNE (the shallowest zone) and NNW (the deepest part).

The area inside the main zone and immediately around it yielded some fragments of pottery, chiefly of later periods. Among the more interesting of the finds belonging to the cargo of the Cypro-Mycenaean ship were the upper part of a stirrup jar (A28, Fig. 11), which came from a

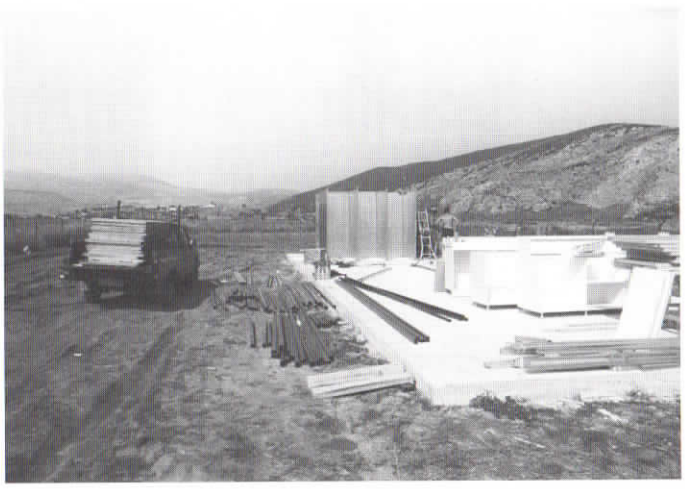


Fig. 1. *Constructing the base camp set up at Paralia Irion for the expedition. (Photo: N. Tsouchlos)*

Fig. 2. *The diving boat Siomos and the HIMA raft anchored over the wreck site. (Photo: N. Tsouchlos)*

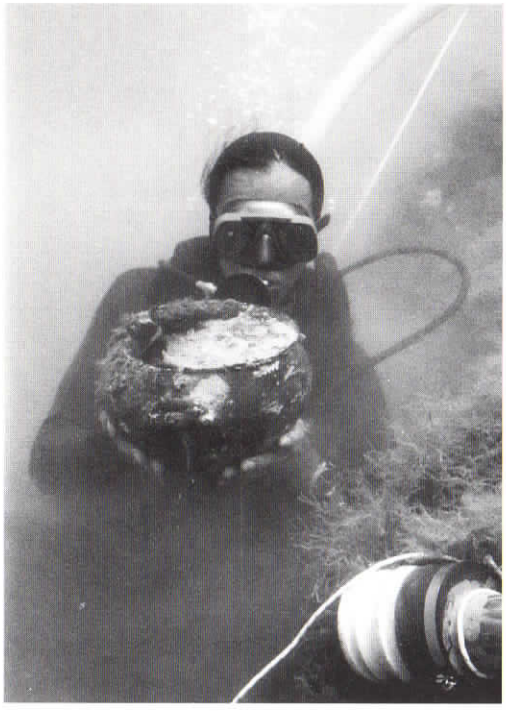


Fig. 3.
Thanos Aronis-Webb inspecting the deep-bowl krater A36 just after it was freed from the sandy bottom. (Photo: K. Jachney)

- A general survey of the perimeter zone and excavation area using a metal detector (Fig. 5).

An extensive and thorough search of the bottom with a metal detector produced only modern objects.

- The opening of two exploratory trenches in the perimeter zone.

Before starting the main excavation two trial trenches were opened. The first (T.T.1), 2 x 2 m, was in the lower central part of sector SI and covered most of the sandy area there (see plans, pp. 8-13). It produced not one significant find although it reached a depth of 1.20 m below the original seabed surface. The excavators noticed that a little below the surface there was a layer of dark mud, apparently due to old silting by the river Selas, which up until 30 years ago ran into the sea at Paralia Irion. The second trial trench (T.T.2) in the NE part was trapezoidal in plan (see plans, pp. 8-13). This area featured many concretions with small sandy patches between. This trench was richer in finds and many groups of finds were found which chiefly included small and large pot fragments, most of them from the third Cypriot pithos A7 (groups A33, A34, A49). Find A37 was also found to the NE, close to the perimeter zone, and when cleaned it proved to be a complete stirrup jar with only the spout missing,

Fig. 4.
The stone anchor with one hole (Ω2) from the tip of Point Iria at the spot where it was found. (Photo: K. Jachney)

little below sector SIII, part of the Mycenaean deep bowl A26 and, in particular, the complete Mycenaean deep-bowl krater A36 (Fig. 3), which was found some 50 m south of the perimeter zone. Some stones were also found, probably from a ship's ballast.

Among the many fragments of mainly later artefacts (Figs. 12, 13) that were photographed and plotted, especially important was the rediscovery of the stone anchor with three holes that was first located by Haralambos Kritzas in 1974. The anchor was found NNE of and just outside the perimeter zone at a depth of 12.50 m (see Figs. 1 and 3a on pp. 18, 19). It was found by Thanos Aronis-Webb, who also spotted another stone anchor (Ω2), with one hole (Fig. 4), close to the end of the Point (see Figs. 2, 3b, pp. 18,19).

Fig. 5.
Surveying the bottom in the area of the wreck with a metal detector. (Photo: K. Jachney)

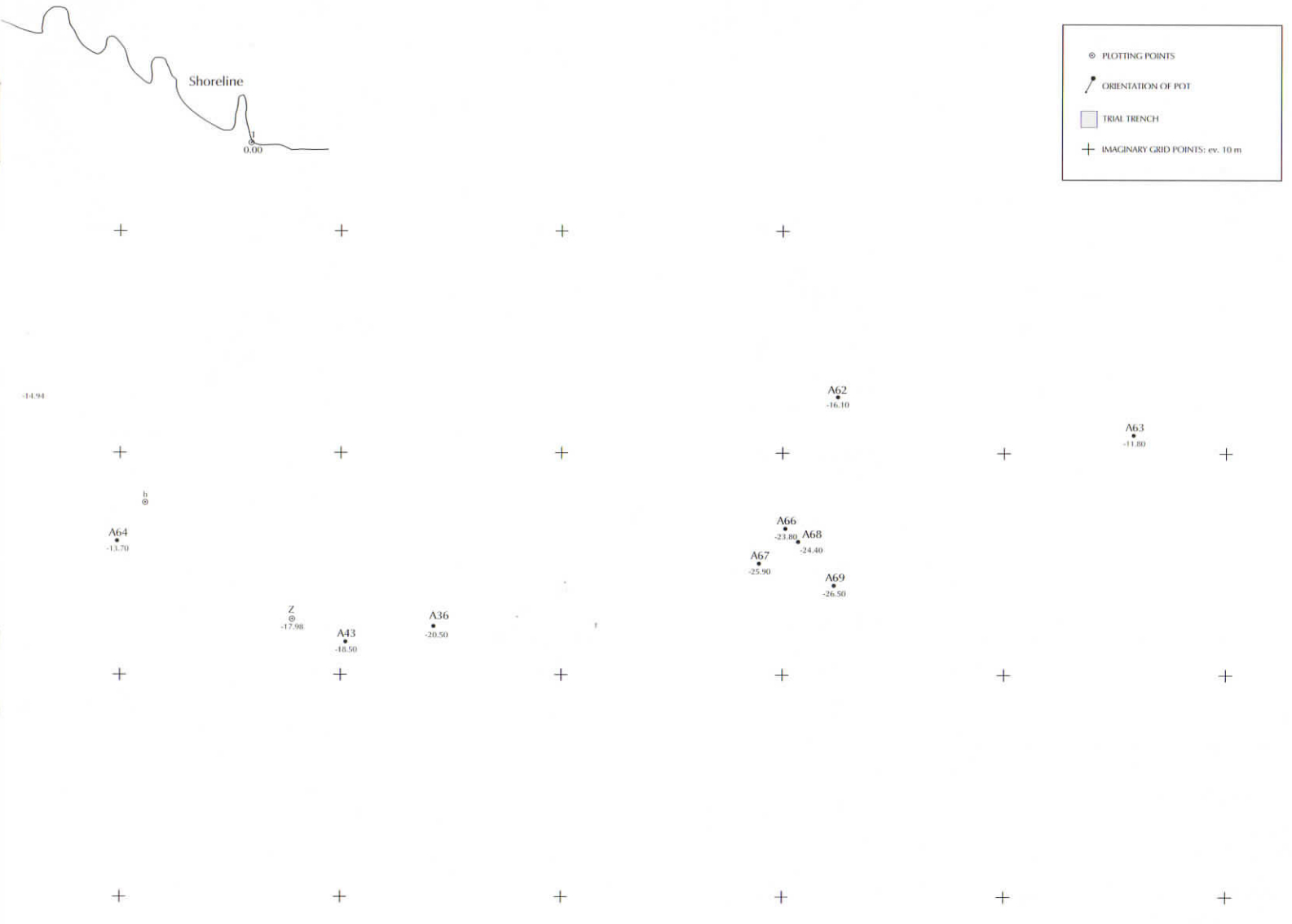
H.I.M.A. **1993**

POINT IRIA WRECK

DIRECTOR: HARALAMBOS PENNAS
ASSISTANT DIRECTOR: YANNIS VICHOS

TOPOGRAPHIC PLAN OF THE PERIMETER ZONE AND SURROUNDING AREA WITH THE POSITIONS OF THE FINDS FROM THE 1993 EXCAVATION PERIOD

SURVEYORS: VASSO KYRIAKOPOULOU
VASSILIS KONIORDOS


Shoreline
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PLOTTING POINTS
ORIENTATION OF POT
TRIAL TRENCH
IMAGINARY GRID POINTS: ev. 10 m
-14.94
A62
-16.10
A63
-11.80
b
A64
-13.70
A66
-23.80
A68
-24.40
A67
-25.90
A69
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A36
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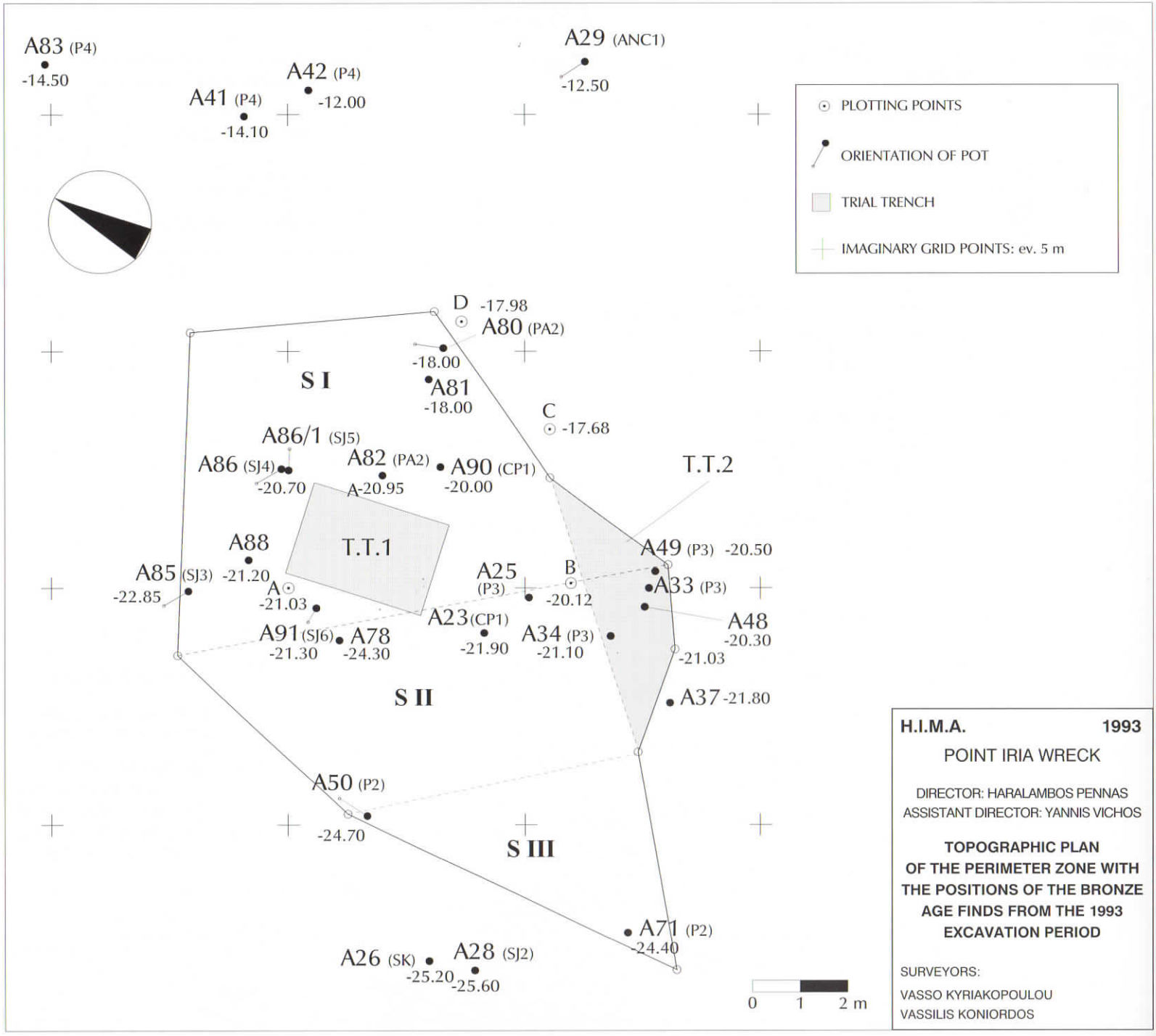


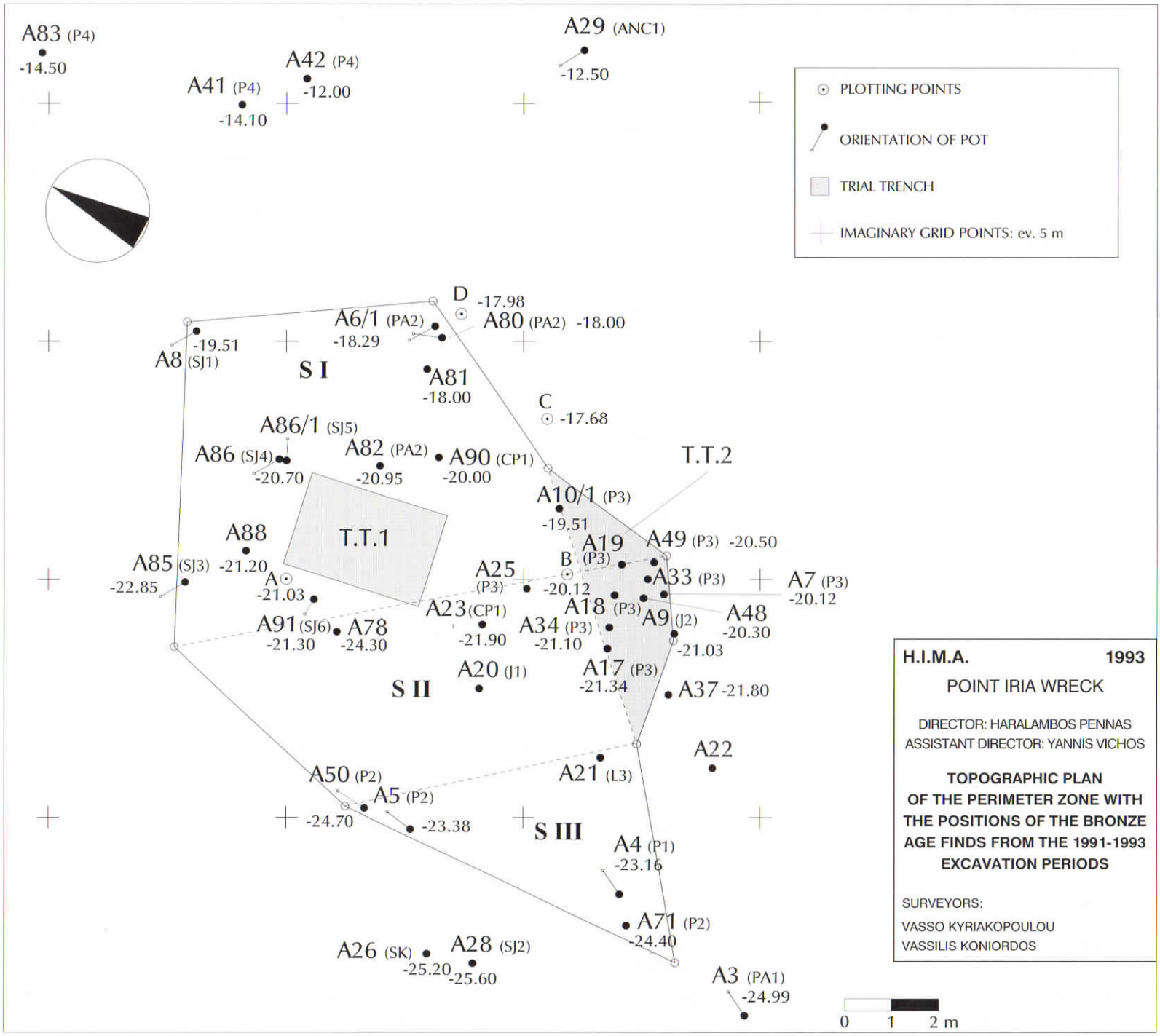
H.I.M.A. **1993**

POINT IRIA WRECK

DIRECTOR: HARALAMBOS PENNAS
ASSISTANT DIRECTOR: YANNIS VICHOS

TOPOGRAPHIC PLAN OF THE PERIMETER ZONE WITH THE POSITIONS OF THE BRONZE AGE FINDS FROM THE 1993 EXCAVATION PERIOD

SURVEYORS:
VASSO KYRIAKOPOULOU
VASSILIS KONIORDOS


A83 (P4)
-14.50
A42 (P4)
-12.00
A41 (P4)
-14.10
A29 (ANC1)
-12.50
PLOTTING POINTS
ORIENTATION OF POT
TRIAL TRENCH
IMAGINARY GRID POINTS: ev. 5 m
D -17.98
A6/1 (PA2)
-18.29
A80 (PA2) -18.00
A8 (SJ1)
-19.51
S I
A81
-18.00
C -17.68
A86/1 (SJ5)
A86 (SJ4)
-20.70
A82 (PA2)
-20.95
A90 (CP1)
-20.00
T.T.2
A10/1 (P3)
-19.51
A88
T.T.1
A19
A49 (P3) -20.50
A85 (SJ3) -21.20
-22.85
A
-21.03
B (P3)
A25 (P3)
-20.12
A33 (P3)
A7 (P3)
-20.12
A23 (CP1)
-21.90
A18 (P3)
A9 (J2)
A48
-20.30
A91 (SJ6)
-21.30
A78
-24.30
A34 (P3)
-21.10
-21.03
A20 (J1)
S II
A17 (P3)
-21.34
A37 -21.80
A22
A21 (L3)
A50 (P2)
A5 (P2)
-24.70
-23.38
S III
A4 (P1)
-23.16
A71 (P2)
-24.40
A26 (SK)
-25.20
A28 (SJ2)
-25.60
A3 (PA1)
-24.99
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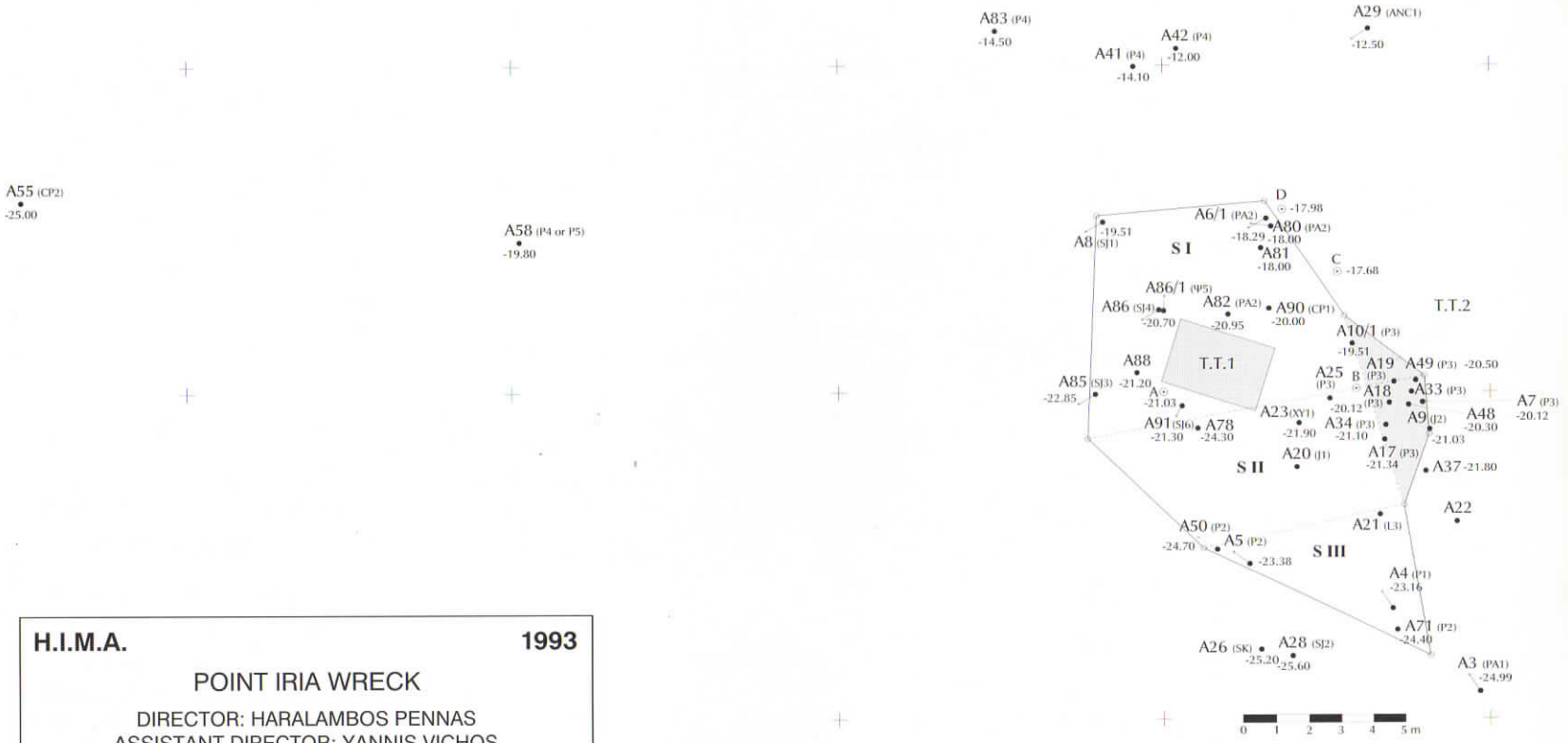
H.I.M.A. 1993
POINT IRIA WRECK
DIRECTOR: HARALAMBOS PENNAS
ASSISTANT DIRECTOR: YANNIS VICHOS
TOPOGRAPHIC PLAN OF THE PERIMETER ZONE WITH THE POSITIONS OF THE BRONZE AGE FINDS FROM THE 1991-1993 EXCAVATION PERIODS
SURVEYORS:
VASSO KYRIAKOPOULOU
VASSILIS KONIORDOS



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POINT IRIA WRECK

DIRECTOR: HARALAMBOS PENNAS
ASSISTANT DIRECTOR: YANNIS VICHOS

TOPOGRAPHIC PLAN OF THE PERIMETER ZONE AND SURROUNDING AREA WITH THE POSITIONS OF THE LATE BRONZE AGE FINDS FROM THE 1991-1993 EXCAVATION PERIODS

SURVEYORS: VASSO KYRIAKOPOULOU
VASSILIS KONIORDOS


Shoreline
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A66 (H2)
-23.80
A67
-25.90
Z
-17.98
A36 (KR)
-20.50
A14 (L2)
-12.80

Fig. 6. *View of the excavation zone inside the perimeter (Photo: K. Jachney)*

- The excavation of two of the three sectors (SII, SIII) into which the perimeter zone was divided.

Having now formed a fairly accurate picture of the state of the site and the scatter of archaeological finds both on the seabed and below it, the excavation team proceed to a full excavation of the two lower sectors (SII and SIII). In SII, where there were smaller patches of sand and more concretions, a number of finds were located, including part of a Mycenaean cooking pot (A23) and fragments of a Cypriot pithos (A25, A34), which also probably belong to the third Cypriot pithos (A7).

In SIII two pithos fragments were found (A50, A71), which probably come from the second Cypriot pithos A5.

Having nearly completed the excavation of the two lower sectors, the excavators continued with the excavation of the upper sector (SI), initially in the part around the first trial trench (T.T.1). There they had a pleasant surprise. Underneath a large section of a pointed-base amphora, which had evidently rolled there almost a millennium after the sinking of the Cypro-Mycenaean ship, was a stirrup jar covered with concreted marine organisms, sand and stones (A85, Figs. 7 ,8). Two more complete stirrup jars (lacking only their spouts) were uncovered a little to the north, one of which (A86/1, Fig. 9) has painted decoration on the body and false spout. The discovery of these three finds a short distance apart encouraged the team to concentrate their efforts less in the sandy patches in SI and more in the places where there were concretions, using hammers and chisels to break them up and an air lift to remove the sand.

In this way numerous groups of finds and important single ones were uncovered (the complete stirrup jars A85 and A91, fragments A80 and A82 of the second jar A6/1, as well as the second half of the cooking pot A23/A90). The dark layer of mud also appeared here just below the surface of the seabed.

- A topographic and photographic scale plan.

All the finds on the surface or just below the sand were photographed in situ and plotted from fixed points by triangulation (axes x, y) before being raised. Their depths (z) were measured with an accurate depth finder. Unfortunately a succession of breakdowns in the SHARPS system made it impossible to use it for plotting the positions of the finds. Much of the work and many of the finds were recorded on video by Vassilis Koniordos.

- The raising, recording, initial conservation measures and transport of the finds.

Raising the finds presented no particular problem except for the concretions, which had first to be carefully detached, and the stirrup jars, which required great care when being raised because of their bulk. The pithos fragments posed more of a problem due to the very fragile condition of their walls. The finds were temporarily stored in the commercial container during the excavation

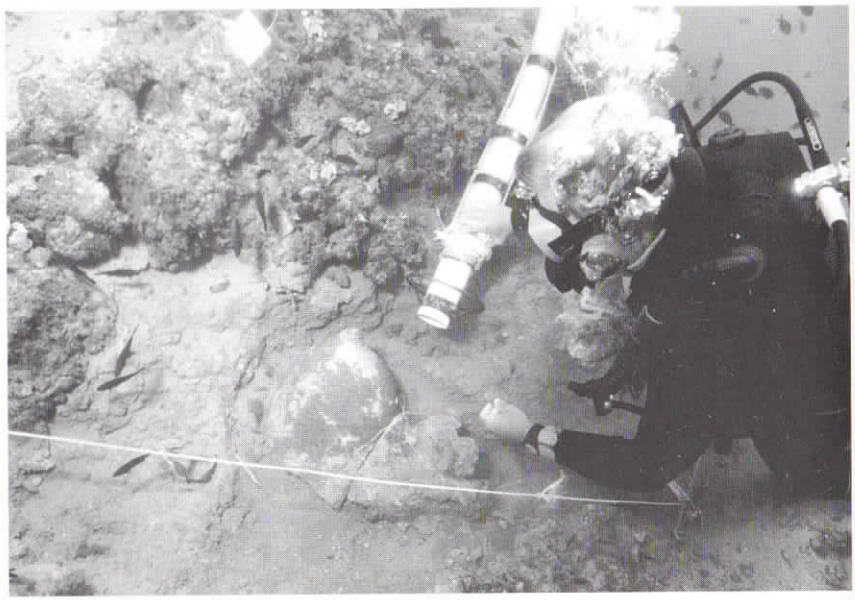

Fig. 7. *Excavating the pointed-base amphora A84 and the stirrup jar A85. (Photo: K. Jachney)*

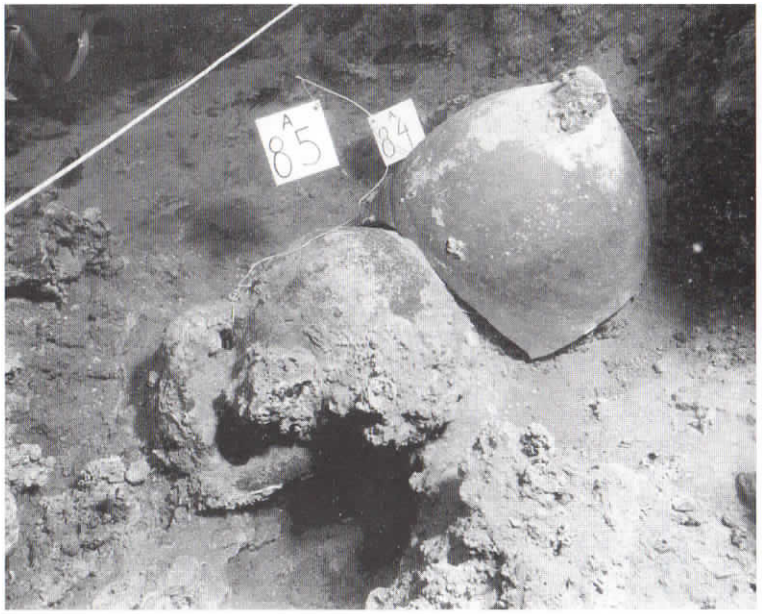

Fig. 8. *After removing the lower part of the pointed-base amphora A84, the complete concreted stirrup jar A85 appeared. (Photo: K. Jachney)*

Fig. 9. *The painted stirrup jar A86/1 after its discovery. (Photo: K. Jachney)*

Fig. 10. *The neck of jar A6/1-A80-A82 where it was found in situ. (Photo: K. Jachney)*

Fig. 11. *The upper preserved part of stirrup jar A28. (Photo: K. Jachney)*

Fig. 12. *Three upper fragments of amphoras from later periods found in and around the main excavation zone. (Photo: N. Tsouchlos)*

Fig. 13. *Three roof tiles from a later period found outside the main excavation zone and perhaps coming from a ship's cabin or else a part of the cargo (Photo: N. Tsouchlos)*

in vessels filled with seawater. The larger finds were placed in a big tank in a mixture of 1/3 sea and 2/3 fresh water. Anita Moraïtou and Theofano Saramandi took the first steps in their desalination and cleaning. Yannos Lolos, Yannis Vichos and Stella Demesticha inventoried all the finds, entering the details directly into the computer, while Nikos Tsouchlos and Kyle Jachney photographed them.

All in all 71 groups of finds, chiefly pots and sherds, and including two stone anchors (one of them within the wreck site), ships' ballast stones and small pieces of wood.

First results of the 1993 excavation period:

1. It was established that main concentration of the cargo of the Cypro-Mycenaean wreck lies within and closely around the delimited area, and that the cargo is all of the same period.

2. A considerable number of complete or nearly complete pots were recovered and many sherds, adding to the known quantity of pottery in the cargo and broadening the range of types.

3. The excavation, which reached a depth of between 0.90 and 1.20 m, produced useful evidence for stratigraphy of the site and the conditions in which the concretions were formed, and the scatter of the cargo gave indications of the conditions under which the ship sank. A study and comparison of all the evidence has already started begun and the first results will be published when the excavation is completed.

4. The site of the wreck and the sea around the tip of Point Iria are a classic example of a danger zone for ships because of the prevailing winds and currents. This is borne out by the pottery of later periods, including that found on the main wreck site, coming from later shipwrecks or chance jettisoning. Interesting finds include two sherds, at least, dating to the Early Bronze Age and the trapezoidal anchor with a single hole (Ω2) from the tip of the Point (see Fig. 4, in p. 7). Among later finds are a lead ring (Fig. 4, p. 20) and four tiles (?roof tiles, Fig. 13); the latter may have come from the cabin roof of a late Roman or early Byzantine ship.

All the finds were transported on the Kalokyra to the HIMA conservation laboratory in the Spetses Museum, which houses the rest of the finds from the Point Iria wreck, and the work of desalinating them was begun immediately.

In the course of the excavation the HIMA base was visited by the Hon. Andrew Frazer, Lady Charlotte Frazer, Prince and Princess Lubkowitsh and Mr and Mrs Mancroft. They were escorted by Harry Tzalas, former president of HIMA.

The site was also visited by the French journalist Catherine Boitard from the French News Agency and the Greek-French journalist Angelique Coucounis of the periodical Archeologia. Radio Suisse-Romande and Radio Canada also sent reports on the progress and significance of the excavation. Peter Nomikos the shipowner accompanied by Adonis Kyrou also came.

Other visitors included Professors Vasos Karageorghis and Spyros Iakovides, who inspected the finds and discussed their date and provenance with the excavators, and Andreas David with his family. Mr David, Professor Karageorghis and the directors of the excavation visited the Spetses Museum to see the finds already recovered from the wreck and promised

support for their projected future exhibition there. The last days of the excavation coincided with the 5th International Symposium on Ship Construction in Antiquity which took place at Nafplio. Many of the excavation team attended the Symposium, either as participants with papers or simply listening. On the last day of the Symposium the excavation director Haralambos Pennas gave a brief report on the results of the 1993 excavation season at Point Iria. The paper was dedicated to Haralambos Kritzas and Nikos Tsouchlos. At the finish of the Symposium proceedings the archaeologists Patrice Pomey and Honor Frost visited the HIMA camp at Iria, examined the finds and then made a dive on the wreck accompanied by Vassilis Koniordos and Phaidon Antonopoulos. They were impressed by the finds, the importance of the wreck and the manner in which the excavation was being conducted, and they expressed their pleasure at the opportunity to dive on the site. The site was also visited by the British archaeologist Toby Parker.

The expenses of the 1993 Point Iria excavation campaign were covered by a generous grant from the **A. G. Leventis Foundation** and other smaller ones. Important contributions in terms of services, means and equipment were made by Nikos Koutsourakis of Koutsourakis-Eleftheriadis Ltd, Kostas Nizamis of the Greek Diving Centre, Adonis Kyrou, the insurance company Nasco Karaoglan Ltd, the Greek Ministry of Health and the Hydrofoil Joint Service (Ceres). We also thank the Harbour Police for their assistance, the Commune of Paralia Irion, Vasilis Priovolos and members of the HIMA excavation team who volunteered their services for the campaign.

In particular we would like to thank Professor **Vasos Karageorghis**, Honorary Member of HIMA, for his decisive support and his collaboration, and Messrs **Konstantinos Leventis** and **Andreas David** for their enthusuastic, practical support.

In order to stress the special importance of this excavation of a wreck in the Argolic Gulf with a cargo from Cyprus, HIMA decided to invite a Cypriot diving archaeologist to take part in every excavation campaign and to pay all the expenses. In 1993 the visiting Cypriot archaeologist was Haralambia Kenti.

POINT IRIA WRECK (1993)

II. THE STONE ANCHORS

Yannis Vichos

The 1993 excavation season at Point Iria produced, in addition to the Late Helladic pottery, two stone anchors of the most representative types: with one and with three holes. The study of the anchors as well as all the material is currently in hand. Here we will describe their basic features without attempting an exhaustive study of them with parallels and provenance; these will be the subject of a wider study in a future publication.

A29 (Figs 1 and 3a)

A29 was found on a rocky bottom with small sandy patches at a depth of 12.5 m, some 6 m east of the main concentration of the ship's cargo (see pp. 8-13).

Description

Stone slab anchor of piriform shape with a single hole at the top and two in the base. Made of friable conglomerate.

Basic measurements:

Max. pres. h. 48.3; max. pres. w. 40.5; max. pres. th. 9; av. diam. holes 2.2 cm; weight 25 kg.

Comment

The upper hole was to take for the ship's anchor line and the other two for the wooden "teeth". It belongs to Honor Frost's "composite type"[1], used, according to her, for anchoring on sandy bottoms. Its position just above the main cargo concentration might connect it with the Cypro-Mycenaean ship in spite of its relatively small size. It cannot be certainly dated by its type and shape, since such anchors were in use from the Bronze Age to the Middle Ages.[2]

The biconical section of all three holes shows that they were drilled from both sides (with a wooden drill).[3]

Ω2 (Fig. 3b)

The second anchor was found at a depth of 20 m, some 20 m from the tip of Point Iria and 100 m from the main concentration of finds. It lay on a sandy ledge with the top resting against a large rock (Fig. 4, p. 7). Nearby and around the anchor were many sherds, one of which may be Early Helladic in date. The anchor and pottery, as well as their location in a place that was dangerous for navigation, suggest that there may have been one or more wrecks at the tip of Point Iria.

Description

A large stone anchor with an irregular trapezoidal shape and one hole at the top. It has a general pyramidal appearance, widening from the top to the base. It has many old breaks on all the sides and a rectangular cut in an upper corner.

Basic measurements:

Max. pres. h. 48.5; max. pres. w. 38; max. pres. th. 14.5; max. diam. hole 5 cm; weight 42 kg.

Comment

The single hole at the top was to take the ship's anchor line. In Honor Frost's typology it belongs to the weight-anchor type, which held the ship by its weight alone, and according to Frost was used for anchoring on a rocky bottom.[4] The biconical section of the hole shows that it was drilled from both sides, like those on A29. Its general appearance suggests a prehistoric chronology, but the irregular trapezoidal form does not correspond to any typical shape of that period. This fact together with the cut on one of the upper corners suggest its use as an anchor was secondary. Its first function may have been as a weight in a prehistoric oil press.[5]

Dr G. Konstantinou, director of the Cyprus Geological Survey, who had the kindness to examine the anchor, identified the rock as pyroxenite and did not rule out the possibility that it came from Cyprus.[6]

Preliminary Conclusions

- Both anchors are made of a friable rock of poor quality (at least for the manufacture of anchors). This means either that they were made out of need on some beach during the course of a voyage, using whatever material was to hand, or

that they were anchors used by small local coastal craft. Their size and weight point to small vessels, since no large seagoing ship could have been securely anchored by either of them.

- The anchors cannot be dated because they do not belong to any of the characteristic classes. The stone they are made of gives no indication of their provenance, since it is very common.

- In spite of these problems we intend to gather all the evidence possible from a careful examination o them, especially for A29, which has more probabilities of being associated with the Cypro-Mycenaean ship.

We thank Honor Frost, who examined the anchors during her visit in 1993 to the site of the excavation and Dr G. Konstantinou for his information about the stone anchor Ω2.

Fig. 2. *The anchor expert Honor Frost and Professor Patrice Pomey examining anchor Ω2 during their visit to Iria in the summer of 1993. (Photo: N. Tsouchlos)*

Fig. 1.
Stone anchor A29.
It was found above the main concentration of the cargo of the wreck.
(Photo: N. Tsouchlos)

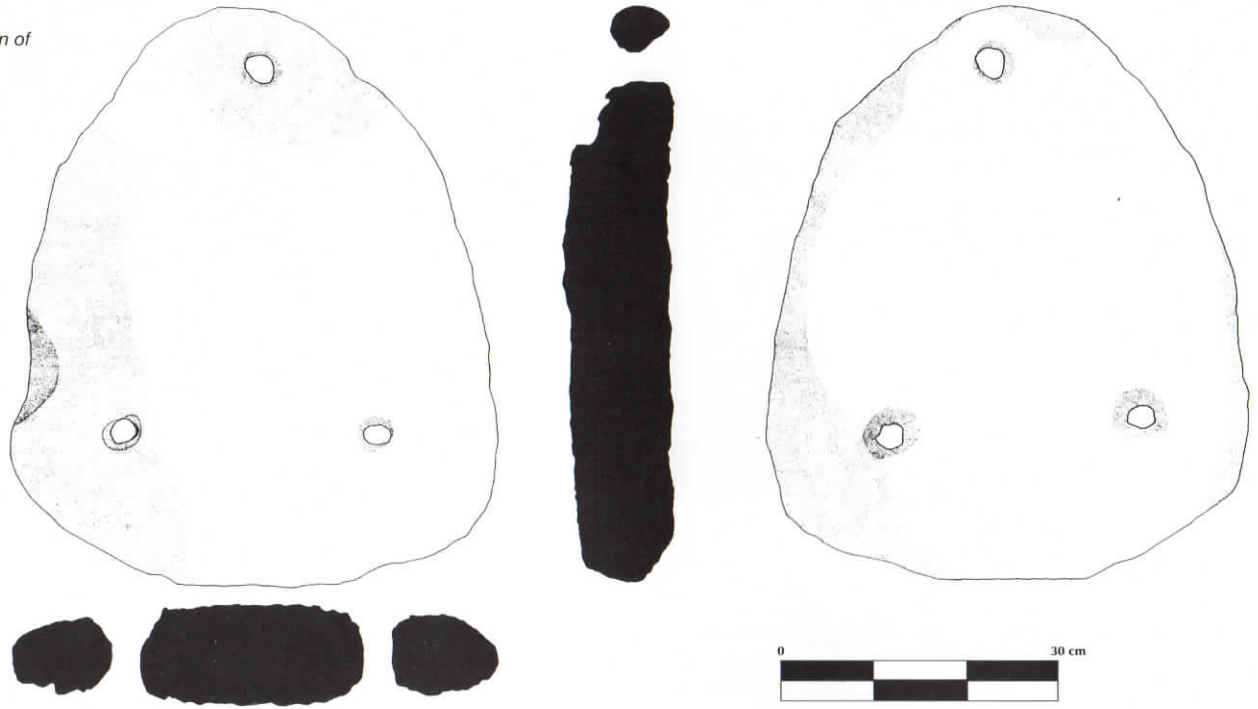

Fig. 3a.
Sides and section of anchor A29.

Profiles: Alexandra Mari

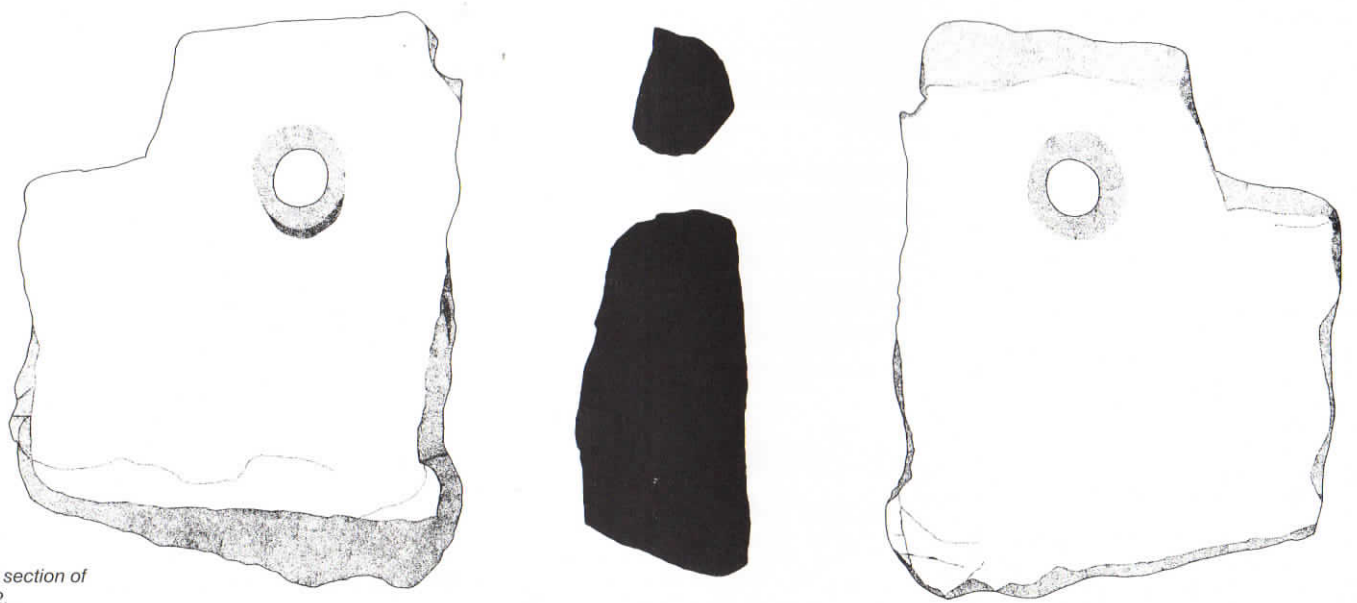

Fig. 3b.
Sides and section of anchor Ω2.

The lead ring A1
(Fig. 4)

Among the pottery of later periods found in the vicinity of the wreck was one metal object. This is a lead ring with an average diameter of 10.8, an estimated height of 12.9 and a max. th. of 1.8 cm. Originally it had a flattened perforated projection for a rope lashing. Numbers of such rings have been found in different sizes and weights, chiefly in the Western Mediterranean.[7] They usually occur as isolated finds at anchorage or fishing places, but they have also been found in the context of ancient wrecks.[8] Their function is uncertain, but they were probably used to free fouled anchors. The presence of decorative impressions of such rings stamped on the stocks of ancient anchors as apotropaic signs strengthens this view.[9]

The Iria ring is a small example of these, and was thus probably an attachment for freeing small anchors or fishing lines. The loss of the projection with the hole for attaching a line means that it was broken on the last occasion when it was used.

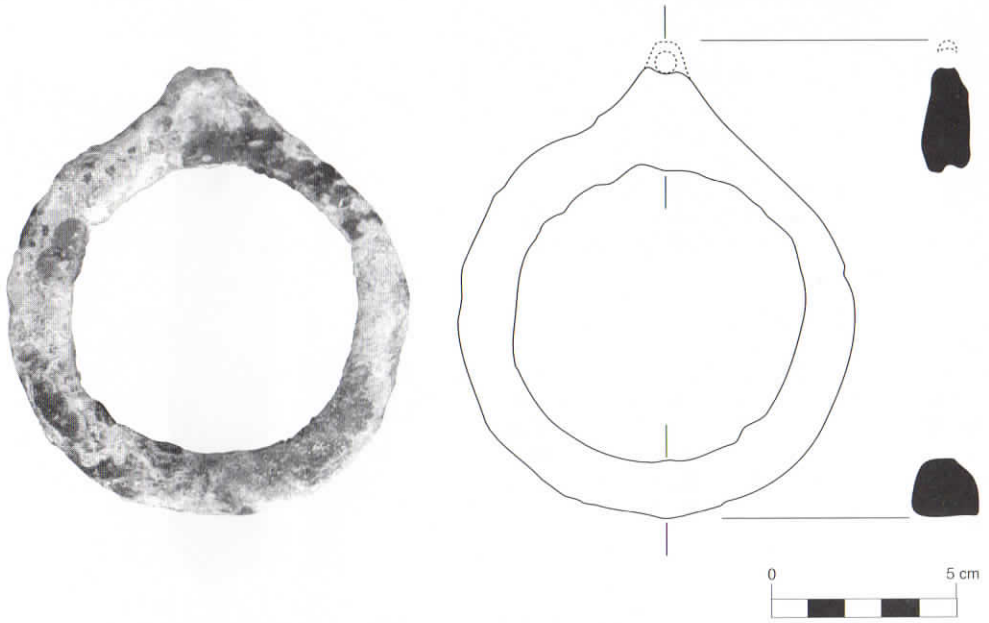

Fig. 4.
Lead ring A1 (before cleaning) found on the bottom off Point Iria.
(photo and profile: Yannis Vichos)

NOTES

1. For types of stone anchors, see Frost 1963, 7-10.

2. For the use of stone anchors in the Middle Ages, see Frost 1970; Grossmann & Kingsley 1966, 49-55.

3. For methods of making holes in stone anchors and for their shapes, see Frost 1970, 388.

4. Frost 1963, 7-10.

5. Hadjisavvas 1992.

6. Dr Konstantinou, director of the Cyprus Geological Survey writes in his report: "Petrologically the example is pyroxenite. Mineralogically, it consists almost entirely of pyroxenes chiefly clino-pyroxene. Both the ortho-pyroxene and clino-pyroxene have partially altered to chlorite or fine-grain calcite, the result of typical hydrothermal action at a temperature of around 250° C.

Rocks of these kinds occur in the Troodos mountains, the district of Dasos Lemesou and in lesser amounts at Akamas. Small quantities of pebbles up to 30 cm in diameter are found in the rivers cutting through the Troodos. Still smaller amounts occur in the district of Dasos Lemesou, on the southern beaches. I personally see nothing special in this rock that would justify looking for it on the southern beaches of Cyprus to use for anchors, when these beaches are full of other rocks that would serve the purpose much better. In any case the size of the pebbles is for the most part too small for making anchors".

7. Gianfrotta & Pomey 1980, 286-288.

8. A large lead ring (diam. 28 cm) with two holes was found on the Porticello wreck in Italy (415-385 BC): Eismann & Ridgeway, 23-24, figs. 2.23, 2.24.

A smaller lead ring was also found on the Hellenistic wreck at Serçe Limani: Pulak & Townsend 1987, 40-41, fig. 9.

9. Haldane 1985, 555-557.

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POINT IRIA WRECK (1993)
III. THE POTTERY

Yannos G. Lolos

Progress in the study of the pottery from the 1993 excavation of the Point Iria wreck establishes the special importance of the finds in relation to all the assemblages of late 13th c. BC pottery hitherto known from land and sea sites in the Aegean.

Preliminary conclusions based on the study currently under way by the writer of the finds so far recovered and on the petrographic analyses of the clay carried out by Dr Peter Day at Sheffield University indicate that the pottery from the wreck appears to comprise three discrete classes: one Cypriot (Late Cypriot IIC/IIIA), one Cretan (Late Minoan IIIB 2) and one Mycenaean (Late Helladic IIIB 2).

Among the Late Cypriot IIC/IIIA fragments from the main concentration of finds the following deserve special attention:

A41

The flat base of a Cypriot pithos. After cleaning and conservation, the probability that it belongs either to pithos A5 will be examined (see Pennas, Vichos and Lolos 1993, fig. 5δ; Karageorghis 1993, fig. 5:a) or perhaps to a fourth pithos in addition to the first three known (A4, A5 and A7).

A34 (Fig. 2)

Bottom and lower part of a large Cypriot pithos (diam. flat base 26 cm).

This probably belongs to pithos A7 (see Pennas, Vichos & Lolos 1995, 12, fig. 8d; Karageorghis 1993, fig. 5:c). The finding in 1993 of this fragment and others in the same area leads one to hope that it may be possible to completely restore this pithos in the Spetses Museum laboratory. A recent break in the sherd shows clearly the high content of mica in the clay.

A49 (Fig. 1)

Shoulder fragment of a Cypriot pithos, perhaps A7.

Fig. 1. *Part of a Cypriot pithos (A49) with a multiple relief band. (Photo: N. Tsouchlos)*

It preserves part of the relief band at the junction of the neck and shoulder and a large part of the typical composite relief band on the shoulder. This band with its three shallow ("finger") grooves has a carefully made appearance, perhaps because the fragment is so well preserved.

The clay is relatively well levigated, hard and well fired and produces a metallic clink when struck. The same applies to other pithos sherds from the wreck. They were apparently fired at a very high temperature. in general the extremely good firing of the Cypriot pithoi from Iria contrasts with that of many Mycenaean examples in the Argolid.

A58 (Fig. 3)

Large section of shoulder and belly of a Cypriot pithos. On the belly just below the greatest diameter is a horizontal multiple relief band, very roughly executed and slightly wavy. Probable traces of another similar band can be detected higher up in the region of the shoulder.
A58 must come from a fourth pithos with a badly made relief band on the belly and perhaps a second on the shoulder. The other pithoi, A4, A5 and probably A7 had only one band on the shoulder, like most of the Cypriot pithoi in the cargo of the Ulu Burun wreck (Pulak 1995, 45-47). Furthermore, the clay of A58 is quite different from that of the other three pithoi and contains many grog inclusions.

There is a good parallel for the body fragment of A58 from the site of Maa-Palaiokastro in Cyprus (Karageorghis & Demas 1988, pl. LXII:460).

A9

Flat base of a jug of well-known Late Cypriot IIC/IIIA type. It is the second example of a Cypriot jug of this type to have come from the Iria wreck. For the shape, cf. jug A20: Pennas, Vichos & Lolos 1995, figs. 5, 9a; Karageorghis 1993, fig. 5:d; Lolos 1995, 77, fig. 17.

Among the Aegean pottery from the Iria wreck is a particularly interesting group of tall coarse-ware stirrup jars, which seem to have formed an

Fig. 2. *Lower section of Cypriot pithos A34. (Photo: N. Tsouchlos)*

Fig. 3. *Part of Cypriot pithos A58, before cleaning. (Photo: N. Tsouchlos)*

important part of the ship's cargo of pottery. During the 1993 excavation season five stirrup jars were recovered: A28, A85, A86, A86/1 and A91 (Figs. 4, 5). If we add A8, found in the 1991 excavation (Pennas, Vichos & Lolos 1995, figs. 4, 8a; Lolos 1995, figs. 19, 20) and two examples found under the sand on the last day of the 1993 excavation and raised the following year, the number of stirrup jars from the wreck totals eight. This is an important group of "maritime" stirrup jars from the Mediterranean area and approximately equal in number to the earlier (by some 100 years) group from Ulu Burun in Lycia.

What is most interesting is that these stirrup jars have been shown to be Cretan products, according to the first results of the petrographic analysis made by Peter Day. The clay, in fact, appears to have come from Central Crete. Useful comparative evidence may be expected to emerge from the examination of the clay of the stirrup jars from the Ulu Burun and Cape Gelidonya wrecks being carried out by Richard Jones and Peter Day, and the definitive study and interpretation of the Point Iria examples will be greatly advanced by the publication of the joint work by Haskell et al. (in press).

Of the five stirrup jars recovered during the 1993 season, four are complete except for the vertical tubular spout and belong to Furumark's Type 164 (1941, fig. 9).

About half of stirrup jar A28 (Figs. 4, 5), made of coarse yellow-ochre clay with many black and brown inclusions, is preserved (max. pres. h. 25.5, h. of false spout 6, diam. disk 7.5 cm), but the spout is entire (h. 9 cm). There are exact parallels for the particular shape of the spout and its relation to the false spout from Mycenae (e.g. Haskell 1981, pl. 43c) and elsewhere.

Stirrup jar A86/1 (Figs. 4, 5; also Lolos, Pennas & Vichos 1995, figs. 2, 5, and Vichos & Lolos 1994, fig. 12) is slightly shorter and wider than the others, with an ovoid-conical body approaching the spherical. This stirrup jar also preserves traces of painted decoration, consisting of a spiral on the disk of the false spout and two bands just below the shoulder, while the others, in their present state of preservation, appear to be plain, although some may originally have been decorated. The simple

Photos:
N. Tsouchlos

Stirrup jar A85 (before cleaning).

Stirrup jar A86 (before cleaning).

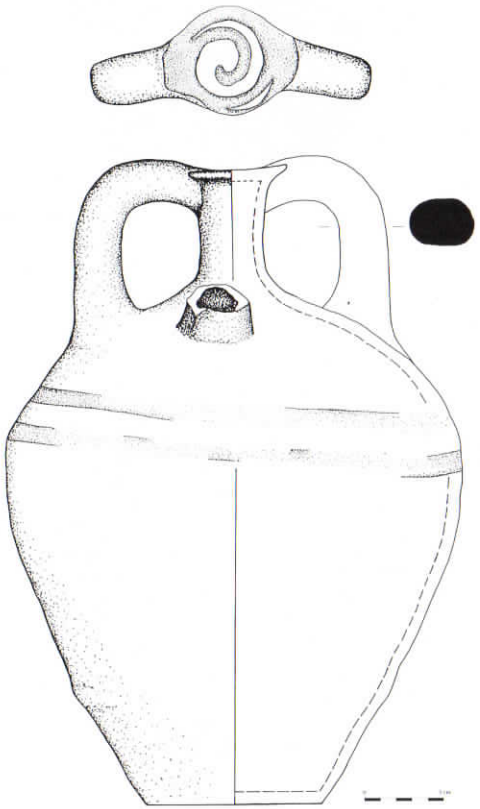
Stirrup jar A91 (before cleaning).

The upper part of stirrup jar A28.

The painted stirrup jar A86/1.
Left, one side of the stirrup jar with the two painted bands on the shoulder. Right, the painted spiral on the disk of the false spout (from above).

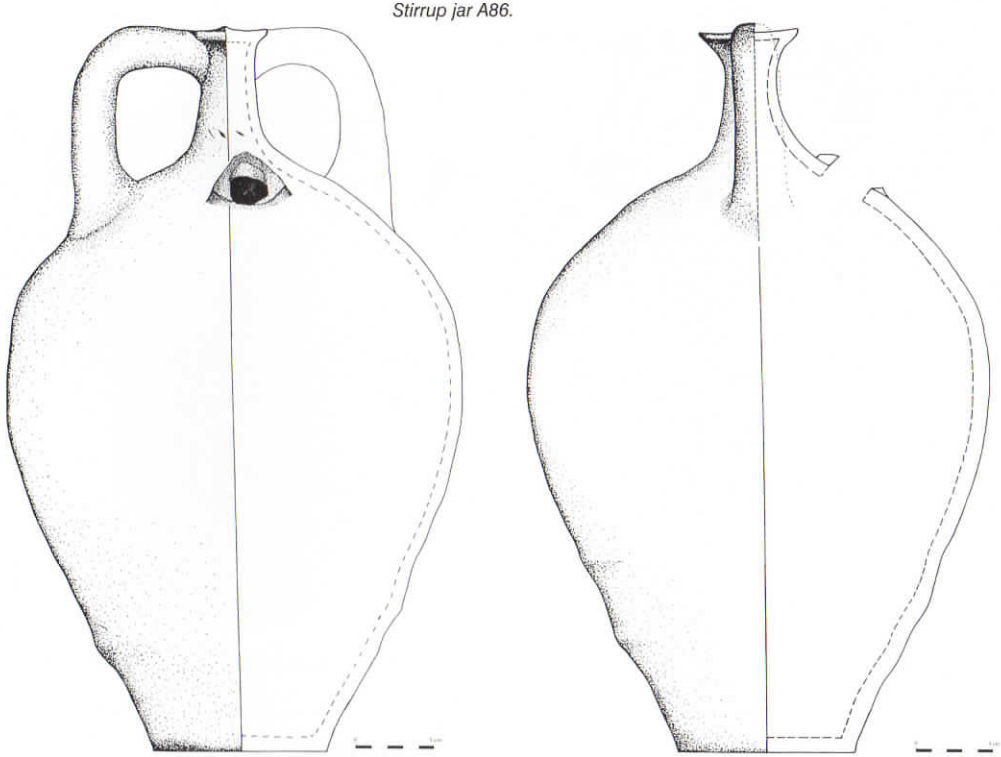
Fig. 4. Five of the eight LM IIIB 2 stirrup jars from the Point Iria wreck.

Fig. 5.
Profiles of three LM IIIB 2 stirrup jars from the Point Iria wreck.
(Profiles: Stella Demesticha)

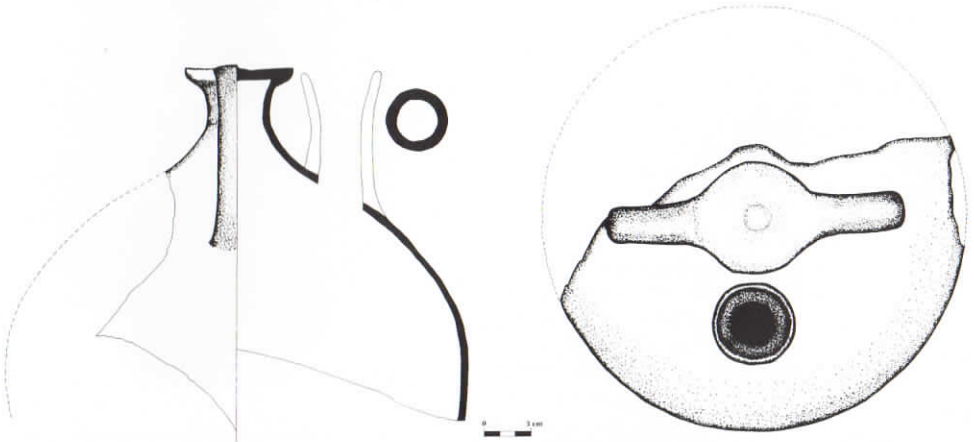


Stirrup jar A86/1.

Stirrup jar A86.



Stirrup jar A28.



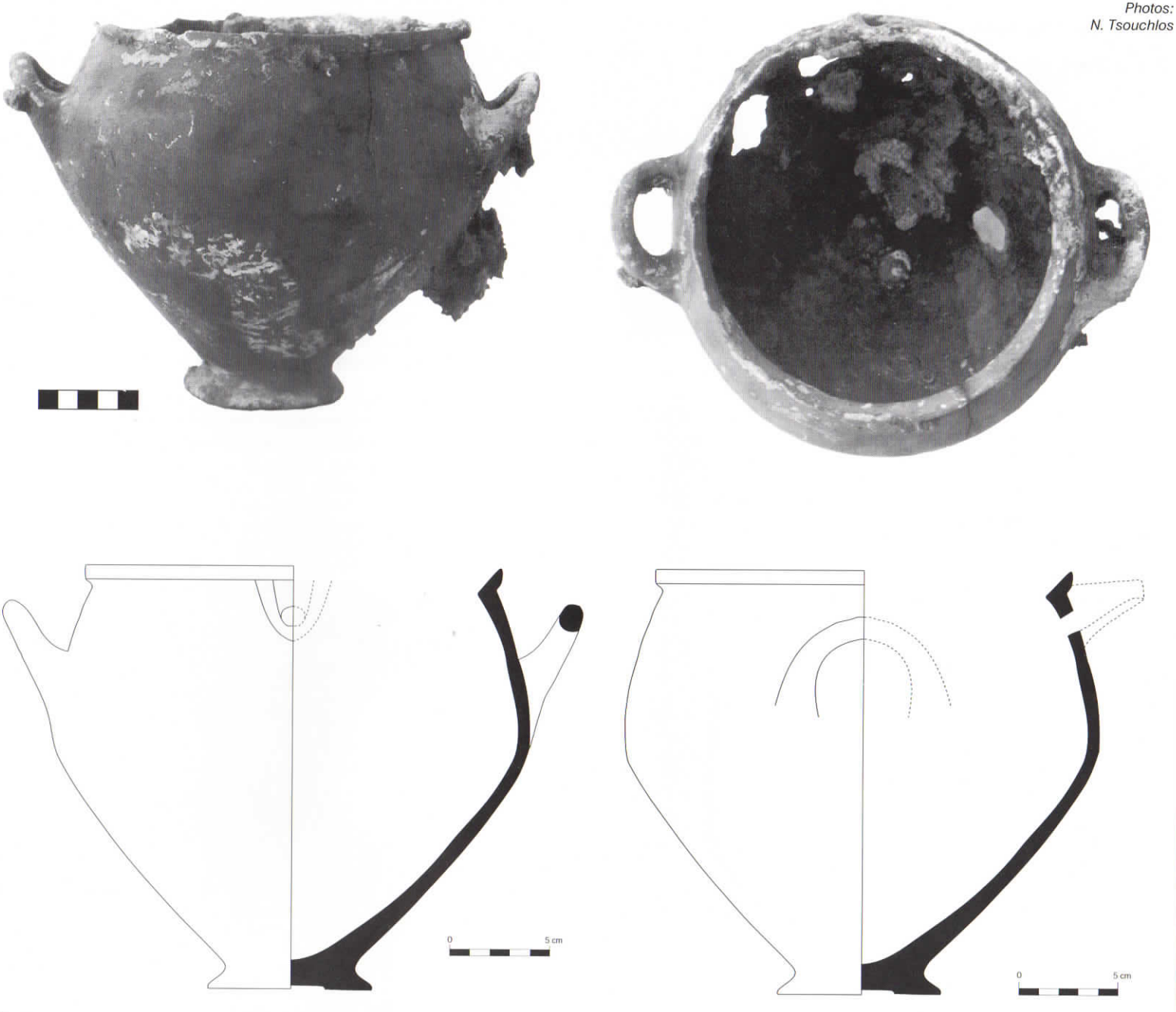


Fig. 6.
The spouted deep-bowl krater A36: photos and profiles.

Profiles: Stella Demesticha

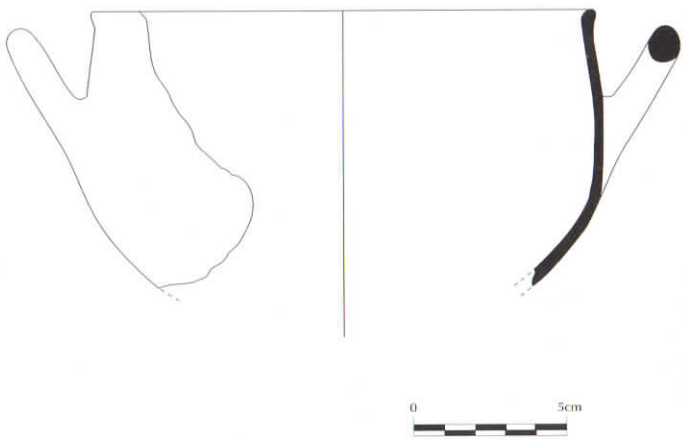


Fig. 7. *Part of a Mycenaean (LH IIIB) deep bowl (A26). (Photo: Y. Lolos; Profile: Alexandra Mari)*

spiral was a usual decorative motif on the disk of the false spout of Late Helladic/Late Minoan III stirrup jars, large and small (cf. Blegen & Rawson 1966, figs. 393, 394). The spiral on amphora A86/1 has a close parallel in the spiral on the disk of a tall stirrup jar of commercial type from a grave in the extensive cemetery of Armenoi at Rethymno (unpublished, in the Rethymno Museum, inv. no. 2336, and mentioned here by kind permission of Dr Yannis Tzedakis). The clay of this amphora also, in fact, shows great similarity with that of the Point Iria stirrup jars.

Two Mycenaean jars, A3 and A6/1 (LH IIIB 2), have already been identified among the material from the Iria wreck (Pennas, Vichos & Lolos 1993, 18. fig.2, 5b; 1995, 14) and for the jar type, Blegen 1937, fig. 430 from Prosymna in Argoiida). The 1993 excavation produced three sherds (A80, A80/1 and A82) which certainly belong to jar A6/1. Fragment A82 is the neck (Fig. 8, and fragment A80 is a large section of the body, from the shoulder with the horizontal cylindrical handle to the base. The two jars appear to have been made from the same clay. They both have thin walls for their size and are therefore fragile.

The spouted deep-bowl krater A36 (Fig. 6; Vichos & Lolos 1994, fig. 14), the first example of Mycenaean fine ware from Point Iria, must have been part of the ship's cargo, although it was found some distance to

Fig. 8. *Neck of jar A82. Together with the group of finds A80 and A6/1, it is the second jar from the wreck. (Photo: N. Tsouchlos).*

the south of the main concentration of finds. The deep-bowl krater, made of fine clay, is complete except for small pieces of the body and rim and the spout on the side (h. 21, diam. base 9.5, diam. rim 20.5 cm).

It has a slightly raised base and two cylindrical handles. It is fine and very well made and originally may have had painted decoration. It is clearly the product of a flourishing pottery workshop in some large metropolitan centre (in the Argolid?) and belongs to the latest Late Helladic IIIB horizon.

The original existence of a horizontal spout on one side of the deep-bowl krater just below the rim is attested by the irregular circular hole and a small part of the side of the spout. The latter feature makes the krater a relatively rare example among the body of published LH IIIB deep-bowl kraters.

In its general shape A36 is closely related to the deep-bowl kraters of Furumark's Types 281 and 282 (1941, figs. 13, 14; 1992 pl. 155), which have ring-bases, but it has closer parallels in painted deep-bowl kraters (though without spouts) from Prosymna in the Argolid (Blegen 1937, fig. 124:231) and Enkomi in Cyprus (Catling & Karageorghis 1960, 114, no. 15, pl. 27c; Furumark 1992, pl. 166:303.1). The Enkomi krater is considered an Aegean import and represents Furumark's Type 303 (1941, fig. 18). According to Catling, Karageorghis and Åsrtröm it may well be a Late Minoan IIIB Cretan vase. In addition to the spout, the Iria krater also differs from the Prosymna and Enkomi examples in the profile of the lower part of the body, which is straighter, like that of Furumark's Type 305 (1941, fig. 18; 1992, pl. 167:305.8, h. 18 cm, of LH IIIB date). For the shape of the body, see also Blegen & Rawson 1966, 397, Shape 60, figs. 385:593, 386:593 (from the Palace of Nestor); Godart & Tzedakis 1992, 57, pl. LIX:1, from a tomb at Souda in Crete; and a deep-bowl krater, larger than ours, in the Herakleion Museum (Room X, Case 141, No. 8472).

More exact parallels to A36, however, are the LH IIIB 2-IIIC spouted deep-bowl kraters from three different sites: the Lower Acropolis at Tiryns (Kilian 1988, 108, fig. 8), the North Slope of the Acropolis at Athens (Mountjoy 1995, 45-46, fig.

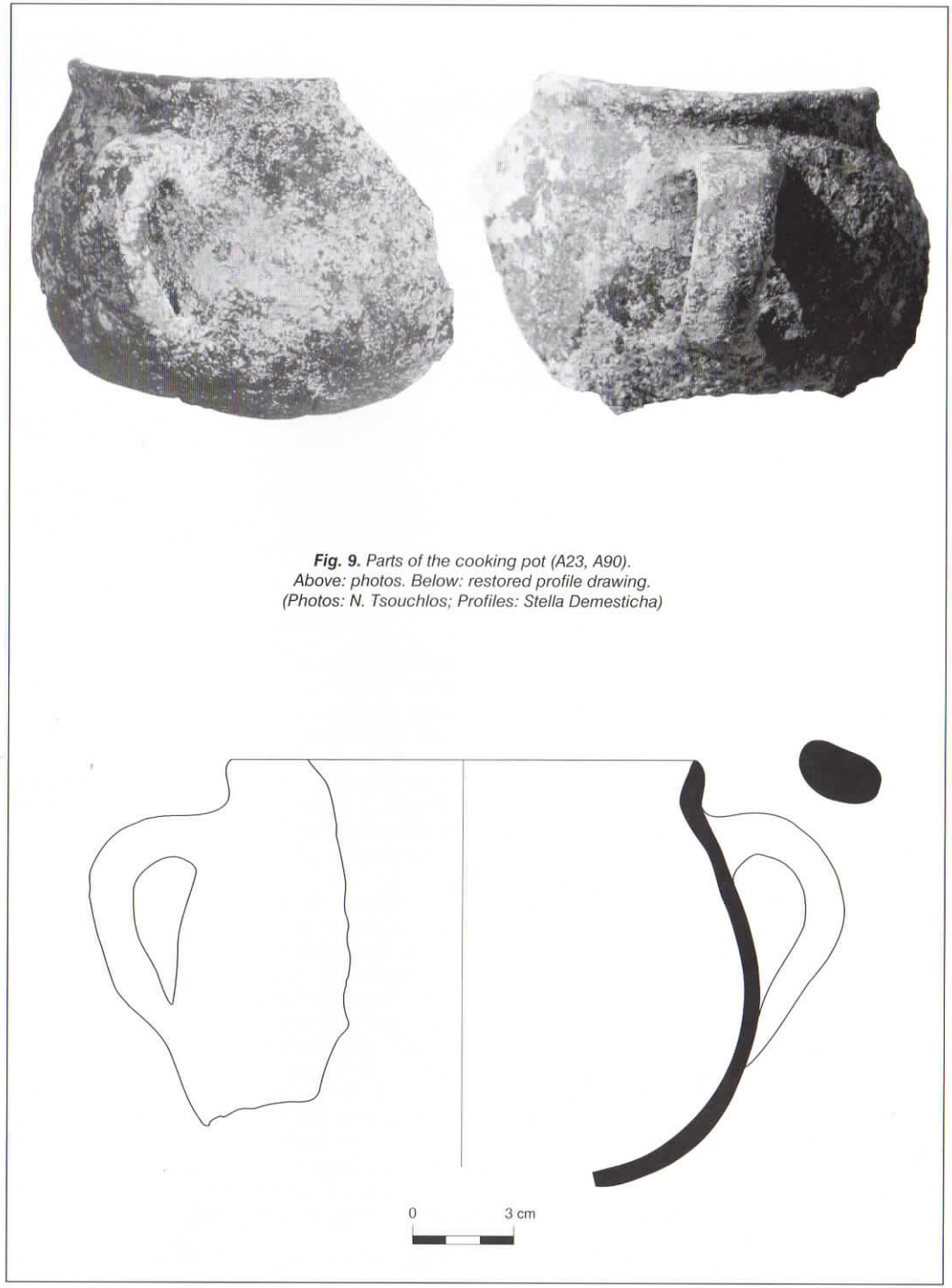


Fig. 9. *Parts of the cooking pot (A23, A90). Above: photos. Below: restored profile drawing. (Photos: N. Tsouchlos; Profiles: Stella Demesticha)*

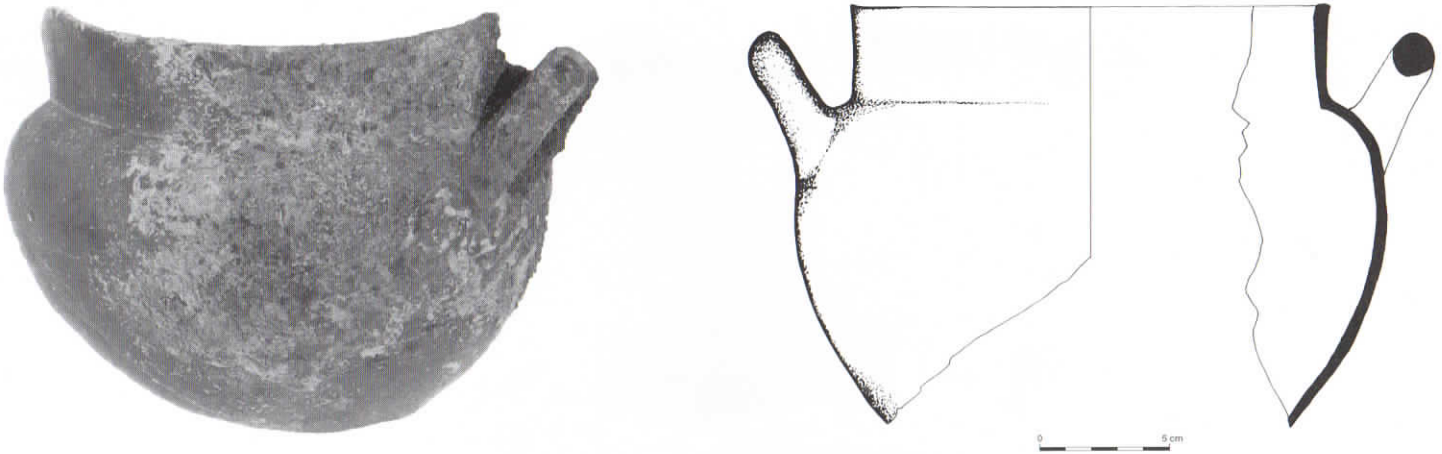


Fig. 10. *Section of a wide two-handled bowl (A55) from the wreck site.*
(Photo: Y. Lolos; Profile: Stella Demesticha)

60) and Mistros on Euboia (Sapouna Sakellaraki 1995, 64: displayed on the middle shelf of Case 6 in the Chalkis Museum).

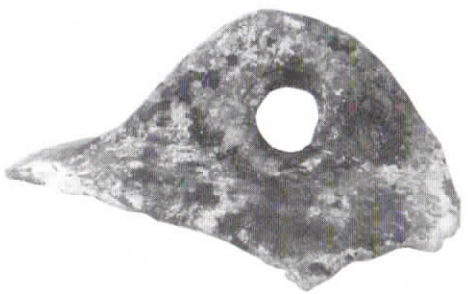
Fragment A26 (Fig. 7) is, after the deep-bowl krater A36, the second example of high quality Late Helladic fine ware to come from the wreck site. After the lumpy concretions on its surface were carefully cleaned off, it was seen to be part of the rim and wall of a deep bowl of fine clay with the one preserved horizontal cylindrical handle. Originally it also probably had painted decoration. For the shape generally, see Furumark 1941, Shape 284 (LH IIIB and LH IIIC 1; early) and Shape 285 (LH IIIC 1; late); Mountjoy 1986, fig. 143 (LH IIIB 1), 160-162 (LH IIIB 2), 189-193 (LH IIIC: early); Mountjoy 1993, 87 (206-207, LH IIIB), 91 (228), 95 (247-249, LH IIIC: early); also Ervin 1968, 271, pl. 93, fig. 25, and Jantzen et al. 1968, 373, fig. 6 (large deep bowl or krater from the important Late Mycenaean settlement of Iria).

Fragments A23 and A90 (Fig. 9), from the main concentration area of finds, and not yet mended, belong to a type of cooking pot with two sturdy vertical handles which should be classed with the group of LH IIIB 2 pots from the cargo. It has quite close parallels in small LH IIIB cooking pots, most of them tripod, with one of two stout vertical handles, like those from Rooms 60, 67, 68 in the Palace of Nestor in Western Messenia (Blegen & Rawson 1966, figs. 340-342). For Mycenaean cooking pots in general, see Furumark 1941, Shapes 314, 315, 316, 320.

The clay of the pot A23/A90 is moderately coarse, brown, with numerous black inclusions. As we know from archaeological surveys in the Argosaronic Gulf, surface sherds of coarse and semi-coarse LH IIIB pots of everyday use (tripod cauldrons and other utility vessels), made from clay of this type, abound at Late Mycenaean sites in the region, such as Kastelli Vourlia, east of Point Iria, Ayioi Anaryiroi on Spetses, Myti Kommeni on Dokos and Ayios Nikolaos-Bisti on Hydra (see representative examples in the Spetses Museum). We may say here that according to Peter Day's preliminary findings, the clay of sherd A23 probably comes from Aigina.

Fragment A55 (Fig. 10) is from a vessel which could well have belonged to the cargo of the wreck. It is a large section, nearly half, of a wide-mouthed, evidently utility vessel, with a vertical collar and a horizontal handle of oval section on the shoulder. The calculated diameter of the rim is 17.5-18 cm. We have not so far found any close parallels for it, but the shape may be

Fig. 11.
Fragment of a pot (A66) with a horizontal loop handle.
(Photo: N. Tsouchlos)



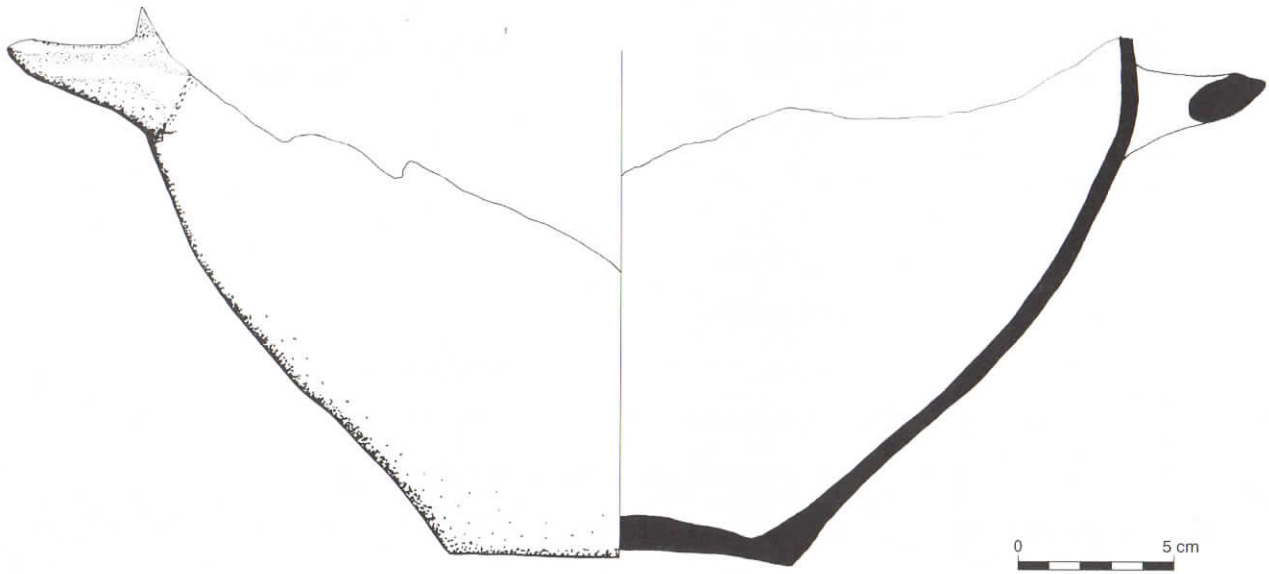


Fig. 12.

Large fragment of a pot (A62) with a horizontal loop handle. Above left: photo from below. Below: profile.

(Photo: N. Tsouchlos; Profile: Stella Demesticha)

compared with Furumark's LH IIIA1 Type 279 (1941, fig. 13).

Lastly, among the material recovered during the 1993 excavation were two fragments, A62 (Fig. 12) and A66 (Fig. 11), with horizontal loop handles and roughly made. They come from (handmade?) pots of very early appearance and their inclusion in the pottery of the Cypro-Mycenaean wreck appears doubtful.

Although the two handles recall certain types of handles on Late Cypriot vases, it seems more probable that A62 and A66 go back to pre-Mycenaean, possibly Early Helladic, times. Relevant to this is the fact that two sure Early Helladic sherds were recovered from the general area of the wreck: part of an amphora body with the characteristic broad vertical handle and part of the body of a large vessel with relief bands. If these sherds are not thought to be mere incidental jetsam from Early Helladic ships, it might in the future be possible with an extension of the survey to locate in the Strouthous (Point Iria) area the remains of a shipwreck dating to the period of the now well-attested Early Helladic thalassocracy in the Argosaronic Gulf and Myrtoon Sea.

General Comments

1. On the basis of the relevant finds from the 1993 excavation there is evidence for the original presence of five Late Cypriot IIC/IIIA pithoi in the cargo of the Point Iria wreck. These are the pithoi A4, A5, A7 (with the sherds that belong to it) and A58. A fifth example would have been the complete pithos discovered and photographed in the main area of the site by Nikos Tsouchlos in 1971 (*ΕΝΑΛΙΑ* II, 1990, vol. 1/2: cover picture; also Lolos 1995, fig. 18), but which has unfortunately been lost. The number of pithoi in the Point Iria wreck is comparatively respectable when one considers that the "royal cargo" of the Ulu Burun wreck, dating to around 1300 BC, included ten Cypriot pithoi of similar type, at least three of which were used as containers for transporting small Cypriot vases (Pulak 1995, 46-47).

2. As the excavation progresses, we find a notable increase in the number of Late Minoan IIIB 2 transport stirrup jars of Cretan origin. To the 1991 stirrup jar A8 can be added five more from the 1993 excavation (A28, S85, A86, A86/1, A91). The widespread use of stirrup jars as containers for transporting liquids, chiefly olive oil, in the 14th and 13th centuries BC is further attested by their presence in the cargoes of two other wrecks of the Late Mycenaean period on the south coast of Asia Minor (Ulu Burun and Cape Gelidonya). Their westward traffic has now been recognised at three places in the Central Mediterranean: Antigori in Sardinia, the island of Filicudi, north of Sicily, and a site near Agrigento in Sicily.

3. A welcome new element in the study of the wreck excavation is the finding of fine Mycenaean ware of the LH IIIB 2 phase: the deep-bowl krater A36 and the deep bowl A26. Even though none of their painted decoration has survived, they will certainly help considerably in the precise dating of the cargo. The spot where A36 was found will also give some idea of the extent of the scatter of the ship's cargo on the bottom, and this should form the basis for a future intensive search of the seabed in this area.

4. From the 1993 excavation of the Point Iria wreck the picture has emerged of a much larger cargo of pottery than was first apparent and with an extremely interesting composition. The size and variety of the cargo will undoubtedly prove to be both striking and impressive when once all the pottery is put on display in a suitable room in the Spetses Museum. Although the cargo appears, at least for the moment, to have consisted only of pottery, it is important evidence for the study of the process and content of the barter trade between Cyprus and the key centres of the Aegean at the critical turn of the 13th - 12th c. BC in the Eastern Mediterranean.

5. Lastly, the indications that have emerged of the possible existence of an earlier (Early Helladic II) wreck in the Point Iria area are of the greatest interest. This is a matter that calls for further investigation.

The Hellenic Institute of Marine Archaeology and contributors to the excavation, study and maintenance of the Cypro-Mycenaean wreck at Point Iria warmly thank the ***Institute for Aegean Prehistory*** *(INSTAP) and its director,* ***Malcolm Wiener****, personally for the generous financial backing given to the Iria excavation project. This support has contributed decisively to the progress and successful completion of the whole project. The publication of the present volume IV of the* ***ΕΝΑΛΙΑ Annual*** *has also been largely funded by* ***INSTAP*** *donations.*

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UNDERWATER SURVEY IN THE AVLEMONAS REGION OF EASTERN KYTHIRA (1993 SEASON)

Dimitris Kourkoumelis

"...for they did not use anchors at that time, but stones, as Apollonios also tells us..."
Scholiast of Pindar, Pythionikon 4, verse 341

In September 1993 an exploratory survey was carried out by a team from HIMA[1] in the area of sea around Avlemonas on the island of Kythira. The survey took place at the same time as and in collaboration with the land excavation conducted by Yannis Sakellarakis on the site of the Minoan Peak Sanctuary of Aï-Yioryi on Vouno, the first of its kind known outside of Crete.[2] The important finds from the excavation, including many bronze figurines, stone vases and abundant pottery it has showed that this place had a special importance for the Cretans and it has added a further dimension to the previously known Minoan settlement at Kastri.[3] During both the Minoan and historical periods Kythira was a place of strategic importance, and a brief glance at the nautical charts of the region shows how easy it would have been from there to control the north-south and especially the east-west sea routes. Thus the prospect of an extensive underwater survey in an area with such distinctive geographical features was appeared very attractive. It should also be pointed out that HIMA had been in the same area in 1980, when a team of members had opened up some trenches on the Lord Elgin's shipwreck of the "Mentor". For some of our team, therefore, this was a return to a site that was already familiar.

In accordance with the permit granted by the Ministry of Culture the boundaries of the area to be surveyed were, on the north, the headland of Souroumi on the east coast of Kythira, and on the south, Point Mothonaio, and they included the small islands of Dragonera and Antidragonera (Map 1). The whole of the area in which the survey was permitted was carefully examined, with interesting results which are detailed below. The seabed was explored to a depth of some 30 metres irrespective of the distance from the shore. A total of 52 hours were spent diving by the team.

Three areas were located where there was evidence for the existence of a wreck. Two of them were close to the east coast of the island and the third was opposite Antidragonera. Apart from these three sites, scattered piles of pottery were observed in many places, chiefly amphorae, belonging to many periods. In every case, however, the amounts were too small to suggest a possible wreck. They were probably the result of jettisoning, either by modern fishing boats, which frequently throw overboard the unwanted pieces of pots caught in their nets, or even by ancient merchant ships, for which a broken amphora was useless. Nor was there any consistency in the dates of the pot fragments: sherds of ancient Greek, Roman Byzantine and recent amphorae were found all together.

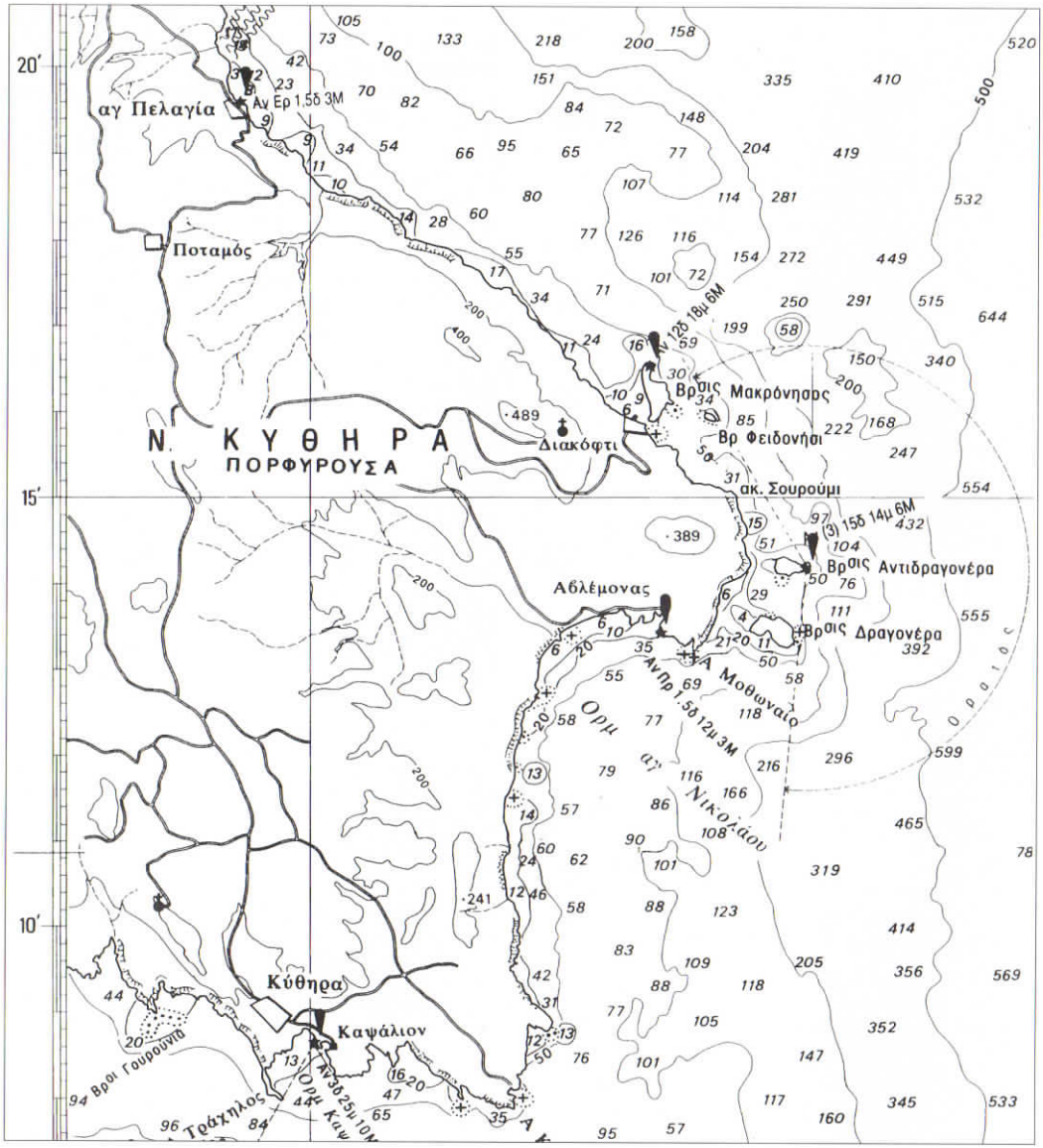
Fig. 1. *Finds from the wreck site at Alevrospilia. (Photo: N. Tsouchlos)*

At the first site, off the east coast of Kythira, known as Alevrospilia, one certain wreck was found, probably a small 19th c. merchant vessel. Numerous fragments of amphorae, bowls and glazed utility wares (Fig. 1) were found in shallow water (from 8.5 to 10 m) scattered over a large area. The place is well known to the local fishermen, for the pottery is visible from the surface. An extensive survey of the area would be interesting not only for a study of the pottery, but also because of the probability of finding parts of the ship, which might provide useful information about ship construction in that period.

The second site, which is of particular interest, lies to the north of the first at a place known locally as Tourkovrachos or Avlaki. It is in a small inlet largely sheltered from southerly winds, but inaccessible from the land because of the precipitous cliffs. Here anchors of different periods were found and a large stone anchor stock (Fig. 2). It was at a depth of 27.6 m, and is 1.25 m long with a greatest breadth of 0.21 m. Its is oblong with rounded ends and in the middle has a cutting for attaching it to the wooden shank. Stocks of this type date chiefly to the period from the 6th to the end of the 4th c. BC.[4] Apart from the anchors, however, no other evidence was found in the area for the existence of a wreck.

The third site where there were indications of ancient ships is on the north side of Antidragonera (Fig. 3). This is a small uninhabited islet 760 m long and about 360 m wide (Map 1). It is shaped like a figure-of-eight with inlets on the north and south sides.

There is a red beacon on its eastern tip. During the exploration of the northern inlet nine stone pyramidal anchors were found in the eastern part (Figs. 4-8). A second stone stock was found in the western part, similar to the one found in Avlaki bay but smaller (1.15 m long, maximum width 0.16 m). The group of nine stone anchors is of great importance. They were all found in a line orientated SW - NE at depths of from 8 to 18 m, the shallowest being some 150 m distant from the deepest one. The bottom is rocky at this point with patches of coarse sand between the rocks. It slopes gently down towards the north to a depth of some 25 m. Unlike the eastern point of the inlet, however, at a short distance from the shore a vertical cliff drops off to some 45m. Lack of time prevented a detailed exploration of the area roundabout.[5] The anchors were numbered A1 to A9, without regard to their depth or position. They are all the same in shape: a truncated pyramid with a flat rectangular base and a suspension hole at the top,[6] and a vertical perforation connecting the top of the anchor with



Map 1. *Chart of the Avlemonas harbour area (SE Kythira), the east coast of the island and islets of Dragonera and Antidragonera.*

the horizontal hole. In all the anchors this vertical perforation is filled with lead.[7] These anchors are of the type known as "wedge-shaped".[8] They differ in size, the height varying between 0.78 and 0.83 m, the length of the base between 0.53 and 0.69 m, the width of the base between 0.35 and 0.48 m, the length of the top between 0.33 and 0.45 m, and the width of the top between 0.20 and 0.31 m. In addition to their variation in size, certain morphological differences were noted, the most important being that some of them had rounded corners (A5, A6, A7: Figs. 4, 5), while on the rest the edges are angular[9] (A1, A2, A3, A8, A9: Figs. 6, 7, 8).

Based on these measurements, it is calculated that their weights vary from 240 kg for the smallest to 490 kg for the largest. Their combined weight would total at least 2,250 kg. Preliminary observations in the field show that the anchors can be divided into two groups: the first includes the anchors A4, A5, A6 and A7 (Figs. 4, 5), which were found at a shallower depth and were farthest apart, some 47 m; the second comprises anchors A1, A2, A3, A8 and A9 (Figs. 6, 7, 8). It is noteworthy that the upper ends of anchors A1 and A2 are resting roughly one on the other (Fig. 6), while A3 and A8 are a short distance to the SE and NW respectively. A5 (Fig. 8) lies at the greatest depth, 35 m SE of A1 and A2. Not many small artefacts were found: only a fragment of a flat raised pithos base,[10] and the cylindrical rim of a pithos, close to anchors A2, A3 and A6, which was not removed because it was concreted to the rocks and covered with sand. In the area of the second group a larger concentration of sherds was noted, but their number was not sufficient to justify the conclusion that there is a wreck there. There is no doubt, however, that one or more ships had been in distress in this place, and we hope that our investigations next year will tell us whether or not they had gone down.

The locality where the anchors were found raises many questions. The island of Antidragonera has little to offer apart from shelter from southerly winds. Also, the distance separating it from the coast of Kythira and the more secure havens of Avlemonas or Diakofti is small. Only some urgent need for shelter by one or more ships could explain the presence of the anchors in this place. Yet it is difficult on the available evidence to judge whether one or more than one vessel was involved. We do know, however, from three similar anchors at the wreck of the Madonnina that a ship carried more than one. The three anchors from the Madonnina are the only ones of this type found in a dated wreck, but we do not know whether this was the maximum number of anchors a ship carried. The Antidragonera anchors are thus a particularly important find. There is a large number of them,[11] but even so we cannot be sure there are only nine, since the survey is not yet finished.

Archaeological knowledge about stone anchors remains rather inconclusive. In spite of the large number that have been found in land and underwater excavations, it is still hard to draw up

Fig. 2. The stone stock at Tourkovrachos, or Avlaki, in situ. (Photo: N. Tsouchlos)

a typology for them or to define their precise chronological evolution.[12] We are dealing with a type that had a long existence, and if it evolved in accord with the requirements of the ships, earlier forms might well have continued in use over a long period. Stone anchors were employed from the prehistoric period[13] until modern post-war years.[14] Anchors can only be dated with certainty when they occur in closed contexts that are dated by the other associated objects.[15] The problem is that even when a type of anchor is securely dated by the other finds in a wreck, it still cannot be used as a point of reference for the chronology of all anchors of the same type. Anchors found on land sites are also difficult to date, because if they are found as votive offerings in sanctuaries it is uncertain when exactly they were dedicated. If, again, they were found reused as building material, it is still not known when they were in use as anchors.[16] In such cases, however, we have at least a terminus post quem for the anchor in question, but not an absolute general chronology for the particular type. The same problems apply to the Antidragonera examples. Without the presence of archaeologically datable evidence it is difficult, if not impossible, to date them with any accuracy. The Antidragonera anchors are an important find which may help to answer some of the many questions that interest archaeologists about this basic item of a ship's equipment. The ideal situation, of course, would be if a wreck were discovered that was associated with the anchors. It is the hope of us all as archaeologists that a wreck will be found in this place; it would solve many of the questions that otherwise will remain unanswered. But even if this does not happen, we shall have the satisfaction of feeling that we have lived vicariously the hours of hazard braved by the sailors, who finally succeeded in escaping with their lives and their ship from a perilous situation.

Fig. 3. Islet of Antidragonera (left) from the W. (Photo: N. Tsouchlos)

NOTES

1. The HIMA divers taking part in the expedition were N. Tsouchlos, technical director; Ph. Antonopoulos, in charge of diving; R. Margariti, archaeologist; El. Stamatatou, archaeologist; G. Valvis, archaeologist; S. Vosyniotis, electrical engineer; P. Vakondios, technician; and the writer, archaeologist, in charge of the survey. Representing the Ephorate of Underwater Antiquities were Ch. Papachristopoulou, archaeologist, and M. Tzephronis, technician. I would like to thank all those who took part in the survey for their material and moral support, and for the time they gave up in order to make the survey as safe and rewarding as possible.

2. Sakellarakis 1994.

3. The results of the excavation at Kastri have been published by Coldstream and Huxley 1972.

4. For the chronology of stone stocks, see Gianfrotta 1977, 285, where he writes: "in turn these attributions may be seen in connexion with the supplanting of the Homeric word for anchor, *εὐνή*, by the later form, *ἄγκυρα*, which was already used in the 7th century BC, for example by Alceo (362 LP9). *Ἄγκυρα* probably denotes the new form of anchor with stock, shank and flukes. And further down: "we may attempt at least a preliminary definition of the chronological span covered by stone stocks: it lasts some three centuries, from the 6th to the latter part of the 4th ... conversely there are no stone stocks that can be dated to the second half of the 4th century or later."

5. The target of the second campaign will be a detailed examination of the area where the anchors were found.

6. Their shapes may be compared to those of the anchors found in the harbour of Zea, now in the Piraeus Museum,

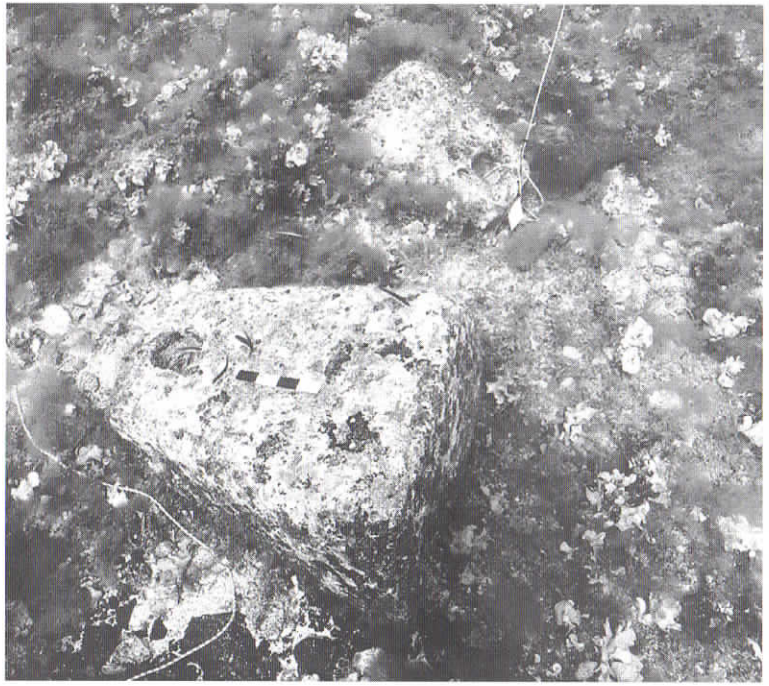


Fig. 4. *Anchors A5 and A6 in situ. (Photo: N. Tsouchlos)*

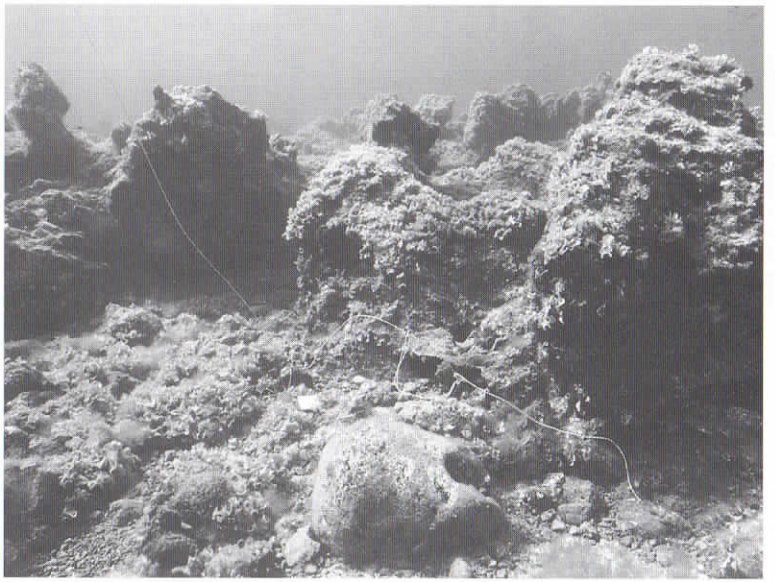


Fig. 5. *Anchor A7 in situ. (Photo: N. Tsouchlos)*

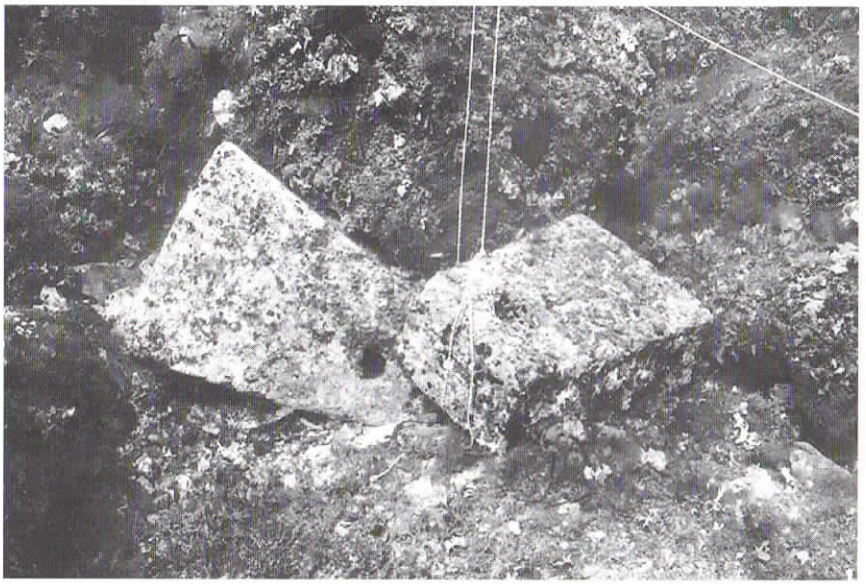


Fig. 6. *Anchors A2 and A3 in situ. (photo: N. Tsouchlos)*

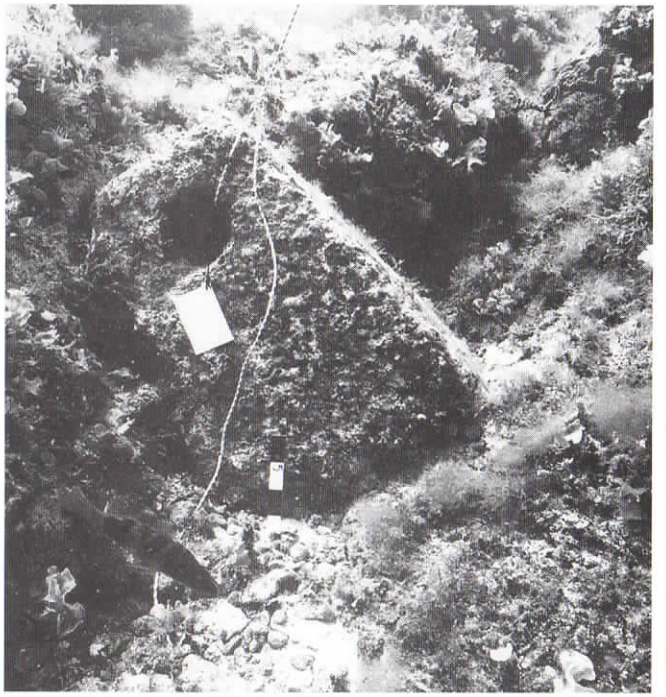


Fig. 7. *Anchor A8 in situ. (Photo: N. Tsouchlos)*

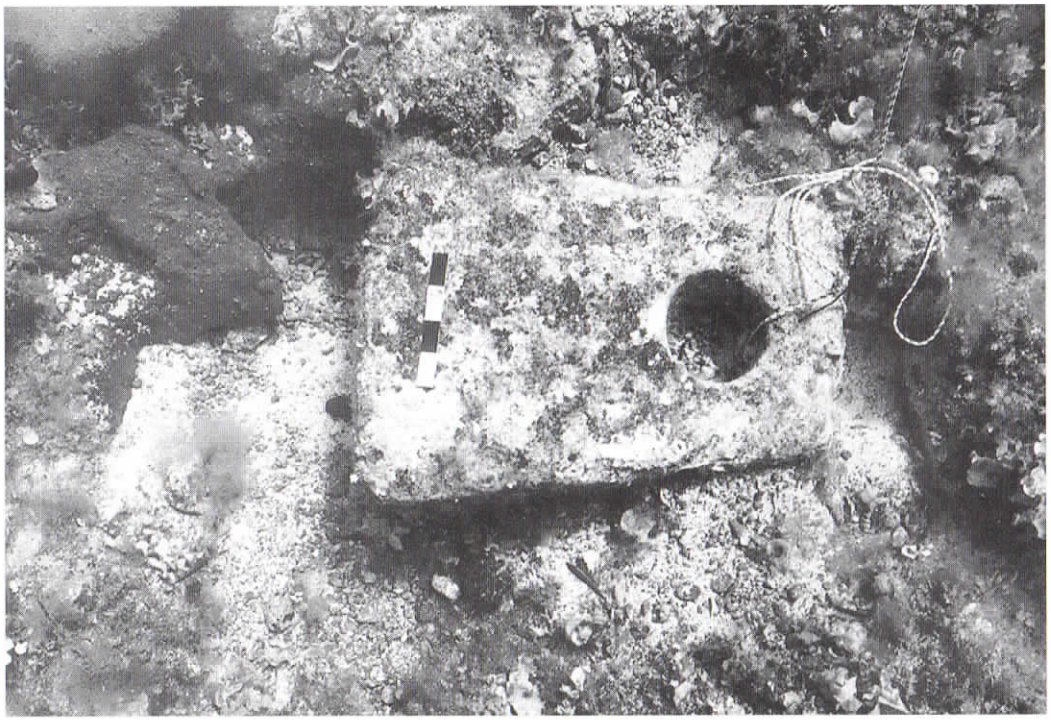


Fig. 8. *Anchor A9 in situ. (Photo: N. Tsouchlos)*

and especially those from the Madonnina wreck near Taranto in southern Italy (McCann 1972, 182 ff.).

7. Samples of the lead and stone should be taken from all the anchors and submitted for analysis; this might produce interesting information about the provenance of the anchors.

8. See Frost 1993, 454.

9. To surmise that these differences indicate different degrees of use or different provenances is to suggest conclusions that are not warranted by our present state of knowledge.

10. The fragment of a pithos base was handed over to the Ephorate of Underwater Antiquities.

11. So far, 19 anchors of a similar type have been found: 13 of stone and pyramidal in shape, now in the Piraeus Archaeological Museum, which probably came from dredging work in the harbour of Zea, one in the Volos Archaeological Museum, three from the Madonnina wreck at Taranto in southern Italy, one from the Ognina wreck at Syracuse, and one from the island of Limosa south of Sicily. The Antidragonera group, therefore, is the second largest in size ever to have been found and the first to have been found in situ in Greece.

12. For example, Gianfrotta (1977, 285) believes that stone stocks date from the 6th to the end of the 4th c. BC, and the pyramidal Madonnina anchors are dated to about 350 BC (McCann 1972, 185). In this contest Frost (1985, 101) raises the question: "The presence of stone anchors on cargo-carrying ships, which would normally have been equipped with lead-stocked anchors, remains to be explained." Our view is that, on the contrary, the finding of a similar type of anchor on cargo ships in other places as well, like the harbour of Zea, shows the diachronic and varied use of the anchors, even though Frost (1985, 99) writes "... the distribution of the pyramidal form seems to be Hellenic with some diffusion in Magna Grecia. In period these anchors apparently coincide with the peak of Greek naval power: the 5th to 4th centuries BC."

13. Like the stone anchors from the Early Helladic wreck at Dokos: see Papathanasopoulos, Vichos, Hadjidaki & Lolos 1990.

14. On the use of stone anchors by fishermen, see Frost 1993, fig. 3.

15. The stone anchors from La Madonnina were dated by the two lamps found in the wreck dating to 350 BC (McCann 1972, 185).

16. See Frost 1985b, 281-321, pls. A-N.

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EXCAVATION OF A CLASSICAL SHIPWRECK AT ALONNESOS (5th c. BC)

Elpida Hadjidaki

Introduction[1]

Between 425 and 400 BC, a large commercial vessel sank southeast of Alonnesos, in the Northern Sporades (Fig. 2).

The shipwreck was discovered several years ago by the fisherman and diver Dimitris Mavrikis, who together with the German diver and antiquities conservator Peter Winterstein reported it to the Department of Maritime Antiquities. They also submitted photographs which made clear the impressive dimensions of the ship.

A preliminary underwater survey followed in October of 1991, during which the locations of other shipwrecks known to Mavrikis were revealed, including two Byzantine wrecks near Vasilikos Bay at the island of Peristera, and another carrying amphoras from Chios, near Cape Tselios on the same island. Because the two Byzantine wrecks were at the considerable depth of 50 metres and we were not suitably prepared, we dived only on the third one, at a depth of up to 39 metres.

In August of 1992 the study and excavation of the Classical ship began, which will continue for several years. Here it should be mentioned that:

1) This underwater project is the largest undertaken by the Department of Maritime Antiquities during its 17 years of existence.[2]

2) This is the first Classical wreck to have been excavated in Greece.

3) It is the largest ship of this period ever to be excavated and studied scientifically, and has overturned many theories concerning ancient shipping, for reasons that will be discussed below.

The situation before the excavation

The first impressions of the site in 1991 were that the shipwreck was located on a sloping sandy seabed, at a depth of 22-30 metres. The cargo consisted of thousands of amphoras, which formed a mound 25m long and 12m wide (Fig. 1).

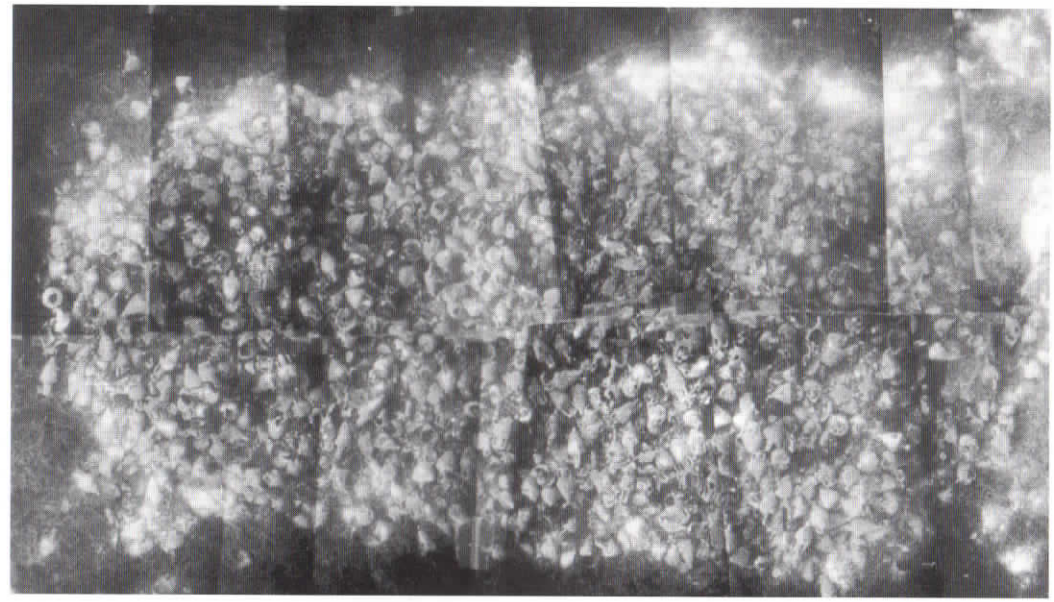


Fig. 1. *Photomosaic of the wreck. (Photo: S. Piskardelis)*

The cargo was deposited on the bottom in such a way that it still describes the perimeter of the ship. It seems to have been stowed in three layers. The upper one was badly disturbed, but the lower layers were relatively untouched, with the amphoras pointing towards the north-west. Most of them were found intact, although their stoppers were missing.

From the way the amphoras lay we concluded that the ship was oriented in a compass direction of 120°, and we suppose that it sank while it was pointing in that direction.

Typical amphoras of various types dating to 400 BC were recovered from the vicinity of the ship.

The principal cargo on board had been wine coming from Mende[3] on the Chalkidiki Peninsula (Fig. 3) and from the island of Skopelos (ancient Peparethos (Fig. 4). Mende[4] and Peparethos were among the ancient towns that produced and exported wine, mainly to the area of Black Sea, from the middle of the 5th c. BC onwards.[5]

Underwater excavation in 1992 and 1993

In August of 1992 the first phase of scientific study began, which was devoted to laying the groundwork for the excavation proper.

The wreck is not close to Alonnesos itself, but lies off a small uninhabited island called Peristera. We built a small village on the bare coast of Peristera consisting of four wooden sheds, bathroom facilities and three additional platforms to take the diving equipment, compressors, diving bottles, decompression chamber in case of emergency, etc. All the work was carried out by personnel of the Department of Maritime Antiquities, who did a marvelous job of transforming the jagged rocks into an organized worksite.[6] The diving was carried out from a floating platform built out of barrels and wood, following the suggestion of members of the Navy Underwater Demolition Team, who were present to supervise the diving.[7]

After these preliminary tasks were completed the first research project began, which was to record the existing state of the shipwreck using two forms of photogrammetry. The first step was to

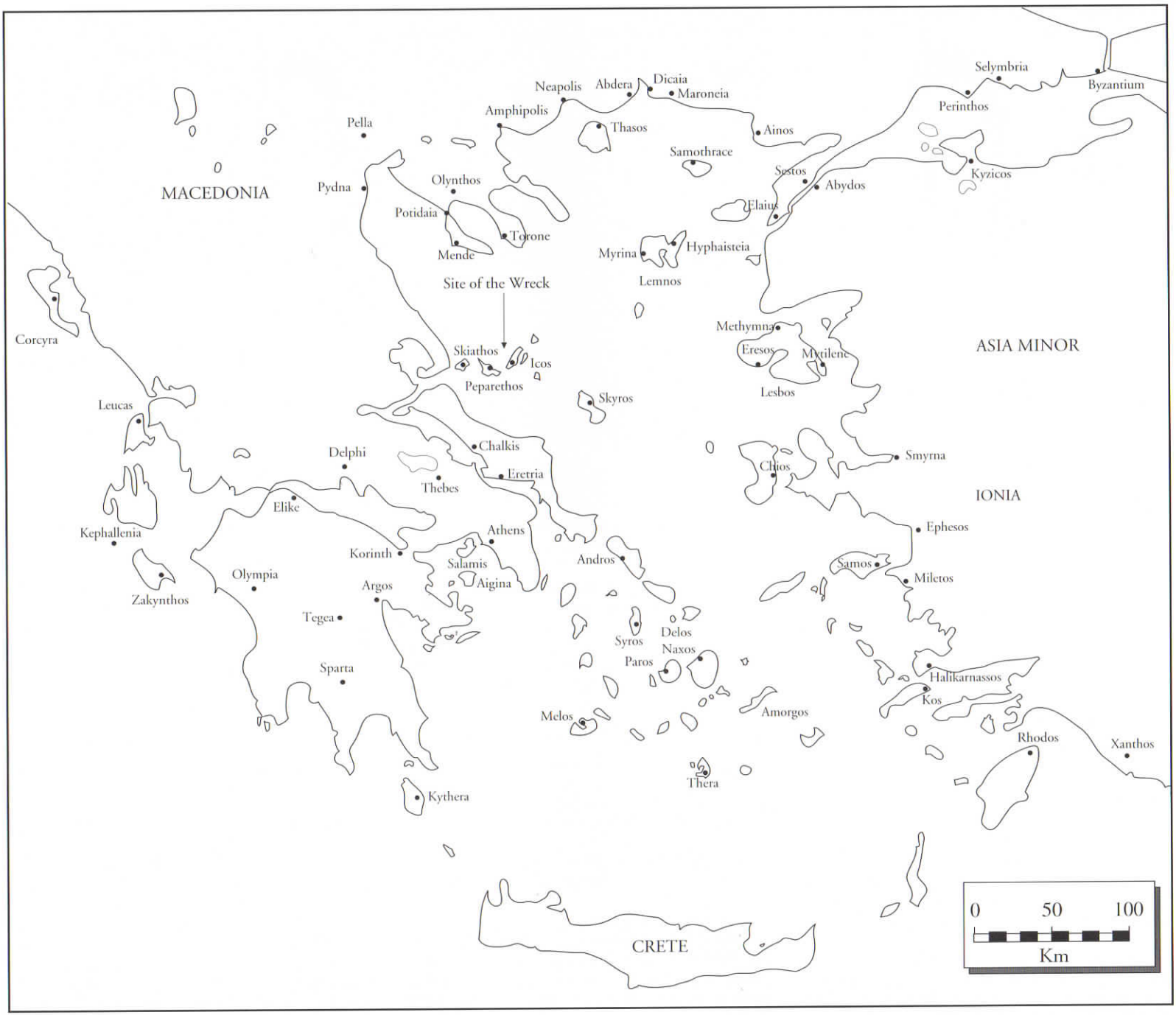


Fig. 2. *Map of Classical Greece with the site of the wreck.*

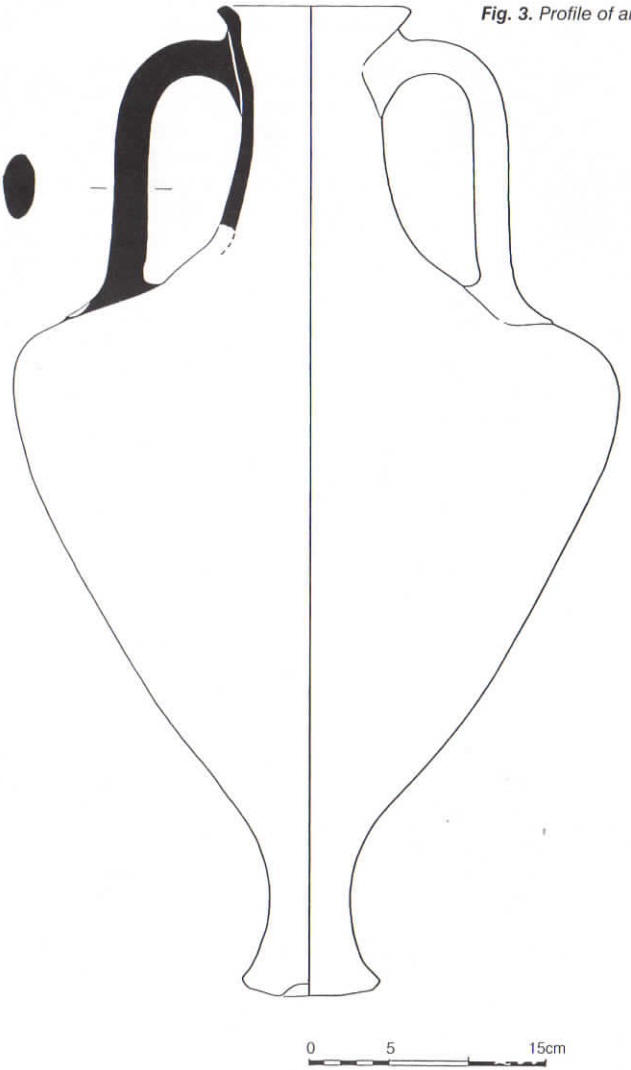


Fig. 3. Profile of an amphora from Mende. (S. Piskardelis)

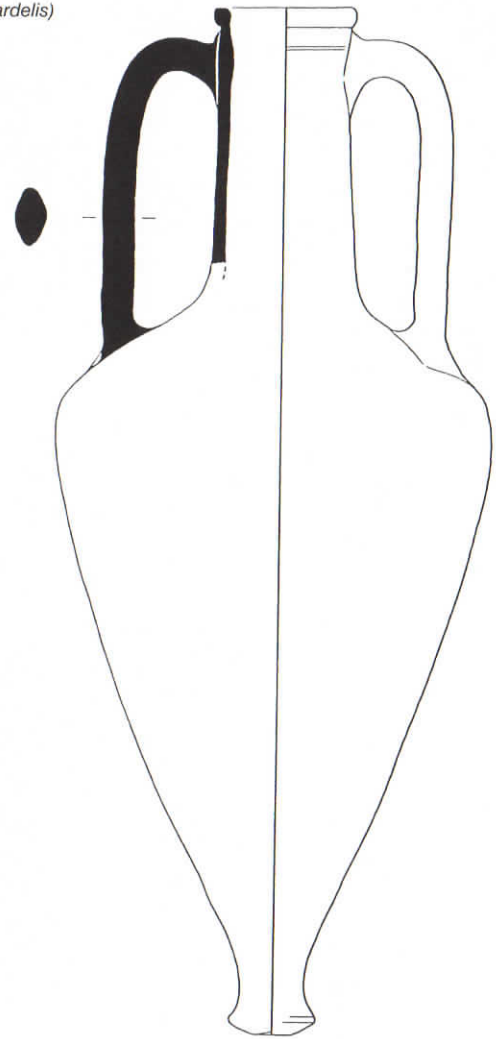


Fig. 4. Profile of an amphora from Peparethos. (S. Piskardelis)

lay out a rope grid, consisting of two by two meter squares. The wreck was covered by 72 squares, which were mainly useful for orienting the divers, and not for taking precise measurement (Fig. 5).

The first photogrammetric method involved putting down a network of 66 fixed points, spaced roughly 2 meters apart, whose depths were found with a bathymeter. The horizontal distance between each point and four or five of its near neighbors was measured with tapes. The surface of the wreck was then photographed piece by piece in small sections, with at least three fixed points in each photograph. We then developed a computer program which uses the series of distance measurements to find a best fit for the positions of all the fixed points.[8] The program also calculates the error in each measurement, a feature that enabled us to discard a number of measurements which were patently wrong. This software was available on the site in 1993, and measurements were retaken when they were in dispute. Finally, all of the objects in each photograph were traced onto a digitizing tablet and stored in a Computer Aided Design program. The fixed points were used to relate one image to the other (Fig. 6).

Fig. 5. *Team of divers placing the grid over the wreck. (Photo: G. Tsalikis)*

The second method used to map the site was almost identical to the first, with the difference that it relied upon fairly expensive specialised instruments capable of producing maps from photographic stereo pairs. This method was employed by Dimitri Karantaidis from the Ministry of Macedonia and Northern Thrace[9] (Fig. 7), who paid us a visit. The two methods differed mainly in the technical means they employed. The first made use of inexpensive equipment that could be taken to the excavation site, and allowed plotting of objects on the spot, while the second required large and expensive instruments which were difficult to transport. However, the second method required less time to be spent by divers underwater. Both methods appear to have been equally accurate and are new ways of plotting in underwater archaeology.

While the measurements were being taken for the photogrammetry, we labeled all the 976 amphoras lying on the seabed as well as 33 others found scattered around its perimeter. There were three other surface finds of note. The first probably belonged to one of the ship's anchors (Fig. 8) and was found 25 metres south of the main site. It is a lead fitting that attached the wooden arms to the shank of the anchor. This is a rare find, because such lead pieces were only beginning to be made in the 5th c. BC.[10] The remaining finds were two black-glazed vessels, one a cup-skyphos, and the other a bowl, both dating to around 425-400 BC[11] (Figs. 9, 10).

Following the survey, 2 of the 72 2x2 m squares sections covering the wreck were excavated.

In this small area, the density of finds was impressive. 200 wine amphorae were recovered from the first three layers, ranging from 0.65 to 0.85 m. in height.

Below the amphoras, excavation levels Γ and Δ contained a large number of cup-skyphoi with stamped and engraved rays on the inside[12] (Figs. 11, 12), many plates (Fig. 13), a mug with petal ribbing on the wall[13] (Fig. 14), black-glazed oil lamps[14] (Fig. 15), a plain cooking-pot[15] (Fig. 16), and numerous fragments of different vessels for domestic use, all of which date to between 425 and 400 BC.

Metal objects were also found. We brought up the lower body and rim of a double-handled bronze bucket (bell situla) with Ionian decoration along the rim (Fig. 17). The body of the bucket had disintegrated, but what remained was very similar to one excavated in a Macedonian tomb dating to the last quarter of the 5th c. BC, or beginning of the 4th c BC.[16] These buckets were used in the Classical and Hellenistic periods for transporting wine and water.[17]

All the black-glazed vessels are Symposium table-ware and the clay is remarkably well preserved, looking almost as it must have 2500 years ago. The deep black glaze has the fine appearance of the best Athenian ware, and analysis of the clay undertaken by the center for

Fig. 6

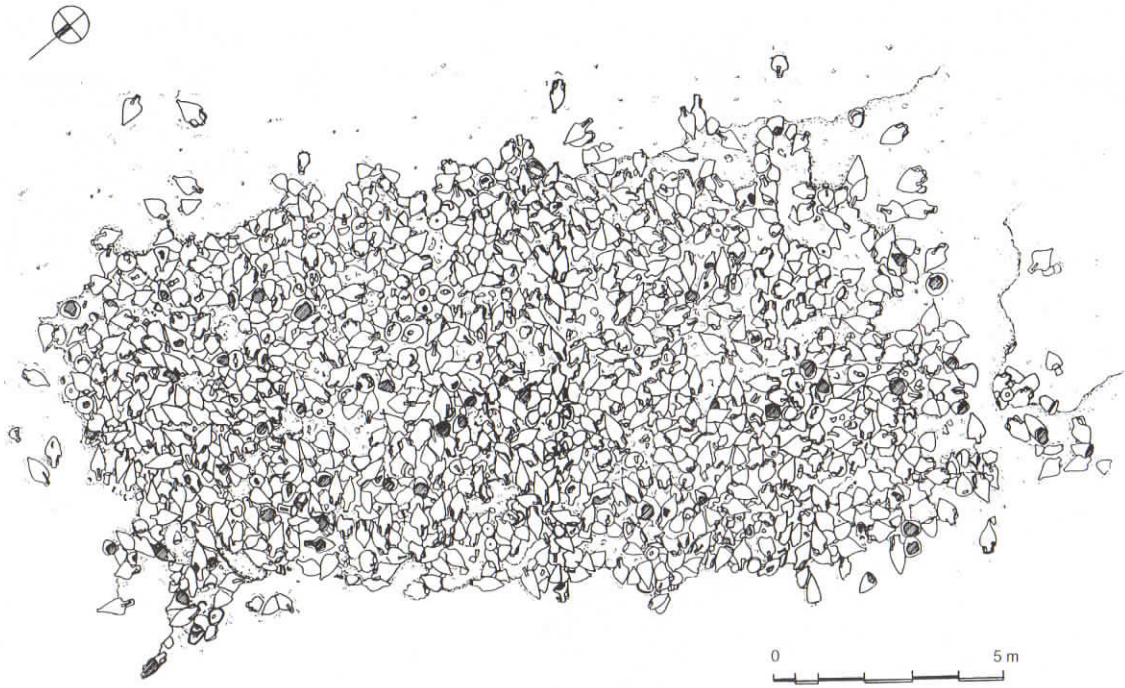


Fig. 7

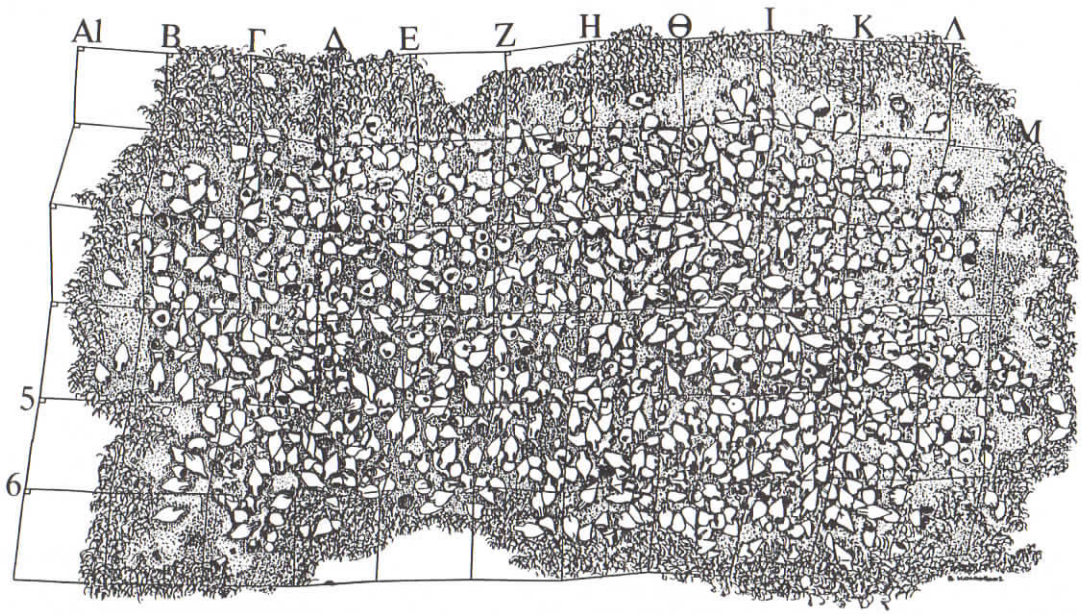


Fig. 6. *Photogrammetric plan of the wreck. (N. Lianos, Aik. Tagonidou)*

Fig. 7. *Horizontal plan of the wreck. (D. Karantaïdis, V. Koniordos)*

archeometry at the national research institute of Democritos by Professor of Physics Yannis Maniatis, showed that the vessels originated in Athens.[18]

It should be pointed out that because of their high value metal objects were rarely used for everyday purposes. One therefore wonders whether they were part of the cargo, or whether they and the black-glazed vases were for the personal use of a wealthy Athenian ship captain. We hope that further excavation will help answer this question.

For the present, excavation stopped at the level of the ship's ballast, with the intention of continuing next year in order to try to locate the remains of the wooden hull.

Conclusions

The excavation of a Classical shipwreck is important because up to the present so few have been excavated. The best known is the Kyrenia Ship, which dates to around 350 BC, and which was excavated by the American archaeologist Michael Katzev off the northern coast of Cyprus in the late sixties and early seventies.[19] Large sections of the wood were recovered, making it possible to reconstruct the ship almost in its entirety.[20]

Another 5th-4th c. BC wreck was excavated by Cynthia Eismann off the coast of Sicily.[21] In this case some of ship's cargo remained, dating to exactly the same period as that of Alonnesos, and also containing wine amphorae from Mende. Unfortunately, too little of the wood remained to allow reconstruction of the ship itself. As for the Ma'agan Michael[22] wreck excavated by Professor Elisha Linder in Israel in a remarkable state of preservation, it is the same size as the Kyrenia ship: 15 m long and 5 m wide.

All of the other known ships date either to 300 years later, or to before the Classical period.

Different scholars in their studies of ancient shipping have maintained that freighters carrying over 75 tons and more than 1500 amphoras did not appear until the Roman period in the 1st c BC, 300 years after the Alonnesos shipwreck.[23]

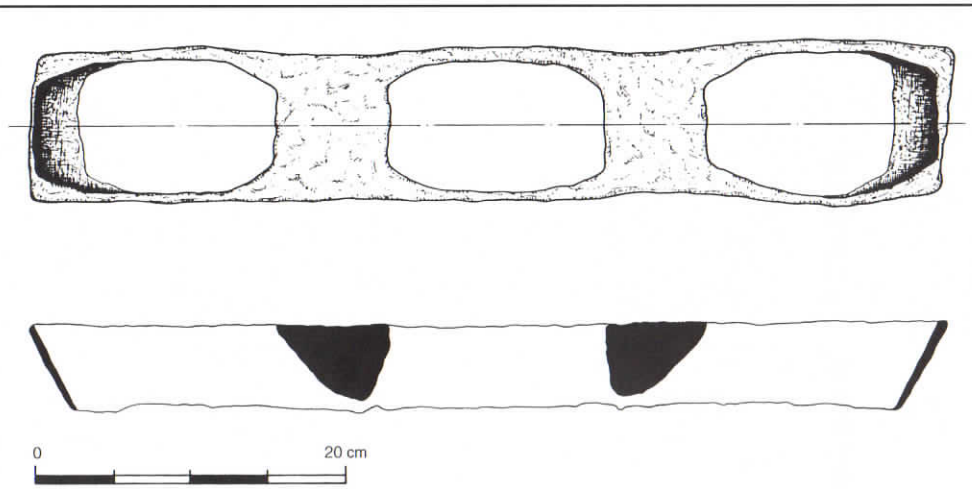


Fig. 8. *Drawing of an ancient lead anchor clamp. (S. Piskardelis)*

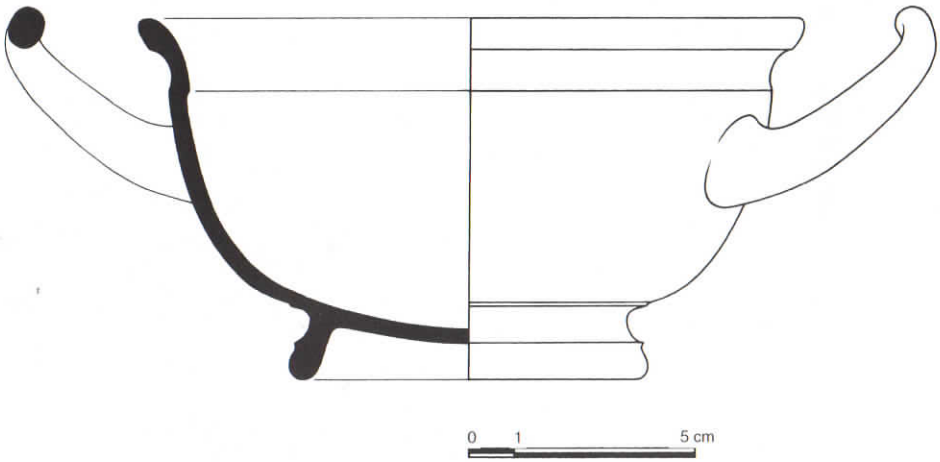


Fig. 9. *Skyphoid cup. (S. Piskardelis)*

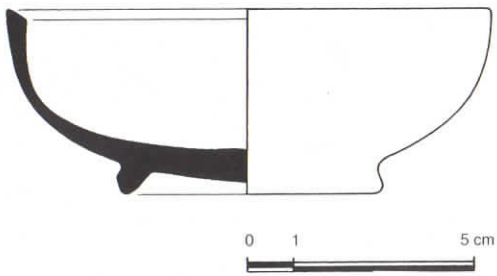


Fig. 10. *Phiale. (S. Piskardelis)*

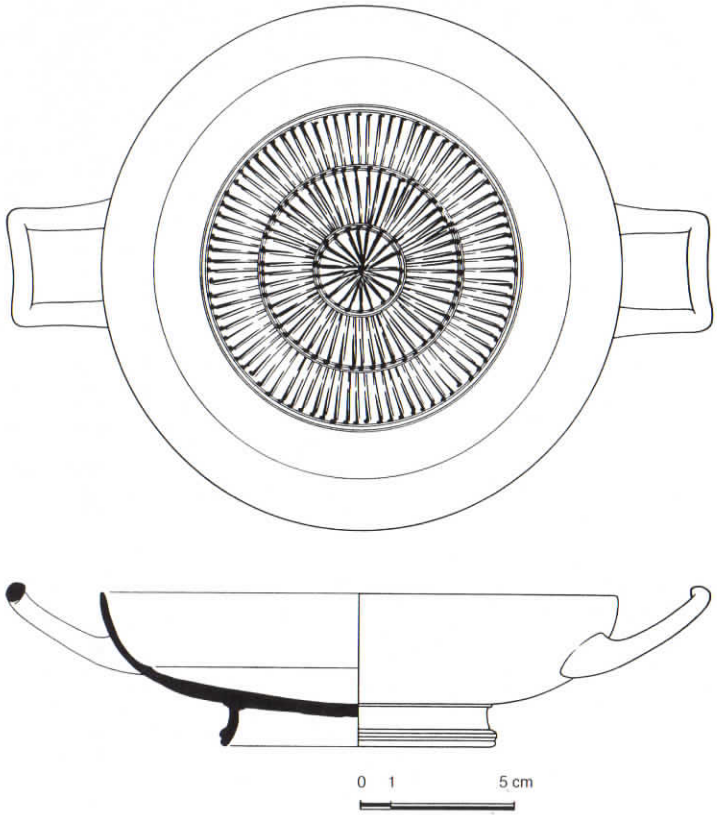


Fig. 11. Black-figure cup with impressed decoration. (S. Piskardelis)

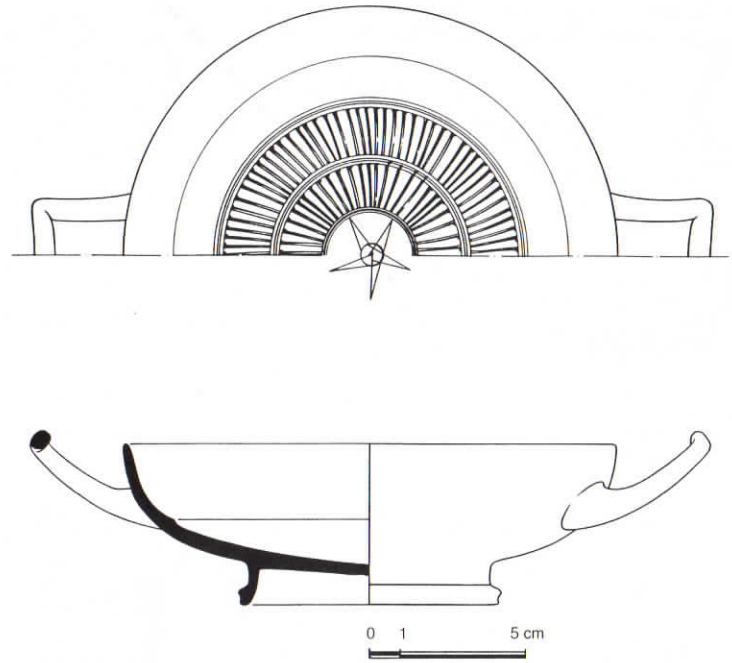


Fig. 12. Black-figure cup with incised decoration. (S. Piskardelis)

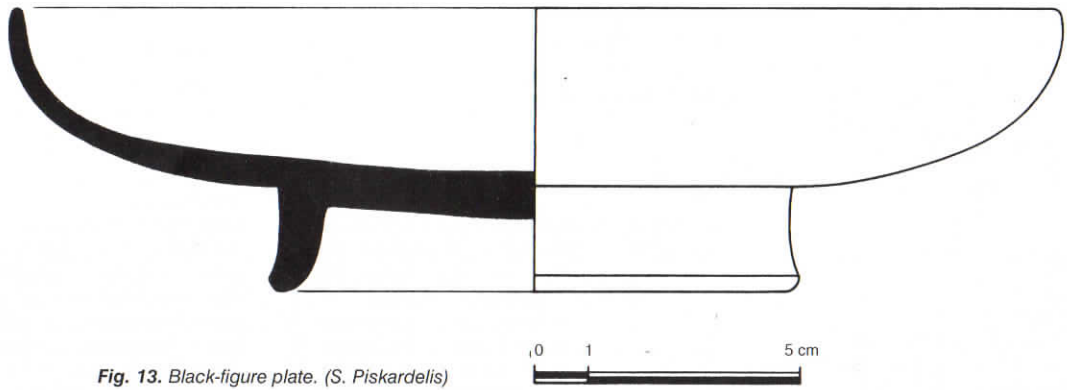
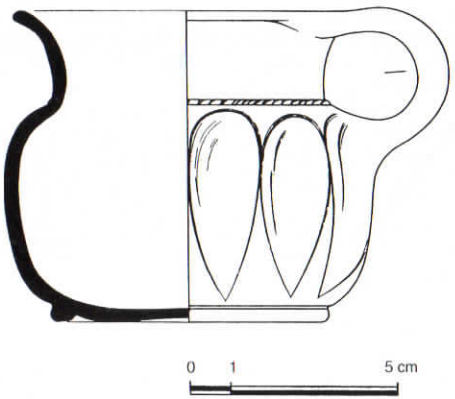


Fig. 13. Black-figure plate. (S. Piskardelis)



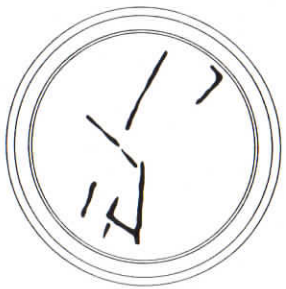


Fig. 14. *Black-figure kotyle. (S. Piskardelis)*

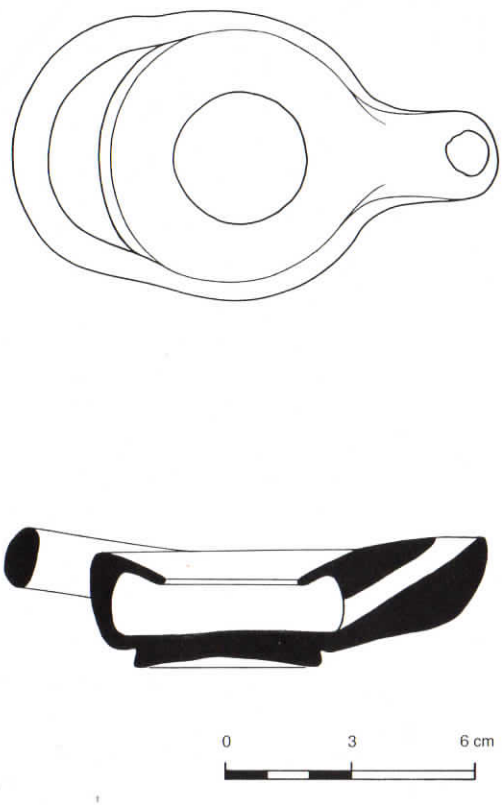


Fig. 15. *Black-figure lamp. (S. Piskardelis)*

Professor L. Casson, however, basing his arguments on Thucydides, believes that the size of Classical merchant ships was frequently underestimated, and that burdens of up to 150 tons were not uncommon from the 5th century onwards[24]. Our excavation supports Professor Casson.

Our survey of the surface layer at Alonnesos found 1000 amphora, weighing 28-37 kg each, and there are three additional levels below, leading to an estimated 3000 to 4000 amphoras. Such a cargo would require a vessel capable of carrying over 100 tons, which makes it necessary to revise the view that Classical ships were relatively small and points to yet another achievement of the ancient Greeks which was afterwards adopted by the Romans.

Notes:

1. This article is largely based upon public lectures by the author given at the Archaeological Society on the 31st of March 1993 and at the 5th International Symposium on Shipbuilding in Antiquity, August 1993 in Nafplion.

2. The scientific personnel taking part in the excavation were: Archaeologists: E. Hadjidaki, E. Spondilis, D. Haniotis, A. Simosi, S Asimakopoulou, C. Agouridis, D. Sotirakis, E. Mantzouka, G. Koutsouflakis, D. Gartagani, V. Lazari, G. Mavrofridis, F. Mantziou, M. Goutzamani; A. Ritzonis, E. Kaggelari, P. Skarpelou, and the student Archaeologists: Ch. Papachristopoulou, M. Tsopela, K. Sigler, and K. Tretheway; Architects: N. Lianos, K Tagonidou, V. Koniordos, T. Nakasis, and the student A. Vaitsos; Geologists-Oceanologists: E. Hahamidou, V. Masoura; Biologist: N. Nikodimou; Topographer: G. Baksevanakis, D. Karantaidis; Chemist: A. Katsi; Conservators: R. Papadima, S. Simeonidou, R. Maninou, K. Androutsaki, K. Gigiza; Draftsmen: S. Piskardelis and K. Pollatou; Computer Operator: E. Saiti; Guard: A. Yiannoulatou; Photographers: P. Vezirtzis, G. Tsialikis, and C. Platt on behalf of National Geographic.

3. Mende was founded in 730 BC by the Eretrians and belonged to the first Greek colonies in Chalkidiki (see *RE* 15 (1931) 777-780, s.v. Mende (B. Lenk); also PECS 572, s.v. Mende (S. G. Miller); also E. L. Hicks, Greek Historical Inscriptions (Oxford 1882) 27, 41, 49, 80, 140.

4. Pliny, Natural History 4.12.72, 14.9.76; *RE* 19 (1937) 551-559, s.v. Peparethos (R. Herbst); C. Friedrich, "Skiathos und Peparethos", *Athenische Mitteilungen* 31 (1906) 99-128.

5. Sophocles, Φιλοκτήτης, v. 548-549, Loeb Classical Library (1919) vol. II; Athenaeus, *Δειπνοσοφισταί* 1.29a, d-e, Loeb Classical Library (1927), vol. I; Demosthenes, *Προς την Λακρίτου Παραγραφήν*, xxxv, 35, edition Les belles lettres, Paris (1954); C. Eisman, *The Porticello Shipwreck, A Mediterranean Merchant Vessel of 415-385 BC.*, Texas A&M University Press (1987) pp. 37-52; I. B. Brashinski: *Research in Ancient Trade*, HAYKA (1984) pp. 105-7 (in Russian); A. Doulgeri-Intzessiloglou et V. Garlan: "Vin et Amphores de Peparethos et d'Ikos", *BCH*, CXIV, (1990) pp. 361-392; S. Monahoff, *Amphoras from the Tavric Peninsula of the 4th to 2nd c. BC*, Saratov University Press 1989 (in Russian); J. Y. Empereur and Y. Garlan: "Les ateliers amphoriques grecs", in *Les amphores greques. Les problèmes de l' évolution du métier et de la commerce dans l'antiquité*. Edition de l'Université Saratov (1992) pp. 19-21 (in Russian with brief synopsis in French). I thank my colleague P. Mela for her assistance in translating the Russian articles.

6. The technical personnel of the Department of Maritime Antiquities were: E Gigizas, D. Drossinos, N. Theodorakopoulos, A. Zanos, I. Zevgitis, G. Kontoyiannis, E. Kouvelas, D. Liberopoulos, H. Margaronis, K. Bizas, S. Papadopoulos, A. Polatos, S. Poporis, A. Salpadimas, N. Sapoudsis, D. Skrobolas, P. Tripilas, G. Hadzis, P. Chronis.

7. We thank the Ministry of Defense and especially Vice-Admiral G. Theofanidis, then Commander of the Underwater Demolition Team, not only for their superb collaboration and assistance during the last sixteen years, but also for the special training they provided for our divers in order to prepare them for the season at Alonnesos. We also thank the officers Mr. Th. Madanas, and D. Voidonikolas, as well as the Navy divers L. Zorzos, and A. Stamatiou, for their active participation in the underwater excavation in 1992, and their patience in supervising diving activities for eleven hours each day.
In 1993 a professional diver, K. Thoktarides became chief

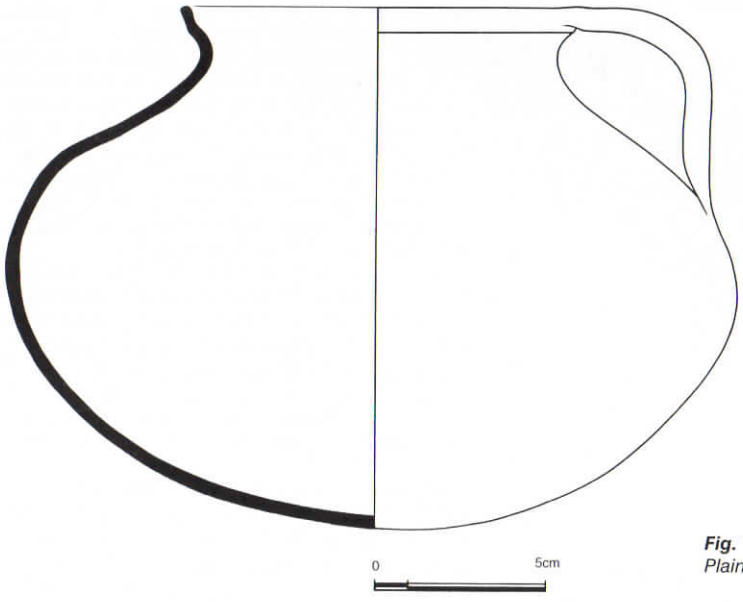


Fig. 16.
Plain cooking-pot. (S. Piskardelis)

diver. Although young, he has tremendous knowledge of the technical aspects of diving. We owe Mr. Thoktarides many thanks for the successful completion of the underwater work, which lasted for two months and involved 49 divers. In 1992 there were 425 dives, and in 1993 there were 810 dives, and the divers who participated were the following:
P. Antoniou, G. Avgoustakis, M. Vasilaki, V. Glezos, M. Zacharias, G. Kalapothakis, H. Kouvelas, A. Konstantineas, K. Kostantopoulos, E. Kyriakopoulos, N. Makridakis, L. Mersenier, N. Miliadis, S. Kikolaidis, I. Papavasilopoulos, N. Papakonstantinou, X. Papantonolgou, M. Petrides, A. Polychronopoulos, M. Raftakis, M. Tzefronis, K. Tsiamis, P. Tsabourakis, P. Chronopoulos.

8. The computer program was developed by Professor of Physics, Dr. Michael Marder, in cooperation with architects of the Department of Maritime Antiquities Drs. N. Lianos and K. Tagonidou. Their dedicated work allowed us to develop detailed plans of the shipwreck on-site.

9. This method was employed by the Topographer and Mechanical Engineer of the Ministry of Macedonia and Thrace, Dimitri Karantaides, who worked together with an architect from the 9th Byzantine Department, Vasilis Koniordos. Mr. Koniordos was responsible for supervising this work, and executing the final drawings. We thank the Ministry of Macedonia and Thrace, and especially Mr. Karantaides for their cooperation. The technical description of this method is to be published separately by Mr. Karantaides.

10. See the reconstruction of an ancient anchor in the article by G. Kapitän, "Ancient anchors-technology and classification", *The International Journal of Nautical Archaeology* (1984), 13.1 pp. 33-44, fig. 1.

11. *Agora* XII, pl. 27, fig. 6 between 617 and 621 and XII part I, p. 112; *Αρχαιολογικό Δελτίο*, Athens Ministry of Culture v. 19, 1964, Χρονικά, pl. 65a.

12. See *Agora* XII, Part 2, plates. 22-23, fig 5, between 483 and 496, and XII, part 1, pp. 102-104. For similar kylixes see G. Bakalakis, *Οίνος Ισμαρικός*, Thessaloniki (1990), part B, pp. 643-650.

13. See *Agora* XII Part 2, Plate 11 (215) and *Αρχαιολογικό Δελτίο*, Athens Ministry of Culture v. 41, 1986, Χρονικά, pl. 33c.

14. *Agora* IV, 56 (21-212) type 23A, Plate 7 and 36; L. Maragou, *Αρχαία Ελληνική Τέχνη*, N. P Goulandri, Athens (1985) p. 138, plate 204.

15. See *Agora* XII, part 2, plate 93, between 1929 and 1930 and XII part 1, p. 224.

16. K. Romiopoulou, "Finds from Late Classical Tombs in Thessalonike", in *Φίλια έπη εις Γεώργιον Μυλωνάν*, 3, pp. 194-218, Αθήνα, Αρχαιολογική Εταιρεία (in Greek) 1989, pp. 194-198, pl. 45.

17. *Θησαυροί της Αρχαίας Μακεδονίας*, Archaeological Museum of Thessaloniki (ΤΑΠΑ 1979,) p. 80, type 332, pl. 47; L. Maragou *Αρχαία Ελληνική Τέχνη*, N. P Goulandri, Athens (1985) p. 166, pl 264; M. Andronikos, *Βεργίνα* (Athens1992), p. 210 pl. 176; *The Search for Alexander*, (Greek Ministry of Culture 1980), pls. 17-19 and 26, p. 156 type 107, p. 163 type 123, and p. 170 type 135.

18. I would like to thank Professor Maniatis for his collaboration in identifying the clay, and for carrying out a radiocarbon analysis of the wood found beneath the amphoras, and dated to 541-411 BC.

19. Swiny, H. W., and Katzev M. L., "The Kyrenia shipwreck: A fourth-century BC Greek merchant ship", in *Marine Archaeology, Colston Papers* 23 (London 1973); D. J. Blackman, ed., pp. 339-359; M. L. Katzev, "Resurrecting the Oldest Known Greek Ship", *National Geographic* 137 pp. 841-857.

20. M. L. Katzev, "Conservation of the Kyrenia Ship: 1970-71", *National Geographic Society Research Reports*, 11, National Geographic Society, Washington (1971); M. L. Katzev, "The Kyrenia Ship: An Interim Report on its Hull Construction", *American Journal of Archaeology* 89 pp. 71-101 (1985); M. L. Katzev, *Kyrenia II: An Ancient Ship Sails Again*, Hellenic Institute for the Preservation of Nautical Tradition, Piraeus (1987).

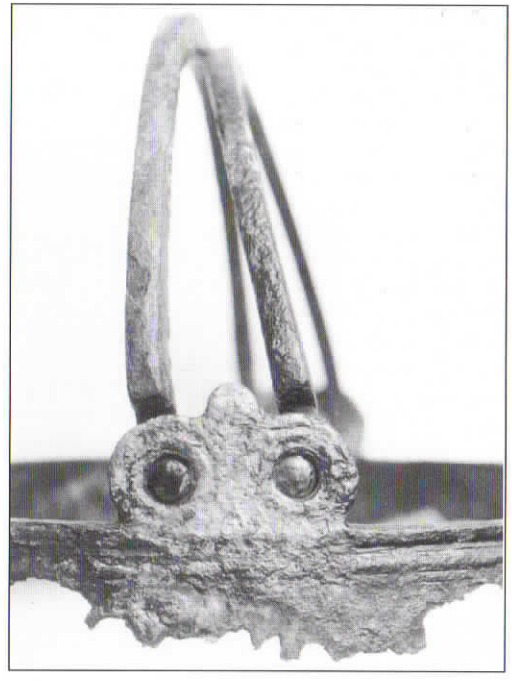
21. C. Eisman, *The Porticello Shipwreck, A Mediterranean Merchant Vessel of 415-385 B.C.*, Texas A&M University Press (1987) pp. 98-109.

22. E. Linder, "Ma'agan Michael Shipwreck - Excavating an Ancient Merchantman", *Biblical Archaeology Review*, 18 (1992); E. Linder "Il Relitto Di Ma'agan", *Archeo* VIII, 9(103) (1993).

23. See C. Torr, *Ancient Ships*, Cambridge (1894), p 25; Lefebvre des Noettes, *De la marine antique à la marine moderne: la revolution du gouvernail*, Paris (1935) p. 49 and pp. 69-70; A. J. Parker, "Cargoes, containers and stowage: the ancient Mediterranean", *The International Journal of Nautical Archaeology* (1992) 21.2 pp. 89-100.

24. See L. Casson, *Ships and Seamanship in the Ancient World*, Princeton (1971) p. 171.

Fig. 17. *Upper part of a bronze situla. (Photo: P. Vezyrtzis)*



GEOMETRIC KRATER FROM MERENDA, ATTICA, DEPICTING TWO WARSHIPS

Yannis Vichos

The krater

In the Brauron Archaeological Museum a large (no. 1492: Fig. 1) and a smaller fragment (no. 1492a; Fig. 2) of the same Geometric krater are exhibited. It was found in the course of a rescue excavation at Merenda (ancient Myrrhinous) in East Attica,[1] perhaps in 1968 (there is no proper information about the find in the records of the 2nd Ephorate of Prehistoric and Classical Antiquities nor the excavators' notebooks). The size and type of the vase strongly suggest that it was a grave marker on the tomb of some eminent person in the Geometric cemetery at Merenda. The large fragment displayed in the Brauron Museum consists of part of the low rim, one stirrup handle (partly restored) and a large part of the body.

The preserved measurements are: h. 48 cm, width of vase 68 cm, preserved chord of the rim 49 cm, h. of rim 4.7 cm, l. of handle 31 cm.

Decoration

The painted representations and decoration are fairly well preserved over the whole surface.

The side of the rim is decorated with hatched leaves and there are two relief rosettes on the top.

To the right of the handle is a panel flanked by meanders and containing a horse and a bird .

Three horizontal lines separate the decoration on the rim from the frieze with chariots and warriors.

Below the frieze are consecutive bands with linear and decorative motifs.

In the space beneath each of the two horizontal components of the double loop handle is painted a warship in profile. The three rows of zigzag lines above the ships are a common motif in this period and are not related to them.

Chronology

The vase combines early elements (e.g. the low rim, meander decoration in the handle zone flanked by a metope, which are all features found on Middle Geometric kraters) with later ones (e.g. the chariot frieze, which precludes a MG date for the krater). The workshop was Attic, but not Athenian, since the motif of hatched leaves is not found on Athenian kraters. It is, however, Cycladic and not out of place in East Attica.

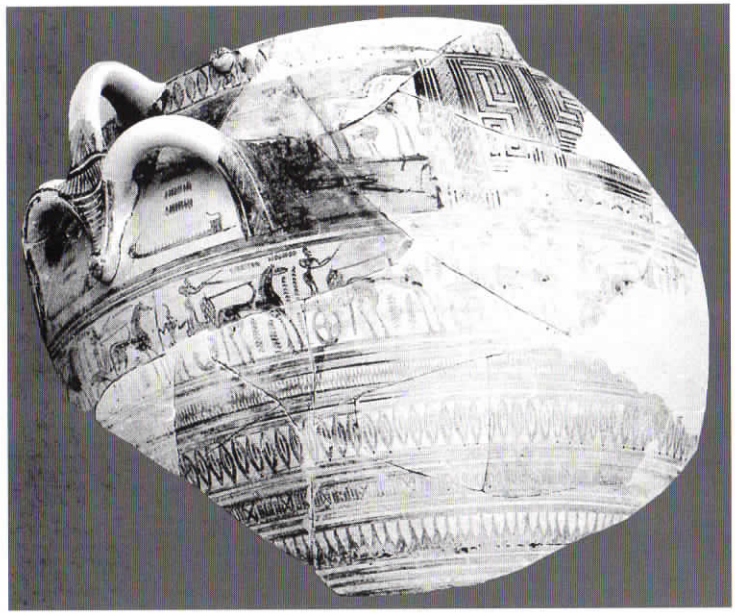


Fig. 1. The Geometric krater. Brauron Museum. (Photo: N. Tsouchlos)

The workshop follows the style of the large LG I workshops (Dipylon and Hirschfeld), but the drawing is executed with a finer line and there are differences in the iconography. The Merenda krater would thus appear to be a LG I product of an East Attic workshop (760-750 BC).

The painter combines traditional (MG II) and contemporary (LG IA) traits.

The ships

The Merenda krater is the third Geometric example with a painted representation of ships under the handle.[2]

Here, however, unlike the other two examples, we have two ships (10.8 cm in length) skillfully painted in the spaces under by the handles. The first ship, on the left, will be called ship A (Fig. 3) and the second, ship B (Fig. 4).

Both of them are warships with a long, slightly raised ram, and in spite of some slight differences are of the same type.

They have straight keels, which start to curve upwards as they follow the line of the raised stern. This carries a medium sized platform on ship A and a vestigial one on ship B, which however has a conspicuous steering-oar.

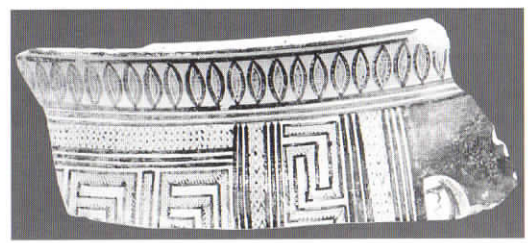
A prominent structure is mounted on the bow of each vessel. The three ends of the horizontal planks reinforcing the structures can be seen projecting forward of the stem-posts. 17 sturdy tholepins, to accommodate an equivalent number of oars on each side, are visible above the gunwale of ship A; ship B has 19 smaller ones. The steering-oar on ship B is depicted in detail with all its individual parts: tiller, shaft and long blade.

The bow and stern of both ships are embellished with terminations in the shape of a horn. The one on the bow was given a graceful double curve and appears as a regular continuation of the stem-post, while that on the stern curves in a different manner. The basic outline of both vessels is given emphasis by a thick black painted line.

Both hulls were painted a dark brown colour, which has for the most part flaked away leaving traces only in places.

A row of what appear to be spots, which are the remaining traces of the original paint used for the hull, can be distinguished below some of the tholepins, creating the false impression of openings for the oars of a second, lower bank, and consequently that the ships were biremes. The spots are in fact the remnants of the thicker layer of paint left by the painter's brush as he lifted it from the surface of the vase. Similar spots are visible on other parts of the vase. In any case, vase-painting convention in the Geometric period required that openings for oars should be indicated not by the use of added paint, but by removing the paint at these points

Fig. 2. Second fragment of the krater. (Photo: N. Tsouchlos)



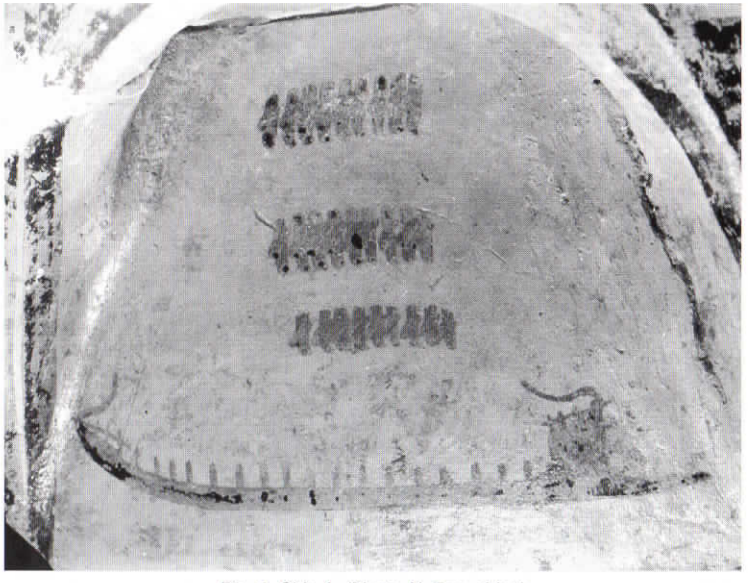


Fig. 3. *Ship A. (Photo: N. Tsouchlos)*

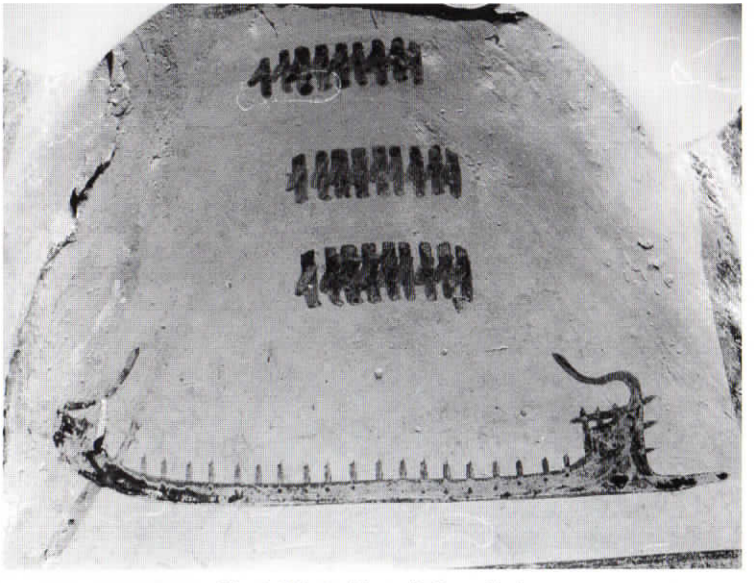


Fig. 4. *Ship B. (Photo: N. Tsouchlos)*

and leaving the natural clay colour to show through. This technique also occurs in the well-known representations of biremes on other vases of this period, as well as on other parts of the Merenda ships themselves: for example, the gaps between the meshes of the gunwale.

Lastly, especially in the case of ship B, which is the better preserved, we can distinguish certain features on the bow that must reflect the artist's attempt to convey details of the ship's construction: the lines of the drawing reveal the method of joining the keel to the ram and stem-post. Also, where the planking ends, a curved line can be seen that seems intended to render the curvature of the hull at this point. A similar example of an attempt to show how the planking was faired to the stempost can be seen in the ship on an Attic vase in the Royal Ontario Museum at Toronto (710-700 BC).[3]

A consideration of these constructional details suggests that the ram was an extension of the keel, and that the stem-post was fitted into the base of the ram, bracing it vertically. The triangle formed by the lines of the keel, stem-post and planking would have been filled with some sort of timbers.

The ships on the Merenda krater have no exact parallels among the well-known representations of ships of that period. Their lack of any element of perspective constitutes the great difference between them and those on the Dipylon vases, which are viewed from the side and are painted with a realistic perspective, a technique rarely found in Geometric art. Their nearest known parallel is the ship on an Attic krater in the Louvre (no. 522).[4] In the case of the Merenda ships, however, neither rowers nor oars are shown, nor indeed a mast or sail. It is noticeable that the painter of the krater omitted any moving elements that would have cluttered the representation, preferring instead to paint the hull realistically with tholepins for the oars and, in the case of ship B, an impressive steering-oar.

Lastly, there is a certain similarity between the raised hull at the stern, for the protection of the steersman, and that on the Attic ships in the Metropolitan Museum of New York.[5]

From the above analysis we may fairly safely conclude that, if the tholepins are in fact extensions of the timber ends, the two ships on the Merenda krater depict single-banked galleys with some twenty oars a side,[6] making forty in all; if on the other hand the tholepins are not the ends of the timbers, then these vessels represent galleys with outriggers, but with the same number of rowers.[7]

NOTES

1. For the site, see Παπαδημητρίου 1961, 30-37 and Coldstream 1979, 35, 78, 133, 376.
2. See van Doorninck 1982, 277-9, figs. 1-3: Protogeometric krater, Alikarnassos Museum (no. 4); and Basch 1987, 171-2, fig. 353: LG I krater, Louvre A517.
3. Basch 1987, 184-187, fig. 388A and 392.
4. op. cit., 173-175, fig. 362.
5. op. cit., 178-179, fig. 374.
6. op. cit., 195-196, fig. 417B.
7. op. cit., 195-196, fig. 417C.

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HELLENIC INSTITUTE OF MARINE ARCHAEOLOGY

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ADDRESS: I.EN.A.E., 4 Al. Soutsou Str., Athens, Greece 106 71
TEL: (30 1) 36 03 662 - FAX: (30 1) 64 50 033, 32 25 075

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