

A Weighty Matter: Pontic Fish Amphorae

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Introduction

The salted fish products of the Pontos Euxeinos were among the most well known goods of this region during Hellenistic and Roman times. Our ancient literary sources together with archaeological finds provide us with a variety of information regarding the fish industry of the Black Sea. Little is known, however, about how this important constituent of the ancients' diet was transported and traded.¹ The aim of this paper is to have a close look at some Hellenistic and Roman amphorae in the hope that these may provide some clues about the containers used for transporting this product.

A link between the amphora shape and its contents

Although not easily perceptible to the untrained eye, there is a close relationship between the shape, proportions and function of transport amphorae. The ancients were well aware of these connections, as a short passage from Macrobius' *Saturnalia* (7.12.13-16) demonstrates: "...the best wine is found in the middle of the flask. But it has been proved by experience that, in the case of olive oil, the best floats on top, while for honey the best is at the bottom".

Technical needs seem to have been taken into account when an amphora was designed. Different substances required different forms and sizes. Products to be shipped varied in density and in weight; these differences together with the different physical/chemical properties of the various goods dictated the shape of an amphora. This is without a doubt the reason why some ceramic containers have a cup-shaped mouth able to receive less fluid contents without problems: a vessel with a shorter neck and ovoid or globular body was probably used for olive oil, while containers with a wider base and a large mouth with a simple, plain rim might have been used for liquids with a high viscosity like honey. An amphora intended specifically for a fish product would either have no neck or a larger truncated conical neck that would not impede the filling and emptying of the vessel with fish sauce or salted fish. Wine amphorae on the contrary seem to have had a narrow and rather longer neck, probably designed specially according to the kind of wine transported. Two amphorae of a strikingly different morphology, discovered at Olynthos,

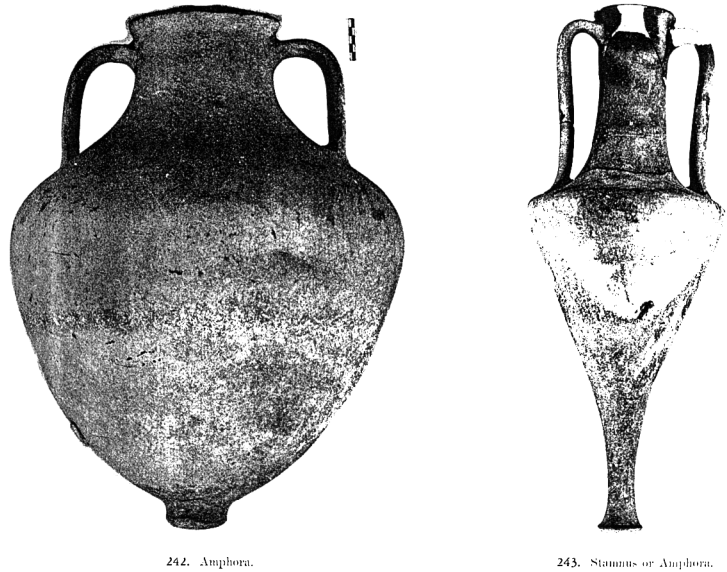


Fig. 1. Two amphorae found at Olynthos, after Robinson 1950, figs. 242-243.

and placed by Robinson on the same plate in his work, clearly illustrate these conceptual differences (Fig. 1).²

Fish amphorae of the Mediterranean

If we look at the shape of amphora types created for the containment of fish products, it is noticeable that ancient potters from the Straits of Gibraltar to the Straits of Kerch followed similar criteria in creating their products. Well-known discoveries of such amphorae made in the western Mediterranean help us to define even more clearly the main characteristics of a container designed to hold a fish product (Fig. 2a-b).

Given the characteristic designs of the amphorae under discussion, these amphorae can also provide us with some clues about the kind of fish products for which they were intended. An amphora with a large mouth, tronconical neck and a body whose maximum diameter is at its lowest end and completed by a hollow spike could be for a fish sauce product such as *garum*, with small pieces of fish collecting in the lower part of the body and the spike. But the hollow spike seems to have been replaced by a solid one in the case of amphorae intended for salted fish. Good examples of this second type of container are the Dressel 7-11 types, together with the Beltrán II A and II B.³ Finally, an amphora which had a large mouth and tronconical neck but an ovoid body and a solid toe could suggest that it was designed for the transportation of more solid merchandise such as salted pieces of fish. A type

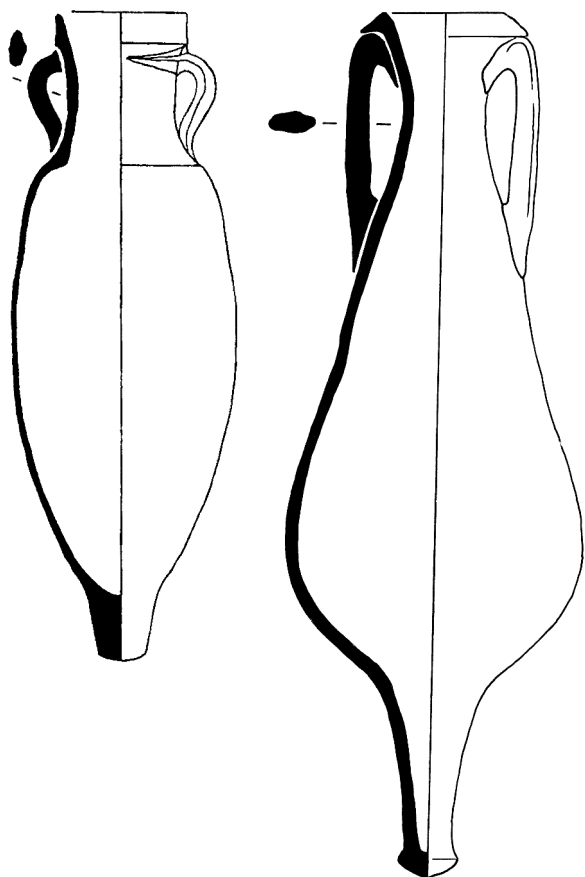


Fig. 2. a: “Amphore à saumure d’Espagne”, after Sciallano & Sibella 1994; b: Beltrán II A, after Etienne & Mayet 2002, fig. 35.1.

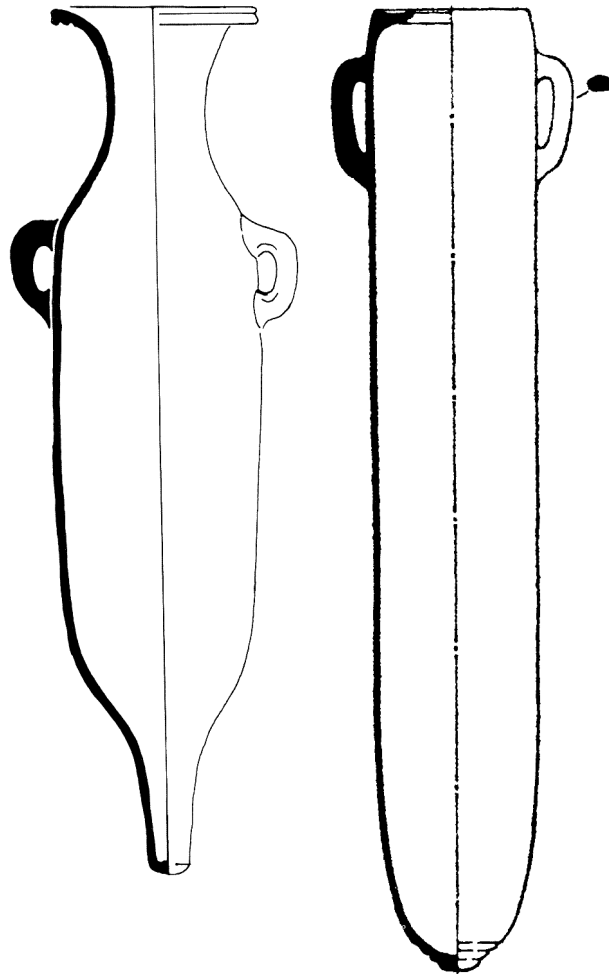
named “Amphore à saumure d’Espagne” provides us with a good example of this sort of ware.⁴

North Africa was also a famous producer of fish products, and its fish amphorae served as models for many Iberian amphorae, after many Punic colonies were established on the Iberian shores and began to manufacture fish products there. Typical North African fish amphorae, such as Dr 18/Mañá C2b or Mañá D followed this local Punic tradition; the first, with a hollow spike, perhaps used for fish sauce and the second, with a cylindrical body, for salted fish (Fig. 3a-b).⁵

During Roman times, the southern part of the Iberian Peninsula and North Africa together created a new *koine*, such as is reflected in the amphora shape Dr. 14 among others.⁶ North African amphorae, however, such as Mañá C2c or Leptiminus II continued to follow the earlier Punic tradition (Fig. 4a-b).⁷

Italy was also a manufacturer of fish products, although on a lesser scale than the regions named previously. The best-known amphorae types, which have a shape suitable for a fish product, seem to be Dressel types 21 & 22 (Fig. 5).⁸

Fig. 3. a: Mañá C2b amphora, after Etienne & Mayet 2002, fig. 26.2; b: Mañá D amphora, after Sciallano & Sibella 1994.



The eastern Mediterranean, the Aegean, and the Sea of Marmara were also famous for their fish products, and some amphorae from these areas as well suggest by their shape that fish products were their main contents. One of these amphorae is a large, ovoid amphora with heavy bifid handles whose peaks were higher than its rim (Fig. 6).⁹

Another candidate for an amphora, designed specifically for fish products, from this region is an amphora discovered at Knossos.¹⁰ Its large neck and its ovoid body, which ends in a conical spike, are features more suitable for an amphora designed for fish than for one intended for wine (Fig. 7).

Another conical amphora, the so-called Carrot amphora (also known as Schöne-Mau XV), which lacks a neck, also seems to be suitable for the containment of fish products (Fig. 8). As P. Vipard has pointed out, the traces of pitch found on the inner side of its walls are not only characteristic of a vessel that contained wine but also of one that held a fish product. I believe

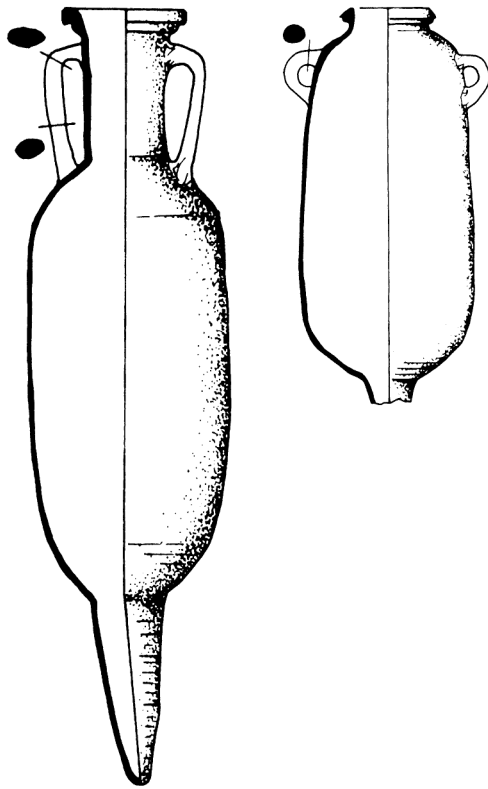


Fig. 4. a: *Leptiminus* I, after Opaït 2000, fig. 1.6; b: *Leptiminus* II, after Opaït 2000, fig. 2.24.

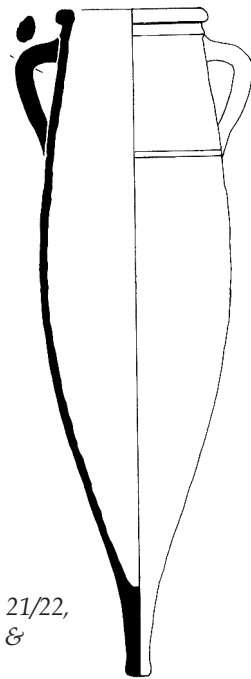


Fig. 5. Dressel 21/22, after Sciallano & Sibella 1994.



Fig. 6. Robinson 1959, M 54, photo A. Opaït.

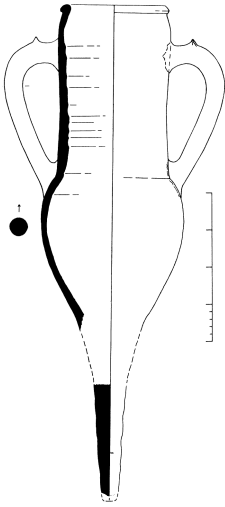


Fig. 7. Aegean amphora, after Hayes 1983, fig. 24. A66.

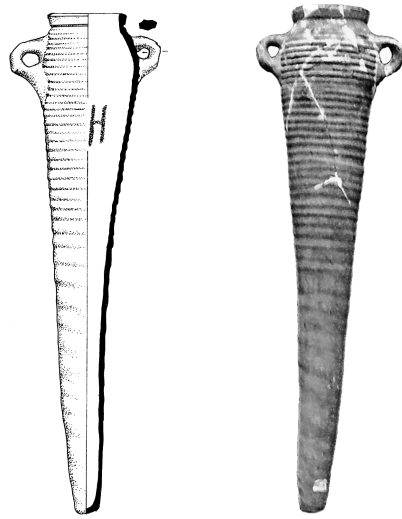


Fig. 8. Amphora of the type Schöne-Mau XV from Carsium, drawing and photo A. Opaïț.

that the shape of this amphora argues convincingly for a fish product as the vessel's main content and thus supports Vipard's conclusions.¹¹ Its origin seems to be the Levant.

Fish amphorae of the Black Sea

Fish was one of the main resources of the Black Sea in ancient times. Confined between the Strait of Bosphorus and the Strait of Kerch – a confinement that created a huge corridor for the all-season passage of huge schools of fish – the Pontos Euxeinus was richer in fish products than the Mediterranean. Large rivers such as the Danube, the Dnister, the Dnieper, the Bug, the Don, and the Kuban flowed into it, creating large deltas, which were also abundant with fish. Important studies of the ichthyofauna in the Black Sea have been undertaken by Russian scholars, such as N.V. Ivanova,¹² V. Ju. Marti,¹³ and Ju.E. Lapin and V.D. Lebedev.¹⁴ They have demonstrated the supremacy of large species such as sturgeon, pike and catfish at sites situated nearby these large rivers, while at Tyrityake and Chersonesos migratory saltwater fish predominated (Fig. 9).¹⁵

The richness of this area in fish is also suggested by some red figure “fish-plates” decorated with fish, most likely representing species typical of those found in the Black Sea and its tributaries (Fig. 10).¹⁶

The fish amphorae of the Pontos Euxeinus have not been categorized as such before and the identification presented here is a hypothesis based primarily on their morphological characteristics, which fit however well with their



Fig. 9. Chersonesos Museum, Inv. no. 2489.36 (not to scale).

Fig. 10. Chersonesos Museum, Inv. no. 206 (not to scale).



use as containers for a fish product. Moreover, these amphorae are present at almost every North Pontic site. In addition, and perhaps most tellingly, it should also be borne in mind that the only foodstuffs produced on the northern and western coasts of the Black Sea and available for export, were grain, wine, and fish products, and the amphorae under discussion are not suited to use with either of the first two products.¹⁷

The Pontic fish amphorae differ in dimensions and weight from the Mediterranean ones but they seem to make use of the same structure and shape.

They have a wide mouth, a large trunco-conical neck and an ovoid body ending in a massive spike. These amphorae seem to have been larger and heavier than their western Mediterranean counterparts; they were also made in different sizes¹⁸. Although the workshops for these types of amphorae have not yet been discovered, the pattern of their distribution can provide us with some clues to their provenance. While more work has to be done before we will have a clear mapping of the production places for fish amphorae, it is important to have a clear definition of these Pontic fish amphora types.

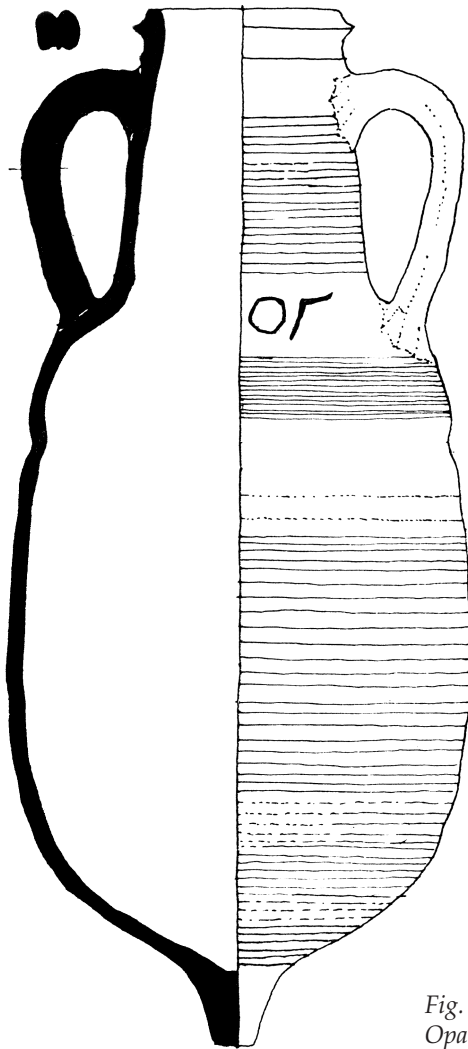


Fig. 11. Amphora type Zeest 75 from Greci, after Opaïț 1980, pl. IX. 1-3.

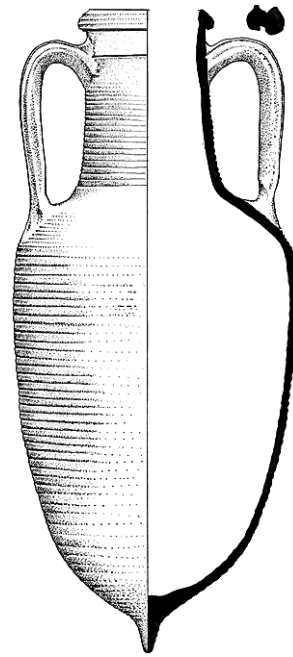


Fig. 12. Tomis, Constanta Museum.

Zeest 75

This is a very impressive container, characterized by hefty dimensions and weight. An example, discovered in Dobrudja at Greci, is to date the largest of this type; it has a large mouth that probably had an exterior diameter of 30 cm and an interior diameter of 22 cm, while the vessel itself had a maximum diameter of 62 cm and a height of 138 cm (Fig. 11).¹⁹ Other examples are of lesser dimensions: one found at Olbia is only 125 cm high,²⁰ another at Istros is only 110 cm,²¹ while at Čornoričes'kyj necropolis one of only 95 cm height has been found.²² The smallest amphorae of this type were found at Sovhoz 10, with a height of 76 cm and a maximum diameter of 32.6 cm, and at Tanais with a height of 75 cm, and a maximum diameter of 39 cm.²³ The variation in size range suggests that this type was deliberately made with varying capacities.

Some differences in the rim modeling also seem to indicate different workshops. At least four rim variants can be determined: triangular, rolled with facets, trapezoidal with a rounded base, and rectangular. Unfortunately, the present writer did not have the chance to view all of these variants personally, and it is therefore difficult to describe their fabrics.

A. The first variant has a thick rim, triangular in its upper section, pointed towards the exterior and separated by an off-set at its lower part. Examples were discovered at Greci,²⁴ Bezymjannaja, in the Chersonesean *chora* (unpublished), Balaklava,²⁵ Bliznecy,²⁶ Olbia,²⁷ and its territory at Kozyrskoe,²⁸ at Tanais,²⁹ and Gorgippia.³⁰ It seems to be one of the most frequently found variants.

B. The second variant has a massive rolled rim with small facets; examples of this variant were found at Tomis (personal communication C. Chera), Balaklava,³¹ Olbia,³² Bliznecy,³³ Tanais,³⁴ and Gorgippia.³⁵ The Tomitan example has a height of 85 cm, a maximum diameter of 37.5 cm and a rim diameter of 18 cm (Fig. 12).

C. The third variant has a trapezoidal rim with a rounded top and a marked external offset on its underside. A large example was discovered in the Black Sea close to Kalos Limen and is on display in the Černomorskoe Museum (personal communication V. Stolba). Its height is 11 cm, the diameter of its rim is 24 cm and its maximum diameter is 57 cm (Fig. 13). A smaller amphora has been discovered in the necropolis of Sovhoz No. 10. It has a height of 75 cm, a rim diameter of 14.6 cm and a maximum diameter of 32.5 cm (Fig. 14a-b).

D. The fourth variant has an almost rectangular massive rim, with its top bevelled towards the exterior; it occurs at Istros,³⁶ Olbia,³⁷ in the Chersonesos area at Čornoričes'kyj necropolis,³⁸ and at Gorgippia (Fig. 15).³⁹

Of particular note is the occurrence of stamps either on the neck or on the handles of these amphorae, employing the name of the ΚΑΛΛΙΚΤ/ΠΑΤΟΥ (in genitive) at Olbia (Fig. 16).⁴⁰ Another stamp, which supposedly occurs on this amphora type, is ΦΑΥΚΤ/ΕΙΝΟΥ, discovered at Tanais.⁴¹ The presence of these stamps, and the different capacities of these amphorae, suggest the existence of an organized and controlled production of this type of vessel. Also, sometimes dipinti occur on this type, such as ΟΓ at Greci,⁴² and ΙΘ on a fragment discovered at Balaklava (Chersonesos Museum, inv. no. 3.37394 – personal communication Oleg Savelja) (Fig. 17).

The origin of the Zeest 75 type seems to be indicated by a Hellenistic amphora discovered and dated in the first quarter of the 2nd century BC. Monachov has determined a Sinopean origin for this amphora (Fig. 18).⁴³

The material is suggestive of a North Pontic production, especially that of the variant with a triangular rim, which was made in the Balaklava area and also probably at Myrmekion (Fig. 19).⁴⁴ It is worth mentioning that the quiet Balaklava Bay was one of the main fish suppliers for Chersonesos.⁴⁵

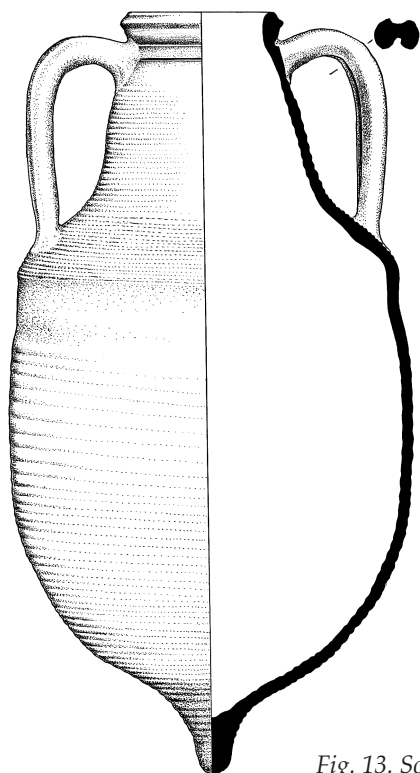


Fig. 13. Sovhoz No. 10, urn 195.

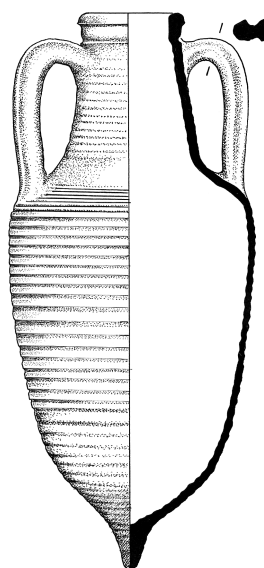


Fig. 14 Černomorskoe Museum.

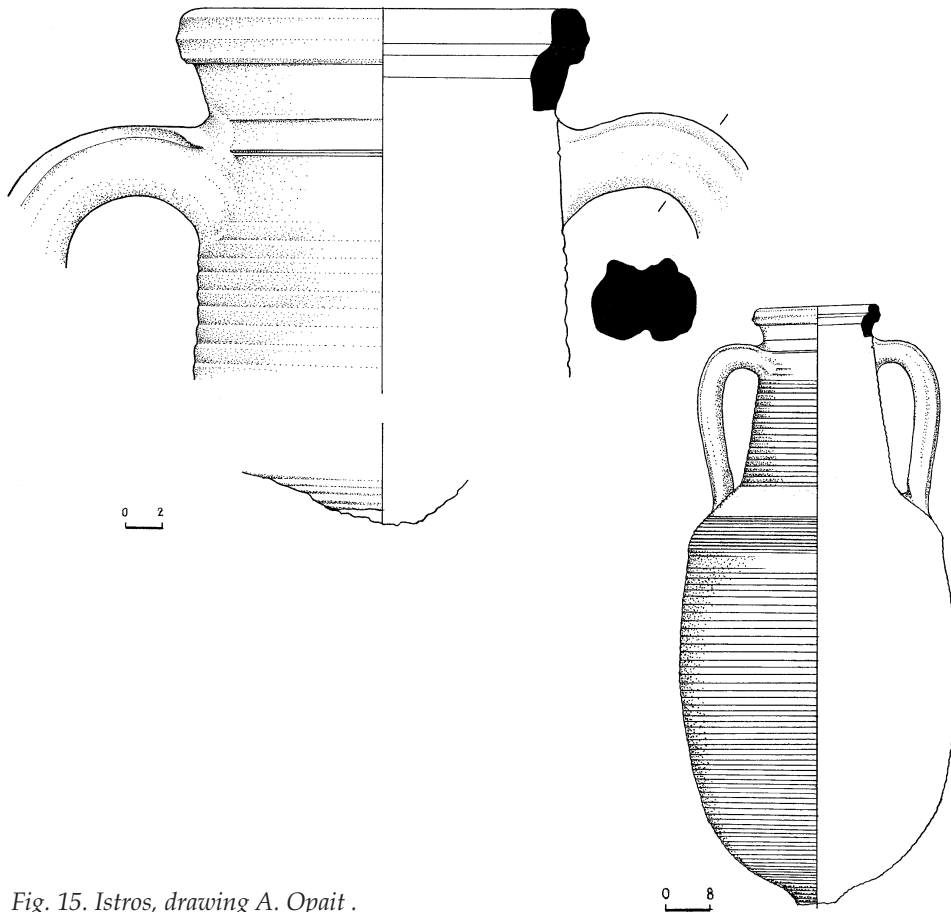


Fig. 15. Istros, drawing A. Opait .

Zeest 75-Similis

The neck, rim and handle of this amphora type are quite similar to those of the previous type. However, there are also some minor differences between the two types. Zeest 75-Similis has smaller dimensions than Zeest 75; its rim has a simple, triangular form; its neck is well delimited from the shoulder, and its body is conical. Some examples of this type have been discovered at the Sovchoz and Čatyrdag necropoleis (Fig. 20a-b).⁴⁶

The diameter of their rims varies from 15 cm to 20 cm, the maximum diameter of the amphorae lies between 42 cm and 45 cm, and their height between 83 cm and 101 cm. This container has been treated as a separate type, but future studies will decide whether this and Zeest 75 truly are separate types or whether Zeest 75-Similis is simply a smaller variant of the previous type.

Its fabric is hard, has a hackly fracture and a red color which varies between Munsell 7.5R 5/8 and 10R 5/8; it is dominated by quartz and iron minerals.

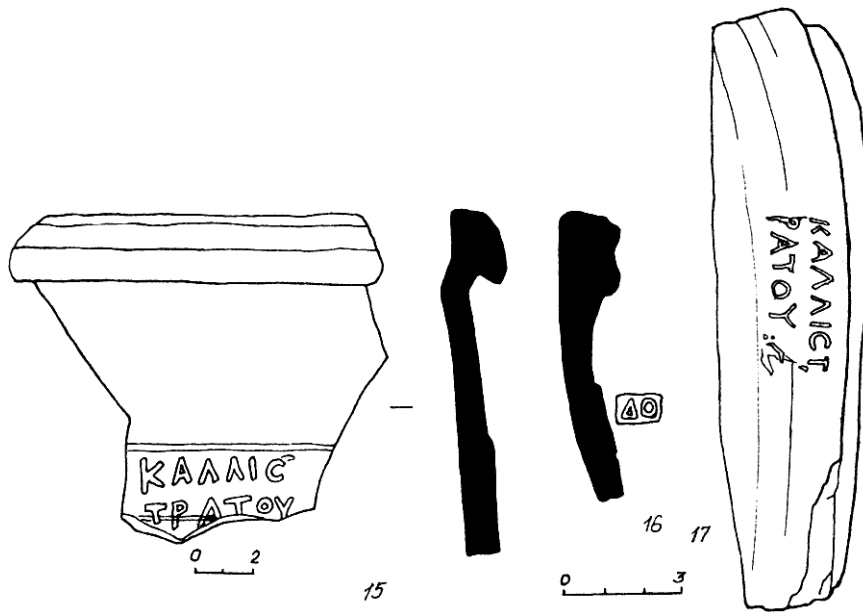


Fig. 16. Zeest 75, stamped fragments from Olbia, after Krapivina 1993, 99, fig. 72.



Fig. 17. Zeest 75, Chersonesos Museum, Inv. no. 3.37394.

Zeest 85-Similis

This is one of the most massive and heaviest amphora types. The diameter of its rim varies between 13 cm, a find at Ostia, and 20 cm, a vessel from Sovchoz 10, while their height varies between 77 cm and 113 cm (Fig. 21a-b). The rim is massive; the North Pontic – possibly Chersonesean – subtype has its rim slightly ridged on the outside, while other Pontic amphora subtypes have rolled rims.⁴⁷ The handles are also massive, ovoid in section, but with a deep cut on the internal side, a feature that is characteristic for many of the North Pontic amphorae. The amphora profile has a gentle and almost continuous line from its top to its lower portion, where it ends in a massive spike. It occurs frequently in the eastern part of Romania (Moldavia and Dobrudja), in the Chersonesean territory, and Myrmekion; examples have also been discovered at Ostia,⁴⁸ and Knossos.⁴⁹

The material of the North Pontic (Chersonesean area?) subtype has a light red (Munsell 2.5YR 6/8) to red (2.5YR 5/8) color, with abundant inclusions of

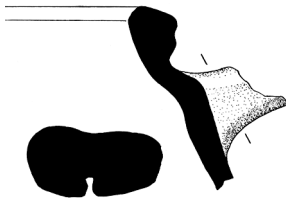


Fig. 18 Myrmekion: profile.

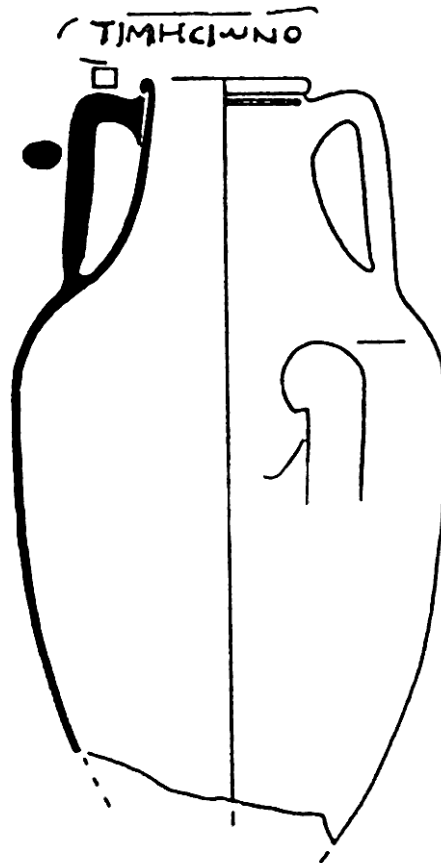


Fig. 19. Bolšoj Kastel', after Monachov 1999, pl. 236.6.

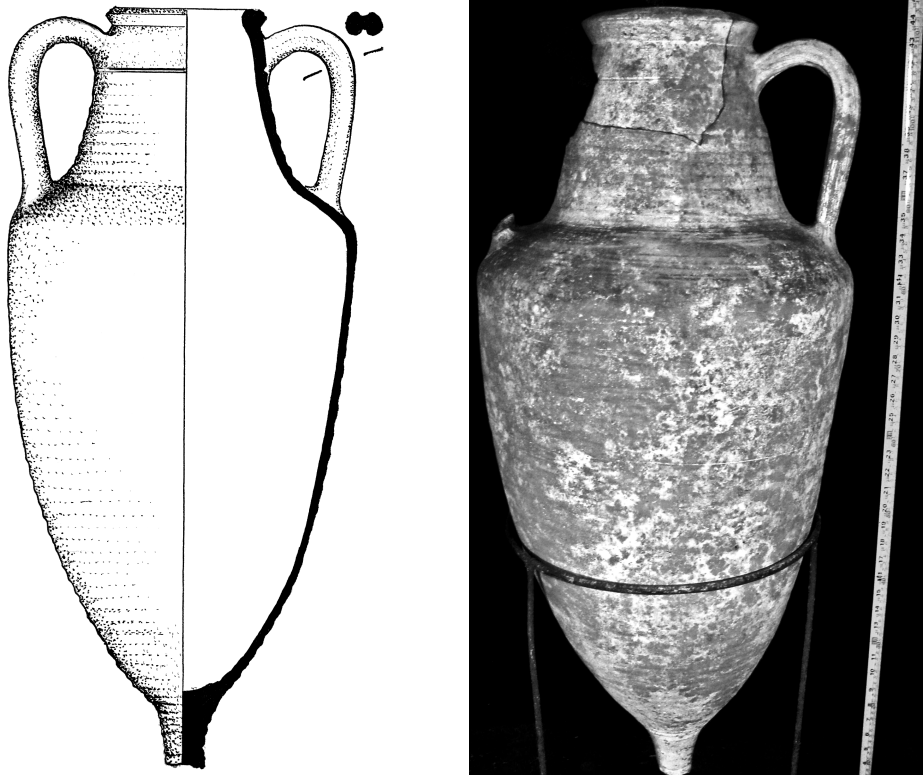


Fig. 20. Sovchoz No. 10, urn 185.

iron oxide, occasionally some inclusions are larger, quartz rock fragments and calcite inclusions. The shape seems to imitate a container made at Sinope.⁵⁰

Zeest 83 & 89

This amphora type is characteristic of the Bosphoran Kingdom, being well represented at Tyritake, Ilouraton, Myrmekion⁵¹, Gorgippia and other settlements of the Taman Peninsula, and Pantikapaion.⁵² It is very rare in the western part of the Crimea. It has an ovoid body and large neck; sometimes the difference between the neck and the body is indistinct. Its maximum height varies between 70 and 100 cm; the diameter of its rim lies between 20 and 30 cm, and the maximum diameter of its body between 40 and 50 cm (Fig. 22a-b). Its local production is indicated by the similarity of its rim to jugs which we know were produced in the area. The amphora's prototype may be a Hellenistic Sinopean amphora, such as that discovered at Kalos Limen,⁵³ and a second one of which is on display in the Kerch Museum.

The color of this type's material indicates its production at a variety of workshops which sometimes used different techniques of firing, one sample

indicating the initial use of a reduced atmosphere and a later switch to an oxidizing atmosphere in the final stage of firing. Its color varies from red (Munsell 10R 5/8) to light red (Munsell 10R 6/6-6/8). It is very hard, sometimes with fine calcite iron minerals inclusions, at other times large clay pellets (?) are visible creating a mixture that looks like a “halva” (Fig. 23a-d).

Fish table amphora 54

This type of amphora is characterized by a slipshod, sagging, thin rim, and large mouth (16-18 cm), a long, wide neck, a handle ovoid in cross section, with a sharp central groove, short, sloppy shoulders, an ovoid body with a maximum diameter varying between 24 cm and 28 cm, and a large and tubular base of c. 8-10 cm diameter (Fig. 24). The height of amphorae of this style fluctuates between 49 and 54 cm.⁵⁵ V.V. Krapivina, however, has published an example discovered at Olbia that has smaller dimensions, i.e. a height of 31 cm and a maximum body diameter of 18 cm.⁵⁶ A whitish wash covers the exterior of these amphorae. It is difficult to determine if this kind of amphora was made in a single workshop or in many different workshops as we only

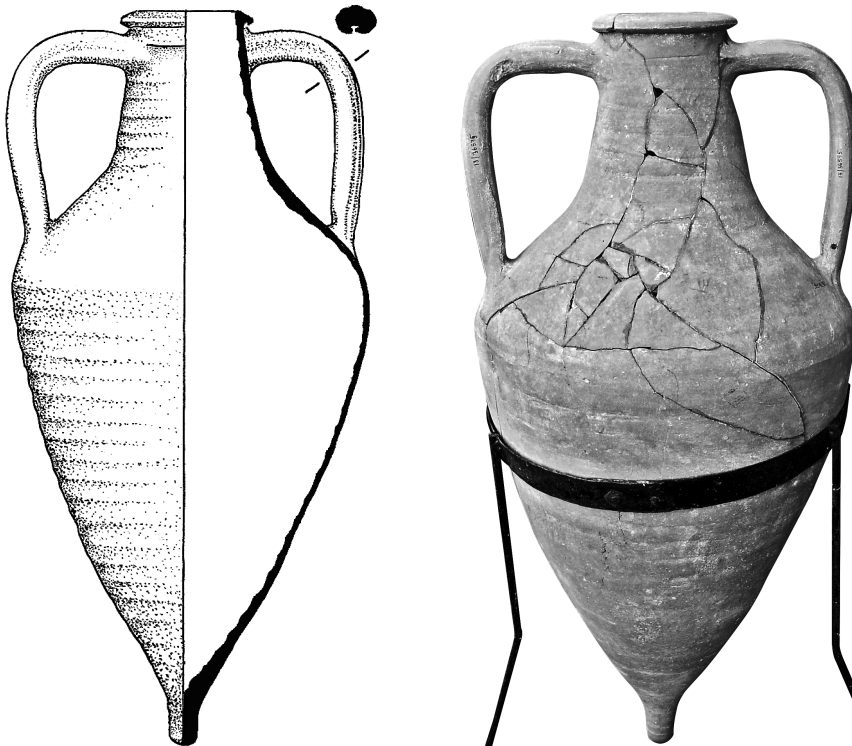


Fig. 21. Sovchoz No. 10, urn 237.

have the material of which fish amphorae discovered at Sovhoz No.10 and Bezymyannaya are made.

This type of table amphora is dated in the first half of the 3rd century to Tanais.⁵⁷ It also appears at Gorgippia⁵⁸ and Myrmekion.⁵⁹ The illustrated specimen comes from a necropolis discovered at Inkerman.⁶⁰ At Bezymjannaja a half amphora of this type was found in a context dated to the second half of the 3rd century AD. The material of these last amphorae indicates a local production for the Inkerman and Bezymjannaja examples, probably around Balaklava (?). Their material is very similar to the fabric of Zeest 75, variant A (Balaklava?). A whitish slip covers the exterior of this amphora.



Fig. 22 a: Gorgippia, after Alekseeva 1997, pl. 149.; b: Zeest 83 & 89 from Myrmekion, photo A. Butjagin (not to scale).

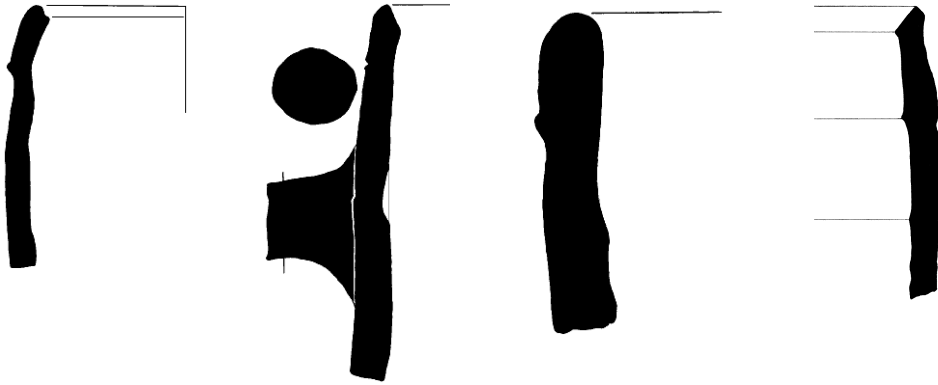


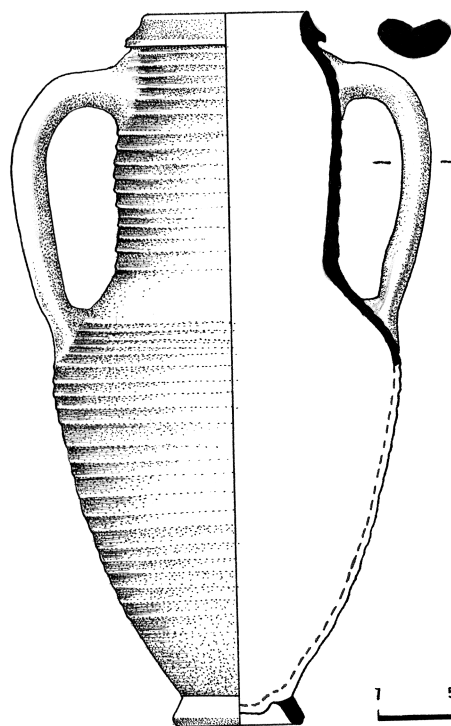
Fig. 23. Zeest 83 & 89 rim fragments (Scale 1:4).

Conclusion

After completing this overview of these large containers, some preliminary conclusions can be drawn.

The archaeological discoveries confirm the reports in ancient literary sources of the existence of a Pontic fish production and trade since Classical and Hellenistic times. It is our contention that amphorae with large necks and conical bodies were the typical containers used to transport the Pontic fish products. Archaeological documentation of fish processing activities is particularly strong for the Roman period. Numerous fish salting installations have been discovered in some North Pontic cities such as Chersonesos, Myrmekion, and Tyritake. A possible explanation for the abundance of these discoveries can be the solidity of the salting vats (*cetaria*), which were sunk into the ground or cut into the rocks and constructed of mortar. Sometimes these vats were in use together with *pithoi*, as is the case at Tyritake.⁶¹ The use of *pithoi* suggests the existence of a fish sauce production since the mixture of fish, salt and spices used in the making of fish sauce must be placed in the sun for a while and required stirring two or three times daily. This process of stirring required rounded containers, such as *pithoi* and large amphorae. The same procedure can also be used if layers of salt, fish, herbs and spices were alternately placed in amphorae. This method seems to match that described by Pseudo Gargilius Martialis in which layers of salt, fish and herbs were put into a “solid well-pitched container”.⁶² It is possible too that all these solid amphorae, which were used as processing containers, were originally used as transport containers, filled with fish products. Therefore we cannot exclude the existence of a boom in this industry during the Roman period of peace and prosperity.

An important question which arises is what kind of fish product was manufactured in these installations, as it is known that fish can be processed in different ways, for example as salt fish, fish paste, and fish sauce.⁶³ If we

Fig. 24. *Sovchoz urn 10. Fish table amphora.*

take into account the fact that the vats found at these installations are rectangular and of sizeable dimensions, while the small rounded basins generally used in the mixing of fish mass are missing, we can assume that the main product was salted fish (*salsamentum*). This kind of product is suggested also by the shape of the amphorae: they were made without an empty conical or cylindrical spike able to receive the residue left by a fish sauce, as is the case with many Mediterranean fish amphorae. All the Pontic amphoras are large, heavy, and robust, as amply demonstrated by the already famous amphora discovered in the shipwreck off Varna. We are informed that this amphora is “unusually large and measures nearly three feet (one meter) tall by 1.5 feet (0.5 meter) wide”; “...it contained bones of a large freshwater catfish species, several olive pits, and resin. ... Cut marks visible on the fish bones, together with other physical clues and references from classical literature, lead researchers to believe the amphora carried fish steaks-catfish that was butchered into six to eight centimeter (two to three inch) chunks and perhaps salted and dried for preservation during shipping”.⁶⁴ The New York Times also informs us that this amphora “held the bones of a six- to seven-foot-long freshwater catfish that has been dried and cut into steaks, a popular food in ancient Greece”.⁶⁵ If we disregard the radiocarbon dating (between 2,490 and 2,280, i.e. between ca. 487 and 277 BC), and Hiebert’s identification of this amphora with a Sinopean one, we have the picture of a North Pontic amphora of

Roman times. The resin is typical material used in coating the internal walls of fish amphorae. Sometimes different wine amphora types were reused for salt fish. A typical case of such reuse was found in the shipwreck of Grado. Here, the salted fish was put in a large variety of amphora types, including some classic wine amphorae, such as Cretan, Knidian and Forlimpopoli, while *l(iquamini) flos*, a much valued product, was transported in amphorae of local North Adriatic production specially designed for a fish sauce.⁶⁶ It is obvious that the element of chance played a role in this case. When local fishermen were lucky enough to catch a spectacular shoal of sardines, they managed to process and export them rapidly using whatever amphorae were available on the spot, as reused containers that were good enough to transport salted fish. This, however, seems rather to have been the exception than the rule and large fisheries were fully equipped with the proper containers for their various products. This rule is supported by the coexistence of salting installations with amphora kilns as at Leptiminius, which is an excellent example of this practice.

The morphological differences that exist between the Mediterranean and Pontic fish amphorae can provide us with some clues that can help to clarify the controversial problem of the origins of fish processing. If we consider that most Mediterranean fish amphora types have a design which favoured a content of fish sauce while most Pontic amphora types are more suited to a content of salted fish, we can assume that fish size and fish processing played a distinctive role in the modeling of the amphora shapes used in those two geographic areas. The difference seems also to be dictated by the different natural resources present in those regions. The Black Sea has tributaries and deltas rich in large fresh water fish species, while the Mediterranean has mainly fish species of smaller dimensions, more suited for processing into fish sauce. As well, we should not forget that the Phoenician purple dye industry used many methods that may be applied to the production of fish sauce.⁶⁷ Therefore, it is possible that these two methods of fish processing coexisted independently from prehistoric times, both being determined by the fish species, the climate and the local tradition. In addition to these factors, I should also point out that “the chance element” was less present in a region rich in fish such as the tributaries of the Black Sea than in the Mediterranean. This factor allowed the development of a steady Pontic fish industry, which was able to supply constant food to regional communities. Although western Mediterranean fish amphorae have been found spread over large geographic areas, this was due to the fact that they were part of a redistribution system much better organized in the Mediterranean basin than in the Black Sea. This is probably the main reason that the Pontic and the Aegean fish amphorae remain confined to a restricted geographic area.

In conclusion, I think that it is necessary to pay considerable attention to these economic aspects, interpreting these humble remains of amphorae in an adequate way. Although much more work remains to be done before we

can discover, excavate and map all the Pontic amphora workshops, we need to have a good definition of these containers, the only physical witness of the intensive fish trade in antiquity.

Notes

- 1 Cf. Bekker-Nielsen 2005.
- 2 Robinson 1950, figs. 242-243.
- 3 Sciallano & Sibella 1991, 57 and 59-60.
- 4 Sciallano & Sibella 1991, 61.
- 5 Sciallano & Sibella 1991, 73 and 75.
- 6 Opaïț 2000, 439-441, Leptiminius I, fig. 1.
- 7 Sciallano & Sibella 1991, 74 and Opaïț 2000, 441- 442, Leptiminius II, fig. 2.
- 8 Peacock & Williams 1986, 96-97: Class 7.
- 9 Robinson 1959, 89, no. M54, pl. 19; Sciallano & Sibella 1991, 96.
- 10 Hayes 1983, 151 (Type 25), fig. 24.66.
- 11 Vipard 1995, 51-77.
- 12 Ivanova 1994.
- 13 Marti 1941.
- 14 Lebedev & Lapin 1954.
- 15 For a recent and pertinent discussion, see Højte 2005.
- 16 Zedgenidze 1978; another similarly decorated fishplate is on display in the Kerch Museum.
- 17 To these products we must add olive oil which seems to have been produced on the southern shore of the Black Sea, especially around Sinope.
- 18 The large dimensions of these amphoras did not impede their transport on land, as they have been discovered far inland of Dobrudja or Crimea. I therefore partially disagree with Böttger and Šelov (1998, 33), who consider large amphoras such as Zeest 75 as having been used "hauptsächlich für die stationäre Aufbewahrung vor allem von Schüttgut - Getreide, Mehl u.a., nich aber für Transport und Lagerung von Flüssigkeiten ...".
- 19 Opaïț 1980, 308 (type XI), pl. IX.1-3; XV.2.
- 20 Zeest 1960, 113 (type 75), pl. 31.75a.
- 21 Zeest 1960, 113 (type 75), pl. 31.75b.
- 22 Babenčikov 1963, pl. XVI.1.
- 23 Arsen'eva & Naumenko 1992, 140-141, fig. 18.
- 24 Opaïț 1980, 308 (type XI), pl. IX.1-3; XV.2.
- 25 Klenina 2000, 123-134, fig. 25.3.
- 26 Klenina 2004, 24, (type 4), fig. 7.70.
- 27 Zeest 1960, 113 (type 75), pl. 31.75a; Krapivina 1993, 99 (type 31), fig. 30.26.
- 28 Burakov 1976, 71, pl. II.16
- 29 Arsen'eva & Naumenko 1992, 140-141, fig. 18.
- 30 Alekseeva 1997, pl. 90.6; 127.2.
- 31 Klenina 2000, 123-134, fig. 25.2,5.
- 32 Krapivina 1993, 99, fig. 72.15.
- 33 Klenina 2004, 24, (type 4), figs. 7.68-69.
- 34 Arsen'eva & Naumenko 1992, 144-145, fig. 24.2.
- 35 Alekseeva 1997, pl. 90.6.
- 36 Zeest 1960, 113 (type 75), pl. 31.75b.
- 37 Krapivina 1993, fig. 72.16.

- 38 Babenčikov 1963, pl. XVI.1.
- 39 Alekseeva 1997, pl. 106.11; 124.12.
- 40 Krapivina 1993, 99, fig. 72, 15-17.
- 41 Kruglikova 1966, 208-209; Šelov 1972, 124; Krapivina 1993, 99.
- 42 Opaït 1980, 308 (type XI), pl. IX.1-3; XV.2.
- 43 Monachov 1999, pl. 236.6; Monachov 2003, pl. 106.1.
- 44 The Myrmekion material seems to be closer to "light red", Munsell 10R 6/6, with sparse iron minerals and yellowish-grey inclusions (the fabric contains ill sorted red-brown rock fragments, frequent red-brown iron ore nodules, fine translucent crystals of quartz, fine calcite inclusions (?). The Balaklava (?) material is closer to orange, "yellowish red" and "reddish yellow", Munsell 5YR 5/8-6/8. Its fabric contains well-sorted inclusions, mainly crushed shells (calcites), rounded, opaque crystals of quartz, and iron minerals.
- 45 Semenov-Zuser 1947, 241.
- 46 Myc, Lysenko, Semin, Teslenko & Ščukin 1997, 211-221, fig. 121.
- 47 We should keep in mind that while many amphora shapes have been imitated in different workshops, their makers continued to fashion some parts of the amphora according to their own cultural traditions. Only by paying attention to this minor variable can we separate one variant (workshop) from another (workshops).
- 48 Panella 1986, fig. 26.
- 49 Hayes 1983, 155 (Type 39), fig. 25.91.
- 50 Vnukov 2003, 133, fig. 52.222.
- 51 For the illustrated amphora, all the fragments and the material close ups I am deeply grateful to A. Butjagin who allowed me to take pictures during my visit at Myrmekion in the summer of 2003.
- 52 Zeest 1960, 115-116 (type 83), pl. 34 and 117 (type 89), pl. 36; Abramov 1993, pl. 57; Alekseeva 1997, pl. 90.1,2; 95.9; 110.22; 112.7; 119.1,2; 120.9,10; 124.20; 133.13, 14; 149.2; 171.12; 172.13, 18; Turovskij, Nikolaenko, Goriachuk & Ladiukov 2001, 66 (type II.11).
- 53 Kutajsov & Užencev 1994, 58, fig. 10.2.
- 54 Krapivina 1993, 99 (type 27), fig. 30.25; Turovskij, Nikolaenko, Goriachuk & Ladiukov 2001 (type II.17).
- 55 Arsen'eva & Naumenko 1992, 157.
- 56 Krapivina 1993, 99 (type 27), fig. 30.25.
- 57 Arsen'eva & Naumenko 1992, 157, fig. 38.1.
- 58 Alekseeva 1997, pl. 131.2.
- 59 Gajdukevič 1987, 171, fig. 191.
- 60 Strželeckij 1959, 142.
- 61 Gajdukevič 1952, 57, figs. 62-64.
- 62 Curtis 2001, 405; Curtis 1991, 192-193, Appendix 1-5.
- 63 Curtis 2001, 405-408.
- 64 http://news.nationalgeographic.com/news/2003/01/0110_030113_blacksea.html.
- 65 Broad 2003.
- 66 Auriemma 2000, 36-37.
- 67 Curtis 2001, 320.