

LARGE LEAD CONTAINERS FROM THONIS-HERACLEION, EGYPT: METAL STORAGE VESSELS?

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Abstract

Underwater excavations in Thonis-Heracleion, Egypt, continue to yield large numbers of bronze and lead objects. In this paper, I discuss the dating and function of a group of nine exceptionally large lead containers in one of the ancient waterways of this Egyptian port city. Ranging in diameter from 50 to 120 cm, they are the largest objects made of lead found at the site and unique in the archaeological record. Their size, shape, and archaeological context are described before presenting parallels in different material in order to better understand their function and current location. Similar ceramic examples indicate that the metal containers were most likely used for storage of foodstuffs, such as liquids or cereals, perhaps as part of temple facilities. The framework derived from the archaeological context suggests a late fifth to early third century B.C. date, which is significantly earlier than other lead objects of considerable size. It is likely that the containers in the canal are associated with wooden poles preserved in the vicinity, creating a wooden moorage or stabilizing a narrow island. A hypothesis is advanced that they were part of a storage facility for rituals, possibly involving water offerings, conducted in this area.

INTRODUCTION

The rarity of lead objects in general and the uniqueness of these large lead containers make for an interesting case study in a series on « questions métallurgiques ». The selection of containers here are the largest and heaviest metal objects from the site and they are so far unparalleled in antiquity. All remain *in situ*. They serve as an example of both the unique nature of the assemblage as well as an indication of the serendipity of archaeological preservation and excavation.

The containers were found in Aboukir Bay on the Egyptian Mediterranean coast, 20 km east of Alexandria. Since 1996, Franck Goddio and the Institut européen d'archéologie sous-marine, in collaboration with the Egyptian Ministry of State for Antiquities, have directed the survey work and subsequent underwater excavations of the sunken landscape in Aboukir Bay.¹ This work led to the identification of two submerged settlements: East

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Canopus and Thonis-Heracleion. The lead containers were found in the latter town, which was located at the mouth of the ancient Canopic branch of the Nile. The main deity at Thonis-Heracleion was Amun-Gereb, whose naos was found in the temple temenos (Goddio and Fabre 2008²: 309, no. 115; Goddio 2007: 90, fig. 3.37). The discovery of another monument, a twin to the famous Naukratis stela at Thonis-Heracleion not only established the Egyptian name of the town as Thonis (SCA 277; Goddio and Fabre 2008²: 309, no. 116; von Bomhard 2012; also Yoyotte 1958: 427-30; 2001, 2004), but also demonstrated the closeness of economic ties between Naukratis and Thonis-Heracleion from at least 378 B.C. when the stela was erected (von Bomhard 2012: 98-104). At this time, Thonis-Heracleion functioned as a customs office for traffic on this branch of the Nile.

Ceramics give a broad date range for activity at the site. The earliest pottery dates to the last quarter of the seventh century B.C. and it shows a sharp decline after the middle of the second century B.C. (Grataloup 2010: 151). This is corroborated by the radiocarbon dates obtained from the ships and wooden infrastructure, such as moorings, around the town.² There are only a handful of Roman sherds from the site.

THE LEAD CONTAINERS

An unusual aspect of the archaeological material at the site of Thonis-Heracleion is the large number of lead objects recovered during survey and excavation, with 1,200 inventory numbers to date (Goddio and Fabre 2008²: 33-44, nos. 319-368; Goddio 2007: 125, fig. 3.104). The majority of items are relatively small and portable, such as weights (Van der Wilt 2010), statuettes (Heinz 2011), brailing rings, and sounding leads. For the purposes of the analysis of the objects until the point of deposition three broad functional categories were identified: economic, ritual, and nautical. Without excluding the potential overlap between them, these three categories serve as useful perspectives to begin to explain the presence and function of the large containers discussed here.

The lead objects were mainly found in its ancient waterways or at the edge of land and water (fig. 1). The distribution pattern runs from the north passage leading to the Nile in the north-east of the site and continues in a south-west direction through the so-called Grand Canal, north of the temple of Amun-Gereb. Such a pattern in underwater areas is significant, as the objects are effectively taken out of the normal cycles of reuse and recycling. It is likely, therefore, that the deposition of lead objects in the former waterways of the site is an important factor in the survival of the material in all its diversity.

Andrew Meadows for information concerning the ceramics and coins respectively; and to Abdelhamid and Youssria el-Ghandour for their invaluable help and hospitality in the Maritime Museum in Alexandria.

¹ Goddio 2007; for maps, see Goddio 2011: 124, fig. 7.3; 127, fig. 7.5; 128, fig. 7.6; and for an overview and discussion of the objects from Thonis-Heracleion, see Goddio and Fabre 2008². For the submergence of part of the site after which it becomes part of the bay, see Stanley et al. 2007; Goddio 2010.

² The ¹⁴C analyses will be published in a forthcoming volume on the shipwrecks in the Oxford Centre for Maritime Archaeology Monograph Series. For some examples of ¹⁴C dates of timber, see Fabre 2011: 14 fig. 1.3, 19 fig. 1.7, 20 fig. 1.8, 21 fig. 1.10, 23 figs. 1.12 and 1.13, 26 fig. 1.15, 27 figs. 1.17 and 1.18, and 28 fig. 1.19.

The containers selected here are among the largest containers from Thonis-Heracleion. All containers with a diameter larger than 40 cm remain underwater, which means these containers were not studied in person.³ Their size, however, is exceptional and justifies a discussion.⁴ They were found during survey work in the Grand Canal in 2001 and 2002, when divers recorded the GPS location and general information (fig. 2). Another smaller container (no. 9) probably belonging to this group was identified in 2004. They are all closed, round, and have bulbous shapes.⁵ There seems to be an ordering to the diameter of the containers: it consists of the larger containers, i.e. 100-120 cm diameter, at the southern end of the cluster and the smaller ones at the northern end (fig. 3). Their proximity suggests the possibility that they should be understood in relationship to each other.

This group of large containers was found relatively close together in the Grand Canal (fig. 2). The scale of the map is perhaps deceptive, as the distances between the containers are still significant: between each container there is an average 5 m distance. Between the containers in the north (no. 7) and in the south-east (no. 5) is 28.5 m, and the distance between the latter and the closest one to the west (no. 8) is 12.4 m.

DATING AND ARCHAEOLOGICAL CONTEXT

Although the containers were found during prospection dives, the archaeological context of this group in the Grand Canal does provide enough evidence for a date range through the ceramics and coins found in the vicinity. The containers themselves were found resting within layers containing sherds and coins on a compact clay stratum (Goddio 2007: 104, figs. 3.62 and 3.63).⁶ It is apparent that in the mobile layer of sand at the top objects may move around. Thus, the following description of the archaeological context should *not* be interpreted as a closed context surrounding the lead containers. They do, however, give a good general indication of the date of activity in the area.

Ceramic Evidence

Fine ware and coins were recovered from the same surveys during which the large containers were found. The ceramic assemblage is dominated by imported fine ware from Attica, mainly vessels such as *skyphoi* and *lekythoi* used for liquids (Grataloup 2012: 174-175, 180-181).⁷ The assemblage is more indicative of an area of ritual activity rather than shipwrecks or storage activity. The squat *skyphoi* date from the middle of the fifth century

³ Two photographs of one of the large containers are published here, as they are the only ones currently available.

⁴ The chemical composition of the metal has also not been determined, which may provide a worthwhile future avenue of research for this category specifically. Research on Roman pewter ware shows that the ratio of tin, copper, and lead in the alloy varies according to the shape and size of the intended vessel, see Pollard 1983.

⁵ Franck Goddio, pers. comm.

⁶ The caption of fig. 3.63 should read “Stratigraphy of the excavation H2 near the *lead container* Inv. No. 2725” (my emphasis), see Goddio 2007: 104.

⁷ I thank Catherine Grataloup for her help and comments on the discussion of the ceramics.

to the first half of the fourth century B.C. and they taper off in the second half of that century. Many *lekythoi* are dated from the late fifth to first half of the fourth century B.C. There are also fragments of painted table amphoras, of either East Greek or Levantine origin (Lehmann 2000), dated to the end of the fifth and first half of the fourth century B.C. Amphoras and local wares, on the other hand, are rare, except for a production of fine ware vessels (cups, bowls and jugs) in marl clay, particularly typical at certain sites in the Egyptian Delta during the Persian period (Grataloup 2012).

Numismatic Evidence

The coins found in the vicinity of the containers in the Grand Canal all originate around the southern edge of the cluster, container no. 5 being closest in most cases.⁸ Within one meter of this container was an Athenian bronze coin B.C. (exc. no. 2793, 4th century B.C., 0.75 m distance), a Macedonian bronze coin of Alexander of an uncertain mint (exc. no. 678, c. 336-323 B.C., 0.75 m distance), and a Ptolemaic coin from series 2 (exc. no. 685, 302-261 B.C., 0.50 m distance).⁹ A Macedonian bronze coin of Philip II (exc. no. 687, c. 358-336 B.C.) and a bronze coin from Cos (exc. no. 682, 4th century B.C.) were found at around 1.5 m distance. More coins were found in a radius of between 2 and 5.6 m from the group (table 1) and taken together the numismatic evidence supports a fourth to early third century B.C. date for the strata. There are four coins in total in table 1 (exc. nos. 2789_1, 2789_12, 2789_25, and 2789_29) that should be dated later than the third century B.C. Since they are a small number, from a relatively mobile layer as opposed to a closed stratigraphic unit, and in view of the absence of ceramics of later date, I consider the coins intrusive and possibly dropped in the canal by accident at a later date.

Other Evidence

Excavations in the Grand Canal (Goddio 2007: 102-111, figs. 3.61, 3.62, 3.63, 3.64, 3.65, and 3.71) were conducted near the mole in H2, directly north of the temple, closest to the large containers. They yielded objects from the whole occupation range of the site, but the majority is from the fourth and third centuries B.C. (Goddio 2007: 105). Many bronze ritual objects were found in the area, as well as a concentration of the gold finds (Goddio 2007: 124-125, figs. 3.102, 3.103, and 3.104). In the centre of the canal near the lead containers, wooden posts were discovered, which the excavator suggests to interpret as possibly part of a moorage or anchoring posts or narrow island.¹⁰ Radiocarbon analysis of the samples from the wooden posts presents a second half of the fourth century B.C. date (Goddio 2007: 105). A broader date range from the sixth to first centuries B.C. was

⁸ This discussion is part of ongoing work on the coins and I thank Andrew Meadows for sharing his results so far with me. The distances between objects are reconstructed from the distribution map, i.e. there is a single point indicating the lead container from which the distance to the coin is measured. The measurements have not been altered to account for the radius of the container, i.e. if the coin is 75 cm away from the container and that container has a radius of 50 cm, the distance may in fact only be 25 cm from the maximum diameter.

⁹ For the dating and seriation of the Ptolemaic coins, see Picard and Faucher 2012.

¹⁰ Franck Goddio, pers. comm.; see also Goddio 2007: 105.

obtained from samples from the wrecks and wooden anchor stocks in the Grand Canal (Goddio 2007: 106-107, fig. 3.68). Other finds from the temple area are indicative of its important position during the fourth and third centuries B.C., e.g. the Heracleion stela, twin to the Naukratis stela, from the reign of Nektanebo I, year 1, i.e. 378 B.C. (SCA 277; von Bomhard 2012; Goddio 2007: 83).

To summarize, the ceramics in the vicinity of the containers suggest activity in the late fifth century and diminishing in the second half of the fourth, whereas the coins suggest the (mid-) fourth century to early third century dating. Taken together, the ceramics and the coins combine into a robust framework indicating a late fifth to early third century B.C. date. This is significantly earlier than the earliest known lead vessels of considerable size, i.e. the lead braziers from Bodrum, Turkey, which are dated to the end of the second to the middle of the first century B.C. (Leonard 1973).

INTERPRETATION

After establishing this framework for the containers, it is time to address the location of the containers at the bottom of a canal. The Grand Canal was the main waterway through the site running north of the temple of Amun-Gereb. Many boats would have frequented the canal with cargoes of a diverse nature: boats of temple personnel associated with the temple's economic role in levying taxes, the general supply and logistics of the temple, with ritual activity with processions, as well as the regular traffic one would expect on a waterway. Objects at the bottom of this canal could have been deposited there as the result of different processes: deposition after ritual activity, directly from the running of the temple itself, and rubbish depositions as the natural result of a busy thoroughfare are also likely to be present.

Interestingly, there are no exact parallels for lead containers of this shape and size. A discussion of objects of a equal size is helpful in order to address the function of the large containers on a conceptual level. The functional attributes of large ceramic containers are similar in terms of accessibility, stability, transportability, and 'graspability' (Christakis 2005: 5) and thus provide a useful concept for the metal containers. The examples of large ceramic vessels such as Greek *pithoi* and Roman *dolia* will serve for this purpose. Examples are known in the Aegean from the Late Bronze Age onwards, and in general they are very suited to store subsistence commodities, such as grain and wine (Christakis 1999: 4; 2005: 53-59). Examples of straight-sided ceramic *pithoi* from the fourth century in domestic contexts from Egypt are known from Aswan (Müller 2010: 432, 442 fig. 5) and Elephantine.¹¹

¹¹ They are straight-sided storage jars from area 15 of smaller dimensions than the lead containers at 45-65 cm diameter and 62-78 cm in height. One is dated to 550-400 B.C. (Phase V), see Aston 1999: 220 no. 1970, pl. 68 and b/w pl. 11; and two others were found in archaeological layers in house P associated with the reign of Nektanebo II (360-342 B.C.) (Phase VIa, house P), see Aston 1999: 266 no. 2305, pl. 85 and b/w pl. 14; and 270 no. 2337, pl. 87 and b/w pl. 15.

The lead vessels from Thonis-Heracleion are closer to the Roman *dolia* with their bulbous shapes. Container no. 5 (figs. 4 and 5) is similar in shape and size to the *dolia* found on ships and on land from the western Mediterranean (Marlier 2008; Heslin 2011). The containers on the wrecks are specifically associated with a regional wine trade to Gaul, which was based at Minturnae, Italy (Heslin 2011: 161), and they are interpreted as a reaction to a need for the bulk transportation of cheap wine. The earliest example, the Cap Bénat B (Parker 1992: 98 no. 173), dates to the late second to early first century B.C. The latest are from the middle of the third century A.D., with a distinct peak in *dolium* use onboard ships in the first century A.D. (Heslin 2011: 157, 158-159, table 9.1).

The large size of the ceramic vessels such as *dolia* has repercussions for its functionality. In the archaeological record, large ceramic vessels occur either as permanent fixtures in a ship, or buried in the floors of warehouses with part of the vessel, or even just the neck, protruding above ground. From the archaeological context of preserved examples in general it is clear that large ceramic storage containers were often left behind when a settlement was abandoned (Schiffer 1987: 95, fig. 4.7). Moving a *dolium* would be difficult, risking fracturing due to the sheer mass both of the vessel and its content (Heslin 2011: 162). The transportability of the large lead containers is an important consideration, with the high mass density of lead making these containers even heavier than their ceramic counterparts. They are, therefore, likely to have been immobile or fixed, perhaps on a ship, or in a storage context of a warehouse or temple.¹² The contents of the containers would have been decanted from the larger vessel using pumps and smaller containers (Heslin 2011: 164-166; Christakis 2005: 54).

Turning to accessibility and stability, the presence of the containers in the middle the Grand Canal could suggest that they were once part of the outfit of a ship, even with difference in diameter size. The pattern of the 11 ceramic *dolia* from the Grand Ribaut D wreck (Parker 1992: 203-204, no. 477), for example, also shows a difference in size: some are slightly larger than others and there is a general distribution difference where the *dolia* are at the centre of the wreck while the space at the opposite ends is for amphoras (Gianfrotta and Hesnard 1987: pl. XLIX). The distribution within this wreck is three *dolia* per row, whereas the Thonis-Heracleion distribution shows a 'row' of two.

Considering this potential nautical aspect as part of a ship's outfit, it is interesting to note that *dolia* were better suited to riverine transport, because they were able to carry more in less hold space than the equivalent volume in amphoras, making transport more efficient and conducive to shallow waters.¹³ This observation is significant in the context of Thonis-Heracleion in its marshy environment at the mouth of the Nile. The majority of the wood samples from the wrecks in Thonis-Heracleion are of the local acacia tree, *Acacia sp.* and *Acacia tortilis/radiana* (Fabre 2011: 17-19; Gale et al. 2003: 335-336) and for a certain number of ships it is clear that the hull construction is very suited to the marshy and shallow water environment of the Egyptian Mediterranean coast (Fabre 2011: 28-29). The main

¹² For an analysis of the context of Cretan Bronze Age *pitthoi*, see Christakis 2005: 53-59.

¹³ Heslin 2011: 163; following Pallarés 1985: 617-618; and Marlier 2008.

drawback, however, in interpreting the containers as part of a ship's equipment is the lack of associated timber that would indicate the presence of an accompanying hull. Consequently, the possibility of the containers being part of a ship's outfit is only a theoretical one.

The deliberate deposition of the vessels in the water is another option, if the vessels were connected to rituals and therefore too sacred to reuse or recycle. Was sinking in the water perhaps the most convenient method to dispose of them, in the middle of the canal where the water may have been deepest? This, however, would pose practical problems, as the act of removing them from a ship would cause a weight shift that would compromise the balance of the boat even if the containers were empty. The weight shift in the boat would have been extremely difficult to manage,¹⁴ although a wide, flat-bottomed riverine vessel would perhaps be easier to manage in such a scenario than a seafaring ship with a round hull. Neither of the interpretations proffered so far, however, seem very satisfactory.

At this point I would like to offer a hypothesis that has a better fit with the archaeological evidence presented. Storage facilities would have been necessary both for the daily provisions of the sanctuary as well as fulfilling the economic role of the temple in terms of taxation. The wooden posts may suggest some form of harbour infrastructure, perhaps as a wooden mooring area or as stabilizations for a small narrow island supporting the large containers. The large quantity of fine ware and other bronze and gold objects found in the Grand Canal supports the idea that this canal was an area with much ritual activity. Consequently, the lead containers may be interpreted as storage managed by the temple for dedicatory purposes. The fine ware found in the canal may have been used to decant the liquid in the large vessels (Christakis 2005: 54). The lead containers presumably stored a liquid such as fresh water or wine to be dedicated in the cups and jugs.¹⁵ Water seems the most likely candidate: water libation rituals are common in Egyptian temples.¹⁶ Demand would also be high for drinking water in a harbour town at the edge of the sea. And finally, the management of the saline seawater, the tides, and the Nile flood, i.e. fresh water carrying fertile mud and silts from further upstream, would have been a major concern for Thonis-Heracleion at the interface between the sea, the Nile, and the canal system connecting the town.¹⁷

¹⁴ It is precisely the problem of potentially capsizing a ship as the result of the weight shift if a *dolium* fractures that may explain the limited use of this type of ship, see Heslin 2011: 161, esp. n. 10.

¹⁵ The text of four near-identical 19th dynasty donation stelae found in Gebel Silsileh mentions throwing offerings into the Nile, an act rarely mentioned in Egyptian texts, see Barguet 1952: 62-63 and n. 1.

¹⁶ I give two references to water rituals performed in the vicinity of a body of water: for barque sanctuaries see Colin 2005: 283-285; for the Taharqa ramp leading to the water in Karnak, see Traunecker 1972. For libations in general, see Borghouts 1979.

¹⁷ For a study on the role of water, the Nile flood, and its connotations of bounty in the Hellenistic and Roman period, see Wild 1981. The examples discussed by Wild are of a different nature than the ritual proposed here, but it does demonstrate the importance of water as a concept in Egyptian (inspired) ritual. A unique colossal Hapy statue (SCA 281), a male deity personifying the Nile flood, stood near the temple, see Goddio and Fabre 2008²: 105, 306 no. 102; Goddio 2007: 90 fig. 3.37. The presence of such a figure in this harbour town is perhaps significant in this respect, but the connection between this statue and a cult related to water requires development in a separate study, which I intend to undertake in the future.

CONCLUSIONS

Although there is limited information regarding the containers themselves, it is possible to draw some conclusions about the dating, function, and location of these nine containers from the disparate strands of evidence discussed here.

Ceramics and coins establish the chronological boundaries of the site as a whole. More specifically, the archaeological context of these lead containers suggests a late fifth to early third century B.C. date. Ceramic sherds across the site drop sharply in number by the middle of the second century B.C., which may serve as a general *terminus ante quem*.

Comparison with large ceramic containers elsewhere provides interesting information to interpret the function and use of the lead examples. Ceramic vessels of similar dimensions are mostly used for storage of foodstuffs. They are found in a fixed environment, either buried in the floor, or as a fixture in a ship, after which they were left *in situ* at abandonment. For the lead containers from Thonis-Heracleion this suggests a similar storage context associated with a wooden mooring area, or perhaps a narrow island, and subsequent deposition *in situ*. This area may consequently have been part of a storage facility for rituals, perhaps involving offerings of water, conducted in the Grand Canal.

This case study shows the potential of these objects to shed light on activities in the town despite the lack of direct parallels. The choice of lead as material for these containers is unique and requires further analysis with regard to its abundance in Thonis-Heracleion. It is clear that large lead objects appeared earlier and its range is wider than previously known. In short, Thonis-Heracleion opens up a completely new perspective on the question of lead metallurgy in antiquity.

CATALOGUE

- No. 1: H. 2002.H1.3801; diameter 120 cm, H. 100 cm; in situ, round and bulbous shape.
Distance from no. 2 is 0.75 m.
- No. 2: H.2004.XX.8591; diameter 110 cm; in situ, round and bulbous shape.
- No. 3: H.2002.H1.3802; diameter 100 cm, H. 80 cm; in situ, round and bulbous shape.
Distance from no. 1 is 0.75 m; from no. 4 is 4.2 m; from no. 7 is 3.8 m; from no. 3 is 6.1 m;
from no. 5 is 3.5 m.
- No. 4: H.2002.H1.2927; diameter 100 cm, H. 80 cm; large container, round and bulbous shape.
Distance from no. 7 is 5.1 m; from no. 5 4.8 m; from no. 2 is 6.1 m; from no. 6 is 5.6 m.
- No. 5: H.2001.H2.2725; diameter approximately 120 cm; in situ, round and bulbous shape with two perforations in walls near the shoulder of the vessel.
Distance from no. 7 is 4.6 m; from no. 2 is 4.2 m.
- No. 6: H.2001.H1.2415; diameter 75 cm, H. 85 cm; round and bulbous shape.
Distance from no. 3 is 5.8 m; from no. 2 is 3.5 m.
- No. 7: H.2001.H1.2417; diameter 75 cm; round and bulbous shape.
Distance from no. 3 is 5.6 m.
- No. 8: H.2002.H1.2928; dimensions unknown; large container, round and bulbous shape.
Distance from no. 4 is 4.6 m; from no. 3 is 5.1 m.
- No. 9: H.2004.XX.8849; diameter 50 cm; round and bulbous shape.

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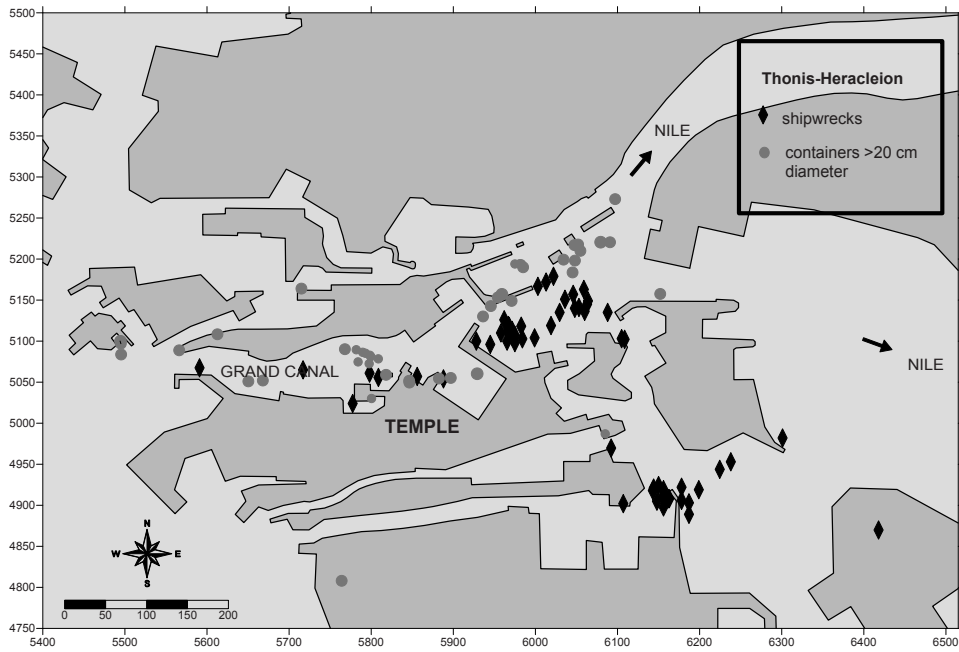


Fig. 1. Lead containers, all with a diameter of 20 cm and larger (© Franck Goddio / Hilti Foundation).

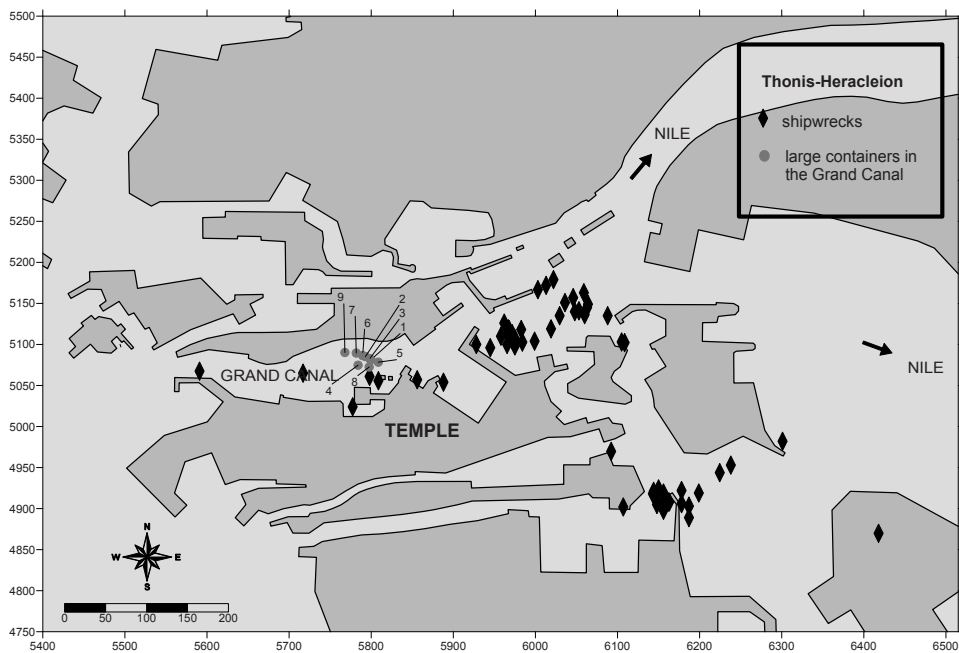


Fig. 2. Group of large containers in the Grand Canal (© Franck Goddio / Hilti Foundation).

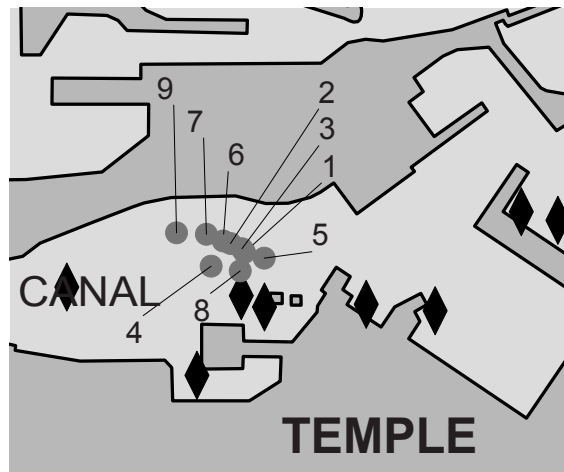


Fig. 3. Detail of the cluster in the Grand Canal (© Franck Goddio / Hilti Foundation).

Excavation number	Distance	Date, type
681	2.1 m (from no. 5)	Ptolemaic series 2-3
1400	2.5 m (from no. 8), 2 m (from no. 5)	Ptolemaic series 2-3
1412_7	2,5 m (from no. 5)	c. 336-323 BCE, illegible Macedonian coin of Alexander
2789_4 and _5	2.6 m (from no. 5)	Ptolemaic series 2
2789_2		Ptolemaic series 2-3
2789_1		Ptolemaic series 6-7
2789_12 and 2789_25		Ptolemaic series 9
2789_29		illegible Roman coin
2792	3 m (from no. 5)	4 th c. BCE, Athenian tetradrachm
683	3.5 m (from no. 5)	4 th c. BCE, bronze coin of Rhodes
6492_1 and 6492_2	3.5 m (from no. 4)	Ptolemaic series 2-3
689	3.9 m (from no. 5)	Ptolemaic series 1-2
690	4.1 m (from no. 5)	Ptolemaic series 1-2
8015	4.9 m (from no. 6)	Ptolemaic series 2
680	5 m (from no. 5)	4 th c. BCE, bronze coin of Cos
2745_2	5.6 m (from no. 5)	mid-late 4 th c. BCE, bronze coin of Sidon

Table 1. Coins in the vicinity of the cluster of large containers.



Fig. 4. Container no. 5, diam. ca. 120 cm (© Franck Goddio / Hilti Foundation).



Fig. 5. Container no. 5, diam. ca. 120 cm (© Franck Goddio / Hilti Foundation).