LESBIAN WINE AND STORAGE AMPHORAS

A PROGRESS REPORT ON IDENTIFICATION

(PLATES 69–72)

DESPITE the great progress which has been made in the identification and study of ancient wine and storage amphoras, there are still many states which must have exported wine in some quantity for which insufficient evidence exists to permit attribution to them of a particular class or classes of jars. In addition, there remain a good many jars and fragments of jars as yet unidentified and unattributable to any individual exporting state. Such has been the case with a group of predominantly gray amphoras collected by Virginia R. Grace in the Stoa of Attalos at the Agora Excavations of the American School of Classical Studies at Athens. Information concerning other gray amphoras found elsewhere has also accumulated there in her files.[1]

The amphoras here in question, a selected sampling of which (Pl. 69) will be used for the purposes of this article preliminary to the full publication of the class, cover a wide chronological range which seems to start in the 7th century B.C. but which stops abruptly sometime in the second half of the 4th century B.C. This is quite puzzling since other wine-

[1] Without the help and direction of Virginia R. Grace, Agora Research Fellow of the American School of Classical Studies at Athens, this manuscript never could have been written; the basic inventory of gray amphora examples and pertinent material was assembled by her over a period of years in the Stoa of Attalos II in the Athenian Agora. Professor Homer A. Thompson, under whose direction (1947–1967) the Agora material was excavated, Professor T. Leslie Shear, Jr., present Field Director of the Agora Excavations, and Charles K. Williams, II, Field Director of the Corinth Excavations, were most gracious about releasing material for publication. Williams and Carolyn G. Koehler both helped provide information concerning the Lesbian amphoras at Corinth, and I am indebted to Miss Despina Hadzi, Epimeletria for the island of Mytilene and then Curator of the Mytilene Museum, and to Mrs. Karapiperi, the official in charge of the Methymna Museum, for their assistance in finding new material. Members of the German Archaeological Institute, particularly F. W. Willemsen and Dr. Ursula Knigge, should also be thanked for their willingness to let gray amphoras from the Kerameikos be studied and published. A large vote of thanks also goes to Professor Miranda Marvin of the Wellesley College Departments of Art and Classics, with whose help the amphora sherds were submitted to the Brookhaven National Laboratory in Upton, Long Island, New York, where neutron activation tests were performed by Dorothea Brooks and Alan Bieber under the general direction of Dr. Edward V. Sayre and Dr. Garman Harbottle. All deserve thanks for their efforts. Financial assistance was obtained in the form of a grant from the Samuel H. Kress Foundation in New York City. Final thanks go to Philippa M. W. Matheson for her invaluable editorial help and to Professors James R. McCredie and Homer A. Thompson for general aid and assistance.

The following special abbreviations are used in this article:

Grace, *Amphoras* = V. R. Grace, *Excavations of the Athenian Agora*, Picture Book No. 6, *Amphoras and the Ancient Wine Trade*, rev. ed., Princeton 1979

Grace, "Handles" = V. R. Grace, "Stamped Amphora Handles found in 1931–1932," *Hesperia* 3, 1934, pp. 1–310

Knigge = U. Knigge, *Kerameikos*, IX, *Die Ergebnisse der Ausgrabungen*, Berlin 1976

Lamb, *BSA* 31 = W. Lamb, "Antissa," *BSA* 31, 1930/31, pp. 166–178

producing states such as Rhodes and Knidos greatly expanded their wine and amphora production during the Hellenistic period. This peculiar phenomenon will be the subject of future, separate research.

The earliest gray amphora fragments were excavated from a context in the Athenian Agora dated the third quarter of the 7th century B.C. (Pl. 70:**1**). Other jars datable to the Archaic period were found in the area of Athens[2] as well as in more distant, scattered locations.[3] Concerning his finds at Old Smyrna, Turkey, J. M. Cook wrote, "study of the archaic amphorae shows that import of wine from Chios and from a centre exporting in grey jars can be dated a far back as the eighth century—in fact to Homeric times."[4] I. B. Zeest corroborates the Archaic beginnings of the class of gray, wine amphoras; a group belonging to this class was found at Pantikapaion on the Black Sea in an early 5th-century B.C. stratum covering the remains of a building destroyed in the 6th century.[5] The bulk of the material, however, was found in the Athenian Agora excavations and included many fragments complete enough to facilitate the restoration of almost whole jars.[6] Most of these jars came from wells, with a sizeable group (4) of smaller "red" examples (e.g. **4**) found

[2] Archaic period, in developmental sequence:

Kerameikos inv. no.

Unnumbered neck, handles and shoulder fragment
SW 109
SW 108 (**2**); Knigge, p. 86.

Agora inv. no.	*Deposit*	*Agora inv. no.*	*Deposit*
P 15915	F 19:5	P 24875 (**4**)	Q 12:3
P 16802 (**3**)	G 15:1	P 24876	Q 12:3
P 23027	H 12:14	P 24877	Q 12:3
P 24915	R 12:4	P 24878	Q 12:3
toe fragment, in HH, Tin 185	T 18:1	P 12789	G 11:13
P 16800	G 15:1	P 16062	F 19:4
P 26069	L 17:6		

Piraeus Archaeological Museum
label: Napolean Athanasakis, Giatrakou 32, Athens.

[3] a) Sicilian jars: no. 13 (T. 1026); no. 14 (T. 1081); no. 15 (T. 1025), P. Pelagatti, "L'attivita della Soprintendenza alle Antichita della Sicilia Orientale, Parte 1," *Kokalos* 22–23, II, 1976–1977, p. 525, note 15, pl. LXXVI, nos. 13–15.

b) Bucharest jar: XXII 2, P. Alexandrescu, *Histria* II, Bucharest 1966, pp. 164–166 and pl. 86.

c) Chersonesos jar: M. Ebert, *PZ* 5, 1913, p. 27 with fig. 28:t.

d) Thasos fragments: unnumbered necks (6) and one body with handles (3), found in 1953 sondage, files of V. R. Grace, Agora Excavations, Athens.

e) Old Smyrna fragments: three neck fragments, each with one connected handle, files of V. R. Grace, Agora Excavations.

[4] J. M. Cook, "Archaeology in Greece, 1952," *JHS* 73, 1953, p. 124.

[5] Types 8b, 8c, 9a, 9b, and 7, I. B. Zeest, *Pottery Containers from the Bosporos*, Moscow 1960, pp. 73, 74, pls. II, III, notes 37, 38, 42.

[6] Archaic period: see footnote 2 above.

Classical and Hellenistic periods, in developmental sequence:

Agora inv. no.	*Deposit*	*Agora inv. no.*	*Deposit*
P 21974 (**6**)	N 7:3	P 11018	B 15:1
P 21975	N 7:3	SS 10234	C 19:5
SS 10289 (**7**)	B 19:11	P 23814	Q 15:2
P 16443	G 18:1 (u)		

together in a well under a gutter of the Stoa of Attalos.[7] Also, gray amphoras were found by German excavators re-used as burial containers in the Kerameikos cemetery in Athens (e.g. **5**).[8] Examples were found in Corinth,[9] Eleusis,[10] and in tombs in Egypt[11] and on Rhodes,[12] and necks and handles were brought up from a sunken wreck off the Greek coast south of Athens as recently as 1961.[13] All these constitute what, over a long period of accumulation, became a group of predominantly gray-colored fragments and jars with stylistic characteristics consistent enough to have them identified as a separate and distinct class of amphora.

Besides the general grayness in color, an unusual feature for Greek wine amphoras which are predominantly of warmer earth colors, all the jars possess cylindrical handles (profiles, Pl. 71) that end at the lower point of attachment to the body in a sort of tail that lies in relief on the shoulder of the vessel.[14] The tail strongly resembles that of a rat, and so has been referred to as a rattail. This is a unique feature; most amphora handles are joined smoothly and almost unnoticeably to the shoulders of the jar with perhaps only a finger impression to mark the juncture.[15] Few other classes of amphoras have cylindrical handles; most are oval or flattened in section. Offset ridges can be observed between the rims and necks at almost all developmental periods of this group of amphoras (**3** is an exception), although in the earliest, 7th-century examples the offset is lower, at the midpoint of the upper handle attachments (e.g. **1**). An additional offset ridge or groove can sometimes be discerned at the base of the neck also, a feature very pronounced in **1** but missing entirely in **8**, dated 350–325 B.C. Many of the later necks (e.g. **4–8**) exhibit a slight bombé tendency, that is, a tendency to bulge slightly outward, then in again between the rim and the base of the neck.

Careful comparisons of the jars show that the color actually ranges from light buff gray (Munsell Y8/1) through "red" (YR/5/4) to almost black (N 3/), although a dull medium gray (N 5/)[16] would be a good description in most cases. Most pieces appear unslipped, although some show evidence of a black wash or buff slip,[17] perhaps to increase their "grayness" for identification purposes.[18] The cores of the pieces as observed at the breaks also vary from gray to "red"; in many instances the color of the interior is in striking contrast to

[7] Agora inv. nos. P 24875, P 24876, P 24877, P 24878. The finds from this well (Deposit Q 12:3) are to be published by Sally R. Roberts.

[8] Kerameikos inv. nos. HW 46, HW 226 (**5**; Knigge, pp. 138, 132); SW 82, 1338, HS 163 (**8**), Q 60, Q 67.

[9] Corinth inv. nos. C-71-617 a, b, C-71-531, C-37-2766.

[10] Eleusis Archaeological Museum: jar Mylonas IV, notes dated: "19–IX–53", files of V. R. Grace, Agora Excavations.

[11] The Greco-Roman Museum of Alexandria, Egypt: two unnumbered fractional jars, files of V. R. Grace, Agora Excavations.

[12] Rhodes Archaeological Museum: fractional jar. Concerning the tomb group (tomb 21?) from which this jar comes, see G. Jacopi, "La necropole di Pontamo (Chalchi)," *Clara Rhodos* II, Rhodes 1932, pp. 117–164.

[13] Piraeus Archaeological Museum: Voula Wreck, necks A and B.

[14] Pl. 72:a; Grace, *Amphoras*, no. 53.

[15] Grace, "Handles," p. 201.

[16] A. H. Munsell, *Atlas of the Munsell Color System*, Malden, Mass. 1907, Neutral and Color Charts.

[17] E.g., P 15915, SW 109, Zeest Type 9a, Agora toe fragment, and P 16800.

[18] Cf., e.g., gray pottery on Lesbos (pp. 252–254 below).

that of the exterior.[19] Six of the known amphoras bear stamps or incised monograms (e.g. **7**: incised Π),[20] none of them the same and none appearing on the handles, the usual position for a stamp, but on the neck instead. Stamping on the neck is known to occur at a certain period in Chios and Thasos[21] but was not widespread. At least two separate sizes of amphora appear, the smaller ones considered fractional by comparison to the larger jars (compare **2** [regular] and **4** [fractional] of overlapping dates). This difference in size is reflected mainly in changes in the proportions of the body rather than in those of the necks (compare neck and handle measurements to body measurements of **4** and **5**). The fractional jars are usually "red" rather than gray until after 325 B.C., the date assigned to the two latest jars found in Egypt,[22] which are fractional but gray.

As with other classes of amphoras of Classical and Hellenistic times,[23] a continuous tendency towards slimming and elongation can be observed throughout the development of the class. This lengthening of the vessels produced accompanying developmental changes in necks, handles, and toes also, as well as in over-all height. Observe the difference in height between **2** (H.: 0.685 m.) and **5** (H.: 0.776 m.), the former a burial jar from the Kerameikos dated *ca.* 500 B.C. and the latter from the same site but from a context of 470/460 B.C. The handles and neck of **5** are 0.03 m. and 0.016 m. in length, respectively, longer than those on **2**, the whole jar **5** being 0.09 m. taller. **8**, a third Kerameikos jar dated somewhere between 350 and 325 B.C. and the latest one illustrated in this text, has a height of 0.814 m., nearly 0.04 m. taller than **5**. The handles and neck on **8** are 0.12 m. longer than those of **1**, the earliest 7th-century jar illustrated, the increase representing the changes during the 300 years demonstrated by existing examples of gray amphoras. The over-all increase in height cannot be determined as yet[24] but only that between the late 6th century (**2**) and latter part of the 4th (**8**), a total of 0.13 meters. The decrease in body diameter that accompanied the lengthening process must have compensated for the increase in height: after swelling to a maximum of 0.412 m. in **5**, the bodies shrink steadily to 0.34 m. in **7** and finally 0.32 m. in **8**, the change in the latter and in the later fractionals[25] accomplished by a sudden sharpening of the shoulder angle and the elimination of any rounding of the body at all. It would seem that this tendency toward elongation and slimming was a continuous attempt to ease the handling as affected by the weight distribution of the container, as well as to facilitate easier shipping and storage.

The position of the top handle attachments in relation to the rims also seems to vary from period to period. Starting well below the plain lip of **1**, the top handle attachments can be seen to encroach more and more on what develops first into a rolled, flat rim (Pl. 71:**2**–**5**),

[19] See below, p. 254.

[20] SS 10289 (**7**): incised Π; SS 10234: oinochoe; Kerameikos 1338: incised ξ; Rhodes Museum, fractional jar: Μ (MY monogram); Corinth C-71-617 a: ΜΑ (MA monogram); Corinth C-37-2766: Ω (omega?).

[21] Grace, "Handles," p. 201, note 5; *eadem*, "Early Thasian Stamped Amphoras," *AJA* 50, 1946, fig. 4, with p. 37, note 21.

[22] See footnote 11 above.

[23] Cf. Grace, *Amphoras*, *passim*.

[24] Measurements for the Sicilian jars (see footnote 3 above) are not available.

[25] See footnotes 11 and 12 above.

then becomes a slightly flaring half-roll rim (Pl. 71:**7**, **8**). **4** and **6** are exceptions to this rule, **4** being a fractional amphora and perhaps **6** as well. The top handle attachments finally engulf the rim entirely in **7**, then fall below a plainer lip again in **8**, almost a century later. At the same time the flare of the handle curvature can be seen to increase, reaching an extreme outward flare in **7**, then straightening and lengthening into an almost reverse curve in **8** in an attempt to compensate for the extreme length of neck (H. of neck: 0.242 m. [**7**] *vs.* 0.119 m. [**1**]). The lower handle attachments move closer and closer to the base of the neck during the lengthening process, and the rattails become more and more elongated. The slight bombé curve to the necks can be seen easily in Plate 71:**4**–**8**.

Like the bodies, the diameters of the toes also decrease. What starts as an almost flat, hollow base[26] that could conceivably support the jar in an upright position in **2** (Pl. 71:**2**) narrows and lengthens into a solid peg toe (Pl. 71:**4**, **8**). This change appears earlier in the "red" fractional jars (Pl. 71:**4**) which also exhibit an indentation on the bottom of the toe, a feature never apparent in the full-size amphoras or the later gray fractionals.

But, although a definite pattern of development can be determined both chronologically and through variation in shape in the gray amphoras, the variety of findspots only suggests extensive trade distribution rather than providing information concerning the origin of the amphoras. Nor do the few stamps add much: of the four (the incised sigma [Kerameikos 1338] and the incised pi [**7**] are not considered stamps), one is a stamp containing a squat oinochoe (Agora SS 10234), the second perhaps an omega (Corinth C-37-2766), and the third (Corinth C-71-617 a) and fourth (the fractionals in the Rhodes Archaeological Museum) are stamped monograms that perhaps could be deciphered as MA and MY.[27] Very little is known about Lesbian usage of monograms or symbols in stamping beyond the fact that early coins contained ΛΕ, MYTI or M monograms and that the lyre and lion, cock, ram, and female heads were common emblems.[28]

Preliminary Archaeological Assumptions

The first suggestion that the gray amphoras could be connected with Lesbos and the Lesbian wine industry came from J. M. Cook, who associated the gray color of the amphoras from his excavations in Old Smyrna with that of the Aeolic bucchero pottery excavated on the island of Lesbos and surrounding sites in Asia Minor.[29] That Lesbos was a source of Aeolic bucchero was established by W. Lamb from material she excavated from the Lesbian sites at Antissa in 1930–1932,[30] and Methymna in 1932,[31] the pottery from both indicating that bucchero was the dominant ware manufactured at these sites in the 7th and 6th cen-

[26] See also footnote 3 (a) above: jars listed have similar bases.

[27] See footnote 20 above. Cf. W. Wroth, *A Catalogue of the Greek Coins in the British Museum. Troas, Aeolis and Lesbos*, London 1894, Pls. XXX:11, XXXII:9, XXXVII:11. These could perhaps be deciphered as MY for Mytilene and MA for Methymna, but no similar monogram stamps have been found.

[28] *Ibid.*; C. Seltman, *Greek Coins*, London 1955, p. 114.

[29] Note in files of V. R. Grace, Stoa of Attalos II, Agora Excavations, Athens dated "29.VIII.52". The term "bucchero" as used in the present article refers to gray fine pottery, or tableware and non-wine amphora coarse wares. It is used to differentiate between other gray ware and gray amphoras.

[30] Lamb, *BSA* 31, pp. 166–178; "Antissa," *BSA* 32, 1931/32, pp. 41–67.

[31] W. Lamb, "Grey Wares from Lesbos," *JHS* 52, 1932, pp. 1–12.

turies B.C.[32] Her findings confirmed earlier conclusions by J. Böhlau and E. A. Gardner: bucchero pieces studied by them on Rhodes[33] and in Naukratis[34] were attributed to Aeolian origin, and one to Mytilene on Lesbos in particular. This evidence plus the fact that the earliest of the literary references to Lesbian wine concerns a shipment of the wine to Naukratis in the 7th century[35] only strengthens Cook's proposed identification of the gray ware. Virginia Grace tended to agree with Cook: in reference notes dated August 29, 1952 on the "gray" wine jars in the Athenian Agora, Grace notes that "Cook thinks or has thought that the gray jars are Lesbian because of the bucchero and I am inclined to agree."[36] J. K. Anderson and I. B. Zeest showed similar agreement at later times; in 1953, when referring to gray fragments found on Chios, Anderson noted that "these amphoras are almost certainly related to the grey bucchero of Lesbos,"[37] and Zeest, in her 1960 publication on pottery containers found in the Black Sea region, concurred in Grace's identification of the gray amphoras with pottery wares of Lesbos, her agreement based on the similarity of clay alone.[38] Yet the connection remained tentative, and when Cedric Boulter published the contents of a mid-5th-century well in the Athenian Agora, a basic description of the class to which two jars belonged, written by Virginia Grace, was included in the article but with no mention of Lesbos as the place of origin.[39] Even in *Amphoras and the Ancient Wine Trade* by V. Grace, revised in 1979, reference to the Lesbian class is always accompanied by a question mark;[40] attribution up to this time was based on similarity of clay colors alone with no evidence actually found on the island of Lesbos to support the conclusion that the gray amphoras were in fact manufactured there.

But could the connection between the amphoras and the Lesbian bucchero suggested by Cook be considered reliable if based on color similarities alone? Though color variations exist within the amphora class (cf. **4**, "red"), the great majority of the jars are definitely gray, therefore establishing gray as their intended and characteristic color or their color of choice. "Choice" is the key word here, for tests[41] have proved that the gray color of the

[32] Lamb, *BSA* 31, p. 168, fig. 1, Trench P, section: the level from 2.5 m. to 2.00–1.75 m. is labeled "Full bucchero period". An inscribed, 6th-century kantharos was found in this level, and the "rest of the bucchero belongs to both the seventh and sixth centuries . . ."; *JHS* 52, 1932, pp. 2–3: "the archaic examples belong to the seventh century and sixth, probably the first half."

[33] H. B. Walters, *History of Ancient Pottery* I, London 1905, pp. 339, 347.

[34] *Ibid.*, E. A. Gardner, "Early Greek Vases and African Colonies," *JHS* 10, 1889, pp. 126–133; see particularly pp. 126, 128.

[35] Strabo (XVII.1.33 [C 808]); H. Michell, *The Economics of Ancient Greece*, Cambridge 1940, p. 294. This fact is referred to by several writers because business reasons for being in Egypt helped promote a relationship between Charaxos, Sappho's brother, and a well-known courtesan there, a relationship loudly deplored by Sappho in her poetry.

[36] See footnote 29 above.

[37] J. K. Anderson, "Excavation of the Kofina Ridge, Chios," *BSA* 49, 1954, p. 139.

[38] Zeest, *op. cit.* (footnote 5 above), p. 74.

[39] C. Boulter, "Pottery of the Mid-Fifth Century from a Well in the Athenian Agora," *Hesperia* 22, 1953, pp. 102–104.

[40] Grace, *Amphoras*, nos. 52 and 53 with accompanying text.

[41] Refiring tests were performed in November, 1959 on two pieces of Lesbian amphoras at the Agora (one from a fractional "red" jar from a well in Q 12:3 dated *ca.* 500 B.C., the other a slice from a full-sized "gray" jar handle from a well in Q 15:2 dated *ca.* 400 B.C.) by Dr. Marie Farnsworth, research chemist and author of

amphoras was the result of firing or at least of cooling the amphoras in a reducing rather than an oxidizing atmosphere, and that pottery of either red or gray could be produced from the same clay. These tests also verified that variations in tone in both the gray amphoras and Lesbian bucchero, particularly the differences between the interior and exterior colors observed at breaks, were the result of difficulties inherent in the firing process, or in other words, that the firing of gray pottery could be successful in varying degrees.

If the gray color was a matter of choice and not of clay, it would seem probable that gray amphoras were manufactured in an area where gray pottery was produced, known, and accepted. And Lamb's excavations on Lesbos indicated a full bucchero period in the 7th and 6th centuries B.C.[42] In fact, gray pottery remained popular in areas of the northeastern Aegean for hundreds of years. That it remained so with the people of Lesbos is still in evidence, for as recently as 1963 potters could be observed firing their water pots either red or gray, using the same red clay in both cases.[43] Color similarities did, indeed, seem to be a good reason for connecting the two wares, but only as a good clue or first step in pinpointing the origin of the gray amphoras.

Literary References

That Lesbos could be a source of amphora manufacture is indicated by other evidence of a different nature. Though no wine amphora remains have been found either on the island or elsewhere that are readily attributable to Lesbian origin, abundant literary and historical references are available that testify to the excellence, size, and lengthy history of the Lesbian wine industry. If Lesbos is to be compared with other islands and cities with wine industries of similar importance, then the following references indicate that amphora manufacture must have been in operation on Lesbos as it was in these other areas. Blümner states that the significant export of Lesbian wine indicated by these tests assumes the existence of a heavy industry in pottery on the island.[44]

The references to Lesbian wine cover a wide chronological range, from Archaic Greek to Roman times. The earliest mention is by Strabo (XVII.1.33 [C 808]), who records that in the 7th century B.C. Sappho's brother Charaxos exported wine from Lesbos as far as Naukratis in Egypt.[45] Then Athenaeus, who lived and wrote in Naukratis at the end of the 2nd and the beginning of the 3rd century after Christ, lists in his *Deipnosophists* references made to Lesbian wines by comic poets of earlier centuries.[46] Athenaeus quotes Alexis (*ca.*

numerous articles on the techniques involved in Greek pottery. The two pieces, with parts of each kept as controls, were refired at 900° C. in an oxidizing atmosphere. As predicted, the gray slice turned to a buff color almost identical with the original and refired red pieces. In a letter to Virginia Grace in the Agora files, referring to the tests, Dr. Farnsworth stated, "it seems . . . that the two pots are identical insofar as material is concerned. The gray was fired and cooled in a reducing atmosphere, and the red may or may not have been fired in a reducing atmosphere, but was allowed to remain oxidized or reoxidized in cooling."

[42] See footnote 32 above.

[43] B. A. Sparkes and L. Talcott, *The Athenian Agora*, XII, *Black and Plain Pottery of the 6th, 5th and 4th Centuries B.C.*, Princeton 1970, p. 190 and note 22.

[44] M. Blümner, *Die gewarbliche Thätigheit der Völker das klassischen Altertums*, Leipzig 1869, p. 45.

[45] See footnote 35 above.

[46] Athenaeus, *The Deipnosophists*, Loeb Classical Library, London and Cambridge, Mass. 1951, introduction, p. viii.

375–*ca.* 275 B.C.) as saying that there was "not another wine pleasanter to drink" than Lesbian (I.28). Alexis continues by making an allusion to the payment of duty, saying that Bacchus was kind because all Naukratites importing Lesbian wine could do so free of duty, whereas if the wine was sent elsewhere by Naukratites it was confiscated (I.28). As an indication of the excellence attributed to the Lesbian wines, Athenaeus has Clearchos (second half of the 4th century B.C.) insist that they "must have been made by Maron, the Priest of Apollo, himself" (I.28). Eubolos (early 4th century) refers to the wine as "old Lesbian distilling nectar" (I.29), and Ephippos (early 4th century) particularly likes the "Pramnian wines of Lesbos" (I.28). Philyllios (beginning of the 4th century) claims that they did not give headaches (I.31), and Archestratos, a 4th-century writer on symposia, included in these passages by Athenaeus, urges that "ye must drink old wine, with hoary head . . . whose moist locks are crowned with a white bouquet grown in Lesbos which the sea waves encircle" (I.29). He claims later that the "Lesbian will seem to you to possess the glory of ambrosia rather than wine" (I.29). It should be be noted that these and other authors of the 5th, 4th, and 3rd centuries B.C. also refer to Thasian, Chian, and Mendean wines, all of which are attested by actual jars of the period that originate from these localities.

A papyrus record of note written by the Egyptian, Zenon, assistant to Apollonios, the estate manager of Ptolemy Philadelphos, shows that Lesbian wines as well as wines from Thasos, Knidos, Chios, and Leukas were shipped to Egypt in the 3rd century B.C.[47] And the physician Erasistratos of that same century is reported by Pliny (*N.H.* XIV.73) to have ordered Lesbian wine and to have added the name of Lesbian to those of Thasian and Chian as one of the wines held in highest esteem subsequent to the great vintages of the Homeric age.

In the 1st century B.C., Philodemos, a Gadarene from Palestine who lived in Rome and Naples, included the following line in a poem: "Anoint my limbs with saffron and wet my gullet with wine of Mytilene."[48] In an earlier verse he had referred to "wanting no Chian wine again,"[49] his preference being the Mytilenean. This could be poetic license and reference to times past, but Pliny says later without poetic intent (*N.H.* XIV.74) that "the wine of Lesbos by dint of its own nature smacks of the sea," and Galen, the physician (*ca.* A.D. 130–200), was known to have praised Lesbian wines,[50] all of which suggests that Lesbian wines were known continuously into Imperial Roman times.

Athenaeus, speaking for himself, remarks that "Mityleneans call the sweet wine of their country 'prodromus'; others say 'protropus'" (I.30), both of which refer to the first flow of juice from the wine press caused just by the weight of the grapes before any pressure is applied. This is more, though indirect, praise of the Lesbian wines, for the first flow from a wine press is always considered the best. Athenaeus also claims that the Lesbian wine has "less astringency and is more diuretic" (I.32) than the Knidian and Chian, and he recommends the "protropus, the sweet Lesbian," for the stomach (II.45). He specifies that "only the

[47] M. Rostovtzeff, *The Social and Economic History of the Hellenistic World*, Oxford 1941, I, pp. 226, 228 and III, p. 1370, note 53; Michell, *op. cit.* (footnote 35 above), p. 294.

[48] C. Seltman, *Wine in the Ancient World*, London 1957, p. 119.

[49] *Ibid.*

[50] *RE* XII, *s.v.* Lesbos, Stuttgart 1925, p. 2118; Galen, *On the Natural Faculties*, Loeb Classical Library, London 1916, XIII.405, XIV.28k.

purest waters are suitable for adding to Chian and Lesbian wine" (I.33) and quotes Archestratos as saying that by comparison to Lesbian wine, Thasian is simply nothing (I.29).

Every mention of Lesbian wine is enthusiastic, to say the least, and the island is referred to in ancient texts as "Lesbos of the luscious grapes" (Athenaeus, III.92), or "Lesbos, rich in wine" (Athenaeus, XVI.598), or some other admiring phrase. Little else is known about the wines other than that the grapes were grown in terraced vineyards without props or stakes but were allowed to trail along the ground naturally.[51] The wines were produced chiefly in Methymna in the north of the island, where, as indicated by coins from that city, the wine god Dionysos was worshipped.[52] There is also reference in Athenaeus to a "lesbion"[53] as some kind of cup, but a difference of opinion exists concerning this.[54] And a pseudo-Aristotelian reference of the early 3rd century B.C.[55] tells us of trade in Lesbian wine carried on by Pontic merchants. Almost all these references suggest a lucrative wine industry, and therefore, if Lesbos is presumed to have followed the practices of other contemporary wine-producing states, it is not unreasonable to expect that a special type of amphora identifiable as Lesbian was used for the transportation of this commodity.

New Efforts and Inquiry

Thorough consideration of the evidence presented in the preceding sections pointed to the necessity of finding material on the island of Lesbos itself if the attribution of the gray amphoras really were to be substantiated. A connection more solid than that based on clay color alone had to be established between Lesbian bucchero and the gray, wine amphoras, and some association with a pottery industry had to be proved. If a heavy pottery industry existed of the magnitude necessary to facilitate a wine export as significant as that indicated by ancient literary references, some remains of it had to be traceable on the island somehow, whether in archaeological records or local customs and traditions. In an effort to uncover the necessary evidence, a trip to the island was scheduled in August of 1972.

[51] *RE, loc. cit.*

[52] Wroth, *op. cit.* (footnote 27 above), p. lxxvi.

[53] Athenaeus, *The Deipnosophists*, XI.486, mentions a lesbion as a kind of cup and quotes an epigram of Hedylus (*ca.* 200 B.C.) as illustration: "Callistion, she who could hold her own in the drinking contest with men—no sham miracle either—drank up six quarts on an empty stomach; it is her lesbion filled with sweet smell of pure balsam, and made of lustrous glass that is here dedicated to thee, Paphian goddess. Do thou by all means preserve her that once again thy walls may carry the booty of sweet desire inspired by her."

[54] Gulick, in his note on this passage in the *Deipnosophists* translation (see footnote 46), prefers Kaibel's interpretation of the word, that the lesbion was "a vessel filled with ointment, the prize of her victory." The fact that a small amphora of variegated glass, in a shape that could well be patterned after that of Lesbian wine amphoras, was found at Antissa in Lesbos (*BSA* 32, 1931–1932, fig. 13:1) tends to support this interpretation. V. Grace notes that a number of little glass amphoras have been found; of one she has a photograph. M. Blümner (*op. cit.* [footnote 44 above], pp. 44–45) inferred from the Hedylus epigram that the glass industry may have moved from Alexandria to Lesbos around 200 B.C. Yet at the same time other uses of the word "lesbion" with reference to a part of a ship are known (*RE* XII, p. 2123), all of which seems to indicate that the term developed idiomatic connotations.

[55] Rostovtzeff, *op. cit.* (footnote 47 above), p. 120; Aristotle, "On Marvelous Things Heard," Loeb edition of *Minor Works*, London 1936, 104.839b, p. 285.

Local tradition was scrutinized first.[56] The fact that a modern pottery industry existed on the island suggested the continuation of an established custom, since, in modern as well as ancient times, artisans tend to continue an industry in a specific area and cluster together in pursuing their craft.[57] If this were the case in Lesbos, original clay beds might still be in use. Sometime between 1962 and 1968, a white-glazed earthenware pottery with multicolored floral designs labeled as manufactured in Agiasos, Lesbos had been introduced to the Athenian tourist market, and samples of the clay used in this ware were obtained in hopes of establishing a link with the ancient clay sources.[58] Another valuable source of information, that is private owners of antiquities, was pursued, but no amount of effort could locate any families who owned ancient artifacts. Many old families often own pieces that have been passed down through successive generations, and these collections as well as those of local citizens with historical interests have been a source of amphoras on many other islands.[59] As far as could be ascertained, however, no jars fitting the general description of "Lesbian" wine amphoras were known to exist on the island.

Permission was obtained from the Greek Archaeological Service to handle and photograph all excavated material housed in the museums on the island. References by W. Lamb to a "rolled handle-attachment of a (?) hydria" that seemed "to belong to the 7th century,"[60] and to three small amphoras, one gray and two red,[61] suggested that re-evaluation of the Archaic bucchero in terms of the known characteristics of the gray amphoras might provide evidence previously unnoticed or not considered important. Opportunities to examine town sites known to have been connected with wine production or trade, particularly Mytilene and Methymna, were also arranged. The surface of the Methymna site had been described as still littered with sherds.[62] The area had been designated an archaeological site only some three or four years earlier, but many things of value were known to have been and still were being taken from there, few of which found their way into the hands of the Archaeological Service.[63] This being the case, the opportunity of finding new material was a distinct possibility.

[56] Mr. Miltis Paraskevaides, journalist and citizen of Mytilene known for his interest in Lesbian history and antiquities, was most helpful about providing both general and specific background material concerning the island.

[57] E.g., the Kerameikos, or pottery quarter, in ancient Athens, and Hephaistos Street, still the street of smiths.

[58] Further inquiry produced the name of another traditional pottery center, the town of Mandomados, but as subsequent investigation proved the road to this village impassable for cars and trucks, mass production seemed unlikely there in modern times, and so investigation was not continued further.

[59] V. R. Grace, "Samian Amphoras," *Hesperia* 40, 1971, pp. 52–55. The names of Demosthenes and Nikitas Haviarias, late of Syme, and Lucas Benaki, late of Athens and Alexandria, are mentioned in this respect.

[60] Lamb, *BSA* 31, pp. 171–172.

[61] *Ibid.*, p. 177.

[62] Information given verbally by Professor Anna Benjamin, Rutgers University, New Jersey.

[63] Mrs. Karapiperi, the official in charge of the two rooms in the basement of an old school designated as the Methymna Museum, told of local children regularly checking the site for coins after each rainstorm.

New Evidence and Material

The suspicion that re-evaluation of the Antissa and Methymna bucchero might produce evidence pertinent to the amphora class proved correct. A squat, gray, "table"[64] amphora with cylindrical handles that ended at the lower point of attachment in a short rattail was included among the finds from Antissa displayed in the Mytilene Museum ("Amphora A"; Pl. 69:a, b).[65] It proved to be the amphora described in Lamb's article on Antissa as "grey and unpolished" and, referring to her published photograph, as "partly concealed by the wall."[66] Closer investigation revealed further stylistic features comparable to those of the gray, wine amphoras. When compared to **1** in the Agora wine-amphora series, Amphora A displays similar measurements and proportions. The neck heights are very close (0.119 m. for **1** as compared to 0.099 m. for Amphora A) and the handle curvatures and diameters are very similar (0.032 m. and 0.024 m., respectively). The rattails are of the early, abbreviated form in both cases. Both amphoras have thick lips with flat tops, and both exhibit the early offset groove at the base of the neck at the point of juncture with the body. This is much more pronounced in Amphora A, however, and the groove on the neck at the midpoint of the upper handle attachments that distinguishes the 7th-century wine amphoras is conspicuously missing. The absence of this feature and the fact that the neck does not flare downwards towards the bottom but is perfectly straight are perhaps the only points that differentiate the neck of Amphora A from the 7th-century, wine-amphora neck. The straight neck of Amphora A swells into a short, perfectly round body ending in a flat base with a barely discernible ring. The ring is really more of a ridge like the one at the base of the amphora neck and creates the effect of a vessel without a base rather than one with a definite bottom or foot, as is implied by the supporting ring or torus foot of most amphoras of the smaller, "table" variety.[67] The lack of any added base or foot on Amphora A aligns its shape closely to that of **2** in the amphora series; the latter appears to be just a larger, elongated version of Amphora A. The fact that the early 7th- and 6th-century wine amphoras have wide, hollow bases that could almost support the jars in an upright position[68] also suggests that they are just larger variations of the Amphora A shape that were adapted to wine-amphora requirements, i.e. provided with elongated toes as third handles.

Amphora B (Antissa K55; Pl. 69:c, d), a slightly taller and larger, reddish, "table" amphora from the same context in Antissa, does have a downward-flaring neck like **1** in the Agora amphora series and is attached to a large ovoid body even more similar in proportions to those of **2** than Amphora A.[69] Since the vessel is a smaller, "table" amphora, however, the body does not elongate into a toe but tapers slightly as does that of **2**, then ends in a flat base capable of supporting the jar in an upright position, a base, like that of Amphora A, with barely discernible ring or ridge at the bottom. An offset ridge is visible at the point of junc-

[64] "Table" in this context meaning a smaller amphora supported by an attached base.

[65] Lamb, *BSA* 31, p. 177; this small amphora is unnumbered and so was labeled "Amphora A" for this article.

[66] *Ibid.*, pl. XXVII:6.

[67] R. S. Folsom, *Handbook of Greek Pottery*, London 1967, pp. 153–159.

[68] See above, p. 252 and footnote 26.

[69] Lamb, *BSA* 31, p. 177; this amphora was labeled "Amphora B" for this article.

ture between neck and body, but unlike those of both Amphora A and the wine amphoras, the rim is a flat-topped, thin, half roll rather than a thick lip, and the handles are flattened and ribbonlike and are joined smoothly to the body without rattails. One handle is incised its entire length with lines that seem to form three rectangular panels, shapes thought by W. Lamb to be a particular potter's mark.[70]

The incidence of cylindrical handles ending in rattails on both Amphora A and the wine amphoras should serve to establish a definite connection between the two types of containers. The same is true of the offset ridge at the junction of neck and body that exists in both amphoras from Antissa and can be observed in the wine amphoras at various stages in development (Pl. 70:**1**, **5**). Neither cylindrical handles with rattails nor offset ridges between bodies and necks are stylistic features common in other early Greek wine or "table" amphoras. Of equal importance, however, are the similarities in proportions of necks to bodies seen in Amphora B and **1**, and between the "table"-amphora bodies (particularly Amphora B) and **2**. Each class of wine amphora, regardless of the tendency to elongate during the course of development, had a basic neck and body shape, and the relationship or proportion between the two remains roughly the same throughout the history of each class.[71] Judging from the variety of known combinations, the shapes and proportions of Amphoras A and B and the gray, wine amphoras are too similar to be accidental and must therefore be considered additional evidence of connections between the two types of containers. The dates attributed to both the Antissa amphoras and the gray, wine amphoras are comparable, the Antissa amphoras coming from a 7th- and 6th-century bucchero period indicated by Lamb's findings and the wine amphoras from 7th- and 6th-century contexts. Since they were manufactured during the same general time periods, it is impossible to conjecture which type of container influenced the other, but it seems safe to surmise that the common stylistic features and proportions exhibited by the two types of jars indicate a common origin on the island of Lesbos.

Other evidence of a less specific nature was also gained from restudying the Lesbian bucchero. The colors in the bucchero were observed to cover the same range as those in the wine amphoras; in fact the description of the bucchero by Lamb could apply equally well to the gray amphoras. She described the bucchero as ranging from "silver-grey to gun-metal" with cores "usually grey, but sometimes reddish," and clay and surface from "rough" to "polished" to "enhanced by a grey wash" with "mica . . . present in varying quantity."[72] Also observed was an inclination towards raised or relief decoration applied to the bucchero that was suggestive of the rattails on the amphoras. Described as a possible imitation of the technique of decorating metal vases whereby additional material is welded, riveted, or made to adhere somehow to the original surface of the vessel, additional or raised clay ridges or bars were evident on some bucchero pieces.[73] In bucchero ware from Larissa considered by Lamb as part of the Aeolic/Lesbian bucchero group,[74] raised horizontal bars that divide the

[70] *Ibid.*
[71] Grace, *Amphoras*, nos. 44, 45–47, 56, 62, 64.
[72] Lamb, *JHS* 52, 1932 (footnote 31 above), p. 3.
[73] *Ibid.*, p. 9.
[74] *Ibid.*, pp. 1, 11 (8) explanation.

rims into decorative panels protrude from the vessels in much the same way as do the rattails on the amphoras; the same central peak or ridge that forms the rattail and slopes and blends into the main surface on both sides is created in the same manner in these bars (see, from Larissa, Pl. 72:b, nos. 8, 11, and 16, from Methymna, Pl. 72:c, no. 12). "The bars being in relief and loosely attached, break off easily,"[75] a description easily applied to the rattails as shown by the impression or outline left on the amphora shoulders where the handles and rattails have broken off (e.g. **8**). Also observable in the bucchero is the use of offset ridges below the lips of vessels, evident in the wine amphoras (Pl. 72:c, nos. 9–12). No. 15 (Pl. 72:c) is almost the same as the rim which appears on **6** (Pl. 71). As with Amphoras A and B, it is impossible to determine which type of container influenced which when comparing the bucchero and the wine amphoras. It is certainly clear, however, that ample precedent existed in Lesbos and near-by areas producing bucchero for employing the decorative motifs of rattails and offset ridges that appear in the gray amphoras and not in early Greek wine amphoras known to originate elsewhere.

Also, as suspected, examples from the actual class of amphora were found to occur on the island of Lesbos. Numerous sherds exhibiting the colors and stylistic characteristics considered "Lesbian" were collected from the surface of the site at Methymna; gray cylindrical handles, elongated, blunt, gray toes, pieces showing the rattail, and neck pieces exhibiting the bombé bulge were considered the most reliable examples.

More numerous and more readily identifiable were sherds found stored in the Mytilene Museum. All this material had been recovered from construction sites in the town of Mytilene a few months earlier: ". . . the pieces from Mytilene . . . were all found at the excavation of 1972 at the building site of the Incurable Children Hospital at the north part of the town, near Epano Skala where an archaic apsidal building from below some remains of a Roman building [was] uncovered."[76] The apsidal building was believed to be in the area of an ancient sanctuary where finds have been recovered datable from the 7th century B.C. to the late Roman period.[77]

Photographs e–h on Plate 69 illustrate material from the different boxes, or lots, in this instance Lots 32, 41, 42, and 64. Lot 32 was found at a depth of 1.85 m. below the earth's surface, Lot 41 at 2.0 m., Lot 42 at 2.20 m., and Lot 64 at 2.30 m. A survey of the material showed that most of the jars were from about the same period of class development, 400–300 B.C. All the toes (Pl. 69:e, f) were long and of the narrow diameter without indentations, which dates the jars after 480 B.C.; all neck pieces (Pl. 69:f) exhibited distinct bombé tendencies and were gray, which would push the date of the jars past 460 B.C. (bombé "red" necks, exceptions in the chronological order, were earlier); and all the handles (Pl. 69:e, f, h) encroached on a good half of the roll lip with offset ridges beneath, which would indicate an even later period at the beginning of the 4th century B.C., when handles dropped below the lip again after encroaching on all of it earlier. The slighter projection of the lip (cf. Pl. 72:b, no. 8) and the extreme length and straightness of some of the handle pieces (Pl. 69:e, h) also

[75] *Ibid.*, p. 9.
[76] Despina Hadzi, *per litt.* February 18, 1973.
[77] *Ibid.*

suggest the later period. It proved impossible to judge the curvature flare of the handles from the small portions of lip attachments available.

Neutron Activation Analysis

Permission was obtained to remove three sherds from the Mytilene Museum. These were added to four pieces collected from Methymna as well as three pieces from the Agora collection in Athens, and to the examples, both fired and unfired, of the modern clay used by potters in the center of the modern pottery industry at Agiasos, Mytilene. The entire collection of fragments was sent to the Brookhaven National Laboratory in Upton, Long Island, New York where it was subjected to neutron activation analysis. Chemical analysis of the clays in fine pottery has proven to be of limited value, the clays having been heavily refined and perhaps mixed with other substances and imported clay varieties.[78] But amphoras come under the heading of coarse wares, which are more apt to be made of local, unrefined clays.[79] Chances were good, therefore, that true analysis was possible and that a valid comparison of ancient and modern clay sources might result.

The fragments were labeled and submitted in the following form:[80]

LESBIAN AMPHORA FRAGMENTS

LA SERIES (Athenian Agora Excavations)
- LA 12 shoulder piece showing ovoid (rattail) indentation of bottom handle attachment
- LA 13 toe fragment
- LA 14 neck fragment, slightly bombé

LT SERIES (Mytilene Museum)
- LT 15 body fragment
- LT 16 body fragment
- LT 17 neck fragment, bombé

LM SERIES (Methymna, site surface fragments)
- LM 18 whole toe
- LM 19 body fragment
- LM 20 body fragment
- LM 21 RED toe fragment

LI SERIES (modern pottery pieces from Agiasos)
- LI 01 broken vase, unfired, unglazed
- LI 02 cup, fired, unglazed

TEST RESULTS

Positive Findings. The outcome of the neutron activation tests (see Table: Neutron Activation Results, p. 268)[81] was both gratifying and puzzling. The results show that some of the

[78] R. M. Cook, *Greek Painted Pottery*, London 1966, p. 252.

[79] J. V. Noble, *The Techniques of Painted Attic Pottery*, London 1966, p. 2.

[80] In assembling the sherds for testing, it was suggested by Dorothea Brooks that handle fragments, because they were usually of reinforced clay, were the least suitable for testing purposes. This was disconcerting because, as cylindrical handles are a main characteristic of the amphora class, the collection of sherds tended heavily to handles to make sure they were amphora pieces and not bucchero fragments (see footnote 29 above). Toe pieces and bombé neck fragments had equal identification merits, but where body fragments, particularly those from Methymna, had to be substituted, it was felt that the material was less reliable. Body fragments from Mytilene were so obviously from amphoras (deposits were of amphora fragments only) that they did not create the same concern.

[81] Based on computer printouts, verbal reports by E. V. Sayre, and a written report by Dorothea Brooks dated March 7, 1973, all submitted by Brookhaven National Laboratory; all subsequent evidence, unless separately noted, is from these sources. LI 11 and LI 22, included in the Neutron Activation Results Table but not above, on this page, are samples of LI 01 and LI 02 that were fired and added to the group at Brookhaven. Additional numbers representing samples of the sherds washed twice in distilled water were also created at Brookhaven:

amphoras, at least, form an identifiable group according to their elements of composition and that these may be compared with the modern clay samples. The agreement between the ancient and modern samples was not close enough to determine that they came from the same source, but it has often proved difficult to match clay from modern beds with ancient pottery from the same locale; Ancient Corinth is one site where such attempts have so far failed. Neither did the two modern samples from the same potter agree completely, for that matter.[82] The major difference between the ancient and modern pottery was the higher sodium content of the ancient clay. Concentration of sodium usually means one of three things: 1) extra sodium as part of the temper, or reinforcing material, used by the potters, 2) absorption from the ground in which the pottery has been buried, 3) purposeful addition by the potter; recent studies have shown cases where modern potters have thrown a pinch of salt into each batch of clay under preparation,[83] a measure calculated to increase the cohesion of the clay by promoting greater electrostatic attraction between the particles without making the clay stiffer at the same time.[84] Additional tests were performed at Brookhaven using distilled water to leach out the added salt. Negative results proved that the sodium had not been absorbed from the earth surrounding the sherds while buried, and so it must have been added by the ancient potters.[85]

The finding of a high antimony content in the Lesbos pottery as a whole was at first considered important, but not enough data on antimony exists to permit much stress to be laid on this fact. The percentage was very distinctive, however, when compared with results from tests on other Aegean pottery (as represented by samples from Attica, Mykenai, Lakonia, and Knossos). It should be noted, however, that to date no tests of this type have been made on pottery from western and central Asia Minor, its coastal areas, and other offshore islands (Lesbos being one). Asia Minor is geographically closer to Lesbos than to the other Aegean areas mentioned, and therefore a closer correlation in clays from the two neighboring areas might possibly, though not necessarily, be expected.

LA 22 from LA 12
LT 26 from LT 16
L<M> 27 from L<M> 17 (mislabeled by Brookhaven, should be LT)
LM 28 from LM 18
LM 49 from LM 19
LI 42 from LI 01

Some of these numbers are cited by A. M. Bieber, Jr., D. W. Brooks, G. Harbottle and E. V. Sayre, "Compositional Groupings of Some Ancient Aegean and Eastern Mediterranean Pottery," *Atti dei Convegni Lincei* 11, *Applicazione dei metodi nucleari nel campo delle opere d'arte* (Congresso Internazionale Roma-Venezia, 24–29 maggio 1973), Rome 1976, pp. 112, 120–121, 127, 129–130, 134–135, Appendix p. 141.

[82] This can perhaps be explained as due to differences in digging and preparing the same clay for different purposes, e.g., that a cup with a delicate handle may have required reinforcement or tempering whereas a more solid vase did not.

[83] From a paper given at the American Chemical Society meeting in Dallas, April, 1973, "Biblical Studies through Activation Analysis," by Dorothea Brooks *et al.* (to be published).

[84] Information obtained verbally from Joseph Veach Noble, Director, The Museum of the City of New York.

[85] This same variation in sodium concentration between ancient and modern sherds has also appeared in the results of other tests made at Brookhaven. In these tests, the modern clay was found to have a higher overall concentration of all elements, a result that can be explained by the fact that ancient potters used more temper in their clay compounds, thereby diluting the basic clay considerably.

On the basis of the antimony content as well as the ratios of the other elements, all the pieces from Mytilene (LT series) were judged to be from the same source; samples LT 15, 16, and 17, and also LM 20 from Methymna were found to correlate closely. LA 13 from Athens also qualified for this group with a slightly lower antimony content, while LM 18 from Methymna had an even lower antimony content but one close enough for it to be added to the group on a questionable basis. That sherds from Mytilene and Methymna should correlate is only to be expected, given the interaction between wine-producing cities on the island. That a piece found in Athens was also from the same clay source and that another from Methymna was close enough in chemical makeup to be included seems reasonable if variations in the general clay source are considered. These variations could include differences in the way separate potters prepared their clay, differences within the clay source itself, and varying concentrations of temper used. The similarities of the test results on these specimens were greater than the differences, however, and indicate a similar geographic region as their source.

Questionable results. Neutron activation results for the other pottery samples were less conclusive. Example LA 12 was more similar to other Greek samples tested than to accompanying Lesbian samples. The fact that it was gray and was chosen because it showed an impression where a rattail handle had been attached, and was therefore considered a good, well-identified example, could make this test result an indication of another, different source of clay on the island. Evidence of different clay sources located in the same general area but with widely differing chemical patterns have been found in Israel.[86] The fact that widely separated pottery-making centers (Agiasos and Mandomados) are known to have existed in modern times, and so perhaps in ancient times as well, could also lend weight to this theory. Equally inconclusive were the test results on LM 19, described by Dorothea Brooks as "unique"[87] and comparable to no other pottery tested at Brookhaven thus far. Being a body fragment of questionable reliability (see footnote 80 above), it should probably be disregarded completely. But Brooks cautioned that, when dealing with heavily tempered materials, there is always the danger of hitting a pocket of temper; such could be the case with this sample. And, like LA 12, it could also be evidence of another clay source on the island, for the differences between LM 19 and LA 12 and the pieces of the Lesbian group were described only as making it "unlikely that they were from the same clay source," not necessarily that they were not from Lesbos at all.

Negative results. The two remaining samples, LA 14 and LM 21, were described as definitely "not from the same general source as the Lesbos group,"[88] but information was not sufficient to say more. The results of the tests on these two pieces were therefore not similar to test results on other clay groups either. LA 14 was selected from Agora material not only because of its gray color but because it was an excellent example of the identifying bombé neck bulge associated with the amphora class. That so identifiable a sample should receive

[86] See footnote 81 above; Dorothea Brooks stated that "in Israel there were two types of clay used for pottery . . . found near each other, but with very different patterns."

[87] See footnote 81 above.

[88] Brooks, *op. cit.* (footnote 81 above).

negative test results must be considered significant. Less conclusive but also significant were the results on LM 21, a "red" toe from Methymna. Red in color, but long and blunt like the later amphoras (e.g. **7** and **8**) and not displaying the depression on the bottom common to the predominantly red group (e.g. **4**) dating from *ca.* 500–480 B.C., it was included in the test group as an experiment. Positive results relating a red example to the Lesbos clay group would have helped allay growing suspicions concerning the red amphoras displaying Lesbian characteristics; a red toe with a depression on the bottom would have offered more conclusive evidence but was unavailable. The negative results obtained from this red toe, however, the low antimony content in particular, suggest that its clay might have originated somewhere other than in Lesbos. The possibility that the piece could have been misidentified must always be considered; otherwise, the negative results merely add to a growing body of conflicting evidence which supports the theory that some other area was also manufacturing amphoras with "Lesbian" characteristics. Research on this subject is still under way and will, it is hoped, be the basis of another study in the future.

Summary. Neutron activation analysis was worthwhile for several reasons. On the positive side, it provided definitive evidence that some of the amphoras displaying the formal characteristics considered "Lesbian" (e.g., gray color, cylindrical handles ending in rattails, bombé necks, tapering, blunt toes) constitute a close, definable group which, when considered together with the existing literary evidence, seems most likely to have been manufactured on the island of Lesbos. On the negative side, and equally important, is the evidence that not all amphoras with "Lesbian" characteristics (LA 14) necessarily were made on Lesbos. This latter conclusion warrants further consideration and study.

CATALOGUE: SELECTED SAMPLING OF LESBIAN AMPHORAS

Amphoras in this catalogue are numbered in developmental sequence. Both stylistic changes and context dates, where available, were considered in determining the sequence. Where no context dates were available, approximate dates were determined by this author through stylistic comparison with amphoras datable from external evidence. The jars from the Agora Excavations in Athens are designated by their inventory numbers, either "P" (Pottery) or "SS" (Stamped Seal) categories, and dates were determined by deposit materials. For the most recent and definitive description of the deposits and their dating, see S. I. Rotroff, *The Athenian Agora*, XXII, *Hellenistic Pottery. The Athenian and Imported Moldmade Bowls*, Princeton 1982, "Deposit Summaries," pp. 96–106. Inventory numbers from other excavations and publications are stated where available. All measurements were taken or confirmed by this author (P.H. = preserved height, D. = diameter, N.H. = neck height, N.D. = neck diameter, H.H. = handle height, H.D. = handle diameter, T.D. = toe diameter, L.W. = lip width).

SERIES IN ATHENS (Pls. 70, 71)

1. Agora P 22739 Deposit O 12:1

Published: E. Brann, "Protoattic Well Groups from the Athenian Agora," *Hesperia* 30, 1961, p. 346, F 80, pls. 86, 89.

P.H.	0.189 m.	H.H.	0.13 m.
D.	—	H.D.	0.032 m.
N.H.	0.119 m.	T.D.	—
N.D.	—	L.W.	—

Gray throughout with bits.

One fragment mended from many pieces, part of rim, neck, and handle and shoulder preserved; a non-joining fragment of handle with lower attachment added in plaster.

Slightly thickened rim with slight flare, slanting beveled top.

Downward-flaring neck, offset groove below at level of middle of upper handle attachments; second

offset groove at base of neck at point of juncture with body.

Cylindrical handles, short, thick, joining neck at top below rim, leaving rim completely free; lower handle attachment comes to a slight ridge toward lower preserved end as though to form a rattail.

Third quarter 7th century B.C.

2. Kerameikos SW 108

Published: Knigge, p. 86.

P.H.	0.685 m.	H.H.	0.171 m.
D.	0.393 m.	H.D.	—
N.H.	0.15 m.	T.D.	0.08 m.
N.D.	0.115 m.	L.W.	—

Clay coarse with mica, dark buff gray throughout.

Whole jar restored from pieces, slight plaster restoration, part of lip missing.

Wide rim with offset ridge directly beneath.

Short cylindrical handles encroaching on lower portion of rim, ending in short but evident rattail. Wide, squat, ovoid body.

Wide toe, flat, cut with string.

Ca. 500 B.C. (context with lekythos)

3. Agora P 16802 G 15:1 (main mass of fill)

P.H.	0.275 m.	H.H.	0.174 m.
D.	—	H.D.	—
N.H.	0.15 m.	T.D.	—
N.D.	0.105 m.	L.W.	0.02 m.

Very coarse dark gray clay with mica.

Neck, one handle intact, other handle, parts of shoulder put together from pieces. Thick cylindrical handles with slight curvature encroaching on lower half of rim, ending in a short rattail.

Thick roll rim, flat on top, *no* offset below.

Ca. 500 B.C.

4. Agora P 24875 Q 12:3

P.H.	0.65 m.	H.H.	0.183 m.
D.	0.302 m.	H.D.	—
N.H.	0.178 m.	T.D.	0.034 m.
N.D.	0.120 m.	L.W.	0.016 m.

Clay micaceous buff, slight smear inside.

Whole jar mended from many pieces, some plaster restoration.

Flaring roll rim with offset ridge below.

Cylindrical handles with slight curvature but pulled in closer to neck at bottom attachment; top attachment clear of rim, bottom ending in long rattail.

Bombé neck leading into distinctly ovoid body that tapers quickly to narrow, flat toe with depression on underside.

Ca. 520–490 B.C.

5. Kerameikos HW 226

Published: Knigge, p. 132.

P.H.	0.776 m.	H.H.	0.20 m.
D.	0.412 m.	H.D.	—
N.H.	0.176 m.	T.D.	0.05 m.
N.D.	0.112 m.	L.W.	0.016 m.

Fine gray-buff clay with dark gray core, some mica and bits in surface.

Whole jar mended from many pieces, slight plaster restoration; jagged cutting in body where opened for infant burial.

Narrow, roll rim with offset ridge beneath, flat top.

Neck long, bombé; offset groove at base at point of juncture with body.

Long, cylindrical handles of minimum curvature, encroaching on a good half of rim, ending in long rattail.

Ovoid body curving roundly to narrow, flat toe.

Dated by context to 470/460 B.C.

6. Agora P 21974 Well N 7:3

Published: Grace *apud* Boulter, *Hesperia* 22, p. 102, no. 149, pl. 39.

P.H.	0.26 m.	H.H.	0.17 m.
D.	—	H.D.	—
N.H.	0.17 m.	T.D.	—
N.D.	0.115 m.	L.W.	0.023 m.

Buff-gray clay with pitted surface, mica, and large gray core.

Neck, rim and handles, upper portion of shoulder all intact.

Thick, flaring lip, offset ridge below.

Thick, cylindrical handles, short with minimum of curvature, drawing in to bottom attachment and ending in very short rattail.

Ca. 460–440 B.C.

7. Agora SS 10289 Deposit B 19:11 (upper fill)

P.H.	0.742 m.	H.H.	0.225 m.
D.	0.34 m.	H.D.	—
N.H.	0.192 m.	T.D.	—
N.D.	—	L.W.	0.012 m.

Clay light gray with darker areas, bits.

Whole jar, neck and handles intact, body mended from many pieces, some plaster restoration; top of rim and one handle worn away; part of toe broken off.

Very narrow roll rim with offset ridge beneath.

Long neck, bombé, with offset groove at base point of juncture with body; letter Π below rim deeply incised before firing.

Cylindrical handles with extreme curvature encroaching on top of rim, pulling in to bottom attachment close to base of neck, ending in long rattail.

Ovoid body quickly curving from shoulder to narrow toe.

Ca. 425–400 B.C.

8. Kerameikos HS 163

P.H.	0.814 m.	H.H.	0.250 m.
D.	0.32 m.	H.D.	—
N.H.	0.242 m.	T.D.	0.037 m.
N.D.	—	L.W.	—

Light buff-gray, fine clay with bits, no mica.

Whole jar; most of neck, part of rim, one handle and body restored from many pieces; part of neck, rim, one handle missing; slight plaster restoration.

Narrow, downward-slanting rim with offset ridge below.

Very long, bombé neck.

Cylindrical handle with less extreme curvature set close below rim at upper attachment; lower half of handle makes almost reverse curve to bottom attachment pulled in close to base of neck, ends in short rattail. Ovoid body tapering in almost straight line from acute shoulder angle to long, narrow, flat toe.

Mid- to second half 4th century B.C.

MYTILENE FINDS (Pl. 69)

Amphora A (Antissa - unnumbered)

Published: Lamb, *BSA* 31, p. 177, pl. XXVII, no. 6.

P.H.	0.45 m.	H.H.	—
D.	0.351 m.	H.D.	0.024 m.
N.H.	0.099 m.	T.D.	0.112 m.
N.D.	0.13 m.	L.W.	—

Dark gray clay, unslipped, unpolished.

Whole jar restored from many pieces.

Thick, flat-topped roll rim with no offset ridge below.

Short, straight neck with offset ridge at base of neck at point of juncture with body.

Short, cylindrical handles attached at top well below rim and at bottom ending in short but distinct rattail.

Slight ring toe, flat bottom with slight slope to center.

7th to first half of 6th century B.C.

Amphora B (Antissa K 55)

Published: Lamb, *BSA* 31, p. 177.

P.H.	0.55 m.	H.H.	—
D.	0.365 m.	H.D.	0.018 m.
N.H.	0.10 m.	T.D.	0.115 m.
N.D.	0.124 m.	L.W.	0.04 m.

Dark red clay with bits.

Intact jar except for slight repair at bottom.

Half roll, flat-topped rim with no offset ridge below.

Short, downward-flaring neck with offset ridge at base at point of juncture with body.

Flat handles of minimum curvature attached at top well below rim and smoothly at bottom; one handle incised the entire length with lines that seem to form three rectangular panels.

Large, ovoid body tapering slightly to flat bottom.

Very slight, downward-flaring ring toe, flat bottom on underside indented slightly.

7th to first half of 6th century B.C.

Fragments shown in Plate 69:e–h

e. Mytilene Lot 41–42

Dark gray, almost black clay.

Three sherds, probably from the same amphora: 1) long, cylindrical handle piece ending in broken rattail; 2) body piece showing bottom of elongated rattail in relief; 3) long, hollow toe with flat bottom, two incised lines near base (?).

f. Mytilene Lot 32

Buff gray clay.

Three sherds: 1) curved part of cylindrical handle with bit of rim above it; 2) half wall of toe with bottom broken, showing long and hollow base; 3) bottom

part of toe showing part of one wall and flat bottom, hollow.

g. Mytilene Lot 64

Gray clay.

Four sherds: 1) rim and upper handle-attachment piece showing offset ridge, cylindrical handle; 2) base handle attachment ending in broken rattail; 3 and 4) two bombé neck-wall pieces.

h. Mytilene Lot 32

Gray clay.

Six sherds: 1 and 2) two long cylindrical handle pieces; 3) one lower handle attachment ending in broken rattail; 4) one curved part of cylindrical handle with portion of lip above and beside it showing offset ridge; 5 and 6) two lip and neck-wall pieces showing offset ridge.

BARBARA G. CLINKENBEARD

Temple, NH 03084

TABLE: NEUTRON ACTIVATION RESULTS
Brookhaven National Laboratory, Upton, Long Island, New York

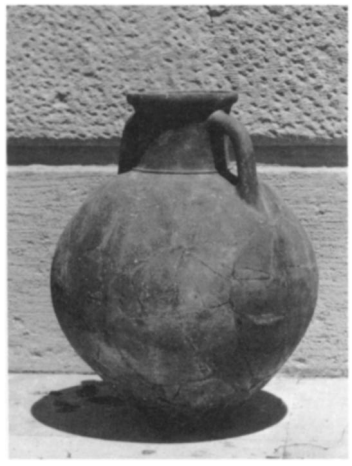
FINAL CALCULATION OF ELEMENT CONCENTRATIONS IN SAMPLES OF BRUTAL RUN OF 11/30/72 ON LESBGEZ GP; 1
All amounts are in PPM except SODIUM, POTASSIUM, and IRON which are PCT

SAMPLE	SODIUM	POTASSIUM	RUBIDIUM	CESIUM	BARIUM	SCANDIUM	LANTHANUM*	CERIUM	EUROPIUM
LA12 LESBGEZ GP; 1	.959	2.210	87.478	5.623	384.475	33.295	39.963	87.091	1.780
LA13 LESBGEZ GP; 1	2.146	3.322	120.797	15.924	739.327	25.889	43.528	91.075	1.742
LA14 LESBGEZ GP; 1	1.121	2.884	113.693	8.701	497.191	31.150	44.516	91.895	1.765
LI01 LESBGEZ GP; 1	.240	2.207	121.755	12.933	467.313	42.558	76.290	131.702	3.327
LI11 LESBGEZ GP; 1	.296	2.255	134.693	14.746	506.120	47.818	89.707	156.748	3.727
LI12 LESBGEZ GP; 1	.437	2.980	167.976	10.775	533.132	35.937	64.015	119.538	2.436
LI22 LESBGEZ GP; 1	.459	3.044	158.933	12.060	621.817	37.308	68.893	127.542	2.662
LM17 LESBGEZ GP; 1	1.395	2.904	146.161	12.980	800.138	26.818	54.514	112.278	1.926
LM18 LESBGEZ GP; 1	1.807	3.312	148.782	7.954	1998.697	28.318	53.941	107.521	1.648
LM19 LESBGEZ GP; 1	2.641	3.321	155.429	9.217	3130.049	19.451	89.613	202.015	2.263
LM20 LESBGEZ GP; 1	1.149	3.642	152.864	20.078	1310.223	29.953	53.951	111.874	1.864
LM21 LESBGEZ GP; 1	.718	2.976	131.517	6.243	745.752	31.196	48.080	102.811	1.786
LT15 LESBGEZ GP; 1	1.537	3.016	131.456	19.457	902.986	31.599	46.700	98.790	1.876
LT16 LESBGEZ GP; 1	1.912	2.910	148.815	17.708	1037.802	27.717	45.766	92.442	1.675

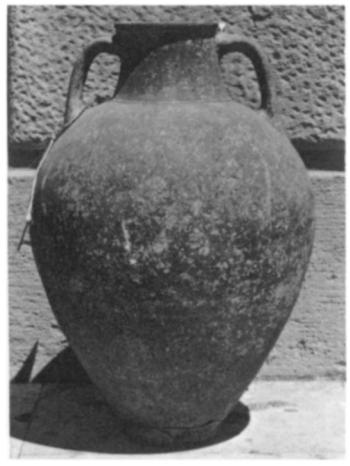
SAMPLE	HAFNIUM	THORIUM	TANTALUM	CHROMIUM	MANGANESE	IRON	COBALT	LUTETIUM	ANTIMONY
LA12 LESBGEZ GP; 1	4.874	13.096	1.548	1519.761	796.210	8.886	83.562	.581	2.234
LA13 LESBGEZ GP; 1	4.673	21.624	1.161	164.275	1012.907	5.527	43.920	.448	2.915
LA14 LESBGEZ GP; 1	5.379	14.807	1.668	516.957	581.028	7.881	46.036	.670	2.574
LI01 LESBGEZ GP; 1	6.511	20.583	2.389	358.270	2383.241	9.295	43.492	1.095	4.900
LI11 LESBGEZ GP; 1	7.382	22.820	2.932	404.292	2838.306	10.413	55.355	1.100	5.580
LI12 LESBGEZ GP; 1	6.495	22.699	2.098	319.638	1346.113	8.279	29.526	.847	5.481
LI22 LESBGEZ GP; 1	6.613	22.925	2.284	316.700	1458.961	8.682	35.191	.987	5.637
LM17 LESBGEZ GP; 1	6.364	20.156	1.885	221.494	1025.724	6.544	27.500	.650	4.772
LM18 LESBGEZ GP; 1	5.444	28.689	1.602	211.427	1183.884	6.290	25.774	.594	1.716
LM19 LESBGEZ GP; 1	8.904	43.996	1.686	63.465	1491.352	5.628	17.877	.546	2.539
LM20 LESBGEZ GP; 1	6.364	20.941	1.751	243.946	957.565	6.193	26.490	.653	4.695
LM21 LESBGEZ GP; 1	7.144	15.626	1.758	231.511	436.745	7.385	24.535	.709	1.736
LT15 LESBGEZ GP; 1	5.105	18.296	1.529	313.941	1432.871	7.619	35.256	.553	4.598
LT16 LESBGEZ GP; 1	4.394	18.984	1.155	192.481	1166.439	6.088	26.898	.466	4.145

*Using new values for LA (11/16/72)

a. Amphora "A"



b. Amphora "A"



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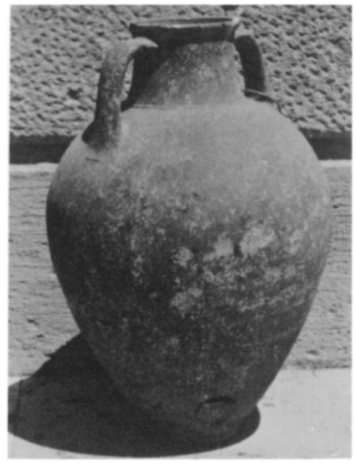
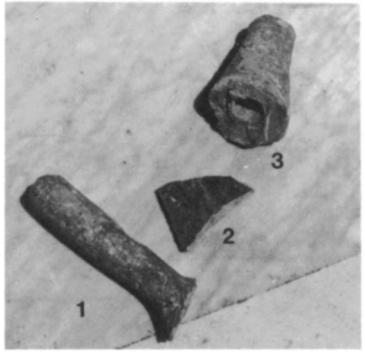


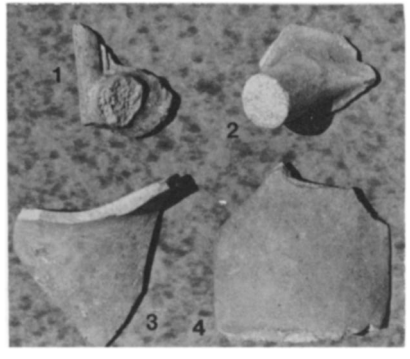
d. Amphora "B"

Amphoras from Antissa
Scale 1:10



e. Lot 41-42

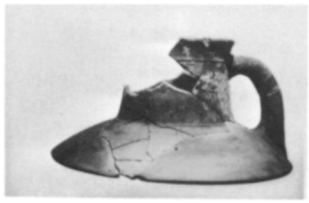
f. Lot 32



g. Lot 64

h. Lot 32

Amphora fragments from Mytilene



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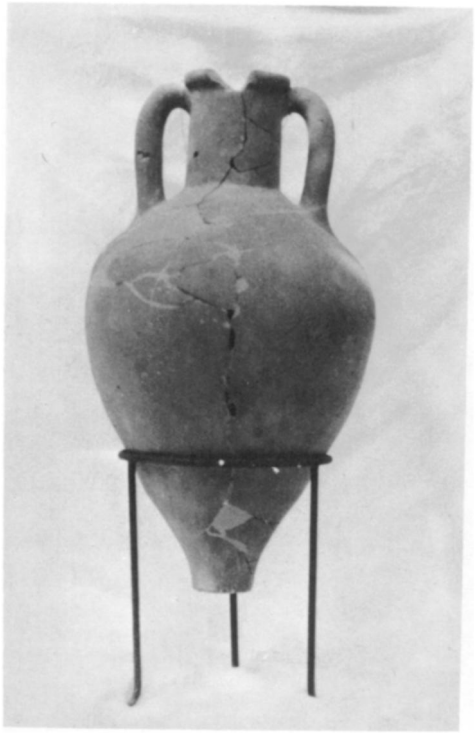

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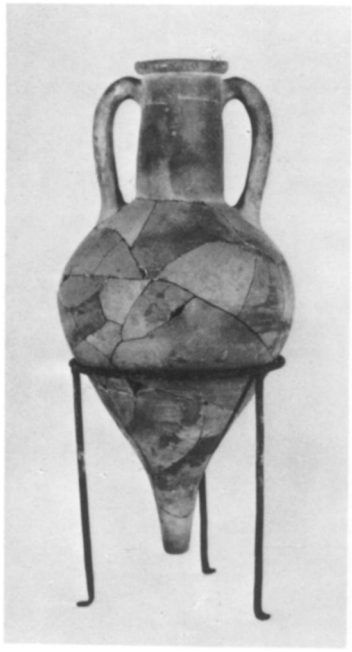


4

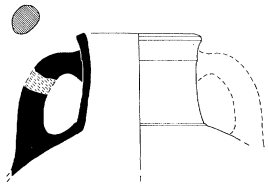
6

5

7

8

Amphoras from Athens
Scale 1:10



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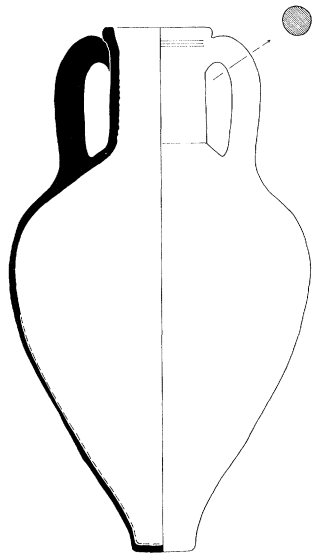

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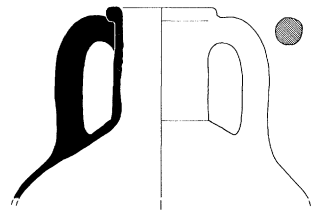

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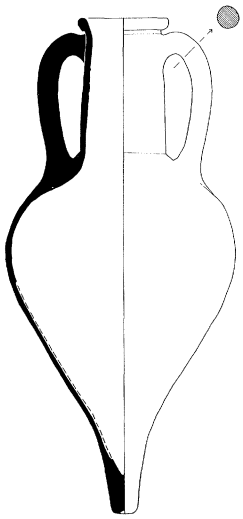

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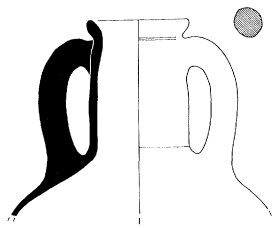

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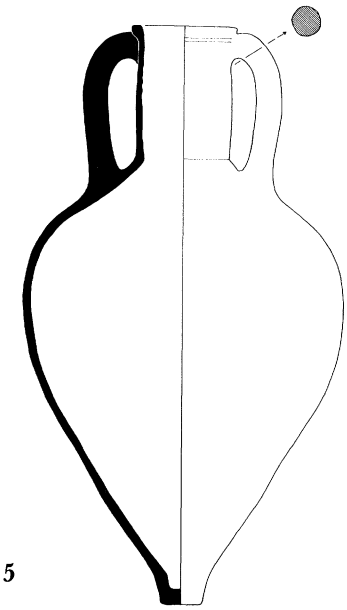
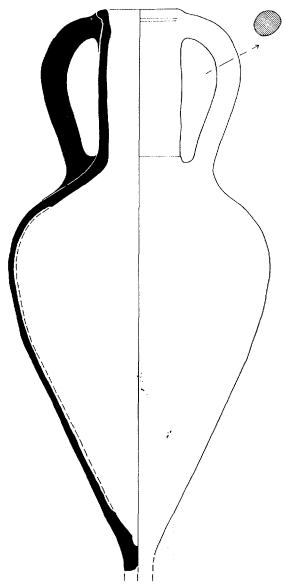


5

Amphoras from Athens
Scale 1:10
Drawings by H. Besi from pencil originals by B. G. Clinkenbeard



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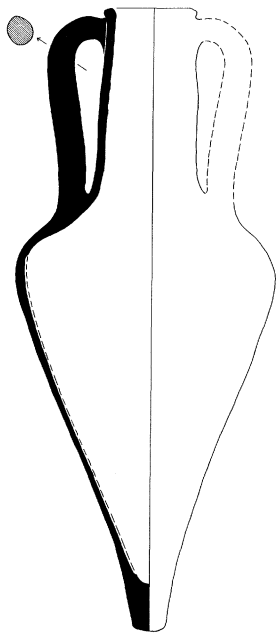
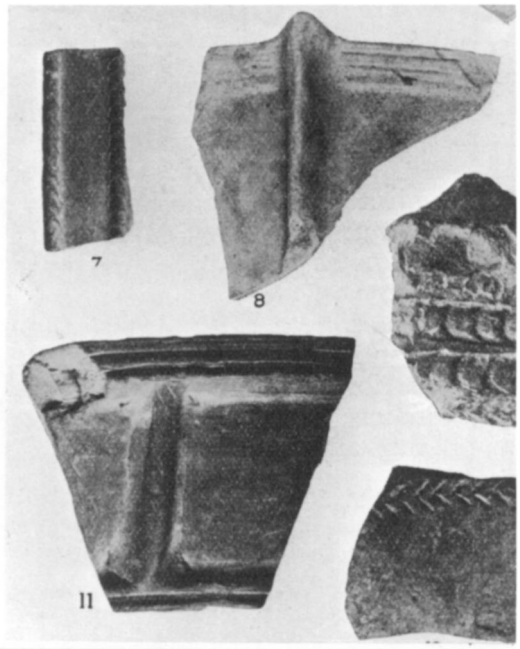
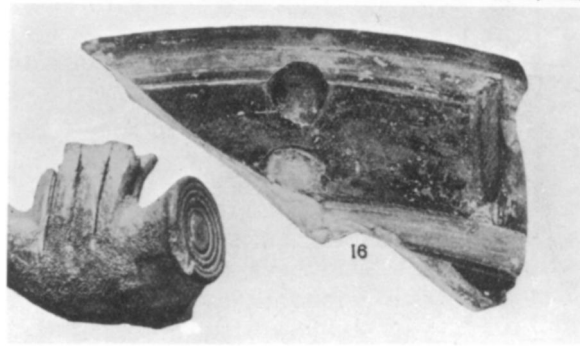


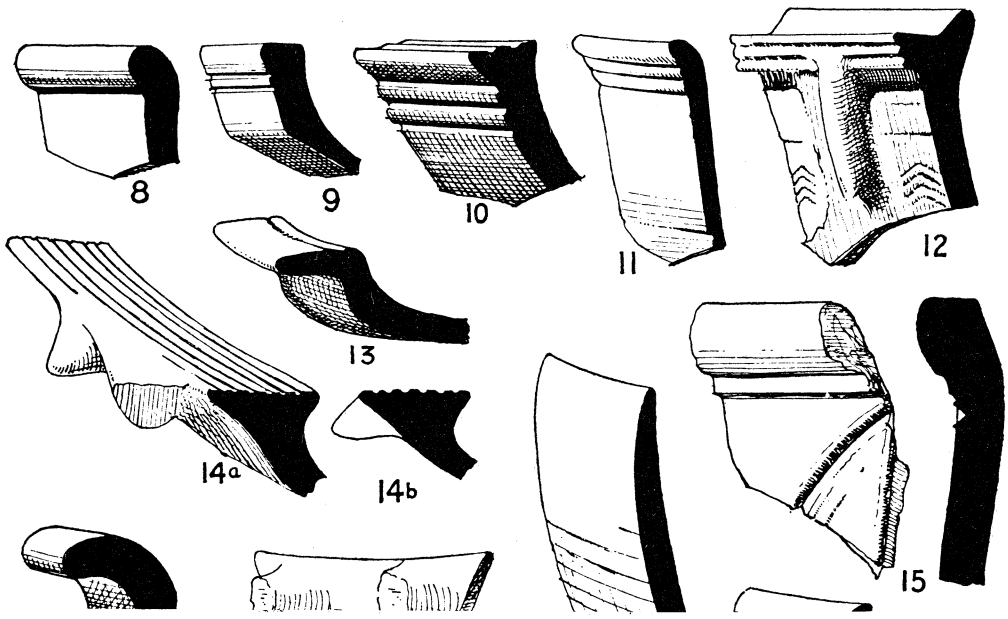
8

a. Rattail (P 24876)





b. No. 7, from Pyrrha; nos. 8, 11, and 16, from Larissa. W. Lamb, "Grey Wares from Lesbos," *JHS* 52, 1932, p. 10, fig. 4



c. Nos. 8–12 and 15, from Methymna. W. Lamb, *op. cit.*, p. 6, fig. 2