

Ertekin M. Doksanaltı & Erdogan Aslan

COMPARISON OF A 'SHIP-TYPE' BRAZIER FOUND IN KNIDOS UNDERWATER RESEARCH AND 'SHIP-TYPE' BRAZIER OF THE ROMAN IMPERIAL PERIOD

Braziers, specially fabricated to warm up the ship and carry out cooking activities, were introduced. Different ship braziers were produced, varying depending upon the places and conditions in which they were used. This study examines different types of braziers (referred to here as ship-type braziers), which have been found underwater. Using data taken from a ship-type brazier found during the Knidos underwater researches and a brazier on exhibit at the Antalya Archaeological Museum, this article aims to determine the chronological and typological development of the braziers found in different spots along the sea courses of ancient ships in the Mediterranean Basin. Ship-type braziers, whose names have been designated according to their findspots, were used from the late 1st century BC until the 10th century AD. Considering their characteristics, the ship-type Knidos braziers have been determined to date back to the 1st century BC and were used up to the 1st century AD.

Introduction¹

Knidos is located in the Caria region, in the southwest of Anatolia. This ancient city is at the westernmost point of the mountainous Datça Peninsula, which is within the borders of Datça County in the province of Muğla. Knidos features two harbors, one in the northwest called the Military/Trireme-Small Harbor, and the other in the southeast called the Commercial-Large Harbor. Submerged wrecks found in spots close to the city, the wrecks around the commercial harbor pier, and the contexts and deposits of the pier all serve to indicate that the city's location must have lain at the intersection of sea routes and featured heavy sea traffic².

During the excavations and underwater research conducted in Knidos in 2015, many ancient shipwrecks, roof tiles, which were contained in the cargo of these wrecks, amphorae, architectural blocks and stone and iron anchors were also found, in addition to the ship-type brazier discussed here.³ The brazier was found at a depth of 15 meters on the northern pier of the 'Commercial Harbor' (fig. 1). Shipworms and concrete residues on the brazier were removed by the conservators

after they had taken the necessary precautions. The Knidos brazier is now displayed at the nearby Marmaris Museum.

A second ship-type brazier, now in the Antalya museum, was also included in this study.

These braziers, which were made of terracotta and known to have been used in ancient ships, are very rare to find, on account of the fact that many had been destroyed. The clay material and shape characteristics of the brazier fragments found during the excavations and underwater researches closely resemble storage cases and coating plates and have therefore often been mistaken for them. This confusion makes it difficult to detect the form development and distribution fields related to the braziers.

Knidos Ship-type Brazier (figs. 1–2)

The Knidos brazier was determined to have been used in ships due to its findspot and the characteristics of its form (fig. 1). It has an approximate size of W. 0.41 × L. 0.45 × H. 0.22 m. The brazier consists of a fire bowl, attachment, tray and low stand. The width and the height of the (U-shaped) fire bowl are 0.16 m. There are three attachments along the rim (L: 0.047 m, H: 0.016 m) of the fire bowl, with the most solid attachment having a width, length and height of 0.037 m, 0.077 m, and 0.031 m, respectively. An oval tray is positioned in front of the fire bowl. The preserved part of the tray, a section of which is broken, has a width, length and height of 0.40 m, 0.26 m, and 0.05 m, respectively. Two (L-shaped) low supports (H: 0.05 m) are positioned facing one another under the fire bowl and tray sections of the brazier. These stands are trapezoidal and have a gap on the front side. This gap serves a dual purpose, namely to prevent the heat in the fire bowl from reaching the ground and to create air circulation around the area to cool down the lower part of the brazier.

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² ASLAN 2015, 101–120; BÜYÜKÖZER 2013, 147; DOKSANALTı/ASLAN 2016, 71–72 fig. 14–15.

³ ASLAN 2015, 108 fig. 11; E. DOKSANALTı/E. ASLAN ET.AL., Knidos Excavations and Researches: 2015. 38. Kazı Sonuçları Toplantısı (in press).

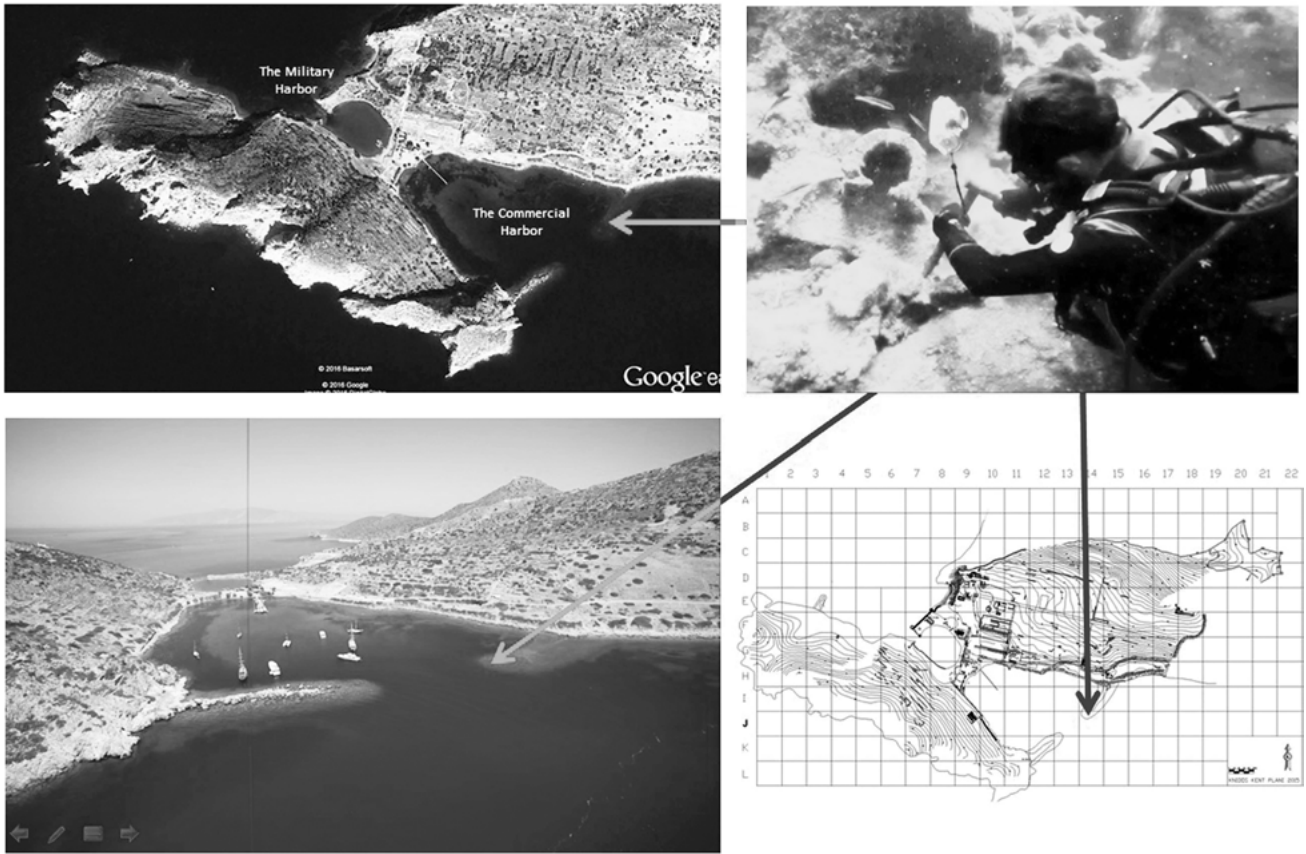


Fig. 1. Location of the mole where the 'Ship Type Brazier' was found during the underwater researches at Knidos.

The brazier, made out of reddish, gritty clay, is coated with a Mussini 365 W-Lasur-Oxid-Rot color. Though thinly applied, this coating has been preserved in certain parts. The brazier features a simple decoration, with concave circles used on the fire bowl and the upper part of the tray rim. Darkened or otherwise completely blackened parts, likely the result of heavy usage, can be observed in both the tray and the fire bowl of the brazier. These blackened parts are largely seen on the ground and wall of the fire bowl. Furthermore, due to the high degrees of heat generated, the surface area of certain parts of the fire bowl has taken on a glassy appearance.

Parallels from Knidos and the excavation context suggest that the production of these tools started in the late periods of the 3rd century BC, before winding down in the 1st century AD⁴. The clay characteristics of the Knidos brazier found underwater resemble those of the cylindrical braziers produced during the Hellenistic period in Knidos. The Knidos brazier is therefore most likely a local variation of these. Furthermore, despite the absence of any shipwrecks off the northern pier, the Knidos brazier was found with material dating to the late Hellenistic period and the Roman Imperial Period. Another important item that helped with dating the brazier and determining where it was produced was a brazier fragment found

in an Augustan era deposit⁵ during the Knidos excavations⁶. The clay characteristics of the attachment on this brazier and another found in Knidos⁷ are identical to those found on the Knidos brazier mentioned earlier. Considering these findings, the Knidos brazier can be dated between the end of the 1st century BC and the first half of the 1st century AD.

Ship-type Brazier in the Antalya Museum (fig. 3)

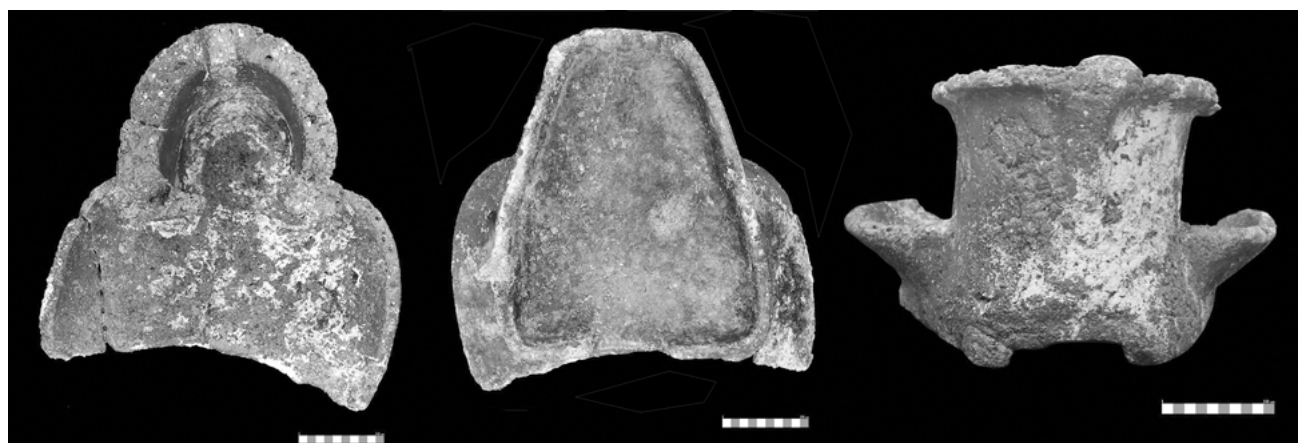
On exhibit in the Antalya Museum is a ship-type brazier that was found off the Antalya coast by a fisherman, who brought it to the museum. It is a low brazier that is placed on a stand with a tray. The upper part of the fire bowl and a section of the base are broken. The preserved section of the brazier has a width, length and height of 0.31 m, 0.37 m, and 0.21 m, respectively. The base of the brazier supports the body and is round, like the cylindrical braziers. The fire bowl section does not have a perfect U shape, but rather is rounder (three quarters of a circle). The tray in front of the fire bowl is rectangular, with its corners extended transversely. Despite being encrusted with a thick layer of lime, the fire bowl and tray of the brazier have slightly visible blackened spots.

⁴ ŞAHİN 2003, 59–66.

⁵ DOKSANALTI 1997, 11; 59.

⁶ ŞAHİN 2003, 57 KF 38 pl. 32

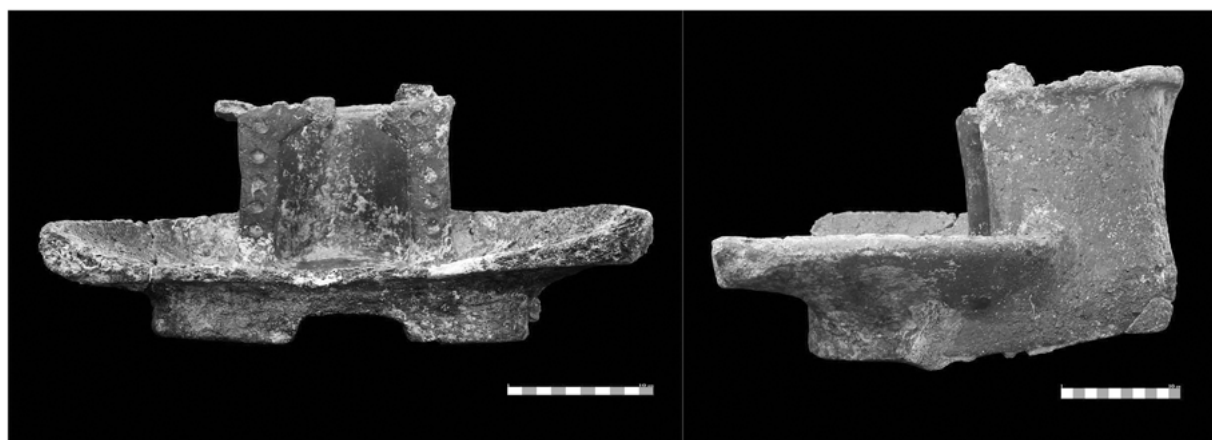
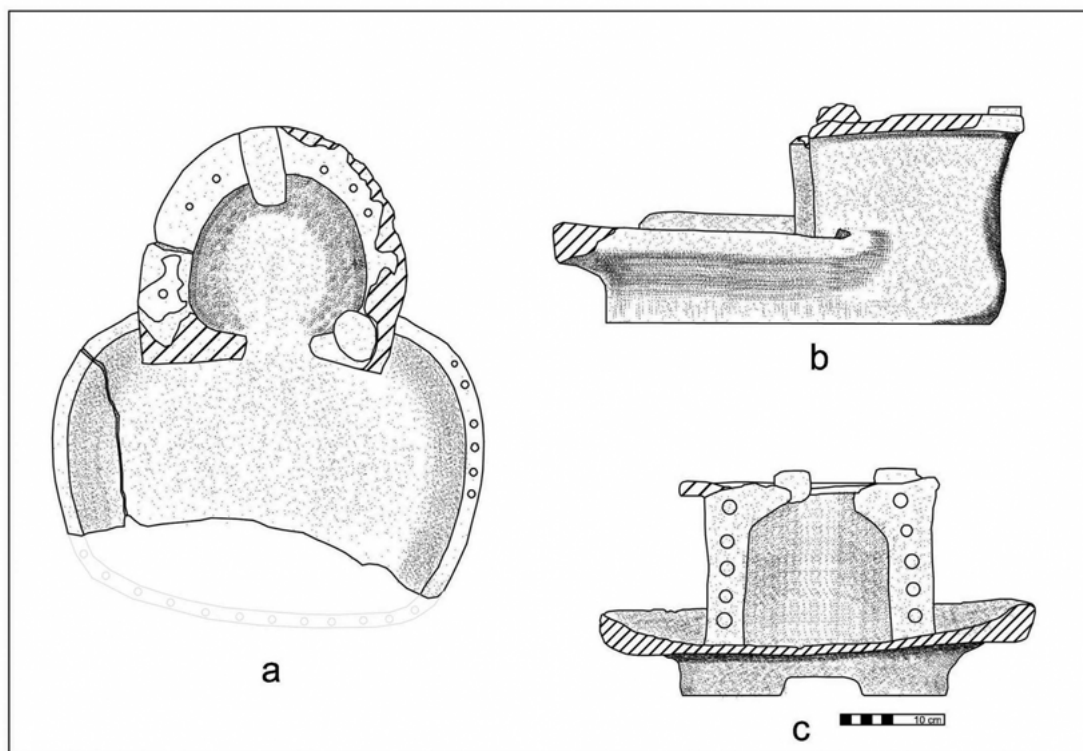
⁷ ŞAHİN 2003, 57 KF 39 pl. 32



View from above

View from below

View from back side



View from front side

View from right side

Fig. 2. The 'Ship Type Brazier' found during the underwater researchs at Knidos.

‘Ship-Type Brazier’

Portable braziers, which first began to be widely used in the 8th century BC⁸ and gradually became a typical feature of cooking practices in ancient cultures, were produced in various forms all the way up to the Hellenistic period and the Byzantine era in the Middle Ages⁹. These braziers are mainly made of terracotta and designed variously in a round, half-round or U-shaped form¹⁰; they also feature fire bowls, which were used to control the fire, and logs or supports for positioning the chytra. There are two basic brazier forms that date back to the Archaic and Classical periods. The fire bowls for the braziers in the Archaic period are short and cylindrical, while those in the Classical periods are in the form of an open tray with low conical stands¹¹.

Outside of these two basic forms, there were also portable braziers, called *Lasana*¹², which were made as separate parts. They feature tripods with tips specifically shaped to position the chytra. These portable braziers with tripods were used during the Archaic and Classical periods.

In addition to the braziers with half-round forms or U shapes, cylindrical portable braziers with high bodies, ornaments and three attachments, which were used for positioning the chytra, were also produced. These attachments were often made with plastic tops and feature lugs that were embellished with molded masks (Dionysus, satyrs, Hephaistos etc.). Chytras are positioned on the long beards of three embossed heads shaped in grotesque forms. These portable braziers are common in the Mediterranean basin. Such braziers have been found in different places, such as *Alexandria*, *Halikarnassos*, *Naukratis*, *Delos*, Rhodos, *Loryma*, *Kos*, Athens, Knidos and others¹³. Braziers from the Hellenistic period are taller than those from the Classical period. While some of these types of braziers have been found in residential buildings, they tend to be more frequently discovered at cult sites. As understood from the findings, in addition to having been used for cooking purposes in private buildings, these braziers also played a role in religious ceremonies¹⁴. Attachments belonging to such braziers in Knidos were commonly unearthed from the deposits of cult sites.

It is clear that the braziers which had been used for cooking in the Archaic, Classical and Hellenistic periods, would not have been suitable for the ancient wooden ships navigating on rough seas. The Archaic and Classical braziers, which featured high stands, and the cylindrical braziers used in the Hellenistic period would likely have tipped over during passages on choppy seas. In addition to this hazard, the ashtrays under these braziers would have been prone to spreading fire to the deck.

All of these issues created the need for a practical and portable brazier, one that was capable of being employed

for cooking¹⁵ and warming purposes but that was resistant to tipping over on wavy seas and possibly spreading fire everywhere.

Found underwater or in shipwrecks, the ship-type braziers are ideally suited for use on ships thanks to their shape designs. A limited number of ship-type brazier specimens have been found during underwater research or coincidentally by fishermen, including one found in Athenian Agora¹⁶, eight in different areas of Bodrum, where they are preserved at the Bodrum Underwater Archaeology Museum¹⁷, 20 during underwater research conducted along the coast of Israel¹⁸, one off of Capo Zafferano in Sicily¹⁹ and one during the Yenikapı excavations conducted in Istanbul²⁰. In addition, one ship-type brazier was found underwater along the Antalya coastline and another in Knidos. It is likely this number will increase as underwater researches and meticulously performed evaluations of broken ceramic pieces continue to be conducted.

It is a well-established fact that meals were cooked for the crew and passengers on the ship during both short and long sea passages. However, kindling fires in the ships for purposes of cooking and keeping the ship warm needed to be strictly controlled in order to prevent fires or small sparks from escaping and causing the wooden ships to go up in flames. The braziers fashioned for use in the ships were shaped in accordance with the area (with limited space) in which they were used, and necessary precautions were taken to mitigate the risks of the spread of fire.

It is uncertain whether or not the braziers that were found in the shipwrecks or at other underwater sites had been produced exclusively for ships, since accurate data still does not exist.

The main characteristic of the braziers believed to have been used in the ships is their low stands, which would have been necessary to ensure greater stability of the brazier when in use. These low stands have flat bases with large surfaces to further minimize the risk of falling. A large, flat tray was used for collecting the ash. The sides of the tray are clearly raised and fixed in position to keep the ash from spreading out from it. These braziers tend to be unadorned, but there are some specimens with decorative work on them²¹.

The ship-type braziers were produced as simple but goal-oriented, practical tools for use in the daily life on the ships. Their primary purposes were to cook a meal in the fastest way

⁸ LYNCH/PAPADOPOULOS 2006, 30 Fig. 22.

⁹ FRANTZ 1938, 450 Fig. 19-B1.

¹⁰ SPARKES/TALCOTT 1962, 129 plate 5; TSAKIRGIS 2007, 228 fig. 24,3 a–b.

¹¹ TSAKIRGIS 2007, 228 fig. 24,3 a–b.

¹² MORRIS 1985, 393.

¹³ BAKALAKIS 1934, 203; ROBINSON 1935, 210; SPARKES/TALCOTT 1962, 131; BAILEY 1972, 1; LEONARD 1973, 22; ROMANO 1994, 57; GALILI/SHARVIT 1999, 167; VOGELKOFF-BROGAN 2000, 308–310; ŞAHİN 2003, 1.

¹⁴ ŞAHİN 2005, 241–43.

¹⁵ GALILI/SHARVIT 1999, 167; ROSEN/GALILI 2007, 301.

¹⁶ The Agora brazier should be assessed as a land-based brazier, but one that has the same features as the ship-type braziers. ROBINSON 1959, 34 pl. 38 G 123; SPARKES/TALCOTT 1962 Pl. VI.6.

¹⁷ LEONARD 1973, 19 Ill.1,6–16: There are eight ship-type braziers in the Bodrum Underwater Archaeology Museum collection. Two of them are made of lead, and the remaining six are made of terracotta. Four of them date to the Hellenistic period, and two were produced in the Byzantine era. TROCKMORTON 1972, 77 Res. 15.

¹⁸ ASHKENAZI ET AL. 2012, 85; GALILI/ROSEN 2012, 420. Twenty ship-type lead braziers were found during the underwater research conducted on the coast of Israel. They all date to the Roman Imperial period, and are divided into two types: The first type has a firebowl shaped as a horseshoe, three attachments on the firebowl and a tray in front. The second type, on the other hand, has a round firebowl and a chimney.

¹⁹ LEONARDO 2016, 258–259.

²⁰ KOCABAŞ 2012 Fig.29.

²¹ ASHKENAZI ET AL. 2012, 85–86.

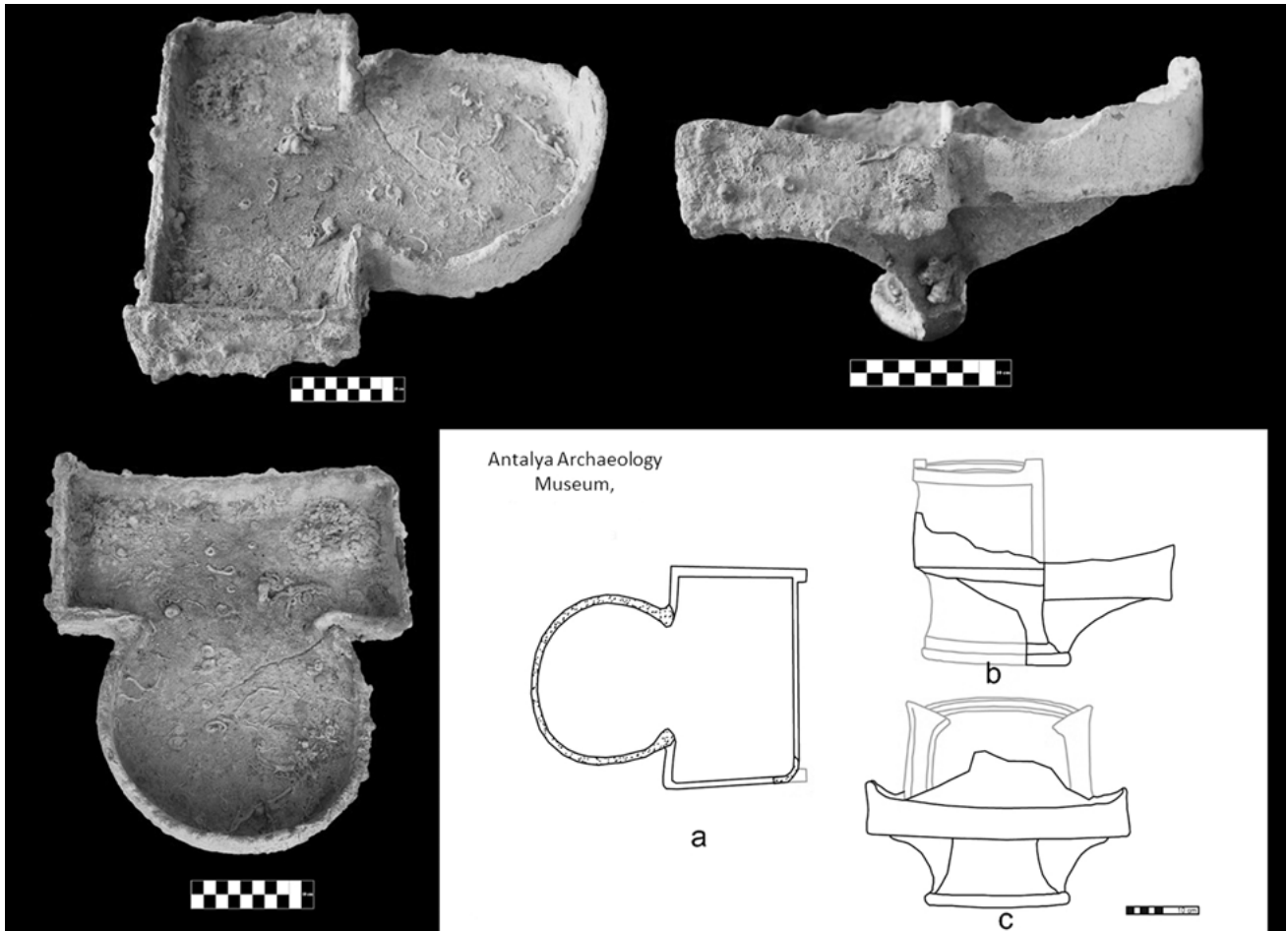


Fig. 3. A 'Ship Type Brazier' found Antalya Archaeology Museum.

possible and to warm the crew and passengers on cold days. These braziers were preferred for vessels that had shortage of space, as they were small enough not to take up too much room. After being used for cooking or warming, the braziers were stored in an area where the other ship equipment was kept. The most reliable data available is provided by the Istanbul Yenikapı Shipwreck no 12 (YK 12)²², where a brazier is believed to have been *in situ* after having been used. This brazier was found in a specifically prepared closed-off section at the stern. This section housed the amphora and storage cases in which the crew kept its food and beverages, and other kitchen cups and equipment²³. The braziers must have been kept stable in this section of the vessel, which also featured a specially-designed kitchen.

Unfortunately, with the exception of the YK12 shipwreck, the lack of any other in-situ examples, calls into question whether or not the braziers found underwater were used for shipping purposes. After examining the braziers housed in Bodrum, M.R. Leonard suggested that some of them were used for shipping, while others were used by the ships²⁴. The brazier found in-situ in the YK 12 shipwreck, and those found on the coastline of Israel, the coastline of Antalya and in Knidos were definitely used by the crew of the ship,

considering the traces of burn marks resulting from heavy use on certain sections. These findings suggest that braziers found in underwater sites or in shipwrecks were most likely used for cooking and warming purposes to meet the daily needs of the ship crew and passengers.

Brick ovens, like those seen in the Yassı Ada shipwreck²⁵, were used in medium- or large-size commercial vessels, or in vessels with clearly-defined kitchens. Portable and practical ship-type braziers were more suitable for small vessels that did not have kitchens. Based on the evidence derived from the Istanbul Yenikapı (YK 12) shipwreck, which provides the most accurate data available on this subject²⁶, we may suggest that braziers were preferred in small vessels with no kitchen.

Ship-type Braziers of the Roman Imperial Period (fig. 4)

The earliest ship-type brazier, which dates to the Hellenistic period²⁷, is in the Bodrum Museum. It has a base that supports the body and is round like the cylindrical braziers. The fire bowl section does not have a perfect U-shape; instead, it is rounder (three quarters of a circle). The tray in front of the fire bowl is rectangular, and its corners are extended

²² KOCABAŞ 2015, 83–89

²³ BARAN-ÇELİK 2007, 224–25 fig. 16–21; KOCABAŞ 2015, 85

²⁴ LEONARD 1973, 19; 22–23.

²⁵ TURANLI 1999, 96–97; 99

²⁶ KOCABAŞ 2015, 86.

²⁷ LEONARD 1973 ill. 1,6–8.

transversely (**fig. 4a–b**). The brazier in the Antalya Museum resembles the one in Bodrum and is probably contemporary with it (**fig. 4c–d**). The Knidos brazier is lower, with a more stable base, and has a horseshoe-shaped fire bowl. Its tray is trapezoidal, without a fully rounded shape (**fig. 4e–f**). The Athenian Agora specimen, dating to the 1st or 2nd century AD, stands on three low, cylindrical feet²⁸. It has a fire bowl shaped in a horseshoe and a fully rounded tray (**fig. 4g–h**).

All the other specimens of Roman date that had been found underwater are made out of lead²⁹. The lead braziers in the Bodrum Underwater Museum (**fig. 4i–j,k–l**) and those found off the coast of Israel have no base; their bodies rest directly on the ground³⁰ (**fig. 4m–n**). Their fire bowls are U-shaped, and their attachments are in the form of a shell or astragalos. Their trays, however, are combined with the fire bowls to form a single part. While a chimney is added to the back of the fire bowl, it has no connection with the fire bowl. This chimney, which would have been filled with water, has double walls and is thought to have served to cool the lead brazier or to heat up the space. Filling the reservoir formed in the double walls lead blanks does not require elevation from the ground as it provides isolation³¹. Underwater finds have indicated that the lead ship-type braziers were used widely³² in marine activities taking place in the Mediterranean region between the 1st century BC and the Late Roman Period³³, reaching their peak in the Roman Imperial period. Lead was probably preferred due to its resistance to humid environments and corrosion. Moreover, a 20–25 k. lead brazier on a ship³⁴ could be employed for different purposes when needed³⁵.

Byzantine brazier specimens³⁶ at the Bodrum Underwater Archaeology Museum (**fig. 4o–p,r–s**) and the 7th–8th century braziers³⁷ that were found *in situ* on the Istanbul Yenikapı (YK12) shipwreck are made out of terracotta. These Byzantine period braziers are heavier and have no base, their fire bowls and trays are connected, and they have U-shaped bodies. Some specimens have round trays, while others have trays with corners, and the attachment is removed on the fire bowl, and two horizontal lugs are added on both sides on some of them. In other cases, the fire bowls are so long that they extend down to the tray section, being shaped as such to allow the positioning of two or more chytras. The shape of the body of the brazier found on the Istanbul Yenikapı (YK12) shipwreck are largely retained, but the section over the fire bowl and the place for positioning the chytras are changed into three full circles. Round lids (with lugs), similar in appearance to pot lids and used to close the brazier holes, were found during the excavations. Standard designs of the fire bowls were adopted after the 7th century AD.

Conclusion

Although all examples except the Athenian Agora specimen were found underwater, there is still much discussion about whether or not these braziers were actually produced specifically for the ancient ships. However, the brazier found *in-situ* during the Istanbul Yenikapı excavations serves to support the idea that braziers were in fact made specifically for use on ships, particularly considering that it was found in a specific area on the deck, where it would have been best secured against falling over and risking the spread of fire on the vessel during passages on turbulent seas.

The bodies of ship-type braziers, produced in various forms from the Hellenistic period until the Byzantine era, are not very different from one another in terms of their function. The ship-type braziers found in Knidos underwater work (**fig. 3e–f**) and the one now displayed in the Antalya Museum (**fig. 3c–d**) have been dated by comparison to a similar brazier on display in the Bodrum Underwater Archaeology Museum (**fig. 3a–b**). Both of these braziers have the same characteristic stands used in the cylindrical braziers dating back to the Hellenistic period. In addition, their U-shaped fire bowls, which do not have the full horseshoe form, indicate that the ship-type braziers from the Hellenistic period lacked this characteristic feature so frequently seen in the Roman period. From this it can be understood that the low brazier situated on a stand with a tray, which is thought to have been produced using cylindrical braziers, must be the first of its kind. While the brazier found underwater at Knidos resembles these two abovementioned braziers, it does have certain differences, including a fire bowl shaped as a full horseshoe and a tray not as fully round as the Athenian Agora specimen (**fig. 3g–h**). It has been suggested that the Knidos brazier, which can be interpreted as belonging to a transition period, may date to between the late 1st century BC and early 1st century AD.

Of the 32 braziers discovered thus far, 22 are made of lead, and 10 are made of terracotta. Six of these terracotta braziers belong to the late Hellenistic period, one to the early Roman Imperial period, and three to the Byzantine period. All of the specimens made out of lead date to the Roman period.

ertekin96@selcuk.edu.tr (Selçuk University, Faculty of Letters, Department of Archaeology, Turkey)
erdoganaslan@gmail.com (Selçuk University, Faculty of Letters, Department of Archaeology, Turkey)

²⁸ ROBINSON 1959, 34 Pl. 38 G 123.

²⁹ GALILI/SHARVIT 1999, 167–168; ROSEN/GALILI 2007, 301.

³⁰ LEONARD 1973 ill. 2, 11–12.

³¹ GALILI/ROSEN 2012, 416, Fig. 1.

³² GALILI/SHARVIT 1999, 167–168; ROSEN/GALILI 2007, 301.

³³ ROSEN/GALILI 2007, 304; ROSEN/GALILI 2012, 420; GALILI/ROSEN 2015, 342.

³⁴ ROSEN/GALILI 2007, 305.

³⁵ For the lead tools used in ancient time ships, please see: ROSEN/GALILI 2007, 300.

³⁶ LEONARD 1973 ill. 2, 13–17.

³⁷ KOCABAŞ/KOCABAŞ 2012, 112 Fig. 29; KOCABAŞ 2015, 83.

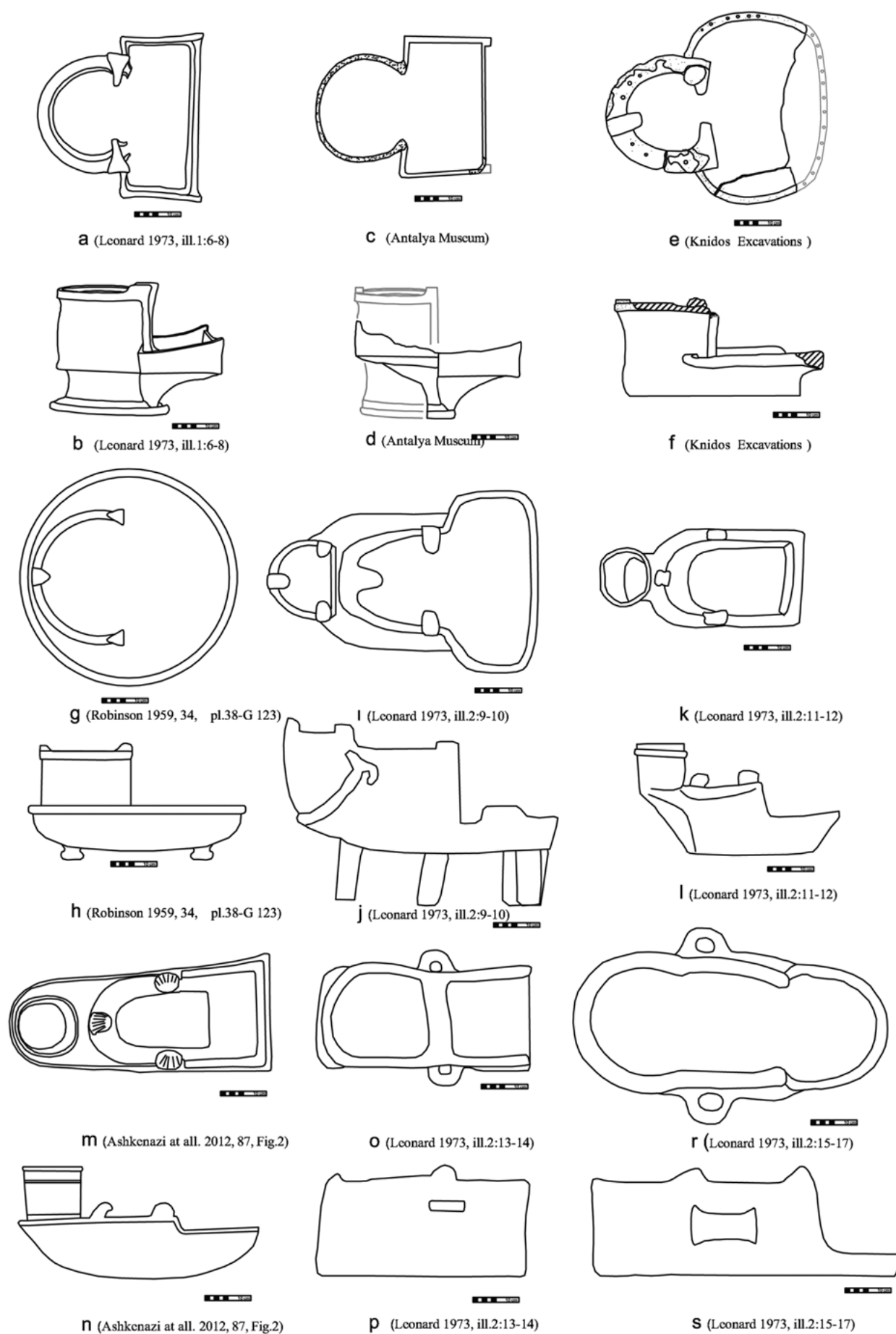


Fig. 4. The form development of 'Ship Type Braziers'.

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