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Scripta manent

As we approach the final phase of the excavation of the Early Helladic wreck at Dokos, we feel we should once more address all of you who have supported the project financially or morally or have simply followed its progress with interest. In addition to again expressing our warmest thanks and emphasizing that without this support it would not have been possible to realize the project, we should like to tell you a little more about it and answer some possible questions and doubts.

The underwater excavation carried out by the Institute at Dokos is the first systematic excavation of an ancient wreck site in Greek waters and the first to employ the latest technological methods. Tribute has been paid to the Dokos excavation by leading underwater archaeologists all over the world and by various scientists and scholars specializing in this field.

The Dokos wreck is the oldest of its kind so far known to us. It has produced the most valuable solid evidence for seafaring and trade in the Early Bronze Age during the latter part of the 3rd millennium BC that has come to light in the Aegean. Furthermore the assorted pottery finds from the site afford a revealing picture of the kinds of utility vessels and utensils in use at that time and of the way of life of Early Bronze Age folk.We have decided to suspend temporarily the intensive underwater part of the project in order to speed up the conservation and study of the objects already recovered with a view to publishing and exhibiting them. We believe that the work of excavation should keep in step with the study and publication of the material and the presentation to the public of the finds and conclusions from the excavation.

The conservation, cataloguing, drawing and photographing of the material with the ultimate aim of studying and publishing it, form the natural complement to the operations at the site and an integral part of every archaeological excavation. This phase calls for long, patient work by a team of specialized scholars and technicians made up of archaeologists, conservators, draughtsmen, photographers, chemists and archaeometrists. It is, however, the most essential part of the project and represents a necessary stage before the final publication.

The final publication of the finds and conclusions is in its turn the crowning point of every archaeological excavation. The careful study that precedes it enables the archaeologists to carefully examine and evaluate all the evidence before them and to make comparisons with the material from other excavations.

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COVER PAGE:

Point Iria wreck. Cretan stirrup jar and Cypriot jug of ca. 1200 B.C.
(photos by Nikos Tsouchlos).

Excavation without publication is tantamount to the destruction of the site and the loss of the archaeological evidence that has been extracted from it.

The most valuable evidence about the life of early man, especially in the prehistoric period to which the Dokos wreck belongs, is to be found in the humble artifacts of everyday use, made chiefly of clay, stone, wood and metal. As the grand old Greek archaeologist, Constantine Romaios, eloquently put it, the prehistoric earth yields not gold, but the truth about mankind.

With these ideas in mind, H.I.M.A. and all of us who took part in the Dokos excavation will continue the task of completing this project for a few more years. At the same time, the Institute is extending its underwater activities to the wreck at Point Iria on the north coast of the Gulf of Argos. This is a Cypro-Mycenaean wreck from the heyday of Mycenaean thalassocracy at the end of the 13th c. BC.

It is the first Mycenaean wreck to have been found in Greece and the third in the eastern Mediterranean, after those at Cape Gelidonia and Uru Burun on the southwest coast of Asia Minor.

The Point Iria find, which has been known to H.I.M.A. since the 1960s, has recently acquired a new dimension with the discovery that part of the ship's cargo is Cypriot.

'The excavation of the Point Iria site is in a sense a natural continuation of the one at Dokos, both because it lies within the same geographical region and because it is contemporary with the Mycenaean settlement on the Myti Kommeni promontory at Dokos.

'I should like to end this editorial note with a plea. H.I.M.A. has undergone a radical stage of development in recent years. It has required much labour, purpose and selfless dedication on the part of its members to earn general esteem. Its contribution and capabilities are by now proven. What is awaited in order to establish a long-term, fruitful presence in the field is proper recognition by the State together with a stable, advantageous collaboration on the part of the authorities. We are, unhappily, still waiting for the headquarters that has been promised us for so many years.

Nikos N. Tsouchlos

June 1994

THE 1991 UNDERWATER SURVEY OF THE LATE BRONZE AGE WRECK AT POINT IRIA

PART I: THE UNDERWATER SURVEY

Charalambos Pennas and Yannis Vichos

Between 30 September and 10 October an underwater survey was carried out of a Late Bronze Age wreck at Point Iria by the Hellenic Institute of Marine Archaeology. A team of ten members from the Institute took part, consisting of Charalambos Pennas, the expedition director, Ilias Spondylis, archaeologist and representative of the Ephoria of Underwater Archaeology, Yannis Vichos, archaeologist from H.I.M.A., Nikos Tsouchlos, president of H.I.M.A. and technical supervisor, Phaidon Antonopoulos, vice-president of H.I.M.A. and diving supervisor, Lucy Blue, archaeologist, Thanos Aronis-Webb, archaeologist, Vaso Kyriakopoulou, topographical surveyor, and Panayotis Karras, diver.

For the transport of the team to and from the site and as a floating diving base, the traditional type trechandiri Kalokyra was used (*Fig. 1*), generously loaned for the period of the survey by Adonis Kyrou, together with a small inflatable boat. The skipper of the Kalokyra, Dionysis Lekkas, also greatly assisted in the survey.

In addition to the various water craft, we employed the regular equipment needed for the survey, part of which was supplied by the Underwater Demolition Unit of the Greek Navy (M.Y.K.); the rest was the property of H.I.M.A.[1].

The survey was a continuation of the exploratory investigation made in 1990, during which the wreck had been relocated and its extent defined. Representative finds on the seabed had also been photographed on that occasion and a rough sketch made of the site marking the positions of the finds (see *ΕΝΑΛΙΑ ANNUAL* II, 1990, pp. 39-41).

The main aim of the 1991 survey was to locate the position of the wreck more precisely and delimit the area of the site, to photograph and plot all surface finds and to recover all those in danger of being stolen, as well as any others that might help to determine the nature and date of the wreck.

Fig. 1. *The trechandiri Kalokyra anchored over the site. (photo: N. Tsouchlos).*

The first two days were devoted to organizing the survey and visiting the site of the wreck to find the best spot at which to drop the Kalokyra's anchor for the purposes of the project.

The headland off which the wreck lies is called Kavo Iri (ancient *Strouthous*) and the beach northwest of it is known as Iria Beach (ancient *Agrioi Limenes*)[2].

Diving on the site began on Wednesday 2 October. The first team, consisting of Vichos, Antonopoulos and Blue, made a reconnaissance dive and located the exact position of the wreck and the finds that had been marked in the 1990 survey. During the dive Blue discovered two new finds, a half buried amphora that appeared to be intact (*Fig. 10* in p. 14) and an upright pithos neck, the bottom of which was apparently buried in the sand (*Fig. 3*). It was also noticed that in the place where in 1990 an upright half buried pithos neck had been found, 4.5 m northwest of the main pithos in the middle of the site (see the sketch in the *ΕΝΑΛΙΑ ANNUAL* I, 1990, p. 40), the upper part of a pithos with its neck was found buried on its side. This pithos had not been observed in 1990, and it is possible that it was the same pithos neck that had been found in 1990 and that it had been moved by

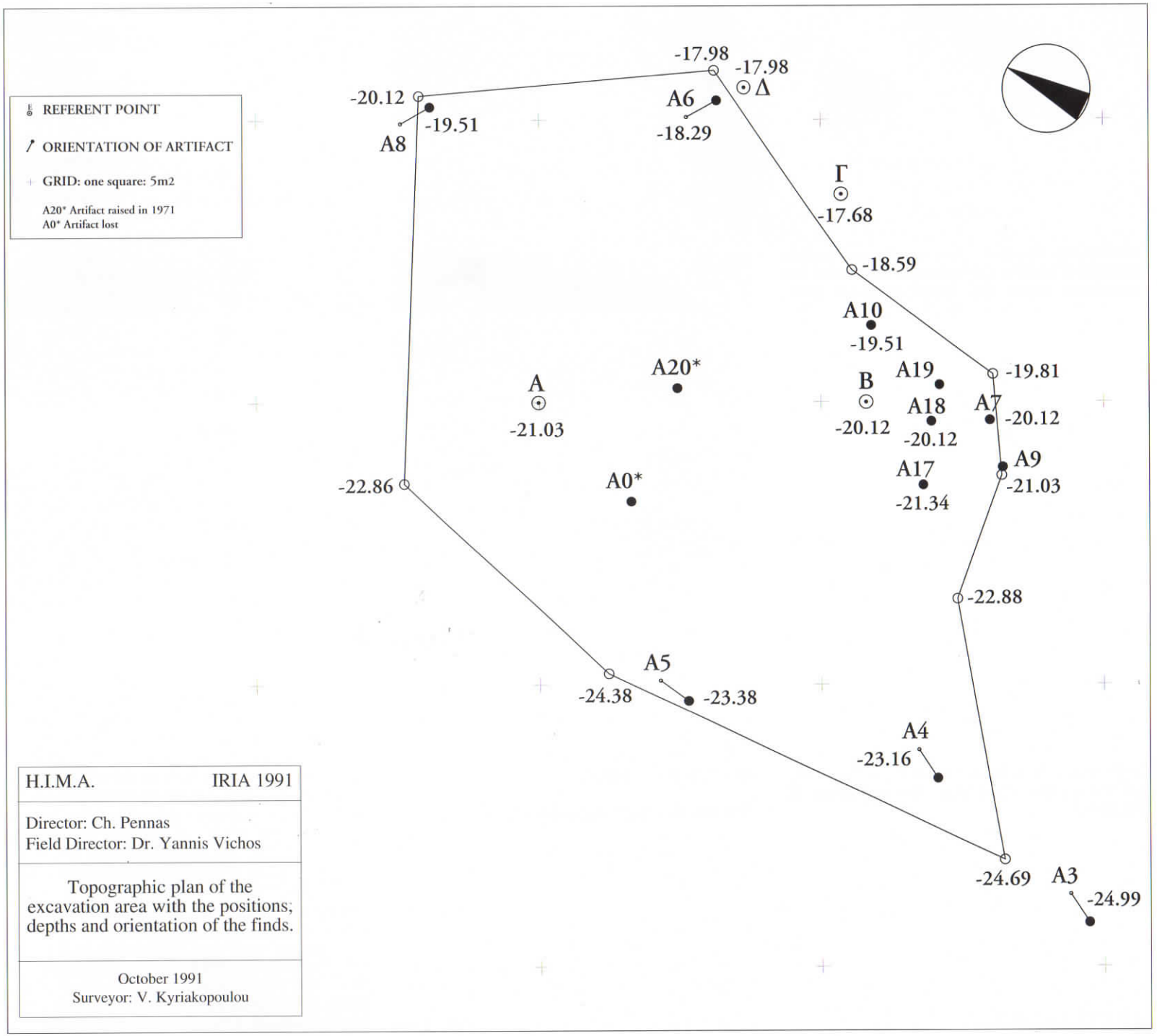

REFERENT POINT
ORIENTATION OF ARTIFACT
GRID: one square: 5m2
A20* Artifact raised in 1971
A0* Artifact lost
-17.98
-17.98
Δ
-20.12
A6
-19.51
A8
-18.29
Γ
-17.68
-18.59
A10
-19.51
A20*
A19
-19.81
A
-21.03
B
-20.12
A18
-20.12
A7
-20.12
A9
-21.03
A17
-21.34
A0*
-22.86
-22.88
A5
-24.38
-23.38
A4
-23.16
-24.69
A3
-24.99
H.I.M.A.
IRIA 1991
Director: Ch. Pennas
Field Director: Dr. Yannis Vichos
Topographic plan of the excavation area with the positions; depths and orientation of the finds.
October 1991
Surveyor: V. Kyriakopoulou

Fig. 2.
Cypriot pithos A4 on the wreck site (from above). (photo: N. Tsouchlos).

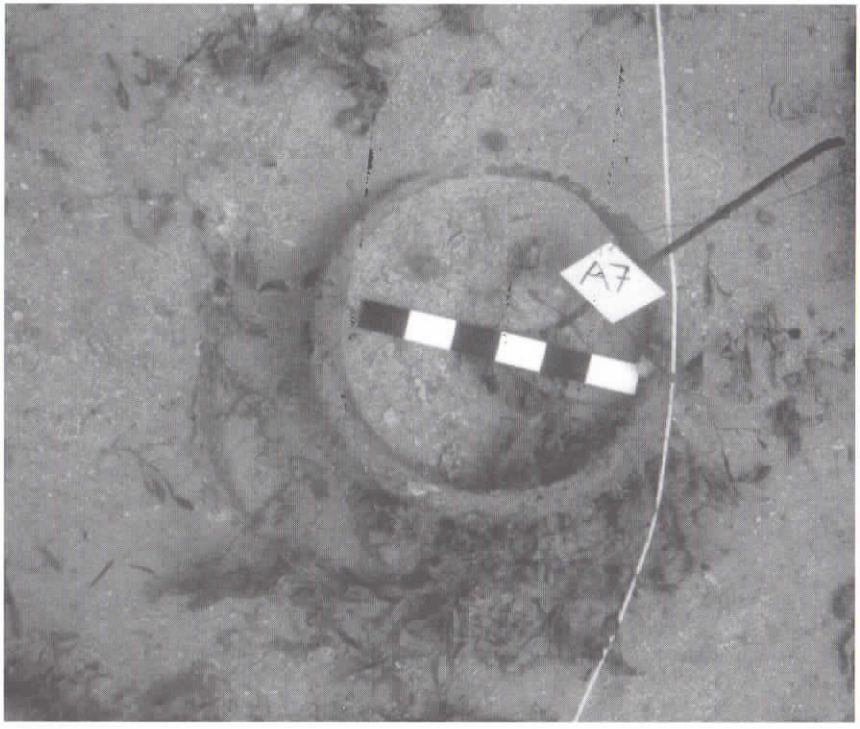


Fig. 3.
Buried neck of the Cypriot pithos A7. (photo: N. Tsouchlos).

an illegal diver in an attempt to raise it. It is probable, in other words, that the 1991 and 1990 finds are the same.

Our general conclusion about the state of the finds was as follows: in addition to the half-buried amphora, the large pithos in the middle of the site must also have been complete, although broken into two or three fragments (*Fig. 2*), and large sections of the rest of the vessels were visible. All the finds were buried to a greater or lesser extent in the sand, and a considerable number were concreted to the rocks.

The reconnaissance of the site began 25 m S-SE and ended some 20 m N-NW of the wreck To the west it reached a depth of 28 m. No other artifacts were found in this area outside the marked zone).

Lastly, during the course of the dive, after reconnoitering the site, nine iron stakes, numbering 1 to 9, were driven into the seabed around the area of the main scatter of the finds.

During the following dives that were carried out on the same day, the nine stakes were joined by a rope and formed a perimeter line around the main zone. Pottery finds from later periods were also located outside the perimeter to the north and east of the main zone. All the finds, inside and outside the perimeter line, were marked in situ with numbered labels (*Fig. 4*). Two dives were carried out with the aim of locating the stone anchor with three holes that had been found by Charalambos Kritzas 1974 north of the main concentration of finds, but without success.

On Thursday 3 October 4 reference points (A, B, Γ, and Δ) were set up inside the marked area, and the measuring began under the supervision of Vaso Kyriakopoulou, using a

measuring tape, to plot the position of the finds and to calculate their depths and orientation. The finds and measuring operations were photographed by Nikos Tsouchlos.

Bad weather interrupted the work during the next two days. On Friday, with the help of Adonis Kyrou, the survey team visited the archaeological site at the village of Kandia, where Mycenaean sherds are visible on the surface. Also, at the village of Iria we asked whether other divers had been observed visiting the wreck site, and this seems to have occurred at least once. On Saturday, with Adonis Kyrou again driving us, the team visited archaeological sites and monuments in the area, like Yyftokastro, where there is an important Mycenaean site, and Vothiki, which has a site that appears to be Classical.

On Sunday 6 October Spondylis, Agouridis, Kyriakopoulou and Webb set up two new reference points, outside the marked area (E and Z) and completed the plotting of the finds Pennas and Antonopoulos carried out a reconnaissance dive to experiment with methods of detaching finds concreted to the bottom and to organize the raising of the finds.

Over the next two days all the finds were photographed in situ and work began on detaching the finds concreted to the bottom using a hammer and cold chisel.

On Wednesday 9 October we started raising the finds. The general rule followed was to begin raising the deepest and largest objects and then to proceed to the smaller ones in shallower depths. The pottery finds, chiefly parts of amphoras, jars and large pithoi, were hoisted on board the Kalokyra and immediately wrapped in wet burlap and allotted a catalogue number. They were later measured and given a brief description.

Four dives completed the recovery of the objects. Lifting parachutes were used for some of the finds because of their great weight. The rest were brought up in net bags.

Before the lifting process began, Kyriakopoulou took bearings of the orientation of the finds and Tsouchlos photographed the work.

On Thursday 10 October the Kalokyra sailed from Tolo for Spetses with all the finds (*Fig.5*). On board, besides Dionysis the skipper, were the owner, Adonis Kyrou, together with Pennas and Spondylis. The Kalokyra arrived at Spetses in the afternoon and the finds were immediately taken to the Spetses Museum, where they were handed over to the Museum personnel and the conservator of the 2nd Ephoria of Byzantine Antiquities, Theophano Saramandi. The finds were accompanied by the catalogue with their short descriptions. They were housed in the Spetses Archaeological Museum with the agreement of the former head of the Ephoria, Mrs Eleni Manolesou, whom we thank.

During the days that followed, the finds were photographed and placed in large plastic tanks which had been procured by H.I.M.A. and sent to the museum. The finds are kept in water in the room put by the Ephoria at the disposal of H.I.M.A. on the groundfloor of the Museum until the work of cleaning, conservation and restoration is completed.

Fig.4. *Marking the stirrup jar A8 in situ. (photo: N. Tsouchlos).*

To sum up: during the bottom survey of the wreck at Point Iria by a H.I.M.A. reconnaissance team in the ten day period from 1/10 to 10/10/91, the following tasks were accomplished:

-The position of the wreck on the sea bottom and in relation to the mainland was precisely pinpointed.

-The finds were marked and their exact positions and depths plotted (plan on p. 5).

-The finds were photographed in situ, individually and in groups, where possible.

-All the finds visible on the bottom, which were at risk, were raised.

The finds that were raised were inventoried and transported to the conservation laboratory for antiquities in the Spetses Archaeological Museum, where the first steps in their conservation were taken.

Preliminary conclusions

A first evaluation of the results of the 1991 survey of the Point Iria wreck, in conjunction with the observations made during the previous surveys of the site in 1974 and 1990, suggests the following interim conclusions:

1. In the undersea area of some 900 m^2 that was surveyed off Point Iria, a total of 25 objects, chiefly pottery, were found on the sea

Fig. 5.
Excavation team and finds on the deck of the Kalokyra en route to the Spetses Museum.
(photo: N. Tsouchlos).

bottom, dating from the Late Bronze Age to the Byzantine period.

2. Among these finds a group of pottery can be distinguished, which was concentrated in an area of about 105 m^2 at a depth ranging from 20 to 28 m. All the finds in this group are typologically and chronologically relate[3].

3. The group consists of large and small domestic pottery of commercial types used for transport traveling vessels including large pithoi, jars, deep basins, a jug and a large trading Mycenaean stirrup-jar.

4. Most of the pots in the group are of Cypriot origin. All the finds date to the Late Mycenaean period, around 1200 BC.

5. The stone anchor with three holes that was found near the site in 1974 by Kritzas is a typical example of a Late Bronze Age anchor.

6. All the above facts point to the conclusion that part of the cargo of a Late Bronze Age Cypro-Mycenaean ship lies on the bottom of the sea off Point Iria.

7. The presence of objects of later periods in the general area of the wreck can be explained as the result of passing ships jettisoning part of their cargo, throwing broken pots overboard or sinking. In the latter event, the possibility cannot be ruled out that the remains of more than one wreck of different periods exist in the area of the Point.

8. The Point Iria wreck is a particularly important find both for the study of shipping in that period and our knowledge of the transport and movement of goods in the Eastern Mediterranean.

9. The exploratory excavation of the site projected for 1993 should prove of great interest, because it is expected to produce more evidence for the origin of the wreck, its

cargo and perhaps also for ship construction at that time.

NOTES

1. This equipment included an inflatable boat with a 35 HP outboard motor (belonging to M.Y.K.), 11 double diving cylinders (7 from H.I.M.A. and 4 from M.Y.K.), 3 single ones (from H.I.M.A.), a compressor (from M.Y.K.), two NIKONOS III cameras with flash, tools, and diving gear for 10 persons (from H.I.M.A.).

2. For more information, see Kyrou 1990, p. 211.

3. The presence of a later amphora on the boundary of the pottery concentration must be considered a fortuitous jettison.

PART II: THE POTTERY

Yannos Lolos

A preliminary study of the pottery from the Point Iria wreck[1] shows that the finds from the area of greatest concentration on the sea bottom constitute one of the most unusual and important closed groups of pottery to have been found in Greek waters.

The most decisive evidence for the date of the wreck is the Mycenaean coarse-ware stirrup jar A8 (*Figs. 4, 8a, 10*). Lacking only its vertical tubular spout, this stirrup jar is one of the complete or nearly complete vessels from the wreck. It has a tall ovoid body and was probably undecorated, to judge at least from its appearance before cleaning. It is a commercial stirrup jar of the type known as Aegean, which was popular in the Late Helladic/Late Minoan IIIA and IIIB periods, during the 14th and 13th centuries BC (Furumark 1941, fig. 9, shape 164).

In its general shape, A8 may be compared with the coarse-ware stirrup jars from the House of the Wine Merchant at Mycenae[2], dated to LH IIIA-B (Haskell 1981, 225 ff.), and with others, dating to the end of the LH IIIB 1 period, from the House of the Oil Merchant at Mycenae (Haskell 1981, 230 ff.), as well as with many inscribed stirrup jars from sites on the Greek mainland and Crete, which, taken together, span the LH/LM IIIA 2 - IIIB periods (Catling et al. 1980).

Fig. 1. *Upper part of an pithoid amphora with two horizontal shoulder handles (A3). (photo: Y. Vichos).*

Undecorated stirrup jars of almost identical type to A8 are represented by a LH IIIA-IIIB stirrup jar from the House of the Wine Merchant at Mycenae (Haskell 1981, 230, no. 10952, fig. 3d, pl. 43b) and by an example from the end of the LH IIIB period from the Oil Magazine 32 in the Palace of Nestor (Blegen and Rawson 1966, 403, shape 65a, figs. 329, no, 402; 389, no. 402; 390, no. 402). Based on the above parallels with stirrup jar A8 and bearing in mind the particular ovoid shape of its body (for this, see Haskell 1981, 234-235) and its general appearance, the Iria stirrup jar should be dated to the late 13th c. BC, and most probably towards its end, if not actually to its end. To judge from its fabric, it is not unlikely to be of Cretan origin.

Commercial coarse-ware stirrup jars with tall bodies have been found in underwater contexts from sites as far apart as Ulu Burun on the Lycian peninsula (e.g. Bass 1987, 715) and the island of Filicudi north of Sicily (Cavalier and Vagnetti 1982, 138, no. 11, pl. XLVII: 11).

Fig. 2. Upper half of Cypriot pithos A4.

Fig. 3. The lower half of Cypriot pithos A4.

The tall stirrup jar from the Iria wreck is the third example of its kind from southern Argolida to have been found on the seabed. The other two include the stirrup jar from the underwater excavation by H.I.M.A. at Myti Kommeni on Dokos[3] and the upper part of a stirrup jar of the same class found in the sea in the vicinity of Kosta, opposite Spetses (information kindly supplied by Adonis Kyrou: height of false spout 5.5 cm, diameter of disk 9 cm).The find spots of these three examples on the sea bottom in southern Argolid (Dokos, Kosta, Iria) also serve to chart the shipping routes followed in this region during Late Mycenaean times.

Apart from stirrup jar A8, the pottery from the main area of the wreck (from the marked area), included parts of two large undecorated vessels of general Mycenaean appearance: the upper half of a well-made jar (A3), with two horizontal cylindrical handles on the shoulder (*Figs. 1, 8b*), a photograph of which on the sea bottom has been published (Pennas 1990, 8, fig. 3); and a large shoulder fragment of a jar of the same type with one surviving horizontal handle (A6:1). They can be assigned with some confidence to the later 13th c. BC. It should be noted that large jars of this type with two horizontal cylindrical handles on the shoulder, although much less frequent than the usual kind with three or four horizontal or vertical handles, are not unknown in Late Mycenaean contexts (for examples dating to the latest LH IIIB period from Room 38 in the Palace of Nestor at Pylos, see Blegen and Rawson 1966, 395, shape 56, fig. 330, nos. 601, 611; fig. 384, nos. 601, 611)[4]. The closest parallel, however, for the shape of pithoid jars A3 and A6/1, comes from a Mycenaean chamber tomb at Prosymna in Argolid (see Blegen 1937, fig. 430).

Apart from the presence of the Mycenaean-Helladic transport vessels, a quite unexpected development during the course of our investigation of the material from the sea bottom at Iria, and one with considerable implications, was the identification of vessels of a purely Cypriot type. These are the pithoi A4: 1-5, A5: 1 and A7, which were found in the

Fig. 4. *Mycenaean stirrup jar A8. (photo: Y. Vichos).*

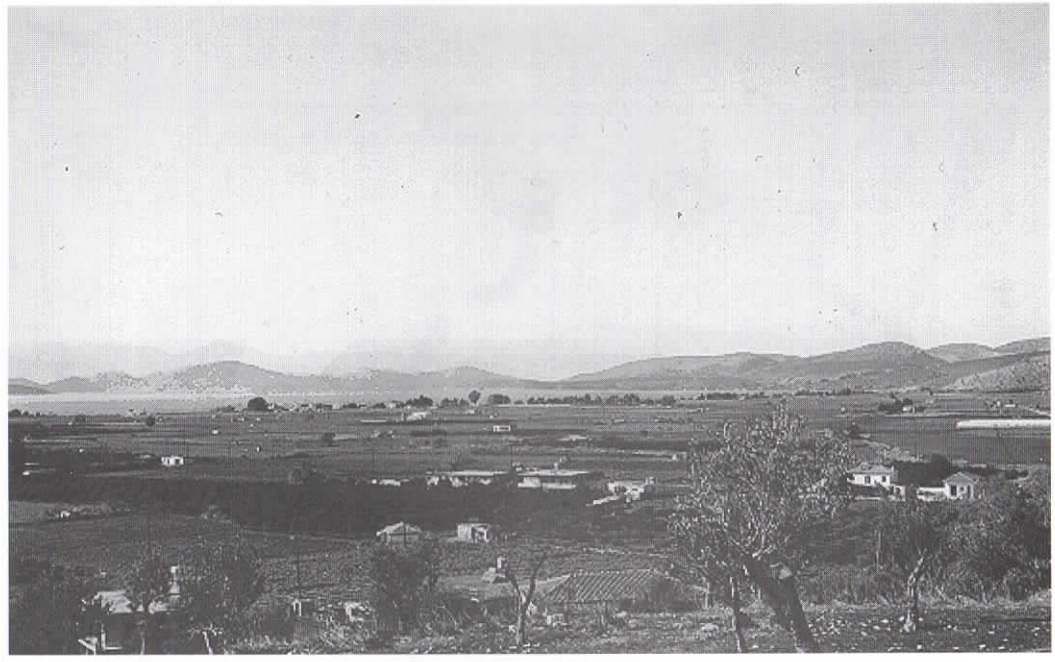


Fig. 6. *View of the Iria plain from the prehistoric site at the modern village of Iria. Behind, left, Tolo. (photo: A. Mari).*

Fig. 5. *The handleless Cypriot jug A20. (photo: N. Tsouchlos).*

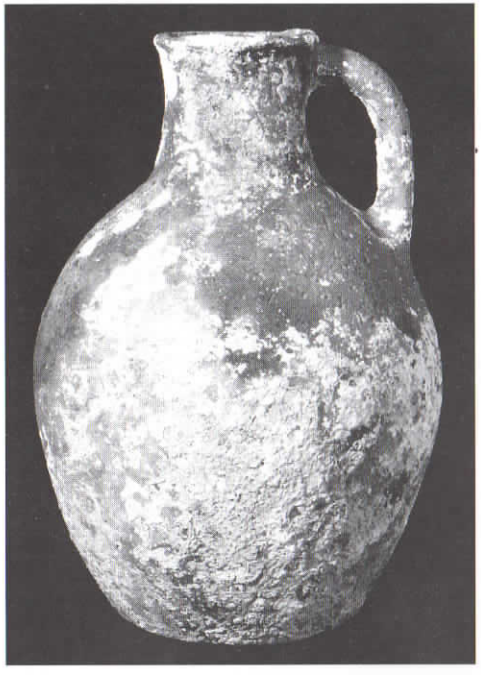


Fig. 7. *The prehistoric acropolis of Kandia. (photo: A. Mari).*

Drawings: Tonia Koutsouraki

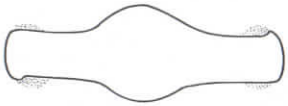


Fig. 8a. *Profile and section of stirrup jar A8.*

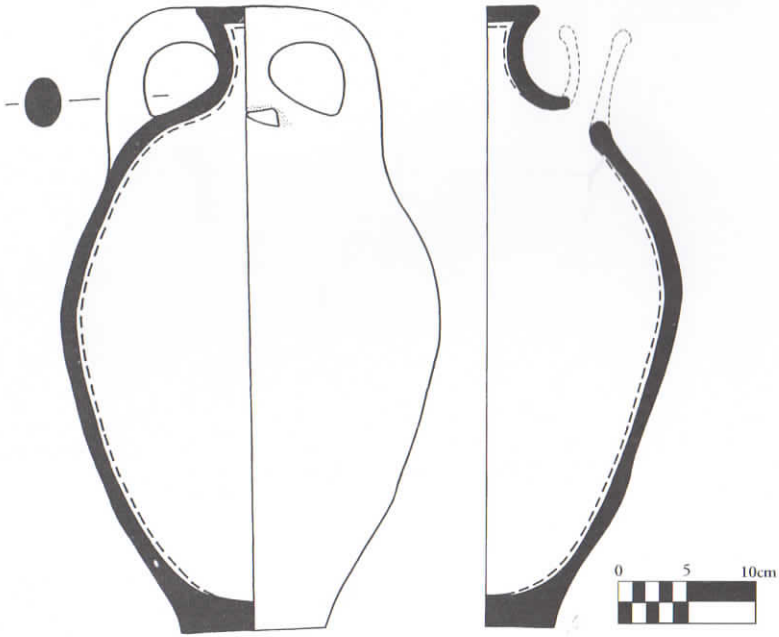


Fig. 8.

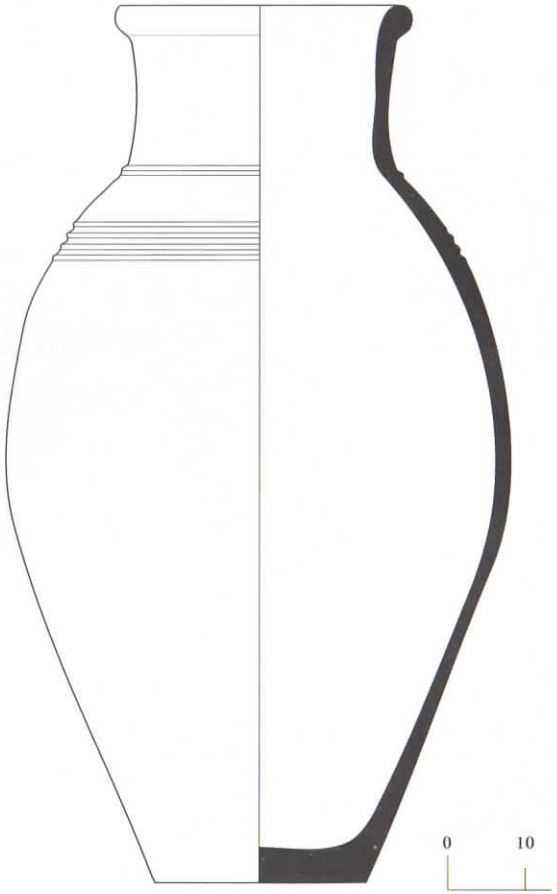
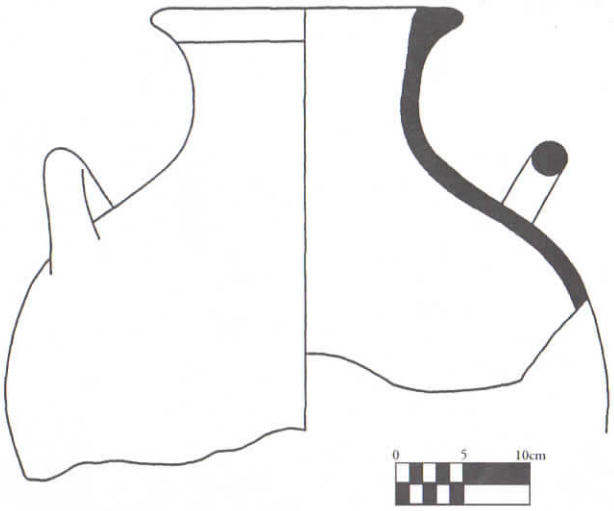


Fig. 8b. *Profile and section of amphora A3.*



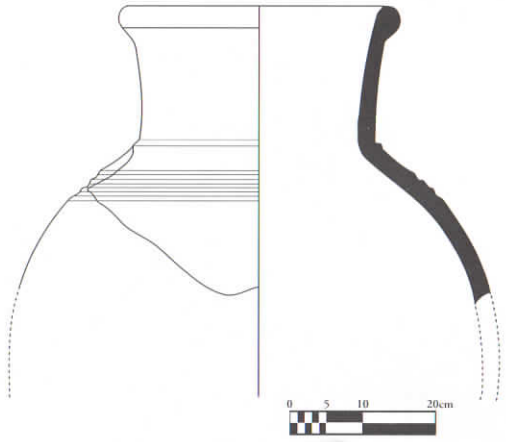


Fig. 8c,d. *Profiles and sections of the Cypriot pithoi A4 and A7.*

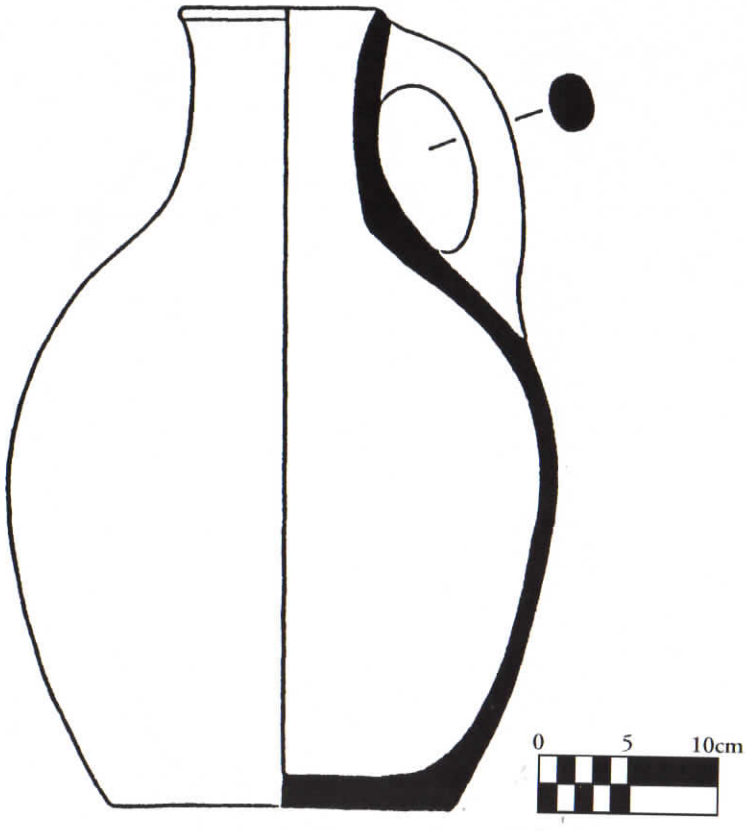
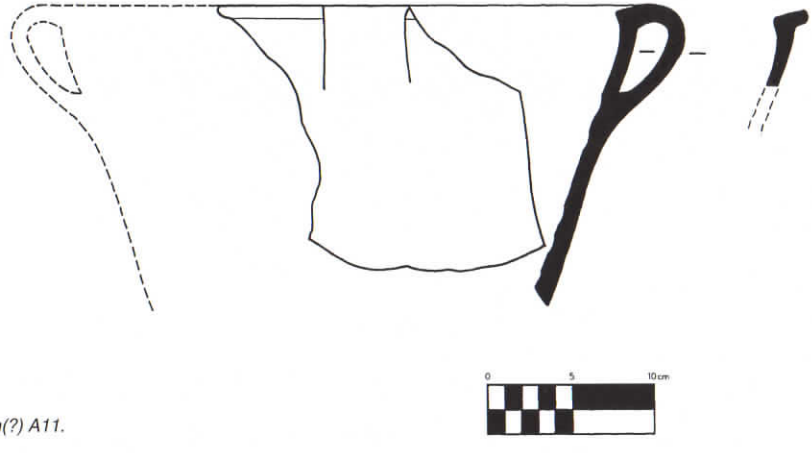


***Fig. 9a**. Profile and section of Cypriot jug A20.*

***Fig. 9b.** Profile and section of the large bowl A14.*



Drawings: Tonia Koutsouraki

***Fig. 9c.** Profile and section of the basin(?) A11.*

Fig. 9.

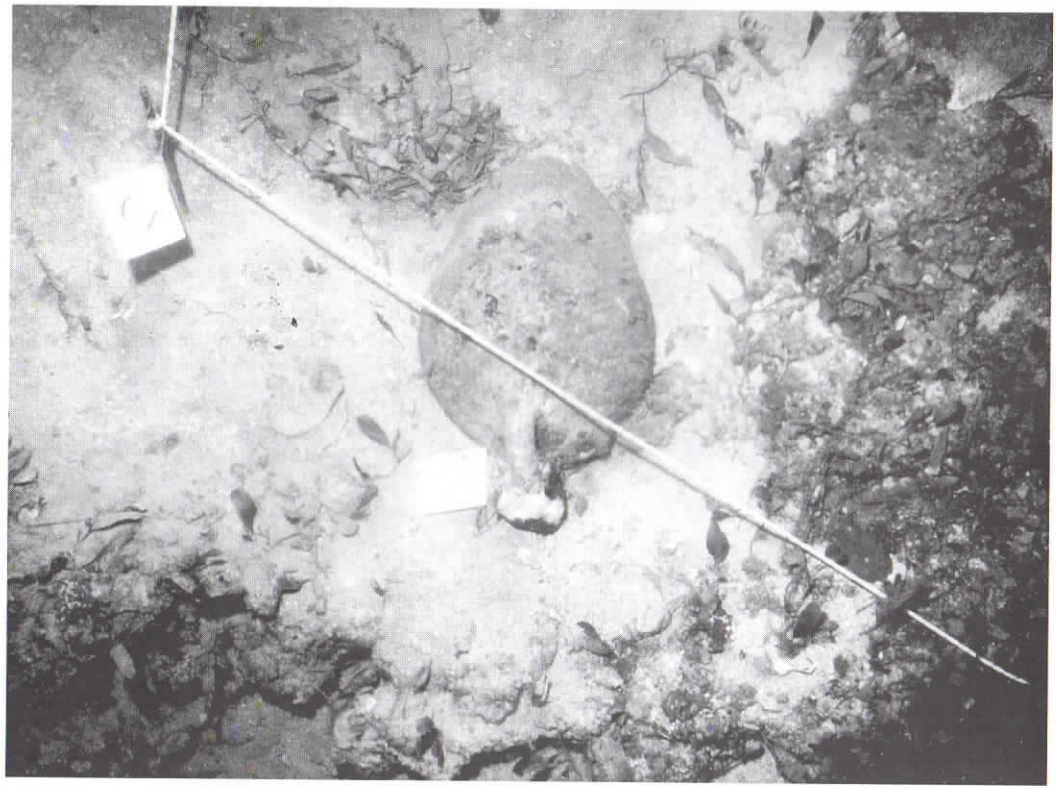


Fig. 10. Mycenaean stirrup jar A8 on the wreck site (Photo: Y. Vichos).

area of the greatest scatter of pottery[5], and the large intact jug A20, which had fortunately been rescued from the wreck site some years previously by Nikos Tsouchlos[6]. These types have such numerous and striking parallels in Cyprus that there can be no doubt that they are of Cypriot origin. These initial conclusions are expected to be confirmed by a petrographic examination of the clay, like that carried out on other Cypriot pottery found outside Cyprus (Ferrarese Ceruti, Vagnetti and Lo Schiavo 1987, 19, fig. 2.5; Jones and Day 1987).

The pithoi A4 (*Figs. 2, 3 and 8c*), A5 and A7 (*Fig. 8d*) have a conical-ovoid body, a generally cylindrical neck and thickened well-formed rim and have no handles. There is a plastic ring around the base of the neck, and on the shoulder a multiple horizontal relief band made with three fingertips.

The Iria pithoi have numerous exact parallels in typical Cypriot pithoi of the Late Cypriot IIC and beginning of the IIIA period from sites like Myrtou-Pighades, Pyla-Kokkinokremos, and Maa-Palaiokastro as well as at Ugarit in Syria (Catling 1957, fig. 24: 359; Karageorghis and Demas 1984, pls. XXI:18A, XXII:19, XLI:19, 18A; Karageorghis and Demas 1988, pls. LXII: 462, CLXXXIV: 462; Schaeffer 1959. fig. 86: 22, 23, 27, 29, pl. XXXI: 2).

Pithoi with or without handles, with beehive-shaped or ovoid bodies and decorated with a horizontal multiple relief band on the shoulder or, very often, with two such bands and a wavy band between, had a wide distribution in Cyprus, especially during the 13th c. BC (Åström1972, 259-264, fig. LXXII: 6; Karageorghis 1992, 8, for recent examples from Kalavassos). We find them in far great distances in the Mediterranean, from Ugarit on the Syrian coast to Antigori in Sardinia (Schaeffer 1949, fig. 86: 21, 22, 23, 27, 28, 29; Ferrarese Ceruti, Vagnetti and Lo Schiavo 1987, 19, 36, fig. 2.5; Karageorghis 1992, 8).

The tall undecorated jug A20 (*Figs. 5, 9a*) is distinguish by its great weight, massive body, wide base and relatively narrow neck. The shape, which is totally absent from the known Late Mycenaean pottery repertoire, and general appearance of this jug find close or exact parallels in Late Cypriot IIC or IIC/IIIA versions of jugs from Cypriot sites like Ayios Iakovos, Myrtou-Pighades, Kition, Pyla-Kokkinokremos and Maa-Palaiokastro (Gjerstad 1934, pl. LXVI:1 [top row, second pot]; Catling 1957, fig. 22: 305 - 307 (Plain White Jugs); Karageorghis and Demas 1985, pl. LXII:230/2; Karageorghis and Demas 1984, pl. XXXVII:1, 24, 45, 50, 88A, 128; Karageorghis and Demas 1988, pl. LX:550, CXCI: 550, CXCV:615, Bothros 1/2, CXCVI:432; also Åström 1972, fig. LXXII:5).

Two partially preserved pots of open shape, the largish bowl or basin A14 (*Fig. 9b*) and the basin(?) A11 (*Fig. 9c*), which came from points outside the presumed concentration of pottery finds, may also prove to be Cypriot, once they are cleaned and the necessary laboratory examination of their clay carried out[7]. It may be noted that these particular shapes, which bear no similarities to those of the plain LH IIIB basins known from Peloponnesian sites, are very close to the those of the generally contemporary large bowls or basins from Cypriot sites, and some examples from the sanctuary at the site of Myrtou-Pighades (Catling 1957, figs. 21 and 22, (Plain White Bowls) and Pyla-Kokkinokremos (Karageorghis and Demas 1984, pls. XXI:18, XXXVI:18).

Lastly, there are three fragments of obviously later vessels, comprising two amphoras (A12 and A13) and a closed three-handled pot of unusual type, with metallic features (A2/A15), which came from points outside the main concentration of pottery, and part of an amphora (A6) from within the site of the wreck. These may be explained as jetsam from passing ships and have no connection with the main body of Cypro-Mycenaean pottery. The

situation is similar at Myti Kommeni on Dokos and other wreck sites.

General comments

1. The Point Iria wreck is the third Late Bronze Age wreck in the Mediterranean to be fully excavated, and the first in the Aegean area. From a preliminary examination of the part of the cargo that has so far been recovered, it appears to be contemporary with the Cape Gelidonya wreck and approximately a century later than the one at Ulu Burun on the south coast of Turkey. It thus belongs to an advanced phase of the Late Bronze Age at around 1200 BC.

2. The geographical location of the pottery at Iria is a direct indication of the existence of an important sea communications and trading route along the south coast of Argolida, clearly forming part of both a local Peloponnesian and a much wider network of sea communications in the Late Mycenaean period. The route is further defined by a series of Late Mycenaean sites and settlements, absolutely or approximately contemporary with the Iria wreck, along the south coast of Argolida and on the islands in the area[8]. The local limits of this route can be defined on the east-southeast by the sites at Choriza and Ayios Nikolaos (Bisti) on Hydra[9] at Myti Kommeni on Dokos and Magoula at Ermioni, and on the west-northwest by Asine[10], and by Tiryns in the bight of the Argolic Gulf.

3. As an underwater one-period cargo find, the pottery (Mycenaean/Helladic and Cypriot) from the wreck offers an instructive chronological homogeneity. Even more interesting is the fact that this group of pottery contained characteristic types of both Mycenaean and Cypriot transport vessels that were particularly widespread in the 13th c. BC (the stirrup jar A8 and the pithoi A4, A5, A7), and whose distribution range covers the greater part of the Mediterranean. The traffic in these wares, within the framework of the international long-distance exchange trade of the time, can now be followed from the coast of Syria (Ugarit), Cyprus and Lycia (Ulu Burun point) to the Aeolian Islands north of Sicily and Sardinia.

4. The Cypriot pottery recovered from the Iria wreck forms the largest single group of Late Cypriot transport vessels so far known in the Aegean. It is also naturally expected that the quantity of this pottery will be significantly increased by the planned excavation of the site in the future.

5. It is hoped that the Cypro-Mycenaean finds at Iria will eventually provide further concrete evidence of trading and shipping during the late Mycenaean period in the Aegean area and beyond. It will also shed new light on one of the most critical periods in Greek and Cypriot prehistory, in the course of which the collapse began of the great Mycenaean *Koine* in the eastern Mediterranean.

NOTES

1. I am especially obliged to Dr. Lucia Vagnetti for the information she readily supplied during the course of the preliminary study of the pottery from the wreck. I also warmly thank Dr. Bill Phelps for his interest in our survey and the discussion we had about the Iria find, and also the archaeologist Tonia Koutsouraki for her painstaking and accurate drawing of the pottery from the wreck and for her ready collaboration generally.

2. The deposit of fifty and more coarse-ware stirrup jars from the House of the Wine Merchant at Mycenae is dated to the mature Late Helladic IIIA or IIIA-B periods (on this question, see Haskell 1981, 225-226).

3. This is the find B39 from 1992, dated to the LH IIIA-B period. It is made of coarse clay and the beginning of one handle is preserved (pres. h. of false spout 6.3 cm, calculated diameter of the disk of the false mouth 7 cm, exactly the same as the disk on stirrup-jar A8 from Iria). Like other pottery finds from the area of concentration of the Early Helladic II wreck on the bottom at Myti Kommeni, this stray piece must have been dropped or thrown overboard from a ship.

4. Another, considerably earlier example comes from the South Tholos Tomb 1 at Peristeria in Western Messenia (unpublished: today in Apothiki 2 of the Museum at Chora, Triphylia; it is mentioned here with the kind permission of Prof. G. S. Korres).

5. It should be noted that in the main area of the wreck at Iria there was also a fourth, completely intact pithos of Cypriot type, which was photographed some twenty years ago by Nikos Tsouchlos (see the cover photo on *ΕΝΑΛΙΑ* II,1/2, 1990). To judge from the existing photographs, this pithos with its conical-ovoid or ovoid body, had a plastic band around the neck-shoulder junction, but lacked the characteristic multiple relief band on the shoulder. It may be taken as certain that, unhappily, it was stolen during the long intervening period between 1974 and 1990, when the H.I.M.A. survey began.

6. Today this jug is in the Spetses Museum together with the other pottery finds from the wreck.

7. Professor Vasos Karageorghis, having seen the drawing and photograph of the sherd A11, does not rule out the probability that it comes from a laver (for the type of Late Cypriot IIC 2/IIIA laver, see Karageorghis and Demas 1988, pls. LXI:588, CLXXXIV:588). Professor Karageorghis expressed the above opinion in a recent meeting we had in Athens and after the final text of this article had been submitted for publication in *ΕΝΑΛΙΑ*. We thank him warmly, not only for his suggestion (on a point that needs further research), but for the general fruitful exchange of views about the Iria wreck that we had and for his cooperation.

8. Of the Mycenaean sites in the area known to us, the nearest to the wreck is the settlement on a hill, with a splendid view (*Fig. 6*), at the modern village of Iria. The life span of this settlement, small sections of which were excavated by K. Gebauer in 1938, does not seem to have lasted beyond the latest LH IIIB 2/earliest IIIC 1 periods (Walter 1940, 221; Jantzen et al. 1968, 373-374; Ervin 1968, 271; Hope Simpson 1981, 26-27 (A27); also AA 1939, 287ff.).The settlement was conveniently situated from a strategic point of view, with direct access to natural harbours (ancient *Agrioi Limenes*), and able to control a considerable area of cultivable land. Its more direct importance will surely emerge in the context of the final interpretation of the wreck. Already, during a recent visit by members of the Iria survey team to the prehistoric settlement, the impression was formed that it had been a local centre which flourished during all three main periods of the Bronze Age, like neighbouring Kandia (*Fig. 7*), Asine and Ermioni. The surface sherds noted at the site include Early, Middle and Late Helladic, as well as Neolithic, material).

9. A Late Mycenaean site on Hydra (ancient Hydrea) with a large artificial water supply system of Cyclopean appearance (reservoir, conduit). This site, which was probably an important provisioning station for Mycenaean ships, was pointed out to us by Adonis Kyrou (Kyrou 1990, 95-97, 111, 245-246; Lolos 1991, 198).

10. The closest to Iria of the Mycenaean centres in Argolida that are mentioned in the Homeric Catalogue of Ships are Asine, Masis and Ermioni (Iliad II, 560, 562). These three cities are also mentioned in a fragment from Hesiod's poem, the Catalogue of Women or Eoiai: 39 (94.96) b 14-11 (Papyros Edition, no. 170, Athens, pp. 64-65).

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DOKOS: 1991 CAMPAIGN

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Yannis Vichos
Yannos Lolos

THE UNDERWATER EXCAVATION

During the 1991 campaign at the Early Helladic wreck site on Dokos conducted by the Hellenic Institute of Marine Archaeology in August and September under the direction of the Honorary Ephor of Antiquities, Dr. George Papathanasopoulos, the excavation of the site was continued using the same means and methods employed in the previous season. Only the use of stereophotography was discontinued, since it was thought to be superfluous now that the SHARPS system has proved itself to be so reliable, and also because the area of Trench 2 is on a very steep slope and it would have been very difficult and time-consuming to set up and move the stereophotographic grid.

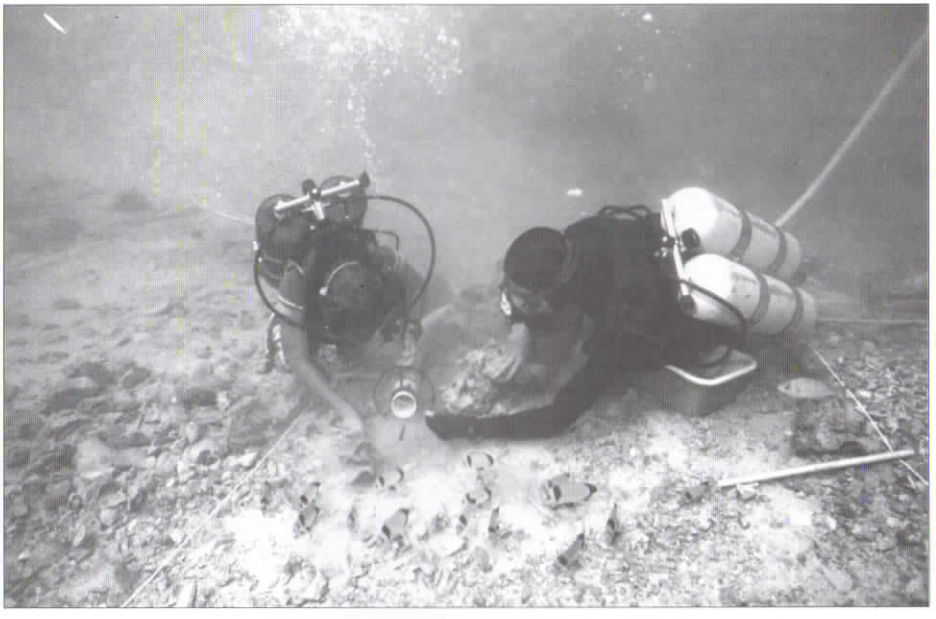


Photo: Kyle Jachney

Fig. 1. *Excavating with the air-lift in Trench T2.*

The following work was accomplished in 1991:

1. Marking, photographing and plotting with the SHARPS the positions of the visible surface finds that had appeared in the course of the previous winter, and raising them.

Altogether 119 individual finds or groups of finds were marked, plotted and raised, the great majority of them parts of Early Helladic pots (*Fig. 3*), querns and grinders.

Many of the pots are of particular interest, like an almost complete EH spherical amphora, an almost complete deep EH bowl, the upper part of a jug and the foot of a spit support, among others.

2. Excavation of the second trench (T2), which had been laid out and cleaned in 1990 (*Fig. 1*).

A full stratigraphic excavation of two of the sections of T2 (T2α, T2γ) was carried out:

The surface level A consisted mainly of very many large and medium stones, querns, a little sand, shells, EH sherds and marine concretions. The cleaning of the surface level had begun in the previous campaign with the removal of the large and medium stones all over T2. The average thickness of Level A at this point was roughly 50 cm.

Level B consisted of more and deeper sand, small stones, fossilized shells and fragments of EH pots. Most of the sherds were Early Helladic, but quite a number of fine and often painted LH sherds were also found in this level.

Level C, at a depth of 1 to 1.5-2 m, went down to a point where archaeological traces ceased to appear. We began to notice this when the excavation reached a depth of 1.5 to about 2 m below the seabed. The composition of the third level was compacted sand with small and medium stones and fossilized shells in different places, and in some parts a dark brown muddy clay appeared. There were numbers of EH sherds in this level (*Fig. 2*), and also some large fragments of pots mixed with LH sherds. The EH sherds were characterized by calcareous deposits, which may have come from the surrounding rocks.

The most important finds in Trench 2 were marked, photographed and plotted with the SHARPS. All the finds were then raised. In Trench 2 a total of 17 individual finds or groups came from Level A, 26 from Level B and 92 from Level C.

The finds included many large EH pot fragments, many fewer LH sherds, querns, grinders, animal teeth and bone fragments, some blades and flakes of obsidian, a small amount of charcoal, small pieces of wood and lumps of slightly baked or unbaked clay. The finds also included a small lead anchor stock of the Classical or Hellenistic period.

3. The third Trench (T3) was laid out and the surface cleaned.

During the cleaning of Trench 3, three groups of surface EH pot fragments were marked, and a small number of querns and grinders.

The positions of the finds plotted by the SHARPS were entered in two files on the computer: the first contains only the positions of the finds from the 1991, and the second also includes the finds from the two previous campaigns. In this way it is possible to select

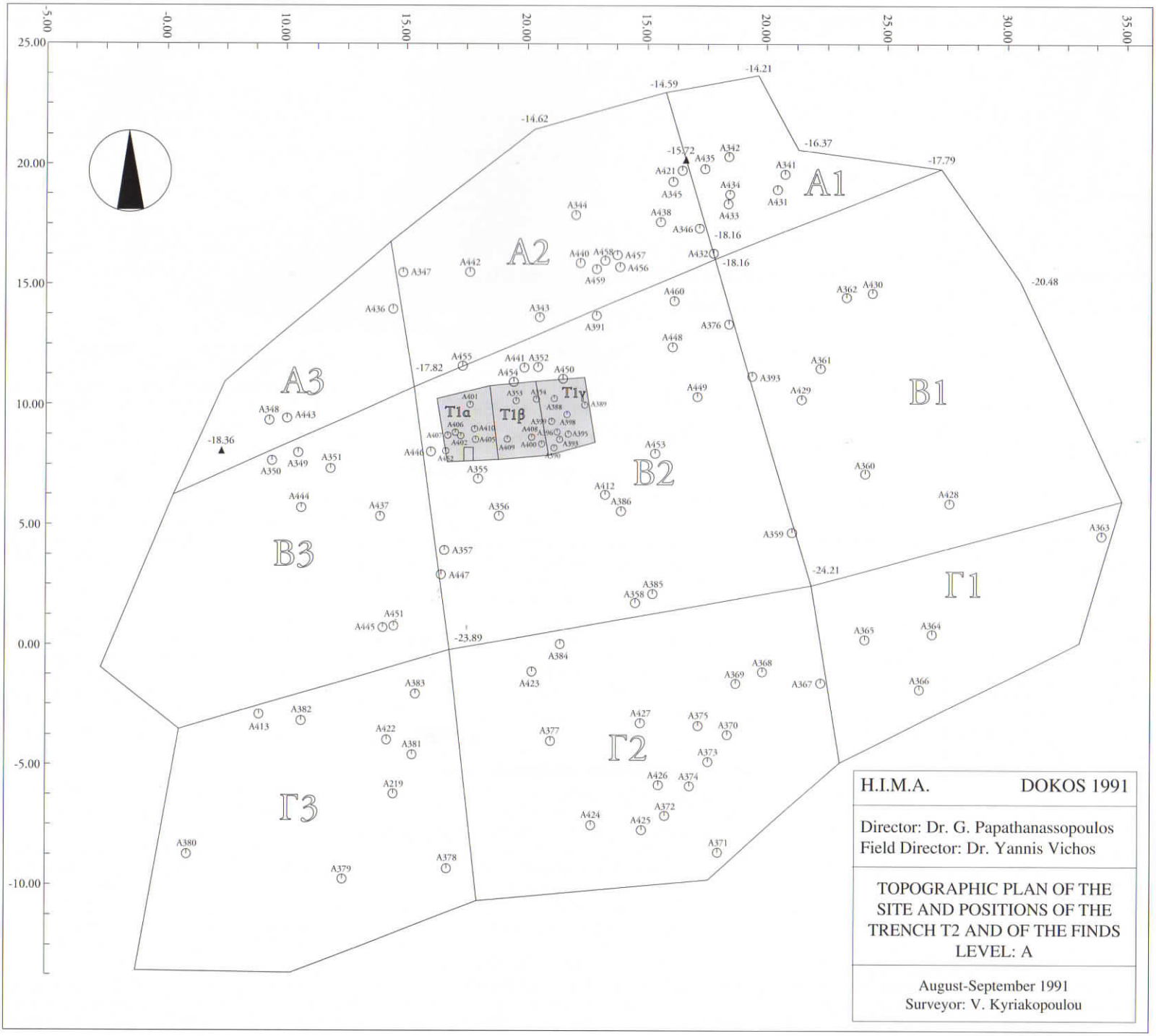

A1
A2
A3
B1
B2
B3
Γ1
Γ2
Γ3
T1α
T1β
T1γ
H.I.M.A. DOKOS 1991
Director: Dr. G. Papathanassopoulos
Field Director: Dr. Yannis Vichos
TOPOGRAPHIC PLAN OF THE SITE AND POSITIONS OF THE TRENCH T2 AND OF THE FINDS LEVEL: A
August-September 1991
Surveyor: V. Kyriakopoulou

Photo: Kyle Jachney

Fig. 2. *Part of an EH II pot in T2.*

and print plans with all the combinations of the finds.

In 1991 a total of 237 individual finds or groups of finds were recovered from the three excavation levels. If we add to these the 411 individual finds or groups of finds from the two preceding seasons, the total number recovered comes to 648. These 648 groups represent thousands of small, medium and large potsherds, whole vessels, querns and grinders, lead objects and other finds of organic and inorganic materials.

A first estimate puts the total number of EH pots represented by the above finds in the hundreds.

The inventorying, drawing, photography and classification of the finds, as well as the details of the conservation treatment of all the finds, were carried out with the aid of an Apple Macintosh computer. The processing of all these details on the computer is used to create an index card for each find containing all the facts about it, including statistical data on the frequency of each type of pot or quern shape, and the total number of pots contained in the wreck cargo or found in the area, either on the bottom or at a depth below it, or belonging to other periods.

At the same time the treatment of the finds by a team of conservators in the laboratory of the Spetses Museum, which H.I.M.A. organized and equipped for the purpose, continues at intervals.

The finds from this year's excavation season make it even more apparent that the great bulk of the EH II pottery recovered from the underwater site formed the cargo of a large Early Helladic ship which foundered in a natural harbour, where there would have been much traffic, since it was next to a settlement, probably a trading station, on the Myti Kommeni promontory in the EH period.

Many of the small finds, like animal teeth, obsidian, fragments of spindle-whorls and small pieces of unbaked bricks, that have been recovered to date must have washed into the sea from the EH settlement on the promontory and have no connection with the wreck.

The picture of this large underwater find is complemented by the limited presence among the EH II pottery of Mycenaean sherds, plain and decorated, representing the three main phases of the Mycenaean period (Late Helladic I, II and III). There can be no doubt that this material comes for the most part from the large Mycenaean settlement on the promontory, parts of which are being uncovered by the land excavation.

THE POTTERY

The numerous finds made during the 1991 campaign added considerably to the total quantity of pottery from Dokos. Comprising as it does a closed group of Early Helladic II pottery, the large underwater find at Myti Kommeni is ideal for a detailed study of the pottery made in the second brilliant phase of the Early Bronze Age. An interesting and puzzling assemblage of EH pottery that is comparable in size with the Dokos cargo is that from the underground chambers discovered at Koropi, in Attica, by Olga Kakavoyanni (Kakavoyanni 1986).

As we have mentioned in earlier reports, the bulk of the material from the wreck cargo consists of sherds belonging to the EH II period, and to be more precise, to its latter part. Nevertheless, even from the underwater excavations of 1989-1991 a considerable number of whole or restorable EH II pots were recovered.

Alongside the ongoing study of the EH II pottery from the wreck, a programme has been started for a petrographic analysis of the clay of certain classes of pottery and of the clay utensils, in order to try to determine their provenance. This may make it possible to calculate the route of the Dokos ship and throw some light on the pottery trade in the Argosaronic Gulf during the EH II period.

The addition of the fresh pottery material from the 1991 season has brought further confirmation of the preponderance of the simple

bowl without handles in the frequency chart of the principal EH pottery types from the wreck. Deep (e.g. A53) and shallow (e.g. A242, A25) versions of this shape, usually with a ring foot, have already been cleaned and drawn *(Fig. 4 and Pl. Ia, b)*, as well as large specimens like bowl A456 (*Fig. 5*) with a high conical foot, which has a close parallel in A30 from the underwater site of Ledeza (*Fig. 15*). The shallow spouted bowl Γ17 (*Pl. Ic*) is unique among the large body of material not only for its shape, but because of its different clay, which is light brown to orange in colour.

As the study of the EH II pottery recovered in 1991 progresses, the well-known type of amphora with an oval or oval-spherical body and two or more vertical strap handles on the widest part is fully established as the second commonest type in the wreck cargo. There are in general numerous rim, shoulder and body fragments of this type of amphora, as well as the typical broad, sharply curved strap handles (*Fig. 6*), some of which are stamped (*Fig. 7*). The necks are either vertical or nearly vertical (A324, A357), or everted with more or less concave walls (A445, Γ48). In some cases the bodies are decorated with horizontal plastic bands level with the handles or on the shoulder (A297/1, *Pl. Va, b*).

One of the more interesting EH II fragments that have been identified is that of the two-handled amphora A357 (h. 24.5 cm), about half of which has survived, heavily encrusted on the inside. It is the only example of this shape of which the whole profile from the rim to the flat base has been preserved.

The flattened strap handles of amphoras and jars that have been recently cleaned include two stamped examples made of brown clay, which must be added to those already published, A21/4 and A260/1 (Papathanasopoulos et al. 1990, 12, fig. 17). One of these (A318), with an average width of 4 cm, has a row of three small impressed circles (diam. 1 cm) on the upper surface, and the other (A464, a 1992 find; see *Fig. 7b*), 5.3 cm wide, has two impressed motifs composed of three concentric circles (cf. A260/1 in *Fig. 7a*). Impressed or incised little circles and concentric circles, alone, in a row or scattered,

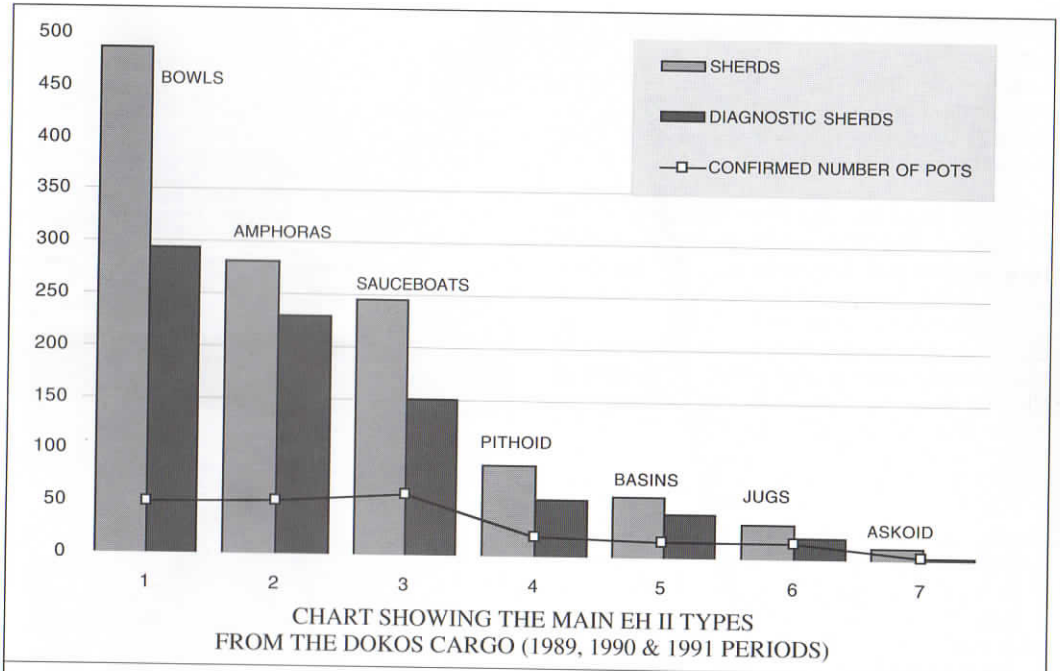
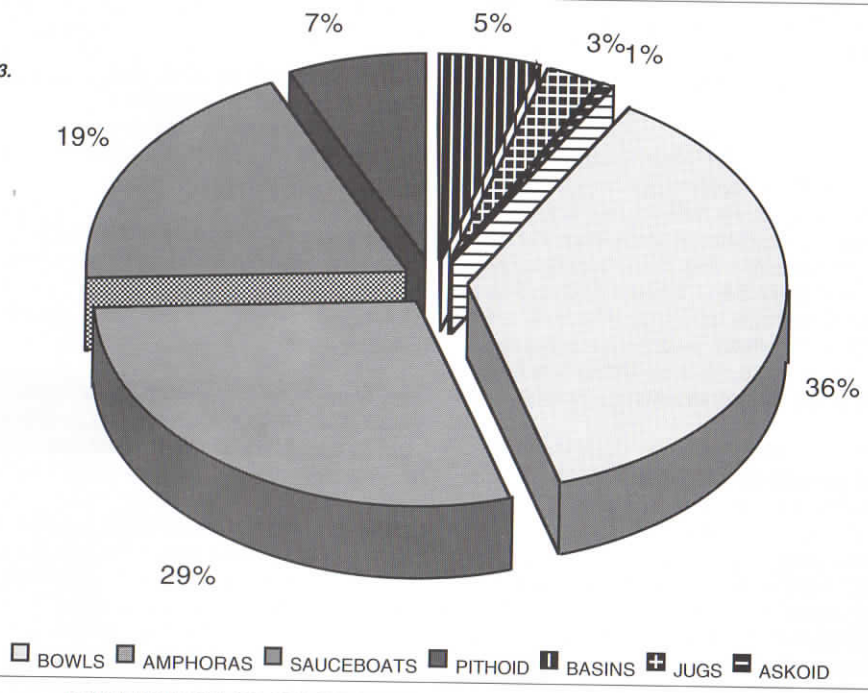


CHART SHOWING THE MAIN EH II TYPES
FROM THE DOKOS CARGO (1989, 1990 & 1991 PERIODS)

Fig. 3.



PERCENTAGE OF DIAGNOSTIC SHERDS OF THE MAIN EH II TYPES
FROM THE DOKOS CARGO (1989, 1990 & 1991 PERIODS)

were frequently used on Early Cycladic II-III pots and utensils (Bossert 1983, 127, fig.2: 2; Barber 1987, figs. 58: 11, 19, 59: 6, 19, 25a, 61), and also occur on pottery, usually of Cycladic origin or inspiration, from EH centres in the Peloponnese and Central Greece.

Flattened strap handles with impressed motifs or stamps, like these from Dokos, are very rare among the amphora and jar handles known from EH sites. Apart from one example known to us from the EH settlement on the Bali headland of Hydra, a broad strap handle has recently been published from the cave of Skotini Tharrounion on Euboia (Sampson 1993, 307, drawing 241: 43, fig. 253), on the top of which are six stamps with the same motif, but different from the concentric circles.

These example of amphoras with stamped handles from Dokos are the earliest known group of their kind in the Aegean. Their presence in the wreck cargo is clear evidence of trade in different products and of the development of a regular system of maritime commerce. They are in a way forerunners of the Greek stamped amphoras of the historical period.

Small (A51, A154), medium and very large (A131, A99, see *Pl. Id*) examples of sauceboats, which are the third commonest shape in the wreck cargo, and some of which still preserve traces of the original lustrous Urfirnis slip, have already been drawn. As the drawing of the finds progresses, it is hoped eventually to produce a comprehensive typology of the EH sauceboats from Dokos, in order to be able to compare them with those from EH sites in Argolid, Corinthia, Attica, Boiotia and Euboia.

A number of partially preserved deep bowls with a distinctive spout (A434, Γ65/1, Γ119, Γ139; see *Fig. 8* and *Pl. IIa*) form a special group among the open shapes. The spout, attached just below the lip, is always horizontal, open and provided with a circular hole in the wall of the pot. A good idea of the shape is given by a complete (restored) example with two small horizontal handles on the sides from Zygouries (Blegen 1928, 99, no. 276, fig. 87) and another similar one from

Fig. 4. *EH II bowls, after restoration (photo: K. Xenikakis).*

the Lerna III level in the Lerna Room of the Argos Museum (and cf. Protonotariou-Deilaki 1971, 70, pl. 61b:1, a jug from the settlement site of Ayios Yerasimos at Lechaion).

The one-handled type of cup with a slightly carinated profile is represented by two examples, one complete (A310) and the other (Γ2) lacking only the raised handle (see Papathanasopoulos et al. 1990, 12, fig. 13). As the study of the pottery advances, more EH parallels are being found that are close or identical to these two cups. They are known from Argissa in Thessaly, Lithares near Thebes, Ayios Kosmas and Palaia Kokkinia in Attica (Spyropoulos 1969, pl. 31a; Hanschmann and Milojcic 1976, figs. 24: 10, 28: 84, 91, 125, 126, 138).

Among the fragmentary EH II jugs of well-known type, with a cut-away or slightly beak-spouted mouth (A95, A142, A215), which have already been cleaned and drawn, three have clay imitation rivets on the handles (Papathanasopoulos et al. 1990, 12, figs. 18, 19a-b; cf. Blegen 1928, fig. 100: 1, 3, 5, from Zygouries). The flattened handle of jug A148 is interesting: it

Fig. 5. *EH II bowl A456 (photo: K. Xenikakis).*

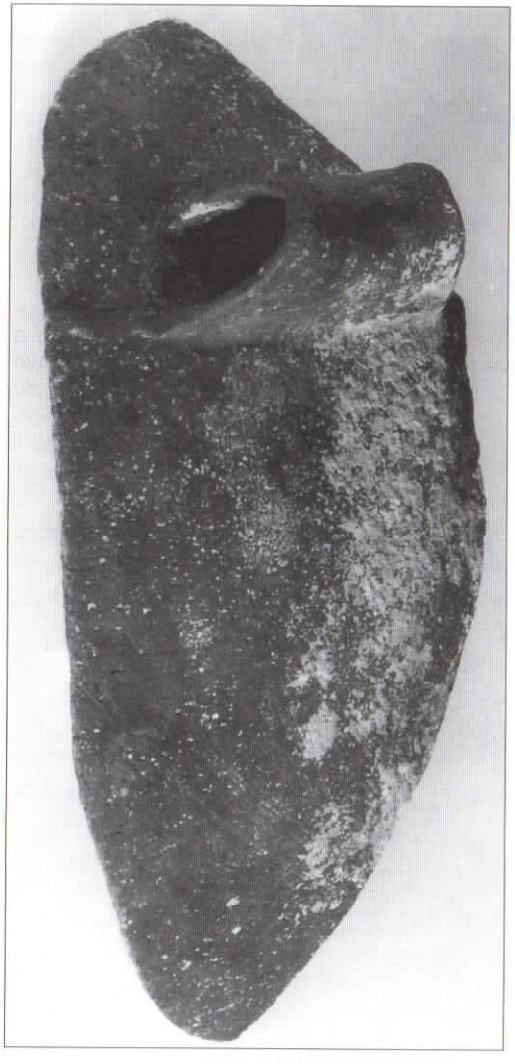


Fig. 6. *Body fragment of EH II amphora A123, with complete strap handle (photo: K. Xenikakis).*

has an elongated swelling 4 cm long at the top, and on the lowest part an incised linear motif in the shape of a double capital Greek lambda, 4.5 cm high, probably only for decoration (*Pl. IIb*).

The fragment of a high-necked beaked jug (Γ142: *Fig. 9* and *Pl. IIc*) is unique for its shape, the colour of the clay and its fine workmanship. It is an exceptional vessel and its shape and grey surface mark it out immediately from the rest. We have the impression that when its conservation has been completed, the provenance of the jug should be looked for in the Troad region of Asia Minor.

Only a small part of the shoulder and the neck, spout and upper beginning of the flattened handle of jug Γ142 have survived. Its preserved height is 14.3 cm. The width of the spout, which is at the same height as the beginning of the handle, is 4.3 cm, and the width of the handle 3.5 cm. It is made of fine, light orange, well-fired clay. The body of the jug would have been relatively large and spherical or spherical-oval in shape. The whole surface of the surviving fragment, inside and out, is grey to dark gray, slipped and well burnished.

The shape of Γ142 has no parallels among the EH II jugs from the Greek mainland or the Early Cycladic jugs from the islands. Our first impression that the jug might have been an import from Crete, based on some similarities with Early Minoan II beaked jugs, has not been borne out[1].

Close or identical parallels for the shape of the grey jug have only been found in the Early Chalcolithic pottery from sites in Asia Minor like Troy and Yortan, which includes examples of high-necked beaked jugs with more or less spherical bodies and a grey, black or red burnished slip (e.g. Forsdyke 1925, 6, A 36, pl. I: A 36 (Yortan); Blegen 1963, 96, 97, fig. 22: 10 from Troy III). The shape and general appearance of Γ142 may also be compared to imported Asia Minor beaked jugs with spherical or spherical-oval bodies that have been found in rock-cut graves in the large EH cemetery at Manika in Euboia (Hanschmann and Milojcic 1976, Suppl. 29: 14, 21 (EH II-III); Sampson 1983, 519, 520, 521, fig. 5).

The most basic type of EH II askos is known from many complete examples from major EH sites like Lerna, Ayios Kosmas, Eutresis and Orchomenos. It is relatively tall, with a flat and not always stable base, and is distinguished by its wide, elliptical shape and trumpet-shaped mouth. This shape is represented in the Dokos wreck cargo by a number of probable sherds and one fine complete example in Urfirnis ware which lacks only the handle (see no. 3 in the cover photo of *ΕΝΑΛΙΑ* I, 2, 1989). It comes from an earlier H.I.M.A. survey of the wreck site at Myti Kommeni and is now with the rest of the pottery from the wreck in the storeroom of the Ephoria of Underwater Archaeology in Niokastro at Pylos.

Some of the identified fragments of askoi have already been cleaned and drawn (A77, A159). The askos fragment A159 (*Pl. IIIa*) is of parti-

Fig. 7. *Stamped handles of EH II amphoras: a. Handle A260/1; b. Handle A464 (photos: K. Xenikakis).*

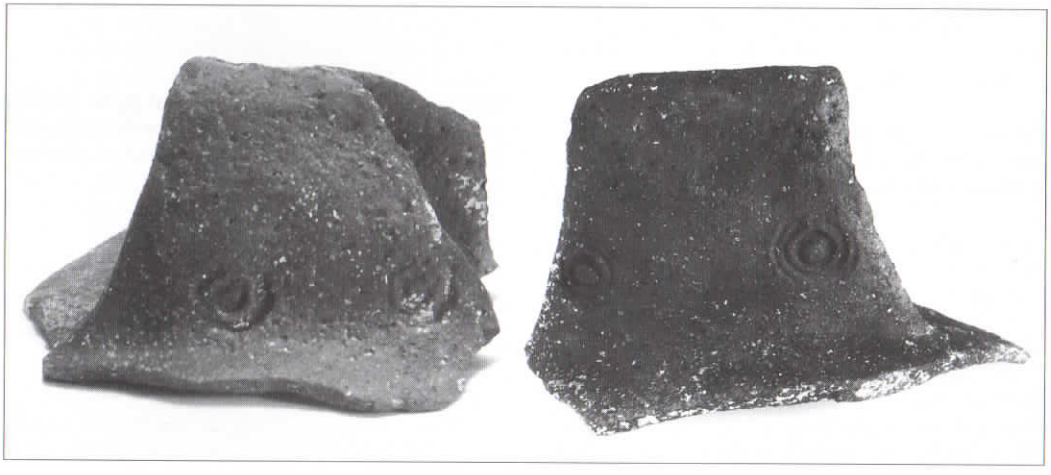


Fig. 8. EH II spouted deep bowl Γ119 (photo: K. Xenikakis).

cular interest, as we pointed out in a previous report, because of the incised rhomboid motif on its back, which was probably a potter's mark (Papathanasopoulos et al. 1992, 13, figs. 20, 21a). The following should be added to the parallels cited in the above report; an incised rhomboid mark on an EH pot of unusual shape from Rafina (Theocharis 1951, 87, fig. 12a-b), and another similar one on a small unpublished late Early Cycladic pithos from Akrotiri on Thera (personal information from Professor Christos Doumas).

As with the cargoes of most ancient wrecks, the collection of pottery from Dokos includes a mixture of different classes of pottery.

Apart from the EH material, which forms the bulk of the cargo, there is a group of typical Cycladic pottery, particularly EC II types, including parts of pyxis shoulders and bodies with single and double vertically perforated knobs, as well as pyxis lids and the shallow spouted bowl Γ17 (see above). Some of these pots are probably regular Cycladic vessels, while others may well be imitations of Cycladic types made in the flourishing workshops of Argolida, Attica or the Argosaronic Gulf. It is a fact that varieties of EC/EH II pyxides are found at different EH sites in Argolida, Corinthia, Attica, Boiotia and Euboia (e.g. Asine, Tiryns, Zygouries, Rafina, Lithares, Manika).

In addition to the pyxis fragments already published (Papathanasopoulos et al. 1992, 13, 15, fig. 22), the recently cleaned sherds of closed vessels of this class include a body fragment of a flattened spherical pyxis (A385) with twin vertical tubular perforated lugs (*Pl. IIIb, c*; cf A92, A338), a fragment of another pyxis(?) with a slightly asymmetrical shape (A81/04), and part of a convex pyxis lid (B13; cf. A167).

Among the small closed pots that have been cleaned, the two-handled collar-jar A376 (*Pl. IVa*), the upper part of which has survived, is of interest. The closest parallels to it are two two-handled EH II jars from Lerna III (now on display in a case in the Lerna Room of the Argos Museum). It can also be compared to a two-handled collar-jar with a flattened spherical body of the same period from Boiotian Orchomenos (Hanschmann and Milojcic 1976, fig. 27: 42). Various painted two-handled collar jars with spherical, flattened spherical or biconical bodies occur in Lerna IV, belonging to the EH III period (Hanschmann and Milojcic 1976, fig. 30: 37, 38, 47, 56, 61).

The wide-mouthed cooking pot is represented by a considerable number of examples. A relatively large fragment of one (Γ133) with a vertical loop handle on the shoulder is shown here (*Fig. 10* and *Pl. IVb*). Similar sturdy handles, single or in pairs, also appear on Minoan and Mycenaean cooking pots, tripod vessels and others (for different Late Mycenaean versions of this type, see Blegen and Rawson 1966, figs. 340-342).

Among the jar sherds already cleaned is a diagnostic fragment of a thick, well-made flat

Fig. 9. Part of beaked jug Γ142 (photo: K. Xenikakis).

pithos rim with a carefully modeled relief band below it.

Among the body sherds of large vessels of pithos type and others are some (e.g. A394, A429) with a massive, usually cylindrical knob. The largest example is on sherd A394 (*Pl. IVc*), which came from a pithos. Such knobs, few in number and more or less symmetrically arranged, are found on EH pithoi and smaller shapes from sites in the central regions of the EH world, like Zygouries (Blegen 1928, 119, 120, figs. 111, 112) and Eutresis (Goldman 1931, figs. 100, 110, knobbed pithoi, E.H. I). They are no doubt survivals from the Late Neolithic pottery tradition (see Tsountas 1908, col. 232, fig. 128: pithos sherd with a disc-like nipple; Sampson 1993, 114, fig. 104, drawing 115: nos. 6, 8, 9). The knobs had a practical, not a decorative function, and would no doubt have been used together with ropes to facilitate the transport of these large storage vessels.

As we have mentioned in previous excavation reports, the three main categories of clay utensils in the EH II wreck cargo are the variously shaped spit supports (*Fig. 11*), braziers and portable hearths or baking-pans. From among the many fragments of bottoms, walls, flattened rims and rounded corners of the clay baking-pans so far cleaned by the conservators at the Spetses Museum, we illustrate the typical fragment A319 (*Pl. IVd*: part of the bottom and wall). The expanded rim of these utensils is often decorated with stamped motifs (in the case of A319, with alternating zigzag lines), The bottom is generally rough underneath, in contrast to the smooth upper surface.

Knobs, plastic bands, glazes

Apart from the long ledge lugs below the rims of open bowls, which sometimes have a decorative and sometimes a functional role, open and closed pots of various sizes commonly have thick or thin horizontal plastic bands that are purely decorative (e.g. A297/1; *Pl. Va, b*). There are two basic types: those with different kinds of finger-impressed decoration, and those with parallel oblique incised strokes (rope-pattern decoration). We hope that the publication of the drawings of the different kinds of relief bands on the Dokos pottery will establish a typology of EH II plastic band decoration that will have a wider validity. It may also be possible to study their evolution from the corresponding bands on coarse and semi-coarse Neolithic wares.

Fig. 10. *Part of EH II cook-pot Γ133 (photo: K. Xenikakis).*

Careful cleaning of the EH II pottery from the wreck continues to reveal on the surface of many of the sauceboats, plain bowls and other pots traces of the brown, red-brown, grey-brown or grey-black Urfirnis slip that is characteristic of the fine wares of this period. None of the pots cleaned so far, however, preserves all of the original slip.

Sherd with a lead clamp

Among the dozens of small sherds that have already been cleaned in the Spetses Museum, sherd Γ129/36 (*Pl. Ve*) is of special interest. It is from the body of a handmade pot of fine yellowish clay and still preserves in situ one of the lead clamps used to repair it in antiquity. The clamp, although corroded, is still inserted in one of the holes drilled for the purpose in the wall of the pot. It is in two parts: the one on the outer surface is straight and 4.5 cm long, and the one on the lower, inner surface is curved and 3.5 cm long.

Such lead clamps, usually in the shape of a Π or in two parts, like ours, were widely used in the Aegean during the 3rd millennium BC and the later Bronze Age periods. They were used to repair bowls, jars, pithoi and other vessels (see Renfrew 1979, 91, notes 24-30, with bibliography; and Walter 1985, 59), as well as marble vessels and figurines (Papathanasopoulos 1961/62, 134-135, pl. 69; Getz-Preziosi 1989, 59-60, fig. 42; see also a figurine of Plastiras type, a recent acquisition impounded by the National Archaeological Museum).

An interesting collection of evidence for the use of lead for making clamps has been assembled from sites in the Argosaronic Gulf and Myrtoon Sea (the area of sea NW of a line from Sounion to Malea). To our example from Dokos may be added:

-A complete EH red-burnished bowl, skillfully mended, from Kolona on Aigina, found by G. Welter (Renfrew 1979, 91, 112, note 24, 118, pl. 2b).

-An EH II sauceboat with a greyish Urfirnis slip, today restored from many fragments, with perforations in the body clearly intended for lead clamps, which came from the site of Ayia Marina on Spetses. It was found by Dimitrios Theocharis and is on display in the first room of the Spetses Museum (inv. no. 461, (III) SP. 70).

-Sherd from an EH II pithos with parts of two lead clamps in the corresponding holes, now in the Spetses Museum. It came from a rescue surface collection at the site of a partly looted EH II cemetery on the volcanic islet of Parapola, or Velopoula, an outpost of the EH thalassocracy in the middle of the Myrtoon Sea (and see Kyrou 1990, 74-76, 252-253).

-Two probable Mycenaean lead clamps from areas MK67 and MK28 in Sector B of the prehistoric settlement on the Myti Kommeni promontory. They were found during surface cleaning carried out in August of 1990.

Sherd with a potter's mark

The discovery of a potter's mark *(Pl. Vc)* on a ring-base (diam. 11 cm) of fine brown clay (A58/02, 1989 find) from a large EH II bowl is interesting. It was found after careful cleaning of the sherd. The mark consists of two incised crossed lines on the underneath of the base. This and perhaps the rhomboid incision on askos A159 are the first sure examples of writing recognized among the material from the wreck.

The mark on the base of A58/02 has an exact parallel in an incised X on the underneath of the base of a shallow EH bowl from Zygouries, in Corinthia (Blegen 1928, 107, fig. 92), and

Fig. 11. *Part of EH II clay stand (krateutes) A451.*

incised marks of a similar kind on EH sherds are mentioned from Ayios Kosmas, in Attica (Mylonas 1932, 75). This precise mark is not included in the EH pottery marks published from Lithares, near Thebes (Tzavella-Evjen 1980).

The X, as the simplest form of mark identifying a potter or pottery workshop, has a wide distribution throughout the Bronze Age. It is found on pottery from different sites both in and beyond the Aegean (Taylour 1958, 52-53). We may cite, as examples, the appearance of an incised X on sherds of Grey Minyan ware from Eleusina (Mylonas 1932, 75-76, fig. 50); on the underneath of the flat base of a plain LH I pot from Lerna displayed in the Lerna Room of the Argos Museum (no. 253; and see Caskey 1970, pl. IV: Lerna L. 557); and also, in a less regular form, on a LM IB/LH II sherd from Ayia Irini on Kea (Caskey 1970, 115, no. 25, fig. 4, pl. IV).

And the surface survey carried out in Sector B of the prehistoric settlement on the Myti Kommeni promontory in 1990 produced three sherds (one base and two handles) of Mycenaean household pots with small incised signs or potters' marks, among them an X.

Stone vessel

Among the finds from the wreck was the fragment of a an EH II stone vessel (A413, *Pl. Vd*), the first of its kind to be found. It is part of a shallow circular basin made of a rough dark grey-green stone, with a flat base and vertical sides that taper towards the rim (max. pres. h. 8 cm, av. th. wall 1.8 cm, av. th. base 2 cm, diam. base at least 25 cm).

Shallow stone EH basins with vertical sides have been published from Lithares (Spyropoulos 1969, 29, pl. 30b; Tzavella-Evjen 1984, 171, 172, pls. 86a-d, 87a). There are two stone basins of similar type from Vravrona, one of them complete, in the N. P. Goulandris Collection (Doumas 1984, 133, no. 163, inv. no. 627b; also the basin inv. no. 365). Another parallel to the Dokos basin is a fragment of base and side exhibited in the first room of the Spetses Museum. It came from nearby Parapola or Velopoula and was handed over to the museum by Mr Adonis Kyrou. The Dokos basin may well have had two horizontal ledge handles on opposite sides like some of the Lithares and Vravrona examples.

Mycenaean Pottery

Among the large quantity of material brought up from the main site of the wreck at Myti Kommeni is a limited number of Mycenaean sherds, plain and painted, belonging to the LH I-II and LH III periods. They were stray sherds mixed in with the main body of EH II material.

It is probable that some of these sherds were washed into the sea from the Mycenaean settlement on Myti Kommeni, but others might have been thrown overboard from Mycenaean ships lying in the small bay on the south side of the point. Together with the many finds from Sectors A and B of the land excavation on the promontory, the Mycenaean sherds from the sea bottom are good evidence of intensive human habitation and maritime activity in the Myti Kommeni area during the three main phases of the Mycenaean period.

Isolated fragments of Mycenaean pottery were collected during the first preliminary surveys

made in the years 1975-1977 in the area of the EH wreck. They included a fragment of a LH II/III kylix with a well-made foot and stem, now in the storeroom of the Ephoria of Underwater Archaeology in Niokastro at Pylos (see no. I in the cover photo of *ΕΝΑΛΙΑ* I, 2, 1989).

The Mycenaean pottery from the excavation of the main concentration of the EH wreck cargo on the seabed in the years 1989-1991 includes LH sherds with painted bands, the feet and stems of LH III kylikes, nearly half of a handleless conical cup of the LH I-IIIA period (Γ144, *Pl. VIe*; for the type, see Furumark 1941, fig. 15, shape 204), and also an interesting series of LH I-II sherds (ca. 1550-1400 BC). These include:

-A small rim fragment of a cup of Keftiu type (Γ129/173) with remains of painted decoration (part of a horizontal band and solid disk). Yellowish clay; black paint. LH I.

-Part of the rim and side of a tall Keftiu cup (Γ132/1, *Fig. 12* and *Pl. VIa, b*) with a central plastic band and the beginning of the lower end of a vertical strap handle. Mended from two sherds. Estimated rim diameter 11 cm. Light orange clay; yellow slip inside and out; brown-black paint. Decoration: a horizontal band on the rim, inside and out, on the relief band and below it; on the upper part of the body two rows of stylized leaves are separated by two or three thin bands. LH IIA.

For the shape of the cup, see Furumark 1941, shape 224; Coldstream and Huxley 1972, 284-285 (Type III, in the series of Keftiu cups). For the decoration, ibid, motif 64:3.

-Part of the rim and side of a hemispherical cup (Γ132, *Pl. VIc, d*), of relatively shallow type, with a vertical strap handle and a crude imitation of a metal rivet head where it joins the rim. Estimated rim diameter: 16.5-17 cm. Àellowish clay with a slip of the same colour inside and out; brown-black paint. Principal decoration: eye-spirals with thickened outlines and thin spirals linked by two wavy diagonal tangential and two arched tangential lines. Handle solid painted on the outside; horizontal lines on the rim, inside and out. LH IIA.

Fig. 12. *Part of Late Helladic IIA keftiu cup Γ132/1 (photo: K. Xenikakis).*

For the shape, see Furumark 1941, shape 211 (IIA). For the main decorative theme, ibid. motif 46: 10, 12.

-Body sherd decorated with a stylized double-axe (partially preserved) of LH II type, without a handle and with double wavy lines between the blades. LH IIA. For the type of axe, see Furumark 1941, motif 35: 8, 10-12.

-Sherd decorated with a tall solid triangle. LH IIA.

For the decorative motif of solid triangles, see Coldstream and Huxley 1972, 197, pl. 56:ˆ 250 (from Kastri on Kythera); Lolos 1987, 26, fig. 20 (from Volimidia, Chora, in Triphylia).

-Part of the upper body of a stirrup jar of early type (A421) with three handles, the middle one thinner than the other two. Max. pres. h. 12 cm; estimated h. ca. 30 cm or less; diam. disk 6 cm. Light brown clay with many inclusions. LH II(A).

For the type of stirrup jar, see Furumark 1941, shape 169. For a LM IB/LH IIA example from nearby Aigina, see Welter 1962, pl. 26a. Other early examples of this shape from Argolida and Messenia: Deïlaki 1973, 91, pl. 90b (Nafplia); Lolos 1987, fig. 324a (Englianos), 383 (Volimidia), 394 (Routsi).

-Part of the neck and body of a squat juglet (Γ137, *Fig. 13*) with a partly preserved vertical handle on the shoulder. LH II(A).

For the type of juglet, see Furumark 1941, shape 87.

To the above early Mycenaean sherds must now be added three fragments of the same period from the H.I.M.A. land and underwater excavations at Myti Kommeni in 1992. These

Fig. 13. *Part of Late Helladic II squat jug Γ137 (photo: K. Xenikakis).*

include a fragmentary LH I-IIA Keftiu cup with a central plastic band from Area 2 in Sector A on the promontory; part of a LH I-IIA Keftiu cup similar to the previous one, and part of the side (3.5X2.5 cm) of a fine LH IIA hemispherical cup similar to Γ132 from the underwater site (Trench 4, Level Γ). The latter, made of fine yellowish clay and slipped inside and out, preserves part of a large eye-spiral with a thickened(?) outline and six or seven spirals in dark brown paint.

The two early types of Mycenaean cup that have been identified among the LH I-II sherds from the wreck site, the tall Keftiu cup decorated with a stylized leaf band and the elegant hemispherical cup with large linked eye-spirals, also known as the Peristeria type (from the gold example with hammered spirals found in Tholos Tomb 3 at Peristeria in Messenia: Marinatos 1965, pl. 136a-137) are typical LH IIA pottery types on the mainland (Dickinson 1972, 105, note 19; 1974 110, 111, fig. 2: 1,5; Lolos 1987, 256, 268-269, 434-435).

Both types of cup occur among the pottery from all the large mainland centres, and even appear among the imported Mycenaean pottery known from Aegean island sites like Ayia Irini on Kea, Philacopi on Milos, Kolona on Aigina and now Myti Kommeni. The Peristeria type has also been found at places outside the Aegean in the Eastern Mediterranean, for example at Lachish in Palestine and in Egypt (Furumark 1950, 204, fig. 14: c-d); and both types appear among the early Mycenaean imports at distant island sites in the Tyrrhenian Sea.

For example, part of the rim of a LH II Keftiu cup, similar in shape and decoration to our cup Γ132/01, comes from Punta d'Alaca on the island of Vivara near Naples (Marazzi 1988, 18, drawing 1: row 1, type 5; Marazzi and Re 1983, 165, no. 208, fig. 5: 208; 1985, 47 (5.20), pl. VIII: 5.20). And sherds of LH IIA hemispherical cups with eye-spirals just like Γ132 have come to light at Punta d' Alaca abd Punta Mezzogiorno on Vivara (Cazzela et al. 1982, 152-153, no. 13, pl. LIII: 8; Marazzi 1988, 18, drawing 1: row 3, type 3; Marazzi and Re 1983, 167 no. 5+, 1, fig. 4; 1985, 47 (no. 5.21), 49 (no. 5.42), pls. VII, VIII; 1986, 158, no. 5+, 1, fig. 4, 5), and also on the acropolis at Lipari, north of Sicily (Vagnetti 1982a, 133, no. 12, pl. XLIV:1).

The presence of two early cups in the Mycenaean material at Dokos and Vivara obviously does not imply any direct connection between the two sites. Their appearance on the two islands merely demonstrates the dispersion of the two types over a large part of the Mediterranean in the first half of the 15th c. BC, according to the prevailing absolute dating. Their diffusion in the Aegean and via the Ionian Sea to the Tyrrhenian can be explained by the existence of an extensive network of maritime trade routes and communications, whose operations were to a great extent dictated by geographical factors, the winds and the sea currents, and which had been first established by Minoan and Mycenaean sailors, traders and perhaps itinerant craftsmen as early as the beginning of the Mycenaean period, if not before.

It is clear, therefore, that the same standardized pottery types that were being produced in large numbers at the principal centres in the Peloponnese and at sites like Berbati, near Mycenae, and Englianos in western Messenia, arrived at the island settlements of the Aegean, like Ayia Irene, Philacopi and Myti Kommeni, as well as more distant stations in the central Mediterranean like Vivara, at the same time. At both Berbati and Englianos kilns have been found which were in operation during the early Mycenaean period (see Åkerström 1968, 49, pl. II: 4; Dickinson 1972, 105, note 19; Blegen et al. 1973, 19-20, figs. 44, 45., 307, 308; Lolos 1987, 127-128, 531).

THE SUBMERGED SITE OF LEDEZA

At the same time that the material from the EH II wreck is being processed, the study is underway of a series of pottery and other finds from the neighbouring EH II site of Ledeza on the north shore of Dokos, which are also in the Spetses Museum. These finds came from earlier rescue collections made by Mr Adonis

Fig. 14. *Part of EH II brazier A31, from the underwater site of Ledeza (photo: K. Xenikakis).*

Fig. 15. *Large EH II bowl A30, from the undrerwater site of Ledeza (photo: K. Xenikakis).*

Fig. 16. *Large part of EH II four-legged clay stand (krateutes) A32, from the underwater site of Ledeza (photo: K. Xenikakis).*

Kyrou on land and in the sea at the locality of Ledeza (Kyrou 1990, 71, 72, 250-251), and from the underwater survey carried out there by H.I.M.A. in August of 1991 under the direction of George Papathanasopoulos by Yannis Vichos, Lucy Blue and the surveyor Vaso Kyriakopoulou.

A comparative examination of the material from the EH harbour of Ledeza, the cargo of the wreck at Myti Kommeni and the small EH II site on the same promontory was thought desirable because of the proximity of the three sites and the chronological coincidence of the pottery. A study of the finds from the three sites at Dokos and a comparison with those from other EH sites on the neighbouring islands and the Ermioni coast will, we hope, contribute to a more precise understanding of the extent and character of the EH II thalassocracy in the Argosaronic Gulf and Myrtoon Sea that is now a well established fact.

Among the EH II pots and utensils from the underwater site at Ledeza that have been cleaned so far are the following:

A30: Half of a large bowl (*Fig. 15*) with a conical foot. H. 14.7, diam. foot 7.8 cm. It has an elongated ledge lug just below the rim, and on the outside are traces of a grey-brown slip. In general appearance it is similar to the large bowl A456 from the wreck, although the latter has a higher foot.

A31: Approximately one quarter of a brazier with a knobbed handle (*Fig. 14*). Pres. h. 13.7 cm. Three examples of this type of brazier are known from the Myti Kommeni wreck (Papathanasopoulos 1989, 26, fig. 4; Papathanasopoulos et al. 1992, 16, fig. 25).

A32: Half of a tetrapod spit support (*Fig. 16*) with a vertical strap handle on the preserved side of the body. H. 15 cm. It belongs to a class of tetrapod zoomorphic spit supports that we know from an example from the EH site at Rafina (Theocharis 1951, 91-92, fig. 20) and another in the N. P. Goulandris Collection (coll. no. 537). To these may be added an imitation zoomorphic spit stand from Lithares (Tzavella-Evjen 1984, pl. 82a).

A33: Part of a sauceboat with a complete spout and traces of glazed slip.

A34: Upper half of a small closed pot with five small double pellets reminiscent of Neolithic models. Pres. h. 6.5 cm, diam. mouth 6.9 cm.

A35: Part of a large bowl with a ring base. Diam. base 14.2 cm.

Lastly we must mention a pyxis lid with a flat top (A23, *Pl. Vf*). It has the usual small holes at opposite sides of the perimeter. Unlike this Ledeza lid, all the Early Cycladic/Early Helladic pyxis lids found so far in the wreck are convex (e.g. A167, B13).

THE LAND EXCAVATION

In 1991 the excavation on the promontory of Myti Kommeni was continued at three places in the Mycenaean settlement: areas MK B 40, MK B 28 and MK B 38. The most important results of the excavation were found in MK B 40. The stone foundations and lower parts of the walls (60-70 cm thick) were uncovered of a large tripartite megaron type of LH structure, measuring 10 x 4 m on the inside. A full excavation of this building was begun, which will be completed next year.

The finds on the floor in Room A include a large quern, three grinders and an undecorated LH IIIB amphora, which has exact parallels in amphoras from Midea and Pylos. In the fill in Room B part of a clay tile or drain was also found.

Based on this season's excavation the building MK B 40 (*Fig. 17*) seems to have been destroyed by a strong earthquake during the LH IIIB period, probably towards its end. The earthquake identified at Dokos may perhaps be connected with the earthquake, or series of earthquakes, that is thought to have destroyed major Mycenaean centres in Argolida, like Tiryns and Midea, in about 1200 BC.

NOTE

1. Our warm thanks to Professors Yannis Sakellarakis and Peter Day for the useful exchange of views we had.

THE EXCAVATION TEAM

In 1991 over forty students, archaeologists and specialists in other fields, technicians, divers and support personnel, under the direction of the Honorary Ephor of Antiquities, Dr George Papathanasopoulos, took part in the campaign.

A team of archaeological divers consisting of Christos Agouridis, Charalambos Kritzas, Roxani Margariti, Lucy Blue, David Conlin, Elina Stamatatou, Charlotta Scheich and Georgia Fox carried out archaeological work on the wreck site under the guidance of the field excavation director, Dr Yannis Vichos. Dr Elpida Hadzidaki was the official government representative.

Dr Yannos Lolos collaborated with the director, field director and other archaeologists in the cataloguing, identification and study of the pottery.

The president of H.I.M.A., Nikos Tsouchlos, was in technical charge of the excavation and the photography, with the help of architects Vasilis Koniordos and Yannis Baltsavias, mechanical engineers Stavros Vosyniotis and Vasilis Kavoulakos, and the photographers Kyle Jachney and Kostas Toutountzidis.

The surveyor Vaso Kyriakopoulou was in charge of the underwater mapping, assisted by S. Vosyniotis and V. Kavoulakos for the SHARPS system.

The vice-president of H.I.M.A., Phaidon Antonopoulos, was responsible for all the diving during the campaign.

Other members of the team included the conservator Anita Moraïtou, the archaeology students Thanos Aronis-Webb, Yiorgos Koutsouflakis, Yiorgos Valvis and Rita Yeorgoulaki, in addition to Edward Moore, Yannis Garras, Marianna Teske, Panayotis Karras and Nikos Moundakis.

During the 1991 season at Dokos (2 August to 15 September), a number of visitors came and dived on the site, including the British archaeologist Miss Honor Frost, the Israeli archaeologists Dr Avner Raban and Yaakov Kahanov, the Italian excavators Riccardi and Garabardi, the American archaeologist Dr Bill Phelps, the British scholar Commander A. Tilley and the commander of the Underwater Demolition Squad, Captain Yannis Theofanidis.

The work was filmed by a team from Aegean Documentaries, Nikos Veryitsis and Stratos Stasinos.

Photo: N. Tsouchlos

Fig. 17. *Myti Kommeni, Dokos. Building MK B 40 during the 1992 excavation season; as seen from the East.*

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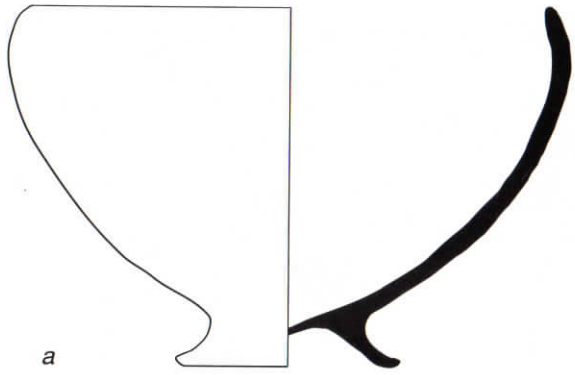
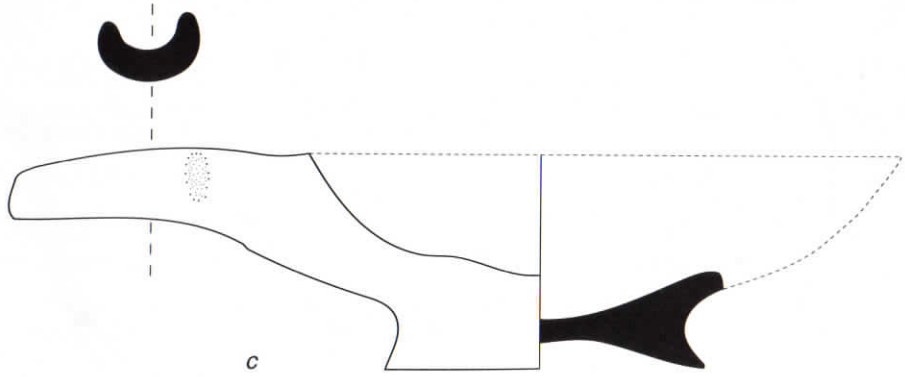


a

Drawing: S. Demesticha

A 53

0 5 εκ



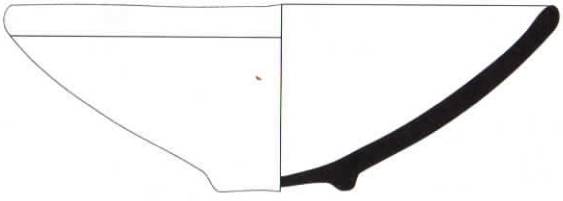
c

Γ 17

0 5 εκ

Drawing: T. Koutsouraki

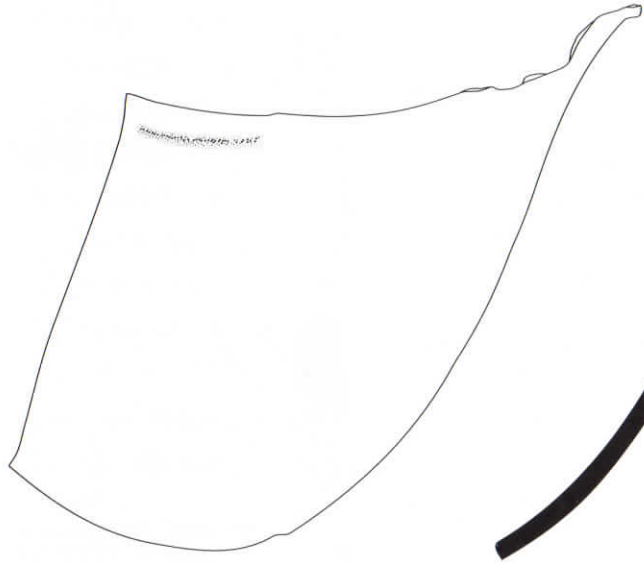
b



Drawing: T. Koutsouraki

A 242

0 5 εκ



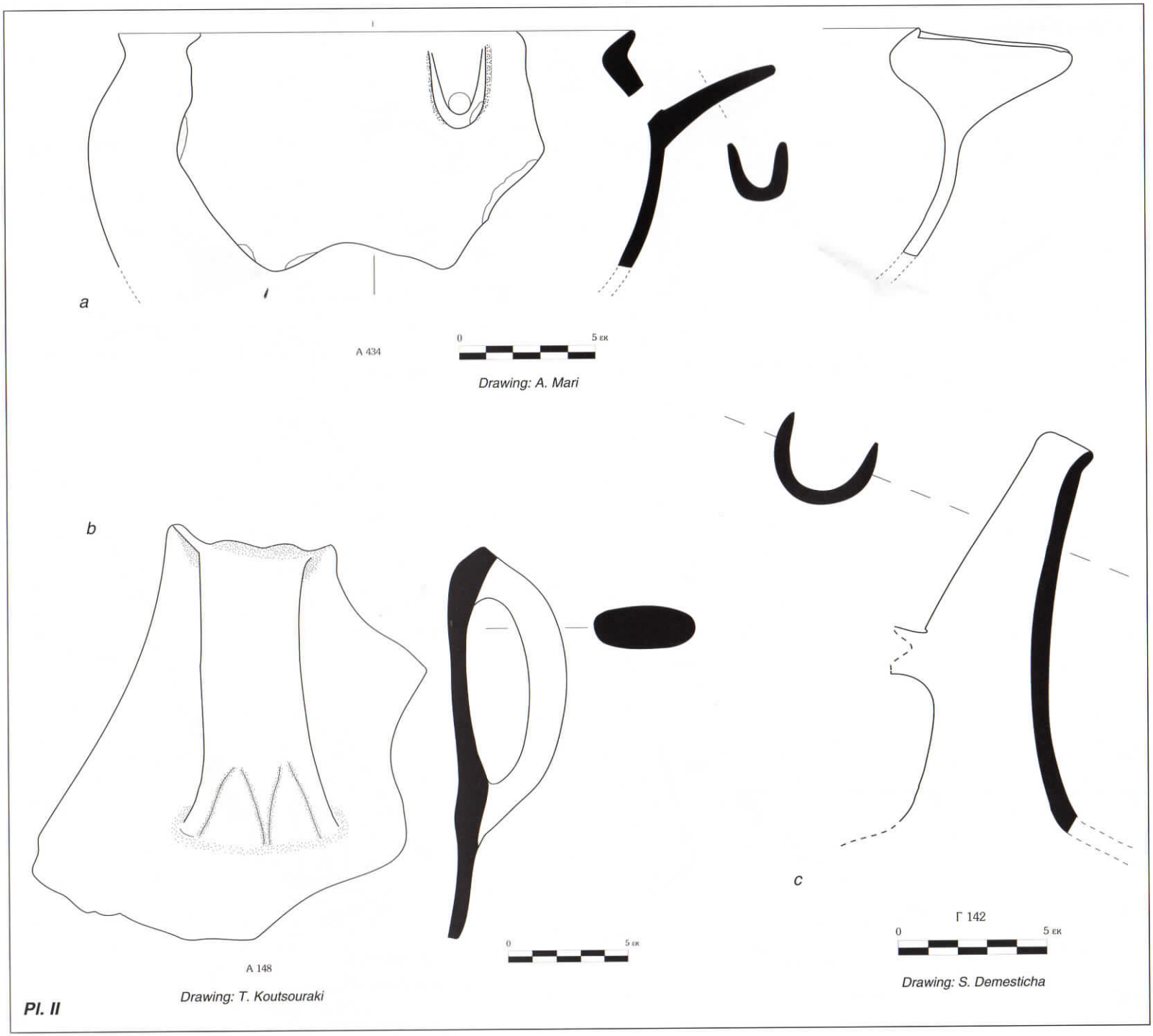
A 99

0 5 εκ

d

Drawing: T. Koutsouraki

Pl. I

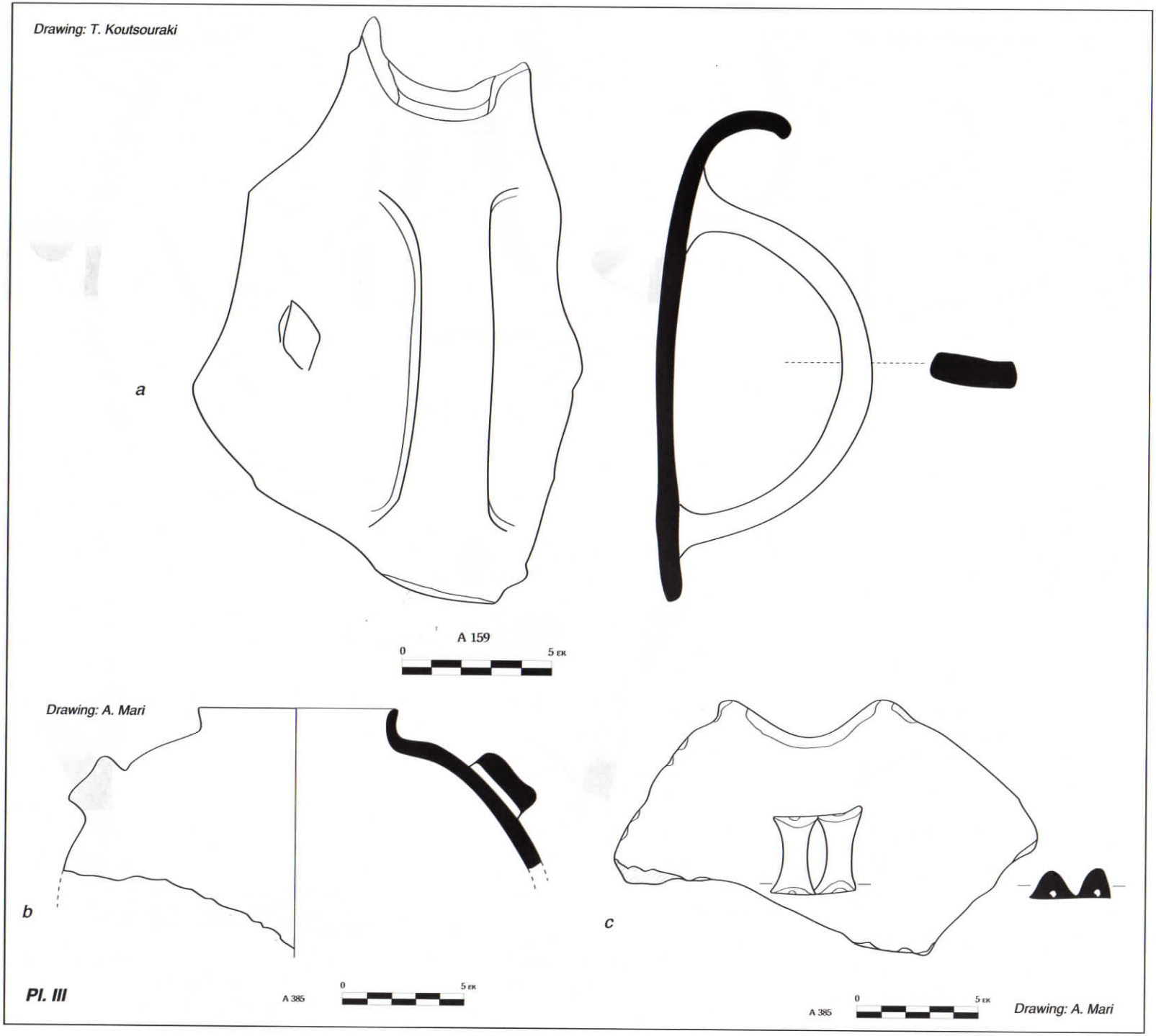


Drawing: A. Mari

Drawing: T. Koutsouraki

Drawing: S. Demesticha

Pl. II


Drawing: T. Koutsouraki
a
A 159
0
5 εκ
Drawing: A. Mari
b
c
A 385
0
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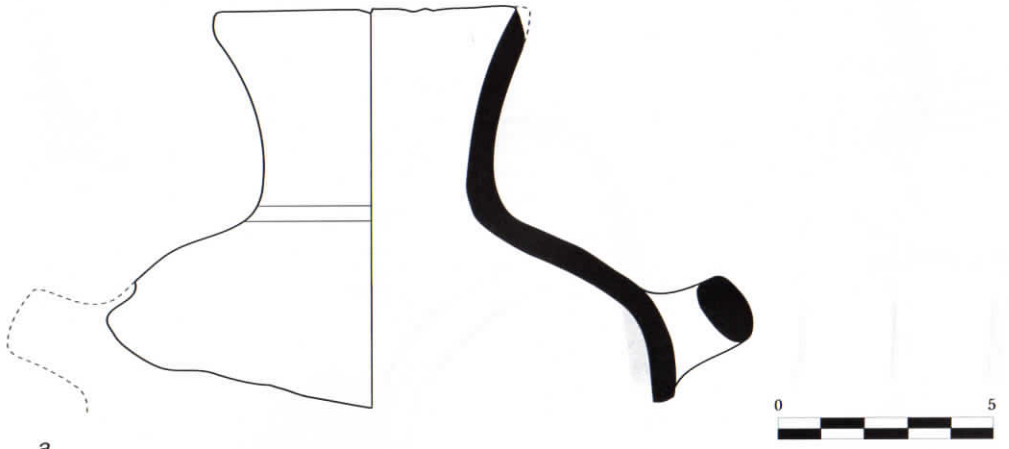
A 385
0
5 εκ
Drawing: A. Mari

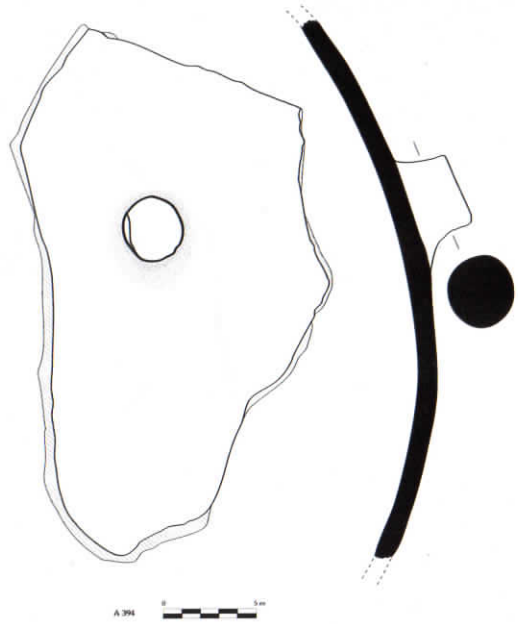
Pl. III



a

A376

Drawing: T. Koutsouraki



c

Drawing: A. Mari

b

Γ 133

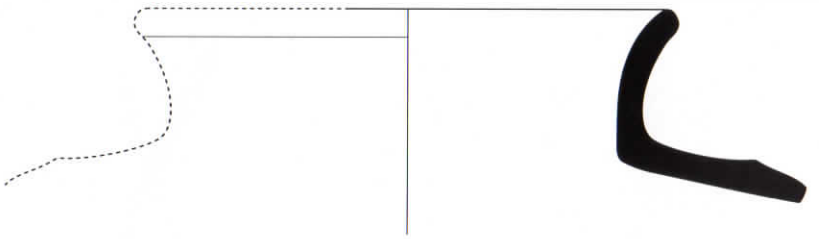
Drawing: A. Mari

d

A 319

Drawing: A. Mari

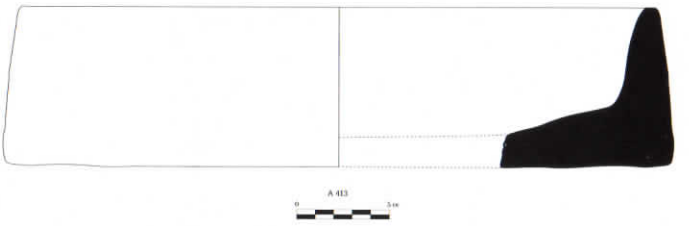
Pl. IV



a

A 297/1

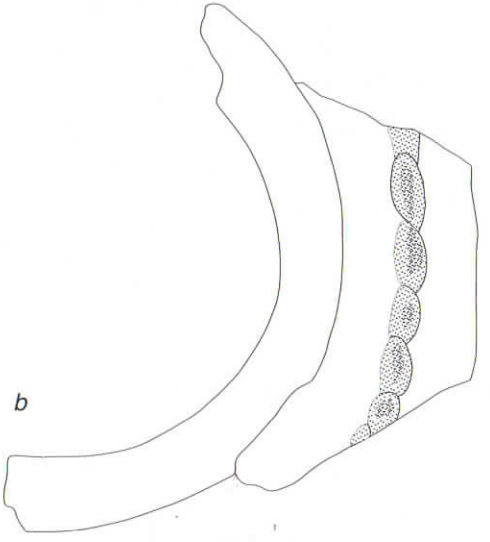
0 5 εκ



d

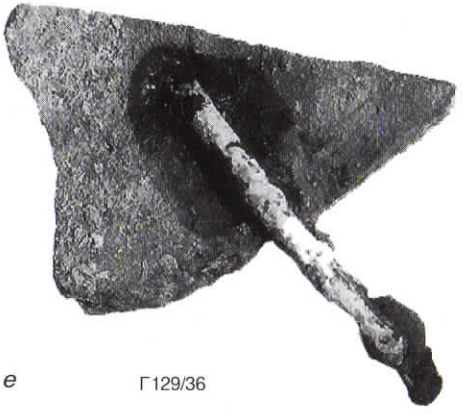
Drawing: A. Mari

Drawings: T. Koutsouraki



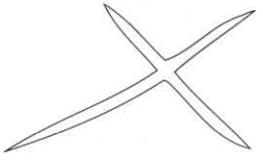
b

A297/1: view from above



e

Γ129/36

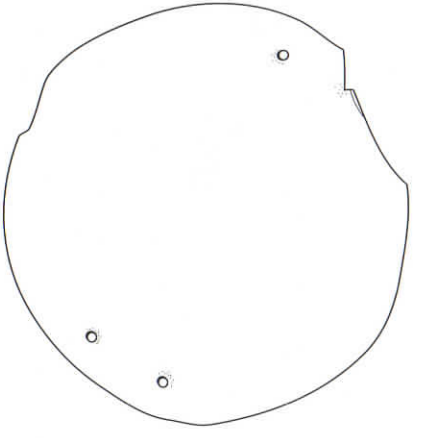


c

A 58/2

0 1 2 εκ.

Drawing: A. Mari



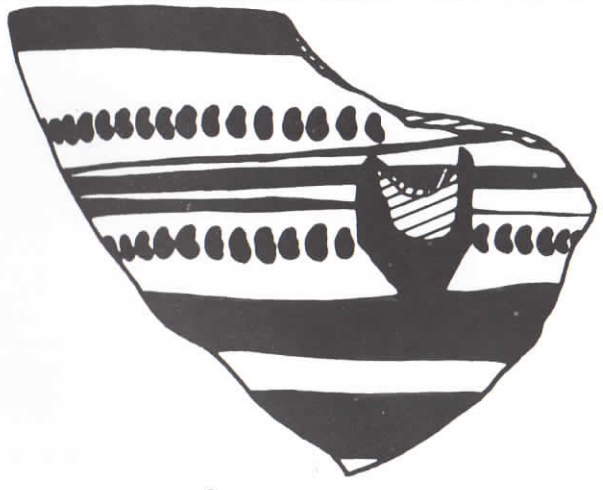
f

A 23 (ΛΕΔΕΖΑ)

0 5 εκ

Drawing: T. Koutsouraki

Pl. V



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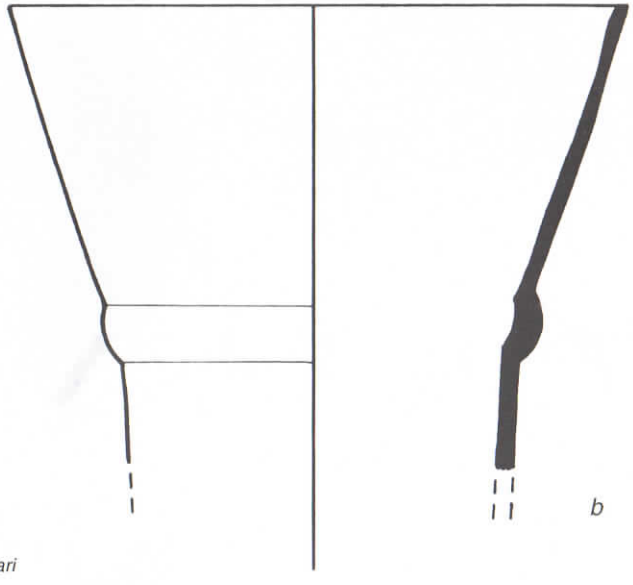
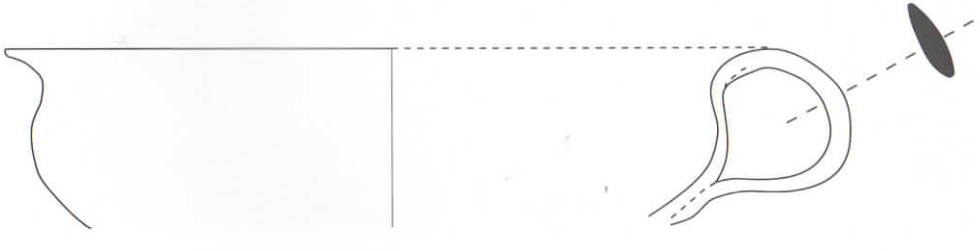


b

Γ132/1

Drawing: A. Mari

0 1 2 3 4 5 cm



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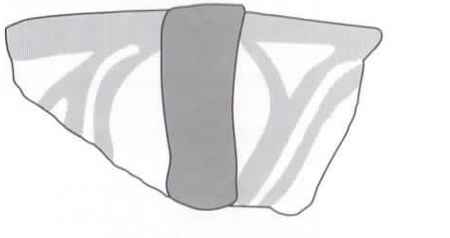
Γ 132 0 5 εκ

Drawing: S. Demesticha



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Γ 132 0 5

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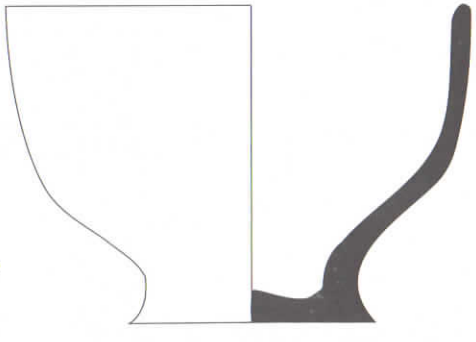

e

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Γ 144

Pl. VI

CONSERVATION OF THE CERAMIC FINDS FROM THE DOKOS WRECK

Theophano Saramandi
Anita Moraïtou

The conservation of the ceramic finds from Dokos began in the summer of 1990 in the laboratory set up for this purpose in the Spetses Museum (the Hadziyannis Mexis mansion). The space used for the laboratory was provided by the 1st Ephoria of Byzantine Antiquities. It was first organized and equipped in 1989 by Theophano Saramandi[1] with funds from H.I.M.A., and this was subsequently continued with the collaboration of Anita Moraïtou[2]. The conservation work to date was carried out during the periods 1/8/90-20/9/90, 15/9/91-14/12/91, 25/9/92-1/11/92, 16/5/93-3/7/93 and 11/9/93-8/10/93.

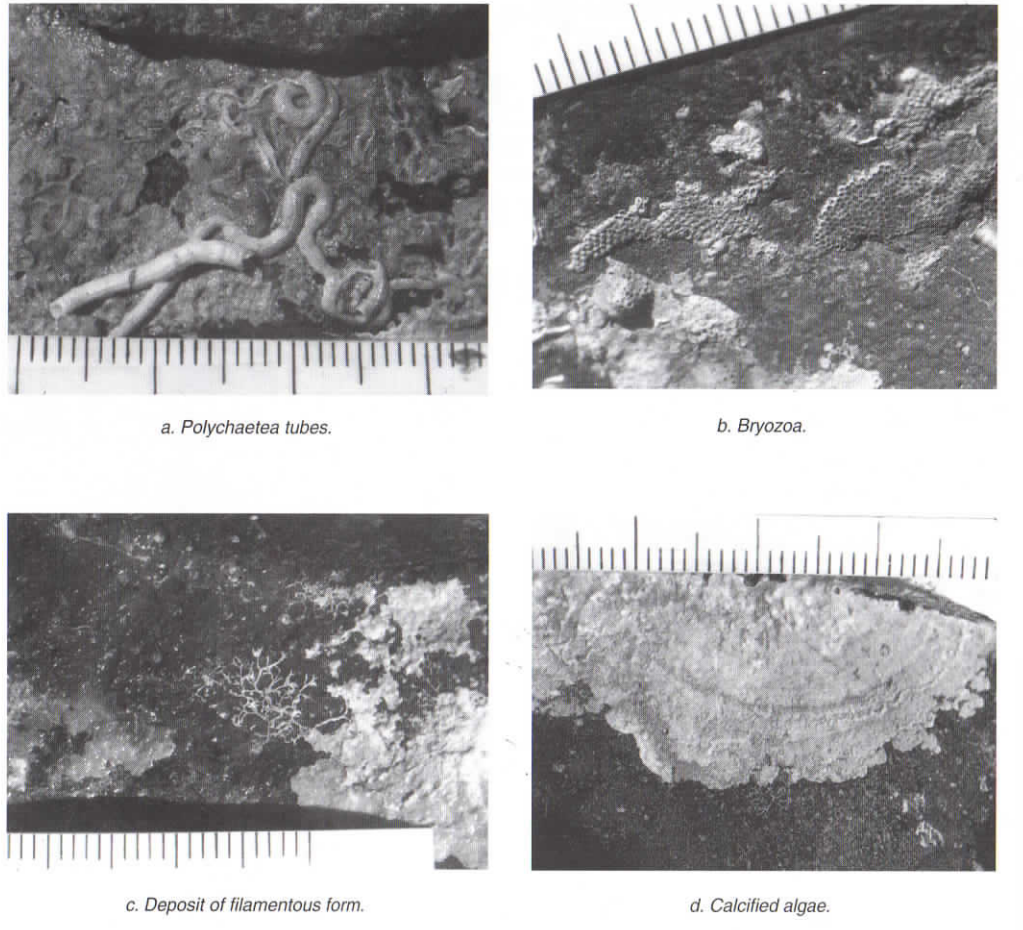
1. Description of the ceramic finds

The ceramic finds recovered from the wreck site at Dokos during the annual H.I.M.A. excavation seasons in the years 1989-1992 consisted of EH II pots and utensils[3]. They included bowls, sauceboats, jars, askos and pithos types, basins, jugs and cups, and among the utensils were braziers, spit stands and baking-pans.

The fabric of the pottery is chiefly a coarse clay with non-plastic inclusions of different grain sizes. The colour varies between various shades of brown, red, grey, green, black and combinations of these, with brown-red predominating, depending on the type of clay and the firing atmosphere of the kiln.

Many of the pots have a thin burnished surface which shows the marks of the burnishing tool. It is not clear whether this surface is an applied slip or results from the treatment of the clay body. A considerable number of pots have incised or impressed decoration.

Because of the low firing temperature, the pottery at this period is generally friable. The type of clay, the non-plastic inclusions, and the nature of the surface can only be identified with certainty after analysis in an archaeometric laboratory[4].



a. Polychaetea tubes.

b. Bryozoa.

c. Deposit of filamentous form.

d. Calcified algae.

Fig. 1. *Calcareous deposits of biogenic origin on the surface of pottery from the Dokos wreck.*

2. State of preservation

2.1 Breakage

Very few of the ceramic finds were found intact. Some of them are fragments that can be stuck together, but the majority consists of sherds and parts of pots. A total of some 15,000 finds have been recovered.

2.2 Surface damage

As a result chiefly of mechanical wear, but also of other physicochemical causes, the surface of the pottery is not always in good condition and shows deterioration.

In addition, various benthic organisms that attached themselves to the surfaces of the pottery may also have had a negative effect.

The bivalve lithodomus lithophagus[5] is known to bore holes in pottery.

2.3 Loss of mass cohesiveness

In certain cases disintegration of the clay body in the form of flaking and crumbling can be observed. This phenomenon is attributed largely to endogenous factors, such as faults in the preparation of the clay and in the firing.

2.4 Calcareous incrustation

The pottery finds from Dokos, like all underwater finds, are covered with calcareous deposits and layers of biogenic and abiogenic origin composed of:

a) skeletal material from benthic animal organisms and calcified vegetal organisms (Polychaeta tubes, Bryozoa, calcified Rhodophyceae, mollusca, corals and others were identified[6] (*Fig. 1*).
b) deposits due to chemical precipitation of calcium carbonate ($CaCO_3$ precipitated in a supersaturated solution).
c) deposits of biochemical origin[7] (microbiological action of various kinds encourages the formation of calcium carbonate).

In some cases the deposits were very massive and formed concretions together with other fragments of pottery .

The colonies of marine organisms differed according to the stratum from which the pottery came and the presence of oxygen in their immediate environment. The pottery buried under the sand was covered with dead colonies of organisms and the deposits were generally less extensive. On the other hand, the pottery from the surface of the seabed, where oxygen was plentiful, was covered with a mass of organisms, most of them living.

New colonies of organisms were observed overlying older, dead ones.

2.5 Marine plants

Among the living organisms that were found to have colonized the pottery were many kinds of algae, including Rhodophyceae (Lithophyllum), Phaeophyceae (Padina sp.) and Chlorophyceae (Halimedia)[8]. Noticeable among the marine plants was a soft thin layer of brown-black colour, irregular in outline and with a dermatoid appearance. Examination under a stereomicroscope showed the tissue to have a cellular structure. It may be Dermolithon sp., a Phaeophycea of the Ralfsiaceae family[9] (*Fig. 2*).

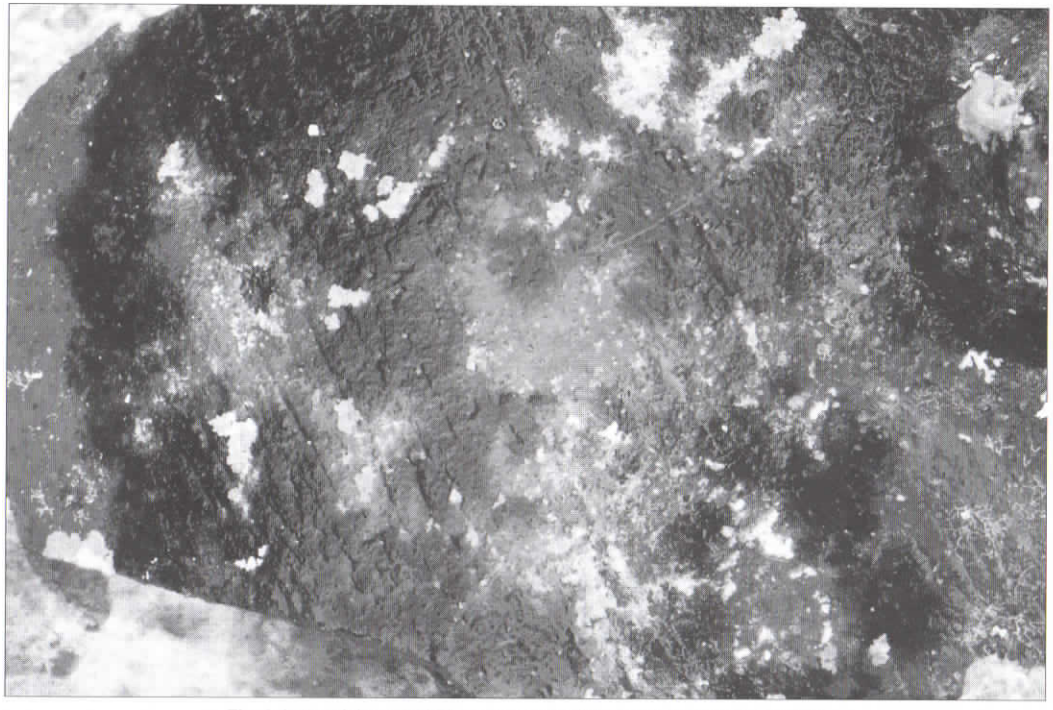


***Fig. 2**. Layer of dermatoid Phaeophycea, probably of the Ralfsiaceae family.*

2.6 Colour alteration

The colour of the pottery has been altered by stains of two kinds:

a) Iron corrosion stains caused by proximity to an iron object, such as a modern nail, and by other chemical and biochemical processes.
b) Black stains, usually formed beneath calcareous deposits. In this case the colour alteration is attributed to the action of anaerobic sulphur reducing bacteria which produce hydrogen sulphide (H_2S), which in turn reacts with the iron oxide to form black iron sulphide.

2.7 Soluble salts

The porous materials from a marine environment, regardless of the time they have remained in it, are impregnated with soluble salts, chief among which is sodium chloride (NaCl). As long as the pottery is wet, the salts remain in solution in the pores. If the pot is allowed to dry before the salts have been removed, they crystallize and exert pressures on the walls of the pores, resulting in the fracturing and disintegration of the ceramic fabric. This destructive action is not always apparent immediately after drying, but rather after the repeated hydration and dehydration of the salts caused by fluctuations of the relative humidity of the environment.

3. Conservation

3.1 First aid at the excavation site

The most important concern, after the ceramic finds have been brought up from the bottom of the sea is them keep it completely immersed

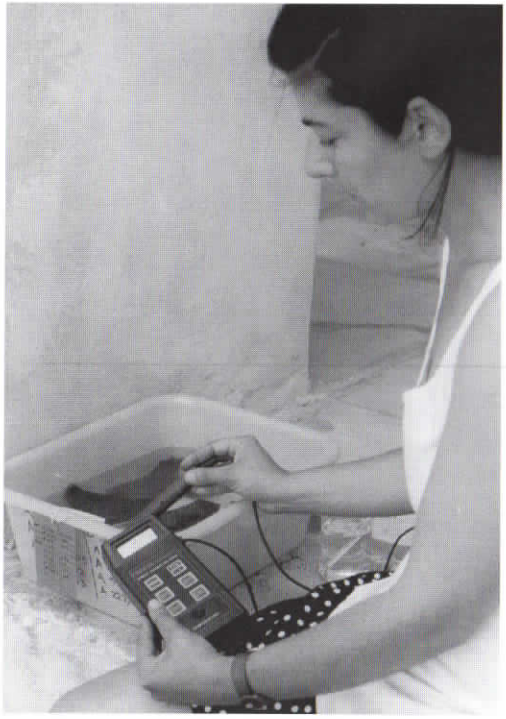


Fig. 3. Checking the desalination with a conductivity meter. There is a tag on each container on which the readings and changes of water are recorded.

in seawater. Because of the difficulty of transporting fresh water to Dokos, the des-alination process began only after the pottery was transported to the laboratory.

3.2 Use of biocides

The decomposition of live organisms and the action of sulphur reducing bacteria result in the characteristic bad odour caused by the release of hydrogen sulphide (H_2S). With some of the finds (A 507) a biocide was added to the storage water, since they were heavily incrusted with marine organisms in a state of decomposition. We used with good effect, so far as the smell was concerned, 1% TEGO 51 B, a wide-spectrum biocide (dodecyl diethylene diamino glycene and dodecyl aminopropyl glycene with the addition of a surface tension dispersant) in the storage water for a suitable period of time.

3.3 Desalination

The desalination process is the most laborious stage in the conservation procedure. Because of the large number of finds, their fragility and the impossibility of continuous surveillance, the desalinating method adopted was that of static immersion. The ceramic finds are immersed successively in baths of seawater, tapwater and distilled water. The change from one to the other is effected in stages, according to the conductivity reading of the water in each bath. As can be seen in Tables II and III (*Fig. 5*). the progress of desalination by static immersion is very slow. To speed up the process in the Spetses laboratory, the electrodialytic method was used,11 whereby a continuous low-tension current is passed through two poles placed diametrically opposite the ceramic objects. With this method the positive ions (Na+) are attracted by the negative pole and the negative ones (CL-) by the positive.

Desalination is considered complete when the conductivity of the water is reduced to levels below those of the tapwater (see *Table I*).

To facilitate the desalination operation and for documentation purposes a tag is hung on each basin, on which the date, conductivity reading and changes of water are noted (*Fig. 3*).

3.4 Cleaning

Removing the calcareous deposits from the surface of the pottery is, after desalination, the most laborious stage in the conservation procedure. Unlike desalination, the cleaning process requires extra care and long hours of active labour.

Cleaning the Dokos pottery is carried out entirely by mechanical means. The equipment used includes a scalpel, a vibrotool with a scalpel blade fitted, a drill with different kinds of burrs and cutting disks, and an ultrasonic scraper. In the case of the two-handled spherical jar Δ.A1, the calcareous deposit on the inside12 was so hard, compact and massive that its removal required the use of a diamond-edged cutting disk (*Fig. 4*).

Fig. 4. Mechanical cleaning using a revolving wheel.

The use of chemical means like acid and chelating agents was ruled out, because there is evidence[13] that the acid attacks the calcareous inclusions in the clay, oxidizes and removes the iron and by releasing CO^2 detaches the sensitive slips, while the use of chelating agents like sodium hexametaphosphate and ethylene diamine tetracetc acid (E.D.T.A. 4 Na) softens the clay body and makes the removal of the deposits impossible.

Cleaning is carried out in two stages. The first takes place during the desalination of the pottery while it is still wet. Most of the deposits are removed at this time. As experience in cleaning the finds from Dokos and elsewhere[14] has shown, it is easier to remove the calcareous deposits while they are still wet[15]. Another reason why the cleaning should take place concurrently with the desalination is that the deposits block the pores of the pottery and prevent the salts from being flushed out.

The second stage of the cleaning takes place after the object is dry, because it has been observed that the thin layers of deposit are more easily detached after they have dried, when their adherence to the underlying pottery surface has weakened (*Figs. 6, 7*).

The stains are removed during the desalinating process. To clean the rust marks, 8%

TABLE I

WATER CONDUCTIVITY

	µS.cm-1
Seawater	= 50,000
Tapwater	= 700
Distilled water	= 0

TABLE II

PROGRESS OF DESALINATION OF Δ.A1 OVER A PERIOD OF 9 MONTHS WITH THE STATIC IMMERSION METHOD

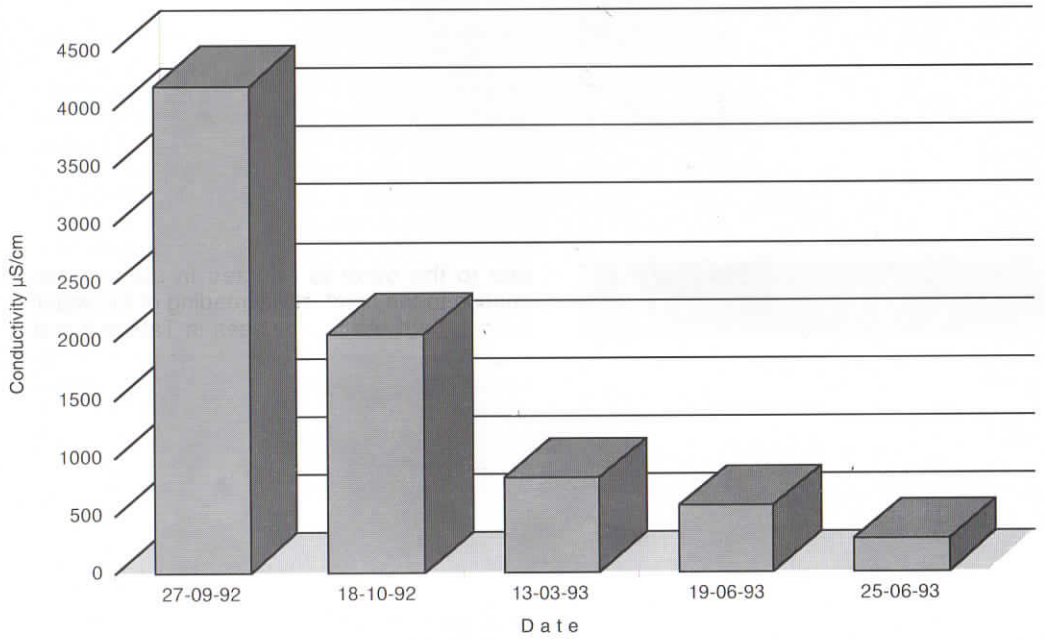


TABLE III

RATE OF EXTRACTION OF SALTS IN Δ.A1 BETWEEN SUCCESIVE CHANGES OF DISTILLED WATER OVER A PERIOD OF 11 DAYS WITH THE STATIC IMMERSION METHOD

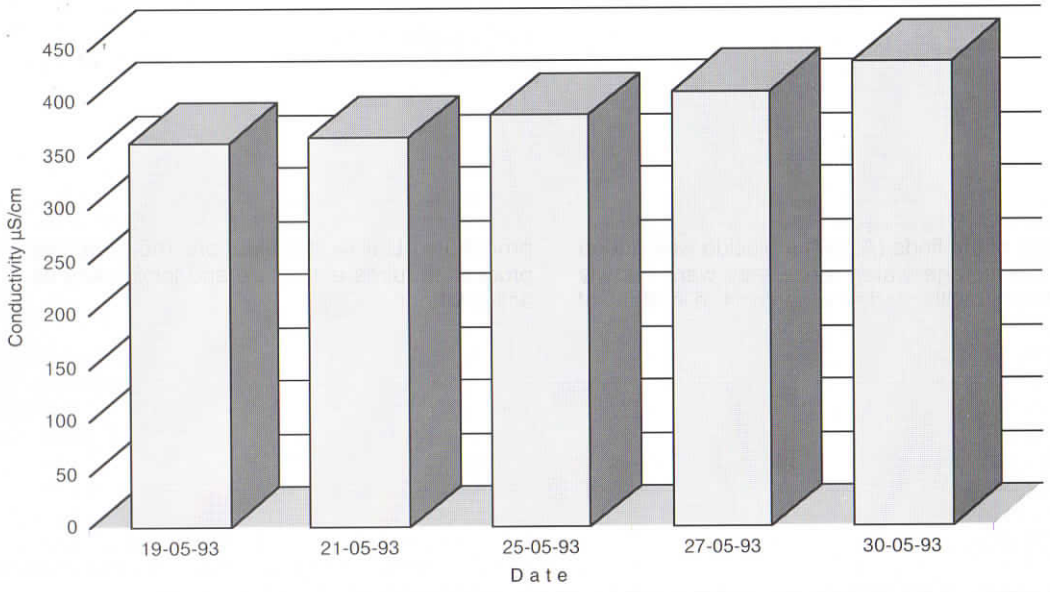
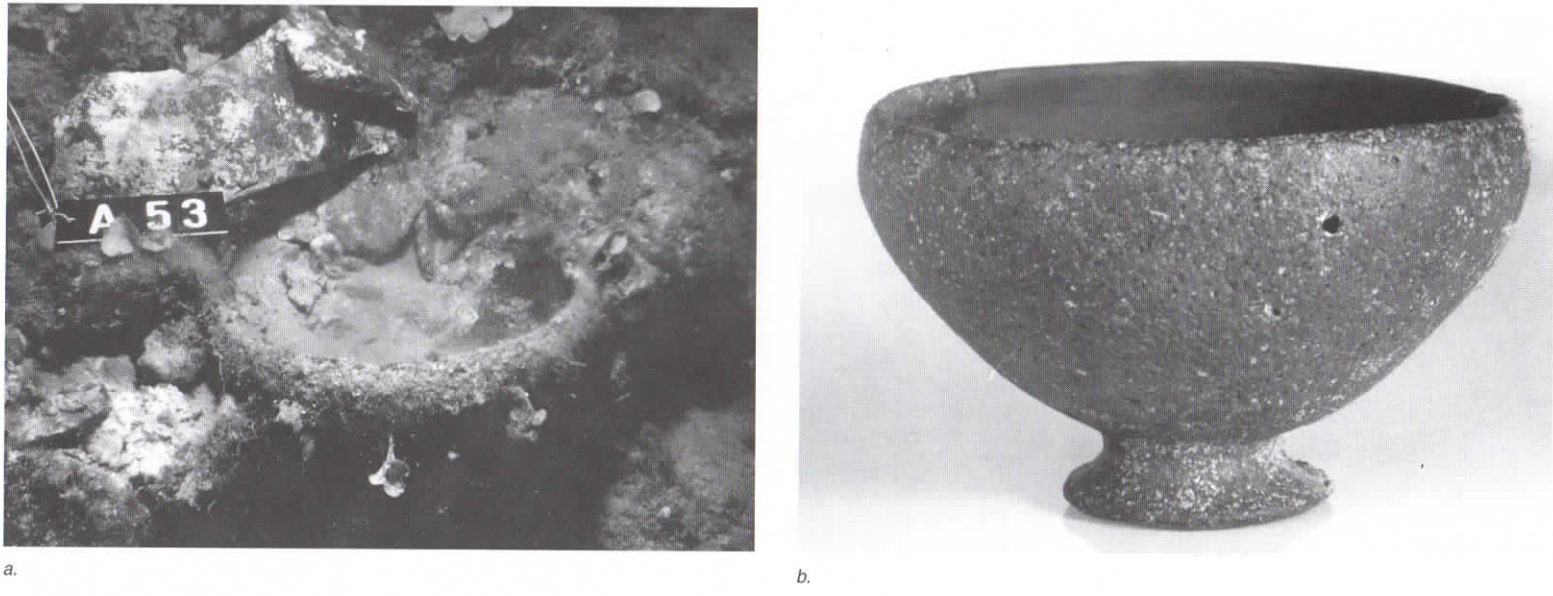
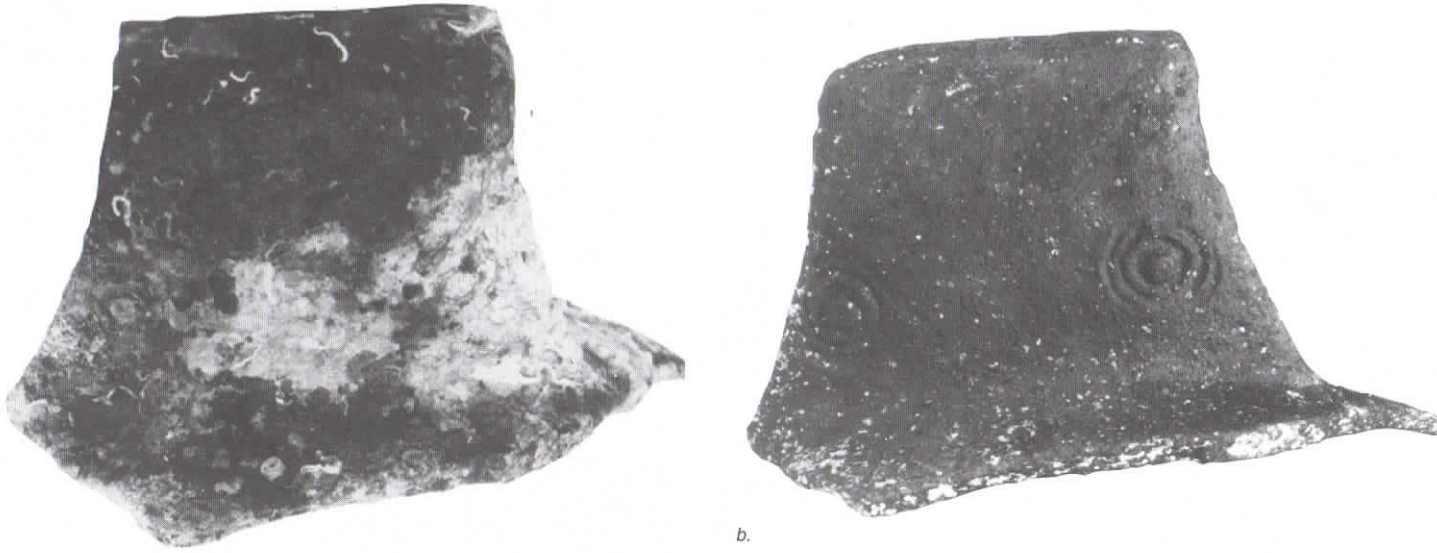


Fig. 5.



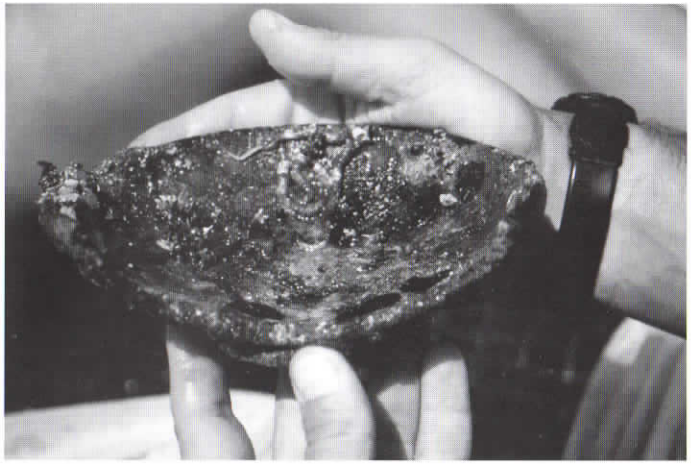
a. b.

Fig. 6. The deep EH II bowl A35 from the Dokos wreck: a. As it was found on the bottom. b. After cleaning.

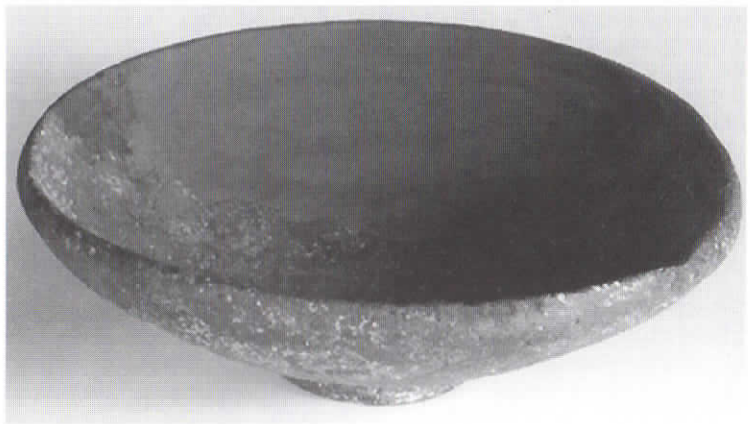


a. b.

Fig. 7. EH jar handle A464 from the Dokos wreck: a. Before cleaning. b. After cleaning.



a.



b.

Fig. 8. *Shallow EH bowl A25 from the Dokos wreck. a. Just after raising. b. After cleaning and gap-filling.*

a.

b.

Fig. 9. *EH brazier A41/A67/A96 from the Dokos wreck: a. Before cleaning. b. After cleaning and gap-filling.*

neutralized thioglycolic acid was used in a methyl cellulose paste[16].

The black iron sulphide stains are removed by the use of hydrogen peroxide (12 vol.)[17], evidently because of the latter's oxidizing properties.
The soft brown-black layers of the dermatoid Phaeophycea are removed mechanically with the scalpel. The part remaining embedded in the pores of the clay, which cannot be removed mechanically, is bleached out with hydrogen peroxide (12 vol.).

3.5 Drying

After completing the desalination and the first stage of cleaning, the pottery is allowed to dry out. For greater safety the drying is promoted by immersing the pottery first in equal parts of elhyl alcohol and distilled water and then in ethyl alcohol[18].

3.6 Consolidation

The problem of consolidating wet pottery during desalination has not yet, even internationally, found a satisfactory answer that fulfills all the required specifications. Resin solutions cannot be applied to a wet substratum, while emulsions and colloidal dispersions are not effective during extended exposure to a wet environment. In the case of the Dokos finds, therefore, whenever consolidation was necessary in order to restore the cohesiveness of the clay body and surface, a thin solution of Paraloid B72 (an ethyl methacrylate methyl acrylate copolymer) was used after the completion of the desalination and drying processes.

3.7 Bonding

Pottery parts and sherds were bonded using a cellulose nitrate adhesive (Hanschmann & Milojcic 1976G).

3.8 Gap-filling (*Figs. 8, 9*)

Where it was deemed necessary, for reasons of stability or appearance, to restore the missing parts of the pots, artist's plaster of paris was used with inorganic pigments incorporated. In certain cases the plaster was overpainted with inorganic pigments in an acrylic medium (Primal AC33). Paraloid B72 solution was applied to the broken surfaces to act as a separating agent between the plaster and the ceramic fabric[19].

4. Documentation

In order to record and document the state of preservation of the ceramic finds from Dokos and the conservation treatment carried out, a special form (*Fig. 10*) was designed, which is filled out for each object or group of sherds. The record includes a photograph before and after treatment. Colour negative was used to give a clearer picture of the deposits. Where necessary the finds were also photographed on black and white negative and colour positive film.

Remarks

The underwater wealth of cultural relics from shipwrecks of earlier periods in Greek waters is enormous. In recent years, with the growth in the number of systematic underwater excavations, the need for conservation has become more pressing.

In spite of the practical experience in the field of conservation of underwater finds that exists in Greece, there is a dearth of publications on the subject. The methodical excavation of the Dokos wreck and the large number of ceramic finds have given us the opportunity to approach the subject of the conservation of underwater ceramic material in a systematic manner, in order to establish a Greek terminology for conservation, to perfect a system of documentation and to lay the foundations for a scientific approach to the subject.

Our involvement in the conservation of the H.I.M.A. finds has highlighted the need for collaboration with specialists in connection with the identification of every kind of marine organism, its attachment to the clay substratum and the kind and degree of damage it causes. The data resulting from this collaboration will form a valuable contribution to the scientific documentation of the state of preservation of ancient ceramics recovered from an underwater environment.

We hope this article will supply a spark that will trigger a specialized investigation and a documented application of conservation methods.

Acknowledgments

We thank the executive Committee of H.I.M.A. and all those responsible for the Dokos excavation for their splendid collaboration and their support of this publication.
Mr K. Asimenos, Ministry of Culture chemist, contributed to the designing of the conservation laboratory, for which we thank him.
Also collaborating in the work were the conservators Margarita Venaki and Spyridoula Papanikou, and Kostas Vasileiades, a student at the Technological Educational Institution.
We would like to acknowledge here the contribution of the biologists Mrs E. Vardala-Theodorou from the Museum of Natural History, Dr A. Pantazidou, Lecturer in Ecology and Taxonomy at the University of Athens, and Dr G. Panayotidis of the National Marine Research Centre.
Lastly, we wish to thank all the personnel of the Spetses Museum and in particular Mrs A. Gritsa for their wholehearted collaboration, as well as the captain of the Kalokyra, Dionysis Lekkas, for the assistance he gave us.

Notes

1. Theophano Saramanti is conservator at the 1st Ephoria of Byzantine Antiquities of the Ministry of Culture and responsible for the conservation of the Dokos finds.
2. Anita Moraïtou is conservator at the 1st Ephoria of Prehistoric and Classical Antiquities of the Ministry of Culture and adviser to H.I.M.A. on conservation matters.
3. Papathanasopoulos et al. 1992.
4. The examination of the pottery is scheduled to be carried out in the Archaeometric Laboratory of the NRCPS Demokritos. For the technology of slips, see Aloupi & Maniatis 1968.
5. Evi Vardala-Theodorou 1993, "Παρατηρήσεις επί των Ευρημάτων από Δοκό και Ίρια", Report to the H.I.M.A. 1993, H.I.M.A. archives.
6. Vardala-Theodorou op.cit. note 5; Campbell 1989; A. Pantazidou, "Έκθεση Βιολογικής Εξέτασης οστράκου από το Δοκό", HIMA Archives, 28/12/93.
7. Weier 1973, 137-140.
8. Vardala-Theodorou, op.cit. note 5.
9. Pantazidou, op.cit. note 6.
10. Florian 1987, 16.
11. Jedrzejewska 1970.
12. The identification of the deposit was made by the Archaeometric Laboratory of the NRCPS Demokritos by XRD analysis.
13. The exclusion of acids and chelating agents is in accordance with the results of Olive & Pearson 1975.
14. Ganitis 1993.
15. Pearson 1987, 254, mentions that if the inorganic deposits are allowed to dry, they harden due to their reaction with the CO^2 in the atmosphere. This explanation does not appear to be documented scientifically.
16. This method is also used on the Acropolis marbles: Doganis et al. 1992.
17. A widely used method: Pearson 1987, 256.
18. As Pearson 1987, 257, reports, the use of ethyl alcohol, due to its low surface tension, increases the penetration of water into the pottery and speeds up the extraction of the remaining hydrated salts.
19. Koob 1987.

HELLENIC INSTITUTE OF MARINE ARCHAEOLOGY

CONSERVATION DOCUMENT OF CERAMIC FIND

Cons. No

IDENTIFICATION

PROVENANCE | AREA | Date of raising

LAYER | GROUP | SECTOR | TRENCH

DESCRIPTION

DIMENSIONS

RELATIVE SHERDS

BEFORE | AFTER

PHOTOGRAPHIC & DRAWING RECORD

BEFORE	AFTER
B&W	B&W
COLOR	COLOR
SLIDE	SLIDE
	DRAWING

CONDITION OF FIND BEFORE CONSERVATION

CERAMIC BODY

SURFACE

CALCAREOUS CONCRETIONS

ALGAL GROWTH

STAINING

OBSERVATIONS

PHYSICOCHEMICAL EXAMINATIONS & ANALYSIS

CONSERVATION/RESTORATION TREATMENT (MATERIALS & METHODS)

DATE: START | END

First aid on site

Use of biocide

Desalination

Removal of calcareous concretions

Removal of algal growth

Stain removal

Consolidation

Bonding

Gap filling

Color matching

Other

OBSERVATIONS DURING & AFTER CONSERVATION

TECHNICAL DESCRIPTION OF FIND (after cleaning &drying)

CLAY

Description

Color — Munsell code

Inclusions

SURFACE

Description

Color — Munsell code

Decoration

Other

TECHNICAL DATA OF MANUFACTURE

OTHER DATA

LOCATION OF FIND — CONSERVATOR:

Fig. 10.
The conservation forms designed for the needs of the pottery finds from the Dokos cargo.

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SHIP (?) ENGRAVING ON A JUG HANDLE FROM THE CARGO OF THE DOKOS EH II WRECK

Yannis Vichos

During the 1992 underwater excavation period at Dokos, part of a wide strap handle was found, probably from an EH II jug (*Fig. 1*). Numbers of such handles were found among the material brought to light from the sunken wreck cargo .

The interesting feature of this handle is the existence of an incised composition on its inner surface, where it would not have been visible when the pot was still whole (*Figs. 1, 2*). Its position on the inside of the handle and its careless execution give the impression that it was a graffito made before the handle was attached and the pot fired. What could have led the potter to incise a subject in a place where nobody would see it? Since he could hardly have anticipated that the ship carrying the pot would be wrecked and that the fragments would end up in the hands of archaeologists, the potter must have incised the graffito either for his own amusement, wanting to make a hasty sketch of a subject he liked, or else experimentally before finally incising it on the outside of some other pot that he was about to make and fire. Quite a number of example[1] have been found of representations and other iconographical subjects on LC II and LH II pots that were incised before firing (*Figs. 3-5*). But what exactly did the potter wish to represent so cursorily on the jug handle found in the Dokos cargo?

It has two basic horizontal and several vertical components. The horizontal and some of the vertical elements taken together could form a schematic representation of an EH ship seen from the side[2]. If this is so, then the low bow and the pronounced articulaion at about the middle of the ship stand out conspicuously, while the high stern is less clearly defined. The prominent vertical feature in the shape of a V might represent the horns of a sheep or goat. The closest parallel is a rock engraving from Korphi t'Aroniou on Naxos[3] (*Fig. 4*). The other incisions may represent the potter's sketchy attempts to fill up the composition.

This interpretation of the graffito as an experimental effort by the potter to depict an EH ship is supported by the fact that there is a known series of incised ship representations on EH II and EC II pots and also on stones.

The closest parallel to our incised handle in terms of the medium and the theme is the incision of a ship on an EH II pot handle from Orchomenos, although in this case it is on the outside[4] (*Fig. 5a*). Here too the vertical lines are difficult to interpret.

Lastly and most importantly is the large series of incised EC II ships on the fryingpan utensils from the graves at Halandriani on Syros (*Figs. 5b-g*).

If, therefore, the incised composition on the Dokos jug handle does represent in a basic way an EH ship, then it belongs to the common type of vessel known from many pictorial representations belonging to the Early Bronze Age in Greece and the Aegean[5].

Drawings: Y. Vichos

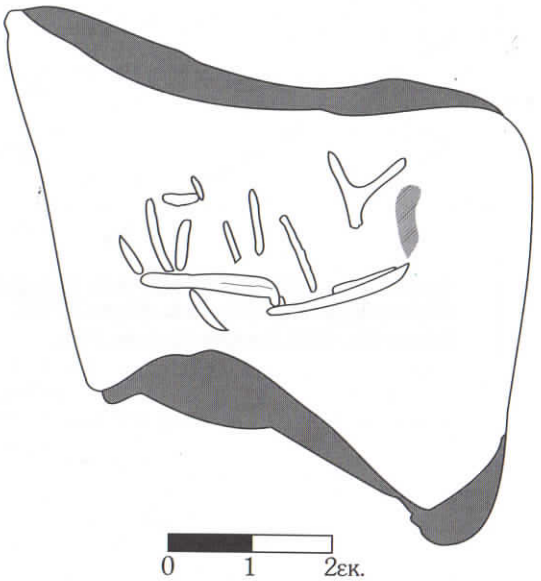

Fig. 1. *The jug's handle (inside) with the incision.*

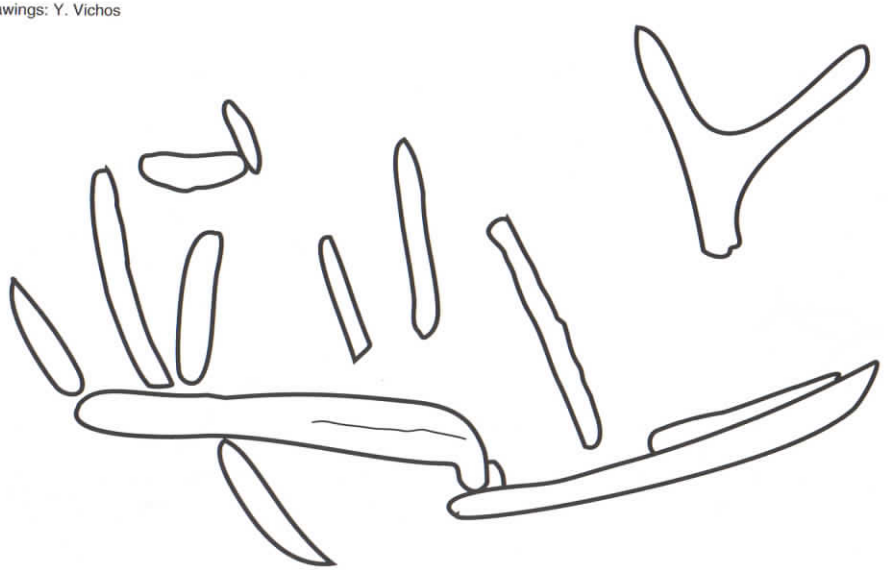

Fig. 2. *Detail of the incision.*

Fig. 3. An EH II amphora's handle from the Dokos cargo with an incised composition.

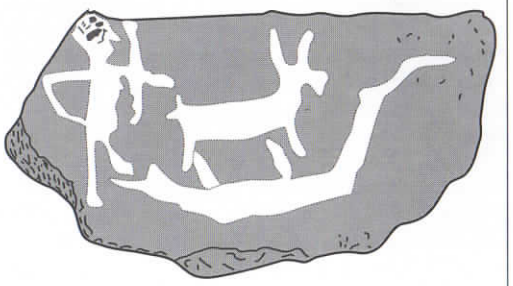

Fig. 4. Rock engraving composition with a ship from Korphi t' Aroniou, Naxos

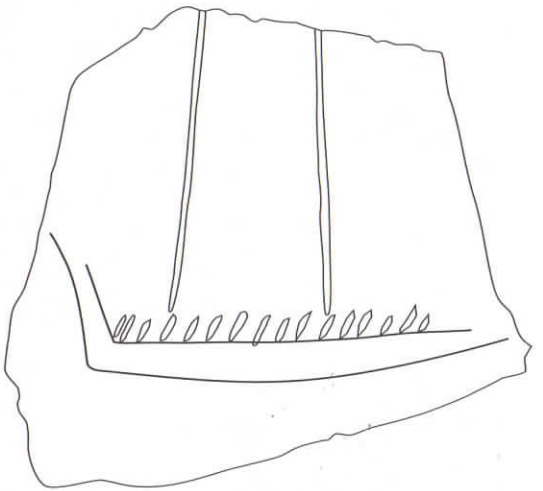

Fig. 5a. The ship on the askos handle, from Orchomenos.

Drawings: Y. Vichos

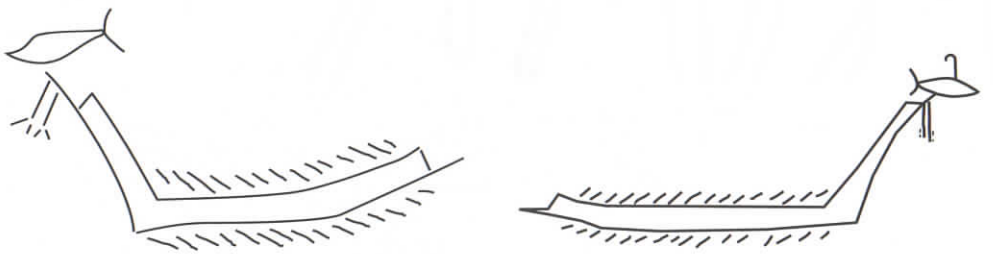

Fig. 5b-c. Two drawings of EC ships from two fryingpans from Halandriani on Syros (National Archaeological Museum of Athens, nos: 4974, 6184).

NOTES

1. We differentiate between the incised pictorial representations and the incised decorative motifs that are very common on EH and especially EC pottery. The incised depictions of ships on the EC fryingpan utensils from Halandriani on Syros are well-known. There is also an incised ship on an EH II askos handle from Orchomenos.

2. The very schematic, sketchy treatment of the ship may be explained as much by the potter's experimental attempt as by the restricted space on the jug handle.

3. Two of the marble slabs with crusted representations from Professor Ch. Doumas's excavation at Korfi t' Aroniou on Naxos depict compositions that include a ship (Doumas 1965, 49, fig. 4 and 53, fig. 7). On the first one, in addition to the rather ragged drawing of an Early Cycladic ship, there are also sheep or goats with large horns, and the whole treatment is careless and has many elements that are hard to interpret.

4. See Kunze 1934, 87, 29: 3.

5. In addition to the representations on the Syros fryingpans, the Korphi t' Arniou rock engravings and the Orchomenos incision, this common type of ship is also represented by a clay model from Palaiokastro on Crete and a probable clay model fragment of an EH II ship from Ayia Marina on Spetses discovered by Theocharis (see Vichos 1993, in the press).

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