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The Classical Greek Shipwreck at Tektaş Burnu, Turkey

DEBORAH N. CARLSON

Abstract

The remains of a fifth-century B.C. shipwreck were discovered off the Aegean coast of Turkey by the Institute of Nautical Archaeology (INA) in 1996. Excavation of the wreck between 1999 and 2001 determined that the ship had been carrying a cargo of wine contained in about 200 amphoras of the so-called pseudo-Samian type, which have been found at various sites along the Black Sea coast but are not presently attributed to any specific site. An amphora stamp from the wreck, however, suggests that these 200 pseudo-Samian jars may have been produced at nearby Erythrae. The ship was also carrying lesser quantities of pine tar, East Greek pottery, and amphoras from Chios, Mende, and Samos. Remains of the ship include a pair of marble *ophthalmoi*—the only eyes ever found in association with an ancient vessel—and the earliest securely dated examples of lead-filled anchor stocks. Presently dated to ca. 440–425, the wreck is an important addition to the rather limited corpus of archaeological evidence for fifth-century Ionia. Furthermore, as the only Classical shipwreck ever to be fully excavated in Aegean waters, this modest vessel promises to shed light on the local trade networks and overall economic condition of Ionia at a time when Athens is thought to have dominated maritime commerce in the Aegean.*

For three consecutive summers between 1999 and 2001, the Institute of Nautical Archaeology at Texas A&M University excavated a Classical Greek shipwreck off the Aegean coast of Turkey at Tektaş Burnu.¹ Tektaş Burnu is located along a rugged, uninhabited stretch of coast southwest of Siğacık (ancient Teos), and directly east of Chios (fig. 1). The wreck was discovered in 1996 during one of

INA's annual surveys for shipwrecks in Turkish waters. At that time, divers located a mound of approximately 60 amphoras lying on a sandy shelf at a depth of between 38 and 43 m (fig. 2). Upon recognizing that the mound contained at least two distinct amphora types, the divers raised one complete jar of each type for identification and dating. The following year, the amphoras were examined by Mark Lawall of the University of Manitoba, who identified the jars as Mendean and pseudo-Samian and concluded that they were best dated to the third quarter of the fifth century.

The decision to move ahead with excavation of the wreck was based not only on the historical significance of the period as the apex of the Athenian empire, but also on the importance that commercial shipping played within that empire. Until now, scholars have had little firsthand knowledge of merchant vessels from the fifth century, as the existing corpus of evidence demonstrates. Brief exploration of a ship wrecked near Phagrou in the Sporades islands in 1995 and 1996 brought to light Mendean amphoras and black glaze pottery. Though the excavation, which was limited to one 2 × 2 m grid square, did not continue, the ship is estimated to have been carrying more than 1,500 amphoras when it sank sometime between 480 and 425.² The merchant ship wrecked at Alonnesos was even larger, carrying perhaps more than 4,000 Mendean and Peparethian amphoras when it sank between 420 and 400.³ Owing to its tremendous size,

* The author would like to thank George Bass for the opportunity to share in a fantastic working and learning experience as his Assistant Director at Tektaş Burnu. The excavation would not have been possible without the generous financial support of the National Geographic Society, the National Endowment for the Humanities, the Institute of Nautical Archaeology (INA), Texas A&M University, and Turkish Airlines. We are especially grateful to The Turkish Ministry of Culture, and their representative commissioners Harun Özdaş in 1999, Huseyin Vurgal in 2000, Gökhan Bozkurtlar in 1999 and 2000, and Yaşar Yıldız in 2001. Special thanks to Oğuz Alpözen, Director of the Bodrum Museum of Underwater Archaeology, and the dedicated INA conservation staff. The author would also like to thank the readers of her first draft for their insightful comments, and especially to recognize Mark Lawall, who

has been an inexhaustible source of information and advice. Photographs were taken by Donald A. Frey and Kristine M. Trego, and artifacts illustrations are the work of Bilge Gunesdoğan and Selma Ağar.

¹ Bass 2002; Carlson 1999, 2001, 2002; Gibbins 2000. The project was directed by INA founder George F. Bass and staffed by an international team comprising INA personnel, students from Texas A&M University's Nautical Archaeology Program, and smaller numbers of students from universities in America, Turkey, and the United Kingdom. All dates given are B.C.

² Touchais (1996, 1290) and Kazianes (1996, 724), where the Phagrou shipwreck is variously described as dating to the middle and the end of the fifth century.

³ Hadjidaki 1996.

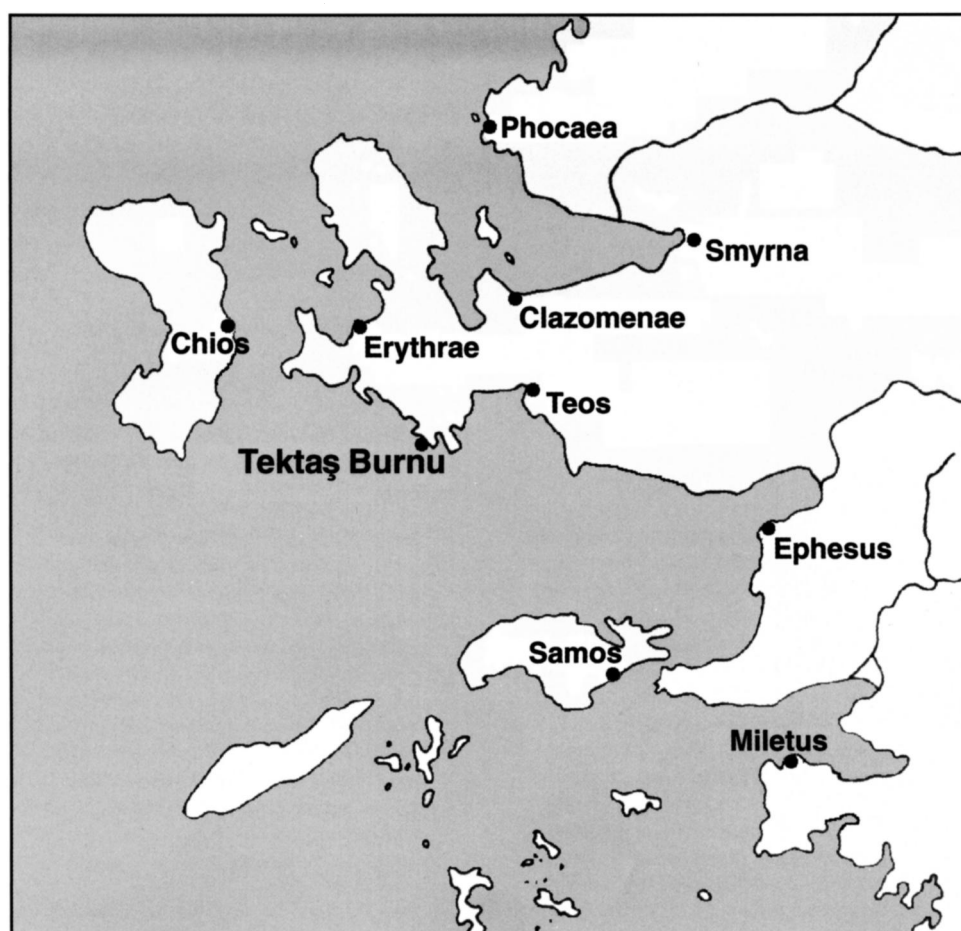


Fig. 1. Map of the Ionian coast showing the location of Tektaş Burnu. (D. Carlson)

the wreck has been only partially explored, but initial finds suggest a secondary cargo of Attic black glaze pottery. The Porticello shipwreck, located in the Straits of Messina, had already been heavily looted when it was excavated in 1970.⁴ Though this vessel was considerably smaller than the Alonnesos ship, measuring only 16 or 17 m long, the two cargoes are remarkably similar. Originally thought to date between 415 and 385, a recent reassessment of the amphoras has moved the date of the Porticello wreck into the early fourth century.⁵ Thus, classicists have had surprisingly little raw data to work with relating to the nautical archaeology of the Athenian empire, and it was in an effort to fill this historical gap that INA chose the Tektaş Burnu shipwreck for excavation.

EXCAVATION

Excavation began late in the summer of 1999, after we had taken the time, earlier in the sum-

mer, to come to terms with the inhospitable living conditions at Tektaş Burnu. The coastline consists of jagged spires of friable rock, and is featureless but for a small cove 100 m south of the wreck site, where our support vessels were anchored. We chose to situate our camp (fig. 3) on the rocky coast above the wreck, despite the fact that the area is completely exposed to the northwesterly meltem winds, which blow almost every day and often reach gale force. These meltems routinely produced rough seas that not only complicated dive operations but also gave us a deeper appreciation of the extreme conditions that may have existed when a small merchant ship came to grief here almost 2,500 years ago.

Our initial assessment of the shipwreck site indicated that the majority of the ship's cargo had come to rest on the sandy seabed between two large outcrops of rock in an area roughly 12 m long and 4 m wide (fig. 4). Following removal of the sand over-

⁴Eisman and Ridgway 1987.

⁵Lawall 1998.

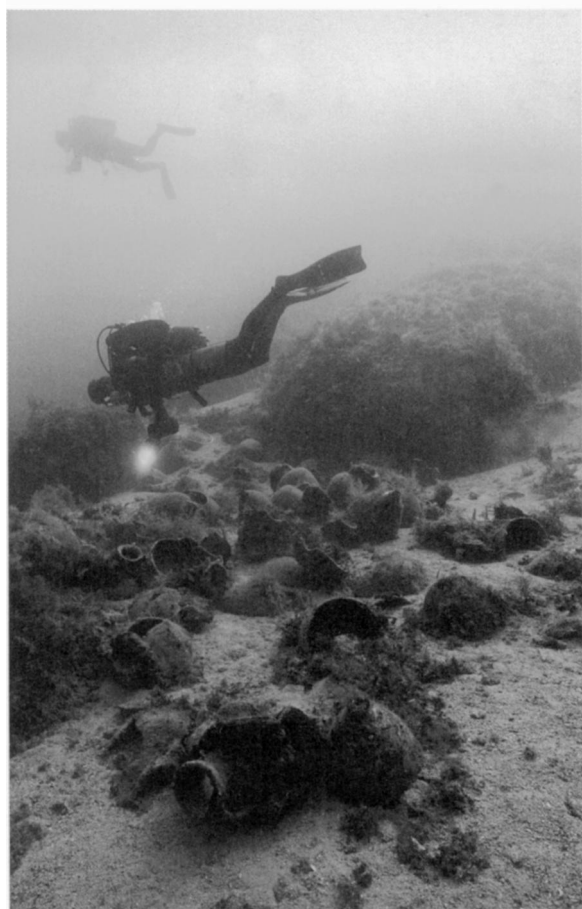


Fig. 2. The wreck site before excavation in 1999. (D. Frey)

burden, it was possible to discern a second cluster of artifacts at the edge of the shelf approximately 10 m from the large amphora mound. Excavation would later enable us to determine that this secondary cluster of objects had simply rolled away from the bulk of the wreck and collected at the shelf's edge, while the main concentration of cargo, which indicated a ship perhaps not more than 12 m long, remained sandwiched between the two large rocks.

Methodology

Excavation at Tektaş Burnu was based on proven methods of underwater archaeology, most of which were invented or refined by the project's

director and his colleagues over the last 40 years.⁶ The standard excavation tool was the airlift, though hammers and chisels were required on occasion to free artifacts from marine concretion. A string grid was laid to divide the wreck into 2×2 m squares, and each excavator was assigned a specific grid square. Because most divers were limited to only 20 minutes on the bottom twice a day, and high visibility made it possible to photograph at a depth of 40 m using only ambient light, we largely abandoned the time-consuming process of measuring artifacts by trilateration in favor of a more efficient, but equally accurate, method of mapping by photogrammetry.⁷ Once raised, artifacts were registered and digitally photographed. These photographs, combined with all relevant information about an artifact's dimensions, condition, and provenience, were entered into a relational project database.⁸

CARGO

Amphoras

Pseudo-Samian. The ship's primary cargo appears to have been a shipment of wine contained in slightly fewer than 200 pseudo-Samian amphoras.⁹ Pseudo-Samian jars bear a general resemblance to Samian amphoras of the sixth and fifth centuries, but are unique for their odd combination of heavy, Archaic rims and small knob toes. The juxtaposition of two jars from Tektaş Burnu (fig. 5), a pseudo-Samian and a Samian amphora from the middle of the fifth century, highlights some of the similarities in shape and fabric. The pseudo-Samian jars from Tektaş Burnu are characterized by a squat, cylindrical neck with heavy echinoid rim, short handles that extend slightly outward toward a broad, rounded shoulder, and a conical body that tapers to a hollow knob toe. The fabric is a well-levigated reddish yellow (5 YR 6/6) to pale brown (7.5 YR 6/6) over a bluish-gray core, with a moderate scatter of silt-sized black and white inclusions. There is considerable variety among the toes of these jars, with at least three discernible types. The more common double-beveled toe is paralleled in jars from the Black Sea and nearby Clazomenae, while the disc-shaped toes appear to be of Samian

⁶ Bass 1970, 1975.

⁷ Green et al. 2002.

⁸ The *Tektaş Database Solution*, designed by Berta Lledo using *FileMaker Pro* software, revolutionized the recordkeeping of this and subsequent INA projects, for it allowed us to peruse more than 10 separate but integrated groups of data, including the artifact catalogue, the diving log, the team roster, and a daily journal.

⁹ The macrobotanical contents of more than 120 decanted (of an estimated 196 total) pseudo-Samian amphoras are currently being analyzed by Cheryl Ward of Florida State University. Virtually all of the pseudo-Samian amphoras recovered from the wreck are lined with pitch, in which it has been possible, on occasion, to see intact grape seeds. Nevertheless, any conclusions regarding amphora contents should remain hypothetical pending the results of Ward's analyses.



Fig. 3. The 2000 excavation camp at Tektaş Burnu. (A. Nason)

influence.¹⁰ Such variety likely suggests multiple sources of influence, multiple potters, and perhaps multiple workshops.¹¹

The term “pseudo-Samian” was first used in the late 1960s by Soviet archaeologists as a designation for a distinct class of amphoras found in sixth- and early fifth-century contexts along the northern and eastern coasts of the Black Sea.¹² At the Colchian settlement of Simagre, in modern day Georgia, pseudo-Samian fragments dominate the existing assemblage of Archaic transport amphoras.¹³ The distribution of pseudo-Samian amphoras in the Mediterranean is, by contrast, rather thin, with a small number of examples from Chios, Naucratis, Athens, Clazo-

menae, Miletus, Aegina, and Cyprus.¹⁴ The amphora type was first identified in 1960 by Ireida Zeest, who classified such jars as “Samian” based on a resemblance between the rosy red, micaceous clays of these unattributed amphoras and the fabrics of traditional Samian jars.¹⁵ The rather obscure relationship between Samian and pseudo-Samian (or “Sami-an”) amphoras is complicated further by the fact that Zeest’s “Samian” type shares certain morphological features with another series classified by Zeest as Protothasian inasmuch as their unusual banded toes were thought to resemble later Thasian amphoras.¹⁶ Today, it is generally agreed that Zeest’s “Samian” and Protothasian amphoras represent different evo-

¹⁰ For the double-beveled toe as a feature of Zeest’s Protothasian type, see Dupont 1998, 185. For examples from Chios, see Tsaravopoulos 1986, pl. 31.5. Ersin Doğer of Ege University was the first to note a resemblance between the double-beveled toes of the pseudo-Samian jars from Tektaş Burnu and toes of Clazomenian amphoras. For the latter, see Doğer 1986 and Dupont 1998, 151–6.

¹¹ Dupont (1998, 185) maintains that “the diversity of the clays, together with the numerous differences in the details of shape—especially as concerns the rim and foot—show that we are dealing with the products of a large number of workshops.”

¹² Lordkipanidze (1968, 40) apparently was responsible for coining the term “pseudo-Samian,” in describing amphoras found at Simagre (Colchis). Sites that have produced examples of Protothasian/pseudo-Samian amphoras include Histria, Nadlimanskoe III, Olbia/Berezan, Kutsevolovka, Tiritake, Panticapaeum, Mirmekion, Taman, Anapa, Kepoi, Torikos, and Simagre (Cook and Dupont 1998, 219–20 ns. 262–8 for specific bibliographical references). While the overwhelming majority of Protothasian/pseudo-Samian finds in the Black Sea come from sixth-century deposits, Treister and Vinogradov (1993, 542) describe a late sixth- or early fifth-century Protothasian amphora fragment used as an ostrakon among the

earliest finds at Chersonesos, and Abramov and Maslennikov (1991) illustrate a pseudo-Samian amphora from Cape Zyuk, dated to the early fifth century.

¹³ Kacharava 1995, 65.

¹⁴ Rescue excavations of a late sixth- or early fifth-century pottery workshop in Chios town produced the distinctive double-beveled toes (Tsaravopoulos 1986, pl. 31.5), while the uppermost one-third of a pseudo-Samian amphora was retrieved during an underwater survey off the eastern coast of Chios near Delphinion (Garnett and Boardman 1961, no. 29). At Naucratis a nearly intact specimen was found, dated to the seventh or sixth century (Hogarth et al. 1905, 126 fig. 6). Lawall (pers. comm.) has noted amphora fragments similar to those from Tektaş Burnu in Athenian Agora well S16:1, closed ca. 400. The Clazomenae material is largely unpublished, but for two dozen fragments included in Ersoy 1993, 416–20. Examples from Miletus and the Athenian Kerameikos probably represent a larger standard and are described in n. 33. For the “Samian” jars from Cyprus and Aegina, see Johnston 1981, nos. 41, 48; 1990, nos. 99–105, respectively.

¹⁵ Zeest 1960, 70, pl. 1.3. For a synopsis of Zeest’s “Sami-an” and Protothasian amphoras, see Dupont 1998, 178–86.

¹⁶ Zeest 1960, 104, pl. 25.56a–b.

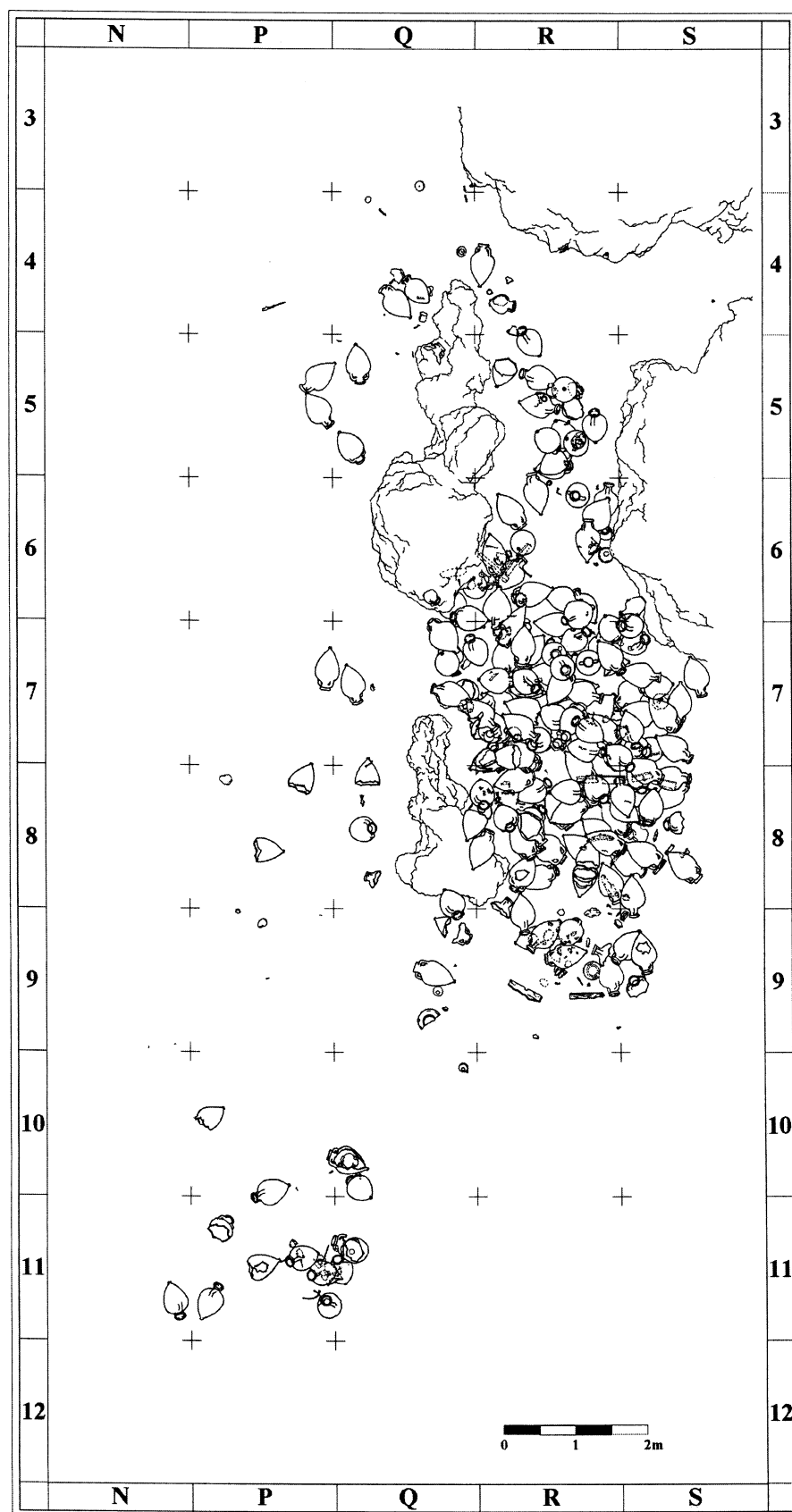


Fig. 4. The Tektaş Burnu site plan. (Drawn by S. Matthews, inked by M. Polzer)



Fig. 5. A mid fifth-century Samian amphora (top) and a pseudo-Samian amphora (bottom) both from Tektaş Burnu. (K. Trego)

lutionary phases of the same typology, and the terms are used almost interchangeably, with the latter preferred by those who advocate a north Aegean origin for these amphoras.

Scholars have suspected for some time that scientific analysis could play an important role in distinguishing pseudo-Samian fabrics from their Samian counterparts.¹⁷ The petrography of coastal Asia Minor is, however, particularly problematic because many of the fabrics are fine-grained and geologically (but not necessarily geographically) very similar to one another. Preliminary petrographic examination of three pseudo-Samian amphoras from Tektaş Burnu revealed high quantities of quartz and lesser amounts of volcanic tuff, suggesting a volcanic source for the clay (fig. 6).¹⁸ It is hoped that additional analyses, now under way, will make it possible to locate the geological source of the pseudo-Samian jars from Tektaş Burnu.

At least 20% of the pseudo-Samian amphoras from Tektaş Burnu were stamped with an incuse circle stamp, about 1 cm in diameter, located either on the neck between the handles, or less frequently, on the shoulder or at the base of one handle.¹⁹ Though the purpose of such circle stamps is unknown, their appearance on amphoras that span a wide chronological and geographical spectrum has caused many to conclude that the circle stamp was a means of testing the density of the clay while the amphora was still leather hard.²⁰ At least nine pseudo-Samian jars are stamped with a small grape leaf set within a lozenge (fig. 7), and another has a graffito of the Greek letter eta (H) incised on its neck.

The most revealing stamp from Tektaş Burnu is a circle, 2 cm in diameter, framing the Greek letters EPY• (fig. 8), located on the neck of a pseudo-Samian amphora. The monogram recalls the fifth-century coinage of nearby Erythrae, which features the letters EPY or EPYΘ arranged in the corners of an incuse square framing a central rosette.²¹ In the fourth century, the most prevalent Erythraean coins have a reverse stamped with the EPY monogram and magistrate's name alongside the club of Herakles and a bow in a case (fig. 9). Excavations in the Athenian Agora have produced at least one partial amphora, from a context of ca. 325, with a rectangular stamp atop each handle. One stamp contains the letters EPY, and in the other is displayed the club of Herakles, indicat-

¹⁷ Whitbread 1995, 129.

¹⁸ Petrographic analyses were carried out by David Hill and Chris Caran of Quaternary Analysis Labs in Austin, Texas.

¹⁹ Current totals put the number at 40 of 196 (20.4%), but that number does not account for the jars that are still too

heavily covered with marine concretion to tell if stamps are present.

²⁰ Eiseman and Ridgway 1987, 41–2.

²¹ Head 1964, 119–21 pl. XV.2–7. Each rosette has what Head describes as a central pellet, raising the possibility that what

ing that, although a century after the Tektaş Burnu shipwreck, the EPY monogram was a recognizable symbol of Erythrae on amphoras as well as coins.²² Other fourth-century Erythraean amphora stamps feature the EPY monogram arranged around a ligature Alpha Delta; a compelling parallel for the Alpha Delta device that has appeared on several Archaic pseudo-Samian amphoras from Aegina and the Black Sea.²³ In addition, the association with Erythrae could conceivably explain the lone epsilon that appears as a stamp on various Archaic pseudo-Samian jars.²⁴

The attribution of pseudo-Samian amphoras to Erythrae is particularly intriguing because relatively little is known of the Classical city. Excavation during the 1960s showed that Erythrae had been destroyed by, and made subject to, the Persians ca. 545.²⁵ Fifty years later, the Erythraeans joined the Ionian Revolt and sent eight ships to the Battle of Lade. The city appears to have been among the first to revolt from the Delian League, as is suggested by an important inscription, now lost, which records the existence of an Athenian garrison and the establishment of a democratic council at Erythrae, perhaps in the late 450s.²⁶ The city's tribute was later assessed at the substantial sum of seven talents, equal to the highest tribute paid by an Ionian city. Virtually nothing else is known of Erythrae until, allied with Chios, the city revolted against Athens in 412.

Evidence for amphora production at Erythrae comes from the recent discovery of a storage room associated with an amphora workshop dating to the second half of the third century.²⁷ Chemical characterization of the pseudo-Samian amphoras from Tektaş Burnu, and, if possible, comparison with jars

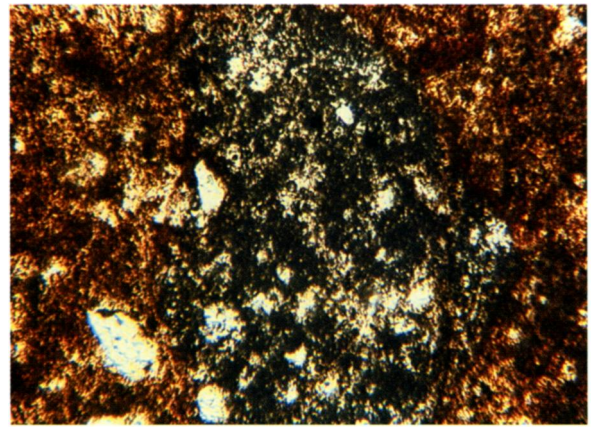


Fig. 6. A polished thin section of pseudo-Samian amphora Lot 574, shown at 20× magnification. (D. Hill)

produced within the region around Erythrae, should make it possible to better define the geological source(s) of the pseudo-Samian fabric(s).²⁸ Presently, it is expected that these comparative analyses will ultimately include pseudo-Samian jars from the Aegean and Black Seas.²⁹ As the largest sealed assemblage of pseudo-Samian amphoras in existence, the Tektaş Burnu corpus has much to contribute to the study of amphora distribution, circulation, and capacities in Classical Greece. Volumetric measurements of 59 intact pseudo-Samian amphoras taken during the 2002 study season yielded an average capacity of 25.12 l.³⁰

Mendeian. Ten Mendeian amphoras, including the one recovered during the 1996 survey, constitute the second largest group of transport amphoras from the Tektaş Burnu wreck. The majority of these jars are datable to 450–425 and exhibit fea-

appears to be a small dot following the EPY on the Tektaş Burnu stamp may in fact be an abraded rosette or a central pellet to be connected with the fifth-century coins.

²² Agora inv. no. P30873, from deposit R13:11, closed before 325. Special thanks to Mark Lawall, who tracked down the reference and the jar.

²³ Erythraean stamps with the ligature Alpha Delta have been found in the Athenian Kerameikos (Jöhrens 1999, 169–70 nos. 24–27, pl. 25.4–7), the Athenian Agora (SS4568, SS4915, SS6838, SS7203, SS7603, SS13654, and SS14436), and at Amphipolis (Nikolaïdou-Patera 1986, fig. 1.4). For the Alpha Delta graffito on a complete amphora from Aegina, see Johnston 1990, 50 no. 99. Cook and Dupont (1998, 220 n. 282) reference similar dipinti on two Protothasian amphoras from Olbia and Berezan. At Erythrae itself, surface finds collected by the local Turkish guard include an assortment of amphora handles stamped with a ligature Alpha Delta only, raising the possibility that the ligature Alpha Delta-EPY monogram combination was applied to jars intended for export to markets abroad (?).

²⁴ Epsilon stamps from the Black Sea: Gaidukevich 1964, 136 fig. 3.2 and two unpublished examples in the Hermitage Museum mentioned by Cook and Dupont (1998, 220 n. 279); on

an unattributed globular amphora from Cyprus: Nicolaou and Empereur 1986, fig. 15b; from Aegina: Johnston 1990, 51 fig. 122, who cites other late Archaic examples, unpublished, from Iasos (J.87 5703) and the Agora (SS7616 and SS14757). Dupont (1999, 157 n. 128) similarly references an unpublished epsilon stamp on a Protothasian amphora fragment from Iasos.

²⁵ Akurgal 1970, 233; Bayburtluoğlu 1975, 71–2.

²⁶ Meiggs and Lewis 1999, 89 no. 40.

²⁷ Özyiğit 1990. Theophrastus, at least, knew Erythraean wine to be among the mildest (*de Odoribus* 52).

²⁸ Chemical characterization analyses are currently being carried out by Ünsal Yalçın of the University of Bonn, Germany.

²⁹ In a recent analysis of over 100 Archaic and early Classical “Samian” ceramic samples from the Black Sea, Dupont isolated four different chemical groups (Thrace, Miletus, Samos, and Chios) that he believes point to multiple workshops of different origin (Dupont, forthcoming). Given the geological similarities between Erythrae and Chios, and the evidence of the EPY amphora stamp from Tektaş Burnu, it is worth pursuing the possibility that Dupont’s Chian group is in fact Erythraean.

³⁰ This figure does not take into account pseudo-Samian amphora TK 45, which, with a capacity of 31.34 l, appears to belong to a larger standard.

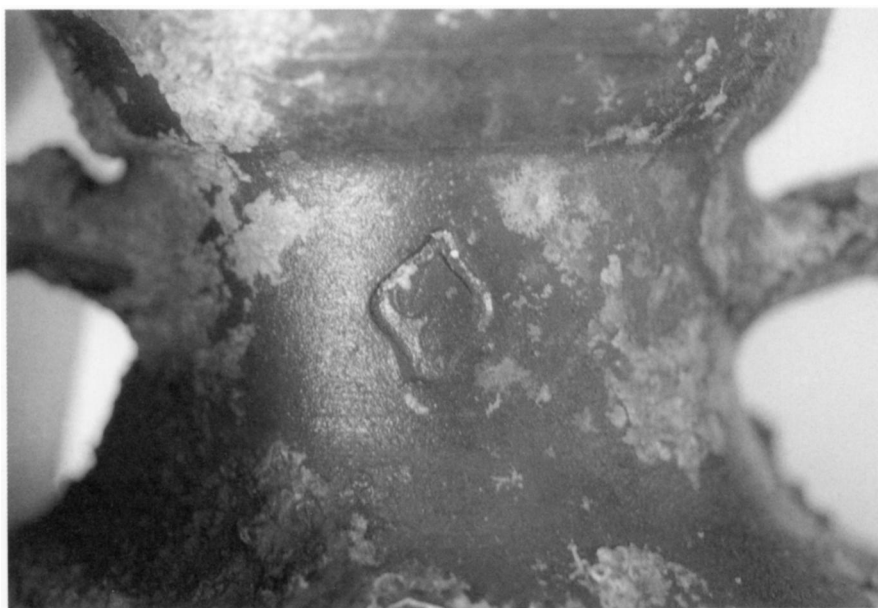


Fig. 7. A leaf stamp on the neck of pseudo-Samian amphora Lot 574. (D. Carlson)



Fig. 8. The monogram stamp of pseudo-Samian amphora Lot 846. (D. Carlson)

tures typical of Lawall's middle Mendeian phase,³¹ with outward-pointing rims and a transitional body that is less rotund and increasingly elongated (fig. 10). In antiquity, Mende was particularly well known as an exporter of fine wines,³² but 9 of the 10 Mendeian jars from Tektaş Burnu were found to contain

not wine but resinous black pitch. These nine Mendeian amphoras are to varying degrees full, with most at least 70% but some less than 40% full of tar. During excavation we encountered no fragments of broken Mendeian jars, though we did encounter large globules of tar on the site. These tar globules

³¹ Lawall 1995, 122.

³² On the quality of Mendeian wine among the ancient Greeks, see Ath. 1.29d–f, 1.31a, 4.129d–e, whose work relies in part on the views of fifth-century comic poets Hermippus

and Kratinos. For the importance of Mendeian wine as an item of export, see Dem. 35. These and other references are collected in Papadopoulos and Paspalas 1999.



Fig. 9. A silver coin of Erythrae minted in the last third of the fourth century. (AR Rhod. drachma. Greek, Hellenistic period, 330–300 B.C. Mint: Ionia, Erythrai. Metal: Silver. Diam.: 15 mm. Museum of Fine Arts, Boston. Henry Lillie Pierce Fund; 04.1026. Photograph © 2003 Museum of Fine Arts, Boston)

³³ The contents of six of nine tar-filled Mendeian jars were sampled and analyzed by Curt Beck of the Amber Research Laboratory at Vassar College. Beck's analysis by mass spectrometry showed that the Tektaş Burnu tar lacks the marker for *Pinus halepensis* (Aleppo pine) and therefore probably belongs to a northern Greek species of pine such as *Pinus sylvestris*, which, according to Meiggs (1982, 43) "penetrates into Macedon and is common in the Black Sea forests." At present, Vaughn M. Bryant of the Palynology Laboratory at Texas A&M University is conducting pollen analyses of the Tektaş Burnu pine tar, which may make it possible to identify the source of the tar with more specificity.

³⁴ The cattle bones were identified by David Reese of Yale University's Peabody Museum. Also found on site were smaller quantities of caudal vertebrae, presumably the remains of a cattle tail meant to be consumed in a soup or stew, though it would be premature to speculate as to whether this was designated as cargo or meant for a meal consumed on board. Small patches of



Fig. 10. Mendeian amphora Lot 357. (K. Trego)

must have spilled from the jars that are now less than 40% full but were presumably totally full when loaded on board (a full Mendeian jar weighs about 40 kg). Preliminary chemical analysis of the tar contents has shown it to be a low-temperature pine tar perhaps of north Aegean origin.³³

The 10th Mendeian jar was filled with more than 100 butchered beef bones, mostly ribs and vertebrae.³⁴ A larger-than-average pseudo-Samian amphora was similarly stocked.³⁵ The transport of butchered animal, and particularly cattle, parts inside amphoras is not unknown in the western Mediterranean, and appears to have been a Punic practice.³⁶ It seems probable that the beef bones from Tektaş Bur-

pitch on the interior shoulder of the Mendeian amphora suggest that the jar had once been lined and was being reused.

³⁵ Amphora TK 45 (ht. 68 cm; max. diam. 37 cm; capacity 31 l) is some 10 cm taller than other pseudo-Samian jars from Tektaş Burnu and corresponds to a larger standard represented by whole jars from Miletus (Voigtländer 1981, 128 no. 5 fig. 14.2; 1982, 69 no. 167) and the Athenian Kerameikos (*Kerameikos* 9.101 no. 50 pl. 49.3, dated ca. 490/80). Dupont (1998, 186) references an example from Panticapeum now in Moscow's Pushkin Museum of Fine Arts.

³⁶ Many ancient shipwrecks have yielded the loose remains of animals that were likely either transported as cargo or consumed on board. That the storage of butchered meat in amphoras seemed to have been a largely Punic tradition is evidenced by finds in the western and central Mediterranean at Coltellazzo A (Parker 1992a, 151), Olbia A and B (Parker 1992a, 294; Dell'Amico 1986), Torre la Sal (Parker 1992a, 152) and Santa Gilla (Solinas 1993, 32).

nu represent the remains of salted beef stores for the crew, particularly if the meat was packed into whichever two amphoras were most readily available in port (in this case a Mendeian and a pseudo-Samian).³⁷ There is, however, also reason to think that the meat formed part of the ship's cargo, as the comic poet Hermippus describes beef ribs from Thessaly among Athenian imports of the fifth century.³⁸ It has long been thought that meat, which was not a staple of the ancient Greek diet, was available to the general population only as a result of the large-scale state sacrifices during public religious festivals.³⁹ While some recent scholarship has challenged the accuracy of this assumption,⁴⁰ the evidence from Tektaş Burnu clearly shows that, regardless of where an animal was sacrificed, the ancient Greeks were familiar with the process of preserving surplus beef for later consumption.⁴¹ In addition, the cargo from Tektaş Burnu underscores the fact that amphoras were not strictly oil and wine containers, but were utilized to transport a wide variety of commodities that included fish products, shells, nuts, grapes, olives, meat, and even tar.⁴²

Other types. The remainder of the amphora cargo from Tektaş Burnu consists of two jars from Chios, at least three from Samos, and two other amphoras tentatively characterized as North Aegean on the basis of various morphological features. The Chian amphoras are particularly diagnostic in that they represent the two final phases of the bulbous-necked type, which was superseded by the straight-necked type around 430 or 425.⁴³ The earlier of the two jars, with the bulge centered on the neck, may be dated 450–440, and the later one, with the bulge rising toward the rim, belongs between 440 and 430/25. The date of the wreck itself may be close to 425, to judge from the presence of a complete Samian-Milesian amphora, shown in figure 11, dating from the last quarter of the fifth century.⁴⁴ The chronology of these spindle-shaped Samian-Milesian amphoras



Fig. 11. Samian-Milesian amphora Lot 532. (K. Trego)

is, however, not nearly as secure as that of the Chian types, and not sufficiently compelling to move the date of the wreck far beyond 425. The presence of two distinct Samian amphora types, separated in date by perhaps 20 or 25 years, suggests that, like the pair of old and new Chian jars, some of the amphoras on board had likely been in use for at least a generation when the ship sank. Elsewhere among the cargo were two jars of probable north Aegean origin; one a small, shapeless amphora strongly reminiscent of the Lesbian red series but for subtle differences in the rim and handles,⁴⁵ and the other a short, slim vessel evocative of Peparethian or perhaps Thasian types (fig. 12).

³⁷ See Frost (1999, 244–6) for salting as a means of preserving meat. It is presumed, but not known for certain, that the Tektaş Burnu meat was salted.

³⁸ Fr. 63 = Athenaeus 1.27.d–e.

³⁹ Garnsey 1999, 123: "Meat was the food of sacrifice *par excellence*, and was offered to participants in religious ceremonies. By the same token, it was *only* available on such occasions, and did not make a significant contribution to the regular diet." Nilsson 1964, 254–5: "The great festivals, as is the case with Easter in modern Greece, were the only opportunities which the man of the people had of enjoying roast meat."

⁴⁰ Esp. Berthiaume 1982. I thank my reviewers for drawing my attention to this important reference.

⁴¹ Cf. the dinner guest of Theophr. *Char.* 9.2, who pockets some of the host's sacrificial meat in order to salt it later.

⁴² Fish, shells, and nuts are referenced by Parker (1992b, 92); for grapes, see Bertucchi 1992, 189; Frey (1982, 5) describes a fifth-century Chian amphora recovered off the coast of Knidos that was filled with olive pits; amphoras filled with tar or pitch are mentioned by Herodotus (4.195) and known from the sixth-century wreck at Giglio (Bound 1991) and the early fourth-century wreck at Porticello (Eisman and Ridgway 1987, 3 n. 2).

⁴³ Mattingly 1981, 78–80.

⁴⁴ Grace 1971, 77–8 (fig. 3.3).

⁴⁵ The unique beak-shaped rim and oval (as opposed to Lesbian cylindrical) handles are indicative of Zeest's "high swollen-necked type." Monakhov (1999, 89 fig. 23.3–5) shows examples of this type from the Black Sea, where they begin ca. 480–470 and continue into the third quarter of the fifth century. Dupont (1998, 161) observes that this type's place of

Pottery

East Greek Wares. After the transport amphoras, the second largest assemblage of cargo is a group of 13 table amphoras in three distinct sizes. Ten examples seem to represent the standard size, ranging from 0.22 to 0.26 m in height, two smaller varieties, 0.18 m in height, were excavated intact, and a larger version is known from a preserved shoulder, mouth, and neck. Each size shares stylistic features that point to a common, perhaps ultimately metallic, ancestor: doubled cylindrical handles that meet the neck in a prominent molded ridge; an offset between neck and shoulder that is decorated with single, or occasionally paired, dots, painted polychrome bands around the belly, and a stemmed foot with a molded ridge like that of the neck (fig. 13). All but one of the Tektaş Burnu table amphoras still contain the remnants of pitch lining, which has been sampled



Fig. 12. North Aegean (?) amphora Lot 828. (K. Trego)

production "is not yet precisely located but should preferably be in the Northern Aegean." A similar jar excavated at Berezan is described as "Ionian": Solovyov 1999, fig. 65.

⁴⁶From Rhodes: *Clara Rhodos* 8 (1936) 105–9; from Apollonia: Venedikov et al. 1963, 257 nos. 744, 745; from Athens: Sparkes and Talcott 1970, 341 no. 1497 (400–425); from Chios: Boardman 1967, 176 no. 922; from Geroevka: Scholl and Zin'ko 1999, pl. E9. My thanks to Stavros Paspalas for providing references to several later Rhodian parallels.

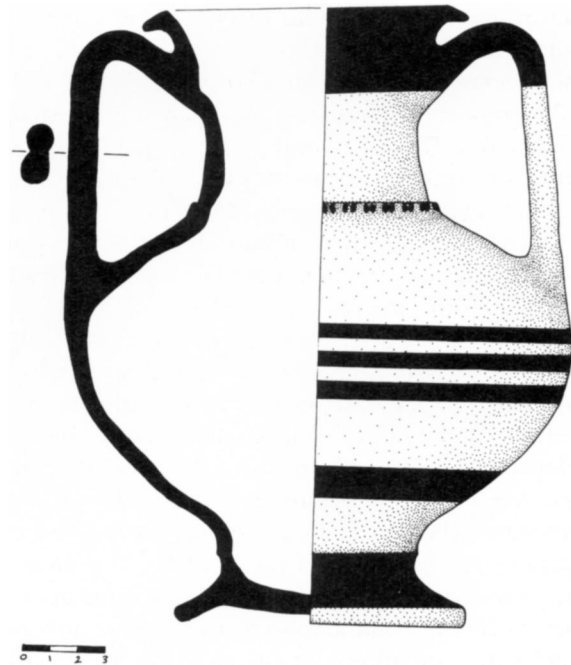


Fig. 13. An archetypal table amphora. (B. Güneşdoğdu)

and is awaiting analysis. Parallel vessels from sixth- and fifth-century contexts have been excavated from various sites around the Mediterranean and Black Seas.⁴⁶

The large domed askos shown in figure 14 appears to have been decorated, like the table amphoras, by being dipped inverted in paint so as to coat only the uppermost portions, in this case the handle and rim. The shape, which has a strong parallel in a vessel from a fifth-century context at Miletus,⁴⁷ seems to have been a holdover from the sixth century, as evidenced by several examples from the Black Sea and Athens.⁴⁸ Four banded olpai excavated from the wreck appear to be standard East Greek shapes.⁴⁹

Chian Wares. Vessels from the nearby island of Chios constitute a significant portion of the pottery found on board the Tektaş Burnu ship. The most numerous pieces are 10 slim, footless black glaze kantharoi that feature the unmistakably Chian grayish-brown fabric (fig. 15).⁵⁰ At least two other kantharoi are white-slipped and still carry traces of a distinctive decorative scheme seen on Chian cups

⁴⁷Voigtländer 1982, 123 no. 76.

⁴⁸From Olbia: Skudnova 1988, fig. 118 (550–525); from Kiev: Cook and Dupont 1998, 104 fig. 12.6 (540–520); from Histria: Alexandrescu 1978, 106 no. 696 (late fifth century); from Athens: Sparkes and Talcott 1970, 358 no. 1727 (490–450).

⁴⁹Anderson 1954, 138 no. 44; Boardman 1967, 145 no. 596; Sparkes and Talcott 1970, 78 no. 255; Greek Ministry 2000, 58.

⁵⁰Boardman 1967, nos. 763–764, 888–889 (sixth century); Alexandrescu 1978, no. 734 (fifth century [?]).

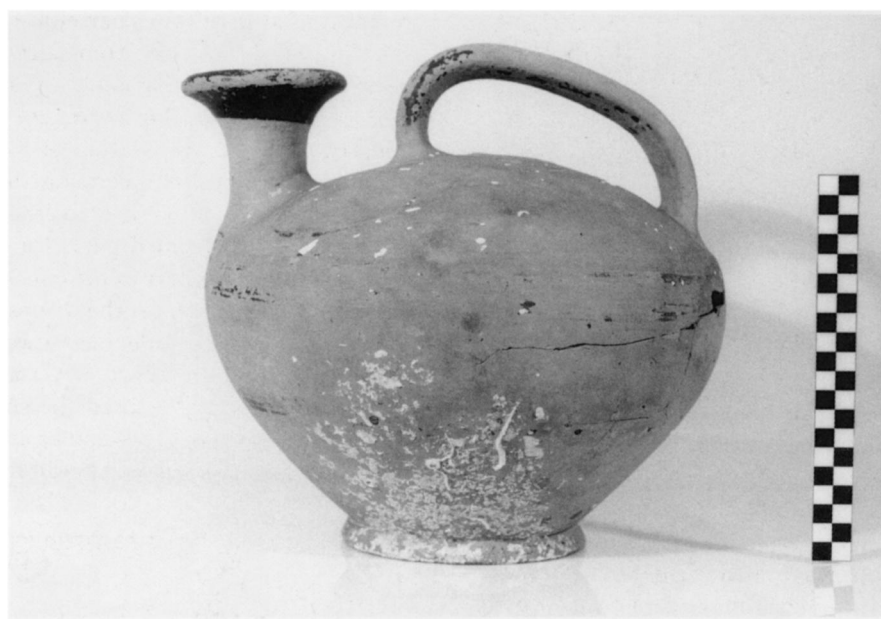


Fig. 14. The large domed askos. (K. Trego)

excavated at Emporio and Miletus:⁵¹ a thin dark band around the exterior below the handles and, on the interior, a broad band of white on an otherwise black background. Votive cups of this exact type, with dedicatory inscriptions painted around the rim, have been excavated at Naucratis and Aegina, raising the question of whether these cups were specially made on Chios or produced locally near the sanctuaries.⁵² While it is true that these cups “were cheap, plain, but fragile vases, not altogether ideal cargo,”⁵³ their discovery among the cargo at Tektaş Burnu distinguishes them as Chian exports, though it is impossible to know whether the cups were destined to become votive offerings.

The remainder of the ship’s cargo includes nine large one-handled cups, several of which were found nested together within the amphora mound. The large one-handled cups have nine small counterparts, three of which were retrieved from within individual pseudo-Samian amphoras being emptied for flotation (fig. 16).⁵⁴ At present it is unclear whether the cups were intentionally placed inside the amphoras, perhaps to be used for scooping out the

contents, or whether their provenience is caused by the mischievousness of resident octopi, which are known to inhabit amphoras and collect items small enough to be pulled inside.

A dozen handleless oil lamps found scattered around the wreck are also thought to constitute a portion of the ship’s secondary cargo (fig. 17). Several are undecorated, but most have painted nozzles and two concentric circles in the interior of the well. An identical lamp was excavated from a late fifth-century



Fig. 15. One of 10 black glaze Chian kantharoi. (K. Trego)

⁵¹ Sixth-century examples have been found at Emporio (Boardman 1967, 161 nos. 763–764) and Miletus (Kleiner and Müller-Wiener 1972, 74–5 fig. 5, pl. 21.2–3). Voigtländer (1982, 61 no. 117) illustrates a one-handled variety from fifth-century Miletus. Anderson (1954, 146) sees the fourth-century white-slipped drinking cups from Kofinà Ridge as “direct descendants of the archaic ‘Naucratis’ chalices.”

⁵² Naucratis: Boardman 1999, 123 fig. 141 and Aegina: Williams 1983, 169 figs. 10–11. For a summary of the scholarship on the votive cups and their inscriptions, see Boardman 1986.

⁵³ Boardman 1986, 253.

⁵⁴ See Anderson 1954, 148 no. 161 and 152 no. 222 for parallels of Hellenistic date from Kofinà Ridge.



Fig. 16. Three small one-handed cups. (D. Frey)

grave north of Emporio, Chios, which also contained a large one-handed cup and a small table amphora very similar to examples from Tektaş Burnu.⁵⁵

Attic Wares. A select few artifacts from the Tektaş Burnu ship deserve special mention because they are the only evidence that this ship was even indirectly engaged in the trade networks converging on Athens. These objects represent the most common shapes in fifth-century Attic black glaze pottery, and include a pair of Sessile type kantharoi, one with impressed decoration (figs. 18–19),⁵⁶ a small askos (fig. 20),⁵⁷ a salt cellar, and a shallow bowl with a Greek graffito on the underside. A very fine turned stone alabastron, another vessel characteristic of fifth-century Greece, was discovered in close proximity to the askos shown in figure 20.

SHIPBOARD ITEMS

The quantity and quality of the diagnostic pottery associated with the Tektaş Burnu cargo suggest that this was a small, local ship involved in a modest shipping venture. A small assemblage of undecorated coarseware vessels from the wreck may represent some or all of the items used on board the ship. Although it is certainly possible that some of these objects were in fact cargo, they are presented here as a group for the sake of simplicity and clarity. The corpus includes a hydria and jug, a plate, two shallow bowls, a mortar, and a salt cellar with a pair of suspension holes presumably designed to make the item easy to stow. The

remains of at least four coarseware kettles or chyt-rai (fig. 21) in two different sizes are currently being examined for remains of organic residue that could indicate whether or not the vessels had been used in the preparation of food.

One object that almost certainly shows signs of use is a small, coarse lamp retrieved from the interior of an amphora that formed part of a small cluster of artifacts at the periphery of the wreck site. This lamp is noticeably heavier than other lamps recovered from the wreck, and it has a deeper oil well, a very practical design for use on board a ship at sea. Very near the amphora that contained the ship's lamp were found two bronze bucket handles and what appears to be the shaft of a ladle or kyathos.⁵⁸ These objects

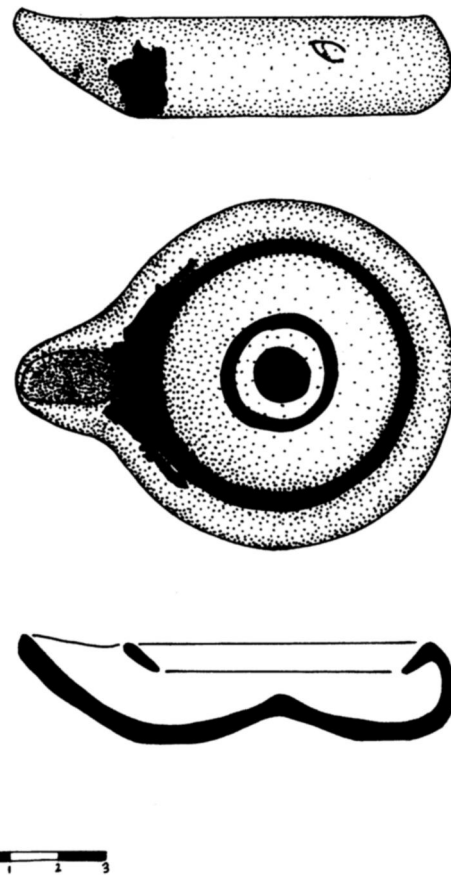


Fig. 17. One of 12 oil lamps. (B. Guneşdoğdu)

⁵⁵ Boardman 1967, 176. The table amphora (no. 922) and one-handler (no. 923) are shown on pl. 67, and the lamp (no. 505) on pl. 94. The Tektaş Burnu lamps appear to be late survivals of Howland's type 21A.

⁵⁶ The Sessile kantharoi are represented by a fragmentary high-handled cup and a complete low-handled cup with impressed decoration. Parallels in Sparkes and Talcott 1970, 114–5 nos. 628 and 633, suggest a date between 450 and 425. Bosilkov (1967, 38) shows a similar low-handled stamped kantharos

now in Sozopol.

⁵⁷ Similar in size and shape is Sparkes and Talcott 1970, 318 no. 1173 (470–450).

⁵⁸ Ladles have also been found among the remains of the shipwrecks at Phagrou (Kazianes 1996, pl. 239c) and Alonnesos (Hadjidaki 1996, 587 fig. 33). The Alonnesos ship was also carrying a bronze bucket, or *situla* (Hadjidaki 1996, 586 figs. 31–32).



Fig. 18. A Sessile type black glaze kantharos with impressed decoration. (K. Trego)



Fig. 19. Close-up of the stamped kantharos shown in fig. 18. (K. Trego)

suggest that the vessel's working area, the ship's stern, was located downslope, meaning that the ship must have come to rest with its bow in the shallower waters upslope. Two bone tiles (fig. 22), each 2 cm square, may be all that remains of an ancient game played on board.

THE SHIP'S REMAINS

Of the ship itself we found only fasteners and bits of wood.⁵⁹ The fasteners, which number more than 150, range in size from small tacks to large clenched copper nails, which represent approximately 20% of the total and would have been used in traditional mortise-and-tenon ship construction to secure hull planking to internal frames. It appears that, when the Tektaş Burnu ship sank, it did not settle onto a bed of sand, sealing and thus pre-

⁵⁹ Robert Blanchette and Joel Jurgens of the University of Minnesota's Department of Plant Pathology are analyzing the wood fragments; see Jurgens et al. 2003. Several small and badly deteriorated wood fragments thought to come from the ship's hull have been identified as pine and oak.

⁶⁰ This reconstruction is a working hypothesis that accounts for the presence of two small but isolated groups of artifacts,

serving the hull under the weight of the amphora cargo. Instead, the ship sat exposed, sandwiched between two large boulders, allowing marine organisms unrestricted access to the wood, which they devoured. When the fragile, worm-eaten hull finally gave way, most of the cargo sank into place, but various loose objects rolled away, forming small artifact clusters separate from the main amphora mound.⁶⁰

Evidence for the ship's orientation upon the seabed comes primarily from the discovery of two white marble disks (fig. 23) in the loose sand at the top of

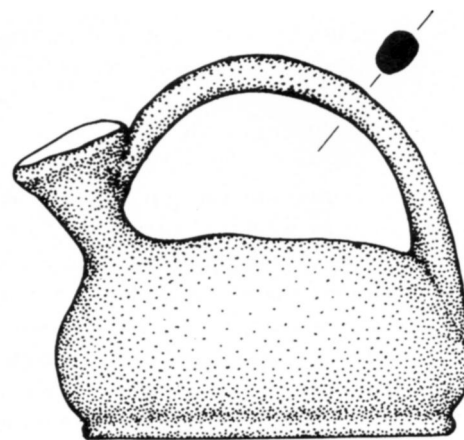
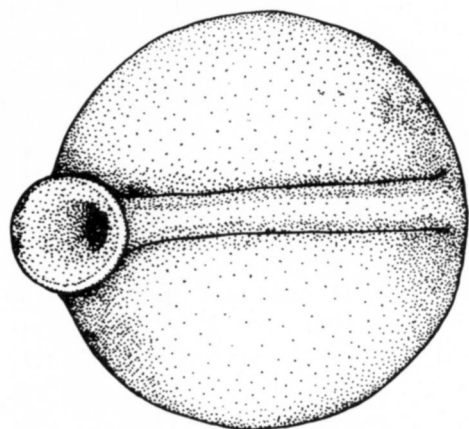


Fig. 20. The small black glaze askos. (B. Guneşdoğan)

mostly amphoras, in deeper waters. One of these was a cluster of three amphoras excavated by the author at a distance of some 12 m from the main amphora mound and not shown on the site plan that appears in fig. 4. One cannot rule out the possibility that the nets of local fishermen played a role in the displacement of artifacts.



Fig. 21. One of at least four kettles or chytrai. (K. Trego)

the wreck site. These disks, each about 14 cm in diameter, were the ship's eyes or *ophthalmoi*, once fastened to the ship's bow near the stem.⁶¹ The exterior surface of each eye is convex and incised with two pairs of concentric circles; reddish stains between these lines are the remains of painted decoration. A level reverse surface allowed each eye to sit flush against the ship's hull, to which it was affixed by a lead spike, which in one case has survived intact (fig. 24). The decorative surface treatment of the Tektaş Burnu ophthalmoi resembles that of nearly one dozen marble eyes discovered at the Piraeus since the late 19th century and thought to come from the shipsheds that once housed the Athenian triremes.⁶² The Piraeus eyes are more naturalistically rendered in an almond shape, much like the majority of oared warships depicted on ancient Greek vases. There are, however, a handful of black figure vase paintings that illustrate how some ancient ships carried purely circular ophthalmoi like those found at Tektaş Burnu (fig. 25).⁶³

Though the marine environment at Tektaş Burnu left behind no substantial hull remains and no evidence of the ship's decking, superstructure, or rig-

ging, the remnants of five wooden anchors, in the form of 14 lead stock cores, were found over the course of three excavation seasons (fig. 26).⁶⁴ The ancient Greeks poured molten lead into a wooden casing, or anchor stock, to give weight to the anchor and help it sit securely on the seabed. These lead anchor stock cores represent the earliest known example of a transitional phase in anchor construction, away from earlier stocks entirely of stone and toward later stocks



Fig. 22. Two bone tiles that may be gaming pieces. (D. Frey)

⁶¹ A more comprehensive study of the ship's ophthalmoi is Nowak 2001. For the eye as an apotropaic device and symbol of power among the ancient Greeks, see Steinhart 1995.

⁶² Saatsoglou-Paliadeli 1978.

⁶³ Nowak (2001, 90–1) explores the question of whether the type and size of ship determined the shape and size of the ship's eye. His survey of ancient vase paintings, which are admittedly problematic inasmuch as they depict far fewer mer-

chantmen than warships, permits Nowak to cautiously suggest that circular eyes were a feature of merchant vessels and almond-shaped of oared warships.

⁶⁴ Trethewey (2001) provides a more detailed treatment of the lead anchor stock cores and their role in the evolution of ancient anchors, but does not include the four cores excavated in 2001.



Fig. 23. The ship's two marble ophthalmoi. (D. Frey)

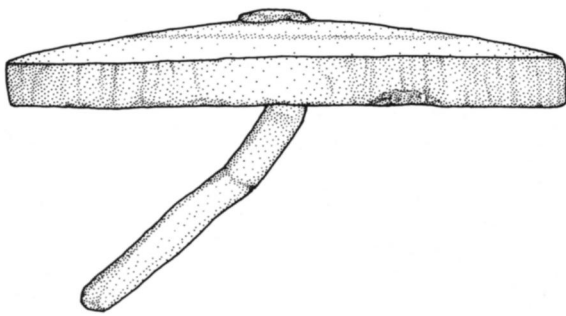


Fig. 24. Profile of marble ophthalmos TK 7. (Selma Açar)

entirely of lead.⁶⁵ There are, furthermore, two types of anchor stock represented at Tektaş Burnu: those with two long lead cores (6 cores from 3 anchors) and those with four shorter cores (8 cores from 2 anchors), which are the largest overall, measuring more than 1 m in length. During the last week of the 2001 excavation season, we located the second of two four-core anchor stocks at the base of the shelf on which the wreck sits, in 54 m of water and beneath 1 m of sand. The discovery suggests that this large anchor was cast out in an early but futile attempt to keep the ship from coming to grief on the rocky coastline. It may be the case that the anchor line was too

short, for in the end the ship crept slowly toward the coast and was ultimately broken apart on the razor-sharp rocks. Perhaps the anchor held long enough to allow the crew sufficient time to gather their possessions and make their escape.

CONCLUSIONS

The ship that sank at Tektaş Burnu in the third quarter of the fifth century was a modest merchantman probably not more than 10–12 m in length. In this respect, the Tektaş Burnu ship is comparable to the fourth-century wrecks excavated at Ma'agan Michael, Porticello, and Kyrenia, but is essentially the polar opposite of the fifth-century Alonnesos shipwreck.⁶⁶ The preponderance of Chian pottery, and the relative scarcity of Attic finewares, on board the Tektaş Burnu ship suggests that this was a local vessel plying a course along the Ionian coast. If the association of the EPY amphora stamp with Ionian Erythrae is correct, then we can be reasonably certain that the ship had called at Erythrae, and probably Chios, before embarking with a cargo of pseudo-Samian amphoras and Chian pottery. Perhaps the small ship was heading southward toward Miletus or Samos when it fell victim to the treacherous wind-driven currents of the Chian straits.⁶⁷

Scientific analysis of the Tektaş Burnu pottery may have important implications for our understanding of the economic relationship between Chios and Erythrae. Large quantities of Chian pottery discovered at Erythrae led the excavator to conjecture that the site had functioned as a subsidiary production area for Chian wares.⁶⁸ Dupont's analysis of 37 Chian pottery pieces from Erythrae revealed chemical differences in the source of the fabric, leading Dupont to conclude that Erythrae was producing imitative Chian wares for local markets.⁶⁹ In light of the fine reputation that Chian wine enjoyed in antiquity,⁷⁰ and the fact that "Chian amphoras have been found in smaller quantities than those of other wine-producing regions,"⁷¹ it

⁶⁵ Trethewey (2001, 113) references a similar anchor from the shipwreck at Ma'agan Michael, Israel, ca. 400, which was formerly the earliest example of this anchor type (Rosloff 1991). The ship that was wrecked at Kyra Panaghia, which may be contemporary with or even slightly earlier than the Tektaş Burnu shipwreck, was also carrying an anchor with lead cores like those found at Tektaş Burnu (Kazianes 1996, pl. 239d).

⁶⁶ Tonnage estimates based largely on amphora capacities suggest that the cargo on board the Tektaş Burnu ship weighed between 6 and 7 tons. The ship excavated at Ma'agan Michael was carrying 13 tons of stone and is estimated to have been approximately 13 m long (Rosloff 1991). The Porticello ship, though heavily looted, is thought to have been a vessel of 30 tons burden (Eisman and Ridgway 1987, 108). The Kyrenia

ship, 14 m in length, carried a cargo of 400 amphoras and had a capacity of 25 tons. By contrast, Hadjidaki (1996, 588) suggests that the Alonnesos ship may have been as large as 126 tons burden. It is worth noting the possibility that the Tektaş Burnu ship was carrying an organic cargo that is now lost or was sailing only partially laden.

⁶⁷ Morton 2001, 100–4.

⁶⁸ Bayburtluğolu 1978, 30.

⁶⁹ Dupont 1983, 25; 1998, 151.

⁷⁰ Plut. *Mor* 470F and Hermippus fr. 82.5 = Athen. 29E.

⁷¹ Sarinakis (1986, 122–3) cites the comparatively high number of Rhodian and Cnidian amphoras discovered at Alexandria, Delos, and the Athenian Agora.



Fig. 25. Black figure oinochoe of ca. 510 showing a sailing ship with circular ophthalmos. (Courtesy of the Museum Meermanno-Westreenianum, The Hague. Inv. no. 619/836)

is worth considering the possibility that Erythraean potters and Chian vintners collaborated to export Chian vintages in pseudo-Samian jars.⁷²

The attribution of the pseudo-Samian amphora type to Erythrae is particularly illuminating in light of the fact that so little is known of the Classical city. This curious lack of evidence is symptomatic of a broader trend in fifth-century Ionia that is most conspicuous in the archaeological record, where the absence of monumental temples like those built in the previous century at Ephesus, Samos, and Didyma is readily apparent. In this architectural void, J. Cook saw an Ionia devastated by the revolt of 499 and mired in an “economic paralysis,”⁷³ brought on in part by the high cost of Athe-

nian imperialism. More recently, R. Osborne’s comprehensive assessment of fifth-century Ionian archaeology has, to some extent, mollified the totality of Cook’s thesis.⁷⁴ Osborne demonstrates that a critical lack of excavation is partly to blame for the bleakness of Ionia’s archaeological picture, and he cautions against interpreting this absence of evidence as an indicator of poverty. The Tektaş Burnu cargo offers further proof of how misleading this evidentiary equation can be, inasmuch as this modest cargo suggests that the city of Erythrae, though archaeologically unknown in the fifth century, played a significant role in the production and distribution of East Greek ceramics and consumables.

⁷²To this end, the author notes the preponderance of lone circle stamps, either on the neck or at the base of one handle, on many of the pseudo-Samian amphoras from Tektaş Burnu. According to Dupont (1998, 149), the presence of solitary circles or crosses stamped in precisely these locations is a “significant feature” of contemporary swollen-necked Chian amphoras (i.e., before 430/25). This fact, when weighed with the discovery of pseudo-Samian amphora toes among the remains of a late Archaic potter’s workshop on Chios (Tsaravopoulos

1986, 138), at the very least points to an environment of mutual influence.

⁷³Cook 1961, 18.

⁷⁴Osborne 1999. Osborne adduces an impressive amount of evidence in an effort to update the archaeological picture of fifth-century Ionia, to which could be added Zavoykin 1992, an account of the recent excavation and classification, at Phanagoria, of large quantities of Samian amphoras dating to the second half of the fifth century.



Fig. 26. A team member excavates the four lead cores of ancient anchor stock. (D. Frey)

As the only Classical wreck ever to be completely excavated in Aegean waters, the Tektaş Burnu shipwreck constitutes rare and important evidence that the maritime trade of coastal Ionia endured, at least on a local level, in the decades following the Ionian Revolt and the rise of the Athenian empire. The extent to which this localized commerce reflects the curbing of Ionian economic activity in the Black Sea is an important issue, and one that will be revisited pursuant to the continued excavation, study, and comparative analysis of pseudo-Samian amphora finds and the role of Ionian Erythrae as one, if not the sole, source of this important amphora type.⁷⁵

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⁷⁵While the majority of pseudo-Samian amphora finds from the Black Sea predate the first quarter of the fifth century, the chronology of finds from Miletus, Clazomenae, and Chios is less secure but clearly central to the question of whether

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Ionian trade interests were redirected following the Ionian Revolt. The author plans to undertake a comprehensive study of pseudo-Samian as Erythraean amphoras, as the recipient of the AIA's Olivia James Traveling Fellowship for 2003–2004.

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