

This is an extract from:

*The Economic History of Byzantium:
From the Seventh through the Fifteenth Century*

Angeliki E. Laiou, Editor-in-Chief

Scholarly Committee

Charalambos Bouras

Cécile Morrisson

Nicolas Oikonomides[†]

Constantine Pitsakis

Published by

*Dumbarton Oaks Research Library and Collection
Washington, D. C.*

in three volumes as number 39 in the series

Dumbarton Oaks Studies

© 2002 Dumbarton Oaks

Trustees for Harvard University

Washington, D.C.

Printed in the United States of America

www.doaks.org/etexts.html

Byzantine Shipwrecks

Frederick van Doorninck, Jr.

Roughly eighty Byzantine shipwrecks have been reported in the archaeological literature but only some thirty in any detail; of the latter, about a dozen are either too early or marginal in interest for inclusion in this chapter. In the western Mediterranean there are two wrecks of ships carrying as cargo a type of large, cylindrical amphora (Keay 62) used for the export of North African olive oil during the latter part of the fifth and the first half of the sixth century. The amphoras on one of these wrecks, off Filicudi in the Aeolian Islands,¹ were lined with resin, suggesting that they did not in this instance contain olive oil. This wreck may have occurred before the Byzantine recovery of North Africa, but the other one, at Anse de la Palu off Port-Cros island on the southern coast of France, may date to the second half of the sixth century.² The latter ship was also carrying some wine amphoras from the eastern Mediterranean, including cylindrical (Late Roman [LR] 1) amphoras most probably from the north-eastern Mediterranean, globular (LR 2) amphoras from the Aegean or Black Sea region, and cigar-shaped (LR 4) amphoras from Gaza.

Soon after the recovery of North Africa from the Vandals in 533, a ship carrying 200–300 tons of prefabricated marble architectural elements belonging to the columns, altar, altar canopy, choir screen, and pulpit of a small basilica sank near the port of Marzamemi on the southeastern tip of Sicily.³ These marbles and ones very close to them in style in churches at Ravenna and Cyrenaica are relics of Justinian's attempt to promote religious unity within the empire through a standardization of church architecture and constitute evidence that the long-distance shipment by sea of partially finished objects of stone, a practice well documented by Roman shipwrecks with cargoes of unfinished architectural elements, sarcophagi, and statues, continued into early Byzantine times.

There are several known wrecks of ships that had been carrying cargoes probably of wine from the eastern Mediterranean at some time during the sixth or the early sev-

¹ For a bibliography and a summary of what is known about the wreck, see A. J. Parker, *Ancient Shipwrecks of the Mediterranean and the Roman Provinces* (Oxford, 1992), no. 401.

² Parker, *Ancient Shipwrecks*, no. 782; a preliminary publication of the wreck is scheduled to appear in *Etudes massaliètes* 5.

³ Parker, *Ancient Shipwrecks*, no. 671.

enth century. A wreck off Cape Andreas at the northeastern end of Cyprus contains a substantial number of LR 1 amphoras of this general date; the interiors of the jars are lined with resin.⁴ Cargo and ship's pottery taken from a late sixth-century wreck off Iskandil Burnu on the western end of the Knidian peninsula (southwest Asia Minor) indicate that the ship was probably Palestinian and transporting wine in bag-shaped and LR 4 amphoras, the most common local-wine containers for south Palestine and Gaza respectively. A kosher casserole with sealed lid possibly belonged to a Jew on board.⁵ A ship carrying bag-shaped amphoras, set on rope rings and packed in straw, sank while still in Palestine at the port of Dor;⁶ wreck excavation was begun in 1994.⁷ The wreck had been tentatively dated by the shape of the amphoras to the beginning of the seventh century, but carbon 14 dates of wood samples from the ship's keel now suggest that the wreck occurred perhaps as much as a full century earlier. The ship appears to constitute our earliest example of a medieval Mediterranean hull without mortise-and-tenon joints in its planking, a cost-cutting economy probably made possible by the ship's very small size.

An early seventh-century shipwreck, excavated at Saint Gervais on the southwest coast of France, gives apparent evidence of Levantine merchants or seamen involved in the local transport of pitch and grain. Ship's pottery, including two pitchers with Greek graffiti and a Gaza amphora, was mainly from the eastern Mediterranean.⁸

Shortly after the Persian withdrawal from the Aegean in 626, a ship with some eight hundred amphoras of wine set out from an eastern Aegean port and sank off the island of Yassı Ada while sailing southward between Asia Minor and Kos; the wreck has been excavated.⁹

Economy took precedence over appearance in the ship's construction. Wales girdling the sides and a majority of timbers lining the hull interior were little more than half-logs. Construction methods employed were more economical than those of a century or two earlier. Mortise-and-tenon joints that edge-joined hull planking together were much smaller, more widely spaced, and now used only up to the waterline. The hull planking was no longer fastened to frames by wooden trunnels and large clenched nails, but by light nails that barely penetrated halfway into frames. In contrast to long-lived Greco-Roman vessels, this ship was a much more affordable vessel lasting just long enough to turn a good profit. The hulls of the Dor and Saint Gervais ships, as well as of a seventh-century lighter for off-loading heavy cargo excavated at Pantano Longarini in southeastern Sicily,¹⁰ give similar evidence of more economical shipbuilding methods.

⁴ *Ibid.*, no. 204.

⁵ *Ibid.*, no. 518.

⁶ *Ibid.*, no. 367.

⁷ S. Wachsmann et al., "The 1994 INA/CMS Joint Expedition to Tantura Lagoon, Israel," *INA Quarterly* 22.2 (1995): 3–20.

⁸ Parker, *Ancient Shipwrecks*, no. 1001.

⁹ *Ibid.*, no. 1239.

¹⁰ *Ibid.*, no. 787. The hull remnants were long thought to belong to a large merchant ship, but a new reconstruction, not yet published, reveals the vessel's true nature.

The ship's galley had a tile roof and tile firebox with iron grill and was equipped to prepare and serve food and drink to a considerable number of people, remarkable in an age when passengers normally provisioned themselves. Utensils included 21 cooking pots, 2 cauldrons and a bake pan of copper, 18 ceramic pitchers, and 4 or 5 table settings; a well-stocked larder contained 16 pantry jars.

The cargo consisted of some seven hundred globular LR 2 amphoras stacked three deep and somewhat more than a hundred relatively small, cylindrical LR 1 amphoras placed horizontally between the necks of the globular jars in the top layer. The recovery on average of just under a dozen grape seeds from amphoras still intact suggests that most, or all, of the amphoras had been carrying low-grade wine. Approximately 80% of the globular jars belong to four closely related types recently made; the rest, to some forty different types with in some instances late sixth-century forms. Similarly, there are a dozen different types of cylindrical amphoras. Most, or all, of the amphoras had seen earlier use. Many newer globular ones had earlier carried olives, possibly preserved in sweet wine. Some older globular jars had held lentils. Several dozen different marks of ownership occur on the amphoras; some jars had had more than one owner. The amphoras show little sign of prolonged use; it is likely that the older ones had served for some time as sedentary storage jars.¹¹

An inscription on a steelyard indicates that the ship's captain was a priest (*πρεσβύτερος ναύκληρος*). The ship may have belonged to the church and been designed to transport churchmen as well as cargo. It is hard to imagine how purely commercial transactions could have brought together on one ship amphoras of so many different types, ages, and sources. Taxes in kind are a more likely agent.¹² Allusions to the Christian faith among amphora graffiti may reflect the church's involvement.¹³ A contemporaneous church complex on Samos with a press and globular and cylindrical amphoras much like those on the ship has been cited as evidence for a church role in the provisioning of military bases.¹⁴ Perhaps the ship was carrying wine intended for troops then involved in Herakleios' campaign against the Persians in the East. A wreck off the Knidian peninsula also with both LR 1 and 2 amphoras may be a few decades later in date.¹⁵

¹¹ F. H. van Doorninck, Jr., "The Cargo Amphoras on the Seventh Century Yassı Ada and the Eleventh Century Serçe Limanı Shipwrecks: Two Examples of a Reuse of Byzantine Amphoras as Transport Jars," in *Recherches sur la céramique byzantine*, ed. V. Déroche and J.-M. Spieser, *BCH*, suppl., 18 (1989): 247–53. P. G. van Alfen, "New Light on the 7th-c. Yassı Ada Shipwreck: Capacities and Standard Sizes of LRA1 Amphoras," *JRA* 9 (1996): 189–213.

¹² Taxes in kind as a possible explanation for the nature of the cargo was first suggested by P. Arthur, "Aspects of Byzantine Economy: An Evaluation of Amphora Evidence from Italy," in *Recherches sur la céramique byzantine* (as above, note 11), 87.

¹³ Arthur, "Aspects," 85, cites Christograms and the like on late Roman and Byzantine vessels as possible reflections of ecclesiastical control.

¹⁴ C. Steckner, "Les amphores LR 1 et LR 2 en relation avec le pressoir du complexe ecclésiastique des thermes de Samos," in *Recherches sur la céramique byzantine* (as above, note 11), 65.

¹⁵ Parker, *Ancient Shipwrecks*, no. 352; for the date, see C. Pulak, "1987 Yılı Sualtı Araştırmaları," in *VI. Araştırma Sonuçları Toplantısı* (Ankara, 1988), 3.

A severe reduction in long-distance trade during the latter part of the seventh and the eighth century is paralleled by an absence of Byzantine wrecks that can be confidently assigned to this period. Two wrecks of the ninth or early tenth century contribute evidence of the subsequent resurgence of maritime trade and increased economic importance of the Byzantine Crimea. One wreck, at Bozburun on the southwest coast of Asia Minor, is of a ship carrying Crimean wine amphoras; its excavation ended in 1998.¹⁶ The other wreck, off Mljet in Dalmatia, has yielded an assortment of Byzantine amphoras, including some from the Crimea, and glassware with both Byzantine and Islamic parallels.¹⁷

A substantial increase in tenth- and eleventh-century maritime commerce is indicated by a sharp rise in frequency of known Byzantine wrecks belonging to this period.¹⁸ These wrecks occur along the sea-lanes between Constantinople and southern Russia, Trebizond, Syria, and the Adriatic. The main type of amphora found on them has a short neck, small earlike handles, and an almost globular piriform body.¹⁹

One of these wrecks is of a 15-m-long ship that sank at Serçe Limanı on the Asia Minor coast north of Rhodes in the latter 1020s while sailing westward with cargoes from Fatimid Syria; the wreck has been excavated.²⁰ Although the hulls framing pattern shows influence from central Europe, perhaps via the Danube, Byzantine units of measure were used in the hull's construction, suggesting that the ship was built somewhere not too far from Constantinople. No mortise-and-tenon joints were employed in the planking, which was fastened to already erected framing in the modern way. Very simple lines giving the hull a flat bottom and steep, straight sides produced a boxlike hold that maximized capacity (some 30 tons). The vessel had been well maintained and equipped for repairs and defense against piracy. Fishnet weights with Christian symbols and pork consumption suggest that the crew was Christian.

Commercial equipment on board included a Byzantine steelyard, three balances, glass dinar and dirham weights, and two large sets of balance-pan weights, one Byzantine and the other Fatimid. A paucity of coins—3 one-quarter dinars, 15 dinar-coin clippings (in place of silver coins), and some 40 Byzantine copper coins—coupled with 3 Byzantine lead seals for documents suggest the possible use of letters of credit.

The cargoes were diverse and often small, as shipments often are in contemporaneous Geniza documents.²¹ They included some 3 tons of glass cullet, some 80 or more items of glassware, several dozen cooking pots, several dozen splash-ware and sgraffito-

¹⁶ F. M. Hocker, "Bozburun Byzantine Shipwreck Excavation: The Final Campaign, 1998," *INA Quarterly* 25.4 (1998): 3–13. See also Parker, *Ancient Shipwrecks*, no. 111, where the date cited is too early; similar amphoras at Sarkel are dated to the 9th and early 10th centuries. S. A. Pletneva, "Keramika Sarkela–Beloi-Vezhi," *Materialy i issledovaniia po arkheologii SSSR* 75 (1959): 266.

¹⁷ Parker, *Ancient Shipwrecks*, no. 703.

¹⁸ These wrecks include Parker, *Ancient Shipwrecks*, nos. 70, 385, 498, 557, and 1139.

¹⁹ Type I in N. Günsenin, "Recherches sur les amphores byzantines dans les musées turcs," in *Recherches sur la céramique byzantine* (as above, note 11), 269–71.

²⁰ Parker, *Ancient Shipwrecks*, no. 1070.

²¹ S. D. Goitein, *A Mediterranean Society*, vol. 1, *Economic Foundations* (Berkeley, 1967), chaps. 3 and 4.

ware glazed bowls, several half-dozen lots of jugs and gargoulette pitchers, most of just over a hundred shipboard amphoras (almost all probably carrying wine), raisins, sumac, and unidentifiable perishable cargo occupying the forward half of the hold.

The glass cullet (2 tons of raw glass and 1 ton of broken glassware and glassmaking waste) replaced stone ballast. Shipping glass cullet cheaply as ballast often made economic and technical good sense, since melting glass requires a much lower temperature than making glass and a desired kind of glass can not always be made from locally available raw materials. The Egyptian glassware at the Corinth glass factories (see p. 597) and apparent Syrian glassware in a glass factory at Preslav in Bulgaria²² can be viewed in this light. Another Byzantine shipwreck with Syrian glassware cullet similar to that from Serçe Limanı lies 30 km to the east.²³

Most of the cargo amphoras were piriform, and many of these were in design and fabric like piriform jars made in kilns recently discovered on the north coast of the Sea of Marmara,²⁴ a body of water particularly rich in wrecks with such amphoras. A survey of one of these wrecks just published has revealed that the ship carried at least twenty thousand amphoras of a relatively small size.²⁵ Perhaps the size range of transport jars was somewhat slow in adjusting to the new requirements of a greatly increased volume of trade in wine.

The half-dozen or so merchants who owned the Serçe Limanı cargo amphoras were accustomed to using their amphoras over and over again as transport jars, selling the contents but keeping the jars and carving down damaged rims and handles to minimize further damage; a high incidence of carved amphoras in museum collections indicates that this was a common practice. Graffiti on the Serçe Limanı amphoras give evidence that the merchants and many of their amphoras were from a locale with a Byzantine-Slavic population, presumably in the Sea of Marmara region.

Wrecks with amphoras can sometimes yield important information concerning capacity systems and sizes, as well as marketing and standardization practices. The Serçe Limanı piriform amphoras, for example, belong to more than two dozen distinct capacity sizes, some for red and others for white wine, ranging from 15 to 60 Byzantine pounds (λίτραι) of wine and belonging to three interrelated capacity systems in which capacities increase at 3- or 5-λίτραι intervals.²⁶ Such a multiplicity of sizes stands in stark contrast to the few basic sizes employed in the Roman period or earlier and seems to imply profound changes in the marketing of wine. Accurate capacities were achieved through a strict control of both external jar dimensions and the amount of clay used.

²² G. Džinkov, "Srednovekovna stuklarska rabotilnitsa v Patleina" (Medieval glass workshop in Patleina), *Izvestiia-Institut* 26 (1963): 63, fig. 17.

²³ C. Pulak, *INA Newsletter* 12.2 (1985): 2.

²⁴ N. Günsenin, "Ganos: Centre de production d'amphores à l'époque byzantine," *Anatolia antiqua* 2 (1993): 193–201; a kiln that produced such amphoras was found on Marmara (Prokonnesos) in 1994.

²⁵ N. Günsenin, "1994 yılı Marmara Adaları Araştırması," in *XIII. Araştırması Sonuçları Toplantısı* (Ankara, 1996), 357–59, figs. 1 and 2.

²⁶ F. H. van Doorninck, Jr., "Giving Good Weight in Eleventh-Century Byzantium: The Metrology of the Glass Wreck Amphoras," *INA Quarterly* 20.2 (1993): 8–12.

Although the amphoras are of various capacity sizes, almost all have a mouth that would have accommodated a stopper of just one standard size. A new study of the seventh-century Yassı Ada amphoras now in progress will present considerable evidence of a λίτρα-based capacity system and that a significant increase in the number of capacity sizes used and a standardization of stopper sizes was then already under way.

Byzantine sgraffito wares were important exports to the Levant, Russia, and Italy during the twelfth and thirteenth centuries. Several known shipwrecks might contribute significantly to our knowledge of the production centers and carriers involved in this trade were they thoroughly excavated and studied. One, already partially excavated, is of a mid-twelfth-century ship that sank off Pelagonesos in the Northern Sporades while carrying thousands of plates, bowls, and cups like those of the fine, spiral, and developed styles found at Corinth and Athens; more than fifty amphoras and six millstones possibly represent secondary cargoes.²⁷ A late twelfth-century wreck off Skopelos in the Northern Sporades²⁸ and an early thirteenth-century wreck off Kastellorizon near the southern coast of Asia Minor,²⁹ both pillaged sites, have cargoes of a Byzantine sgraffito ware called Aegean Ware.

The type of Byzantine amphora most often found on twelfth- and thirteenth-century wrecks has a slender, elongated piriform body, tall neck, and vertical handles that arch high above the mouth.³⁰ Wrecks with such amphoras occur on the sea-lanes between Constantinople and Russia, Trebizond, Syria, and Italy.³¹ It would be of great interest to know the nationality of the ships involved and where they had taken on their cargoes. Unfortunately, only one of these wrecks has been even partially excavated.³² The ship, which sank off the Syrian coast at Tartous, was carrying about five thousand amphoras that were very carefully stacked vertically in at least five layers in the hold with all handles set athwartships. Light-timbered bulkheads divided the hold into compartments, probably to increase cargo stability.

²⁷ Parker, *Ancient Shipwrecks*, no. 796.

²⁸ *Ibid.*, no. 1099.

²⁹ *Ibid.*, no. 538.

³⁰ Type III in Günsenin, "Recherches," 271–74.

³¹ They include Parker, *Ancient Shipwrecks*, nos. 117, 361, 1110–11, 1128, and 1136. For additional information on the distribution of this amphora type, see Günsenin, "Recherches," 271–74, and S. Tanabe et al., *Excavation of a Sunken Ship Found off the Syrian Coast: An Interim Report* (Kyoto, 1989), 66–68.

³² Tanabe et al., *Excavation*.

Bibliography

- Arthur, P. "Aspects of Byzantine Economy: An Evaluation of Amphora Evidence from Italy." In *Recherches sur la céramique byzantine*, ed. V. Déroche and J.-M. Spieser. *BCH*, suppl., 18 (1989): 79–91.
- Džinkov, G. "Srednovjekovna stuklarska rabotilnitsa v Patleina" (Medieval glass workshop in Patleina). *Izvestiia-Institut* 26 (1963): 47–69.
- Goitein, S. D. *A Mediterranean Society*. Vol. 1, *Economic Foundations*. Berkeley, 1967.
- Günsenin, N. "Recherches sur les amphores byzantines dans les musées turcs." In *Recherches sur la céramique byzantine*, ed. V. Déroche and J.-M. Spieser. *BCH*, suppl. 18 (1989): 267–76.
- . "Ganos: Centre de production d'amphores à l'époque byzantine." *Anatolia antiqua* 2 (1993): 193–201.
- . "1994 yılı Marmara Adaları Araştırması." In *XIII. Araştırması Sonuçları Toplantısı* (Ankara, 1996), 357–73.
- Hocker, F. M. "Bozburun Byzantine Shipwreck Excavation: The Final Campaign, 1998." *INA Quarterly* 25.4 (1998): 3–13.
- Parker, A. J. *Ancient Shipwrecks of the Mediterranean and the Roman Provinces*. Oxford, 1992.
- Steckner, C. "Les amphores LR 1 et LR 2 en relation avec le pressoir du complexe ecclésiastique des thermes de Samos." In *Recherches sur la céramique byzantine*, ed. V. Déroche and J.-M. Spieser. *BCH*, suppl. 18 (1989): 57–71.
- Tanabe, S. et al. *Excavation of a Sunken Ship Found off the Syrian Coast: An Interim Report*. Kyoto, 1989.
- van Alfen, P. G. "New Light on the 7th-c. Yassı Ada Shipwreck: Capacities and Standard Sizes of LRA1 Amphoras." *JRA* 9 (1996): 189–213.
- van Doorninck, F. H., Jr. "The Cargo Amphoras on the Seventh Century Yassı Ada and the Eleventh Century Serçe Limanı Shipwrecks: Two Examples of a Reuse of Byzantine Amphoras as Transport Jars." In *Recherches sur la céramique byzantine*, ed. V. Déroche and J.-M. Spieser. *BCH*, suppl. 18 (1989): 247–57.
- Wachsmann, S., et al. "The 1994 INA/CMS Joint Expedition to Tantura Lagoon, Israel." *INA Quarterly* 22.2 (1995): 3–20.