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1

The religious landscape and gifts to the gods

1 The sacred topography of Thonis-Heracleion

Franck Goddio

Introduction

The text of the Decree of Saïs clearly illustrates the intertwined nature of the Egyptian maritime economy and the temples in the cities of Saïs, Thonis-Heracleion and Naukratis on the Canopic branch of the Nile. Thonis-Heracleion was the western guardian to the gates of Egypt and through its harbour flowed a myriad of exported and imported goods. The Decree demonstrates that while the temple and its religious authorities benefited from the rich income from customs and trade, the administration of, and revenue from, taxation was controlled solely by the sovereign. The funds were collected and transferred into the royal domain, and the king then decided on the share to be allocated to the temples. At Thonis-Heracleion, the archaeological evidence would suggest that the administration of customs dues was located from the fourth century BC onwards on the Central Island. Prior to this date, it was most likely to have been in the north of the city and was probably set around the entrance of the North-East channel—the main entrance point into the port from the Nile and Mediterranean sea beyond at this time.

The study and interpretation of the archaeology of Thonis-Heracleion up to this point has largely been focussed on the overall topography of the port, the general trends in its economic life, or of groups of trade-related artefacts. In contrast, comparatively less emphasis has been devoted to the study of the sacred and religious life of the city, despite the wealth of material evidence for both grand temple-based and every-day ritual devotion. This paper offers an initial attempt to characterise the religious life of Thonis-Heracleion through the study of its sacred topography. Building out from locating the main temple complexes and other cult structures of the city, this chapter considers which deities were worshipped and, where there is robust evidence to do so, identifies the places in which this occurred. This chapter also considers the important issue of the changing topography of the city and how the sacred landscape developed alongside it. The overall aim is not to present a coherent and fully worked through exposition of this sacred landscape—we are at too preliminary a stage for that—but to give some initial pointers towards how this landscape would have looked and how it would have changed with time across the first millennium BC.

The Canopic branch of the Nile, which stemmed from the mouth of its ancient Delta, was by far its most important branch during the first millennium BC. Toussoun notes that for some ancient authors it was the very bed of the river Nile.[1] As the widest and deepest of the Nile's seven branches in antiquity, it was the best approach into Egypt from the sea and its navigability also made it a natural entry into the country.[2] The history of the northwestern Delta and of Egypt itself at the time of the Third Intermediate Period demonstrates the importance of controlling this access point for both military and economic reasons.[3]

The former Canopic or Heracleotic mouth shared the same characteristics as those of the Nile's other branches.[4] Sand dune belts lining the clay embankments frame some of the Delta's vast and flat inland expanses. They are criss-crossed by secondary branches connecting coastal lagoons to the main branch where they merge, creating an aquatic landscape of islands, islets, canals, lakes and marshlands. This unique hydrography was called *hone*,[5] which the Palestrina mosaic clearly illustrates on its lower part.[6]

The geological and hydrographical conditions of the area made it vulnerable to natural disasters. The slow subsidence of the eastern Mediterranean land mass and the gradual rise of sea level weakened the substrate of these lowlands, counteracting the consolidating effect of the silt deposited annually by the flooding of the Nile. Sudden sediment failure resulting from land liquefaction, itself triggered by tidal waves or catastrophic floods of the Nile, all led inexorably to total land submersion.[7]

A geophysical survey begun in 1997 by the European Institute of Underwater Archaeology (IEASM) over an

1 Toussoun 1922: 29; Herodotus *Historiae* 2.15–17.
2 Diodorus Siculus *Bibliotheca Historica* 1.19.1–4; Plutarch *Lycurgus* 53.
3 Yoyotte 2011: 7–8; 2012: 47–59.
4 Bernand 1970: 302–3.
5 Yoyotte 1966–7: 85–6; 1967–8: 108–9; 1971–2: 165–7; 2013: 298–9, 307–8, 349–52.
6 Whitehouse 1976; Meyboom 1995: pls 6–27; Leone 1997; Walker 2001; Goddio 2007: 129, fig. 3.108; 2008: 48; Robinson and Wilson 2010: xi.
7 Stanley et al. 2001: 293–4; 2004: 4–10; 2007: 54–7. A major natural disaster seems to have occurred in the second half of the fifth century or at the beginning of the fourth century BC. The final destruction was most probably due to a tsunami as by that time (eighth century AD) the Canopic branch of the Nile had dried up.

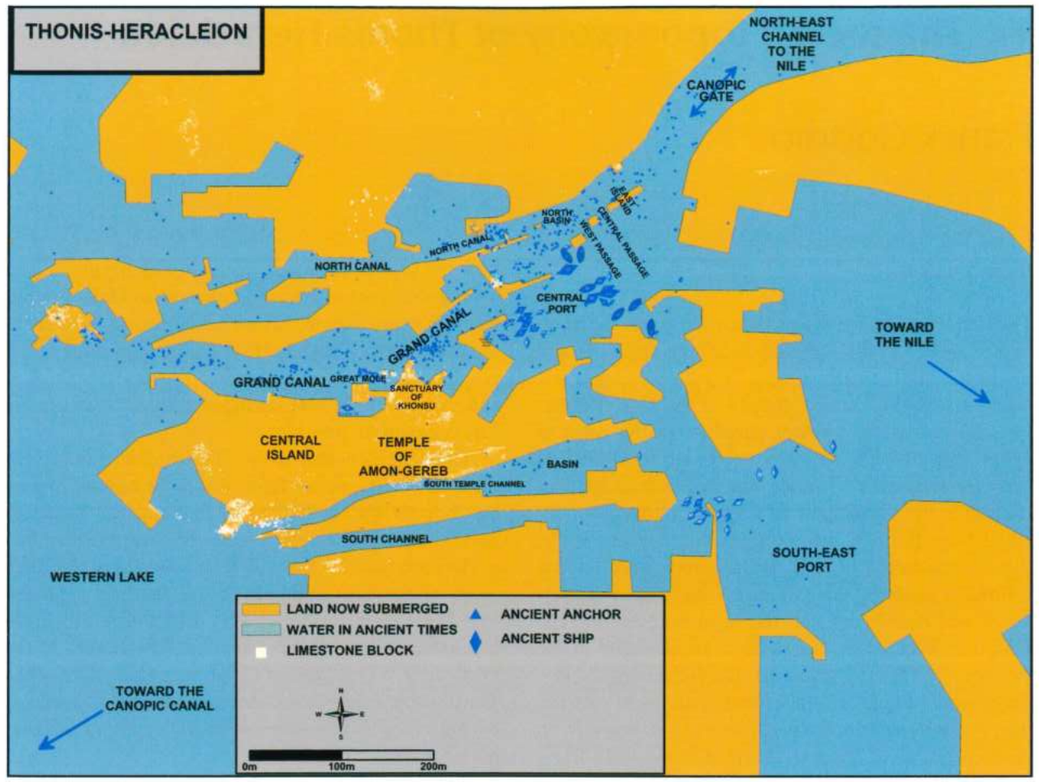

Figure 1.1 Central site of Thonis-Heracleion. (Map: F. Goddio; © F. Goddio/IEASM.)

area of 11,000 ha (about 27,000 acres) west of Aboukir Bay uncovered a vast submerged triangular area of land of the ancient *hone*.[8] Archaeological excavations carried out over a period of fifteen years have located the cities of Thonis-Heracleion and East Canopus, drawn maps of the area and conducted surveys and excavations of submerged monuments.[9]

Thonis-Heracleion was founded on the west bank of the Canopic branch of the Nile, near its mouth, just south of the first tributary, west of the sand dune belt lining the river. The city was connected to the main branch by several secondary diverticula forming broad access channels through the dune belt. This location, within the *hone*, was particularly advantageous, for its ports and harbours were protected from the winds, heavy swells, and waves of this sparsely-sheltered coast of the Delta. The advanced position of the town also meant that all maritime traffic entering or exiting Egypt via this mouth came under its control and its wide communication channels allowed rapid interventions in the Canopic branch. The city was perfectly positioned to become the 'keeper of the Canopic branch'.[10]

The main site consists of several islands and islets, with channels crossing it from east to west connecting an eastern harbour with a large western lake (Figure 1.1). The widest transversal waterway, called by the team the 'Grand Canal', ran along the north side of the central island of Thonis-Heracleion. A 'North Canal' extended from the channel which accessed the city from the northeast. Two other east-west canals ran south of the main island and large port basins were built to the east and southeast of the site, connected to the Nile by three wide main fluvial channels passing through the dune belt. Secondary canals between islands were the finishing touches to this complex landscape, a confusing pattern of tangled water bodies and land.[11] The port basins were connected to each other by a network of north-south channels. Excavations have shown that the passages between these were sometimes defended by fortifications.

Several large waterways running from the Western Lake irrigated the lands further to the west. The most important one, a western extension of the Grand Canal, connected the cities of Thonis-Heracleion and Canopus.[12]

8 Goddio 2007: 15–7; 2010.
9 On the identification of Thonis-Heracleion see Yoyotte 1958: 428–30; 2001b: 28; 2004a: 36; Goddio 2007: 29–68 (Canopus), 69–130 (Thonis-Heracleion); 2010: 3–10, 11–12.
10 Herodotus *Historiae* 2.113–4: '… and the warden of the Nile mouth, whose name was Thonis …'.
11 Goddio 2011: 127–8, figs 7.5–6.
12 Goddio 2010: 11–12.

Thus the port-city also served as an interface between the Canopic mouth and the city of Canopus, which was located about 3.5 km from Thonis-Heracleion.[13] There is also plentiful evidence to suggest that Thonis-Heracleion operated as an *emporion*.[14]

The work undertaken to define the general layout of the city has also brought to light its sacred topography. Sanctuaries were discovered frequently alongside places for trade and also defence. The actual locations of temples known from literature have been revealed through new finds of epigraphic texts. Furthermore, the topographic work has also brought to light previously unknown temples and sanctuaries, from which the material culture has permitted the identification of the deities worshipped. This work has confirmed and enriched our prior knowledge of the practice of worship in the city, while at the same time it has also highlighted the particular cult practices of the region, especially those concerning the Osirian rites in the month of *Khoiak*.

Evidence for divine worship in Thonis-Heracleion prior to the rediscovery of the city

Prior to its rediscovery, Thonis-Heracleion was best known in Greek and Latin literature for its sanctuary dedicated to the cult of Herakles. Herodotus mentions several stories about heroes from the Trojan War involved in the abduction of Helen, which he links to this temple:[15] Paris, returning to Sparta after abducting Helen was forced by adverse winds to shelter in the Canopic region where 'there was (and still is) on the coast a temple of Herakles'.[16] Over the centuries, other ancient authors supplemented these stories with many legends about the Canopic region.[17] According to Eustathius, the mouth called 'Heracleotic' is so named because it was through this entry that Herakles set foot in Egypt:

> *… when Herakles returned with the golden apples, he visited Libya entirely on foot as well as Asia. And, when he arrived at the sanctuary of Amun, he made splendid sacrifices to the deity, and thence passed into Egypt, whereupon the mouth took the name of Herakles.*[18]

Herodotus distinguishes two figures of Herakles, a very ancient Egyptian god and the Greek demigod.[19] The assimilation of one to the other probably happened during the Hellenistic Period, while at least six or seven other figures of Herakles of different origins coexisted alongside them.[20]

In Egypt, Herakles was associated with Khonsu,[21] through the process of the *interpretatio graeca*. Khonsu was the divine son of Amun (Zeus) and Mut (Hera) and thus it is no surprise that the worship of Amun at Thonis-Heracleion was known before the archaeological discovery of this town, particularly from a famous Ptolemaic decree.[22]

The Decree of Canopus

The oldest document referring to the cult of Amun in Thonis-Heracleion before the excavations on site was the Royal Decree of Canopus by Ptolemy III in 238 BC. In its Greek version it mentions that a nautical procession of a statue of Osiris in his sacred boat took place every year on the 29th of the month of *Khoiak*, from his sanctuary in Heracleion to his temple in Canopus.[23] The part of the Decree that refers to the 'sanctuary of Heracleion' in Greek also mentions 'the temple of Amun-Gereb at the entrance to the *hone*' when written in Egyptian hieroglyphs. Thus, the Decree revealed the name of the foremost divinity of Heracleion: Amun-Gereb, and indicated that the rites of *Khoiak* were celebrated in this town.

Spiegelberg, who studied the demotic version of the Decree, realized that 'the entrance of the *hone*' meant the Canopic mouth of the Nile, and made the connection with the city called Hone, which appeared on the Naukratis stela discovered in the late nineteenth century.[24] The identification of the city Hone with Thonis-Heracleion is now beyond question, thanks to the discovery of the Thonis-Heracleion stela in 2001 in the remains of the temple of Amun-Gereb.[25]

The Decree of Canopus also mentions the earliest reference to date of the epithet *Gereb* associated with the name of Amun.[26] It has been demonstrated that *gereb* was a kind of land property deed which, with the added *mekes*, gave the pharaohs official proof of their inheritance as rulers of the Two Lands and the world, thus giving the new kings of Egypt universal sovereignty.[27] Consequently, the status of the temple in Thonis-Heracleion located at the mouth of the *hone* and identified as the temple of Amun-Gereb by the Decree of Canopus was that of a sanctuary associated with dynastic continuity.

13 Yoyotte 2002: 14–15.
14 On Thonis-Heracleion as an *emporion*, see Goddio 2008: 46–8; 2011: 121–9; Fabre 2008d: 219–20, 232–3; von Bomhard 2012a: 98–102.
15 Herodotus *Historiae* 1.3; 2.113–20.
16 Ibid. 2.113.
17 E.g., Bernand 1970: 164–221.
18 Eustathius *Scholia in Dionysium* 11.
19 Herodotus *Historiae* 2.43–5.
20 On Herakles' complex personality resulting from a combination of a number of gods or heroes, see Barguet 1985: 496 note 66; Yoyotte 2004b: 1–6.
21 See Quaegebeur 1975–6: 469–72.
22 Guermeur 2005: 143–8. He also illustrates the dissemination of Amun, the 'Theban' god, through the Nile valley and beyond during the New Kingdom (ibid.: 4).
23 Hieroglyphic version: Sethe 1904: *Urkunden* II: 144, 1–3; demotic version: Spiegelberg 1922: 72–3; Simpson 1966: 234–7; Greek version: Bernand 1970: 995; 1992: 24.26.
24 Spiegelberg 1922: 73, 90 note 41.
25 Yoyotte 2001b: 32; 2004a: 35–6; Goddio 2007: 77, 83.
26 The Cairo demotic papyrus CG 31169 (discussed below) is not precisely dated.
27 Yoyotte 2001b: 31; 2004a: 38; Guermeur 2005: 147–8.

Figure 1.2a Lower register on side 1 of bronze object. HX-12826. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

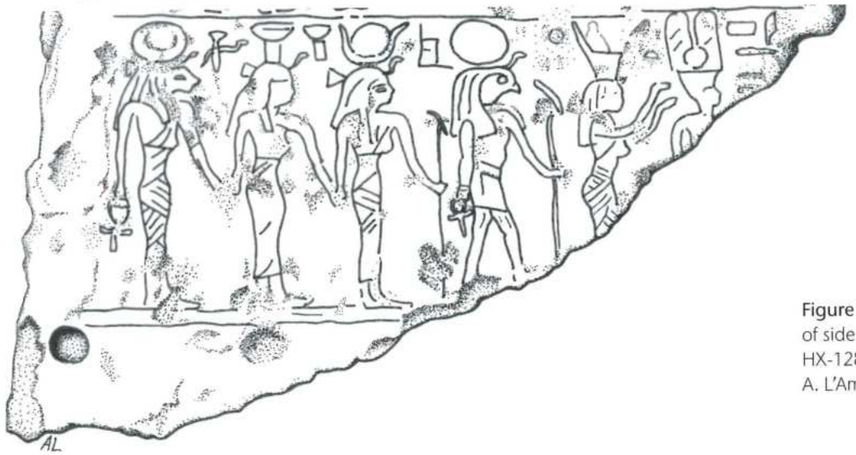

Figure 1.2b Lower register of side 1 of bronze object. HX-12826. (Drawing: A. L'Amoulen.)

Other Egyptian documents

In addition to the Decree of Canopus, the name Amun-Gereb was also inscribed on a monument of a private individual. This naophorus statue is in the Yale Peabody Museum and seems to date to the reign of Ptolemy V.[28] It represents a priest who, among many other functions, performed his duty in several Egyptian cities as a priest of Khonsu, Osiris, Khonsu the Child, and Amun-Gereb, as a scribe of the temple of Amun-Gereb, as a scribe of the temple of Osiris of Canopus and as a priest of Horus, *Ḥpḥp* Lord of the Sea.[29] Guermeur also mentions a representation of Amun-Re named 'Lord of the Gereb' in a procession of the gods of Lower Egypt decorating the lower section of the north inner wall of the temple of Arensnuphis in Philae. He also notes that the name Amun-Gereb appears on a demotic papyrus in Cairo listing various deities and place names.[30]

In summary, the gods mentioned for Thonis-Heracleion in the ancient texts are Herakles (and his Egyptian equivalent Khonsu), Amun-Gereb, and Osiris. To these must be added Isis of Heracleion, who appears in a papyrus bearing the epithet of 'Mistress of the Sea'.[31]

When taken together, the documentary record clearly indicates religious activity at the site but provides little more information. Consequently, the results of the underwater excavations at Thonis-Heracleion have much to contribute to the understanding of religious practice and belief both in this city of the northwestern Delta.

The main gods in Thonis-Heracleion according to the excavated evidence

The triad Amun-Mut-Khonsu

Excavations confirm that the divine triad Amun-Mut-Khonsu were worshipped in Thonis-Heracleion.[32] Archaeological excavations have brought to light two royal objects which demonstrate this and also provide useful topographical information. The first and oldest inscribed royal object to represent the divine triad in Thonis-Heracleion is a small bronze pyramid-shaped piece inscribed on all four sides.[33] It was discovered during the 2011 IEASM excavations on an island at the entrance of the North Canal and it shows on one of its sides the cartouche of Pharaoh Amasis (570–526 BC)

28 Klotz and Leblanc 2012: 690.
29 Guermeur 2005: 146; Klotz and Leblanc 2012: 655–6.
30 Guermeur 2005: 30–31, 147.
31 *P.Oxyrhyncus* XI no. 1380, I.61–2, Malaise and Winand 1993: 13; Thiers 2009: 14 note d.
32 As well as in many other cities of the Delta, see Guermeur 2008: 81–311.
33 H-12826: object currently being studied.

Figure 1.3 Amasis making an offering on side 4 of object. HX-12826. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

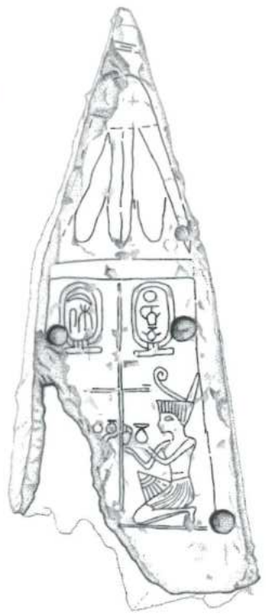

Figure 1.4 Side 4 of object. HX-12826 (H. 12.8 cm, L. 9.1 cm, W. 6 cm). (Drawing: A. L'Amoulen.)

and, on the lower frieze of another side, a procession of gods and goddesses (right to left): Amun, wearing the double plume and the solar disk; Mut, crowned with the *pschent*; and an anthropomorphic Khonsu, whose falcon head bears the full moon and the uraeus. The triad is followed by Isis, Nephthys, and Wadjet as a lion-headed goddess (Figures 1.2–4).

The second royal object mentioning the divine triad dates to the time of Ptolemy VIII *c.* 118 BC (Figure 1.5).[34] It is a colossal (6.1 m high, 3.1 m wide) pink granite veined gneiss stela, with a bilingual text, although most of the Greek is undecipherable. It was found *in situ* in 17 fragments, north of the North Canal.[35] A large part of the Egyptian text is worn, but the names of the gods of the triad are mentioned. In the preserved part of the lunette, Pharaoh and his two wives, Cleopatra II and Cleopatra III, all worship Amun and Mut, as well as the first three Lagid couples from the time of the Ptolemaic Philadelphians. The hieroglyphic text, which is unfortunately damaged, mentions Amun several times as the 'Lord of Gereb' (l. 22), 'Lord of the Water' (l. 14) and 'King of the Gods' (l. 13).[36] Mut is also shown in the lunette,[37] and in the inscription she is called 'Mistress of Shen' (?) (l. 2). It seems that this goddess resided in a

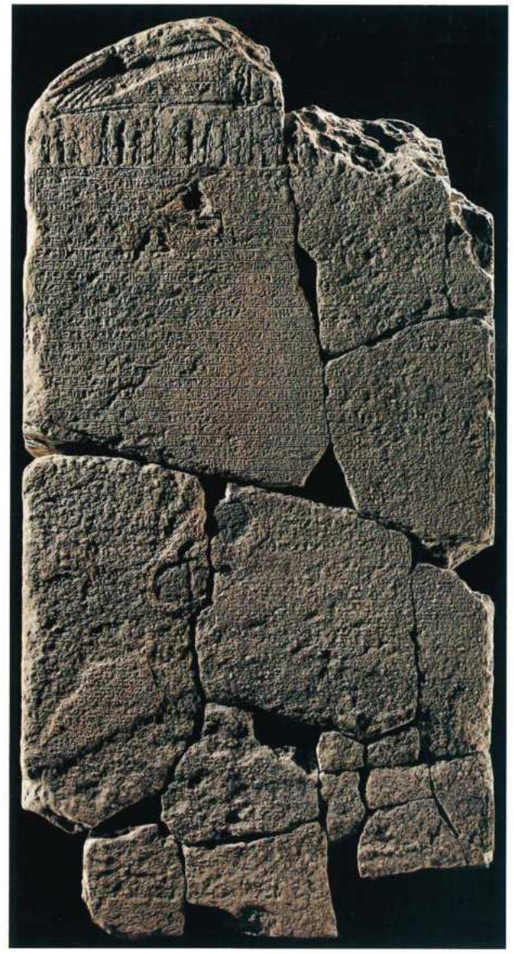

Figure 1.5 Stela of Ptolemy VIII Euergetes II. SCA 529 (H. 6.1 m, W. 3.10 m). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

new or renovated temple in Thonis-Heracleion (l. 17).[38] Khonsu—Amun and Mut's son—is also mentioned in the inscription (ll. 16–18).[39] The stela also demonstrates that Ptolemy VIII and some of his predecessors were benefactors of Amun, Mut and Khonsu, the triad of Thonis-Heracleion.

Amun and the temple of Amun-Gereb

The remains of a large sanctuary, its temenos built with limestone blocks, was brought to light on the site of Thonis-Heracleion's Central Island. Two royal objects discovered *in situ* have allowed us to identify the god to whom the temple was dedicated, and also to formally

34 SCA 529; Yoyotte 2004a: 39; Goddio 2007: 118, 129 fig. 3.109; 2008: 46–7; Thiers 2008; 2009.
35 Goddio 2009: ix, fig. 1, xi-xii, fig. 4, xiv–xv.
36 Thiers 2009: 20, 14, 13.
37 Ibid.: 3–5, 8.
38 Ibid.: 17, 30.
39 Ibid.: 16–18, 29, 31.

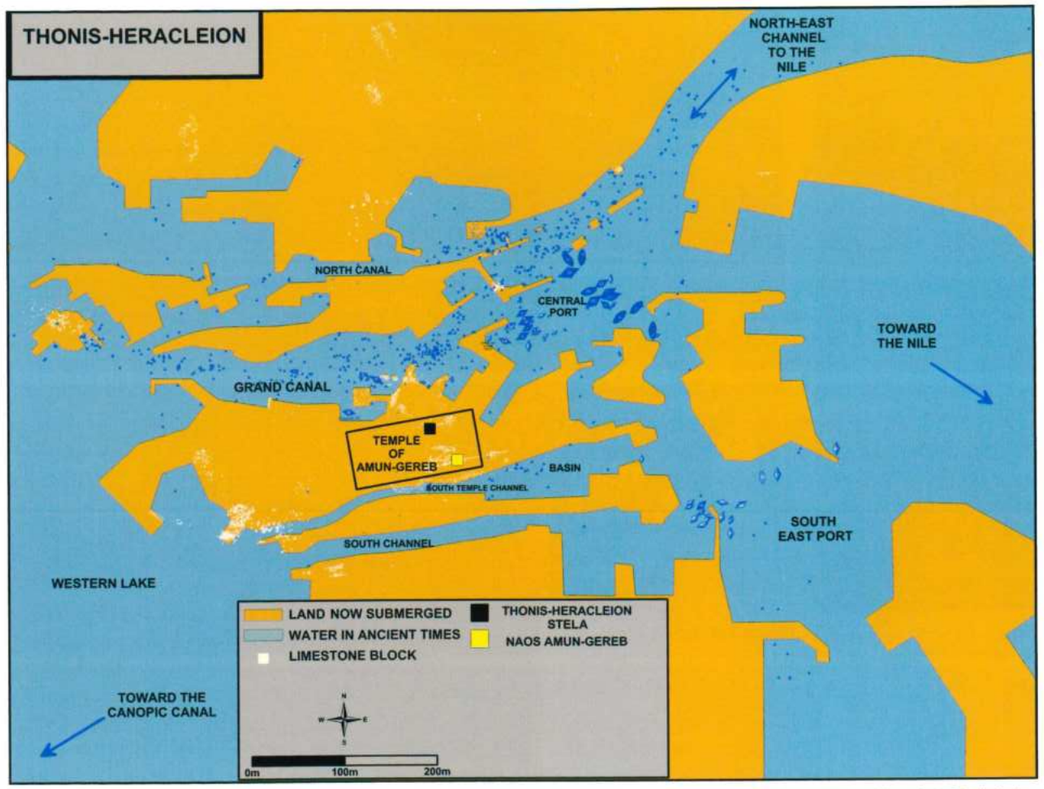

Figure 1.6 Location of the temple of Amun-Gereb and positions of the two royal monuments. (Map F. Goddio; © F. Goddio/IEASM.)

establish the place of 'the temple of Amun-Gereb at the mouth of the *hone*' or 'temple of Heracleion' mentioned in the Decree of Canopus, while proving that 'Hone' and 'Heracleion' were two names describing the same geographic entity (Figure 1.6).

The first of these objects is a 2 m high red granite monolithic naos from the Ptolemaic Period with some fragmentary inscriptions on the door jambs (Figure 1.7).[40] On the right: '... He who presides the *mekes*, the great god of the House of Rejoicing...' and on the left: 'He raised him to a king, designating him as ...'. These epithets and prerogatives are those of Amun-Gereb,[41] and the shrine would have contained the statue of the temple's principal deity. The cartouches of the Lagid ruler who erected the naos in the temple when he came to power are damaged but, based on their actual length, he was probably a Ptolemy, between Ptolemy III and Ptolemy VIII.[42] By comparing the text from this naos to that of the Canopus Decree, it can be seen that the Greek place name 'Heracleion' was the equivalent of the Egyptian 'temple of Amun-Gereb at the mouth of the *hone*'. This association not only identifies the deity to whom the temple was dedicated, but also demonstrated that the city in which it stood was Heracleion.

The second object discovered in the temple area was a black granite stela about 2 m high, which was found in pristine condition (Figure 1.8). It had been discovered under the remains of the north wall of the sanctuary[43] near to which it had probably been buried. It is almost a duplicate of the stela found at Naukratis in 1899 which was given the same year to the Giza Museum.[44] It is a Decree dated to Year 1 of Nectanebo I (380 BC) outlining the Pharaoh's plans in favour of the temple of Neith in Saïs. The king granted the sanctuary one tenth of taxes on imports passing through Thonis-Heracleion and on all transactions and local production of goods at Naukratis in addition to what the temple was already receiving from the royal domain.[45] The excellent state of preservation of the Thonis-Heracleion stela owes nothing to chance: it was positioned face down in the ground, and while many artefacts and debris littered the site around it, none were found under it.[46] The monument was most likely

40 SCA 457; Goddio 2007: 74, 88, fig. 3.32; 2008: 45; Yoyotte 2008e: 309; Fabre 2008b: 91; Goddio and Fabre 2008: 77, 79.
41 Malaise and Winand 1993: 21; Yoyotte 2004a: 36–8; 2008e: 309.
42 Guermeur 2005: 145.
43 Goddio 2007: 77, 83; 2008: 45–6.
44 Cairo Museum JE 34002; Maspero 1900: 40.
45 von Bomhard 2012a: 82 note b, 94–5 and this volume, Chapter 5.
46 SCA 277; Goddio 2007: 83, 86, figs 3.25–7.

Figure 1.7 Pink granite naos of Amun-Gereb. SCA 457 (H. 1.74 m). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

buried this way to protect the hieroglyphs. The inscriptions were probably preserved thanks to a layer of clay and plant material. Moreover, the stela must have been buried long before the catastrophic events that led to the land failure in the region, otherwise it would have been found in fragments just like the stela of Ptolemy VIII.[47] The monument mentions for the first time the Egyptian hieroglyphic name of the city with the article before the word 'hone', '*ta* hone', 'the hone', that is to say Thonis.[48] This is not found on the Naukratis stela, which only mentions the name 'hone' without the article. When Pharaoh, according to the stela of Thonis-Heracleion, indicates where this monument is to be erected, he pronounces the city's full name: 'The Hone-of-Saïs'. What is more, he describes the location of the city 'at the mouth of the sea of the Greeks'.[49] Thus, the discovery of the stela on the temenos of the temple of Amun-Gereb confirms that the Egyptian city of Thonis was the Greek Heracleion.

47 Goddio 2011: 125, note 26; von Bomhard 2012a: 13. It is not impossible that the Naukratis stela, found deeply buried and unspoilt, was also buried on purpose like the Thonis-Heracleion stela.
48 This confirmed the proposal made by Yoyotte (1958: 428–30) about the etymology of the name of the city.
49 Yoyotte 2001b: 25; 2008b: 240; Goddio 2008: 45–6; Fabre 2008d: 232–3; Goddio and Fabre 2008: 240; von Bomhard 2012a: 86–9, 94.

Figure 1.8 Stela of Thonis-Heracleion. SCA 277 (H. 1.99 m). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

The word *gereb* is also mentioned on the headless statue of an individual, a benefactor of 'the Lords of the Gereb'.[50] The hieroglyphic inscription was carved on the chest and upper arms of the statue, which was found near the temenos of the great temple.

Based on the archaeological evidence of pottery,[51] coins,[52] and statuary,[53] excavations in the sanctuary of Amun-Gereb show that it was active from the beginning of the fourth century BC to the second

50 SCA 455; Yoyotte 2004a: 38; Kiss and Yoyotte 2008: 307. The plural 'Lords' indicates that Khonsu was also 'Lord of Gereb' (a paper on Khonsu and Khonsu-Thoth is being prepared by A.-S. von Bomhard).
51 Grataloup and McCann 2008; Grataloup 2010: 155–6; this volume Chapter 7.
52 Meadows 2008a: 244–5.
53 Yoyotte 2008a: 116–9; Kiss 2008b: 121–3.

Figure 1.9 One side of the limestone slab. HX-13040 (L. 11.5cm, H. 9.0 cm, Th. 4 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

century BC.[54] The work here uncovered many other things: important royal statues,[55] rich cult furniture,[56] bronze situlae and simpula,[57] a gold phiale,[58] and an incense burner in an archaic Greek style, that all clearly illustrate the ritual use of this space.[59]

Amun was also present outside the temple area in various parts of the city of Thonis-Heracleion in the form of cult statuettes, for example, a small bronze head or numerous crown elements,[60] two tall straight plumes with the solar bronze disk,[61] or his great helmet also in bronze and originally gilded,[62] which would have been part of a full-size statue of the god. The deity is also present in its representations of Amun's rams in different materials: bronze statuettes[63] and also a thin limestone slab with reliefs on each side (Figure 1.9).[64]

A lead coin weight dating from the fourth century BC shows on one side the rear of an Athenian tetradrachm, and on the other the motif of the head of a ram, an animal representing the living image of the cult of Amun (Figure 1.10a-b). This weight must have served in the economic management of the domain of the temple of Amun-Gereb. It is of particular importance for our knowledge of monetary activities of the period in general and of Thonis-Heracleion in particular.[65]

At the entrance to the temple of Amun-Gereb stood three colossal statues in pink Aswan granite representing a royal couple and a figure of fertility.[66] The pharaoh, five metres high, was found in five pieces and almost complete.[67] He is depicted walking with his left leg forward.

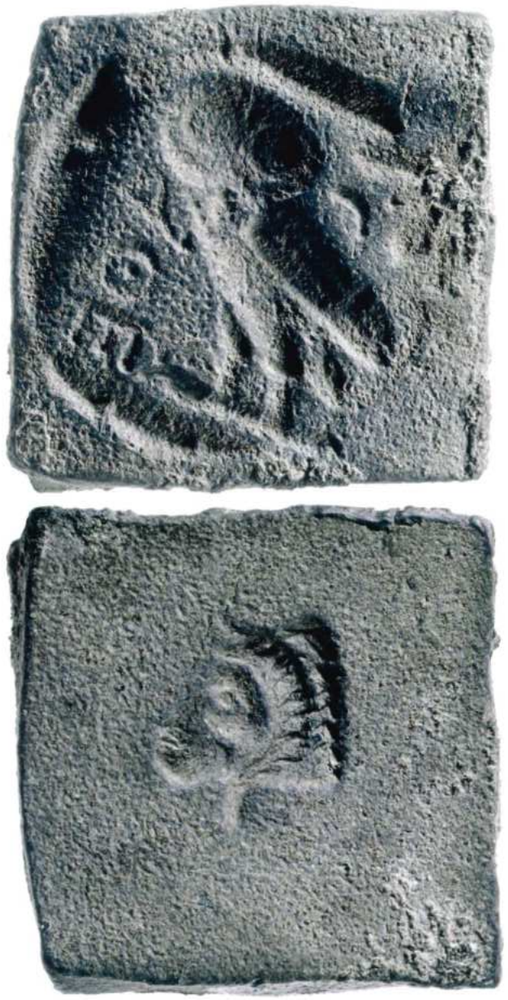

Figure 1.10a and b Lead coin weight showing a ram's head on the reverse (H. 2.6 cm, W. 2.6 cm, Th. 0.6 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

The pharaoh wears the *pschent* with a rearing cobra and holds in his right fist the cylindrical *mekes*-case, the symbol of his sovereignty. The queen, who at 4.95 m is almost as tall as the king, is represented as Isis-Hathor, identified by her headdress, the solar disk between ox horns.[68] The addition of two tall plumes is a reference

54 Goddio 2007: 78.
55 Yoyotte 2008a: 116–9; 2008c: 305.
56 Goddio 2007: 75–100.
57 Ibid.: 99–100; Ragheb 2009: 15–16, 22; Robinson 2008: 42–85.
58 SCA 296; Goddio 2007: 92–3, fig. 3.40; SCA 270; Cox 2008a: 313–4; Goddio and Fabre 2008: 170; Robinson 2008: 135; 2010: 220–1.
59 SCA 270; Goddio 2007: 99–100; Kiss 2008d: 256–7; Goddio and Fabre 2008: 257.
60 SCA 1019; Goddio and Fabre 2008: 78, 320; Heinz 2014: 56, 132–3.
61 SCA 929; Goddio and Fabre 2008: 78, 323; Heinz 2014: 173–5.
62 SCA 967; Libonati 2008: 323; Goddio and Fabre 2008: 78.
63 E.g., HX-8206, SCA 1011; Goddio and Fabre 2008: 321 (SCA 1011 is referred to as SCA 1001 because of a typographic mistake).
64 H-13040 is currently being studied; Fabre http://ieasm.org/downloads/IEASM_religion_Belier_Amon_df.pdf.
65 SCA 1101; Goddio and Fabre 2008: 224; Fabre 2008d: 225; Meadows 2008b: 343; 2011: 109, 113, fig. 1.2; and in this volume Chapter 6; Van der Wilt 2014 (2): 45 Nr. 53.
66 Goddio 2007: 77, 88–92, 129, fig. 3.109.
67 SCA 279; Goddio 2007: 77, 129, fig. 3.109; Yoyotte 2008a: 116–9; Goddio and Fabre 2008: 117, 119, 131, 306.
68 SCA 280; Goddio 2007: 77, 129, fig. 3.109; Yoyotte 2008a: 116–9; Goddio and Fabre 2008: 117, 131, 307; Albersmeier 2010: 191–2.

to Isis-Sothis, who heralds the coming of the flood.[69] Her body was broken into three pieces and her left knee, shoulder and right arm are missing. The refined sculptural technique brings out the transparency of her finely pleated long dress. The presence of the colossal couple at the temple entrance conforms to the Egyptian tradition of sovereign glorification and exaltation of the royal cult. It is, however, particularly meaningful at the entrance of a temple dedicated to Amun-Gereb, the god of dynastic continuity. Found close by the two royal figures was another colossal statue of Hapy, a fertility figure. At 5.4 m, it is the tallest Egyptian statue of a deity known to date,[70] and a fitting personification of the flood, its scale recalling the size of the mouth of the Nile's largest branch. As it embodies the liquid element, it is the very image of the aquatic nature of this region in the *hone*.

Mut

The two other members of the Theban triad, Mut and Khonsu, had their sanctuaries either in the area of the great temple of Amun-Gereb, or near it, which echoes the co-location of their sanctuaries in Karnak. At Karnak the main temple of Khonsu was in the northwest, within the temple compound, and that of Mut outside to the southwest of the temple of Amun. At Thonis-Heracleion, the temple that Ptolemy VIII may have been dedicated to Mut,[71] as suggested on the colossal stela, has so far not been identified with any certainty. At the southwest corner of the temenos of Amun, however, lies the remains of a sanctuary that extends for more than 60 m and could be associated with Mut. It dates from the Ptolemaic Period, but was heavily re-occupied during Byzantine times. Along the bank of the canal that leads to it, on the southern side of the temenos of Amun-Gereb, several representations of the god Bes[72] were found along with female statuettes.[73] A link probably exists between Bes as the protector of mothers, the statuettes and this sanctuary. An armed Bes of brown Nile silt with the shrine of an Apis bull could possibly also suggest the near presence of a Serapeium.[74]

Khonsu, Harpokrates, and Herakles

Khonsu-the-Child, son of Amun and Mut, the divine heir, was identified with Herakles, which is why the latter's name was given to the temple and city of Heracleion.[75] Other divine children are also found in excavations throughout the city, in the form of inscriptions, bronze or lead cult statues, and elements of headdresses. Several engraved bronze bases from votive deposits evoke Horus-the-Child, Harpokrates, who is asked to give life.[76] Some figures of Harpokrates are represented in the canonical way, naked, with the side lock of youth, his right forefinger to his mouth, or with his arms by his side. The figures stand, either upright or quite often bent at the knee, reproducing in a three-dimensions the hieroglyph for 'child'.[77] They wear different headdresses: some wear the royal *pschent*, others a skullcap.[78] Two others wear the *hemhem* crown which is the emblem of various divine sons, especially in his manifestation of the 'royal child' perpetually reborn.[79] This headdress is particularly appropriate for Khonsu-Herakles.[80] Other Harpokrates figures, often in lead, are clearly Greek interpretations: seated, a finger of the right hand brought to the mouth, and a rounded container under the left arm.[81] This type of Hellenistic 'pot-carrying Harpokrates' has been interpreted differently by scholars:[82] he has been connected to the Memphis *phallophoria*[83] and compared to certain phallic figures.[84] Phallic figures were also found in Thonis-Heracleion,[85] and they were probably also related to the *phallophoria* in the Canopic region.

The sanctuary of Khonsu-Herakles

The remains of a sanctuary built with large limestone blocks were found north of the temple of Amun-Gereb. Archaeological excavations have uncovered a foundation deposit located in the northeast corner of the monument (Figure 1.11).[86] It consists of a faience statue of Khonsu-the-Child accompanied by a wooden naos scaled to its size. Surrounding the divine child were a tablet, an amulet representing Shu, a *wadjet*-eye, a papyrus-*wadj*

69 Thiers 2009: 3; von Bomhard 2012b: 77.
70 SCA 281; Goddio 2007: 77, 88–90, 129, fig. 3.109; Baines 2008: 100–4; Goddio and Fabre 2008: 98–9, 105, 131, 306; Libonati 2010a: 32–5.
71 From Thiers 2009: 17, translation note d, the reading 'Mut' is uncertain.
72 Excavation report IEASM 2012. M3_13134, M3_13225.
73 Excavation report IEASM 2012. M3_13109, M3_13288; material currently being studied.
74 Berlandini-Keller: forthcoming.
75 Quaegebeur 1974: 45–6, 48; 1975–6: 469–72; Yoyotte and Chuvin 1988: 175–6 and note 44.
76 HX-2268, HX-13270; Yoyotte 2004a: 33–5; De Meulenaere 1990: 63.
77 Fabre 2008h: 318.
78 Wearing the *pschent*, e.g., SCA 1022, SCA 1059; Heinz 2014: 7–9; wearing the skullcap, e.g., SCA 995; Goddio and Fabre 2008: 75; Heinz 2014: 13–19; and the blue or red crown: ibid. 2014: 12–13.
79 Yoyotte and Chuvin 1988: 171.
80 Ibid.: 176. For Harpokrates with a *hemhem* on a *nemes*, see Heinz 2014: 10–1; Heinz (2011 and 2013: 7) notes that only bronze statuettes wear a *hemhem* crown.
81 E.g., SCA 917, SCA 925, SCA 1052; Hardwick 2008b: 339; Fabre 2008t: 339; Goddio and Fabre 2008: 76; Heinz 2014: 23–8.
82 For the 'pot carrying' Harpokrates terracotta figurines, see Malaise 1991; Töröck 1995: esp. 62–9.
83 Ibid.: 63.
84 Ibid.: 52–6, Malaise 1991: 228.
85 E.g., the group SCA 383; Yoyotte 2008d: 308; Goddio and Fabre 2008: 191; or phalluses in limestone (SCA 528) or lead (SCA 1020); Goddio and Fabre 2008: 311, 340; the objects are currently being studied; Heinz 2014: 74–6.
86 Goddio 2007: 99–100; Fabre 2008c: 138–9; Heinz 2014: 13–14, 49, 57, 117–18, 194–6; von Bomhard 2014: 339–55.

Figure 1.11 Foundation deposit in the temple of Khonsu-Herakles. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Figure 1.12 Bronze *hemhem* crown. SCA 401 (H. 15 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

column, a miniature double *hes*-vase, and several uraei, all of which were made of frit.

In the area of the sanctuary a few mementoes of the divine son were found. These include a well-preserved bronze headdress, consisting of a *nemes* on which rests a *hemhem* crown, a headpiece that characterizes the young god (Figure 1.12).[87] The complex crest was the official icon of Khonsu-the-Child, son of Amun-Re in Thonis-Heracleion as well as in Tanis.[88] The crown found in Thonis-Heracleion had a kind of clasp that indicated that it could be fitted onto a statuette that could have been made of wood. The dimensions of the object suggest that on a standing figure of Khonsu-the-Child, the statue of this god would have measured between 50 and 75 cm in height, a suitable size for a cult statue. It is possible that a pink granite naos, which was found nearby, in the area of the large temenos, could have been the shrine for such a statue (Figure 1.13).

A bronze statuette, 21.5 cm high, of an anthropomorphic falcon-headed Khonsu, was found in the area of the sanctuary (Figure 1.14).[89] Although the statuette was damaged by sea water, it is whole and has evidence to suggest that its eyes were originally inlaid. The god wears the tripartite wig bearing the lunar disc inserted into the crescent moon, decorated with a barely distinguishable uraeus with marked reliefs. This form

87 SCA 401; Kiss 2008g: 322; Goddio and Fabre 2008: 78; Heinz 2014: 164.

88 Chuvin and Yoyotte 1986: 44–8; Yoyotte 2004b: 7.

89 SCA 387; Ragheb 2008b: 318; Goddio and Fabre 2008: 73; Heinz 2014: 91.

Figure 1.13 Pink granite naos. SCA 456 (H. 1.10 m). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Figure 1.14 Bronze statuette of an anthropomorphic Khonsu. SCA 387 (H. 21.5 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

might have been referring to different manifestations of Khonsu, including 'Khonsu-the-Merciful', 'Khonsu-who-determines-fate', or Khonsu-Thoth. These three manifestations of the god, as well as 'Khonsu Master of Lifetime',[90] highlight his role as an avenger, something usually reserved for divine sons, like Horus the avenger of his father Osiris. The fact that divine children wore the *hemhem* crown conveyed the same idea. Indeed, the meaning of this crown is 'The Roarer' and its presence was thought to spread terror among one's enemies.[91] This crown was to Khonsu what the club was to Herakles: an image of the triumphant vigour of youth and a sign of its destructive power.[92]

Bronze cult furniture was also found associated with this temple of Khonsu-Herakles.[93] Many pieces of jewellery,[94] coins, including gold ones,[95] and amulets[96] littered the sanctuary grounds. They testify to the importance of this place where the young god was revered as a model of the divine heir and whom the Greeks identified with Herakles. A Cypriot representation of Herakles was found on the site on the obverse of a Cypriot hemistater of king Pumiathon (Figure 1.15),[97] where a beardless

90 On the assimilation of this manifestation of Khonsu to Herakles, see Quaegebeur 1974: 45.

91 Abubakr 1937: 64–5.

92 Yoyotte and Chuvin 1988: 176.

93 E.g., SCA 222, SCA 407, SCA 388, SCA 392, SCA 579, SCA 916, SCA 1034; Goddio and Fabre 2008: 151, 165–72, 325, 327, 329–30, 333–4; Goddio 2007: 99; Ragheb 2008g.

94 E.g., SCA 288, SCA 298, SCA 308 and SCA 290; Goddio and Fabre 2008: 314, 316.

95 E.g., SCA 304, SCA 307, SCA 312, SCA 313, SCA 318; Goddio and Fabre 2008: 351.

96 Amulets of Horus as a falcon: SCA 561; Fabre 2008r: 338 and H1-2776, H1-12212, H1-12132; Heinz 2013: 100–1, 103.

97 Callot 1992: 297–300; Lichocka and Yoyotte 2008: 351; Masson and Scnycer 1972: 100; Robinson 2008: 23.

Figure 1.15 Cypriot hemistater of Pumiathon. SCA 287. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Herakles/Melqart is shown wearing only his lion skin and carrying his club and bow. This coin could have been deposited as an act of veneration by a wealthy Cypriot in the sanctuary of the equivalent god as Herakles/Melqart in Thonis-Heracleion.[98]

A sanctuary of Khonsu-Thoth

A bronze plaque inscribed with three columns of hieroglyphs established that Khonsu-Thoth was revered in Thonis-Heracleion in the sixth century BC (Figures 1.16a–b).[99] The name of Khonsu-Thoth appears in the middle column, framed on the left and right by cartouches of pharaoh Amasis. Taking into account the layout and orientation of the signs, straightforward palaeography can demonstrate that pharaoh is assimilated on this artefact to the divine child of the Thonis-Heracleion triad in the form of Khonsu-Thoth.[100] Khonsu was already known in the *Pyramid Texts* for his ferocity, which would lead him in later periods to become an avenging and a healing deity.[101] Khonsu inflicts illness and death or grants protection against evil in his manifestations as 'Khonsu-who-determines-fate',[102] and 'Khonsu-the-Merciful'.[103] In the *Coffin Texts*, Khonsu, like Thoth, is a god of justice.[104] The Khonsu-Thoth entity, uniting the powers of Khonsu and Thoth, was thus particularly apt to be the keeper of gates, entrances and passages, letting through the righteous and warding off the nefarious. Interestingly, this artefact was discovered at the entrance of the former harbour, among the remains of a small shrine located on what appears to have been an islet. The association of the shrine with Amasis is also strengthened through the discovery of another bronze object there bearing his name (Figures 1.2–4).[105] Its precise location was at the mouth of the North-East Channel, which connected the city's harbour to the Canopic branch of the Nile.

On the bronze plaque, Khonsu-Thoth is called 'the great god' and 'Lord of...' followed by a place-name, which

Figure 1.16a Bronze plaque of Khonsu-Thoth. HX-11302 (H. 8.8 cm. W. 9.7 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

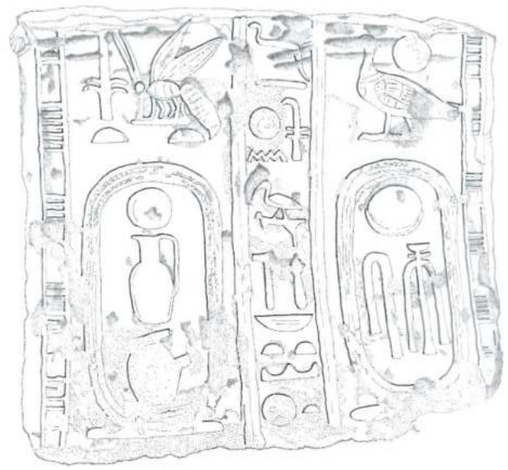

Figure 1.16b Plaque HX-11302. (Drawing: A. L'Amoulen.)

indicates a necropolis or sandy promontory.[106] Although the sanctuary was looted in antiquity, thirteen limestone sarcophagi (lengths between 43 to 48 cm) were discovered on site (Figure 1.17). The emptied sarcophagi and their lids were found scattered down the slope of the islet. Their dimensions suggest that they may have contained animal remains the size of large birds, such as ibis or hawks.[107] It

98 Yon 1992: 145–60; SCA 287; Goddio 2007: 77; Lichocka and Yoyotte 2008: 351; Fabre 2008c: 139; Goddio and Fabre 2008: 78; Yoyotte 2004b: 14.

99 HX-11302. This god was venerated in Thebes from the New Kingdom.

100 von Bomhard, in preparation.

101 Posener 1965: 343; 1966: 339–40.

102 Ibid. 1968: 401–3, 405.

103 Ibid. 1966: 341.

104 Ibid.: 340. See also Labrique 2005: 313–5 for the role of Khonsu-Thoth in the context of royal legitimacy.

105 HX-12826.

106 According to von Bomhard (pers. comm), the sign for desert can be read 'the gezireh' or 'the necropolis'.

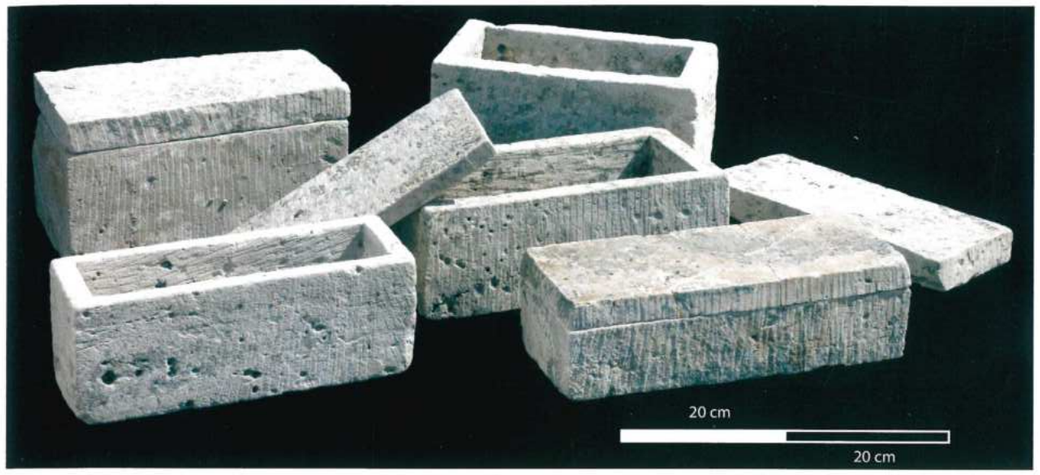

Figure 1.17 Some of the small limestone sarcophagi. HX-11891 to HX-11895. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

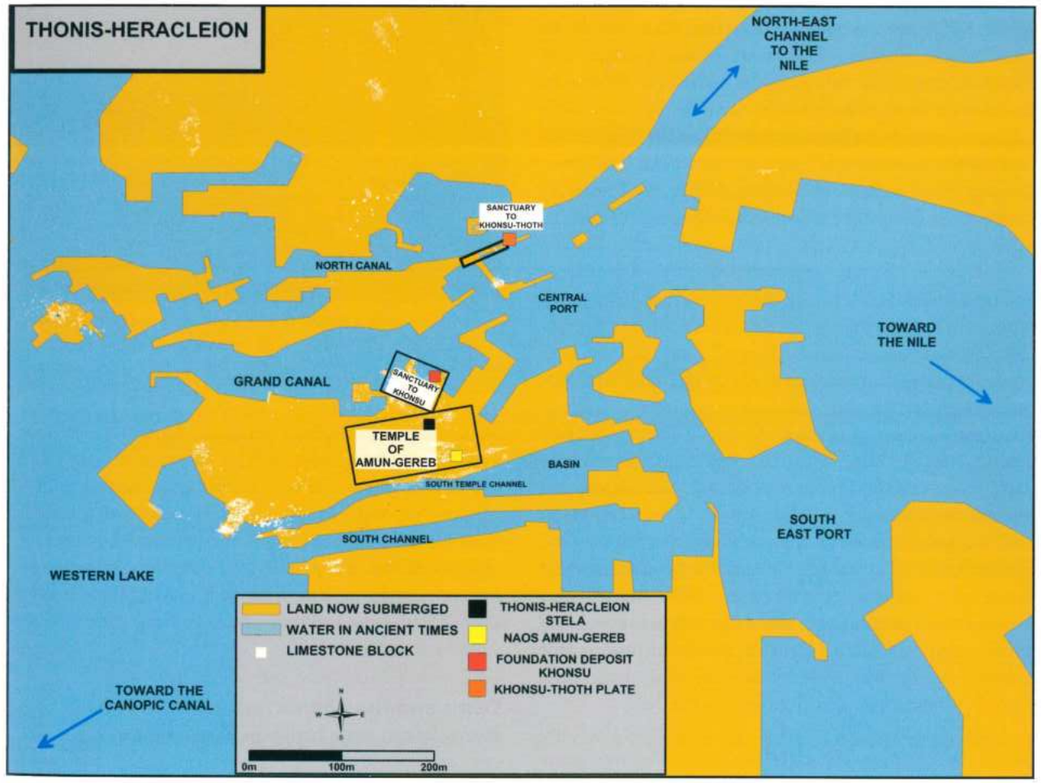

Figure 1.18 Locations of the temples of Amun-Gereb, Khonsu-Herakles and Khonsu-Thoth. (Map: F. Goddio; © F. Goddio/IEASM.)

is therefore possible that an ibis cemetery was also connected with the sanctuary of Khonsu-Thoth (Figure 1.18).

The association of King Amasis with Khonsu-Thoth stresses the importance attributed to this deity, especially as we know that in Naukratis it was the second most important deity after the god Amun.[108] The situation may have been the same in Thonis-Heracleion. The assimilation of Amasis to Khonsu-Thoth, the keeper of

107 Archaeozoological analyses of the faunal remains collected in the vicinity of these upturned sarcophagi are currently under way. Ibis and raptor necropolis are very often associated: Ikram 2012: fig. 3.4.

108 Yoyotte 1982–3: 133; 1993–4: 689; 2013: 550.

Thonis-Heracleion, reminds us that this was the pharaoh who, according to Herodotus, regulated the access and management of the Canopic branch.[109] Thus it was fitting for the ruler to be associated with a sanctuary at the junction between the harbour and the Nile, from which Khonsu-Thoth could offer 'theological' protection.

The giant god Hapy from Thonis-Heracleion

The colossal male statue personifying the flood and its bounty stands in a striding position, his head adorned with a papyrus plant symbolizing Lower Egypt and carrying a table of offerings (Figure 1.19). It was broken into seven pieces, which were mixed with those of the two royal colossi.[110] The statue bears the traces of ancient repairs; some surfaces, the right shoulder, for example, were re-polished. As most of the damage seems to concentrate on the statue's right side, it is possible that the colossus collapsed on this side, perhaps during an earthquake.[111] The statue seems more eroded than that of the royal couple, although they were found together and therefore exposed to the same sub-surface conditions. Its base originally had a rounded front, while the bases of the other two statues had sharp angles. These findings could suggest that the statue of Hapy was carved at a different date—perhaps earlier—than the royal figures. They were later gathered together to embellish the entrance of the sanctuary of Amun-Gereb.

The statue of Hapy represents in three dimensions and on a colossal scale one of the types of 'fertility figures' often seen in processions carved on the walls of Egyptian temples, carrying similar offerings.[112] These figures, who symbolize the contributions made to the temple of proceeds from the flood by each nome, are on the walls of the temple, heading towards the god. They give their offerings to the king, who then dedicates them to the deity. However, the Colossus of Thonis-Heracleion, just like the royal couple, faced outwards, thus subtly combining royal offerings to the bounty granted to the land by the flood.[113] The conjunction of the sheer size of this statue with its location, at the Heracleotic mouth, may not be a mere coincidence. Although this statue of Hapy appears to be unique in Egypt by virtue of its size, one could imagine that similar ones may also have been placed at the mouth of each branch of the Nile.

Hapy was called 'Father of the gods' because the flood was to the Egyptians the manifestation of the resurgence of the primeval waters from which came the world, the gods, and men. The presence of this great statue in Thonis-Heracleion was also possibly related to the worship of the renewed waters on the occasion of the

Figure 1.19 Colossal statue of Hapy. SCA 281 (H. 5.4 m). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

rebirth of Osiris.[114] The city of Thonis-Heracleion was connected to Canopus by a canal along which, as mentioned in the Decree of Canopus, a fluvial procession would take place during the Osirian festivals (see below). The 'Osiris-Canopus' or 'Osiris *hydreios*' statues, peculiar to this city, consisted of a statue-jar with an Osiris (or Isis)-headed lid, which were symbols of the flood. Excavations at East Canopus also recovered statues and amulets of this type,[115] as well as a magnificent Roman bust depicting the Nile river god, masterfully carved in a stone with gray and green hues evoking the chromatic variations of the river.[116]

Osiris and the *Khoiak* festival in Thonis-Heracleion: archaeological evidence

Already known from epigraphic sources, the presence of the cult of Osiris in Thonis-Heracleion has been clearly defined through its cult objects.[117] Many bronze cult statuettes of the god or statuette fragments have been discovered throughout the city, indicating the widespread importance of this god (Figure 1.20).[118] In a number of areas, a concentration of votive deposits was associated with architectural structures, which may be the remains of levelled buildings. For example, four large and elaborate statuettes of Osiris were found at the edge of the North Canal in the north harbour associated with monumental sandstone architectural elements.[119] This suggests that in this location may have been a sanctuary or a pier connected to the worship of Osiris. This would comply with the indications found in *The Book of the Temple* on the construction of Osirian cult spaces, in which the norm was to place them outside the main temple.[120]

Aside from these northern architectural remains, another site located in the south of the city yielded evidence for another sanctuary. On an island southeast of the harbour basins, bronze effigies of Osiris[121] were found next to a black granite offering table[122] in an area where a few limestone blocks and slabs were also found scattered. Lying nearby were bronze figurines of Harpokrates,[123] a bronze amulet representing the identical offering table in miniature,[124] and some fragments of lion-shaped silver figures that were probably attached to precious furniture, such as a throne.[125]

Osiris does not only manifest his presence in Thonis-Heracleion through statuettes, but also through an impressive array of utensils that can be linked to his worship and especially the celebration of the Mysteries of Osiris, as mentioned on the stelae of the Royal Decree of Canopus, or on the walls of the Osirian chapels of Dendera.[126] During the fourth month of the flood—called *Khoiak*—mystery cults were performed in temples throughout Egypt called the Mysteries of the god's rebirth, with very elaborate, complex and secret rituals. It is highly likely that such ceremonies were also performed in the sanctuaries of Osiris in Thonis-Heracleion.

Figure 1.20 Osiris statuettes. HX-10241 (H. 26.5 cm) and HX-10240 (H. 31 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

The simpula

To date, 111 long-handled ladles (*c.* 50 cm), called simpula,[127] ending in the shape of a duckhead,[128] a bird spatula, or a vulture,[129] have been excavated (Figure 1.21). They are remarkable for both the numbers in which they have been discovered and for their find spots, which are mostly watery locations in what were once a canal or a port basin.[130] Geophysical surveys and test excavations have revealed the existence of several channels and harbour basins in Thonis-Heracleion and a network of canals between this city and the centre of East Canopus.[131] It is along the Grand Canal, as well as in the harbours, that most of the simpula were found. The route of the canal that leads from Thonis-Heracleion to Canopus

109 Herodotus *Historiae* 2.178–9.
110 Goddio 2007: 88–9 fig. 3.33; Goddio and Fabre 2008: 102–3, 105.
111 Baines 2008: 101.
112 Ibid. 1985: 85–93.
113 Ibid. 2008: 104.
114 Yoyotte 2001a: 9.
115 Kiss 2008a: 62–5; Goddio and Fabre 2008: 63–5; Libonati 2010b: 204–7.
116 Smith 2008: 80–3; Kiss 2010: 212–5.
117 Goddio 2007: 111.
118 SCA 411, SCA 926, SCA 952, SCA 966, SCA 982, SCA 1004, SCA 1013, SCA 1031, and SCA 1081; Fabre 2008j: 319–20; Goddio and Fabre 2008: 67, 148, and 283; Heinz 2014: 30–43.
119 M5-10215 (24.5 cm), M5-10216 (head 9.3 cm), M5-10240 (31 cm), M5-10241 25.5 cm).
120 Quack 2010: 24; see also Yoyotte 2010: 37.
121 HX-9936, HX-9937, HX-9955, HX-9957; Heinz 2014: 36, 39–40.
122 HX-9988.
123 HX-9918, HX-9919, HX-9964; Heinz 2014: 15–16.
124 HX-9920; Heinz 2014: 193.
125 HX-9938, HX-9939, HX-9940; Heinz 2014: 149–50.
126 Chassinat 1966, 1968; Cauville 1988: 23–36; 1990: 68–84; 1997: 14–28.
127 Goddio 2007: 108–11 figs 3.70, 3.79; Fabre 2008c: 145–6; 2008p: 329–30; Cox 2008c: 329–330; Ragheb 2008e: 329; 2008g; 2009: 16 and fig. 5; Goddio and Fabre 2008: 150, 329–31; Robinson 2008:42–85; Yoyotte 2003: 4 note 15 and 2010: 37–8 mentions these two synonyms, simpuvium and simpulum, derived from the same assumed rump word for which the etymology is not assured.
128 Duck heads often seem to decorate long utensils designed to be hung. See, for example, long handled lamps (SCA 1024 and 1028): Fabre and Cox 2008b: 332; Robinson 2008: 201; or an incense shovel spoon (SCA 580) Ragheb 2008f: 335; Goddio and Fabre 2008: 166; Robinson 2008: 221–2.
129 This cult material was studied by Robinson (2008).
130 That is, for every simpula found in a stratigraphic context. The few exceptions were moved by landslides and bottom trawling.
131 Goddio 2010: 3–10.

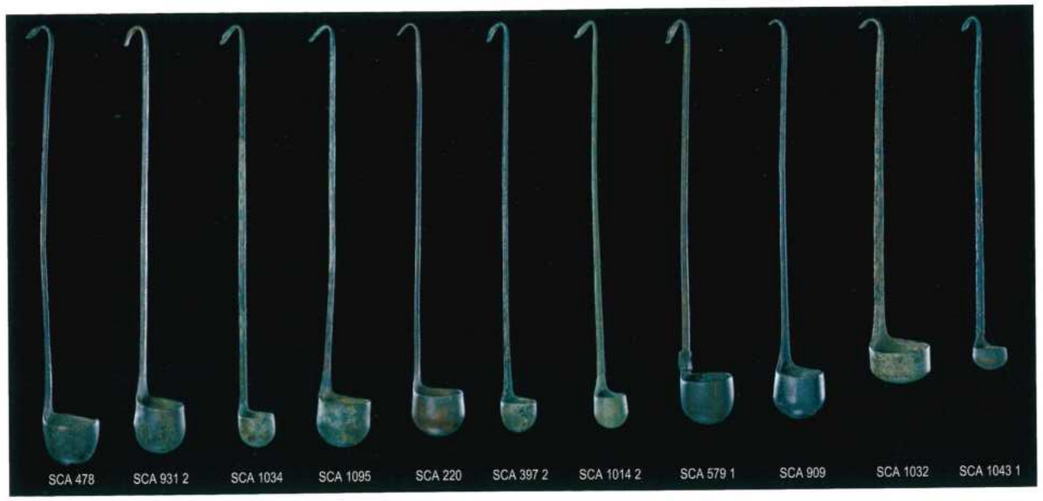

Figure 1.21 A selection of simpula from Thonis-Heracleion. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Figure 1.22 Map showing the location of the simpula. (Map: F. Goddio; © F. Goddio/IEASM.)

and identified by its magnetic signature was also verified by four test excavations.[132] These excavations yielded rich archaeological remains but no simpula. The great number of simpula deposited in the Grand Canal, along the north side of the temple of Amun-Gereb, were positioned lengthwise following the same direction as the canal (approximately east-west). This pattern was also seen in simpula found in the secondary canals in the

132 For geophysical surveys already carried out in this canal see Goddio 2010: 11–12, figs 1.18, 1.19.

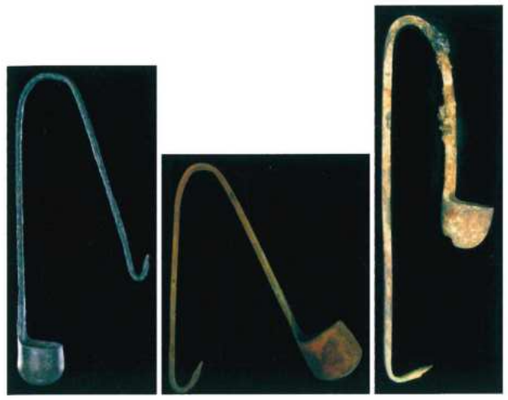

Figure 1.23a-c Three examples of deliberately twisted simpula. SCA 1042, HX-10770, HX-11637. (Photos: SCA 1042: C. Gerigk; © F. Goddio/Hilti Foundation; HX-10770 and HX-11637: IEASM; © F. Goddio/Hilti Foundation.)

harbour basins. The regularity of the pattern for the location of the deposition of the simpula—in water, close to the shore and with their long-axis parallel with the bank of the canal or watercourse—suggests a repetitive ritual act (Figure 1.22).

Quack has aptly demonstrated, by way of examples from the *Book of the Temple*, that the Egyptians sometimes performed rituals that consisted of casting offerings into the water. For example, the *Book of the Temple* confirms—something that was already known—that the *Book of the Flood* was thrown into the water with other offerings.[133] In the *Book of the Temple*, in a passage devoted to the construction of temples which deals precisely with the Osirian area and the sacred hill, there is a discussion of offerings cast from the riverbank into the water.[134] Quack notes that, according to the Calendar of Hathor's celebrations in the temple of Horus at Edfu, on the 5th of *Paophi* offerings were thrown into the water in honour of Nun the Ancient, who personified the primeval waters.[135] This example perhaps takes on a special meaning in Thonis-Heracleion, where the colossal statue of the figure of fertility embodying the flood had been erected.

Some of the simpula were deliberately bent before being deposited in the water, an obvious indication of the ritual aspect of the deposit (Figure 1.23a-c).[136] Quack compares this Egyptian practice of destroying or

Figure 1.24 Sacred utensils used in the *Khoiak* rituals. (Drawing: A. L'Amoulen, after Chassinat 1966: inside cover.)

damaging an object before casting it into the water to a passage in Chapter 125 of the *Book of the Dead*, where it is written that he who is declared 'justified' tells the 42 divine judges before whom he must appear that he has—as is the custom—broken a faience *wadj*-column before casting it into the water. Quack concludes his review of examples by saying that by destroying an object prior to depositing it in the water it was protected twice against any future desecration by making it both unreachable and unusable after it had served its sacred purpose.[137] This argument is verified by some foundation deposits, and particularly applies to the ladles found in Thonis-Heracleion.[138]

The simpula are most probably linked to the *Khoiak* celebrations,[139] during which they were used in sacred practices as well as in Dionysian rites (Figures 1.24–5).[140] A description of the ritual use of a similar long metal ladle is found on a wall of the Dendera Osirian chapels. The representation clearly shows the curved ending of the ladle's handle.[141] It is used to measure out the amount

133 Quack 2000–01: 11–2.
134 Ibid.: 12.
135 Ibid.: 12–3 (Edfu V 349, 9 ff.).
136 SCA 908; SCA 1042; Goddio and Fabre 2008: 286, 329–30; HX-06481; HX-07021; HX-08571; HX-08572; HX08577; HX-08800; HX-10770; HX-11637; HX-13408; Robinson 2008: 57, 67–8, 76, 82.
137 Quack 2000–01: 13–16.
138 E.g., Dreyer et al. 2003: pl. 24f, with a copper chisel twisted deliberately to make it unusable.
139 Chassinat 1966: inside cover page: objects used in the celebration of the mysteries of Osiris; Egyptian representations of these utensils as seen on the reliefs of the tomb of Petosiris, drawing by Lefebvre 1923: pl. 8, reproduced in Ragheb 2008g: 15, fig. 11; see also a Roman representation on a stela from the time of Hadrian in the Vatican museum, reproduced in Wild 1981: 303 pl. 13; a similar ladle appears on the Palestrina mosaic, see Meyboom 1995: 36, 69, 194, 267, note 159, 324 notes 166, pl. 22.
140 Yoyotte 2010: 37–8; Fabre 2008b: 96; 2008c: 145–6; on the reproduction of these utensils in Dionsyian scenes on *stamnoi*, see Yoyotte 2010: 38 note 26.
141 Mariette 1873: pl. 38 (col. 118); Chassinat 1966: 59–60 and pl. 7 (col. 118); 1968: 776.

Figure 1.25 Examples of simpula on a relief in the tomb of Petosiris. (From Lefebvre 1923: pl. 8.)

Figure 1.26a A *wedjat*-eye engraved on simpulum. SCA 220. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Figure 1.26b A *wedjat*-eye engraved on simpulum SCA 220. (Drawing: M. Ez el-Dihn.)

of earth, soaked in the waters of the sacred lake[142] which will fill the fourteen vessels (*debeh*). The ritual ascribes a specific material and volume for each of these vessels,[143] which were, in their turn, used to measure out the exact amounts of substances of various spices and crushed precious stones that were all mixed together with soaked earth to produce the statue of Sokaris.[144] On two ladles from Thonis-Heracleion, a *wedjat*-eye was engraved on the square section of the handle near the bowl, which supports the hypothesis that the ritual function of these ladles was related to Osirian practices.[145] The full eye symbolizes the reconstruction of the fourteen parts of Osiris' body and the fourteen *debeh* vessels were supposed to contain his scattered body parts (Figures 1.26a-b).[146]

The oldest known simpulum that is certainly dated is a silver example from Psusennes' treasure (twenty-first dynasty).[147] It is a three dimensional representation of the determinative hieroglyph given to the ladle used in the *Khoiak* ritual at Dendera, namely 'She who reunites.'[148] This is also an epithet of the goddess Nut that refers to the recovery of Osiris' body in the goddess' womb, which is equated to the function of the sarcophagus where the dead are revived. In the context of mysteries, the womb is compared to the mould of Sokaris. Nut plays an important role in the ritual, since she is presented with the mixed materials in a silver vessel placed on her knees, before the contents are poured into the two halves of the mould of Sokaris,[149] in front of which she is shown kneeling.[150] Metal ladles of different sizes, in gold or bronze, were used as measuring tools during the performance of the ritual.

The evidence from Thonis-Heracleion concerning these simpula is unique. Elsewhere in Egypt there would appear to be no similar deposits of simpula along a processional route and there is no record of simpula being found in such quantities at any other site. Equally, there is no mention of such depositional practices in the mysteries of *Khoiak* inscribed on the Dendera chapels. This would suggest that there was a distinct, perhaps local, variation of the ritual in Thonis-Heracleion.

142 In the case of Thonis-Heracleion, based on the archaeological evidence, it may have been soaked in the waters of the Grand Canal, the sacred way of the city: Goddio 2007: 111.
143 Chassinat 1968: 494–7, 776–7, 815.
144 Ibid.: 773–4; Cauville 1997: 20, 25–6.
145 SCA 220 = H1-01475 and HXX-5614; Robinson 2008: 60–1, 71.
146 Chassinat 1966: 17–8.
147 CG: JE 85909; Montet 1951: 99, fig. 41, 102 no. 400; Le Guilloux 1998: 189 pl. 3; Yoyotte 2003: 4; 2010: 38.
148 *ḫnm.t wrt*: Chassinat 1966: 59–60; 1968: 776.
149 Chassinat 1968: 774; Cauville 1997: 26.
150 Mariette 1873: pl. 39; Chassinat 1966: pl. 8.

Figure 1.27a Object linked to Dionysian rituals. SCA 223 (H. 25 cm, D. 28.5 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

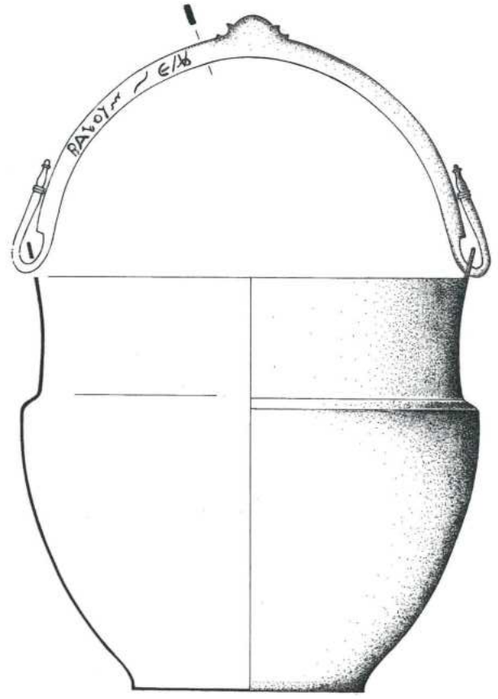

Figure 1.27b Object linked to Dionysian rituals. SCA 223 (H. 25 cm, D. 28.5 cm). (Drawing: M. Ez el-Dihn.)

A large number of ritual deposits were also recorded in the excavations along the Grand Canal and the harbour basins.[151] They often consisted of a bronze or lead container with residues of fauna or flora, sometimes found next to incense or fumigation utensils. They are always accompanied with a number of lead objects of different shapes.[152] It is noteworthy that the small lead containers were usually sealed by crushing the opening by hand to trap the contents before throwing the object into the water.[153] Miniature lead vessels often supplemented these offerings.[154] Yoyotte interpreted these archaeological finds as proof of the existence of 'oratories, spaces for individual devotion' along the banks of the Grand Canal.[155]

In addition, it should be noted that the simpula were also linked to Dionysian rites. There are a dozen examples of Attic vases with representations of Bacchants using these ladles to draw wine from *stamnoi*, to help induce a Dionysian state of ecstasy.[156] Here it is also important to recall the assimilation between Osiris and Dionysos, which was documented by Herodotus.[157]

Elsewhere in Thonis-Heracleion, other objects have been discovered which recall the many similarities between Dionysian and Osirian rituals.[158] A large bronze situlum was found within the great temenos, with a partially eroded Dionysian inscription in Greek engraved on its handle (Figures 1.27a–b).[159] A skyphoid pyxis shows a maenad dancing to the sound of her tambourine, a typical participant in Dionysian processions (Figure 1.28).[160] Another vase could also be associated to this Dionysian series, a squat lekythos showing a panther, an animal often found in Dionysian processions (Figure 1.29).[161] Such objects are of particular importance as they appear to suggest the mingling and assimilation of Egyptian and

151 Goddio 2007: 109–11; for example: a miniature lead simpulum damaged deliberately (SCA 957); Goddio and Fabre 2008: 342.
152 Lead is often associated with death or sleepiness; see Aufrère 1991: 454.
153 These lead containers are part of a larger survey of lead objects found at Thonis-Heracleion: Van der Wilt 2014. A sheet of lead was sometimes added before crushing the opening to ensure the vessel was perfectly sealed; SCA 1077; Goddio and Fabre 2008: 193, 341.
154 E.g., SCA 1053; SCA 901; SCA 1009; SCA 923; SCA 1051; Goddio and Fabre 2008: 341–2.
155 Yoyotte 2010: 37.
156 Ibid: 38 and note 26.
157 Herodotus *Historiae* 2.42, 123, 144; see also Coulon 2013: 177–80.
158 Fabre 2008c: 145–6; Yoyotte 2010: 37–8; 2003: 5–7.
159 SCA 223; Cox 2008b: 328; Goddio and Fabre 2008: 169; Robinson 2008: 144–5; 2010: 226, fig. 19.7.
160 SCA 590; Grataloup 2008b: 348–9; Fabre 2008c: 145–6; Goddio and Fabre 2008: 151, 218.
161 SCA 247; Grataloup 2008a: 348; Fabre 2008c: 145–6; Goddio and Fabre 2008: 151.

Figure 1.28 Object linked to Dionysian rituals. SCA 590 (H. 15.5 cm, D. 10.3 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Figure 1.29 Object linked to Dionysian rituals. SCA 247 (H. 8 cm, D. 5.4 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Greek objects and ideas within the undoubtedly cosmopolitan community of Thonis-Heracleion.

The volume of discoveries of utensils and votive deposits linked to Osirian rites clearly demonstrate that these mysteries were celebrated in Thonis-Heracleion. They can pinpoint where the ceremonies were held, sometimes with interesting local variations compared to the mysteries described in Dendera. The cult of Osiris was clearly omnipresent in the city and its waterways.

A 'tank garden' in the temple of Amun-Gereb

One of the first phases of the mysteries took place on the 12th of the month of *Khoiak*. In a stone vessel[162] called the 'tank garden'[163] was set a golden mould,[164] of a cubit length (52.5 cm) in the shape of a mummy with a human face wearing the White Crown. The two halves of the mould, creating two divine figures, were filled with a mixture of silt and barley. They were then sprayed with water from the lake or the sacred canal until the 21st of *Khoiak*.[165] The water, flowing out of the tank garden, called 'the humours of Osiris,'[166] was collected in a lower basin of pink granite. Once removed from the mould, the two halves of Osiris *vegetans* were reassembled on the 21st of *Khoiak*, glued and bound by four papyrus bands. The Osiris figurine was then dried in the sun throughout that day.[167]

There is evidence for such rites taking place in Thonis-Heracleion: in the great temple behind the two naos structures of Amun-Re of Gereb and Khonsu-Herakles, was a large tank of pink granite (Figure 1.30). The find spot of the tank, co-located with the naoi, suggests that it was at the heart of the most secret and sacred part of the sanctuary.[168]

> *Its walls are pierced with two holes, one resulting from later pagan reuse, and the other linked to its use as a garden tank. This is where Osiris' effigy made of sand and barley germinated before being brought out in the sun and dried ...*[169]

It would appear that there were variations in the ritual from that described in the text from Dendera. The garden tank from Thonis-Heracleion, for example, does not correspond to that described at Dendera, although this is not unusual.[170] For example, this variation is also

162 Shale tank; Chassinat 1966: 53–4; 1968: 810; Cauville 1997: 15.
163 Called in Egyptian the 'garden of Shentayt'. The goddess Shentayt participated in the mysteries with Isis and Nephthys.
164 Mariette 1873 pl. 35; Chassinat 1966: 54 and pl. 1.
165 Chassinat 1966: 54–7; 207–8; 1968: 820.
166 Ibid. 1966: 213–4.
167 Ibid. 1966: 196, 205; 1968: 810.
168 SCA 459; L. 205 cm, W. 90 cm, H. 63 cm. Goddio 2007: 88 fig. 3. 31; Yoyotte 2008f: 313; 2010: 37 note 21; Fabre 2008c: 145; Goddio and Fabre 2008: 144.
169 Yoyotte 2008f: 313.
170 According to Chassinat 1966: 53; 1968: 810, the garden tank described in the ritual is square, one cubit and two palms in length (67.5 cm), with a depth of three palms and three fingers (28.2 cm).

Figure 1.30 Tank garden. SCA 459 (L. 2.05 m). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Figure 1.31 Lead votive boat-model, a copy of a papyrus-made boat. SCA 1039 (L. 37.3 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

seen in a garden tank from Coptos, from the time of Sheshonk I (*c.* 945–924 BC).[171] The tank was engraved in the twenty-second dynasty with hymns to Shentayt and incantations recited during a ritual of the *Khoiak* mysteries. This example shows that there were variations in the performance of these rituals and in the amounts of materials used, as can be seen in a papyrus from the Ptolemaic Period that describes larger quantities than those specified in the ritual of Dendera to produce an Osiris-Sokaris effigy.[172]

Given that the garden tank of Thonis-Heracleion was found near the naos of Amun-Gereb, one may suppose that there might have been some form of local celebration of the mysteries in connection with the transmission of royalty, as Amun-Gereb was a protector of kingship. The colossal stela of Ptolemy VIII found at Thonis-Heracleion mentions, among the deities of the temple, Shentayt, and the two sisters Isis and Nephthys, suggesting that the Osirian rites may have played a role in the rituals of transmission of power.[173] If the garden tank of Thonis-Heracleion was the centrepiece of such rituals, ceremonies celebrating these legitimisation rites might have been merged with the ritual of *Khoiak* or run in parallel with it.

The votive boats of Thonis-Heracleion and 'the Navigation of Osiris'

A number of votive boats (most of them lead) were excavated in Thonis-Heracleion (Figure 1.31).[174] Their presence is easily interpreted in the context of the ritual of the Navigation of Osiris *vegetans* on the 22nd of *Khoiak*. On that day, at the time of the eighth hour (2 pm), a fleet of 34 boats sailed on the sacred lake of the district of Osiris.[175] The papyrus-made boats, a cubit and two palms (67.5 cm) long, transported 34 deities who accompanied Osiris and the divine member, and were illuminated by 365 lamps.

The lead votive boats from Thonis-Heracleion are clearly attached to the celebration of the mysteries, firstly because lead is associated with Osiris,[176] and secondly because they reproduce the barques with a throne

171 Yoyotte 1977–8: 163–9; 1979–80: 194–7; 1981–2: 189–92; 2013: 385–92, 397–400, 403–6. Dimensions of the tank JE 37516: L. 1.54 m; W. 0.88 m; H. 0.60 m.
172 Derchain 1965: 143, 184 note 174.
173 According to Thiers (2009: 28), who mentions that such legitimization rites are attested on the Pithom stela (I. 26–7), see Thiers 2007: 79–80.
174 Goddio 2007: 110, fig 3.73; Fabre 2008u: 340; Goddio and Fabre 2008: 147, 340: Heinz 2014: 185–9; Van der Wilt 2014: 63–4.
175 Chassinat 1966: 64; 1968: 614–6; Cauville 1997: 16, 22.
176 Aufrère 1991: 454.

Figure 1.32 Detail of throne. SCA 1039 (L. 37.3 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

described in the ritual. They vary in size from 12–60 cm in length or more.[177] All have a throne, but the gods they carried have not survived (Figure 1.32). The models are carefully made and the hatching on the lead replicates the papyrus that the vessels and thrones of the cultic fleet were made of.[178]

Nine of these votive boats were discovered in channels and harbour basins surrounding the great temple of Amun-Gereb. Three of them (HX-13111, HX-13112, HX-13303) had been deposited along with many lead weights and other objects made of lead[179] under limestone slabs, which may have been a landing place for boats. Two vessels from this deposit (HX-13111, HX-13112) were almost of the same size as the life-size papyrus boats which sailed during the mysteries: the preserved length of HX-13111 is 65 cm, but it would have been a little longer originally as its ends are missing. They are life-like, finely wrought models. The thrones on the larger examples were not moulded as part of the object, like those of the smaller models, but made separately and fixed by a tenon. Significantly, according to the practice already observed for simpula, the models were deliberately damaged, and even torn apart before being deposited. The hull of boat HX-13111, its throne (HX-10285) and its steering oars (HX-1311-2) were found close to one another, but each under separate slabs of a mole. The fact that these elements were found underneath slabs proves that they were older than the time when the pavement was placed. Perhaps once used in Osirian rites, the models could not be melted down to be re-used. We do not know whether these boats were used once during the mysteries, or for several successive years, but they were certainly not destroyed after they went out of use. Rather, they were either deposited in the canals around the temple of Amun-Gereb along the route that the papyrus barques were navigating on the 22nd of *Khoiak*, or carefully preserved with a view to being consecrated in votive deposits in foundations on the occasion of a new construction or rearrangement of the site. It may also suggest that the mole, made sacred by those deposits, was utilized during the Osirian ceremony.

Fifteen lead oil lamps have also been recovered from the harbour basins and canals.[180] They were also often found near to the lead votive boats, and could recall the 365 lamps described in the Ritual.

The unusual number of deposits connected to the ritual of *Khoiak* show the important role of the Grand Canal and the waters surrounding the temple of Amun-Gereb in the context of the celebration of the mysteries. The archaeological excavations show that quite clearly in Thonis-Heracleion they replaced the sacred lake of the Osirian districts. One might recall in this context a detail from the *Book of the Temple* about Osirian complexes, that the offerings made in this area were not intended for human consumption, but were returned to nature and probably thrown into the water.[181] This was similarly the case for votive offerings in small lead containers, which were found throughout the entire network of water channels in Thonis-Heracleion.[182]

The temple of Amun-Gereb, like all sanctuaries of the *hone* was surrounded by water and its cultural practices were adapted to the local topography (Figure 1.33). The channels surrounding the temples were the privileged area for the navigation of Osiris.

Osiris: the journey to the west

Further evidence for the adaption of the rituals of the mysteries of *Khoiak* to Thonis-Heracleion comes from the Decree of Canopus, which mentions the navigation of Osiris in his boat from Heracleion to Canopus on the 29th of *Khoiak*. This unusual choice of date is not mentioned in the Ritual of Dendera, nor has it previously been commented upon.[183] Nevertheless, in comparing

177 E.g., SCA 405: 12.1 cm; SCA 1017: 21. 5 cm, or SCA 1072: 44.5 cm. Goddio and Fabre 2008: 147, 340.
178 E.g., SCA 1039; Goddio and Fabre 2008: 147; HX-13111, HX-13112 and HX-13303.
179 Van der Wilt 2010: 157–64.
180 E.g., SCA 998; Goddio and Fabre 2008: 341.
181 Quack 2004: 17.
182 Goddio 2007: 125, fig. 3.104.
183 E.g., Chassinat 1968: 614–5, who identifies the navigation of Osiris, described in the Decree of Canopus, to the navigation of the 22nd of *Khoiak* mentioned in the Ritual. He does not take into account the divergences between dates, nor the differences between the texts of the Ritual and the Decree of Canopus.

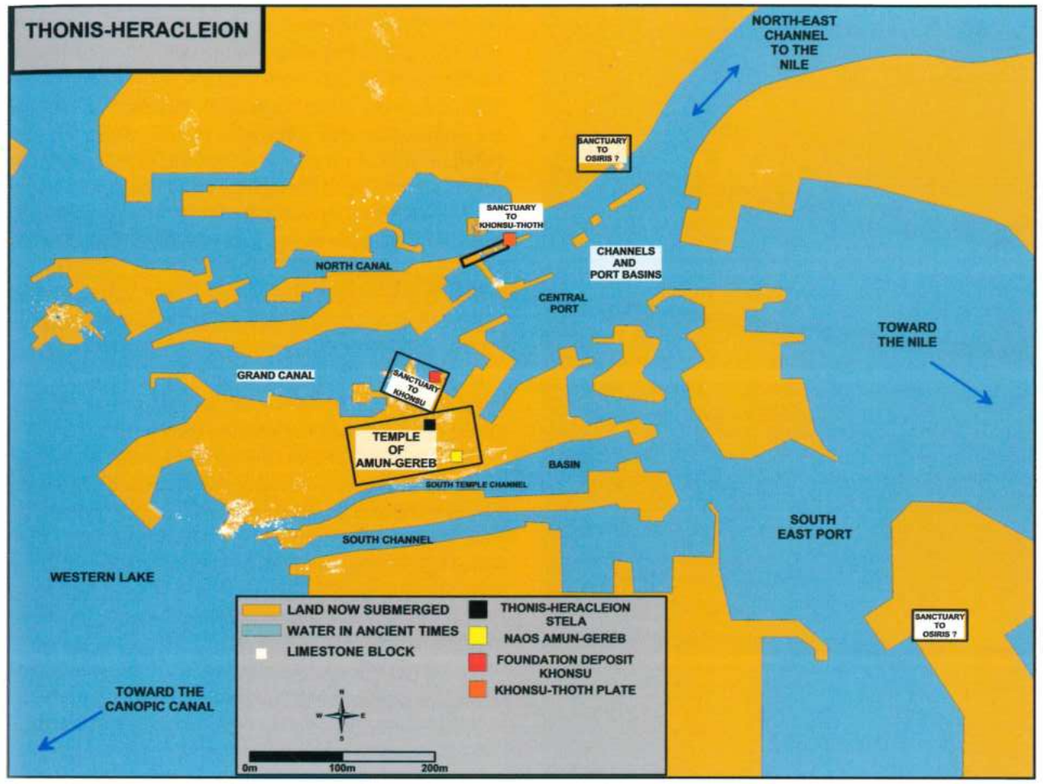

Figure 1.33 Map showing the positions of the temples of Amun-Gereb, Khonsu-Herakles, Khonsu-Thoth and the locations identified to date with the cult of Osiris. (Map: F. Goddio; © F. Goddio/IEASM.)

textual sources, it is clear that the navigation described in the Decree of Canopus is a boating event, which had nothing in common with the one described in the mysteries at Dendera.

In the Dendera version of the ritual, the navigation of the yearly Osiris *vegetans* occurs on the 22nd of *Khoiak*, with 34 boats carrying as many deities, and 365 lamps,[184] on a sacred lake. A Greco-Roman papyrus[185] from Thebes indicates that three days later, on the 24th of the same month at the end of the night, thus on the 25th at dawn, at the edge of the sacred lake they would recite the 'Ritual of the Navigation of Osiris' and 'the Ritual of the Opening of the *Neshmet* boat'.[186] These prayers would have been recited probably just before the crew of small gods on their papyrus boats were swaddled and then buried (or thrown into the water).[187]

In the Decree of Canopus, where all the decisions and technical details are very carefully described, the date of the navigation is the 29th of *Khoiak*. There is no mention of 34 boats, other deities, or 365 lamps. Given the distance to be covered, about 3.5 km from Thonis-Heracleion to Canopus, it is likely that the divine boat would have had to be longer than the small papyrus boats described in the Ritual of Dendera (67.5 cm). The boat was also likely to have been made of gilded wood, based on the two determinatives used in the demotic version of the Decree of Canopus, combining wood and gold.[188] The detailed analysis of the three versions of the Decree, hieroglyphic, demotic and Greek, as well as the context, which determined and influenced its terms, gives us valuable information about the god's journey from Thonis-Heracleion to Canopus.

The Decree was written by priests from sanctuaries from all over Egypt who met in synod at Canopus in the ninth year of the reign of Ptolemy III (238 BC).[189] The resolutions aimed at increasing the honours already bestowed on Ptolemy and his sister-wife Berenike, the reigning monarchs, who from then on would be designated in the Decree as 'Benefactors', Euergetes. They created a special panegyric to be pronounced on a date coinciding with other celebrations. This meant that the calendar was re-organized. In return for these honours

184 Ibid. 1966: 64; 1968: 614–6, 811.
185 Barguet 1962: 18.
186 Yoyotte 2003: 2: 'Neshmet' was the name of the boat that carried Osiris during his great celebrations in Abydos.
187 Chassinat 1966: 230.
188 Yoyotte 2010: 37; 2003: 2.
189 Bernand 1970: 1002–3.

bestowed on the monarchs, the titles of the priests of the dynastic cult were given greater importance, and more importantly, a fifth phyle of priests was created, increasing their numbers and confirming the principle of hereditary priesthood. The synod was still sitting when the daughter of the monarchs, who was also called Berenike, died. Arrangements were then made in her favour, and the details of the honours rendered to the now deified princess were so numerous and described with such thoroughness that almost half of the measures outlined in the Decree concern her.[190] It mentions that the young Berenike was '… to lie beside Osiris in the temple of Canopus …'[191] and, on the occasion of '… Osiris' journey from his temple in Thonis-Heracleion to this temple (Canopus) every year on the 29th of *Khoiak* …'.[192] Thus a statue of the deified princess, attended to with great care before the navigation, with a special hairstyle,[193] was to share the offerings and ceremonies dedicated to the God of the West on his nautical procession.

If the statue of Berenike is fully described in the Decree of Canopus, the exact nature of Osiris' effigy during the navigation of the 29th of *Khoiak* remains unclear and requires further discussion. It could certainly be a cult statue usually kept in the sanctuary of Osiris in Thonis-Heracleion, but it would then have to be returned to the temple in order to make the same journey the year after. However, there is no mention—in the otherwise very detailed presentation of the Decree—of a return journey. On the contrary, everything seems to indicate that the culmination of the journey is in Canopus.[194] The boat that goes west is called *Sekhte*,[195] the same name as the boat in which the sun sails every evening to disappear in the west. As this navigation of the 29th was linked to the celebrations of *Khoiak*, which usually ended on the 30th with placing the Osiris figures in their tomb, it is far more likely that the statue of Osiris, was sailing to its final resting place in Canopus.

The Ritual of Dendera describes the production of two different statues. The first is that of Osiris *vegetans*, which was made with a mixture of silt and grain. It was kept in a square garden tank, 67.5 cm in length and 28.2 cm high, and sprinkled with water until the 21st of *Khoiak*, when it was taken out and dried in the sun. The Osiris *vegetans* of Thonis-Heracleion could have been of a much greater size than that indicated in the Ritual of Dendera, to judge from the dimensions of the tank garden found in the temple of Amun-Gereb, which is 205 cm long, 90 cm wide and 63 cm high. The second statuette according to the Ritual of Dendera was that of Sokaris, which was prepared in front of a statue of the goddess Nut. It was made of various spices and crushed precious stones with added earth soaked in holy water. It was then dried in the sun and anointed from the 19th to the 23rd. Following the Ritual of Dendera, both effigies were then swaddled and stored in a 'superior' tomb replacing the statuettes from the previous year, where they would remain until the following year. The Osirian statues from the previous year, after their funeral equipment was renewed in full, were then buried in a 'lower'[196] tomb on the 30th, or in some cases, such as at Saïs, thrown into the water.[197]

In Thonis-Heracleion during the annual celebration of the mourning of the God of the West and of Berenike, one of the statuettes from the previous year (or perhaps both the Osiris *vegetans* and Sokaris statues), was (were) sailed up the waterway between Thonis-Heracleion and Canopus in a large golden boat to the temple of Osiris. There, it (they) would be thrown into the water or, more probably, be buried in a special place dedicated to the tombs of Osirian figures within the temple compound in Canopus, similar to the one found in Karnak.[198]

The combination of the commemoration of a royal princess with the *Khoiak* rituals was, as reported by Herodotus, not without precedent. Like Berenike, the daughter of Mycerinus, a king of the fourth dynasty, also died prematurely; she was placed inside a cow made of gilded wood which Herodotus claims to have seen in Saïs.[199] This story evokes the description in the *Khoiak* ritual of the hollowed-out cow sculpted in gilded sycamore, a cubit in length (52.5 cm), which contained a headless mummy.[200] If Herodotus is to be believed, the gilded cow in which the princess was put to rest was also much bigger than the one described in the Ritual of Dendera, in the same way as the tank garden of Thonis-Heracleion is bigger that the one in the Ritual.

The annual sailing journey on the 29th of *Khoiak* seems distinctive to Thonis-Heracleion. The remains of an 11 m long boat that has been excavated in the Grand Canal, the sacred waterway of the temple of Amun-Gereb, may

190 Ibid.: 1020.

191 Beginning of l. 25 in the hieroglyphic text: Sethe 1904: 143, 9; l. 13 in the demotic text: Simpson 1996: 234–5; end of l. 40 in the Greek text: Bernand 1970: 995.

192 L. 25 in the hieroglyphic text: Sethe 1904: 144, 1–3; l. 14 in the demotic text: Simpson 1996: 235–7; l. 41–2 in the Greek text: Bernand 1970: 995.

193 L. 32 in the hieroglyphic text: Sethe 1904: 149, 9–11; l. 18 in the demotic text: Simpson 1996: 238–9; l. 54–5 in the Greek text: Bernand 1970: 996. Dunand 1980: 295 suggests a connection between the annual manufacturing of the statue of Berenike and that of the Osirian statuettes in the month of *Khoiak*.

194 The Egyptian word is *hetep*, which means to rest, to cease.

195 Yoyotte 2003: 2, notices that whereas the Greek text simply describes the boat as the 'sacred boat of Osiris', the hieroglyphic text calls it 'the *Sekhte*' and the demotic text 'the temple's *Sekhte*', and he also mentions that the determinative of the hieroglyphic text represents the *Neshmet* boat.

196 Chassinat 1968: 769, 775, 820–1; Cauville 1997: 25–6.

197 Quack 2000-1: 6–7; 2004: 17; 2010: 30.

198 Coulon et al. 1995; Leclère and Coulon 1998. It is also possible that one of the Thonis-Heracleion statues of the previous year (Osiris-*vegetans* or Osiris-Sokaris) was thrown into the water and the other statue put into the tomb at Canopus.

199 Herodotus *Historia* 2.129–30. According to Yoyotte (2011: 12 note 79) it could, in fact, concern the daughter of Bocchoris of the twenty-fourth dynasty (*c.* 719–713 BC).

200 Chassinat 1966: 65–6; 1968: 596–600, 816; Cauville 1997: 21.

help us to conceptualise the procession in more detail. Excavations in its immediate vicinity suggest that we are in the presence of a ritual boat belonging to the temple. A rich assemblage of ritual instruments, including nine simpula, were retrieved from around it, as well as the offerings and other deposits; they are similar to those linked to the celebrations of Osirian mysteries discovered elsewhere in Thonis-Heracleion. It was not wrecked, but appears to have been deliberately sunk directly in front of oratories—offering places on the shore—which seems to suggest that we are dealing with a vessel that was ritually deposited. Such a hypothesis is perhaps supported by the construction of the barque in sycamore, a wood commonly used in the mysteries of Osiris.[201]

The water voyage of the 29th *Khoiak* from Thonis-Heracleion to Canopus might be compared to the rituals of Abydos, which mention a final boat journey before the burial of the god in the district of Peker.[202] In Abydos, the resurrection of Osiris occurred in the same district, close to his resting place. If Canopic practices are based on those of Abydos, then Canopus, a burial place, was also a place of rebirth; this could explain why the very name of the city evokes the memory of popular festivities (Figure 1.34).[203] The episode of the Osirian myth of the revival of the ithyphallic god on his deathbed by Isis setting herself on him to conceive their son Horus, is probably the source of the celebrations and rejoicings evoking fertility and regeneration, for example, the *phallophoria* and others festivities. Those could explain the reputation for licentiousness and excess of the town. The rebirth of Osiris at Canopus would also be consistent with the particular sculpted *hydreios*, which represented the resurgence of the god in his manifestation as the flood. The statues of the priests bearing these *hydreios* jars, a particularly fine example of which was found in the submerged royal quarters of Alexandria,[204] are probably connected with rituals linked to the revival of nature. This long nautical procession starting in Thonis-Heracleion and ending in Canopus offers us one of the most remarkable and compelling examples of religious practices being adapted to a particular landscape, in this case the watery nature of the Canopic region and the *hone*.

Figure 1.34 Faience figure of Isis. SCA 522 (H. 7.0 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Other Egyptian gods found in the excavations of Thonis-Heracleion

Many other gods and goddesses that were revered throughout Egypt are also present in Thonis-Heracleion. Unfortunately, the distribution of their effigies does not currently provide sufficient information to be able to locate their sanctuaries. They are, however, listed below in the hope that future excavations of this site might add details to enrich our knowledge of the *emporion*'s sacred topography.

Isis

Isis is fairly common in Thonis-Heracleion,[205] mostly in the form of statuettes. They are usually in bronze, the commonest being the Isis *lactans* type wearing Hathor's headdress—the disk between two horns—which is often placed on the cylindrical *modius* made of rearing uraei.[206]

201 Ship 11 is presently under study. For the relationship between Osiris and the sycamore wood cf. Koemoth 1994: 203–7. For the use of sycamore wood during the celebration of the mysteries of Osiris: see Chassinat 1966 and 1968: for the Osiris-Sokaris laid in between sycamore branches for a period of 7 days symbolizing the seven months of gestation of Osiris in Mut's womb: 69, 72, 819, and concerning the Osiris *vegetans* and the Osiris-Sokaris being placed in sycamore chests which were later used as their coffins: 60–1, 814. The sycamore is the 'tree of life' from the *Pyramids' texts*.

202 Chassinat 1966: 253–6; Herbin 1994: 58, 183–4; Smith 1987: 77; 2011: 365, 372, 417, 597.

203 Strabo 17.1.17.

204 SCA 449; Dunand 1998: 189–4; 2008: 160–3; Kiss 1998: 178–81.

205 *P.Oxyrhynchus* no. 1380, I. 61–2, mentions that in Heracleion a form of the goddess Isis was the 'Mistress of the Sea'.

206 Fabre 2008i: 318–19; Goddio and Fabre 2008: 74 (SCA 1093, 972, 978); Heinz 2014: 44–50.

A delicate faience statuette, with the typical throne headdress (which names Isis), was excavated from the base of a pile of large limestone blocks west of the temple of Khonsu.[207] All that remains is the upper part; the infant has not survived. It is similar in size, style and production to the faience amulets in the foundation deposit located in the northeast corner of the same temple.[208] It is also similar in material and size to a statuette published by Bianchi, but the quality of the statuette of Thonis-Heracleion, although damaged, is remarkable, evoking the artistic genius of the Saïte Period, which was much imitated in Nectanebo's time.[209] (Figure 1.34).

The name of Isis also appears on a situla fragment found in a channel; it was dedicated to Isis in the funerary cult of an individual.[210] We know that during the *Khoiak* ritual, similar vases in gold, called *usheb*, were used to sprinkle the Osiris *vegetans* (*Khenti Amentit*) and the divine member until the 21st of *Khoiak*. The Osirian effigy and the divine member were each divided into left and right halves, and these four moulds were placed in the garden tank to be watered.[211] The situla was a container closely associated with the cult of Isis in the Greco-Roman Period.[212] Three situlae were uncovered in the temple area.[213]

Horus

Effigies of Horus were found throughout the city. Two black granite statues of Horus as a falcon, roughly 70 cm in height, were discovered at the east end of an island to the south of the waterway running along the south side of the temple of Amun-Gereb (Figure 1.35). While the pharaoh had been identified with this bird of prey from the Predynastic Period, in the Late Period the Horus falcon played an important role in the royal ideology of Nectanebo II.[214] A statue, probably from Heliopolis and now in the Metropolitan Museum, nearly the same size (72 cm high) as those found in Thonis-Heracleion, shows Nectanebo II between a falcon's legs.[215] The two statues from Thonis-Heracleion could be from the same period. Excavations have revealed traces of fortifications in the area of their discovery,[216] and we know that under the Nectanebo sovereigns all access points in Egypt and temples were extensively refurbished and fortified.[217]

Figure 1.35 Black granite statue of Horus the falcon. SCA 278 (H. 68 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Horus is also shown as amulets: eight lead amulets displaying the falcon god were excavated around the sanctuary of Khonsu, northeast of the temple.[218] The god also appears on lead amulets in the Central Port basin. Five other amulets, an emblem,[219] and three bronze figurines of the god were found in excavations throughout the city. Finally, a lead mummy-shaped statuette of a falcon-headed Osiris-Sokaris (*c.* seven cm) was found in the Grand Canal.[220] The place of discovery, the mummified shape of Osiris-Sokaris, and the material (lead) would suggest that this statuette was probably used during the rituals of the *Khoiak* celebrations in Thonis-Heracleion.

Thoth

The ibis god Thoth appears in the form of statuettes or fragments of bronze statuettes (mostly bronze feet which were perhaps inserted in a wooden body)[221] and emblem stands.[222] He is also shown as a baboon on lead amulets.[223]

207 SCA 522; Hardwick 2008c: 344; Goddio and Fabre 2008: 151; Heinz 2014: 49–50.
208 Goddio 2007: 99–100, fig. 3.56; Fabre 2008c: 138–9; von Bomhard, 2014: 243–4.
209 Bianchi 1988: 206, cat. 100, pl. 27.
210 SCA 1060; Fabre 20080: 328; Robinson 2008: 143.
211 Chassinat 1966: 53–4; 1968: 811. In the tank-garden the divine member was placed under the Osiris *vegetans*: ibid. 1966: 204.
212 Ibid. 1966: 211–3; Fabre 20080: 328.
213 SCA 223; Cox 2008b: 328; Goddio and Fabre 2008: 169; also HX-11571 and HX-13126; Robinson 2008: 144–5.
214 Yoyotte 1959: 70–4; Tresson 1933: 144–50, pl. 7; Arnold 1999: 124; Kiss 2008e: 305; Goddio and Fabre 2008: 93 (SCA 278).
215 Bianchi 1988: 94.
216 Goddio 2007: 99–100; 2011: 127–8, fig. 7.6.
217 Arnold 1999: 105, 108, 129.
218 SCA 561; Fabre 2008r: 338; Goddio and Fabre 2008: 183; Heinz 2014: 95–105.
219 SCA 997; Fabre 2008n: 321; Goddio and Fabre 2008: 151; Heinz 2014: 103.
220 HXX-8262.
221 SCA 1087; Fabre 2008g: 317; Goddio and Fabre 2008: 189: Heinz 2014: 107–13.
222 SCA 1037; Fabre and Cox 2008a: 322; Goddio and Fabre 2008: 168 and HX-10815: Heinz 2014: 108.
223 SCA 1021, SCA 1098; Fabre 2008s: 338–9; Goddio and Fabre 2008: 186: Heinz 2014: 131.

Nekhbet

A large and beautiful bronze head (17 cm) of the vulture goddess was discovered in the North Canal area; she wears the *atef* crown.[224] The head was fixed by a tenon to the body, but the latter was not found.

Bastet

The goddess Bastet is common throughout the city. Bronze statuettes in various sizes have been discovered in different places during the excavations, as well as an inscribed base with two remaining human feet of a statuette dedicated to the goddess in favour of a 'justified' individual whose name is now lost. The inscription conveys the customary wish for a long life.[225] Bastet is also shown elsewhere as a cat,[226] or a cat-headed woman.[227]

Sekhmet

This fearsome goddess was also revered in the city in the form of three bronze statuettes.[228] We know she was worshipped in western regions of Egypt, as she was known as the 'Lady of the West'.[229]

Hathor

Only one statuette of the goddess has been found so far; it is made of bronze.[230] Four fragmentary bronze Hathor headdresses have also been discovered.[231] In addition, remains of nine bronze Hathor sistra were found, eight of which were in the Grand Canal, the Central Port and the North Canal, all close to the riverbanks.[232] Only one was found in connection with a building in the north of the city.[233] This may suggest a deliberate deposition of these sistra in a watery location, perhaps as part of a ritual act.

Apis

Five statuettes of the sacred bull and emblems with its image were discovered in the northern area of the city.[234]

Anubis

Five statuettes and emblems of the dog-god Wepwawet-Anubis have been uncovered.[235]

Maat

Only one small figurine of the goddess Maat has been found.[236]

Bes

One bronze and three lead statuettes,[237] and a large terracotta sconce have been found representing the form of the divine dwarf.[238] He is also represented on two bronze vases, a perfume vase in lead, and sitting on top of the goddess Hathor on a bronze sistrum.

Nefertum

The young god Nefertum, son of Ptah and Sekhmet, is found on five lead amulets,[239] and three bronze statuettes.[240]

Neith

Only one small head of the goddess has been discovered. It was found north of the site and to judge from the style and its archaeological context, it dates from the Saïte Period.[241] Next to the head, a bronze object was found with a fragmentary inscription in very fine hieroglyphs that gives the name of the goddess and seems to mention in the usual phraseology the martial qualities of the pharoah.[242] Neith is also represented, frequently mentioned and honoured on the Thonis-Heracleion stela dating from the time of Nectanebo I and found in the temenos of Amun's temple.[243]

Foreign gods in Thonis-Heracleion

As might be expected in a cosmopolitan port city open to influences from both the Greek and Persian worlds,

224 SCA 895; Ragheb 2008d: 321; Goddio and Fabre 2008: 186: Heinz 2014: 114.
225 SCA 962; Ragheb 2008c: 320; Goddio and Fabre 2008: 186: Heinz 2014: 179; De Meulenaere 1990: 63.
226 SCA 930, SCA 474; Fabre 2008f: 317; Ragheb 2008a: 317; Goddio and Fabre 2008: 184, and HX-11026: Heinz 2014: 125–8.
227 SCA 968; Fabre 2008f: 317; Goddio and Fabre 2008: 185: Heinz: 91–2.
228 SCA 1041; Fabre 2008f: 317; Goddio and Fabre 2008: 187: Heinz: 92–3.
229 Yoyotte 2012: 39–40, 100 notes 126–7.
230 HX-12836.
231 HX-3083, HX-9704, HX-9921, HX-11223.
232 SCA 581, SCA 977, SCA 906; Fabre 2008q: 333–4; Goddio and Fabre 2008: 169; Robinson 2008: 189–3.
233 HXX-8020.
234 SCA 1001; Fabre 2008m: 321; Goddio and Fabre 2008: 186; Heinz 2014: 129–30.
235 SCA 975, SCA 973, and SCA 981; Fabre 2008e: 316; 2008l: 321; Goddio and Fabre 2008: 188–9; Heinz 2014: 121–3.
236 SCA 1003; Fabre 2008k: 320; Goddio and Fabre 2008: 169; Heinz 2014: 58.
237 Heinz 2014: 87–9.
238 M3 13134.
239 SCA 974; Hardwick 2008a: 339; Goddio and Fabre 2008: 191; Heinz 2014: 52–4.
240 Heinz 2014: 48, 51–5.
241 Ibid.: 57. H 11632.
242 HX-11301: object currently being studied.
243 von Bomhard 2012a: 20–21, figs 2.6–2.9, 24–8. 91–2 and this volume Chapter 5.

Figure 1.36 Gold foundation plaque. SCA 876 (L. 10.8 cm; H. 5 cm; Th.: 0.8 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

several foreign gods are also represented in the archaeology of Thonis-Heracleion. Like the Egyptian gods and goddesses, the finds are not always sufficient to pinpoint the topographical location of worship, but they are included here to give an idea of both the range of foreign deities and also the extent to which they were worshipped alongside or assimilated into local religious practice.

Melqart

A handsome statuette head of the Cypriot god was found in a harbour basin.[244] Dating to the late fifth or early fourth century BC, it is a clear sign of the cultural, religious and commercial exchanges which took place in this *emporion*, established at Egypt's point of entry, and perhaps reflects the customs and beliefs of a foreign community.[245] This young god, identified with the Greek Herakles, is shown on the obverse of the hemistater of Pumiathon,[246] the Cypriot king of Kition (Figure 1.15).

Herakles

A gold foundation plaque was unearthed on an island located between the Grand Canal and the North Canal (Figure 1.36).[247] It is a document in Greek, five and a half lines long, and inscribed in punch dotted line technique:

> *King Ptolemy, (son) of Ptolemy and Arsinoe, the sibling gods, gives this gymnasterium to Herakles for his own (well-being) and that of Queen Berenike, his sister and wife, and that of their children.*[248]

This foundation plaque, established by Ptolemy III (246–221 BC) suggests that there must have been a gymnasium dedicated to Herakles in the vicinity of the discovery, which would have contained a chapel or an altar dedicated to the hero (Figure 1.37).[249] The importance of the demigod in this city was such that the Greeks gave it his name, and identified the temple of Amun-Gereb and his son Khonsu, the 'temple of Amun' to the Egyptians, as a 'Heracleion'.[250] The choice to donate a characteristically Greek-style public building by the Lagidae may also be significant in emphasising or establishing Ptolemaic urban culture, clearly illustrated in the sole language of the foundation plaque: Greek.

Athena

The goddess Athena—*interpretatio graeca* of the goddess Neith[251]—was prominently displayed in Thonis-Heracleion, the gateway to Egypt for any vessel coming from the Greek world. Two fragments of a bronze spear and a finely crafted bronze crest,[252] which must have decorated the Corinthian helmet of a colossal statue of the goddess (estimated to be 4 m high), were found scattered

244 Kiss produced a preliminary description and identification of statuette K7-1103, for IEASM; data published in Fabre and Goddio 2012; Heinz 2014: 82.

245 As Horn (1969: 37) notes, Egyptians were not hostile towards foreign gods. However, they remained deeply attached to their own gods: Bresson 1980: 318.

246 SCA 287; Lichocka and Yoyotte 2008: 351; Goddio and Fabre 2008: 78; Meadows this volume Chapter 6.

247 SCA 876; Goddio 2007: 117 fig. 3.88; Yoyotte and Clauss 2008: 140–1; Goddio and Fabre 2008: 141–3; Yoyotte 2004a: 32.

248 Translation by Clauss in Yoyotte and Clauss 2008: 140.

249 Cf. the plaque (British Museum no. 1063) discovered in 1818 on the 'peninsula of Aboukir', with a dedication by the same Ptolemy III to an Osirian temenos.

250 Quaegebeur 1975–6: 469–72; Yoyotte and Chuvin 1988: 175–6 and note 44; Goddio 2008: 46; Fabre 2008a: 72–3.

251 Mallet 1888: 237–44; El Sayed 1982: 76.

252 SCA 224, Goddio 2007: 126 fig. 3.105, H1-2299; Kiss 2008c: 226–7; Goddio and Fabre 2008: 227, 337.

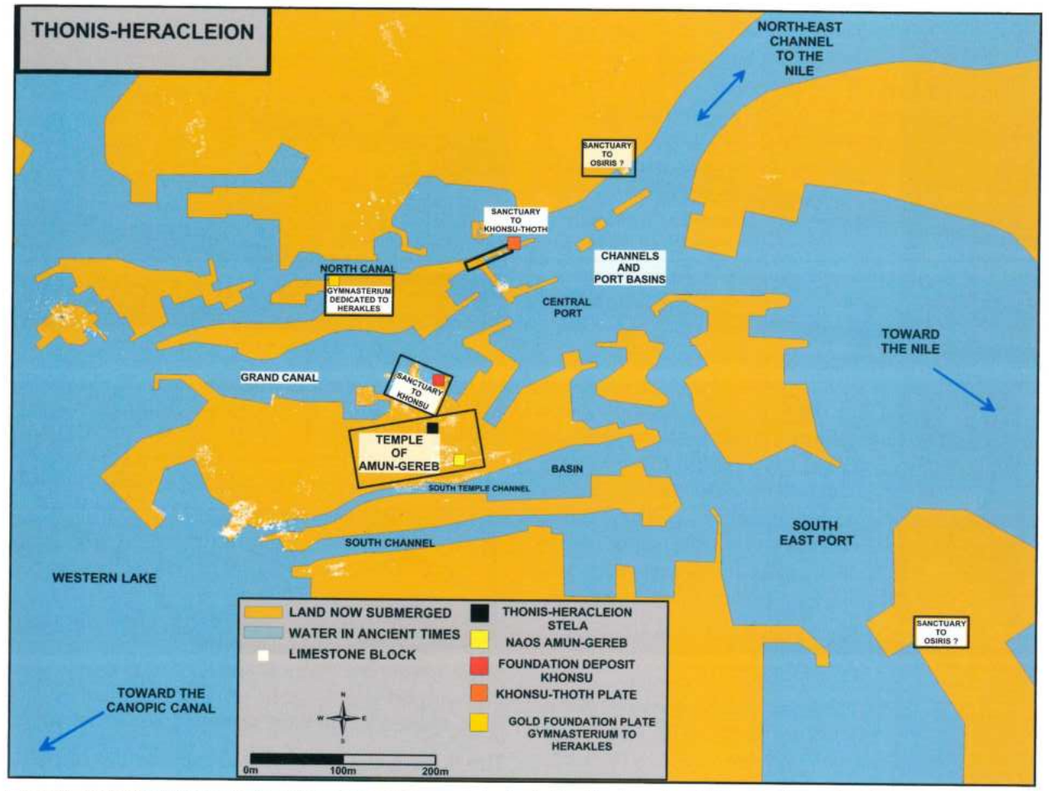

Figure 1.37 Map showing the location of the monument dedicated to Herakles, in addition to those already mentioned in this chapter. (Map: F. Goddio; © F. Goddio/IEASM.)

in the harbour basins east of the temple of Amun-Gereb. These elements confirm that the armed goddess had in Thonis a representation as large as her importance.

The setting up of a statue of Athena in the area close to the entrance to the port would have been particularly comprehensible for both Egyptians and visiting or resident Greeks. The association of Athena with the goddess Neith was a natural one as both were involved, amongst other things, as patron deities of craft activities. Athena was also important for navigation, which would have been particularly appropriate for Greek sailors coming safely into harbour. This combination of craft production and navigation neatly encompasses the trading activities taking place in the *emporion* and was also a reminder of the tax on trade—both import and production taxes—that were recorded on the Decree of Saïs and donated to the temple of Neith, called the 'Mistress of the Sea'.

Equally, the armed nature of the statue could also have resonated with the likely garrison of Greek mercenaries, who would have venerated Athena as a disciplined and strategic warrior goddess who was said to make the weapons of the warriors and to guard the bodies of the fallen. The statue also evokes the warrior character of Neith, the archer goddess, who was expected to protect the country at its northern frontier.

Athena is also represented in a small bronze statuette, illustrating that she was also venerated at a personal level by either an inhabitant or visitor to the port.[253]

Summary: facts, questions, and prospects

The city and its site

The survey and excavation work in Thonis-Heracleion has allowed us to define both the location of the city and its major religious monuments, enabling a start to be made on reconstructing its sacred topography. Importantly, the inscribed artefacts discovered at the site confirmed ancient epigraphic and literary indications,[254] proving that the city was indeed located at the mouth of the Canopic branch. They also helped to formally identify the city as Thonis-Heracleion: the stela of Nectanebo I,[255] found *in situ*, mentions for the first time, and in Egyptian hieroglyphs, the full name of the city

253 SCA 996; Goddio and Fabre 2008: 226, 320; Heinz 2014: 77–8.

254 In particular: Decree of Canopus; Diodorus *Bibliotheca Historica* 1.19.4; Strabo *Geographica* 17.16–18. See also Yoyotte et al. 1997: 107–9 for translations of Strabo and comments.

255 Goddio 2007: 77, 83; 2008: 45–6; Yoyotte 2001b: 24–5; 2004a: 35–6; 2008b: 239–40.

Figure 1.38a and b Top of the 14th column of stela SCA 277: '. . . the city named "The Hone of Saïs" '. (a: photo: B. Vallée; b: drawing: A. L'Amoulen.)

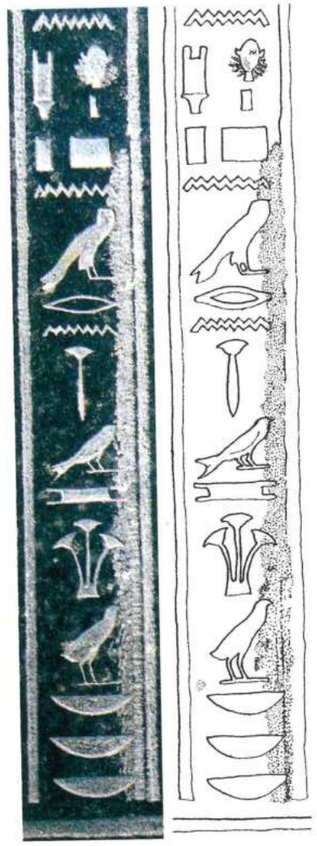

Figure 1.39a and b Bottom of 13th column of SCA 277: '. . . at the mouth of the sea of the Greeks'. (a: photo: B. Vallée; b: drawing: A. L'Amoulen.)

(Figure 1.38a-b): 'the Hone of Saïs'.[256] It also describes its location: 'at the mouth of the sea of the Greeks' (Figure 1.39a-b).

A second object, a small bronze plaque[257] found in two small fragments south of the temenos of the temple, also bears the inscription: 'at the mouth of *Hawy Nebwy*', i.e., the mouth of the sea of the Greeks (Figures 1.40a-b).[258]

256 von Bomhard 2012a: 86–9, 94; this volume Chapter 5.
257 SCA 389, Yoyotte 2008g: 337–8; Goddio and Fabre 2008: 233.
258 Yoyotte 2004a: 38; von Bomhard 2012a: 100–2, fig. 4.15.

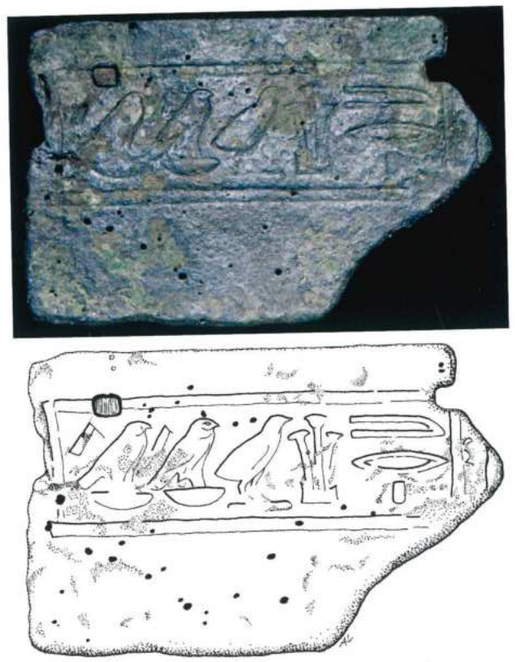

Figure 1.40a and b Plaque SCA 389 (L. 21.5 cm) 'at the mouth of the *Hawy-Nebwy*'. (a: photo: C. Gerigk; © F. Goddio/Hilti Foundation; b: drawing: A. L'Amoulen.)

The great temple of Amun-Gereb and the cult of Khonsu

The location of the great temple of Amun-Gereb (which the Decree of Canopus placed at the entrance of the *hone*) has been confirmed as being on the Central Island of the city, thanks to the discovery of the naos of the temple's main deity. The buildings which belonged to the great temple occupied an area in excess of three hectares (7.3 acres). Their general outline can be reconstructed from a line of clusters of large limestone blocks which were sometimes buried under a metre or more of sediment.[259] Their chaotic appearance, having in some places collapsed like dominoes,[260] or been scattered over a large area, suggests the kind of upheavals caused by earthquakes and tsunamis, followed by human destruction, because the walls have evidently been quarried. The scattered pink granite fragments of the three colossal statues, which at one time stood south of the complex, were found relatively close to each other in the area of the temple. The site is rich in cult utensils of finely crafted bronze, and sometimes gold, as well as statues in bronze or stone, or fragments of cult statues. Alongside the pottery,[261] they demonstrate that this sacred area was occupied from the beginning of the fourth century BC to the end of the second century BC.

259 On the mapping of these blocks, see Goddio 2007: 76–7, fig 3.8 'map of the site H1'.
260 Ibid.: 82, fig. 3.18.
261 Ibid.: 99; Grataloup 2010: 155–6.

Thonis-Heracleion, a diachronic approach

The artefactual record of the Central Island of the city, with its temple of Amun-Gereb, shows that the zone was mostly occupied during the Ptolemaic Period. Significantly further north, beyond the Grand Canal and on the border of the North Canal, some objects demonstrate an early phase of occupation during the Saïte Period. A small bronze plaque[262] engraved with a Horus name which can be attributed to Psamtek I[263] was found at the entrance of the North Canal, on what was probably an island. Close by (*c.* 30 m), two bronze objects, mentioned above, bear the cartouche of Amasis. One showed the divine triad of Thonis-Heracleion (Figures 1.2–4) and the other the name of Khonsu-Thoth (Figure 1.16a-b). The pottery found here confirms an early phase of occupation from the late seventh to the early sixth century BC.[264] Thus it would appear that two distinct areas of cultic activity for Khonsu existed, the later one in the great temple of Amun-Gereb, and an earlier one in a probable temple further north to be confirmed by future excavations.

The reason behind this shift may have been related to the silting up of the North-East channel that led to the Nile until the fifth century BC. This must have been significant, as excavations have revealed the presence of a building erected, at a later time in the fourth century BC, directly over this main waterway. The silting up of the northern watercourse consequently resulted in the reorganisation and development of the city toward the south. This caused the change in its religious landscape, becoming focussed on the Central Island that was still accessible from the Nile thanks to a water passage through the coastal dunes to the southeast.

Not all of the sanctuaries and temples mentioned in this study were active at the same time. For example, the sanctuary of Khonsu-Thoth—the Keeper of the Gates—was located at the end of the North-East Channel in the Saïte Period and when this silted up the temple would no longer have been where it was required. Perhaps it lost its religious legitimacy in the sacred landscape, resulting in its abandonment in the late fifth century BC. Consequently, this temple would not have been a contemporary of the large temple of Amun-Gereb on the Central Island, where excavation has revealed that occupation actually began its activity in the early fourth century BC.

The temple of Herakles in the time of Herodotus

In the context of these discoveries, a problematic issue remains outstanding: the location of the great sanctuary of Herakles in Thonis-Heracleion at the time of Herodotus' travels. The data provided by stratigraphic excavations shows that the sanctuaries of Amun-Gereb and his son Khonsu, erected on the main island, were built *after* Herodotus' visit. While it is certainly possible for an older sanctuary to have been substantially remodelled or even completely destroyed in order to make way for a new building, it is likely that at least some of this earlier structure would have survived in the archaeological record.[265] That no trace of an earlier temple has been discovered to date on the Central Island would suggest that we should look elsewhere, possibly in the areas to the north that were occupied in the Saïte Period. Consequently, it would seem most likely that the temple of Herakles that stood in Herodotus' time would be located here.

The levelled remains of a monumental complex which covered nearly three hectares (7.3 acres) has been discovered to the north of the North Canal. The visible remains consist of limestone blocks of various sizes, sometimes almost shapeless because of natural erosion, a paved area, and other areas with the remains of cobblestones. To the east of this area, a cutting site for architectural elements and statuary has been identified, illustrating the systematic demolition of this monumental complex. Very large blocks of pink granite and fragments of a black granite sphinx[266] were scattered among splinters of granite and stone waste, all of which was barely covered by a layer of marine sediment. Selective excavations over this area have not yet been able to show any overall architectural organisation, although there are some remains of the foundations of a number of buildings. It is very likely that the large sanctuary of Herakles seen by Herodotus was situated here in this northern part of the city.

After its destruction, the great sanctuary may have been rebuilt further south, on the Central Island. Interestingly, this transfer occurred at the very time the wide North-East Channel, which connected the city to the Canopic branch of the Nile, had silted up. The date of Herodotus' journey (450 BC) gives us a *terminus ante quem*, and we know thanks to the discovery of the stela of Thonis-Heracleion in the main island sanctuary that this temple was active by 380 BC, as this was the first year of the reign of Nectanebo I and the year when he promulgated his Decree and erected the stela of Thonis-Heracleion. It is most likely that the transfer of the temple between 450 and 380 BC was the result of a natural phenomenon, either an accumulative process (silting), or a violent one (maybe earthquakes followed by devastating tsunamis). However, this hypothesis by no means explains all outstanding issues and inconsistencies at the northern site. The excavated objects, in the

262 HXX-11303; von Bomhard 2012a: 98–9, fig. 4.12.
263 This Horus title could also belong to Nepherites I (first king of the twenty-ninth dynasty), or Achoris (end of the twenty-ninth dynasty), but the entire archaeological context, especially the pottery, points to the Saïte period.
264 Grataloup 2010: 151–3.
265 Though recent stratigraphic excavations (2014) in the area of the temple of Amun-Gereb revealed some well preserved ceramics from the Late Pharaonic period at a level lower than the one of the foundations of this sanctuary, no evidence of any other foundations for a prior monument has been found.
266 The sphinx is almost re-assembled: SCA 282; Kiss 2008f: 306.

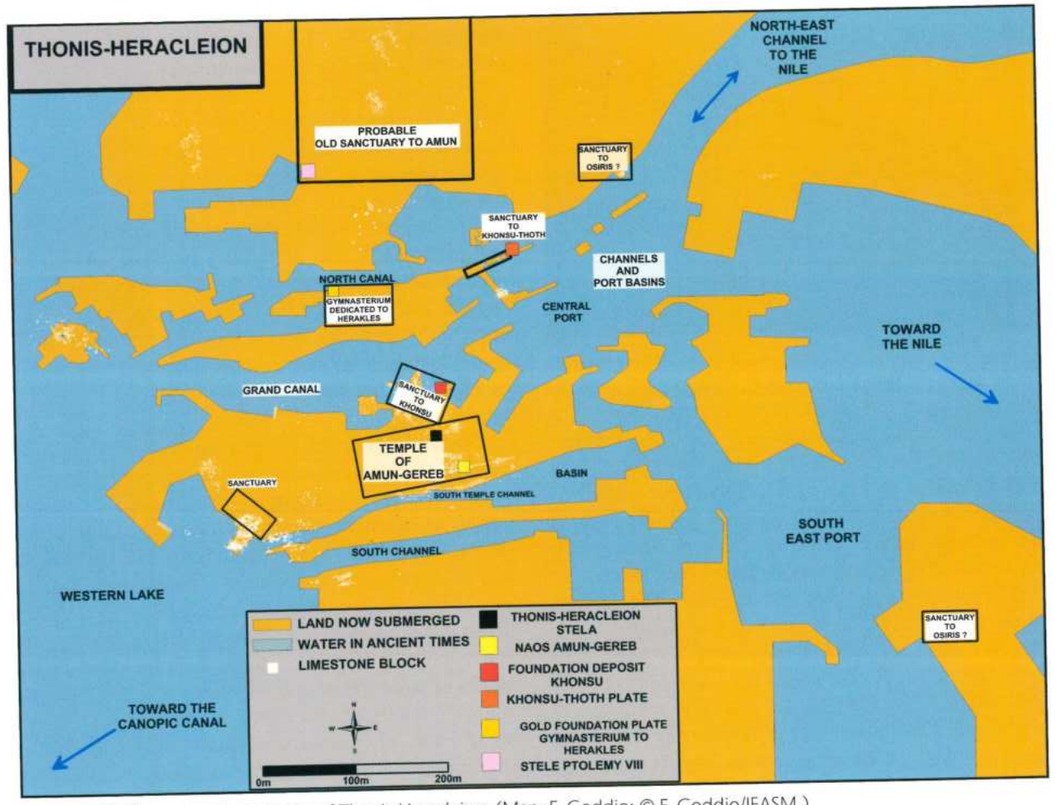

Figure 1.41 The sacred topography of Thonis-Heracleion. (Map: F. Goddio; © F. Goddio/IEASM.)

northern zone, clearly indicate cult activity from the seventh to the fifth century BC,[267] revealed by numerous fragments of bronze statuettes and various elements of headdresses that represent almost the entire pantheon of the city.[268] Unfortunately, it would appear that the site was extensively plundered—as only small objects remained in this area.

Issues surrounding the colossal stela

Given the apparent abandonment of the northern area, however, it would seem strange that the colossal stela of Ptolemy VIII, the largest object discovered in Thonis-Heracleion and dating from just before the end of the occupation of the new sanctuary of Amun, around the end of the second century BC, should be found here (Figure 1.41).

The colossal gneiss and pink granite stela (6.10 × 3.10 m) was discovered in the western part of the northern sector of the site during a targeted excavation following a geographical survey.[269]

No other evidence of occupation later than the time of its erection was recovered from around the great stela and it would seem that this gigantic object, weighing sixteen tons, was one of the last acts of construction that took place in Thonis-Heracleion, *c.* 118–114 BC.[270] Elsewhere in the city there is little evidence of occupation from the second century BC onwards, with finds from the Roman era being extremely scarce. Why the stela was erected on a site which, according to the archaeological record, was abandoned at the time is hard to understand. Nevertheless, this area was probably still part of the city's religious domain for such a monument to be placed there. The text of the stela records donations

267 Grataloup 2010: 151–3. The studies on the Thonis-Heracleion ceramics of the Persian and Late Pharaonic dynasties may contribute to narrow the time frame for the date of transfer of the temple; ibid. 2012: 167–8.

268 The following gods and goddesses were found: Amun, Osiris, Horus, Harpokrates, Isis, Thoth, Hathor, Apis, Athena, Anubis, Bastet, and Nefertum. This concentration of diverse gods may be reflected in the expression 'the sanctuary of all the gods' in l. 14 of the colossal stela; Thiers 2009: 14, 27–8.

269 On localising the discovery site: Goddio 2007: 127 fig. 3.106, 128 fig. 3.107; 2009: ix fig. 1. On the magnetic and bathymetric maps: 2010: 9–10, figs 1.13–14.

270 We must add the much deteriorated remains of a colossal white marble statue (HXX-6900), where the following elements are still distinguishable: the left buttock, the back pillar and the hand of a pharaoh wearing the *shendyt*, which were found near to the colossal stela. On the archaeological environment and the list of other artefacts found nearby, see Goddio 2009: xiii–xiv.

of the pharaoh following a request made by priests to recover land owned by the temple since high antiquity, and recognised until year 44 of the reign of Amasis.[271] In addition, they would regain a right of asylum which had also been lost.[272] Perhaps the stela was located in the north of the city—near the former location of the temple to Herakles?

The very presence of this stela in Thonis-Heracleion is evidence of royal consent, and the text seems to indicate that the king had placed this order 'at the door to deliver justice', which would mean at the propylon of the temple.[273] As it does not seem that the sanctuary was active at the time of the erection of the stela, it is possible that it was displayed in this specific location after the area had been renovated for the occasion because of its continuing religious and historical importance.

The stela of Ptolemy VIII consequently brings us to the end of the pagan religious landscape in the city, although its text also takes us back to its very beginnings. The recovery of the right of asylum mentioned on the stela is also found repeated in Herodotus.[274] Paris was forced by adverse winds to take shelter in the Canopic region:

> *There was (and still is) on the coast a temple of Herakles, in which if any man's slave were to take refuge and have the sacred marks set upon him, giving himself over to the god, it would not be lawful to lay hands upon him; and this custom has continued still unchanged from the beginning down to my own time.*

It is particularly interesting to note that the ancient temple to Herakles still enjoyed its right of asylum in the time of Herodotus. It was therefore not lost at the time of the first Persian occupation, at least not when Herodotus made his journey. The privileges of the temple may have disappeared only at the time of its reconstruction further south, on the main island.

The old temple of Herakles may have existed from a very early period indeed, as Herodotus associated the Canopic region with characters from the time of the Trojan war,[275] for example, in the tale of Paris' unwilling landing on the Egyptian coast, or the legend of Menelaus' pilot Κάνωβος, who died on these shores from a snake bite, and gave his name to the city of Canopus.[276] The harbour of Thonis was certainly known to the Greek world at the time when the Homeric texts were fixed in the eighth century BC, a time that also corresponds to the opening up of Egypt to the west with the emergence of the Saïte principality and subsequently the twenty-fourth and twenty-sixth dynasties.[277]

Thonis-Heracleion: a 'Thebes of the North'?

The reference to the 'Thebes of the North' appears on line 13 of the colossal stela of Ptolemy VIII, in a context which is unfortunately incomplete.[278] It describes the procession of the statue of Amun-Re, the 'King of the Gods' to the 'Thebes of the North',[279] the god circling the ramparts while outdoors.[280] Thiers points out that the local Amun was called 'King of the Gods', which was the major Theban epithet of the god.[281] In his studies of the 'Thebes of the North', Guermeur mentions that the expression appears during the twenty-sixth dynasty, and that it applies quite evidently to the city of Sema Behedet (Tell el-Balamoun), and then to Tanis from the thirtieth dynasty onwards.[282]

Yet Guermeur collates other documents relevant to the region that once formed the Great Kingdom of the West, all dating from the end of the twenty-fifth dynasty to the end of the Saïte Period, which prove that there was a 'Thebes of the North' which was neither Sema Behedet nor Tanis, and which was located between Imaou and Saïs.[283] He offers three reasons for this title. The first, and most important one, is religious, implying that the major gods of the site termed the 'Thebes of the North' are the Theban triad. The second is the spatial layout of the religious structures, which is similar to that of Thebes.[284] The third and determining reason is political, as it was in the interest of the rulers of the Great Kingdom of the West to move closer to Thebes.[285] The 'Thebes of the North' studied by Guermeur could have been Saïs, even if for a just a short period,[286] and we cannot exclude that it may also have referred to Thonis-Heracleion,[287] for

271 Thiers 2009: 20, 35 (l. 21); 2011: 248.

272 Ibid.: 20, 46–8 (l. 22). Thiers notes that the right to asylum was also linked to the safety of the priests inside the temple. It was very important for them because it gave them a legal protection that acted as a deterrent. Indeed, some priests were mistreated by brigands or civil servants. This is even mentioned in l. 22 of the stela.

273 Ibid.: 22, 37 (l. 24).

274 Ibid.: 46–7; Herodotus *Historiae* 2.113.

275 Bernand 1970: 164–221; *Historiae* 2.113.

276 For an Egyptian etymology of Canopus, see Malaise 1999: 228–9.

277 Yoyotte 2001b: 27.

278 Thiers 2009: 13, who identifies Tell el-Balamoun with the Northern Thebes in question: ibid.: 26.

279 See Guermeur 2011: 171 for a study of the expression 'Thebes of the North'.

280 Thiers 2009: 13, 26–7.

281 Ibid.: 26.

282 Guermeur 2011: 171.

283 Ibid. 2005: 106–16; Zivie-Coche 2005: VIII.

284 Brissaud et al. 1998: 88 argue in the context of Tanis that from an architectural point of view, to look for similarities or differences between Tanis and Thebes is far from being a simple endeavour, because a site is always a combination of diachronic elements. Nevertheless, they acknowledge some architectural analogies between these two cities when comparing the plans of Karnak (e.g., Nims 1965: 14, 95) and Tanis (e.g., Brissaud 1998: 16). In Thonis-Heracleion, a sanctuary of Khonsu was located north of the complex of Amun, and there may also be a sanctuary of Mut further south, but this has not yet been confirmed. One must also take into account, in addition to diachronic issues raised by Brissaud, the disparities of the topo-geographical conditions of this area, especially the aquatic ones in the region of the *hone*.

285 Guermeur 2011: 174; Yoyotte 2012: 59.

286 Guermeur 2011: 174.

287 The city of Thonis-Heracleion is situated further north, on the shore equally distant from Imaou and Saïs.

the political reasons mentioned above. The dynasts of the Great Kingdom of the West, isolated from Thebes, had excellent reasons to designate a town situated on land which they controlled as 'Thebes of the North', in order to have the god Amun legitimize their sovereignty. The same goes for the Saïtes, who claimed that they had inherited their power from Neith, and thus it would have been confirmed by Amun. If this is correct, the Hone-of-Saïs could well have had a 'dynastic' function long before the Ptolemaic era.

The Byzantine nunnery and the ruined temple

Following the virtual abandonment of the city in the Roman Period, there is renewed activity on the site—albeit now Christian—in the Byzantine Period. There is evidence in the northwestern sector of the Central Island for renewed activity and the construction of a structure with blocks reused from the pagan sanctuaries.[288] A Ptolemaic temple, which extends from the southwest corner of the sanctuary of Amun-Gereb, was also repurposed and modified at this time with architectural elements characteristic of the Byzantine Period. These structures most likely relate to the nunnery mentioned in Byzantine texts and where a coin hoard, as well as other Byzantine gold coins, has been found.[289] Recent work (2014) also showed that an adjacent temple of the Ptolemaic Period, which extends at the southwest corner of the sanctuary of Amun-Gereb , was repurposed and modified in the Byzantine Period with added architectural elements, such as column capitals. A number of Byzantine gold coins, lined up all alongside the foundations of its eastern structure, have been recovered during the excavations.

Conclusion

Thonis-Heracleion must be approached diachronically to fully understand the evolution of the great *emporion* and the sacred topography of the city, as well as their development and their decline.[290] The latter are conditioned by the geographical and natural environment of the *hone* and they are affected by any changes to this fragile aquatic landscape. A papyrus of the second century AD evokes this lability:

> *Indeed, the flooding river brings a lot of silt to this region, and covers Canopus with water; it flooded many fields and these newly formed marshlands connected the island of Canopus with the place called Thonis; and, over a surface of thirty stadia, it enclosed them in Egyptian farms and churning out its black silt, wove them together.*[291]

We also note that at this time Thonis-Heracleion had lost its importance and was referred to as the 'place called Thonis'.

According to the archaeological evidence, the *emporion* developed at an early date and, in the first instance, in the north of the site. This was also confirmed by the layout and dating of the shipwrecks, which indicate some port activity ranging from the eighth to the first centuries BC, with a concentration between the fifth and the beginning of the third centuries BC.[292] The latter must represent the time of the greatest activity of the port.[293] Occupation migrated thereafter from north to south, most likely following geographic changes to the region.[294] In the same way, sanctuaries were established according to the natural movements associated with shifts in occupation. Remarkably, religious activity survived the decline of the *emporion*.[295]

After Alexander the Great ordered that all maritime traffic be transferred to Alexandria,[296] Egypt's new capital, Thonis-Heracleion, still retained its religious importance through its sanctuaries. As the temple of dynastic continuity was located here, the city enjoyed donations from the Ptolemaic kings, who were certainly keen to gain the sympathies of the local priesthood, especially as the assimilation of Khonsu, son of Amun, with Herakles could only increase the interest of the descendants of the Greek hero in this location near Alexandria. The colossal statues, the luxury of the furnishings, and the erection of the gigantic stela under Ptolemy VIII are all evidence of the continuing importance of the city. The archaeological data equally attests to the interest expressed by the kings of the last Egyptian dynasties and those of the Lagidae for the city's shrines and especially for its temples of Amun and his son Khonsu, the divine heir in the image of the

288 Goddio 2007: 120, 126; 2011: 129 note 42.

289 Peltier 1978: 178 (44th miracle). In the Byzantine era, Thonis-Heracleion had lost all of its economic and religious importance, and was mentioned as the 'Heracleion domain' (*kome*); ibid: 160 (39th miracle), 176 (43rd miracle). Evidence of occupancy in this period is also attested to by the retrieval and reuse of cult monuments from the great sanctuaries in ordinary constructions (naos and Osirian vat as drinking troughs, granite columns and beams as millstones etc.). For archaeological evidence, see Meadows 2008c: 352 (SCA 316, SCA 314); 2008d: 352 (SCA 315, SCA 319), and this volume Chapter 6; for the Islamic Period: Bresc 2008a: 200–201; 2008b: 352; 352 (SCA 317); Goddio and Fabre 2008: 197, 201.

290 Goddio 2011: 121–9.

291 *P.Michaelides* 4; Bernand 1970: 225–8.

292 Goddio 2007: 111–6 figs 3.82–3, 3.85–7; 2008: 46–8; 2011: 125–9 figs 7.5–6; Fabre 2008d: 220; 2011: 15 fig. 1.4; Fabre and Goddio 2013: 2 fig. 1.

293 Goddio 2011: 128.

294 For a comprehensive view of the impact of human factors on sailing and trade in antiquity, see Arnaud 2011.

295 Monetary deposits found south-west of the temple, and the density of artefacts in the area of the temenos, which has no equivalent in any other part of the city, could be good markers of the central role played by the temple in the economic and social life of the city; see Meadows, this volume, Chapter 6.

296 Pseudo-Aristotle *Oeconomia* 2.33c.

new sovereign.[297] The Lagidae were possibly even more inclined to display the divine transmission of power in Thonis-Heracleion's 'House of Rejoicing' dedicated to Herakles-Khonsu, as they considered themselves to be the descendants of the god on their father's side and from Dionysos-Osiris on their maternal side.[298]

The initial data on the sacred topography of Thonis-Heracleion shows that throughout the Ptolemaic Period the seat of religious life was located on the Central Island, which bore the great temple of Amun-Gereb, and further north the sanctuary of Khonsu. The next excavations of the site will aim to conclude the research on the Central Island, but also to assess the sacred landscape of the northern part of the city, on this '... sacred ground, on this land, within the confines of the nomes of the gods of the western horizon, in this open space on the borders of the country, at the edge of the sea...',[299] where the 'Master of Water' and Osiris reigned.

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297 One should mention here the fact that a pair of statues of Seti II (*c.* 1203–1196 BC) were found inside the great temenos. Their dorsal pillars mention the solar title of the king in its most developed variant: *wser-kheperw-re*, the chosen of Re, Beloved of Amun (Yoyotte 2004a: 33; 2008c: 305). Yoyotte saw in these two statues a royal type which 'by its lack of beard and necklace, had the characteristics of statues and drawings which show the king wearing the *khepresh* crown, a headdress associated with the taking of power by a young king' (pers. comm.). Yoyotte (2004a: 33 note 14) also noted that the transfer of these monuments to Thonis-Heracleion was probably carried out prior to the Roman conquest. This is confirmed by the excavations, which has not identified Roman activity on the site.

298 Triumphal inscription from Adoulis; Theocritus *Eidyllia* 17.26–7.

299 Colossal stela of Ptolemy VIII; Thiers 2009: 14 (l. 15).

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2 The production and circulation of metal statuettes and amulets at Thonis-Heracleion

Sanda Sue Heinz

This volume addresses theories and evidence for manufacture and patterns of trade in Egypt in the Late Period. Many of its articles focus on how new finds from Thonis-Heracleion and related sites alter the current picture or fill gaps in our knowledge. Below I discuss the ways in which the statuettes and amulets from Thonis-Heracleion contribute to that discussion.[1] I evaluate the evidence for a workshop for metal statuettes and amulets at the site, and discuss what that workshop, or workshops, can say about the distribution and circulation of statuettes throughout Egypt. Thousands of metal statuettes of deities survive from Egypt and were used as gifts to the gods,[2] but relatively little is known about the manufacturing process, the economics behind their use, and their patterns of exchange in Egypt.

All of the statuettes from the site derive from the port's main phase of occupation, between the seventh and second centuries BC.[3] This port is one of the few sites from that time period with provenanced figures from recorded archaeological contexts, and it is the only site where all of the statuettes and amulets from the Late and Ptolemaic Periods have been fully catalogued and analysed in detail.[4] This foundation provides a solid platform from which to develop discussions on the economy and its intersection with cult.

The finds and their context

The practice of dedicating metal statuettes to temples was known in earlier periods, but blossomed during the Third Intermediate Period, came to a peak in the Late Period, and continued into the Ptolemaic Period.[5] Scholars established these general trends by adhering to the broad chronology of sites where hundreds of such statuettes have been found,[6] with some help from statuettes with inscriptions.[7] The precise dating of individual statuettes is rarely possible based on appearance alone, particularly for deity statuettes, which comprise the majority of the Thonis-Heracleion subjects and which tend to maintain conservative, traditional iconographies.

Several factors combine to make the dating of statuettes and amulets particularly challenging: their consistent iconography over centuries, the lack of preserved inscriptions for the majority of statuettes, the rarity of well-documented deposits, the lack of provenance information, the vulnerability of statuette caches (*favissae*) to looting, and the composition of those caches, which frequently include statuettes collected over years and possibly even centuries.[8] The finds from Thonis-Heracleion present many of these same difficulties, but they are at least documented with a clear provenance.

Over a decade, IEASM recovered and recorded over 300 statuettes and amulets from the port's landmasses and harbours.[9] Approximately 55 per cent (179) are bronze, 33 per cent (110) are lead, and 12 per cent (40) are of other materials such as terracotta, faience, and limestone.[10] Of those, 83 per cent (272) conform to standard Egyptian iconography while about 17 per cent (57) are

1 For an overview of the topography and history of the site, see Goddio 2007: 69–130; 2011: 122–9; this volume Chapter 1; Goddio and Fabre 2008: 44–8.
2 Major works on Egyptian statuettes, bronzes in particular: Roeder 1937; 1956; Aubert and Aubert 2001; Page Gasser 2001; Hill 2004; 2007a; Jørgensen 2009; Mendoza 2008; Weiß 2012; Bianchi and Ziegler 2014.
3 Chronology of Thonis-Heracleion: Goddio 2007: 75; 2011: 128–9; this volume, Chapter 1; Goddio and Fabre 2008: 46. For the pottery: Grataloup 2008; 2010; 2011; this volume Chapter 7. According to the coins: Meadows this volume Chapter 6.
4 Heinz 2014a; 2014b. All statuettes and amulets referenced in this article with an 'H' number are catalogued in more detail in Heinz 2014b; the catalogue numbers are provided where appropriate. All of the statuettes are housed in Egypt, with the majority in the Maritime Museum, Alexandria. For particular aspects of the material, see Heinz 2011 (lead statuettes and amulets); 2014c (production methods); Fabre and Goddio 2012 (Cypriot head, H11031). Other sites have more statuettes, and some have more context information, but most remain unpublished; see, for instance, Davies 2007 (animal necropoleis at Saqqara) or Wuttmann et al. 2007 (Osiris sanctuary at Ayn Manawir), with bibliography.
5 General timeline of Egyptian bronze statuary: Ogden 2000: 158–61; Hill 2001: 204–6; 2007a; Weiß 2012: 487–91.
6 For a useful overview of such sites in the Delta, see Weiß 2012, particularly 381–462.
7 For the general form of such inscriptions, see De Meulenaere 1990; Weiß 2012: 482–6. Aubert and Aubert, for instance, utilize inscribed figures in their overview of the development of the use of bronze and gold throughout Egyptian history (2001: 15–155).
8 Hill 2001: 203; 2004: 3; Schulz 2004.
9 This article refers to statuettes and amulets found between 2000 and 2010. More recent finds from seasons 2011–2015 will be compiled and analysed in a future study by the author. Thus far, the new finds complement pre-existing material, causing no significant changes to the main trends presented by the 2000–2010 corpus.
10 Heinz 2014a: 226–7, appendix 4 for a breakdown of the items by material. Here I use the term 'bronze' for its familiarity, but bronze is actually a specific mixture of copper and tin. Most figures from this period are tin bronzes, usually with an addition of lead between 1–30 per cent (for example, Craddock 1977: 103–8), but without scientific testing, it can only be said for certain that these 'bronze' figures are copper alloys. For use of the term 'copper alloy' or 'cupreous metals', see, for example, Craddock 1976; 1977; Ogden 2000; Schorsch 2007.

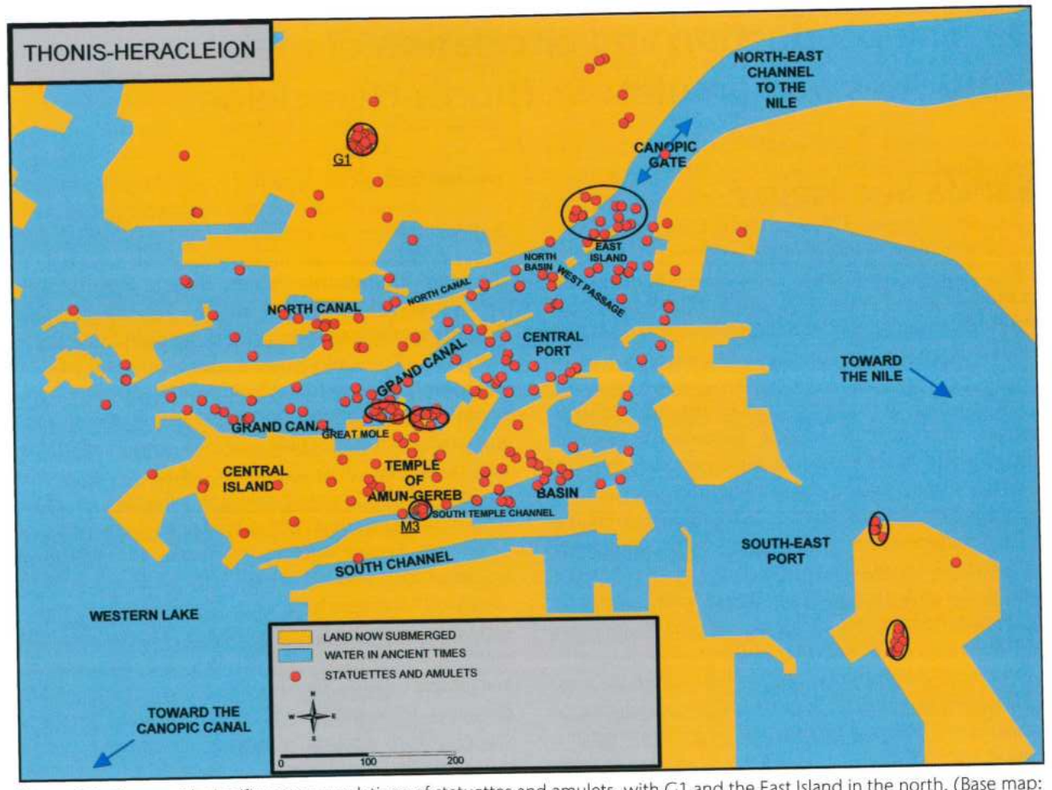

Figure 2.1 Zones with significant accumulations of statuettes and amulets, with G1 and the East Island in the north. (Base map: © F. Goddio/IEASM; findspots added by the author.)

fashioned in other styles, primarily Greco-Egyptian.[11] Stratigraphic dating of these figures is more reliable than stylistic dating, but still problematic at this site, which is currently 5–7 m underwater. The port's stratigraphy is complex and in some cases fluid, with some finds in the upper, loose, sandy layers shifting positions as a result of wave action and currents.[12] Moreover, many figures were found by prospection in the upper layers, rather than during stratigraphic excavation.[13] For this reason, we cannot assign each statuette a precise date based on its stratigraphic position.[14]

The distribution of ceramics on the site, however, shows that there are certain chronological zones; finds in the mobile layers are not randomly distributed by wave action. If small objects moved, most seem to have stayed within the same zone. According to the ceramic distributions, in general, the northern part of the site is home to older remains (*c.* seventh–fourth centuries BC) than the southern part (*c.* fourth–second centuries BC).[15] Some areas contradict that rule; the southeast landmass in Figure 2.1, for example, had a few datable sherds that were earlier (fifth–fourth centuries BC).[16] For the most part, however, the trend holds firm. The few statuettes datable by iconography follow the chronological trends established by the pottery.[17]

Figure 2.1 shows the distribution of statuettes and amulets, with heavier accumulations circled.[18] The most notable for this discussion are the dense accumulation

11 Heinz 2014a: 228, appendix 5 for the items by style. For the Greco-Egyptian figures, see the appendix heading 'Greek and Ptolemaic'.
12 Goddio 2007: 28.
13 Heinz 2014a: 229–31, appendix 6 for those found on prospection and during excavation.
14 Compare, for example, the narrow stratigraphic dates for terracottas at Athribis, where the statuettes come from clear, well-defined strata: Szymańska 2005: 20–43.
15 See Grataloup 2008 and 2010 for the dating of particular zones on site. For a shift in settlement (possibly) from north to south, see Grataloup 2010: 156, 158.
16 Catherine Grataloup pers. comm. and this volume Chapter 7.
17 For example, the Cypriot limestone head, H11031: Fabre and Goddio 2012, specifically 85–8; Heinz 2014a: 57–8; 2014b: 82–3 cat. no. 122. See also the (mostly) southern distribution of Greco-Egyptian (Ptolemaic Period) lead horse, elephant, and child deity figurines: Heinz 2014a: 179, fig. 5.5.
18 The context information discussed in this section was compiled from various sources: the geo-referenced positions of the statuettes (Goddio 2007: 74), published information (indicated where applicable), unpublished yearly site reports by David Fabre and Franck Goddio, the excavators' daily journals for each season, and pers. comms between the author and members of the excavation team.

to the far north (G1) and the looser one in the Canopic Gate on and surrounding the East Island. G1 was surveyed and excavated in 2003 and 2004, with some later survey in 2007.[19] Over 40 statuettes and amulets were discovered in this one area, which is approximately 40 × 40 m. The relatively large number of statuettes and other ritual equipment found there suggests that the zone may have acted as, or been near to, a sanctuary. Limestone blocks were jumbled and little of the architecture is preserved or understood. Despite the jumbled construction, G1 fits the profile of a *favissa*—a type of secondary burial context where statuettes are typically found after being cleared from display areas, presumably as temples filled to the point of overflowing with dedications;[20] statuettes and ritual equipment are concentrated, while other finds, such as coins and ceramics, are not abundant. The ceramic material dates to the sixth and fifth centuries BC with an absence of Ptolemaic material.[21]

On and around the East Island in the North-East Channel there is a combination of lead and bronze artefacts including statuettes and ritual instruments, but the scatter is not as concentrated as in G1.[22] The island has a dense accumulation of limestone construction blocks and the surrounding finds are mostly of a cultic nature; thus the island has been identified as a sacred zone.[23] The stratigraphy of the area is disturbed and the excavators have suggested that the island was struck by a landslide, which may explain the looser distribution of statuettes and amulets.[24] Some Ptolemaic material has been found in the North-East Channel, but material excavated in J6, closest to the island, dates to the fifth–fourth centuries BC.[25]

G1 and the East Island show a snapshot of Late Period cult items and include a mixture of statuettes, amulets, and cult equipment, such as fragmented metal vessels, incense burners, and ladles. These accumulations, together with other statuettes in the northern part of the site, mean that at Thonis-Heracleion, unlike many other sites, it is possible to distinguish between certain trends in the Late and Ptolemaic Periods, including production trends.

Evidence for production at Thonis-Heracleion[26]

The terracotta, faience, and stone figures from the port are few (only 12 per cent of the total corpus), and it is likely that most are imports from other sites, as there is no sign of production areas or production-related finds for any of those categories of material.[27] In fact, at least one piece is definitely an import: H697, a nude female Egyptian terracotta of Nile silt.[28] Its better-preserved mould sibling was found in Naukratis, a large centre for terracotta production and the likely origin of H697.[29]

Metal finds are much more abundant at Thonis-Heracleion and many items were probably locally produced. The location of a large, clearly-defined production centre (or centres) has not yet been discovered, even though the site is rich in metals finds, with several thousand bronze and lead items. Some scattered artefacts, however, indicate that metal production, and specifically statuette production, took place on site as early as the fifth century BC, even if a central foundry is as yet unknown.

The first and best evidence for metal craft production is the slag and waste that accumulated. The slag is distributed widely across the site with no clear concentration (Figure 2.2). Similarly, lead ingots, which could be used to produce lead statuettes and amulets, leaded bronze statuettes, or any number of other lead and bronze items, are distributed widely.[30] Many of the ingots may have been in transit to other cities, but none were directly associated with shipwreck cargoes. At least some were probably used on the site. For instance, at least one silver ingot was found on the southeast landmass less than 10 m from the only silver statuettes (three lion fragments: H9938–H9940);[31] the proximity of the two sets of finds is suggestive of local production (in this case, statuette production), especially when we take into account the relative rarity of silver finds (excluding coins) and the size of the site.

The slag is a more reliable indicator of local production, but it has not been studied in detail, at least not well enough to determine whether the metal production was primary (smelting from raw ore) or secondary (manufactured from imported ingots), or both.[32] Considering

19 Goddio 2007: 120. Heinz 2014a: 22–3 as well as 232, appendix 7a for a list of the statuettes and amulets in G1.
20 An overview of the characteristics of statuette caches: Weiß 2012: 465–6.
21 Catherine Grataloup pers. comm.
22 See Meadows 2011: 95–8 for a review of this zone in relation to coin die H9712. See Heinz 2014a: 23–4 and 235, appendix 7e for a list of the statuettes and amulets in this area.
23 Grataloup 2012: 16 note 5.
24 Meadows 2011: 98.
25 For this date, see ibid.: 98 note 3.
26 This section is adapted from Heinz 2014a: 149–55.
27 Perhaps with the exception of faience, which includes at least four nearly identical uraeus amulets: Goddio and Fabre 2008: 138–9, 340, 344 cat. nos 334, 371; Heinz 2014b: 117–19 cat. nos 182–5.
28 Heinz 2014b: 73–4 cat. no. 108.
29 NA569 in the Museum of Classical Archaeology, Cambridge. Many thanks to Ross Thomas of the British Museum's Naukratis project for informing me of the mould sibling.
30 For lead's role in bronze production see, for example, Ogden 2000: 154–5; Scheel 1989: 20. For ingots at Thonis-Heracleion, see Van der Wilt 2010: 161–3; 2014: 71–101, specifically figs 3.3–4, 3.7–8 for their distribution on site.
31 Lion statuettes: Heinz 2014b: 149–50 cat. nos 238–40.
32 Pichot et al. 2006: 220–2 identify three stages of production that each produce distinctive slag: reduction, purification, and elaboration. At Thonis-Heracleion we would expect evidence at least for the third phase 'elaboration', where the metal is taken from ingots and is cast, hammered, or struck to make the final product (a statuette, metal vessel, utensils, coins). Closer examination of the slag is necessary to make that determination.

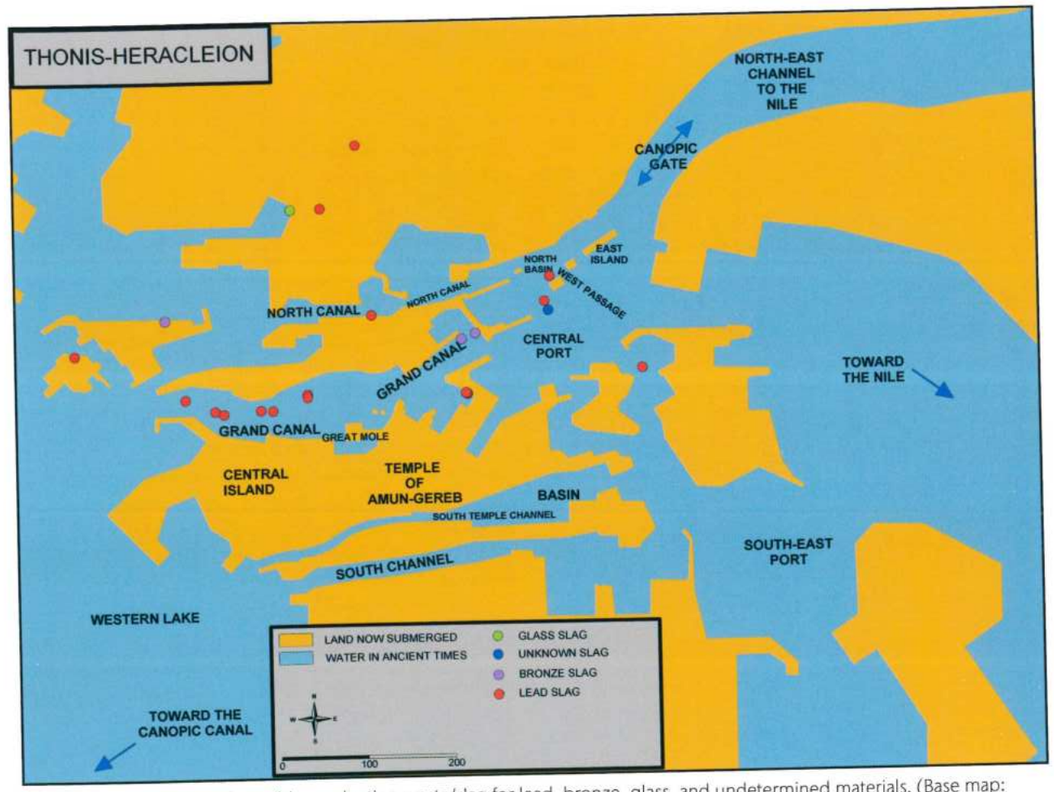

Figure 2.2 Distribution of possible production waste/slag for lead, bronze, glass, and undetermined materials. (Base map: © F. Goddio/IEASM; findspots added by the author.)

Thonis-Heracleion's prominent trade activities and its distance from native and foreign sources of lead and copper, the second scenario is more likely, but currently unconfirmed.[33]

Two moulds (H9099 and H3084) and a coin die (H9712) are also evidence for production on site. Mould H3084, which is currently unpublished, is a cubic bronze mould that may have been used to make lead sling bullets. The coin die is from the mid-fourth century BC, with impressions for Athenian obverses on three sides.[34] Mould H9099, meanwhile, is particularly important in terms of statuette production. It is a flat lead mould with several impressions on both sides.[35] The impressions of primary interest are three that represent ram horns of the type used to decorate *atef* and *hemhem* crowns for Egyptian bronze statuettes. This mould was likely used to produce waxes for the casting of bronze crown attachments for Osiris figures.

The coin die and mould H9099 were discovered near the East Island in the Canopic Gate, approximately 25 m from each other. This zone, because of these two finds, marks the best potential area for metal production on site, but they are also finds that could have been mobile and thus definitive evidence for the location of a foundry (or foundries) is still elusive. Mould H3084, meanwhile, was in a different sector, in the Grand Canal just north of the central temple of Amun-Gereb; its presence in this zone hints at another phase of production in the fourth or third century, perhaps a workshop that specialised in weaponry, as opposed to cult items. Its find location in the canal, however, sheds no light on the original location of such a workshop. Locations of workshops also probably changed as settlement patterns shifted from the north to the south.

Other indicators of statuette production include mould siblings and casting flaws. The presence of identical mould siblings is often a reliable sign that production took place at a site; if the figures were exported from another site, siblings would be split apart and the chances of finding them together would dramatically decrease. Types from Thonis-Heracleion that have identical mould siblings are small lead Greco-Egyptian

33 Metal ores and mining in Egypt: Garland and Bannister 1927 (outdated, but useful still for background information); Scheel 1989: 11–20; Ogden 2000; Masson this volume Chapter 3.

34 Meadows 2011.

35 For the implications of this mould for the analysis of casting techniques used on site, specifically indirect lost wax casting, see Heinz 2014a: 120–58, especially 127–30, figs 4.4–9; 2014b: 197 cat. no. 329; 2014c.

horses (for example, H11644, Figure 2.3),[36] elephants (for example, H6122, Figure 2.4),[37] and child deities (for example, H10808, Figure 2.5),[38] as well as lead falcon pendants that adhere to traditional Egyptian iconography.[39]

The horses, elephants, and child deities are Ptolemaic in date and probably derive from a different type of workshop activity than many of the traditional Egyptian lead representations—one more in line with terracotta workshops, as many of those lead Greco-Egyptian types mimic or draw from terracotta motifs. The Greco-Egyptian statuettes have a different distribution from the more traditional Egyptian types, one that was outside of the main sacred areas, and was particularly concentrated on the central landmass in the area directly east of the Amun-Gereb temple.[40] Egyptian-style statuettes were still being dedicated (and probably manufactured on site) in the Ptolemaic Period, and were even being dedicated on the central landmass, but in a more concentrated way inside the main temple structure.

The lead falcon pendants and other traditional Egyptian representations in lead mirror the distribution of the Egyptian bronzes offered as temple dedications, and span the Late and Ptolemaic Periods. Considering their similar function and distribution, the lead Egyptian-style figures were probably made in the same (likely temple-controlled) workshops as the bronzes, as lead was readily available to bronze workers, who also had the artistic and religious expertise needed to craft the image.

Miscast items or casting wasters are important remnants of production practices, and items that have minor casting mistakes also tend to have a more limited circulation. Bronze statuette fragments that could be wasters are two arms and one standing canine. One arm, H3172 (Figure 2.6), has a deformed piece of bronze attached at the top of the shoulder and the other arm, H1417 (Figure 2.7), has a pitted, spongy surface consistent with examples of miscast items elsewhere.[41] Canine H6848

36 Heinz 2014b: 145 cat no. 231.

37 Ibid.: 139–40 cat. no. 220.

38 Ibid.: 25–6 cat. no. 34.

39 Mould siblings: Heinz 2014a: 146–7, figs 4.28–9; 2014c: 207–8, 218, figs 7–9. In general, horses: Heinz 2011: 216; 2014a: 68–70; 2014b: 144–6 cat. nos 229–36; elephants: Goddio and Fabre 2008: 192, 340, cat. nos 328–9; Heinz 2011: 215, 231, fig. 3; 2014a: 66–8; 2014b: 137–43 cat. nos 215-228; child deities: Goddio and Fabre 2008: 76, 339, no. 325–6; Heinz 2011: 214–15, 231, fig. 2; 2014a: 35–7; 2014b: 23–8 cat. nos 29–39; falcon pendants: Goddio and Fabre 2008: 183, 338 cat. no. 319; Heinz 2011: 216–17, 232, fig. 4; 2014a: 61; 2014b: 95–103 cat. nos 139–56.

40 Goddio (this volume Chapter 1) suggests that the temple of Amun-Gereb was established on the Central Island in the fourth century BC and thrived in the Ptolemaic period until the second century BC. Thus, the concentration of Greco-Egyptian statuettes on the Central Island is entirely in keeping with our developing understanding of the spatial development of the site from the Late Period and into the Ptolemaic period (Goddio 2007: 78).

41 Pitted, spongy bronzes: Page Gasser 2001: 13. H3172: Heinz 2014b: 70–1 cat. no. 103; H1417: Heinz 2014b: 69 cat. no. 101.

Figure 2.3 Leaping horse. H11644, lead (H. 3.5 cm, W. 3.0 cm, Th. 1.0 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.4 Elephant with rider. H6122, lead (H. 3.2 cm, W. 3.8 cm, Th. 1.3 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.5 Child deity, seated and holding a round pot. H10808, lead (H. 4.5 cm, W. 2.4 cm, Th. 2.4 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.6 Left arm with a deformed shoulder. H3172, SCA 973, bronze (H. 10.1 cm, W. 4.9 cm, Th. 1.6 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.7 Left arm with a porous, pitted surface. H1417, bronze (H. 9.2 cm, W. 2.0 cm, Th. 1.4 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.8 Standing canine, Wepwawet, with a severely pocked surface and uneven plinth. H6848, heavily leaded bronze or lead alloy (H. 4.2 cm, W. 4.7 cm, Th. 1.1 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.9 Detail photo of the pock-marked knees and legs of a seated child deity. H8239, SCA 1022, bronze (H. 9.7 cm, W. 4.8 cm, Th. 4.7 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

(Figure 2.8), which is either heavily-leaded bronze or another lead alloy, has a join between the feet and plinth that is very bumpy and uneven; no attempt was made to smooth or disguise it.[42] The figure also has a pocked surface with deep indentations. These could be from corrosion or they could be from air bubbles trapped in the mould that burst during casting if the mould was not properly aerated. The damage is similar to that on a child deity in the Bibel+Orient Collection at the University of Fribourg. The figure's surface is pocked on the face, chest, and legs—damage that Page Gasser attributes to air bubbles.[43] Indentations on the legs of child deity

42 H6848: Goddio and Fabre 2008: 189, 321 cat. no. 195; Heinz 2014b: 123 cat. no. 191.

43 Page Gasser 2001: 13 in reference to ÄFig 2001.9 from the University of Fribourg collection.

Figure 2.10 Upper body of a falcon-headed hybrid deity with a deformed torso and crown. H8187, lead (H. 5.2 cm, W. 3.0 cm, Th. 1.4 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.12 Striding male, possibly Nefertem, with a damaged head, left arm, torso, and left leg. H8167, lead (H. 4.3 cm, W. 1.4 cm, Th. 0.7 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

H8239 (Figure 2.9) are similar,[44] although less severe than on canine H6848.

Wasters and casting damage are somewhat more frequent with the Egyptian-style lead material. Items that are probably casting wasters include a falcon-headed hybrid statuette (H8187, Figure 2.10) and two unidentified deities (H6806, H8167, Figures 2.11–12), although the composition of the material for H6806 is unknown.[45]

44 H8239: Goddio and Fabre 2008: 75, 318 cat. no. 174, photo from cat. no. 177; Heinz 2014b: 19–20 cat. no. 23.

45 Heinz 2014b: 90 cat. no. 134 (H8187); 62–3 cat. no. 86 (H6806); 63–4 cat. no. 88 (H8167).

Figure 2.11 Striding male, possibly Nefertem, with a broken and warped left leg. H6806, lead or bronze (H. 7.7 cm, W. 2.4 cm, Th. 2.2 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Figure 2.13 Falcon pendant with a hole in the top of the left wing, shown from above. H3062, SCA 424, lead (H. 2.3 cm, W. 1.1 cm, Th. 0.7 cm). Maritime Museum, Alexandria. (Photo: S. S. Heinz © F. Goddio/Hilti Foundation.)

Among other cult items, Robinson suggests that H3758 is a miscast duck finial for a ladle.[46] As for the falcon pendants, eight out of the 18 figures have a small chip or hole in one wing, usually at the top of the wing where it joins the body.[47] The chips, or holes, occur in an area that is not prone to breakage; the wings protrude, but not enough to be vulnerable (see, for example, H3062, Figure 2.13).[48] The hole is not the result of a flawed mould, as falcons from different mould series have the flaw, and sometimes it occurs on the right wing and other times on the left. The regularity with which this one fault appears, however, suggests something related to the casting process. The holes are not so damaging to the appearance of the figures that it would have prevented their use, but they probably would have constrained their circulation to the site and its immediate surroundings.

Notably, several of the miscast figures, as well as many damaged statuettes, were found in G1.[49] G1 would not have been a production area; as noted above, it is a typical statuette cache (secondary context), but the presence of so many damaged figures in G1 is still informative. They likely demonstrate that bronze and lead statuette production was nearby and took place in the fifth century or earlier. Mould H9099 and the coin die, meanwhile, were found near the East Island, another indication that the production of metal artefacts, and statuette production in particular, started early in the history of Thonis-Heracleion, at least by the fifth century BC and continued through into the Ptolemaic period.[50]

Metal workshops in Egypt

In all, finds such as the moulds, slag, mould siblings, casting wasters, and flawed figures attest to metal production at the site, even though the scope and location of production remain unknown. Metallurgical studies, especially those focused on the slag, may help to more firmly establish the nature of this workshop(s), and when it existed.[51]

At this point in the study of metal production in Egypt, even the basic identification of manufacture on the site is an important step forward in scholarly discussions for the Late and Ptolemaic Periods. Archaeologically attested metal production centres in Egypt are few,[52] with the most notable being a large-scale complex at Pi-Ramesse in Qantir that dates to the New Kingdom.[53] Pi-Ramesse has extensive installations for copper works that demonstrate the sophistication and scale of metal use and production in the New Kingdom; what the installations would have been used to make is still unknown. Other sites include Middle Kingdom Kahun, with a small number of casting moulds;[54] Ptolemaic installations in the funerary temple of Seti I in Thebes, with a limestone casting mould and hearths for heating crucibles;[55] possible iron works at Naukratis;[56] and a further three metal-working sites that are close chronologically and geographically to Thonis-Heracleion in Alexandria, Abou Rawash, and Marea, ranging from the Ptolemaic through early Roman Periods.[57]

The latter three sites were primarily involved in iron working, although in some cases copper alloys were used as well. The Cricket Ground in Alexandria and a related site at the ex-British Consulate may have been involved in arms production, as many arrowheads, sling bullets, and other weapons were found, in addition to casting waste.[58] Thonis-Heracleion has a wide range of arms and armour; once that material is fully catalogued and studied at both sites, we will be able to see if any of these items were produced at the Cricket Ground and Consulate workshops—or at least consider potential links between the sites in the Ptolemaic Period.

In situ archaeologically attested statuette workshops are unknown, with the possible exception of Qubbet el-Hawa, near Aswan; research on this site is relatively new and promises exciting revelations for casting techniques and production in the Late Period. The workshop has waxes, bronzes that are still in their investment (the ceramic material that covers them during firing), as well as other waste items, but detailed research and publications of this particular context are only now in progress.[59] Terracotta workshops are documented (although still rare) in Egypt, but other metal statuette workshops like

46 Robinson 2008: 86 cat. no. 51.

47 Falcon pendants with a hole in the wing: H5578, H10718, H3545, H1493, H3470, H2703, H3062, H2776; Heinz 2014b: 96–101 cat. nos 140–1, 143–5, 147–8, 152.

48 H3062: Heinz 2014b: 99–100 cat. no. 148.

49 Miscast items in G1: H8239, H8187, H6806, H8167, H6848.

50 See also Meadows this volume Chapter 6.

51 See Pichot et al. 2006 for the importance of slag as an indicator of the type of production activities that took place. For metallurgical studies and other scientific examinations, see, for example, Craddock 1976; 1977; 1988 (Greek, Roman, and Etruscan copper alloys); Riederer 1981, with bibliography (Egyptian statuettes); Cowell 1986 (Egyptian tools and weapons, especially axes); Schorsch 1988; 2007 (Egyptian statuettes).

52 Some information is available from pictorial sources. Scheel 1989: 21–33, for instance, provides an overview of casting and includes depictions from wall paintings.

53 Pusch 1990; 1994; Rehren and Pusch 2012.

54 Roeder 1956: §693 mentions Kahun and includes the possibility of workshops at Hermopolis and Tell Mokdam. Hermopolis had a few bronze tools that were near a stone artisans workshop; Roeder proposed that there may have been a foundry as well, but with little explanation (Roeder 1959, Kap. VI §49f). Kahun had casting moulds and tools: Petrie et al. 1890: 29 no. 55; Gilmore 1986.

55 Scheel 1989: 25–8.

56 Masson this volume Chapter 3.

57 For an overview, see Pichot et al. 2006: 223–6 with bibliography; Pichot 2010: 61–4 (Marea).

58 Pichot et al. 2006: 224.

59 For details see http://www.aegyptisches-museum.uni-bonn.de/projekte/bronzegusswerkstatt. For preliminary data see Edel 2008: 1869–78, QH 207 §4. These may actually be more of a secondary deposit than *in situ* evidence, but still with one clear, concentrated context. After final submission of this article, Fitzenreiter et al. 2014 and Auenmüller 2014 and 2015 were published, offering further details about this relevant new research.

the one in Qubbet el-Hawa, with such a concentrated amount of production material from one clear context, are not attested.[60]

A few other workshops may be inferred from displaced and scattered finds, like those at Thonis-Heracleion. The animal necropoleis at Saqqara (twenty-sixth dynasty–Ptolemaic Period) boast over 1,800 bronze statuettes from excavations between 1964 and 1976, as well as several thousand more from earlier excavations.[61] Hastings hypothesised that a large group of plaster casts and fragments from the Upper Baboon Gallery may have been used as sculptor's models for the production of stone and/or bronze figures.[62] This hypothesis is debatable, as plaster is commonly used in the galleries and the status of these types of items as sculptor's models or *donaria* are continuously re-examined.[63] One find from that area, however, was described as 'a plaster fragment with a bronze figure of a baboon wearing the lunar disk embedded in it'; unfortunately the plaster fragment was removed.[64] Many statuettes are covered in a thin layer of gesso before gilding,[65] but if this figure really was embedded in a 'fragment' of plaster, it is possible that it was a waster with the investment still attached from the lost wax casting process. Further study of this area is necessary to determine if there was workshop activity.

Memphis, meanwhile, had a number of displaced finds that attest to a workshop in that area. Over 1,700 plaster moulds are known from three museum collections, all with a broad Memphite provenance and generally dated to the Ptolemaic and Roman periods.[66] Many of these moulds would have been used to produce bronze statuettes (mostly Greco-Egyptian),[67] while the rest were for terracottas, but the origin of the moulds (within Memphis) is unknown.[68] Another similar group of moulds is in the Gayer-Anderson collection at the Greco-Roman Museum in Alexandria.[69] While there are no direct links between the moulds at Memphis and statuettes at Thonis-Heracleion (nothing was irrefutably made in Memphis), some of the Memphite moulds for bronze vessel attachments are very similar to cast attachments at Thonis-Heracleion.[70] Even if those particular moulds were not used to manufacture the Thonis-Heracleion items directly, the similarities suggest that the city once had moulds of its own just like them. It is unlikely that we would find them today, even if Thonis-Heracleion had many, as they would have degraded in their current marine environment.

Athribis may also have housed a metal statuette workshop in the Late Period. No such production area has been discovered, but a significant number of inscriptions on Egyptian child deity statuettes from the site specifically name Athribis as the deity's locality. It is unlikely that these statuettes were purposely produced and inscribed elsewhere before being taken to Athribis.[71]

Workshops and the circulation of bronze statuettes

The lack of directly attested statuette production centres means that past suggestions regarding bronze statuette workshops and circulation were primarily based on the iconography of the statuettes and not on direct production evidence from particular sites. The most influential theory was that of Roeder, a scholar who produced a catalogue of Egyptian bronzes from the Staatliche Museen in Berlin; his catalogue remains one of the most important works for bronze studies.[72]

Roeder wrote in detail about his theories on statuette production. He proposed that bronze statuettes were mass-produced using the indirect lost wax casting method, a form of lost wax casting that allows for production of identical figures.[73] While the details of his theory are arguable (especially regarding assembly), the evidence from Thonis-Heracleion does show that serial production may have been in progress as early as the Late Period at the site.[74]

60 For a brief overview of terracotta workshops, actual and inferred, see Bailey 2008: 5. Of those, Athribis is one of the most important because of its detailed stratigraphic information: Szymańska 2005: 22–37, 45–63. Boutantin 2014: 6–52 also provides a comprehensive overview of contextualized terracottas and workshop centres.

61 Smith 1974: 49–57; Davies 2007: 178–9. This tally does not include a cache of around 600 objects, almost all bronze situlae, discovered in 1995: Nicholson 2004; 2005. For earlier excavations, see Ziegler 1996. For a broad compilation of the finds from the site, see Weiß 2012: 412–39.

62 Hastings 1997: 60.

63 For recent overviews and re-analysis of 'sculptor's models', complete with bibliography, see Tomoum 2005 and Hill 2009, especially 241–5. Plaster use in the galleries: John Baines pers. comm.

64 Davies 2006: 98 cat. no. BCO-64, H5-1391 [3189].

65 Oddy et al. 1988.

66 Moulds from the Memphite area: Edgar 1903; Rabe 2010; 2011. Date: Edgar 1903: xi-xiii; Rabe 2011: 15–16.

67 Although there are some traditional Egyptian figures: for example, Rabe 2011: 48–50 cat. nos 40 (Ptah), 43 (lion-headed goddess), 44 (Anubis), 45 (Min).

68 Precise location unknown: Edgar 1903: i-iii; Rabe 2011: 19–21. How to determine whether a mould was for terracottas or bronzes: Seif el-Din 1988: 168–9; Rabe 2011: 14–15.

69 Seif el-Din 1999.

70 For example, a bovine leg mould in Rabe 2011: 136 cat. no. 260, as compared with the bovine legs on a bronze incense burner from Thonis-Heracleion, H3073: Goddio and Fabre 2008: 166, 333 cat. no. 285; Robinson 2008: 206 cat. no. 165. Other detailed comparisons between Rabe's Memphis moulds in the August Kestner Museum in Hanover and Thonis-Heracleion finds: Heinz 2014a: 132–5.

71 Weiß 2012: 381–5 assembled a corpus of all published statuettes from Athribis, the majority of which come from one find recorded in Kamel 1968. From Weiß's corpus (2012), six have inscriptions that describe the deity Harpakhered as 'of Athribis': 585–6, 593–4, 601, 890–1 cat. nos 250, 278, 282, 310, 1428, 1433. See also H2268 from Thonis-Heracleion, which is described in more detail below.

72 Roeder 1956; secondarily 1937.

73 Roeder 1933a; 1933b; 1937: §475–605; 1956: §691–709.

74 Heinz 2014a: 120–58; 2014c.

Meanwhile, Roeder's proposals regarding workshops and the circulation of statuettes are more difficult to test because so few workshops are known and so few bronze caches are published.[75] He argued that the main cult centre or primary places of worship for a particular deity or animal would have been where most bronzes of that type were produced (for example, Bastet in Bubastis),[76] with each workshop guarding its moulds jealously.[77] Those statuettes were then purchased and circulated throughout the country, which explains how many ended up in sites outside of where they were produced.[78] While it stands to reason that the main cult centres would determine the standard iconography of a type, or have a distinctive type, with this model it is difficult to get a sense of how widely workshops were distributed (beyond primary cult centres), and how many different types of deity statuettes one workshop would have produced (seemingly few).

Roeder focused in particular on Osiris statuettes for discussions on workshop distribution,[79] although he developed a wide range of stylistic criteria for other statuette types that to him corresponded with geographical workshop indicators.[80] For Osiris, he proposed that arm positions correlated with production regions: the right fist above the left (Lower Egypt), fists touching at the centre (Middle Egypt), and crossed arms (Upper Egypt). Although he did point to some provenanced statuettes as proof of his theory, he also based his hypothesis on pairings of deities when they were shown in groups.[81] For example, if an Osiris was shown with Neith (the goddess of Lower Egypt), Osiris' arm position was considered to complement Neith's and was assumed to reflect Lower Egypt.[82]

Over time, this theory has fallen into disfavour, primarily because information from provenanced statuettes contradicts Roeder.[83] For example, if Osiris figures with the 'Lower Egyptian' position really were produced in Lower Egypt, and the other types were not, we would expect those figures to dominate assemblages in the Delta, with perhaps some extra-regional figures included. That is not the case. At Thonis-Heracleion, the 'fists touching' or 'Middle Egyptian' position is more common than the 'Lower Egyptian' position despite the port's prominent location at the mouth of the Nile, at the edge of the Delta.[84] Similar patterns are visible at several sites.[85] In light of these results, Roeder's explanation is not the simplest or most logical for the distribution of types across Egypt. Rather than stretch his theory and hypothesise massive circulation of statuettes between three major production regions,[86] we should instead look for alternative interpretations for Osiris typology (chronological or cult-related),[87] and take a fresh approach to production and circulation.

Are there other methods, apart from metallurgical analysis, that we can use to determine whether statuettes circulated widely?[88] We know that many were taken to sanctuaries in Greece as dedications, gifts, and/or souvenirs,[89] but within Egypt itself, how much did statuettes circulate between sites and how much did sites rely on their own production? At Thonis-Heracleion, there is at least one bronze statuette that may have 'travelled'. It is a bronze base that names 'Harpakhered, the great god, who is of Athribis', and it probably originally displayed a striding Harpakhered like several similar statuettes from Athribis.[90] Tracing such movements on the large scale, however, is impossible using only inscriptions such as these. Statuettes frequently lack their original inscriptions and of those inscriptions that survive, many do not give a place-name for the deity.[91] Even if the inscriptions provide a place name, only a small

75 Roeder on workshops/artistic schools: 1937: §623–72, 679; 1955; 1956: §692–3, 710–17. He does admit that many of his attributions in §672 are in large part guesswork, and that more fixed points are needed to understand the traits of particular workshops with any degree of security. Hill also notes that it is difficult to test Roeder's theory because so few of his ideas were supported by photographs or other documentation (Hill 2007b: 127 note 10). Weiß (2012) has gathered extensive data on all sites of the Delta with known statuette caches, and from that she was able to establish a useful typology of statuettes for the region (2012: 58–380). The original reports that she draws from, however, are usually not comprehensive in their description of the statuettes and many do not provide detailed archaeological information, which limits their use for determining artistic schools and workshops.

76 Roeder 1956: §716a.

77 Ibid.: §692b.

78 Ibid.: §692c; 716d.

79 Roeder 1937: §345, 630; 1955; 1956: §223–5.

80 Ibid. 1937: §657–72; 1955: §7–14; 1956: §716–7.

81 Roeder's chart of provenanced figures, which is problematic for his theory: Roeder 1937: §630a2A.

82 Deities in groups reflecting their origin: Roeder 1955: §2d.

83 For critiques of his approach, see Grenier 2002: 93; Hill 2007b: 127 note 10; Weiß 2012: 377–9, 1003–6, table 3b.

84 Heinz 2014a: 38–42, 246–7, appendix 10.

85 For example, Memphis (Ziegler 1996: 36), 'Ayn Manawir (Wuttmann et al. 1996: 433, although only a few statuettes of this large corpus had been cleaned and examined), and in a comprehensive study of provenanced bronzes from the Delta (Weiß 2012: 377–9).

86 Ziegler 1996: 36.

87 Chronological possibilities, Heinz 2014a: 41–2, fig. 2.4, although the sample size is very small and would need further confirmation from other stratigraphically dated figures. For possible cultic associations, particularly for Osiris with the right fist over the left, but holding a *was*-sceptre instead of the crook and flail, see Weiß 2012: 379.

88 In the future, we hope to test the statuettes for their composition with a portable XRF; this tool, however, examines surface layers only, which can be problematic for corroded bronzes like those at Thonis-Heracleion.

89 For example, Winter 1971; Jantzen 1972; Ebbinghaus 2006; Weiß 2005; 2012: 493–511.

90 H2268. Yoyotte 2004: 33, 35 cat. no. 7; Heinz 2014a: 248–9 no. 1; 2014b: 178 cat. no. 292. Translation and transliteration courtesy of Elsbeth van der Wilt.

91 On the lack of inscriptions for ancient bronzes: Hill 2001: 206. Weiß (2012) catalogued over 1,700 statuettes; of those, 26 inscriptions assign a place name to the deity, including the six Athribis figures in note 71 above.

number name a deity of one town but were discovered in another.[92] Moreover, Colin argues that just because a deity was explicitly identified with a particular place, it does not always follow that the statuette or inscription was made in that location, particularly if the epithet was frequently used and well known.[93] These considerations problematize an inscription-based approach. The difficulties inherent in using inscriptions to determine circulation do not prove or disprove the idea that statuettes circulated widely; it is simply a method that provides no clear answer.

Another way to approach the issue is to look for any statuettes that may have been in transit. Many statuettes at Thonis-Heracleion were found in the harbours and canals, and some may have been on one of the ships that sunk in the waterways, *en route* to other cities. None, however, can be directly related to a particular ship and there are other formation processes that may have led to their positions in the canals and harbours (cultic deposition and/or displacement by natural events).[94] Some statuettes, for example, were initially associated with ship 17, but upon closer examination Belov determined that these finds were in a stratum positioned above it. Ship 17 had no cargo when it sank.[95] The status of many of the items in the canals, even when they are close to sunken vessels, is similarly unclear. None offer definitive proof of travel in progress.

In the end, at this site, production material is the most useful focus point for questions about workshops and circulation. Overall, Thonis-Heracleion's material suggests that workshops could have been present at a wide range of sites. The port was a very significant site in terms of trade and also cult;[96] people celebrated the *Khoiak* festival there wherein a cult statue of Osiris travelled from Thonis-Heracleion to Canopus and back again, and the city's cult of Amun and Khonsu was also well known in antiquity.[97] At the same time, the port's number of Egyptian statuettes is fairly modest (272 as of 2010), and the site would not have been one of the largest cultic and administrative centres of the country, like Memphis, Saïs, Abydos, or Thebes.

The Thonis-Heracleion workshop(s) also produced a range of deities, not just images of the titular gods Amun and Khonsu. Such locally-produced statuettes include those described in the 'Production' section above: attachments for Osiris or child deity figures, falcon pendants, male figures (probably Nefertem), and falcon-headed deities. This is not to say that statuettes and offerings never circulated between sites and that each workshop produced all types of statuettes at a particular site. Some types probably did have special associations with particular local cults and some statuettes most likely did travel, but sites may not have been as reliant on such circulation as they would have been under Roeder's system. The scope of production at Thonis-Heracleion is unknown, so what percentage of dedications individual temples would have produced on their own (all or only a portion) is not defined, but it seems likely that many sites manufactured a range of types beyond their primary cult figures.

Moreover, we find a more diverse selection of deities at Thonis-Heracleion than there are specific temples or shrines;[98] Isis, for instance, may have been dedicated in association with deities like Osiris or Harpakhered, instead of having her own shrine or temple. This was a common practice throughout the Delta; gods were seen as having relationships to each other, and to larger concepts, like solar cult or fertility cult, and so could be dedicated together.[99] Therefore, with that kind of system in place, wherein other deities were offered on a regular basis to temples or animal necropoleis that did not house a cult specifically for that deity, it seems questionable to assume that workshops limited themselves to the manufacture of only a few primary types.

A decentralised mode of production fits well with Hill's theories about the production of royal statuettes. She argues that royal statuettes frequently differ from royal stone statuary in small ways because they were produced in temple workshops alongside other bronze statuettes and not in centralised royal workshops. As Hill notes, peculiarities of iconography visible only among royal bronze statuettes, 'indicate that the corpus of metal kings was manufactured across an extended network of temples that, while no doubt influenced by some unitary, central entity, also remained relatively independent, absorbing influences from their respective

92 Weiß 2012 catalogues 13 examples—the find location is listed last for each entry: 547 cat. no. 107, Osiris Neferhotep, Diospolis Parva (Memphite area); 576 cat. no. 212, Harpokrates, Busiris (Saïs); 583 cat. no. 241, Chons, Chenut (Serapeum dromos in Memphis); 609 cat. no. 338, Harpokrates, Behbeit el-Hagar (Athribis?); 663–4 cat. no. 532, Thoth, Hermopolis (Memphis); 676 cat. no. 569, Thoth (as a bull), Busiris (Saqqara); 801–2 cat. no. 1082, Horus, Letopolis (Saqqara); 802 cat. no. 1084, Horus, Letopolis (Memphis); 805 cat. no. 1096, Horus, Letopolis (Saqqara); 820 cat. no. 1156, Hor-Mahes, Hebenu (Memphis); 893 cat. no. 1441, Harpokrates, Busiris (Saïs); cat. no. 1423, Harpokrates, Letopolis (Memphis, Palace of Apries); 900 cat. no. 1469, Horus, Buto (Saqqara).

93 Colin 1998: 342. Although, with the Thonis-Heracleion inscription at least, it seems likely that it was made at Athribis, as several other directly comparable inscriptions are known from that site (see note 71).

94 Cultic deposition in harbours and canals: Heinz 2014a: 199–200; see also Quack 2000–2001. See Goddio this volume Chapter 1; Van der Wilt this volume Chapter 8.

95 Belov 2014: 84–6.

96 Fabre 2008b for Thonis-Heracleion's role as an *emporion*.

97 Fabre 2008a for festivals at Thonis-Heracleion. See also Goddio: 2007: 1–4; Goddio and Fabre 2008: 45–6; and Libonati 2010: 6–13 for the full range of literary sources related to the site. For the sacred topography of Thonis-Heracleion, see Goddio this volume Chapter 1.

98 Cults at Thonis-Heracleion: Fabre 2008a; Heinz 2014a: 79–88; Goddio this volume Chapter 1.

99 For this phenomenon, see Weiß 2012: 460–2, 479, 500.

locales'.[100] The Thonis-Heracleion statuettes, which are mostly deities, are more difficult to analyse in the same manner because there are not many fixed chronological points for comparison; royal statuettes are still difficult to date, but tend to have cartouches, other inscriptions, or more individualised features. Nevertheless, simply the presence of production material at Thonis-Heracleion evokes the idea of a more decentralised system, one that goes beyond cities that acted as traditional seats of power.

Conclusion: workshops in the wider economic view

In contrast to Roeder's breakdown of workshops, wherein many statuettes would be carried from one place to another for dedication, the Thonis-Heracleion material, and to some extent the Athribis statuettes, seem to point towards a more decentralised system of production. Some statuettes may have travelled between sites, but many temples probably would have had workshops that would have dictated the appearance of their own statuettes. As much of the production evidence from the site derives from the northern (earlier) zones, this type of dispersed production may have been in place at least by the fifth century BC.

Much about these conclusions is still very speculative. Thonis-Heracleion is only one site with a limited amount of production material, and it is difficult to know how representative it is, but it is a good starting point for discussions that take into account actual workshops. More evidence needs to be compiled and studied from other sites with stratigraphic information, particularly sites at each extreme of the spectrum—like Saqqara, which was a major destination for cult practice and which has a correspondingly large number of statuettes (produced there or brought from elsewhere?), and 'Ayn Manawir, which the authors characterize as a representative example of a small, modest temple in a largely self-sufficient rural community.[101]

These discussions about workshops help us to gain perspective not only on iconographies and chronology, but also on the cult economy of the time. Current theories regarding the dedication of bronze statuettes postulate that they were produced by temple workshops and then sold to devotees and/or festival participants who would then offer the statuette through intermediary temple personnel.[102] This industry was large, with thousands of statuettes dedicated. These statuettes, especially gilded bronzes, were costly, and could have been a substantial source of revenue for their producers.[103] In many cases, they were also associated with animal cults, which involved the dedication of animal mummies, dedications that were mass-produced in some cult centres.[104] By determining what types of sites would have had workshops at the time, we can also investigate how widely that wealth was (or was not) shared among temples.

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100 Hill 2007b: 117, and more widely 2004: 109–12, 145–6, although one must keep in mind the limited corpus of stone statuary, which Hill acknowledges is difficult to organize chronologically (2004: 145–6).

101 Wuttmann et al. 2007: 173. Ayn Manawir has a substantial number of statuettes (over 400), but more because of its extraordinary preservation circumstances than because it was a major centre for cult in the region (Wuttmann et al. 1996; 1998; 2007). Unfortunately, most of the information regarding the 17,000 bronzes from Karnak is now lost, as many of the bronzes were sold off or went unrecorded, and some may even have been stolen (Jambon 2009: 271–5).

102 Temple workshops: for example, Hill 2004: 111; 2007b: 117; Schorsch 2007; Weiß 2012: 481, 491; Bianchi 2014: 15. As related to personal piety, see Davies and Smith 1997: 122–4, as well as an imaginative account of such an experience in Smith 1974: 64–82, esp. 69–70. An alternative, but contested, viewpoint: Kessler (especially 1989: 253–90; 2005) argues that animal cult and similar dedications (like bronzes) were not the result of a growing sense of personal piety among the populace, but were closely related to royal cult and were patronized primarily by royal and priestly classes. Weiß 2012: 480 negotiates a middle ground, with an emphasis on festival participation.

103 Hill 2009: 245 note 16 for some sources that further nuance the economic and social structure (beyond purchase and dedication), especially early on in its development—particularly Colin 1998, who makes a connection between statuette dedication and land grants.

104 For possible connections between animal bronzes and animal cult, see Weiß 2012: 468–81. For an introduction to animal mummies, including examples of the scale of the phenomenon, see Ikram 2005.

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3 Cult and trade. A reflection on Egyptian metal offerings from Naukratis

Aurélia Masson

Introduction

Metal votives form a significant corpus of Egyptian offerings at Naukratis.[1] This category of material has received little attention, since the emphasis has often been on Greek offerings from the Greek sanctuaries of Naukratis, both in the collection of artefacts during the early excavations at the site and in the subsequent publications.[2] Metal votives do, however, give an indication of the extent to which Naukratis was embedded in the material culture and votive practices of the wider Delta,[3] with Saïs, as well as many other sites in the Delta including Thonis-Heracleion, providing a wide array of parallels.[4]

This paper presents an important deposit of votive offerings known as the 'cache of bronzes'. They were probably buried at some point between the late fifth and first half of the fourth century BC and illustrate the previously little-acknowledged Egyptian material culture and religious beliefs in Naukratis during the Late Period.

The significant increase of bronze votives in Egypt, especially from the twenty-sixth dynasty onwards, could find an explanation in changes in votive practices or, less likely, in the use of 'more efficient copper-production methods'.[5] It also needs to be seen in the context of trade activities and the import of raw metal.[6] Therefore, the second part of this paper will explore the possible origin(s) of the metals used to produce these offerings during the Late Period.

1 Metal offerings from Naukratis: the 'cache of bronzes'

Context of discovery

A cache of votive objects was discovered in 1885 in a house located in the southern part of the settlement (circled in red in Figure 3.1). This area, close to the Great Temenos, is usually considered to be particularly Egyptian in character.[7]

The number of objects was originally very significant, but locals, encouraged by Giza dealers, looted 'a large quantity, apparently all the best of the things', and despite all his efforts, Petrie was unable to recover the whole find.[8] They were found 'buried in the earth, scattered about all through the whole filling of a chamber, some eight feet [*c.* 2.4 m] in the depth', with 'the bulk of them two or three feet from the bottom'.[9] The objects were often burnt or broken. In his publication, Petrie mentioned the finds without giving any further details about the context. The house could be the building Petrie called the 'Ptolemaic building' on his map (Figure 3.1), although he actually mentioned two 'Ptolemaic' houses in this area,[10] making the identification less certain. Even though he provided no illustrations of the finds, it is possible to identify a good number of them with the help of his short published description, as well as his journal, notebook and museum archives.

Petrie dated the whole complex to the early Ptolemaic Period on the basis of two fragments of Greek pottery.[11]

1 My thanks go first of all to Alexandra Villing, Marianne Bergeron and Ross Thomas with whom I have been working on the Naukratis Project, sharing ideas and information, as well as to Thomas Kiely for his useful insights on Cyprus. I would like to thank also Elsbeth van der Wilt and Sanda Heinz for our interesting discussions and comparisons of material from Thonis-Heracleion. Finally, I would like to express my gratitude to Damian Robinson and Linda Hulin for their invitation and for organising such an inspiring conference.

2 On this bias see: Villing et al. 2013–2015.

3 The few bronze figures displaying Greek style and theme that are said to come from Naukratis are dubious: Masson 2013–2015: 2. They were mainly acquired by von Bissing from art dealers in Cairo in 1921, and are now kept in the Allard Pierson Museum in Amsterdam. Only a bronze figure of Venus Anadyomene is genuinely from Naukratis (BM 1888, 0601.37); due to its small size (height 2.90 cm), a function as an offering is unlikely, it may be the finial of a pin (?). See Heinz forthcoming for a discussion on Greek and Pharaonic style bronze votives at Thonis-Heracleion and Naukratis.

4 See especially the significant catalogue of bronze figurines in the Delta by Weiß (2012), who also discussed the bronze finds at Naukratis. See also the major catalogues by Roeder (1937; 1956).

5 As suggested in Ogden 2000: 152.

6 On this problem, see Heinz this volume Chapter 2.

7 Leclère 2008: 116.

8 Petrie 1886: 41–2. In his journal (Journal 1884–1885: 147–53; EES Archive), Petrie reported his tribulations to recover the hoard that dealers tried to sell and, more briefly, his subsequent excavation of the find-spot. More details are recorded in Petrie's Notebook 6 (original in the Petrie Museum), including a list of objects that were sold and bought illegally: Quirke 2010: 116–8 (list not published).

9 Petrie 1886: 41.

10 The second house yielded a bronze seal with the name of an official in Aramaic that can be dated to the Persian Period, fifth century BC: Villing 2013: 75, fig. 1. As far as we can judge so far, nothing was found in this house that can be securely dated to the Ptolemaic Period.

11 Petrie 1886: 42.

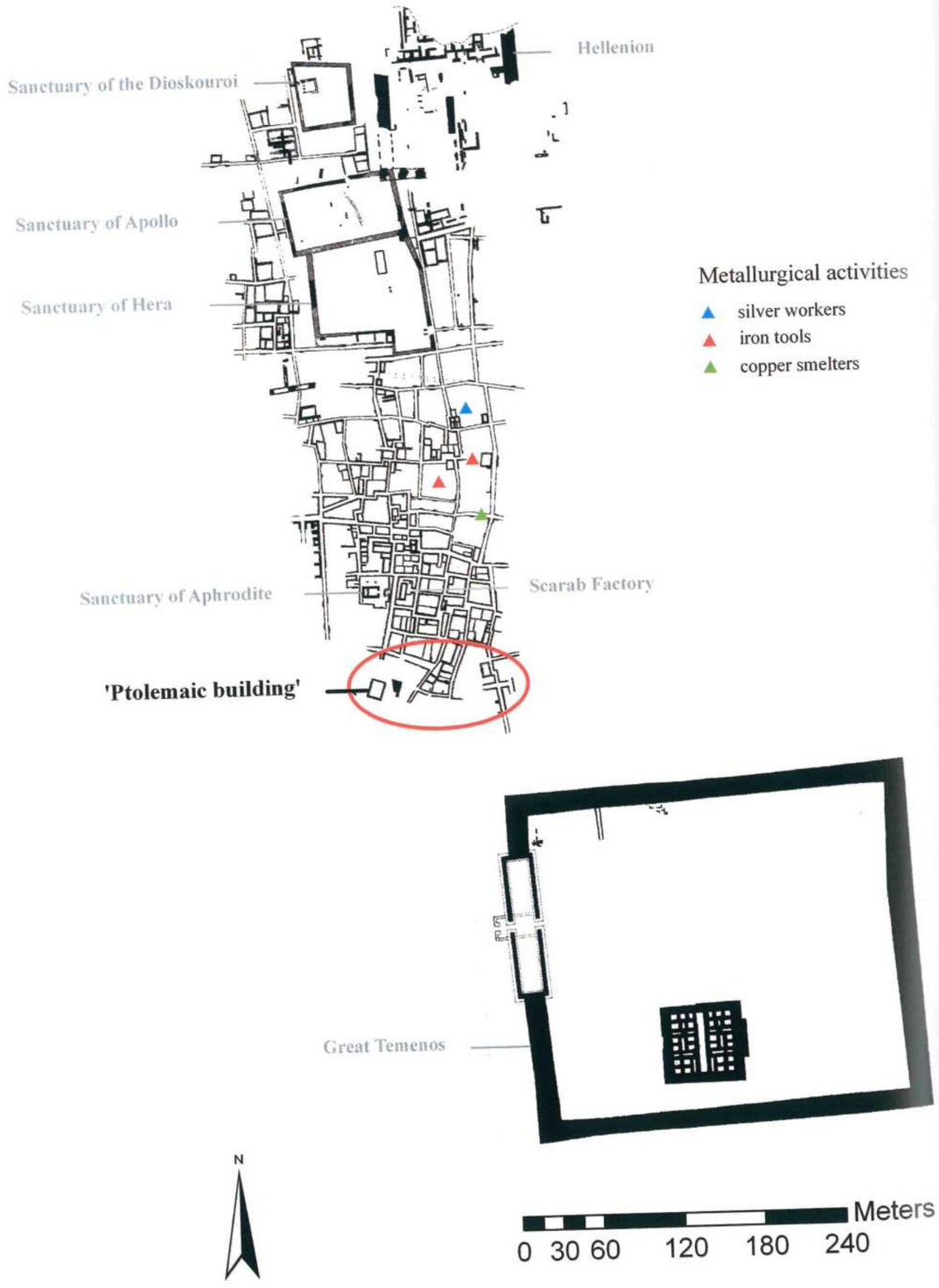

Figure 3.1 General map of Naukratis (combining maps of Petrie 1886, Gardner 1888, Hogarth 1899 and 1905, with georeferencing after Thomas and Villing 2013.)

Figure 3.2 One of the Attic squat net-patterned lekythoi, found during the first season at Naukratis. BM 1885,1101.65. (Photo: © Trustees of the British Museum.)

The first of these—described as a 'small brown vase with black net pattern of cross lines, and white spots at the crossings'—can be identified, however, as a net-patterned *lekythos* from Attica, dated to the late fifth and especially the early fourth century BC.[12] Six examples of this type are known from Naukratis, and we cannot be sure which one exactly was the piece found by Petrie (Figure 3.2).[13]

The second sherd belongs to 'a splendid vase of buff figures on a red ground, ornamented with raised slip, white and gold.'[14] The only piece which has decoration

Figure 3.3 Attic red-figure squat lekythos with raised clay and added white and gold, with a representation of a draped woman and Eros, from the 'cache of bronzes'. BM 1885,1101.70. (Photo: © Trustees of the British Museum.)

and technique that correspond precisely to Petrie's description is a fragment of an Attic Red Figure squat *lekythos* (Figure 3.3). Its registration number and burnt aspect support this identification. Such decorated vases can be closely dated between *c.* 420 and 390 BC.[15]

Rather than Ptolemaic, a Late Period date appears to better suit the finds.[16] Dating bronze offerings more precisely, on the other hand, is a tricky matter, and, since the cache is a secondary deposit, the individual dating could be quite heterogeneous.[17] The consistent dating of the Greek sherds, between the late fifth and early fourth century BC, could be a hint towards the approximate date when these votives were buried. Such arguments nevertheless should be treated with extreme caution, especially since the votives were distributed across almost 2.5 m of stratigraphy and Petrie only supervised the end of the excavation of the cache.

Bronze finds make up the bulk of the material.[18] In his published list, Petrie counted 145 of them, all of Pharaonic-style, with votive boxes, figures of Egyptian deities and models of cultic equipment. Weiß presents 121 bronze finds from Naukratis and believes that they all likely originated from this context.[19] To date, however, a

12 On finds of squat patterned *lekythoi* of the late fifth–early fourth century BC in Egypt, see: Defernez 2003: 265–9, 341–53, pl. LVII and LXXVI; cf. also Chelbi et al. 2006: 56, fig. 24e for examples from Carthage.

13 The example presented in this publication is nonetheless the best candidate: this relatively well-preserved net-patterned *lekythos* is kept in the British Museum, as are all non-bronze finds identified as belonging to the cache, and was acquired in 1885.

14 Petrie 1886: 42.

15 Villing et al. 2013–2015: British Museum 1885, 1101.70.

16 Arguments recently used to date the cache to the Late Period are not supported by the new research at Naukratis. Weiß partially based her assumption on a statuette representing a lion-headed goddess, possibly Sekhmet (Boston, Museum of Fine Arts 86.246), that she dated no later than the thirtieth dynasty, and even maybe as early as the twenty-sixth dynasty: Weiß 2012: 446, 711, Kat.-Nr. 685. This figure, discovered in 1885, was however not listed by Petrie as part of the cache and probably came from a different context. In her MPhil on votive boxes, Thum discussed 20 votive boxes from Naukratis kept at the British Museum, suggesting a Late Period date, too. She based her argument solely on an assumed development of the town from the South to the North: Thum 2012: 57, 'the position of the "house" in the southern portion of the site strongly suggests that [the bronzes] are not Ptolemaic in date'. According to new research, however, there is no evidence to support such an assumption: see Thomas this volume Chapter 13.

17 For example, some bronzes dated to the Third Intermediate Period and others of the early twenty-sixth dynasty have been found in much later caches in North Saqqara: Davies 2007: 183–4.

18 The term 'bronze' used for the finds discussed in this article is purely nominative. I am not aware of any study analysing the alloy composition of the Naukratis metal votive offerings.

19 Weiß 2012: 442–6.

total of more than 300 bronze votive offerings are known from Naukratis in a number of museums, and some of them were definitely not discovered during Petrie's excavations.[20] Therefore, not all bronzes from Naukratis can stem from the 'cache of bronzes', and this situation creates some difficulties with reconstituting the hoard.

Petrie recorded in his journal a list that differs slightly from his published one and that provides additional information on the finds, as well as containing more objects than are reported in his publication:

> *[…] Here is the list of the rest of the find that I have discovered, seized, or bought up, here; small cases with snake flat 11 & 4 broken; snake upright 13 & 3 broken; lizard 43 & 8; two human headed snakes 1; snake at length 9 & 3 broken; ichneumon 1; 2 lizards 3 &1; snake & lizard 1 & 2 broken; 3 snakes, 1 broken. 1 long case 14 inches, with snake. Small case with cat. Case with Bast 3 ½ in[che]s high. Statuettes. Osiris 12 & 7 broken; winged Isis 5 in[che]s high; legs of a figure 5 in[che]s high; Isis & Horus 3 & 3 broken; Bulls 2 broken; upper part of a large Bast, 3 ½ high; seated Anubis 4 high; ichneumon 12 ½ high with bones inside, feet broken & much injured in burning; 2 kneeling figures; Horus 1 & 2 broken; Nefertum 2 broken; human headed snake 3 ½ high; snake on staff, 5 high, another 3 ½ high; triad Osiris Isis & Horus; 4 cats 2 ¾ high; Double snakes; Nebhat 2 broken; box-stand inscribed; buckets (libations) 2 & 1. In all 111 perfect & 45 broken bronzes beside many fragments. A fine ram's head in limestone. A porcelain Bast 4 high inscribed & small Isis & Horus (2) & Taur.*[21]

Votive boxes

Votive boxes, known also as 'relic-boxes', form the majority of the bronze finds.[22] Petrie counted 99 'bronze boxes',[23] primarily for lizards, snakes and eels (such as Figure 3.4a–b).[24] Variants with a combination of reptiles, matching species or otherwise, also occur (Figure 3.4c).[25] The animals are represented on top of a hollow-cast case, usually rectangular in shape. The case should contain the mummified body of the animal figured,[26] or more precisely parts of it, since the size of many cases seems too small to have contained the whole body. When the case is not completely empty or

Figure 3.4a Bronze votive-box surmounted by a lizard from Naukratis. H1089.1. (Photo: © Bristol, City Art Gallery & Museum.)

Figure 3.4b Bronze votive-box surmounted by a coiled snake from Naukratis. H1071.1. (Photo: © Bristol, City Art Gallery & Museum.)

sealed, remains of linen, plaster and/or clay, hair and bones are visible inside. Their workmanship seems in general of a rather poor quality, a common feature of the mass-produced votives of the Late Period,[27] but this appearance could also be due to their bad state of preservation.[28] Most of them are standardised in size and shape, probably indicating that they were produced in the same workshop.

20 See Masson 2015: all known bronze offerings from Naukratis are now published in the Online Research Catalogue 'Naukratis: Greeks in Egypt' Villing et al. 2013–2015 (http://www.britishmuseum.org/naukratis).

21 Petrie Journal 1884–1885: 159, entry for March 6th 1885. A rather similar list of items was written in Petrie's Notebook 6 (scan 30 right and 31 left). Just a few elements are missing in the Notebook's list.

22 They were meant to be an offering rather than a real 'reliquary' containing the body or body parts of an animal associated with a specific deity. A synthesis on the function and nature of votive boxes is given in the Thum 2012, who prefers the term of 'votive coffin'. Votive boxes are scarce among metal votives at Thonis-Heracleion. For an example of a shrew votive box, see Goddio and Fabre 2008: 323 no. 208.

23 Petrie called them 'small cases' in his journal.

24 They correspond to Weiß types T 5, T 13, T 14 and T 15: Weiß 2012: 267–8, 276–9, 720–1, 725–38. They rarely come from contexts that can be precisely dated; however ten reptile (lizard and snake) votive boxes found in the falcon catacomb at North Saqqara can be assigned to the Late Period and especially the first half of fourth century BC: Davies and Smith 2005: 52, 71, 94; Weiß 2012: 734, Kat.-Nr. 783.

25 The variants of the reptiles' votive boxes mentioned by Petrie present figures of two lizards, two to three snakes, or a combination of cobra and lizard; a 'bronze box' topped with two human-headed cobras is also reported amongst the finds: Petrie 1886: 41.

26 Grilleto 2000: 69, cat. no. 43. The X-ray performed on a snake votive box confirmed the presence of a mummified reptile inside the case. See also Schorsch 1988.

27 Ogden 2000: 160. On the techniques used in the mass-production of the votive boxes, see Thum 2012: 25–35.

28 Most of the votive boxes were never properly restored and are covered with corrosion. The restored eel votive box BM 1885,1101.566 is of good craftsmanship, but it is also of a much greater size than any other votive box from Naukratis.

Figure 3.4c Bronze votive-box surmounted by two lizards, found during the first season at Naukratis. BM 1885,1101.78. (Photo: © Trustees of the British Museum.)

Comparing Petrie's list with the 102 votive boxes we are aware of so far, there is no complete correspondence. For example, Petrie listed 9 cobra votive boxes in his publication and 16 in his journal ('snake upright 13 & 3 broken'), while at least 14 specimens of this type are to date known to have been discovered in Naukratis. On the other hand, Petrie counted 51 lizard votive boxes in his publication and journal and only 39 of them have been identified so far. Such differences could be explained by the difficulties in correctly identifying the plastic figure on top of the votive boxes, since they are usually damaged by corrosion.[29] Importantly, the discovery of votive boxes is also recorded for other contexts in Naukratis.[30]

Petrie noticed amongst the 'bronze boxes' one example for an ichneumon (Egyptian mongoose), which might correspond to Boston, Museum of Fine Arts 86.282.[31] Falcon and cat votive boxes (such as Figure 3.5a–b) are not mentioned in Petrie's published list of 'bronze boxes'. They could correspond to the Horus and cat figures that he mentioned amongst the rest of the bronze finds from this context.[32] A 'small case with cat' appears nevertheless in his journal list.

Lizards, eels, and snakes are ordinarily associated with the Heliopolitan solar god and demiurge Atum.[33] Atum was revered in Saïs,[34] where similar votive boxes were also discovered, if not in such great numbers.[35] This god was also part of the sacred triad worshipped in Bubastis, where a few lizard votive boxes were found.[36] Votive boxes

Figure 3.5a Bronze votive-box surmounted by a falcon wearing a double-crown, found during the first season at Naukratis. 9,9,86,115. (Photo: © National Museums Liverpool, World Museum.)

Figure 3.5b Bronze votive-box surmounted by a cat (or simple figure?), found during the first season at Naukratis. BM 1885,1101.573. (Photo: © Trustees of the British Museum.)

29 On similar problems with recognising the animal figures on unrestored votive boxes, see Davies and Smith 2005: 52.

30 See *infra*.

31 Weiß 2012: 800, Kat.-Nr. 1078, Taf. 51d.

32 Petrie 1886: 41.

33 Myśliwiec 1978; 1981. On the likely confusion between the eel and snake in antiquity: Weiß 2012: 267–8. The snake can also be associated with the female counterpart of Atum, Temet: Myśliwiec 1978: 125; Weiß 2012: 278.

34 Myśliwiec 1979.

35 Only three so far are known, two of which bear a dedicatory inscription to Atum: Roeder 1956: 387, § 518h; Kessler 1989: 41; Vittmann 2003: 162; Weiß 2012: Kat.-Nr. 720, 744 and 755.

36 Hilton Price 1887: 230; Weiß 2012: Kat.-Nr. 797-800. See also eel and reptile votive boxes from North Saqqara and Athribis: ibid.: Nr. 724, 747, 749, 756–757, 763, 768, 770, 783, 792–796.

Figure 3.6 Inscribed base for a bronze figure of Neith, from the 'cache of bronzes'. BM 1885,1101.74. (Photo: © Trustees of the British Museum.)

surmounted by a falcon wearing a double-crown[37] could be connected to Horus whose cult is well evidenced in Saïs,[38] although other deities related to the sun and/or the sky as well as the pharaoh himself can take the shape of a falcon.[39] Cat figures and votive boxes are linked to the cult of Bastet, again attested in Saïs, though the Bastet cult is particularly active in Bubastis and rather common in the Delta.[40] In light of these finds, Weiß believed that these attestations of animal cult lack a relationship with the gods revered at Naukratis, and that they are more closely linked to the cultic area of Saïs, which had Naukratis in its dominion.[41] The snake cult at Naukratis is nonetheless well evidenced on a Ptolemaic sarcophagus belonging to Panehemise, the prophet of Amun-Ra *šn*^{r} and the snake *šn*^{r} in Naukratis.[42] One might wonder if these reptiles' votive boxes could be early attestations of this local cult in Naukratis and, therefore, not related to Atum.[43]

Figure 3.7 Bronze figure of Mahes, from the 'cache of bronzes'. BM 1885,1101.84. (Photo: © Trustees of the British Museum.)

Figures

According to the published list, the assemblage contained 42 bronze figures and 4 bronze models of cultic equipment.[44] More than 160 figures and elements of figures, however, were retrieved during the excavations at Naukratis in total.[45] A few of them can be easily recognised as originating from the cache.

The 'box-stand inscribed' that Petrie recorded in his journal corresponds to the base of a now lost figure (Figure 3.6). Recent restoration work revealed a dedicatory inscription to Neith, the patron goddess of Saïs.[46] It strengthens the link between the bulk of this bronze group and the major cults of Saïs.

Another unpublished piece that can be reckoned to be part of the hoard is a figure of Mahes that Petrie mistakenly identified as the 'upper part of a large figure of Bast' (Figure 3.7). Mahes, a lion-headed god of war—usually depicted as holding the sickle sword *khepesh* as on the figure from Naukratis—was regarded as the son of Bast in Lower Egypt. His cult was centred on Bubastis and Leontopolis, and so far, except for a single known example from the Memphite region, all similar bronzes

37 This corresponds to Weiß type T 23: ibid.: 287, 747–54, Taf. 45d–i.

38 Daressy 1903: 183; Schott 1967: 99; Delvaux 1998.

39 Davies and Smith 2005: 54.

40 Kessler 1989: 150–4. Only one cat votive box in copper alloy was found at Saïs by Daressy: Wilson 2006: 90, 289. As to be expected for a city protected by Bastet, Bubastis provided many cat figures and votive boxes, as well as other metal votives dedicated to the goddess: Naville 1891; Weiß 2012: 385–90. For different types of cat bronzes: ibid.: 297–300, type T 32–4.

41 Weiß 2012: 445–6.

42 On the sarcophagus of Panehemise: Leitz 2011. See also references in Guermeur 2005: 132–3 on Panehemise and the cult of the snake *šn*^{r} ('the One who repels') in Naukratis.

43 A detailed analysis on the Egyptian cults and beliefs that can be inferred from the study of the Egyptian small finds from Naukratis would go beyond the scope of this article. Another study, focusing especially on bronzes and amulets from Naukratis, will further discuss this issue: Masson forthcoming.

44 Only a few of the bronze figures and none of the models of cultic equipment can be discussed within the scope of the present article. See Masson 2015 for further studies.

45 Five bronze figures kept in the Ashmolean Museum and said to be from Naukratis have been identified as coming from a large cache at Teh el-Barud signaled by Griffith (in Gardner 1888: 81) and are therefore excluded from the present study.

46 The best preserved part of the inscription reads as follow: 'Recitation by Neith, the Great One, Mother (?) of the Great God, lord of Heaven, [Mistress?] of the gods'.

come from these two sites.[47] The two bronzes representing a lion-headed god discovered in Saïs are to be associated with Horus of Pe and not Mahes.[48] The bronze group showing Bast and the king (Boston, Museum of Fine Arts 86.264) is another testimony to Bast's importance in Naukratis and belongs to this find-complex.[49] The cache also contained some large bronzes of Bast.[50] The association with deities particularly revered in the Delta is again quite conspicuous.[51]

A large number of the bronze figures—25 out of 42—are related to the Osirian triad, Osiris, Isis and Harpokrates. Osiris is particularly well-represented, with 19 figures from the cache alone, and at least a further 13 discovered elsewhere in Naukratis. Here again Weiß stressed the link with the important Osirian cult in Saïs.[52] The presence of Osiris and the other members of the Osirian triad is overwhelming in many other Late Period bronze deposits.[53] Three quarters of the votives from the large cache at North Saqqara published by Emery are related to the Osirian triad.[54] The importance of the Osirian cult for the inhabitants of Naukratis is furthermore well-documented in the donation stela of the year 16 of Amasis, kept in the State Hermitage Museum in St. Petersburg.[55] The king is represented offering globular wine vases to Harpokrates and probably Isis. The inscription states that an inhabitant of Naukratis, Neferibrasaneith, made a donation in favour of Osiris-whose-eye-is-perfect, Great God of the village of The-Wall-of-P[a]kher(w), on the territory of Saïs. He made a donation for a monthly luminary ritual performed on the occasion of the new moon in front of the cult statues of Osiris, Horus and Isis. The stela illustrates how intimately the inhabitants of Naukratis were involved in regional cultic activities during the twenty-sixth dynasty.

Petrie also mentioned two bronze figures of Nefertum, another deity revered in the Delta, especially in the Memphite region where he was considered the son of Ptah and Sekhmet in the Memphite triad, and in Bubastis through his close association with Bastet/Sekhmet.[56] The cults of the Memphite triad, the Osirian triad, and of the other gods mentioned so far as represented in the cache of bronzes are also well evidenced by

a b c

Figure 3.8
a Bronze figure of Nefertum, found during the first season at Naukratis. 9,9,86,107. (Photo: © National Museums Liverpool, World Museum.)
b Amulet of Nefertum in glazed composition, found during the first season at Naukratis. 9,9,86,60. (Photo: © National Museums Liverpool, World Museum.)
c Amulet of Nefertum in stone (steatite?), found during the second season at Naukratis. AN1896-1908-EA.684. (Photo: © Ashmolean Museum, Oxford.)

numerous other artefacts in Naukratis. For example, in addition to the five bronze figures/amulets of Nefertum discovered at Naukratis, there are at least eight figures and/or amulets in glazed composition and stone (Figure 3.8a–c).[57] During the Late Period, Nefertum's role widened to 'bearer of good fortune', explaining his popularity as an amuletic figure.[58] This humble material attests the local importance of these gods and testifies to popular beliefs at Naukratis, even if their cult might not

47 Weiß 2012: Typ 106, 201–2, 666–9, Taf. 29 a–d, Taf. 73. Lion figures that can be associated with Mahes amongst other deities, are mainly found in Leontopolis, with one known from North Saqqara and another from Bubastis: Weiß 2012: T 36–T 37, 301–3, 796–9, Taf. 50d–f, Taf. 51a.

48 Ibid.: 450–1, Typ 105, 666, Taf. 28f, Nr. 539 and Typ 107, 669, Taf. 29e, Nr. 549.

49 'Bast standing, and figure kneeling adoring, on a box' listed in Petrie 1886: 41. Published in Weiß 2012: Typ G 15a, Nr. 1215, Taf. 57f.

50 Petrie mentioned a large Bast in Bulak Museum, to which he could supply the arm (possibly JE26842 in the Egyptian Museum in Cairo), as well as 'a large cat […], a seated Bast large, same small': Quirke 2010: 117 (scan 25 right of Notebook 6).

51 Bastet, as a cat or cat-headed goddess is represented by several bronzes in Thonis-Heracleion: Goddio and Fabre 2008: 317 no. 168–70.

52 Weiß 2012: 445.

53 The Osirian triad is very present in Thonis-Heracleion, too, particularly through bronze figures: Goddio and Fabre 2008: 319–21 nos 181–8 and nos 194 (Osiris); 318–9 nos 178–80 (Isis nursing); 318 nos 174–7, 323 no. 209 (Harpokrates).

54 Emery 1970: 6.

55 On this stela, see for example: De Meulenaere 1993: 18 note 56; El-Sayed 1975: 53–61 no. 4, pl. 8; Meeks 1979: 616 note 34, 634 note 113, 630 no. 26.5.16; Yoyotte 1991–92: 642–4.

56 Weiß 2012: 106. A few amulets representing Nefertum—five made out of lead and one in bronze—were discovered in Thonis-Heracleion: Goddio and Fabre 2008: 191 no. 323; Heinz 2011: 217.

57 Other elements are too fragmentary, corroded or the design is too schematic to be sure of the identification.

58 Heinz 2011: 217 and note 41 for further literature.

Figure 3.9a Large amulet of Sekhmet in glazed composition, from the 'cache of bronzes'. BM 1885,1101.64. (Photo: © Trustees of the British Museum.)

Figure 3.9b Spacer-bead in glazed composition, from the 'cache of bronzes'. BM 1885,1101.66. (Photo: © Trustees of the British Museum.)

Figure 3.9c Small gilded figure of a falcon wearing the double-crown in steatite (?), from the 'cache of bronzes'. BM 1885,1101.43. (Photo: © Trustees of the British Museum.)

always be mentioned in inscriptions. The same phenomenon can be further demonstrated by means of the other types of finds which were uncovered in the house.

Other finds

In addition to bronzes, several pieces in glazed composition formed part of the 'cache', including an inscribed amulet of Sekhmet (Figure 3.9a).[59] The latter is burnt, as were a good part of the finds. An 'ornamented piece, with threading holes, lotus pattern, in green and red pottery, fine work'[60] can be identified as a spacer-bead in glazed composition (Figure 3.9b). Similar elements were discovered in Tell Defenneh and dated by Petrie to the sixth century BC.[61] The 'small pottery hawk, gilt' that Petrie listed must be a small figure of a falcon with some traces of gilding, a unique piece amongst Naukratis finds (Figure 3.9c): with its double crown, it forms an interesting parallel to the hawk votive boxes.

Petrie also mentioned a ram's head in limestone: a 'fine piece'. From the description and the date it entered the museum, it can be identified with a sculptor's model kept at the British Museum (Figure 3.10). Such sculptures were primarily practice pieces, a sculptor's studies or models.[62] Some of the finished pieces were eventually offered as gifts to the gods.[63] The ram-headed god Amun-Ra Baded was the main Egyptian god worshipped in Naukratis from at least the twenty-sixth dynasty.[64] This fine piece of sculpture could easily have formed an appropriate votive offering.

Finally, Petrie listed two other stone finds: a 'burnisher in black stone, like a celt in form' easily identified as another British Museum piece (Figure 3.11) and a 'taur in marble, small'.[65] So far, no marble sculpture

59 It corresponds to the 'Bast, 4 inches high, with inscription' in Petrie 1886: 42. The inscription states clearly that the goddess represented is Sekhmet.

60 Petrie 1886: 42.

61 Petrie 1888, pl. XL nos 5–6.

62 Rams are a common topic for sculptors' models, both in the round and in relief during the Late and Ptolemaic Periods: Tomoum 2005: 85, 230–1, no. 114–9. On the functions of animal models: ibid.: 94–103.

63 Bianchi 1981: 35–6.

64 Guermeur 2005: 126–38; Yoyotte 1983. The pre-Ptolemaic evidence for a temple/cult to Amun-Ra Baded is discussed in Leclère 2008: 131; Spencer 2011. The supposed position of this temple within the Great Temenos is now confirmed by new archaeological evidence: Thomas and Villing 2013; Thomas this volume Chapter 13.

65 Petrie 1886: 42.

Figure 3.10 Sculptor's model in the shape of a ram-head in limestone, from the 'cache of bronzes'. BM 1885,1101.19. (Photo: © Trustees of the British Museum.)

Figure 3.11 The 'burnisher in black stone, like a celt in form', from the 'cache of bronzes'. BM 1885,1101.72. (Photo: © Trustees of the British Museum.)

representing a bull has been identified. Could he have misspelt 'taur' for torus? In addition to the dozen fragments of architecture in marble that were discovered in the temple of Apollo and other contexts, a number of other architectural pieces are preserved from Naukratis without further specification as to find-spot, and perhaps the 'taur' is to be found among them.

To conclude: interesting connections with Saïs and the material culture of the Delta in general can thus be drawn from several bronzes. Looking at the whole complex, there are also elements which are distinctive of Naukratite material culture and cults, such as fragments of Greek ceramic and marble as well as the sculpture of a ram, and possibly the numerous reptile votive boxes, if one accepts the presence of the cult of the snake *šnˁ* already in Late Period Naukratis. Weiß proposed that the bronzes possibly did not pertain to a votive burial, but to a commercial context, and that they were meant to be sold to pilgrims on their way to a temple in Saïs.[66] The reasoning was that she thought that this cache was an isolated deposit of bronzes, without any connection to the known Egyptian cultic activity at Naukratis. However, Naukratis provided far more Pharaonic-style bronzes than the number accounted for by this deposit. Votive boxes and figures in bronze were discovered in many other spots in Naukratis. Petrie reported in his journal (1884–1885) that he bought such finds from *sebbakhin* working at Naukratis on more than one occasion. Griffith signaled several bronze reptile cases in a trench located outside the Great Temenos[67] and Hogarth found another concentration of offerings including bronzes on the north-west corner of the enclosure wall.[68] Considering that some were buried just outside of the sacred precinct, these bronzes were in all likelihood meant to be deposited as a local offering, and not to be sold for distant dedication.[69]

Deposits containing a large amount of bronze votives are fairly common finds in Egypt.[70] They are usually secondary deposits buried inside or in the proximity of temple precincts, as they are at Naukratis.[71] Amongst the more or less contemporary contexts to the Naukratis deposit, one can quote the caches discovered by Emery in 1968–9 in North Saqqara, during the clearance of chapels of the thirtieth dynasty.[72] The main cache found in a pit below the paved floor of Shrine D contained 102 statuettes of deities, mainly in bronze, but also in wood and stone. The bronzes were in perfect condition, often wrapped in linen. Some were tidied neatly above a large wooden statue of Osiris, and three wooden shrines were filled with statuettes. Other deposits of votive statuettes in bronze, wood and stone were discovered in the vicinity. In those cases, 'they gave the appearance of hurried and rather haphazard burial; moreover, many of the objects in these caches showed signs of breakage and decay before they were concealed'.[73] In spite of their often poor state of preservation, the votives from the cache at Naukratis were not recycled. Of course, as pointed out by Ogden, caches such as these do raise the question of the recycling of old metal votives.[74] Yet, as illustrated by the Saqqara caches, even votives in perfect condition were buried at some point.[75] Such a policy would imply that the temple workshops, where bronze votives were mass-produced during the Late and Ptolemaic Periods, had access to ample metal supplies.[76]

66 Weiß 2012: 446; Thum (2012: 546) disagrees to some extent with this interpretation.

67 Petrie Notebook 150 (original in the Petrie Museum), entry by Griffith for 7th January 1885.

68 Hogarth Diary 1903, entry for Saturday 2nd May.

69 Further details on the content and meaning of these offering deposits in Masson forthcoming.

70 For the Delta, contexts of discovery individually commented by site, see Weiß 2012: 381–462.

71 Spencer 2007: 29. Bronze votives are sometimes found within their primary context of use. 'Ayn Manawir in the Oasis of Kharga provides an interesting case of regular deposit and not a cache: 400 bronzes and other objects that can be dated to the late fifth century BC were discovered on the floor of chapels, located to the north of a temple dedicated to Osiris-iu: Wuttmann, Coulon and Gombert 2008.

72 Emery 1970; Davies 2007.

73 Emery 1970: 6.

74 Ogden 2000: 156.

75 Spencer has argued that the statues buried in caches 'could still benefit from rituals enacted in the temple': Spencer 2007: 29.

76 One of these workshops, dated to the Ptolemaic Period, was discovered in the funerary temple of Seti I on the west bank of Thebes: Scheel 1989: 25–9, 41.

2 The Late Period metal trade and the origin(s) of the metal used for Egyptian bronzes

Metal was an essential commodity in Late Period trade between Egypt and the Mediterranean region. Scholarly discussions tend to focus on silver, since weighed silver bullion formed the basis of economic exchanges,[77] as well as of the Egyptian taxation system,[78] and would have been used to pay the salaries of the mercenaries enrolled in the Egyptian army.[79] Moreover, under Achaemenid rule, Egypt had to pay the Persian king a yearly tribute of hundreds of talents of silver.[80] *Hacksilber* hoards containing ingots and scraps of silver alongside Greek coins are material evidence for the significance of silver in the Late Period.[81] These treasures were found in various contexts of the sixth to fourth centuries BC in Egypt and in other non-monetarised societies of the Eastern Mediterranean area. Its own sources being insufficient for its needs, Egypt had to import silver, most likely from the Aegean.[82]

The trade in copper is less well studied despite it being a very important metal in the Iron Age and later periods, used in the production of large numbers of commodities, not only votives.[83] As previously stated, the mass-production of votive offerings from the Late Period onwards must have required a steady supply of copper and also of lead.[84] Indeed, a high lead content (commonly around 20 per cent, and up to 30 per cent) is one of the characteristics of Egyptian votives in copper alloy dated to the Late and Ptolemaic Periods.[85] Votives entirely made out of lead also occur at that time and though their presence is particularly marked in Thonis-Heracleion, they are less common in the rest of Egypt.[86]

Mines in the Sinai and the Eastern Desert during the Late Period

A number of mines in the Sinai and in the Eastern Desert along the Red Sea coast were exploited for their copper and lead ores by the Egyptians since early times.[87] Copper mines in the Sinai were exploited particularly during the Old and Middle Kingdom,[88] and, in some cases, during the New Kingdom. For example, the famous copper mines of Timna in the Sinai, already in use in the fifth millennium BC, were extensively exploited during the Ramesside Period.[89] Thanks to recent investigations, the continuity of copper mining in Timna has now been determined during the Early Iron Age.[90] Yet, the Egyptians left the Sinai after the twentieth dynasty and probably did not have much access to this copper, at least not before Shoshenq I's campaign in the region; furthermore, the exploitation of these mines came to an end abruptly after the end of the ninth century.[91] No evidence for copper mining in the Sinai has been so far uncovered after the twenty-second dynasty.[92] Ogden suggested that the copper mines in Wadi Sitra in the Eastern Desert perhaps supplied the metal workshops within the temple complexes at Thebes; however, the date of mining activity there is undefined.[93] Mining expeditions undertaken in the Eastern Desert are documented for the beginning of the twenty-sixth dynasty. Inscriptions dated to the reign of Psamtek I mention that Montuemhat, the powerful fourth prophet of Amun and Mayor of Thebes, sent expeditions to the lead mines of Gebel el-Rosas.[94] These lead ores, however, were not necessarily used for metallurgy. Lead isotope analyses on a variety of Late Bronze Age Egyptian finds containing lead and copper have demonstrated that lead ores from the Eastern desert were not used in smelting metal.[95] They found other applications, particularly in the production of kohl—in the mineral form of galena, one of the most common

77 Le Rider 2001: 170–1.
78 Howgego 1995: 93; Briant and Descat 1998: 77–8; van Alfen 2002: 182–3.
79 Möller 2000: 210 and note 192 for further literature.
80 Herodotus *Historiae* 3.91; van Alfen 2002: 185–6.
81 On *Hacksilber*, see particularly Balmuth 2001; Kroll 2003. Numerous references also in Kassianidou 2012a: 243.
82 As argued in van Alfen 2002: 188. Möller (2000: 29) underlined that a third of the silver coins found in Egypt are of Thraco-Macedonian origin. The known and exploited sources for silver were nonetheless not limited to the Aegean region during the Archaic and Classical Periods: Kassianidou 2012a: 245–6.
83 On the importance of copper during the Late Period: van Alfen 2002: 172–4.
84 Not discussed in this paper is tin, which occurred in a much smaller percentage in the Egyptian votives. A survey on the much debated origin of this metal—possibly in the far western Mediterranean—is given by van Alfen 2002: 170–2. See also bibliography provided in Charalambous et al. 2014: 205–6.
85 Ogden 2000: 155. Recent analyses carried out on the votive deposit found in the temple of Osiris-Iu in Kharga oasis indicate that the bronze votives contain 7 per cent tin and up to 25 per cent lead (Wuttmann et al. 2008: 168). High levels of lead are noticed in general in Late Period metalwork, which requires complex casting, since lead-rich alloys combine 'greater fluidity with relatively low melting point': Davies and Cowell 1987: 98. Lead was a cheaper metal, which could also explain its high levels in Egyptian votives.
86 Heinz 2011.
87 On the different resources of copper available to the Egyptians, see Ogden 2000: 149–51.
88 Abd-el Raziq et al. 2007; 2012.
89 Craddock 1995.
90 Ben-Yosef et al. 2012.
91 *Idem*: 64–5.
92 Ogden himself remarks (2000: 150): 'Strangely, there is no evidence so far for any exploitation of the Timna mines in the Late Period—the period when the production of copper statuettes and the like in Egypt increased exponentially'.
93 Ogden 2000: 150.
94 Vikentiev 1957.
95 Shortland 2006, and particularly his comment (p. 659) that 'The source of lead metal for Egypt therefore seems to lie outside the country. The copper metal and copper alloys have very similar lead isotopic characteristics to those of the lead metals and are therefore also interpreted as being from a source outside Egypt'.

lead ores—and, in some cases, in the manufacture of glazed composition and glass objects.

The import of copper and lead

Even if a sporadic supply of copper and lead from the Red Sea and Eastern Desert cannot be entirely ruled out in the Late Period, this source would not have been sufficient to cover the needs of Egypt for these metals. As with silver, Egypt would have had to import them.

Among the various sources for copper ores available in the Aegean world and the Levant,[96] Cyprus has always been regarded as a major copper provider for Egypt. The import and use of Cypriot copper in Egypt, and elsewhere in the Mediterranean region, are well documented for the Late Bronze Age/New Kingdom. Numerous scholars have discussed the textual, iconographic and archaeological evidence in detail. In the letters of Amarna, the king of Alashiya[97] mentions the large quantities of copper that he sent to Egypt.[98] Copper ingots carried by tribute bearers appear in several New Kingdom Egyptian tombs.[99] Though the tribute bearers are identified as Minoans (Keftiu) or Syrians, scholars suppose that the ingots originated from Cyprus, since Crete and Syria are not copper-rich regions.[100] A relief from the temple of Luxor and dated to the reign of Ramses II depicts a personification of the Mountain of Alashiya in an economic procession bringing great quantities of copper and silver to the pharaoh.[101] Scientific evidence suggests a Cypriot origin for the copper imported into Egypt during the New Kingdom. More than a hundred lead isotope analyses were carried out on copper ingots discovered in various contexts from the Late Bronze Age in the Eastern Mediterranean area; they all support a Cypriot source of the ores.[102] On the other hand, similar analyses carried out on copper alloy objects found in Amarna identified the Laurion mines in Attica as one of the two major sources for the copper, while the second source remained unidentified.[103]

When it comes to the source(s) of copper and lead in the Late Period, our knowledge is more limited and uncertain, though it has noticeably improved over the last decade. Large imports of copper in Egypt are clearly attested in the customs account of Elephantine dated to the fifth century BC, to either the reign of Xerxes or Artaxerxes I: a total amount 21,000 *karsh* (equivalent to 210,000 Persian Period shekels, i.e., *c.* 1.764 tons) of copper or bronze is recorded along with tin, iron, and other commodities transported on three Phoenician ships.[104] The origin of this copper is not certain.[105] Two neo-Babylonian tablets from Uruk, dated to the mid-sixth century BC, mention copper and iron from *Yamana*, a much debated toponym.[106] Briant, and more recently Kassianidou, have both proposed to translate *Yamana* as Cyprus.[107] Specialists in Semitic languages identify *Yamana* with Ionia in these tablets.[108] A passage from Ezekiel (27:13), usually dated to the early sixth century BC, refers to copper or bronze artefacts coming from Yawan (or Javan), Tubal, and Meshech;[109] several scholars take these toponyms to refer to different regions of Anatolia: respectively, Ionia, Cilicia, and Phrygia.[110] Finally, Muhly has argued that Yaman or Yawan had 'nothing to do with Classical Ionia' in Western Anatolia, suggesting that the 'men from the land of Yawan'—as they appear in a letter dated to the reign of the Assyrian king Tiglath-Pileser III (744–727 BC)—consisted of inhabitants of Lycia, Cilicia, and Cyprus.[111]

The exploitation of copper sources after the Bronze Age is now better documented thanks to a series of recent and on-going surveys and excavations in the Levant and Cyprus. Prospections in the copper-rich central region of Cyprus—to the northwest of Tamassos and in the region of Troodos—have provided evidence for intense copper mining during the Iron Age.[112] Copper mining

96 van Alfen 2002: 172–4.
97 For the identification of Alashiya as Cyprus, see, for example, Diakonoff 1992: 175.
98 Kassianidou 2009: 48; Zaccagnini 2000.
99 Wachsmann 1987: 50–2.
100 Point discussed in Kassianidou 2009: 48.
101 Kitchen 2009: 6.
102 Lead isotope analyses were carried out on ingots from Greece, Turkey, Bulgaria, Sardinia and the shipwrecks of Uluburun and Cape Gelidonya on the southern coast of Anatolia: Gale and Stós-Gale 1999: 272–3.
103 Stós-Gale et al. 1995.
104 Yardeni 1994; Briant and Descat 1998: 66–7; Stager 2003: 242.
105 *nḥsh sḥlmy*' is the term used to define this commodity. There has been some discussion about the meaning of *sḥlmy*', either indicating an unknown toponym, or translated as 'of good quality': Briant and Descat 1998: 72 note 52; van Alfen 2002: 173 note 615.
106 Oppenheim 1967: 237; Briant and Descat 1998: 96–7.
107 Briant 2002: 383; Kassianidou 2012a: 235.
108 van Alfen 2002: 173 note 615; Oppenheim 1967: 241 and note 14a: 'western Asia Minor colonized by Greeks (the Yam(a)na(j), as they are called in cuneiform texts since Sargon II'.
109 Ezekiel 27 offers a list of various commodities that were shipped in and out of Tyre, around 600–580 BC; the translation of this passage poses many challenges: van Alfen 2002: 26–7.
110 Diakonoff 1992: 174 note 29, 181, 185; van Alfen 2002: 233 note 839; Greenberg 1997: 551; Stager 2003: 240. Diakonoff, followed by Stager, translates *kelai neḥosheth* as 'copper implements', while Greenberg, followed by van Alfen, prefers 'bronze vessels'. Diakonoff adds that 'the term *Yāwān* is used by the prophets (before the Achaemenian and Hellenistic Periods) apparently only in the sense of 'Ionia in Asia Minor', not 'Greece' [...] but it is used for 'Greece' in the general sense in the other late books'.
111 Muhly 2009: 25–8.
112 Ben-Yosef et al. 2011; Given et al. 2007; Given and Knapp 2003: 273, 277. Koucky and Steinberg's study had already demonstrated the intensity of copper mining between the Late Cypro-Archaic and early Hellenistic Periods, 'one of the peaks in Cypriot metal production' (1982: 128, fig. 2). Further literature is quoted in Mehl 2013: 140 note 10. See also the Iron Age mines of Ayia Varvara (mainly sixth-fifth century BC), though the total production of copper was very low, estimated at around 1000 kg: Fasnacht 1999; Fasnacht et al. 2000. On compositional study of Cypriot bronzes dating to the Early Iron Age, see Charalambous et al. 2014.

is also now well-documented in the Arabah Valley in Jordan and, as seen previously, in the Sinai during the Iron Age, but metallurgical activities are mainly attested between the eleventh and ninth centuries BC and less so for the later phase of the Iron Age.[113]

Ingots form substantial material evidence for the trade in raw metal in the Late Period, but only recently was such evidence brought to light in Egypt. The excavations at Thonis-Heracleion uncovered several silver, bronze[114] and lead[115] ingots. The first of these to be published was a lead ingot, elongated and oblong in shape (47 cm long and 11 cm wide), marked with four stamps of Greek style,[116] and dated broadly between the sixth and second century BC. In the absence of lead isotope analysis, Fabre was rather cautious about the origin of the metal, because extensive galena (lead sulphide) exploitation by the Egyptians makes a local sourcing of the material a possibility.[117] As previously stated, however, it is likely that Egyptians were not smelting their local ores. Additional lead ingots from Thonis-Heracleion have since been the subject of a study by van der Wilt.[118] She quotes a relevant parallel in the stamped lead ingots found on the Porticello wreck near Sicily, which sank around the late fifth-early fourth century BC.[119] According to lead isotope analyses conducted on two of these ingots, the source of the lead is Laurion.[120]

Different ingots have also been discovered in the Priests' Quarter in Karnak, a residential and administrative sector located inside the *temenos* of Amun.[121] The finds belong to three treasures which are composed exclusively of ingots and hacked pieces of 'copper alloy' (metal not analysed) (Figure 3.12).[122] Two of them, collected on the floor levels of House VII, can be precisely dated to the second half of the sixth century BC, possibly the end of the twenty-sixth dynasty. Each treasure was wrapped in linen, maybe a kind of pouch, according to the traces preserved in the corrosion (visible on Figure 3.12). One of these 'pouches' was sealed with seal impressions featuring important priestly titles.[123] Some ingots are plano-convex in shape, while others are more rectangular or trapezoidal fragments, hacked from larger objects.[124] The individual ingots are small and rather light. Plano-convex types are so far not known among the copper ingots from Thonis-Heracleion.[125]

Figure 3.12 One of the treasures from the Priests' Quarter in Karnak, made up of ingots and hacked pieces of 'copper alloy', with traces of linen visible in the corrosion. (Photo: © CNRS-Cfeetk.)

113 Ben-Yosef et al. 2010; Levy et al. 2012: 210; Ben-Yosef et al. 2012. On early Iron Age chronology in the Levant: Finkelstein 2014.

114 These ingots might be made from copper. Oppenheim underlined that bronze 'as a raw material is never the object of commercial transactions in the ancient Near East because it was typically prepared on the spot from copper and tin by the manufacturer of bronze objects' (Oppenheim 1967: 241). He argues that the mention of tin beside the word used for 'bronze/copper' in the Neo-Babylonian tablets from Uruk supports his assertion.

115 They are briefly mentioned in Robinson 2010: 219. Lead ingots are further discussed in Van der Wilt 2010.

116 Goddio and Fabre 2008: 342, no. 357.

117 Idem.

118 Van der Wilt 2010. Among the 19 lead ingots, 11 present a similar loaf-shape as the one discussed above.

119 Eiseman and Ridgway 1987; Parker 1992: 332–4, no. 879; Van der Wilt 2010: 161–2.

120 Eiseman and Ridgway 1987: 57, 107.

121 On this quarter, see Masson 2007.

122 Published with further details in Masson 2015b. The first treasure (7097.1/5–9) weighs 1191.9 g, while the second (7129.1) and the third (8200.6) weigh 979.6 and 997.6 g, respectively. Alteration of their original weight due to corrosion needs to be taken into account.

123 Archaeological and textual evidence for sealed pouches are documented for *Hacksilber* only: Stolper 1993: 8, 10 note 5; Thompson 2003. Pre-weighed lots, individualised in pouches, where each pouch contains a standard weight of metal—such as the mina—were meant to facilitate trade, payment or the recording of deposits. Such a system was already used centuries before the introduction of coinage. See for example the treasure of Tel Dor, on the Palestinian coast, dated to the eleventh century BC: Kroll 2003: 314–5; Stern 2001.

124 These shapes are reminiscent of the silver ingots and scraps found in a *Hacksilber* found in the house V of the Priests' Quarter. This fourth treasure contained also two Greek coins: Masson 2015b.

125 Their shape can be oblong (*c.* 15–20 cm); smaller ones (not more than a few centimetres) are also attested, one of a cube shape while the other is more elongated. I am grateful to Elsbeth van der Wilt for this information.

Some small-sized plano-convex copper ingots have been found in Hazor, but the most recent one is far too early in date, ninth century BC.[126] The shape of copper ingots from Cyprus or Eastern Anatolia during the Late Period is unknown.[127] A few shipwrecks dating to this period, all discovered in the western Mediterranean, contained copper or bronze ingots of a variety of shapes.[128] Although the possibility of import of metal from this region to Egypt should not be totally disregarded,[129] no reliable evidence is currently available to suggest this. Without isotopic analysis, it is impossible to pinpoint the origin of the small ingots from Karnak: the metal was likely imported, but it could also recycle earlier copper alloy artefacts.

Analyses of the Egyptian bronzes and the origin of the metal

Much scientific analysis has been carried out on Late Period Egyptian finds in copper alloy.[130] Amongst this, the work of Riederer is particularly significant on the Late Period bronzes. The analyses conducted by Cowell on Egyptian metal finds in the British Museum included a few pieces in copper alloy dated to the first millennium BC.[131] These analyses provide information on the different types of alloys and the relationship between composition and typology.[132]

Analyses that address the provenance(s) of the ores, on the contrary, are scarce. Some thirty years ago, Fleming conducted lead isotope analysis on a large range of objects dated to the twenty-fifth and twenty-seventh dynasties found in Memphis as well as in Kawa and Sanam in Sudan.[133] The results, published in 1982, were rather unexpected.[134] The lead present in the alloy of these Memphite and Nubian finds originated from a similar source or sources that do not correspond to native lead ores. In fact, they were identified as Piombino in Italy, Laurion in Attica and the island of Siphnos. Another important point drawn from these analyses is that most artefacts were made of several imported materials, 'probably through the re-use of scrap bronze on a routine basis'.[135] The analytical technique was not particularly refined at the time of the study, and our knowledge of the ores available and used during the Iron Age and later periods has significantly improved since through extensive surveys.

Isotopic analyses carried out on lead present in the sediments of the bay of Alexandria have provided new information regarding the sources of the copper that was supplied to the western Delta.[136] They demonstrated that Egypt was already importing this metal from Cyprus and Turkey (the Black Sea region and the Taurus Mountains) during the Pre- and Early Dynastic Periods.[137] Ruling out the Sinai and the Levant as sources for metal imports to Alexandria, these results paint a very different picture of the development of the Early Bronze Age metal trade in the western Delta as opposed to what is known for the eastern Delta. If the identification of the Cypriot origin is correct, imports of copper from Cyprus before the mid-third millennium must, however, have been quite limited.[138]

126 Yahalom-Mack et al. 2014. Lead Isotope analyses carried on ingots of the Iron Age I-IIA from Hazor determined that the metal originated from Faynan in Jordan during the end of second and early first millennium BC, and then from Cyprus during the ninth century BC (idem).

127 Pers. comm. from V. Kassianidou. For Late Bronze Age copper ingots of different shapes, and mainly of Cypriot origin (plano-convex and oxhyde copper ingots), see Tylecote 1976: 30–2.

128 For a synthesis and further literature see Parker 1992: nos 365, 820 and 993. Ingots of lead alloy and copper-tin-lead alloy, of various shapes (mill-shaped, rectangular and loaf-shaped), were discovered in wreck no. 365, discovered near the mines of Montevecchio and Ingustosu on the western coast of Sardinia at Domu de S'Orku; it sank around 700–400 BC. Many pebble-shaped copper ingots of various sizes were discovered in wreck no. 820, which sank in the late fifth to early fourth century BC off the southern French coast. Further west along the same coast, the wreck from Rochelongue (Parker no. 993) sank in the mid-sixth century BC; it contained 800 kg of copper ingots as well as a large range of bronze objects. For lead ingots found on wrecks dated to the Archaic and Classical Periods, see Brown 2011: 118–24.

129 van Alfen 2002: 173 note 614.

130 Riederer 1992; Ogden 2000: 148 (with many references to Riederer).

131 Davies and Cowell 1987: 96–118 (mainly atomic absorption spectrophotometry and in some cases X-Ray fluorescence spectrometry).

132 Cowell examined if the craftsmen would use a specific type of alloy to improve the efficiency of an object, such as weapons, or to ease the cast of complex decorated objects. Riederer tried to find possible links between Late Period bronze statuettes of individual deities that may derive from a common workshop and their composition.

133 The categories included votives and amulets, as well as tools and weapons, see Fleming 1979.

134 Fleming 1982.

135 Ibid: 69.

136 Véron et al. 2013.

137 The copper and lead ore imprints also match less likely sources that the authors prefer to discard, such as South-eastern Arabia: ibid: 143–4.

138 The evidence for metalwork in Cyprus during the fourth to mid-third millennium, during the Chalcolithic Period, is discussed in Peltenburg 2011. Referring to lead isotope analyses which had identified Cypriot copper for various objects found in Jordan and Crete, Peltenburg prefers to stay cautious: the 'extraction, production, and export of Cypriot copper at such an early date seems counter-intuitive in view of its small-scale use on the island […]. However, our information is biased to the copper-poor south and west of the island, away from the copper-rich north' (2011: 6). In any case, the Cypriot sites of Ambelikou, Enkomi and Kition that Véron et al. (2013: 143) mentioned as evidence of copper metallurgy being established in Cyprus during the Philia Culture (mid-to later third millennium) are actually not occupied before the second millennium: on earliest phases and metallurgical activities in Enkomi see, for example, Kassianidou 2012b. On metallurgical production in Cyprus and trade of metals between Cyprus, Anatolia, the Aegean and possibly Southern Levant during the Philia culture: Knapp 2012: 15–7.

Similar research has also been carried out for Iron Age Alexandria.[139] The geographical provenance of the copper has not yet been discussed in a publication, but similar sources could be possible in this period.[140]

Conclusion

Little known to scholars until now, Egyptian Late Period bronzes and other objects form an important category of finds from the early excavations at Naukratis. They served as votive offerings in religious contexts, and their precise find contexts can be reconstructed in a number of cases. The most important of these contexts is the 'cache of bronzes', excavated by Petrie in the southern part of town. The finds illustrate that Naukratis formed part of the Egypt-wide phenomenon of the growing production and consumption of bronze votives in the Late Period. Such increase must have been facilitated, or perhaps even stimulated, by an affluent and secure supply of metal.

In all probability, copper and lead, which are the primary metals used to produce votives in the Late Period, were imported into Egypt, even though only isotope analyses would be able to confirm this assertion. The precise identification of a particular mine as a source is not always possible through isotopic analyses,[141] but it is easy to differentiate 'local' from imported ores.[142] Cyprus and southeastern Anatolia seem the best candidates for imports of copper in Late Period Egypt, though as we saw, many other sources were also exploited during this period.

A new project including a series of isotopic analyses on various finds in lead and copper alloy dated to the Iron Age and later (covering the period between the twenty-first and the thirtieth dynasty), and coming from different sites across Egypt and Sudan would greatly improve and revise our picture of the trade in metals. Such studies are still too rare for this period of intense economic activity and cultural interactions, and are so far limited to a few lead[143] and copper ingots,[144] or *Hacksilber*.[145] Likewise, as demonstrated by the investigation conducted by Shortland on a wide variety of Late Bronze Age Egyptian objects, isotopic analysis can reveal details about trade in a whole range of materials with lead and copper contents.[146]

Naukratis, renowned for its faience production,[147] seems also to have been an important centre for metallurgical activities, at least according to Petrie's observations (Figure 3.1).[148] In contrast to the Late Bronze Age, when these industries used different sources for their raw material, did they collaborate during the Late Period?[149] As a melting-pot for cultural, technical and commercial exchange between Egypt and the Mediterranean world, Naukratis would be an ideal case-study for such a research project.

Since I gave this paper, an important contribution to our knowledge on copper import during the Late Period has been published: Schulze, M. and Lehmann, R., 'Alte und neue Analyseverfahren an den Bronzen des Museum August Kestner und was sie uns verraten', in M. Fitzenreiter, C. E. Loeben, D. Raue and U. Wallenstein (eds), Gegossene Götter: Metallhandwerk und Massenproduktion im Alten Ägypten, Rahden/Westf., 2014, 133-154.

Furthermore, a collaborative project '(Re)Sources: Origins of Metals in Late Period Egypt' has started in 2015 between the British Museum and the Curt-Engelhorn-Zentrum Archäometrie in Mannheim. The pilot study, funded by the Gerda Henkel Foundation, will combine XRF and Lead Isotope analyses on a selection of Late Period metal and faience finds from Naukratis.

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139 Véron et al. 2006.

140 Alain Véron kindly wrote to me stating that the isotopic composition would fit the ratios known from Turkey or Cyprus, with a preference for the former. He specified that further research is needed to confirm this signature.

141 Budd et al. 1995.

142 Ores in the Sinai and Eastern Desert have very low 207Pb/206Pb and 208Pb/206Pb values, easily distinguishable from the much higher values of other major ore sources such as from Laurion, Cyprus and Sardinia: Shortland 2006: 665.

143 Eiseman and Ridgway 1987: 57, 107.

144 Yahalom-Mack et al. 2014 (ingots dated to the Iron Age I-IIA).

145 Stós-Gale 2001. Lead isotope analyses conducted on a *Hacksilber* of the seventh century BC revealed that the silver ingots and scraps are matches to the three major Greek sources, Laurion, Siphnos, and Chalkidiki/Troad. Stós-Gale suggested that the unselective use of silver from all available sources testifies to wide and intricate trading patterns at that period.

146 Shortland 2006.

147 Gorton 1996: 91–131.

148 Petrie observed what he believed to be traces of significant metallurgic activities for iron (iron tools, iron slags and iron ore) in the 'low strata of the town', which includes the stratum of the scarab factory, and he defined Naukratis as a 'great centre of the iron trade'; he also indicated locations for 'copper smelters' as well as 'silver workers' on his plan of the town: Petrie 1886: 39, pl. XLV.

149 Ogden had assumed that the faience manufacture would use 'by-products of metallurgy, not recycled objects' as raw material for the glazing: Ogden 2000: 157; see also Kaczmarczyk and Hedges 1983: 239. Shortland's research, however, demonstrated that this was not the case during the Late Bronze Age. Such assessment would need verification for later periods.

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II

The organisation of trade

4 Money, taxes, and maritime trade in Late Period Egypt

Brian Muhs

In Egypt during the late second and first millennia BC, the use of silver as a medium of exchange and a store of wealth gradually increased, at least among some segments of society. High value transactions increasingly employed silver bullion, supplemented from the sixth century BC onwards by imported coins treated as bullion, until locally minted coins finally appeared in Egypt in the fourth century BC. This paper argues that Egyptian taxation practices evolved with and adapted to this increasing use of silver. During the late second and early first millennia BC, the Egyptian state only occasionally levied taxes in silver. During the Late Period (664–332 BC), however, the state introduced new methods of taxation that targeted individuals and transactions that were likely to employ silver. These new methods of taxation in turn literally shaped maritime trade in Egypt, because the new methods created bottlenecks where transactions could be taxed.

Money in the late second and early first millennia BC

In the New Kingdom (*c.* 1550–1069 BC), weights of silver, copper and occasionally volumes of grain served as standard measures of value. A much wider variety of commodities served as media of exchange, however. Gold and silver were occasionally used as stores of value, but presumably they were too valuable or too rare to use as media of exchange in the majority of transactions.

In the Third Intermediate Period (1069–664 BC), weights of silver and occasionally quantities of cloth served as standard measures of value. Cloth, and especially silver, appear to have increasingly served as media of exchange as well, along with weights of gold and copper, and volumes of grain. The range of commodities used as media of exchange thus seems to have been more limited than in the preceding New Kingdom, perhaps because silver was more readily available. The robbery of royal tombs at the end of the New Kingdom may have injected considerable quantities of gold and silver into the Egyptian economy.[1]

Measures of value

In the New Kingdom, values were usually expressed as weights of metal. The metal was most often silver, frequently copper, and very rarely gold, measured with a *deben* of 91 g, subdivided into 10 *kite* of 9.1 g, or occasionally into twelve silver *shati* of 7.6 g.[2] Values of commodities were also sometimes expressed as volumes of grain, usually barley, measured with the *khar*–sack of 76.56 l, subdivided into four *oipe* or *hekats* of 19.14 l or 40 *hin*, or with the *hin* of 0.47 l.[3]

In the Third Intermediate Period, weights of silver and quantities of cloth apparently served as standard measures of value, to which weights of copper and volumes of grain could be equated. The *Oracular Property Decree* for the High Priest of Amun Menkheperre,[4] inscribed in the temple of Khonsu at Thebes and dated to the early tenth century BC, records sellers of properties as saying (l. 13)

> *We have received the 5 [*khar*–sacks] of emmer per [shawl evaluated at 100] copper [*deben*] per* deben *of silver [...]'.*

The buyer Menkheperre says (ll. 27–28)

> *'Let the silver payment be great from Amun-Re, King of the Gods, the great god. Give it, per* deben *of silver, at 60* deben *of copper, and I shall give the 40* (deben) *over and above them. I shall give 5* khar*–sacks of emmer [per] shawl, though it is 3* khar*–sacks that the country gives per shawl—an excess of 2* khar*–sacks.*

Finally, the list of payments repeatedly states (ll. 32–52), that 305 *deben* amount to 30½ shawls. These equivalences imply that 100 *deben* of copper made 50 *khar*–sacks of emmer wheat, made 10 shawls, and made one *deben* of silver. Similarly, Hieratic *P.Brooklyn* 16.205,[5] from the Theban region and dated to the late eleventh or early tenth century BC,[6] records a judicial oracular consultation with the god Khonsu about a disputed payment, about which is said (col 3, ll. 7–8) 'Harsetitef received two *oipe*–measures of emmer wheat—one *oipe*–measure (equalling) a shawl—in Year 49. The scribe (also) received two shawls, total four'.[7] In this case, the total value of the payments is given in shawls. Apparently quantities of cloth, expressed in numbers of shawls (*dr*), replaced weights of copper as measures of lower values in the Third Intermediate Period.

1 Cf. Ritner 2009: 104.
2 Černý 1954: 904–6.
3 Ibid.: 914–6.
4 Epigraphic Survey 1981: 17–20, pl. 133; Ritner 2009: 130–5 no. 30.
5 Parker 1962: 49–52, pls 17–9 Appendix 1.
6 von Beckerath 1994: 15–17.
7 Parker (1962) translated *dr* as 'loincloth' rather than 'shawl'.

Media of exchange

In the New Kingdom, purchases were most often made with one or more objects said to be worth a certain weight of metal, in exchange for one or more other objects said to be worth the same weight of metal. Sometimes metal objects were used in such exchanges, such as copper utensils, and they were said to be worth their weight in metal.[8] Nonetheless, lumps of precious metal were occasionally used as media of exchange, as well as measures of value. *Seniu* or *shati*, meaning 'rings', are mentioned as media of exchange as well as measures of value in some hieratic papyri. The existence of such rings is confirmed by their presence in the et-Till hoard from el-Amarna, along with bars of gold and bits of silver.[9] The rings in the et-Till hoard vary considerably in weight, but in the hieratic papyri they are treated as uniform, 1/12 *deben* or 7.6 g each, which could suggest that they were abstract tokens used as a medium of exchange.[10] It is also possible, however, that the rings were kept in sacks and that it was their overall weight that was significant in transactions, and not the weight of individual rings.

In the Third Intermediate Period, payment could be made with a variety of commodities. Some texts state that payment consisted of a quantity of commodities 'worth' another quantity of commodities, usually one of the standard measures of value such as silver or cloth, as was common in New Kingdom records from Deir el-Medina. Thus in the *Oracular Property Decree* for Menkheperre cited above, the list of payments (ll. 32–52) consistently states that payments were in *deben*, and several times clarifies '305 *deben* amounting to 30½ shawls'. These payments must have been in copper *deben*, as described above, and 30½ shawls must have been their value according to a standard measure. Likewise, in Hieratic *P.Brooklyn* 16.205, cited above, payment consisted of two *oipe*-measures of emmer wheat and two shawls, so the payment was worth four shawls according to a standard measure.

Other texts, however, state that payment consisted simply of one of the standard measures of value, most often a weight of silver. For example, Stela Cairo JdE 70218,[11] from the Memphite region and dated to the early tenth century BC, records the purchase of two fields, one for 2 *deben* 2 *kite* of silver, and the other for 1 *deben* of silver. Similarly, Stela Cairo JdE 66285, from Abydos and dated to the early tenth century BC, records (ll. 9–26) the purchase of fields for 10 *deben* of silver, a garden for 2 *deben* of silver, 10 oxen for 2 *deben* of silver, 11 people for 6 *deben* and 1 *kite* of silver, and the services of 12¼ people from the temple of Osiris at Abydos for 8 *deben* 7⅔ + ⅔ *kite* of silver.[12] Likewise, Stela Cairo JdE 31882 (Apanage Stela), from the temple of Amun at Thebes and dated to the late tenth century BC, records (ll. 8–23) the purchase of fields from 16 groups of cultivators for a total of 18 *deben* and 4¾ *kite* of silver, as well as 35 slaves for a total of 15 *deben* and ⅓ *kite* of silver.[13] Finally, Stela Cairo JdE 37888, from the Theban region and dated to the early seventh century BC, records the transfer of fields from the chantress of the Residence of Amun, Ankhnesites, for an unknown number of gold *deben* and 10 red cloths.[14] The simplest explanation for the absence of commodities other than silver, gold or cloth in these texts is that payment was actually made in silver, gold or cloth. This would suggest that silver was increasingly being used as a medium of exchange as well as a measure of value in the Third Intermediate Period, compared to the New Kingdom. An alternative explanation is that payment was still made with a variety of commodities, but it was no longer felt necessary to indicate the commodities, only their value in a standard measure like silver. This would indicate nothing about the use of silver as a medium of exchange, but would still suggest that silver was increasingly being used as a measure of value.

Evidence that some exchanges were made with silver may be found in Abnormal Hieratic contracts that refer to the payment of weights of silver specifically of the treasury of the god Harsaphes. Temple notaries were introduced in the late Third Intermediate Period to create these Abnormal Hieratic contracts, to provide written records of private property transfers. The treasury of Harsaphes appears in the earliest surviving Abnormal Hieratic contract from the late eighth century BC, *P.Leiden* K 128.[15] It also appears in an earlier abstract of an Abnormal Hieratic contract in Papyrus Berlin 3048 verso,[16] which has been attributed to king Takeloth II in the ninth century BC,[17] or king Takeloth III in the early eighth century BC.[18] Some have suggested that these weights of silver had to meet purity standards set by the temple treasury of Harsaphes.[19] Others have suggested that these weights of silver had to be in a form of proto-coinage, that is actual silver ingots marked with the sign of the temple treasury of Harsaphes.[20] Still others have suggested that these weights of silver were merely weighed according to the temple treasury standard.[21] The last suggestion is the most likely, because there is no physical evidence that stamped ingots existed, and because parallels from the Persian Period seem to refer to a weight standard (see below).

8 Černý 1954: 906–7; Kemp 1989: 248–50.
9 Kemp 1989: 242–6.
10 Castle 1992: 263–70.
11 Munier 1922; Ritner 2009: 161–2 no. 38.
12 Blackman 1941; Ritner 2009: 166–72 no. 41.
13 Legrain 1897; Erman 1897; Menu 1989; Ritner 2009: 271–8 no. 69.
14 Legrain 1906; Ritner 2009: 573–4 no. 170.
15 Vleeming 1980.
16 Möller 1921; cf. Donker van Heel 2002.
17 Payraudeau 2009: 291–5.
18 Ibid. 2004: 82–5.
19 Griffith 1909: 76.
20 Müller-Wollermann 2007a; 2007b: 176–8.
21 Vleeming 1991a: 87–9 note uu.

Stores of wealth

Egyptian bullion hoards illustrate the increasing use of gold, and especially silver, as a store of wealth in the late second and early first millennia BC. The et-Till hoard was found in a residential quarter of Tell el-Amarna and dates to the fourteenth century BC. It consisted of a pottery jar containing 23 crude bars of gold, weighing 3,375 grams or 37 *deben*, as well as silver rings, figurines and other bits weighing 1,086 grams or 12 *deben*. This emergency hoard clearly indicates that gold and silver could occasionally serve as a store of wealth, at least among a privileged elite.[22] The Tell Basta hoard or hoards were found on two occasions during railway construction near the site of Bubastis. Some of the objects are inscribed and date to the thirteenth and twelfth centuries BC, but they may have been deposited later, possibly much later. The finds consisted of gold and silver bowls, jars, jugs, situlae, wine strainers, jewelry, vessel parts and scrap, for the most part of unknown weight.[23] The Elephantine hoard consisted of a small ceramic vessel stylistically dated to the twenty-fifth or early twenty-sixth dynasty (750–600 BC), which contained three linen packets and 118 pieces of cut silver fragments (*Hacksilber*) weighing together 39.45 g. It has been suggested that the packets each weighed approximately 13.15 g, and that this was a standard weight.[24]

Money taxes in the late second and early first millennia BC

In the New Kingdom and Third Intermediate Period, the king and the temples each collected taxes from their respective domains, though the king could draw on temple reserves when needed. Most of these taxes were collected in kind and labour, such as the harvest tax on agricultural fields, and the compulsory labour obligation for people. The harvest tax was collected with the help of field surveys, which recorded field areas and calculated their taxes as a proportion of their estimated yields. Examples of field surveys survive from the New Kingdom,[25] and from the Third Intermediate Period.[26] The compulsory labour obligation was probably collected with the help of censuses organized by household and listing occupations. Censuses and census documents survive from the New Kingdom,[27] but not from the Third Intermediate Period, though there are references to the taxation of certain occupations that probably reflect a census. For example, the granite altar Cairo JdE 39410, from Heracleopolis and dating to the mid-tenth century BC, records the daily ox-offering to the god Harsaphes in his temple in Heracleopolis. Individual military officials contribute approximately six months of oxen, individual priests and officials of Harsaphes contribute two months, at least 26 towns contribute three months, and various occupations contribute one month, including (ll. 27–28): 'the coppersmiths and the harpists, 1 ox; the gardeners and the washers, 1 ox; the chariot craftsmen 1 ox; the chariot warriors, 1 ox; the stone masons, 1 ox; the potters and the builders, 1 ox'.[28]

Occupational Taxes

The first regular taxes in silver were taxes on specific occupational groups. Temples probably collected these occupational taxes with the help of censuses that recorded the occupations of household heads. Taxes in silver were not exacted from every occupation, however, suggesting that the use of silver was limited. For example, the stela Cairo JdE 36861, from the Memphite region and dating to the early seventh century BC, records a royal donation to a shrine of Amun-Re, which seems to have been managed by the temple of Ptah. The donation included 30 *deben* of silver from the fishermen of Memphis annually, equivalent to 38 oxen.[29]

Money in the Late Period (664–332 BC)

In the Saïte Period (664–525 BC), weights of silver became the standard measures of value, to the exclusion of other metals and commodities. Weights of silver appear to have served increasingly as media of exchange as well, while the use of other commodities apparently diminished, creating a partial unity of measures of value and media of exchange. In the Persian Period (525–332 BC), Egyptian texts equated foreign weight and coin terms with Egyptian weights, theoretically allowing imported coins to be treated as abstract tokens. In hoards, however, imported coins were treated as bullion until and even after the introduction of locally minted coins in the fourth century BC.

Measures of value

In the Saïte and Persian Periods, Abnormal Hieratic and Demotic texts usually measure value as weights of silver. Weights of copper are almost never used, in contrast to the New Kingdom. The weights of silver are almost always either the *deben* of 91 g or the *kite* of 9.1 g. In the Persian Period, Demotic texts sometimes also refer to *staters* equated to two *kite*, or five to the *deben*. These *staters* are also described as Ionian *staters*, and

22 Kemp 1989: 244–6.
23 Lilyquist 2012.
24 Noeske 1991; 1993: 204–5.
25 Gardiner 1941; 1948a; 1948b.
26 Gasse 1988; Vleeming 1991b; 1993.
27 Demarée and Valbelle 2011.
28 Tresson 1938; Ritner 2009: 180–6 no. 45.
29 Meeks 1979; Ritner 2009: 512–6 no. 157; Agut-Labordère 2011: 638–9.

are thought to reflect Athenian *tetradrachms*, the most common coins in Persian Period Egypt, which weighed 17.2 g on average.[30]

In the Persian Period, Aramaic texts from Egypt refer to the silver *karsh*, *shekel*, *zus* and *hallur*.[31] The *karsh* consisted of 10 *shekels*, and the *shekel* of two *zuz* or of 40 *hallurs*.[32] Three Aramaic texts equate two *shekels* with one *stater*, and one adds that the *stater* is of the 'silver of Yavan' (Ionia). This *stater* is also thought to reflect the Athenian *tetradrachma*.[33] This implies that in Persian Period Egypt, the Aramaic *karsh* was equivalent to the Egyptian *deben*, and the Aramaic *shekel* was equivalent to the Egyptian *kite*. One Aramaic text, a register of customs duties, also refers to gold *staters*, which are equivalent to slightly less than a *shekel*.[34]

Media of exchange

In the Saïte and Persian Periods, Abnormal Hieratic and Demotic texts usually express payments as weights of silver, but occasionally as commodities, or as commodities worth a weight of silver. A payment expressed as a commodity occurs in *P.Louvre* E. 7850, from Thebes, dated to Year 38 of Amasis (533 BC), which is a receipt for payment of a red bull as 'the substitute for the things which are given to the Overseer of the Necropolis', for an individual who was presumably to be buried.[35] The value of the red bull is not indicated, but *P.Cairo* CG 50062, from Assiut, dated to Year 6 of Cambyses (524 BC), records a series of payments of ½ silver *kite* per burial.[36] Payments expressed as commodities worth weights of silver occur in *P.Cairo* CG 50060, from Assiut from the same archive as the preceding papyrus, dated to Year 5 of Cambyses (525 BC), which is a receipt for silver that the Overseer of the Necropolis has given to the *lesonis*. There follows a list of quantities of wine and beer and their values in silver, or in some cases simply weights of silver, which are said to be in the possession of the *lesonis* and other individuals.[37]

After the Third Intermediate Period, Abnormal Hieratic contracts cease to refer to payment of weights of silver of the treasury of Harsaphes. Instead, in the Saïte Period, Abnormal Hieratic and Demotic contracts refer to weights of silver of the treasury of Thebes, and in the Persian Period Demotic contracts refer to weights of silver of the treasury of Ptah. As in the Late Third Intermediate Period, there has been debate whether this meant that the silver had to meet purity standards set by the temple treasuries,[38] or that it had to consist of ingots marked with the sign of the temple treasuries,[39] or whether it was merely weighed according to the temple treasury standard.[40] The last is probably the correct interpretation. In the Persian Period, Aramaic texts refer twice to payment in silver weighed out on the balance,[41] many times to payment in silver weighed according to the 'stones of the king',[42] or in one or two cases according to the 'stones of Ptah'.[43] The latter is surely the same standard of the treasury of Ptah mentioned in Demotic contracts. Furthermore, stamped ingots are conspicuously absent from Saïte and Persian Period hoards.

Stores of wealth

Saïte and Persian Period hoards can consist of ingots, jewellery, and chopped fragments of silver (*Hacksilber*), as in earlier periods, or of coins, or of a combination of the two. These hoards illustrate the use of silver as a store of wealth as well as a medium of exchange. Hoards without coins can be difficult to date, and in Egypt they are usually assumed to date before coins began to appear at the end of the sixth century BC. Three such hoards are known from Egypt,[44] including one from Tell el-Atrib (Athribis) found in 1924 that contained 50 kg of silver.[45] Hoards with coins appear in Egypt from the end of the sixth century BC. From the Archaic Period (to 480 BC), thirteen coin hoards are known from Egypt, containing at least 428 coins.[46] Five of these hoards included cut or fragmented coins. These five hoards also contained cake ingots or *Hacksilber*, and in one hoard from Mit Rahinah (Memphis) found in 1860 the ingots and *Hacksilber* weighed 73 kg, dwarfing the 23 coins accompanying them.[47] From the Classical Period (480–332 BC), twenty-eight coin hoards are known from Egypt, containing at least 8,827 coins, though one hoard from Tell el-Maskhuta found in 1947–48 accounts for at least 6,000 of them.[48] Nine of these hoards included cut or fragmented coins, and nine hoards (not all the same ones) contained cake ingots and/or *Hacksilber*.[49] Hoards containing ingots and *Hacksilber* as well as coins continued into the fourth century BC, even after locally minted coins became available. The numerous cut and fragmented coins may represent tests of quality, suggesting that the coins were valued for their silver rather than for their nominal values. Similarly, the ingots may also represent a test of quality, because the Classical authors record that molten silver bubbled a certain way when it was at least 97 per cent pure.[50] Such tests of quality are more likely to be performed when media are actively exchanged than when they are passively being stored, suggesting that the coins and the ingots were used as media of exchange as well as stores of wealth.[51]

The first references to Greek coins in Egyptian texts are Ionian staters, which appear in the Persian Period,[52] as do the first references to Ionian staters in Aramaic texts.[53] The first coins minted in Egypt were unmarked imitations of Athenian tetradrachms, possibly dating from the late fifth century BC, or more likely from the early fourth century BC onwards, after Egypt successfully revolted from Persian rule. There are also a number of fractions imitating Athenian types, some marked with the hieroglyphic legend *w3ḥ*, others with the Greek legend NAY, presumably for Naukratis.[54] Dies for producing unmarked imitations of Athenian tetradrachms have been found at several locations in Egypt, suggesting decentralised production.[55] In the mid-fourth century BC, the Egyptian king Tachos (362–360 BC) minted a gold coin of Athenian design, but on the daric standard marked with the Greek legend TAΩ, and his successor king Nectanebo II (360–343 BC) probably produced a series of gold coins on the daric standard with the hieroglyphic text *nb nfr*, 'good gold'.[56] In the late fourth century BC, after the Persians reconquered Egypt, king Artaxerxes III (343–338 BC) produced a series of imitation Athenian tetradrachms and fractions thereof marked with the Demotic label 'pharaoh Artaxerxes'. At the same time, the Egyptian satraps Sabakes (*c.* 340–333 BC) and Mazakes (333–332 BC) produced imitation tetradrachms and fractions marked with the Aramaic labels 'Sabakes' and 'Mazakes'.[57] There is considerable debate whether some or all of these Egyptian issues were intended primarily for Greek mercenaries who demanded payment in coins, or whether they may have had a wider circulation.[58]

Money taxes in the Late Period (664–332 BC)

In the Saïte and Persian Periods, the state and the temples continued to collect taxes from their respective domains. There were however an increasing number of taxes in silver, alongside harvest taxes in kind and compulsory labour obligations, no doubt due to the increased availability of silver. The new money taxes were use-taxes collected at bottlenecks, which targeted individuals with silver and reflected their ability to pay. They included sales taxes on exchanges as a fraction of the value of the exchange, customs duties on imported goods as a fraction of the value of the goods, and occupational taxes as a surcharge on specific occupational activities. Initially, the state relied on temples to collect money taxes, but in time the state began to collect some money taxes itself.

The state could also draw on temple revenues when needed. The Classical sources record that in the early fourth century BC, the kings of the thirtieth dynasty tried to raise metal revenues by taxing priests and temples, in order to pay for Greek mercenaries. Pseudo-Aristotle says that King Tachos lacked money for war against the Persians, so his Athenian general Chabrias encouraged him to tell the priests that he would have to suppress some temples and many priests to pay for the wars.[59] The priests therefore volunteered the money, to preserve their temples and positions. Furthermore, he imposed taxes on property and people, and on the sale of grain, and a 10 per cent tax on professions. Polyaenus recounts a similar story, that King Thamos was short of money, so Chabrias encouraged him to confiscate gold and silver from the wealthy and to repay them with tax revenues.[60]

Sales taxes

The earliest bottleneck money taxes were sales taxes on real estate transfers. The use of silver as a medium of exchange appears to have spread through Egyptian society through trade and from the top down, and was thus initially restricted to merchants and traders, and to expensive transactions like real estate transfers, so it is logical that the first money taxes were levied on these transactions. Already in the late Third Intermediate Period, by the ninth or early eighth century BC, temples had established notaries to record real property transfers. Beginning in the Saïte Period, by the late seventh century BC the temples used this notarisation requirement as a bottleneck to collect 10 per cent of the value of the property involved in the transfer.[61] This is recorded on two Abnormal Hieratic contracts, *P.Turin* 2118A (246), dated to Year 30 of Psamtek I (635 BC), and *P.Turin* 2120 (247), dated to Year 45 of Psamtek I (620 BC);[62] and on two Demotic contracts, *P.British Museum* 10117, dated to Year 29 of Amasis (542 BC),[63] and *P.Louvre* E. 7128, dated to Year 12 of Darius I (511 BC).[64]

30 Chauveau 2000.
31 Porten 1968: 62.
32 Ibid.: 66–7.
33 Ibid.: 64 and note 13.
34 Yardeni 1994: 70; Briant and Descat 1998: 75–8.
35 Devauchelle 1987: 154–5 Annexe A, pl. 23; Donker van Heel 1996: 222–5 Text 22; 2012: 149–50.
36 Spiegelberg 1932: 52–3 and pls 26–7.
37 Ibid.: 46–8 and pls 21–2.
38 Griffith 1909: 76; van Alfen 2004–5: 21–6.
39 Müller-Wollermann 2007a; 2007b: 176–8.
40 Vleeming 1991a: 87–9 note uu.
41 Porten 1968: 63 and note 6.
42 Ibid.: and note 7.
43 Ibid.: and note 8.
44 Kroll 2001: 3–4.
45 Engelbach 1924: 181–5.
46 Kraay, Mørkholm, and Thompson 1973: 227–30 nos 1632, 1634–43; Price 1975: no. 7; Price 1976: no. 10.
47 Kroll 2001: 4–5; van Alfen 2004–5: 40 table 4: Archaic Egypt.
48 Kraay et al. 1973: 230–3 nos 1644–63; Buttrey 1982; Price et al. 1994: nos. 57, 125, 151; Kroll 2001: 1–3; van Alfen 2002: 62–4 Nahman's and Endicott's Hoards; van Alfen 2004–5: 8–13.
49 Kroll 2001: 5–7; van Alfen 2004–5: 41–2 table 5: Classical Egypt.
50 Kroll 2001: 8; van Alfen 2004–5: 27.
51 Kroll 2001: 11–16; van Alfen 2004–5: 17–19.
52 Chauveau 2000.
53 Porten 1968: 64 and note 13.
54 van Alfen 2002: 15–23; 2011: 66–71.
55 Meadows 2011.
56 van Alfen 2002: 23–4; 2011: 70; Faucher et al. 2012.
57 van Alfen 2002: 27–32; 2011: 71–3.
58 Ibid. 2002: 32–48; 2011: 55–7, 84–5.
59 Pseudo-Aristotle *Oikonomika* 2.2.
60 Polyaenus *Strategemata* 3.11.5; Agut-Labordère 2011.
61 Vleeming 1992; Depauw 2000: 56–63.
62 Malinine 1953: 56–71 texte IX and 72–84 texte X.
63 Reich 1914: 9–25.
64 Malinine 1953: 85–8 texte XI; Pestman 1994: 71–3 texte 10.

Occupational taxes

In the Late Period, temples seem to have administered and controlled access to the cemeteries in the neighbouring deserts. Beginning in the Saïte Period, by the seventh century BC, burial plots had to be purchased from temples, and by the sixth century BC temples started collecting a money tax on the burial of the dead in these cemeteries, burials serving as a convenient bottleneck. These were not death taxes, because there was no requirement that the dead be buried in these cemeteries, only the desire of Egyptians for a good burial. Furthermore, the temples collected the tax from mortuary priests, who buried and performed rituals for the dead, and who received a significant contribution from the deceased's relatives for doing so. The tax was thus in effect an occupational tax on mortuary priests.

Already in the Saïte Period, temple officials known as the Overseer of the Necropolis received payments in silver for the purchase of tombs, or the plots of land on which they were built. In the Demotic Stela Louvre C. 101, dated to Year 8 of Psamtek I (657 BC), the Overseer of the Necropolis declares to a tomb owner that he is satisfied with the money for a tomb that a mason has built.[65] In the hieroglyphic Stela Florence 1658 (2536), dated to Year 4 of an unnamed pharaoh, the Overseer of the Necropolis declares to a tomb owner that he has received the money for a tomb.[66] In Demotic *P.Louvre* E. 7128, dated to Year 12 of Darius I (511 BC), the Overseer of the Necropolis declares to a *choachyte* that his heart is satisfied with the money for a plot of land.[67]

The Overseer of the Necropolis also received payments for the right to bury individual mummies in tombs, above the cost of the tombs themselves. In the Demotic *P.Louvre* E. 7850, dated to Year 38 of Amasis (533 BC), the Overseer of the Necropolis acknowledges to his superior the receipt of a red bull as payment for the burial of an individual.[68] Demotic *P.Cairo* CG 50062, dated to Year 6 of Cambyses (524 BC), records a series of payments of ½ silver kite, apparently for burials.[69]

Customs duties

In the Late Period, the state started directly collecting customs duties levied at the border on goods entering Egypt. To facilitate this, the state may have required foreign merchants and traders to enter Egypt only at designated points, thereby creating bottlenecks at which it could collect customs duties on goods. Physical bottlenecks at the borders of Egypt were not new. Already in the nineteenth century BC, king Senusert III set up Stela Berlin 14753 at the fortress of Semna in Nubia, forbidding any Nubians to travel north except to trade at Mirgissa.[70] Some have argued that the fortress of Sile on the northeastern border of Egypt played a similar role in the New Kingdom.[71]

The state also appears to have instituted some kind of border control in the Saïte Period. Herodotus wrote that the Saïte king Amasis (570–526 BC) allowed the Greeks to settle at the site of Naukratis, located in the Egyptian Delta on the Canopic Branch of the Nile.[72] He says further that in earlier times, before his own time, Naukratis was the only *emporion* or trading port in Egypt, and that ships that came to any other branch of the Nile were required to sail on to the Canopic branch to Naukratis. He describes this concentration of trade at Naukratis as a privilege, but it could also have served as a bottleneck at which customs duties could be levied, though there is no direct evidence for customs duties in the Saïte Period.[73]

The earliest direct evidence for customs duties dates to the Persian Period, the time of Herodotus, when Naukratis was no longer the only trading port in Egypt. There is an Aramaic papyrus from Elephantine at the southern border of Egypt, which contains a register of customs duties collected in money from Ionian and Phoenician ships and cargoes.[74] The incoming cargoes primarily consisted of wine, oil, bronze, iron, wool and wood, while the outgoing cargoes consisted primarily of natron. The customs duties consisted of 10 per cent of the cargo payable in kind, and a money tax called 'silver of the men' payable in gold or silver.[75] Although the papyrus was found in Elephantine, it does not name that site, and most of the ships named on it came from Ionia or Phoenicia, so scholars have argued that the papyrus was originally written at a northern site like Memphis, Naukratis, or most likely Thonis-Heracleion, and was only later brought to Elephantine.[76]

Thonis-Heracleion was located at the mouth of the Canopic Branch of the Nile, downstream from Naukratis, and developed as its harbour. The role of Thonis-Heracleion as the customs collection point for Naukratis is confirmed by a pair of nearly identical basalt stelae erected at the two sites in the fourth century BC by king Nectanebo I. The stela from Thonis-Heracleion dedicates 10 per cent of the harbour customs duties and local tax revenues to the temple of Neith at Saïs, while the stela from Naukratis dedicates 10 per cent of local tax revenues.[77] These dedications were not a tax of 10 per cent, but rather 10 per cent of the total tax revenues, while the state kept the other 90 per cent.[78]

65 Malinine 1975: 168–74.
66 Bosticco 1972: 38–9 no. 28, pl. 28.
67 Malinine 1953: 85–8 texte XI; Pestman 1994: 71–3 texte 10.
68 Devauchelle 1987: 154–5 Annexe A, pl. 23; Donker van Heel 1996: 222–5 text 22; 2012: 149–50.
69 Spiegelberg 1932: 52–3 and pls 26–7.
70 Meurer 1996: 10–27.
71 Aḥituv 1996.
72 Herodotus *Historiae* 2.179.
73 Posener 1947; Pfeiffer 2010: 15–17.
74 *P.Berlin* P. 13446 A–H, K–L + *P.Cairo* ar. 3465 (J 43502) (*P.Aḥiqar* palimpsest), see Porten and Yardeni 1993: 82–193 text C3.7; Yardeni 1994; Briant and Descat 1998.
75 Yardeni 1994: 70–3; Briant and Descat 1998: 73–9.
76 Briant and Descat 1998: 91–2; Pfeiffer 2010: 18–19.
77 Yoyotte 2006; Pfeiffer 2010: 19–20; von Bomhard 2012.
78 Lichtheim 1976; von Bomhard 2012: 93–7.

Conclusion

The growing monetization of Egypt in the Late Period made it increasingly possible, attractive, and necessary for the state and temples to exact taxes in silver. The use of silver was not yet universal in Egypt at this time, however, requiring the state and the temples to develop new use taxes to target individuals and transactions likely to employ silver. These new taxes established or utilized existing transactional bottlenecks, such as the notarization of contracts, the burial of the dead, or the landing of cargoes, to capture silver-using individuals and transactions.

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5 The stela of Thonis-Heracleion. Economic, topographic and epigraphic aspects

Anne-Sophie von Bomhard

Underwater excavations on the submerged site of the ancient town of Thonis-Heracleion were rewarded in 2001 with the discovery of a stela of black granodiorite stone.[1] It was found intact on the area of the temple of Amun-Gereb in Thonis-Heracleion (Figure 5.1).[2]

The stela, almost two metres high, records a Decree issued by Nectanebo I, the first king of the thirtieth dynasty (380–362 BC). The Decree is known from another stela of the same size and material, discovered at the very end of the nineteenth century on the site of the ancient town of Naukratis. The text of both stelae is almost identical, except for a passage at the end, where the king indicates the site for erecting each monument: he designates the town called *niwt-krṯ,* Naukratis, on the copy from Naukratis; and a town called 'The Hone', *t3 ḥnt*, for the one from Thonis-Heracleion. Thus, the new-found stela was discovered in the very town where Nectanebo I had decreed it to be set up, exactly like the one unearthed earlier at Naukratis. On the stela of Thonis-Heracleion, the engraved *t3 ḥnt*, 'The Hone', with the article *t3*, confirms the supposed etymology of 'Thonis',[3] and the discovery of the object at Heracleion provided positive proof that Thonis was its ancient Egyptian name; in addition, it also offered the first known hieroglyphic attestation of the complete name of Thonis.

The Decree itself is of major interest, since it displays decisions made by Nectanebo I at the very beginning of his reign in favour of the temple of Neith at Saïs. It allows a better understanding of the economic links between three major towns of the region: Thonis, Saïs, and Naukratis.

The Decree of Saïs

The lunettes of the two stelae show the pharaoh holding offerings to the goddess Neith in her temple in Saïs, whom he calls 'his mother' (Figures 5.2–3). As the text of the Decree confirms,[4] it is in this town, and in this sanctuary, that the king pronounced the decisions engraved and immortalized on the two monuments. This is the reason why this edict is suitably termed 'the Decree of Saïs',[5] currently known by the two specimens from Naukratis and Thonis. It is likely that a third stela existed, destined for the temple of Saïs as the beneficiary of this donation.

Figure 5.1 The Decree of Saïs, the stela of Thonis-Heracleion. SCA 277 (H. 195 cm, W. 88 cm, D. 34 cm). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

1 Goddio 2007: 77, 83.
2 Ibid.: 75–102; 2008: 45–8 and this volume Chapter 1.
3 Crum 1934: 690; Yoyotte 1958: 428.
4 Columns 7 and 8.
5 According to the earlier suggestion concerning the Naukratis stela by Yoyotte 1958: 430.

Figure 5.2 The lunette of the stela of Naukratis. (Photo: B. Vallée; © F. Goddio/IEASM.)

Figure 5.3 The lunette of the stela of Thonis-Heracleion. (Photo: C. Gerigk; © F. Goddio/IEASM.)

The circumstances of Nectanebo's donation

When Achoris died in 380 BC, his son was set aside from kingship by Nectanebo, son of Tachos, who was the dynast of Sebennytos. The man who was to become the founder of the thirtieth dynasty was keen on recreating a unified, strong and brilliant Egypt, just as it had been during Saïte times. The new pharaoh's accession to the throne was very probably supported by the powerful priesthood at Saïs, which had been predominant throughout the Saïte dynasty before the First Persian Period and which had maintained a notable influence during the Persian occupation: it is known that Cambyses (525–522 BC) restored the temple of Neith,[6] and Darius (522–486 BC) decided to embellish the sanctuary, particularly the 'House of Life', a respected centre for the teaching of Egyptian medicine.[7] In addition, Darius is presented at the temple of Hibis as 'the son of Neith', where a scene shows him as

6 Posener 1936: 15–16; Briant 1996: 69.

7 Posener 1936: 22; Briant 1992: 59; 1996: 489–90.

a child suckled by the Saïte goddess.[8] With such moves, the Persian sovereigns recognised both Egyptian beliefs and the dynastic function of Neith. Nectanebo I continued this tradition. As Gardiner[9] had already pointed out regarding the Naukratis stela, the terms used in the Decree[10] and the finery shown in the lunette[11] suggest that the king had been enthroned in the temple of Neith at Saïs. This is confirmed by the introductory columns, which indicate that it was the goddess Neith who raised Nectanebo to the head of the Two Lands, and made him king.[12] In the lunette, it is said that the gifts he handed over to the goddess are destined for 'his mother' Neith.

A further element leads to the understanding that the scene on the right side of the lunette is linked to the enthronement of Nectanebo I, and that this representation illustrates a Saïte ritual connected with the legitimation of royal power. The text of column 8 of the Decree indicates that the plate held out to the goddess by the king bearing the red crown is 'the *ḫbḥ* offering destined for his father Osiris, Lord of Eternity (*nb nḥḥ*)'.[13] This is the precise wording referring to Cambyses, which can be read on the statue of Udjahorresnet, the chief physician who occupied a high function in the temple of Neith. He was the admiral of the Egyptian fleet during the rule of Amasis and his successor Psamtek III. After Egypt's defeat resulting in the first Persian occupation (525 BC), he entered the service of Cambyses, becoming his personal doctor. He enjoined the Persian ruler to take measures in favour of the temple of Neith, which had been profaned and occupied by foreigners, and obtained both the renovation of the temple and the reinstatement of the divine offerings.[14] Then, according to the narrative of Udjahorresnet, 'His Majesty (Cambyses) came in person to present the *ḫbḥ* offering to the Lord of Eternity (*nb nḥḥ*) within the temple of Neith, as every king has done formerly '.[15] This last part of the sentence, 'as every king has done formerly ' indicates that this is an ancient ritual. This offering in the temple of Neith at Saïs, as well as the fact that Cambyses instructs Udjahorresnet to compose his Egyptian titulary,[16] underline the conqueror's wish to adopt the traditions of the Saïte dynasty; it also explains his good deeds for the temple of the goddess Neith,[17] mother of the sun god, goddess of the crowns, who grants kingship since the earliest times.

On the stelae of the Decree of Saïs, one and a half century later, the king's ritual offering by Nectanebo I to 'his father' Osiris Lord of Eternity in the temple of Neith at Saïs—'as every king had done formerly'—is clearly tied to the receiving of sovereignty over Egypt.[18] Nectanebo, presented as the son of Osiris, becomes Horus, heir of the Two Lands. This would suggest that Nectanebo's recognition as king of the entire realm was accomplished in the temple of Neith at Saïs. This is most probably the reason why the pharaoh decided—as Cambyses had done before him—to give this very considerable donation to the temple of the goddess and its priesthood, at the time of his ascension to the throne: the Decree is indeed dated into the first year of the king's reign.

Presentation of the Decree

Like all royal decrees (*wḏ-nsw*),[19] the Decree of Saïs is conceived in the habitual form, beginning with the king's titles and his qualities and aptitudes to rule,[20] followed by revealing the king's decision. In the first part of the text which, as usual, describes pharaoh's beneficial deeds for the temples, some phrases nevertheless indicate the particularly conciliatory attitude and attention to the advice and wishes of the priests themselves, which is much less usual:[21] it is stated that the king discussed his projects regarding the affairs of the temples with them, and it is expressly specified that he took their opinions into account.[22] The determination of the ruler to build and consolidate temples is apparent through the use of expressive and determinative

8 Briant 1992: 63; 1996: 492.

9 Gardiner 1953: 23.

10 In column 7 and 8: terms like *bs nsw*, 'royal introduction', and *ḫ'i*, 'to appear', or 'crowned', are used during coronation ceremonies.

11 The ribbon at the back of the red crown that is visible on the Naukratis stela appears frequently in scenes of the *sed* feasts, and on the Thonis stela, the king wears the pharaonic beard.

12 In the first column of the Decree the king is said to be beloved by Neith, and to be her heir; in the second, she promoted him ruler of the Two Lands, setting her uraeus on his front.

13 Osiris Lord of Eternity is one of the particular forms of Osiris in the temple of Neith: Capart 1924: 22–3.

14 Posener 1936: 15–6; von Bomhard 2012: 41, 73. Note the excellent photographs in Baines 1996: 84–5, who proposes a new reading order of the texts of this naophorous statue.

15 Posener 1936: 18.

16 Ibid: 7, 170.

17 These measures of Cambyses in favour of the temple of Neith stand in contrast to the contents of the Decree issued by that king to limit the incomes of the Egyptian temples. As the temple of Neith at Saïs does not figure among the sanctuaries that preserve their privileges, Posener (1936: 171 note 1) supposes that the rehabilitation of the temple of Neith must have been prior to the promulgation of the decree concerned, and probably goes back to the beginning of Cambyses' reign. Chronologically, this accords with his asking Udjahorresnet to compose his Egyptian titulary. It may also be supposed that Cambyses did not want to alienate the Saïte clergy, and never envisaged reducing the donations from the royal domain to the temple of Neith.

18 This is the reason the Saïte scholar who conceived the Decree created a pun with a theological meaning about the passage in column 8 mentioning this offering, see *infra*.

19 Vernus 2013a: 259–62; 2013b: 21–2.

20 Ibid. 2013a: 302–4.

21 Nectanebo I's favourable disposition towards the priests has already been noted by Yoyotte (1993–94: 682) in the context of the Naukratis stela. On the subject of the Decree of Saïs, von Recklinghausen (2011: 46) evokes a meeting of the priests summoned by the king and suggests that it could be seen as a procedure that preceded the synods of the Ptolemaic Period. Vernus (2013a: 261–2 note 16) points out the distinction between the decrees of pharaonic times issued by the king and the Ptolemaic 'sacerdotal decrees'.

22 Column 5.

hieroglyphs,[23] which are practically absent elsewhere in the text, according to what is termed 'the Saïte manner' of alphabetical spelling without determinatives.[24] These building projects will indeed be implemented throughout the pharaoh's entire reign.

If the king displays such benevolence towards the priests—no doubt in return for the Saïte clergy's proclaiming him to be the son of the goddess Neith—he also regally declares the supremacy of Egypt over the other nations: the pharaoh is said to recognize the foreign chiefs by accepting their '*inw*'.[25] The word '*inw*' is usually translated as 'tribute', but it really appears more in the light of a present offered as a token of submission. This first part of the Decree, while employing standard phrases enumerating the pharaoh's qualities,[26] appears almost like a programme of government that the king will carry out during his reign. The ascension of Nectanebo I is accompanied by the beginning of great activity in favour of the temples, which are built or renovated, and above all are allocated with suitable domains.[27]

The deed to the temple of Neith allowed the new pharaoh to propitiate the priests of Saïs and at the same time to contribute to the prosperity of the region, because Egyptian temples were centres of regional economy guaranteeing a living for a multitude of people.[28] The agricultural land and fisheries that they owned were sometimes dispersed over considerable distances. They were true production units capable of providing for the people's livelihood, as well as stocking the warehouses of the temples for the daily offerings, and the more important ones for feast days.[29]

The donation to the temple

After the first part, enumerating the titles and qualities of the king, the Decree reveals the purpose of the donation in the following general outline: from the customs dues exacted at Thonis, as well the taxes raised on trade at Naukratis, all of which flow into the royal domain (*pr nsw*), Nectanebo redirects 10 per cent to the treasury of the temple of Neith at Saïs.

In Egypt, state taxes of any origin (customs, trade, fishery, farming, etc.) were collected by dedicated administrative services depending on the king.[30] The collected funds were paid into the treasury of the royal domain, as indicated in the Decree. It was the king who then decided on the donations to the temples.[31] In the case of the Decree of Saïs, the king decides that the royal domain should transfer to the treasury of the temple part of the taxes flowing into the royal treasury.

Regarding the stela of Naukratis, Mallet, Posener and Yoyotte[32] noted that Nectanebo I did not instigate these duties which were, in fact, pre-existent from the time of Amasis, and probably much earlier. The royal command simply aims at an increase the amount already received by the temple of Neith from the royal domain.

Customs dues before Nectanebo

A palimpsest document in Aramaic provides some information on customs administration, very probably at Thonis-Heracleion, at the time of the first Persian occupation, some one hundred years before Nectanebo's accession to the throne.[33] It is dated in the year 11 of a king, probably Xerxes. The document—the most ancient Mediterranean port register known so far—is an annual report detailing customs levies applied to merchandise transported by ships from Asia Minor and Syria-Phoenicia. All of these are paid into the royal domain. The system of taxation depends as much on the type of ship (four different types) as on its tonnage and, naturally, on the merchandise taxed; it is both precise and complicated,[34] which probably results from an overlay of different measures added over time, and thus indicates its antiquity. Very probably, the Persians adopted the Saïte customs system.[35]

An even earlier artefact with a hieroglyph text not only implies the exaction of customs duties, but also relates them to the temple of Neith. This is the naophorous statue of Nekhethorheb, who was appointed by Amasis (570–526 BC) to the position of governor of the gates of entry to the country by land and by sea (*imy-r ꜥ3w ḫ3swt w3ḏ-wr*), and who was therefore also responsible for customs. The text engraved on the statue relates how Nekhethorheb was empowered by the king to provide for the altar of Neith at Saïs in a suitable manner.[36] The wording implies

23 Column 5 shows the sign of the man building a wall and that of the man completing construction of a building (*ḳd* and *ḫws*). These hieroglyphs are present because of the performative value that the Egyptians accorded to images.
24 De Meulenaere 1972: 138. This kind of cryptography is already attested in the Middle Kingdom: Drioton 1933: 1, 9.
25 Column 7, von Bomhard 2012: 70–1 note c for the sense of the word *inw*.
26 Columns 1–7.
27 Meeks 1972: 154–5; 1979: 654–5.
28 In addition to all categories of priesthood and the personnel required to make the temple function, there would also have been bakers, butchers, gardeners (for vegetables and flowers), workers to maintain and guard the buildings, and craftsmen to manufacture and maintain cult paraphernalia.
29 The temples owned extended properties: at the end of the thirtieth dynasty, the temple of Edfu, for instance, owned a total of 3,613 ha: Meeks 1972: 155.
30 Customs were controlled by an important administrator in charge of the frontiers and the entries into the country.
31 Meeks 1979: 607–8.
32 Mallet 1922: 148–9; Posener 1947: 127; Yoyotte 1993–4: 683; also Briant and Descat 1998: 90.
33 A customs register in Aramaic, the Elephantine Papyrus, also called Aḥiqar Scroll: Yardeni 1994; Briant and Descat 1998.
34 Yardeni 1994: 70–3; Briant and Descat 1998: 73–9; for an outline of the system of taxation in this papyrus, see von Bomhard 2012: 97.
35 Briant and Descat 1998: 88 note 102, 93.
36 Tresson 1933: 131–2; Posener 1947: 124–7.

an obvious connection between the funds paid into the royal domain from customs control on the Mediterranean shore and a contribution to the temples,[37] but it further, and above all, underscores that in the time of Amasis maritime trade was already subject to customs control and imposition at the seaboard, and therefore at Thonis.[38]

The statue of Nekhethorheb indicates the restoration of funds to the temple of Neith of Saïs following periods of instability and strife, when income from trade and customs is liable to decrease. Its text mentions the poverty of the estates of the temples in general, and that of Neith in particular, when he was appointed by Amasis to become governor of the gates of entry into Egypt. Under the authority of the king, Nekhethorheb undertakes to remedy this situation, more especially with respect to the temple of Neith.[39] Posener attributes this paucity to the troubles provoked by the conflicts between Apries and Amasis, which is why he sets Nekhethorheb's nomination at the beginning of the reign of Amasis.[40] This governor's action indicates that the system of customs as a means of financing the temples was already operative before the time of Amasis.[41]

Another statue preserves a notice about resettling the finances of the temple of Neith after a period of trouble. This is the statue of the chief physician Udjahorresnet, who after Cambyses' victory secured the rehabilitation of the temple and obtained the means to guarantee the divine offering from the conqueror.[42]

In both cases, at the beginning of the reigns of Amasis as well as Cambyses, once the stability necessary for trade had returned, and customs dues were rising, the current ruler was able to take measures in favour of the temple of Neith and endow it again out of the royal domain.

These objects demonstrate that the customs administration and the amounts exacted at Thonis were operative long before Nectanebo's accession to the throne. The same was very likely the case concerning taxation applied to the Greeks at Naukratis, since they were present in that town from the beginning of Saïte times. Nectanebo I neither created the taxes mentioned on the Decree, nor did he increase them and the Decree does not indicate the amount of the taxes. In fact, Nectanebo's decision does not concern the taxes themselves, but rather their final destination after being collected. The amount of the tax received by the royal domain remains exactly the same, it is only the share which is then transferred to the temple that is increased. Thus, the aim of the Decree can be summarized in the following way: from the sums flowing into the royal domain, the king merely added another 10 per cent to the share that was already being redirected to the temple of Saïs. This disposition clearly appears in the text: Nectanebo I specified on his Decree that the new donation was made 'in addition to what issued (from the royal domain) before' (*m-ḫ3w-r wn im m-b3ḥ*); in other words, the donation did not replace the pre-existing allocation, but was added to it (*m-ḫ3w-r*).[43] Mallet outlined that as the king had neither created nor increased any tax, but had nevertheless significantly favoured the priests, it had been a clever political move on his part.[44]

Nectanebo formulates his Decree: the origin of the funds

Regarding the origin of the funds destined for the temple of Saïs, the king dissociates the towns of Thonis and Naukratis, because the nature of the taxes in either town is different: they are levied on customs in Thonis, and in Naukratis on trade. In addition, the respective geographical position of the two towns is an essential factor in order to correctly understand and appreciate the terms of the Decree and the economic relations within the region (Figure 5.4). The now submerged town of Thonis was situated right at the rim of the Mediterranean Sea, at the entrance to the Canopic branch, and was thus a sea port. Naukratis, on the other hand, lies today more than 70 km inland as the crow flies; to this distance must be added a further seven km from the submerged Thonis to the current coastline, which, including the curves and meanders of the river, brought the total distance to navigate on the waterway to some 100–120 km from the seaboard.[45]

Figure 5.4 The waterways showing the ancient Canopic branch. Green stippling: possible water connections between the two branches. (Adapted from O. Toussoun, 1922: pl. 10, additions by the author and L. von Bomhard.)

37 Posener 1947: 127; Yoyotte 1993–4: 683; Briant and Descat 1998: 90; Pébarthe 2005: 173.
38 Mallet 1922: 149; Posener 1947: 127; Briant and Descat 1998: 77, 92; Möller 2000: 208; Yoyotte 2001: 27.
39 Tresson 1933: 129–32.
40 Posener 1947: 128.
41 Bresson 1980: 293; Pébarthe 2005: 173–4.
42 Posener 1936: 15–6.
43 von Bomhard 2012: column 11, 82 notes a and b for the interpretation of *im*, referring to the royal domain. The true significance of this sentence has not been fully understood by the translators of the Naukratis stela, but was understood by Mallet 1922: 149 and Möller 2000: 208.
44 Mallet 1922: 148–9.
45 Bernand 1970: 623–4; Höckmann 2008–9: 76.

In other words, as Höckmann emphasised,[46] the *emporion* at Naukratis as an inland port on a river was thus in every way dependent on fluvial transport over an estimated distance of seven days' journey up-river from Thonis, the water being navigable only by day. Any ship arriving in Naukratis from the seaboard, or leaving to go down to the coast had, without exception, to pass through the harbour controls of Thonis at the mouth of the Canopic branch, which was the largest branch of the river and the one best adapted for maritime trade and exchange. The resulting activity and wealth for the region surely favoured the power of the Saïte kings and their predecessors, and even possibly the dynasts before them.

The funds from Thonis

With regard to the share of the duties from Thonis, the king declares: 'Let there be given one in ten of the gold, of the silver, of the timber, of the processed wood, and of all things coming from the sea of the Greeks, and of all assets that are reckoned for the benefit of the royal domain …'.[47]

Clearly, all imports are taxed independent of origin. Out of all customs dues collected at Thonis and paid into the royal domain, 10 per cent are then transferred to the temple of Neith. Regarding these duties on imports from the Mediterranean, the Decree itemises the merchandise that is taxed: gold, silver, timber and processed wood,[48] 'and all things[49] coming in from the sea of the Greeks,'[50] and specifies it in such detail because the rate of taxation destined for the royal domain must have been different for each of these commodities. Gold and silver were also the exchange currency used to pay the taxes.[51] The distinction between timber and processed wood can already be found on the Aḥiqar Scroll.[52] Apart from gold, silver and wood, the Decree of Saïs does not differentiate any further between 'all things' imported. Among the clearly identified goods imported by Ionian and Sidonian vessels, however, the papyrus cites wine, oil, iron, bronze, and wool, in addition to wood.[53]

Following the words '… and all things coming from the sea of the Greeks', i.e., the closing sentence on the Decree about import duties, the king then adds 'and of all assets that are reckoned for the benefit of the royal domain … ', meaning that, in addition to customs dues on imported goods, further levies were raised at Thonis on 'all assets' (*išwt nbt*), which must have concerned local taxes, and possibly also export dues; as an example, we know from the Aḥiqar Scroll that natron (sodium carbonate) was subjected to export tax.[54] *išwt nbt* can also include harbour taxes or some kind of a lump amount on exports, as also apparent from the Elephantine Papyrus.[55] The Decree mentions no names for the various taxes explicitly. Only the customs dues are specified as applied to 'all things coming from the sea of the Greeks' and this is only mentioned for Thonis and not for Naukratis. It would appear logical that the Egyptian treasury raised customs dues at the very entrance of the Canopic mouth of the Nile, and not at Naukratis, which is situated far up-river.

On arrival at Thonis, cargoes of ships were obviously inspected in order to establish the precise amount of the customs dues. Similarly, each departing vessel was examined for eventual export taxes or tolls.[56] The buildings harbouring military control and the administration of customs at Thonis-Heracleion have so far not been located with any certainty, but the available archaeological data seems to point to the north of the Central Island,[57] possibly on the Great Mole.

In addition to the income levied on imports, Thonis, like all other towns, must have been subjected to taxes on local income. In view of the important internal and international trade of Thonis-Heracleion, these revenues must have been quite sizeable. Of the entire income resulting from both customs and the *išwt nbt* out of Thonis, and perceived by the royal domain, 10 per cent were redirected to the temple of Neith.

The funds from Naukratis

Regarding the share from the taxes collected at Naukratis, the king says: '… as well as one in 10 of the gold, of the silver, and of all things that appear in Per-meryt, called Keretch, on the bank of the Anu, which are reckoned for the benefit of the royal domain …'.

Two elements indicate that, contrary to Thonis, there is no question of customs dues: for one, wood as a typical import product, is not mentioned, and for another, the sentence 'coming in from the sea of the Greeks' is not present. At Naukratis the royal domain raised taxes on gold, silver, and 'all things that appear', which very probably means all manufactured goods, exported or not. The gold and silver taxed in Naukratis clearly have an origin different from the imported precious metals that had been paid for or imported and thus were already subject to customs fees at Thonis, and very likely

46 Höckmann 2008–9: 77, 112–3.
47 The king's words are reported in direct speech; in royal commands, it is generally the king in person who speaks, see Vernus 2013a: 270; 2013b: 28.
48 Importing wood, which is a relatively rare commodity in Egypt, is attested as early as the first king of the First Dynasty: Wilkinson 1999: 161.
49 'All things' means all other merchandise imported into Egypt.
50 *wȝḏ-wr ḥȝw-nbwt*: for discussions concerning the term *ḥȝw-nbwt*, see von Bomhard 2012: 75–6.
51 Cf. Muhs this volume Chapter 4.
52 Briant and Descat 1998: 72 note 53.
53 Ibid.: 64, 66–72.
54 Ibid.: 80–1, 92.
55 Ibid.: 81.
56 Mallet 1922: 146–7; Briant and Descat 1998: 78.
57 Goddio this volume Chapter 1.

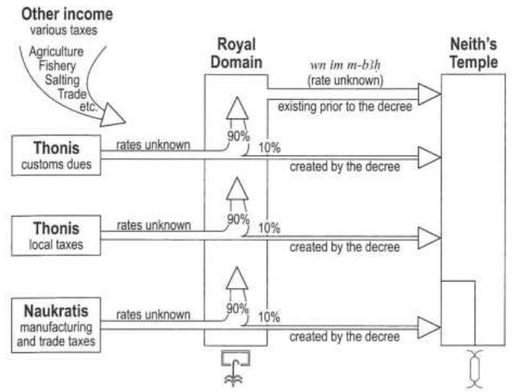

Figure 5.5 The sources of revenue of the temple of Neith according to the Decree of Saïs. (Drawing: L. von Bomhard.)

concern income from local transactions as well as trade at Naukratis. No distinction is made between income from the Greek community and that of the Egyptian part of the town, whose importance and prosperity was already pointed out by Yoyotte.[58] The term 'all things that appear' suggests manufactured goods; it is known that the Greeks ran numerous workshops, manufacturing objects from a variety of materials, such as faience or stone.[59] Gold and silver mentioned in the Decree as being taxed at Naukratis probably come mostly from Greek trade;[60] nothing indicates, however, that gold and silver, as well as the term 'all things that appear' do not apply to the Egyptian community as well. From all these various levies issuing from Naukratis into the royal domain, 10 per cent are then redirected to the treasury of the temple of Neith.

These are the terms in which Nectanebo I pronounced his decisions in the Decree of Saïs. If the taxes are not detailed explicitly, the reason is simply that the king's purpose was not to create these taxes, which in fact already existed, or to modify them, but merely to increase the share attributed to the temple of Saïs (Figure 5.5).

The extent of the king's donation

For the temple of Saïs, the volume of this newly-added income is considerable, in view of the extent of trade at Naukratis, and of the traffic in the port of Thonis-Heracleion. Some idea of the activities of Thonis-Heracleion may be gleaned from the Aḥiqar Scroll,[61] which enumerates the arrival and departure over one year of 42 vessels from only two foreign trading points, i.e., reporting a very small part of overall shipping in that port. Furthermore, the studies of pottery, coins, metals and weights resulting from the underwater excavations carried out in recent years converge to demonstrate that, during the centuries preceding the foundation of Alexandria, the site of Thonis-Heracleion was indeed a major *emporion* and a hub of maritime exchange and trade.[62] The presence of a great number of sunken vessels, mostly from the sixth up to the second century BC, and of over 700 anchors,[63] some of impressive size, testifies to its maritime traffic (Figure 5.6). The analysis of the pottery confirms the range of trade between the seventh and the second centuries BC, and differentiates local manufacturing from imports.[64] Numismatic studies[65] enhance the wealth of business generated there. Like coins, weights are also a good reflection of trade exchange and the corpus of lead weights from Thonis-Heracleion doubles the known total number of all Egypt.[66] The geographical features of the region vastly contributed to this expansion: the Canopic branch was, indeed, by far the most important arm of the Nile, with its easily accessible mouth.[67] The existence of Thonis as a coastal watch point seems to reach far back in time, since Herodotus reports that the guardian of this river mouth was named Thonis, and the name of Thon, king of Egypt contemporary to Menelaus, appears in the Odyssey.[68] Posener[69] compares Herodotus' term of 'guardian of the river mouth' to the Egyptian title of 'governor of the gates of entry to the country by land and by sea' (*imy-r ꜥ3w ḫ3swt wȝḏ-wr*); the title, and therefore the function, already existed and was extensively attested in the eighteenth dynasty (~ 1500 BC).[70] The fact that the name of Thonis appears in the Odyssey proves, as Yoyotte pointed out,[71] that the frontier post and *emporion* of Thonis already existed at the time when Homer's text was established in the eighth or early seventh century BC, a date now substantiated by the evidence from the underwater excavations.

In the course of time, successive additions and extensions to the harbour resulted in a well-equipped

58 Yoyotte 1982–3: 136; 1991–92; 1993–94; 1994–95; 2013: 508–20, 537–53, 589–605; Guermeur 2005: 126–38; Pébarthe 2005: 177. See also Villing this volume Chapter 12, and Masson this volume Chapter 3.
59 Broadman 1995: 155–6; Möller 2000: 113–4.
60 The Greeks must have undertaken trading transactions exporting products like wheat, linen, papyrus and manufactured objects and importing silver, wine, oil, etc.: Möller 2000: 30, 211–2.
61 Briant and Descat 1998: 59, 65.
62 Goddio 2008: 45–8; 2011: 124–9, fig. 7.6; Fabre 2008; Fabre and Goddio 2012: 88–9; 2013: 3.
63 Goddio 2007: 128, fig. 3.107; 2011: 128, fig. 7.6; Fabre 2011: 15, fig. 1.4, 25–7, figs 1.16, 1.17 and this volume Chapter 9. Fabre and Belov 2012: 118–20; Fabre and Goddio 2013: 4–5, figs 4–5; Robinson this volume Chapter 11; Belov this volume Chapter 10.
64 Grataloup and McGann 2008; Grataloup 2010; 2012 and this volume Chapter 7. For the occupation of the site according to the cult objects, see Goddio 2007: 75–110; 2008: 45–7 and this volume Chapter 1; Heinz 2014.
65 Meadows 2008a; 2008b; 2011 and this volume Chapter 6.
66 Van der Wilt 2010: 159; 2014: 157 and this volume Chapter 8.
67 Bernand 1970: 624.
68 Herodotus *Historiae* 2.113–4; Homer *Odyssea* 4.228; Yoyotte 2001: 27; Fabre 2004–5: 61.
69 Posener 1947: 122 note 1.
70 Ibid: 121 note 1; Nibbi 1975: 44–5.
71 Yoyotte 2001: 27.

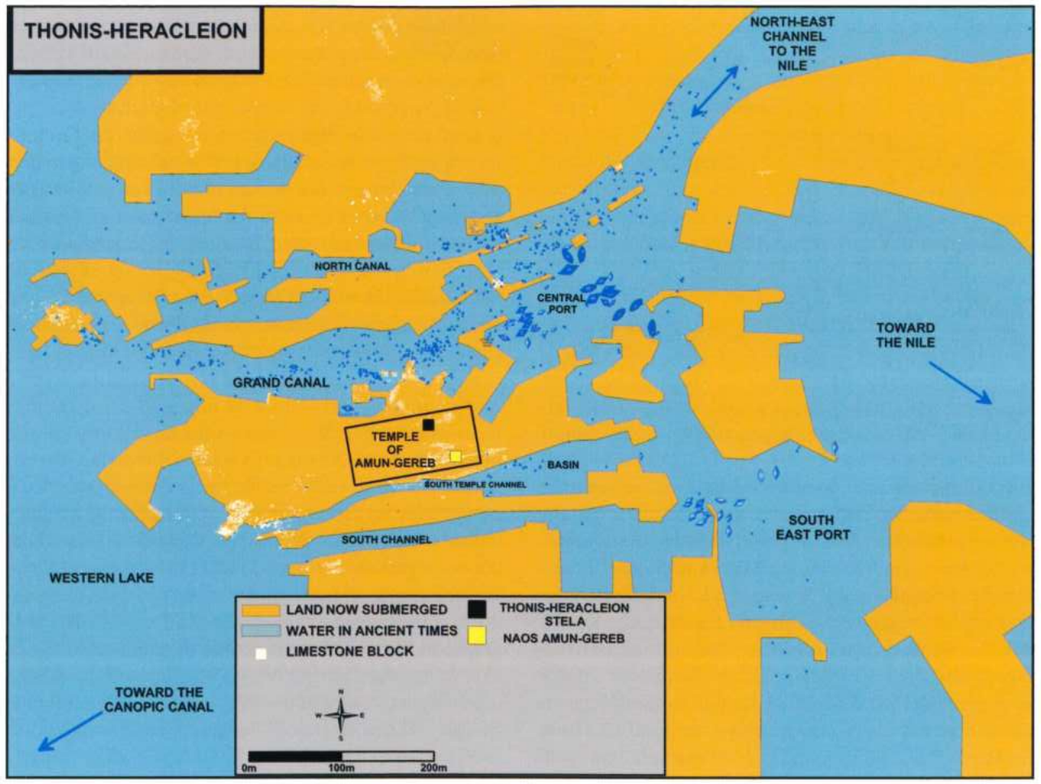

Figure 5.6 The Thonis-Heracleion peninsula with the area of the Amon temple and the site of the stela. (Map created by F. Goddio; © F. Goddio/IEASM.)

port,[72] with multiple basins and canals, the entries from the Nile protected by sand dunes from the prevailing winds (Figure 5.6). In addition, Herodotus reports that 'in earlier times' the Canopic Nile had been the exclusive entryway into Egypt from the Mediterranean.[73] All these conditions, and the broad Canopic branch leading straight up-river from Thonis to Naukratis, contributed to render the waterway connecting these two towns a major highway of exchange between the Egyptians and the Greeks.[74]

Topography and onomastics

The Decree provides onomastic and topographic data. In the passage where the Decree details the origin of the funds destined for the temple of Saïs, both stelae feature two names for Naukratis: 'Per-meryt (*pr-mryt*), also called Keretch (*krṯ*)'. The order in which these names appear in the formulation suggests that chronologically Per-meryt is older than Keretch. Per-meryt signifies 'the domain of the port', describing an economic entity and could have been the initial Egyptian name of the town.[75] The origin of Keretch is disputed[76] and could be Carian. Yoyotte provides further arguments demonstrating that 'le grec "Naucratis" transcrit un toponyme indigène et non l'inverse', and recalls that the first attestation of the name of Naukratis (*niwt-krṯ*, 'the town Keretch') is found on the Hermitage Stela dating from the year 16 of Amasis.[77] From a topographical viewpoint, the Decree also indicates that Naukratis is situated 'at the rim of a waterway called "Anu"', which is surely the Canopic branch of the Nile: when he mentions the site of the town, Nectanebo would obviously indicate the important Canopic branch rather than a canal linking Naukratis to Saïs. An important argument establishing that the Anu is the Canopic branch itself, and not any secondary

72 Fabre 2008: 220; Goddio 2008: 45–8; 2011: 127, fig. 7.5, and this volume Chapter 1.

73 Herodotus *Historiae* 2.179.

74 The creation of the Naukratis project by the British Museum, with the publication of all objects from that town currently in 70 institutions worldwide, as well as several new studies of the site of Naukratis, will allow a comparison with the archaeological discoveries from Thonis-Heracleion; see in this volume the contributions by Thomas (Chapter 13), Villing (Chapter 12), Masson (Chapter 3) and Bergeron (Chapter 14).

75 De Meulenaere 1982: 361; Yoyotte 1982–3: 131; for Agut-Labordère 2012: 358–60, this name would designate the administration regulating the particular statute of the Greeks at Naukratis. See also Villing this volume Chapter 12.

76 Leclère 2008: 117 note 24; von Bomhard 2012: 80 note f, 93, fig. 4.7.

77 Yoyotte 1991–2: 640–3.

waterway, is the fact that Anu is also the name of the marshland (*ḏḥw*) of the third nome of Lower Egypt,[78] which is situated to the west of the Canopic branch, or at least to the west of the nome of Neith.[79] Furthermore, the great historical stela of Year One of Amasis points out that 'the king' had attributed space in the *ḏḥw* Anu to the Greeks.[80] As Bresson notes, the king who set the Greeks up in this region can hardly be Amasis because this is the first year of his reign, but rather it was Apries, or more likely a predecessor, because archaeological data indicate that the trading activity of the Greeks in this place existed prior to Amasis, at the time of Psamtek I.[81]

In the same context of the origin of the taxes, and again on both stelae, Thonis is simply called Hone, without the feminine article *t3*. Although Lichtheim supposed that Hone was merely part of Naukratis or a nearby site,[82] Maspero, as the first translator of the Naukratis stela, had already suggested that Hone must have been situated far from Naukratis, near the Canopic mouth '… à l'endroit le plus favorable pour établir une douane de mer'.[83] The recent discovery of the submerged town of Thonis-Heracleion vindicates Maspero's view a century later.

At the end of the Decree, where Nectanebo indicates on each stela the place where the monument is to be set up, he uses the complete name of the towns: on the Naukratis stela, the location is spelt '*niwt krṯ*', the town of *krṯ*, which subsequently becomes 'Naukratis'. On the stela of Thonis-Heracleion, the king designates '*t3 ḥnt*', 'The Hone', which became 'Thonis'; the discovery of the stela therefore confirms the etymology of the name of this town, as suggested earlier by Yoyotte.[84] The Thonis-Heracleion stela itself provides the first known hieroglyphic attestation of the name of 'Thonis', with the article *t3*, and it even gives the complete name of 'The-Hone-of-Saïs', *t3 ḥnt n s3w* (see Figure 5.8 below). We know that the word *hone* designates a vast spread of water or a watery area:[85] the entire region of this principal mouth of the river, with its low-lying land, its lakes, canals and its coastline, fully justifies the word *hone*. The complete name of 'The-Hone-of-Saïs' thus emphasizes the fact that a network of waterways must have facilitated communications between Thonis and Saïs.[86] During the existence of the Canopic branch, the Bolbitine was much less important,[87] and it is very possible that what is today Lake Edku was a much bigger extent of water at the time; it may have been connected near Saïs with the Bolbitine branch, which was located further west at the time, providing an almost direct link between Thonis-Heracleion and Saïs, which could explain the complete name of the 'The-Hone-of-Saïs' revealed on the Stela of Thonis-Heracleion. The entire system of fluvial interconnections greatly favoured economic exchange between the three towns of Thonis-Heracleion, Naukratis and Saïs. In addition, Naukratis was linked to Saïs by a canal (Figure 5.4), and according to the new interpretation of a passage on the Hermitage Stela, an excise duty station (*p3-ḫrw*) existed on this waterway.[88]

On the Thonis stela, the king further indicates that 'The-Hone-of-Saïs' is situated 'at the mouth of the sea of the Haw-nebwt',[89] i.e., the Canopic mouth. This is the very place where the stela was found.[90] The site of the town of Thonis at the entrance to the Canopic branch was very obviously well-adapted to its function of customs control, and there, the vessels were visited and their cargos evaluated.[91]

The contents of the Decree of Saïs provide an image of the most prosperous and flourishing time of Thonis,[92] and illustrate how the wealth of the first two towns, Thonis and Naukratis, was benefiting Saïs and its temple, and contributing to the prosperity of the entire region.[93]

The display of the pharaoh's decisions

Stelae, especially of such size, are obviously conceived to be exposed and read. However, copies of the Decree of Saïs were certainly not destined for the eyes of ships' captains berthing in Thonis-Heracleion, or those of the Greek merchants of Naukratis. To begin with, the text is not bi- or trilingual, like other well-known decrees, but

78 Barguet 1962: 16; Bresson 1980: 294.

79 On the discussion regarding the situation of Naukratis west, or more likely east of the Canopic branch, see Möller 2000: 115–6.

80 Daressy 1900: 3. Differing from Daressy's reading the date of the stele as 'year 3 of Amasis', Posener (1947: 128–9) reads 'year 1'.

81 Bresson 1980: 294, 326 notes 18–19; Yoyotte 1991–2: 636–7; Boardman 1995: 147–8; Möller 2000: 187–8; Pébarthe 2005: 170. For a review of the archaeological and historical data concerning the site of Naukratis, in the light of the new discoveries at Thonis-Heracleion and recent research about Naukratis, see Villing and Schlotzhauer 2006: 1–10.

82 Lichtheim 1977: 141; 1980: 89 note 8.

83 Maspero 1900: 43; Mallet 1922: 146-7; Yoyotte 1958: 429.

84 Yoyotte 1958: 428–30; 2001: 28; 2008: 239-40.

85 Ibid. 2001: 28; Fabre 2004–5: 62; von Bomhard 2012: 77–8.

86 Other waterways must have connected the Canopic and the Bolbitine branches, particularly further north through the lakes on the littoral, which were much bigger at the time.

87 Stanley and Warne 2007: 12 map A and 15, fig. 2.9 B.

88 Thiers 2007: 96.

89 *Haw-nebwt* must here be understood as 'Greeks', but the Egyptian word is very ancient and designates all those that come from the Mediterranean at the northern tip of Egypt. See also Fabre this volume Chapter 10.

90 Two monuments bearing the name of the Canopic mouth were discovered by the IEASM *in situ* at the Canopic mouth itself: the stela of Thonis-Heracleion and a small bronze plate mentioning 'the mouth of the *Haw-nebwt*', von Bomhard 2012: 101–2 and fig. 4.15, and see Goddio this volume Chapter 1.

91 Briant and Descat 1998: 78.

92 According to the sunken vessels found in its harbours, the port reached its highest level of activity between the fifth and the third century BC: Goddio 2011: 128.

93 The Decree only mentions funds attributed to the temple of Saïs, and not to all the temples of Thonis and Naukratis because only the one at Saïs was to receive such an increase, with no change to the others.

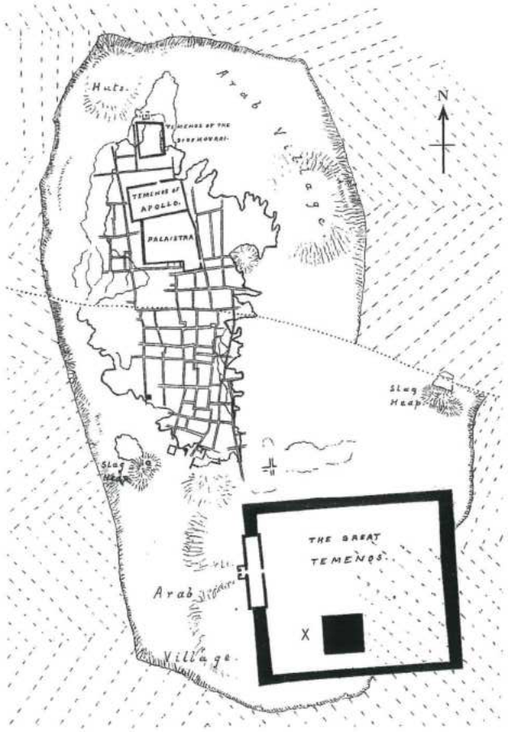

Figure 5.7 The site of Naukratis with the Great Temenos and the Great Mound (X). (From Petrie 1886: pl. 40; © Egypt Exploration Society.)

is conceived in the most refined Egyptian hieroglyphic writing, including research into archaic forms. It is rich in graphic puzzles, puns, and theological allusions. This language could never be truly appreciated for its true value by foreign sailors or traders—in the unlikely event that they were able to read hieroglyphs—but was destined for cultured, scholarly Egyptians.

Secondly, both stelae were not set up on a public space, but on the temenos of an Egyptian temple: that of Amun 'Lord of Batet' in Naukratis and that of Amun-Gereb in Thonis-Heracleion.[94] This demonstrates that it was addressed to the Egyptians themselves and not to foreigners. The Naukratis stela was discovered in 1899 in the course of 'agricultural operations'[95] near the Great Mound that was described by Petrie (Figure 5.7).[96] In the same year, it was donated to the Gizeh Museum by Prince Hussein Pasha, on whose land it had been found.[97] The first publication of the text was made by Maspero the following year.[98] The Thonis-Heracleion stela was brought to light in 2001 by the IEASM[99] in the middle of the area of the temple of Amun (Figure 5.6). The presence of both monuments within a temple compound indicates that they were set up for the attention of the religious authorities and were intended for a political purpose.

The third point demonstrating that the text is addressed neither to sailors nor to traders is, in fact, the most obvious one: the formulation of the Decree itself does not fulfil the practical function of announcing the amounts of customs dues that ships coming into Thonis were to pay, nor the taxes applied to various merchandise at Naukratis, simply because it does not specify them. As Mallet[100] had already pointed out, the Naukratis stela in no way indicates the rate of customs or taxation to pay: it merely determines the fact that 10 per cent of all that is collected for the royal domain is then to be redirected to the temple of Saïs. The only thing that could interest seafarers and traders is how much they would have to pay and not any intermediate or final destination of that amount.

Both stelae were set up for display in temples rather than for practical use,[101] and it clearly appears that they were destined to commemorate the accession of Nectanebo I to the throne, and to perpetuate his donation to the temple of Neith, the tutelary goddess of kingship since ancient times, and particularly again in the Saïte Period. It could very well be concluded that a third copy of the Decree would also have been set up in the temple of Saïs itself.

The writer of the Decree of Saïs

The two stelae of Thonis and Naukratis were engraved by two separate sculptors, as documented by certain graphic habits and the different manner of executing the same hieroglyphs.[102] The text itself, however, was conceived by one and the same author, choosing the hieroglyphs to use by both engravers. The composition and the selection of signs and of the terms utilized in the drafting of the Decree renders this text an accomplished model of scholarly writing, a true anthology of all the 'graphic puzzles' allowed in hieroglyphic writing. The author was erudite, a scholar of high level, and an expert capable of juggling with words as much as with signs. It is very likely that he belonged to the elite of the Saïte priesthood, since the Decree was pronounced in the temple of Saïs as the beneficiary of the donation. It appears that the author of the text was particularly well-versed in the theology of the goddess Neith of Saïs, whom he may have served. He very probably held a high position in the temple hierarchy, and may even have been its head. The illustrations of his ingenuity are so numerous and varied that we can only present a few examples. We find a predilection for the archaisms used two to three centuries earlier by the scribes of the Saïte Period, of Old Kingdom inspiration, and much in demand again at the time of Nectanebo.[103]

94 Yoyotte 1982–3: 135–6; Goddio 2003: 172, 181; 2007: 77, 83.
95 Hogarth 1905: 122.
96 Petrie 1886: 24–6.
97 Maspero 1904: 793.
98 Ibid.: 1900.
99 Goddio 2007: 77, 83.
100 Mallet 1922: 149.
101 Baines 1990: 17.
102 See von Bomhard 2012: 2 and 56–89 for the column-by-column comparison between the two stelae. A paleographic study of the two monuments is in progress.

Orthographic variations

The translators of the Naukratis stela were instantly struck by the numerous different ways to spell the same word, a technique which Posener termed 'dissimilation graphique' and which he indicated to be part of the 'raffinements d'écriture' of Saïte scholars.[104] Drioton, in his studies of the cryptography in the eighteenth dynasty, pointed out that one of its rules was to write a word or a sound in as many different ways as possible and that, inversely, one and the same hieroglyph should be used to display all the various meanings and readings that it could express.[105] The cryptography and the 'dissimilation graphique' are particularly strongly represented on the Decree. The discovery of the second stela at Thonis-Heracleion increases the number of orthographic variations even further,[106] and reveals, above all, the utilisation of another kind of 'graphic puzzle' that could be qualified as 'complementarity'.

Complementarity

Although the two monuments of Naukratis and Thonis were never meant to be displayed next to each other, the editor worked in such a way that the figurative representations or the formulae displayed on one stela were completed by the manner in which they were designed or written on the other. The phenomenon is particularly obvious when it comes to ready-made formulae, like the enumeration of the benefits generally expected by a king from a god: 'life, stability, power, health and joy'. In the central part of the lunette, underneath the two uraei, one reads on the Naukratis stela: 'may she (Neith) give life and stability' (Figure 5.2), and on the Thonis stela: '… may she give life and power' (Figure 5.3);[107] in the last column of the Decree, the series of benefits the king expects is complete only when reading both stelae. The fact that 'health and joy', completing the formula, are missing on either lunette, may possibly argue in favour of there having existed at least one more copy of the Decree.

This procedure, which completes the data provided on one monument by those displayed on the other, also concerns the imagery:[108] as an example, in the right-hand scene of offering, the king wears the pharaonic beard on Thonis-Heracleion (Figure 5.3), and on Naukratis, his red crown has a ribbon hanging from it (Figure 5.2). In the same scene on the right side, the fourth object on the plate of offerings is a vase which looks like a milk jar on Thonis, and more like a wine jug on Naukratis: as both liquids are used in this kind of offering, the stelae again complete each other. The central object, a loaf, in combination with the plate itself, results in the hieroglyph (Gardiner R4), *ḥtp*, and the entire assemblage spells the word *ḥtpw* for 'offerings'. Numerous graphic puzzles of different types are set into the images or the text.

Indicative peck marks

A second kind of 'graphic game' is found only on the stela of Thonis-Heracleion.[109] The top of the last column of the Decree, which reads: 'in a town The-Hone-of-Saïs is its name',[110] is completely pecked (Figure 5.8) throughout its entire surface, and slightly more densely at the rim than in the middle, which indicates that the purpose was not to erase a previous text. Possibly, the markings have a 'topographical' meaning and these dots might represent the swampy surface of the watery region of the *hone*, with lakes, watery surfaces, and imbrications of

Figure 5.8 Thonis, col. 4: 'The-Hone-of-Saïs'. (Photo: B. Vallée; © F. Goddio/IEASM.)

103 Mallet 1888: 27–8; Posener 1934: 142–3 note 5.
104 Posener 1934: 142.
105 Drioton 1933: 11.
106 For the orthographic variations of the words collected on the two stelae, see von Bomhard 2012: 151–69, Index of Egyptian words.
107 Very likely, the choice of words and hieroglyphs on each stela is not accidental, considering the fact that the sign for *ḏd*, 'stability', found on the Naukratis stela, appears sometimes twice in the name of the god Amun of that place (*imn ḥ3 ḏd*); whereas the hieroglyph for *w3s*, 'power', which is found on the Thonis-Heracleion stela, probably alludes to the dynastic function of the god Amun of that town. This enhances Goddio's remark that the dynastic function of this god in Thonis-Heracleion must have existed prior to the time of the Lagidae (see Goddio this volume Chapter 1 on the subject of Thebes of the North).
108 A synoptic overview of all orthographic and figurative variations between the stelae is given in von Bomhard 2012: 147–9. The variations of the images on the two stelae are the iconographic equivalent of the different orthographic versions of the same word that Posener describes as 'dissimilation graphique'. These variations in the images could be designated as 'dissimilation iconique'.
109 See the chapter on Corrections and Hammerings, von Bomhard 2012: 105–12.
110 Column 14. According to Yoyotte (2001: 32), the engraver had pecked this part of the column in order to mark the spot where the name of Thonis should replace that of Naukratis. This interpretation does not hold for two reasons: first, because the name Naukratis—unlike that of Thonis—does not appear at the top of column 14 but at the bottom of column 13; and second, and above all, because the engraver did not need to alter the surface, and could easily have obtained a mark by using colour, chalk for example, which can be washed off without leaving a trace on the stone.

river branches, land and sea, as illustrated by the Nilotic scenes shown on the Palestrina mosaic.[111] In addition, a line running from the neck of the owl crosses the circular hieroglyph for 'town' as if to stress the obligatory passage through Thonis; then, from the sign of the town, the line descends, as if to reproduce the course into the Canopic branch. This graphic suggestion of a mandatory sailing route through Thonis may simply be of a 'geographical' tenure: as the town controls the entry to the Canopic branch, any ship coming from the sea to enter this course of the Nile must travel through this port. However, the graphics may as well have a 'legal' implication evoking the exclusivity of entry into Egypt pointed out by Herodotus.[112] He visited Egypt during the First Persian Period (~450 BC), and indicated that at the time, the Canopic mouth was no longer the mandatory entry into Egypt, which implies that it was so in earlier times. It would indeed appear that during the first Persian occupation, Thonis had lost this exclusivity,[113] and some archaeological indices plead in favour of the fact that Pelusium, at the eastern edge of the Delta, increased in importance as an entry port at the time.[114] Herodotus reported the Greek trade monopoly at Naukratis as ancient, which is generally understood as meaning from the times of Amasis (570–526 BC). However, Fantalkin[115] advances historical as well as archaeological arguments dating this monopoly earlier still;[116] this privilege seems quickly to have followed the arrival of the Greeks at Naukratis, which most historians date in the time of Psamtek I (664–610 BC).[117] Once Amasis, well-known as a law-giver, had become king, he would have regulated customs and trade at Thonis, providing a legal structure for the particular statute of the Greeks at Naukratis and for the administration of its trade controlled by nine cities in Asia Minor.[118] This pharaoh would have created or preserved the exclusivity of entry through Thonis, simplifying the collection of customs dues.[119]

With regard to Naukratis, one should apparently distinguish three separate notions which could evolve independently, and very differently, over time: the particular statute of the Greeks, the trade monopoly, and the mandatory entrance through the Canopic mouth. The first is the statute granted to the Greeks in that town: the autonomy in handling trade operations was controlled by their own chief merchants under the supervision of the *prostatai,* the magistrates delegated by the nine cities which created the *Hellenion,*[120] and which had the privilege of running the port.[121] This statute seems to have prevailed over an extensive period. If the residence of the Greeks at Naukratis was accompanied by diverse advantages, possibly already of a trading nature, these may have been granted by the first Saïte rulers as compensation for military service.[122] The legal confirmation of their statute seems, again according to Herodotus, to have been created or rearranged by Amasis.[123] According to Pébarthe, in his choice of the nine Greek cities, Amasis could have favoured the Greek cities that had not visibly supported Apries, which could be the reason for his excluding the town of Miletus.[124] Although they were autonomous in the matter of trade, the Greeks were not altogether independent,[125] since they were subject to controls from Thonis, and to the goodwill of the pharaohs to uphold their privileges.[126] They had to pay custom dues at Thonis, levies on trade at Naukratis, and other taxes, such as fluvial excise duties,[127] and even a tax on all river transport.[128] However, the trade of the Greeks was prosperous as long as their special statute lasted—even if it was probably interrupted more than once[129]—and remained so even after the cities of the *Hellenion* no longer managed the port. According to Bresson, that control ended in 387/386 BC, if not slightly earlier, because by then the cities of Asia Minor had come under Persian domination.[130] In Nectanebo's time, trade seemed to be flourishing, as witnessed by the taxes from Naukratis destined for his donation to the temple of Saïs. At about 400 BC, relieved from the Persian occupation, the Egyptians needed to review the administration of their country and the status of Naukratis. It cannot be a coincidence that Nectanebo I's first gesture on mounting the throne in 380 BC concerned the taxes flowing into the royal domain from Thonis-Heracleion and Naukratis.

111 Whitehouse 1976; Meyboom 1995: pl. 6–27; Walker 2001: 333; Goddio 2007: 129, fig. 3.108; 2008: 48; Robinson and Wilson 2010: xi.
112 Herodotus *Historiae* 2.178–9.
113 Mallet 1893: 435; 1922: 16, 20–1; Fabre 2004–5: 70–3; Briant (1996: 593) indicates that although the mouths of the Nile were guarded and controlled by the Persians, transport and fighting vessels were able to circulate freely on all of the branches of the Nile.
114 Carrez-Maratray and Defernez 1996: 40, 44–9.
115 Fantalkin 2006: 202–4.
116 End of the seventh to the first third of the sixth century BC.
117 Yoyotte 1991–2: 636–7; Boardman 1995: 147–8; Bresson 1980: 317; 2005: 138–9; Möller 2000: 187–8; Pébarthe 2005: 138. For the two-fold aspect of the monopoly, positive (favouring Greek trade) and negative (limiting it to Naukratis) see Mallet 1888: 22–3; Möller 2000: 204.
118 Bresson 1980: 297; 2005: 138.
119 Möller 2000: 204.
120 Boardman 1995: 159; Möller 2000: 195–6; Pébarthe 2005: 169–70.
121 Bresson 1980: 312, 319; Pébarthe 2005: 175. On the theories concerning the *prostatai*, and their function of representing the Greeks towards the pharaoh: Möller 2000: 195–6.
122 Bresson 1980: 326 note 19; 2005: 138–9, 149–51; Möller 2000: 33–4; Höckmann 2008–9: 105–6.
123 Herodotus *Historiae* 2.178–9; Bresson 1980: 297; 2005: 138; Möller 2000: 196, 214.
124 Pébarthe 2005: 175; Bresson (2005: 150–2) argues that Miletus had later supported the Persians against Egypt because this town had been excluded from the cities creating the *Hellenion*.
125 Bresson 1980: 317–8; 2005: 141; Agut-Labordère 2010: 362, 366.
126 Boardman 1980: 158–9; Bresson 1980: 293, 297; Fabre 2004–5: 61.
127 Thiers 2007: 94–6; Agut-Labordère 2010: 357 note 12.
128 Thiers 2007: 94.
129 Bresson 2005: 139–41.
130 Bresson (ibid.: 140–1) believes that at that time the Greeks of Naukratis took over control of the *emporion* by attaining the statute of a 'city'.

The second point, the monopoly of Greek trade in the town of Naukratis, which Herodotus said had 'once' existed, seems not to have survived over time: the discovery of the town of Thonis-Heracleion and all archaeological data resulting from it, converge to demonstrate that Thonis itself had already at the time of Amasis, and even before, become an *emporion* in its own right.[131] The diachronical archaeological study of the submerged site of Thonis-Heracleion has brought to light occupation and port activity from the late seventh to the early sixth century BC in the area of the North Canal.[132] A bronze plaque in the name of Psamtek I was found in this zone, as well as two objects bearing the cartouche of Amasis,[133] in a sanctuary strategically sited at the very entrance of the port of Thonis-Heracleion.[134] After his victory over Apries, Amasis had probably entirely re-ordered the existing customs system at the Canopic mouth, and encouraged international exchange there, as well as the Greek trade at Naukratis. The economic expansion of these two *emporia* certainly contributed sizeably to the great prosperity that is said to have spread throughout Egypt in his reign.[135]

The third notion is the mandatory entrance into Egypt through the Canopic mouth. Although the trade monopoly implies mandatory entrance via Thonis, the reverse does not necessarily follow: the obligatory passage through Thonis-Heracleion may be enforced independent of whether the Greeks had or no longer had any kind of trade monopoly. The exclusive entrance through the port of Thonis certainly favoured Greek trade at Naukratis, but it interested above all each pharaoh, since it guaranteed better control of customs, and reinforced the security of the country. The mandatory entrance through the Canopic branch was strongly imposed by Amasis, as detailed by Herodotus;[136] its surveillance was greatly favoured by the geographical position of Thonis-Heracleion, and was probably maintained up to the Persian occupation.

It is possible that Nectanebo I renewed the mandatory entrance through Thonis-Heracleion, which had been abolished during the Persian occupation, and that this was the point the designer of the Decree wanted to emphasise by creating the line that crosses the hieroglyph of the town (Figure 5.8). The new pharaoh's decision would fit very well with his will to control and fortify his frontiers, an action initiated right from his accession to the throne, which he pursued throughout his reign, and which was continued by his successors.[137] The restoration of the mandatory entrance via Thonis-Heracleion would also enhance his generosity to the temple of Neith,

Figure 5.9 Thonis, col. 13.
(Photo: B. Vallée; © F. Goddio/IEASM.)

because it increased the gross amounts of customs dues received at the Canopic mouth, and thus the additional share to revert to the temple of Saïs. If it turned out that Nectanebo I did indeed restore the exclusivity of entry into Egypt through the Canopic branch of the Nile, the mark on the stela of Thonis-Heracleion (Figure 5.8) would be of historical as well as economic significance.

The last column but one (Figure 5.9) presents further geo-topographic peck marks on the Thonis-Heracleion stela: where the king orders that the text of the Decree was to be engraved on the stela destined for Thonis, and that the monument was to be set up 'at the mouth of the sea of the Greeks' (*m r(ȝ) n wȝḏ-wr ḥȝw-nbwt*),[138] the entire text is underscored in front by a large line which is probably meant to represent the Canopic waterway. In addition, in a kind of topographical 'jeu de mot', the

131 These archaeological data support the view of Fantalkin 2006: 202–4.
132 Goddio 2007: 112, fig. 3.82, 114, fig. 3.85 for the ships and anchors; 2011: 128 for the Thonis-Heracleion *emporion*; this volume Chapter 1.
133 For photographs of the monuments of Amasis, see Goddio this volume Chapter 1; for a photograph of the plaque of Psamtek I, see von Bomhard 2012: 99, fig. 4.12.
134 See Goddio this volume Chapter 1.
135 Herodotus *Historiae* 2.177.
136 Ibid.: 2.178–9.
137 Mallet 1922: 99–100.
138 von Bomhard 2012: 86, and 111 for the interpretation of the marks.

Figure 5.10 Thonis, col. 5. (Photo: B. Vallée; © F. Goddio/IEASM.)

sign of the face *ḥr*, 'on', is pecked in its lower part, i.e., 'at the mouth' (Figure 5.9), displaying the words *m r(3)* 'at the mouth' as an image. Other examples of indicative marks appear on Thonis-Heracleion, as for example on Figure 5.14 below.

Visual traps

This process aims at grouping together identical or similar hieroglyphs to produce 'visual traps', as in column 5 of the text on both stelae (Figure 5.10),[139] where, after three signs of water assembled with linguistic acrobatics,[140] we find two faces next to each other, then two arms[141] following each other in the sequence: '… what they say, without neglecting their words' (… *ḏd.sn nn sḫ ḥr ḥr mdw.sn*). This presentation of similar signs, grouped together by twos or threes, is a juggling exercise of style by a specialist in hieroglyphic writing, and destined for the eyes of learned men.

Most of the visual traps are not chosen by happenstance; they contain theological allusions relating essentially to the goddess Neith, who incarnates the primeval water from which are created the sun and the world.

Graphisms in honour of Neith, Mistress of the Floods

For an ancient Egyptian, the name expresses the very essence of a god, of a being, or of the designated matter: Neith is the personification of the primeval waters at the origin of the sun and the creation, and her very name means 'water'; inversely, everything that figures the liquid element can evoke her nature and spell her name.[142] Knowing the performative value allocated either to the words or the images, one better understands the editor's tendency to multiply the hieroglyphs representing the liquid element (Figures 5.10–11): it allows for increased opportunities to pronounce the name, and thereby to evoke the goddess, qualified in column 12 of the text and in the lunettes as the 'Mistress of the Floods' (Figures 5.2–3, above the left-hand Neith). All translators of the Naukratis stela emphasized that the determinatives were absent most of the time. We must point out one notable exception: the determinative for 'water' is practically never missing,[143] either as a ripple of water 𓈖 or as a basin or pool 𓊃, and is often shown in threes (Figure 5.12). This triple presence of a basin can also be read '*nnn*', evoking the primeval ocean (*nwn*) or the goddess of the floods. The same goes for the alignment of the three hieroglyphs for town[144] as they are placed in the name of The-Hone-of-Saïs (Figure 5.8) or in the lunette in front of the uraeus of Lower Egypt (Figures 5.2–3). On each stela, the name of Neith is written twelve times normally in a clearly visible manner.[145] This number easily doubles if we take into account all the other graphics[146] that could be pronounced '*nnt*' or '*nt*', like the name of the goddess.

Figure 5.11 Thonis, col. 6. (Photo: B. Vallée; © F. Goddio/IEASM.)

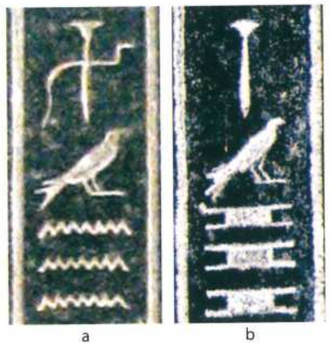

Figure 5.12 'The sea' in a Naukratis, col. 9; b Thonis, col. 12. (Photo: B. Vallée; © F. Goddio/IEASM.)

139 Ibid.: 66, 67, 91. 'Visual traps' translates the expression 'calembours graphiques' used by Posener 1934: 146 note 6.

140 Two stylistic devices allow assembling the three 𓈖: the absence of the three plural strokes of the pronoun *sn*, and the particular spelling of the negation which appears already in column 3 (see von Bomhard 2012, Index of Egyptian words: 159).

141 The first arm reads *m*, the second one *d*, spelling *mdw* for 'words'.

142 For the reading *nt* of the three ripples of 'water', Jelínková 1950: 330–4; Collombert 2010: 101. For the pronunciation of '*n*' for the hieroglyphs of basins 𓊃, or 𓊄, see Leitz 2006: 169, 182.

143 With one single exception: on Naukratis, at the lower end of column 13, it is absent due to lack of space.

144 For the reading '*n*' of the hieroglyph of the town, see Leitz 2006: 170, 182.

145 Four examples are in the lunettes, counting the signs 𓊆 engraved in the open neck of the two uraei. In the lunettes, the name of the goddess is associated with each of the cardinal points: to the west, on the side of the right-hand offering, to the east on the opposite, to the south and the north on the two uraei bearing the crowns of Upper and Lower Egypt. For the ancient Egyptians, this association of Neith with the cardinal points recalls that the primordial waters envelop the entire created world, see von Bomhard 2012: 27, fig. 2.10.

146 An interesting occurrence of the allusion to the watery nature of the sky appears in the Naukratis lunette in the habitual epithet of the goddess 'Mistress of Heaven', where the sign for 'heaven' is replaced by the hieroglyph of the pool (see Figure 5.2, in front of the left-hand Neith).

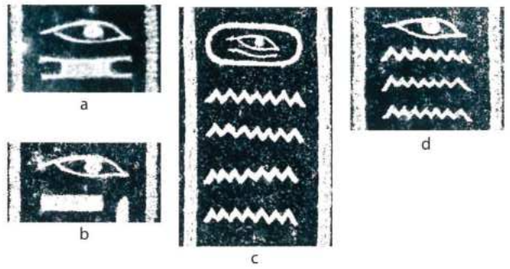

Figure 5.13 a Thonis, col. 1; b Thonis, col. 5; c Naukratis, col. 10; d Thonis, col. 13. (Photos: B. Vallée; © F. Goddio/IEASM.)

Groups of signs evoking the demiurgic role of Neith

As the hieroglyph of the eye can be read as the verb *iri*, 'to make', 'to do', or 'to engender', it may also be understood as 'what has been created', or (the) 'creation', and the editor took pleasure in setting it above water signs, thereby evoking the image of the creation emerging from the primeval waters, that is from Neith (Figure 5.13). The constitution of the fourth example (d) is the result of sophisticated spellings.[147]

Puns with a theological meaning

In columns 7 and 8 (Figure 5.14) the Decree relates, in the annalistic style,[148] the introduction of Pharaoh (*bs nsw*) into the temple of Neith, the king bearing the red crown (*ḫˁ m nt*) and standing next to his mother (*r-gs mwt.f*). This describes the image on the right-hand side of the lunettes (Figures 5.2–3, right-hand offering), where Nectanebo is shown with the crown of Lower Egypt, making an offering to a cult statue of the sitting goddess. It concerns more precisely the *ḳbḥ* libation to Osiris 'Lord of Eternity', the ritual offering 'as every king had done formerly'.[149] This Saïte ritual celebrated in the Osirian sanctuary which contained the tomb of the god, in the northern part of the temple of Neith, where the king appears as the son of Osiris, is very probably linked to the royal enthronement.[150] The words *ḫˁ m nt*, 'crowned', or 'appearing with the Red Crown' (Figure 5.14) may also be translated as 'He who issued from Neith', or 'He who issued from water', which alludes to the sun born of Neith, i.e., of the primeval waters. Thus, pharaoh next to Neith is compared to the sun appearing for the first time next to its—and his—mother Neith. Like the Saïte kings before, and more especially Amasis, Nectanebo proclaims himself as 'the son of Neith', because this means that the king is equal to the sun, thereby legitimizing his kingship.[151] This word play, like others on the Decree, emphasizes the link between the primeval waters, the sun, and the divine filiation of the kings. One of the aims of the Decree is to legitimise Nectanebo's access to the throne by showing him as the son of Neith: the lunettes illustrate this through his offerings to 'his mother', and the first columns of the text describe how the goddess of Saïs put the crown on his head.

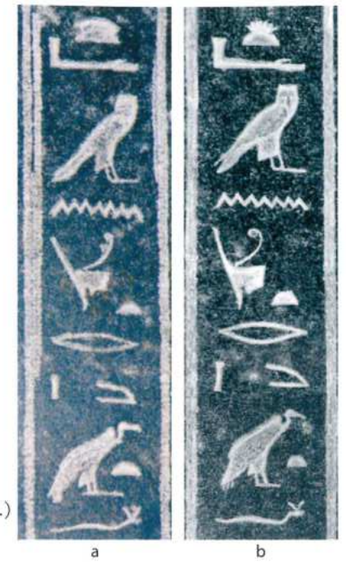

Figure 5.14 a Thonis, col. 8; b Naukratis, col. 8. (Photos: B. Vallée; © F. Goddio/IEASM.)

To attract the attention of the knowledgeable Egyptian reader to the double sense of the sentence and its theological connotation, this passage was emphasized in the margin by the engraver of the Thonis stela[152] using a line doubling the rear border of the column (Figure 5.14a).

Another peck mark exalts the 'cosmo-theocratic' nature of the king. In column 4 of the Thonis-Heracleion stela, two hieroglyphs of the hoe are marked by two round sizeable dots filled by peckings (Figure 5.15). These two hieroglyphs, and therefore the four points, frame the sentence 'as he rises over the horizon'. The four dots on the instrument that serves to dig the furrows of the foundation evoke the four corners where poles are stuck in the ground to stretch the cord (*pḏ sšr*), delineating

147 In order to set together the three '*n*' in the sentence 'what I have done be maintained by … ', *smn ir.n.(i) (i)n ntyw…*, the editor dropped the personal pronoun after the first '*n*' and the '*i*' of '*in*' before the second.

148 Vernus 2013a: 304–5.

149 According to the text concerning Cambyses on Udjahorresnet's statue: Posener 1936: 18.

150 See *supra*: the circumstances of Nectanebo's donation.

151 Nectanebo I apparently wished to revive the Saïte period, and particularly the time of Amasis: like him, he claims to be the son of Neith, like him, he takes measures concerning the Canopic Gate and Greek trade at Naukratis, like him, he increases the contributions to the temple of Neith. He reinforces the defences at the entries into Egypt and very likely restores the obligatory maritime entry through the Canopic mouth. The art of his time, as it does in Saïte times, takes inspiration from the works of the Old and Middle Kingdom, as well as the scriptures with their graphic puzzles as they appear in the Decree.

152 See Corrections and Hammerings, von Bomhard 2012: 109–10.

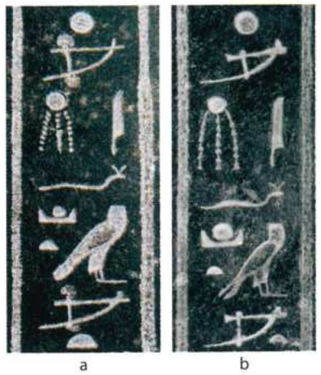

Figure 5.15
a Thonis, col. 4;
b Naukratis, col. 4.
(Photo: B. Vallée;
© F. Goddio/IEASM.)

the borders of the temple. In the eyes of the Egyptians, the temple is a reflection of the universe. Here, the universe itself is concerned and the four points represent the ultimate points that the sun can reach on the horizon during the day, and in the course of the year.[153] When pharaoh describes the border of the world 'under his sandals'—'south up to *rtḥ ḳbt*, north up to *ḳbḥ ḥr*, east up to the place where Re rises, and west to the place where it sinks'—he marks the boundaries of the created world which he occupies entirely, as does the sun. The four dots framing the sentence 'as he rises above the horizon' are the four extreme limits reached by the sun, the points where the pillars of the sky are planted, the same spots where Nut places her arms and feet,[154] and the sentence refers both to the sun and to the king.[155]

Hieroglyphic innovations

In addition to all the graphic games decorating this remarkable text, we also find hieroglyphs which were not attested to before the publication of the Naukratis stela by Maspero. In column 7, three magnificent springing gazelles replace three jumping kids to express 'the hearts'[156] in an archaic plural (Figure 5.16).[157] The choice of this desert animal is particularly apt, because it concerns the 'hearts' of the rulers of foreign countries, and the ancient Egyptians saw all regions outside Egypt as desert zones bordering the Two Lands. This is also the reason why sacrifices of desert animals, such as the gazelle, are assimilated to the sacrifice of enemies; in the Egyptian mind foreigners are linked to hostile forces.

Figure 5.16 Thonis, col. 7.
(Photo: B. Vallée; © F. Goddio/IEASM.)

Figure 5.17
a Thonis col. 11;
b Naukratis col. 11.
(Photo: B. Vallée;
© F. Goddio/IEASM.)

This new hieroglyph, which is particularly well-executed by the engravers of each stela, increases the number of known hieroglyphs.

Another example of unattested hieroglyphs appears in an addition to the Decree,[158] where the king specifies that the daily offering must include a piece of beef, a fat goose, and five measures of wine.[159] Obviously, this is destined to favour the priests of Saïs. In this passage, the bovine displays asymmetric horns (Figure 5.17).[160] This is not attested among the hieroglyphs representing this animal, but it is known from painted and engraved images since the Old Kingdom.[161] This deformity is intentionally provoked during breeding and attaches a special value to the animal, which is generally an especially well-tended fat ox (Figures 5.18–19). This graphic precision thus emphasizes that the beef intended for the daily meat offering must be of prime quality. Further, it

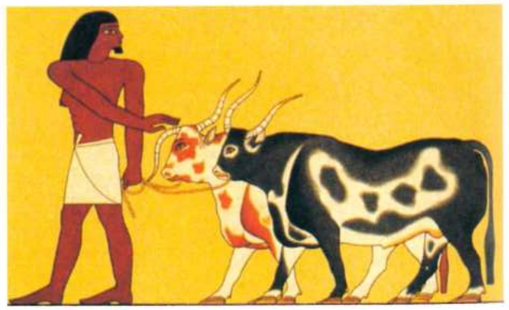

Figure 5.18 Beni-Hassan, Middle Kingdom. (Drawing: from Prisse d'Avennes 1858–1879.)

153 For the movements of the sun and the terms *rtḥ ḳbt, srḳ ḥtyt* and *ḳbḥ ḥr* see ibid.: 122–3.
154 The sky goddess Nut may represent the hieroglyph of the sky 𓇼 when she is shown as 𓇽, where her members are the four pillars of the sky, ibid.: 27, fig. 2.10.
155 On the Naukratis stele the four dots on the hoe do not appear, but the same idea is suggested by the choice of the hieroglyph of the tool used for the foundations to frame the sentence 'as he rises over the horizon'. The allusion would have passed over if the engraver of the Thonis-Heracleion stela had not marked the four dots. This suggests that a great number of graphic puns might be overlooked in the writings from the Old Kingdom or the Saïte period unless they are very meticulously scrutinised.
156 The word *ibw* for 'hearts' was read by Gunn 1943: 57 on the Naukratis stela.
157 The use of the plural by trebling is very frequent in the text of the Decree and is part of the search for archaisms dear to the scribes of the Saïte Period.
158 Column 11 of the Decree.
159 The *mnw* jar, here translated as 'measure', has an estimated capacity of 15 litres, which would add up to 75 litres for five measure: Aḥituv 1972: 302.
160 The animal is a bull on Thonis, and a cow or an ox on Naukratis, which provides another example of complementarities.
161 Seligman 1932: 460, pl. 74.

Figure 5.19 Luxor, New Kingdom. (Photo: A.-S. von Bomhard.)

Figure 5.20 Horns as enemies' arms. (Photo: A.-S. von Bomhard.)

indicates that the sacrifice of the animal during these offerings must be assimilated with the eradication of evil forces, because the horns of such animals are sometimes represented as the imploring arms of vanquished enemies (Figure 5.20). On the image from Beni Hassan (Figure 5.18), the reddish-tinted ox, a colour linked to Seth, enhances this interpretation.

The creation of new hieroglyphs illustrates the originality of the writer who also uses the spelling games of the Saïte scholars, employing alphabetic uniliteral signs with a great variety in spelling words, the search for ancient mannerism like archaic plurals, i.e., trebling, and the absence of determinatives. When these are used by the author of the Decree of Saïs, it is invariably with a precise aim: either to evoke Neith through the sign of water,[162] or to glorify the duties of pharaoh as a triple purveyor of abundance: for the living, for the deceased through offerings to them, and for the altars of the gods.[163] The writer further employed determinatives to enhance the king's role as the builder of temples for the gods,[164] or simply to add precision, as in the case of the bull (Figure 5.17), by altering the shape of its horns. Still, the concentration of many different scholarly writing techniques discovered in the Decree of Saïs far exceeds any previously known ones, and stands witness to the subtlety and ability of the learned person who conceived the text. At the time when it was promulgated, the contents of the Decree were of the utmost importance, since it consecrated the recognition of Nectanebo I's sovereignty over all Egypt, as well as the permanence of his sizeable donation to the temple of Saïs. Clearly, its composition and the supervision of the execution of the copies were entrusted to one of the most brilliant minds of the time.

The copies of the Decree of Saïs

As soon as he discovered the Thonis-Heracleion stela, Goddio pointed out its excellent state of preservation.[165] Even if it had been found face downward, which reduced erosion, he also noted that not a single sherd or piece of debris was found underneath this stela, unlike other artefacts immediately surrounding it. Furthermore, in addition to the catastrophic events which ended in the submergence of the land of the entire region of Thonis-Heracleion, the possibility of the stela remaining intact if it had still been standing at the time when these events took place is practically nil. Goddio suggested that it had been hidden considerably earlier, and possibly carefully embedded face downward in clay, in order to protect the hieroglyphs and figures.[166] He added that the intact recovery of the Naukratis stela tends to indicate that it had been buried similarly and probably at the same time. This may lead to the hope that further copies of the Decree of Saïs, likewise hidden in ancient times, might one day be discovered, particularly the one destined for Saïs and its temple of Neith, the goddess 'Mistress of the Floods', who graciously remitted to the world the copy hidden at the bottom of the sea.

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162 Six times, see ibid.: 91; of which once in the lunette: figs 5.2–3 above the left-hand image of Neith.
163 The word 'supplies' *df3w* spelt letter by letter and accompanied by a determinative and the three strokes of the plural is set up very much in evidence at the top of column 7, just below the two statues of Neith.
164 The word *ḫws*, 'to complete a building' is spelt in single letters, and with a determinative. On the Decree, the creator uses the determinative of the man in the process of building, because of the performative value of the hieroglyphs.
165 Goddio 2003: 180–1; ibid.: 2007: 83.
166 Ibid. 2011: 125 note 26.

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6 Coin circulation and coin production at Thonis-Heracleion and in the Delta region in the Late Period

Andrew Meadows

Introduction

Like no other category of objects from an archaeological site, coins allow us to tell stories. Even in antiquity, low value coins were everyday objects, and have the power to talk to us about the everyday activities of everyday inhabitants of the city where they are found. Coins also have characteristics that allow them to tell more detailed stories than other objects. They tell us, generally quite explicitly, where they were made, and by whom. More often than not we can say with some degree of precision when they were made. And so when we have known contexts of discovery, we can draw clear lines from the time and place of production to the time and place of deposition.

The site of Thonis-Heracleion occupies perhaps a unique place in the history of the study of excavation coins. In part, of course, Thonis-Heracleion, a small town entirely underwater, with a history stretching from the Pharaonic Period to the Roman, is one of a kind. Its submarine fate has shielded it from both the casual and systematic removal and looting of coins over the years since its demise. Unique also, however, is the method of recording the numismatic finds. Few sites, even on land, have benefitted from the careful recording of find spots of individual coins. The data collected from Thonis-Heracleion allows us, in a way that has never been possible before, to draw maps of the find spots of coins across an entire ancient settlement, and to chart the ebb and flow of economic activity across the chronological span of its occupation.

But for all the opportunities, the numismatic material from Thonis-Heracleion brings with it its own set of challenges. The coins are, for the most part, appallingly badly preserved and exceptionally difficult to identify with precision. Furthermore, a very large number have been recovered in the decade since survey and excavation have begun. Moreover, a substantial majority of the coin finds come not from excavation, but from survey. This means that they have been recovered not necessarily from the point of final deposit in antiquity, but from a layer of sediment that covers the entire site, in which objects have been moving for hundreds of years. This last circumstance appears at first glance to be a significant cause for concern in the interpretation of the location of finds. However, as we shall see, there is some cause to think that, while movement of coins may have taken place over numbers of meters, it is not the case that coins have moved large distances across the site.

In the survey that follows, I draw upon the examination of 2,200 coins, of which approximately 1,400 have proven identifiable in some respect. Examination of the objects has proceeded, broadly speaking by season, and incorporates finds made between 2004 and 2010. In addition to these individual finds, I consider briefly four hoards that have been recovered from the site. To the evidence of the coins is added also some consideration of the implications of the discovery on the site of an ancient coin die that has been published elsewhere.[1]

My aim here is to offer a (necessarily preliminary) picture of what the evidence may (1) tell us of the behaviour of coins within the town of Thonis-Heracleion; (2) reveal about the pattern of coin finds observable at Thonis-Heracleion compared to those at three other sites for which figures are available; and (3) contribute to reconstructing the picture of coin production and coin use in the Delta region in the late Classical and early Hellenistic Periods.

The nature and pattern of finds at Thonis-Heracleion

Hoards

We may begin with hoards—groups of coins deposited together in antiquity—partly because they form a separate and important category of evidence, and partly because they provide an introduction to the possibilities and limitations of the evidence. Four hoards are so far known to me from the site of Thonis-Heracleion.

The first of these consists of a group of gold quarter staters of Ptolemy I (*EH* 1.153).[2] The coins are currently on exhibition, but I was able to record them at the Greco-Roman Museum in Alexandria in 2005. Gold coins are not common, needless to say, among the finds from Thonis-Heracleion, or indeed from the excavation of any ancient site. Thus, to find five gold coins of identical type within a single area of the site is as sure an indication that there can be that these coins were deposited together. That said, these coins were not excavated, but were recovered during survey work around the main

1 Meadows 2011.

2 H4536, SCA 318; H4504, SCA 313; H4160, SCA 312; H3578, SCA 304; H3642, SCA 307. Goddio and Fabre 2006: 269–71 nos 320, 319, 318, 317 and 328.

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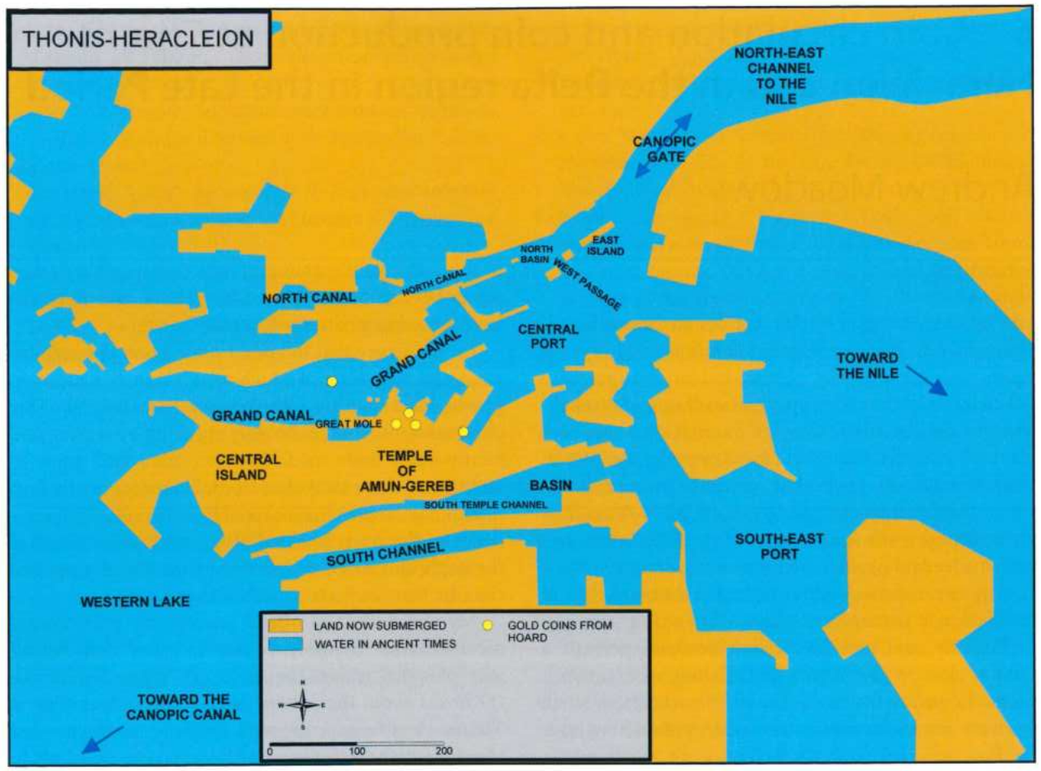

Figure 6.1 Find spots of the five coins from the 2004 gold hoard. (Base map: © F. Goddio/IEASM.)

temple area. A map of their distribution thus reveals not a single find, but rather a scatter (Figure 6.1). This is, at first sight, alarming: the hoard has become dispersed within the mobile layer of sediment. But it is at least clear that they seem to cluster around an original point of deposit, probably within the precinct of the main sanctuary of Khonsu-Herakles (H1),[3] and have not been carried from one side of the site to another. During a decade of prior and subsequent survey and excavation work no further specimen of this type has been found. This suggests that we should be aware that while coins do move within this sediment, their movement may be limited, and that it is, therefore, worthwhile examining the distribution of coins from this layer for general patterns of deposit. Returning to the hoard itself, the deposit date of this hoard is *c.* 295–285 BC, within the reign of Ptolemy I, and as such falls comparatively early within the chronological spectrum of coin finds from the site.

The second hoard that I have been able to examine is that discovered in excavation during the 2010 season.[4] This is a hoard of exceptional importance in a number of respects. It has, for a start, yielded a denomination not previously recognised, and as such has contributed to a re-evaluation of the structure and development of Ptolemaic bronze coinage of the 170s–160s by Lorber and Faucher.[5] More importantly, it is datable to some point between *c.* 170 and 163 BC, and contains only coins of one particular subgroup of coinage (Series 6e), which falls at the end of a period of relatively frequent change in the coinage. All the coins are in fresh condition. The hoard does not have the feel of a savings deposit, but rather that of a group of coins taken out of circulation at one time.

This, of course, is just one hoard, and should not be over-interpreted. However, this date of closure in around the early to mid-160s BC finds an interesting parallel in the individual finds from Thonis-Heracleion. This combined evidence, as we shall see, may suggest a break in monetary activity at Thonis-Heracleion in the early to mid-160s BC.

That said, the third hoard (*EH* 1. 235) immediately compromises that conclusion. Found in 2006, it consists of some 50 bronze coins of apparently identical type, with Zeus Ammon on the obverse and two eagles on the reverse.[6] It has not yet been possible to weigh and

3 On the topography nature and finds from this area, see Goddio 2007: 75–100.

4 *EH* 1.203. The hoard will be fully published by Meadows and Fabre (forthcoming).

5 Lorber and Faucher 2009. Cf. also Picard and Faucher 2012: 60–76.

6 H9458, SCA 1099. For pictures of the group see Goddio and Fabre 2008: 353 no. 438 and Hawass and Goddio 2010: 104.

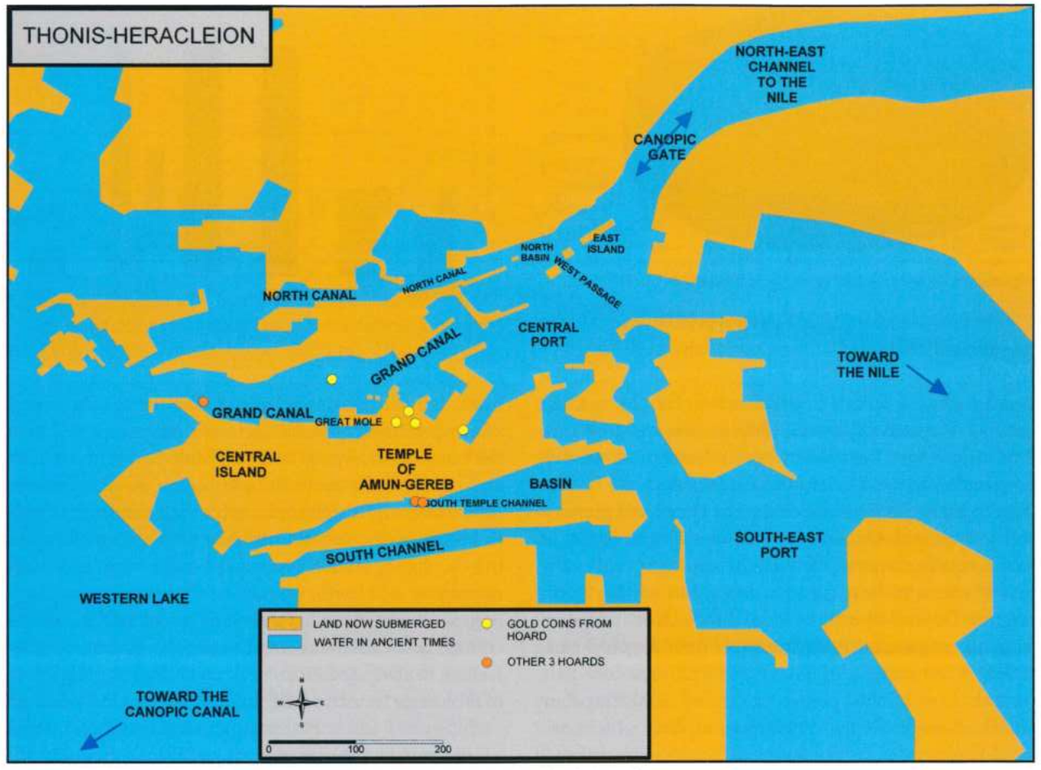

Figure 6.2 All four Thonis-Heracleion hoards. (Base map: © F. Goddio/IEASM.)

measure the coins in question since they have been constantly on exhibition since their conservation. However, from photographs it appears that these are coins of Series 9 struck between *c.* 113 and 44 BC. This hoard is a late outlier, not only among the hoards, but also in the context of the coin finds as a whole. These second and third hoards were found, almost certainly in their original place of deposit, in close proximity to each other, at the southern edge of the island containing the main temenos compound (H1) (Figure 6.2).

The fourth hoard (*EH* 1. 198) has also been unavailable for study thus far.[7] From cursory examination while on exhibition, and from the photograph published in the exhibition catalogues, it appears that these coins are Ptolemaic bronzes of relatively large module and therefore belong chronologically somewhere between Hoards 1 and 2. No more can be said at present. This hoard was discovered at the western end of the Grand Canal (Figure 6.2).[8]

Single finds

Hoards provide some highlights, but the real picture of coin deposition at Thonis-Heracleion comes only from looking at the individual finds. As noted above, I have

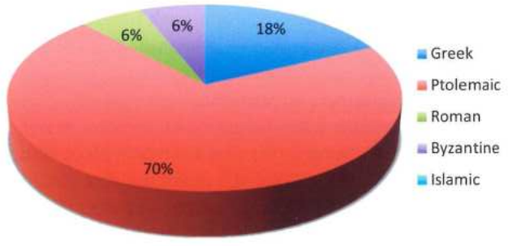

Figure 6.3 Individual finds from Thonis-Heracleion by period.

thus far been able to examine approximately 2,200 coins, of which a little more than 1,400 have proved to be identifiable to some degree. The pattern of representation at the site is quite startling for an Egyptian site (Figure 6.3).

One might have expected the Roman and Byzantine Periods to dominate the finds as they do at other sites (see further below for comparisons). However, at Thonis-Heracleion, 70 per cent of all identifiable coins are Ptolemaic, 18 per cent are pre-Ptolemaic Greek, while the Byzantine and Roman Periods are represented by just 6 per cent each.

We can break this down further. Starting with the earliest coins, the pattern here is no less surprising (Figure 6.4).

7 H6413, SCA 937. For photos see Goddio and Fabre 2008: 354 no. 445 and Hawass and Goddio 2010: 57.

8 On the nature of this central waterway see Goddio 2007: 102–11.

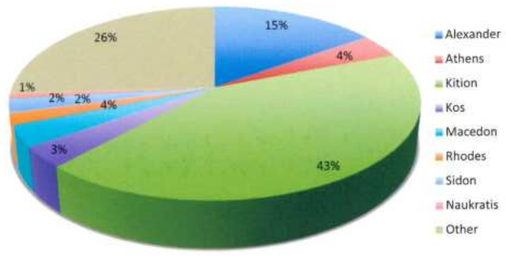

Figure 6.4 Pre-Ptolemaic coin finds by region of origin.

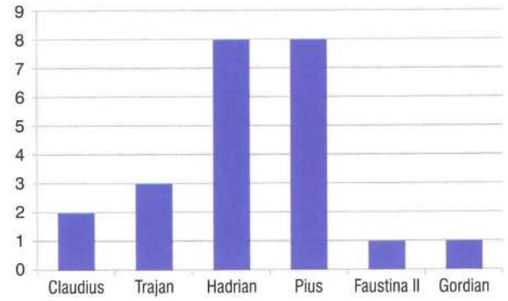

Figure 6.5 Roman coins from Thonis-Heracleion by reign.

The finds are dominated by one type, a bronze coinage traditionally attributed to the Cypriot city of Kition, representing 43 per cent of the pre-Ptolemaic finds from the city. I shall discuss this in detail below. For the rest, the pattern is reasonably predictable in geographic terms. The coasts of southern and western Asia Minor are well represented, as are Macedonian issues, which are in turn dominated by issues of Alexander the Great, and presumably arrived with the king or soon after him in Egypt. In fact, a significant proportion of the coinage of this early period seems to belong to the latter part of the fourth century. This includes the issues of Rhodes, Kos and Sidon. And two of the star finds from this period, gold hemistaters of Pumiathon of Kition and Pixodarus of Caria were also struck in the period 350–330 BC.[9] Only the silver tetradrachms of Athens, of which seven have so far been identified, could plausibly be earlier, though not by much.[10]

The Roman Period also seems to yield a rather bizarre collection of material (Figure 6.5). There is almost nothing of the first century AD, a peak under Hadrian (AD 117–138) and Antoninus Pius (AD 138–161) and then all but nothing from the later second and third centuries AD. The sample is, of course, very small. The lack of late third and fourth century small bronzes may be a result of their having dissolved beyond recognition due to their thin fabric. But the near complete absence of Alexandrian tetradrachm coinage is quite remarkable.

The Byzantine coinage, predictably, consists entirely of local bronze *dodecanummi*, normally in such atrocious condition that they are identifiable only by their fabric and the faintest of preserved designs or inscriptions.

The vast majority (70 per cent) of identifiable coins date from the Ptolemaic Period. Before beginning to describe the distribution of these, it will be as well to provide a brief introduction to how Ptolemaic coinage is now catalogued, for this is a fast-moving, and still fluid area of scholarship, which has, in fact, undergone rapid transformation even in the short period during which I have been working on the Thonis-Heracleion material. Ptolemaic silver coinage presents few problems of cataloguing. The general lines have been clear for a generation, and it is possible to assign the vast majority of coins to an individual reign, and some are even dated to specific years. That said, there is very little silver coinage from the Thonis-Heracleion excavations. The overwhelming majority of the coin finds are bronze, and here the categorisation is far more difficult. Older handbooks and catalogues attempt the attribution of all bronze to individual reigns. However, it has become increasingly clear that such categorisation is not always possible. On the one hand, certain typological series were produced seamlessly and with no visible change over multiple reigns. On the other hand, several major reforms of the coinage occurred in the middle of reigns. Recent work by Lorber, Faucher and Picard has established 10 basic series of Ptolemaic bronze, which are summarised in Table 6.1.[11]

In Series 1 and 2, Ptolemaic coinage is still essentially a Greek or Macedonian coinage, with small modules and denominations. However, the transition from Series 2 to 3 around 261 BC saw a significant development in the size of the denominations in use, as well in the denominational structure. Coins of Series 1 and 2 tend to be easy to distinguish from later issues, even when not fully legible, just from their size and fabric. By the same token, issues of heavy bronze of the subsequent Series 4, 5, 6 and 7 are easy to distinguish by their size, but also by the appearance of a central depression in the coin, which is absent on earlier issues. However, the denominational complexity of Series 3–7 renders them difficult to distinguish from each other when in a poor state of preservation (as

Table 6.1 The Ptolemaic Bronze coin series as defined in Picard and Faucher 2012.

Series	No. of Denominations	Reigns	Approx. Dates
1	2	Ptolemy 1	315–301 BC
2	4	Ptolemy 1 and 2	301–261 BC
3	6	Ptolemy 2 and 3	261–240 BC
4	7	Ptolemy 3 and 4	240–220 BC
5	8	Ptolemy. 4 and 5	220–197 BC
6	8	Ptolemy 5 and 6	197–163 BC
7	6	Ptolemy 6 and 8, Cleopatra 2	163–115 BC
8	2	Ptolemy 9	115–113 BC
9	2	Ptolemy 10–14	113–44 BC
10	2	Cleopatra 7	44–30 BC

9 Pumiathon: H1490, SCA 287; Pixodarus: H10717.

10 For examples, see Goddio and Fabre 2008: 224 nos 367, 435–6.

11 For a full overview, see now Picard and Faucher 2012, with previous bibliography.

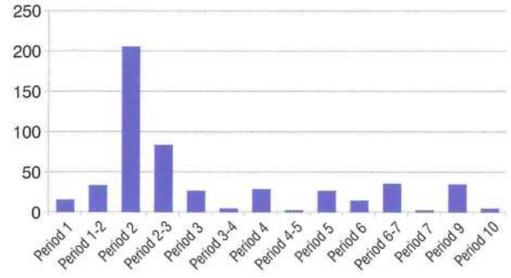

Figure 6.6 Distribution of Ptolemaic bronze finds by Series.

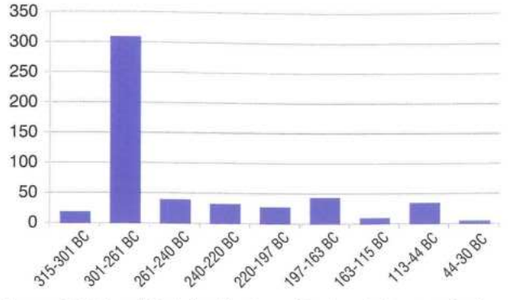

Figure 6.7 Simplified distribution of Ptolemaic bronze finds by date range.

most coins from Thonis-Heracleion are). Diameter and iconographic features often make it possible to narrow down a coin to an individual series even when the coins are in very poor condition. Another major change took place with the advent of the long-lived Series 9. The physical size of the coinage dramatically reduced, as did the denominational structure. Such coins are relatively easy to identify, as in the case of the 2005 hoard (*EH* 1.235) that we have considered above.

The distribution of the Thonis-Heracleion Ptolemaic bronze finds by series (including coins which cannot certainly be attributed to one series) may be seen in Figure 6.6.

A slightly simplified version of this chart, where uncertain coins are equally distributed over the series to which they might possibly belong, and where dates are substituted for series on the x-axis is provided as Figure 6.7.

Such bar charts are extremely difficult to interpret by themselves. A major problem lies, for example, in the fact that we do not have reliable estimates for the original sizes of the coinages. We cannot say, therefore, to what extent this obviously uneven distribution is the result of uneven numbers of original coins. Nor can we say with confidence how long some of these coinages remained in circulation. For example, although there is clear evidence for a reform of the coinage in *c.* 261 BC, which expanded the denominational structure and introduced heavy coinage, there was some typological continuity between the two most common denominations of Series 2, which may have allowed them to continue to circulate alongside Series 3 after the reform. We may, to a certain extent, mitigate the inscrutability by examining the pattern of find distribution at other sites in the region, and this avenue will be approached below.

But, as noted above, the Thonis-Heracleion excavations offer us a unique opportunity not just to quantify finds, but also to draw distribution maps of the finds 'on the ground'. These, in fact, tell a fascinating story.

In Figure 6.8 are plotted the finds of pre-Ptolemaic Greek coins. It is clear from this that there is a strong concentration of finds in the area around the Great Mole on the Grand Canal (H4),[12] with a scattering outwards which may indicate deposit over a slightly more extended area, but could also, as we have seen, be the result of drift in the sediment layer outwards from a highly localised point at the centre. A second strong area of concentration can be seen in the northern zone of the city. Here we can be more confident that we are looking at genuine concentration of finds, since these coins derive from the excavation of a series of buildings constructed from limestone blocks, which also yielded statuettes, amulets and jewellery (G1).[13] Interestingly, the pattern of finds of silver coins of Athens and Aegina seems to be different from that of the bronze coinage, with a broad scatter towards the western part of the site. Numbers are small however, and caution is required in the evaluation of the significance of this pattern.

The finds of early Ptolemaic coins of Series 1 (*c.* 315–301 BC: Figure 6.9) are few in number, but seem to follow the pattern of the pre-Ptolemaic finds. They are confined to the area of the Great Mole and the temenos of Khonsu-Herakles (H4 and H1).

Series 2 (*c.* 301–261 BC), which is by far the best represented of all Series on the site, shows a marked difference in distribution compared to earlier finds (Figure 6.10). There is still a concentration around the Great Mole, but there is an increased presence to the south, east and west of this, suggesting greater distribution of coinage across the Central Island. Gone, however, are the concentrations in the western area of the site, as well as that in the north. Judging only from the coin finds, one might be tempted to talk of a contraction of monetary activity in the early Ptolemaic Period to the area around the Temple of Khonsu-Herakles.

However, there are small signs of activity in the northern and northeastern parts of the site, and this intensifies slightly when we overlay the finds of Series 3–5 (*c.* 261–197 BC) over those of Series 1–2, thus taking us down to the end of the third century BC (Figure 6.11).

A similar effect is produced by adding the finds of the earlier part of the second century, consisting of

12 On the nature of this feature, see Goddio 2007: 101–2. Also see Goddio this volume Chapter 1 and Heinz this volume Chapter 2 for a discussion of the possible function of this area and also Grataloup this volume Chapter 7 for the ceramic evidence for this part of the site.

13 See Goddio 2007: 119–20 with fig. 3.93.

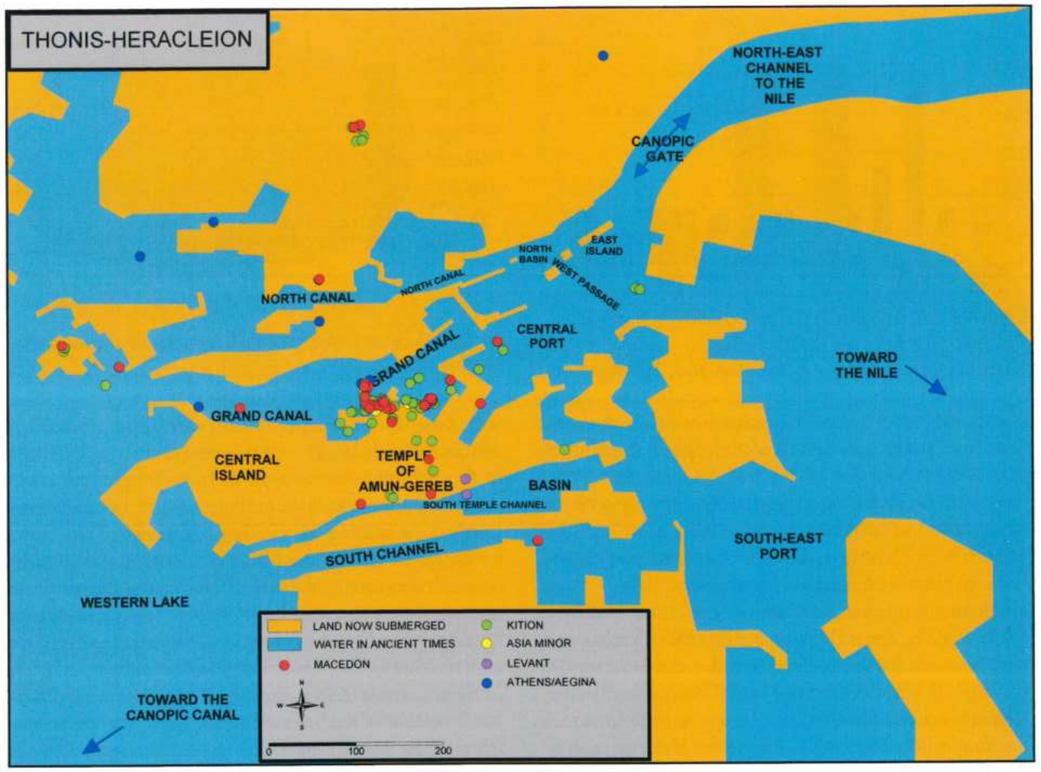

Figure 6.8 Distribution of pre-Ptolemaic coin finds. (Base map: © F. Goddio/IEASM.)

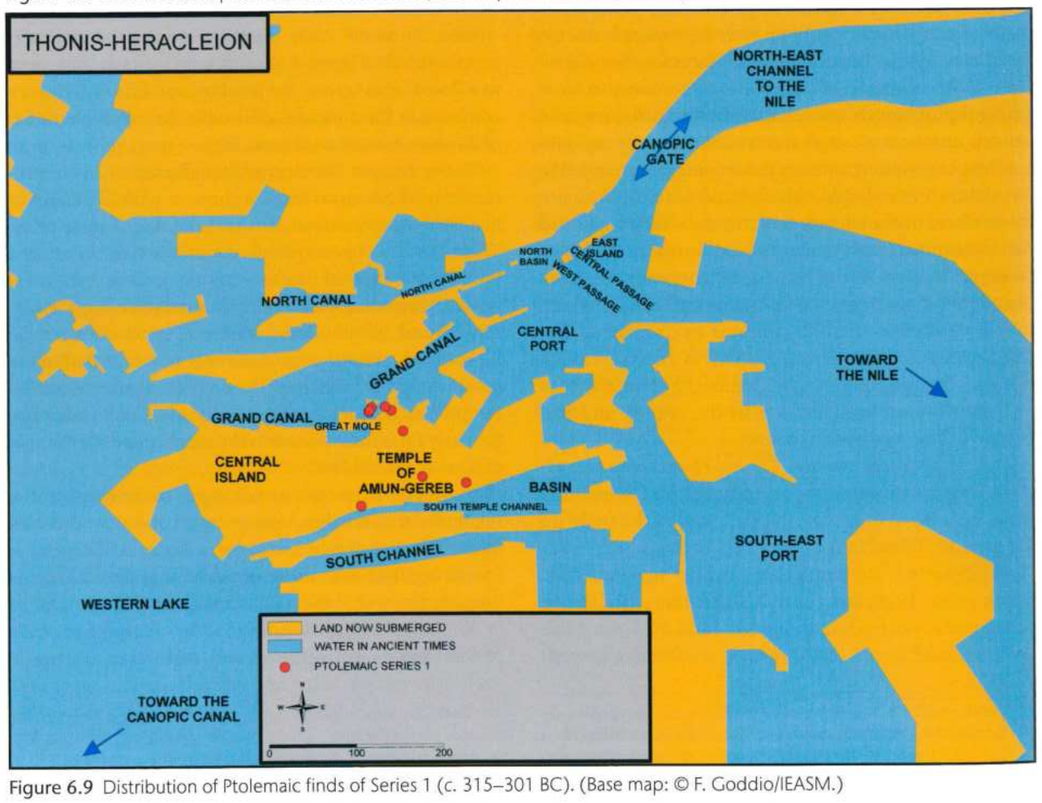

Figure 6.9 Distribution of Ptolemaic finds of Series 1 (c. 315–301 BC). (Base map: © F. Goddio/IEASM.)

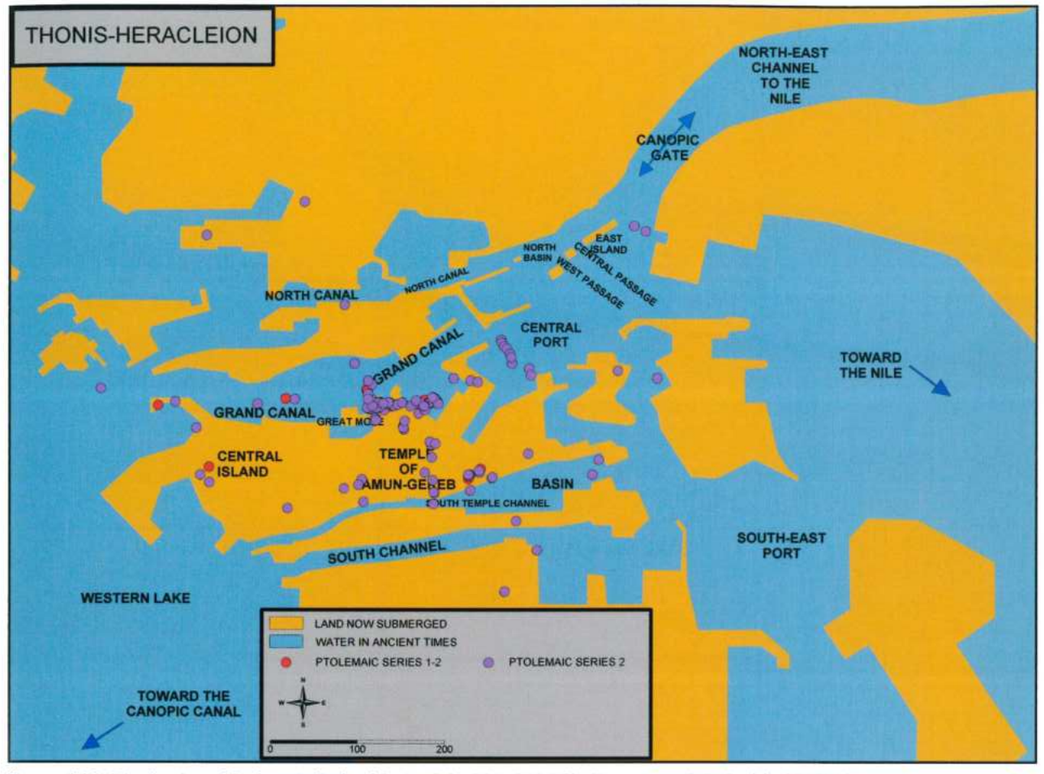

Figure 6.10 Distribution of Ptolemaic finds of Series 2 (c. 301–261 BC). (Base map: © F. Goddio/IEASM.)

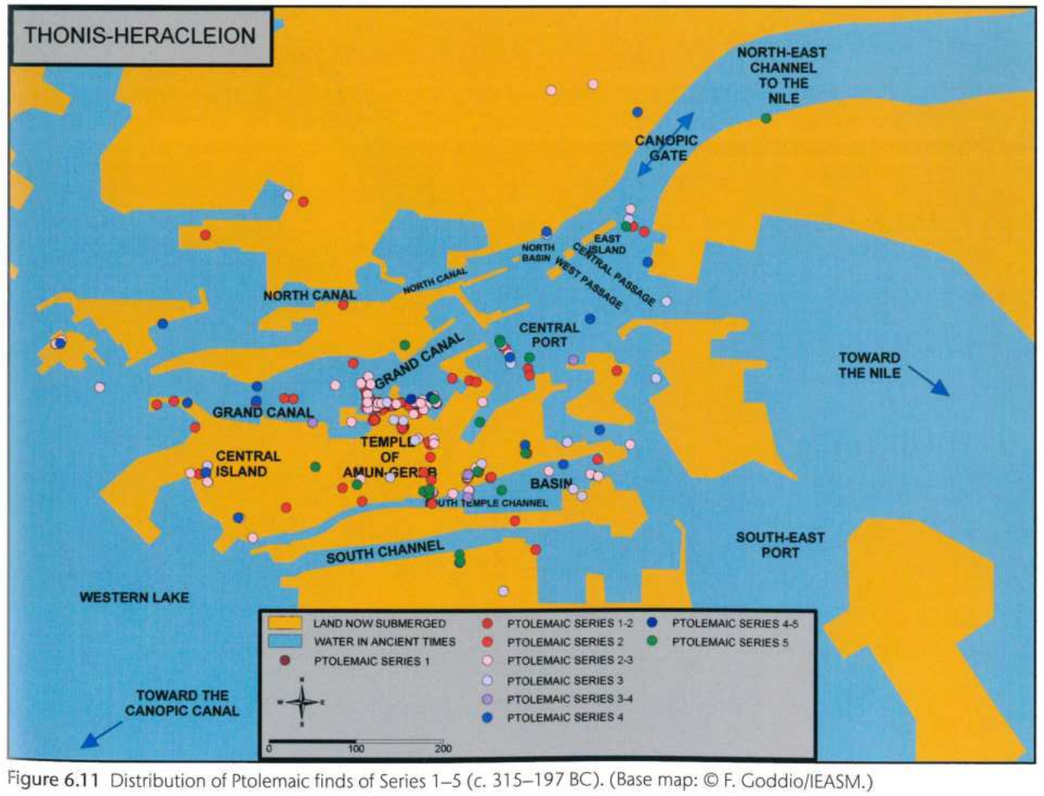

Figure 6.11 Distribution of Ptolemaic finds of Series 1–5 (c. 315–197 BC). (Base map: © F. Goddio/IEASM.)

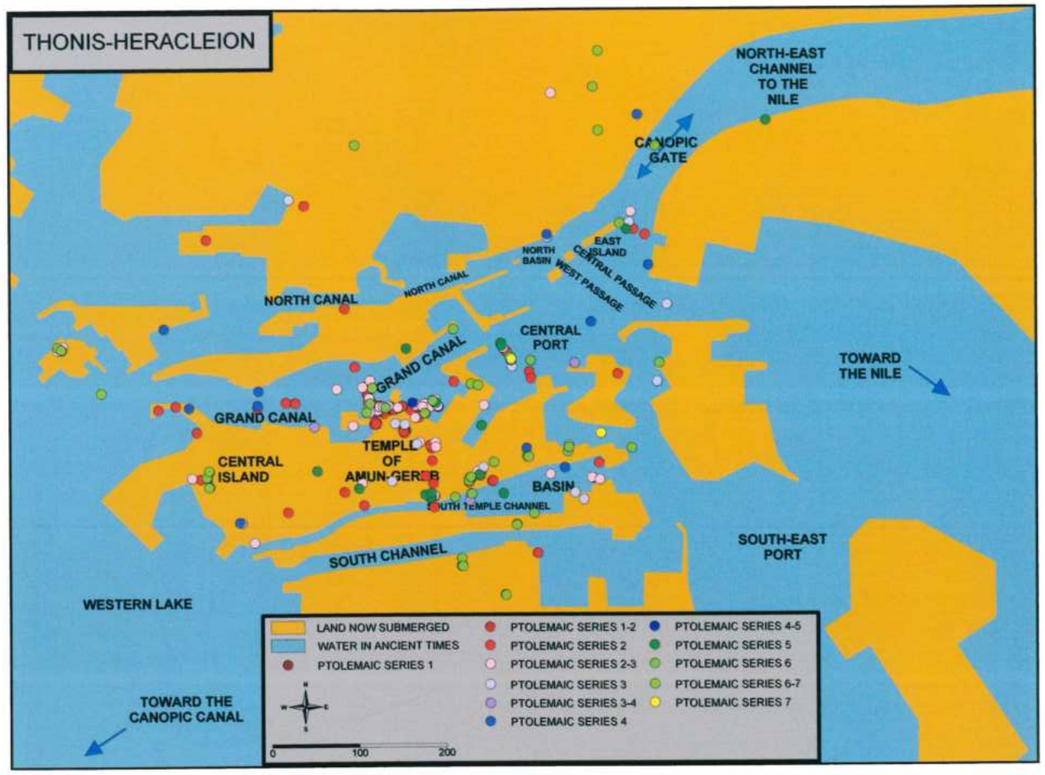

Figure 6.12 Distribution of Ptolemaic finds of Series 1–7 (c. 315–115 BC). (Base map: © F. Goddio/IEASM.)

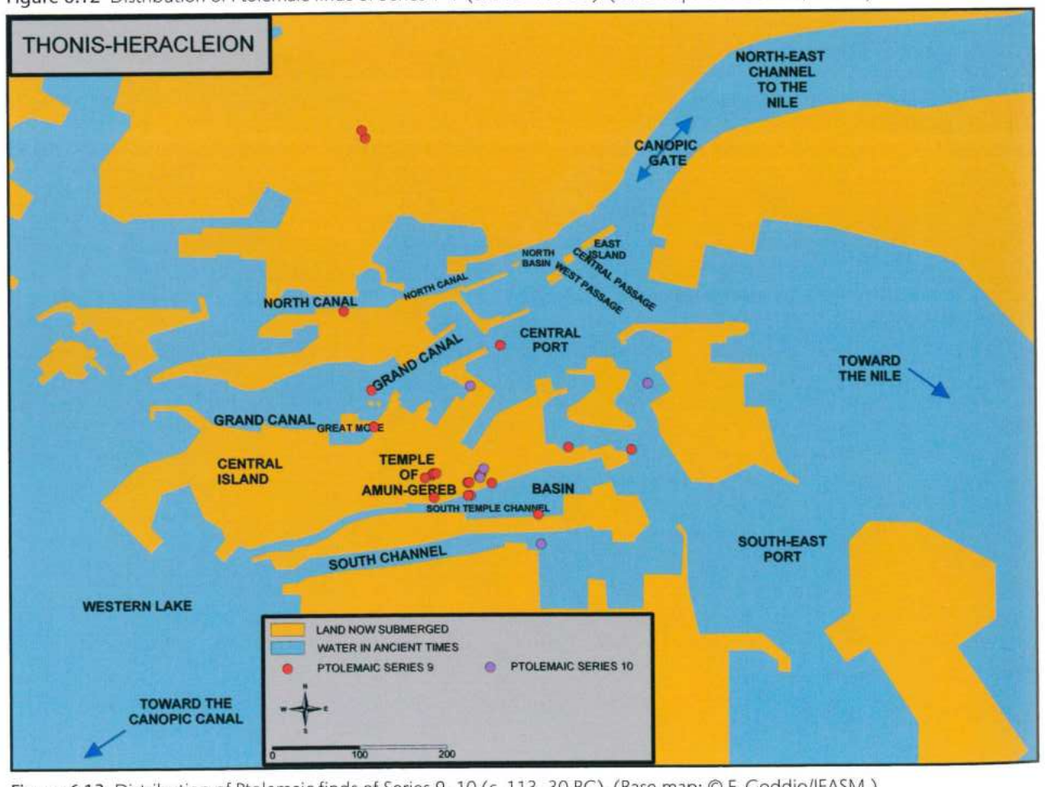

Figure 6.13 Distribution of Ptolemaic finds of Series 9–10 (c. 113–30 BC). (Base map: © F. Goddio/IEASM.)

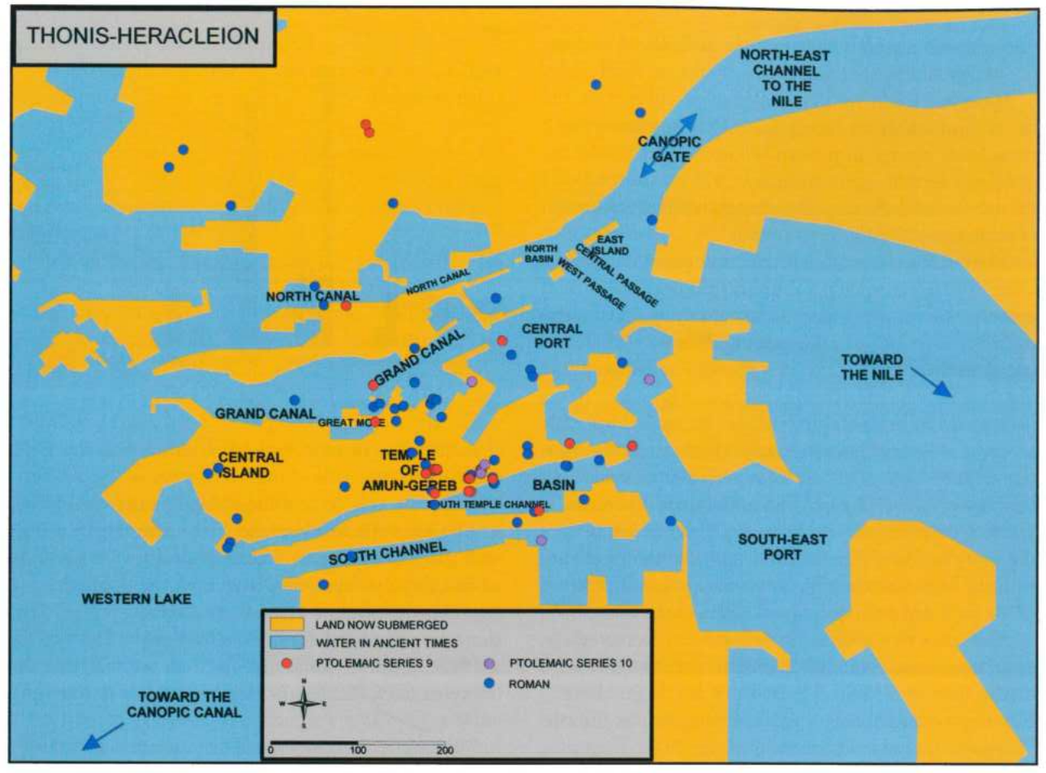

Figure 6.14 Distribution of Ptolemaic finds of Series 9–10 and Roman finds. (Base map: © F. Goddio/IEASM.)

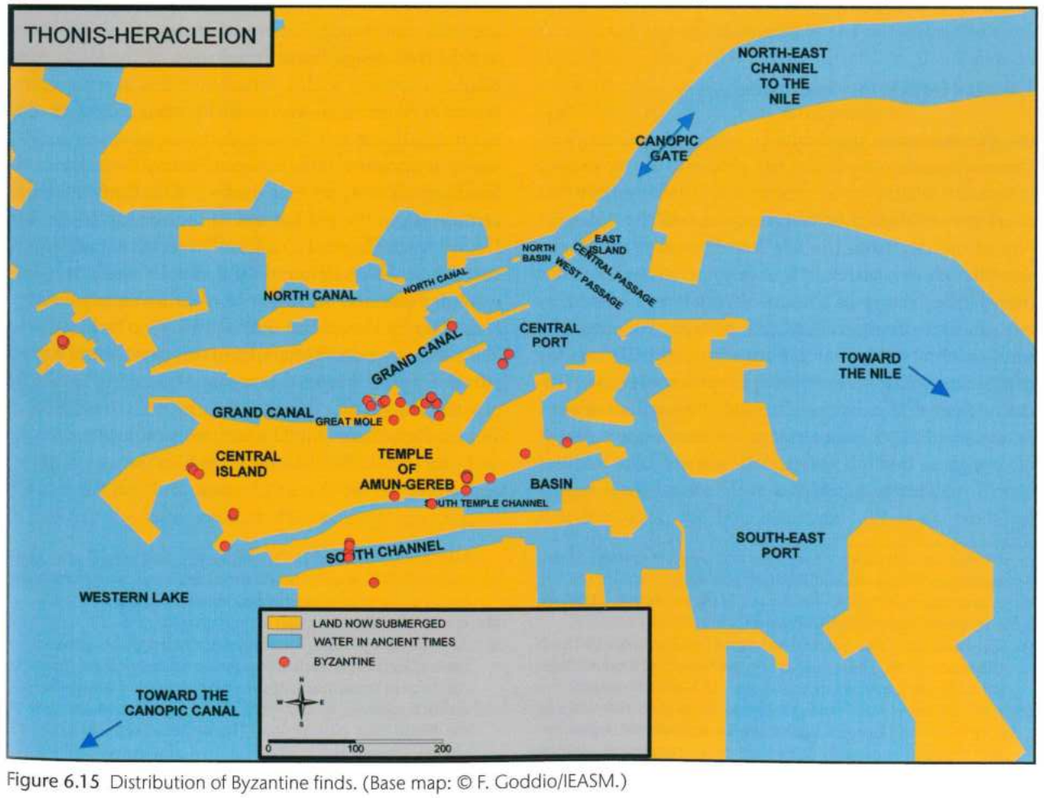

Figure 6.15 Distribution of Byzantine finds. (Base map: © F. Goddio/IEASM.)

Series 6 and a very small number of coins of Series 7 (*c.* 197–115 BC: Figure 6.12).

However, when we plot the finds of coins from the late second century to the end of Ptolemaic rule, we see a remarkable change in pattern (Figure 6.13). Circulation, or at least deposit, seems once more to have contracted to the area around the central temenos, with just a handful of outliers.

The evidence from the distribution of coins suggests, therefore, that at some point in the middle of the second century, a dramatic change occurred in monetary activity at the city of Thonis-Heracleion. Precisely when this may have happened is not easy to say. For although the distribution of coins of Series 7 might suggest that it was only after the beginning of that Series, in fact virtually no coins of Series 7 have been identified among the finds (see Figures 6.6–7). Thus, it is perfectly possible that the change occurred early within the period covered by Series 7, or even late within Series 6. If the latter were the case, this would make the transition contemporary with the burial of one of the known hoards from the site (*EH* 1.203), and perhaps suggest a date in the 160s BC.[14]

As Figure 6.14 shows, this contraction was perhaps only temporary. For although the numbers of coins dating from the Roman Period are not large, the distribution of those coins is again spread all over the site. This pattern changes dramatically again in the Byzantine Period, when the finds of coins are once more largely confined to the area around the Great Mole, and other areas of the Central Island (Figure 6.15).

Thonis-Heracleion in context

On the one hand, the evidence of the coin finds from Thonis-Heracleion, particularly given our ability to map it in such detail, provides us with a satisfying ability to chart the ebb and flow of coinage across the topography of the city from the late fourth century BC to the seventh century AD. But its ability to inform us about the specific history of Thonis-Heracleion is limited by our ability to contextualise this pattern. For example, we have observed a clear pattern of a wealth of finds for the Ptolemaic bronzes of Series 2, and an apparent dramatic change in behaviour around the border between Series 6 and 7. We have noted too a comparative dearth of coinage of the imperial period. But are these oddities specific to Thonis-Heracleion itself? Or are these simply

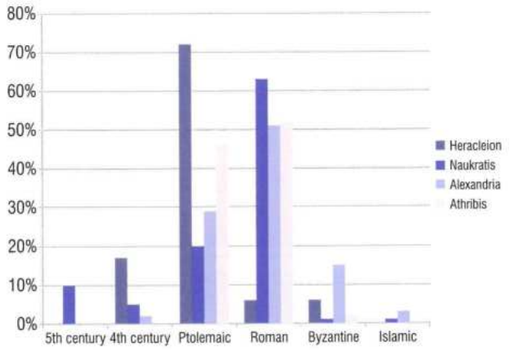

Figure 6.16 Comparison of sites by broad period.

characteristics of monetary behaviour across the Delta and Alexandria?

The only way to test the exceptionality or normality of Thonis-Heracleion is to try to compare its profile with those of other sites. In this respect we are fortunate in that the last four years have seen the publication of important excavation finds from Alexandria itself, and from the site of Tell Atrib (Athribis) in the Delta to the south of Thonis-Heracleion.[15] To these we may also add the coins from Flinders Petrie's excavations at Naukratis in 1884–5.[16]

We may begin with Figure 6.16, which compares the four sites in terms of periods represented among the coin finds. A number of curiosities stand out. Beginning with the fifth century BC, it comes as no particular surprise to find that a significant proportion of the finds from Naukratis belong to this period, nor that it is not represented at Alexandria, which was founded only at the end of the fourth century.[17] However, given what we know of the tight economic links between Thonis-Heracleion and Naukratis, now stunningly confirmed for the early fourth century BC in the publication of the version of the Saïs Decree from Thonis-Heracleion[18] it seems extraordinary that Thonis-Heracleion should not be demonstrating a similar pattern. The absence of fifth-century coinage from Thonis-Heracleion seems unlikely to be by chance. The site has yielded pottery from this period, and earlier, particularly in the northern part of the site.[19] Another possible reason for absence of fifth-century material at Thonis-Heracleion might seem to be the fact that the majority of coin finds from the site (as they are from all archaeological sites) are of bronze, and that there exists

14 For further discussion of the date and possible context of this hoard, see Meadows and Fabre (forthcoming).

15 Alexandria: Picard et al. 2012 (3,529 coins). Athribis: Krzyżanowska and Myśliwiec 2009 (1,682 coins).

16 The Naukratis coins (740 in total) were published twice by Head: 1886a and 1886b. These finds are not without their methodological difficulties: for the circumstances, see Möller 2000: 90.

17 The absence of fifth century material from the excavations at Athribis should be set alongside the hoard evidence. An important hoard of apparently more than 77 silver coins was said to have been unearthed at the site in 1929, and passed in to commerce (*IGCH* 1640). The contents that were recorded suggest burial in the first quarter of the fifth century BC.

18 von Bomhard 2012.

19 See Grataloup 2010, noticing, for example, the presence of ceramics of the sixth-fifth centuries BC in her Area B, in the central area to the north of the grand canal, and of fifth-fourth-century material in her Area C, along the northern side of the North-East passage into Thonis-Heracleion; see also this volume Chapter 7.

no fifth-century bronze coinage. However it should be noted that eighteen fourth-century silver coins have been found at Thonis-Heracleion.[20] The absence of fifth-century coinage from Thonis-Heracleion thus remains a mystery, and it is tempting to suggest that the reason for the difference in this respect between Thonis-Heracleion and Naukratis may lie in the different statuses of the two settlements.

Turning to the fourth century, we see that for this period the pattern is reversed. Less than five per cent of the coin finds from Alexandria and Naukratis date to this period, and nothing is recorded for Athribis.[21] By contrast, Thonis-Heracleion, as we have noted already, has a remarkably strong representation of fourth-century finds. However, it is important to note that these seem to date from the latter half of the century. Thonis-Heracleion is as barren of coinage of the first half of the fourth century as it is of the fifth.

The highly elevated percentage of Ptolemaic finds we find at Thonis-Heracleion is unique among the four sites. And the reason for this uniqueness is clear when we examine the pattern for the finds of the Roman Period. At Naukratis, the Ptolemaic and Roman finds account for around 80 per cent of all coin finds, and the same is true for Alexandria, while at Athribis the total is close to 90 per cent. For Thonis-Heracleion too, the total for these two periods is close to 80 per cent, but the vast majority of these are Ptolemaic finds. The very high percentage representation for the Ptolemaic Period is in fact a reflection not just of the ubiquity of Ptolemaic material, but also of the fact that the Roman Period is so poorly represented. It seems clear that this pattern must reflect a fundamental difference between the monetary history of Thonis-Heracleion and the other sites. This difference is observable, as we have seen in the distribution of finds on the site, which suggests a significant break in the pattern of circulation in the mid-second century BC.

There does, therefore, seem to be some correlation between the purely numerical pattern that emerges from the graph of coins by period, and the mapped distribution of the coins on the ground. This suggests to me a clear expansion of coinage across the city throughout the third century, and then a significant reining in of the use of coinage both in quantity and in physical location of its loss in the second half of the second century BC, and then throughout the first centuries BC and AD. Only towards the end of the latter century does coinage reappear in moderate quantities on the site, and then predominantly under Hadrian and Pius.

Coin production in the Delta region

For the majority of Egyptian sites, and indeed sites elsewhere, one would not ordinarily consider the question of coin production. For many Greek cities it is self-evident that coins were produced at them since we have coins that proclaim their place of origin, but it is extremely rare that the archaeological record has left us with any trace of the physical production of those coins. Within Egypt, we have virtually no coins, certainly before the arrival of Alexander the Great, that unambiguously state their place of production.[22] Even after the arrival of Alexander, matters are not straightforward. There has been considerable debate, for example, about the location of Alexander's original mint (Alexandria or Memphis),[23] and the location of a principal mint at Alexandria under the Ptolemies is largely a matter of likelihood and convention. Certainly the coins do not state their point of production, and indeed, as Lorber's forthcoming study of the early Ptolemaic silver will demonstrate, there is some reason to talk of branch or subsidiary mints.[24]

But before the Ptolemaic Period there are only a handful of coinages that were unambiguously issued within Egypt. These are the 'civic' issues of Naukratis;[25] the coins in gold, conventionally, though not necessarily correctly, attributed to Nectanebo II,[26] and much rarer issues apparently signed by the rebel king Tachos;[27] the silver coins indisputably struck in the name of Artaxerxes III as pharaoh, and of his satraps in Egypt; and bronze struck by these same satraps.[28]

However, two types of find from Thonis-Heracleion require us to consider the possibility of coin production within the city. The first of these is the coin die (Figure 6.17). This has been published fully elsewhere, so can be summarised here.[29]

The Thonis-Heracleion die consists of an irregular cube of bronze, with dimensions of *c.* 30 × 30 × 33 mm, and weighing 233 g, on which are engraved on three sides obverse dies for imitations of Athenian tetradrachms. They are disposed upon the bronze in such way that each has on its opposite side a blank face. Presumably this feature was intended to avoid having to place any one of the dies face down while another die was being struck. The style of the dies seems most closely to approximate that found on the late Athenian imitations produced

20 Two coins of Naukratis; one of Aegina; seven of Athenian type; five Alexanders and three unidentified.

21 Again, however, this absence is filled at Athribis by the hoard evidence. A hoard of approximately 700 silver tetradrachms is said to have been discovered at the site in 1905 (*IGCH* 1663).

22 For a survey of the evidence, see Nicolet Pierre 2005.

23 For a recent discussion of the question, see Le Rider 2007: 197–200.

24 Lorber (forthcoming).

25 For bronze issues in the name of both the city (NAY) and, apparently, Alexander (ΑΛΕ) see Head 1886b: 66–7. For silver with Athenian types and the legend NAY, see http://numismatics.org/collection/1944.100.75458.

26 Faucher et al. 2012.

27 Jenkins 1955: 150.

28 For the satrapal issues see Nicolet-Pierre 1979; for the royal issues, Mørkholm 1974; Price 1993.

29 Meadows 2011.

Figure 6.17 The bronze coin die from Thonis-Heracleion H9712. (Photo: C. Gerigk; © Franck Goddio/Hilti Foundation.)

by the Persian administration at the end of the fourth century. So on this basis, the die seems to belong to the last decades of Persian rule of Egypt.

Remarkably, although finds of ancient dies are extraordinarily rare, the Thonis-Heracleion die is not unique. Another such cuboid obverse die, once in the private collection of V. Adda of Alexandria and said to have been found in the Delta, has long been known, though now survives only in an electrotype copy in the British Museum. A reverse die appeared in commerce in association with a group of Athenian coins (*IGCH* 1663) and imitations said to have been found near ancient Athribis, and is now in the Numismatic Museum in Athens. Different in manufacture, but with a similar provenance, are two dies that were shown to George Hill at the British Museum, and said to have been found at Saïs. Altogether, then, we have five (or perhaps more accurately nine) dies for producing Athenian-type tetradrachms with provenances in the Egyptian Delta.[30]

Such an assemblage of material is unknown from any other area of the Greek world. It strongly suggests that the coinage for which they were designed—imitations of Athenian tetradrachms of the fourth century BC—was in widespread production in the Delta, and quite possibly at Thonis-Heracleion.[31] This proposition is seemingly confirmed by finds of Athenian tetradrachms from the site. I have recorded 7 specimens in 2,200 coins so far (0.32 per cent), which may sound unimpressive, but the American excavations at the Agora yielded just 23 fourth-century specimens from 14,000 finds (0.16 per cent).[32] No other Egyptian site, to my knowledge, has yielded as many Athenian tetradrachms outside of hoards.

30 Ibid. for a fuller discussion and illustration.
31 The extent to which this was the case has been a question of some debate among numismatists: see the summary, ibid.
32 Kroll and Walker 1993: 17–18 nos 15 (silver) and 16 (plated examples).
33 The attribution was first made by Babelon 1893: nos 613–18: see Callot 1992: 297.
34 Callot 1992: 298; cf. eund. 1993: 48.

Figure 6.18a–b Bronze coin of Kition type. From the collection of the American Numismatic Society 1944.100.58077 (E.T. Newell bequest ©ANS).

The other category of find which, to my mind, opens up the possibility of coin production at Thonis-Heracleion, is formed by a bronze coinage already mentioned above. Of the 255 Greek coins that are not Ptolemaic, no fewer than 109 (43 per cent) are of a single type (Figure 6.18). This has on the obverse a lion walking left on a dotted line with a ram's head in the field above, all within a dotted border; on the reverse is a horse walking left on a dotted line with a star of eight rays above, and a symbol of Tanit in the left field. In a number of the standard catalogues these coins are attributed to Evagoras II of Salamis.[33] In 1992, however, Callot pointed out that, whereas the excavations carried out at Salamis had not yielded a single specimen of this coinage, the several excavations carried out by Greek and French teams at the city of Kition had yielded no fewer than 25 such coins.[34] He thus felt justified in reviving an old attribution, that of Six, of these coins to the city of Kition.[35] Given that bronze coinage, in contrast to silver, tends to stay close to its place of production, Callot's reasoning cannot be faulted. And it can be further bolstered by the clear connection of these bronzes to the mint of Kition through the use of the Tanit symbol that appears on their reverse.[36]

What then are we to make of the fact that more than four times as many of these coins have now turned up at the site of Thonis-Heracleion? We should begin by noting that the distribution of these coins across the site rules out the likelihood that we are dealing here with a single find that is skewing our perception (Figure 6.19).

Moreover, we may add to our evidence from Thonis-Heracleion the fact that four specimens of this coinage were discovered by Petrie at Naukratis among a total of 21 pre-Ptolemaic bronzes that Barclay Head was able to identify.[37] The sample is small, but this means that this type accounts for 20 per cent of the Greek bronze at Naukratis. Moreover, it now transpires that the CEA excavations at Alexandria have also brought to light a coin of this type (1 of just 57 identified pre-Ptolemaic bronzes).[38]

35 Six 1883.
36 Callot 1993: 48–9; cf. Markou 2009: 14–16.
37 Head 1886a: 12.
38 Marcellesi 2012: 190 no. 1345. The coin is identified in the publication of the finds as a Siculo-Punic bronze. However, it is clear from examination of the piece that it is in fact a bronze of Kition. I am grateful to Jean-Yves Empereur and Olivier Picard for making it possible for me to see the coin in question.

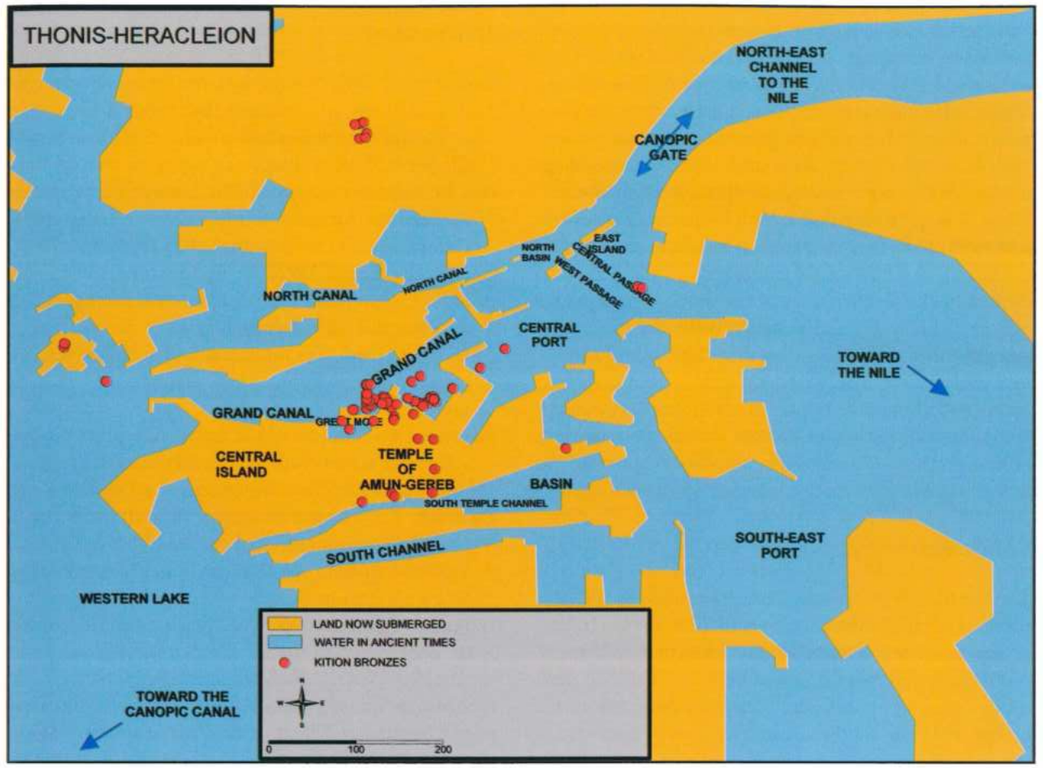

Figure 6.19 Distribution of 'Kition' bronzes. (Base map: © F. Goddio/IEASM.)

Even more extraordinarily, a coin of this type also turned up in the excavations of the Anubieion at Saqqara, where it was one of just five pre-Ptolemaic bronzes.[39]

We are justified, it seems to me, in asking whether a 40 per cent representation at Thonis-Heracleion and 20 per cent representation at Naukratis, and a total of 115 Egyptian finds so far from four different sites, may suggest that this is not a Cypriot coinage at all, but rather a local product of the north-western Delta region. But if this is an Egyptian bronze coinage, how do we reconcile this with the affinity in design with the coinage of Kition and the excavation of this type in Cyprus too? Conceivably, the answer is to be found in an observation made by Six in the nineteenth century, and corroborated by Callot (I quote the latter):

> *There are also coins of exactly the same type but of much coarser manufacture like those that Six (1883) qualifies as being of 'fabrique rude' (p. 312), of which a number of examples figure among the excavation coins of V. Karageorghis. These coins, few in number, would be classified as irregular or 'barbarous' strikes if they did not occur in the same excavations as yet other examples, extremely rare, of even worse manufacture. These coins, still unpublished, will not be described in detail here. I will note only that they show on obverse and reverse quadrupeds that with much indulgence could be interpreted as the lion and the horse of the prototype. Are these also irregular strikes?*[40]

If there are both genuine coins of the lion and horse type, and 'barbarous' imitations, is it possible that these imitations were being produced in Egypt, and may account for the high rate of discovery there? Imitation, as we have seen, was standard in the realm of silver coinage. Ideally, one would test this by conducting a stylistic analysis or die study of the finds from Thonis-Heracleion, but the condition of the coins sadly prohibits such an approach. There is one straw at which we can clutch. Callot notes of his finds from Kition-Bamboula: 'we can see a certain regularity in the adjustment of the dies since, of the 12 examples where it could be noted, they are oriented at 30°, 180° and 0°'. Although they are in poor condition, I have been able to note the die-axes for the Thonis-Heracleion specimens and can say that only 55 per cent of these conform to Callot's observation. There may be some reason to think with the finds from Thonis-Heracleion we are dealing, at least in part with an imitative coinage. The significant quantity of coins of this type found at Thonis-Heracleion and Naukratis may suggest that these were produced locally.

39 Price 1988: 75 no. 636.
40 Callot 1992: 298. He goes on to suggest that these poor quality imitations were issued during the last gasp of Pumiathon's reign after the arrival of Alexander the Great.

Whether this hypothesis is correct or not, it remains the case we have large quantities of coins of 'Cypriot' types occurring in the NW Delta and in Cyprus. This strongly suggests that such coin was flowing freely from one place to the other. We should not allow our uncertainty about the precise agency behind the production of this coinage to obscure the importance of this phenomenon of circulation. It is quite remarkable for a bronze coinage of this sort to circulate over so broad an area, and may suggest a relatively tight monetary integration of the Delta and Cyprus in the third quarter of the fourth century. This pattern actually fits rather neatly with the suggestion recently made by Markou[41] that the extensive and anomalous gold coinage of the fourth century Cypriot kings may have resulted from the import of gold from Egypt. In any event, the evidence from Thonis-Heracleion requires a radical revision of conclusions previously drawn for the lack of monetary interaction between Egypt and Cyprus.[42]

Conclusion

The site finds from Thonis-Heracleion, though still only partially identified, offer rich possibilities for the tracing of the monetary activity of this important settlement. Preliminary results suggest that we may be able to chart a beginning of monetary activity not long before the arrival of Alexander the Great. This activity consisted of the use and perhaps even production of bronze coinage, and perhaps too the production of silver. Following the Ptolemaic conquest three major changes occurred. Production of coin at the city stopped; foreign coin ceased to enter the city; and large quantities of Ptolemaic coin, produced at nearby Alexandria, arrived across the entire site. Distribution maps suggest a spread of monetary activity outwards over time from the ritual centre of the site to outer areas of Thonis-Heracleion until some crisis event lead to a sudden contraction of monetary activity in the 160s BC. Thereafter, coinage is found in much smaller quantities, suggesting that, if the event of the 160s had led to depopulation, inhabitants did not return in the same numbers. The Roman Period saw reduced coin use over the whole of the site, before this use contracted again to the old ritual core of the site in the Byzantine Period. From the crisis of the 160s, if such there was, the city never fully recovered.

Acknowledgements

My thanks are due to Franck Goddio for the invitation to work on this exciting material, and to the Hilti Foundation for continued financial support for this work. I am also indebted to audiences in Oxford and Alexandria for their comments on earlier versions of this paper.

41 Markou 2011: 223–4, 303.

42 See Destrooper-Georgiades 1995, who was able to draw on a much smaller body of evidence.

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7 Thonis-Heracleion pottery of the Late Period: tradition and influences

Catherine Grataloup

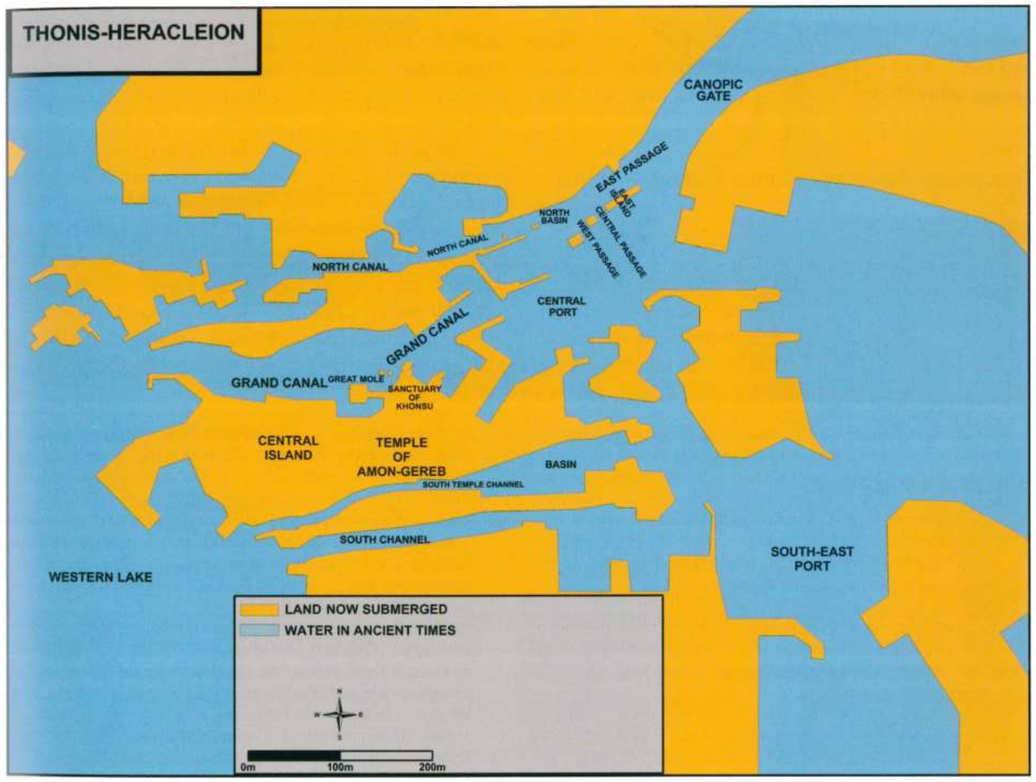


Figure 7.1 Plans and structures uncovered at Thonis-Heracleion. (Map: F. Goddio; © F. Goddio/IEASM.)

Introduction

The archaeological excavations conducted across Aboukir bay by the European Institute for Underwater Archaeology (IEASM), directed by Franck Goddio,[1] have revealed the sunken city of Thonis-Heracleion, which was situated in the Delta, near the mouth of the Canopic branch of the Nile.[2] This site is characterised by the large temple to Amun-Gereb and sits in a complex network of lakes, port basins, rivers and canals (Figure 7.1).

The excavations at the site have uncovered a ceramic assemblage that allows us to deepen our knowledge of this area in the northwest of the Egyptian Delta. The pottery from the Saïte to Ptolemaic Periods derives from both survey and excavation and allows us to consider the nature of the Thonis-Heracleion as a major port and *emporion*. In terms of the quantities of finds, it should be noted that the Persian and Ptolemaic Periods are better represented in the assemblage than the Saïte Period.

In recent years, research has been undertaken on the evolution of the production of Egyptian ceramics

1 I would like to thank Franck Goddio and his team, who have allowed me to work on this material. I would like also to thank the Oxford Centre of Maritime Archaeology for the invitation to present the preliminary results of this study at the Oxford symposium and the opportunity to publish it in this present volume. The drawings were made by Maha Ez el-Dihn and C. Grataloup, the photographs by Fernando Peirera (†), Philippe Rousseau (IEASM), and C. Grataloup.

2 The titles and abstracts of the publications on Thonis-Heracleion may be consulted on the website of IEASM: http://www.ieasm.org/publications. See also Goddio 2007.

between the Saïte and Ptolemaic Periods.[3] This paper will present new evidence from Thonis-Heracleion that covers this exciting period when the northwestern Delta became a major node in the commercial routes of Egypt and the Mediterranean basin. It will present a preliminary report on the impact of these contacts on the pottery from the site[4] and trace the development of the ceramic assemblage across the main chronological periods. The significance of the site in the networks of maritime exchange will be considered through the introduction of foreign pottery.[5] Alongside the import of fine and table wares was also a local industry that supplied, among other things, plain and cooking ware and also imitated foreign wares.[6]

Fine wares: liquid containers and table wares

Saïte Period

This period is characterised by the prevalence of imports, and most particularly in the current excavations of containers for liquids. The earliest pottery,[7] from the end of the seventh century BC to around the middle of the sixth century BC, consists of imported bowls from eastern Greece. Two examples of these bowls are illustrated in Figures 7.2.1 and 7.2.2, one a bird bowl dated to *c.* 630 BC,[8] the other a rosette bowl.[9] At the close of the seventh century BC[10] and during the sixth century BC a category of drinking vessel appeared that became widespread in archaic East Greek production is attested: the Ionian cup (Figures 7.2.3–5).[11] These represent an important part (22 per cent) of the Saïte-Period ceramics discovered to date and belong to two types that are also well represented at Naukratis.[12] These are Schlotzhauer types 5 and 9, the latter being, with variants, in the majority. They date between *c.* 610–525 BC, with the majority between 575 and 525 BC.

Alongside this group, a few other types of archaic-period Greek pottery have been revealed, although in limited quantities. Thus, from northern Ionia: a sherd of a Late Wild Goat style oenochoe (*c.* 750–600 BC) (Figure 7.2.6);[13] a sherd from a Clazomenian amphora (Figure 7.2.7) from the third quarter of the sixth century BC;[14] a Chian one-handled cup (Figure 7.2.8), which finds parallels with Chian pottery at the end of the seventh century BC;[15] a fragment of a Chian chalice

3 For example: French 1997; Harlaut 2002; French and Bourriau 2007; Defernez 2011; Masson 2011; Marchand 2013.

4 It should be noted that each excavation campaign uncovers material that adds to and modifies the picture that was presented of local production and imports to the site when it was first studied. See Grataloup 2008.

5 In the Saïte and Persian periods most trade was with Cyprus, Syria-Palestine, Phoenicia, the Aegean and Attica.

6 Amphora are not included in this study, but it is right to report on current research on imitations of this type of container which appeared in various forms from the sixth century BC to the second century BC (the chronological limits of this study). See Defernez and Marchand 2006.

7 A sherd decorated with concentric circles and a band seems to belong to a Cypriot Black-on-Red globular juglet, dating to around 750–650 BC. I would like to thank Sabine Laemmel, who kindly gave me her opinion on this sherd. Although from the same layer as the bowls presented in the following text, it is possible that this sherd was deposited in this layer at the time of its formation. To date, it represents the earliest sherd from Thonis-Heracleion. This means that the north zone still contains much evidence for the first years of occupation of this coastal site, which appears to develop in the area towards the sea, with a migration of settlement inland with time. The possible impact of the geographical environment on the evolution of the occupation should be seen, in part, between Berezan and Olbia: Solovev 1998: 208–9, 222.

8 Distinguished by a bird figure (a cygnet?) and geometric decoration (cross-hatched lozenges, strokes, circles) and attributable to northern Ionia. It is widely distributed and found in the western Mediterranean at Lattes (Py 1993: 440), to the Black Sea at Berezan (Piotrovski 2005: pl. 40) via Istria (Alexandrescu 2005: 389, no. C53), and Cyprus (Calvet and Yon 1997: pl. IV.36–40). The excavations at Clazomenia yielded bird bowls with different profiles. The bowls found in contexts between 650–630 BC (Hurmuzlu 2004: 85, fig. 16) appear to be closer to our example. Note here that the bird bowls studied from Berezan in Posamentir's article on Berezan and Naukratis (Posamentir 2006: 163) are considered to be bowls from northern Ionia dating to not earlier than 630 BC. According to the classification of decoration established by Coldstream, the sherd from Thonis-Heracleion should be placed in group II, dating 675–640 BC (Coldstream 2009: 299–300).

9 Their production should be situated at the close of the last quarter of the seventh century BC and they are especially frequent in the beginning of the first half of the sixth century BC. Attributed to workshops in northern Ionia, or near Clazomene (Cook and Dupont 1998: 26). At Naukratis, these bowls are found until the second half of the sixth century BC. They had a wide distribution, being present at Berezan (Piottrovski 2005: 42, cat. no. 43), Histria (Alexandrescu 1978: 339–40, pl. 59 C56, C59, northern Ionia at the end of the seventh-beginning of the sixth century BC), Cyprus (Gjerstad 1977: pl. XI), Lattes (Py 1993: 440), and also at Tocra (Boardman and Hayes 1973; the profile and the decoration are paralleled by 20–24, fig. 9.2039, where the form appears to belong to the beginning of its history). We stress the remark by Pierre Dupont (Dupont 2004: 449): "Bénéficiant de l'expérience acquise sur les bols à oiseaux de grande diffusion, les officines nord-ioniennes récidivent avec le lancement de modèles à rosettes…". At this stage in the study of material discovered in the northern zone of Thonis-Heracleion, it is right to point out that at Naukratis the bird bowls date between 620 and 610 BC, and that other hemispherical bowls (*Kalottenschalen*), lotus bowls, eyes-bowls, bowls with meanders produced in northern Ionia, and rosette bowls, were also found. It is possible that such a range may be uncovered at Thonis-Heracleion in future excavations.

10 Note that the break between the end of the seventh century BC and the beginning of the sixth century BC is difficult to identify. The material from the sixth century BC seems, at the moment, to mainly to belong to the Saïte period.

11 Current research challenges certain accepted origins of production. See Dupont 2000.

12 I am deeply grateful to Dr Udo Schlotzhauer, Archaeological Institute of Berlin, who kindly supplied me with information about the profiles at Thonis-Heracleion, and highlighted the place of these two types at Naukratis.

13 Cook 1991: 112; Boardman 1995: 162; Cook and Dupont 1998: 51–5; Posamentir 2006: 161, fig. 5 (Berezan: treatment of the ground, the belly and the red spot).

14 Cook and Dupont 1998: 105: fig. 12.7; Sidorova 2009: 13, 52, pl. 22.

15 Boardman 1967: 12, 124, 127 type D (brown paint on cream slip), fig. 78.378.

Figure 7.2 Saïte period fine ware imports.
1 East Greek bird bowl; 2 East Greek rosette bowl; 3–5 Ionian cups; 6 Late Wild Goat style oinochoe; 7 Clazomenian amphora; 8 Chian one-handled cup; 9 Chian chalice; 10 'Samian' olpe; 11 table amphora; 12 bottle; 13 Attic Black Figure ware cup-skyphos; 14 early Middle Corinthian aryballos.

with a creamy white slip (Figure 7.2.9), the rim decoration of which, the only decorative element that we have, is mentioned at Tocra amongst type III examples, dated to 570 BC;[16] an olpe[17] with a whitish slip decorated with brown bands (Figure 7.2.10), the nearest parallels of which are found in Samos in a context dating 560–550 BC;[18] also, from east Greece, an undecorated table amphora (Figure 7.2.11) close to the shapes recovered from Samos and in the same fabric;[19] an elongated bottle (Figure 7.2.12), neck missing, but which probably belongs to the group attributed 'without good reason' to Samos and known during the sixth century BC;[20] from mainland Greece, from Attica, a Black Figure ware sherd from a syphos-cup dated to the third quarter of the sixth century BC (Figure 7.2.13);[21] from Corinth, the base[22] of an Early or Middle Corinthian aryballos, the decoration of which, although unclear, probably the lower part of the body of an animal (Figure 7.2.14).[23]

No contemporary local imitations of imported ceramics have been identified to date.

Persian Period/Local Dynasties Period

The Persian Period is clearly attested in certain sectors of the site, which are different from those occupied in Saïte times. The transition between the end of the sixth century and the beginning of the fifth century BC is, however, from the point of view of ceramics, unclear. Nevertheless, the areas of the Persian occupation present a characteristic repertoire of liquid vases. Local vessels are now common, even if imports form the majority of the assemblage. Attic Black Gloss pottery—both containers and table wares—are well attested in the ceramic assemblage for the Persian Period.[24] The containers include: bolsals (Figure 7.3.1),[25] shallow bowls (bowl: shallow wall and convex-concave profile) (Figures 7.3.2–3), cups (Figure 7.3.4), cup-skyphoi (Figure 7.3.5–6), askoi (Figure 7.3.7), kantharoi, cup-kantharoi, lekanoi, pyxides, lekythoi, squat lekythoi, and a number of type A skyphoi, copies of which date to the early fifth century BC and the fourth century BC (Figures 7.3.8–10).[26] By contrast, the only Attic Black Gloss table ware form from this period is the fish platter.

Attic Black Figure ware pottery is not well represented: a sherd of a Black Figure cup (Figure 7.3.11) from the 'Leafless Group' workshop (*c.* 500 BC) and a sherd from a lekythos (Figure 7.3.12) attributable either to the Gela painter (575–475 BC) or to the Phanyllis Group of the same date.[27]

At this stage in the excavations, we have not identified local imitations for most of these Attic types during this period. Only the squat lekythos appears to have been copied, but in very small quantities. An example of a finely-made squat lekythos in unslipped silt ware (Figure 7.4.1), comes from a context dating to the end of the fifth century BC to the first quarter of the fourth century BC, and a siltware lekythos references the vocabulary of the Black Deianeria type (Figure 7.4.2).[28]

The repertoire of Attic Red Figure ware is limited and is only found in two areas of the site, both of which have cultic associations: an area to the north of the temple of Amun-Gereb and an area in the East Passage. Thus, a bell-krater (Figure 7.4.3), dated *c.* 430–420 BC should be mentioned,[29] and also an askos (Figure 7.4.4), probably dating to the last quarter of the fifth century BC.[30] Squat lekythoi are, however, well represented.[31] The iconography consists of a woman holding a box (Figure 7.4.5),[32] a feline

16 Ibid; Boardman and Hayes 11966: 58–9, type III. A study by Lemos (2000: 14) suggests that this type belongs to the wild goat style in Chios from around the seventh century BC to the first decades of the sixth century BC. An example is known from Berezan and is dated between 570–530 BC (Piotrovski 2005: 94, 145 no. 92) or the first quarter of the sixth century BC (Cook and Dupont 1998: 50).

17 Also called a 'jug': Boardman 1967: 144; Boardman and Hayes 1973: 75.

18 Furtwangler and Kienast 1989: 91 no. 631, context 141: 560–550 BC Abb.15.cb. Less slender forms at Berezan were also attributed to Chios: Piotrovski 2005: nos 101, 102.

19 Boardman and Hayes 1966: 87 and pl. 65.951. Note, however, that this shape is very common in decorated north Ionian examples from the first half of the sixth century BC. See Piotrovski 2005: 45 fig. 52, decorated in the wild goat style; Walter-Karydi 1973, Taf. 113 nos 924–8.

20 Cook and Dupont 1998: 133 fig. 19.1.c; Knigge and Tancke 2005: 84 and Taf. 18.2; Piotrovski 2005: no. 83, Ionia, Lindos, second half of the sixth century BC (Berezan).

21 The unslipped band along the edge of the body bearing, here, the decoration of a figure running to the left, separated from a palmette by a branch of ivy. See Petralkova 2006: 33–4, pl. 19; band cup 540–530 BC. This form was introduced around the middle of the sixth century BC. I thank Dr Thomas Mannack, Reader in Classical Iconography, Beazley Archive, Classical Art Research Centre, Ioannou School for Classical and Byzantine Studies, for this information.

22 A round base marked by a light depression, rising to a globular body, decorated with a painted rosette on the base, and painted and incised on the turn of the base in brown.

23 Although we are at the beginning of the study of this site, the low numbers of Corinthian pottery is close to the findings that have already established that Egypt never represented an important market for Corinth (Smoláriková 2002: 30, 47). Corinthian pottery is attested at Alexandria from the end of the seventh century BC: Venit 1985: 187 no. 10.

24 Or Red Glaze ware in two forms: bolsal and shallow bowl, the latter with a shallow wall and convex-concave profile.

25 There is a guilloche circle around palmettes, not present on the drawing.

26 To date, one plate has been identified, dating to the end of the fifth century BC, Sparkes and Talcott 1970: 146, figs. 10.1022, 1024.

27 I thank Dr Thomas Mannack for this identification. We also note the presence of some small Attic Black Figure (10 sherds), half of which may be placed 550–475 BC.

28 Sparkes and Talcott 1970: 151, pl. 38 nos 1102, 1107.

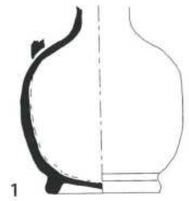
29 For this vessel and its ornament see a bell krater attributed to Polygnotus by Beazley 1931: 89.3–4, 90.3a, 4a, pls 1243–44; 1963: 1029.28; Matheson 1955: 55, pl. 41; CVA Bologna Museo Civico 1243–4, pls 89.3–4, 90.3a, 4a.

30 Rotroff 2006: 289, pl. 110.1162.

31 They represent about half of all Red Figure pottery. For the place of these squat lekythoi in Egypt, see Defernez 2003: 351.

32 Sparkes and Talcott 1970: 153–4, fig. 11.1120; Salles 1993: 181, fig. 193.174; Defernez 2003: 343, type 225.

Figure 7.3 Persian period Attic fine ware imports.
1 bolsal; **2–3** bowl with convex-concave profile; **4** cup; **5–6** cup-skyphos; **7** askos; **8–10** type A skyphos;
11 cup belonging to the Leafless Group workshop; **12** lekythos, attributable to the Gela painter or the Phanyllis group.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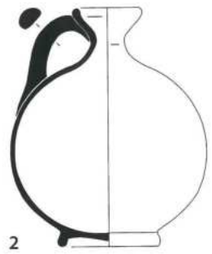
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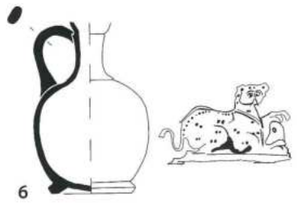
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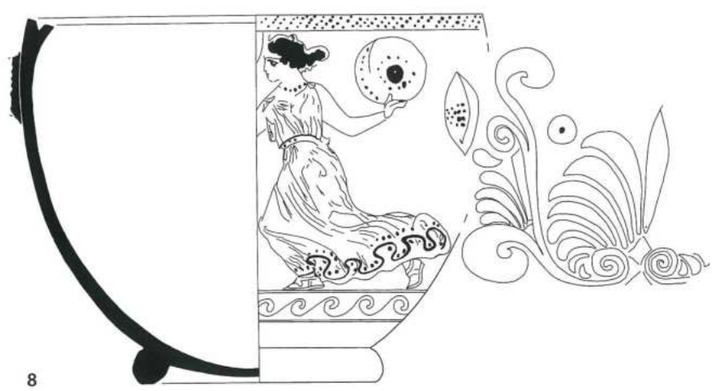
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Figure 7.4 Persian period local and imported fine wares.
1–2 siltware aryballoid lekythoi; 3 Attic Red Figure bell-krater; 4 Attic Red Figure askos; 5–7 Attic Red Figure squat lekythoi; 8 Campanian skyphoid pyxis.

(Figure 7.4.6),[33] or a palmette (Figure 7.4.7),[34] the latter being the most common decorative motif. The import into Egypt of Attic lekythoi with cylindrical bodies should be placed during the last quarter of the fifth century BC and the beginning of the fourth century BC, as is the case at Tell el-Herr.[35] A Campanian skyphoid pyxis, dating *c.* 350 BC (Figure 7.4.8),[36] has also been identified from Persian contexts.

In addition to Greek influence, other external influences on local pottery forms are perceptible on jugs, sometimes also referred to as juglets.[37] This small container[38] quickly became part of the ceramic repertoire and remained so, at least at Thonis-Heracleion, up to the Ptolemaic Period. For the Persian Period,[39] we must look to the Palestinian repertoire for parallels or typological elements, such as the elongated profile, piriform body and flat base.[40] Figure 7.5.1 is assumed to be an imported form of this pottery, whereas Figure 7.5.2 is a locally-produced marl copy and 7.5.3, a siltware copy, and are most probably related to the same repertoire.[41]

At Mevorakh, another type of juglet with a squat profile (Figure 7.5.4–6)[42] is the most common type in the Persian Period in Palestine and examples date to the fifth-fourth centuries BC.[43] No imported example has been identified at Thonis-Heracleion, where this form is only found in local fabrics, always with a flat base, and profiles such as those published by Lehmann, or from tombs at Phlasou (Cyprus).[44] The majority of these juglets are in marl ware and several exhibit flaws in their manufacture.[45]

During the Persian Period, a specific local production appears which is probably related to the Assyrian repertoire.[46] Figures 7.5.7–8 illustrate a beaker/cup, and Figures 7.5.9–10 a bowl.[47] These are characterised by a quite limited typology, an inspiration drawn partly from the Assyrian ceramic tradition of the eighth-seventh centuries BC,[48] and partly from metal vases.[49] Furthermore, the choice of a white clay[50] reinforces the idea that the quality of these Assyrian imitation ceramics was important.[51] It also indicates the probable existence of workshops in the Delta (those in the western Delta are relevant to the material from Thonis-Heracleion) where the clays necessary for these fabrics occur. These vessels date to between the third quarter of the fifth century BC and the middle of the fourth century BC, with, possibly a slight change in the appearance of some types. There is a shift in neo-Assyrian vessels to those made locally in Egyptian marl through the period of Persian domination and into the local dynasties.[52] While this marl production for a local population was a new development, it does not appear to have been major in scale. Production was perhaps occasional, with the sudden beginning in the second half of the period of Persian domination and an abrupt end in the latter period of the local dynasties.

33 Beazley 1931: 116, pl. LX.8; Sparkes and Talcott 1970: 1538q, pl. 38; Wilson 1982: 29, pl. XXVI.2; Bibakis 1985: 243, no. 353; Robertson 1987: pl. XXIV.31–33.

34 Sparkes and Talcott 1970: pl. 38; Defernez 2003: 341–52. The small size of several lekythoi decorated with palmettes was noted at Tell el-Herr (Defernez 2003: 345) and corresponds to a late variant in this group.

35 Defernez 2003: 352.

36 Smith and Pryce 1926: IVEa.8, pl. 91 11.4A-B; Friis Johansen 1955: pl. 247.244.3A–B.

37 For this variation on terminology see David 2012: 71 note 16.

38 This form is already present in the first half of the sixth century BC, for example at Berezan, with North Ionian copies with either a straight or a triangular rim, a handle attached from the rim to the top of the body, and painted decoration: Piotrovoski 2005: 58–9.

39 Defernez 2003: 158–62, 253–7, 338–40.

40 Ibid.: 338 type 218.

41 Stern 1978: 38, fig. 10.7; Kapitaikin 2006: 38, fig. 10.7 (perfume juglet, common type).

42 Defernez 2003: 338–9, type 220.

43 Stern 1978: 38–9, fig. 9.15.

44 Lehmann 1998, Taf. 45.271–2 and Taf. 190, it is notable that the same context yielded the form with the elongated body. Georghiou and Karageorghis 2013: 94, pl. XIV.33, 57, pl. XVII.13. It should be noted that on the local copies the handle is not always attached to the rim.

45 Deformed body, irregular firing.

46 Grataloup 2012.

47 These Achaemenid bowls appear quite suddenly in the Egyptian repertoire of the Late Period and then seemingly persist until the beginning of the Roman period. They are also represented in different modes of production (terracotta, siltware, unslipped, slipped).

48 Notably those neo-Assyrian luxury wares called 'Palace ware', most particularly liquid vases. Anastasio 2010: 32: 'goblets and beakers'.

49 Such as bronze bowls: Fabre 2008: 158, 171–2. For type 3 at Thonis-Heracleion (Grataloup 2012: 178), a neo-Assyrian original is recognised as the inspiration. Thus Defernez (2009: 117–118) recalls that the Achaemenid bowls or phiales are 'of Neo-Assyrian origin, and possess numerous counterparts in terracotta, glass and faience' and that they 'constitute the first step in what was called, until recently, the "Achaemenid international style" industry'. However, it should be noted that, regarding the copies from Thonis-Heracleion, the profile of the pottery vases do not appear, to date, to evolve in the same way as the metal ones, thus the rims are not high or so out-turned, although such forms are present in metal at Thonis-Heracleion (on this point see the work of Fabre on the bronze bowls found at Thonis-Heracleion: Fabre 2008: 158, 171–2), Pfrommer 1987: fig. 71.

50 The sole example/copy in white clay, with a flat base, was identified on the site from a context probably dating to the end of the fifth century BC.

51 Thus, we could stress a relationship of colours between the Assyrian ceramics belonging to A and B wares and Egyptian pottery presented in this article: the most common colour in Ware A is beige, with variations between reddish and greenish hues due to firing. The greenish colour is most frequent in Ware B, which corresponds in the literature to 'Palace ware': Kreppner 2006: 18–22, 53 and pl. 97.2.

52 On this subject, we are reminded that the neo-Assyrian vessels in question belonged to a specific production called 'Palace ware' which was bound to a particular aspect of Assyrian culture that may have persisted and as Kreppner (2006: 171) argued, 'The fall of the Neo-Assyrian Empire neither interrupted ceramic production, nor caused a change in wares and forms (…). Thus a continuity of pottery production is proven from the mid seventh throughout the sixth as far as the beginning of the fifth centuries B.C.'.

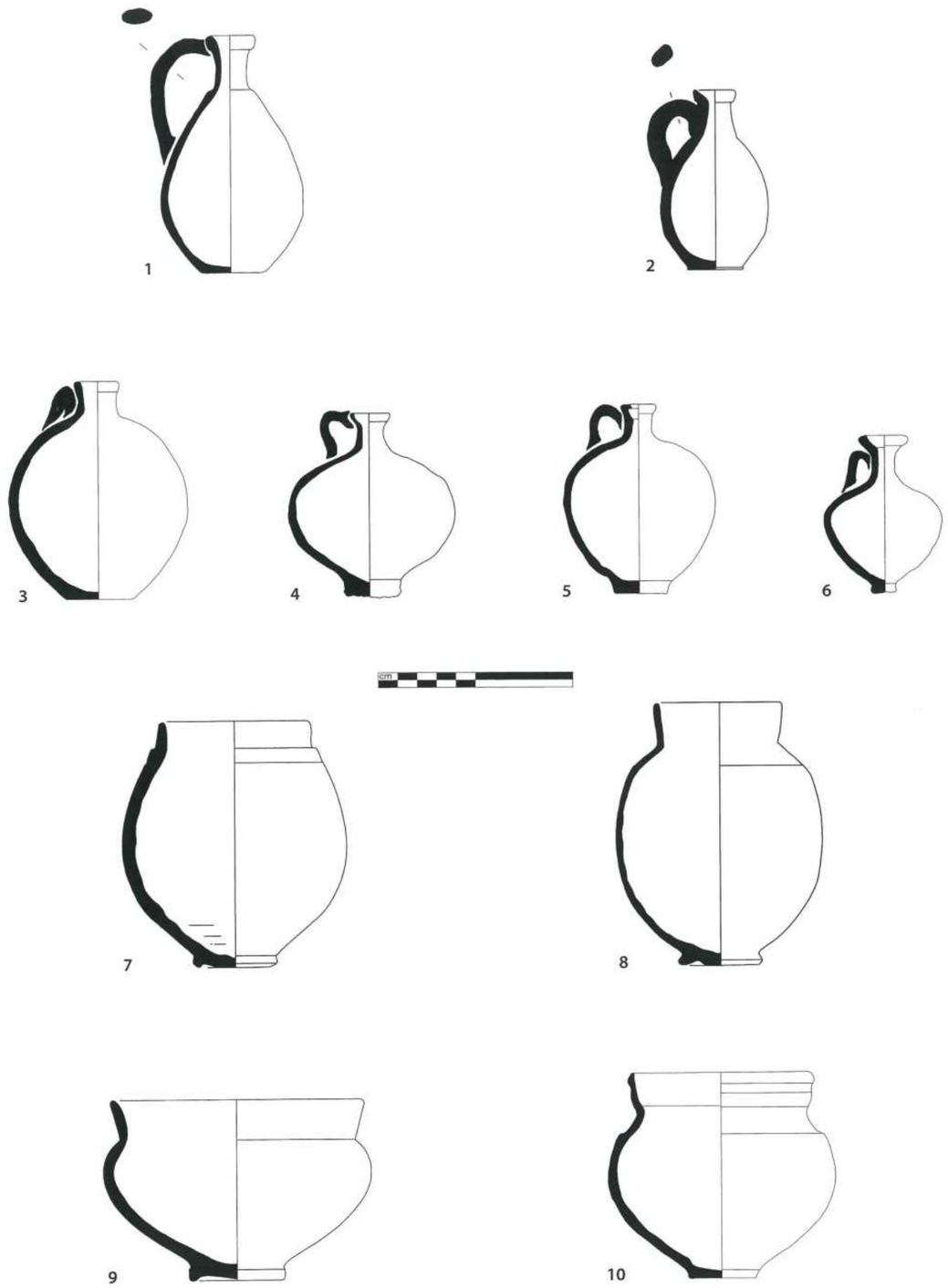

Figure 7.5 Persian period local and imported fine wares.
1 Palestinian juglet; 2 siltware copy of Palestinian juglet; 3–6 siltware juglets; 7–8 marl clay beakers; 9–10 marl clay bowls.

Painted and plain table amphora (Figures 7.6.1–2) were found in the same contexts as the marl wares. These were the only imports without any local imitations and represent a new ware to Thonis-Heracleion at this time.[53]

Ptolemaic Period

It is important to stress that, to date, no Eastern Sigillata A (ESA) ware has been identified at Thonis-Heracleion, while Campanian A ware (Figure 7.6.3)[54] has been found in context. These two facts suggest a date for the abandonment of the site, at least from the point of view of ceramics. According to data from Alexandria, it seems that Campanian A ware is well represented between 150 and 125 BC and was no longer imported from the last quarter of the second century BC (125–100 BC). Consequently, with the absence of ESA from Thonis-Heracleion,[55] it is possible to suggest that the site was abandoned before this type of pottery was imported, i.e., before 125 BC, perhaps even between 150–125 BC.[56]

It is notable that in the Ptolemaic Period local products become more numerically significant than imports.[57] This was not the case previously when local wares were in the minority and imports dominated the ceramic assemblage. These local wares, however, were clearly influenced by imports and show a clearly Hellenic typology. Local potters also attempted to imitate Attic Black Gloss by firing the ceramic in a reducing atmosphere. Thus, if the fine Greek pottery present in the Persian Period had little influence on the contemporary local ceramics, the same cannot be said for the Ptolemaic Period and we can note the presence of a number of examples of local products that were clearly influenced by imported ceramics.[58] An askos (Figure 7.6.4)[59] clearly references the squat lekythos (Figure 7.6.5),[60] a shape in the Greek repertoire in the second quarter of the fifth century BC. Another example are the lekythoi with a short neck and concave rim, which are fired in an oxidizing atmosphere in order to imitate the Attic 'Black Deianeira' type with a globular body.[61] These lekythoi were produced in different fabrics, one of which is closer to the slipped production from Mareotid kilns (Figure 7.6.6). The kantharos identified in two examples fired in a reducing atmosphere (Figure 7.6.7) correspond to the 'Large Baggy' type dated *c.* 250–200 BC,[62] some of the details of which already existed on kantharoi of the third quarter of the fourth century BC.[63]

Inspired by a Greek repertoire, the oinochoi from Thonis-Heracleion are in a mixed fabric (Figure 7.7.1), or a fine siltware fabric fired in either an oxydizing (Figure 7.7.2) or reducing (Figure 7.7.3) atmosphere, and also in a marl fabric.[64] Greek jugs known from Athens were also copied in a marl fabric or in fine slipped siltware (Figure 7.7.4–5): the most frequent form is Shape 1 which has a ring-shaped base and is known to date from 270 BC.[65]

A rare type of jug with piriform body, enlarged neck and strainer,[66] which was probably made in a mixed local fabric, was found practically complete (Figure 7.7.6).[67] This form is similar to a fragment of either local or Cypriot manufacture from a deposit in Alexandria from the end of the Ptolemaic Period.[68] Consequently, it could be an example of a form drawing its inspiration from beyond the Greek world. It should be noted that the examples from Thonis-Heracleion are from contexts dated to the end of the third century BC to the first half of the second century BC.

Several vases may be matched to an Achaemenid pottery tradition. Fragments of a hydria or a vessel with an enlarged neck (Figure 7.7.7–8), made in fine siltware and fired in either a reducing or oxydizing atmosphere, are similar to vessels found in the necropolis at Hadra.[69] Their necks—also called 'trumpet necks'—can be compared to early Hellenistic vessels with a closed ovoid body in faience,[70] which according to Enklaar are 'the local pottery of Alexandria'.[71] What is notable is that this

53 Note that the painted table amphora represent a homogenous group in terms of their fabric, but their origin is still to be determined (Defernez 2007b: 571–2). This was different from the plain table amphora, a copy of which presents a fabric close to Cypriote production with a temper of large grit.
54 These bowls are of Morel shape 27c with small stamp decoration and a central rosette. Morel 1969: 62: 'Cette forme 27c apparaît vers 200 et dure pendant la plus grande partie du IIe siècle'.
55 Elaigne 2012: 33, 39, 285.
56 A chronology that accords with the date of the monumental stela of Ptolemy VIII, studied by Thiers (2009).
57 See fig. 7.6.
58 Ballet 1998; Harlaut 2002: 275.
59 Sparkes and Talcott 1970: 158.
60 The shiny aspect of the surfaces of certain shapes seems to belong to the second century BC: Harlaut 2002: 73.
61 Situated in the gap between *c.* 600 BC to the end of the fourth century BC: Sparkes and Talcott 1970: 151. The writer states that the small sizes were better known in the second-third quarter of the fifth century BC, but that their production probably paralleled those of the larger shapes.
62 Rotroff 1997: 103, fig. 17.252, 'Baggy, Large' type.
63 Kallini 2013: 62, fig. 9, a Hellenistic kantharos that appears in Athens *c.* 300 BC: a deep bowl with two handles, straight walled, and without a foot.
64 It is interesting to note this Greek shape, one of many imitated by Egyptian potters, is also attested at Karnak in two fabrics: Masson 2011: 281.
65 Rotroff 2006: 73.
66 The first is almost complete, the second identified without its strainer, which suggests that other examples were perhaps not recognized in the absence of this characteristic feature.
67 Another probable jug survived only as a sherd with a neck and its strainer.
68 Hayes and Harlaut 2002: 117, fig. 9.
69 Adriani 1940: 113, pl. XLVI: 5, 7, grey clay pottery, necropolis at Hadra (Ezbt el-Makhlouf).
70 Nenna and Seif el-Din 2000: 33, 49 shape T7.1, 251–83 and pls 9, 48.281; 'Ces trois villes, Memphis, Athribis et Alexandrie, ont donc certainement été des centres de production de faïence, mais d'autres centres ont pu exister en Egypte'.
71 Enklaar 1998: 268–9, figs 10–12.

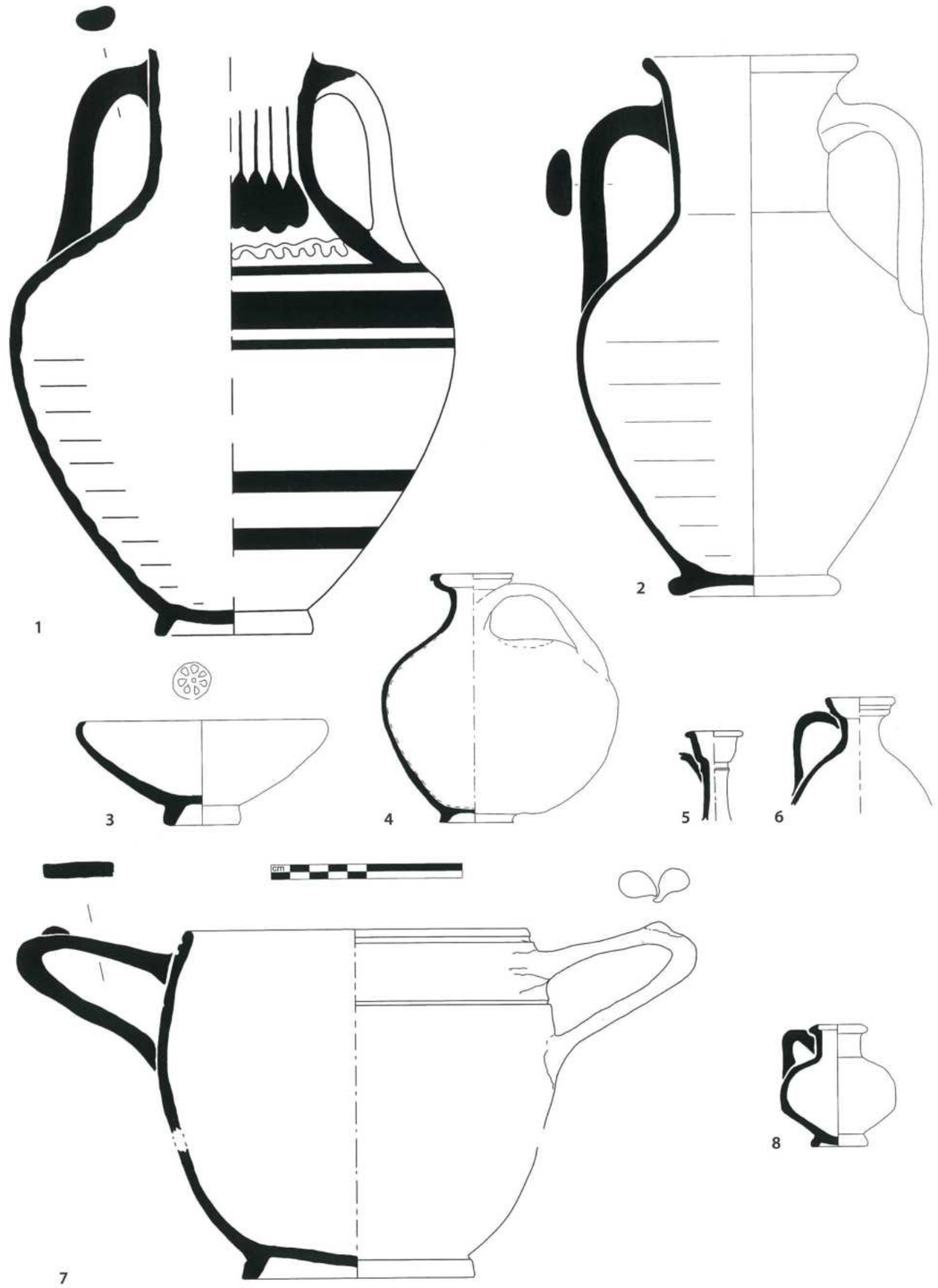

Figure 7.6 Persian and Ptolemaic period imported table wares
Persian period: **1** painted table amphora; **2** plain table ware; *Ptolemaic period*: **3** Campanian bowl; **4** local askos; **5–6** local lekythoi; **7** local kantharos; **8** local oinochos.

shape proceeds from an Achaemenid repertoire.[72] These typological details were taken up in a production in mixed fabric that was sometimes slipped (Figure 7.7.9). It should be noted, however, that even when the fabric and the treatment of the profile was finely made, the same can not be said for the base, which was string cut and irregular. A local bowl with an Achaemenid form (Figure 7.7.10) was fired in a reducing atmosphere to imitate metal. Several of these metal bowls have also been discovered during the excavations at Thonis-Heracleion.[73]

Cylindrical goblets with a ring base (Figure 7.7.11–12) from the excavations at Thonis-Heracleion,[74] are also known from other Egyptian sites in the Ptolemaic Period, for example, Tell al-Moufarig, in a fine red siltware fabric with an irregular slip. This shape was not inspired by imported forms and is specifically Hellenistic.[75] A similar form is also present at Qedua in a Saïte/Persian context[76] and also at Buto, in a context from the second half of the sixth century BC.[77] The presence of cylindrical goblets in metal and terracotta is rightly noted in Defernez's study as not belonging to the Egyptian repertoire, but probably to the Achaemenid.[78] The examples in metal from Thonis-Heracleion corroborate this by their presence in a Persian context.[79] In ceramic examples from the Ptolemaic Period, they have a flat base with a ring base, which is more or less pronounced, and first appears during the fifth century BC.[80] Their black colour, which is obtained in a reduced firing atmosphere, is a clear reference to the goblets in this form that are made of metal and not to a slip.[81] Though more crudely manufactured, the ceramic goblet possessed certain typological elements—the tall, broad neck, marked shoulder, and piriform body—that could also refer to an Achaemenid tradition. Such goblets are quite common in Ptolemaic levels at Thonis-Heracleion. One of the characteristics of these goblets concerns their base, which is very roughly string-cut and never flat, which suggests that they were not intended to be set down but, perhaps, to be inserted into a hollow of some sort. Their discovery on the site suggests a short period of local manufacture lasting between the end of the third century BC to the first half of the second century BC, possibly only the beginning of the second century BC.[82]

Alongside the vessels for liquids detailed above, the table wares of the Ptolemaic Period from Thonis-Heracleion also demonstrate that local manufacture was inspired by Greek shapes.[83] There are two types of carinated bowls (with either a slight or sharp carination), which have also been identified in Alexandria.[84] The shape with a rounded carination (Figure 7.8.1) is very poorly represented in Thonis-Heracleion, while the type with a pronounced carination is frequently found. They are usually fired in a reducing atmosphere, and less often in an oxydizing one, (Figure 7.8.2). Some examples are also in an unslipped marl fabric. Stamped decoration—palmettes or guilloches—on the interior surface of the bowls is rare. There is evidence that some of the bowls (Figure 7.8.3) fired in a reducing atmosphere draw clear inspiration from Classical bowls of 'Out-turned rim' type, which reached the site of Thonis-Heracleion during the Persian Period. In Alexandria, Ptolemaic imitations of the carinated vessels are dated to the third century BC.[85]

The majority of the bowls recovered are convex bowls of the 'Echinus bowl' type,[86] examples of which date from the third century BC and, at least from the first half of the second century BC, are slipped, have an inverted rim, and were fired in a reducing atmosphere (Figures 7.8.4–6). Convex bowls (Figure 7.8.7–9) are also found during this same period in a range of shapes that appears to be more varied, especially for those produced in the first half of the second century BC. The rare examples of bowls in marl fabric (Figure 7.8.10) represent the integration of this form into the locally-made repertoire of colour-coated vessels, which appear in Alexandria at the beginning of the second century BC.[87]

Plates made in either a fine mixed or Nile silt fabric and fired in a reducing (Figure 7.9.1–2) or in an oxydizing atmosphere (Figure 7.9.3–4) also show a discernible Hellenistic influence. Those fired in an oxydizing atmosphere seem to be more carefully made, with plates fired in a reducing atmosphere being coarser. According to

72 According to Nenna (2000: 134): the 'amphora-rhyton', which occurs in metal vessels of the fifth and fourth centuries BC. We note the presence of these necks in Assyrian shapes, with a pointed base, types that date to the eighth to seventh centuries BC (Hausleiter 2020: Taf. 82–9).
73 Fabre 2006: 156–9 cat. nos 1–5, 258–64, 266–7.
74 Also identified in a mixed fabric siltware fired in a reducing or oxidizing atmosphere, partially slipped, from the canal connecting Thonis-Heracleion and Canopus in a context from the end of the third century BC. The partial slip integrates it with the contemporary 'Colour-coated' wares of the second century BC in the eastern area of the Mediterranean.
75 Ballet 1997: 52–3, pl. 2.17, high vertical bowl. The site of Tebtunis was also mentioned.
76 Hamza 1997: 82, fig. 1.32.
77 French 2004: 92 type 4.
78 Defernez 2010: 114–17.
79 In Fabre 2006: 160, 300 cat. nos 275–6, the date should be reviewed, according to the context of the fifth century BC and the first half of the fourth century BC.
80 Defernez 2011: 110.
81 Ibid.: 110, '…la transposition de vaisselles métalliques en terres cuite existe en Egypte, et ailleurs dans le basin méditerranéen oriental, à l'époque perse…'.
82 We note a very similar shape, interpreted as a miniature jar (or a stopper), found in a Roman context at Paphos, dating from the first century AD to the second century AD, however with an uncertain precision: 'but could be residual', Hayes 1991: 84, fig. XXV.3.
83 Harlaut 2002.
84 Ibid.: 270.
85 Ibid.: 269.
86 Ibid.: 270, 284–7, figs 8–11.
87 Elaigne 1999: 21; 2000, a study of this type of material in Hellenistic contexts in Alexandria.

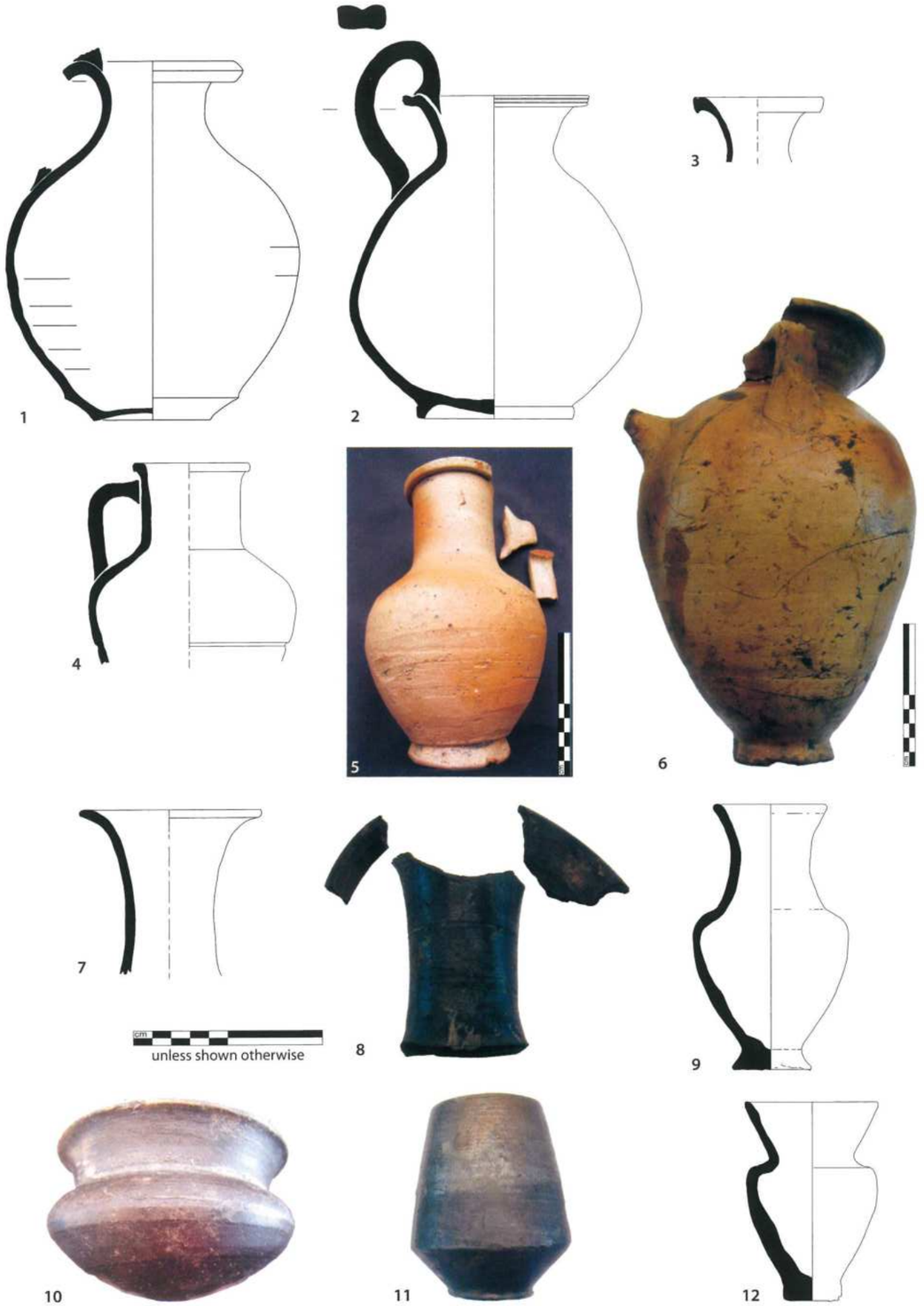

Figure 7.7 Ptolemaic period local copies of Greek table wares
1–3 oinochoai, oxydizing (1–2) or reducing (3) atmosphere; 4–5 jugs in the Attic tradition; 6 strainer jug; 7–9 hydria with elongated neck; 10 Achaemenid type bowl; 11 cylindrical goblet; 12 mixed ware goblet.

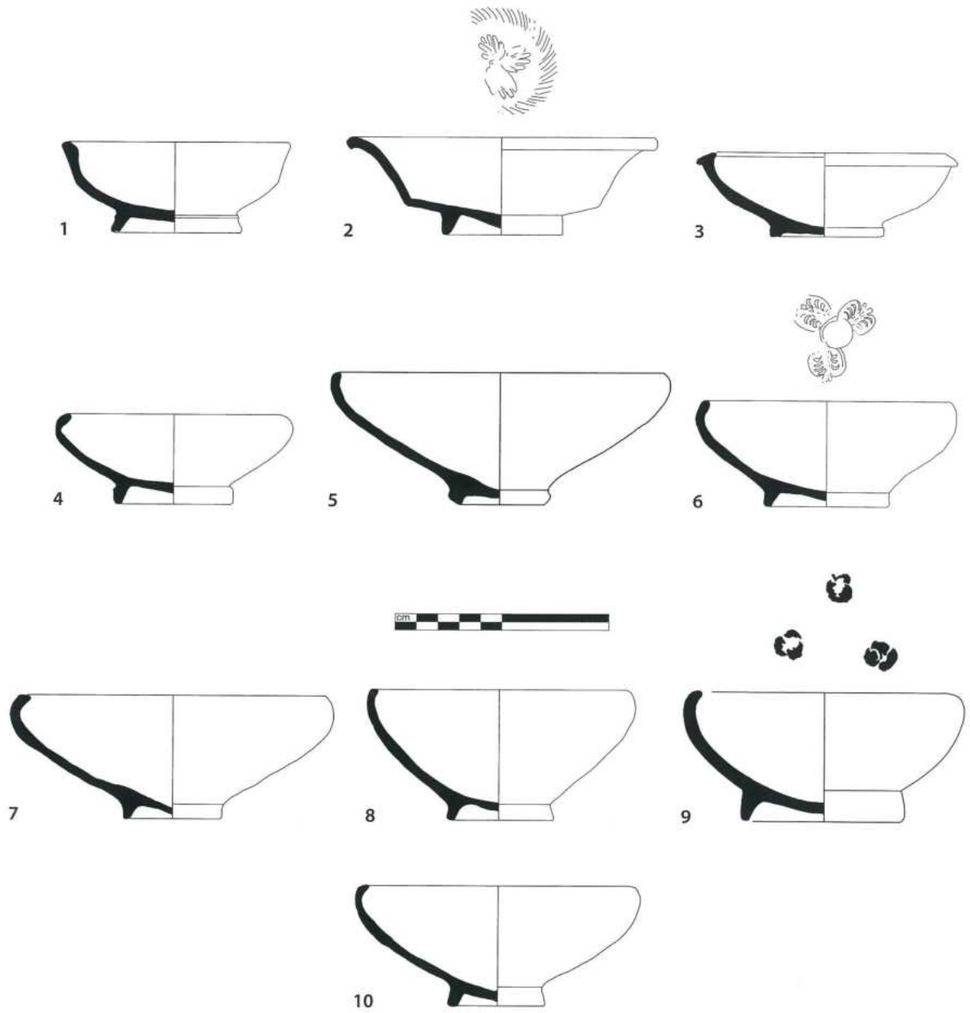

Figure 7.8 Ptolemaic period local copies of Greek table wares
1–2 siltware carinated bowls; 3 siltware out-turned rim bowl; 4–6 siltware Echinus type bowl; 7–9 convex bowls; 10 colour-coated bowl.

the typological criteria developed by Harlaut,[88] they are dated to the second century BC by their rim and the profile of their wall. Fish plates are also found in the same contexts. Some of these are fired in a reducing atmosphere (Figure 7.9.5), although they are more usually slipped in mixed fabric and fired in an oxydizing atmosphere. Several types of rim are noted: a rim with a short pendant lip is known from two sherds (Figure 7.9.6);[89] a grooved rim (Figure 7.9.7); and a rim with a rounded lip (Figure 7.9.8). It should be noted that the foot of these dishes is in accordance with Classical shapes, without, however, the groove under the ring base. Very few examples of these types of bowls and plates carry a decorated stamp of palmettes, or palmettes and guilloches. This decoration seems to appear in the first half of the second century BC.[90]

It is notable that no two-handled cup of local manufacture has been found in the ceramic assemblage of the site to date.[91] The lack of this form is interesting as it concerns the chronology of the occupation of Thonis-Heracleion as it is present in Alexandria in the second century BC in colour-coated ware.[92]

88 Harlaut 2002: 284, figs 8.f–h, 286, fig. 10.d.
89 One in mixed fabric and finely made, the other in siltware and rough manufacture. Missing from the drawing is decoration consisting of five radiating palmettes on the interior surface.
90 Harlaut 2002: 271.
91 Elaigne 2000.
92 Harlaut 2002: 272, fig. 11e.

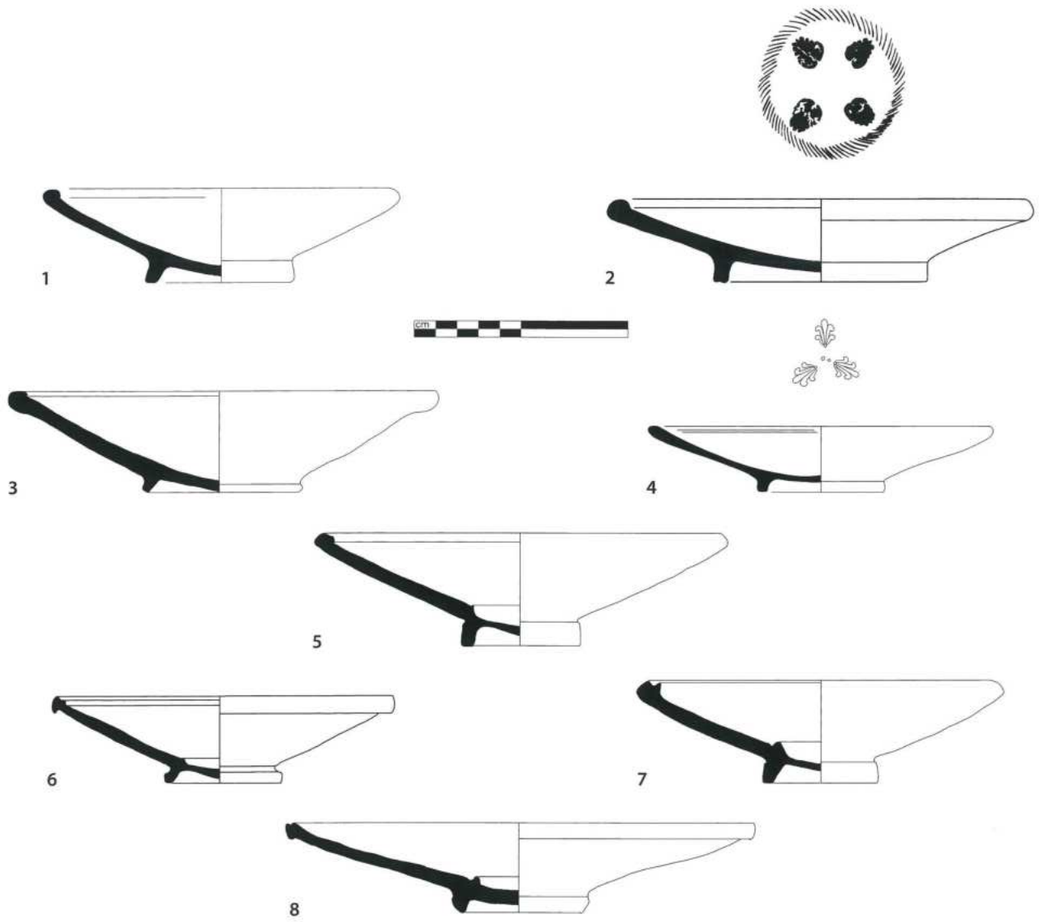

Figure 7.9 Ptolemaic period local copies of Greek table wares
1–2 plates, reducing atmosphere; 3–4 plates, oxidizing atmosphere; 5 fish plate, reducing atmosphere; 6–8 fish plates, oxidizing atmosphere.

Plain and cooking wares

For the plain and cooking wares, the excavations have revealed far fewer storage vessels (not including amphora) and cooking wares than fine wares and table wares.[93]

Saïte and Ptolemaic Periods

Plain wares

Plain wares form the majority of locally produced ceramics in Thonis-Heracleion. Silt wares intended for the storage of food are the most prevalent in the repertoire of shapes from the earliest contexts of the site. These ceramics are mainly jars, and most particularly, have a more or less cylindrical body, a bulging or slightly pointed base, a high neck, either moulded or not, and a thick red slip (Figure 7.10.1–2). The date of these jars, said to be typical of the Saïte/Persian Period, is still not really determined. Thus, some authors suggest that the jars with moulded necks are the most recent and do not appear before the middle of the sixth century BC,[94] whereas others suggest that jars with a high neck, smooth or moulded, which do not appear before 550 BC, could all be contemporaneous.[95]

93 This observation is probably due to the fact that the finewares, for the majority, were in the canal or basin close to the cult structures with which they are chronologically linked.

94 Masson 2011: 275–6.

95 I thank Peter French who was kind enough to share this analysis with me. The excavations at Buto attest to the to their presence during the second half of the sixth century BC. In 2004 French wrote: 'the preceding period has already seen an increase in the incidence of gentle swellings on the necks of jars' (2004: 92).

To date, the contexts from Thonis-Heracleion do not allow us to precisely date the appearance of a particular form of neck on these siltware jars. Nevertheless, it would appear that the thick red slip is more clearly associated with jars with moulded necks, which continue to be produced throughout the Persian Period.

The bulging or slightly pointed base is also present on other types of small jars. These are made in a more or less fine siltware fabric and are sometimes slipped (Figure 7.10.3), although an example with a pierced neck is unslipped (Figure 7.10.4). The first shows affinities with the Ptolemaic Period (Figure 7.11.1–2), the second is without doubt closer in form to a poorly-made small jar (or flask) in siltware with a slip, found in Persian contexts (Figure 7.10.5).[96]

Also present on other sites in the Delta or Upper Egypt,[97] is a coarse siltware jar with a red slip known as a 'Pigeon pot'. Examples from Thonis-Heracleion (Figure 7.10.6), from Saïte contexts are close to a profile that becomes standardised from the second half of the sixth century BC.[98] While variants existed in the Persian Period on the site (Figure 7.10.7), no Ptolemaic example has been found to date, although it should be noted that this type seems to persist elsewhere in Egypt in this period.[99]

Persian contexts also contain slipped jars in siltware, belonging to the wide-mouthed type with two small handles, a rolled rim and ridges at the level of the handles (Figure 7.10.8). It is likely that other examples will be found at Thonis-Heracleion as this type seems to persist, notably in Upper Egypt during the Ptolemaic Period.[100]

Other forms of plain ware appear during the Persian Period. A frequent find is a type of jar in a siltware fabric that was slipped, with an ovoid body and a short, moulded neck (Figure 7.10.9), or a short neck with an external flange (Figure 7.10.10). A type of basin with a ring base, and usually with a cylindrical body (Figures 7.10.11–13), appears to belong to a production which seems to be particularly Deltaic.[101] These last two types of vessel from the Late Period persisted, with variations, into the Ptolemaic Period. At Thonis-Heracleion such jars continue into the mid-second century BC, with examples being a jar with a straight neck (Figure 7.11.3–4) and a basin (Figure 7.11.5 for an *in situ* photograph). These late examples appear in fine siltware, but also in a mixed fabric, with a partial slip on the upper part of the vessel. This permanence of shape is also to be found in the small jars with a pointed base known from the Late Period in several sites in the Delta,[102] and clearly identified in a Ptolemaic context at Thonis-Heracleion with, however, by this date a short, unmoulded neck (Figures 7.11.1–2).

The development of the mortarium can be seen through imports and rare imitations from the Saïte/Persian to the Ptolemaic Period. The first type found in Thonis-Heracleion are from the Saïte Period[103] and have a conical body, flat bottom, a smooth or slightly undulating wall and triangular rim. These mortaria were either imported, probably from Cyprus, (Figure 7.11.6) or locally imitated in siltware (Figure 7.11.7):[104] a variant with a small rolled rim was found in a Persian context (Figure 7.11.8). A second type of mortarium has also been identified from the site. These have a ring-shaped base marked with a groove, an often undulating body and a more or less pronounced triangular rim (Figure 7.11.9). Every example of this type of mortarium is imported and to date no local imitations have been found.[105]

Imports of the classic shape of mortarium, the collar rim type,[106] are found in contexts of the fourth century BC (Figure 7.11.10). Local imitations of this type are made in siltware on a potter's wheel, as seen in an example from Thonis-Heracleion by a manufacturing defect of its handles whose axis was offset (Figure 7.11.11).

Cooking wares

Recent studies of the Ptolemaic material from Alexandria has detailed the local adoption and production of the Greek repertoire of cooking wares, notably of the *lopas*, *chytra* and *kakkabe*, from the beginning of the third century BC.[107] It is noted, however, that at the end of the fifth century BC or the middle of the fourth century BC,[108] a Greek cooking shape—the *lopas*—was imported to Thonis-Heracleion, probably from Aegina (Figure 7.11.12).[109] A local imitation in silt ware was found in a Persian context (Figure 7.11.13). There is some variety

96 This form continues, but in marl fabric, at Saqqara in a context of the first half of the fourth century BC: French and Ghaly 1992: 109, fig. 51.43, 'small bottle'

97 Spencer 1996: pl. 65; Masson 2011: 241 and fig. 4.5.

98 French 2004: 93–4. On the subject of profiles in contexts belonging to the first half of the sixth century BC, see Hartung 2007: 110, Abb. 16.5.

99 Masson 2011: 241, figs 4–5.

100 Ibid.: 249, 300 and fig. 60.

101 For the chronological variants of the rims, see Defernez 2003: 59–60, type 17.a, pl. V, 279, type 173, pl. LXI. For Ptolemaic contexts of the third century BC, see Dixneuf 2007: 66–7, figs 102–3.

102 Masson 2001: 276 and note 57; Aston and Aston 2010: 100, fig. 18.280.

103 Defernez 2003: 402 type 253 and type 254–5.

104 Defernez and Marchand 2006: 64 ff: such testimonies of Cypriot trade was rapidly imitated 'dès les première décennies du VI BC'.

105 I thank Alexandra Villing for alerting me to a clearly deformed example at Thonis-Heracleion that could be an import.

106 Sparkes and Talcott 1970: 221, pl. 92.1898 (Corinth).

107 From the beginning of the third century BC, Alexandrian cooking vessels adopted types known from the Greek repertoire: the *chytra*, *kakkabe*, *lopas*, and bowl: Harlaut 2002: 266. The adoption of this repertoire is a phenomenon well known from other Egyptian sites: Tell el-Herr (Defernez 2007a); Karnak (Masson 2011); Naukratis (Berlin 2001).

108 Sparkes and Talcott 1970: 227, fig. 18.1962.

109 Keith Swift (University of Texas at Austin, ICA research fellow and ceramics specialist) in an *ad hoc* study conducted in 2004, proposed a probable origin: 'Aegina, Poros and the Methana peninsula. Aegina seems the most likely on the grounds of the large-scale production of this ware', Internal report 2004; Sparkes and Talcott 1970: 373, fig. 18.1953 (425–400 BC).

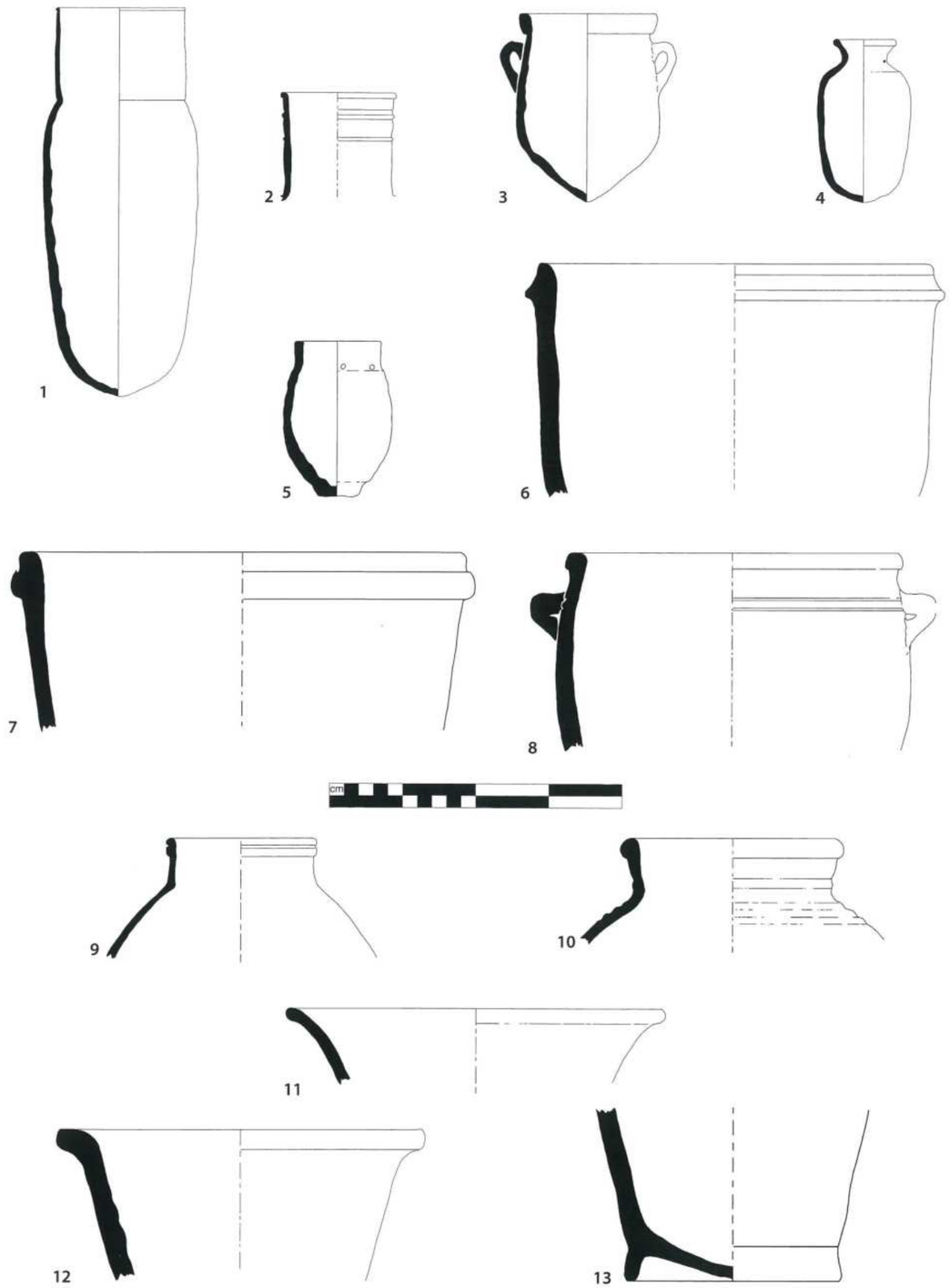

Figure 7.10 Saïte and Persian local plain wares
1–3 Saïte slipped or unslipped jars; 4 Saïte unslipped small jar with pierced neck; 5 Persian slipped small jar with pierced neck; 6 Saïte 'pigeon pot'; 7 Persian 'pigeon pot'; 8 Persian two-handled jar or basin; 9–10 Persian jars; 11–13 Persian basins.

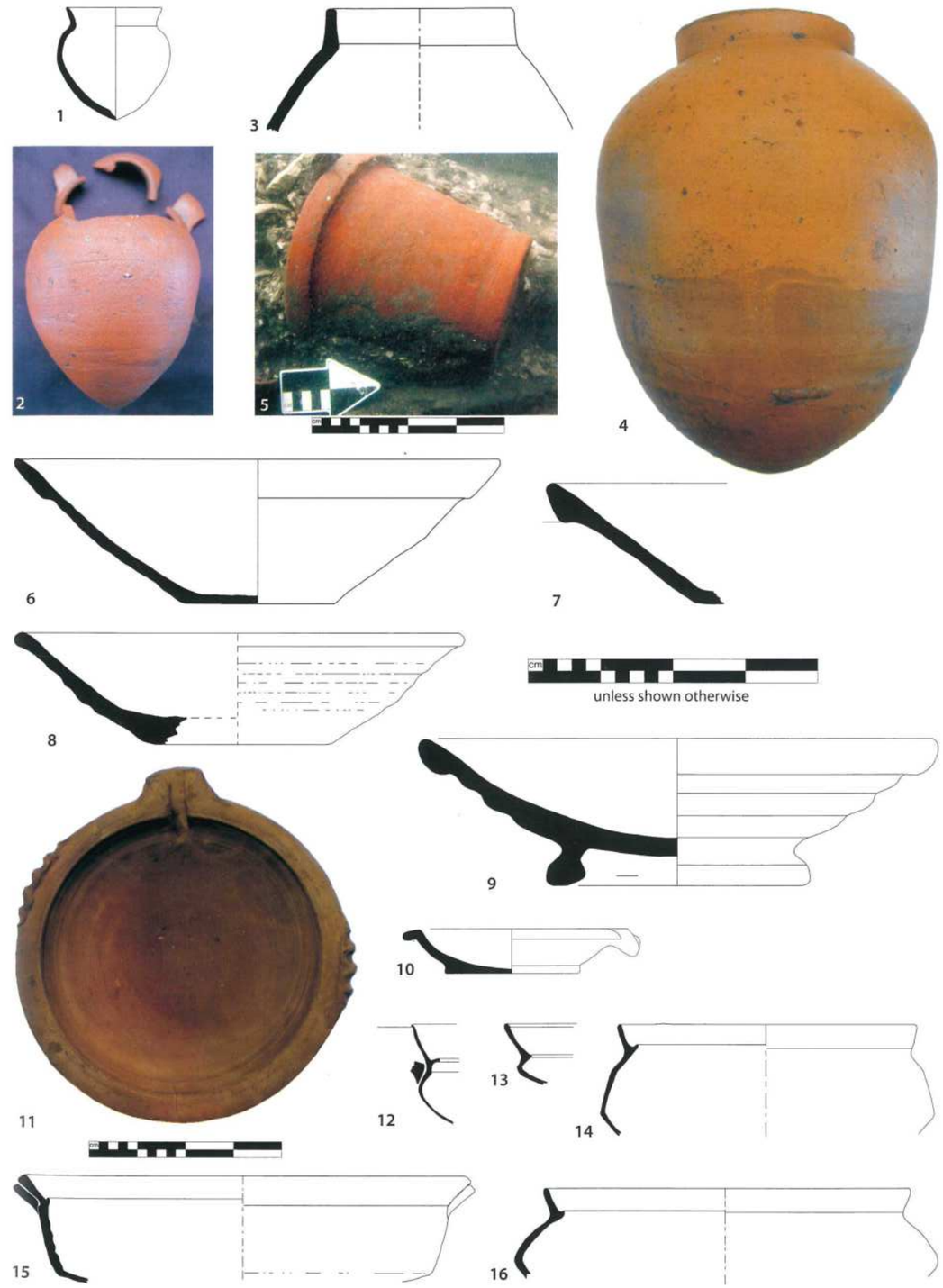

Figure 7.11 Persian and Ptolemaic imported and local plain and cooking wares
1–2 Ptolemaic local small jars; 3–4 Ptolemaic local jars; 5 Ptolemaic local basin; 6 Saïte imported mortar; 7 Saïte local mortar; 8–9 Persian imported (Cypriot?) mortars; 10 Persian imported collar rim type mortar; 11 Persian local collar rim type mortar; 12 Persian imported *lopas*; 13 Persian local *lopas*; 14 Persian imported *lopas*; 15–16 Ptolemaic local *lopades*.

Figure 7.12 Cooking wares
1 Persian imported *chytra* (period); 2–3 Persian local *chytrae*; 4–5 Ptolemaic local *chytrae*.

in the fabrics of *lopades* found in Persian contexts, these were probably imported and are likely to indicate different sources of production (Figure 7.11.14). This is the opposite of the situation in the Ptolemaic Period, when *lopades* were produced locally (Figures 7.11.15[110]–16[111]). The same applies to the *chytra*, which appear in Persian contexts as an import (Figure 7.12.1), but also as local imitations in mixed fabric (Figure 7.12.2), and in siltware with a thick dark red/orange slip (Figure 7.12.3).[112] The latter is of good quality, and does not seem to have been used, at least, in a fire. If its closest Attic type is dated to the last quarter of the sixth century BC,[113] it is likely, in view of the fabric (paste and slip), that the example from Thonis-Heracleion is a contemporary imitation, or closely follows the shape of the original import.[114]

In the Ptolemaic Period, two forms of cooking ware are inspired by the Classical repertoire: the *chytra* with the high neck (Figure 7.12.4) in fine siltware fabric[115] and the *chytra* with a handle[116] in mixed fabric (Figure 7.12.5).

Discussion

It is possible to observe, at this stage in the study, that the features of fine wares and plain wares in the Saïte Period are different. Fine wares imported from East Greece are in the majority, and not imitated, the plain wares are local. Cooking wares are virtually absent from the site to date.

In the Persian Period, the fine wares are largely imported, especially Attic products, with smaller numbers of vessels coming from the Levant. It is notable that the Attic wares are not often imitated by local Egyptian potters, while some Levantine imports were. Moreover, some well-made local products do not reference a ceramic typology, but one drawn from an Assyrian metal repertoire. Plain pottery conforms to both the local tradition for storage wares and also to a lesser extent to an Attic repertoire. Cooking wares attest to some imports from the eastern Mediterranean, with little local imitation.

110 Imitations: Rotroff 2006: 180 ff, shape 3 (285–110 BC) 'standard Hellenistic *lopas*' which developed during the first quarter of the third century BC, group 1 (285–225 BC, probably).
111 Harlaut 2002: 267, fig. 4c.
112 On the presence of this thick red slip, see also French 2004: 91.
113 Sparkes and Talcott 1970: 224, 371, pl. 93.1924.
114 The context at Thonis-Heracleion, situated on the area of the East Passage, has delivered material covering a wide date range, but nevertheless the beginning seems to be situated at the end of the sixth century BC and then covers the fifth century BC.
115 Harlaut 2002: fig. 3b, *chytra* with a high neck, third century BC.
116 Ibid.: 278, fig. 2a.

Figure 7.13 Testimony of the permanence of form
1 Persian local bowl in marl clay; 2 Roman local bowl in slipped marl clay; 3 Ptolemaic local Achaemenid type bowl, reducing atmosphere; 4 Roman local Achaemenid type bowl, oxidizing atmosphere.

The Ptolemaic Period until about the middle of the second century BC is an amazing mixture of influence of local and imported traditions from previous periods, particularly the Persian Period. This is seen particularly in table wares, which are well-represented in Ptolemaic contexts, with some of the forms continuing until the beginning of the Roman Period.

One of the most remarkable features of the assemblage from Thonis-Heracleion is the perennial use of some forms of pottery across the broad chronological periods. Compare, for example, one of the variants of an Achaemenid type of bowl, of Persian date, produced locally in fine marl ware (Figure 7.13.1) and the nearly identical form of a local bowl, in a marl ware, probably Mareotic, with a slip, of a Roman date (Figure 7.13.2). Here a Ptolemaic Achaemenid type of bowl, locally produced in a reducing atmosphere (Figure 7.13.3),[117] represents an intermediary form between the Persian Achaemenid bowl[118] and the local bowl of Roman date (Figure 7.13.4).

Finally, some general trends within the overall ceramic assemblage can be made. These are necessarily brief, but are included to indicate the potential of this form of analysis at the site of Thonis-Heracleion, and also the contribution that it might make to the interpretations of similar assemblages elsewhere in Egypt particularly those within the Delta.

When first looking at the make-up of the assemblage, it is useful to consider the origin of the material by chronological period (Figure 7.14). Here it must be born in mind that the pottery was examined by eye in the field without the aid of laboratory analyses. Nevertheless, it is interesting to see that even from its very early stages, the assemblage was dominated by imported ceramics. This trend continues through the Persian/local dynasties Period, but was inverted during the Ptolemaic Period. Such findings are perhaps illustrative of the role of Thonis-Heracleion as a major port and *emporion* from the Saïte through to the early Ptolemaic Period, when

117 Pottery from the excavations carried out by the IEASM in the port of Alexandria, and more specifically from a destruction context from the beginning of the first century AD.
118 See above note 62.

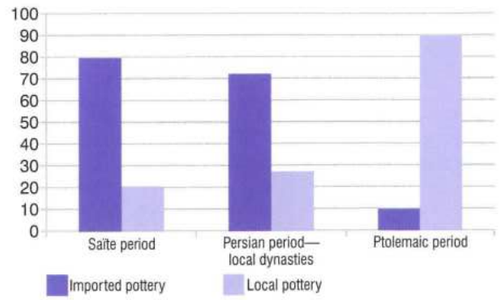

Figure 7.14 Imported and local pottery by period

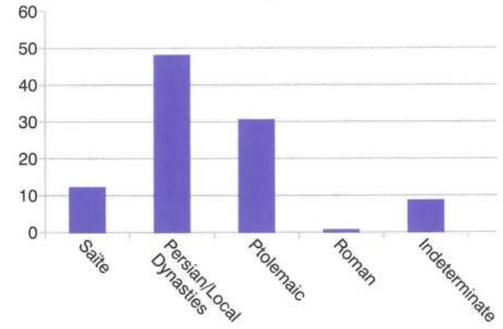

Figure 7.15 Distribution of pottery by period.

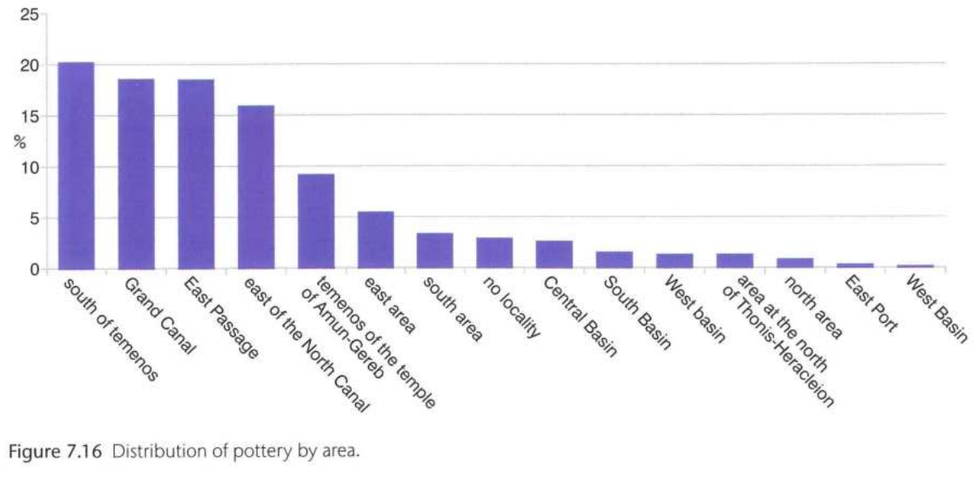

Figure 7.16 Distribution of pottery by area.

its position at the hub of an international network of exchange was usurped by Alexandria.[119]

When the quantified assemblage is grouped chronologically (Figure 7.15) some interesting patterns occur that fit well with other forms of material culture from the site. The largest amount of pottery comes from the Persian/Local Dynasties Period. This is, perhaps, not so surprising as it was during this period that the port seems to have had its heyday as it grew into Egypt's main port and *emporion* for contacts with the Greek world. In quantitative terms this was followed by the Ptolemaic Period, when the life-blood of trade in the port was draining way to Alexandria. The Saïte Period is not particularly well-represented, which may well correspond to Naukratis being the more important port at this time, or may also reflect a lower volume of trade goods or a smaller settlement during this early phase of occupation. Finally, the city appears to have been largely abandoned in the middle of the second century BC and it is consequently of no surprise to note that Roman pottery is almost completely absent. It is found, however, only in surface contents rather than stratified archaeological deposits and may well suggest that the site was still occupied on a very small scale, or visited—perhaps to rob the temples—during this later period. It is interesting to note that despite a large Byzantine religious complex being discovered to the southwest of the temple of Amun-Gereb,[120] little pottery from this period has been quantified to date. This is likely to change as excavations in this area progress.

When looking at the quantitative distribution of ceramics by area around the site, major concentrations of material were found south of the temenos in the area of the south wall of the temple of Amun-Gereb and in the Grand Canal, the waterway to the north of this temple. There are also significant concentrations of pottery around the East Passages, the north canal, the temenos of the temple of Amun-Gereb and the eastern zone (Figure 7.16).

The next stage in the analysis is clearly to look at the distribution of pottery from the main chronological periods to see how Thonis-Heracleion may have developed topographically. It can be observed that the pottery from the Saïte Period is confined to the area of the North

119 Goddio, Robinson and Fabre 2015.

120 See Goddio this volume Chapter 1.

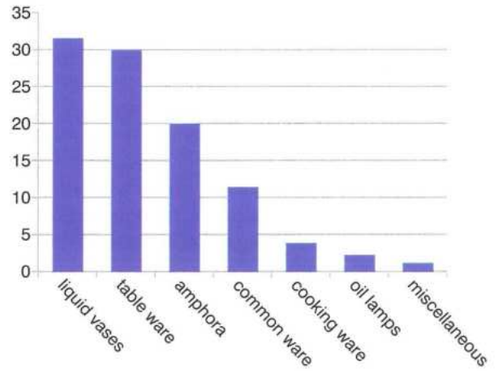

Figure 7.17 Distribution of pottery by category.

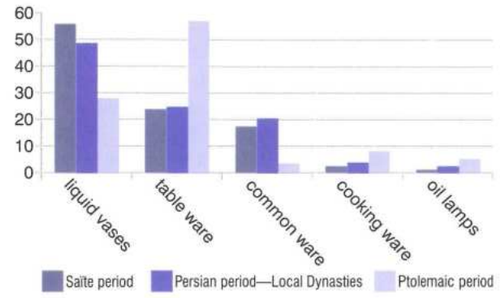

Figure 7.18 Categories of pottery by period (excluding amphorae).

Canal, perhaps indicating that early occupation of the site was located on the large island to the north of the canal. The general southward spread of settlement can be seen in the distribution of material from the Persian/Local Dynasties Period. Pottery from this time is concentrated in an area of the East Canal, the East Passage, and in the Grand Canal to the north of the Central Island on which stood the temple of Amun-Gereb. The more widespread distribution of the site is also, perhaps, reflected in the wide-spread inclusion of Persian/Local Dynasties material in surface assemblages from across the city. Similarly, Ptolemaic pottery is also widely distributed in surface assemblages, but is importantly concentrated on the Central Island and elsewhere in the south of the site.

When the assemblage as a whole is grouped according to form (Figure 7.17), it can be observed that containers for liquids are the most numerous, followed by table wares, amphora, plain wares for storage, cooking wares, and oil lamps, with miscellaneous ceramics having the fewest examples.[121] When these categories are then considered by period (Figure 7.18), the Saïte and Persian Periods show a predominance of liquid containers, whereas table wares dominated the assemblage during the Ptolemaic Period. Plain wares used for storage were present in almost the same quantities in the Saïte and Persian Periods, but were barely represented during the Ptolemaic Period. Finally, cooking wares and lamps are best represented in the Ptolemaic Period, albeit in small quantities.

It should be noted, however, that our excavations are on-going and it is likely that this picture will change with time and as different parts of the site are excavated. For instance, while the areas that we have looked at so far show a preponderance of fine wares, there is nothing to say that future excavations will similarly be dominated. Nevertheless, the initial examination of the data as it stands now is entirely justified; in particular, because it demonstrates the possibility that a ceramic assemblage excavated from a submerged site can be analysed and interpreted in exactly the same way as one on land. In Thonis-Heracleion beneath the mobile upper layer examined during survey, the stratigraphy is well-preserved, able to be excavated layer by layer and the finds contained within them scientifically analysed to produce meaningful interpretations.

What this analysis of the ceramic assemblage has illustrated is its potential. One of the next steps will be to take this analysis further and to examine localised groups of pottery around the city, rather than consider them in the rather gross terms as they have been in this chapter. In this way, we will be able to compare the assemblages from different port basins, or religious complexes, or storage areas against each other. The interpretations contained here are just a beginning.

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121 Miscellaneous ceramics includes bread moulds, measures, stoppers, braziers, strainers, leaded pottery—this last technique, providing an obvious stability, was most probably reserved for pottery destined to be used by sailors.

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8 The weights of Thonis-Heracleion: corpus, distribution, trade and exchange

Elsbeth M. van der Wilt

Introduction

The weights discovered in the IEASM excavations beneath Aboukir Bay offer a direct routeway into the issues concerning the trading community in this port and *emporion* on the Mediterranean coast.[1] The use of weights in standardised systems enabled traders—sometimes operating at a distance far removed from home—to be confident in the weight of the goods they were buying, the tax they were paying and that the deal they reached was fair. The weights also clearly reveal the care that their manufacturers took to ensure that they were accurate and complied to standards. Excavations of shipwrecks throughout the Mediterranean have illustrated that merchants often travelled with their own sets of weights, perhaps for added peace of mind when trading in foreign or unfamiliar markets.[2] Consequently, it will be of no surprise to discover that the corpus of weights from Thonis-Heracleion includes examples of both Egyptian and Greek—specifically Athenian—provenance.

Furthermore, their place of deposition also offers insight into both the potential location of the marketplace for small-scale goods in the *emporion* and also into the ritual behaviour of the merchants, perhaps just before they took to the waves on their journey home. All of these issues will be investigated in this chapter and will follow on from an overview of the assemblage of weights that have come to light in Thonis-Heracleion. These interpretations demonstrate that the assemblage has the potential to contribute more than just a simple description of the weights and the standards, and that they allow us to understand some of the people's concerns—notably that they would not be duped and also perhaps that they would travel and return home safely.

Metal weights

The corpus from Thonis-Heracleion consists almost exclusively of metal weights: 154 lead and bronze examples and only 2 stone weights.[3] The ratio of metal (mainly lead) weights versus those in stone at the site is firmly established, as this is an overview of weights from excavations from the beginning in 2001 to 2010. Exact numbers, however, are subject to change as work continues: the numbers here are based on the objects I handled personally. For example, the project's database records six stone weights, of which only two were available for study and so only these are included in this overview.

Weights made of metal are a new development in the first millennium BC that took place throughout the eastern Mediterranean. In Egypt until the beginning of the Late Period, the preferred material for weights was stone.[4] During the Late Period (664–332 BC) there is an increase in the preference for metal weights, although stone weights continue to be used. They are found in larger absolute numbers than previously, but they are of less significance on the whole as metal weights appear in even larger numbers.[5] Consequently, the preponderance of metal weights is entirely appropriate for Thonis-Heracleion, whose main period of occupation dates from the eighth to the second century BC with the peak of its economic activity being between the fourth to second century BC.[6]

This development from stone to metal weights is mirrored elsewhere in the eastern Mediterranean. During the ninth to seventh centuries BC, animal shapes such as lions and ducks occur as metal weights in Late Assyrian contexts,[7] and domed weights made of stone occur in the

1 For general overview of the site and its objects, see Goddio 2007; Stanley et al. 2007; Goddio and Fabre 2008; Goddio 2010, 2011.

2 For example the Uluburun wreck, see Pulak 2000: 263.

3 In this article I present my preliminary findings on the weights from Thonis-Heracleion. A comprehensive catalogue of the weights is in preparation and will be published in the Oxford Centre for Maritime Archaeology monograph series. The identification of the material is on based on visual inspection only, and thus uncertain for some of the weights.

4 The most important contributions to the study of Egyptian weights and metrology are Petrie's monograph on the topic (1926) and Cour-Marty's PhD thesis (1989), with a concise overview published a year later (1990). Overviews of weights and weight standards in the standard reference works are often brief, for example, Grandet (2001: 495) devotes just four sentences to 'weight' in the larger entry on 'Weights and measures'. There he refers the reader to Gardiner's Egyptian grammar for 'The classic presentation of the ancient Egyptian system of weights and measures', which consists of one paragraph detailing the ten *kite* per *deben* ratio: see Gardiner 1957: 200. The *LÄ* is no exception, with a short overview in one paragraph of both documentation and artifacts from the Old Kingdom to the New Kingdom: see Helck 1980: 1202; followed by a short overview of weights and measures in demotic sources, Vleeming 1980: 1211; see also Cour-Marty 1989 (1): 2. A large number of metal weights were found during excavations in the Delta: see Petrie 1888: 80–94.

5 For a table of dated (Egyptian) weights sorted according to material, provenance, and shape, see Cour-Marty 1990: 54, fig. 26.

6 Grataloup this volume Chapter 7; also von Bomhard 2012.

7 Curtis 2013: 74–6, 173–4 nos 533–69 and pls XLII–III; Skinner 1967: 36–7; Elayi and Elayi 1997: 24 note 26; for the weight systems, see Powell 1990; Heltzer 1996: 33.

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7 Curtis 2013: 74–6, 173–4 nos 533–69 and pls XLII–III; Skinner 1967: 36–7; Elayi and Elayi 1997: 24 note 26; for the weight systems, see Powell 1990; Heltzer 1996: 33.

Table 8.1 Overview of weights from Thonis-Heracleion based on shape, markings, and weight.

156 weights (154 metal + 2 stone)		
26 Greek-style weights (all lead)	14 market weights with Athenian symbols 2 market weights with symbols, Attic, not identifiably Athenian 9 market weights with signs or markings 1 light weight with impression	25 >50g 1 <50g
92 Greek-style weights (90 lead + 2 bronze)	14 market weights, based on mina (as unit), uninscribed 78 weights, based on a multiple or fraction of a drachma (as unit), uninscribed	35 >50g 57 <50g
38 Egyptian-style weights (2 stone; 2 metal unidentified; 7 lead?; 19 lead; 2 bronze?; 6 bronze)	16 cupcake weights including 2 stone, uninscribed 22 domed weights, uninscribed	only 6 >50g in total (5 >100g in total)
Total: 156		

Levantine region at this time,[8] for example, in the corpus of 58 weights from Lachish.[9] Overall, there seems to be a continuation of Late Bronze Age standards in the Near East into the first millennium.[10]

In the Aegean there are only very few weights to illustrate this transition. The only surviving weights from Greece between the twelfth to the sixth century were found in tomb no. 79 in the Toumba cemetery in Lefkandi, Euboea.[11] Sixteen nearly complete hematite weights, as well as fragments, were found, representing a direct continuation of Late Bronze Age practices of making weights in hematite. After this, the use of lead for weights becomes dominant in the Aegean, as it was cheap and plentiful.[12] Bronze was preferred for official weights when accuracy was required as evidenced by stamps and inscriptions on weights made in that material. From the Aegean this spread across the Mediterranean, for example four lead weights from this early period (900–770 BC) were found in the Phoenician *emporion* of Huelva, Spain.[13]

This broad development in the eastern Mediterranean from the middle of the first millennium BC onwards is clearly reflected in the corpus from Thonis-Heracleion. It fits well with the general dating of the site on the basis of the ceramics, showing that its main period of occupation was between the late seventh century to the mid-second century BC.[14]

Greek and Egyptian weights from Thonis-Heracleion

The weights are divided into several categories based on their shape (see Table 8.1): square plaques or cubic shapes are a typically Greek style, whereas cupcake or domed shapes are more typically Egyptian. Nearly 75 per cent of weights at the site are Greek-style weights, i.e., square plaques, and they are nearly all made of lead, with only 2 exceptions made in bronze (Figure 8.1). All of the metal weights are lighter than 3 kg. The heaviest are ones with markings indicating the fraction of the weight unit and are clearly based on Greek weight standards. The majority (57 of 92) of the weights are uninscribed, small and light, and they weigh less than 50 g.

Figure 8.1 Greek-style weight. H6507 SCA 945 (L. 5 cm, W. 4 cm, Th. 1.1 cm). (Photo: E. M. van der Wilt; © F. Goddio/Hilti Foundation.)

The Egyptian-style weights are also typically lighter than 50 g: 32 in total or 84 per cent. In comparison with the Greek-style weights, there is a mix in this group between lead and bronze; I cannot give exact numbers as the material of too many weights cannot be identified with certainty (see Table 8.1). In the Egyptian-style group, I distinguish between cupcake shapes and more

8 Kletter 1991.
9 Elayi and Elayi 1997: 20; for Lachish see Diringer 1953: 348–56, pls 50–1, the script on the weights, suggests a seventh to sixth century BC date; a similar weight with a shekel sign as identified on the example from Lachish is found in Defenneh, see Petrie 1888: pl. XLVII no. 119; for further references on the shekel sign and its interpretation, see Lemaire and Vernus 1978.
10 Based on a study on Phoenician weights: see Kroll 2008: 39; see also Heltzer 1996.
11 Kroll 2008a: 38, 39 table 1, 40, fig. 1 and 44.
12 Pernice 1894: 5; Petruso 1992: 2 note 2. Lead was a by-product of the silver mining at Laurion for example, see Conophagos 1980: 145–52.
13 Gonzales de Canales et al. 2006: 23, fig. 36, 24.
14 For an overview of the ceramics, see Grataloup 2010; this volume Chapter 7.

Figure 8.2 Cupcake weight. H9719 (Diam. 8.0 cm max, 5.8 cm at base, H. 5.2 cm). (Photo: E. M. van der Wilt; © F. Goddio/Hilti Foundation.)

Figure 8.3 Domed weight. H6599 (Diam. 4.9 cm max, H. 2.8 cm). (Photo: E. M. van der Wilt; © F. Goddio/Hilti Foundation.)

domed ones.[15] The cupcake weights are on an Egyptian standard with a *deben* of 91 g (Figure 8.2). The circular, domed shapes, on the other hand, do not fit in this system and elude attribution thus far (Figure 8.3). The shape is typically Egyptian,[16] but it also appears elsewhere in the Near East as a shape for a weight, and consequently a Near Eastern standard is a possibility for these weights.

These three categories can be plotted on to the ancient topography of Thonis-Heracleion (Figure 8.4) to reveal general spatial patterns. The domed-shaped weights are scattered across the site, with a concentration around the main temple. By contrast, the Egyptian cupcake weights are found in the northern areas of the site and are absent in the area around the temple (see Figure 8.5). The distribution of the cupcake and domed weights is clearly distinct and requires further study. This may perhaps be correlated with a shift in the settlement to the Central Island associated with the construction of the temple of Amun-Gereb.[17]

The distribution of Greek-style weights shows a general scatter across the site. When the heavier market weights are differentiated from the lighter weights, it becomes clear that there are concentrations of lighter weights in and around the temple area, whereas the weights with symbols and/or markings are more often found in the Grand Canal, for example, or other waterways (Figure 8.6). I will return to this observation below.

Weight standards

First, it is necessary to date the weights as precisely as possible by establishing the weight standard. This is the system of multiples and fractions of a unit that forms the basis of an individual weight. Any changes and fluctuations in an established weight standard can be dated via cross-referencing of the archaeological context and written sources. Establishing the weight standard is helped considerably if the weight is marked in any way, for example, with symbols or signs.

The Egyptian cupcake weights are fractions (and multiples) of the *deben*, the main Egyptian standard that was used from the New Kingdom. Weighing around 91 g, the *deben* multiplies by and divides the unit by ten.[18] The *kite* (*qedet*, approximately 9.1 g) has binary divisions,[19] with a half-*kite* roughly, but conveniently, equating to an Attic drachma. In the New Kingdom the *deben* was used as a standard measure for exchange in transactions, facilitating trade and acting as a proto-currency.[20] The *deben* standard remains unchanged at 91 g throughout the first millennium BC and is attested for example in several weights with royal names of the twenty-fifth and twenty-sixth dynasties.[21] The *deben* is clearly present in the 16 cupcake-shaped weights from Thonis-Heracleion (see Table 8.1), but the possibility of dating the weights through their standard is limited, as the weight standard was in use for a large part of the

15 The descriptor 'cupcake' for this type of weight was already in use in 1965, and I use it here because it evokes the shape clearly and immediately: see Kisch 1965: 4; this shape is the most common for Egyptian weights, see Cour-Marty 1990: 25.
16 Weigall 1908: xiv; Petrie 1926: 6–7.
17 Grataloup 2010: 156–8; Goddio this volume Chapter 1.
18 Grandet 2001: 495; Hendin 2007: 78–9; Castle (1992: 263–71) mentions the exception to this rule, presumably implemented to facilitate trade: in the foreign trade of the Ramesside Period, there was a unit called *šʿ.t*, *šʿ*, or *sniw* that measured 1/12 of a *deben*.
19 Other weight systems in the eastern Mediterranean by contrast, such as the Babylonian, Phoenician, and (later) Greek weight systems, are sexagesimal: see Powell 1979: 106; Hendin 2007: 86, 93.
20 Bleiberg 2007: 181; for a group of inscribed weights from Deir el-Medina: see Valbelle 1977.
21 Cour-Marty 1990: 24.

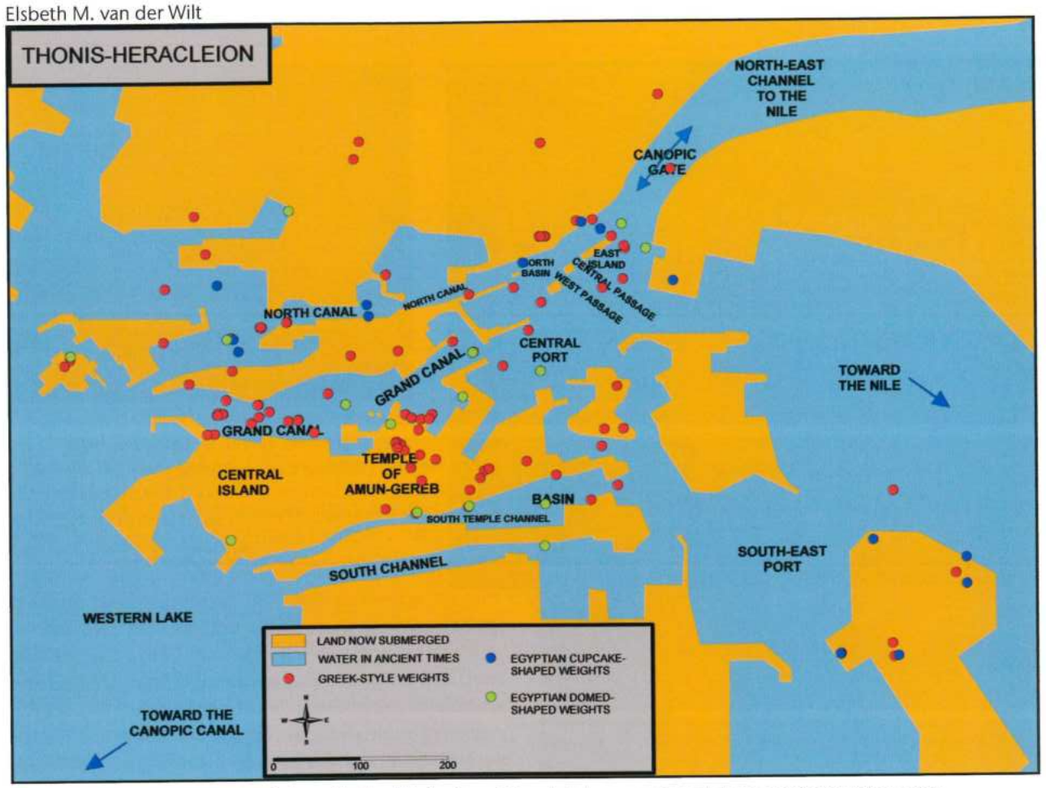

Figure 8.4 Map of Thonis-Heracleion with the distribution of Greek-style, cupcake and domed weights. (Base map: © F. Goddio/IEASM; find spots added by the author.)

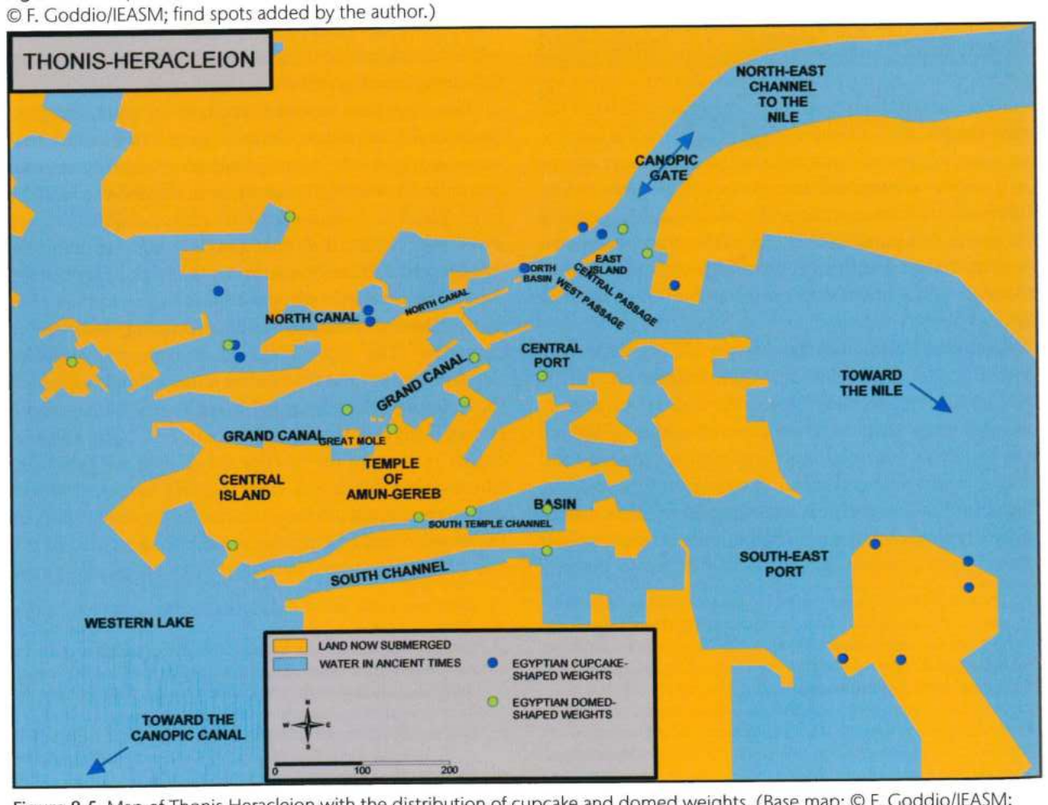

Figure 8.5 Map of Thonis-Heracleion with the distribution of cupcake and domed weights. (Base map: © F. Goddio/IEASM; find spots added by the author.)

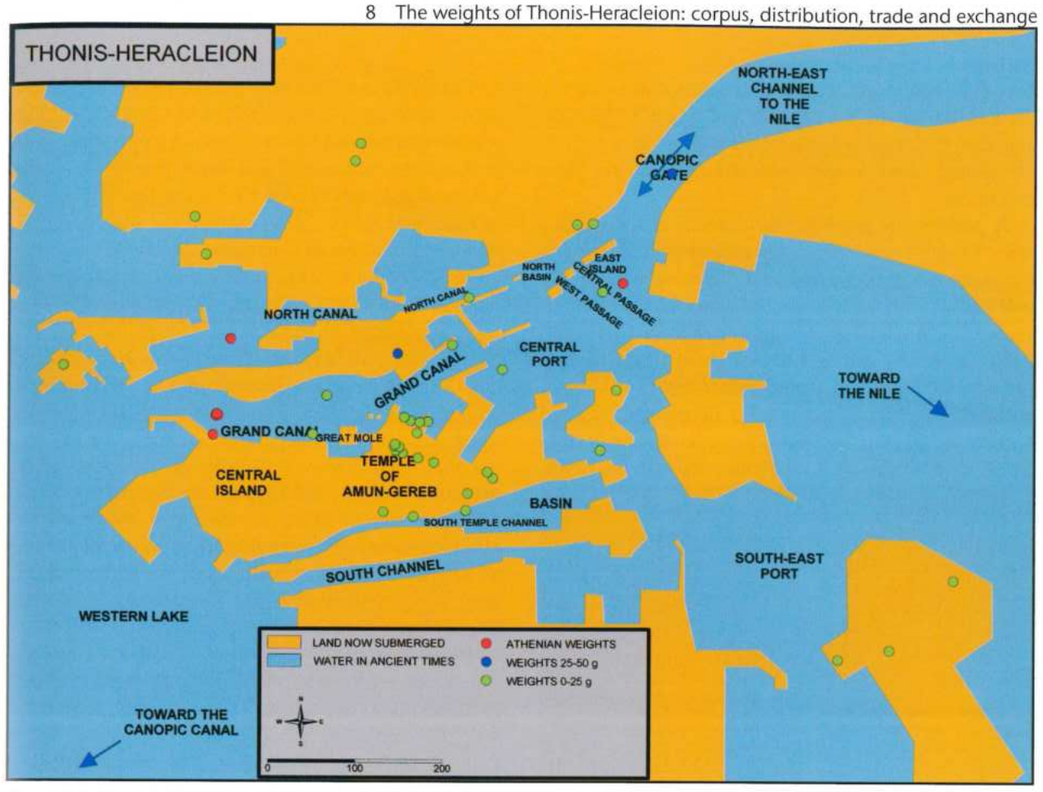

Figure 8.6 Map of Thonis-Heracleion with the distribution of Athenian weights and light weights (< 50/25 g). (Base map: © F. Goddio/IEASM; find spots added by the author.)

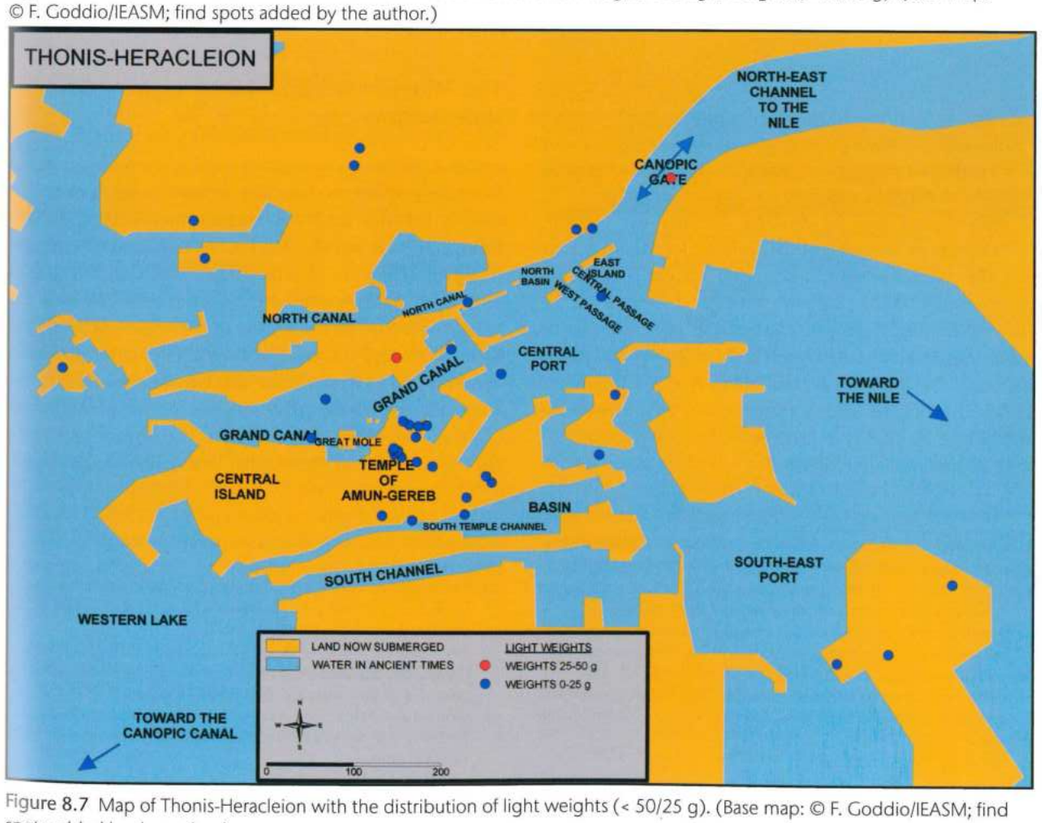

Figure 8.7 Map of Thonis-Heracleion with the distribution of light weights (< 50/25 g). (Base map: © F. Goddio/IEASM; find spots added by the author.)

first millennium BC. The predominant shapes during the Late Period are the cupcake and dome.[22] There are a further 22 domed weights from the site, but as already mentioned, their weight standard has not yet been identified.

A problematic point for the analysis of the weights from Thonis-Heracleion is the difficulty in identifying Ptolemaic weights. By contrast, Seleucid weights are well known with their distinctive symbols, for example, anchors.[23] This lack of examples may in fact be a difficulty in distinguishing between those from the Late Period and Ptolemaic Period rather than an absence of them altogether.[24] Evidence for the presence of third century BC weights in Thonis-Heracleion comes from Greek-style weights, as it is not discernable in the (uninscribed) Egyptian-style weights.

For comparative material from the Classical Period onwards in the Greek world, there are two catalogues directly relevant to the corpus of weights from Thonis-Heracleion. Lang worked on the 14 bronze and 61 lead weights from the Athenian agora.[25] Her catalogue remains one of the most important for Greek metrology and it contains several parallels for the Attic material from Thonis-Heracleion. The analysis and chronological ordering, however, is now superseded by more recent work on Attic metrology by Hitzl. He made a significant contribution in the field of ancient metrology when he published a large group of weights from Olympia.[26] The most relevant part of this work for this chapter is the re-assessment of the Attic weight system as first proposed by Lang. Hitzl restructures the system and proposes a new dating for the market weights through cross-referencing with archaeological data. His new proposals have been generally accepted and have been used as the basis for the Attic weight standards in Thonis-Heracleion.

Athens had two co-existing systems for weights, both of which are present in Thonis-Heracleion.[27] One was the market weight, a ponderal system based on a market *stater*, that is, a double *mina* as distinct from the coin *stater* weighing 8.7 g. The number of drachmas per *mina* (based on the Attic drachma of 4.35 g) gradually increases, from 105 via 112 and 138 to 150, as a process of standardization to facilitate conversion between different weight standards over time.[28] There are 40 market weights in Thonis-Heracleion.

The second was a silver system based on the Euboeic-Attic *mina* of 435 g, i.e., a drachma of 4.35 g × 100.[29] This was the standard applied to Athenian coins, which were favoured internationally, and consequently the standard remained stable down to Roman times. There are 78 small and light (< 50 g) examples of weights on this standard from Thonis-Heracleion (see Table 8.1), but as the weight of the Attic drachma remained stable, the date range of these weights is broad.

To summarize, all metal weights weigh less than 3 kg. Nearly 75 per cent of weights from Thonis-Heracleion are in a Greek style, both market weights as well as weights on the silver standard. About half, 57 of 118 examples, weigh less than 50 g, furthermore, in this group 50 weigh less than 25 g (Figure 8.7). With the exception of the two stone weights, the Egyptian-style weights are also light: generally weighing less than 50 g. From this, two conclusions present themselves: first, nearly 75 per cent of weights are on a Greek standard, and second, clearly these weights do not reflect transactions concerning large or bulky goods.

Only two (small and light) Greek-style weights were recovered from G1, where a concentration of pre-Ptolemaic coins was found.[30] There are large numbers of weights found at the bottom of ancient canals, as well as a significant concentration around the temple of Amun-Gereb and the Great Mole (Figure. 8.4).[31] I will look at these two different distribution patterns in some more detail below.

The Athenian weights and the light Greek style weights

I start with the six weights from the site with Athenian symbols and letters, which is in itself a significant discovery for the study of ancient metrology.[32] To my knowledge they are also the first Athenian weights found in Egypt. They are also the only weights in the corpus with both symbols and letters, on the basis of which the weights may be firmly slotted into a wider metrological framework and dated accordingly. The combination of symbols and letters indicate that the weights are not just Attic but specifically Athenian: the legend ΔHMO is an abbreviation of δημόσιον and it is the official guarantee for the accuracy of the weight. The symbols indicate the

22 Ibid.: 32–3, figs 4–5, 54, fig. 26; for an image of a contemporaneous set of weights with a balance, see Skinner 1967: pl. 8.
23 For example, Rostovtzeff 1941: 451–5, pls LIV–V; at auction, see Christie's 1989: 73 no. 240; and Elayi and Elayi 1997: 32–4.
24 Rostovtzeff (1941: 1299) already remarked that there seems to be no change in the metrological system in the Ptolemaic period.
25 For her catalogue of metal weights, see Lang 1964: 25–33.
26 Hitzl 1996; some refinement in the dating of the weight systems in a review has also been taken into account here: see Johnston 1998.
27 Kroll 2012: 114–5 note 22.
28 Hitzl (1996: 105–6, 111–20) has an excellent overview of the symbols of the multiples and fractions of the weights in the successive weight systems.
29 Using Doyen 2012 for the weight of an Attic drachma, as per Kroll 2013: 533 note 5, on the basis of Lang 1964: 37 SW16, pl. 12.
30 See Meadows this volume Chapter 6.
31 For a general dating of this area from the middle of the fifth to the second centuries BC on the basis of ceramics, see Grataloup 2010: 154–5; also 2012; and this volume Chapter 7.
32 Goddio and Fabre 2008: 342–3, nos 358–364, and 367. For a preliminary analysis and dating of a selection of the weights see Van der Wilt 2010.

Table 8.2 The six Athenian weights from Thonis-Heracleion.

No. (symbol)	Weight (g) (reconstructed mina in g)	Multiple/fraction	% Deviation (no. of dr/mina)
1– no. 6723 (wheel + ΔHMO)	2920 (486.7)	Triple stater	–0.1% (112)
2– no. 6722 (wheel + ΔHMO)	1920 (480)	Double stater°	–1.5% (112)
3– no. 8173 (dolphin + ΔHMO)	398.8 (398.8)	Half stater	–18.1% (112)
4– no. 9042 (amphora + ΔHMO)	287.9 (431.9)	Third stater	–11.4% (112)
5– no. 6253 (tortoise + ΔHMO)	238.2 (476.4)	Quarter stater	–2.2% (112)
6– no. 6507 (half tortoise + ΔHMO and HMITE)	119 (476)	Eighth stater	–2.3% (112)

° Parallel: Lang 1964: LW 1, pl. 2; for all other known comparanda, see Empereur 1981: 540 no. 5, fig. 5 and note 6.

multiple or fraction of the stater and enables the original mass of the object to be reconstructed.

Two observations should be made from these weights, the first of which is the dating. In Table 8.2 the six weights are listed with the modern weight and the mass of the reconstructed weight *mina* (on the basis of the symbols and letters). The final column lists the deviation of the weight to the mass of the 'original' on the basis of the weight standard. All weights must be attributed to Hitzl's Class C, which was in use between the early fourth century[33] and the third century BC. Hitzl proposes a Late Classical system ('C') of 110 drachmas per *mina* instead of Lang's 112 drachmas per *mina*.[34] The 112 drachmas per *mina*, however, is preferred here as it fits the data from Thonis-Heracleion much better. Furthermore, the timing of the change from 105 to 112 drachmas per *mina* has been revised with recent work suggesting an early fourth century BC start date instead of 420 BC, and this is applied here.[35] The lettering on the weights suggests that they should be dated to the second half of the fourth century BC.[36] Interestingly, the dating of these weights corresponds exactly with the appearance of earliest coins at the site.[37]

A second observation is on the relationship between the current mass and the original weight standard, and the accuracy achieved in antiquity of an individual weight to its intended mass. Again, the weights from Thonis-Heracleion give us several indications for a crucial point in metrology. The back of weight no. 1, and to a lesser extent no. 2, have traces of tool marks suggesting the mass of the object was closely monitored (Figure 8.8). This observation is supported by the fact that their current mass corresponds closely to the ideal mass reconstructed on the basis of the symbols and legends of the Attic weight standard (see Table 8.2). This

Figure 8.8 Back of weight no. 1. H6723 SCA 959 (L. 9.1 cm, W. 9.1 cm, H. 5.6 cm max). (Photo: E. M. van der Wilt; © F. Goddio/Hilti Foundation.)

in turn signals the high level of accuracy achieved in weights made of lead. The idea that the ancient Greeks or Egyptians were incapable of achieving a high level of accuracy in their measurements[38] is untenable, when considering the fractions of a drachma in circulation as fractional coinage.[39] The degree of accuracy demonstrated by weights nos 1, 2, 5, and 6, as well as the large number of small lead weights, clearly shows the ability to control the accuracy of weights in the marketplace. This does away with the assumption that lead weights were less accurate than ones in bronze.[40] It is unlikely that

33 The start date of this weight system is slightly later than Hitzl 1996: 113, as per Johnston 1998.
34 Hitzl 1996: 113–5.
35 I thank J. H. Kroll for drawing my attention to this review: see Johnston 1998: 253.
36 For a more detailed argument, see Van der Wilt 2010: 160.
37 See Meadows this volume Chapter 6.
38 For example, Grayson 1974.
39 For a discussion of this point, see Bresson 2000: 214–5.
40 For the higher degree of accuracy for silver weights, suggested by Hitzl 1996: 92, see Bresson 2000: 230.

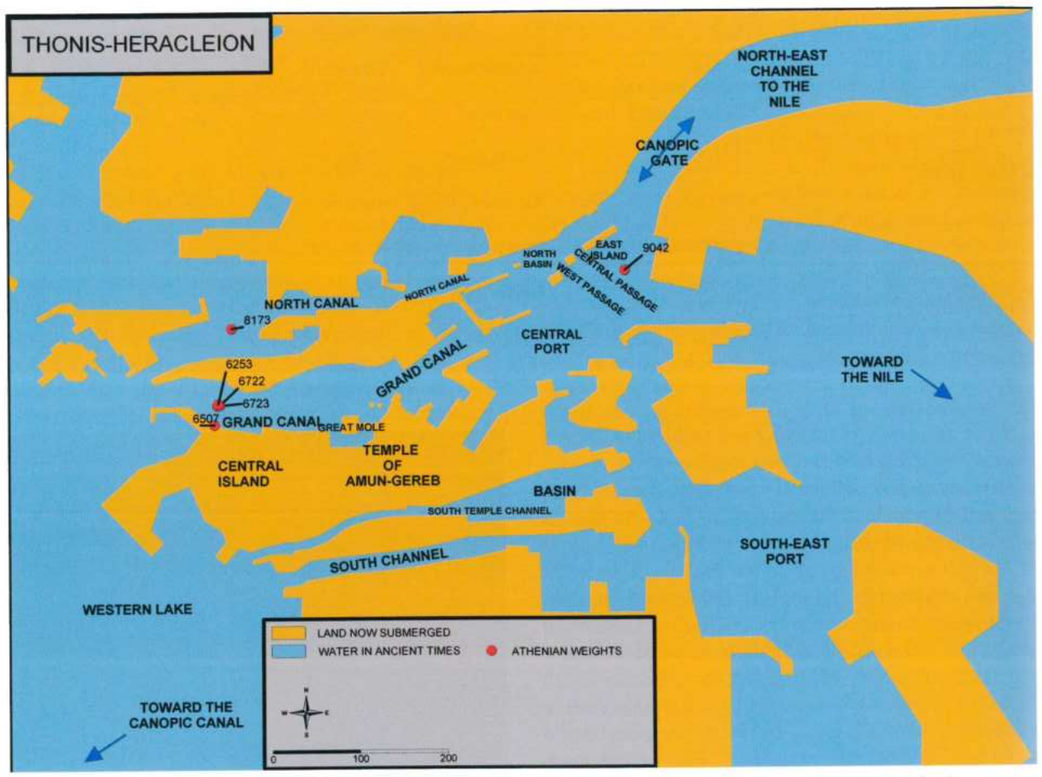

Figure 8.9 Map of Thonis-Heracleion with the distribution of Athenian weights. (Base map: © F. Goddio/IEASM; find spots added by the author.)

the degree of accuracy at the point of manufacture was different due to a lack of craftsmanship or ore in their production.[41]

At the other end of the spectrum are small, light, uninscribed lead weights without symbols or markings. Their square shape and material points to an Aegean context and the Attic drachma is the unit of this group. A different set of observations can be made about these weights. Their dating is broad, as the drachma remains stable at 4.3 g. In order to narrow down the date range, the depositional context becomes the most important factor and it is here that the finds from Thonis-Heracleion are particularly well-served.

Although Pernice includes a large number of lighter weights, as does Petrie, and other publications contain small numbers, they do not feature in metrological analyses.[42] Petrie, for example, mentions 'small square leaden weights' of small denominations, but is hesitant to use them for analysis due to a fear that they may be too inaccurate through the original 'balance error', as well as post-depositional corrosion to the metal, to be reliable for analysis.[43] As a result a discussion of these weights is largely absent, sometimes leading scholars erroneously to assume light weights are entirely absent in the archaeological record.[44] This is clearly not the case, and in light of the discussion above on the degree of accuracy observable in the Athenian weights, it seems likely that pre-deposition at least similar accuracy levels were feasible also in the smaller weights.

The implications of the spatial distribution: the Athenian weights and the light Greek-style weights

The comparison of the spatial distribution of these two groups of weights highlights several differences. The Athenian weights within Thonis-Heracleion show a concentration in the western end of the Grand Canal as well as two outliers (Figure 8.9). One (no. 4) is found close to the Central Island Passage leading to the Canopic Gate

41 Also, different situations may demand different levels of accuracy, i.e., buying jewellery vs. food, see Bresson 2000: 217. It is important to note that the deposition of the weights underwater in antiquity played a significant role in preserving their mass as the lead develops only a thin surface layer of oxidization underwater, see Cronyn 1990: 207; also Tylecote 1983.

42 Pernice 1894: 45–7, 144–64 nos 420–595; Petrie 1926: 23–4, pl. xliii–xliv; and limited numbers elsewhere.

43 Petrie 1926: 22.

44 For remarks on the small weights and accuracy, see Bresson 2000: 215 note 26.

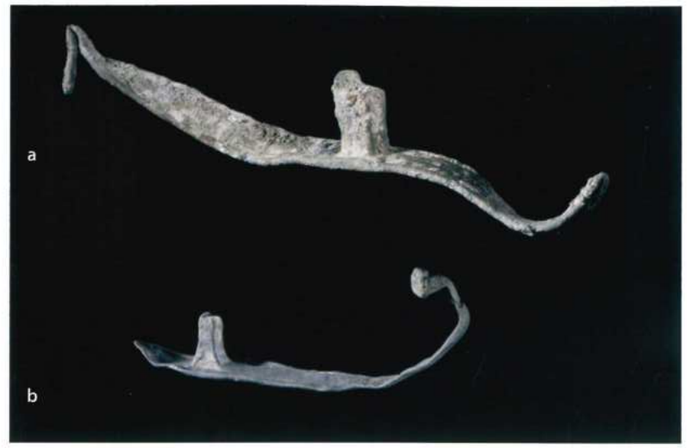

Figure 8.10 Lead barques.
a SCA 1072 (L. 44.5 cm, W. 3.7 cm)
b SCA 1039 (H. 6.2 cm, W. 3.3 cm, L. 37.3 cm)
(Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

in the northeast, relatively isolated from other weights. It is part of a general scatter of metal objects within five metres distance of the weight, including bronze and lead ladles, and two lead barques (Figure 8.10).

Another weight (no. 3) is from the northwest of the site. In this particular location relatively few other objects were found. There are several Egyptian-style weights nearby, five relatively heavy lead ones—ranging from 1,840 to 55.1 g—and two very heavy stone weights—46.5 and 28 kg respectively. A lead applique representing the head of Dionysus was found 2.5 m to the south.

At the western end of the Grand Canal two uninscribed square plaque weights were found in the vicinity of weights (nos 1, 2, and 5), as well as a bronze ladle and a lead barque. Another weight with currently still illegible markings was found near to an Athenian weight (no. 6). The Grand Canal contains many objects that are clearly associated with ritual activity that were deliberately deposited along the length of the canal.[45] It is therefore possible that the weights are also in some way associated with this. Surprisingly, the weights in the Grand Canal are all Aegean-style weights, with the exception of one domed shape (Figure 8.1). The Athenian weights were therefore found away from the main region of trade and taxation, which was on the Central Island and in the vicinity of the temple of Amun-Gereb, and instead appear to have been deposited alongside other objects that are deemed to have a ritual significance in a watery context. Consequently, their deposition may well have been associated more with a ritual than an economic act. As the personal belongings of merchants who had—likely—travelled across the Mediterranean from Athens, the weights could well have been deposited into the waters of the Grand Canal as offerings of thanks for a successful journey or in the hope of a safe return home.

In marked contrast to this pattern is the group of weights in and around the temple area. They are predominantly light plaque weights, weighing between 0.5 and 50 g, that were found in the north of the Central Island (Figure 8.7). If one narrows the selection of weights down further by mapping just those under 25 g, the concentration on the main temple area is even more evident (Figure 8.8). Is it possible that these weights reflect market areas? Again there is a parallel in the coins with a significant concentration in the roughly same area, which may reflect the type of transactions or exchanges that took place in these areas.

Cour-Marty links the proportion of weights from other settlement areas, such as Amarna (more than 25 per cent of the total number of weights in the New Kingdom) and Thebes, to the presence and importance of craftsmen and the working of precious metals.[46] It is, however, only natural that weights would be found in places such as houses, shops, workshops, and marketplaces where they would have been used.[47] Pharmacies, for example, would also have required light precise weights and there is no reason to assume an exclusive relationship between precious metals and the presence of (light) weights. To sum up, it is the group of light, small weights for which the strongest case can be made of reflecting everyday small-scale economic activity, perhaps a market-place to the north of the temple of Amun-Gereb.

Conclusions

The weights from Thonis-Heracleion may be divided into several groups according to the provenance of their weight standard. The observation that the Greek-style weights are the largest subset in Thonis-Heracleion is notable and the find of the first Athenian weights—some

45 Cf. Goddio this volume Chapter 1.

46 Cour-Marty 1990: 23.

47 For example, the occurrence of a number of stone weights, as well as 'rare metal weights', in fill layers of floors in a building from the First Persian Period in Elephantine discovered in Area 15 of the Austrian excavations in Aswan, perhaps associated with the military garrison stationed there at this time. See Müller 2008: 326 note 32.

in pristine condition—allows us to date them to the second half of the fourth century BC. Their condition and close fit also enables us to suggest that a high level of accuracy was achieved on the weight standard in antiquity and carefully monitored, regardless of the material they were made from. This observation clearly has implications for weights in antiquity in general, and reaches far beyond the immediate context of an Egyptian port city. The square weights without markings, and the Egyptian cupcake and domed shapes cannot be dated on their shape and weight standard alone, but a more detailed contextual analysis will be needed in individual cases before further progress can be made.

A majority of weights also weigh less than 50 g, both on the Greek and Egyptian standard, with a significant concentration of these in the area just to the north of the temple at the centre of the site. The location of these weights on land, especially around the temple, may perhaps be taken as an indication of a market-place. By contrast, the deposition of the Athenian weights in the canals in the vicinity of objects with a known cultic function or role shows that the weights cannot be taken as direct representatives of economic transactions.

The weights from Thonis-Heracleion consequently reveal the presence and the concerns of differing communities in the port. The small weights show people engaged in transactions in the vicinity of the temple, whereas the Athenian weights provide a link into the ritual life of the sailors and merchants and their concerns to propitiate their gods and ensure or give thanks for safe passage. The high levels of accuracy of the weights also speak directly of the concerns of institutions and the people who oversaw and benefitted from them. Ensuring fair dealing and instilling confidence in the market and in transactions was at the heart of non-local trade between strangers that took place in the port of Thonis-Heracleion.

Acknowledgements

I am indebted to J. H. Kroll for very helpful discussions on the weights and weight systems in Thonis-Heracleion and for making his unpublished notes on the Attic weight system available for consultation. I would like to thank Franck Goddio for access to this new material, and Damian Robinson, Sanda Heinz, and the wider European Institute for Underwater Archaeology (IEASM) and Oxford teams working in Thonis-Heracleion for offering many helpful discussions and comments. The Hilti Foundation is thanked most sincerely for their financial support.

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III

Ships at Thonis-Heracleion

9 The ships of Thonis-Heracleion in context

David Fabre

Figure 9.1 Shipwreck 17. Thonis-Heracleion, Central Port. Conventional ^{14}C dating: 543 +/- 50 BC. Calibrated ^{14}C dating 786 cal BC–416 cal BC. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

'Beau ciel, vrai ciel, regarde-moi qui change !
Après tant d'orgueil, après tant d'étrange
Oisiveté, mais pleine de pouvoir,
Je m'abandonne à ce brillant espace,
Sur les maisons des morts mon ombre passe
Qui m'apprivoise à son frêle mouvoir.'

Paul Valéry, *Le cimetière marin*

To the memory of André Bernand

Introduction

The ships submerged in the Central Port of Thonis-Heracleion are something of a treasure-trove for the nautical archaeologist (Figure 9.1). Dating predominantly to the Late Period of Egyptian history, the vessels offer an unparalleled opportunity to examine a form of shipbuilding that was rooted in the nautical traditions of the Nile Delta and to explore the reasons behind their deposition in the Central Port.[1] Rather than simply concentrate on either the moment of creation or abandonment, however, the purpose of this paper is to examine the environmental conditions—both physical and social—that shaped their construction, use and deposition. It demonstrates that the *bar*-ships, or *baris*,[2] which appear to represent the majority of the vessels abandoned in the Central Port, were perfectly adapted to their native environment and to their job of carrying goods and people and even defending the Delta against the enemies of Egypt. This was a difficult and dangerous sailing environment, full of shifting sands and unpredictable winds, yet the Canopic branch of the Nile was also ideally placed to provide access to and from the 'Sea of the Greeks' for the dynasts of the Late Period.[3]

1 See Belov this volume Chapter 10 and Robinson this volume Chapter 11.

2 See Belov this volume Chapter 10.

3 Goddio, Robinson and Fabre 2015.

Figure 9.2 Limestone anchors discovered during survey: west of the Central Port, south of the Eastern Passage, Port H3. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Thonis-Heracleion: *emporion* of Egypt

Begun in 1996 in Aboukir Bay, about 30 km to the north-east of Alexandria, geophysical and geological analyses have made it possible to determine the historical contours of the Canopic region, the circumstances and chronology of its submersion, as well as the ancient course of the western branch of the Nile, and the position and configuration of the principal archaeological sites mentioned in ancient texts. Using topographical survey and archaeological excavation, in conjunction with ancient literary, epigraphic, and iconographic sources, and drawing on a thorough historiographic knowledge from the ancient sources, the ongoing work of the European Institute of Underwater Archaeology (*Institut Européen d'Archéologie Sous-Marine*, IEASM), directed by Franck Goddio in cooperation with the Supreme Council of Antiquities of Egypt, has enabled us to identify Thonis-Heracleion, the city harbour of the eighth to the second centuries BC, and its topography.[4]

The site of Thonis-Heracleion and allusions to its location occur in classical literature. To the east of Canopus and on the Mediterranean shore, the city was, at the mouth of the Nile's western branch, known as the 'Canopic', or 'Herakleopolitan Mouth'.[5] Today this area at the western end of Aboukir Bay is under water. In the Egyptian Late Period, however, this site controlled access to Egypt, traded with the Greek regions and supervised foreign ships in transit to Naukratis. Thonis-Heracleion was a major *emporion*, a port and place of trade and exchange in the western Delta prior to the foundation of Alexandria in 331 BC.[6]

The port of Thonis-Heracleion clearly saw an intense amount of economic activity. As can be seen from the intact stela of granodiorite, a duplicate of the stela of Naukratis, discovered in the *temenos* of the main god of the city, Amun-Gereb.[7] Intense trade between Egypt and the lands of the eastern Mediterranean has been confirmed by the presence of imported ceramics, with the peak of imports coming during the middle of the first millennium (from the sixth to the fourth centuries BC). The ceramic evidence would suggest a complex web of trading networks converging on Thonis-Heracleion, with Corinth an important early node, the Ionian and Cycladic islands becoming important partners later, and an Athenian trade route developing in the Persian period. There was also significant contact with the trading world of the Phoenicians, with Cyprus a major node in this network.[8]

4 For the history of Thonis-Heracleion, its role and function, as well as the process of its discovery and the archaeological results, see Yoyotte 2001; 2004; Goddio 2007: 1–28, 69–130; 2008; Fabre 2008a.

5 Bernand 1970: 153–258.

6 Goddio 2011: 124–9.

7 von Bomhard 2012.

8 Here we are not able to present, even incompletely, the role of Thonis-Heracleion as an *emporion* and customs post. We refer to our review, which shows how during the Late Period this port, commanding access to the Canopic branch of the Nile, had trade relations with Greece, and was used to inspect all foreign ships passing through Naukratis: Fabre 2008b. See also Grataloup 2008; 2010; Carrez-Maratray 2005; Malkin 2011. Concerning the link between Thonis-Heracleion and Cyprus, see Fabre and Goddio 2012.

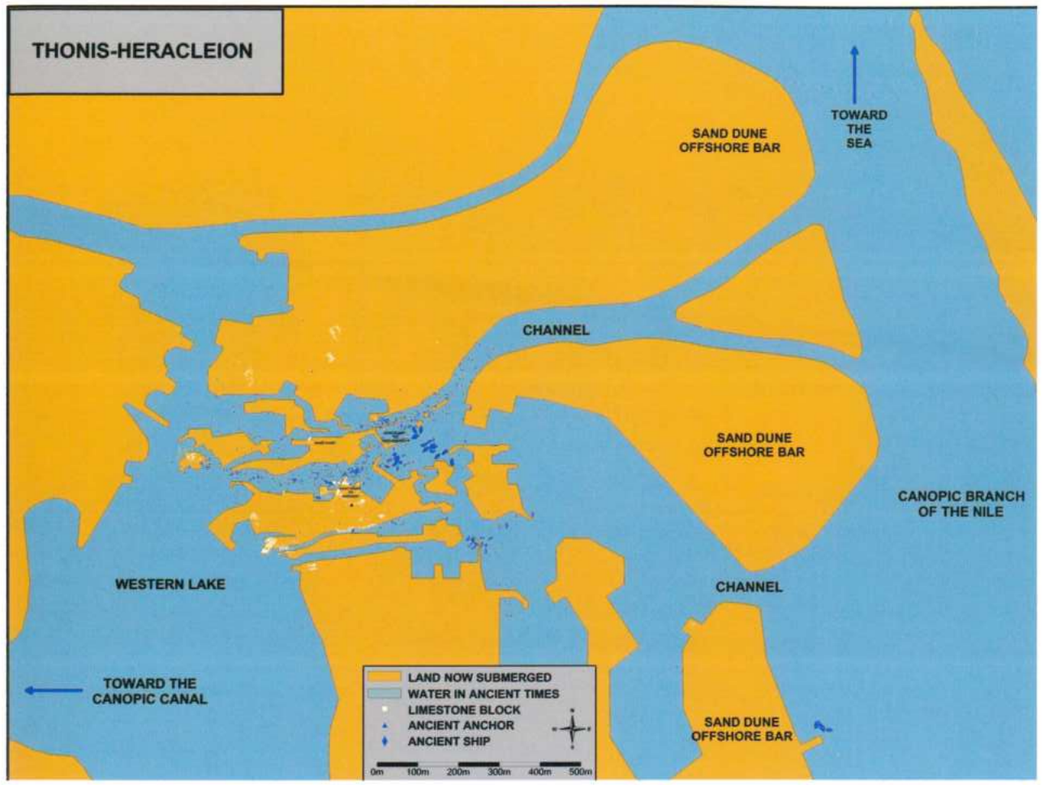

Figure 9.3 The town of Thonis-Heracleion, situated between port basins to the east and a lake to the west, with the distribution of ancient ships and anchors. Sand dunes separated it from the mouth of the Nile's Canopic channel. (Map: F. Goddio; © F. Goddio/IEASM.)

The ships of Thonis-Heracleion[9]

The range and scale of the nautical and archaeological evidence testifies to the importance of Thonis-Heracleion as a port: over 700 anchors (Figure 9.2) and more than 60 ships have been found, the majority of which date from the sixth to the second centuries BC. By systematically locating the ships in the Central Port, it has been possible to create a map showing the distribution of the ancient vessels, which has revealed both clusters and isolated examples (Figures 9.3–4). It should be stressed at this point that the ships have only been examined through survey, with limited and isolated soundings being made to evaluate each (Figures 9.5–6).[10] Wooden fragments from them have been carbon dated, revealing that the majority of the ships date from the Late Period and are thus pre-Ptolemaic.[11] These vessels serve as an exceptional resource for the study of naval architecture, the development and operation of the port, the organization of fluvial/maritime or regional/interregional trade, and more generally, the historical geography of the region.

Analyses of the wood used in the construction of the ships discovered in Thonis-Heracleion reveals that it

9 We summarize here two preliminary studies already published concerning the ships of Thonis-Heracleion, with bibliography: Fabre 2011 and Fabre and Belov 2012. See also Fabre and Goddio 2013.

10 The archaeological approach to these ships, as well as to the stone anchors and anchor stocks, follows the same pattern as that adopted for determining the contours of the sunken lands and port infrastructures. During the survey, excavation of these vessels was kept to a minimum, with only the first layer of coarse modern sediment being removed from around the ship remains protruding from the clay. This allows the outline of the ship to be drawn and wood samples taken for ^{14}C dating and the identification of the wood species. Just two shipwrecks (11 and 17) have been excavated (between 2009 and 2010), and the excavation of ship 43 is currently in progress (see below).

11 A considerable number of ships can be assigned to the Ptolemaic period—around 40 per cent—but we confine ourselves here to pre-Ptolemaic ships. We draw attention to the fact that the range of dates suggested by radiocarbon is quite large, even after adjustments have been made for environmental factors (plus or minus 50 years, or even more). The date derived from ^{14}C methods only relates to the period during which the wood was living matter, that is, when it was still sapwood. The data, with ^{14}C analyses and references, will be published in a monograph devoted to each of Thonis-Heracleion's excavated ships.

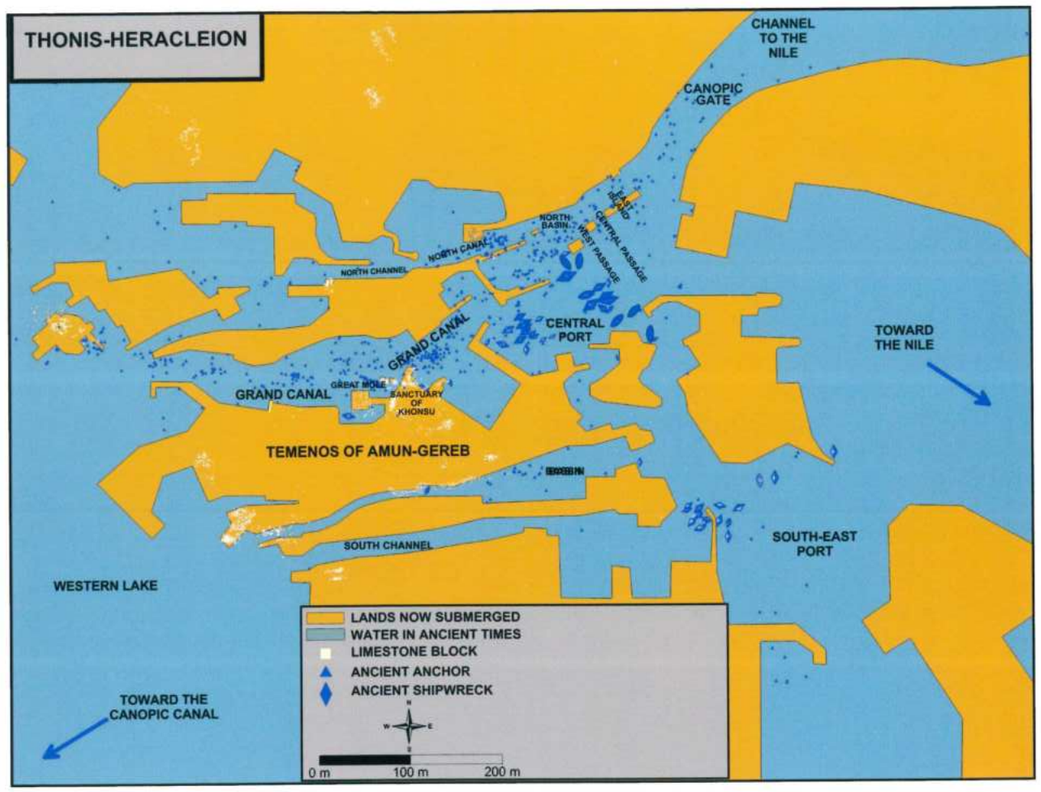

Figure 9.4 Thonis-Heracleion organised around the *temenos* of the main god of the city: Amun-Gereb. Note the two concentrations of sunken vessels in the Central Port H3. (Map: F. Goddio; © F. Goddio/IEASM.)

was for the most part (70 per cent) acacia (*Acacia* sp.), which was native to Egypt. The other local wood observed in the remains of ships in Thonis-Heracleion is sycamore, used for the construction of fluvial craft.[12] Four ships have planking, in part made of oak: *Quercus* sp. (sclerophyllous oak type or deciduous oak type). Usually this wood was imported, however the texts of Theophrastus and Pliny the Elder show that oak was present in the Thebaid.[13] Even before the study of the architecture of the ships, these facts suggest local construction. Only two ships in the Central Port possessed wood from non-native species: pine (*Pinus* sp.).[14] This would suggest that few foreign ships were sunk in the port, as well as a virtual absence of imported shipbuilding timber, despite the clear references in historical texts to an import trade in this material. The local nature of the vessels can also be seen in the ways in which they were constructed, using a method of carpentry that appears to be uniquely Egyptian.[15]

Constraints of the region?[16]

To date, the majority of the ships of Thonis-Heracleion that have been studied feature a solid, expansive lower hull, from which it is possible to estimate their size. Roughly, the average length of the ships is around 20–26 m and the width around 7–10 m. The geometry and proportions of the Thonis-Heracleion ships correspond to what we know about antique coasters in general: they had a length to width ratio of 1 : 3. Certain ships from Thonis-Heracleion also demonstrate a relatively flat lower hull, which is characteristic of the naval architecture of interior waterways, although they were also fitted with a keel and thus would also be adapted

12 This is the case of the ship 11 (fourth century BC), discovered in the Grand Canal north of the *temenos*, excavated in 2010 and 2011. Study in progress by Fabre, Cabrera-Tejedor, Sandrin, and Brousse.

13 Theophrastus *De Historia Plantarum* 2.4.2.8; Pliny the Elder *Naturalis Historia* 13.63.19.

14 One also wonders whether this fact does not reflect different levels of access to wood resources in Egypt, as the region of Thonis-Heracleion would have been particularly well supplied with acacia. See below.

15 See Belov this volume Chapter 10; Fabre 2011; Fabre and Belov 2012.

16 The rest of the chapter continues our preliminary study of the ships of Thonis-Heracleion (Fabre 2011) and develops some ideas expressed during the OCMA symposium in Japan in 2009: *East meets West along the Maritime Silk Route, 2–3 July 2009*, Waseda University, Tokyo.

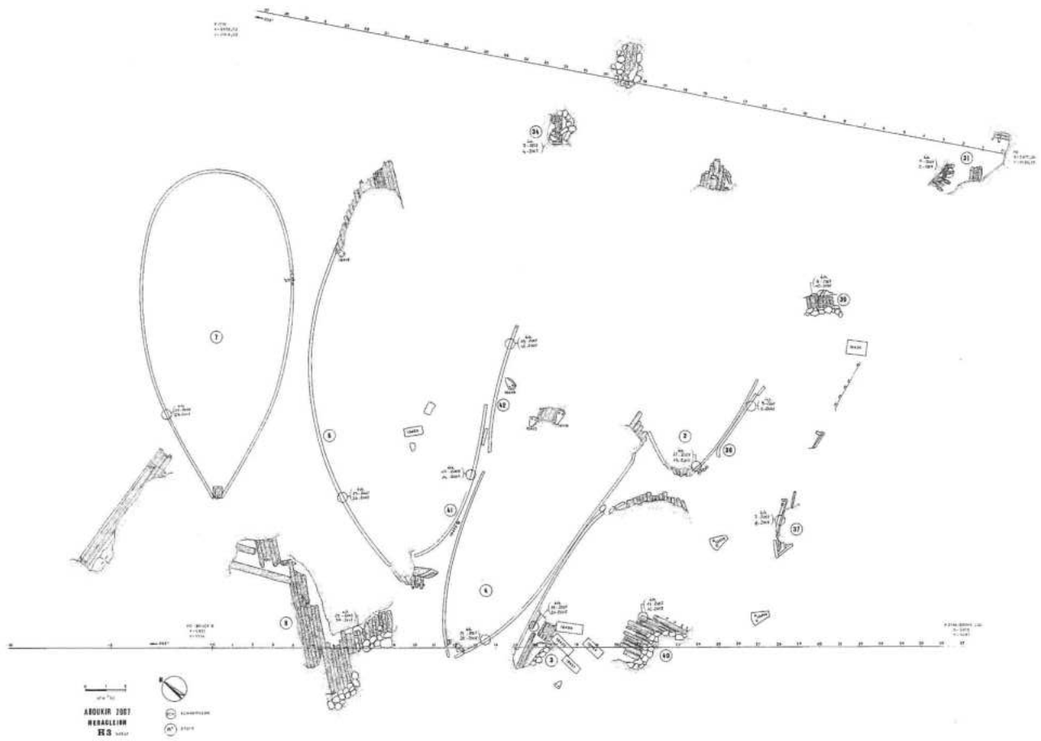

Figure 9.5 Plan showing a concentration of ships in the western part of the Central Port. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

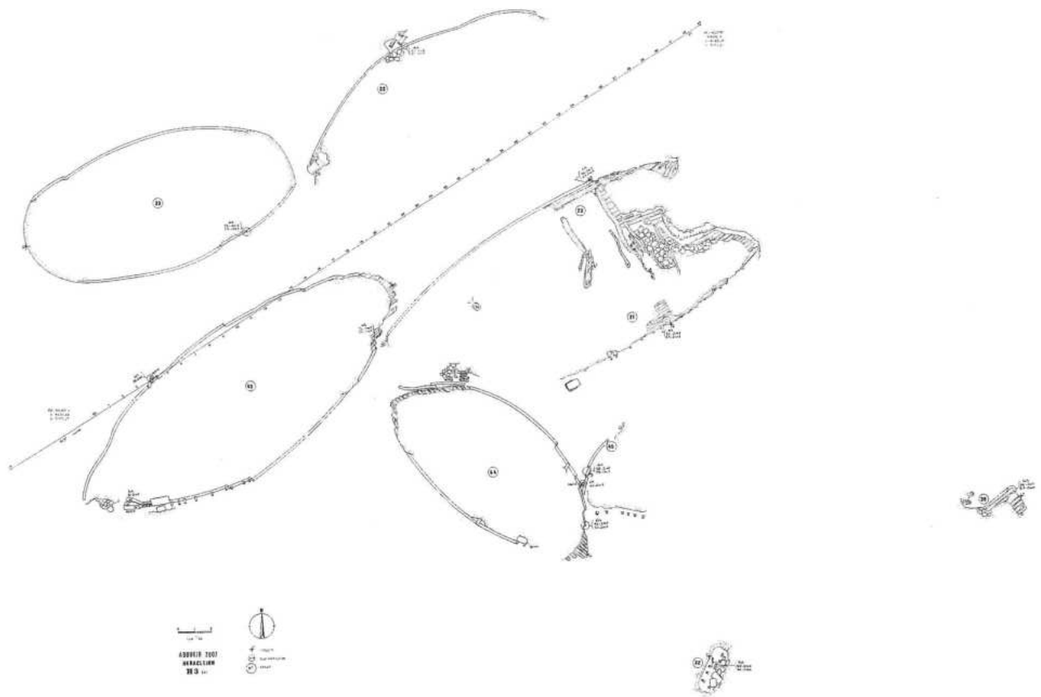

Figure 9.6 Plan showing a concentration of ships in the eastern part of the Central Port. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

to maritime use. The absence of traces of shipworm on the outer side of the planking,[17] the use of local wood, and the form of construction suggest that many of the vessels from Thonis-Heracleion were river-going rather than sea-going ships. In fact, it would appear to be an optimised form of naval architecture, perfectly suited to its operational environment.

It is essential that the naval architecture of the ships and boats of Thonis-Heracleion be understood in conjunction with the local nautical environment and/or that of the nearby inland waterways to be navigated. In the Delta, earth and water are locked in a struggle to form a territory that is neither truly land or river. Heliodorus describes this marshy landscape, the dwelling of shepherds and herdsmen:

> *And this is what the lake is like; this whole region is called by the Egyptians 'the land of shepherds'; it is a natural basin, which receives part of its water from the Nile's floods and transforms itself into a lake, very deep in the middle but, at the edges, forming a marshy plain; what shores are for the sea, marshes are for the lake in question.*[18]

And Achilles Tatius gives a realistic backdrop of the revolt of the Bouviers (*Boukoloi*): 'There are also islands that have cabins on them and they look like improvised towns protected by the lake,'[19] or:

> *Around the territories that are thus inhabited by the herdsmen, there is always a great deal of stagnant water; when all the land is covered by the waters, lakes form there which, even when the Nile withdraws, continue to exist and keep their water, as well as the mud that the water has formed. And the herdsmen cross these lakes on foot, or by boat, but only boats carrying a single person can navigate across them; any boat from foreign part gets bogged down in the mud. Their boats are small and light and they need little water to sail over; if, eventually, there is no water left at all, the boatmen hoist their boats on to their backs and carry them until they find more water …*[20]

The description of Achilles Tatius of the landscape of lakes and marshes, islands and peninsulas, is reminiscent of the representation of the Nile Delta in the Palestrina mosaic.[21] He also emphasizes the importance of the type of aquatic communication channels that we find in Thonis-Heracleion[22] to the local society and its economy. At present, however, there is little evidence for the type of small boats described in the text from the Central Port where the vessels appear to be larger cargo-carrying *baris*.[23] Nevertheless, the combination of the texts of Heliodorus and Achilles Tatius can be set alongside that of the Palestrina mosaic to provide a clear description and illustration of the configuration of the territories of the 'people of the marshes'.

This watery environment can be understood further through consideration of the exact meaning of *nebwt*. This forms part of the Egyptian expression *haw-nebwt*, which appears in the text of the Decree of Saïs in 'everything that comes from the Sea of the Greeks' (*m w3ḏ-wr ḥ3w-nbwt*).[24] The meaning of *nebwt* is 'baskets', which probably referred to types of wickerwork [or reed/papyrus?] vessels coated with pitch to make them watertight that would have been commonly used in this environment.[25] *Haw-nebwt* is one of the oldest geographical names,[26] and consequently the 'Greeks' from the text of the Decree are, properly speaking, 'those who are beyond the baskets'. These *nebwt* are apparently forms of habitation half on dry land and half on marshland. The term would have been applied first of all to the populations of the maritime band of the Delta, and then seems to have been extended, as Egyptian sailors spread northwards, to the inhabitants of the Aegean islands.[27]

17 So far, this has been proven for 3 of the ships, out of the total of 64 found to date.

18 Heliodorus *Aethiopica* 5.

19 Achilles Tatius *Leucippe and Clitophon* 4.12.7–8. The novel *The Adventures of Leucippe and Clitophon* is indeed a work attributed to the author Achilles Tatius, of Egyptian origins, who probably lived in the second century AD. Commentators have highlighted the uncertainty about the times in which Achilles Tatius lived and the possibility that the work was the composition of two authors. Grimal 1958: 871, 874.

20 Achilles Tatius *Leucippe and Clitophon* 4.12.2.

21 Walker 2003. As for the domestic architecture of the wetlands, one should imagine houses built of reeds or papyrus and clay as we still see on the shores of Lake Manzala. Blouin suggests an interesting parallel with the housing of the Maʿdan or 'Marsh Arabs' that still inhabit the Euphrates Delta in southern Iraq: 'The lifestyle of the Maʿdan, mainly focused on fishing, raising buffalo culture, and the cultivation of reeds, is similar to that current in the region during the Assyrian period and has many similarities with that of the inhabitants of the marshy areas of the Nile Delta in, antiquity … Their traditional houses, very similar to those on the cylinder seals and reliefs of the Uruk period, are raised on pillars made of thick bundles of reeds and are sometimes made unbaked bricks covered with mat reeds, sometimes entirely of reeds. This marsh architecture, which takes advantage of building materials available in the immediate environment, produces houses that, in comparison with structures made of baked or unbaked bricks, look like huts' [translation by the author]: Blouin 2010a: 398, who refers to Henein 2010; Ochsenschlager 1998; 2004; Roaf 1991: 51.

22 That is due primarily to questions of conservation; there is little chance of boats of reeds—similar to those shown on Assyrian reliefs from around 700 BCE, comparable to the papyrus boats by which, according to Pliny the Elder, the inhabitants of the marshes of the Nile Delta sailed—were preserved on the site.

23 See Belov this volume Chapter 10.

24 Yoyotte 2001: 24–5, 32; Bomhard 2012. 'The Sea of the Greeks' (*m w3ḏ-wr ḥ3w-nbwt*) corresponds to the commercial maritime space of the 'Rhodian or Carpathic Sea' of the Greco-Roman onomastics. See Rougé 1966: 43–5 and Pomey 1997: 20–3.

25 Basch 1976.

26 Vercoutter 1947; 1949.

27 The ambivalence in the use of this term exists also for the term *w3ḏ-wr*. During the Ptolemaic Period in the Temple of Edfu, for example, this expression might have designated part of the Delta, and the hydrological system of its coastal regions, whereas, again in the Ptolemaic Period and in royal bilingual documents, it designates without any doubt the Mediterranean: see Favard-Meeks 1989. See also the ambivalence of the meaning of the marshes in the Egyptian sources. As undifferentiated and unordered spaces, where land and water are mixed, marshes (*pehw*) could be likened to the state of the world prior to its creation. This is also where the young Horus took refuge on the floating island of Chemmis, in the outskirts of Buto, to escape from the attacks of Seth. The marginality of lake and wetland areas could make them places of resistance, where royal power could regenerate itself protected from external attacks. Egyptian sources recount how the Saïte princes of the north resisted the invaders (Ethiopians and Persians). See Chuvin and Yoyotte 1983: 58–9; Servajean 2001: 5; Blouin 2010a: 406. But as a space with fluid boundaries, the Delta marshes could be considered the place of Seth's allies and therefore, from the point of view of power and of the Pharaoh, the guarantor of Ma'at, as threatening places fermenting disorder and sedition (Blouin 2010a: 407). We find this ambivalence in the Greek and Egyptian sources concerning the inhabitants of the coastal fringe of the Nile Delta (see below).

28 Vercoutter 1949: 182 note 6.

29 Vercoutter 1949: 181–5; see also Sauneron 1960. Nonetheless, everything rests on the equivalence of meaning between *w3ḏ-wr*, the 'Great Green' and 'Sea'. On the maritime space of the ancient Egyptians, see Fabre 2004: 12–19.

30 Yoyotte 1962: 100 note 6, 104 note 6.

31 Favard-Meeks 1989: 47.

32 Yoyotte 2008; see also 2004: 38–9.

33 Great Stela of Ptolemy VIII, l. 15. Thiers 2008: 14, 15 notes d-f, 28. This 'open, discovered space' (*peqa*) is reminiscent of the opening of the region's maritime and coastal configuration (the low coast). The 'border of the country' here designates the northern, Mediterranean, border of Egypt.

34 Yoyotte 2001.

35 The methods and results of the geophysical and electronic survey, complimented by geological analyses have been presented in Goddio 2007; 2010; Stanley et al. 2007.

36 The Central Port covered an area of about three hectares. The South-East Port seems to extend for a considerable area and are still under survey.

37 For wreckers, see below.

38 Chuvin and Yoyotte 1983: 54.

Haw-nebwt, and also *shen-rekhyt*, seem to describe lands situated beyond the marshlands and the lake of the coast.[28] A whole series of geographical texts describe the sacred waters of the nomes of the northern Delta and their hydrological systems. From these texts it is clear that when an Egyptian wished to describe the course of the Nile in its final phase, it is this marshland region that they refer to, not the sea.[29] *Haw-nebwt* and *shen-rekhyt* do not designate the sea, but elements of the Egyptian coastline. As for *ra-hawt*, another term sometimes associated with the coast, it is worth noting that it is always related to the freshwater flora and fauna marshlands.[30] Literally, *ra-hawt* is *'the opening of the hawt'*, where *'hawt'*, although rare, seems to designate a space that links the hinterland (*pehw*) and the waters depending on a branch of the Nile or a canal.[31]

Two bronze plaques found between sectors H1 and H7 of the temenos of Amun-Gereb in Thonis-Heracleion bear a horizontal inscription of hieroglyphs: *'m rʿ ḥ3w-nbwt'*, 'at the mouth (of the sea) of the *haw-nebwt*'. Here, *haw-nebwt* designates 'the Greeks', and the inscription specifies the location of Thonis-Heracleion on the coast, also corroborating the text of the Decree of Saïs.[32] In short, Egyptian terminology for the Delta margins comprehends it in terms of its topography and evolution, as a place between land and sea, as much as a navigational space. This is also the case for the great stela of Ptolemy VIII discovered at Thonis-Heracleion, which describes its location as being 'on the edge of the nomes of the gods, on the western horizon, in this open space on the borders of the country, beside the sea.'[33]

The term *henet/hone* also raises an important point concerning the topography of the coastal fringe of the Nile Delta. This is the same term used to name the city of Thonis (*T-Hone*). It appears to be synonymous with the geographical reality of its location, an important navigational zone between land and sea. This textual analysis is entirely corroborated by the rediscovered topography of the city, which was built over one of the 'lower basins of the arms of the Nile from where the offshoots at the end of the lower branch of the Delta emptied into the coastal lagoons, while the single upper arm emptied into the open sea.'[34]

Thonis-Heracleion was organised around the *temenos* of the main god of the city: Amun-Gereb. Temples and their annexes were on a Central Island overlooking the surrounding city. To the north and east stretched the harbours of a large port. The quays, as well as a foreport, opened onto the Nile by a narrow channel. The whole was protected by a string of dunes. The location was ideal, sheltered both from prevailing northwesterly winds and from northeasterly storms. From the topographical maps derived from geophysical and geological surveys,[35] combined with the results from targeted archaeological excavations, it can be seen that the harbour installations were highly complex. There were several major port basins,[36] interconnected by secondary waterways, all centred upon the temple area. These were bordered by two channels crossing the city from east to west, which connected the port basins on the east to a lake in the west. The port basins were connected to the Canopic branch of the Nile by two main passages: a wide passage (the North Canal) between coastal sand dunes linked the north port to the Canopic Branch and a narrow passage (the South Channel) to the southwest connected the southeast port to the Nile (Figures 9.3–4).

The special importance of this site can be clearly seen if it is placed in its wider geographical context. Along the northern sea coast there were strong currents and headwinds, high sea floors and sand bars that would have made coastal voyaging difficult. The narrow coastline is not very welcoming for visiting ships, and it lent itself well to their surveillance and to wreckers.[37] The coastline of the Nile Delta was broken by so-called 'false mouths'. These led sailors into dead-end lakes, mazes of floating islets and channels fringed by sedges and reeds that blocked the view, and they had muddy bottoms in which vessels could easily get stuck. Ships were only able to penetrate into the Delta through the two principle mouths of the Nile, that of Pelusium or of Canopus.[38] It was thus an uncertain landscape: a wide border region fluctuating with the Nile's flow, submerged for long periods of

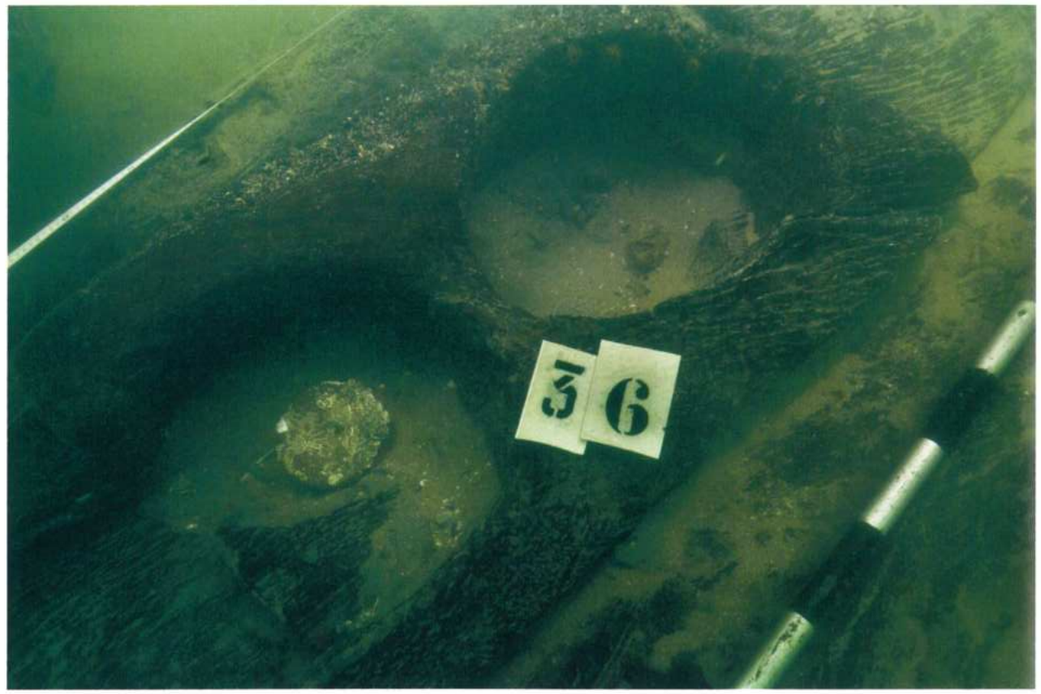

Figure 9.7 Holes arranged in a horizontal piece belonging to the keel of ship 17. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

time and always wet. The shallow drainage canals and lake-like gulfs were not very deep and only ships with flat bottoms and/or low draughts could enter.[39]

The difficulty of navigating the Egyptian coast was noted in classical sources. As Diodorus relates:

> *A sand bank extends across almost the entire breadth of Egypt and the navigators who approach it without prior experience cannot spot it. So those who think they have escaped from the perils of the sea and who, in their ignorance, joyfully set sail for land, suddenly see their vessels running aground and unexpectedly being shipwrecked. And some of them, because of the flatness of the coast, fail to see the land in time and unwittingly encounter either marshy shallows, or else desert coast.*[40]

Ammianus Marcellinus also commented upon the treacherous nature of the near-shore prior to the construction of Alexandria's harbours and its lighthouse.[41] More recently, Jollois, an engineer in the French Department of Civil Engineering at the time of Napoleon, emphasised the need to shift to flat-bottomed vessels under the charge of a local pilot able to guide him through sandbanks via narrow channels known as *boghâz*, a Turkish word meaning 'gullet'. The sandbanks were constantly moving, shifted by the sea's waves, and by westerly and northerly winds, forcing the Nile currents to cut new channels at points of least resistance.[42]

The Canopic region demonstrated a series of physical characteristics that would certainly have directly affected local naval architecture. An area with many lagoons, it constituted a maritime enclave where maritime, riverine and lagoonal craft could sail alongside one another. An estuarine zone, it connected the world of coastal and deep-sea maritime architecture and the architecture of river craft.[43] The constraints of the region

39 Whatever the difficulties of sailing the northern coastal area, care must be taken not to transmit received ideas. The northern fringe of the Delta was not the inhospitable region, sparsely populated, presented by some historians and philologists; and its people were neither marginalized, nor unintegrated with Egypt. 'The abundance of deltaic sites whose origins date back to the pre-dynastic period as well as the dynamism of many settlements during the Pharaonic era shows how the population of the delta was neither marginal nor backward', (Blouin 2010a: 388, translation by this author). See also Kenawi this volume Chapter 15 and Wilson this volume Chapter 16.

40 Diodorus Siculus *Bibliotheca Historica* 1.31.2–5: see Bernand 1970: 22.

41 Ammianus Marcellinus *Roman History* 22.16.9.

42 Jollois 1822: 333–60, quoted in Bernand 1970: 497–8; also Cooper 2012.

43 The technical characteristics that differentiate river, river-sea and sea craft are often difficult to identify, particularly in ancient times, and sources are almost exclusively textual and iconographic. Certain reliefs show sufficiently detailed representations of ships, allowing us to acknowledge the existence of seafaring vessels in the Old Kingdom (Landström 1970: 64–5, 122–3). The presence on the ships of Sahure (*c.* 2400 BC) and of Hatshepsut (*c.* 1470 BC) of a tension cable 'suspended in an arc along the entire length … and intended to prevent the stem and stern post from breaking in severe weather' (Boreux

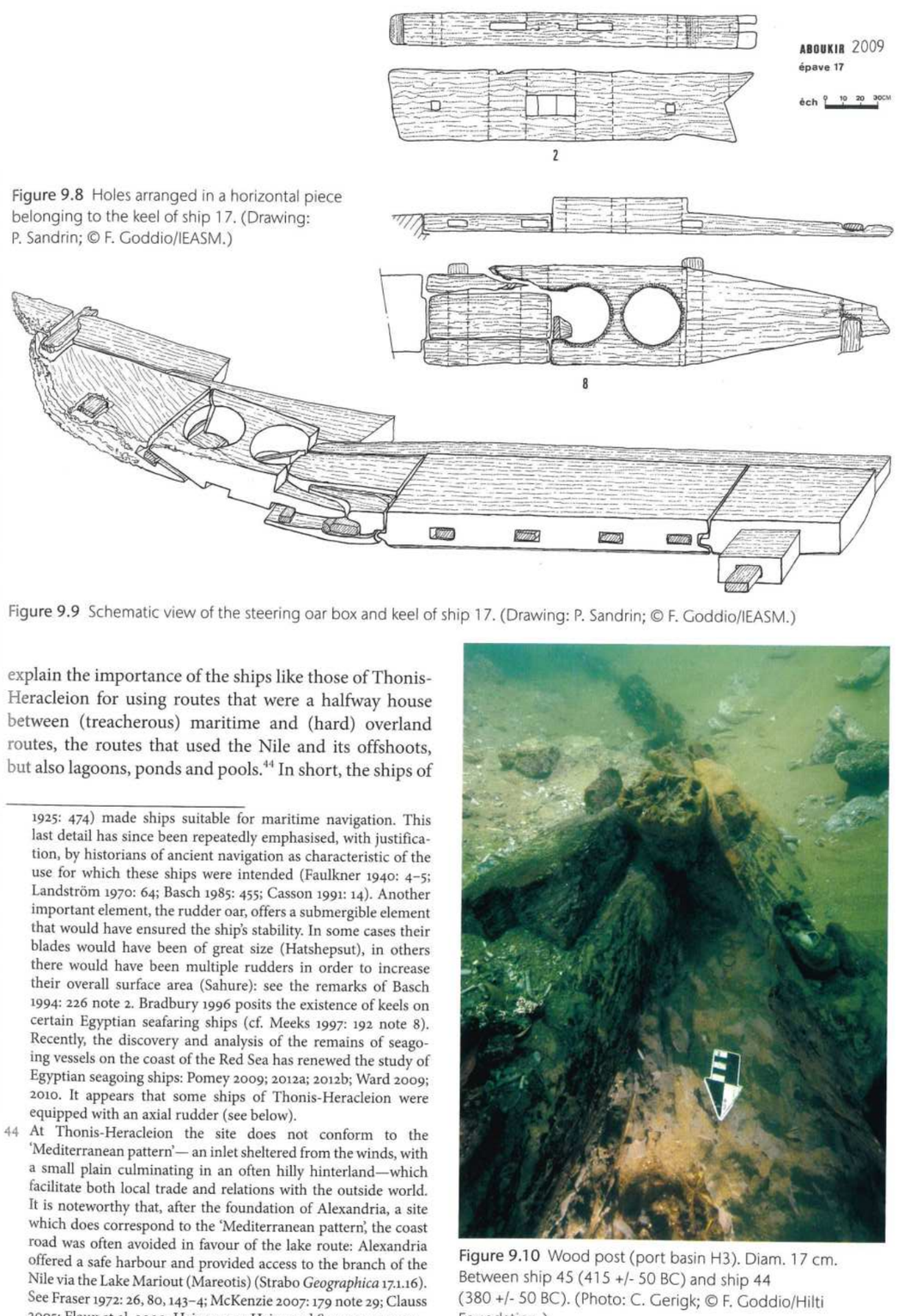

Figure 9.8 Holes arranged in a horizontal piece belonging to the keel of ship 17. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

Figure 9.9 Schematic view of the steering oar box and keel of ship 17. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

explain the importance of the ships like those of Thonis-Heracleion for using routes that were a halfway house between (treacherous) maritime and (hard) overland routes, the routes that used the Nile and its offshoots, but also lagoons, ponds and pools.[44] In short, the ships of

1925: 474) made ships suitable for maritime navigation. This last detail has since been repeatedly emphasised, with justification, by historians of ancient navigation as characteristic of the use for which these ships were intended (Faulkner 1940: 4–5; Landström 1970: 64; Basch 1985: 455; Casson 1991: 14). Another important element, the rudder oar, offers a submergible element that would have ensured the ship's stability. In some cases their blades would have been of great size (Hatshepsut), in others there would have been multiple rudders in order to increase their overall surface area (Sahure): see the remarks of Basch 1994: 226 note 2. Bradbury 1996 posits the existence of keels on certain Egyptian seafaring ships (cf. Meeks 1997: 192 note 8). Recently, the discovery and analysis of the remains of seagoing vessels on the coast of the Red Sea has renewed the study of Egyptian seagoing ships: Pomey 2009; 2012a; 2012b; Ward 2009; 2010. It appears that some ships of Thonis-Heracleion were equipped with an axial rudder (see below).

44 At Thonis-Heracleion the site does not conform to the 'Mediterranean pattern'— an inlet sheltered from the winds, with a small plain culminating in an often hilly hinterland—which facilitate both local trade and relations with the outside world. It is noteworthy that, after the foundation of Alexandria, a site which does correspond to the 'Mediterranean pattern', the coast road was often avoided in favour of the lake route: Alexandria offered a safe harbour and provided access to the branch of the Nile via the Lake Mariout (Mareotis) (Strabo *Geographica* 17.1.16). See Fraser 1972: 26, 80, 143–4; McKenzie 2007: 179 note 29; Clauss 2005; Flaux et al. 2009; Hairy 2009; Hairy and Sennoune 2009.

Figure 9.10 Wood post (port basin H3). Diam. 17 cm. Between ship 45 (415 +/- 50 BC) and ship 44 (380 +/- 50 BC). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

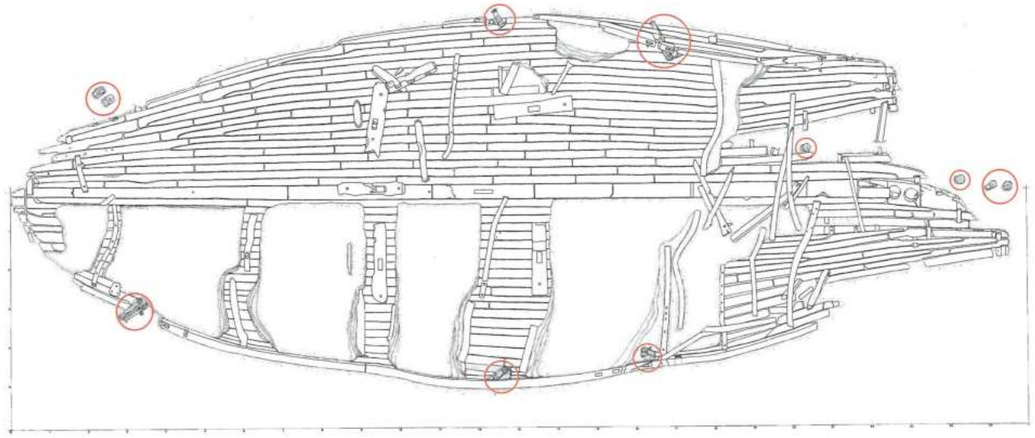

Figure 9.11 Vertical wooden poles surrounding ship 17. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

Thonis-Heracleion appear to have been well-adapted to the estuary conditions in their size and shape, and most probably in the manner in which they were rigged. The limited depth of the coastal waters, dotted with high sea floors, resulted in hulls being extremely flat, so reducing the ships' draughts, to facilitate grounding. Although possessing hardly any keel, it is possible that these ships could also have sailed along the coast,[45] passing easily into the interior, to dock in the Delta. The holes arranged in a horizontal piece belonging to the ship 17's axis indicates that it was equipped with an axial rudder with two holes (Figures 9.7–9.11).[46] The use of a mobile rudder in junks from the South China Sea helps with the understanding of how such a two-holed arrangement would operate, where the rudder could be raised or lowered according to the sailing conditions.[47]

The influence of cultural, socio-economic and geo-political contexts

The 'raison d'être'[48] of the ships of Thonis-Heracleion

While the nautical environment within which the vessels of Thonis-Heracleion sailed would have influenced their architecture and systems of propulsion and direction, the influence of the culture within which the ships were constructed, as well as the socio-economic use to which they would be put, are also of crucial importance to their form.[49] The importance of the broader notion of a 'nautical space', which captures this integration of a particular geography with a community of sailors and boatmen, their regular ports and customs, and their expert understanding of the surroundings and its navigation, becomes apparent here. Another aspect to defining the character of Thonis-Heracleion is as a 'preferential market' where the majority of trade in the region was carried out.[50] Without going into greater detail about the products traded and the nature of regional and inter-regional commerce, it is helpful to remember that the port 'bathed' in a particular nautical space that was just as much a cultural as a physical environment, animated by networks of communication and inter-regional exchange and by the commercial channels of the eastern Mediterranean, the complexity of which we are only beginning to grasp.[51] However, the type of vessel uncovered at Thonis-Heracleion does not allow us to measure the impact and the importance of long-distance trade and offshore shipping routes, at most they enable us to see the site as being at the heart of networks of communication and local/regional exchange, constituted thorough compromises between man and the environment.[52]

In certain ways the ships of Thonis-Heracleion, whose architecture overcomes the constraints of the environment, renew as well as reinforce the analyses of the importance and economic and socio-cultural dynamism of this wet zone situated in the northwest of the Nile Delta in the Late Period. To the archaeological and literary evidence, which reveal the international role of this port-town at the mouth of the Canopic branch, these ships add physical evidence of local management and its risks in this fragile Delta zone. They should be seen as tools of 'strategies' whose aim was to 'maximise the profitability of these marginal places'.[53] While the literature emphasises the nature of Thonis-Heracleion as an important commercial centre, it should not be forgotten that the town and its port were situated in a region filled with wetlands (lakes, wetlands and freshwater lagoons, brackish or salt, permanent, seasonal or occasional),[54] whose exploitation was a matter of ancient local *savoir-faire*.[55] These vast areas of lake, wetland and lagoon which abounded in the Canopic region were propitious for the collection and planting of plants, flowers and fruit, but also for hunting, fishing, fish farming, livestock, and agriculture.[56] These activities took place both on lakes, marshes and lagoons, and on wetlands or low areas seasonally or periodically covered by water, which would have been occupied by fish, birds and waterfowl.[57] Without overstressing the geographic and socio-economic context of these wetlands, the ships of Thonis-Heracleion reveal both the pragmatism

45 If these vessels had sailed at sea (there is nothing to indicate that they did, see above), it was certainly in coastal trade, in no more than a transport and delivery role. Note that while Herodotus mentions the Nile *baris*-ships—we have seen that the construction is similar in all respects to the vessels of Thonis-Heracleion—they are used for the trans-shipment of seagoing ships at the gates of Egypt (see below), Egyptian literature is not as clear in identifying the fluvial or maritime function of them. Named ships-*bar*, that we translate by '*barge*', these vessels appeared at the beginning of the nineteenth dynasty, mentioned the *P.Harris* where Ramesses III (1182–1151 BC) boasts that he built a whole fleet of *kerer*-ships and *menesh*-ships, which are clearly maritime vessels but able to sail inland by way of the river (Fabre 2004: 94–6 with bibliography), and *bar*-ships: 'I have made for you *kerer*-ships, *menesh*-ships and *bar*-ships with equipped troops, for the sea. On it I have placed chiefs of troops and captain of *menesh*-ships, provided with numerous crews, so as to bring back goods from the land of Djahy [in Syro-Palestine] and the ends to your great treasuries in Thebes-the-Victorious'. See Grandet 1994: 230. Concerning the *bar*-ships, see *Wb* I: 465, 8–9; *Wb* II: 403; *Wb* V: 423; *Année lexicographique. Égypte ancienne* 77.1275; 79.0910; Edgerton and Wilson 1936: 54 note 20b; Säve-Söderbergh 1946: 50, 60 note 5; Alt 1945–1951; Caminos 1954: 156; Wente 1967: 74 (x); Christophe 1958: 21; Helck 1971: 511; Vinson 1993: 146–7; Jones 1988: 136–7 no. 30; Grandet 1994: 40.

46 Belov, this volume Chapter 10; Herodotus *Historiae* 2.96 (quoted in note 50) notes that there was only one rudder hole, which is not seen on ship 17, but is on ship 43.

47 The Song and the *Qingming shanghe tu* paintings provide accurate information on mobile rudders. On the one hand, this type of steering does not use hinges but is suspended from two ropes which are wound on a winch placed at the base of the main piece. On the other hand, 'the rudder, well held by a flange which even allows it to rotate, can be raised and lowered depending on the environment (and no doubt also on the size of the load). This arrangement is seen both in river and sea junks. When approaching shallows, the rudder can be lifted to its normal position, while in deep water, it can be lowered well below the hull, so as to increase its efficiency and prevent drifting. Finally, the rudder could often be fully raised and tilted, allowing any required repairs to be made without careening', Dars 1992: 126. See also Audemard 1965, t. 2: 26. The *Gaoli tujing*, dating from before 1125, mentions removable and interchangeable rudders on the large sea junks which travelled to Korea: 'At the stern there are two rudders, one large and one small, that are changed depending on the depth of the water'. *Gaoli tujing*, column *Kechuan*, Dars 1992: 127. Finally, while the blade of the median rudder of the Quanzhou junk (thirteenth century AD) has not been found, archaeologists have identified a horizontal piece in the stern in which it slid to be raised or lowered as required. The exact diameter of the circular opening in which it was placed is 38 cm. Archaeologists who evaluated the original length of the ship at 34.5 m believe that the rudder would have had a length of about 8 m (Song Shipwreck Research Group 1975; Salmon and Lombard 1979). About significant resemblances between certain particularities in Egyptian ships and the junks the Yangse Jiang or the sampans of the bay of Along, see Poujade 1946: 288; 1948: 41; Basch 1987: 33–5, 47.

48 Cited by Pomey and Rieth 2005: 17.

49 Pomey and Rieth 2005: 17. On the *'raison d'ètre'* of the vessels, see the reflections of the authors who quote Muckelroy: 'a boat, regardless how large or small, from prehistoric through modern times, is in fact conceived and constructed as an instrument adapted to one or more pre-determined functions, in response to concrete needs of an economic nature—for the transport of merchandise, of persons … or for military reasons—to defend or attack a territory, to battle other ships. These functions are apparent, architecturally, in different ways' (Pomey and Rieth 2005: 39).

50 See the reflections of Salles 1991: 210.

51 Malkin 2011.

52 It is true also, and of course, of the sea-going routes. See Arnaud 2005.

53 Quotation from Blouin (2007b: 1), who recently conducted a remarkable study on the management of eastern marginal areas of the Nile Delta (the region of Mendes) during the Roman period: see Blouin 2007a; 2007b. Even if her analysis cannot be applied to the wetlands of Thonis-Heracleion, it stimulates a reflection both on their local management and the perception of these spaces during the Late Period. In truth, given the scarcity of written sources, archaeological studies, and even geomorphological, archaeozoological and paleobotanical information, such reflection cannot ignore the extraordinary papyrological documentation from the Ptolemaic and Roman Periods (the charred papyri found in Thmouis and Bubastis). See Blouin 2007a; Kambitsis 1985; Frösén and Hagedorn 1989; Hagedorn and Maresch 1998. In addition, Blouin's research is especially valuable because it takes into account the eastern 'sister' of Thonis, *T-Hone*, whose name reveals a similar topography, which was built with the retreat of the Tanitic branch of the Nile.

54 These wetlands also make archaeological research of the ancient land-water boundaries difficult, as they quickly become confused, and with them the topography of ancient Thonis-Heracleion.

55 On local inherited knowledge of the wetlands of the Nile Delta, particularly around Mendes, see the summary of Blouin 2007b: 2–11. The nature of traffic in these areas is illuminated by Strabo's testimony that the lotus growing sites could be places of relaxation and delight (in addition to being a source of income for many villages in the Nile Delta): 'The places where the beans grow [*nelumbo* or pink lotus] offer a pleasant prospect, and are also a delight for those who want to joyfully feast there. They feast on *thalamagoi* [craft with cabins], penetrating amongst the thickest bean plants in the shade of leaves' (*Geographica* 17.1.15).

56 These activities were probably mostly practiced outside of the official system, 'for the diversification of alimentary, medicinal and commercial resources' (Blouin 2007b: 4). Fishing is certainly one of the most evidenced activities in Thonis-Heracleion, where excavations have uncovered a large number of hooks and net weights (Abdel-Raouf Rageb 2008; Ayodeji 2008; Van der Wilt 2014). Fisheries certainly existed in the Thonis-Heracleion region, like the fringe of the Delta, in which basins both allowed the collection and storage of flood water for the irrigation of the fields after the seasonal floods and, transformed into fishponds, allowed for the farming of fish (Blouin 2007b: 6–7). These wetlands, useless for agriculture were very suitable for livestock, and it is important to stress the importance of pastoralism in the settlement of the northern wetlands. The sources for the cowherds (*boukoloi*) who inhabited the northern fringe of the Delta, known for their uprising in the second century, indicate that this activity was thriving in the northern fringe of the Delta (Blouin 2010a).

57 Designated by the Greek ἐν κοίλοις τόποις in Egyptian papyri (Blouin 2007b: 5; Kambitsis 1985: 79 note 20). See also Herodotus *Historiae* 2.93. During Ptolemaic and Roman times these lands were part of the public domain and were granted to taxpayers who wished to exploit the resources. Again, we refer to Blouin 2007b: 5–6. See also pp. 11–13, her analysis of 'liminal terrains' of agricultural use in the Mendes area, which reveals the change in the local management of the depressions or lakes which accumulated flood water, but within the context of supply to the Mediterranean typical of Roman times. See also Blouin 2010b: 90, concerning Thonis along the edge of the Lake Menzaleh.

with which the complex topology[58] of these places was utilised, and more generally the interaction between the people and the watery landscape of the fringes of the Delta—and the influence on each on the other.

According to Herodotus, the *baris*-type ship, which appears to describe two of the excavated vessels from Thonis-Heracleion, were constructed and used by the inhabitants of the marshes of the north of the Delta.[59] He further suggests that these people 'generally follow the same habits as the other Egyptians … [but who] to get food cheaply devised alternative means.[60] Fishing, and gathering lotus and *nelumbo*, the cultivation and processing of castor, the harvesting of papyrus for various purposes, alimentary or not, and sometimes its trade, as well as shipbuilding, trade and transportation of people,[61] are all clear opportunities offered by the wetlands. The stela of Ptolemy VIII discovered at Thonis-Heracleion would appear to corroborate the importance of the exploitation of acacia wood, perhaps for shipbuilding, at the site. Dating from the second century BC, the stela records a visit by the 'King of Upper and Lower Egypt Ptolemy, the god Philopator' (221–205 BC) to the northern provinces of the Delta: 'to the far (?) territory(ies) within the borders of the country, called the Temple of Acacia, to give an allowance to [those] who are in them […] Khonsu (and) the gods and goddesses who are in the city / temple (?) of the North'.[62] Following the commentary of Thiers, acacia (with sycamore) was also the sacred tree of the seventh province of Egypt, which included the region of Thonis-Heracleion and the end of the waterway that connects the temple in question to the aquatic environment.[63]

Another passage of Herodotus explains the role of *baris*-ships in the trans-shipment of Greek trade goods at the gates of Egypt. The natural and regular route taken by merchandise imported by the Greeks and sent to their warehouses and factories came into Egyptian territory via the Canopic mouth and continued up the branch of the same name to the *emporion* of Naukratis. But

> *if anyone penetrated another mouth of the Nile, he had to attest that he had not come there of his own volition and, having sworn that oath, set sail in his ship to the Canopic mouth; or, if contrary winds made it impossible for him to sail in that direction, he had to transport his cargo on the local boats* (baris) *going across the Delta until he reached Naukratis.*[64]

58 Or the variety of resources? It is not yet possible to establish any direct link between any particular ship and the activities practiced in the lake areas, and wetlands of the northwest Nile Delta. Equally, given the lack of cargo, it is not possible to identify any one vessel as a commercial craft.

59 Herodotus *Historiae* 2.96: 'The *baris*-vessels used for the transport of merchandise are made of the Acacia … They cut a quantity of planks about two cubits in length from this tree, and then proceed to their ship-building, arranging the planks like bricks, and attaching them by ties to a number of long stakes or poles till the hull is complete, when they lay the cross-planks on the top from side to side. They give the boats no ribs, but caulk the seams with papyrus on the inside. Each has a single rudder, which is driven straight through the keel. The mast is a piece of acacia-wood, and the sails are made of papyrus. These boats cannot make way against the current unless there is a brisk breeze; they are, therefore, towed up-stream from the shore: down-steam they are managed as follows'. Excavations have revealed the presence of a packing material used as caulking for the boats, which could be papyrus (analyses are ongoing). Boats 17 and 43 were indeed fitted with an axial rudder hole fitted into a hole in the keel, and a piece of fixing material installed on the keel of wreck 17 shows that they were masted (at least initially). While these *baris*-boats could certainly have been built elsewhere than in Egypt, we believe that the fact that Herodotus gives his description immediately after having spoken of the inhabitants of the marshes is not coincidental. See also Belov this volume Chapter 10.

60 Herodotus *Historiae* 2.92. This assertion of Herodotus is important because it permits us to look beyond the *topoi* of the populations of northern margins of the Delta—the bandit-shepherds of the Egyptian tradition or the savage Egyptians of the Greek tradition. If the evocation of the landscape of the marginal fringe of the Delta by Achilles Tatius confirms the information given by geomorphology, archeology and papyrology, it also reveals the ambivalence of the representation of their populations in the literary sources, see Blouin 2010a. The portrait that *The Cycle of Petubastis*—a Demotic text from the beginning of the Hellenistic period inspired by the disorders of the Egyptian Late Period—gives us of 'shepherds' and 'eel fishermen' is hardly glamorous: menacing pirates with both impressive and daunting physiques, living in a malarial environment and keen cannibals, characteristics that they shared with the herdsmen of Greek novels. Maspero 1967; Rutherford 2000; Struve 1932; Chuvin and Yuvin 1983; Blouin 2010a: 407–8. See also the interesting analysis of Blouin 2010a: 408 (with references) on the representational logic of *barbarus*, whose habitat is the large uncultivated tracts of hostile nature, which prevent the birth and development of civilization. The bandits of the marshes of the northern fringe of the Delta inspired the novelists of the time. And while the assimilation of historical *boukoloi* to the undefeated rebels has a certain reality, it must be also be qualified and contextualized; we refer again to the very comprehensive study by Blouin 2010a. We should remember once again the testimony of Strabo (*Geographica* 17.1.19) which refers to that of Erastosthenes, who explained that originally the task of monitoring the Egyptian coast in the vicinity of Alexandria was entrusted to the residents of *Boukolia*, who were both farmers and pirates. See Chuvin and Yoyotte 1983: 60; Charvet et al. 1997: 80 note 78, 114–15. One notes also that whatever the degree of 'impiety' and 'barbarism' of this 'marginal' population, this testimony shows that it was legally subject to Egyptian sovereignty and met its requirements (auxiliary police force, both as coast-guards and pillagers of wrecks). Capes and low coasts have always tended to be the domain of wreckers who, admittedly, were merely profiting excessively from quite a widespread maritime custom according to which anything flung on to shore by the sea following a shipwreck belonged to whoever discovered it. See, for example, Rougé 1966: 336; Vélissaropoulos 1980: 162; Charbonnel 1995: 303–22; de Spens 1998: 117.

61 On these activities mentioned by Herodotus and their parallels in other sources, see Blouin 2007b.

62 Great Stela of Ptolemy VIII in Heracleion, l.18. Translation Thiers 2009: 18.

63 See commentary of Thiers 2009: 31, who adds: 'Acacia is also venerated in the 17th province of Lower Egypt … This identification could well be confirmed by the mention of the city 'city/temple of the North', *niwt mehw* being the well-known designation for Sema-Behedet. This reading of the passage nonetheless remains highly speculative and there is no guarantee that this episode does not occur in the region of Thonis-Heracleion' [translation by the author].

64 Herodotus *Historiae* 2.178–9.

According to their designs, some of the vessels discovered at Thonis-Heracleion probably participated in the organisation of trade as inshore or trans-shipment craft. It appears that others, or some of the same when reused, were used in the creation of harbour infrastructure as quay, embankment, or even bridges (Figure 9.10).[65] Ship 17 is surrounded by 14 vertical wooden poles, many of which fix the hull to the bottom (Figure 9.11).[66] This fixing of the ship could correspond to its use as a quay or an embankment. The use of boats for bridges is attested to by Diodorus Sicilus who wrote: 'At each mouth (of the Nile) is built a city that is divided by the river and whose two parts are separated by bridges of boats and well-sited defences'.[67] Considered either as ships/boats (their first use) or as port structures (their last use), the vessels of Thonis-Heracleion allow us to at least partially envisage the anthropisation, or at least a form of the anthropisation, of this part of the Nile Delta. The waterways, whether improved or not, naturally favoured the founding and flourishing of the town, where a static network of port structures and a mobile one of ships and boats permitted access to commercial activities, to food production and its distribution.

This analysis leads directly to questions about the role of these ships in the history of the city of Thonis-Heracleion. Beyond attempting to place them in the functioning of the place of commerce and the customs inspection of one of the ports of Egypt, it is necessary to consider the question of a potential link between the great number of ships discovered and the geo-political situation of the period. This question is most urgent in view of the two concentrations of ships in the Central Port, H3, that can be coherently ^{14}C dated: ships 20, 21, 22, 23, 33, 43, 44, 45 (Figure 9.6), which date from the eighth to the late third centuries BC,[68] and ships 2, 3, 4, 6, 7, 8, 31, 34, 36, 39, 40, 42 (Figure 9.5), from the eighth to the second centuries BC[69] (the few ceramic objects found in contact with the planking are dated to the fifth–fourth centuries BC). Some of these ships seem to have been simultaneously sunk either deliberately or as casualties of war. While it is possible to use established facts to link the vessels to historical events, certain working hypotheses emerge that only future research can confirm or disprove.

The Egyptian navy of the Late Period (sixth–fourth centuries BC)

The two groups of vessels in the Central Port of Thonis-Heracleion appear to date from an auspicious period for Egyptian naval construction, when the Saïte pharaohs built up a military fleet, which included triremes.[70] Although certain commentators suggest that the 'long' ships cited in Greek sources would have probably been a modification of Egyptian ships previously designed as *kebenet* (sea-going cargo ships), the designation of triremes is generally accepted.[71] It is clear that the ships of Thonis-Heracleion do not belong to this kind of naval fleet. The shape of the ships, the wood material most commonly used (acacia) and the naval construction method allow us to suppose that for the most part we are dealing with cargo vessels and not military ships like triremes. However, the sources which speak of the clashes between Egyptians and Persians at the mouths of the Nile in the fifth and fourth centuries BC, can provide interesting points of comparison with which to understand the nautical qualities, and sometimes the *raison d'être* of the ships in the Delta.

The strategic importance of the mouths of the Nile

Among the many events in the history of clashes between Egypt and Persia, one could have left behind traces in Thonis-Heracleion. After the first period of Persian domination, at the time of the transition from Xerxes to Artaxerxes I (465 BC), an insurrection took place in the western Delta, endangering the foundations of Achaemenid power in Egypt.[72] The movement began in Marea, on the western Delta (not far from the Canopic branch of the Nile), with the expulsion of Persian collectors of tributes. The revolt was led by a certain Inaros in 463/462 BC.[73] This leader, with Libyan roots, created an army made up of Egyptians and supplemented by mercenaries from different regions. Moreover, he had an agreement with the Athenians, who sent a fleet 200 ships to take up position on the Delta,[74] probably in the region of Thonis-Heracleion. Thucydides has the following to say:

65 Given the topography of the region (see above), use or reuse of ships for the construction of wharves, pontoons or a bridge was clearly appropriate. See Robinson this volume Chapter 11.

66 If ship 17 was used as a dock/pier/bridge, it was its final use, as it has a mast socket which indicates that it sailed (or was made to). It seems that ship 43, currently being excavated, also had a series of posts around its perimeter. Robinson 2012.

67 Diodorus Siculus *Bibliotheca Historica* 1.33.7–8.

68 See Appendix 1.

69 Ibid.

70 Regarding the debate on the types of triremes constructed in the mid-sixth century BC, see Lloyd 1972: 268–79; 1975: 45–61; Basch 1969: 139–62; 1977: 1–10; 1987: 334; Casson 1971: 81 note 19.

71 Bradbury 1996. Wallinga 1987 refutes the hypothesis with convincing linguistic and historical arguments. It is the term *kbnw* that is used on the stele of Pithom (Tell el-Maskhouta, CGC 22183) to designate the vessels that Ptolemy II had constructed to navigate on *w3d-wr*: see *Urk.* II: 86, 10; Naville 1903: 19, also Salles 1998: 94; Thiers 2007: 24–5.

72 This was mainly known from classical sources (Diodorus and Thucydides), as it played a role in the conflicts between Persia and the Athenians on the eastern Aegean Sea from the end of the Greco-Persian Wars and the foundation of the Delian League (479/478 BC).

73 On Inaros' insurrection in Egypt: Briant 1996: 591–4 with references to Salmon 1965: 90–192; Hoglund 1989: 250–87; Kienitz 1953: 69–72.

74 Diodorus Siculus *Bibliotheca Historica* 11.71.3–6. On the Athenian intervention Meiggs 1972: 101–4, 473–6.

> *after crossing the sea, they headed up the Nile and, having taken control of the river and of two thirds of Memphis, they* (the Athenians) *led the fight for the remaining stretch, which was called the White Castle. The Persians and Medeans had taken refuge there, as had the Egyptians, who remained as foreigners after the uprising.*[75]

Reinforced by Athenian forces, Inaros achieved victory over the emergency force sent by Artaxerxes.[76] The battle continued in Papremis (Damanhour) on the Canopic branch. Located some 30 km from Thonis-Heracleion, it is easy to imagine that this served as a base for the Libyan king's military enterprises. For years he would experience both successes and failures until around 454 BC when the Persian fleet broke the blockade, destroying the Athenian fleet, and penetrated all the way to Memphis by river. Inaros was put to death.[77] After this victory, the Persians did not, however, reconquer the western Delta. Their political and strategic choice fell on the heirs of the 'Princes of the Swamps', for, as Briant noted, the priority of the Persians was the to keep the river ways that connected Memphis to the sea open.[78] In controlling Egyptian inland water shipping, they prevented any revolts.[79] The garrisons allowed them to keep the trade routes open, as well as the mouths of the Nile through which war vessels and trade ships passed. The system had its dangers. A few years later, an Athenian squadron headed again for the delta, responding to an appeal from Amyrtaeus, 'the king of the swamp region'[80] and in 445–444 a dynasty by the name of Psamtek (descendants of Inaros) shipped wheat to Athens, a sign that at this time they controlled the Delta's valuable land resources. The same situation was documented in 412.[81]

Egypt's return to independence and the Persians' desire to re-conquer the country in the fourth century BC would leave their historical mark on the entire Nile Delta. It is difficult to imagine that Thonis-Heracleion would not have been affected to some extent by these events. In fact, Diodorus explains that Hakor made the necessary preparations and brought together a large number of Greek mercenaries, including Chabrias.[82] For the Persians' part, Pharnabazus had been ordered by Artaxerxes to march against Egypt. To do so, he created an imposing fleet both for bringing supplies to the troops as well as for bringing down the Delta's defences. In the face of this threat, Nectanebo, who succeeded Hakor and founded the thirtieth dynasty, strengthened these defences: 'Nectanebo relied mainly on the country's natural fortifications—access to Egypt is extremely difficult—and secondly on the installations that cut off absolutely all entry routes, both by land and by water'.[83] Egyptian rulers raised fortifications at each of the mouths of the Nile and thus also at Thonis-Heracleion. Recent excavations have managed to shed light on a small secluded port on the south-east side of the temple; it was protected by an intricate system of what look like angular 'bastions' protruding into the bigger southern port area. This secluded port was inserted into the temple compound and may well have had some special function. The angular 'bastions' could have been defensive structures, indicating perhaps that access to this small port with its narrow entrance could have been highly controlled; during the Egyptian Late Period the temple enclosure itself already had a massive fortified wall.[84] Near the Pelusian mouth—the main access point—walls cut off the navigable routes and water was drained to make passage impossible: 'This made it very difficult for ships to sail in or for the cavalry or infantry to enter'.[85] Pharnabazus thus resolved to attack by way of the Mendesian mouth, though after a short-lived victory, this plan had to be abandoned.[86] Whatever the reasons for the defeat,[87] it is astonishing to note that Pharnabazus did not try his chances at the mouth of Canopus, as the stelae of Naukratis and of Thonis-Heracleion both show

75 Thucydides *History of the Peloponnesian War* 1.104
76 Herodotus *Historiae* 3.12, 7.7; Diodorus Siculus *Bibliotheca Historica* 11.74.1–4.
77 See the Artaxerxes' seal in the Hermitage Museum in Moscow. The Great King, bow and quiver on his back, the king is holding a rope that encircles the necks of four prisoners and brandishing a spear against a man on his knees with an Egyptian hairstyle (*pschent*). This may represent Artaxerxes I and Inaros; Porada 1979. The seal is reproduced in Briant 1996: fig. 12 a-b; see also Nagel 1963: 134, fig. 11.
78 Briant 1996: 593.
79 Cf. Diodorus Siculus *Bibliotheca Historica* 14.47.6.
80 Thucydides *History of the Peloponnesian War* 1.112.3
81 Ibid.: 8.35.2.
82 Diodorus Siculus *Bibliotheca Historica* 15.29.1–2.
83 Ibid.: 15.42.1.
84 For example, see Leclère 2009. From the results of the excavations, it seems that the founding or re-founding of the main temple of the city of Thonis-Heracleion at this site dates from the end of the Egyptian Late Period, more precisely the thirtieth dynasty. Ceramic analysis suggests a chronological range for occupancy from the fourth to the second centuries BC. The earlier periods are more widely represented in the north of the site, see Grataloup 2010; forthcoming. Also, among the most remarkable objects discovered in the area of the *temenos* are a bronze statuette of a pharaoh, possibly Hakoris (according to the preliminary study of Berlandini), as well as the stela of Thonis-Heracleion dating from the reign of Nectanebo I (see above).
85 Diodorus Siculus *Bibliotheca Historica* 15.42.3–5.
86 On Pharnabazus's campaign see Kienitz 1953: 80–92; Lloyd 1994. On the use of water diverted from its natural course, the confusion of water and earth etc, see Bertrand 1988: 145–6, citing Psamtek who took advantage of the benevolence of the goddess Neith, who allowed him to use the Nile to save his army, Ptolemy IV, who opened dykes and filled wells when he had to fight against Antiochus III, and Perdicas, who while attacking Egypt became victim of the river itself, when the ground of a ford was swept away under the feet of his men when he ordered them across—they were drowned or eaten by crocodiles. Blouin 2010a: 402 recalls the defeat of the troops of Louis IX in 1250 near Mansura, along the Damietta branch. This defeat inflicted by the Mamluks on the knights of the Frankish king was apparently largely due to the ignorance of the crusaders of the region's wetlands that they crossed, and to the annual flooding of the Nile.
87 See the review of Briant 1996: 673–4.

that it was the second natural route of entry into Egypt.[88] Was it, like the Pelusian mouth, too well protected?[89] Or it could simply have been that coastal navigation in the Delta from east to west is difficult.[90] We know, for example, that Chabrias, who left Egypt in 379 BC, was in charge of excavation work near Pelusium and also Lake Mareotis, in the Canopic region.[91]

The re-conquest of Egypt seemed to be the Great King's obsession judging from the records of the massive preparations that were made.[92] Accompanied by a considerable naval and transport fleet, Artaxerxes III set off for Egypt at the end of 343 BC. A few months later, in the summer of 342 BC, he entered Memphis.[93] There is little doubt that the strategy of defence was based yet again on the topographical possibilities: render the river impassable and make it impossible to land on the shores of the Delta. Fortifications were erected at all the mouths of the Nile, especially on the Pelusian branch, which had the best shoreline for landing,[94] while Nile boats well adapted to river combat were used by the defenders.[95] These boats also served to transport troops from one location to another in order to prevent enemy troops from landing.[96] Even along the river itself, the banks were fortified to prevent ships from passing.[97] This strategy can be compared to that of Ramesses III against the Sea Peoples (twelfth century BC), which also used *bar*-boats as part of the defence:

> *I organized my frontiers in* Djahy, *prepared before them (local) chiefs, garrison-commanders, and* maryannu-*warriors. I caused the Nile mouth(s), to be prepared, like a strong rampart, with* âha *warships,* menesh-*vessels and* bar-*boats, (all) prepared; and they were manned completely, from stern to stern with valiant warriors bearing their weapons. The soldiery, each a picked man of the Nile-land, were like lion(s) roaring upon the mountain-crests; the chariots were (accompanied by) runners, trained men (?), each had a good and capable chariot-officer. Their horses were restless in every (part of) their bodies, ready to trample down the foreign countries under their hooves.*[98]

Figure 9.12a–b Coin. Pixodaros, Persian Satrap of Caria (340–335 BC). Gold (Diam. 0.90 cm), Thonis-Heracleion, Port H3. H3_10717. In the area of ship 4 (300 +/- 50 BC) and ship 6 (360 +/- 50 BC). (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Conclusion

While there is little evidence to link the ships to historical events with any certainty, of special note is the discovery between ships 4 and 6 of a gold coin (H3_10717) (Figures 9.12a–b). On one side it has the profile of a young man, on the other a bearded upright figure holding a trident (Zeus). A Greek inscription indicates that the coin was minted by Pixodaros, Persian satrap of Caria (340–335 BC). Another interesting fact is that in the area of the sunken vessels,[99] a Greek helmet has been discovered dating from the fifth to fourth century BC (HXX_8295 - SCA 1026) (Figure 9.13).[100] Some of the ships of Thonis-Heracleion might make us recall those which Diodorus describes as coming together at the gates of Egypt, and which were particularly well adapted to lagoons, river combat and/or to transporting troops.[101] But we must not

88 We can add the palimpsest Papyrus of Elephantine (*TAD* C 3,7), which includes a customs register for the satrapy of Egypt from the Achaemenid period, and contains references to certain kinds of foreign ships that entered Egypt, most certainly via Thonis-Heracleion. It dates either from the reign of Xerxes, or the reign of Artaxerxes. See Porten and Yardeni 1993; Yardeni 1994; Lipiński 1994; Briant 1996: 398; Ampolo 1996; Briant and Descat 1998.
89 One wonders also if the cessation of the use of the channel that opened into the Canopic branch to the northeast of the site in the early fourth century (Goddio 2011; Fabre and Grataloup, *Rapport d'activité, Héracléion* 2006) was not the consequence of a deliberate act to block the waterway. The simultaneous rebuilding of the temple, probably with fortifications and in a better protected spot, could be explained in part by the geopolitical situation. But see also Robinson this volume Chapter 12.
90 Herodotus *Historiae* 2.179.
91 Strabo *Geographica* 16.2.33, 17.1.22.
92 Diodorus Siculus *Bibliotheca Historica* 16.40.6.
93 After Nectanebo had fled to Nubia. On the date of the reconquest of Egypt, see Bickerman 1934; Lloyd 1988. For the reasons for the expedition's success, see Briant's summary: 1996: 704–5.
94 Diodorus Siculus *Bibliotheca Historica* 16.46.6–7; 14.47.2–4; 20.76.3.
95 Ibid.: 16.47.6.
96 Ibid.: 20.75.1, 20.76.3–4.
97 Ibid.: 16.47.7, but cf. 15.47.3; 18.33.6; 18.34.1–4. Compare with the *Stela of the Satrap*, dated from the seventh year of the reign of Alexander IV (311–310 BC), which speaks of the merits of Ptolemy the satrap, and especially of his service to the temples. He also renewed a land concession that had been made by a certain Khabbabash, declared himself pharaoh during an indeterminate period between 343 and 336–335. He had come to inspect the Delta, 'to come to know all the Nile's arms that empty into the sea, so that the *kebenet*-ships of the Asians could be kept away from Egypt'; in other words, to improve the Delta's defences, the gateway to the Nile and Memphis, just as all his predecessors had done under the same circumstances.
98 Translation of Kitchen 2008: 34 (*KRI* V 40: 6–12); see Grandet 1993: 191; Edgerton and Wilson 1936: 54–5.
99 Area of ships 2, 3, 4, 6, 7, 8, 31, 34, 36, 37, 39, 40, 42.
100 Secunda 2008.
101 Here as elsewhere, the boundary is blurred between civilian ships and warships. Comparing again with the ships of the Chinese Navy, we can almost make our own the conclusion of Dars (1992: 81): *Besides the great warships … all the others may be ordinary boats of all sizes, river barges and sea vessels, fitted out for the transport of troops or armed for attack or defense (one of their main functions being to cross rivers by being chained to each other during rapid offensives, or while the warships attacked).*

Figure 9.13 Greek helmet. HXX_8295. Fourth–fifth century BC. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

forget that the majority of these vessels, as the ancient authors wrote, participated first and foremost in the local economy, as inshore craft, trans-shipment or cargo ships,[102] or even, in their last role, in the organisation of the harbour infrastructure as quays, embankments, or bridges.[103] The multiple *raisons d'être* of the vessels of the strategic zone of Thonis-Heracleion—a city harbour and basin to the south of the North-Eastern Channel and at the gate of Egypt—increase the reasons why they could have been sunk: after abandonment because of political turmoil, naval battle or geological event; or intentionally, as a defensive strategy, to create an obstacle to entering the port or river.[104] Only the further careful excavation of the vessels, one by one, will allow us to piece together the story behind the ships and boats of Thonis-Heracleion.

What is clear, though, is that the ships of the Central Port were perfectly adapted to the fluvial regions in which they operated. Flat-bottomed, capacious vessels with technical innovations such as the twin-holed steering oar box from ship 17, the ships of the Central Port could navigate the shifting waterways of the Delta and the *hone*—the marshy landscape that was neither land nor sea at the edge of Egypt. It was this type of vessel that enabled both a flourishing trade and the defence of the realm, and in this sense the *hone* and the Nile made the *bar*-ships of the Central Port and in turn the *baris* helped the Delta bloom.

102 Military and commercial use of the vessels of Thonis-Heracleion is not incompatible. One can easily imagine that cargo ships perfectly adapted to commercial usage in the Delta could have used in time of war for the transport of troops and supplies.

103 This is what preliminary analysis seems to show. The presence of the mast base reveals that the ships had voyaged, or were intended to. But present evidence does not allow us to claim that all the sunken ships had been used as infrastructure. Equally it is impossible to say that some of them were not expressly made for this use.

104 This tactic is known in modern history: for example at the siege of Sebastopol during the Crimean War (1854–1855) an entire fleet was sunk to block access to the harbour; Robinson this volume Chapter 12.

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10 Archaeological evidence for the Egyptian *baris* (Herodotus *Historiae* 2.96)

Alexander Belov

Although archaeological finds of Egyptian ships and boats and their fragments are not numerous,[1] our knowledge of Egyptian shipbuilding is not as poor as it could be thanks to a great number of detailed models and representations of ancient sea and river craft found in tombs and on the walls of the temples. In the Late Period (664–332 BC), however, iconographic data becomes scarce, and only a single archaeological example of a boat from Mataria has so far been briefly published.[2] Thus, the discovery of more than 18 vessels dated to the Late Period in the port regions and canals of the submerged city of Thonis-Heracleion provides a rare opportunity to study the construction principles and methods[3] that are characteristic of Egyptian ship building at this time. The study of these vessels may also bring more information on the complex issue of the transition from the shell to skeleton concept and construction method in Mediterranean shipbuilding. Thus, one of the four groups of architectural traditions, the so-called 'Eastern riverine root',[4] may be connected the with Nilotic building tradition and the region of Alexandria.[5] Around 450 BC Herodotus gave a description of the *baris*, an Egyptian river-faring boat.[6] The Greek term 'baris' (βᾶρις) probably originates in the Ancient Egyptian boat type called *br* (*byr*).[7] At the same time it has been suggested that the Egyptian word *br* may have had a foreign origin.[8] The term *br* or *byr* appears for the first time in the eighteenth dynasty and refers to sea-going ships.[9] Egyptian sources mention this vessel quite often[10] and it seems to be a rather common word for a transport ship at this time.[11] Demotic documents mentioning *br* (*byr*) are not numerous and contrary to hieroglyphic texts most of them probably refer to Nilotic cargo ships.[12] However, Vinson cites two documents that can indicate a military use of *br* ships.[13] Darnell suggests a parallel between the *br* ships of the defensive fleet of Ptolemy V mentioned on the Rosetta Stone (196 BC) and those employed by Ramesses III (1184–1153 BC) to defend the Delta against the Sea Peoples.[14] Another interesting document is the Persian *P.Cowley* 26 (412 BC) that contains an inventory for a *byr* ship built of cedar.[15] In Greek literature, the *baris* is connected with Egypt from the time of Aeschylus (525–456 BC).[16] Overall, the textual evidence from Greek papyri suggests that the *baris* was primarily a freighter and transport vessel.[17]

Vinson judiciously observes that Herodotus' description of the *baris* comes sequentially after information on different aspects of life in the Delta, and that it is logically linked to the description of Delta shipping in fragment 2.179.[18] These observations give more weight to the arguments for a Delta origin of the *baris*, rather than an origin in the Nile valley.

Ship 17 of Thonis-Heracleion was studied over three excavation seasons (2009–2011) carried out by the IEASM. About 70 per cent of the hull has been excavated, the remainder, held in place by clay deposits, was left *in situ* in order to protect the vessel.[19] The ship belongs to a large accumulation of other vessels that were scuttled in the port region of the city.[20] The hull of the ship was well-preserved under a 50 cm thick layer of sand and clay. It contained no cargo. The construction of the vessel has been determined by radiocarbon dating, which gave a calibrated range from 804 to 416 cal BC at 2 sigmas

1 The number of extant Egyptian hulls is estimated at twenty: Ward 2000: 39.
2 Ibid.: 129.
3 See Pomey 1988; 2004.
4 Classification after Pomey et al. 2012.
5 See Basch 2008; Rieth 2008; Kahanov 2011.
6 Herodotus *Historiae* 2.96.
7 Casson 1971: 341 note 64; Vinson 1998: 251–60.
8 Vinson 1993: 133–150, 147 notes 69 and 70; 1994: 44–5.
9 Casson 1971: 341 note 64; Vinson 1994: 44–5; 1998: 252.
10 Jones 1988: 136–7, §30.
11 Vinson 1994: 45.
12 Vinson 1998, 252–53. The author cites the following ostraca: *O.Zürich* 1867 (Roman); *O.Leiden* 136, 2; *O.Uppsala* 1185, 2; *O.Leiden* 340, 3.
13 Ibid., 253. Line 12 of the Rosetta Stone contains νῆες (ships) in the Greek text that correspond to the hieroglyphic *kbn.wt* and to the Demotic *byry*. Another example cited is the Roman *P.Krall* 14/8 mentioning *br* ships as part of a naval fleet.
14 Darnell 1992: 72–3 notes 21 and 54.
15 Ray 1988: 268; Vinson 1998: 253. It is not only the imported wood of cedar used in the construction of this boat that attracts one's attention, but also the great quantity of nails. Bronze nails were widely employed in the construction of some of the ships of Thonis-Heracleion for attaching the frames to the planking. This is the case of Shipwreck 61 (234–40 BC) and of Shipwreck 11 (165±50 BC). These boats demonstrate a well-developed internal structure and seem to show some features of a Greco-Roman type of construction.
16 Esch. *Suppl.* 874. See Arnaud (forthcoming).
17 Casson 1971: 340 note 60, 341 note 64; Vinson 1998: 254.
18 Vinson 1998: 252.
19 The construction of ship 17 is thoroughly analysed in author's PhD thesis (Belov 2014a). The aim of this article is to give an overview of the principal constructional features of ship 17 that find parallels in the description of Herodotus.
20 Goddio 2007; Robinson this volume Chapter 11.

(probability of 95 per cent).[21] Fortunately, ceramic fragments and several complete vessels found in the layer adjacent to the planking, as well as sherds preserved *in situ* under some of the constructional elements, helped date the deposition of the ship from the beginning of the fifth to the middle of the fourth century BC, i.e., close to the date of the eye-witness description of Herodotus. Of course, this synchronism is not sufficient on its own to identify ship 17 as a *baris*, so we propose to proceed to a comparative analysis between the ship and the text of Herodotus, cited below in its entirety:[22]

> *Their boats with which they carry cargoes are made of the acacia, of which the form is very like that of the Cyrenaican lotus, and its sap is gum. From this acacia, then, they cut planks two cubits long and arrange them like bricks, building their ships in the following way: on the strong and long tenons they insert two-cubit planks.[23] When they have built their ship in this way, they stretch beams over them. They use no ribs. They obturate the seams from within with papyrus. There is one rudder, passing through a hole in the boat's keel. The mast is of acacia-wood and the sails of papyrus. These boats cannot sail upstream unless a fresh breeze continues; so they are hauled from the bank; but downstream they are thus managed: they have a raft made of tamarisk wood, fastened together with matting of reeds, and a pierced stone of about two talents' weight; the raft, made fast by a rope, floats ahead of the boat, and the stone is made fast by another rope behind. So, driven by the current, the raft floats swiftly and tows the 'baris' (which is the name of these boats), and the stone dragging behind on the bottom keeps the boat's course straight. They have many of these boats; some transport many thousands of talents.*

'The boats with which they carry cargoes are made of the acacia, ...'

Herodotus states that the *baris* is a cargo vessel and this is definitely the case for ship 17. The planking of the ship can be defined as 'sturdy' and 'squat', to quote Haldane's words in reference to the Lisht timbers, which also belonged to a freighter.[24] The average width of the planking of the starboard is 18.8 cm, while its average thickness is 14.4 cm[25] and thus is almost rectangular in section. The planking's outer surface is poorly worked while many knots and other wood defects are visible on its inner surface. To this we should add the coarseness of execution of almost all of the constructional elements, which is especially evident in the through-beams of the vessel. For example, a very sinuous trunk of acacia was used for B1, which at 757 cm long is the best-preserved of the ship's beams. The local timbers used in the construction of ship 17 further helps to corroborate its identity as a Nile river vessel, with seagoing ships largely being built from imported woods.[26]

The first sample of the planking from ship 17 was identified as a sclerophyllous species of oak, while the tenon of the planking appeared to be *Acacia nilotica*.[27] However, repeated sampling in 2009 confirmed that five constructional elements, namely the planking, the tenon of the planking, the bracing timber (half-frame), the through-beam and the support[28] all belong to either of the two species of acacia (*Acacia raddiana Savi* and *Acacia nilotica*), or at least to the genus *Acacia* (sp.).[29] Nineteen additional samples of each type of the constructional details were collected in 2010 and 2011. Preliminary analysis of these samples[30] confirms the dominance of acacia as construction material for ship 17: sixteen samples most probably belong to this genus with the exception of three undetermined samples, all of which belong to the tenons of the planking.

Acacia was also the wood of choice used for the construction of other ships from Thonis-Heracleion.[31] The wood of acacia, and especially of *Acacia nilotica* (*šnt*), was employed in Egyptian boatbuilding from ancient times.[32] Tenons of acacia were employed in the construction of the Khufu I ship, in the timbers from Lisht and those at Mersa Gawasis, in ships from Ayn Sukhna and in the timbers from Wadi al-Jarf.[33]

'From this acacia, then, they cut planks two cubits long and arrange them like bricks, ...'

The planking of ship 17 provides an excellent example of the 'courses of bricks' pattern (Figures 10.1–10.2). This technique, called 'imbrication' by Boreux,[34] originates in an ancient architectural tradition of the Egyptians.[35] Its main idea was to provide a regular alternation between the joints (staggering of the joints) of the neighbouring layers of masonry in order to provide maximum solidity to the construction. The same principle was applied in naval architecture, and the iconographic evidence for the hulls of ships built of short planks in this manner is abundant. Although no representations of this technique can be found before the twelfth dynasty (*c.* 1985–1773 BC), it is probable that the hulls of the boats dating to the fourth to fifth dynasties (*c.* 2613–2345 BC) were already built according to this method.[36] The latest depictions of the technique date to the end of the New Kingdom (*c.* 1550–1069 BC); thus the planking of ship 17 not only confirms the observation of Herodotus, but also provides the latest archaeological evidence for the persistence of this tradition in the Late Period.

21 See Appendix 1.
22 Herodotus *Historiae* 2.9. Recent translation by the author: Belov (forthcoming). The following English translations of Herodotus have been used for those parts of the text that did not require any amendments in the light of the new archaeological data: Macaulay 1890; Godley 1921; Lloyd 1979.
23 For the discussion of this phrase, see below.
24 Haldane 1996: 236.
25 Up to a maximum thickness of 18.0 cm.
26 The timbers from cargo boats found at Lisht (twelfth dynasty) and those of the boat of Mataria (twenty-seventh dynasty) were constructed from local species (acacia and tamarisk in the first case and sycamore in the second). At the same time, archaeological evidence for ceremonial and sea-going craft from the fourth to the fourteenth dynasties shows the predominance of imported wood species and especially that of cedar from Lebanon (sp. *Cedrus libani*).
27 Analysed by the Laboratoire de Datation par le Radiocarbone of the IFAO in 2007. Identification by A. Fahmy, Helwan University, upon the Laboratory's request.
28 Massive pieces of reused planking with rectangular mortises in their upper parts intended for stanchions were named 'supports'. There are four supports placed symmetrically in the central part of the hull in the transversal axis and one in the longitudinal axis, above the keel.
29 Analysed by the Laboratoire de Datation par le Radiocarbone of the IFAO in 2009. Analysis reports IFAO_373 – IFAO_377.
30 According to a preliminary microscopic study by the author with the collaboration of Carlos Cabrera Tejedor.
31 Acacia has been identified in the planking of about 78 per cent of all ships yet discovered in Thonis-Heracleion: see Fabre and Belov 2012.
32 For example Weni (*wni*), high official under Pepi I (2321–2287 BC), built *sekhet* and *satch* boats of acacia that were 60 cubits (about 32 m) long. See Breasted 1907: §324.
33 Ward 2000: 16; Ward and Zazzaro 2010; Pomey 2012a; Tallet 2013: 196. The method of using tenons of wood harder than the planking is well-known in shipbuilding: see Steffy 1994: 258.
34 Boreux 1925: 248.
35 Goyon et al. 2004: 110–11.
36 Boreux 1925: 248–9.

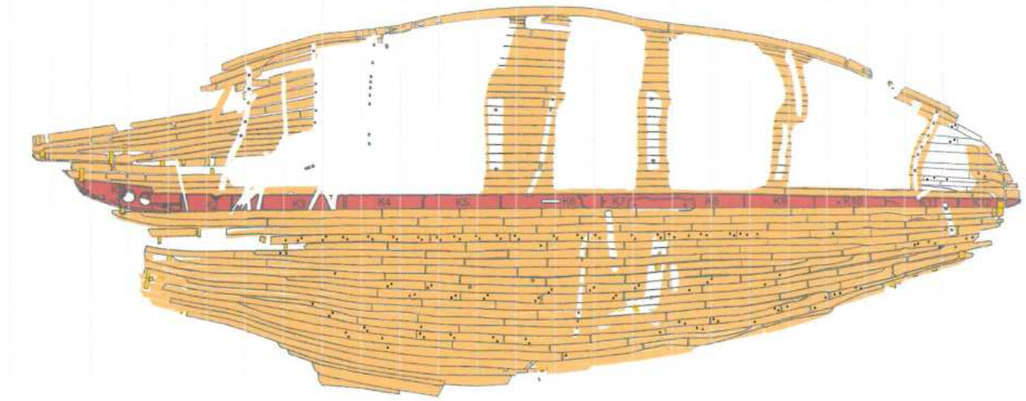


Figure 10.1 General plan of the planking of Thonis-Heracleion ship 17. (Drawing: P. Sandrin/A. Belov; © F. Goddio/IEASM.)

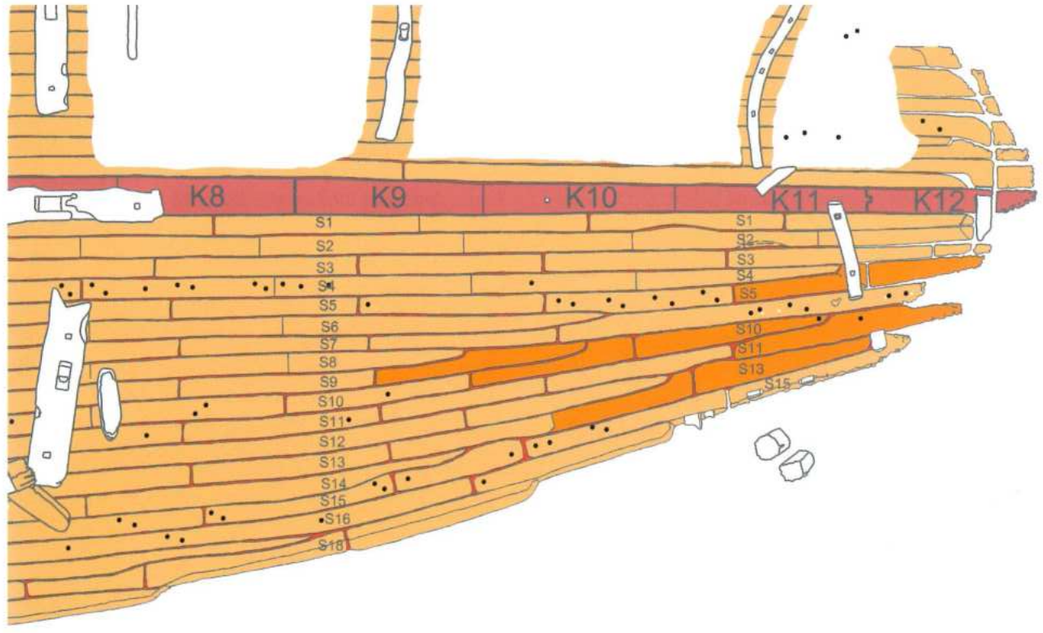
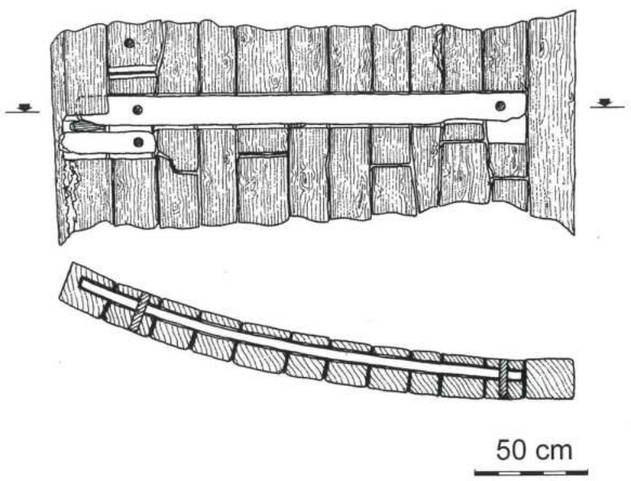


Figure 10.2 Planking pattern of the starboard of Thonis-Heracleion ship 17, bow area. (Drawing: P. Sandrin/A. Belov; © F. Goddio/IEASM.)



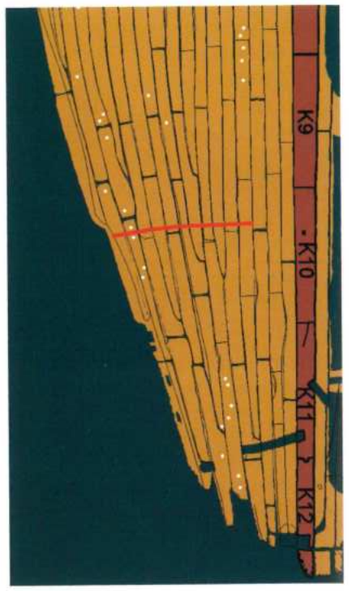


Figure 10.3a Long tenon revealed during the section at the bow of the Thonis-Heracleion ship 17; 3b location of long tenon. (Drawings: P. Sandrin/A. Belov; © F. Goddio/IEASM.)

Ship 17 also contains many knife-shaped[37] planks that find their parallel in the material from the boats of Khufu I, Lisht, Mersa Gawasis and Ayn Sukhna. The purpose of such planks and so-called 'stealer strakes'[38] corresponding to them was to diminish the number of strakes towards the extremities of a hull and thus to narrow the shape of the hull towards the bow and stern of the vessel.

The starboard side of ship 17 was excavated completely and provides around 76 per cent of the planking available for study. It was made of planks measuring between 170 and 220 cm long, with an average length of 192 cm, which corresponds to approximately four cubits. In the longitudinal axis, the planks are always secured by a half-lap splice, and not by joggles or by S-scarfs, as in earlier craft.[39]

According to Herodotus, the length of a plank of a *baris* is two cubits, around 104 cm.[40] For ship 17, however, the planks are almost twice as long. However, Herodotus was describing relatively small vessels,[41] and at the end of the paragraph considered here he states that ships of this type differ in size. The reconstructed length of ship 17 is around 28 m and it obviously belonged to a class of larger cargo vessels. It seems logical to suppose that longer planks of acacia were necessary to build a larger hull. According to Theophrastus, planks up to 12 cubits long (about 624 cm) can be obtained from the wood of the acacia tree.[42] It must be remembered though that the planks of ship 17 are still very short if one compares them to the standards of Greco-Roman shipbuilding.[43] The planks from ship 17 bear witness to a local, purely Egyptian, tradition of assembling the hulls with short timbers[44] that were at the same time rather wide[45] and very thick.

The width of the planks of ship 17 varies from 9 to 29 cm with an average value of 18.2 cm. Thus the planks are characterised by a ratio between their width and length of about 1:10 and this fact increases the effect of the brick-like appearance of the planking.

'building their ships in the following way: on the strong[46] and long tenons they insert two-cubit planks.'

No traces of lashings were found in the construction of ship 17. Although this feature was quite typical of ancient

37 Ward 2000: 102; Pomey 2012a.

38 These are the strakes that are not assembled to either stem or stern post.

39 Ward 2006.

40 Although it would be difficult to imagine a hull completely built of planks of the same length; it is possible that 2-cubit planks could make up the majority of a hull. See Rougé 1975: 41.

41 Boreux 1925: 237.

42 Theophrastus *In Historia Plantarum* 2.4.2.8

43 In Mediterranean boatbuilding traditions the choice of wood species was very wide. Coniferous species were preferred for the planking for their flexibility (Guibal and Pomey 2002: 96). Long planks were obtained from pine, fir, cedar, cypress and larch (Theophrastus *In Historia Plantarum* 4.1.2–4, 5.1.5–8, 5.8.1–3. Other references to the ancient sources can be found in Rival 1991: 90, Index). In normal shipbuilding practice, the longer the planks are, the better. The length of the majority of completely preserved pine planks of the Kyrenia ship (295–285 BC, reconstructed length 14 m), varies from 8 to 10 m: see Steffy 1985: 79, Table 1.

44 It seems that in some cases the Egyptians continued to use short planks even when the type of wood allowed for obtaining longer timbers: see Vinson 1998: 255.

45 Ibid.: 255, note 19.

46 The argumentation supporting this reading of the adjective πυκνός is proposed in Belov forthcoming.

Egyptian watercraft as early as the Old Kingdom,[47] it had probably disappeared, or had become very rare, by the Late Period or even earlier.[48] Instead, Herodotus makes it clear that the planks were fastened together with tenons.

Several translations have been suggested for the term γόμφος. Its general meaning would be 'fastening' and many translators interpreted it as 'bolt', 'stake', 'pole', 'treenail', 'dowel' or 'tenon.'[49] Lloyd and Vinson observed that it is the large size of the fastenings that astonishes Herodotus, comparing them to Greek custom.[50]

However, the word μακρός also means 'long' and very long 'tenons' were observable from the outset of excavations on ship 17. A transversal section of the planking revealed a single tenon of 199 cm long that passed through 11 strakes of the starboard side of the vessel (Figure 10.3a-b).[51] In contrast to Syro-Canaanite and Greco-Roman types of construction where tenons were used to join adjacent planks together with mortise and tenon wood-working joints, the 'tenons' of ship 17 joined together multiple strakes. The width of the tenons varies from 7.5 to 20 cm (12.8 cm on average), while their thickness is within the range of 1.2 and 5.2 cm (4.1 cm on average). The tenons pass through the width of the keel in the lower third of the keel's thickness, because it projects up inside the hull.

The tenons of the planking pass through rectangular channels cut in the centre of the plank edges. The channels are 11.1–31.0 cm wide (19.9 cm on average) and 4.0–8.0 cm thick (5.9 cm on average). Centre to centre distances between the channels varies from 27.5 to 69.8 cm along the length of the planking, with an average value of 46.4 cm.

The planking of the ship needs to be thick to allow these large tenons to be installed. The planks' thickness ranges between 10.0 and 18.0 cm, with an average value of 14.7 cm. In the majority of cases, the tenons were wedged inside the planking with small triangular pieces of wood.[52]

The extremities of the tenons are secured inside the planking with pegs.[53] Their diameter varies between 2.0 and 5.5 cm, but the majority of the pegs have the same standard diameter of 3.5 cm. Unlike the Greco-Roman type of construction, where pegs are evenly distributed on the surface of the hull, the pegs of ship 17 are concentrated on specific strakes. Thus, the starboard strake

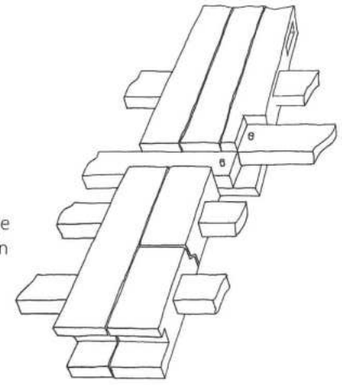


Figure 10.4 Scheme of the planking assemblage of Thonis-Heracleion ship 17. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

S4 contains more than 30 per cent of all the pegs. The strakes S10 and S15 contain 15 per cent each. It is possible to distinguish several zones where pegs are concentrated. The first one includes the starboard strakes numbers 4 and 5. The second one is situated in strakes S10 and S11, and the third one in strakes S15–S16.

The position of these peg-zones corresponds to the length of the tenons of the planking. The first tenon passes through the channels of the keel and through those of the first four to five strakes on each side of the vessel. In the region of transition from one tenon to the next, the tenon is superseded by another one that continues in an outboard direction through the strakes from 4/5 to 10/11. A third transversal tenon joins the strakes from 10/11 to 15/16. In transition areas we find double-size channels with average dimensions of 31.0 × 5.2 cm that contain both the outboard extremity of one tenon and the inboard extremity of another. The tenons are thus superimposed inside two neighbouring strakes. In this area each tenon is secured with a peg, which is why pegs usually appear in pairs (Figures 10.4–10.5).

The system of planking assembly described above produces an 'internal rib' consisting of several sections that acts as a composite frame and plays a primary role in the transversal structure of the ship. The same construction principle is seen in the way in which the tenons of the Late Bronze age shipwreck of Uluburun are employed, with the only difference being that in this case the frame consists of tenons that never exceed their own strake.[54]

47 Ward 2006: 118–29.

48 Preliminary studies of the other Late Period ships from Thonis-Heracleion, which share many features with ship 17, did not reveal any traces of lashings.

49 Lloyd 1976. The French translators used the term of 'cheville'—a peg, a treenail. See, for example, the translation by Larcher, revised by Pessonneaux (1889), Boreux (1925) and Barguet et al. (1964).

50 Lloyd 1976; Vinson 1998.

51 A term of 'tenon-rib' ('tenon-côte' in French) was proposed for these fastenings (Belov 2014a). The awkwardness of this term may be compensated by the presence of the word 'rib' that suggests a parallel with a living body. It is interesting to note that the term '*wg*' (see note 71 below) is associated in some Egyptian texts with the expressions 'ribs of Nephthys' and 'ribs of Isis and Osiris' (see Boreux 1920: 286–93). In this context the reading of '*wg*' as 'tenon-ribs' seems very tempting.

52 The same method has been applied for the planking of the cargo boats from Lisht. See Haldane 1996: 237.

53 No tenon pegs have been observed in the planking of the Lisht and Dashur boats. However, some of the tenons of the Mataria boat were secured with pegs 2 cm in diameter: see Ward 2000: 50, 133.

54 See the publications of Bass 1986; 1989a; 1989b; Pulak 1988; 2002; 2008.

Figure 10.5 Fragment of the planking showing two adjacent tenons in the stern area of Thonis-Heracleion ship 17. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Here, an interesting question connected with the origin of this constructional technique arises, namely whether it is a result of foreign influence or a purely Egyptian technology.[55] Many constructional features of ship 17 strongly indicate that the ship was a freighter of a multi-purpose type, built in a local shipyard and of local wood.[56] It seems that a riverine cargo vessel is more prone to continue ancient boatbuilding traditions than, say, a war galley. While economic factors govern in the first case, it is efficiency, taking advantage of the best technical solutions, that is more important in the second. The construction of a Nilotic boat can in fact be very conservative, as is demonstrated by the *nuggar*.[57] This boat of the Upper Nile has numerous parallels with ancient Egyptian craft.[58]

Mortise-and-tenon joints were used in boatbuilding from at least the Old Kingdom.[59] Shipwrights continued to use them together with lashings in every vessel in the archaeological record, with the exception of the boat timbers from Abydos (Early Dynastic Period, *c.* 2650 BC). It is true that the tenons used in the construction of all these boats (probably with exception of the Mataria boat) have nothing in common with the long tenons of ship 17. This does not mean, however, that a boat of the same construction type could not have existed before the Late Period: archaeological data on Egyptian shipbuilding is too fragmentary to allow for such a definite conclusion. In this light some details of the shipbuilding scenes in the tombs of the Old Kingdom deserve scrupulous attention. Many of the reliefs show workmen cutting long and narrow pieces of wood (Figure 10.6).

55 Discussions of the important innovations that appear in Egyptian shipbuilding during the eighteenth dynasty go beyond our subject. Different opinions can be found in Köster 1923; Glanville 1930; 1932; Février 1935; Faulkner 1940; Säve-Söderbergh 1946; Helck 1962; Landström 1970; Basch 1978; 1987; Ward 2000.

56 Major arguments for this view are suggested in the Conclusions of this article.

57 Clarke 1920; Hornell 1942; 1943.

58 The *nuggar* (*naggr*) is built of local acacia wood (*swnt*) with very short planks and according to a shell-first principle. The keel of the boat is crudely worked and projects a little beneath the level of the planking. The *nuggar* has through-beams that are secured inside the planking. The boat either has no frames at all or has several occasional ribs that are not connected to the keel. The planking is luted from the inside of the hull. Principal divergences from the ancient technology include a transom stern and a wide application of nails in the assembly of the planking instead of tenons or ligatures.

59 This type of joinery was known to the Egyptians as the 'Teeth of Osiris': *Book of the Dead*, Ch. 99, Book 18, see Montet 1925. Incontestable iconographic and archaeological proofs are provided by the boatbuilding scenes in the tomb of Ty (Fifth Dynasty, *c.* 2494–2345 BC), which are the earliest representations of mortise-and-tenon joinery in the Mediterranean, and by the Khufu I ship (Fourth Dynasty, *c.* 2550 BC), where the role of mortise-and-tenon joinery seems to be underestimated by scholars: see Ward 2000: 49.

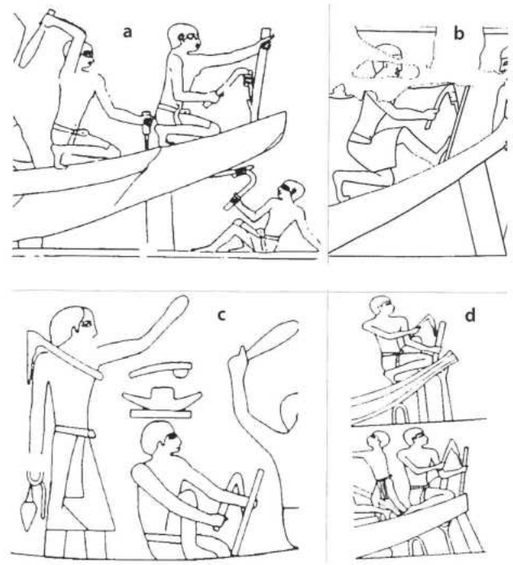


Figure 10.6 Fragments of the reliefs of the Old Kingdom showing workmen cutting long pieces of wood: **a** tomb of Ty from Sakkara, fifth dynasty; **b** tomb of Ni'ankh-khnum and Khnemhotep from Sakkara, fifth dynasty; **c** tomb of Khuenre from Giza, fourth dynasty; **d** tomb of Khunes from Zâwyet el-Maiyitîn, fifth dynasty. (Drawings after Rogers 1996.)

These long, narrow pieces have been interpreted as treenails, tenons or both.[60] It is interesting to note that other workmen depicted on the same reliefs are occupied with cutting the mortises in the planking.[61] It is important to keep in mind that once there is a physical relationship between two elementary objects (*unico*) on an Egyptian representation, their relative dimensions are always respected.[62] Since there is a relation of scale between the workman and the detail which he trims on a representation, it is reasonable to make an estimate of the size of the latter. The object exceeds half the height of the workman[63] on the majority of the reliefs and thus can be estimated at least at 80–90 cm long. If these objects were tenons, they would be for craft smaller than ship 17.

'When they have built their ship in this way, they stretch beams over them.'

Three through-beams have been preserved in the construction of ship 17. One of them (B1) has been preserved almost completely. All of the beams go through the planking and their extremities are visible from the outside of the hull. This is a characteristic feature of Egyptian ship building, which is confirmed by iconographic evidence.[64] The beams have a rather irregular shape and are coarsely worked. Thus, for the fabrication of beam B1 the shipwrights chose an irregularly-shaped trunk of acacia. It seems that not all beams were preserved and it is likely that a middle beam also existed to support the mast. The through-beams were locked within the channels by the tenons of the planking assemblage to give more solidity to the hull in transversal axis. Five supports of approximately the same size (*c.* 200 × 40 × 15 cm) have been discovered in the central part of the hull. It seems that the main role of these supports was to distribute the strain from the beams onto the larger surface of the planking by means of the stanchions. One of the stanchions has been found in an upright position *in situ*, while others were lying inside the hull (Figure 10.7). The supports were made of reused planking—a method that was quite typical of ancient Egyptian shipbuilding.[65]

No traces of deck were found on ship 17 and its inclined beams of irregular form would not in fact permit installing one. However, a small hatch or a door (66 × 46 × 2 cm) was discovered inside the hull that can indicate that the extremities of ship 17 were possibly decked[66] and fitted with a small cabin with a door. In any case, a platform to facilitate steering (helmsman's platform) would necessarily have existed.[67] We also cannot exclude that some type of temporary gangway was installed in order to facilitate the control of the ship, but this cannot be seen in the archaeological record.

'They use no ribs.'

Herodotus reports that no ribs are used in the construction of the *baris*. Ten half-frames or, rather, bracing timbers, of rather irregular shape have been preserved in the construction of ship 17. Their presence is the first mismatch

60 Rogers 1996: 68–74.

61 It is peculiar that mortise-cutting scenes are found only on the reliefs of the tomb of Ty: ibid.: fig. 6A.

62 Vergnieux 1990.

63 The average height of the ancient Egyptian male is estimated at 1.65 m (see Stock et al. 2011: 355, table 14.2).

64 The earliest example is provided by the model of a boat of the Prince Mesehti, from the First Intermediate Period (*c.* 2160–2055 BC). See Landström 1970: fig 207. One of the latest representations is that of 'the Great Ship of Saïs' on the so-called 'blocks of Piankhi' (Psamtek I, 664–610 BC): see Perdu 2004: 226. The ship in question demonstrates two levels of through-beams thus demonstrating her large dimensions. Three levels of beams are visible on the representations of the barges transporting obelisks of the Queen Hatshepsut (1473–1458 BC): see Landström 1970: 128–33. The technical solution of the through-beams can be found in some other boatbuilding traditions of the world: see Pâris 1841: 15, pl. 8, figs 1–3; 49, pl. 46–7.

65 Ward 2000: 140; Creasman 2013.

66 Cf. Casson 1995: 134 discussing Greek 'hollow' ships that were decked at the extremities of the hull only.

67 According to the 3D reconstruction of ship 17, its stern containing the rudder shafts is characterized by a pitch of around 30°. Thus the helmsman needed a more horizontal area such as a steering platform or the roof of a deckhouse. Either possibility cannot be excluded: see Belov 2014b.

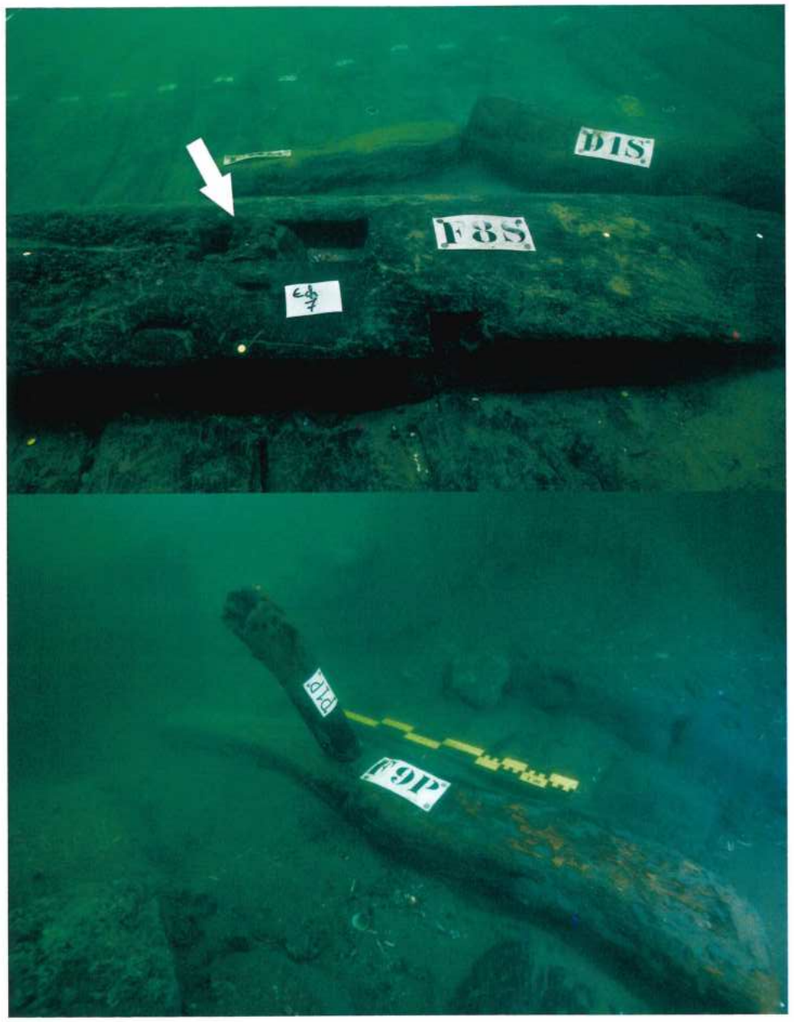


Figure 10.7 Support F8S with the remains of the stanchion (white arrow) in the mortise cut in its upper surface (above). Stanchion found *in situ* in bracing timber F9P. (Photos: C. Gerigk; © F. Goddio/Hilti Foundation.)

between the text and the archaeology. Bracing timbers were attached to the planking by tenons of rectangular section (in the majority of cases) that do not go through the planking. With two exceptions, the bracing timbers were not connected to the keel. They possess a variety of different sections, but those with a polygonal section are predominant. It seems that the bracing timbers were installed in the specific areas, that required reinforcement in the shipbuilder's opinion.[68] It can not be excluded either that these pieces were added one by one in the most vulnerable areas after the ship was already in use.[69]

It may have happened that Herodotus saw the construction of a smaller *baris*[70] and that larger ones would have used ribs, whereas the smaller ones would not have had any frames because the internal tenons of the planking (that are *de facto* frames for a construction of this type) were quite sufficient for maintaining the transversal strength of the hull. Frameless vessels did in fact exist during earlier periods of Egyptian history, for example, the Dashur boats were constructed without frames.

The Egyptian term *wg* (*wgw*; *wgiw*; *wgyt*?; *wgit*?) probably means 'frames' (*wgʒ*–rib).[71] The term is found in the

68 The same idea is present in the construction of the Nilotic *nuggar*: Clarke 1920; Hornell 1942.

69 I would like to thank Dr Patrice Pomey for suggesting this hypothesis during the defense of my PhD thesis 31st January 2014.

70 Boreux 1925: 237.

71 The translation of *wg* as 'frames' was initially proposed by Brugsch (1868). For references to Egyptian sources see Jones 1988: 160–61 note 40–41; *Thesaurus Linguae Aegyptiae*. http://aaew.bbaw.de/ access date 27th February 2014: http://aaew.bbaw.de/tla/servlet/BwlBrowser?lcd=wg&tcd=&scd=&pno=1&etr=0&db=0&f=0&l=0&off=14&bc.x=40&bc.y=13&csz=14. Among the researchers that adhere to this reading are Boreux 1925: 286–93; Junker 1934–1941: 4.74; Hornell 1943: 27–41; Landström 1970: 20–1, 26, 28, 72; Goyon 1971: 11–41. Goyon suggests the existence of the same 'internal members' in the construction of ships depicted on reliefs of Unas (2375–2345 BC) like those of the Khufu I ship. While his meaning is first of all the same piece as the internal girder of Khufu I, it is necessary to note that the pressure from the girder is distributed on the hull by stanchions and frames; Vinson 1994: 22–3, 25.

72 Chapter 19. Boreux 1925: 290–91.

73 Erichsen 1954: 102 note 7.

74 Spiegelberg 1921: 288.

75 Jones 1988: 161 note 40.

76 Ward 2004: 20.

77 Basch 1972.

78 Haldane 1996.

79 Ibid. 1993: 246.

80 Clarke (1920: 50) mentions in reference to the construction of Nilotic *nuggar*: '*In these days the carpenter occasionally fortifies the hull by a few ribs, but these are in no way parts of a system attached to the keel, but are fixed to the interior of the skin, giving a little extra strength where the builder thinks it desirable.*'

81 In the original: […] ἔσωθεν δε τὰς ἁρμονίας ἐν ὧν ἐπάκτωσαν τῇ βύβλῳ.

82 Edgerton 1922–1923; Boreux 1925: 236–9; Casson 1971: 14–15; Lloyd 1975; 1979; Basch 1986; Jones 1990: 54.

83 Morrison 1972; Foerster 1989; Haldane and Shelmerdine 1990; Vinson 1996; 1998.

84 It can be immediately noticed that Herodotus uses this word in the other form. Lloyd cites textual evidence from other Greek sources and says that 'Finally and most important, there is the lexicographical argument that the compound (ἐμ)πακτόω could hardly refer to anything but stuffing material into cracks to make them water-tight': Lloyd 1979: 47.

85 The analysis of this material has not yet been undertaken.

86 An exhaustive analysis of the meaning of the term is proposed in Basch 1986; 2008.

87 Pers. comm. Pomey, 27th November 2012. Luting means the application of waterproofing material between the joints of the planking in progression with the building process: see Steffy 1998; Pomey and Rieth 2005: 212.

Book of the Dead,[72] and also attested in Demotic[73] and Coptic[74] sources where the length of pieces in question could reach 7.5–9 cubits.[75] Archaeological material definitively proves that Egyptians applied frames in construction of their ships. The Khufu I vessel has 16 frames in its construction, inserted in the hull with a spacing of 2–3 m between them. Their function, however, was not to support the hull, but to distribute the weight of the deck and of the upper structures on the planking through stanchions that support the girder.[76] Floor-timbers are visible within the hulls of solar barks cut in the rocks near the pyramids of Giza.[77] The frames from Lisht (1950 BC) are massive and it seems that they formed a real 'bulkhead' supporting the deck.[78] It is possible that frames were present in the construction of the Mataria boat (*c.* 450 BC).[79] Ethnographic material seems to correspond to this evidence.[80]

Thus, it appears that the hulls of larger Egyptian ships and especially those of freighters probably required additional reinforcement.

'They obturate the seams from within with papyrus.'

The suggestion of Herodotus that the ancient shipwright caulked the seams of the planks from inside the vessel with papyrus has caused much controversy. Two quite different translations of the verb (ἐμ)πακτόω have been proposed that completely change the meaning of the sentence.[81] According to the first translation, supported by such scholars as Edgerton, Boreux, Casson, Lloyd, Basch, and Jones, it means 'to caulk' and the complete phrase would be 'they caulk the seams from within with papyrus'.[82] An alternative reading has been proposed by Morrison and further defended by Foerster, by Haldane and Shelmerdine, and by Vinson,[83] which is based on the meaning of the verb πακτόω—'to fasten, close, make fast'.[84] Interpreted in this way, the text of Herodotus provides evidence for internal lashings of the hull of the *baris*.

The evidence from ship 17 sheds new light on this debate, as there are traces of vegetal material[85] in the form of strands driven between the seams of the planks that

Figure 10.8 Vegetal material found in the joints of the planking of Thonis-Heracleion ship 17 as seen from the inside of the hull. (Photo: A. Belov; © F. Goddio/Hilti Foundation.)

can be distinctly seen in both the longitudinal and transversal joints *inside* the planking of the ship (Figure 10.8). This material is visible only in the pronounced gaps between the plank edges that vary in width from 1 to 6 cm, with an average value of 3.3 cm for the starboard. Normally the gaps between the butt edges of the planks belonging to the same strake are more pronounced than those between their side edges.

The choice of the term 'caulking' would not be correct, as it suggests that the material is driven by force from the outer side of the hull.[86] This is not the case with ship 17, where the gaps between the seams were filled from the inside; thus the term 'luting' is preferred in this case.[87]

Figure 10.9 Two circular openings in the after section of the keel of Thonis-Heracleion ship 17. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

The same luting technique is applied for the planking of the *nuggar*, the only difference being that old rags are used instead of vegetal material.[88]

'There is one rudder, passing through a hole in the boat's keel.'

Prior to the discovery of ship 17 the axial rudder was only known in Egypt through ship models and iconography, as well as Herodotus' description. The first representations of an axial rudder in Egypt are dated to the end of the fifth (*c.* 2494–2345 BC) and to the sixth dynasties (*c.* 2345–2181 BC).[89] The axial rudder co-existed with the alternative arrangement of two quarter-rudders during all subsequent periods of Egyptian history; however, it remained the preferred steering system for Nilotic freighters and passenger ships alike. Some minor changes in the arrangement of the axial rudder appear towards the end of the New Kingdom.[90] A representation dated to the reign of Psamtek I (twenty-sixth dynasty, 664–525 BC, regnal years 664–610 BC) shows a large axial rudder installed on royal ships. Not counting the models, the only archaeological evidence for steering oars from Egypt comes from Mersa Gawasis, which were quarter rudders, usually installed on sea-going vessels.[91]

The aft-most section of the proto-keel[92] of ship 17, cut from acacia wood, has the following dimensions: length 305 cm, width 56 cm and a thickness that varies from 10–21 cm. In the central part of this piece two round openings carefully cut with a small chisel, and having a respective diameter of 33 and 39 cm, can be seen (Figure 10.9).

The position of these openings at the preserved extremity of the hull suggests that they served as the shafts for an axial rudder. No remains of the rudder itself were found, but this is not surprising taking into consideration the context of the ships.[93] During the 2010/2011 seasons of excavations at Thonis-Heracleion this interpretation was further confirmed by the discovery of a similar opening at the stern of ship 43 that shows many common constructional features with ship 17.[94] Two shafts for the axial rudder of ship 17, the larger of the two ships, were probably provided to allow for better steering of the ship in ballast and when fully loaded.[95]

88 Clarke 1920: 50; Hornell 1943: 29–30.
89 Jones 1995: 39–40 analyses a representation of a boat in the tomb of Unas-Ankh that probably dates from the end of the fifth to the beginning of the sixth dynasty. The most well-known of the reliefs of the sixth dynasty are those of Deir el-Gebrâwi. See Boreux 1925: 402.
90 Belov 2014b.
91 Zazzaro 2007; 2009; Ward and Zazzaro 2010.
92 A short description of the keel and the arguments for this choice of term are presented in the following paragraph and in more detail in Belov 2015.
93 See Robinson this volume Chapter 11.
94 Ibid.
95 The hypothesis suggested by Pomey, pers. comm. 27th November 2012.

Figure 10.10 Mast step notch with its position circled on the general plan of ship 17. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

Herodotus also mentions that the *baris* had a keel, which is clearly observable in ship 17. In the central part of the ship the keel is twice as thick as its planking and it projects inside the hull.[96] This type of keel can be called a 'proto-keel', but definitely not a 'keel plank', as its role in the longitudinal structure is considerable. The keel consists of 12 short segments with an average length of 202.4 cm, which is very close to the average length of the planking. It is interesting to note that this type of keel would not be visible in a sheer view and this can lead to new explanations for the absence of the keel in the majority of Egyptian representations.

'The mast is of acacia-wood and the sails of papyrus.'

Judging from the preserved mast-step notch, the mast of ship 17 was located amidships and was probably supported by a central beam (Figure 10.10). Moreover, the above-mentioned five supports for the beams are situated symmetrically in the central part of the hull around the mast step-notch. It is quite possible that there was no mast step only lateral knees or a mast shoe to support the mast.[97] The proportions of the mast-step notch (46 × 13 × 5 cm) suggest that the mast was probably of a pivoting type. The position of the mast near the middle beam is confirmed by Egyptian iconography.[98]

Means of propulsion and description of the technique for going downstream

According to Herodotus the *baris* under sail could overpower the Nile's current only in the case of a strong wind; otherwise, she was hauled from the bank.[99] Herodotus does not mention oars and no traces of them were found on ship 17. However, the *barides* used for military purposes must necessarily have some kind of rowing arrangement, even if it was a provisional one.

Herodotus also describes a technique used by the Egyptians for steering the *baris* downstream. As this does not concern any constructional features, we will not analyse it. It is, however, pertinent to recall an interesting experiment carried out by Goyon in collaboration with the Central Hydraulic Laboratory of France.[100] A physical model developed by specialists of this laboratory proved the efficiency of the technique described by Herodotus.

96 In this respect, it resembles the proto-keel of the Bronze Age shipwreck of Uluburun (1300 BC). For references see note 52.
97 Landström 1970: 47, 54, 72, 74, figs 143, 153, 211, 217–219, 262, 377.
98 It is only in the Old Kingdom that the mast of Egyptian ships was shifted towards the bow. In the Middle Kingdom it acquires a central position, which is maintained till the end of pharaonic times. See Assmann 1913: 147–9.
99 Cf. Cooper 2012a; 2012b.
100 Goyon 1971: 38–41 annexe 1.

Mathematical manipulations proposed in a subsequent publication by Wehausen et al. fully confirm the results of the modelling.[101]

'There are many of these boats; some are of many thousand talents' burden.'

The text of Herodotus would suggest that *baris* boats were numerous on the Nile, but that they differed in tonnage. To give an idea of what this would suggest for the cargo carrying capacity of such vessels, one thousand talents would equate to 26 metric tonnes of cargo.[102] The three-dimensional modelling of ship 17 had a displacement of about 151 metric tons, a draft of 1.60 m and a dead weight of approximately 112 metric tonnes, or more than four thousand talents.[103] Consequently ship 17 can be regarded as a cargo vessel of considerable tonnage.[104]

Ship 17 of Thonis-Heracleion: the type of boat

The roughness and strength of ship 17 would undoubtedly indicate that it carried cargo. The planking, bracing timbers and beams of the ship corresponds exactly to the following conclusion of Ward with regard to Egyptian cargo boats: '… freight boats depended on flatter and shorter planks [as opposed to the sculpted planks of a ceremonial craft] and frames frugally sawn from trimmed trunks, seemingly in standardized shapes and sizes that took advantage of the tree's natural curvature.'[105] The very thick (14.4 cm on average) and short (about 192 cm on average) planking of ship 17 preserves numerous knots and fissures in the acacia wood that indicate a frugal use of building material. Similarly, the beams and bracing timbers of ship 17 show the natural curvature of wood.

Many arguments testify that the navigation space of ship 17 was confined to the Nile and its Delta. The ship demonstrates short lengths of the elements of its longitudinal structure that would permit sufficient rigidity for open sea conditions,[106] while on the other hand, a flat bottom and flat keel were quite advantageous for the navigation on the Nile and in the estuary because of numerous shoals.[107] Furthermore, the rough execution and asymmetry of the planking, beams and frames also indicate a river type of construction.

The joints of the planking found in the construction of ship 17 are very different from the double rows of relatively small tenons and lashings associated with the Egyptian sea-going ships of Mersa Gawasis and Ayn Sukhna.[108] The luting of the joints of the planking is characteristic of a river craft. All the sea-going vessels known from both texts and the archaeological record were built of imported wood (especially of cedar), while ship 17 was built of the local species of acacia that probably indicates the local origin of the boat. No traces of ship-worms were found on the outer surface of the keel and of the planking of ship 17. This was, however, also the case for the timbers from seagoing ships from Mersa Gawasis and Ayn Soukhna,[109] and thus there is a small possibility that ship 17 was used beyond the Nile and its Delta. The evidence for an axial rudder also supports the conclusion that the ship was of a river or fluvio-maritime type.[110]

Finally, the estimated deadweight of ship 17 of about 113 metric tonnes would result in a freeboard[111] of 64 cm in case of full charge. Although the hull is very stable in general and the righting lever is maximal at 57 degrees, in reality the absence of a deck would not permit the heel exceeding eight degrees, which is insufficient for seafaring and would hardly permit navigating in full charge beyond the limits of the estuary.

The main characteristics of the hull of ship 17[112]

An initial version of the three-dimensional model for ship 17 suggests that is has a sickle-shaped hull with considerable overhangs at the extremities.[113] The ship is characterised by a flat bottom, a flat keel, and a rather pronounced chine. The overall length of the ship would have been about 27–28 m with a beam of 8 m that gives a length to width ratio of around 1 : 3.4.

101 Wehausen et al. 1988.

102 Taking 1 attic talent as equal to 26 kg, the exact mass being 25.992 kg. See Waterfield 1998: 593.

103 The precise figure is 4,340 talents.

104 The majority of ancient trade vessels of all periods are estimated to have a tonnage of less than 75 tons: see Wilson 2011. In the Egyptian context, these figures are confirmed by the Aḥiqar Scroll dated to the Achaemenid Period, which provides information on the tonnage of foreign ships entering Egypt. This tonnage is in the range of 40–60 tons: see Briant and Descat 1998: 68. According to Arnaud (forthcoming), small boats dominated on the Nile during all periods. However, in the Hellenistic Period the average tonnage of Nilotic ships was close to 250 metric tonnes while some of them were of even more considerable tonnage of 18000 artabas or 450 metric tonnes (ibid.). In the interpretation of Thompson and Garnsey 1983: 72, these ships had a tonnage of 552 metric tons.

105 Ward 2004: 14.

106 The question of longitudinal structure of this ship is not completely resolved. An important structural role for Nilotic boats is attributed to bulwark by Boreux 1925: 244; Haldane 1993; Vinson 1997 and it is possible that this was also the case of ship 17 (Belov 2014a).

107 According to the 3D reconstruction ship 17, it had a draft of 1.2 m unloaded and 1.6 m when fully loaded.

108 Ward and Zazzaro 2010: 35; Pomey 2012a: 10. However, the same joinery has been discovered in Lisht timbers, obviously belonging to a river-faring boat: see Ward 2000: 113–15. Ships of Mersa Gawasis and Ayn Sukhna were probably regularly dismantled for transportation or storage and thus the tenons of the planking were not pegged to facilitate this operation. The long tenons of ship 17, on the contrary, were pegged, proving that the *baris* was not intended to be disassembled.

109 Ward 2012: 222; Abd el-Raziq, Castel and Tallet 2006.

110 The boats of Type 2 on the graffiti from Rod-el-Air (Sinai) associated with the sea-going ships of Ayn Soukhna were probably equipped with an axial rudder (Pomey 2012b: 291). However, Pomey notes that these boats, employed as ferries on a turnaround basis between the coast of Egypt and Sinai, were destined to cover only 100 km in one day of navigation. Otherwise, the axial rudder does not seem to be a good choice for the conditions in open sea (Mark 2012).

111 Freeboard is the distance from the surface of the water to the upper edge of the hull.

112 The main features of this new type of construction and the hypothesis of the sequence of construction are presented in Belov 2014c.

113 It is interesting to note that one of the ships depicted on the mosaic of Praeneste (*c.* 125 BC) has been recently identified as a *baris* by Pomey (forthcoming).

Conclusions

Ship 17 is dated to the beginning of the fifth to the middle of the fourth century BC and its construction shows numerous parallels with Herodotus' description of the local Egyptian river boat called a *baris*. The word-by-word analysis of this text demonstrates that all the statements of Herodotus, except for the smaller length of the planks and the absence of frames in the construction of the *baris*, correspond exactly to the evidence of ship 17. These two mismatches can be explained by the larger size of ship 17 in comparison with the boat described by Herodotus. The resemblance between the *baris* and ship 17 starts with the construction material (acacia) and the type of vessel (Nilotic freighter) and then continues with both the longitudinal (keel, planking) and transversal (through-beams) structure of the ship. The methods of assembling the planking and making the hull watertight are exactly the same as in Herodotus' description. Finally, the steering system of ship 17 and the presence of the mast are also corroborated by the ancient text.

The arguments cited above allow us to state that ship 17 from Thonis-Heracleion most probably belongs to a type of vessel that Herodotus described as a *baris*, or at least to a type that was closely related to it. This type of vessel with a shallow draft and a flat keel was perfectly suited for the navigational conditions of the Delta that included shallow waters and numerous sandbanks. Alternatively, these ships could have been used for the lightening of cargo on to or off of large sea-going freighters that may have anchored in the deeper waters of the port of Thonis-Heracleion.

The advantage of the site of Thonis-Heracleion is that the information provided by ship 17 can be supplemented and extended by the excavations of other ships dated to the Late Period in the harbour. This will allow a more precise definition of the constructional principles and methods used during this time, many of which remain unique to the ancient Egyptian ship-building tradition.

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11 Ship 43 and the formation of the ship graveyard in the Central Port at Thonis-Heracleion

Damian Robinson

Introduction

The port of Thonis-Heracleion would have been home to a diverse range of watercraft, which would have been employed in many aspects of its daily life. Some of these vessels will undoubtedly have wrecked in its harbours, along the waterways leading to and from the port and the Nile or further afield on voyages throughout Egypt and its Delta or abroad in the waters of the Sea of the *ḫ3w-nbwt*,[1] whereas other vessels were perhaps deliberately sunk or otherwise disposed of in temple rituals.[2] Many vessels however, possibly somewhere far beyond fifty per cent of all of those made,[3] would have safely come through the dangers of the Nile and the sea and would have reached the end of their working lives. At this time, their owner would have faced a choice of what to do with them: perhaps to recycle and reuse the vessel for another purpose, to salvage its wood and fittings to realise some of the economic value still retained by it, or to abandon it on some quiet part of the river.

Ship 43 from Thonis-Heracleion was one such vessel that had made it through a working life and had then been abandoned in the port. This paper will consequently attempt to understand why this ship was abandoned in the Central Port alongside a number of other similar vessels through assessing the 'the archaeological signatures left in the wake of the planned aspects of destruction [which] are important clues in the extraction of intention and agency'.[4] The abandonment of this group of vessels was a deliberate and purposeful action done in the full knowledge of how it would have radically altered the local topography and the ways in which the central basin of the port would have been used.

The formation processes associated with the abandonment and deposition of ship 43, therefore, offer us a window in to the decision making processes of the inhabitants of the port or other figures in authority. Yet while we excavate the outcome of these decisions—a ship graveyard—the reasons behind the abandonment and sinking of the ships within it are, at present, open to discussion.[5] Two lines of enquiry will be pursued: one considers the strategic importance of Thonis-Heracleion as a military target in the turbulent times of the Egyptian Late Period and looks at the function of the graveyard as a defensive barrier; while the second is a far more prosaic interpretation, where the ships were used in the creation of maritime infrastructure and sunk as part of a land reclamation scheme or were used as elements of a pontoon bridge—perhaps both.

The discovery and character of ship 43

The port of Thonis-Heracleion has a large nautical assemblage with 64 ancient ships and over 700 ancient anchors being discovered.[6] The majority of the assemblage was located during survey campaigns in the port basins. It was during such a campaign to characterise the topography of the central harbour in 2007 that ship 43 was discovered—so named because it was simply the forty-third vessel to be found at the site. Upon discovery, ship 43 was rapidly surveyed and then reburied. This resulted in the general outline of the vessel being determined through the removal of the upper mobile layer of sand following the surviving edges of the hull as they protruded through the dense grey clay of the harbour floor. This allowed the rough dimensions of the vessel to be established: 23 m long by 8 m wide. The vessel was returned to in 2011 when the current excavations, which aim at stratigraphically excavating approximately half of the vessel, were begun (Figure 11.1).

The protruding timbers were drawn and samples of the planking and a tenon were taken for radiocarbon dating and wood species analysis. These gave dates of 785–481 cal BC and 785–412 cal BC,[7] with the structural

1 *ḫ3w-nbwt* (*haw-nebwt*), translated generally as 'the foreign peoples', or more specifically as 'the Greeks'. See von Bomhard 2012: 54 line 9 and 75–6 note e for a discussion of the term.
2 This is termed ritualistic discard (Richards 2011: 859–60) and is seen in Egypt from the first and second dynasties and including well-known vessels such as the ship of Cheops and the Dashur boats (Ward 2000).
3 Although far removed from the Late Period in time, Bascom (1976: 71–2) suggests from a study of the Lloyd's Registers of ship losses in the eighteenth and nineteenth centuries that somewhere in the region of 50 per cent of all wooden ships built in the Age of Sail were lost.
4 Richards 2011: 872.
5 In this paper the term 'ship graveyard' follows a slightly broader use than that proposed by Richards (2011: 864–6), where it refers to 'accumulations of watercraft retired and deliberately abandoned by their owners'. While this is a possibility for the vessels in the Central Port in Thonis-Heracleion, the graveyard may also have been created through the process of what Richards terms 'structural adaption', that is, the use of articulated hulls as foundations (2011: 861).
6 See Fabre 2011 and Fabre and Belov 2012 for an initial survey of a selection of ships from Thonis-Heracleion and their naval architecture.
7 Planking samples 54_2007 and 55_2007.

Figure 11.1 The stem of ship 43 under excavation, showing the overlying limestone rubble and the anchor. (Photo: C. Gerigk; © F. Goddio/Hilti Foundation.)

elements of the vessel being made from acacia, a hardy tree indigenous to Egypt and the Nile Valley (Appendix 1 and Figure 11.2). The use of acacia in Egyptian shipbuilding was noted by Theophrastus and later by Pliny the Elder, where it is praised for its solidity, resistance to decay and suitability for use as planking.[8] It is likely that such trees would have been widely available to shipbuilders in the Canopic region and by extension we can suggest that ship 43 may well have been local to the harbour in which it was found.

The local nature of the ship may also be investigated further through a consideration of its naval architecture. As the construction details of ship 43 are closely related to those already described by Belov for ship 17, they will not be repeated here.[9] Nevertheless, it is important to reiterate that ship 43 was built in the same way as ship 17, through the design principles and wood working techniques employed and even down to the standard sizing of the planks used in the construction of the hull. Through a detailed reading of Herodotus' description of an Egyptian river boat—*baris*—and comparing this to the nautical architecture of ship 17, Belov proposes that that ship 17 was most likely a multipurpose cargo ship, of a type that would have been commonly found on the river and in its Delta and it seems likely that ship 43 was a similar kind of vessel.[10] With their wide beams and flat bottoms, *baris* would have been specifically designed for use in and around the margins of the Nile Delta.[11]

It is possible to gain an insight into the potential ownership of ship 43 and of the type of work that it may have undertaken through a consideration of the Baldwin-Amiens papyrus.[12] These are two pieces of the same record of the collection of the grain tax by a flotilla of ships. The grain is loaded onto the ships from land owned by various sanctuaries belonging to the temple of Amun at Karnak at locations in the Xth Upper Egyptian nome and also from the area around Hermopolis. From the papyrus, it is clear that all of the temple lands were under the supervision of the Steward of Re 'Messenakhte, as were the ships of the grain fleet. This would suggest that the fleet also belonged to the great temple of Amun and it is also pertinent to note that other temples are known to have had their own fleets of ships.[13] It is possible to speculate that ship 43 may also have been part of a temple fleet, even that of the temple of Amun-Gereb at

8 Theophrastus *Historia Plantarum* 2.4.2.8; Pliny the Elder *Naturalis Historiae* 13.63.19.
9 Cf. Robinson forthcoming for a preliminary discussion.
10 Herodotus *Historiae* 2.96; Belov this volume Chapter 10. Also see Fabre and Belov 2012; Belov 2014a and 2014b.
11 Cf. Fabre this volume Chapter 9.
12 Janssen 2004; Gardiner 1941.
13 Gardiner (1941: 47) notes that in the Harris papyrus (4.12–5, 1) the Theban god has ships for the transportation of corn.

Thonis-Heracleion itself. Interestingly in his translation of the Amiens papyrus, Gardiner prefers to render the title of a ship's master as 'master of a broad boat/barge' rather than simply 'captain'.[14] The careful choice of the phrase 'broad boat/barge would suggest that the scribe who wrote the document was seeking to accurately describe the specific type of river vessel that made up the fleet, a description that seems remarkably like that of Herodotus' *baris* and ships 17 and 43.

The choice of a broad-beamed flat-bottomed design for a transport barge, such as ship 43, would have been entirely appropriate in the fluvial conditions of the Nile and its Delta. Far from a benign sailing environment, the river would have been full of shifting sand banks, particularly after the flood, which posed hazards that served to block passage and even cause vessels to wreck.[15] According to figures in the *Description de l'Egypt*, year-round sailing was restricted to boats drawing less than 0.5 m of water[16] and consequently it is likely that flat-bottomed vessels such as ship 43 would have been ideal for the transportation of goods along the Nile and its Delta throughout much of the year. The utility of the *baris*-type of barge may be further highlighted through consideration of the Aḥiqar Scroll, a customs account written in Aramaic.[17] This records the tax dues collected at a Nile port from Ionian and Phoenician ships over the ten-month sailing season in 475 BC. Even given the relatively small size of contemporary seagoing merchant ships, their projecting keels and wineglass shaped hulls may have restricted sailing too far into the Delta for parts of the year.[18] Consequently, it is possible that imported goods were trans-shipped at Thonis-Heracleion onto vessels such as ship 43 for onward transportation up the Nile to markets, particularly from March to June, which corresponded with the first part of the sailing season and the period of the Low Nile, and when, according to the Aḥiqar Scroll, the ships arriving at the port would have been from Greece.[19]

Another intriguing possibility for the life history of ship 43 is hinted at by Diodorus in his description of Nectanebo II's preparations to defend Egypt against the imminent invasion by the army of the Persian king Artaxerxes III in 344–342 BC. Diodorus notes that the pharaoh possessed 'an incredible number of river boats suited for battles and engagements along the Nile'.[20] Through referring to them as 'river boats', Diodorus is probably differentiating such vessels from any Greek or Phoenician-style triremes in Egyptian service at the time, which would also have seen use (and possibly action) on the Nile during the Late Period.[21] With a 'Nile' hull profile probably very similar to those depicted in the battle relief at Medinet Habu[22] and shallow draft, ship 43 could also have played a role in the defence of Egypt and its great river.

To summarise its working life, it is likely that ship 43 was a broad-beamed vessel of a type that was very common in both the port of Thonis-Heracleion and along the Nile and the waterways of its Delta. The ship would have spent its working life transporting goods around Egypt and may have been involved in the movement of both imports and exports to trans-shipment points, such as the port at Thonis-Heracleion. It is also possible that the vessel was involved in the collection of taxes and the redistribution of goods on behalf of the temple of Amun-Gereb and as such it is likely that ship 43 would also have been part of the fleet associated with this temple.

The abandonment of ship 43

It is notable that ship 43 was not an isolated find, but was located alongside at least seven other vessels in a large graveyard (Figure 11.2). It is important to stress the role of human agency in the formation of this graveyard and to contrast it with the 'shipwreck', which is usefully defined by the Oxford English Dictionary as being the outcome of the process of wrecking, which involves the catastrophic loss of the vessel through 'it being broken up by the violence of the sea, or by its striking or stranding upon a rock or shoal'.[23] Using such a definition, it is clear that ship 43 was not wrecked and is not a shipwreck, as there is no evidence of any form of natural catastrophe or to suggest that the ship was prematurely lost. Instead there is evidence that it was deliberately sunk for a specific purpose. Excavations to date have failed to reveal any traces of the types of material culture, such as the presence of the ship's equipment, its cargo and the property of the crew, which would tend to characterise catastrophic losses.[24] Furthermore, the ship would appear to have at least one, and potentially many other, wooden stakes driven deeply into the grey clays of the harbour basin, the intention of which was to secure the vessel into position

14 Gardiner 1941: 47.
15 Cooper 2011; 2012; Graham 2005. Indeed, one of the ships in the grain fleet of 'Messenakhte—Seti's ship—seems to have been lost on the journey and its cargo taken over by others (Janssen 2004: 35).
16 Cooper 2011: 96.
17 Yardeni 1994.
18 Cf. McGrail 2001, 134–153 and Steffy 1994: 42–59 for overviews of the development of merchant ships up to the Hellenistic period.
19 Cf. Höckmann 2008–9 for a discussion of trans-shipment at Thonis-Heracleion.
20 Diodorus Siculus *Bibliotheca Historica* 16.47.6.
21 Cf. Lloyd 1972; Basch 1969.
22 See Breasted 1930 pls 37, 39 and 40; Faulkner (1941: 9) argues that the Egyptian vessels depicted at Medinet Habu demonstrate a low hull, indicating foreign influence in their design, rather than them being typical Nilotic vessels (Lloyd 1972: 269).
23 Definition of 'shipwreck' taken from the Oxford English Dictionary online (http://www.oed.com). See also Richards 2008: 6–7; 2011: 857.
24 E.g., Gardiner 2005.

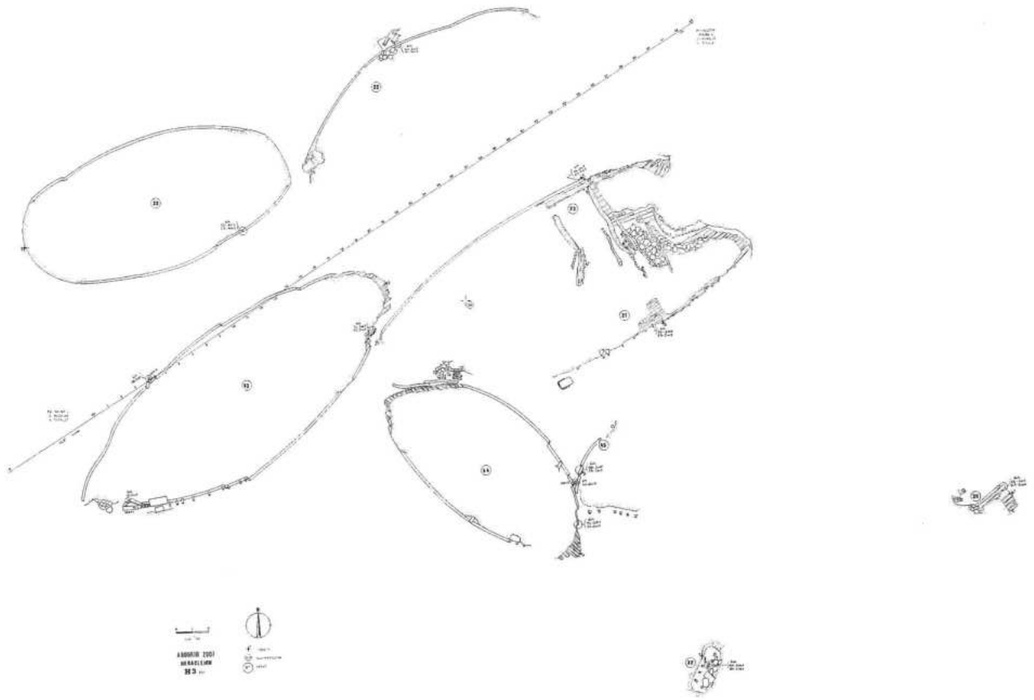

Figure 11.2 The ship graveyard at the eastern end of the Central Port in Thonis-Heracleion. (Drawing: P. Sandrin; © F. Goddio/IEASM.)

and ensure that it did not move. The stakes are a clear indication of the premeditation of the abandonment[25] of ship 43 and do not easily sit with the traditional picture of the shipwreck, with all of the urgency and threat to life and cargo that such an event would entail.

The excavations in ship 43 would also suggest that it had undergone primary salvage, which would have been the consequence of a decision by its owner that the vessel had either: outlived its economic life; was no longer worth repairing; or was replaceable by a more 'modern' version.[26] Primary salvage follows on from the departure of the crew who would have taken much of their personal belongings with them, and today involves the removal of high-value or other saleable materials, such as engines, communications equipment and so on. In such cases the hull remains floating so that it is movable to its final resting place.[27] During this process, ship 43 was probably largely cut down to its hull; for example, excavations have revealed the piece of the keel through which the steering oar passed, but there was no trace of the steering oar itself. Similarly, the masts and the rigging would have been amongst the first items to have been removed, as well as any deck houses or other structures, leaving only the hull of the vessel. Recent and contemporary evidence of ship breaking would suggest that this took place while the ship was still on the water: in such cases, the superstructure is cut down first, leaving the hull until last, allowing the vessel to remain afloat at the side of a dock.[28] It is considered less likely that ship 43 was cut down on land, with the ship pulled up onto a beach or grounded on the shallows of the riverside. In such a case, little attention is paid to retaining the watertight integrity of the hull, which is often breached at an early stage of the breaking process: this did not occur with ship 43.[29]

It is likely that the cutting down of ship 43 was not undertaken simply to recycle the timber,[30] the hull would

25 Cf. Richards 2011: 856–7 for a discussion of the term 'ship abandonment' as it arises out of maritime and insurance law and its use in archaeology.

26 Ibid. 2008: 61.

27 Ibid.: 155–6.

28 Cf. Buxton 1992 and Buxton and Warlow 1997 for photographs of the cutting down of various ships of the Royal Navy, the merchant marine and the German Imperial Navy.

29 Compare for example, the photographs on pages 14 and 28 of Buxton (1992), which illustrate the cutting down of the battle cruisers New Zealand and Princess Royal and the battleship Agincourt dockside and the Bayern, a battleship of the German Imperial Navy in drydock, both at Rosyth, Scotland. Also see Buerk 2006: 32–4 for shipbreaking on the beaches of Bangladesh.

30 There is evidence for the dismantling and recycling of Egyptian vessels from Lisht (Haldane-Ward 1992; Ward 2000: 107–28), believed to be from watercraft associated with the monumental sanctuaries in the area and wadi Gawassis (Ward and Zazarro 2007; 2010).

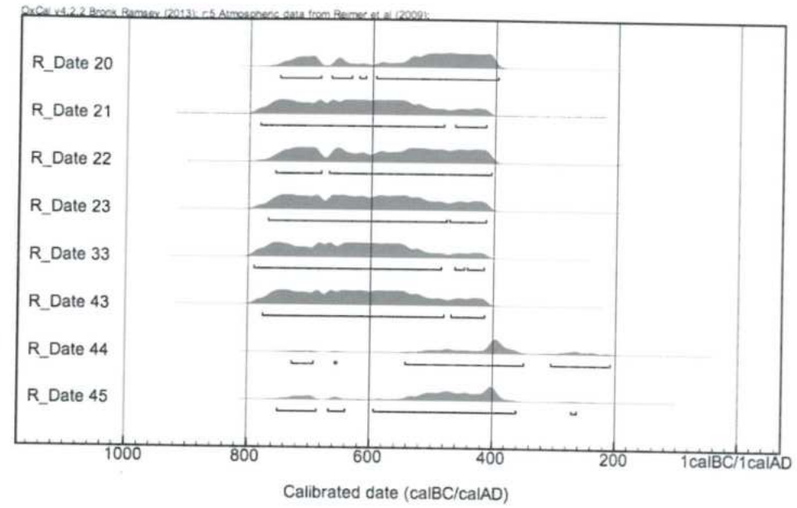

Figure 11.3 Multiple OxCal 4.2 plot of the calibrated dates for the ships in the eastern portion of the Central Port of Thonis-Heracleion.

have contained the majority of the reusable wood in the vessel and if this was the aim then it is likely that the ship-breakers would have rapidly moved on from the primary salvage of masts, rigging etc to the secondary salvage of the hull. Instead the hull was left deliberately intact and the vessel remained on the water, with it being laid-up in some marginal area of the port.[31] Perhaps it was put into storage and largely abandoned, with the result that it was not regularly bailed out, leading to it becoming partially submerged. The evidence for this was a thin deposit of grey Nile clay on top of the hull planking, with the sediment being deposited by river waters pooling in the bottom of the vessel. Directly above the layer of grey clay was a rich organic deposit—mainly papyrus leaves—which suggests that the half-submerged vessel was also swamped during one of the annual Nile floods.[32] The length of time during which ship 43 was laid-up is uncertain, beyond one cycle of the inundation. Nevertheless, it is likely that the silting and swamping of the vessel took place while it was stored in a quiet part of the port to await its reuse, perhaps while other some of the other vessels that were deposited in the eastern graveyard were similarly prepared.

Rather than returning to the breakers for the completion of its scrapping, ship 43 was deliberately sunk alongside at least seven other vessels in a large ship graveyard in the Central Basin of the eastern port of Thonis-Heracleion. Here the reason behind the retention of the (relatively) watertight integrity of the hull during its primary salvage becomes clear, as ship 43 would have been floated from the shore, where it had probably received an initial ballasting of limestone,[33] into its required position at the western edge of the graveyard, where it was perhaps sunk and then covered with further limestone. The rubble formed a dense mantle over the entire wreck and this deposit also continued over the stern of 43 and on to the adjacent ship 20, suggesting that both of these ships—and probably also the remainder of the vessels within this graveyard group—were part of the same event. Ballast is commonly used in the abandonment and sinking of vessels, to ensure that the vessel settles properly and to help counter the any residual buoyancy in the hull.[34]

Ship 43 appears to have been tethered into place by at least one wooden pile, which was driven into the clay of the harbour bottom about half way along the starboard side. It is likely that others will be found as excavations continue, as other piles have been recorded next to vessels in the eastern graveyard.[35] The more completely excavated ship 17 was also staked into position in this way with 14 piles, although this vessel was not part of the eastern graveyard and this large number of stakes may indicate another purpose rather than just maintaining the vessel in position.[36] The excavation of one of the piles revealed that it was driven *c.* 2.5 m into the clays of the harbour bottom.[37] Together with the rubble fill, the use

31 Cf. Beattie-Edwards and Satchell 2011 is an interesting study of an abandonment graveyard in Forton Lake, Gosport, where vessels begin to be abandoned in the lake following the move of the Royal Navy to more accessible berths in Portsmouth harbour. In his study of ship graveyards, Richards (2008: 85, 94) notes that they generally occur in disused or abandoned stretches of waterway.

32 Franck Goddio, pers. comm.

33 Cf. Fabre 2011: 26–7 on ballasting.

34 Richards 2008: 156.

35 Fabre 2011: 26, fig. 1.15 for an illustration of the placement of piles around ship 17. It should be noted that a further pile was uncovered on ship 43 during the 2014 excavation season that appears to have been driven vertically through the planking at the stern of the vessel. This will be investigated further in subsequent missions, as the piles around the vessels—for example, ship 17—are normally positioned around the edges of the vessel rather than being driven through the hull. Consequently, it is also possible that this pile is from a feature subsequent to the initial deposition of the vessel and may, therefore, relate to a later structure built over the top of the graveyard.

36 Fabre this volume Chapter 9, for example, suggests that it could have been part of a quay or an embankment.

37 Belov 2014a: 83–6 and fig. 35.

of piles was a clear placement strategy designed to ensure that the submerged vessels remained where exactly they were put.

In the Viking period ship graveyard in Roskilde Fjord, Denmark, the archaeological evidence would suggest two different episodes of ship deposition: an initial group of ships to form a defensive barrier and a repair to this at a later date.[38] In part, this was recognised through there being a significant 'gap' in the ages of the vessels. While the limited numbers of samples taken from the vessels in the eastern graveyard at Thonis-Heracleion precludes a particularly small date range, when calibrated and associated with the program OxCal (Appendix 1 and Figure 11.3)[39] none of the vessels returned dates that were particularly anomalous from the general trend of the data. This would suggest that the vessels in the graveyard were of a similar age.

Although only two samples were taken from the hull of ship 43 during the survey for radiocarbon dating purposes, the calibrated results would suggest that the vessel was built at some point between the eighth and fifth century BC. The dates for the construction of the vessel can be compared to two other radiocarbon determinations associated with its deposition. The dates for the deposition of the ship come from the pile on the starboard side of the ship that was used to secure the position of the vessel (480–200 cal BC) and also from one of the pine flukes from a stone anchor of Egyptian type that was found at the prow of the ship amongst the limestone rubble (405–208 cal BC) (Figure 11.3).[40] A further sample for radiocarbon dating was taken from another pile between ships 44 and 45, which dated to between 395–203 cal BC.[41] Although there are clearly too few individual dates to be certain, the data so far would seem to suggest that the vessels in the graveyard were deposited at roughly the same time between the early fifth and the late third century BC. Furthermore, even allowing for the fact that there are comparatively large date ranges for both construction and deposition, it can be suggested that ship 43 would have been an old vessel at the time of its abandonment.

Interpreting the creation of the eastern graveyard

The interpretation of the agency behind the creation of the graveyard is by no means straightforward. The port of Thonis-Heracleion was a dynamic and changing geomorphological environment where the gradual raising of sea level in the north of the city resulted in the eventual

Figure 11.4 Excavating the anchor on the port side of ship 43, showing both the remaining pine fluke and the space from which the sample was taken. (Photo: OCMA; © F. Goddio/Hilti Foundation.)

transferral of the location of the major temple to the Central Island at the beginning of the fourth century BC.[42] Equally, the North-East Channel that led to the Nile, and which would have been the primary maritime entrance to the port, appears to have begun silting up—perhaps rapidly—in the late fifth century BC to the extent that a building was constructed in the middle of the former waterway in the fourth century BC.[43] Located between the North-East Channel and the Central Island, the exact timing of the abandonment of the vessels is therefore crucial as different interpretations rely on the North Channel being open and or closed and this area of the port as being either an active zone through which ships regularly passed or a quiet backwater. Unfortunately, at present we can only say that the vessels within the central graveyard were deposited at some point between the early fifth to late third century BC, a wide date range that

38 Crumlin-Pederson 2002: 331–4.

39 OxCal website: http://c14.arch.ox.ac.uk/embed.php?File=oxcal.html. It should be noted that OxCal uses a different radiocarbon calibration curve (IntCal 09) to other dates in this volume, which mainly use the IntCal 98 curve. The result of this is that there are slight discrepancies in the dates given in this paper compared to those in this volume Chapter 9 by Fabre. See for example, dates for ship 21.

40 Anchor fluke 70_2007.

41 Archeolabs laboratory, Ref 69, No. ETH 34171 ARC08/R3560C5.

42 Goddio this volume Chapter 1.

43 Ibid.

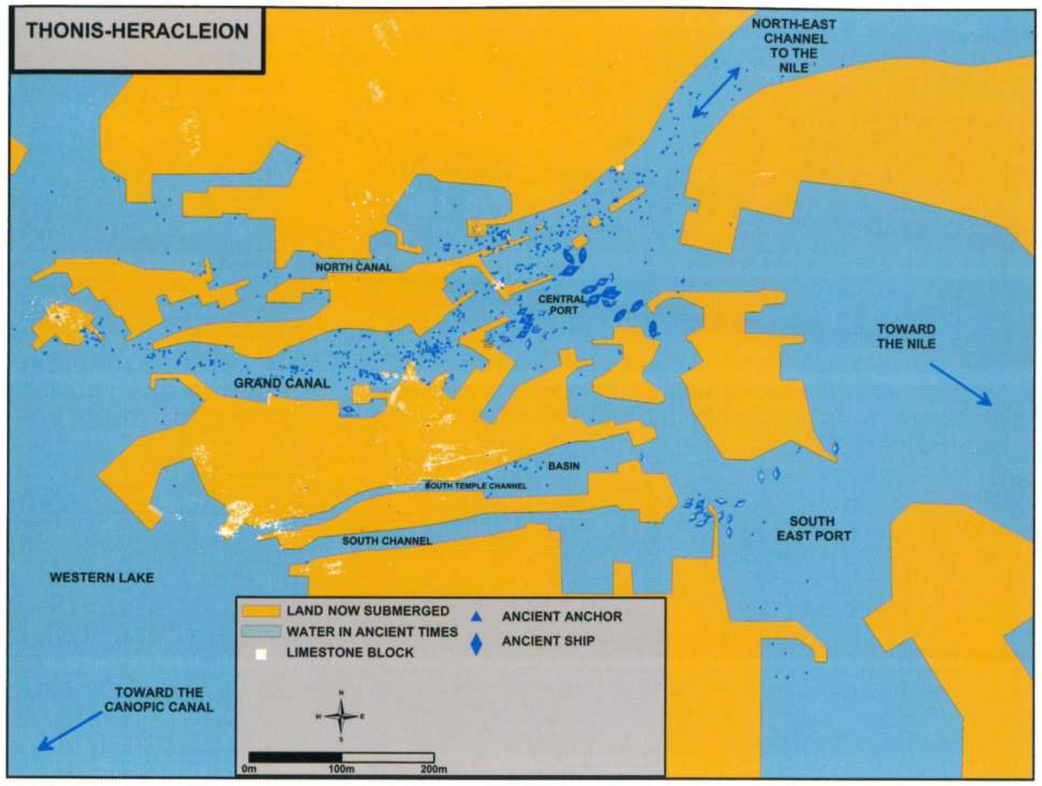

Figure 11.5 Thonis-Heracleion. (Map: F. Goddio; © F. Goddio/IEASM.)

clearly straddles both the silting up of the North-East Channel and the movement of the main focus of the city to the Central Island. Consequently, these changes and the uncertainty in the dating must be kept in mind when reading the interpretations contained below. While it is clear that further work is required to improve the chronology, it is appropriate at this point to present the range of alternatives before advancing what appears—at this stage in our analysis—to be the most likely scenario for the deposition of the ships in the graveyard.

The abandoned ships were all old vessels, which had perhaps reached the end of their working life or were no longer worth repairing.[44] This may suggest that the graveyard was simply the result of the disposal of unwanted vessels that had been staked down and ballasted simply to ensure that they did not move. The problem with this simple interpretation is in the location of the graveyard within the port of Thonis-Heracleion. Studies of the abandonment of unwanted vessels and the creation of graveyards indicate that the most important factor in their location is that they should never be a hazard to navigation. Instead, ship graveyards most often occur in disused or abandoned stretches of waterway away from the main bustle of traffic and trade in the harbour.[45] If the North-East Channel was open, however, the ships of the eastern graveyard would have been located in a prime area for navigation (Figure 11.5) and would most certainly have presented a hazard to vessels sailing into the port from the channel and the Mediterranean beyond, or at best made sailing in this area difficult. At their worst the graveyard would have effectively blocked access to the anchorages in the Central Port and Grand Canal (as seen by the distribution of anchors in Figure 11.5) and would also have prevented easy access to the landing stages of the port and the Central Island on which the large temple complex to Amun-Gereb stood, which would have been the administrative heart of the city and its port.

If the North-East Channel was blocked at the time when ship 43 was reused, however, the vessels in the graveyard would not have presented a hazard. Consequently, it could be suggested then that the ships deposited in the Central Port were simply abandoned in a quiet area. This is considered unlikely as simple abandonment graveyards tend to be characterised by a haphazard collection

44 Cf. Ford 2013: 212, who also suggests that it would have been old vessels that were generally selected for reuse. In his study, the average age of reuse for the state-owned ships in his sample was 26.3 years and 22.8 years for commercial vessels.

45 Richards 2008: 84–5.

Figure 11.6 An aerial view of the blockships and later Churchill Barriers closing off the opening from Holm Sound into Scapa Flow, Orkney. (Courtesy of Orkney Library & Archive.)

of watercraft that accumulate over an extended period of time. The graveyard at Forton Lake, Gosport, for example, has a collection of craft of different types and ages, including cargo vessels, ferries, lifeboats, fishing boats and a variety of military craft. This diverse set of vessels results from the 'core' of the assemblage being formed from the ex-military vessels, which were sold to a disposal yard on the lake. They were stored there and as time went on they became increasingly unseaworthy and were eventually abandoned, particularly after the yard closed in 1959. To this nucleus other vessels were subsequently added, such as the former ferry the Vadne, which was abandoned in 1983, over twenty years after the disposal yard closed down with its collection of World War II era vessels.[46] Such a diverse collection does not appear to have been deposited in the eastern graveyard and while excavations have not been extensive, the ships that have been revealed in outline all appear to be approximately the same shape, size, be made of the same materials and using the same construction technique (Figure 11.2).[47] The exceptions are ships 44 and 45, which appear to be slightly smaller vessels, although still probably of the same board-beamed, shallow draft Nile river boat/barge tradition.

The vessels of the Central Basin were not a simple haphazard collection of old and unwanted vessels dumped in an out of the way part of the port, but instead were a carefully selected and prepared group of ships that were deposited for a clear purpose. In order to come to some understanding of what this purpose was, we can now evaluate the main interpretative scenarios that led to the abandonment of the vessels and the creation of the eastern graveyard.

Defending the North Channel to the Nile

Like the Viking era ships in Roskilde Fjord, or those more recently sunk at the entranceway to the natural harbour of Scapa Flow (Figure 11.6),[48] an appropriate context for blocking the North Channel and access to the Central Basin would be war. In such a graveyard the ships are scuttled carefully in position as a defensive measure designed to block a passage and deny an enemy access. The creation and deposition of craft within a conflict graveyard takes place over a very short period and often contains only a very limited number of different types of contemporary vessels.[49] For example, those sunk in Holm Sound at Scapa Flow were mostly steamships

46 Beattie-Edwards and Satchell 2011.
47 Cf. Fabre 2011; Fabre and Belov 2012.
48 Crumlin-Pederson 2002; Wood 2009.
49 Richards 2008: 867–8; 2011: 27, 29.

built in the last quarter of the nineteenth century and sunk between December 1914 and September 1915.[50] This was undertaken in response to the threat to the British Grand Fleet following the successful penetration of its defences by the U18 in November 1914. It is interesting to note that, as was indicated above, the ships in the eastern graveyard also appear to be of a similar type and age and thus would appear to fit the expected profile of a war-related graveyard.[51]

The use of ships in the creation of defensive barriers is not unknown from the eastern Mediterranean, where literary sources would suggest that from the fifth century BC onwards harbours increasingly became the focus for hostile actions, as invading forces attempted to capture coastal cities from the sea.[52] At the siege of Syracuse, for example, Thucydides reports the use of a defensive pontoon of ships—a *zeugma*—spread out across the harbour, although in this case it was deployed to keep the Athenians inside the harbour, rather than to keep them out.[53] This clearly foreshadowed later developments in harbour defences, which included 'vessels chained side-by-side, harbour entrances blocked with sunken ships, pointed stakes used as landing obstacles, and cargo vessels employed as workboats, floating barriers, fortified platforms and fire ships'.[54]

In Philo of Byzantium's *Compendium of Mechanics*, a treatise explaining how to attack and defend a Hellenistic city, there is a book on siege warfare (*Poliorketika*).[55] Written at some point between the 240s and 220s BC, and so offering a slightly later perspective on naval siege warfare, the volume is nevertheless useful in framing a discussion of how the harbour defences of Thonis-Heracleion might have been constructed, and the role that ship 43 could have played within this. Philo suggests the placement of constructed platforms on the seabed covered with a mound of stones that would have created a barrier just below the waterline, on which he also suggests that metal piles be driven.[56] Here it is relatively easy to envisage the vessels in the eastern graveyard being used instead of specially constructed platforms. This would certainly have speeded up the construction of the defensive barrier, allowing the easy delivery of large quantities of debris and their precise positioning in the harbour mouth. Interestingly, in the section with advice on laying a siege, Philo also suggests filling of the mouth of the harbour with rocks and earth in order to deny a relief force access.[57] From both the attacking and defending portions of the text it is clear that such rubble defences were preferable to the *kleithron*, which consisted of a simple chain and floats, or the *zeugma*, lines of boats joined together.[58] It is, consequently, tempting to see the deposition of ship 43 in the eastern graveyard as a part of the creation of such a permanent defensive structure, which may well have been just one of a range of measures taken to secure the harbour against enemy attack. It may also fit within the context of the addition of other defensive 'bastion' structures to the buildings of the port.[59]

Ship 43 was deposited in the eastern graveyard at some point between the late fourth and end of the second century BC, which corresponds to the end of the Egyptian Late Period and the beginning of the Ptolemaic era. The literary sources would suggest that the conquest of Egypt by Alexander the Great was straightforward and that no actions were fought in the western Delta.[60] Consequently, if the eastern graveyard was conflict-related then it is the Persian invasions to which attention should turn for an appropriate historical context.[61] Yet while the ancient sources provide a context for the creation of the blockship barrier, we must be wary. For successive waves of Persian invasions, the point of attack was almost invariably across Egypt's eastern frontier and Pelusium, with the majority of the initial military action taking place in the eastern Delta before the invading forces pushed on to secure Memphis.[62] Consequently, while the Canopic mouth may have been stoutly defended, would it have been completely closed? Given the importance of Greek military aid to the Egyptians during this period, it would perhaps make strategic sense to keep open the major western harbour. Here the role played by the region in the revolt of Inarus, a 'Libyan' dynast from the western Delta, against Persian rule following the death of Xerxes (death 465, revolt 463/2) may be instructive. Inarus sought Athenian aid, which resulted in a force of 200 triremes being sent.[63] It is likely that these vessels would have sailed into the Delta via the Canopic branch following the longstanding sailing and trade route that intimately connected Athens with

50 Information taken from: http://www.scapaflow.co/index.php/history_and_archaeology/the_20th_century/war/defences_in_and_around_scapa_flow/block_ships.
51 Cf. Ford 2013: 199–201 for a discussion of the scuttled British vessels during the American Revolutionary War. He also stresses the point that the ships used in block-ship barriers were state-owned, which has clear resonances with those from Thonis-Heracleion, where the ships used were likely to have been part of a temple fleet.
52 Murray 2012: 69–142.
53 Thucydides *History of the Peloponnesian War* 7.59.3, 69.4.
54 Murray 2012: 79.
55 Cf. Marsden 1971 and excerpts in Murray 2012: 283–301.
56 Philo of Byzantium *Poliorketika* 53; see also Murray 2012: 291–2 and fig. E.2.
57 Ibid: 101.
58 Ibid. 52 for the *kleithron* and 54 and 102 for the *zeugma*.
59 Fabre this volume Chapter 9.
60 Curtius *Historiae Alexandri Magni* 7.4.2.
61 Cf. Fabre this volume Chapter 9 for a consideration of the historical context within which the defences at Thonis-Heracleion may have been constructed.
62 Ruzicka 2012.
63 Thucydides *History of the Peloponnesian* War 1.104; Diodorus Siculus *Bibliotheca Historica* 11.71.3–6.

Thonis-Heracleion.[64] Despite the revolt going badly for the Egyptians and their Athenian allies, it is likely that no attempt was made to block entrance to the port, which would have needed to have been kept open to receive the relief force of 50 more triremes.[65] The requirement to keep open the Canopic branch of the Delta and most likely its port to receive reinforcements of ships and men during the revolt of Inarus reiterates the importance of keeping supply lines open even in times of conflict and perhaps calls into question the necessity to deny access to Thonis-Heracleion from the sea.

The alliance with Athens at the time of the Inarus revolt was just one of a series of alliances with Athens and Sparta during the period from the initial Persian invasion of 525 until the arrival of Alexander the Great in 332 BC.[66] These alliances would have involved the movement of ships and troops (or the promise thereof) and would likely have required an operational port. It is consequently difficult to see how the blocking of the entrance to Thonis-Heracleion would help to defend Egypt, as it would deny access to the vital supply of Athenian or Spartan allies, or other Greek mercenaries, together with their ships.[67] Blockship barriers are by their very nature difficult to lift or remove and speak more of clear and pressing danger than the mere suggestion of it and it is only likely that such defences would be implemented if there was the expectation of an invasion in the west, which the sources and Persian military tactics do not suggest.[68] Consequently, it is more likely that if defensive barriers were needed in Thonis-Heracleion they would have been of the less permanent *kleithron* or *zeugma* types. Furthermore, given the 1 km long passage from the Nile to the barrier, it would seem as if the blockships would have been something of a last-ditch defence and surely a more logical location for defences would be towards the mouth of the river itself to keep enemy forces away from the city?

Looking at the wider topography of the port itself illustrates further problems with the blockship hypothesis (Figure 11.5), while the blockships would certainly have hindered enemy warships penetrating into the Central Port and prevented them from accessing the island upon which the Temple of Amun-Gereb was located, the same island could also have been reached from the south-east port basin, which could be reached through a southern passageway to the Nile. At present there is no evidence to suggest that this entranceway was also blocked with sunken ships, although it could have been blocked with lines of floating vessels linked together or chains. Nevertheless, the lack of obvious defences in the south of port would call into question the use of the abandoned vessels as blockships.

The most serious complications to the defensive-barrier hypothesis arise when the dating of the various elements within the landscape are taken into consideration. For while the vessels in the graveyard could have been abandoned during the uncertain times of the fourth century BC, it is at this very time that the route to the Nile that they were intended to defend was silting up. If the channel was impassable to vessels—and the construction of a building on it would certainly suggest that it was—then there would be little point in building a defensive position in this location. Consequently, the mounting evidence against war as the reason behind the sinking of ship 43 and the others in the eastern graveyard suggests that it would be prudent to seek alternative explanations for their deposition.

Land reclamation and the creation of maritime infrastructure

The second major hypothesis sees the vessels used as elements in the creation of maritime infrastructure, with them being either deliberately scuttled as part of a land reclamation scheme or used as elements in a pontoon bridge. The logical timeframe for both of these scenarios would be after the North Channel was silted up. This would mean that the newly created artificial island would not be a hazard or hindrance to ships sailing into the port from the north, while a new bridge, or series of bridges, could have been used to connect the new focus of port-life on the Central Island with the older parts of the city to the north.

A pontoon bridge

In his *Bibliotheca Historica*, Diodorus Siculus describes the Delta and its tributaries and suggests that at each of the mouths was a walled city 'which is divided into two parts by the river and provided on each side of the mouth with pontoon bridges and guard houses at suitable points'.[69] While only a general comment, the creation of pontoon bridges to link up the various islands and islets within the *hone* would appear to be eminently sensible, particularly if they could rise and fall with the river during the period of the inundation. Herodotus' description of Xerxes' bridge across the Hellespont is a roughly contemporary account of how such a structure could have been made in Thonis-Heracleion. Warships were placed alongside each other, parallel to the current, in two lines across the Hellespont, with those at either end anchored to hold the bridge against the winds. Flax and papyrus cables were then run from shore-to-shore connecting the ships followed by baulks of wood, brushwood and trampled earth to make the roadway.[70]

In later Roman literature, there are also other accounts of the construction of pontoon bridges, for example Vegetius says that:

> *the most commodious invention is that of the small boats hollowed out of one piece of timber and very light both by their make and the quality of the wood. The army always has a number of these boats on carriages, together with a sufficient quantity of planks and iron nails. This with the help of cables to lash the boats together, a bridge is instantly constructed, which for the time has the solidity of a bridge of stone.*[71]

For both Xerxes' crossing in to Europe and also in Roman military writing, however, the pontoon bridge is something of a temporary affair to deliver troops across bodies of water and secure a strategic advantage while on campaign.[72] An exception to this is Julius Caesar's crossing of the Rhine, where a bridge was created using sharpened wooden stakes driven in to the river sediments inclined in the direction of the current and braced to create trestles across which a road was laid. Here the intention was not simply to transport troops across the Rhine in to the territory of the Sugambri tribe, but the creation of something 'worthy of his [Caesar's] and Rome's dignity',[73] effectively a more permanent form of riverine infrastructure.

When the descriptions of pontoon bridges are compared to the material from the eastern graveyard there are obvious similarities and the re-use of a group of *baris*-type vessels as pontoons is certainly feasible. Furthermore, the piles used in Thonis-Heracleion to secure the ships in place would have added a further element of security for a type of bridge that is seen elsewhere in the ancient world as more of a temporary structure. Also if some of these piles were used to allow the pontoons and the overlying roadway to rise and fall with the flood of the river, we could see this as an eminently practical solution to the problem of providing year-round access between the central islands of the port with those in the north.

There are also difficulties with this interpretation foremost among which is the role played by the limestone rubble that now mantles the graveyard and on which the ancient literature is silent. Were the ships ballasted for stability perhaps? Associated with this is a secondary issue of how this ballast would have affected the regular maintenance of the pontoons and in particular the need to periodically have bailed them out? Finally there is also the shape of the graveyard and the organisation of ships within it. Pontoon bridges are linear features, whereas, according to our current understanding, the graveyard appears to be more elliptical in shape, with at least two lines of vessels deposited bow-to-stern and another smaller boat that now lies at roughly ninety degrees to the other ships.[74] The liquefaction of the land, large floods or violent storms could well have moved the ships from their original position, which could account for the position of ship 44 compared to the others within with the graveyard. This would then leave the lines of pairs of ships that could have been used to create two bridges—as seen in Xerxes' example—but here we would seem to be moving beyond a simple bridge to connect up two areas of the port and in to the realm of larger pieces of maritime infrastructure.

An artificial island in the Central Basin

Aside from breaking and abandonment, the other main use that wooden vessels were put to beyond their life of active maritime service, is as buildings or foundations, as part of what has been termed structural adaption, or vessel reuse.[75] This is not the use of parts of broken up ship and boat fragments, such as those found reused in Egypt in the buildings of Berenike, Myos Hormos and wadi Gawasis on the Red Sea,[76] or indeed elsewhere, such as in the revetments and drains along the banks of the River Thames at Southwark,[77] but the use of intact articulated hulls. Indeed, there is a wide range of examples of the reuse of ships in the creation of maritime infrastructure. Perhaps the most famous literary example is the reuse of a huge ship that had brought an obelisk from Heliopolis in Egypt to Rome. This was used during the construction of the Claudian port at Portus, where it was sunk and secured into place using piles. According to Suetonius, this was done in order to provide a strong foundation for the lighthouse that was built on top of it.[78]

There are also numerous archaeological examples of the reuse of ships in maritime infrastructure. State-owned vessels were often reused in works of harbour infrastructure, as—prior to any sale—they remained the property of the state or navy even after they were taken out of service and as such presented an easily available and inexpensive resource.[79] For example, Ford notes that the English navy sank 48 ships as breakwaters or foundations for harbour

64 An indication of this is seen in the presence of Athenian market weights being in use at the site as noted by Van der Wilt this volume Chapter 8.
65 Thucydides *History of the Peloponnesian* War 1.109.2–110.4; Diodorus Siculus *Bibliotheca Historica* 2.74.5–75.4, 77.1–5.
66 Cf. Ruzicka 2012 for a summary of the various military alliances between Egypt and the various Greek city states.
67 Cf. Ruzicka 2012: 75 on the potential of keeping open the Canopic Branch of the Nile for reinforcements from the Greek world.
68 The standard Persian tactics for the invasion of Egypt are summarised in Ruzicka 2012: 73.
69 Diodorus Siculus *Bibliotheca Historica* 1.33.8.
70 Herodotus *The Persian Wars* 7.36; Hammond and Roseman 1996.
71 Vegetius *De Re Militari* 3.7.
72 See also Ammianus Marcellinus *Roman Antiquities* 17.10.1, 12.4, xxvii 5.2, 29.4.2, 40.5.13.
73 Julius Caesar *The Gallic War* 4.17–18.
74 Cf. Fabre 2011: 16, fig. 1.6.
75 Richards 2008: 861–2 on structural adaption; Ford 2013: 198 on vessel reuse.
76 Sidebotham 2011: 239–40; Blue 2002: 149; Ward and Zazzaro 2007.
77 Marsden 1996: 160–84.
78 Suetonius Claudius *De Vita Caesarum* 20.3.
79 Ford 2013: 199.

extensions between 1655 and 1873 in dockyards both at home and in its overseas colonies.[80] Here the comparison with the situation at Thonis-Heracleion is quite apposite, as ship 43, as well as the others scuttled alongside it, may have been the property of the state. As already noted, Diodorus Siculus suggests that Nectanebo II possessed 'an incredible number of riverboats suited for battles and engagements along the Nile'.[81] Such vessels would have been used to defend the gates of Egypt against invaders in the fourth century BC, but following the Persian reconquest of Egypt there may simply have been a surfeit of state-owned vessels that could have been available for reuse. Equally, if ship 43 was part of a temple fleet, it is easy to envisage a situation where the vessels were reused at the end of their working lives in the development of port infrastructure. The five Thames lighters reused in the creation of a river wall at Erith tell a similar story.[82] Between 1843 and 1860 at least five old, but still river worthy, vessels were floated into place at high tide and then backfilled to create a new river wall. Erith was the furthest point upstream of the port of London where fully loaded ocean-going cargo ships could sail at low tide and so was a major lightering port. There was consequently a plentiful supply of old vessels with which to build river infrastructure as the need arose.

The similarities between ship 43 and those whose structures were adapted to help create maritime infrastructure is obvious and it would seem that the vessels of the eastern graveyard may well have been reused to create a wide artificial 'island'. Like the pontoon bridge hypothesis, the creation of an artificial island is not without its difficulties, foremost among which is that at present it is difficult to be certain if the 'island' did indeed reach above sea level. Nevertheless, it is likely that it would have acted as a foundation for overlying structures, although due to the limited nature of the excavations on ship 43 and more widely in the eastern graveyard—where vessel outlines were simply determined during the initial survey—there is no information on what these structures may have been. Ship B&W4 from Grønnegaard may provide a template for the types of archaeological signatures that might be expected as excavations in the eastern graveyard progress. Here two distinct groups of piles cut across the hull of the vessel, indicating two distinct periods of overlying building.[83] It is hoped that similar piles or other features indicative of what ship 43 may have been a foundation for appear as excavation continues.

Topographically, the land created by the vessels of the eastern graveyard could have been used to join islands together, which were located to the east of the Central Island with the temple to Amun-Gereb (Figure 11.5). A little further to the northwest in the Central Port, although not itself part of the eastern graveyard, ship 17 was similarly reused in the creation of a quay or an embankment.[84] Here the distribution of fourteen piles around the hull of the vessel probably served a dual purpose, as a placement strategy to secure the vessel into position and as piles for an overlying superstructure. Such linear groups of posts and piles are relatively common in Thonis-Heracleion, where they would have formed piers or wooden bridges between islands.[85] Such wooden structures, however, do not appear to have such substantial 'ship and stone' foundations and consequently it may be envisioned that the load which they carried would have been far less. Was ship 17, and the two other sunk adjacent to it, part of an artificial island similar to that created by the ships of the eastern graveyard? Would the gap between the two groups of ships be perhaps spanned by a wooden bridge to connect these two areas?

Conclusions

Although excavations are on-going and interpretations are far from complete, it is possible to put forward some broad conclusions about the life cycle of ship 43. It would seem that ship 43 was a type of broad-beamed river vessel that would have been common sight on the Nile and its Delta during the latter half of the first millennium BC. Built at some point between the late eighth and early fifth century BC, it is likely that the ship was used as for the transportation of cargo, either local or regional produce or foreign goods imported into ports such as Thonis-Heracleion. It may have even been part of a fleet attached to the temple that controlled the port and worked on temple business.

Such information as can be garnered from the 'active' life of ship 43, however, pale by comparison with that from its 'abandoned life', which has provided a host of insights into the choices and decisions made by the owners of the vessel in the years towards the end of the Late Period. Ship 43 was an old vessel when it was removed from service at the end of its working life, sometime between the late fifth and the early third century BC. Rather than be sent to the breakers yard for complete destruction and recycling, ship 43 was initially partially salvaged and cut down to its hull and then left in a quiet corner of the port, probably while other ships were similarly prepared. Ship 43 was then deposited alongside at least seven others in a single act that created a large ship graveyard that would have hindered navigation in the eastern Central Port. The sinking of the vessels was aided by a ballasting of the ships with local limestone and numerous piles to ensure that the ships initially sank and then stayed put where they were required.

80 Ibid.: 201.
81 Diodorus Siculus *Bibliotheca Historica* 16.48.3.
82 Dawkes et al. 2009.
83 Lemée 2006: 119 and fig. 4.1.15.
84 Fabre this volume Chapter 9.
85 Goddio 2007: 83 figs. 3.28–9.

Interpreting why ship 43 was abandoned in the eastern graveyard is more difficult than simply demonstrating how it was undertaken, for it is here that we return to the complex issue of intention and agency. The choice of ship 43 and the others deposited alongside it was also most likely a deliberate one. *Baris*-ships may well have been common along the river, but their ownership by the temple or state would have made them a ready source of material for state-sponsored deposition. In addition, their flat-bottoms may have made this type of vessel particularly attractive as they would have rested upright on the harbour bottom and created a stable base for any infrastructure built upon them. Consequently, it is likely that the vessels within the Central Port graveyard were carefully selected to fulfil their secondary reuse purpose. Thus while such ships would have been a relatively common sight in the port of Thonis-Heracleion, the deliberately structured nature of the deposit means that the archaeological record is heavily biased in their favour. This is surely the reason why there are so few obviously foreign vessels in the assemblage from Thonis-Heracleion particularly from the graveyards. Even if such ships were abandoned in the port, their prominent keels and rounded hulls may have made it unlikely that they would have been included in the selection of vessels to be deposited in the eastern graveyard, particularly as they would not have been the property of the temple or state.

This paper has suggested two alternative scenarios in which the vessel may have been deposited, as a blockship in defensive barrier, or as part of a land reclamation or infrastructure scheme. Two very different interpretations for the creation of just one small aspect of the maritime landscape of Thonis-Heracleion, but their importance is in what they reveal about the society that took the decisions. Were the inhabitants of the port so terrified by the prospect of imminent Persian invasion that they deliberately and permanently blocked the main entryway for invading forces and, more pertinently in this case, for reinforcements from the Mediterranean? At this point given both the strategic importance of Thonis-Heracleion as a gateway to the west and the local topography, which would still have allowed access into and around the harbours, the blockship hypothesis would seem unlikely. Instead the graveyard appears to have been created with the purpose of linking together islands, either with new land or via a bridge. Here we can see the actions of a society confidently using its resources to change their immediate environment and to fashion a new maritime landscape. It is suggested that the stimulus for the creation of the new island was perhaps related to the general, inexorable rise in sea level at the margins of the Delta, which was slowly reclaiming the land closest to the sea in the north of the city and in the silting-up of the North-East Channel and the resultant reorientation of maritime trade to the southern areas of the port.[86] Perhaps the creation of the ship graveyard island was a response to these environmental changes and an effort to both help reclaim land in the important central area of the city and provide access to different parts of it?

The creation of maritime infrastructure would indicate a thriving community and the continued importance of the temple, with its fundamental organisational role in the management and operation of the port. Such a description does not seem to fit the situation of Thonis-Heracleion in the Ptolemaic Period, when its economic power was dwindling away due to the rise of Alexandria.[87] Instead it would seem to suggest the city more at the height of its importance, an echo of which is seen in the text of the copy of the Decree of Saïs found within the main temple complex. Intriguingly, the Decree may also provide some indication of the historical context for the creation of the island or bridge. It was set up in the reign of Nectanebo I following a decision in 387 BC to impose a tithe levied on the taxes on foreign imports and on the products of the Greeks at Naukratis, which was to finance an offering service for the temple in Neith.[88] Such a decision was undoubtedly popular with the powerful priesthood and it was they who carefully took down and purposefully buried the stela to preserve its important text.[89] It is likely that this was undertaken in response to the deprivations of Artaxerxes III following his conquest of Egypt in 343 BC, where he sought to remove the contents of the temples and deprive them of the texts that certified their power.[90] This would certainly provide the context for the decision to take down the copies of the Decree of Saïs in both Thonis-Heracleion and Naukratis and for their burial to prevent them falling into the hands of the troops of the Persian king. It would further suggest that this was not the period in which costly works of maritime infrastructure could be financed and indicates that the graveyard would be more likely a product of the more prosperous years before the invasion of Artaxerxes III. Consequently, it can be suggested that the date for the creation of the island can be refined to somewhere between 480 and 343 BC.[91]

This study of ship 43 is relatively unusual in nautical archaeology where it is far more common to concentrate on the naval architecture of the ship and its working-life.[92] Instead the available data from the initial years of excavation of this vessel enables us to focus on its final

86 Goddio this volume Chapter 1.
87 Cf. Goddio 2011.
88 von Bomhard 2012: 82–3 and this volume Chapter 5.
89 von Bomhard 2012: 11–13; Goddio 2011: 125 note 26; Goddio 2007: 83.
90 Diodorus Siculus *Bibliotheca Historica* 16.51.2; Ruzicka 2012: 195.
91 480 BC being the earliest date from the radiocarbon determination derived from the pile to which ship 43 was staked (480–200 cal BC) and 343 BC being the date of the invasion of Artaxerxes III.
92 Such themes are fully dealt with in the chapters by Belov and Fabre in this volume (Chapters 10 and 9) and as such are clear companions of this current chapter.

years after it had been withdrawn from service and to understand the impact that its deposition in the central basin had upon both the inhabitants of city of Thonis-Heracleion and those who used its port.

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IV

Trade beyond Thonis-Heracleion

12 Egyptian-Greek exchange in the Late Period: the view from Nokradj-Naukratis

Alexandra Villing

In a recent study, historian Joe Manning[1] argued for the term 'the Greek millennium' to be applied to Egyptian history from the seventh century BC to the first century BC, since the Ptolemaic era is 'the consummation and not the beginning of a long process of understanding and accommodation between two cultures [Egypt and Greece] that had been in direct and sustained contact with each other since the seventh century BC'.

The trading port of Naukratis was at the heart of this process. Together with its 'sister' port of Thonis-Heracleion, located downstream at the mouth of the Canopic branch, Naukratis functioned as one of Egypt's main interfaces with the Mediterranean world;[2] it was the Egyptian hub in a network of trade routes that connected Egypt with the East Greek cities of the Anatolian coast, Phoenicia and the Levant, Cyprus, mainland Greece, the Nile Delta, North Africa, Sardinia, Etruria and Spain. It was also a place where Egyptians and foreigners interacted on a daily basis in both the public and the private sphere. The crucial agents in these processes were Mediterranean traders, especially Greeks from the twelve Greek cities and islands explicitly mentioned by Herodotus as present in the port of Naukratis, all of them major trading and seafaring powers in the Archaic Period.[3]

Naukratis and its role in ancient cross-cultural contact has been the subject of intense recent research that combines a restudy of early with new fieldwork and that has as one of its main outcomes a comprehensive catalogue of some 18,000 finds from the early fieldwork and their contextual data.[4] The results of this work are beginning to paint a new, more nuanced picture of this ancient town as a thriving port city channelling goods, people and ideas between Egypt and the Mediterranean world, and as a crossroads of civilisations where Egyptians, traders and settlers from different Greek poleis and other foreigners engaged in close contact.

Complementing other papers in the present volume[5] that present new insights into the city's topography, religious life and Mediterranean links, the aim of the present contribution is to consider the site in its wider economic, social and historical context.

Why Naukratis? Establishing a Greek-Egyptian trading port

As our investigations on Naukratis and the recent research on Thonis-Heracleion suggest, both sites date back to approximately the same time, the later seventh century BC.[6] This not only highlights their intimate connection, but also suggests that their establishment must be seen as part of the larger geopolitical developments in the Eastern Mediterranean and Near Eastern worlds of the period, in which Egypt was becoming intricately involved, and in which both Egyptians and Greeks played key roles.

Indeed, the comprehensive review of evidence from Naukratis conducted so far paints a picture that is rather different from the scenarios marshalled by Egyptologists and Classicists in the sometimes quite polarised debate about the site's origins. It does not bear out, on the one hand, hypotheses of the site's original establishment as an Egyptian town long before the 'arrival' of the Greeks:[7] neither new nor old fieldwork give any indication of a substantial settlement being present at the site before the Saïte Period,[8] with pre-seventh century BC Egyptian finds either confined to small portable objects (scarabs) or of doubtful provenance.[9] On the other hand, nor does the evidence suggest that Naukratis was a purely Greek foundation or a fundamentally Greek site in its early

1 Manning 2010: 27–8.
2 Möller 2000; Bresson 2000: esp. 62; Pfeiffer 2010.
3 Herodotus *Historiae* 2.178–80; see also the summary in Möller 2000: 75–88.
4 Villing et al. 2013–2015. Since 2002, the Naukratis Project at the British Museum, led by the present author and building in part on earlier work by centred at the University of Mainz, has been investigating material from early excavations at Naukratis so as to achieve a comprehensive re-evaluation of the site from both a Greek and Egyptian perspective. Since 2012 new fieldwork is also being conducted at the site (cf. Thomas, this volume, Chapter 13). The project is funded by the Leverhulme Trust (Project Grant number F/00 052/E), the Shelby White–Leon Levy Program for Archaeological Publications, Christian Levett and the Mougins Museum of Classical Art, the Institute of Classical Studies, London, the British Academy (Reckitt Fund), the Honor Frost Foundation, the Michela Schiff Giorgini Foundation and the British Museum.
5 Masson this volume Chapter 3; Thomas this volume Chapter 13; and Bergeron this volume Chapter 14.
6 Like Thonis-Heracleion, Naukratis continues to flourish through the Persian and Ptolemaic periods. Unlike Thonis-Heracleion, however, Naukratis lives on through Roman into Byzantine times, fading into obscurity only in the seventh century AD: Thomas 2014.
7 Yoyotte 1993–4.
8 See Thomas this volume Chapter 13.
9 See, for example, Masson 2013–2015b.

Figure 12.1 Saïte-period siltware beaker, *c.* 620–525 BC; found during the second season of excavations at Naukratis, 1885–6. BM 1888,0601.734. (Photo: © Trustees of the British Museum.)

Figure 12.2 Fragment of Carian skyphos from Naukratis, late seventh century BC, made up of two joining sherds. Photomontage combining Greenock, McLean Museum & Art Gallery, 1987.464 and BM 1888,0601.653. (Photo: © McLean Museum and Art Gallery, Greenock/Inverclyde Council and © The Trustees of the British Museum.)

days. As is now becoming clear, this supposition, prevalent among Classical scholars particularly in the wake of the American fieldwork,[10] hinges largely on a systemic misunderstanding or disregard of Late Period Egyptian evidence at the site. Late Period Egyptian pottery was mostly (but not entirely: Figure 12.1) discarded by early excavators and misdated by later archaeologists, even though it was encountered, in considerable quantity, by both[11] and is, in fact, abundant at the site from its earliest layers onwards, as our own recent (2012–2014) fieldwork has now confirmed.[12] The presence of local pottery alone, of course, does not necessarily indicate the presence of local people. That there must be more to it than trade, however, is borne out by Egyptian figurines and other ritual objects that attest Egyptian cultic practice in Naukratis both in domestic and temple settings, from the Saïte Period onwards.[13] In addition, there is archaeological and epigraphic support for the existence of a large sanctuary of Amun-Ra from, at the latest, the early sixth century BC onwards.[14] The contemporaneous existence of diverse material culture and practices and institutions suggest the presence of both Greek and Egyptian people at the site.[15]

What was the reason for the site's foundation in the late seventh century BC?[16] That Naukratis should have been originally a garrison or border fort manned by Greek mercenaries[17] or a 'retirement village' for military veterans[18] seems on the whole unlikely, not least because of a distinct paucity of military-type structures and related finds (arms and armour are rare, consisting primarily of arrow-heads). Moreover, with Carians known to have formed a major part of the mercenary contingents, as is well attested in inscriptions and funerary monuments from other Egyptian sites, one might also have expected Carians to stand out more than they do on present evidence at Naukratis, even if there is some evidence for their presence, including examples of rarely-exported Carian pottery (Figure 12.2).[19] Instead, the site's location, its material assemblage, and written sources all combine to paint a picture of a town the

10 Möller 2000: 118–9.
11 Spencer 2011; Thomas and Villing 2013.
12 Thomas and Villing forthcoming; Thomas this volume Chapter 13.
13 Masson this volume Chapter 3; Thomas 2013–2015a and 2013–2015b.
14 Yoyotte 1982–3: 129–36; Leclère 2008: 117; Thomas and Villing, 2013: 97; forthcoming.
15 An 'Egyptian from Naukratis' is also mentioned in the later Lindos decree, cf. Bresson 2000; Möller 2005.
16 While it is not unconceivable that a small port existed at the site already earlier, there is no indication from the archaeology that this could have been a major settlement. Imports, too, only begin in the late seventh century BC. Early Corinthian pottery appears at Naukratis in the later seventh century BC, some Attic and Milesian material belongs to the period around 600 BC or slightly earlier, with some quantities of Chian pottery likely in the decade 620–610 BC and possibly earlier: see most recently Schlotzhauer 2012 and Bergeron, this volume, Chapter 14. Historical dates for Archaic Greek pottery in archaeological contexts in the Levant independently confirm a late seventh century BC dating for the earliest pottery finds from Naukratis, as is discussed in detail by Schlotzhauer 2012. For early Cypriot figurines, see Thomas 2013–2015b, which substantially updates the picture presented by Höckmann 2007 and Nick 2006. On the early date of the Egyptian temple precinct of Amun-Re and on some of the published early Egyptian finds from the site, see Yoyotte 1991–2; 1993–4, 1994–5; Leclère 2008: 116–9; Agut-Labordère 2012. For a reassessment of specific groups of Egyptian finds from the site, see, for example, Masson this volume Chapter 3; forthcoming b, c.
17 Smoláriková 2002: 95; cf. Smoláriková 2008.
18 Höckmann 2008–9: 105–7, 116–7.
19 Villing and Williams 2006; Johnston 2013–2015a; Herda and Sauter 2009: 96–7 discuss the evidence and postulate Naukratis as the findspot of a jug with a Carian inscription. Mercenaries are of course well known to have played a major part in Late Period Egypt, and their presence is well attested in literary and epigraphic documents. Archaeologically they are harder to trace, with the site of Tell Dafana/Daphnai now conclusively shown to have been an Egyptian temple town, rather than a Greek mercenary fort: Leclère 2013; Leclère and Spencer 2014.

function of which was, from the beginning and throughout its history, first and foremost that of a trading port. Forming part of the consolidation of Saïte power in the western Delta, Naukratis undoubtedly was a territorial fixed point in the border region facing Libya, yet its main outlook was maritime, part of a long-term strategic reorientation of Egypt towards (certain of) its Mediterranean neighbours, notably Greece, Ionia and Lydia, motivated by shared interests in prestige, trade and military security.[20] While other sites may have had ports, too, or may have counted Greeks among their residents (Memphis being a case in point), it was at Naukratis alone that a substantial number of Greeks had been allowed, and indeed invited, to settle, build sanctuaries, and engage in trade. This reorientation forms part of wider historical developments: Egypt's Mediterranean involvement intensified in the wake of the decline of the Assyrian Empire and events such as the destruction of Nineveh and the battle of Carchemish, while Greek interest in Egypt deepened with the growth of East Greek networks across the Mediterranean, Levant and Black Sea coasts.[21]

In more than one way, then, Naukratis/Nokradj occupied a strategic position: as a territorial marker in an important and long-contested border region; as a permanent representation or foreign diplomatic mission that cemented alliances between the new Egyptian dynasty at Saïs and the Greek Mediterranean and Lydian-dominated Anatolia, in which the supply of mercenaries played a vital role; as a key stage in a series of ports on the Canopic branch between its Mediterranean entry point and the Delta's apex that controlled access and ensured effective taxation;[22] and as Egypt's international harbour and economic gateway in which Greek traders enjoyed exclusive access to Egypt while in effect also acting as agents in the Pharaoh's interests. As new fieldwork now confirms,[23] the Canopic branch—the most accessible of the Nile's branches—ran along the western flank of Naukratis and was wide and deep enough to accommodate Mediterranean seagoing ships all year round; trans-shipment at Thonis-Heracleion, as had sometimes been suspected, was thus not necessary.[24] That the port also served trade beyond the strictly Greek world is confirmed by the substantial proportions of Cypriot and Phoenician trade amphorae that are present particularly in the earlier levels of the site.[25]

Just how many Greek visitors passed through Naukratis particularly in the site's early days is clear from the rich finds of Greek pottery that were dedicated in the site's flourishing Greek sanctuaries.[26] Many of them feature votive inscriptions, making them the largest assemblage of ceramic inscriptions known from the ancient Greek world.[27] Yet their significance is more than purely economic: they attest to a wide range of people that passed through Naukratis, from mercenaries[28] to statesmen and architects, tying Naukratis into a network of contacts that were in the interest of both Egyptians and Greeks. The dedications—including fine Chian and Attic wares, the sanctuary pottery of choice—speak of the level of attraction that Naukratis held also in social terms as the gateway to rich and exotic Egypt: on a personal level, a visit here bestowed social 'capital' and prestige on the trans-Mediterranean elites engaging in conspicuous consumption here, just as the erection of ornate sanctuaries by the various cities was an expression of peer-polity interaction on 'state' level.[29] That foreign visitors were not necessarily confined to Naukratis, but stopped over and engaged in contact and exchange also at other sites seems suggested by the finds of Greek fineware pottery at Thonis-Heracleion[30] and other nearby coastal sites including Rhakotis and Plinthine,[31] but also by the attestation of individuals, such as sixth century BC Samian Zoilos, seemingly a frequent visitor to Egypt and attested epigraphically at both Naukratis and Plinthine.[32]

In economic terms, from the beginning, the town—known to Greeks as Naukratis and to Egyptians as Nokradj[33]—must have had a double character, functioning as a Greek *emporion* or 'port of trade' and as an Egyptian *per-meryt*, harbour/port house. The *emporion* was administered by the *prostatai tou emporiou*, who—at least in Herodotus' day—were drawn from the nine East Greek founding members of the Hellenion, the large sanctuary that appears to have been also an administrative centre. We have to imagine—as Agut-Labordère has recently suggested[34]—that they were matched by Egyptian port officials, similar to the chief merchants (*hry.w swty.w*) attested for the port of Memphis at the time of Taharqa, predecessor of Psamtek I. The Egyptian term *per-meryt* is most famously applied to Naukratis on the two stelae erected in 380 BC by pharaoh Nektanebo I

20 Tanner 2003; Agut-Labordère 2013.
21 Agut-Labordère 2012; Fantalkin 2014.
22 Briant and Descat 1998: 93–4; see also Wilson this volume Chapter 16.
23 Geological work by Ben Pennington (see Pennington and Thomas in preparation; Thomas, this volume, Chapter 13) and electrical resistivity tomography by Kris Strutt (see Strutt and Thomas 2014) on behalf of the Naukratis Project; see also Thomas and Villing forthcoming.
24 Höckmann 2008–9: 78–80, 82–3. That Ionian and Carian ships travelled along the Canopic branch as far as Memphis is also suggested by an Aramaic papyrus, see Briant and Descat 1998: 93–4.
25 Villing 2006; Thomas and Villing forthcoming.
26 See Bergeron this volume Chapter 14.
27 Totalling some 2,800 inscriptions; cf. Villing 2013; Johnston 2013–2015a; Bergeron this volume Chapter 14.
28 Schlotzhauer 2006.
29 Duplouy 2006; Villing forthcoming.
30 For example, Grataloup 2010.
31 Weber 2012; Dhennin and Redon 2013.
32 Boussac 2007: 447, 450 note 15, fig. 2a; Johnston 2013–2015a and 2013–2015d.
33 The earliest known attestations of the names Nokradj and Naukratis are nearly contemporary: see Yoyotte 1991–2: 640–1; Leclère 2008: 117 note 24; Villing 2013: 85, fig. 10.
34 Agut-Labordère 2012.

in Naukratis and Thonis-Heracleion, yet appears also in relation to other places in Egypt and must be a reference to the economic function of the port.[35] As an administrative entity it was thus, in effect, the Egyptian equivalent of the Greek *emporion*. Ultimately it would have been under the jurisdiction of the Egyptian official known as Overseer of the Gate to the Foreign Lands of the 'Great Green', or indeed 'the Sea of the Greeks'.[36] That the port officials at Naukratis maintained direct links with the administration of the royal capital Saïs—probably linked to Naukratis by a canal—is confirmed by the rare find of a clay seal impression (Figure 12.3) in Petrie's excavations at Naukratis,[37] which sealed a papyrus sent by one of Amasis' officials a Saïs, Ahmes-sa-Neith, Director of the Antechamber.

The Greek and Egyptian administrative arrangements and protected port areas would have provided a stable, financially predictable environment for trade at Naukratis. However, the site's sanctuaries also played a key role as spaces in which to seal deals, and possibly to store goods, in addition to providing divine protection for safe trading voyages and divine sanction to promote trust between trading partners.[38] It is hardly surprising to find that all of the Greek cults of Naukratis were in one way or another linked with overseas ventures: Milesian Apollo, Samian Hera, and Aeginetan Zeus (mentioned by Herodotus, but still unlocated)[39] are filiations of cults that played central roles in the international trade and 'colonial' networks of their respective home cities, while both Aphrodite and the Dioskouroi had specific roles in safeguarding seafaring.[40] It was one sanctuary in particular that appears to have had a key administrative function for the Greek port: the large 'Hellenion', uniting nine of the total of twelve Greek cities and islands known from Herodotus to have been involved in Naukratis. If we follow Hogarth in his identification of the sanctuary area (and despite the lack of positive proof his suggestion is overall plausible enough),[41] the Hellenion was home to the worship of several gods, including the 'gods of the Hellenes', that exceptional early manifestation of a nascent common Hellenic identity.[42] Our most recent fieldwork in 2014 suggests that we are indeed dealing here with a large conglomerate of structures surrounded by a wall massive enough to match that of the 'Great Temenos'.[43] Both on a conceptual and topographic level, the Hellenion thus formed a counterpart to the

Figure 12.3 Clay seal impression of Ahmes-sa-Neith, a high official at the court of Pharaoh Amasis (570–526 BC), found at Naukratis. BM EA 27574. (Photo: © Trustees of the British Museum.)

Egyptian sanctuary of Amun-Ra. His monumental precinct known as the 'Great Temenos' in the south of the site, which dates back to the earliest days of Naukratis, is likely to have played a major role in the site's economy and administration on the Egyptian side.[44]

The people of Naukratis: life in a cultural contact zone

The physical segregation of alien traders in societies is an attested phenomenon, a feature also of Polanyi's model of the 'port of trade' that has been applied also to Naukratis.[45] As Philip Curtin[46] set out in his classic study of cross-cultural trade, this segregation sometimes takes the form of separate trading or merchants' towns, such as in the medieval kingdoms of sub-Saharan Africa at Gao on the Niger in modern Mali, or at the capital of ancient Ghana, Kumbi Saleh, where commercial transactions were handled by Muslims in separate 'trading towns' close to royal residences. However, segregation is rarely complete. In the trade diasporas in the Indian Ocean, Curtin observed how the engagement between residents acting as local agents and groups of moving traders on temporary visits soon led to far closer interaction, 'intermarriage soon produced a mixed-race, mixed-cultural community

35 von Bomhard 2012: 79–80; Agut-Labordère 2012: 359–60; cf. Leclère 2008: 117 note 24.
36 Agut-Labordère 2013.
37 Petrie 1886: pl. 20.5.
38 On the economic significance of cults and temples in both real and conceptual terms, see, for example, Kowalzig 2010; Demetriou 2012; Agut-Labordère 2013.
39 Few dedications to Zeus Hellenios are attested among the ceramic inscriptions at Naukratis, and the extent to which they might reflect an Aeginetan cult of Zeus Hellanios remains unclear: see Johnston 2013–2015a.
40 On the cults of Naukratis, see, for example, Demetriou 2012 and the summaries in Möller 2000. That only a single example out of well over a thousand dedicatory vase inscriptions seems to make a specific reference to seafaring nevertheless gives one pause for thought: see Johnston 2013–2015a.
41 For a critical discussion, see Bowden 1996.
42 Malkin 2011: 90–3, 220–1.
43 Thomas and Villing forthcoming.
44 See above, note 14.
45 Möller 2000.
46 Curtin 1984: 38–9.

able to act as cultural brokers'.[47] While we need to be wary of assuming that these or indeed other comparisons—notably with colonial treaty and other modern-era trading ports such as Shanghai or Deshima that were *en vogue* with nineteenth century scholars[48]—are necessarily valid parallels for Naukratis, patterns observed elsewhere may sharpen the mind as to the kind of questions we may ask of our evidence regarding the character of the site, its populations, and the modalities of their interactions.

What do we know of the people of Naukratis? Of course, the population of Naukratis to a large extent still remains elusive, as the early fieldwork does not provide the richly textured evidence for social practices that allows, for example, scholars working on the Greek 'colonies' in the western Mediterranean to reach detailed and subtle conclusions about a site's population and the mechanisms and progress of inter-ethnic interaction.[49] Nevertheless, careful analysis of available data in combination with new research begins to highlight some trends. Certainly, the evidence for local Greek industry confirms Herodotus' description of a contingent of Greek settlers, or settled traders, installed at the port in addition to visitors. Among other things, we can now trace the products of one or several potters' workshops, who from at least the early sixth century BC produced Greek-style vessels from local clay,[50] and as the most recent (2014) unpublished finds from the site suggest, in considerable numbers. At the same time, as noted above, it is increasingly clear that there were also Egyptians living at the site. To what degree were these groups separated? Can we distinguish a Greek quarter from an Egyptian quarter, and within the Greek area, sanctuaries for Greek residents from sanctuaries for visiting traders, as is sometimes suspected?[51] 'Old' evidence from the sanctuaries[52] and 'the town' together with highly instructive data from new fieldwork[53] seems to argue against clear segregation, even if different traditions were maintained and kept separate. Thus, no significant overlap in ritual or votive practice is apparent in the material from the early excavations in the Greek and Egyptian sanctuaries: rather, they appear to have been the kind of public spaces in which ethnic group identities were by and large upheld.[54] Even so, borders were also occasionally crossed, in the form of dedications and instances of *interpretatio graeca/aegyptia*,[55] indicative

Figure 12.4 **a** Terracotta figurine of an ithyphallic Harpocrates, a modified version of a Rhodian temple boy type; siltware, probably produced in Naukratis; fifth century BC. Oxford, Ashmolean Museum AN1896-1908-E.4761. (Photo: © Ashmolean Museum, University of Oxford.); **b** Terracotta figure plaque with a nude woman in relief, c. 550–400 BC, from Naukratis. Greenock, McLean Museum & Art Gallery, 1987.375. (Photo: © McLean Museum and Art Gallery, Greenock.)

of mutual awareness and understanding in everyday life of the community's plurality of sacred spaces.[56] Intriguingly, new excavations in sixth century BC layers seemingly containing ritual refuse attest to a profound conflation of Egyptian, Greek and Levantine/Phoenician material even in the very heart of the supposedly 'Greek' part of town, beside the Hellenion.[57] Nor is there any clear evidence as yet for segregation in terms of layout and architectural style, although the evidence is admittedly patchy.[58]

What seems to be emerging is a picture of a pluri-ethnic population, from the beginning, and increasingly so as time progresses. This is supported also by the terracotta and limestone figurines from the site, a previously very little known and little studied group.[59] Large numbers of figurines have been found especially (though not exclusively) in the 'town' area—an area mostly 'excavated' by *sebbakhin*, even if under the more or less watchful eye of the early excavators, and thus very poorly documented. What is most remarkable nevertheless is that Egyptian Late Period figurines (Figure 12.4) appear

47 Ibid.: 145–50; cf. also Dietler 2010: 146–8, on the value of such comparisons.
48 Villing forthcoming.
49 A prime example being Dietler 2010.
50 Schlotzhauer and Villing 2006; Schlotzhauer 2012; Villing 2013–2015.
51 Crielaard 2005; Möller 2000: 117–8.
52 See Bergeron this volume Chapter 14 and Masson this volume Chapter 3.
53 See Thomas this volume Chapter 13; Thomas and Villing forthcoming.
54 As has been observed by Trivellato in her study of the Sephardic trading diaspora, the maintenance of group boundaries could in fact be beneficial for the stability of cross-cultural trade relations: Trivellato 2008: 275.
55 Notably the equation of Amun-Re with Zeus *Thebaios* on a Pentelic marble base, of probable fourth century BC date, found by Petrie outside the gate to the sanctuary of Amun-Re: British Museum 1886,1005.22 (Inscription 1088).
56 A situation akin perhaps to systems of 'neighbourhood' observed elsewhere, in which the everyday relations of different ethno-religious groups living in proximity to one another appear structured by a complex of norms and implicit knowledge that regulate interaction while preserving religious identities: see Albera and Couroucli 2012, notably the contributions by Baskar and Valtchinova.
57 Thomas and Villing forthcoming.
58 See Thomas this volume Chapter 13.
59 The figurines are now the subject of an in-depth reanalysis by Ross Thomas: Thomas 2013–2015; forthcoming.

to have been widespread here, just as in any other contemporary Egyptian settlement. Consisting especially of images of a phallic Harpokrates and of nude women, they are characteristic of Egyptian 'magical' practices and 'fertility' ritual linked to the prominent Late Period cults of Osiris, Isis-Hathor and Horus the child, and notably the myths and rituals surrounding the yearly inundation by the Nile—thus indicating with a high degree of likelihood Egyptians among the town's inhabitants.

One possible aspect of the growing Egyptian element among the local population may be intermarriage. Even if not explicitly recorded for Naukratis,[60] intermarriage is well attested in Egypt between foreign (including Greek) men and Egyptian women from the later seventh century BC onwards,[61] and a common enough phenomenon generally in the relations between groups of foreigners, notably traders (as noted above), and their host communities.[62] It would fit in as well with the rather slim extant evidence for Greek women in Late Period Naukratis: we may note, for example, that only very few of the numerous votive inscriptions record Greek female names,[63] and that these few are frequently suspected to be *hetairai*, for which Naukratis, of course, was famous. In general, the spectrum of dedications in the site's Greek sanctuaries[64] seems male-dominated, and cults with traditionally strong female involvement—such as that of Demeter, so popular, for example, at contemporary Cyrene—are attested only very slightly and belatedly in the pantheon of early Naukratis. This picture may, of course, change with further discoveries, and equations between material culture and ethnic and indeed gender identity, too, are notoriously treacherous, notably when based on highly lacunose evidence, and complicated by other social and economic factors that determine individuals' choices—as we can see in Roman, but also Ptolemaic, Egypt, where 'ethnic identities' frequently appear rather fluid. The nature of the evidence from Naukratis, indicating a diversity of ritual practice associated with different social and gendered contexts, nevertheless suggests a scenario in which multi-cultural cohabitation was a reality throughout the site's history. We can see this reflected also in local industry and technology. While 'hybrid' elements have been suggested for local pottery production[65] but cannot be fully assessed yet on account of the limited evidence available, they are visible more clearly in local figurine production at Naukratis; as the analysis of this important yet little-known group of evidence by Thomas now shows, the adoption of new motifs and technologies anticipates developments otherwise more commonly associated with the Ptolemaic Period.[66]

Figure 12.5 'False door' tomb stela of Apollos from Naukratis, second half of the sixth or the early fifth century BC. Cairo, Egyptian Museum JE27753 (CG9220). (Photo: © Egyptian Museum Cairo.)

To investigate further the role that material culture played in the expression of identity at Naukratis, let us have a look at local funerary custom, notably the remarkable but so far little considered tomb stela of Apollos, dating to the latter half of the sixth or the early fifth century BC (Figure 12.5).[67] The small stela, reportedly

60 Unless we consider the late fifth century BC inscription by Tamunis and Gorgias as evidence: Villing 2013: 87, fig. 12c.
61 Vittmann 2003: 239–40.
62 On intermarriage in a Greek/Italic context, see Coldstream 1993, with critical remarks by Kelley 2012 and Shepherd 2014; cf. also Fantalkin 2015.
63 Johnston 2013–2015a.
64 Bergeron this volume Chapter 14.
65 Schlotzhauer 2012: 62–5.
66 It is important to note that these developments are at least partly shared by Memphis, another multi-ethnic centre of Late Period Egypt: Thomas 2013–2015; forthcoming.
67 Petrie 1887; Milne 1905: 59–60 no. 9220, pl. 10; Bernand 1970: 761–2 no. 31; Vittmann 2003: 217–9, fig. 210; Moyer 2011: 55 note 43. The stela measures 41 × 25 cm. Two further 'false door' reliefs are attested from Naukratis: British Museum 1886,0401.1529 probably from the Great Temenos, which also combines Egyptian and Greek features, and Oxford, Ashmolean Museum AN 1886.455 from the sanctuary of Apollo.

Figure 12.6 Carian 'false door' stela from Saqqara, c. 530–500 BC. BM EA 67251. (Photo: © Trustees of the British Museum.)

found by locals at Naukratis in 1887, features a doubly-recessed door, painted red, with two leaves, each with two panels, surmounted by a cornice; an incised inscription on the lintel (faintly repeated in the cornice above) names Apollos, son of Thalinos, as its owner.[68] At first sight the relief may remind us of the 'false door' stelae used by Carians (Figure 12.6),[69] and at least once instance also a Greek. Common in the Late Period necropolis of Saqqara,[70] they clearly copy Old Kingdom 'false door' stelae that would have been omnipresent in that same necropolis and must have provided the inspiration for the Carian tombstones. Already Petrie realised, however, that Apollos' stela was not simply straightforwardly of

Figure 12.7 Fragment of Attic (?) grave stela, fourth century BC, probably from Naukratis. (Photo: Petrie Delta Series no. 401; © Egypt Exploration Society.)

Egyptian false-door type, but was made in the 'Greek, and not Egyptian, fashion'. Upon closer inspection, we see that it features an Egyptian cornice, similar to the cornice above Egyptian style Carian stelae, but its door, with its two wings, is different and far more reminiscent of doors in Greek and Anatolian art. Indeed, false doors, similarly recessed and surmounted by a cornice (albeit of Greek type), were popular in grave monuments in the western Anatolian region across the sixth-fourth centuries BC, notably on grave stelae in the region of Lydia, and in built monuments from Caria to Lycia.[71] Providing a close conceptual parallel for a symbolic gateway between the worlds of the living and dead, the ancient Egyptian tradition presumably appealed to the Carians of Memphis, who adopted it for their own monuments without change. This is not the case for Apollos' stela, however, which combines Anatolian with Egyptian elements, thus consciously reflecting both the East Greek/Anatolian background of many of the Naukratites (which, via the traders of Phaselis, encompassed Lycia, as well as Lydia),[72] as well as their new home in Egypt.

Unfortunately, very few other grave markers from the site are known. The early grave marker of Teaos, dating to the second half of the sixth century BC, in its simple format possibly repeats a standard shape of Egyptian tomb stone.[73] For an Attic style grave stela (Figure 12.7) of the fourth century BC[74] and a Hellenistic funerary

68 Petrie read the name differently in the scratched inscription above main inscription n(Apollodotos), but was not followed by Milne (1905: 59–60, pl. X), who reconstructs Apollotos, as in the main inscription. There is also some confusion over the second name, which Petrie read as Thlaino, and this is also what the photograph he illustrates shows, but the photographs is clearly heavily retouched, and incorrectly so: the photograph in Milne is much clearer and reads Thalino.
69 For example, Kammerzell 2001: 251–2, 255, figs 9–10, 14–5; cf. Masson 1978.
70 The sixth century BC false door stela of Exekestos, son of Charon, in Brooklyn Museum, inv. 37.1354E; it too, is of small proportions (H 32.6cm, W 24.3): Herbert 1972: 11–2, no. 1, pl. 1; Höckmann 2001: 218; Vittmann 2003: 227–8, fig. 113.
71 Vittmann 2003: 174; Roosevelt 2006: 80.
72 Johnston 2014.
73 BM 1886,0401.1, cf. Petrie 1886: pl. 30.1. The stone was found near the temple of the Dioskouroi probably in secondary use, but not far from the southern limit of the cemetery.
74 Unpublished, current whereabouts unknown, but recorded in one of Petrie's photographs, Delta series 401, in the archives of the Egypt Exploration Society.

Figure 12.8 Bronze eye with glass inlay from an Egyptian wooden anthropomorphic coffin from the cemetery of Naukratis; Late Period or Ptolemaic. Dundee, McManus Galleries, 1975–100. (Photo: F. Leclère, The British Museum; © Dundee Art Galleries and Museums.)

banquet scene[75] the find place is not entirely assured,[76] but if they are indeed from Naukratis they seem to attest more straightforwardly Greek assertions of identity in the site's later funerary iconography. Clear Egyptian elements in the site's funerary evidence, by contrast, still largely elude our grasp. The tombs in the (small) cemetery area excavated by Gardner that span the Archaic to Roman Periods (the majority, however, not earlier than the fifth and especially fourth century BC)[77] appear largely Greek in terms of contents. Still, there is some evidence for Egyptian style anthropoid coffins (including a bronze eye once inlaid into a wooden sarcophagus: Figure 12.8)[78] as well as grave goods (bronze bells, amulets), even if these do not necessarily have to be earlier than the Ptolemaic Period. To what extent this situation could be a reflection of the (undoubtedly) partial state of evidence remains to be investigated.

Trading at Naukratis: a brief review of the evidence

Even if all we knew from Naukratis was its archaeological record, without any of the literary and epigraphic sources, there could be no doubt that Naukratis was a centre of cross-cultural contact and it would be clear also that this fact was intimately linked to its role in trade and exchange. The location of Naukratis, stretched along one of the main arteries of traffic through the Nile Delta, ensured ample harbour and commercial space along the river bank, as was common in Egypt.[79] Large

Figure 12.9 Weights from Naukratis: **a–c** three Egyptian stone weights: (a) 2 *qedets* and (b–c) 1 *deben*, Bolton Museum, 1925.20.1–3 (Photo: © Bolton Library and Museum Service); **d** bronze weight with Greek letters inlaid in silver, Oriental Institute, University of Chicago, E3025 (Photo: © Oriental Institute Museum, University of Chicago.); **e** small discoid stone weight: half a shekel, Oriental Institute, University of Chicago, E2911. (Photo: © Oriental Institute Museum, University of Chicago.)

numbers of weights (Figure 12.9),[80] comprising a wide variety of types and standards, speaks of the importance of measuring, presumably in economic transactions. Well over a thousand coins, including many from different Greek and other eastern Mediterranean mints, confirm wide trade links from at least 500 BC (with silver early on primarily imported as bullion).[81] Trade amphorae—for wine, oil and other goods—are common, too: over 1,600 stamped handles mostly of the Hellenistic Period (Figure 12.10) make up the bulk of the known evidence, but amphorae were equally frequent (though by and large not kept) in earlier and later periods; as early excavators' notes suggest and our most recent fieldwork confirms, these included not just Greek but also Cypriot and Phoenician trade amphorae, a pattern similar to that at Thonis-Heracleion and indeed other Egyptian sites.[82] Not all exchange was necessarily a matter of commerce though. As Pharaonic diplomatic gifts to several Greek

75 British Museum 1888,0601.35 (Sculpture 728).

76 Gardner lists both pieces as having been 'found last year' but not within 'the limits of the ancient city' (1888: 22). If the earlier piece is identical with the 'slab of sculpture from an early tomb; of three figures, of no interest' that Petrie notes in his *Journal 1884–5* (unpublished journal in the Egypt Exploration Society Archive, XVIId, 47, and the Griffith Institute, University of Oxford) among the 'antikas' he saw in the nearby town of Teh el-Barud, then its findspot would be entirely hypothetical. Despite these uncertainties, the relief indicates that the presence of 'Greek' sculpture is not entirely unimaginable in Late Period Egypt, a scenario doubted—with regard to an Attic grave relief found at Alexandria—by Grimm (2010: 145, fig. 11.4).

77 Tombs of the Archaic period are confirmed by Gardner's noting of Cyrenaic' (= Laconian) pottery as well as by extant finds of the Archaic period (Schlotzhauer 2012: 69–70); fifth and fourth century BC finds are not uncommon among the preserved material. Gardner points out that very few sixth century tombs were found, but overall considered the amphorae from the cemetery to cover the period from the sixth or fifth century BC until Ptolemaic or Roman times (Gardner 1888: 24, 26–7). This is confirmed also by his recording Cypriot basket handled amphorae, probably from child burials (Gardner 1888: 24), as well as Cypriot mortaria of Archaic date (Gardner 1888: 27: 'two large rough plates of yellow ware, of the same description as those found last year in the lower strata of the trench in the temenos of Apollo') that probably served as lids for basket handled amphorae, as attested also in burial context elsewhere (cf. Villing 2006).

78 Dundee, McManus Galleries, 1975-100. Similar pieces have been found for example at Silvagou, the cemetery of the nearby Egyptian town of Kom Firin: Spencer 2008: 12, 32, 34, pl. 29.

79 Zingarelli 2010.

80 Published in part by Petrie 1886: 69-87, but actually more numerous (over 1000 are preserved) and now being restudied by Aurélia Masson. Interestingly, Egyptian weights are more common here than in Thonis-Heracleion (cf. Van der Wilt 2010 and this volume Chapter 8).

81 Head 1886; see also Muhs this volume Chapter 4 and Meadows this volume Chapter 6.

82 Johnston 2013–2015b and 2013–15c; Thomas and Villing forthcoming.

temples show, the practice of gift exchange, reciprocity, was rife between Greeks and Egyptians and may be a factor also in the thin smattering of Greek fineware pottery found in Egypt outside Naukratis.[83]

For a fuller picture and a wider perspective, however, evidence from written sources still proves indispensable, notably for goods that were perishable, not traded in pottery containers and thus leave little tangible trace in the archaeological record. It is two documents in particular that are crucial here: the fifth century BC Aramaic tax register recorded on the Aḥiqar Scroll from Elephantine, and the twin stelae erected by Pharaoh Nectanebo I in 380 BC in Naukratis and Thonis-Heracleion. Both are discussed comprehensively elsewhere and are flagged up here only briefly.[84] The latter mentions imports of gold, silver, timber and worked wood in particular, and while gold may not seem an essential commodity, silver and most certainly wood were indeed vital, with imported wood from Lebanon attested in Egypt since the second millennium BC.[85] Unsurprisingly, cedar and other wood also features among listed imports some hundred years earlier, in the Aramaic tax register dating to the Persian reign over Egypt. One of the most detailed records of ancient trade and taxation available for this period, it lists Greek ships apparently from Phaselis—one of the twelve places reported to have been involved in Naukratis and a 'member' of the Hellenion—arriving in Egypt with a cargo of primarily wine and oil, as well as Phoenician ships (probably from Tell Ghazza) carrying Sidonian wine, cedar wood, bronze, iron, wool, Samian earth, tin (possibly) and building materials—a mixture, thus, of key commodities and 'semi-luxuries'. Imported wine had long played a part in Egyptian elite consumption,[86] particularly Phoenician wine, but from the Late Period also increasingly Greek wine. Poor in metal resources,[87] Egypt long relied on imports, with iron (and possibly tin) presumably coming from the Levant, while copper—extensively used in the Late Period production of bronze figurines frequent also at Naukratis—most likely was imported from Cyprus, a major source for copper from the Bronze into the Iron age.[88] That close trade links existed between Cyprus and Late Period Egypt (in part presumably mediated by Greeks and Phoenicians) is attested also by other finds, such as Cypriot basket handled amphorae and mortaria,

Figure 12.10 Stamped amphora handles from Naukratis: **a** Thasian, *c.* 340–330 BC, BM 1925,0119.464; **b** Rhodian, *c.* 200–160 BC, BM 2011,5003.50; **c** Koan, *c.* 200–50 BC, Brussels, Musées Royaux d'Art et d'Histoire, A.1822 (Photo: © Musées Royaux d'Art et d'Histoire, Bruxelles); **d** Italian (Brindisi), *c.* 130–50 BC, BM 1955,0920.89. (All British Museum pieces © Trustees of the British Museum.)

83 Villing 2013.

84 For the Aḥiqar Scroll see most recently Briant and Descat 1998; Bresson 2000: 67–9; Tal 2009; Villing 2013; for the twin stelae, see Yoyotte 2001; Agut-Labordère 2012; von Bomhard 2012.

85 Möller 2000: 29.

86 Meeks 1993; Wilson and Gilbert 2008.

87 Gold excepted: Bissa 2009: 73.

88 Masson this volume Chapter 3. One might be tempted to indulge in some speculation: could the likely toponym *šlmw* that is associated with bronze in the tax register perhaps refer to Salamis, a key centre for Cypriot copper trade? On *šlmw*, see Briant and Descat 1998: 72 note 72; Yardeni 1994: 78 note 20; Lipiński 1994: 66.

found across the Nile Delta including at Naukratis and Thonis-Heracleion; specifically at Naukratis there are numerous early Cypriot votive figurines as well as a few later inscriptions.[89] Coinage[90] and transport amphorae testify to close links also in later periods. Samian earth also features as an import in later papyri and may have been used in faience production or for cleaning and treating textiles and degreasing wool.[91] In view of the latter it is interesting to note that wool itself not only features among imports, too,[92] but is also known to have been produced at Naukratis; I will return to this later.

Somewhat surprisingly, the only cargo that the Elephantine tax register records as being exported is natron, used in glass and faience production, but also for pickling (for example, of fish) and mummification. Most likely this is because natron was the only export product to have been taxed (and therefore recorded),[93] perhaps on account of natron trade being a royal monopoly, as seems attested later on.[94] The prominence of natron, but also other factors, has led scholars to presume that the unnamed trade port to which the tax register refers could be Naukratis, which was located some 15 km from the main Egyptian natron sources at Tell el-Barnugi (al-Barnuj/Nitriai)[95] as well as en route from the natron sources of the wadi Natrun and its likely shipping port at Terenouthis.[96] Already Shortland et al.[97] had considered Naukratis the bridgehead of a large-scale Mediterranean natron trade, and Boardman[98] recently went as far as suggesting that the trade in natron might have been one of the main reasons for the very establishment of Naukratis. Of course, by the Persian Period, Thonis-Heracleion, too, is a candidate for the point of taxation.[99]

Though not mentioned in the key sources, other goods are likely to have played major roles in Egyptian export, too. One such is alum (*stypteria*), one of the most indispensable and widely traded raw materials from antiquity into the modern period.[100] In use as a mordant into the twentieth century, alum also had uses as a medical ingredient, an ingredient in metalworking[101] and even a flame retardant.[102] Mesopotamian accounts of the sixth century BC and earlier suggest that there was a considerable trade in Egyptian alum, particularly for use in the textile industry. That there was demand for Egyptian alum also in Archaic Greece is suggested by Herodotus' note of a gift of alum by Amasis to the temple of Apollo at Delphi.[103] Egypt was, of course, also a reliable large-scale producer of wheat, which was in great demand from Greek cities particularly in times of crisis.[104] The extent to which it was grain and other subsistence commodities, or luxury or semi-luxury goods such as papyrus, flax/linen or perfume, that were the mainstay of regular trade in the Archaic Period remains a matter of debate;[105] a law of Teos, one of the founding cities of Naukratis, that places a curse on anyone obstructing the city's grain import certainly highlights the importance of grain import as early as the fifth century BC.[106] Finally, black African slaves are well attested in Archaic and Classical Greece; as also in more recent times, they are likely to have travelled via Egyptian ports.

Making things at Naukratis: Naukratis as a centre of production?

Naukratis was a centre for exchange, but to what degree was it also a centre of production? The 'Decree of Saïs' refers to taxes being levied on 'everything that appears/comes into being' at Naukratis, a passage that is commonly understood as referring to local industry.[107] As von Bomhard rightly points out,[108] however, the expression probably has to be understood more widely, referring to everything that is being traded locally and/or exported, which, as ancient sources suggest,[109] might encompass also natural resources and agricultural products.

Nevertheless, archaeology supports the existence of local industry at Naukratis at least to some degree, and even if our picture is still partial and incomplete, recent work has deepened our understanding of this particular aspect of the site. As is now clear, local workshops produced (Greek style) pottery and lamps at the site at least from the sixth century BC onwards, as well as terracotta figurines of both Greek and Egyptian types; figurine production appears to pick up more slowly, though, increasing particularly in the course of the Persian and flourishing in the early Ptolemaic Period, when there is also excavated evidence for workshops.[110] Egyptian style pottery production is more difficult to pin down, but judging—as noted above—from the quantities of early local pottery that can be observed at the site, is likely to have been local and prolific. The local production of scarabs in glazed composition and Egyptian blue paste during the early decades of

89 Villing 2006; for a Cypriot statuette from Thonis-Heracleion, see Fabre and Goddio 2012.
90 Cf. Meadows this volume Chapter 6.
91 Höckmann 2008–9: 101–2, 108–12; Photos-Jones and Hall 2011: 8, 17, 57–61.
92 Briant and Descat 1998: 72.
93 Ibid.: 95–7.
94 van Alfen 2002: 153–4; Lucas 1932: 65–6.
95 Lucas 1932; Shortland et al. 2006.
96 Bernand 1970: 625; Bresciani 1995: 108; Briant and Descat 1998.
97 Shortland et al. 2006: 523.
98 Boardman 2013.
99 Höckmann 2008–9: 101–2, 108–12.
100 Horden and Purcell 2000: 360–3; Bresson 2008: 150; van Alfen 2002: 152–3.
101 Photos-Jones and Hall 2011: 55, 84.
102 Claudius Quadrigarius fr. 81.
103 Herodotus *Historiae* 2.810.
104 Möller 2000: 81.
105 Foxhall 1998; Morley 2007: 42–3; Bissa 2009: 155, 164.
106 Möller 2000: 81.
107 Ibid.: 208; Pfeiffer 2010: 20.
108 von Bomhard 2012: 79, 95.
109 For example, Ps. Aristotle *Oikonomika* 2.1.
110 Thomas 2013–2015.

Figure 12.11 Drill cores from calcite alabastra found in the sanctuary of Apollo at Naukratis, probably sixth century BC. Edinburgh, National Museum of Scotland, A.1886.518.27. (Photo: © National Museums Scotland.)

Figure 12.12 Fragment of an Archaic Greek marble cornice from the sanctuary of Apollo, c. 530–500 BC. BM 1886,0401.4. (Photo: © Trustees of the British Museum.)

the sixth century BC has long been known,[111] but it has only recently been possible to confirm that Egyptian faience pilgrim flasks were also produced locally;[112] some amulets and certain faience vessels of mixed Egyptian-Greek style, too may be local products.[113] Egyptian bronze votive offerings may also have been produced locally, in workshops related to the Egyptian temple;[114] Petrie, moreover, imagined the site as a major centre of iron production,[115] though it has not been possible to confirm this so far.

Much of this local manufacture, however, would have been destined primarily for local consumption, notably in the sanctuaries, and thus hardly suffices to designate Naukratis as a major industrial centre. Some workshops, however, also exported more widely. Naukratite faience scarabs were widely distributed across the Mediterranean, and again this was not just a short-lived industry that profited from the considerable social value (and belief in magical efficacy) that was accorded to 'aegyptiaca' back home and whose products were probably distributed as personal possessions as much as items of trade. Less well known is the considerable production of alabastra and other calcite vessels at the site, one of several alabastra workshops attested in Late Period Egypt. During excavations in the Apollo sanctuary, Petrie noted a pavement made from a layer of limestone chips as well as 'many thousands of alabaster drill cores from tubular drilling and fragments of parts of alabaster vases in course of manufacture' (Figure 12.11), concluding that 'they are evidently from a workshop, & as there are some bits of small vases with them, it seems that Naukratis was a centre of the alabaster vase business'.[116] His conclusion that 'the manufacture of these vases was carried on at Naukratis on a very large scale about 450 b.c.' was based on the stratigraphic association of this level with the 'second temple' of Apollo, to which he assigned a Classical date, associating the style of the few surviving pieces of its marble architecture (Figure 12.12) with the stylistic phase of the Erechtheion. As a consequence, alabastron production at Naukratis is still often believed to be a relatively late phenomenon.[117] What needs to be taken into account, however, is that the dating of the 'second Apollo temple' in the meantime has been considerably revised upwards, to the second half of the sixth century BC.[118] A Late Archaic date certainly seems likely also for other finds associated by Petrie with the drill cores,[119] including a piece of ostrich shell (Figure 12.13)[120] as well as actual products of the alabastron workshop (Figure 12.14).[121]

111 Gorton 1996.
112 Masson this volume Chapter 3.
113 Webb 2013–2015.
114 See Masson this volume Chapter 3.
115 Petrie 1886: 39.
116 Ibid.: 15; W. M. F. Petrie, *Journal 1884–5* (unpublished journal in the Egypt Exploration Society Archive, XVIId, 47, and the Griffith Institute, University of Oxford): 175.
117 Höckmann 2007: 21 note 103; Möller 2000: 90–1.
118 Koenigs 2007: 312, 333–41. While the reliability of Petrie's stratigraphy in the Apollo sanctuary is debated and it certainly is lacking in detail and clarity, the basic information contained within it should not be discarded too lightly, as substantial parts of it withstand closer scrutiny surprisingly well.
119 Petrie 1886: 14.
120 Ibid.: pl. 20.15.
121 Philadelphia, Penn Museum E47, possibly unfinished; cf. Masson 2013–2015b. In addition, according to Petrie's stratigraphic diagram, Cypriot basket amphora handles and pottery of type O3, buff with scarlet figures, which most likely equates with East Greek painted wares such as Fikellura. The engraved decoration on the ostrich egg is not easy to date: a good parallel is the myrtle wreath on the rim of a Caeretan hydria of the final third of the sixth century BC (Boardman 1998: 253, fig. 496); in general wreaths, including myrtle wreaths, are popular from at least the mid-sixth century BC onwards in Greek iconography (Kunze-Götte 2006).

Figure 12.13 Fragment of carved ostrich shell, from the 'drill core layer' associated with the second temple of Apollo. BM 1886,0401.1600. (Photo: © Trustees of the British Museum.)

Figure 12.14 Calcite alabastron from the area of the Great Temenos (sanctuary of Amun-Ra) at Naukratis, sixth–fifth century BC. Oxford, Ashmolean Museum, AN1896-1908-E.3695. (Photo: © Ashmolean Museum, University of Oxford.)

Figure 12.15 Squat lekythos made from banded calcite, late fifth-early fourth century BC. BM 1888,0601.17. (Photo: © Trustees of the British Museum.)

Figure 12.16 Demotic donation stela by the local community of sheep breeders attached to the temples of Naukratis, honouring Sheamenope for his services to the community and the divine ram, hypostasis of Amun-Ra lord of Baded, 282 BC. Michigan, Kelsey Museum of Archaeology, 0.2.5803. (Photo: © Kelsey Museum of Archaeology, University of Michigan.)

As is clear from the drill cores and unfinished pieces, the alabastra produced at Naukratis were made from calcite ('Egyptian alabaster') rather than from gypsum-alabaster; they thus do not include figured alabastra, some of which were also found but must be considered imports, possibly from Cyprus.[122] Petrie's description of the layer suggests large-scale production, in all likelihood not just for local use but also for export, perhaps alongside, or already filled with, local perfume.[123] Egyptian perfume certainly was popular abroad, including in Classical Greece, as references to expensive Egyptian perfume and Egyptian perfume-sellers in Athenian texts indicate.[124] Insofar as we can judge from the patchy evidence, the production of calcite vessels at Naukratis appears to have continued for some time into the Classical Period and seems to have included also shapes other than alabastra: fragments of bowls were found in Petrie's drill core layer, while a highly unusual squat lekythos (Figure 12.15) that imitates Classical Athenian pottery shapes was found in the cemetery of Naukratis and might well be a local product, too.[125]

The mention of perfume again reminds us that we must not forget those products that are less tangible via the archaeological record. Undoubtedly, the area of Naukratis would have yielded agricultural products such as grain, papyrus and flax, as well as possibly finished products such as textiles or salt fish. A lucky coincidence has also preserved for us evidence of another and more unexpected product: wool. It comes in the shape of a demotic stela of 282 BC (Figure 12.16) that describes

122 Confused in Möller 2000: 163, but clarified by Höckmann, 2007: 21–2, 137–9 and note 106.

123 On Egyptian perfume, see Faure 1987: 162; cf. also Shaw 2010 on Egyptian calcite vessels in diplomatic exchange, and Carannante and D'Acunto 2012 on perfumes in general.

124 For example, Athenaeus 12.553d-e. Cf. Bäbler 1998: 69–77. Interestingly, grave stones from the Piraeus (including one with a demotic inscription) also attest the presence of Egyptians from Naukratis in Classical Athens, see ibid.

125 On the finds of such vessels in tombs, see Gardner 1888: 29.

the production (and royal taxation) of wool from flocks of sheep belonging to the local temple of Amun-Re of Baded, including both native breeds and the special Milesian breed, renowned for its high quality.[126] As Agut-Labordère in his new analysis of the stela suggests, production must have been intended in large parts for trade—overseas trade, though Egyptian consumption should perhaps also be considered, not least given that, as noted above, wool features among the imports brought to early fifth century BC Egypt by Phoenician ships.

Nokradj/Naukratis: a Delta landscape with figures

The picture painted of Egypt—and of Egyptian-Greek interaction—in recent scholarship is often characterized by a certain unreality. As both earlier visions of Egyptian 'influence' on Greek culture and notions of Greek 'colonisation' have been swept away by more sophisticated scholarly discourses, much of the Greek view of Egypt as presented in written sources has been exposed as a mirage, a figment of the Greek imagination created as part of the process of Greek construction of identity.[127] Little actual contact of any significance seems conceded between two cultures, frequently presented as diametrically opposed and divided by strict cultural boundaries, imposed not least by an increasingly xenophobic Egyptian society under mounting external pressure, in which foreigners are either Egyptianized (mercenaries) or ghettoized (traders).[128] Yet as new evidence—from both old and new fieldwork—on key archaeological sites such as Naukratis and Thonis-Heracleion emerges and is analysed from multidisciplinary perspectives, this picture is increasingly challenged, and the prospect of a more complex and nuanced relationship between Late Period Egypt and the ancient Mediterranean emerges.[129]

As I have tried to show, Naukratis, born into the newly transformed world of the later seventh century BC, played an important part in in these relations, as a diplomatic and commercial outpost and an Egyptian as well as Greek port, a uniquely 'bilateral' but not the sole element in a chain of sites linking Egypt with the Mediterranean world that also have included sites such as Thonis-Heracleion and Memphis. New research has firmly re-introduced Egyptians into a frequently Greek-dominated picture, as well as highlighted the role of the physical environment of the Nile Delta and its waterways in the history of Naukratis. It has provided substantial new data as well as confirming the existence of significant archaeological remains at the site, both of which remain to be explored and analysed further. Already now, however, we see a clearer picture of the site's history emerging and can begin to answer some questions. Can we trace a change in the site's role over time—a shift in its function, as has been suggested by some,[130] from a commercial to a production centre, a transformation from a trading post to a city? In terms of industry, there are no indications that Naukratis ever was a major industrial centre (even if, of course, absence of evidence is not necessarily evidence of absence), yet changes in the site's character and fortunes can indeed be observed. Dominated from the beginning by large sacred public spaces, the extent of the resident population of Naukratis in its early days is hard to gauge. Certainly, the evidence from the sanctuaries testifies to large numbers of visitors from across the Greek Mediterranean especially during the first one hundred years or more of the site's existence, which in turn implies a considerable infrastructure of resident traders, officials and craftsmen (both Greek *and* Egyptian). This is confirmed also by evidence for local production, catering for local needs as well as limited export. Evidence for domestic cultic practice, present from the beginning yet apparently increasing with time, testifies to a growing Egyptian element in the population, or at least to the increasing adoption of Egyptian practices by resident locals, with intermarriage of Greeks with Egyptian women a plausible hypothesis as at least one element in this development.

In the site's fortunes over time we see reflected the multifarious changes in the political and economic, but also social landscapes of Egypt, and of the Mediterranean world more generally. As I have sketched in slightly more detail elsewhere, the profound shifts in power and transformations of networks of trade that followed the Persian conquests of Lydia and later of Egypt, the Ionian revolt and the Persian Wars, which also resulted in the loss of Naukratis' position as a privileged international port of trade, are mirrored in the changing archaeological assemblage of the site, now no longer a favoured playground of Ionian aristocrats.[131] Yet the site's strategic position allowed it to weather the times: there can be no question of a 'complete loss of the foreign trade function' for Naukratis and its becoming a place of skilled craftsmanship instead.[132] Throughout the fifth to fourth century BC, international trade via Naukratis continued and international networks were maintained as inscriptions recording traders from Naukratis being elected as *proxenoi* abroad attest[133] and, interestingly, we now also find evidence of Egyptians from Naukratis apparently doing business abroad.[134] The sanctuaries of Naukratis continue to receive dedications from traders and visitors from as far afield as Syracuse or Cyprus;[135] much of the

126 Ann Arbor, Michigan, Kelsey Museum inv. 25803; see Agut-Labordère forthcoming.

127 Vasunia 2001.

128 Assmann 1996; Möller 2000.

129 A view also developing in more literary-oriented studies: Moyer 2011.

130 Pfeiffer 2010: 20.

131 Villing forthcoming.

132 Pfeiffer 2010: 21.

133 Redon 2012; Villing 2013.

134 Bäbler 1998: 69–77, see also above note 121.

135 See Villing 2013; forthcoming.

grain trade, but also the trade of luxury goods such as perfume, presumably still passed through the site.

Of course, as Nectanebo's Decree of 380 BC as well as the archaeological find spectrum of fifth and fourth century Thonis-Heracleion confirm, Naukratis was not the only harbour and the main point of taxation may have shifted—although this may not necessarily present a major departure from earlier practice, with a coordinated system of several points of assessment and taxation likely to have existed along the Canopic branch throughout time. Does the drop in (though by no means disappearance of) Attic figured pottery at Naukratis in this period confirm that change, nevertheless, was afoot? Perhaps, yet we have to be wary of drawing conclusions on the basis of an archaeological assemblage shaped (and distorted) by its nineteenth century excavators and influenced by a whole complex of factors, only some of which are economic: in a period of declining votive inscriptions on pottery (generally, though not everywhere), changing votive practices and the rise of Black Glaze pottery (most of which was discarded by early excavators), the portion of the assemblage at our disposal is far from representative and undoubtedly exaggerates, or even creates, the downward trend in direct international links that appears to be observable here.[136]

Certainly, come the Hellenistic Period, the foundation of Alexandria appears to have actively boosted trade along the Canopic branch of the Nile, as the archaeological picture of Naukratis also confirms: we may imagine that Kleomenes of Naukratis, Alexander's financial officer, must have played no small role in promoting his home town. Self-consciously Greek,[137] Hellenistic Naukratis now briefly issued its own bronze coinage. Soon after, the reign of the first Ptolemies saw a major building programme at Naukratis—including a massive temple the pylon of which rivalled that of the temple in Karnak in size—that raised the status of the 'Egyptian' character of the site. Egyptians and 'Greco-Egyptians' are now clearly in evidence as successful traders—such as Nekhtnebef, son of Tefnakht, who highlights his own success in a votive inscription, or Horemheb, offspring of a mixed marriage, whose unique monumental statue shows him in Egyptian manner yet designates him as a Greek in the hieroglyphic inscription.[138] Even though Alexandria soon became the main international hub of Egypt, Naukratis continued to flourish throughout the Ptolemaic Period. Trade on a considerable scale is clear from the numerous stamped amphora handles that attest ongoing links particularly with East Greece but also with Italy and Cyrenaica, in a pattern not dissimilar from that observed at Alexandria itself.[139] Even if fewer foreign traders perhaps now visited the site and its sanctuaries, Naukratis remained an active regional trading centre through the Roman and into the early Byzantine Period. As one of the ports channelling Egyptian grain to Turkey, Greece, Rome and Constantinople, we see it closely follow the fortunes of Alexandria and other towns in the region. Its decline, finally, comes in the seventh century BC, when the grain tribute is redirected by the Rashidun Caliphate ultimately to Mecca and Medina, and the canals and harbours of the western Nile Delta fall into disuse.[140] It may have been a particular historical constellation that gave rise to the town's establishment, but it was its physical position that allowed Naukratis to continue for well over a thousand years to play a major role in local, regional and international networks, in which not just Greeks and Carians, Cypriots, Phoenicians and Persians, but also Egyptians were active agents.

As research progresses and further new data emerge, new insights will undoubtedly allow us to enhance, enrich and quite possibly further revise our understanding of Naukratis and of its populations. In so doing we need to take care, however, not to fall as readily into some of the traps presented by current scholarly fascination with cross-cultural interaction as we accuse our predecessors of doing with regard to notions of colonialism and hellenocentricity: early Naukratis may have been a 'laboratory' not just of inter-Greek but also inter-ethnic cooperation,[141] but the modalities of interaction were complex, encompassing contact and exchange, competition and negotiation, boundaries maintained and, frequently, transgressed, with any substantial 'merging' of cultures as unlikely in the Late Period as, ultimately, in Ptolemaic times.

136 Villing forthcoming.
137 Redon 2012.
138 See Agut-Labordère 2012, with further references.
139 Johnston 2013–2015b and 2013–15c.
140 Thomas 2014.
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13 Naukratis, 'Mistress of ships', in context

Ross Thomas

Naukratis was an important hub for trade and cross-cultural exchange long before the foundation of Alexandria. Established in the late seventh century BC as a base for Greek and eastern Mediterranean traders, Naukratis also functioned as the port of the royal pharaonic city of Saïs.[1] Previous fieldwork by Petrie and Gardner (1884–1886), Hogarth (1899–1903) and Coulson and Leonard (1970s–1980s) concentrated particularly on the central areas of the town. Recent investigations were undertaken by the Supreme Council of Antiquities within the surrounding villages of Rashwan, Abu Mishfa, Gebril Abbas, Hassan Kasim and El Baradany, directed by Mohammed Aly Hakim. The early excavations were pioneering for their time, revealing a wealth of information, but left many questions unanswered; their significance and their effect on scholarship have been discussed in recent publications by the British Museum's Naukratis Project.[2]

In October 2012 and April 2013 two brief seasons of new fieldwork at the site were carried out by members of the Naukratis Project in collaboration with the Egyptian Supreme Council of Antiquities (SCA).[3] The key incentive was to gain new and additional contextual information about Naukratis as part of the on-going reassessment of the site, and to assess the potential of the site for a possible larger-scale fieldwork project. Specifically, our primary objectives were to undertake preliminary investigations of the full extent of the city and its development, its urban structures, palaeo-landscape and position in the system of waterways in the Nile Delta—pressing research questions that could not be answered solely through our on-going reassessment of the nineteenth century fieldwork at the site.[4]

The programme of work included topographical (RTK GPS) survey, geophysical (fluxgate gradiometer) prospection, a targeted programme of geological investigation (auger drilling) and limited excavation, complemented by surface pottery collection and architectural survey (in the limited places where extant). In spite of the short time spent on site, important new results emerged from the work. We faced a great challenge mapping the series of earlier excavations and surveys onto the current landscape, but succeeded in reconciling, as close as is practicable with the accuracy of the methods of the time, Petrie's, Hogarth's and Coulson's maps with each other and with the current lay of the land, utilising ArcGIS and archived satellite and aerial photography following our 2012 season.[5] This article will summarise the major findings of the 2012 and 2013 seasons and, for the purposes of clarity, will use the same terminology for areas as our recent article on the 2012 season,[6] in which a more extensive account of the methodologies employed and the research background can be found. We hope future fieldwork will allow us to resolve further questions raised by this preliminary work, not least completing our geophysical prospection to better understand the layout and development of the settlement (Figure 13.1), and the function and phasing of newly-discovered features.

Topography

The ancient site of Naukratis has a complicated topography that has confused archaeologists for the last 130 years. Today, the ancient harbour town is encircled, and in places covered, by the modern villages of

1 Cf. Fabre this volume Chapter 9.

2 Thomas and Villing 2013; Villing et al. 2013–2015.

3 The Naukratis fieldwork team consisted of Alexandra Villing (British Museum), Penny Wilson (Egyptologist, Durham University), Marianne Bergeron (British Museum), Ben Pennington (Geologist) and field director Ross Thomas (British Museum), assisted by archaeologist Entesar El Sayed Ashour, Eptisam Nabeel Mahmoud Elbahiye, Doaa Ferieg Ali, Emad Hamdy Mohamed Abou Esmail, Tarik Sayed Ahmed Abdellah, and Hani Farouk Abd El-Azeez Shalash of the Beheira section of the SCA, Damanhur, Egypt, who were trained in all aspects of the fieldwork. The October 2012 season was funded by the British Museum, the April 2013 by a British Academy Small Research Grant, Reckitt Fund. Subsequent fieldwork has been primarily funded by The Honor Frost Foundation and Christian Levett (and the Mougins Museum of Classical Art), with contributions by the Fondation Michela Schiff Giorgini, the Egypt Exploration Society, Bryn Mawr College, the British Museum and the Institute of Classical Studies.

4 The British Museum's Naukratis Project, led by Alexandra Villing, is publishing an Online Research Catalogue of over 18,000 objects known from the early excavations at Naukratis distributed over 70 institutions worldwide (Villing et al. 2013–2015). It is funded by the Leverhulme Trust (Project Grant number F/00 052/E), the Shelby White-Leon Levy Program for Archaeological Publications, Christian Levett and the Mougins Museum of Classical Art, the Institute of Classical Studies, London, and the British Museum. Fieldwork revisiting Naukratis has provided new contextual information that enables a better understanding of the distribution of artefacts retrieved during all archaeological investigations at Naukratis. This enables us to better understand ritual offering practices in sanctuaries as well as domestic, industrial and trade activities taking place at this ancient port, discussed in other Naukratis Project publications.

5 Thomas and Villing 2013: 86–8, fig. 8.

6 Ibid.

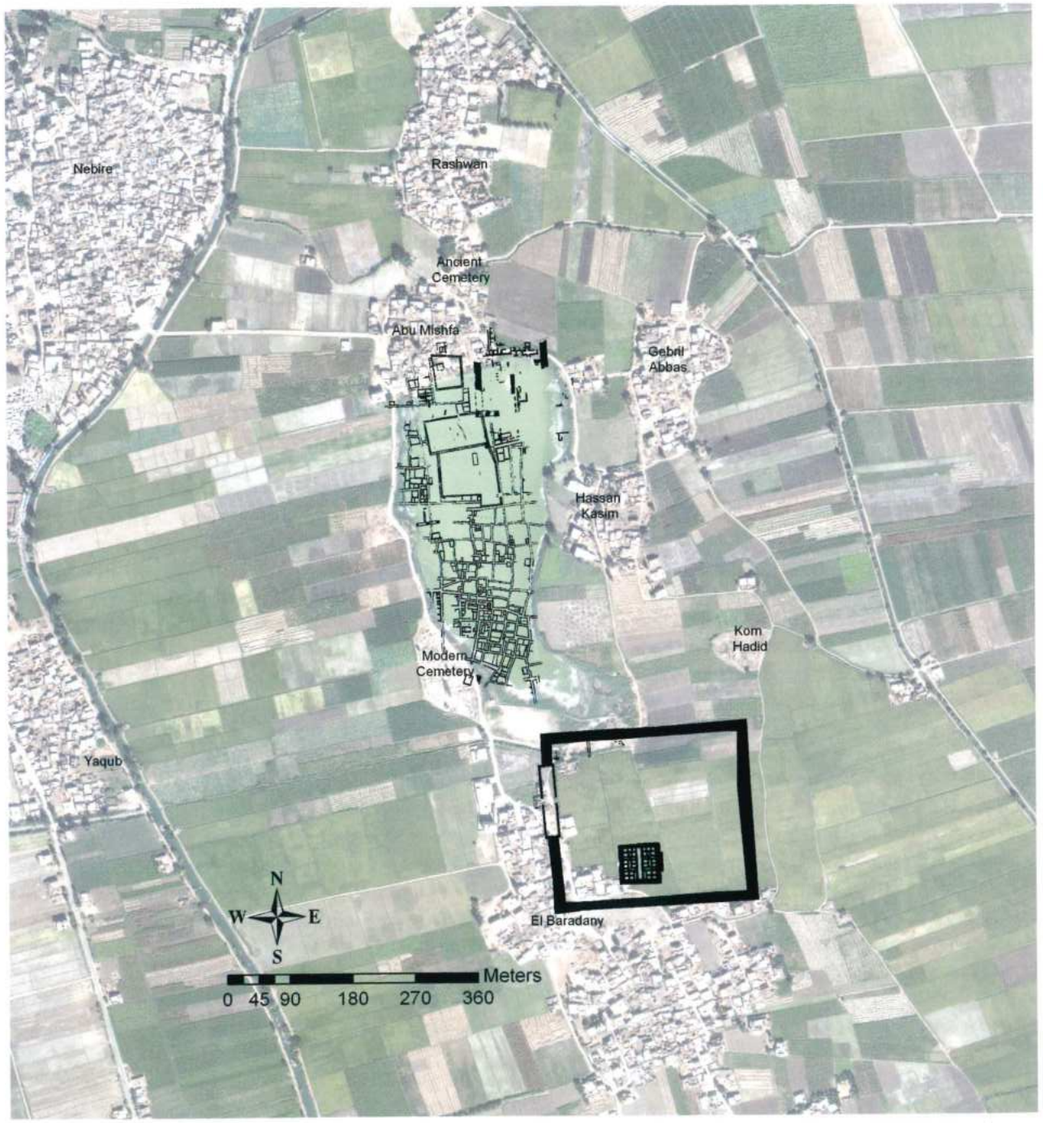


Figure 13.1 Composite plan of Naukratis/ Kom Geif showing satellite image and excavation plans. (Image: © 2013 Google. Satellite image taken on 9 July 2011.)

Rashwan, Abu Mishfa, Gebril Abbas, Hassan Kasim and El Baradany and their fields, collectively known as Kom Geif. A large portion of the northwestern quarter of the ancient settlement is currently a large pit, until recently a lake, left by the excavations of the *sebbakhin* and archaeologists.[7] Our topographical survey of the ancient settlement and its immediate landscape covered 182 ha. It was started in 2012 and completed in 2013, using two RTK GPS units, a Leica GX1230 as a reference station, and another Leica GX1230 as a rover unit.[8] This made it possible to accurately locate modern and ancient features of the site and to incorporate this data into a composite map of Petrie's, Gardner's, Hogarth's, Coulson's and Leonard's and Hakim's plans, sections

7 Bailey 1999: 218; Leclère 2008: 140.

8 The programme used GPS technology, deemed the most time and cost efficient method for the level of accuracy required, to locate all extant architectural and archaeological features, surface survey finds, auger holes, magnetometry grids, and archaeological trenches (both from our work and from earlier work by Mohamed Aly Hakim of the SCA in 2009 and 2011) as well as a topographic survey. Areas of archaeological interest and topographic complexity were covered in greater detail (5 m traverse intervals, every metre and 0.1 m height change) than the outlying fields. This placed the whole survey in real-world co-ordinates with an accuracy of 3.7 cm (see Thomas and Villing 2013).

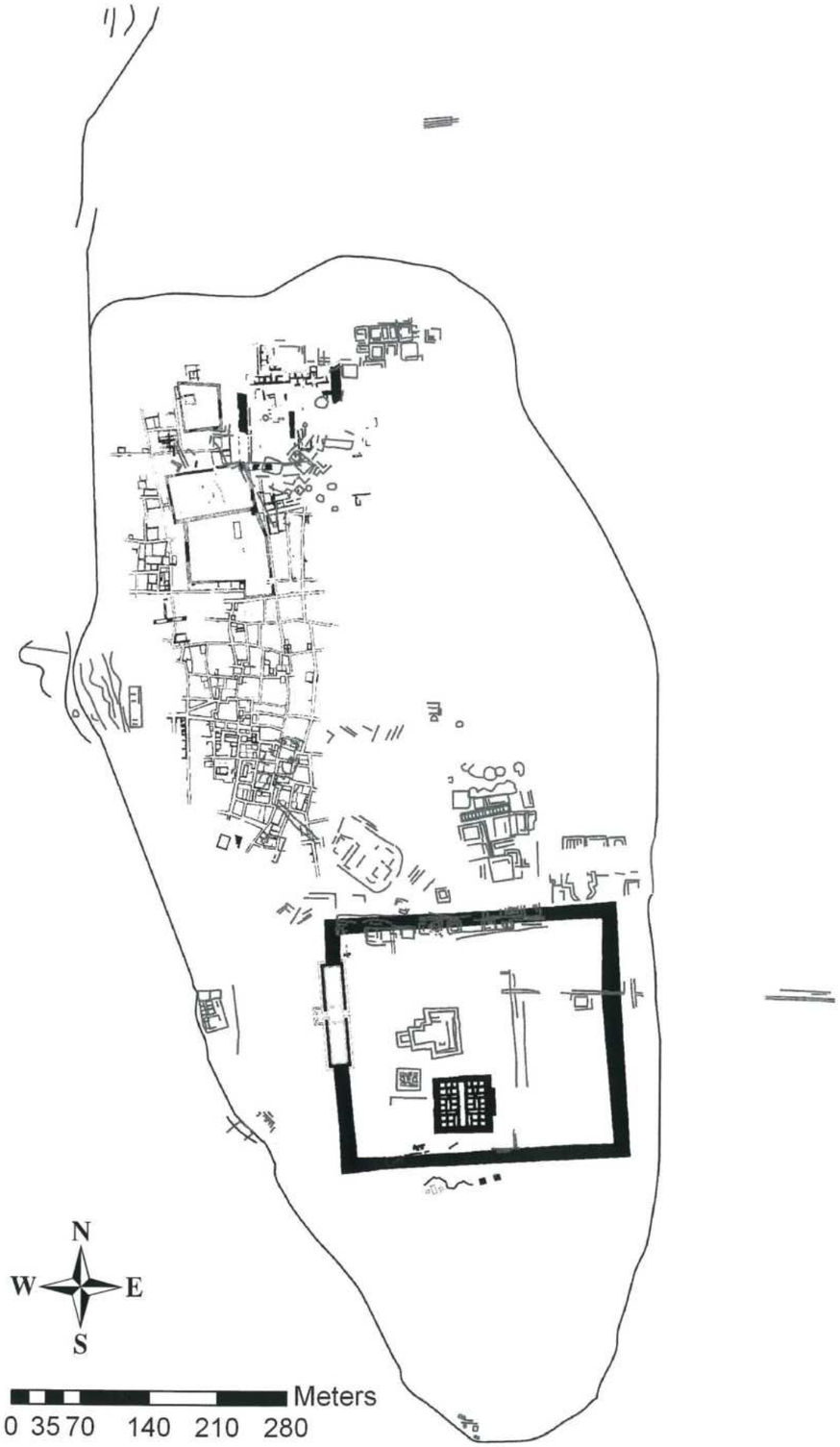


Figure 13.2 Preliminary interpretation of magnetometry results (grey) with excavation plans of Petrie, Gardner, Hogarth and Leonard (black). The limit of the ancient settlement is marked by a black liine. The Canopic branch of the Nile is to the west.

Figure 13.3 Magnetometry results from 2011 and 2012 overlain on satellite image of the site. (Image: © 2013 Google. Satellite image taken on 9 July 2011.).

and photographs alongside aerial photography and satellite images taken in 2011, 2009, 2007, 2004 and 2002 (Figures 13.2–3). It also enabled us to correct errors in subsequent interpretation, notably in the work of the American mission to Naukratis of the 1970s and 80s,[9] as well as to build a topographic model in ArcGIS (Figure 13.4). During the survey, abundant pottery was observed on the surface[10] and a small sample was

9 Thomas and Villing 2013: 87, fig. 8.

10 Each object was located using the RTK GPS. We were also able to record in the same manner the still visible SCA trenches of 2009 and 2011 excavated by Mohamed Aly Hakim. Our ArcGIS plan enabled us to rubber sheet and geo-correct the errors in Coulson's survey (based on somewhat distorted aerial photography) and Leonard's excavation plans of the site. We were then able to compare our surface survey results with Coulson's in real-world coordinates.

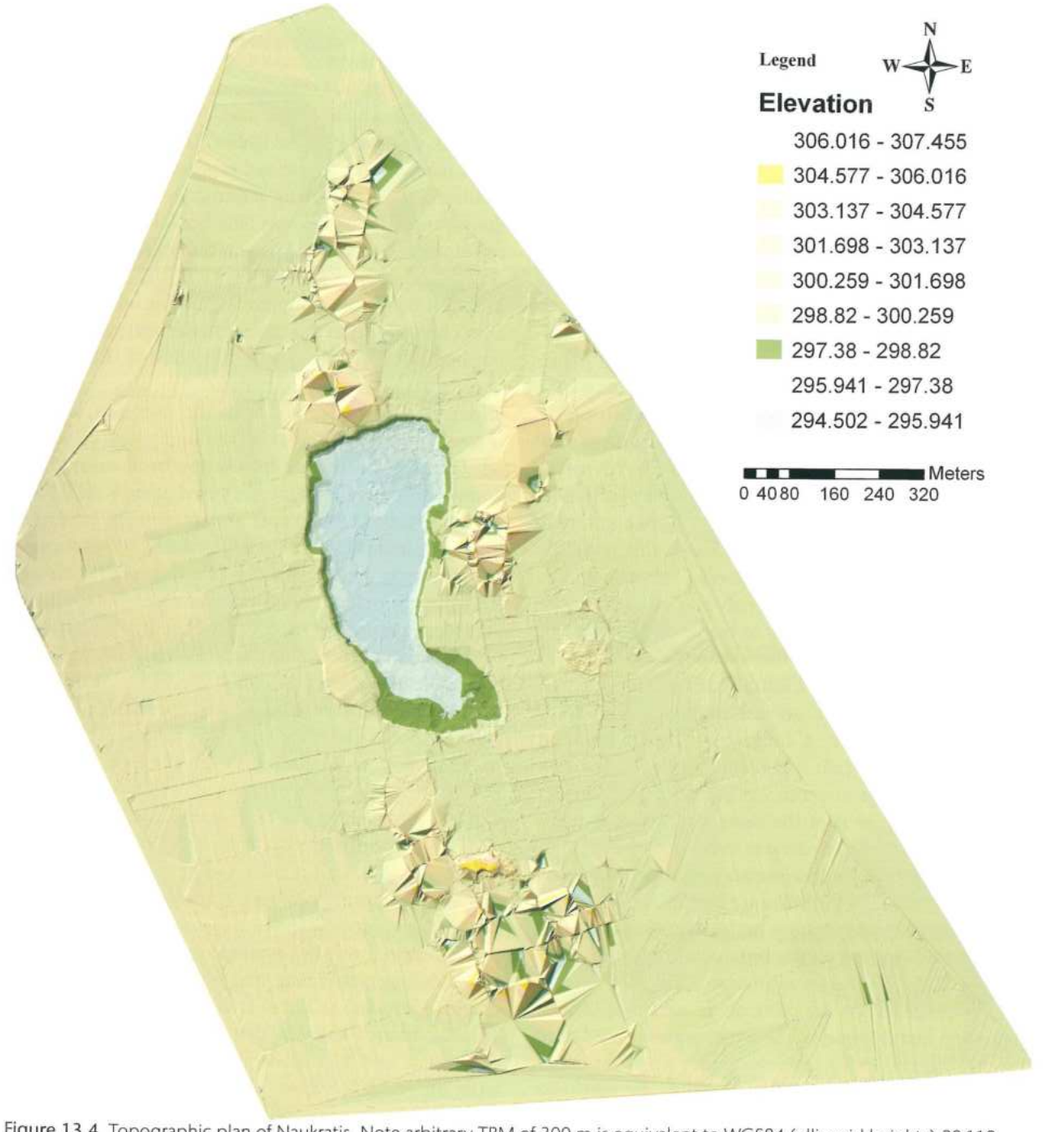


Figure 13.4 Topographic plan of Naukratis. Note arbitrary TBM of 300 m is equivalent to WGS84 (ellipsoid heights) 20.119 MASL and Alexandrian mean sea level of 5.509 MASL.

collected, dating from the late seventh century BC to at least the seventh century AD, agreeing with the date range attested by the artefacts found by Petrie, Gardner, Hogarth, Coulson and Leonard.[11] In 2013, artefacts were also recovered in excavations and auger drill cores, providing dates for geological and archaeological phases.[12]

Geophysical prospection was undertaken using a Bartington Grad601-2 Dual Array Twin Fluxgate Gradiometer[13] (henceforth magnetometer). Magnetometry has now been completed for 26 ha of the 30 ha still accessible of the ancient settlement that we now know reached over 60 ha at its full extent. The magnetometry revealed numerous previously unknown structures, interpreted below as over 70 houses, sections of temenos walls and other religious structures, magazines, and industrial features, as well as the riverfront.

11 Villing et al. 2013–2015.

12 All finds were washed, photographed, bagged with labels, boxed, and stored in Kom Firin magazine for future study and publication.

13 Known to detect man-made sub-surface structures effectively in the sedimentary geology of Nile Delta. For technical details see Thomas and Villing 2013: 85. All data has been processed in Geoplot 3.0 by Kristian Strutt from the Archaeological Prospection Service of Southampton, http://www.southampton.ac.uk/archaeology/research/groups/archaeological_prospection_service_southampton.page), who will also work with this author on the final report of the magnetometry results.

The Nile, harbour and canals

West of the dried up lake and Abu Mishfa-El Baradany road as far as the modern Abu-Diab canal, concealed under fields, lies the Canopic branch river harbour of Naukratis. Long the subject of controversy,[14] magnetometry undertaken in 2012 and 2013 provided an indication of where the ancient river bank/shore line was, a hypothesis subsequently confirmed by the results of geologist Ben Pennington. The magnetometry revealed a 'neutral' zone to the west, consistent with river sediments (i.e., the location of the Canopic branch),[15] next to a series of magnetic linear features (henceforth 'river bank') that we suspected represent harbour terraces retaining surfaces made up of magnetic man-made material on which magazine-like structures were built, aligned north–south following the course of the now dried-up river.[16] A series of hard surfaces containing Ptolemaic pottery built over high energy Late Period shore deposits were confirmed in 2013 by auger cores[17] drilled through this anomaly and dated using the abundant pottery contained within the cores. This 'river bank' anomaly was visible in magnetometry grids in three areas to the northwest, west of Rashwan, and continues all the way to the southwest tip of El Baradany, where the 'neutral' river sediment signature bends towards the southeast marking the southern limit of the settlement. A long 40 m × 11 m building divided into square cells was identified in 2012 next to the riverbank in the west and was interpreted as a magazine. This structure is of the same size and alignment as nearby 'Ptolemaic' structures excavated by Petrie in 1885.[18] Pottery found on the surface of this area includes material representing the full range of Naukratis chronology, from the seventh century BC to seventh century AD, but Ptolemaic and Roman to Byzantine finds were most common there. Transport amphorae of the fifth to early seventh centuries AD are particularly well-represented, suggesting that this part of the settlement was used until the city's decline in the seventh century AD.[19] The thriving harbour of Naukratis is represented by maritime artefacts found in previous excavations at the site. Most were found in this western area of the settlement by the river during Petrie's excavations.[20] These include fishing hooks and weights, ballast stones, fragments of lead hull sheathing, copper hull tacks and brail rings (Figure 13.5).

Whilst Petrie had correctly identified the location of the maritime access to the site,[21] we can now confirm that this was the wide navigable Canopic river branch, not a narrow canal as he had suggested. Hogarth[22] and Coulson's less convincing alternative suggestions[23] for the location of the ancient Nile branch, to the east or running through the settlement, can now be discounted. A programme of auger drill coring was conducted by geologist Ben Pennington, concentrating on the western river channel and its interface with the settlement, to test our hypothesis for the western location of the Canopic branch and the site's harbours.[24] We also wanted to understand how deep and wide the river was, whether it was navigable, when it moved and silted up and in what direction. Using an Eijkelkamp hand auger,[25] nine cores were drilled at points surveyed using RTK GPS. A variety of palaeo-landscapes and archaeological deposits were identified, including mud-brick structures and domestic activity, putative ditch or canal cuts and deposits, river channel and river adjacent environments as well as periods of hiatus and/or farming activity. A preliminary interpretation of the data suggests the presence of a deep (average *c.* 5 m) and wide (*c.* 200 m) river channel immediately to the west of the urban quarters,[26] flowing south to north and laterally migrating from east to west over time. This is most likely the Canopic branch of the Nile. The levels of the geological sequence and a number of datable sherds contained within the auger drill cores confirmed that this was contemporary with the ancient site. Full publication of the 2013 Naukratis auger programme and re-interpretation of previous auger cores[27] drilled at the site will form part of ongoing research on this dynamic landscape.[28] A similar methodology combining magnetometry and auger drill cores undertaken at Tell el-Dab'a revealed a broad early Pelusiac branch channel that once served the ancient settlement and has subsequently silted up.[29] Judging from the results obtained so far, it seems likely that the Canopic branch of the Nile was deep enough and navigable, likely all year round, for sea-going ships such as the *Kyrenia*.[30]

14 Petrie 1886: 2–4, 10; Bernand 1970: 618–23; Möller 2000: 115–16.
15 They are neutral because they are laterally more homogenous than anthropogenically derived sediments.
16 Thomas and Villing 2013: 91.
17 Pennington and Thomas in preparation: cores A04 and A07, complemented by further 2014 auger cores.
18 Petrie 1886: pl. 41, labelled 'Ptolemaic houses'; Petrie 1886 Notebook 6: 17, points 130–2. Objects from this area appear to confirm Petrie's dating, however in many parts of the site, other 'Ptolemaic' houses are known to have contained Late Period or Roman artefacts. Many Roman artefacts have also subsequently been identified as Ptolemaic production (Bailey 2008).
19 Thomas and Villing 2013: fig. 7, table 1.
20 Petrie 1886: 10; Thomas and Villing 2013: 92.
21 Petrie 1886: 10.
22 Hogarth et al. 1905: 122–3.
23 See Villas 1996: 177–90.
24 Thomas and Villing 2013: 91–2.
25 Cores were brought up in 20 cm chunks. The sediment was recorded in terms of grain size, clast percentage and composition, organic content and form, as well as sorting, rounding and mineralogy where appropriate.
26 Pennington and Thomas in preparation: cores A01–3, A06–7.
27 Gifford in Coulson, Leonard and Wilkie 1982: 75; Leonard 1997: 28 with note 67; Villas 1996: 177–90; Shaaban El-Awady 2009; Wilson 2010: 116–18, fig. 9.3.
28 Pennington and Thomas in preparation.
29 Forstner-Müller et al. 2012: 4, fig. 6.
30 An early fourth century BC ship that sank off Cyprus in the early third century BC: see Parker 1992: 231; Casson 1994: 109; Steffy 1985.

Figure 13.5 Maritime artefacts from Naukratis. Not to scale. **1** Two horn brail rings. AN1896-1908. E.3677B and AN1896-1908E.3677A (Photo: British museum staff; © Ashmolean Museum, Oxford.); **2** copper alloy hull sheathing tack. 88.764 (Photo: © Museum of Fine Arts, Boston.); **3** copper alloy hull sheathing tack with traces of lead and pitch from hull. GR 1886,0401.1733 (Photo: © The British Museum.); **4** lead sheet, possibly once hull sheathing. Eg.Inv.1330 (Photo: © Museum of Fine Arts, Boston.); **5** anchor from Naukratis found in construction of El Baradany house in 2012, south Naukratis (Photo: Naukratis team.); **6** copper alloy fishing hook. GR 1888,0601.7 (Photo: © The British Museum.); **7** netting needle. GR 1888,0601.10 (Photo: © The British Museum.); **8** lead net sinkers. 88.775 and 88.77 (Photo: © Museum of Fine Arts, Boston.); **9** water worn (ballast?) stone found by Petrie at Naukratis. GR 2011,5009.315 (Photo: © The British Museum.).

Questions remain concerning the east of the settlement. Scholars have argued for the location of the main river channel,[31] a minor branch, or a canal leading to the Saïte capital Saïs to the east, during part or all of the life of the site.[32] Although pottery has been found to the northeast of the settlement,[33] magnetometry did not pick up any magnetic signal that would be consistent with buildings. Instead there is a 'neutral' zone, consistent with river sediments as found to the west of the site. This 'neutral' zone was also found in other areas to the east and southeast of the settlement, which revealed little other than modern and old field systems (Figure 13.3). A *c.* 37 m long section of a *c.* 6 m wide east-west aligned linear feature was identified in the northeast. Its magnetic signature and dimensions suggest it was a canal or ditch. It is of unknown date and could potentially

31 Hogarth et al. 1905: 122–3.
32 Thiers 2007; Thomas and Villing 2013: 93.
33 Coulson 1996: 8, 132–5, fig. 5, fields S–2, S–15.

be a relatively recent irrigation canal branching off the modern canal that passes by to the east. A second linear east-west feature was found to the southeast. A *c.* 330 m long section of this *c.* 8.5–10 m wide feature of two parallel lines was seen in the geophysics. It penetrates well into the northeast quarter of the Great Temenos, where it meets a perpendicular north-south aligned wall. It appears to be covered by the Great Temenos wall, and respected by an adjacent *c.* 13 m square mud-brick building to the south, within the Great Temenos area, consistent with the dimensions and materials of the tower houses described below. The precise archaeological relationships between these features needs to be clarified in future seasons. If this linear feature is indeed ancient, then the 'neutral' zone to the east of the settlement must have been dry land before these linear features were cut or built, as confirmed by our fieldwork in 2014. Thus the 'neutral' zone to the east was dry land when Naukratis was occupied, albeit over much older (geologically) river deposits. Although tantalising, fieldwork in 2014 confirmed this cannot be an east-west canal linking Naukratis and Saïs, the existence of which has been argued by some scholars,[34] and it may yet be found in another part of the settlement. It was in fact two parallel ditches, both too narrow and shallow for a canal, so could perhaps have been used for farming.[35]

Naukratis town

The settlement at Naukratis is larger than previously thought.[36] Magnetometry and the recent excavations by the SCA in 2009 and 2011 have significantly increased our understanding of the limits and layout of the ancient settlement. The magnetometry revealed previously unknown areas of the settlement, including mud-brick square houses to the northeast, east of a structure at the southwestern limit of modern El Baradany associated with Ptolemaic to early Roman pottery. The western and southern limits of the settlement were constrained by the river. Parts of the eastern limits of the settlement are obscured by modern Gebril Abbas and Hassan Kasim, where ancient material was found during SCA excavations in these areas. The areas east of the Great Temenos and Kom Hadid are clear of structures, with magnetometry indicating old field systems and canals. The northern limit of the settlement is not yet defined, but was constrained by the cemetery excavated by Gardner[37] on a small mound between Rashwan and Abu Mishfa.[38] Our better understanding of the limits of Naukratis forces us to reconsider its size, which must have exceeded 60 ha during the heyday of the city. New features have emerged concerning the layout and architecture of Naukratis. What does the layout of Naukratis mean for the status and function of the settlement?

Herodotus describes Naukratis as both a *polis* and an *emporion*,[39] although the appropriateness of applying the term *polis* to Naukratis prior to the Macedonian conquest has been called into question.[40] Naukratis was never an entirely independent city state, though the religious architecture and written evidence confirms the existence of religious and administrative features consistent with a Greek city and *emporion* during the Saïte and Persian Periods. Still, the settlement cannot be considered a Greek colony, as the population was diverse, including a significant Egyptian element.[41] Greek geographers[42] tend to refer to barbarian cities as *poleis* if they were 'nucleated settlements of a certain size', with a population over 5,000,[43] which Naukratis certainly exceeded during its height. However, is such terminology useful if a settlement, such as Naukratis, is known to have had elements in common with Egyptian settlement? Public buildings are generally poorly represented in the archaeology of Naukratis. It is likely that a trade market existed next to the river harbour, discussed above, but the epigraphically attested *palaistra*[44] and the *prytaneion*, mentioned in later texts, remain undiscovered. An *agora*, essential to any Greek city, is currently absent from the archaeological record of Naukratis, indeed many scholars accept that it is unlikely that an *agora* existed there.[45] On the whole, however, Naukratis has a rather organic look about its construction. It has no *dromos*, no orthogonal Hippodamic-style street layout, as seen in Alexandria with its insulae of peristyle-houses, or indeed Philadelphia, which featured Egyptian tower houses.[46] Indeed, its highly irregular non-orthogonal layout, dominated by large *temene*, seems to resemble other (and older) Egyptian delta towns, such as Saïs, more than it does a Greek city newly-founded in the seventh century BC.[47] It is interesting to note, moreover, that the location of the workshops and industry integrated within

34 Thiers 2007; Wilson 2010: 116–8, fig. 9.3.
35 The major Nile-Red Sea canal was described as being 30–69 m wide by different authors at different periods of its history: Cooper 2009: 204; Herodotus *Historiae* 2.158; Strabo *Geographica* 17.1.26; Pliny the Elder *Naturalis Historia* 6.333.165–6. A canal channel discovered in Karnak was 16 m wide, see Graham et al. 2012: 25.
36 Wilson 2011: 186; see table 1. Wilson calculated a population of 5920, based upon a density of 185 people per ha, within a 32 ha site.
37 Gardner 1888: 21–30.
38 Thomas and Villing 2013: 90–1, fig. 14.
39 Herodotus *Historiae* 2.178–9.
40 Austin 2004: 1238; Möller 2006: 184–94; see Hansen 2004: 87.
41 Yoyotte 1983: 129–36; Leclère 2008: 117–38; Spencer 2011: 35–41; Villing 2013–2015.
42 Specifically in the case of Naukratis, see Strabo *Geographica* 17.1.18; Herodotus *Historiae* 2.178–9.
43 Petrie 1886: 35; Möller 2006: 71–4, 118; Müller 2010: 220, 225; see also Bresson 2005: 152.
44 Petrie 1886: 35; see Redon 2012.
45 Müller 2010: 233.
46 Ibid.: 227, 230, 234.
47 For Egyptian settlements layout, see Müller 2010: 225; Leclère 2008. For Greek colonies and settlement layout see Mertens 2006; Lang 1996. Note the preserved layout of Archaic Smyrna is also organic and irregular.

the settlement in the north, including kilns in the east and a scarab workshop in the town,[48] did not respect the prevailing northerly winds that were taken into account at organised foundations, such as Macedonian settlement at Athribis.[49] Of course, even in Egypt orthogonal street grids were known from the Middle Kingdom to the Roman Period, but they were rare and confined to specific cases relating to expressions of dynastic and/or military power,[50] whereas organic, irregular, street layouts were more common. We cannot exclude the possibility, however, that an initial orthogonal layout may have been superseded, or overgrown by later building activity, when Naukratis expanded, as occurred at other Egyptian sites, such as at Dionysias.[51]

Domestic architecture

The Naukratis Project's 2012 and 2013 programme of magnetometry revealed over 70 previously unknown 12–16 m square or near-square mud-brick structures with substantial walls or footings/foundations; they are densely packed (*c.* 38 per ha), filling all the space not occupied by religious, public, trade, and industrial zones of the settlement. These buildings have a clear magnetic signature and are occasionally seen on the surface. Internal divisions are often visible, dividing the building into a tripartite plan with a number of cells or rooms. Though square, they often overlap and abut other houses or parts of the Great Temenos wall, suggesting that future excavators should expect complicated stratigraphic phasing. As the magnetometry and excavations revealed structures from different periods and at different levels, the plan we have of Naukratis today likely represents various phases, making it difficult to calculate the density and extent of the settlement for the different periods of the site. In sites where tower houses were excavated or augered, they were often found to be well-preserved to some depth. Their wide walls, substantial footings and foundation platforms are features which are typical for mud-brick Egyptian 'tower house' architecture of the Late Period to Roman Period.[52] Such features are, however, inconsistent with the plan of the settlement published by Petrie[53] in

Figure 13.6 Model of a tower house. EA 1886, 0401.1397. (Photo: © The British Museum.)

the northwest quarter of Naukratis. Here Petrie mapped a range of flimsy irregular mud-brick terraced insulae, an architectural style known also from Egypt[54] that is often found alongside tower houses. Is this difference real, and if so what does that mean for the layout and demography of Naukratis and what do we know about the architecture from the subsequent excavations by Hogarth, Leonard and ourselves?

Naukratis' 'tower houses' are large,[55] but fit within the standard 9–16 m width for this architectural tradition of building on a 'casemate' platform.[56] Documentary, model and architectural evidence of tower houses confirms they were commonly three to four and possibly even six stories high.[57] Late Period and Ptolemaic models of such tower houses were also found at Naukratis (see Figure 13.6).[58] There are numerous examples of Late Period Nile Delta settlements populated by tower houses,[59] where the verticalisation of the architecture occurred in response to limited space in the Delta.[60] This was also the case in the constricted fortified garrison towns of Elephantine[61] and Aswan.[62] Tower houses were built on a larger scale during the early Ptolemaic Period, in response to the rapidly growing population, at Karnak, Edfu, and particularly the Fayum.[63] This architectural style continued to be used through the Roman[64] and into the Islamic Period,[65] making them difficult to date on the basis of

48 Petrie 1886: 36; Villing 2013–2015; Möller 2000: 152–4.
49 Müller 2010: 234; Szymańska 2005: 22–37.
50 Müller 2010: 240.
51 Ibid.
52 Marouard 2012; Arnold 2003.
53 Petrie 1886: pl. 41.
54 Müller 2010: 250.
55 The Naukratis tower houses are slightly larger than normal, however the magnetometry parallels cited by Marouard were also larger than excavated examples. This may represent the wider footing platform over which these houses were built, thus explaining the exceptionally narrow, or absent, space between tower houses.
56 Marourard 2012: 124–5; Spencer 2008: 6–10; 2013: 171–3; Arnold 2003: 174 table 14. If one excludes Islamic Period examples, the tower houses tabulated by Arnold range from *c.* 9 m × 11 m to 17 m × 18.5 m.
57 Arnold 2003: 166–9; Müller 2014; Husson 1990: 127; Marouard 2012: 126; Spencer 2013: 173.
58 Petrie 1886: 40, pl. 18.1 and see 18.3; British Museum EA 68816 (1886,0401.1397); Cairo JE28784 and see TR19/3/24/6.
59 At Mendes, Tell el-Nebeshe, Toukh el-Qaramous, Tell el-Moqdam, Kom Firin, Tell Tebilla, Tell Dab'a, Buto, Tell Basta, Tanis and Tell el-Balamun; see Brissaud 2000: 25–6; Forstner-Müller et al. 2011: 4–5, fig. 5; Marouard 2012: 127; Spencer 2008; 2014: 171–4; Spencer 2009: 105, fig.11.1.
60 Marouard 2012: 131.
61 Arnold 2003: 166–9.
62 Müller 2010: 244–5; forthcoming.
63 Tebtynis, Karanis, Philadelphia, Bakchias, and Soknopaiou Nesos. See Hadji-Minaglou 2007: 166–7, figs 2–4; Marouard 2012: 131–2; Müller 2010: 227, 230, 234.
64 Marouard 2012: 131–2.
65 Müller 2014; Arnold 2003: 176, table 14.

the magnetometry results alone. There is only relatively little help from pottery: auger cores, excavations (by Leonard[66] and in 2013) and surface survey collection produced Roman, Ptolemaic and Late Period pottery at Naukratis. The Ptolemaic material was best represented and the Late Period pottery was rare, being covered by subsequent building and occupation deposits. Roman pottery was found in the excavations of the 'South Mound' and in the east of Naukratis. Roman deposits across the site may have been erased by modern building and farming practices, as at Tell el-Dab'a.[67] Alternatively, there may have been a reduction in activity during the Roman Period at Naukratis. The tower house plans at Naukratis closely resemble both Saïte-Persian types found at Buto and later Ptolemaic types from various sites,[68] which are square and organised better than the 'organic' misaligned rectangular examples excavated at the Saïte 'Citadel area' at Kom Firin, that were built over and modified earlier structures.[69] The tower houses at Naukratis were not aligned with an organized orthogonal street plan as found at Philadelphia.[70] Instead, they seem to have grown in a piecemeal fashion, each house roughly respecting the alignment of its neighbours, using all space economically.

Northwest town

The flimsy irregular mud-brick terraced structures published by Petrie in his plan of the 'town,'[71] which was accepted uncritically by subsequent researchers, provides us with a different architectural style and layout. The plan was largely the product of a triangulation survey undertaken by Petrie in 1884–5 of the surviving walls revealed to him by the activities of the *sebbakhin* on the site, which were, by his own admission, difficult to interpret.[72] Though some 'Ptolemaic' houses were identified, the plan, Petrie claims, essentially represents the town of the 'time of Herodotus'.[73] Petrie himself excavated only few houses and failed to describe in any detail,[74] other than in his journal: 'The Greeks undoubtedly borrowed a great deal necessarily from the native ways. The mud-brick houses and *peribolus* for instance are Egyptian in manner'.[75] Gardner carried out his own attempt to excavate 'various private houses', concluding that the 'arrangement of the houses remained conjecture … (though) … the best example produced a plan [unpublished and apparently lost], without doors, suggesting cellars'.[76] Nevertheless, no tower houses were planned, mentioned or recognised in this area. Magnetometry undertaken in 2013 in the lake depression revealed a number of features also visible on Petrie's plan[77] and Hogarth's plans,[78] as well as some apparently mis-aligned new features, and other new features possibly representing different or multiple phases of buildings. However, the area seems disturbed, littered with large magnetic spoil heaps from the excavations rich in pottery. There were no traces in the magnetometry results for tower houses in this 'town' area. It is possible that further excavation may explain this difference, as the magnetometry results offer the geophysics specialist a similarly difficult terrain to interpret as that seen by Petrie in 1884.

The south and east

Hogarth mentioned that there were grand to modest fired brick and limestone buildings dated to Roman and Byzantine Periods in the east of the site towards Kom Hadid,[79] though he failed to investigate them. Small excavations undertaken by Leonard revealed a 1.8 m-wide 10 m section of wall in Kom Hadid, associated with Ptolemaic pottery that may have come from a house.[80] The magnetometry of 2012 revealed a large apsidal structure, aligned north-south just south of Kom Hadid, though the remaining area to the east appears to be populated with the type of 'tower houses' discussed above. Hogarth recognised to the south of the site 'on three sides of the … Great Temenos … an aggregate of house remains, piled up round'[81] the north, west, and southern walls of the temenos. Despite Hogarth's and Leonard's claim that Petrie confused these aggregated mud-brick houses with the remains of a temenos wall,[82] it is clear that Petrie set his colleague Griffith to excavate a series of these houses, just inside and outside of the northern Temenos wall, as sketched and explained in their notebooks.[83] Some of the structures were drawn in his plan of the Great Temenos.[84] The notebooks record Saïte jars, torpedo jars and figurines of Late Period and early Ptolemaic dates,[85] though specific stratigraphic details remain unclear. These domestic structures built over (or lying under) and/or against the Great Temenos wall are represented in the 2013 magnetometry, which revealed square mud-brick structures consistent with

66 Leonard 1997; 2001.
67 Forstner-Müller et al. 2011: 4.
68 Marouard 2012: figs 1 and 4.
69 Spencer 2013: 171–3, fig. 108.
70 Müller 2010: 227, 230, 234.
71 Petrie 1886: pl. 41.
72 Ibid.: 35.
73 Ibid.: pl. 41;'pre-Ptolemaic' Petrie Notebook April 1885, 183A.
74 Petrie 1886: 35.
75 Petrie Journal 1884–5: 73–4.
76 Gardner 1888: 16.
77 Petrie 1886: pl. 41.
78 Hogarth et al. 1898–9: pls 1–2.
79 Ibid.: 1898–9: 41, pl. 2, grids 7b, 8b, and 9b.
80 Leonard 2001: 7, fig. 1.5.
81 Hogarth et al. 1905: 111.
82 Ibid.: 111; Leonard 1997: 29–30.
83 Griffith in Petrie Notebook 150, 10–11, areas 13 and 24.
84 Petrie 1886: pl. 42.
85 Griffith in Petrie Notebook 150: 10–11, areas 13 and 24; Thomas 2013: 118, figs 115–7.

tower houses. Some of the mud-brick walls of these structures, present in the magnetometry, were also visible on the surface of a bare earth road in 2013.

The 'South Mound', in El Baradany, is another complicated area of Petrie's Great Temenos wall obscured by numerous mud-brick structures. Here the ground is too uneven to allow for magnetometry, except in a small area largely obscured by litter and modern construction. Excavations were undertaken by Leonard in the 1980s, who chose to focus on the 'South Mound', revealing a flimsy two-course wide mud-brick structure crossing Areas 1, 2, 482, 490–2 and 502, and part of a sturdier mud-brick structure in Areas 315 and 316.[86] Leonard also revealed two areas of massive mud-brick wall in Areas 12 and 15, to be discussed below. Targeted small-scale excavation in three trenches and the cleaning of two exposed mud-brick sections were carried out in 2013 by Penny Wilson at the 'South Mound' (Figure 13.4). The northwest side of the 'South Mound' revealed stratigraphic sequences and wall sections, cut (then refilled) in Leonard's Area 1, 2, 482, 490–2 and 502 excavations of 1980–1981 in the west. Excavations on the south side of the 'South Mound' were undertaken in a bay in the side of the mound. Trench 1 (3 m × 3 m) revealed a solid sequence of mud-bricks aligned east-west with limited Late Period to Ptolemaic pottery within the bricks, reminiscent of the massive mud-brick wall sections published by Leonard in Areas 12 and 15.[87] Trench 2 (7 m × 3 m) revealed a north-south aligned wall built over a rubble layer and pit dating to the Ptolemaic-Roman Period. Shallow Trench 3 (2 m × 2 m) traced the continuation of the latter wall running north-south from Trench 2. Our excavations revealed a Ptolemaic (or, less likely, earlier) east-west wall, intersected by late Ptolemaic to Roman north-south aligned wall built over a pit and rubble. A full report of the work so far by Penny Wilson will follow in future publications. We hope to undertake future excavations in this relatively undisturbed area of the site, to understand better the relationship between various phases of domestic structures and the putative Temenos wall first recognised by Petrie.[88] It seems that some of the structures observed in the excavations by Leonard and Wilson may represent tower houses, whilst some phases exposed by Leonard in the 'South Mound' are more flimsy terraced insula structures.

In conclusion, the excavations around the Great Temenos by Petrie, Gardner, Hogarth, Leonard and Wilson have revealed similar architecture to that shown by the magnetometry in much of the site, namely tower houses, with some flimsy terraced structures also. The presence of these structures against, over, and potentially under sections of the Great Temenos wall should not be a surprise as there are numerous parallels from across Egypt, for example at Syene and Karanis, where temene were absorbed by the regular settlement following the decline of the Egyptian temples during the Roman Period.[89] This is likely to have followed on from complicated processes of domestic house encroachment, temenos wall rebuilding phases, later robbing, and reuse. This is well represented at other Egyptian sites.[90] The huge area covered by the Great Temenos, the firm foundation and ready-made mud-bricks would have made the wall areas an inevitable choice for prospective builders once it was no longer protected.

The domestic architecture of western Naukratis is distinct from that to the east and south (Figure 13.7). Petrie's 'town of the time of Herodotus,'[91] seems to have consisted of rather flimsily-built insula terraces, whilst the areas to the east and south, surrounding the Temenos, feature tower houses, occasionally interspaced with flimsier structures. Tower houses are a well-known Egyptian architectural style used in the Nile Delta during all periods of Naukratis' occupation. The western town seems different, even if it is difficult here too to identify Greek domestic architecture, grand or humble.[92] Instead, Petrie's plan may represent the organic growth of irregular structures including potentially (unidentified) tower houses as well as terraced insulae, courtyards, pigeon towers, workshops, kilns, and silos as found at other Egyptian sites such as Kom Firin,[93] Aswan,[94] Karanis,[95] Tell el-Herr,[96] Soknopaiou Nesos[97] and Tebtynis,[98] representing a number of phases of a frequently remodelled cityscape. Put simply, the difference between the western, eastern, and southern parts of the site could be explained by Petrie confusing and conflating different structures and phases; or it might represent a different, but still Egyptian style of architecture, or be an earlier phase. Quite probably all three factors were at play. The western town, being closest to the river harbour, with the oldest attested structures—the Greek sanctuaries of Apollo, Aphrodite and Hera—was likely the oldest part of town, regularly rebuilt and remodelled, but constrained by public, religious structures and the organic, irregular unplanned growth of its early success. Houses to the east and south were built without constraints, into open, or sometimes, as in the case of the Great Temenos, newly-available land.

86 Leonard 1997: 36–84, 116–35.
87 Ibid.: 24.
88 Petrie 1886: 23–4.
89 Müller 2010: 251.
90 Spencer 2009: figs 11.1–5; 2010: 150–1, fig. 4; 2011: fig. 13.
91 Petrie Journal 1886: 131.
92 Rider 1965: 210–67, see fig. 51; Lang 1996; Hoepfner and Schwandner 1986.
93 Spencer 2013: 172.
94 Müller 2010: 245–50.
95 Arnold 2003: 180, fig. 113.
96 Valbelle 2007.
97 De Maria et al. 2006: 29–30, figs 9–10.
98 Hadji-Minaglou 2007: 166–7, figs 2–4.

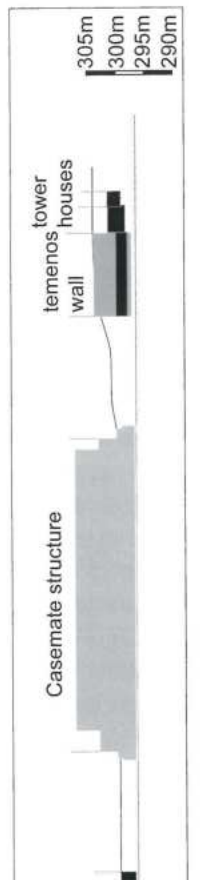


Figure 13.7 Schematic section of west Naukratis.

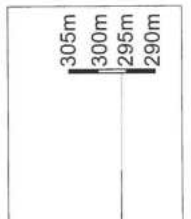


Figure 13.8 Schematic section of the Hellenion.

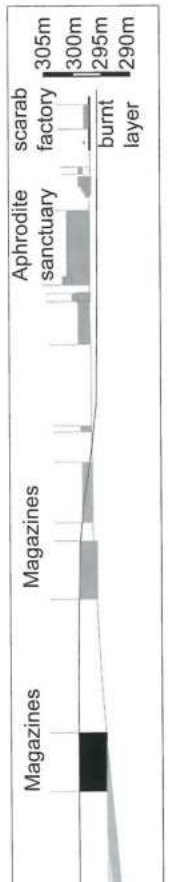
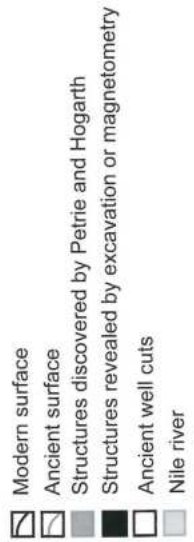


Figure 13.9 Schematic section of the Great Temenos.



Industry and trades

Industry and crafts were carried out within and adjacent to the terraces and tower houses of Naukratis. Archaeological and documentary evidence for industrial practices taking place within tower houses and their courtyards in Aswan[99] Kom Firin[100] and Buto[101] include small-scale craft production and industry utilising kilns. Magnetometry in northeast Naukratis, near the ancient terracottas workshop,[102] revealed a number of highly magnetic irregular anomalies. These could represent ancient industrial kiln waster spoil heaps, or spoil heaps from archaeological excavations (Figure 13.4).

The east of Naukratis, the area around the towns and fields of Gebal Abbas and Hassan Kasim and the unoccupied hill Kom Hadid, revealed clear evidence of industrial activities. Kiln wasters, fired brick and circular patches of burnt earth were frequently observed in the recently harvested fields in October 2012. They occurred alongside a dense concentration of pottery dating to the Late Period, Ptolemaic, and Roman to Byzantine Periods. Magnetometry revealed a number of highly magnetic features in the northeast, some of which were circular, possibly kilns, whilst others were irregular, possibly waster spoil heaps, in the immediate vicinity of the wasters and burnt ground described above. Immediately to the south of these industrial activities was a narrow highly magnetic rectangular *c.* 51 m × *c.* 11 m east-west aligned structure divided into small cells. This appears too long and narrow for domestic use, and is very different to the tower houses or terraced insulae attested elsewhere at the site. The magnetic signal, and the association with kiln wasters and putative kilns, suggests the structures might have served as storerooms for workshops in the area. It should also be noted that kiln wasters were found amongst high-energy river shore deposits discovered in auger cores from the southwest of Naukratis. It has not been possible to determine the precise location of the origin of this industrial activity, although Petrie's western 'slag heap'[103] under the modern cemetery is a possible source. Certainly any industrial activity directly to the west of the Great Temenos seems unlikely to have occurred during the use of the pylon, as it would have obscured the processional way to the Temple of Amun-Re. The wasters were found in association with small generic Nile silt body sherds, at a depth consistent with Late Period and Ptolemaic river shore and bank deposits found in the west.

Demography

Trade and industry attracted a significant population and varied demographic to Naukratis. The population of Naukratis at any given time is difficult to calculate, not least because of our poor understanding of the limits of the site during different periods. Judging by our current state of knowledge, the full limit of the settlement at its peak was over 60 ha, excluding cemetery and canals. The peak of the settlement appears to have been the early to mid-Ptolemaic Period, based on excavations and survey finds, though there is significant evidence also for other periods of activity. Late Period levels were reached in the northwest town, and excavated in parts of the 'South Mound'.[104] Late Period pottery was found in the east.[105] Our minimum estimate of the settlement area of 60 ha,[106] combined with conservative estimates of population density based on documentary evidence of 245 people per ha, suggest that the city centre could have accommodated a population of *c.* 14,700 people during its Ptolemaic peak (Table 13.1).[107]

Most demographic models offer only a general population density for the whole settlement area (including public space), they do not take into account the variability between settlements for the different proportions of space taken up by public buildings. Naukratis had large areas of the town occupied by temple precincts, leaving maybe only 43 ha for domestic settlement.[108] An alternative method to blanket population densities by area

99 Husson 1990: 135–6; Müller 2014.
100 Spencer 2013: 172.
101 Marouard 2012: fig. 4.
102 Bailey 2008: 5, concerning 'site 95'; Petrie 1886: 45; Petrie Journal 1884–5: 200; Hogarth et al. 1898-9: 41 site 38.
103 Petrie 1886: pl. 40. However, this is located 200 m downstream of where the auger core was drilled.
104 Spencer 2011: 39; Thomas and Villing 2013: 100.
105 Coulson 1996: 8, 131, fig. 5, field E-E2; Thomas and Villing 2013: 106, table 1.
106 Since presenting this paper, our 2014 season has revealed an extension of the settlement to the northeast in areas previously inaccessible, that means we should revise the area of the settlement to 60 ha. Also auger work in 2014 revealed archaeological remains (but not necessarily structures) at depths beyond the functional limit of magnetometry, suggesting the site may well exceed this. As this paper is based upon the results of the first two seasons and as we do not know whether the full area was simultaneously occupied throughout the settlements history the author has decided to stick with the original discussion of population with the added warning that this this likely a conservative, underestimate of the full population of Naukratis at its peak.
107 245 people per ha is a reasonable estimation for settlements of Ptolemaic to Roman Egypt, based upon documentary and archaeological evidence. Wilson 2011; Bagnall and Frier 1994; Rathbone 1990. The high density of 514 people per ha suggested by Wilson for Alexandria seems excessive when compared to eighteenth and nineteenth century AD Edinburgh and Rome: see Chandler 1987; Barioch 1988. The same density applied to Naukratis would suggest a population of 26,728, or over 20 people per house based on the house density calculated above. Note that Müller is sceptical about a similar excessively high 500 people per ha population density used by Arnold for Aswan: Arnold 2003: 17–18. Instead, Müller prefers a much smaller density, with a population of 1,000–2,000 people for the 12–13 ha site. Müller 2010a: 221–2, 243; 2014.
108 A conservative estimate that assumes the temenos was respected during the settlement's peak. The archaeological evidence suggests that this was certainly no longer the case at some point in the Roman Period.

Table 13.1 Population estimates based upon different population density models.

Source	Calculation notes	People per ha	Hectares	Population
Wilson 2011		185	32[1]	5920
Population of Naukratis based on population density estimates for other Egyptian sites				
Müller 2014		77–167	60	4,620–10,020
Bagnall and Frier 1994[2]	5.3 per household	232–247	60	13,920–14,820
Rathbone 1990	6 per house	237–267	60	14,220–16,020
Arnold 2003		500	60	30,000
Wilson 2011[3]		514	60	30,840
Population of Naukratis based on 'housefuls'				
Alston 2002[4]	6 per house 38 houses per ha	228	43	9,804
Alston 2002[5]	8 per house	304	43	13,072

1 Wilson 2011: 186 table 7.10. Wilson's conservative estimate for the size of Naukratis, of 32 ha, was based on the information available at the time, whilst acknowledging that the site could be as large as 55 ha.
2 Based on a multiplier of 5.3 per household—note households are distinct from housefuls; see also Alston 2002.
3 Population density of Alexandria. Wilson follows Bowman's (2011) suggestion that this high estimate is conceivable given the likelihood of multi-story apartment blocks in the capital.
4 Six per house followed by Wilson 2011 for AD 170s Thmouis. Rathbone 1990.
5 Taking into account that the 3–6 storey structures may contain more than one family or household unit.

is to calculate population by house. The tower houses at Naukratis were large, but densely packed, at *c.* 38 per ha, in a slightly irregular fashion, like those discovered at Buto.[109] If this density of domestic construction extended over all domestic areas of Naukratis, the settlement could have accommodated *c.* 1,634 multi-story tower houses. If the previous demographic density models used are indeed correct, then each tower house would accommodate 9 people, not unrealistic, but greater than most scholars estimates for 'housefuls' of 5.66–8.04[110] for Ptolemaic and Roman Egypt. An estimate based on such 'housefuls' suggests a more modest population of *c.* 10,000–12,000, though as Table 13.1 illustrates, the demographic models applied to various Ptolemaic and Roman settlements in Egypt vary considerably.

Sanctuaries, public buildings and the cemetery

The modern villages of Rashwan, Abu Mishfa and their fields cover the northern part of Naukratis, including the town, cemetery, administrative structures, and the sanctuaries of the Hellenion and temple of the Dioscuri. Archival research confirms that the ancient cemetery excavated by Petrie and Gardner was between modern Rashwan and Abu Mishfa,[111] which also marked the northern limit for the settlement. This area was surveyed and planned, but no plans were published or are preserved in any of the known surviving notebooks by the excavators.[112] We cannot rule out the possibility that other, as yet unidentified, cemeteries serving Naukratis may have existed near the site, as the area excavated by Gardner was both small and predominantly contained early Ptolemaic graves.

The Hellenion, identified and partially excavated by Hogarth in 1899 and 1903,[113] is located under the fields and road east of Abu Mishfa,[114] with its southern limits largely removed in the northeastern part of the lake depression by archaeological and *sebbakhin* activity. Magnetometry results from 2012 and 2013 suggest that parts of the Hellenion structure survive north of Hogarth's excavations, abutted by at least 14 'tower houses' (Figures 13.3–4). Classical Greek, Hellenistic and Ptolemaic pottery was observed on the surface of this area, reflecting the main periods of activity for the Hellenion, as observed by Hogarth during his excavations,[115] and for the adjacent domestic structures. Roman pottery is scarce in this area today, possibly suggesting a decline at this time. However, Hogarth recognised poorly preserved heavily disturbed Roman levels in this area that suggest that the Roman levels were removed by subsequent construction, possibly the building of the modern road. The ground was levelled and the lake depression bank secured by a concrete revetment when the modern tarmac road that encircles the depression was constructed. This northern area is 4 m higher than the bottom of the lake depression, which marks the bottom of the first phase of the Hellenion structure. This means that beneath the fields of Abu Mishfa 4 m of archaeological deposit must still be preserved, likely encompassing all three major phases of the Hellenion

109 Hartung et al. 2007: pl. 20; Marouard 2012: fig. 4.
110 Number of people per house, rather than number of people per family or household. Rathbone 1990: 120; Alston 2002: 70–5; Müller 2010: 223.
111 Gardner 1888: 11, 21–30; Thomas and Villing 2013: 91.
112 Gardner decided not to publish the plan as he did not believe it important (Gardner 1888: 26). Petrie stated 'I have made the survey of the cemetery' while Griffith was excavating the Aphrodite temple (Petrie Journal 1885–6: 98; see also Petrie Notebook 74).
113 Hogarth et al. 1898–9; Hogarth et al. 1905.
114 Thomas and Villing 2013: 90–1.
115 Hogarth et al. 1898–9: 38.

as investigated by Hogarth in 1899 (Figure 13.8). Within the drained lake depression the area was disturbed, with large spoil heaps from the excavations clear on the surface and obscuring the magnetometry. The magnetometry did reveal, however, what might be the continuation of a large mud-brick temenos wall from the earliest phase of the Hellenion, including its southwest corner, though part of this feature is obscured by the spoil heaps. No temenos wall could be made out in the southeast corner, but instead a number of irregular structures at a different alignment, perhaps representing phases of overbuilding. The earliest phase of the 'Hellenion', with its huge mud brick temenos wall, appears to have been built at a slightly different alignment to the subsequent two phases. We should perhaps be cautious before assuming that this poorly understood phase, with only shallow and potentially disturbed deposits,[116] held the same function as the subsequent two phases. All in all, the area of Naukratis covered by known Greek sanctuaries is a significant 3 ha. This is probably an underrepresentation. However, even if there are new discoveries, the area of Greek sanctuaries is never likely to match the huge 8 ha area covered by Egyptian religious space, which occupied the aptly named Great Temenos to the south.

Magnetometry in the southern lake depression revealed irregular structures and spoil heaps left by the excavators within the heavily disturbed town (described above). A significant magnetic feature could be observed here, 150 m long, aligned northeast to southwest, with a semi-circular southern end and what appears to be a parallel return, obscured by the banks of the lake depression, which would make this large feature *c.* 59 m wide. This feature appears to be an earthwork, but whether it is recent (spoil heap?) or ancient is unclear. The northern section was once covered by what appear to be domestic structures mapped by Petrie,[117] now lost or concealed, and part of the middle section is obscured by structures. It is tempting to interpret this as a long earthwork, judging from its scale and form, built against a hill or tell to the northeast, perhaps a stadium or hippodrome. Such structures are known from Memphis and Alexandria.[118] Any such interpretation has to be very tentative, as this could equally be an exceptionally well-organised 150 m long spoil heap left by the *sebbakhin* and excavators, with a semi-circular end. Only archaeological investigation could resolve the question of identification, and also explain the stratigraphic relationship between this feature and the mud-brick houses in this area. The question remains, where in the settlement were the games held that are attested at Naukratis in the third century AD?[119]

The Great Temenos

The south of Naukratis, under the town and fields of El Baradany, was dominated by the massive 298 m × 259 m 'Great Temenos,'[120] an Egyptian temple precinct dedicated to Amun-Re and associated deities.[121] This was enclosed within a massive mud-brick walled temenos and accessed through a monumental 107 m × 24 m pylon built during the reign of Ptolemy II.[122] Houses built over and/or against the Great Temenos wall are clearly represented in the magnetometry and archaeological investigations in the north, west, and south, as set out above. The precise location of the temenos has been the subject of debate, due to the obfuscation caused by subsequent construction.[123] It is often assumed that the survey methods of Petrie, the son of a surveyor, were sound, not least given his highly respected survey of the pyramids at Gizeh.[124] However, a closer look at his work at Naukratis, recorded in substantial detail in his notebooks,[125] suggests his plan may require some revision, as certain inconsistencies and errors can be recognised in his use of levelling,[126] triangulation, tacheometry and offsets.[127] Indeed, Petrie seems to have regularly corrected triangulation measurements of features when he found his own methods unsatisfactory.[128]

The date and layout of the temple precinct of Amun-Re has been the subject of much debate, though Egyptian epigraphic and archaeological evidence, supported by our own results, confirm that a sanctuary must have existed here from at least the sixth century BC.[129] Its precise form and phasing remain elusive, though recent magnetometry and excavation results have greatly improved the information available to us. The picture we now have is of a complicated plan that represents a sequence of phases and a variety of functions. Some suggestions can be made at this stage.

The Ptolemaic temenos can be best described as a rectangular area encircled by a mud-brick wall with a monumental gateway pylon. The area today is represented by a rectangle of fields flanked on all sides by paths, roads and buildings, with most traces of the walls levelled already over 130 years ago. The area covers nearly 8 ha of the site, a significant portion of the settlement.

116 Ibid.: 31.
117 Petrie 1886: pl. 41.
118 Humphreys 1986: 2, 442.
119 Lobel and Roberts 1954: *P.Oxyrhynchus* 2338.
120 Petrie 1886: 23–34; Hogarth et al. 1905: 110–12.
121 Muhs 1994; Leclère 2008: 118, 120, 128–38; Spencer 2011: 40.
122 Petrie 1886: 23–34.
123 Spencer 2011; Thomas and Villing 2013.
124 Petrie 1883.
125 Thomas and Villing 2013: 97.
126 Petrie Notebooks 6: 73–4 (1884–5).
127 Ibid. Petrie's survey methods at Naukratis, including levelling, tacheometry, and triangulation will be the subject of future studies. Preliminary observations have highlighted inconsistences and unexplained errors in both triangulation and tacheometry calculations that may have influenced the accuracy of his survey. It seems Petrie was not quite as thorough in his survey methods at Naukratis as he was with his previous, much acclaimed survey at Giza.
128 Ibid.
129 Yoyotte 1983: 129–36; Leclère 2008: 117; Thomas and Villing 2013: 97.

Though no longer immediately visible above ground, archival work on Petrie's excavations and our own auger cores suggest that 4–5 m of archaeological deposits must be preserved below the fields (Figure 13.9). Ancient structures within the Great Temenos are today partly obscured by a row of ancient or modern (archaeological?) pits, electricity pylons, paths, and irrigation ditches and in some places ancient or at least earlier (Ottoman?) field systems visible in the magnetometry results. However, different phases of temene walls can perhaps be seen in the magnetometry. Of the large rectangular temenos planned by Petrie, there is a small section of the east wall that seems to be revealed by the magnetometry, with an unclear relationship to a ditch feature that crosses it at right angles (see above). A long east-west section of the north wall appears to have been overbuilt and/or abutted by tower houses. The results appear slightly misaligned with that of Petrie's survey (as explained above), though the complicated phases of reconstruction, modification, reuse, overbuilding and destruction are likely to have confused the picture somewhat. Magnetometry moreover appears to detect walls from a smaller (*c.* 4 ha) and potentially irregular shaped temenos within the larger temenos, which presumably precedes it.

Within the temenos area, magnetometry revealed three new structures that were likely a part of the ritual landscape. They include at least two phases of a mud-brick and limestone 'temple'[130] approximately in the area where we would expected to find the temple of Amun-Re: a rectangular feature measuring 47 m × 35 m within a 'T'-shaped structure 51 m × 64 m in size. Though the magnetometry suggests significant modifications of the layout of the sacred space, it is not possible at present to speculate in what order these occurred. This structure appears misaligned with the Ptolemy II pylon,[131] which may be an argument for it being earlier than the pylon (or it would have been aligned with the pylon). Late Period pottery was found in this area.

A smaller 21 m square casemate structure was identified just south of the 'temple'. Such structures were used during the Late Period as chapels or barque-stations,[132] though its phasing and precise architectural relationship with the other structures of the Great Temenos remains unclear, so interpretations of its role remain tentative, as other functions have also been suggested for such structures.[133] South of this is a 46 m long wall section of a third mud-brick structure, largely obscured by recent building activity undertaken since Leonard and Coulson's work in the 1980s. Immediately to the south and east of these three structures was the large 59 m × 64 m casemate building excavated and planned in detail by Petrie, which has good Saïte parallels from Egyptian temple precincts at Tell Dafana and Tell el-Balamun.[134] Within the Great Temenos area, pottery was rarely observed on the surface, as it had been displaced.[135] Material originating from the Temenos area largely dated from the sixth century BC to the Ptolemaic Period, with only a few Roman pieces. More Roman material is preserved within the 3 m tall 'South Mound' excavated by Penny Wilson and previously by Leonard.

Finally, it must be noted that an important discovery was made by SCA inspector Sabri Choucri during the recent construction of a new school building in El Baradany: a large north-south running stone wall.[136] Sabri Choucri exposed a 13 m long, 4 m deep and over 1 m high section of quay, probably part of the monumental quay that functioned as the Nile access to the processional way to the temple of Amun-Re.[137] It was found to the west, and in alignment with, the pylon and traces of a processional way flanked by rams and sphinxes.[138]

Conclusions

Two field seasons at Naukratis, comprising survey, archaeological, geophysical and geological investigations, have shed new light on this important ancient site, its development, and its role in the interconnected landscape of the Egyptian Nile Delta. Their outcome is twofold: we have been able to reassess old fieldwork and provide new data. On the one hand, they have allowed us to revisit and reassess earlier work on the site over the past 130 years in ways previously impossible. A topographical map was created, incorporating all visible archaeological features of the site and integrating in real-world co-ordinates all previous fieldwork by Petrie, Gardner, Hogarth, Coulson, Leonard and Hakim as well as new discoveries. This has made it possible to reassess central aspects of the work of Petrie and Hogarth at Naukratis. Particularly significant are the implications this has for our understanding of the existence, placement and dating of Petrie's 'Great Temenos', long debated in scholarship. It is now beginning to take shape as a busy, complex and multi-period structure that underwent some considerable change in its long history from the Late Period onwards.[139]

On the other hand, a significant amount of new data on the site is emerging. This includes a number of new archaeological features identified through magnetometry in all areas of the site, including densely packed houses, industrial, public and religious architecture, old field systems, canals, and the river bank with its harbour facilities and magazines. It was also possible to assess the minimum extent of the site at its peak and its relation to the river. As is now clear, the settlement extended well beyond the areas excavated 130 years ago, and was skirted on its western flank by the Canopic branch of the Nile, the location of which is now securely identified through magnetometry and geological core drillings. The latter also suggest that the river was navigable for sea-going ships. We can also now propose a likely location for of the river harbour area and the magazines that enabled Naukratis to operate as a major international port. The ritual Nile harbour that was linked via the processional way with the sanctuary of Amun-Re (the 'Great Temenos') is likely to have been located in the area of the recently-built school in the village of El Baradany.

The improved understanding of the site's topography, archaeology, extent, geomorphology and architecture finally allows us to begin to consider the settlement's urban layout and development over time. It appears that the site was densely occupied with traditional Egyptian architecture, tall tower houses and irregular terraced building. Naukratis clearly housed a significant population in the Ptolemaic Period. We cannot exclude the possibility that the site was already densely populated in the Late Period, as excavations and surface survey have revealed late seventh to fifth century BC material in many areas. By the Roman Period, the densely packed domestic housing had crept into the Great Temenos area. Here our magnetometry survey revealed substantial structures from different phases, presenting a complicated and changing layout. Further archaeological work may help clarify the relationship between these structures, their date and function. Similarly in and around the area of the Hellenion, only partially excavated by Hogarth, new features were revealed. Here as elsewhere, the existence of rich, untouched archaeological remains below the fields of Naukratis could be confirmed. It is now clear that previous assumptions that Naukratis was archaeologically 'exhausted' were wrong. A significant depth of archaeology is preserved and future fieldwork is likely to make significant new discoveries at this important ancient site.

130 The identification of the magnetometry signature as likely mud-brick and limestone walls is supported by a disturbed limestone block found in the immediate vicinity (Thomas and Villing 2013: 85, 99, 103).

131 Even if the location of Petrie's plan is incorrect, it is impossible to see how the pylon could have been aligned with the temple unless there is a significant mis-alignment error in Petrie's plan of the Great Temenos in relation to the rest of Naukratis.

132 Spencer 1979.

133 For parallels from Dafana and Karnak, see Leclère 2008: 512–5; Masson 2014.

134 Petrie 1886: 24, pl. 42; Spencer 1996: 55; Spencer 2011: 36; Petrie 1888: 52; Leclère 2008: 134–7.

135 Much had been cleared from the fields and redeposited to the north by a well pump. Thomas and Villing 2013: 99 table 1; see also Coulson 1996: fields G-S1 and G-S2.

136 As reported to us by the local SCA site guard and archaeologists from the SCA office in Damanhour.

137 Thomas and Villing 2013: 93; see parallel in Boraik 2010. The presence of a grand quay was predicted by Yoyotte 1983: 129–36; Leclère 2008: 117.

138 Excavated in December 1885. Petrie 1886: vii; Gardner 1888: 13–14; Spencer 2011: 35–8, fig. 11; Thomas and Villing 2013: 92; Petrie Journal 1885–86: 18–19.

139 Thomas and Villing 2013: 86, 102–3.

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14 Pots and people: Greek trade and votive rituals at Naukratis

Marianne Bergeron

Herodotus' *Histories* (2.178–9) is the earliest textual source that discusses the site of Naukratis. According to him, the site was given by the Egyptian pharaoh to traders from 12 different Greek poleis as a site where they could settle, conduct trade in Egypt, and build sanctuaries to their gods. The archaeological evidence unearthed in the late nineteenth and early twentieth centuries does indeed corroborate much of what Herodotus described. Nevertheless, many questions remain regarding the Greek trading activities in Naukratis.

To what extent the presence of Greek pottery in Egypt is evidence of a Greek presence or of trade remains a matter of debate. Recently, Weber compiled an extensive catalogue of Greek fine wares and transport amphorae that reached the different parts of Egypt, from as far north as Thonis-Heracleion to the south at Elephantine, beginning in the Archaic Period.[1] Wilson showed that Greek pottery found at Saïs, in the western Nile Delta, demonstrated wide-ranging contacts between Egypt and the eastern Mediterranean world. She argued that at Saïs, as well as at other sites—including Daphnae in the Eastern Nile Delta—Greek pottery would have been destined for the Egyptian elite and not resident Greeks, thus suggesting a specifically Egyptian market for Greek goods.[2] Similarly, Villing has also suggested that Greek pottery in Egypt in the seventh and sixth centuries BC would have been destined not only for an Egyptian 'market', but also for Greeks and Carians (traders, mercenaries, and others), residing in Egypt. Villing noted, however, important distinctions in the presence and use of Greek fine wares and trade amphorae, and between Naukratis and the rest of Egypt.[3] At Naukratis, the ceramic evidence, particularly that with Greek votive inscriptions, and Greek sanctuary architecture does confirm the presence of people of Greek origin here and, indeed, more specifically Greeks from a number of the founding city-states listed by Herodotus. In general, it seems that the notion of 'pots = people and trade routes' does appear to apply at Naukratis, as the origin of much of the Greek fine ware assemblage broadly matches the spectrum of cities mentioned by Herodotus.[4] It does not apply, however, to all Greek fine ware pottery groups that are represented at Naukratis, nor does the pottery provide evidence for the presence of all the Greek city-states listed by Herodotus. For instance, Herodotus explains that the Milesians and the Samians were responsible for the foundation of the sanctuaries of Apollo and Hera respectively. Indeed, much of the ceramics found within these sanctuaries originated from these poleis and these same wares were used for cult activities there as well. The presence of Attic, Laconian, and Corinthian fine wares at Naukratis cannot be explained in the same manner as the Milesian and Samian wares. Likewise, the Aeginetans, we are told, were responsible for the foundation of the sanctuary of Zeus, but evidence for an Aeginetan presence is not to be found in Aeginetan fine wares. The present paper will look at two different groups of pottery found at Naukratis during the Archaic Period: Corinthian and Chian fine wares, and compare these with evidence for the same wares at other contemporary Greek sanctuary sites. My aim is to determine, in the first instance, whether their presence at Naukratis constitutes evidence for trade in these fine wares or evidence for personal use by Greek traders and other visitors and, in the second instance, whether the spectrum of shapes that is represented, as well as lacking, at Naukratis might provide some insight into the makeup of the Greek resident population here.

Pottery and trade at Archaic Naukratis

According to Herodotus, the site of Naukratis was granted by Amasis II (570–526 BC) to Ionians from Chios, Teos, Phokaia, Clazomenai, Samos, and Miletos; Dorians from Rhodes, Cnidos, Halicarnassos, Aegina, and Phaselis, and Aeolians from Mytilene.[5] Amasis II granted them permission to live, worship, and carry out trading activities at the site. Herodotus also explained that during the site's earlier days, Naukratis served as the only port where the Greeks could conduct trade in Egypt.

The archaeological excavations at the site, since its discovery in 1884, have demonstrated that trading activities here were carried out on a large scale and indeed involved exchanges in Greek goods. However, hardly any fragments from Greek trade amphorae are preserved from the site, at least for the Archaic and Classical Periods, but this is probably due in large part to the selective manner in which the early excavators recorded and retained finds. Little care was accorded to coarse wares and transport

1 Weber 2012.
2 Wilson 2011: 149–60.
3 Villing 2013: 73–101.
4 For discussions on the equation of 'pots equal people', see Boardman 2004; Tsetskhladze 2009; 2010.
5 Herodotus *Historiae* 2.178–9.

Figure. 14.1 Samian Hera cup from Naukratis. BM 1888,0601.401. (Photo: © The Trustees of the British Museum.)

amphorae (except for stamped handles and inscribed fragments). Recently, Gantès reassessed the situation based on some of the surviving transport amphora sherds and the field reports of Petrie, Gardner, and Hogarth, as well as those by Coulson and Leonard, whose surveys and excavations took place in the late 1970s and early 1980s.[6] As part of the current Naukratis Project, Alan Johnston is compiling a comprehensive catalogue and reassessment of all transport amphorae from Naukratis. Even though evidence is too slim to allow firm conclusions, we may note the presence of East Greek trade amphorae from as early as 600 BC. For instance, some Chian wine amphorae are dated to 600–550 BC and Clazomenian amphorae to 600–525 BC. Chian amphorae continued to arrive at least until *c.* 500 BC. Lesbian and Samian amphorae are attested by *c.* 550 BC at Naukratis, but as Samian amphorae appear earlier elsewhere in the Delta, we may suspect that the delay is due to gaps in the Naukratite record. A number of Samian Hera cups found in sanctuary contexts indicates that Samians, at any rate, were present and active at Naukratis, possibly as early as *c.* 600 BC.

The vast majority of surviving Greek pottery from Naukratis are the inscribed and decorated wares related to activities which occurred in the sanctuaries of Hera, Aphrodite, Apollo, and the Dioskouroi, as well as in the Hellenion. Decorated East Greek, Corinthian, Attic, and Laconian wares were found here in varying numbers, but exactly what their function was in these sanctuaries is not clear. Stissi, for instance, has recently and extensively argued that decorated wares had little practical use in sanctuaries.[7] He prefers to see these vases as gifts offered by dedicants to the individual gods. Pots used for libations and ceremonies would have been rare and possibly made of precious metal. Wares used for communal

Figure 14.2 Milesian Ionian cup with partial inscription from Naukratis. BM 1886,0401.196. (Photo: © The Trustees of the British Museum.)

dining and drinking in the sanctuaries would have been usually plain, banded, or Black Glaze vessels. The case at Naukratis illustrates his argument well as such wares were found in great numbers: in particular, South Ionian cups with graffito inscriptions to Apollo, the previously mentioned Samian Hera cups that also bore dipinto inscriptions to Hera and of which only a few remain, but also simply decorated Chian kantharoi with dipinto inscriptions and chalices with incised dedications to Aphrodite (Figures 14.1–4). In all three instances, the presence of these cups is representative of three of the same groups of people mentioned by Herodotus as having been involved in the foundation of Naukratis.

Similar activities and a similar use of these fine wares has been observed at other contemporary Greek sanctuaries, thus suggesting a continuity of cultic practice between Naukratis and the wider Greek world. Chian kantharoi and chalices have been found in sanctuaries elsewhere, including at Emporio on the island of Chios and at Aegina.[8] The South Ionian banded cups, many of which were manufactured at Miletus and Samos, were also used in the sanctuaries there.[9]

It is interesting to note that Samian Hera cups identical to those discovered in Naukratis were also found in the Heraion on Samos.[10] It has further been suggested by Schlotzhauer that the Naukratite cups may have first been used at the Heraion in Samos and then brought to Naukratis as an *aphidryma* in the deliberate transplantation of cultic objects between sanctuaries.[11] Such vases might have been used in special rituals with the purpose of ensuring the benevolence and protection from Hera at Naukratis.

Not all of the decorated and inscribed pottery at Naukratis originated from the same regions as the founding poleis. While the Chian, Samian, and Milesian pottery might represent the presence of Chian, Samian, and Milesian traders, the Black Figure and other decorated Attic, Laconian, and Corinthian pottery, for instance, does not necessarily represent the presence of Attic and Corinthian traders. Rather, these fine wares were shipped

6 Gantès 2007: 143–55; Petrie 1886; Gardner 1888; Hogarth et al. 1898/1899: 26–97; Hogarth et al. 1905; Coulson and Leonard 1982: 361–380; Coulson 1996; Leonard 1997; 1998.
7 Stissi 2003: 77–9; 2009: 23–43.
8 Boardman 1967: 161–2; Williams 1983: 169–78.
9 Walter-Karydi 1973: 129 cat. no 379; Schlotzhauer 2012: 45–8.
10 Kron 1984: 292–7; Furtwängler and Kienast 1989: 86–8.
11 Schlotzhauer 2006: 313.

Figure 14.3 Chian Type B kantharos with partial inscription from Naukratis. BM 1924,1201.821. (Photo: © The Trustees of the British Museum.)

Figure 14.4 Chian chalice style patterned chalice from Naukratis. BM 1965,0930.399. (Photo: © The Trustees of the British Museum.)

throughout the Greek world and were popular amongst most Greeks. Their presence at Naukratis ought not to be viewed as evidence for direct trade between Athens, Corinth, or Laconia and Naukratis.

Aeginetan traders and Corinthian pottery

Despite Herodotus's identification of the Aeginetans as one of the 12 Greek poleis responsible for the foundation of the sanctuary of Zeus, no Aeginetan fine ware has been found at the site. It is generally accepted that the Aeginetans, during this period at any rate, did not produce any fine wares of their own.[12] They relied on fine wares from other regions including those from Corinth and Attica. The sanctuary of Zeus has not yet been located at Naukratis despite the discovery of a fragment from a monumental dedicatory inscription to Zeus in the region of the sanctuary of Hera.[13] Another later fragment from a monumental inscription to Zeus was also found in the region of the Great Temenos, the large Egyptian sanctuary situated south of the Greek sanctuaries.[14] Finally, a number of votive inscriptions on pottery sherds might also be dedications to Zeus, yet these were found in the regions of the sanctuary of Aphrodite and the sanctuary of Apollo.[15]

Possible evidence for Aeginetan traders at Naukratis comes, in part, in the form of votive inscriptions on Chian kantharoi dated to the second quarter of the sixth century BC. The names 'Aristophantos' and arguably 'Damonidas' appear on dedicated kantharoi both at Naukratis and Aegina. 'Damonidas'—the name being spelled with an alpha—may have been Dorian.[16] Both individuals may have been merchants who were involved in trade at Naukratis and at Aegina. Recently, Johnston has discussed a number of votive inscriptions on early sixth century BC Ionian cups from the sanctuary of Apollo at Naukratis. While he suggests that these inscriptions may be Ionian, Johnston points out that the script employed in these inscriptions might also suggest that some are Aeginetan.[17] While the Chian kantharoi had dipinto dedications including the dedicator's name, thereby making them specially commissioned personal offerings, the Ionian cups bore graffito inscriptions which could have been made at any point after manufacture. Nonetheless, both the kantharoi and cups, none of which are of Aeginetan origin, might provide evidence for an Aeginetan presence at Naukratis.

It has been suggested that perhaps the Aeginetans were responsible for bringing Corinthian vessels, along with Attic and Laconian fine wares to Naukratis, thereby providing further evidence for an Aeginetan presence at Naukratis by way of trade.[18] This is certainly possible, but it is not the only likely scenario, in part because of the popularity of these types of wares elsewhere in the Greek world and in part because of the way in which these vases appear at Naukratis.

Amongst the fine wares excavated in the sanctuaries of Demeter and Kore/Persephone at Taucheira and Cyrene in Cyrenaica, Corinthian pottery features as the largest group of imported pottery. In general, the earliest ceramic deposits at Taucheira date to *c.* 620 BC, whereas the earliest at Cyrene are slightly later, *c.* 600 BC and Corinthian pottery is present in these layers.[19] Products of several workshops were found in large quantities, suggesting that they arrived in Cyrenaica as parts of large batches.[20] The quality of the Corinthian wares at Cyrene

12 Williams 1983: 155; Möller 2000: 76. Morris argues that at least some Middle Proto-Attic pottery (dated to the first half of the seventh century BC) was produced at Aegina; Morris 1984: 19–36.
13 BM 2012,5021.3; Gardner 1888: 68 no. 14.
14 BM 1886,1005.22.
15 From the sanctuary of Apollo: BM 1886,0401.261; from the sanctuary of Aphrodite: BM 1924,1201.840.
16 Williams 1983: 184.
17 Johnston 2013: 103–12.
18 Möller 2000: 76; Schaus 2006: 179.
19 Boardman and Hayes 1966: 13; Schaus 1985: 106.
20 Boardman and Hayes 1966: 21; Kocybala 1999: 99.

Table 14.1 Corinthian vase painters and groups represented at Naukratis.

Corinthian Period	Corinthian Vase Painters and Groups	Number of Vases at Naukratis	Registration Numbers
EC/MC	Warrior Group (with no individual painters identified)	8	1–3) Cambridge Museum of Classical Archaeology NA185, NA186, and NA187; 4-6) Oxford AN1896-1908-G.120.30, AN1896-1908-G.127.2, and AN1896-1908-G.127.3; 7–8) British Museum 1886,0401.1298 and 1886,0401.1211
Late EC/Early MC	Detroit Painter (possibly)	1	British Museum 1888.0601.562
MC	Klyka Painter	2	1) Cambridge Museum of Classical Archaeology NA173 and NA174; British Museum 1924,1201.1305, 1924,1201.1155, and 1924,1201.1304. 2) Oxford AN1888.185
MC	Ophelandros Painter (possibly)	1	British Museum 1886,0401.789
MC	Otterlo Painter (Near) or Gorgoneion Group	1	Bonn 697.82
MC	Painter of Athens 931	1	British Museum 1886,0401.1054, 1886,0401.1043.a, 1886,0401.1043.b, 1886,0401.1009, probably 1886,0401.994, and possibly 1886,0401.1008
MC	Scale Painter (probably)	1	British Museum 1886,0401.1143
MC	Scale Pattern Group (possibly)	4	1) Cambridge Fitzwilliam GR.6.1894 and British Museum 1924,1201.1219. 2) AN1888.185 [n]. 3) 16876. 4) Cambridge Museum of Classical Archaeology NA177
MC	Blaricum Painter	1	Cambridge Museum of Classical Archaeology NA183
Late MC/Early LC	Kalauria Painter (possibly)	1	British Museum 1888,0601.194
LC I	Hippolytos Painter (near)	1	Bonn 697.80

ranges from good to mediocre and includes a variety of plainer vessels as well.[21] Similar observations were made at Taucheira.[22] Furthermore, the range of shapes is varied too. Approximately 33 per cent of the Corinthian wares at Cyrene are associated with personal use (i.e., alabastra, aryballoi, exaleiptra, pyxides, and amphoriskoi). Kotylai, used in wine consumption, make up approximately 50 per cent of the regular-sized pots. Miniatures, which have a purely votive purpose, make up approximately 33 per cent of all finds and most of these are kotylai and Black Glaze hydriai. Less than three per cent of the Corinthian wares are associated with food consumption, thus suggesting that such vessels, including bowls and lekanides, were supplied either locally or from other Greek regions.[23] Again, a similar pattern has emerged at Taucheira.[24]

At Naukratis, amongst the surviving Corinthian fine wares, there are some similarities with the Corinthian material at Taucheira and Cyrene, but there are also some noticeable differences. First and foremost, the Corinthian fine wares at Naukratis constitute a small group, only approximately four per cent of the whole assemblage as preserved. The range of Corinthian shapes at Naukratis includes vases for personal use and drinking, but the overall numbers are fewer than those observed in Cyrenaica. Furthermore, there is no evidence for batch imports. The products of a few workshops have been identified, but the numbers associated with these workshops are small (Table 14.1). In terms of quality, the vases at Naukratis are largely average.

Corinthian vessels associated with food consumption at Naukratis are few; perhaps such vessels were supplied by other Greek regions or perhaps as plain, non-inscribed wares, the excavators chose not to keep them. Similarly, only a small number of miniature vessels were found or kept: five kotyle fragments and a single alabastron.[25]

Perhaps most interestingly, however, is the fact that some Corinthian shapes that are typically found in large numbers in Greek sanctuaries are almost entirely absent at Naukratis. As mentioned previously, objects associated with personal use were recorded at Naukratis, aryballoi and alabastra in particular. These small unguent jars were common sanctuary dedications during the early part of the sixth century BC throughout the Greek world.[26] Other similar objects that were commonly found in sanctuaries are amphoriskoi, exaleiptra, and pyxides. At Naukratis, however, these were rare. To date, we know of only one exaleiptron, one amphoriskos, and very few

21 Kocybala 1999: 97.
22 Boardman and Hayes 1966: 21.
23 Kocybala 1999: 98 note 653.
24 Ibid.: 99; Boardman and Hayes 1966: 24.
25 Kotylai: Royal Ontario Museum 910x234.16, BM 1924,1201.1181; 1924,1201.1180, 1924,1201.1179, 1924,1201.1154; alabastron: BM 1886,0401.1471.
26 For instance at Aegina, where Corinthian aryballoi and alabastra were found in large numbers in the sanctuary of Aphaia. Here, Corinthian pottery featured as the largest group of imports and whilst only the aryballoi and alabastra from the site were ever published, Neeft also refers to the Corinthian pyxides, exaleiptra, and kalathoi excavated there: see Neeft 1993: 543–69.

pyxides (five lid fragments and eight body fragments).[27] Although Venit suggests that such absences are probably not significant, that cannot be so, because the types of wares and shapes, in general, can also be important indicators of the types of activities occurring within the sanctuaries.[28] Likewise, the absence of certain wares and shapes may be equally revealing and serve to shed some light on the members of the worshipping communities.

Currently, very little is known about the Greek community at Naukratis: who lived here and how were the sanctuaries and the larger community administrated? Much of what we know comes from the ancient literary sources, first and foremost Herodotus, who wrote about the Greek merchants from the founding poleis who were also given permission to live at Naukratis. Other literary sources mention the famous *hetairai* who also resided (perhaps temporarily) at Naukratis and whose beauty was much appreciated by the visiting and resident traders.[29] Inscriptions on Chian kantharoi bearing the names of women have been found at Naukratis. These inscriptions have been used to support historians' claims of the presence of *hetairai* at Naukratis. That these personalised dedications demonstrate the presence of women at the site and more importantly as active participants in cult activity at Naukratis, seems clear, but there is no reason to suppose that all or any of these women were *hetairai*.[30] Beyond this, virtually nothing is known about women or children amongst the Greek population at Naukratis.

Further to this is the possibility of intermarriage between Greeks and natives at Naukratis. Certainly, there is some evidence from the ancient sources, in general, regarding intermarriage between Greek men and native women. Perhaps the clearest example of intermarriage comes from Herodotus, who wrote about the Therans who founded Cyrene and how, according to the Theran version of events, the colonising party consisted of one adult male from each family of the seven cities at Thera.[31] Herodotus then explained that Cyrenaican women, like the Libyan nomads, did not eat cow's meat, thus suggesting that the Theran men, upon arrival in Libya and having founded Cyrene, married native women.[32] This does not remove the possibility that some Greek women may have accompanied their husbands to Libya, but no mention of them is made by Herodotus.

Archaeology too is often cited as evidence for intermarriage, for instance, the burials at the site of Pithekoussai in Ischia. Whether Pithekoussai was first meant to be an *emporion* or an *apoikia* when it was founded in *c.* 760 BC is a matter that has excited much debate over the years.[33] What is clear, however, is that people of Greek, Phoenician, and Italic origin settled here and were involved in trade and metallurgy. Here, the eighth century BC cremation and inhumation burials suggest the presence of people of different origins living side by side. Some archaeologists have argued that the presence of fibulae of distinctive local manufacture in Greek burials at Pithekoussai demonstrates the practice of intermarriage between Greeks and natives: native women would have adopted the Greek way of life but kept their native dress type.[34] However, as Shepherd points out, much in the same way that 'pots do not always = people', there is no reason to exclude the possibility that Greek women, some of whom may have accompanied the Greek men to Pithekoussai or perhaps arrived shortly afterwards, could have appreciated Sicel and Italic metalwork and made use of it for themselves.[35] D'Agostino further suggested that that the presence of impasto vessels in burials also serves as evidence for intermarriage between local women and Greek residents.[36] Most recently, Kelley, taking as an example Tomb 678 (the Carpenter's Tomb), argued that the existence of different burial customs in the single grave was not necessarily evidence for intermarriage, but rather the adoption and combination of Greek, Phoenician, and native material culture which combined to create a unique Pithekoussan identity.[37]

Unlike Cyrene, but perhaps not entirely unlike Pithekoussai, Naukratis was not an exclusively Greek site. To what extent the Greeks and Egyptians here interacted is not clear. Nonetheless, the possibility of intermarriage does exist, whereupon a Greek merchant may have taken on an Egyptian wife who then adopted the Greek way of life.[38] Certainly, some evidence for the

27 Exaleiptron: Boston 86.516; amphoriskos: BM 1924,1201.1218 and 1965,0930.753, which are joining sherds; Pyxides: Paris AM1360 (13), Heidelberg I32, Oxford AN1896-1908-G.1143, AN1896-1908-G.133.3 and AN1896-1908-G.1245, BM 1886,0401.1149, 1924,1201.1172 and 1924,1201.1140; pyxis lids: A.1792, Cambridge Museum of Classical Archaeology NA176, BM 1886,0401.1137, 1886,0401.1104 and 1886,0401.1136.
28 Venit 1982: 18–9.
29 See *infra* note 4.
30 Williams 1983: 185; 2006: 131; British Museum 1924,1201.824; 1924,1201.755; 1924,1201.809; Oxford AN 1896–1908-G.114.7.
31 Herodotus *Historiae* 4.150–9.
32 Ibid.: 4.186; Shepherd 1999: 268–9.
33 For a discussion on the purpose of the site see Ridgway 1992: 107–9.
34 Buchner 1975: 79
35 Shepherd 1999: 275, 294.
36 D'Agostino 1999: 59–60.
37 Kelley 2012: 252–5.
38 It appears that during the twenty-sixth dynasty, Greek and Carian mercenaries fighting alongside the Egyptian army had permission from the pharaoh to settle in Egypt. It has been argued that these foreigners had the right to intermarry (Möller 2000: 34). There are early sixth century BC inscriptions on the statue of Ramesses II at Abu Simbel carved by Greek mercenaries. One in particular, mentions Psammetichos, son of Theocles, who may have been the son of an Egyptian mother and Greek father (Hall 2002: 102; Bernand and Masson 1957: 1–5, (D9, jG, XVIII)). A later example of intermarriage between a Greek and Egyptian exists in the form of a granite colossal statue of Horemheb from Naukratis that dates from the Ptolemaic Period. The sculpture bears an hieroglyphic inscription from the dedicant describing himself as the son of a Greek father and Egyptian mother (Cairo CG1230; Yoyotte 1994–95: 672–3; Agut-Labordère 2012: 369).

Figure 14.5 Corinthian globular aryballos from Naukratis. BM 1888,0601.651 E-MC. (Photo: © The Trustees of the British Museum.)

Figure 14.6 E-MC Corinthian alabastron from Naukratis. BM 1886,0401.1210. (Photo: © The Trustees of the British Museum.)

presence of Egyptian women at Naukratis appears in the form of Late Period Egyptian fertility terracotta figurines found in the settlement.[39]

Returning to the Corinthian fine wares and their possible uses in the sanctuaries at Naukratis, certain vessels such as amphoriskoi, alabastra, and aryballoi, i.e., perfume containers, are most often associated with women (Figures 14.5–6). However, there is also evidence to support that these shapes could be used also by men, including representations on vases and in sculpture. For instance, a late Archaic Attic Black Figure alabastron by the Theseus Painter shows a clothed male, presumably a vendor, holding an alabastron in his left hand and handing a dipstick coated in perfume to a naked athlete.[40] In another example, a late Classical grave stela depicts a naked boy looking up at a young man or youth, presumably an athlete. The boy holds a strigil and globular aryballos in his hands.[41] Some ancient sources also highlight the importance of coating an athlete's skin in oil.[42] Admittedly, these are athletes and there is no evidence to suggest the presence of athletes early on at Naukratis.[43] Unguent jars are also sometimes found as burial offerings in men's graves.[44] Yet as oil may have been used to anoint the deceased, the use of such oils is not specific to one gender over another. In a recent article, Massar argues that there is no direct link between the anointment of the body of the deceased and the perfume containers found in burials. She questions whether these mass-produced late Hellenistic unguentaria, which appear regularly in burials and are so often of such poor quality, could have been used prior to their final use as burial offerings. [45] Rather, she prefers to see the unguent jar as having a specific symbolic role within the funerary vase set. Nonetheless, the iconography and the literature, at any rate, do demonstrate that some men did use unguents.

Pyxides are cosmetic or jewellery containers and these are also most typically associated with women (Figure 14.7). Pyxides found in sanctuary contexts may have contained other items including incense, as demonstrated on an Attic Red Figure kylix. The image on the tondo shows a woman holding a pyxis containing incense in her left hand and burning the incense in a brazier (Figure 14.8).[46] Milne suggested that the word the Greeks used for 'pyxis' during the Classical Period was *kylichis* and not only was the shape used to contain cosmetics or incense, but it was also used as a physician's box.[47] More recently, Oakley, in his article on Attic Red Figure pyxides, argued that Type D pyxides were used by men as well. In at least one case, such a pyxis was found in a man's grave.[48] We have no information to

39 Examples include Cambridge Museum of Classical Archaeology NA 587 and NA 598.
40 Hatzivassiliou 2009: 232, fig. 8.
41 Malibu 73.AA.84.
42 Lucian *Anacharsis* 24; Pliny the Elder *Naturalis Historia* 15.4–5.
43 A first century AD gold diadem was found at Naukratis bearing an inscription with the name 'Tiberius Claudios Artemidoros' (BM 1886,0401.1765). He is mentioned in some ancient sources as an Olympian who partook in the Pankration. Perhaps, during his travels to Alexandria, he left his diadem as an offering in one of the sanctuaries. Pausanias *Graeciae Descriptio* 6.14.2–3.
44 At Pithekoussai, for example, see T.149, T.167, and T168. Buchner 1993: 184, 211–2, 212–23.
45 Massar 2009: 315.
46 BM 1836,0224.167.
47 Milne 1939: 247–54.
48 Oakley 2009: 63.

Figure 14.7 M-LC I Corinthian tripod pyxis from Naukratis. BM 1886,0401.1149. (Photo: © The Trustees of the British Museum.)

Figure 14.8 Attic Red Figure kylix by the Chicago Painter, from Nola. BM 1836,0224.167. (Photo: © The Trustees of the British Museum.)

determine that the deceased made use of such a vessel in life. Nonetheless, the pyxis, which might have been used primarily by women, was not necessarily exclusively a woman's vase.

The exaleiptron is also frequently found in burials and in sanctuary contexts. There has been much debate over the purpose of the exaleiptron, with some scholars favouring a use similar to the pyxis as a perfume container, exclusively by women. Others prefer to see the vessel as a type of unguent jar used in symposia, thus, perhaps also by men.[49]

Perhaps certain shapes were specific to certain cults and thus found more frequently in some sanctuaries than in others? Unfortunately, with the exception of four pyxides found in the sanctuary of Apollo, in most cases at Naukratis it is not clear in which sanctuary the Corinthian wares were found as the excavators left little information behind.[50] However, at the Heraion at Delos, for instance, Corinthian wares made up the majority of votive offerings and aryballoi, alabastra, and amphoriskoi were the most common shapes.[51] Exaleiptra were also found, but in fewer numbers, and pyxides were rare.[52]

As Stissi recently claimed, while unguent jars and pyxides were popular dedications in Greek sanctuaries, particularly in the early sixth century BC, they had no obvious specific use in the ritual activities in the sanctuary. Perhaps it was their contents that were the primary offering.[53] If it was not for their contents, Stissi suggests that their presence there might be seen simply as a gift.[54] It stands to reason however, that in order for an object to be deemed good enough to offer to a deity, that it must have had some meaning to the donor. As dedications, the high numbers of these vases in most Greek sanctuaries might be attributed to the possibility that they were deposited, perhaps in large part by women, but also by some men. Their low numbers at Naukratis might be attributed to the possibility that, given the scarce evidence for women at Naukratis, there were fewer women here, whether of Greek origin or Egyptian women who had adopted a Greek way of life, and therefore fewer people here to offer them.

By the late seventh century BC, when the earliest Corinthian material arrived at Naukratis, Corinthian wares were common at sites throughout Greece. The Corinthian wares found at Naukratis may have arrived via a number of different trade routes: for instance, from mainland Greece southwards to Cyrenaica, where large amounts of Corinthian wares were uncovered.[55] Perhaps some of the Corinthian fine wares at Naukratis came via Cyrenaica, but it is worth noting that there are few parallels regarding the products of specific workshops.

The presence in Cyrenaica of East Greek wares and amulets made at Naukratis suggests the existence of trade routes heading westwards from the East Greek islands via Naukratis. Given the presence of Corinthian fine wares in East Greece, including Miletus and Samos, but very little, it seems at Chios, these Corinthian fine wares may have arrived at Naukratis via a westwards trade route. But the distinctly different pattern for Corinthian fine wares at Naukratis suggests that the wares trickled in, perhaps in large part between 595–570 BC (when they were most popular), not as part of cargo as there is no evidence for batch imports, but as individual objects probably purchased somewhere else along a trade route, with the specific intent to be offered as dedications at Naukratis, possibly from merchants, Aeginetan or otherwise.

49 Kreuzer 2009: 27–8; Pernice 1899: 60–72; Burrows and Ure 1911: 72–99; de la Genière 1980: 31–62.
50 BM 1886,0401.1149; 1886,0401.1137; 1886,0401.1104; 1886,0401.1136.
51 Dugas 1928:67–78.
52 Ibid.: 80–1.
53 Stissi 2003: 78.
54 Ibid. 2009: 29.
55 Schaus 1985: 107.

Figure 14.9 Chian Wild Goat Style kernos from Naukratis. BM 1888,0601.152.b. (Photo: © The Trustees of the British Museum.)

Figure 14.10
Chian Wild goat Style phallus cup. BM 1924,1201.178 and 1888,0601.496.a-c. (Photo: © The Trustees of the British Museum.)

Chian Traders and Chian Pottery

Chian pottery at Naukratis displays some distinctly different patterns from the Corinthian pottery. First and foremost, we know that the Chians were directly involved in the foundation of the *emporion* at Naukratis and it is possible that they were also responsible for the foundation of the sanctuary of Aphrodite, to judge from the large number of Chian ritual vase sherds and those with votive graffito and dipinto inscriptions that mention Aphrodite. Herodotus credits the Milesians with the foundation of the sanctuary at Apollo.[56] A large number of Chian sherds were found in this sanctuary, many of which had graffito dedications to Apollo. The majority of vase offerings found in the temenos here at Naukratis originate from South Ionia, including from Miletus, and the numerous votive dedications to 'Milesian Apollo' further support this attribution (Figure 14.1).[57]

Unlike the Corinthian wares, Chian pottery is preserved in large numbers, approximately 30 per cent of the total extant body of Greek fine wares. It is, in fact, the largest assemblage of Chian pottery in the Greek world outside of Chios. Several sources inform us that Chians were producers of fine wines and mastic oil and we know that their amphorae reached many areas of the ancient world including mainland Greece, the Aegean islands, the Black Sea region, and North Africa, including Naukratis.[58] As producers of fine ware vessels with distinctive shapes and slip, they found a market for these as well. It ought to be pointed out however, that the market for these decorated wares was mostly, although not exclusively, confined to the East Greek world. A significant amount of Chian fine wares was found at Berezan on the Black Sea coast and a small number of Chian fine wares have been found as far west as France and as far north as the Ukraine and Russia.[59] In all likelihood, these fine wares were shipped here alongside transport amphorae and other goods as a secondary cargo.

The earliest Chian wares at Naukratis belong to two stylistic phases that can be dated to between 630–600 BC (Wild Goat Style and Patterned chalices), but given the lack of other imports dating as early as the third quarter of the seventh century BC, we may conceive the dating of the Chian wares weighing more towards the final decade of the seventh century BC. The earliest Chian shapes at Naukratis fall into two groups. The first group comprises vases used in ritual drinking, notably chalices, which, together with the later kantharoi, were the most common shapes found here. Other vessels associated with ritual drinking and eating were bowls, dishes, and dinoi.

The second group consists specifically of ritual and votive shapes such as kernoi (Figure 14.9), which are often found in sanctuaries as well as in burials.[60] Phallus cups have an obvious connection with Aphrodite

56 Herodotus *Historiae* 2.178.

57 Schlotzhauer 2012:43–8. Examples include BM 1886,0401.682; 1886,0401.672; 1886,0401.737; 1886,0401.667.

58 For Chian amphorae found in the Punic Amphora Building in Corinth, see Williams 1978: 17–19. For Chian amphorae found in region of the sanctuary of Aphaia at Aegina, see Johnston 1990: 38–40. For Chian amphorae at Berezan on the Black Sea coast, see Dupont 2005: 46–50. For Chian amphorae at Carthage, see Bechtold and Docter 2010: 102. For information on Chios' production of mastic oil, see Pliny the Elder *Naturalis Historia* 12.72.

59 Ilina 2005: 70–173. For the distribution of Chian fine ware, see Lemos 1991: 191–208.

60 For kernoi used in sanctuaries: Athenaios *Deipnosophistae* 478d; 500d; Pausanias *Graeciae Descriptio* 8.42.11; Boardman and Hayes 1966: cat. no 1446. As burial offerings, kernoi have been in use since the Bronze Age, particularly in Cyprus; for example, see from Tomb 521 at Amathus in Karageorghis and Iacovou 1990: 91–2, pl. VIII, no. 96.

Figure 14.11 Animal Chalice Style Chian chalice-krater. BM 1888,0601.463. (Photo: © The Trustees of the British Museum.)

(Figure 14.10). Two Chian phallus cups are attested at Naukratis, as well as sherds belonging to possibly three more.[61] To date, we know of only one other Chian phallus cup elsewhere, a single sherd from the acropolis at Athens.[62] The phiale mesomphalos was also found in large numbers at Naukratis (Figure 14.11). The phiale shape was a common one to most Greeks and it had a specific ritual purpose in the pouring of libations.[63]

Two other shapes deserve a special mention: the chalice- and skyphos-kraters (Figures 14.12–13). The chalice-krater is quite simply a larger version of the chalice, yet would have been too large to drink from, while it was equally inappropriately-shaped to mix wine with water. Perhaps it was used to represent the deity's portion of wine, thus giving it a ritual and/or dedicatory use? A similar use has been suggested for other large-scale cups, for instance, Attic Red Figure parade cups. These large kylikes are too large to drink from and the iconography is elaborate and usually depicts scenes from mythology, thus, as Tsingarida suggests, they must have been made for heroes and gods, perhaps specifically for the *Xenia*, during which the Greeks entertained heroes and gods.[64] Elsewhere, such banquets are associated particularly with the Dioskouroi, yet, to date, only two sherds from chalice-kraters have been identified as possibly coming from the sanctuary of the Dioskouroi at Naukratis.[65]

The skyphos-krater is a large stemmed bowl with relatively low walls and a domed lid. It is unlikely to have been used as a mixing bowl, but could have been appropriate to serve food. It may have found its place in dining activities in the sanctuary.

In the second quarter of the sixth century BC, kantharoi became popular at Naukratis (Figure 14.3). These simple and largely undecorated cups bore dipinto dedications that included the name of the deity and the name of the dedicator. Thus these cups might have served a dual purpose in sanctuaries: they were used for drinking first and then left behind as votives.

Taking a look first at other Greek sanctuary sites, a number of different patterns in the Chian pottery repertoire emerge. At the sanctuary of Aphaia at Aegina,

61 1. BM 1888,0601.496.a–c and 1924,1201.178; 2. BM 1888,0601.496.d; 3. BM 1924,1201.186; 4. BM 1924,1201.203 and 1924,1201.550; 5. Brussels A.1788.

62 Athens Acropolis Museum no. 5043.

63 For the use of phiale as depicted in iconography, see Cambridge Fitzwilliam GR.P.13, from Naukratis; BM 1890,0730.1 from Kyzikos; Herodotus *Historiae* 7.54.

64 Tsingarida 2009: 195.

65 Burkert 1985: 107, 213; Boston 88.1077; BM 1888,0601.355.

Figure 14.12
Chian Sphinx and Lion Style Skyphos krater lid. BM 1888,0601.547.a. (Photo: © The Trustees of the British Museum.)

where cultic activity predates that at Naukratis, we may notice an absence of Wild Goat Style vases and Patterned chalices. The earliest Chian wares date to 610–580 BC. The main shape here is the chalice. Numerous inscribed kantharoi similar to those at Naukratis and bearing the name of at least one of the same dedicants as at Naukratis were also found.[66] There are very few chalice-kraters and phialae and no kernoi. It would appear that the Chian vases at Aegina were primarily related to ritual drinking.

In all likelihood, these drinking vessels arrived alongside Chian and other amphorae. Evidence for trade in Chian wine at Aegina, albeit from a later period, comes from fragments of Chian wine amphorae that were unearthed in the terrace fill prior to the construction of the second stone temple of Aphaia in the late sixth century BC.[67] Johnston comments on the similarities between the amphora sherds here and those from the Persian destruction layer in the Athenian Agora.[68] Some North Ionian, possibly Clazomenian, amphorae might date as early as the sixth century BC, but, in general East Greek trade amphorae appear later at Aegina.[69] Johnston suggests that the lack of earlier wine amphorae here might be attributed to the use of wine skins.[70]

Similarly at the sanctuaries of Demeter and Kore/Persephone at Cyrene, Chian chalices and only a few chalice-kraters, skyphos-kraters, and phialae were observed. Furthermore, a few bowls, dishes, and at least one oinochoe were also identified.[71] Elsewhere at the site, Chian fine wares were found, as were a number of Attic, Chian, Lesbian, Clazomenian, Corinthian, Laconian, and Samian amphorae.[72]

At Taucheira, the principal shape found was the chalice, but at least one skyphos-krater, one phiale and a small number of chalice-kraters were also recorded.[73] Chian, Corinthian, Samian, and Lesbian wine amphorae from the same period were also noted.[74] The East Greek goods here, as well as those at Cyrene, in particular suggest that these cities were stops on trade routes that partly involved Naukratis, certainly no later than the early sixth century BC and fine wares likely accompanied shipments of wine amphorae.

Much of the Chian decorated pottery at Naukratis was likely brought by Chian merchants who sold wine

66 Williams 1983: 184.
67 Ibid. 1983: 183; Johnston 1990: 38–40.
68 Ibid 1990: 39.
69 Ibid. 1990: 37–64.
70 Ibid. 1990: 61.
71 Schaus 1985: 77–85.
72 Mei 2006: 491–2.
73 Boardman and Hayes 1966: 57–63; 1973: 26.
74 Ibid. 1966: 137–9; 1973: 61–4.

Figure 14.13 Chian Chalice Style phiale mesomphalos from Naukratis. BM 1886,0401.1073. (Photo: © The Trustees of the British Museum.)

and oil in exchange for other goods and who left these decorated wares in the sanctuaries as votive offerings. If so, we would expect Chian cultic practice back home to be reflected in the Chian votive activities at Naukratis. And yet, there is one major difference between the evidence at Chios and that at Naukratis in the use of certain vessels for drinking activities. On Chios itself, we first note that there is a certain amount of similarity between the ceramic assemblage at Naukratis and in the sanctuaries at Emporio, situated on the south coast of Chios. At Emporio, two Greek sanctuaries were excavated. The first, the sanctuary of Athena, was situated inland on the south slope of Mount Prophetis Elias. Cult activity at the site began in the eighth century BC and continued until the mid-fourth century BC.[75] The second sanctuary, the Harbour sanctuary by the harbour south of Mount Prophetis Elias, was recently identified as a sanctuary dedicated to Apollo.[76] Finds here date to between the ninth century BC and the early fourth century BC.[77] The sanctuary of Athena and the sanctuary of Apollo at Emporio produced large amounts of Chian pottery. Yet the two sanctuaries, in use at the same time, produced assemblages of different character.

The sanctuary of Athena on the slope of the hill probably served primarily the local community. Here, imports were very rare and offerings consisted of likely personal dedications, including arrows and spear heads, as well as other typical votive offerings such as terracotta figurines, locally-made cups, and other vessels with inscribed dedications. Imports from elsewhere in Greece, including those from Corinth, as mentioned earlier, and from Attica were more common at the Harbour sanctuary, but these were found in only small quantities. Some personal offerings found at the Harbour sanctuary, such as fish hooks, suggest an association with the sea. Weapons here were few, but a number of rings and other pieces of jewellery were also left. As the Harbour sanctuary was situated by the shoreline, in addition to serving the needs of the local community, it may have been utilized in part by travelling merchants.

The typical vase shapes at both sanctuaries are chalices, again the most commonly found shape, kantharoi and other cups, bowls, plates, and jugs. Kernoi, phialae, and other specifically ritual shapes were also found. Interestingly, there is little evidence for kraters[78] and none for dinoi in the repertoire of the sanctuary of Athena and yet stemmed kraters with Geometric and Sub-Geometric decoration were the most commonly found large vessel shape at the Harbour sanctuary until *c.* 600 BC. Only a very small number of North Ionian and other East Greek kraters were found in the early periods of the Harbour sanctuary. After 600 BC, the local krater disappeared entirely at Emporio and only very few Attic Red and Black Figure kraters were left as offerings at the Harbour sanctuary.[79] Dinoi, whether locally-made or imported, are very rare at Emporio.[80] In the sanctuary of Athena at Emporio, it appears that kraters and dinoi did not have a place in the rituals performed.

A similar picture emerges from the sanctuary of Apollo at the site of Kato Phana on the south coast of Chios west of Emporio, though it must be noted that still very little has been published from excavations at this site, making it dangerous to draw conclusions.[81] Cult worship here began during the Late Mycenaean Period.[82] The kraters found here were Geometric and Sub-Geometric stemmed kraters and according to Boardman, they were produced in the same workshop as the vessels from Emporio.[83] No mention is made of dinoi. There was some imported pottery from East Greece, Corinth, and Attica, but the vast majority of wares were local. Also found were some faience scarabs and amulets produced at Naukratis.[84]

Perhaps these differences regarding the presence of mixing bowls at the sanctuaries can be attributed to different vessel preferences. Perhaps the dedicants at the sanctuary of Athena preferred to use metal vessels, of which no trace remains, to mix their wine with water. A few sherds from large bowls, comparable to kraters, were also found at Emporio. These large bowls might have been appropriate substitutes for mixing bowls.[85] We may also consider that if Chians were not the only ones worshipping at the Harbour sanctuary, then perhaps the presence of imported kraters here and their absence at the sanctuary of Athena might be explained as votives

75 Boardman 1967: 5.
76 Rougou 2012: 133–46.
77 Boardman 1967: 22, 61–2.
78 Only three stemmed krater sherds were recorded: Boardman 1967: 106.
79 Ibid.1967: 105–9 (for locally-made kraters), 150 (for East Greek kraters), 155–6 (for Attic kraters).
80 Ibid. 1967: 115.
81 Kourouniotis, 1915; 1916; Lamb, 1934–1935: 138–164; Beaumont 2007; Beaumont et al. 1999; 2004.
82 Beaumont et al. 2004: 253.
83 Ibid. 2004: 217–21; Boardman 1967: 109.
84 Lamb 1934–1935: 152–5; Beaumont et al. 1999: 269.
85 Boardman 1967: 115–6.

left behind by visitors. From what we know about cultic activities in Greek sanctuaries, wine consumption did occur and mixing bowls are regularly found.

The evidence at Naukratis shows that the Chians did produce dinoi. Interestingly, a small number of dinos fragments were excavated from burials at Rizari on Chios, thus suggesting that Chians had a funerary, indeed a ritual, purpose for their dinoi.[86] They, however, apparently did not use the shape within the context of ritual drinking in their own sanctuaries. The presence of no fewer than 31 Chian dinoi at Naukratis demonstrates that someone at the site was using the Chian mixing bowl. It appears that a small group of Chian potters was producing dinoi for a market that was not entirely their own. Perhaps they were aware of decorated dinoi being sought after in sanctuary contexts and capitalized on this by exporting specially-made bowls. Perhaps Chian dinoi found at Naukratis were purchased at Chios by non-Chian traders who then shipped them abroad. This would suggest that certain Chian goods were shipped not only by Chian traders, but also moved within a wider network. If so, one might expect to see some of these locally made vessels also in the Harbour sanctuary at Emporio, if indeed this was frequented also by a non-local clientele. Indeed, a very small number of dinos sherds were found here.[87] If these dinoi were exported on a large scale, one might expect to find a greater number of them at sites where other Chian wares are found. There are no Chian dinoi at Taucheira, Aegina, and Cyrene, however, where Chian chalices and other drinking shapes were found in significant numbers. Chian dinoi have been identified as only a few isolated sherds in a small number of sites.[88] At Histria for instance, a single Chian dinos sherd was found, but the presence of a number of contemporary North Ionian column kraters and even more Corinthian and Attic Black Figure mixing bowls suggests that visitors to the sanctuary used such bowls.[89] It seems that this Chian production of dinoi was carried out only on a small scale and its focus was on Naukratis.

If merchants arriving at Naukratis brought their own banqueting equipment for dining activities in the sanctuaries, then perhaps the Chian dinoi were brought to Naukratis by non-Chian merchants, who knew the shape well and found the Chian version suitable for their needs. These vessels may also, in part, have been shipped to Naukratis to be sold on to Greek traders residing here for use in a way they were not originally intended. No matter how few, the Greeks here would have required wares for dedication and for participating in ritual banqueting at the various sanctuaries.

The only known Chian type of mixing bowl at Naukratis is the dinos and this Chian shape first appeared in the earliest phase of the site and persisted until *c.* 580 BC. Its decline in popularity after *c.* 580 BC might be attributed to the increased popularity of both Attic and Corinthian Black Figure mixing vessels. Between 595–570 BC, Corinthian kraters were found in surprising numbers at Naukratis and Attic Black Figure kraters and at least one dinos also appear in large numbers beginning at approximately the same time and lasting through to the end of the sixth century BC.[90] It bears repeating that while these new mixing bowls were popular throughout most of the Greek world, the lack of locally-made and imported mixing bowls, including those of Attic and Corinthian origin, on Chios suggests that the Chians appear to have been largely uninterested in them. The relatively short production span for the Chian mixing bowls versus the Chian drinking cups (both chalices and kantharoi), which reached the height of their popularity between 575–550 BC, suggests that, whilst Chian goods were still arriving at Naukratis, the popularity of Chian dinoi ceased after a period, perhaps to be replaced largely by Corinthian and Attic kraters.

Chian fine ware is particularly well represented at Naukratis and its presence here persisted for almost a century. The diversity of shapes here, in contrast with that at other sites where Chian fine wares were recorded, attests the importance of Naukratis for the Chians both in terms of cultic and trading activities, with one not necessarily being exclusive of the other.

Conclusion

At a time when Corinthian fine wares were found, generally in large numbers, all over the Greek world, Corinthian decorated pottery at Naukratis makes up only a small proportion of the whole preserved assemblage of pottery from the site. A few workshops only are represented and the numbers of vessels associated with these workshops are even fewer, making the import of batches unlikely and therefore suggesting that these imports were brought individually and dedicated as personal offerings. Furthermore, several specific shapes typically observed elsewhere in Greek sanctuaries are largely absent at Naukratis, including shapes that were most commonly associated with, but not exclusive to, women, thus possibly indicating that there were few women (of Greek origin or who had adopted the Greek way of life) at the site who might require them.

The Chian material at Naukratis presents a different picture. The Chians were involved in the foundation of the *emporion*. Their trade amphorae have been found at different sites in the Egyptian Nile Delta and beyond, indicating both a Greek and local Egyptian interest in Chian wine. Alongside these amphorae travelled a variety of fine ware vase shapes, including chalices that were also common elsewhere in Greek sanctuaries. The absence at other Greek sanctuary sites of most Chian ritual shapes, such as kernoi, and the presence of only a very few phialae, suggest that these were not articles of trade, but used in rituals at Naukratis by Chians, who used them in their own rituals at home as well. Equally, the absence of Chian dinoi in sanctuary contexts in Chios suggests that the Chians did not normally use these vessels for ritual purposes in sanctuaries. The large number of dinoi found in sanctuary contexts at Naukratis might indicate that Chian potters and traders identified a demand for such mixing bowls for ritual banqueting purposes and produced them largely for export and that Naukratis, with its Greek sanctuaries, was the perfect market for this shape. The presence of Chian fine ware at Naukratis therefore indicates that such wares were transported here for use by Chians and as articles of trade.

The Greek pottery at Naukratis attests a Greek presence here as early as in the late seventh century BC and the Corinthian and Chian fine wares represent two very different yet important groups of Greek imports in the western Nile Delta. Separately, these fine wares offer some information about how they were brought to Naukratis, the people who brought them, and the people who used them.

86 Lemos 1986: 235–9.
87 Boardman 1967: 115.
88 Lemos 1991: 247 cat. nos 303–9. It ought to be pointed out that Chian dinoi were not typically slipped on the interior, consequently a number of dinoi have been misidentified as oinochoai. The possibility remains that other dinoi elsewhere may have been misidentified.
89 Alexandrescou 1978: 41, 64, 66–8.
90 Bergeron (forthcoming).

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15 The economy of the western Nile Delta: Kom al-Ahmer, Metelis, and trade with the Mediterranean

Mohamed Kenawi

Introduction

The importance of the western Nile Delta in Ptolemaic and Roman times is demonstrated by the results of the Beheira survey, conducted by the author between 2008 and 2011. Here a rich array of 63 sites have been documented that convey a vivid picture of the rural economy of the region, which was clearly geared towards surplus production that could be transported on the river and canal networks. The survey has also uncovered evidence of important archaeological remains at Kom al-Ahmer, a site which literary sources may suggest was the capital of the Metelis nome. Together, these two strands of evidence will be used to provide an insight into the potential of the archaeology of the region, Alexandria's hinterland (Figure 15.1).[1]

The modern Egyptian province of Beheira lies adjacent to Alexandria, southeast of the city and bordered on the east by the Rosetta branch of the Nile and on the west by Lake Mareotis and the Libyan desert. The survey in Alexandria's hinterland aimed to: 1) increase knowledge of land use and the ancient agrarian economy, and of the ancient regional and interregional trade systems and routes; 2) provide a better understanding of the topography of the western Delta in the early Hellenistic, Roman, and early Byzantine Periods until the arrival of the Arabs. In 2012, the first archaeological mission took place at Kom al-Ahmer and Kom Wasit to excavate an example of the sites in the region and to discover its history.

Beheira was a rich agricultural area for trade within Egypt and beyond, with processing plants used for secondary production. The economic importance of these structures is seen from the resources invested in them. In an area where architecture was usually made of mud brick, stone and baked brick were used. Buildings used to handle agricultural produce and for the making of wine are found at eight sites. Olive oil presses were found at seven other sites.[2] Two sites with kilns have also been found where amphorae were made specifically for wine.[3] The identification of a commercial plant nursery provides further evidence of this integrated agricultural economy.[4]

The wealth that resulted from this economic network is reflected in the bath building found at Kom al-Ahmer,[5] which is the second largest surviving baths in Egypt. In the Roman Period, Kom al-Ahmer may have been the nome capital, Metelis, while the adjoining site of Kom Wasit could have previously been the capital during the Late Dynastic era.[6] Their location makes them well placed for trade, as they are situated 6 km east of the Rosetta branch of the Nile, 40 km south of Thonis-Heracleion, and 53 km southeast of Alexandria. Excavations and a more detailed survey carried out at Kom al-Ahmer and Kom Wasit in 2012 and 2014 yielded significant finds, including a building with a paved floor and an adjoining redbrick basin. Of the pottery collected, which dates to the third to twelfth centuries AD, between 52 and 70 per cent of the amphorae are imported, with the majority from Cilicia—a confirmation of trade with the eastern Mediterranean in the late phases of the site.

Economic production in the western Delta

The general picture of the economy in Beheira was not the focus of earlier studies, with the exception of well-known site of Schedia, one of Alexandria's ports on the Nile. Alexandria's fame and its port has also tended to overshadow its hinterland.[7] Therefore, one of the aims of the survey was to locate agrarian production sites in order to have a better understanding of the Alexandrian hinterland. Wine, olive oil, and pottery are the three main products of the area that have the greatest archaeological visibility, as well as the commercial plant nursery near Abu Hummus.

Wine production

The results of the Beheira survey demonstrated that wine was the main commodity produced in the region, with evidence found at least at eight different locations (Figure 15.2).[8] Latin authors indicate that Mareotic wines

1 Kenawi 2014.
2 Kenawi 2010: 177–93; 2011: 181–200.
3 Ibid. 2012: 309–17.
4 Kenawi et al. 2012: 195–225.
5 El-Khashab 1949.
6 University of Padua and the Italian-Egyptian Archaeological Center Mission in Beheira, excavation and historical studies in progress: see www.komahmer.com and www.caiecentroarcheologico.org.
7 Although see Blue 2010, Kenawi 2014.
8 Three more single wine production units are located at Schedia (Kom al-Giza and Kom al-Hamam), which is under the archaeological investigation of the German Archaeological mission led by M. Heinzliman and M. Bergman.

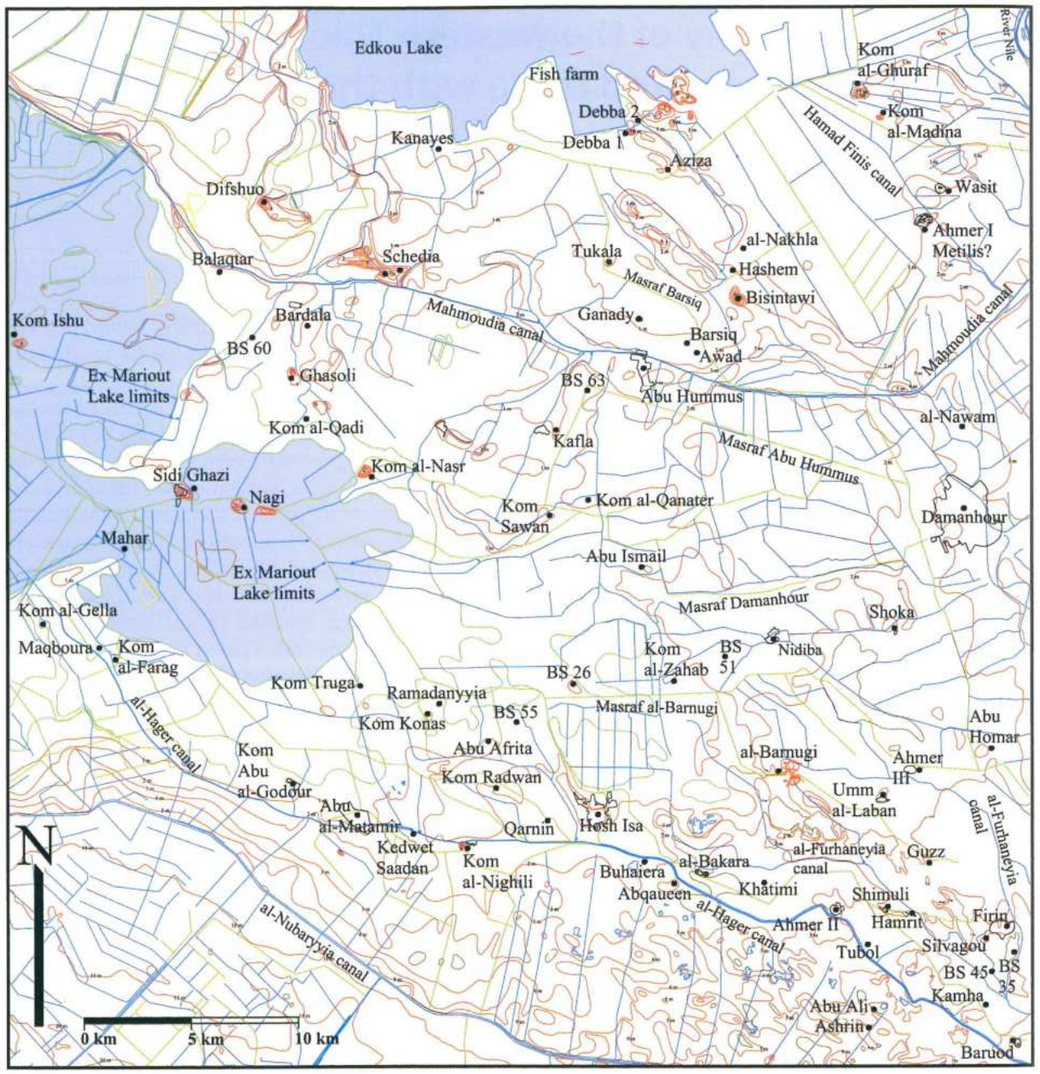

Figure 15.1 Western Nile Delta: Beheira. Red lines denote contours; blue = water canals; bright green = drainage canals; dark green = land below sea level; black = site limits; black dots = sites. (Map: M. Kenawi, Beheira Survey.)

were well-regarded.[9] A total of 32 wine presses were identified at Kom al-Nighili, Kedwet Sadan, Kom Radwan, Kom al-Farag, Kom al-Gella, Kom Truga, Kom Ganady, and Kom al-Qadi. Three other presses had been previously discovered at Kom al-Giza and Kom al-Hamam (ancient Schedia).[10] The large number of wine presses in the region gives an idea of the quantity of wine produced there in the late Hellenistic, Roman, and Late Roman Periods. When added to the more than 30 sites in the area of Lake Mareotis,[11] there are approximately 60 sites which produced wine there and in the western Delta. Five of the sites discovered in the western Delta were originally located on the eastern and southeastern shores of Lake Mareotis before the land reclamation projects started a century ago.[12]

Wine produced in the region was destined for transportation by boat to Alexandria along the network of navigable canals. Kom al-Nighili, Kedwet Sadan, Kom Radwan, Kom al-Farag, and Kom al-Gella are all located on a modern navigable canal that was excavated in 1865–1866 following the traces of an ancient canal (al-Hager canal).[13] This ancient canal used to flow into Lake

9 Dzierzbicka 2010: 127–8; for the quality of the region's wine in the pharaonic period, see Montet 1957: 59.
10 See www.schedia.de.
11 Rodziewicz 1998: 27–36; Blue and Khalil 2011: 135–6.
12 Kenawi 2014: 28–61.
13 Mubarak 2008: 188–90.

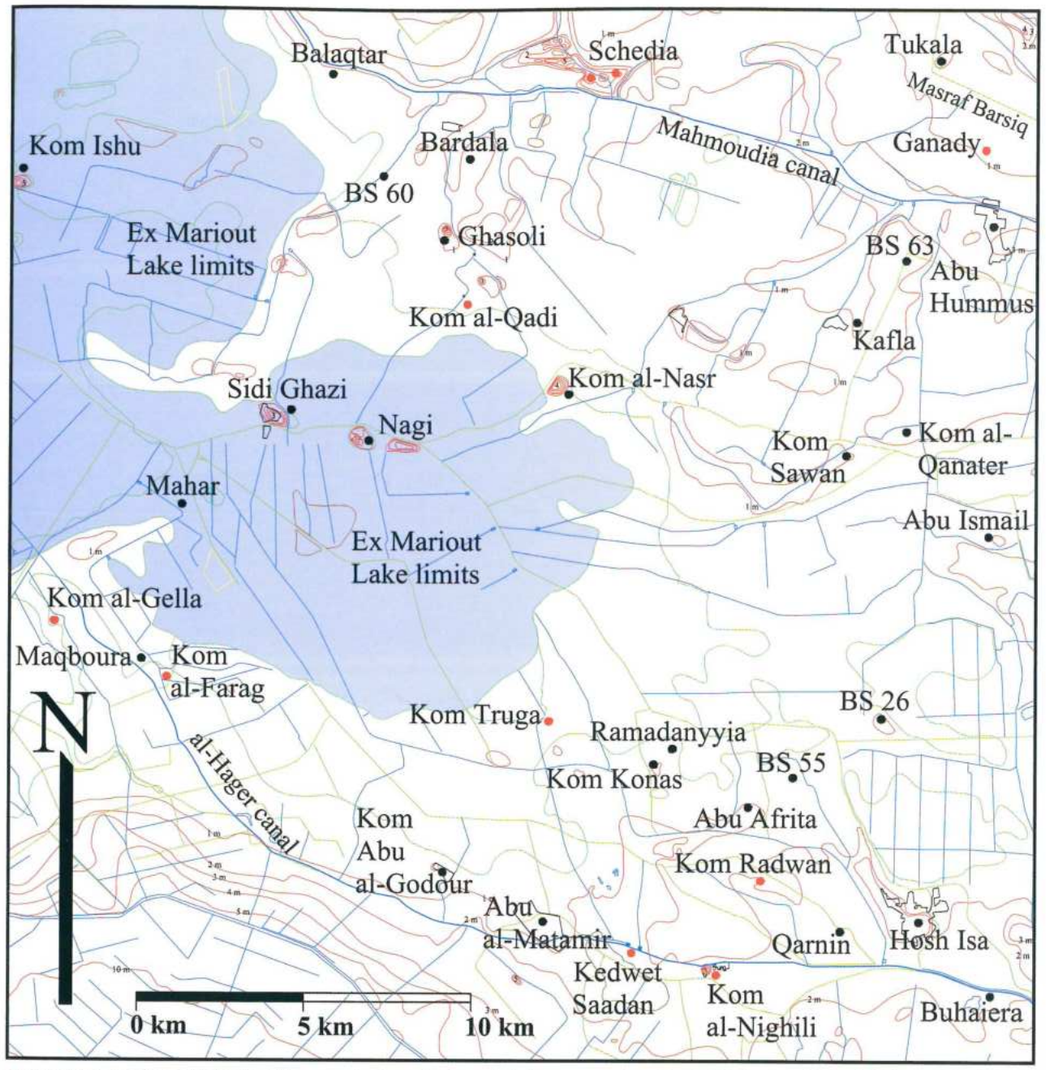

Figure 15.2 Western Nile Delta: Wine production sites in red dots, surrounding sites in black dots. (Map: M. Kenawi, Beheira Survey.)

Mareotis at Kom Truga, where a port was located connecting the sites of the western Delta with Lake Mareotis and Alexandria (Figure 15.3). This illustrates how man-made canals in the western Delta provided direct access both to the markets of Alexandria and to the Mediterranean ports in Late Hellenistic, Roman and Late Roman Periods.

Types of wine press

The wine presses discovered in the western Delta consist of a high floor, where grapes were crushed (by stomping on them or using basket disks) with a large basin below this where the liquid was collected for fermentation.[14] Four different types of wine production structures have been identified and outlined briefly below (Table 15.1).

14 For similar structures in the Mareotis area, see Brun 2004: 147–50.

Table 15.1 A list of wine presses by type.

Type	Site number	Site name	Date	Notes
Type 1	BS 04	Kom al-Farag	3rd BC–3rd AD	unit 1
Type 2	BS 01	Kedwet Sadan	2nd BC–7th AD	unit 1
Type 2	BS 02	Kom al-Nighili	2nd AD–7th AD	unit 1
Type 2	BS 07	Kom Truga	2nd AD–7th AD	unit 1
Type 2	BS 03	Kom Radwan	2nd AD–7th AD	units 1–5
Type 2	BS 06	Kom al-Qadi	2nd AD–7th AD	units 3–4
Type 3	BS 06	Kom al-Qadi	2nd AD–5th AD	unit 3
Type 4	BS 04	Kom al-Farag	1st BC–3rd AD	unit 2

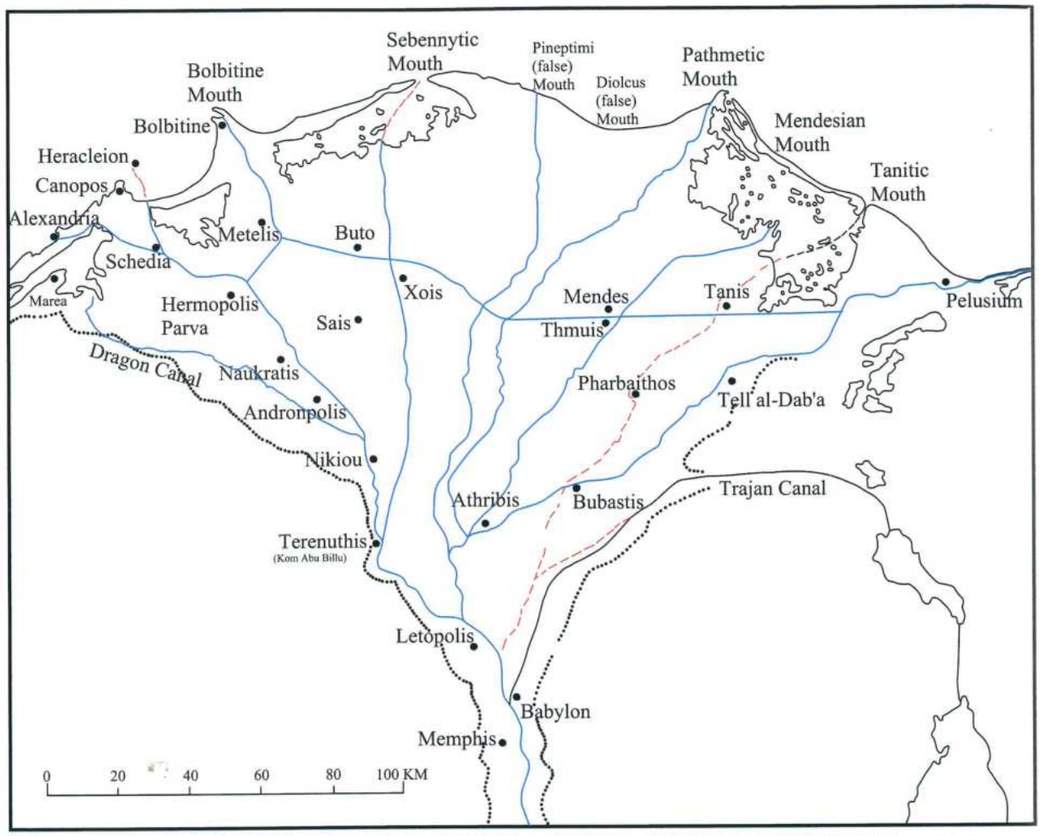

Figure 15.3 Egyptian Delta: Metelis and main historical sites. (Map: based on Bietak 1975: pl. 43, with additions by the author.)

Type 1 (third century BC to the third century AD): Kom al-Farag (unit 1) and Kom Ganady

This type of unit has a square basin covered by light pink hydraulic mortar. Its main feature is an oval-shaped curved depression in the middle of the basin, which was probably to collect grape skins. The walls did not survive in either examples (Figure 15.4).

Type 2 (second to seventh centuries AD): Kom al-Nighili and Kom al-Qadi (Area 3, units 3–4)

These structures have basins with a rectangular shape with a flat floor and baked brick walls. They were covered in mortar of average quality and a reddish colour (Figure 15.5).

Type 3 (second to fifth centuries AD): Kom al-Qadi, unit 3

This type of structure is distinguished by having two different basins, one much smaller than the usual type (Type 2), which was connected to the larger basin by a small channel. This smaller basin may have been used to produce a different type of wine (Figure 15.6).

Figure 15.4 Kom Ganady: wine basin, type 1. (Photo: M. Kenawi.)

Figure 15.5 Kom al-Qadi: wine basin, type 2. (Photo: M. Kenawi.)

Figure 15.6 Kom al-Qadi: two wine complexes, wine basin, type 3. (Photo: M. Kenawi.)

Figure 15.7 Kom al-Frag: wine basin, type 4. (Photo: M. Kenawi.)

Type 4 (first century BC to the third century AD): Kom al-Farag, unit 2

This type of structure consists of a small rock-cut basin partly covered by a higher floor on which grapes were crushed. This floor is made of baked brick and small pieces of stones and covered by hydraulic mortar, while the basin beside it is coated with a high quality white mortar. Remains of stone walls have also survived (Figure 15.7).

Olive oil production

In addition to the wine-producing sites, the Beheira survey has identified seven olive oil production sites, located throughout the region. It can be argued that at three of them (Truga, Kom al-Gella, and Kom Nagi) the scale of the facilities suggests that production was not only for the inhabitants of the site, but was also produced for another market because of the size of the structures and the high quantity of granite grindstones found there. These three sites were originally located on Lake Mareotis, where their position allowed the transportation of olive oil directly to the markets of Alexandria. On the other hand, at Kom Barsiq, Kom Ahmer III, Kom al-Ahmer I, and al-Barnugi, based on the limited numbers of granite grindstones found at these sites, it is likely that the scale of production was only sufficient to supply the needs of their inhabitants. It is interesting to note that no olive oil presses were located during the Lake Mareotis survey. Consequently, it is possible to suggest that oil production played a lesser role in the economy of the northwestern Delta than wine production.

BS 63, a commercial plant nursery

One of the most important sites in the Beheira region is site BS 63,[15] which has been identified as a plant nursery (Figures 15.8–9). The first use of the site is dated to the Hellenistic Period.[16] This substantial structure had the capacity for 10,000 amphorae that would have been filled with earth in which to cultivate plants, such as trees. The use of amphorae suggests that they could have been transported later, once the plants were established and ready for transplanting. This site is located on the Canopic branch of the Nile, seven km south of Schedia,

15 BS for Beheira Survey.

16 Kenawi et al. 2012.

Figure 15.8 Plant nursery near Abu Hummus, view south: amphora bodies, without necks, aligned in rows; in the foreground are those in enclosure E. (Photo: © Peter Fraser Photographic Archive, Lexicon of Greek Personal Names, Oxford.)

where the canal of Alexandria began. In all likelihood, the plants in amphorae were transported to the port of Alexandria, along this canal.

The existence of plant nurseries in ancient Egypt is documented on an ostracon found at Deir el-Medina and published in 1941,[17] and the transportation of live plants on ships is also depicted in the temple of Deir al-Bahari in the reliefs of the journey of Hatshepsut's fleet back from Punt.[18] The identification of the function of this site provides new archaeological evidence for this facet of the economic life of the Hellenistic and Roman Periods.

Pottery kilns for the production of amphorae

Two main sites for amphora production at Kedwet Hasan and at Kedwet al-Dahab,[19] dated to the second century BC, have been documented. They produced a subtype of AE2, catalogued as AE2–2.2 by Dixneuf, which would have been used to transport wine (Figure 15.10).[20] These can be added to the other amphora production sites around Mareotis lake, where AE2 first appeared.[21] Given the scale of wine production in the region, however, it is likely that more kilns remain to be found.[22] Some small pottery workshops were also identified at Kom al-Ahmer 1 that would have produced local wares.

Identification of the location of the nome capital Metelis

Metelis is the only remaining capital of a nome whose location has not been confirmed, although there have been theories concerning its whereabouts.[23] In this section, following a review of the surviving Greek, Latin, Coptic and Arab sources in combination with the archaeological data, it will be proposed that Kom Wasit and Kom al-Ahmer together form the location of the capital of the ancient Metellite nome.

The geographer Ptolemy located Metelis between the Canopic and the Bolbitine branches of the Nile,[24] but did not mention its exact location. It cannot have been Rosetta, that has already been identified with another Greek name, Bolbitine. Habachi suggested that it was Kom al-Nighili near Mahmoudia.[25] However, this cannot be accurate, because Kom al-Nighili was on the eastern bank of the Rosetta branch 2,000 years ago, while today it is on the western bank. Furthermore, that site was small, and no architectural remains were found during

17 Parker 1941. The Abu Hummus plant nursery is the only one of its type that has been found in Egypt and it brings to light the possibility that similar structures might still be buried beneath the Nile silt.

18 Sethe 1906: § 322 and unnumbered plates.

19 Coulson-Wilkie 1986: 66.

20 Dixneuf 2011: fig. 69.

21 Ibid.: 87–95.

22 Kenawi 2014: 84–5.

23 Bernand 1970: 470–89.

24 Rennell 1830; Ptolemy *Geographia* 4.5.

25 Habachi 1947.

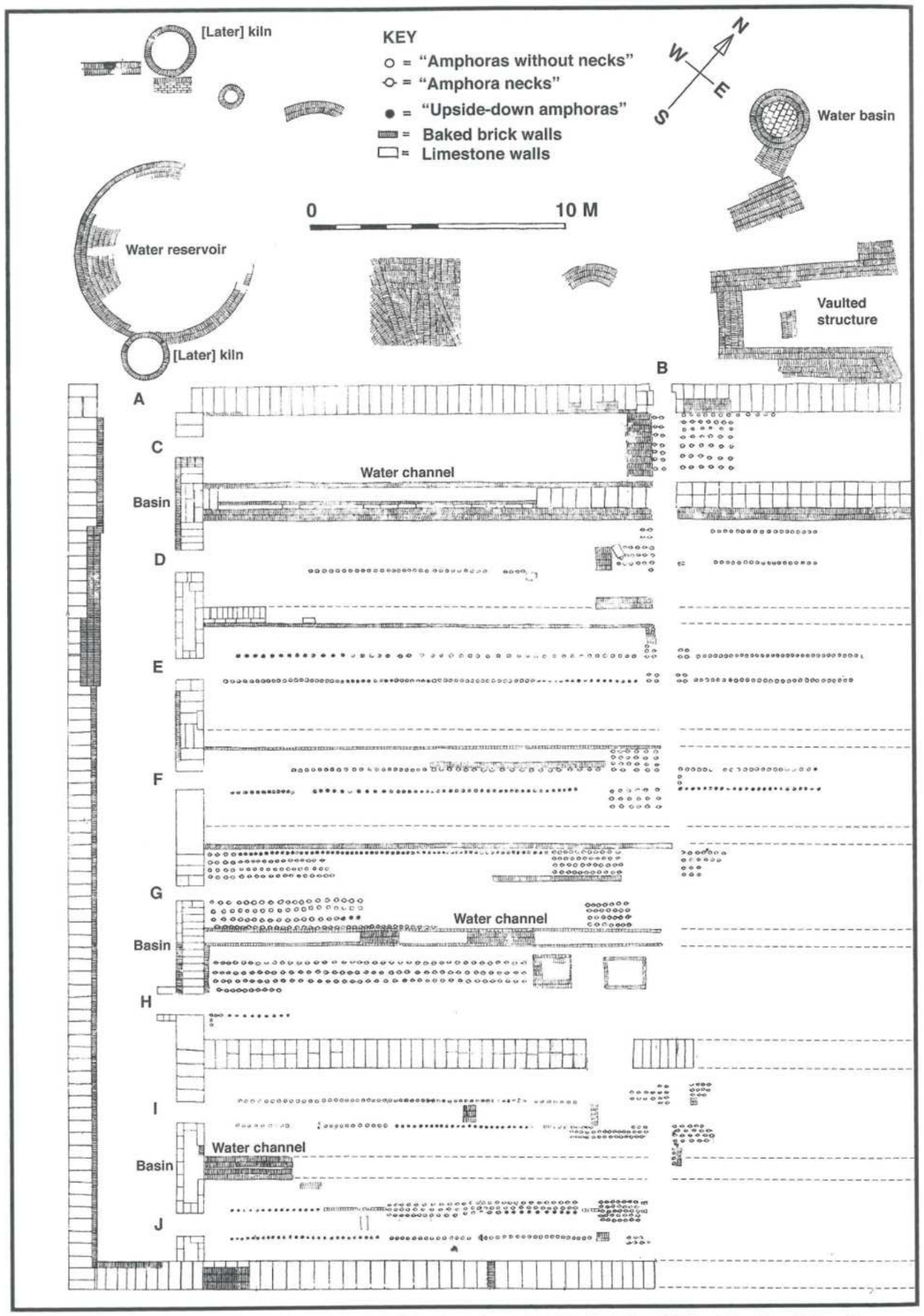

Figure 15.9 Plan of plant nursery near Abu Hummus. (Drawing: after B. A. el-Malek in Riad 1964: pl.4, with additions.)

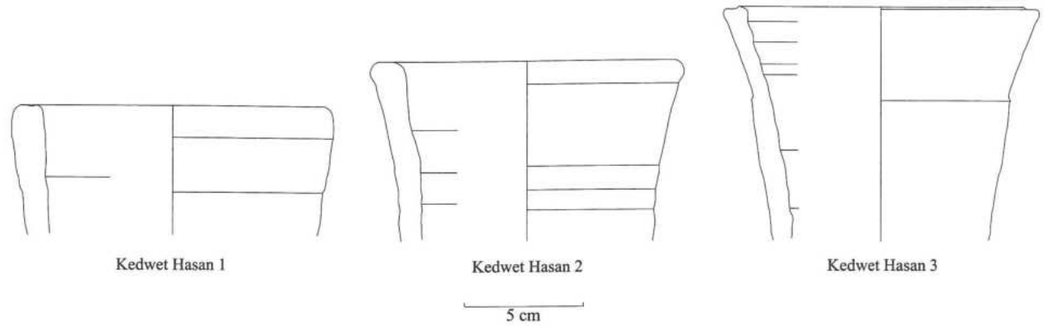

Figure 15.10 Kedwet Hasan: AE2–2.2 amphorae from a kiln discovered in 2009. (Drawing: M. Kenawi.)

the recent excavations or the levelling operation that might indicate a certain level of importance.

The largest site in the region is Kom al-Ghoraf, which is situated six km north of Kom al-Ahmer and Kom Wasit. Excavations have led to the suggestion that Kom al-Ghoraf was the ancient site of Metelis.[26] Arab sources indicate that life in Metelis continued uninterrupted in to the tenth century AD, which would be greatly at odds with the archaeological evidence from Kom al-Ghoraf. Here a clear destruction horizon indicates that the site was completely destroyed in the seventh century AD following the Arab invasion in AD 641.[27] Consequently, in the absence of conclusive evidence other sites must be considered for the location of Metelis.

Metelis in Coptic and Arabic written sources

Coptic and Arabic sources that suggest that Kom al-Ahmer is the site of ancient Metelis are discussed here in comparison to archaeological data.[28] Coptic papyri give the names of the bishops of Metelis (in Coptic Malig/Melig) beginning from AD 325 (Kronios) until AD 743 (Victor), including an important bishop also mentioned in Arabic sources in AD 698 (Theodors).[29] The presence of two named bishops at Metelis after the Arab invasion confirms the continuity of life there until at least AD 743 (the last date listed in the Coptic records) and therefore disproves the idea of the final destruction of the nome capital during the invasion.

In his discussion of the Coptic town Malig/Melig, Amélineau identified Melig as Metelis and also mentioned its Arabic name Mesil or Masil.[30] Arab sources that not only mentioned Mesil, but also Metelis, were then investigated, and also a second spelling, Melids (Malaidis[31]) was uncovered. Metelis and Melids are the same town, because in Arabic the letters 't' and 'd' were mixed, in many cases during transliteration. In *Kitāb al-Buldān* (The Book of the Countries), Yaʿqūbi: (d. 280 AH/AD 893) counted and named the towns of Egypt and mentioned the towns of both Mesil and Melids.[32] Al-Hamadhānī, a Persian historian and geographer (d. 290 AH/AD 903), counted and named the *Kor* of Egypt (the Arabic equivalent of nomes) and listed Melids al-tuor Mesil in his description.[33] Two centuries later, Yāḳūt al-Ḥamawī (d. 626 AH/AD 1229) in *Muʿjam al-Buldān,* describing the Arab conquest of different towns, mentioned Mesil as one of the towns that helped the Byzantines against Amr ibn al-As, the Arab military commander who led the Arab forces in the conquest of Egypt in AD 640/641. Yāḳūt wrote that the inhabitants of Metelis were set free after they had been taken as prisoners of war.[34]

In short, the nome capital Metelis was later called Melig or Malig in Coptic sources and eventually Mesil or Melids in Arabic. The town remained in use until the ninth to tenth centuries AD, after which, the name is no longer found, and the same location starts to be refereed to as al-Muzahametten.

Archaeological evidence: Kom al-Ahmer–Kom Wasit

The written sources suggest that for a site to be identified as Metelis, it should have the following features: continuity after AD 641, a sufficiently large size (as a capital), monumental structures, and a location between the present Rosetta branch of the Nile and the Cairo-Alexandria agricultural highway, which mostly follows the path of the Canopic branch. On these bases, Kom al-Ghoraf can be excluded both archaeologically and

26 See http://www.uniroma1.it/notizie/ecco-metelis-antica-capitale-del-basso-egitto.
27 Lanna 2005, 2012: 155–94; Sist 2012: 139–54.
28 It is absolutely necessary to study Coptic papyri and to publish these sources. It is also essential to read the Arab sources relating to first 300 years of the Arab invasion. Lack of attention to these greatly limits archaeologists, leading them to consider the arrival of the Arabs to herald the end of all archaeological sites in Egypt.
29 Worp 1994: 303.
30 Amélineau 1893: 242–6.
31 Melids appears as Malaidis on Guest's 1912 map of the Delta in the Middle Ages in the location of the Metelite nome.
32 de Geoje 1892: 339.
33 Ibid. 1885: 74.
34 Yāḳūt ed. Gendy 1990: 170.

Figure 15.11 Kom al-Ahmer: General view of the Roman bath complex. (Photo: M. Kenawi.)

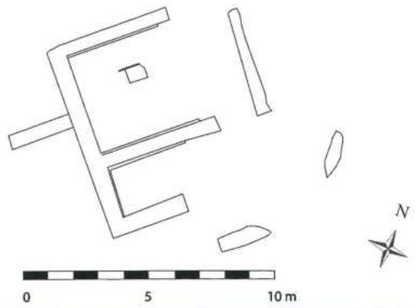

Figure 15.12 Kom al-Ahmer: Topographic survey of structure 10 with NE façade and SE façade. (Photo: M. Kenawi.)

historically.[35] Only two sites fulfil all these criteria, the twin sites of Kom al-Ahmer and Kom Wasit.

It should also be noted that the second largest Roman-Byzantine bath building in Egypt was found at Kom al-Ahmer (Figure 15.11). It may have remained in use until the eighth century AD, demonstrated by an Islamic gold dinar of AD 771 found by the first excavator of the site.[36] The present archaeological mission working at Kom al-Ahmer and Kom Wasit started digging from the highest point of one of the koms at Kom al-Ahmer (14 m high), in order to establish the date of abandonment. Many different early Islamic glazed pottery sherds dated to the ninth and twelfth centuries AD were unearthed in two of the features excavated (F1035, F 1025) and in unit 2. Remains of stone and baked brick buildings were found, which were investigated in 2014 (Figure 15.12). Excavations at the site are at an early stage and at present there is insufficient evidence to clearly identify Kom al-Ahmer as Metelis. It is likely that the adjunct site, Kom Wasit, probably hosted the early phases of life in the town from the twenty-sixth dynasty until the first century AD. Surveys in 2008 and 2012 has already provided evidence to confirm the fact that Kom Wasit was inhabited from the Late Dynastic Period, with pottery dating from the seventh century BC until the first century AD, when it was completely abandoned.[37] In 2014, the Italian team discovered the remains of a complete buried town beneath the Nile silt. Magnetometry revealed many structures surrounding a large rectangular building (113 × 62.5 m), orientated east-west, which seems to be for administrative or religious purposes. Data from aerial photos, combined with topographic mapping and subsequent excavation, show that the town plan has two different orientations, reflecting two different phases. The earliest phase is an early Hellenistic one, which appears in the lower parts of the site, while the later phase is dated to

35 Sist 2012: 139–54.
36 El-Khashab 1949: 28–65.
37 Wilson and Grigoropoulos 2009: 176–7.

the Late Hellenistic to Early Roman Period. Other evidence suggests the presence of a Late Dynastic phase, but this has not yet been confirmed. This is a unique example of the layout of a Hellenistic-Roman town in the Delta (Figures 15.13–14). Following the abandonment of Kom Wasit, possibly because of hydraulic problems, the settlement was transferred to the adjunct site of Kom al-Ahmar, at which occupation was continuous until the end of the ninth to tenth centuries (Figure 15.15).

The location of Kom al-Ahmer six km west of the Rosetta branch of the Nile and two km from Kom Wasit suggests that in antiquity the Bolbitine branch passed between the two sites and probably by Kom al-Ghoraf as well. It can be discerned that the site had a harbour on the Nile, which would have provided direct access to the Mediterranean ports. The site is located 35 km south of Rosetta, 40 km southeast from the port of Thonis-Heracleion, and 52 km southeast from the port of Alexandria. Given its well-connected riverine location, it is possible to assume important amounts of commercial traffic through the site and its port. Excavations would suggest that the peak of economic activity occurs in the fifth to eighth centuries AD, which produced over 75 per cent of all of the amphora sherds, while the percentage of imported amphorae ranges from 52 per cent to about 70 per cent in the last phases of life on the site. Such a figure

Figure 15.13 Kom Wasit: aerial photograph of structures. (Photo: Henrik Brahe.)

Figure 15.14 Kom al-Ahmer: aerial photograph of structures near the bath complex. (Photo: Henrik Brahe.)

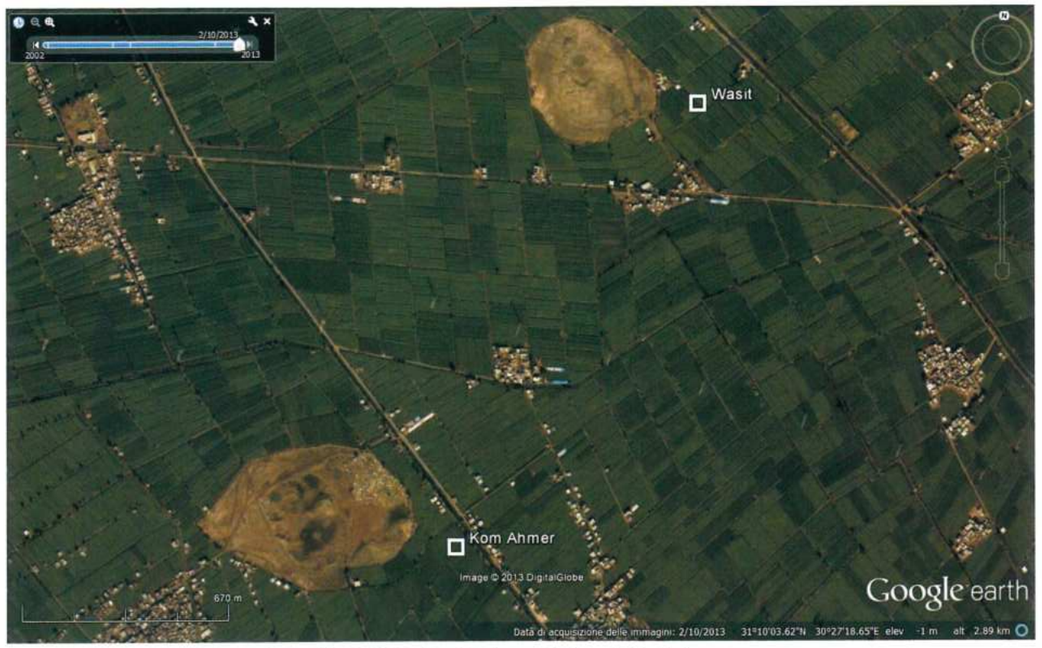

Figure 15.15 Kom al-Ahmer and Kom Wasit 2013. (Satellite image © Google Earth.)

is comparable to that of Schedia, a nearby port-town that had a direct access route to Alexandria via its canal.[38] It can be also suggested that Buto's commercial activity in the Late Dynastic, Hellenistic, and Roman Periods passed through Kom al-Ahmer's port into the Mediterranean.

Conclusion

There is still much work to be done on the archaeological sites of the Delta, and with the pace of development in the region it is essential to carry out as much work as possible quickly before these sites are totally destroyed. The results presented in this paper include work on two sites in 2012 and 2014 and four years of survey in the western Delta, which led to the possible identification of the location of Metelis. The study of the economy in the western Delta enables us to better understand the importance of the small koms and tells spread all over the region. Regardless of their size, these sites were the real economic drivers of all the commercial activity passing through the ports of Alexandria and Thonis-Heracleion. Thus, there is no doubt that investigations in the upcoming years will bring to light more details about this region and its economy.

Acknowledgments

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38 Martin 2010: 945–9.

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16 Baltim, Parallos, and Mutubis: Late Period and Ptolemaic antecedents for Late Antique ports and settlements in northern Egypt

Penelope Wilson

Introduction

Emerging from between the two great Damietta and Rosetta branches of the Nile, the northern land of the Egyptian Delta is home to a network of cities and towns within an agricultural landscape that give way to fish-farming as one travels northward towards the Mediterranean sea. In the millennium of years between the seventh century BC and the seventh century AD this landscape provides the backdrop to a story of human exploitation of an environmental quirk of fate which played an important role in underpinning the Roman Empire, the Byzantine Dream and the new Arab Era. Hundreds of ancient settlements dot the area between modern Kafr el-Sheikh city and the fish farm along the shore of Lake Burullus. The interface between the towns and the lagoon was like the edge of the world, a vast marshy area filled with water, through which no tracks or pathways were visible, unless one knows the secret routes. Yet once tamed and brought into production from the Ptolemaic Period (332–30 BC) onward, this area showed continued development and growth, primarily focussed on growing enough grain for the supply of Rome, as well as providing the Mediterranean world with papyrus writing material, perfumes, oils, wines and fine linen throughout the Roman Period (first to second century AD). In contrast with the self-centred Pharaonic era, the new lands attracted immigrants and migrants from all over the Mediterranean in an unprecedented land 'boom' that saw the establishment of a well-managed and organised system in the Late Antique Period (third to seventh century AD). This unexpected prosperity, following years blighted by disease,[1] plague,[2] and perhaps scarcity,[3] and as suggested by archaeological evidence, requires some explanation and discussion. This paper is an attempt to look at the geological, historical and archaeological framework for the millennium of growth in the northern Delta and reasons for the change in the landscape during the ninth and tenth centuries AD.

Geographical and geological framework

It is an accepted fact that the enduring visual image of the Nile Valley and floodplain is based upon its form in modern times.[4] The ancient floodplain did, however, change significantly between 5000 BC and AD 1900, sometimes from year to year, but also gradually over a much longer period of time. The northern coast was subject to the effects of four main natural influences: eustatic sea level changes; sea currents which shifted and changed in strength over time; the Nile flood regime, the changing patterns of waterways as well as water volume and silt deposition; and slow subsidence of coastal areas and the downward tilting of the delta floodplain towards the west.[5] The geological mapping of these changes, therefore, shows some dramatic differences over the last 30,000 years, but these can also be set against the changing human landscape, especially in Egypt, with its long history going back to the Palaeolithic Period. The established sequence of change of the northern Egyptian coast arose out of the work by the Smithsonian Institution to determine the changing delta front (Figure 16.1).[6] Around 4000–3000 BC the main Nile channel was the Sebennytic branch, which ran through the centre of the delta floodplain to the northernmost point of the landmass, terminating in a substantial promontory.[7] It was accompanied to the west by a delta front barrier with a lagoon and marshland to the south. The settlement site of Buto was effectively the most northerly point of access to the landmass of the delta and may have been on a waterway, the (proto)-Saïtic branch, which connected with Saïs to the south. This means that in the Predynastic Period, the only effective area of settlement was south of Buto and perhaps along the levee of the Sebennytic branch on the emerged delta plain.[8] There was no Rosetta or Bolbitinic outlet to the sea at this time.[9] Due to decreased rainfall and greater distribution of water, the Sebennytic branch

1 Antonine Plague, a smallpox pandemic of AD 166: Scheidel 2001: 95–6.
2 Bubonic Plague pandemic in the reign of Justinian AD 541 and lingering for over two hundred years; ibid.: 100–101.
3 Ibid.: 188, who doubts the serious impact on populations of famines as a result of low floods.
4 Hillier, Bunbury and Graham 2007 discuss this issue with regard to the Nile Valley; Butzer 2002: fig. 4.5; cf. historical maps presented on the modern Delta, Baines and Màlek 2002: 31–53, although an indication of land mass difference over time is shown.
5 Arbouille and Stanley 1991; Stanley and Warne 1993: 629–31.
6 See also Warne and Stanley 1993.
7 Arbouille and Stanley 1991: 61–2, figs 11 A-F; for a colour reconstruction, see Stanley et al. 2008: 600, fig. 2.
8 Stanley et al. 2008.
9 There could have been a western branch of the Nile between the Canopic and Sebennytic, as suggested by geological information from Saïs, but it may have debouched somewhere into Lake Idku or joined the Canopic Branch somewhere from around modern Disuq or Fuwa. The actual outlet through Rosetta would not, therefore, have existed.

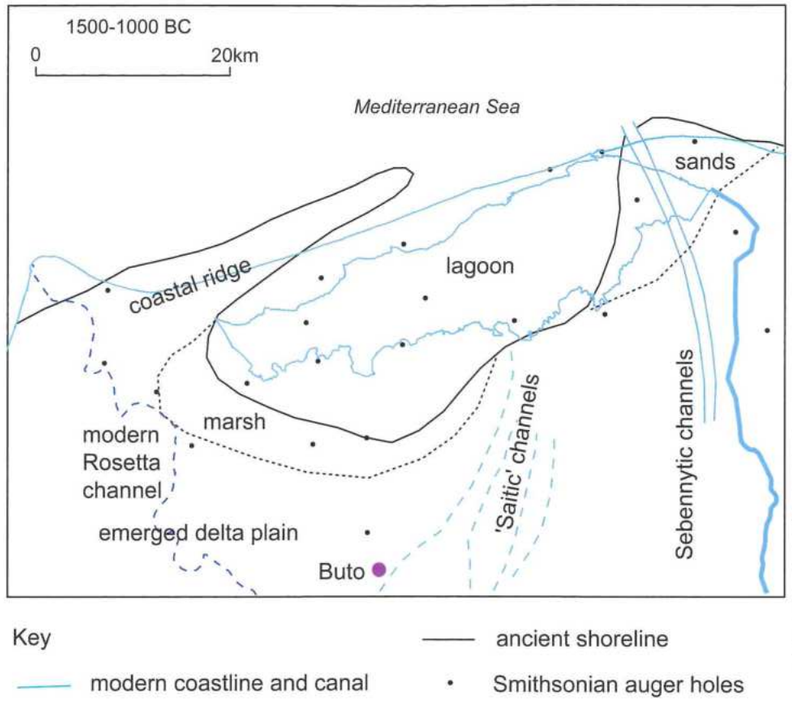


Figure 16.1 The shape of the northern Delta between 1500–1000 BC, superimposed over the modern map. (Map: P. Wilson and R. Dickinson, after Arbouille and Stanley 1991: map E, modern coast from Survey of Egypt 1:50,000 map 1997.)

weakened between 1500–1000 BC, the promontory was eroded and shrank back south, close to the latitude of the modern coast. The coastal ridge composed of concreted calcitic sands may also have diminished in size, but retained the lagoon behind it, with a smaller area of marshland. Meanwhile, the Pre-Saïtic branch continued to flow from Saïs to Buto, debouching into the lagoon, perhaps between the Sebnnytic branch and Buto.

By approximately 500–1 BC, the Sebennytic had diminished further and the Saïtic branch had a trajectory due north of Buto, which resulted in a series of small levee-islands in the northern lagoon and a more restricted area of marshland. The area between the Saïtic and Sebennytic branches thus emerged as new land and was potentially of agricultural quality as it was composed of river silts. Meanwhile, to the west the Bolbitinic branch had been created, perhaps by the man-made excavation of a channel allowing water to escape northward from the marshy area east of the Edku lagoon.[10] This branch became more important, diverting water and causing the continued diminution of the Sebennytic and also of the Canopic branch to the west. The dual effect of diminishing Sebennytic branch and increasing Bolbitine/Rosetta flow effectively made the north-central area of the Nile Delta available for cultivation and settlement from this time, coinciding with the Late and Ptolemaic Period (seventh–first century BC). Although there will have been a large marshy area and possible sea incursions through the gap between the coastal ridge and the Sebennytic branch,[11] the land between Buto and the Bolbitinic branch and to the northwest of Buto would have required some few drainage channels to disperse water and allow movement of animals, people and goods. Given the contemporary knowledge of irrigation technology, perhaps imported from Assyria[12] or the achievement of canal building through the wadi Tumilat by the Persian kings,[13]

10 The assertion that the Bolbitinic branch (later the Rosetta Nile branch) was a man-made creation was made by Herodotus *Historia* 2.17 and has been widely accepted in the literature. The straightness of the channels north of Saïs (Sa el-Hagar) does not look like the natural channel of a meandering distributary, but has yet to be investigated fully: see Bernand 1970: 99–102 for discussions on where the Bolbitine separated from the Canopic Branch. The limited impact of the Rosetta branch is shown in Stanley and Warne 1993: 632, fig. 4.

11 Dumont and El-Shabrawy 2007: 680, suggest that for as much as two-thirds of the year the lagoon and parts of the marshland would have been saline, while during the inundation fresh water would have flushed out the salts, freshening the lake. Canals would always have contained fresh water. One of the reasons for the excavation of the Bolbitinic branch may have been to allow freshwater to be taken directly to the north, where it could be used for irrigation in both the Edku and southwestern Burullus areas.

12 Psamtek I was possibly exiled in Syria or Assyria at one point, before his father Necho I was made king of Memphis and Saïs by the Assyrians and Psamtek installed as his heir at Athribis. Assyrian interest in the control of Egypt is clear and their own empire depended very much upon maintenance of irrigation networks on the Tigris. See Onasch 1994: 118–9; Wilkinson 2003: 128–33.

13 Ruzicka 2012: 24–5 and 239 note 50 for references.

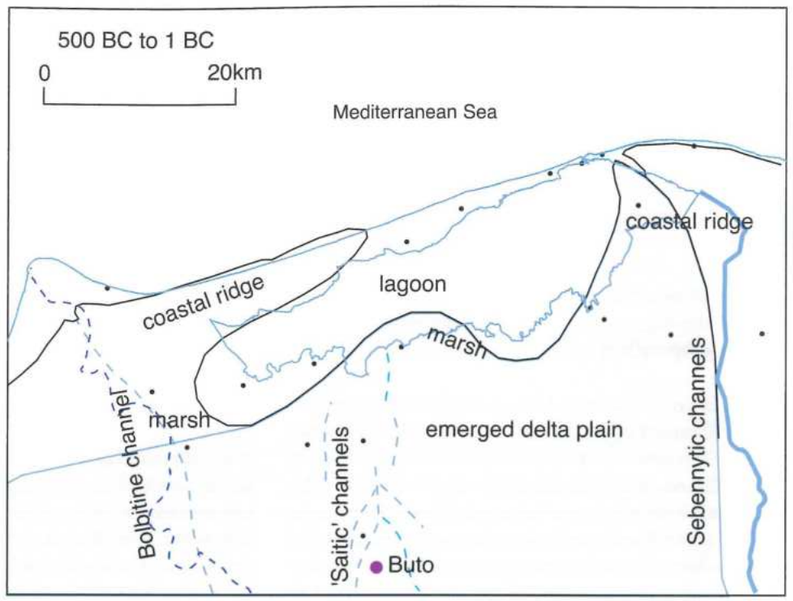


Figure 16.2 The northern Delta around 500–1 BC, showing the emerged delta plain. (Map: P. Wilson and R. Dickinson, after Arbouille and Stanley 1991: map F, modern coast from Survey of Egypt 1:50,000 map, 1997.)

as well as canal digging carried out in the Fayum in the Ptolemaic Period, the technology to effect this transition of the landscape, even in a minimal way, as well as the political and economic impetus was clearly present from the Late Period onwards.[14] As a rough estimate, some 800 km^2 of 'new' or emerged land could have been made available for agriculture (wheat, barley, beans, clover and flax), not forgetting the improved access to marshland and lagoonal resources of the area (Figure 16.2). This land could have sustained the immediate 'new' population, of perhaps up to 400,000 people, as well as providing surpluses for export.[15]

Historical framework: Late Period and Ptolemaic 'colonisation'

It is against this background of geological change that the settlement development of the north of Egypt must be set. During the Pharaonic Period there was largely no opportunity for developing this area and it may always have been exploited in a specialised way for its reeds, papyrus, flax growing, fishing and migratory birds on a relatively seasonal basis, with the margins including marshland used for cattle pasturing.[16] Gradual 'colonisation' seems to have been successful in the eastern Delta from the Predynastic Period and in the northern areas in specific places, such as Buto and Saïs, whose linking waterways perhaps created a network connection that ensured their agricultural lands could be managed effectively.[17] By the Late Period and Ptolemaic Period the opportunity may have arisen to develop farmland more rigorously as well as to exploit links to the Canopic branch, thus bringing the floodplains of the Canopic, Saïtic and western Sebennytic branches together in a vast tract of land, creating the Kingdom of the West.[18] The incoming immigrant prisoners of war and military settlers from the eleventh century BC had created a good foundation for newly peopled-settlements and

14 A valuable historical overview by Yoyotte 2011; for the eastern Delta, see now the magisterial work of Blouin 2014.

15 Compare Medieval estimates for the total land available in the whole of Egypt at 15,000–16,000 km^2, so Scheidel 2001: 220–3. Calculating the carrying capacity of say 16,100 km^2 in Roman Egypt would give up to 2.052 billion (US billion) litres of foodstuffs, enough to feed 6.2–6.85 million people at 300–310 litres a year. 800 km^2 of land could have thus have provided 120.5 million litres of extra food for another 388,710 people. Based on Scheidel 2001: 237–42.

16 Butzer 1976: 93–6.

17 Ibid.: 96 discusses the staged 'filling out' of the Delta with people overcoming excessive water on the land and perhaps endemic malaria. One can also give the example of Metjen and new Delta foundations in the fourth dynasty, and the exhortation to King Merikare to found Delta towns as evidence for the knowledge of the potential of the north lands; Wilson 2007.

18 The Donation Stelae from this period suggest some revision of land ownership from the Third Intermediate Period onwards. See Meeks 1979.

the mercenary and native soldiers employed by the Saïte kings created the basis for a *machimoi* class who also settled and worked the land.[19] It is no coincidence that Saïs became powerful in the seventh century BC and that tax from goods coming into this area was guaranteed for the temple of Neith into the reign of Nectanebo I, according to the Naukratis-Thonis decrees.[20]

The foundation of Alexandria, around 323 BC, to facilitate trade within the Mediterranean, encouraged a land 'boom' in the Fayum and probably throughout the northwest Delta.[21] The area, however, was already looking towards the Aegean through the initiatives of the rulers of the twenty-sixth dynasty, who established a capital city at Saïs in the seventh century BC, a port and emporium at Naukratis on the Canopic branch of the river and began the development of the Canopic mouth of the Nile at the cities of Canopus and Thonis-Heracleion.[22] As established by the Thonis and Naukratis stelae of Nectanebo I, the temple of Neith in Saïs received an additional ten per cent of dues exacted on everything entering Egypt from the Mediterranean,[23] creating the transportation and storage system in the northwest that could have been adapted at Alexandria. There, the new, double sea harbour of the Great Harbour and Eunostos provided excellent mooring facilities and the inland river harbour at Schedia monitored goods leaving and entering Egypt/Alexandria. A network of waterways in the western Delta connected new and old settlements, moving goods and materials northward through Lake Mareotis or the Alexandria Canal. Survey work in the Mareotis area suggests that settlements increased in number and size, despite the vagaries of preservation and difficulties in understanding the taphonomic processes at work in this area.[24]

A similar situation is evident in the Fayum during the Ptolemaic Period, from where the rich papyri evidence has provided an enormous amount of detail about the new 'dynastic' and other settlements,[25] which can be combined with survey and archaeological work to create a well-integrated and nuanced view of life in the Ptolemaic Fayum.[26] Papyri and textual data on this scale are not preserved in the Delta, however, and the understanding of Delta life and development will be reliant upon survey work and archaeological material.

In addition, the Thonis-Heracleion project has established that there was a level of cultic interest among the ruling elite in the river mouths, sea and, perhaps, the north coast of Egypt in general.[27] The Marea Research project[28] and work at Taposiris Magna[29] have, again, shown a possible link between the cultic marking of the landscape and its relationship to burgeoning economic activity in the Ptolemaic Period. The link between economic exploitation and settlement development, cult centres and a regulated waterway system seems to have worked efficiently during Ptolemaic rule and into the Roman Period, so far as can be determined from the available data. Evidence for an early Ptolemaic realisation of the potential of the north Delta is suggested by an analysis of the Satrap stela.

Cultic framework: the Satrap stela and the Baltim door-frame

The Satrap stela was found in a mosque in Cairo, but is believed to have come from Saïs originally.[30] It was erected in year 7 of Alexander II (326 BC), by the satrap of Egypt, Ptolemy son of Lagus, later to become Ptolemy I. The stela shows that at the very beginning of the Ptolemaic dynasty there was a recognition of the value of the northern lands. The lands of the 'marshland (*pehu*) and *p3-t3-n-w3ḏyt* had been under the control of the rebel Khababash, who had donated them to the gods of Pe and Dep (at Buto). Then, the land grant had been overturned by Xerxes, who had not continued the rituals in the temples, meaning that offering reversions had not been made to the people who depended upon them. The purpose of the Satrap stela was to publish the decree upholding the original land donation, moreover:

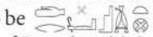
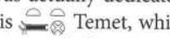
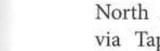
> *His majesty went to Pe and Dep and travelled through all of the* pehu*-marshlands, which were in all of his administrative areas; he went into the marshes, seeing all of the rivers which went to the Great Green, to repulse all of the Asiatic* keben*-boats from Egypt* (ll. 7–8).[31]

In his declaration of intent, Ptolemy says:[32]

> *I give it (the north land) to Horus protector of his father, Lord of Pe, and Wadjyet, Lady of Pe and Dep, from this day to eternity, together with all of its cities (niwt) and all of its towns (dmiw), and all of its people (mrɪw), and all of its acreage (sṯ3wt), all its waters, all its cattle, all its flocks of birds, all of its animal herds, everything which comes from it, which was there before and whatever is added to it, together with the donation, which the King of Upper and Lower Egypt Lord of the Two Lands, Khababash, live forever, made:*
> *its south: the territory of Per-Wadjyet together with Lower Egyptian Wenu (Northern Hermopolis) as far as 'the gates of Hapy';*
> *north: is the land (dunes?) at the shore of the Great Green;*
> *west: 'the gates of the canal of the oar […] of the gods (or stars)' as far as the land (dunes?);*
> *east: the territory of Sebennytos'* (ll. 13–15).[33]

This passage established the boundaries of the northern area 'The Land of Wadjyet' and enacted the 'colonial' hierarchy of settlement (cities and towns), people and animals. The southern boundary includes 'Northern Wenu', which is usually said to be Damanhur,[34] but could more plausibly be an area near Buto.[35] The south boundary continues to the gates of Hapy, most likely to be a branch of the Nile and the Sebennytic branch itself. On the west, the 'gates of the canal of the rudder …' could be a name for the Canopic Branch.[36] The demarcation of the territory across the Delta suggests that, at the time of the Satrap stela, the Bolbitine was not regarded as a major river branch. The world-view of the Decree has broad geographical markers, such as large cities and their suburbs, major river channels and the sea. In addition, the whole of the northern coastline was to be under the name of the 'The Land of Wadjyet' and there is an acknowledgement that settlements and people are an integral part of it. It is likely that the coastline is the real coastal dune area, with the sea beyond extending north of the lagoons of Burullus and Idku.

The coastal areas perhaps should be seen in the light of the wider Ptolemaic empire, stretching along the North African coast from Cyrenaica to Paraetonium via Taposiris Magna, Marea, Marina el-Alamein to Alexandria herself at the centre of the sea, thence to the cities of Canopus and Thonis-Heracleion at the mouth of the Canopic branch, to Pelusium at the mouth of the Pelusiac branch, on to Raphia and ultimately as far north as Tripolis. It would seem logical that some kind of attention would be given to the north Delta coast and that the Sebennytic mouth may also have had some kind of dedicatory inscription in a special shrine.

The Baltim door-frame provides an indication that there was a cultic view of the actual coastline, if not of the individual settlements, in either the Late or Ptolemaic Period. In 1908, Ahmed Kamal collected some objects which had been found at a site called Tell el-Ashaar, near Baltim, east of Lake Burullus, and brought them back to the Egyptian Museum.[37] The material consisted of fragments of an inscribed door-frame of limestone, two limestone blocks and a group of small finds. The door-frame was later republished and the inscription collated by Daressy, who recognised its importance for establishing both a late presence in the north and for suggesting a harbour interest on the north coast.[38] The text is set out under the protective wings of Wadjyet, Lady of Pe and Dep (Buto), and is dedicated to Osiris under the protection of Isis and Nephthys, along with several other gods, of whom are preserved only Horus Wenu (or Wenty) —perhaps connected with Wenu from the Satrap stela—, Sokar and Anubis. The text, however, also names several places that may relate to the nature of the sites concerned. The main cult place seems to be  'Der-Set-Djeba' 'Controller of the Place of Punishing'. 'Place of Punishing of the foes' is a term for temple at Edfu,[39] recognising it as the place where the enemies of Horus were defeated and punished. The name, therefore, could refer to the mythical context for the north as the scene for the battles against Seth, and their successful outcomes. In the Baltim text, the place is said to be in 'the marshlands in the eastern horizon', which suggests that the find spot is not far from where the door-frame was actually dedicated. A second place named in the text is  Temet, which may itself be an early name for Baltim, with the -tim element being directly related to Temet. It could have had a meaning as 'what is complete/ended', referring to the remote location of the place.[40] In the door-frame text, Temet is said to be in Set-Menet 'Place of Mooring'[41] and the name may indicate that there was a harbour or bay in this place. Another place mentioned in the text is  '*Pequt-Wadjut*' 'Swamp (?) of papyrus', which may be a local name for one of the basin areas filled with papyrus, which were purposefully cultivated.[42]

Taken as a whole, the place names seem to have both cultic and 'real' attributions, suggesting that at the time of the dedication of the door-frame there were some established temple and towns in this northern area. Kamel and Daressy both suggested a Late Period to Ptolemaic Period date for the inscription, based on the form of the hieroglyphs. The predominant gods mentioned on the door-frame are Osiris, Isis and Nephthys, which again may suggest the general framework of an Osirian network, and that might favour the Ptolemaic Period. The door-frame was said to have been built into a mud-brick

19 Chevereau 1985.
20 von Bomhard 2012.
21 Bernand 1996: 258–9 the *chora* of Alexandria; Manning 2010: 102–3; Blue and Khalil 2011. For site surveys in the northwest Delta, see Wilson 2012; Trampier 2010; Kenawi 2013 and this volume Chapter 15.
22 The earliest pottery at the site dates to the Saïte Period and the end of seventh century BC, Grataloup 2010; this volume Chapter 7.
23 Thonis stela column 8–9, see von Bomhard 2012: 72–4.
24 Wilson and Grigoropoulos 2009: 45–191 and 289–414.
25 Mueller 2006.
26 Rathbone 1990; Clarysse and Thompson 2006.
27 Goddio 2007.
28 Blue and Khalil 2011.
29 Vörös 2004; Boussac 2007.
30 Cairo Museum *Journal d'Entrée* 22182, Sethe 1904: 11–122; Bianchi 1984: 2; most recently translated by Ritner in Simpson 2003: 392–7; synopsis by Gozzoli 2006: 126–32.
31 Sethe 1904: *Urkunden* II 16.10–14.
32 Ibid.: 19.9–20.8.
33 Ibid.: 19.7–20,16; translations Bevan 1927: 28–32; for the territorial division Montet 1957–1961: I, 91; Helck 1974: 165; Kaplony-Heckel 1985: 613–19.
34 Helck 1974: 164–7.
35 As argued by Engsheden 2008: 37–9 after a reference in Strabo and for a connection between Wenu and Dep (Buto) see Gardiner 1947: 2.195*.
36 Ibid.: 2.195–6*.
37 Kamel 1908.
38 Daressy 1917; Kamel 1908: 144, dimensions 1.4 m long, 0.5 m high, 0.3 m wide, inscribed on two sides. It has so far not been possible to trace the object in the Cairo Museum. It is not noted in the *Journal d'entrée* entries for 1908 to 1920. For this reason the inscription has not yet been collated and there is no photograph.
39 Wilson 1997: 954 *st-ḏb3-sbiw=f*.
40 Ibid.: 1143.
41 *Wb* II.74,14 *mnit*, mooring place.
42 *Wb*. I.561 notes *pqy*, the name of a watery area in a Delta nome taken from the Tanis Geographical Papyrus: Griffiths and Petrie 1889: fragment 29.

structure and the other objects found with it included an offering table, a granite pestle, a statue of Isis nursing Horus, a broken limestone naos, a bronze bowl and a bronze statuette base.[43] Although the material, in general, suggests a Late Period-Ptolemaic type of assemblage, until the objects can be located and studied little more can be done. Information from the find spot of the door-frame is also minimal. Tell el-Ashaar is not a registered Antiquities site any more[44] and the latest satellite imagery of its position, so far as can be ascertained from older maps of the area, show low sandy mounds covered in orchards. The nearby town of Baltim itself is situated east of the shore of Lake Burullus, south of the opening between the sea and lagoon at El Burg, therefore is an excellent anchorage. The modern fishing fleets of the sea and lake are moored here in the winter months, while a rocky outcrop in the centre of the town is the location for the coastguard and police station. The topography of the area suggests that if there had been an ancient mooring place at Temet (Baltim), then it may have been a focal point for access and monitoring of all kinds of ships coming towards Egypt.

Settlement models: size and hierarchy and (im)migration issues

In order to determine the implications of land reclamation and settlement expansion in general and whether it was likely that the Ptolemaic development of the north was extensive, two other issues should be discussed to provide a model for settlement expansion: settlement size and the peopling of the new lands.

If Ptolemaic involvement in the north was strategic, it was likely to have built upon existing centres, so that specific waterways were controlled by temple-settlements, and specific focal points at channel mouths or in good harbours were enhanced, as possibly happened at Baltim. Cult buildings in Egypt were a long-standing method of combining economic exploitation with religious endowments under the protection of the state. As Mueller has shown in her study of the Fayum, however, the Ptolemaic 'dynastic' foundations were only part of the process and along with these more formal endowments there were subsidiary developments of settlements.[45] Similarly, the size of the settlements in the Fayum seems to have been relatively small. In her study of the population of settlements, Krokodilonopolis was largest, with 3,436 people, then Philadelpheia, which had an estimated 2,607 people, and below that most settlements are estimated to have had less than 1,000 people, with the average (including Philadelpheia) of 111 settlements having 530 people, this being a minimum for a viable rural community. The smaller hamlets are estimated to have contained 216 people.[46] The total estimate of a population of 58,831 people for the settlements studied is not such an enormous number, given the immigration and migrations of the period.[47] By comparison, the number of settlements with any kind of pertinent information from northern Egypt is 91 (out of an initial list of 153), giving a potential population boost of 48,230 people, if compared roughly with, and relative to, the Fayum figures. Considering that the northwestern Delta and Alexandria would have soaked up population and the eastern Delta would also have been developed, the Delta population could have grown by 150,000 people, plus the population of Alexandria, if such settlements reflect the extent of development. Butzer estimated that the Delta grew by almost a million people between 1250 BC and 150 BC, recognising the growth of the great nome cities and foundation of new lands,[48] so these figures are not impossible as complementary estimates.

The size of sites in the Fayum fits within a hierarchical pattern, where large centres managed medium large settlements, which then sat at the centre of groups of settlements under 10 ha in size.[49] Where a critical number of such smaller settlements was not reached, there was then no necessity to create the medium large settlements and certainly not the large centres.

Comparison with the north Delta settlement patterns, as suggested from a basic analysis of site size, is admittedly fraught with problems, but interesting in terms of recognising some of the patterns of settlement. In mapping settlement size a number of variables are taken into account and any result is necessarily crude. Data from the 91 extant sites was collected regarding the dimensions of the sites and size estimated in hectares in order to determine where the cut-off point in site size occurred and so to create a site hierarchy.[50]

43 Kamel 1908: 141 and 146.

44 The site is not listed in the *Atlas for Antiquities Sites for Kafr el-Sheikh Governorate*, Supreme Council for Antiquities, Cairo 2001, but did appear in the list of koms from the 1909 decree protecting registered sites (*Journal Officiel du Gouvernement Égyptien*, Samedi 12. Février 1910), so seems to have been de-registered between 1909 and 2001, and thus has been handed over for agriculture. The 1949 Survey of Egypt 1:100,000 map lists the place Tell Il-Asha'ar (Kafri 'ruins') next to a sandy mound north of Baltim, but the later, 1987, 1:25,000 map does not list the site or any possible location at all.

45 Mueller 2006.

46 Cf. Clarysse and Thompson 2006: 103–5: an average settlement size in the Fayum was 512 adults, with a median of 217.

47 Mueller 2006: Appendix 1, 187–91; Clarysse and Thompson 2006: 100–101, estimate a total population of 85,000–95,000 for the whole Arsinoite nome in the third century BC, giving a population of Egypt of 1.5 million. Most authorities think this is too low, cf. Bowman 2011: 317–31 on the *patterns* of population rise and decline.

48 Butzer 1976: 83, table 4; Scheidel 2001: 181–250 on the issue of population versus land productivity for the Roman Period.

49 Mueller 2006: 104. Villages and hamlets were the basic tax units in the Fayum, Clarysse and Thompson 2006: 103–4.

50 The data was compiled from site survey and extant site size as observed from GoogleEarth satellite images. Most sites were probably therefore larger than their current state of preservation suggests. There is also no way of knowing, without further archaeological work, how much of a site area was occupied, set aside for animals or storage and processing, or used as a cemetery. The periodisation of each site area is also unknown, i.e., whether site use 'moved' around the site area over time. The number of different site types with different population densities is also unknown.

The cut-offs occurred at above 40 ha (2 sites), between 25–40 ha (11 sites), 10–25 ha (16 sites) and then below 10 ha (62 sites).

Buto, at 100 hectares, is the dominant site of the whole area, reflecting its antiquity and also its modern preservation.[51] The medium range sites include Kom el-Khawalid (67 ha), Tell Nashawein (although it is a site with two mounds, at 40 ha), then Kom Abu Ismail (36 ha), Mutubis (36 ha), Kom Sheikh Ibrahim (34 ha) and Koms Qabrit, Sidi Selim and El Arab (all over 30 ha). The largest eastern site is Kom Khanziri (Pachnemounis, 25 ha), at the edge of the Sebennytic floodplain, perhaps suggesting that this was the limit of settlement possible and that the town was indeed responsible for a large area. As a point of comparison of other areas with extended settlement patterns, the Fayum has large settlements, including the capital Krokodilon Polis (288 ha), with the medium range towns of Karanis (79 ha), Tebtynis (57 ha), Philadelpheia (50 ha) and then a plethora of the smaller settlement units.[52] According to Mueller, the size of settlement is directly related to the facilities available in it, from police to baths, perhaps something to reflect upon in terms of archaeological survey work. Outside Egypt, one may compare the size of settlements from the same period in Rough Cilicia, which were between 10–30 ha in size,[53] and in Early Imperial North Italy, where important towns were up to 40 ha and lesser towns up to 20 ha in size, with very many smaller settlements around them.[54] In Roman Britain, 73.3 per cent of towns with a known area are under 19 ha in size, with the largest between 130–139 ha; in Iberia, 65.4 per cent are under 19 ha in size, with the largest at 120–129 ha in size,[55] while in the north Delta sites 82.4 per cent are under 19 ha with the largest at 100 ha (Figure 16.3).[56] The general impression is that Egypt was highly urbanized in comparison to other areas of the Roman Empire,[57] and, therefore, the knock-on effect may be that there were more rural settlements feeding into these central places. There are differences, however, with a lack of villas in the Egyptian archaeological record and comparisons of size are difficult because the 'sites' in many countries consist of pottery scatters on agricultural land.

When the north Delta sites are mapped (Figure 16.4), it becomes clear that the pattern of settlements conforms to a central administrative unit, with larger nodal sites in the hinterland perhaps representing areas which were developed earliest and then the majority of sites spread between them in a network of agricultural villages and other types of sites, perhaps including ports (with storage facilities), military outposts and monastic or episcopal

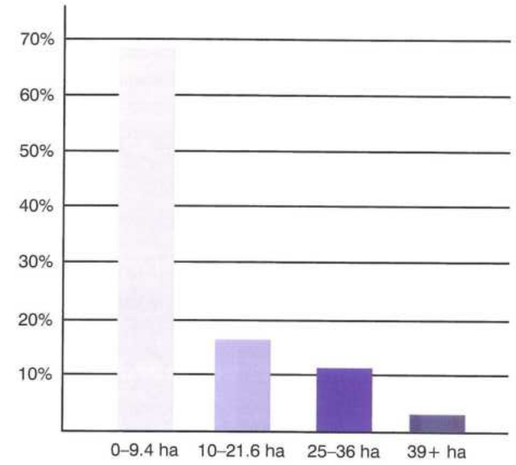


Figure 16.3 Graph showing northern Egypt site size ranges against percentage of the total number of sites (92).

settlements. In an area dependent upon waterways, one may suggest that each settlement possibly had a river landing place, either for loading produce onto boats for shipment or for a ferry by which passengers, goods and animals could cross the water. While not exactly 'harbours', most of them will have left no archaeological trace, so the settlements themselves present a proxy for many possible 'harbours'.

If there was land, then where did the people come from to farm and work that land? The Fayum and Middle Egypt again provide a model and the data reflect slightly different resolutions from different periods. There is also detailed information from the early Ottoman Period specific to the Delta, which is also revealing in terms of understanding population movements and demographic shifts when new land opportunities arose. These may help to provide a context for understanding the northern settlements.

Mueller compiled a list of the origins of people settling in the Fayum during the Ptolemaic Period, which showed that immigrants came to Egypt from all over the eastern Mediterranean, mostly from the Greek speaking areas, such as Cyrenaica, the coast of Asia Minor, Crete and Attika, thus not necessarily those areas under direct Ptolemaic control.[58] There were also Persians, Arabs and Jews among the groups who received tax exemptions in the Arsinoïte nome,[59] for it seems that people knew of the opportunities afforded by Egypt. Soldiers also formed the important *cleruch* class and received incentives, a system which survived into the Roman Period, when veterans

51 One would expect that Xoïs, capital of the Sixth Lower Egyptian nome, at Sakha, just south of Kafr el-Sheikh, to have been a large town, but the extant mound at the site is occupied by a military camp and estimated to be 4.4 ha in size.

52 Mueller 2006: 97, table 3.4.

53 Ibid.: 139.

54 Compiled by de Ligt 2008: 166–71 and 144–5.

55 Figures in considering central place theory, from Marzano 2011: 207–15.

56 That is, 75 out of 91 sites with sizes established from survey or satellite imagery.

57 A. Wilson 2011: 192.

58 Mueller 2006: 168–9.

59 Clarysse and Thompson 2006: 138–61.

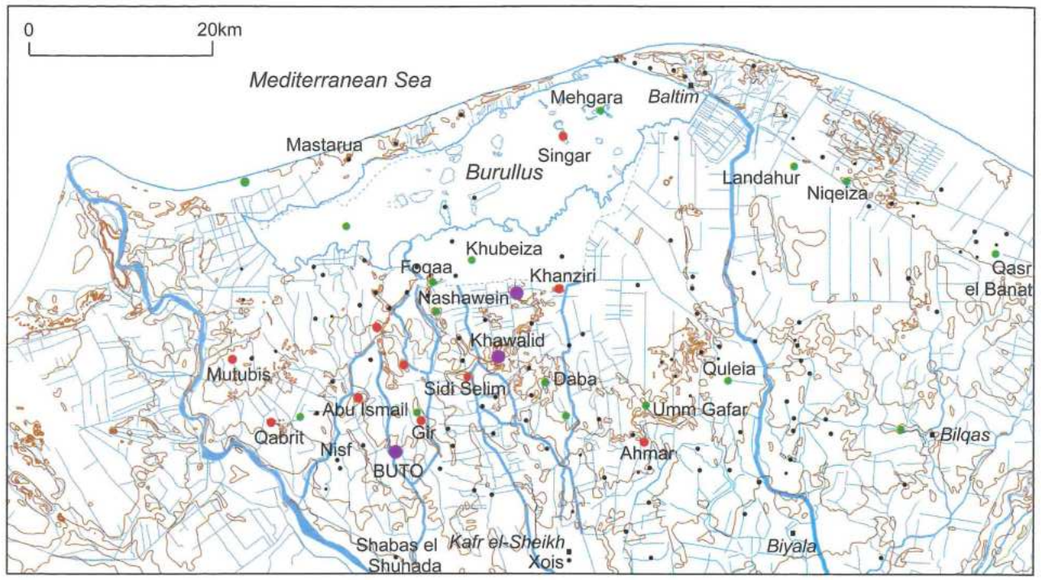


Figure 16.4 Sites with extant remains in the northern Delta mapped according to size. Purple, sites over 39 ha; red, sites between 25–36 ha; green, sites between 10–21.6 ha; black, sites from 1–9.4 ha. Mapped onto modern Delta showing main canals, subsidiary canals, contour lines, the ancient Sebennytic branch and modern Rosetta Branch. (Map: P. Wilson and R. Dickinson, after Survey of Egypt 1:50,000 map, 1997.)

were given a lump sum at the end of their term of service and 'retired' to become farmers.[60] In the Ptolemaic texts the numbers of people with ethnic designations are low, at around 1,600 people, but the bulk of the new settlers must have been Egyptian, following the Ptolemaic policy of internal colonisation. Some came from the large cities of the Delta itself, such as Mendes and Tanis,[61] suggesting that the urban structure of the Late Period may have been changing. Mueller equates increased exploitation with dispersed settlement patterns, growing from nucleated settlement patterns. In times of decline, there would be depopulation of those areas and demographic collapse. Long-distance migration was a feature of the third century BC, while internal migration continued into the second century, until the system came under increasing pressure in the Late Ptolemaic Period.[62] Effectively the evidence for migration in the Ptolemaic Period ends with the coming of the Romans, when a whole new system began.

A comparative model of migration of the *fallahun* people in the early Ottoman Period constructed by Michel is derived from the cadastral survey of 1528 and is based on villages in Beheira Province to the west of the Delta.[63] The survey lists up to 407 individuals, the places whence they came and to which they went, from a total of 134 villages. People tended to head towards the ports, such as Damietta, Rosetta, Alexandria as well as Istanbul, but generally stayed within villages in the west and central Delta. Without the Canopic branch, which had silted up by this time, the western Delta may not have been as fertile as the central area of the Delta floodplain. There may also have been increasing incursions from Bedouin into the western margins, making life difficult there during the sixteenth century. Although the numbers may seem small, they reflect just one group within the agricultural community and could reflect the general pattern of population movement. Furthermore, Michel estimates that 29 per cent of agricultural land was abandoned at this time in 40 villages where accounts exist. That could have supported a population of around 13,000 people and, although this number may be an extreme figure, it is suggestive of the impact such migrations of people may have had.

Taking into account the fact that the northern lands seem to have opened up from the Late and Ptolemaic Periods, that settlement may have begun to spread out from the nome capital city of Buto, in particular, and perhaps have focussed on strategic points along waterways and coasts, the Fayum model indicates the speed of change possible in rural areas from the third century BC, and it is possible, therefore, that the beginnings of the development of the northern Delta are rooted in the Ptolemaic Period. The pattern in the Fayum seems to have been that villages were small in the third century BC,

60 Alston 1995: 123–6, the special case of the veterans at Karanis.
61 Mueller 2006: 173 note 87.
62 Ibid.: 178–80.
63 Michel 2001: 241–90 and 2002: discusses nine deserted villages in Beheira between 1315 and 1528, suggesting a gradual general decline in the western Delta in settlement and agriculture.

expanded in size into the Roman Period, but then some settlements, such as Soknopaiou Nesos, were abandoned after AD 230, while others declined into the fourth century.[64] It is tempting to suggest that long term decline in the Fayum may have resulted in the migration of people to places that offered better conditions and larger agricultural tracts of lands, such as the northern Delta.

Archaeological evidence

There is only a limited amount of evidence for a northern 'boom' similar to that in the northwest Delta during the Ptolemaic Period. It could be argued that due to the nature of survey work and the relative lack of archaeological excavation in the Delta in general, such a situation is not surprising. The buried landscapes of the Delta floodplain present a real challenge to fitting together the archaeological and geological data and this problem is central to our lack of understanding of the dynamics of change in northern Egypt from the first millennium BC to the first millennium AD.

The area lying between the modern Rosetta and Damietta branches and north of Kafr el-Sheikh contains many ancient sites of which very little is known. The EES Delta Survey[65] lists 153 sites in this area alone, and once those sites which have been destroyed or levelled are removed from the list, 91 sites still remain with some kind of visible presence. Where it has been possible to date sites from surface collections of pottery, most of them can be dated to the Late Antique Period, that is, the fourth to seventh century AD, and into the early Islamic Period as far as the tenth century (Table 16.1). The earliest material found at the sites is usually from the Early–Middle Roman Periods, suggesting that there may be a general trajectory of increase in settlement density from the second to the eighth century, while a very few sites have also produced Ptolemaic material.

The question generated by these data is, to what extent do the survey data represent a true picture of settlement development? The data imply that sites had their foundation in the Roman and Late Roman Periods (first to seventh centuries), grew successfully into the Islamic Period and were then subject to decline and abandonment after that time, with some settlements continuing for a while into the early Medieval Period. The picture, however, looks different to the northwest Delta, where Ptolemaic and Roman sites predominate from the survey data.[66] It is possible that the northwest has been subject to more changes in modern times, so that the uppermost layers of the sites have been removed, making it impossible to determine the extent to which the sites may have continued into later periods.

The Ptolemaic Period: first steps

The survey work of Ballet and von der Way at sites around Buto[67] also included some limited excavation of trenches and in some places pottery was found that could be dated to the Ptolemaic Period, including at the site of Kom el-Gir. Recent work at Kom el-Gir, northwest of Buto, has confirmed the Ptolemaic origins and Roman development of this site.[68] It should be noted, therefore, that the surface survey did not find Ptolemaic pottery and it had to extracted by excavation and drill core augering. In the EES Delta Survey work, Ptolemaic material was only identified at Kom el-Khawalid (Phragonis)[69] and Tell Mutubis, a small percentage of the overall total of sites and, significantly, they are two of the larger sites in the sample.[70] Excavations for the EES by Jeffrey Spencer at Kom Daba found standing remains and foundations from a tower-house, with Ptolemaic pottery at or under the foundations.[71] Although such buildings occur from the Late Period into the Late Roman Period, the presence of such constructions suggests a more nucleated settlement that could be compared to an occupation perhaps managed in the same way as the Fayum sites. The presence of Ptolemaic coin hoards, town and industrial quarters, as well as bath-houses from Buto and Xoïs, should also not be ignored in terms of the general exploitation of the area,[72] while the creation of the Metelite nome from the Ptolemaic Period, on the western side of the modern Rosetta Branch,[73] perhaps took advantage of the new river system created by the Bolbitine.

Roman Period exploitation

While the Late to Ptolemaic Periods may have represented increased state interest in the agricultural potential of the north, it is likely that the systematic development of land occurred in the Imperial Roman Period in order to increase production of grain for the *annona*. Evidence for this suggestion is, however, also limited to the survey material and excavation work at sites such as Buto in the north

64 Bowman 2011: 334–5.
65 Egypt Exploration Society Delta Survey website: http://deltasurvey.ees.ac.uk/ds-home.html.
66 P. Wilson 2010.
67 Ballet and Von der Way 1993.
68 Schiestl 2013.
69 Identification by Hogarth 1904: 4–5; Timm 1984–2007 (2): 940–4.
70 Wilson and Grigoropoulos 2009: 454–62 and Tell Mutubis Project.
71 http://deltasurvey.ees.ac.uk/daba269bis.html; SCA number 090128; Hogarth 1904: 16; Spencer 1992: 536.
72 Christiansen 2004: 46–54; Ballet et al 2011; Trümper 2009.
73 Metelis appears in the Ptolemy's *Geographia*, which dates to the first century AD, but may be related to the earlier nome of Berenike attested in the Psenamosis decree from Kom Toukhla and dating to the late Ptolemaic Period: Bernand 1970: 443–89; *Lexicon der Ägyptologie* II: 396; Helck 1974: 166. Various suggestions have been made for the location of the nome capital, including Kom Toukhla, near Abu Hummus (Bernand), Tell el-Negili, near El-Atf [Kafr Amlit], (Ball 1942: 109); and most recently Kom al-Ahmar, as well as Kom el-Ghuraf (Kenawi this volume Chapter 15).

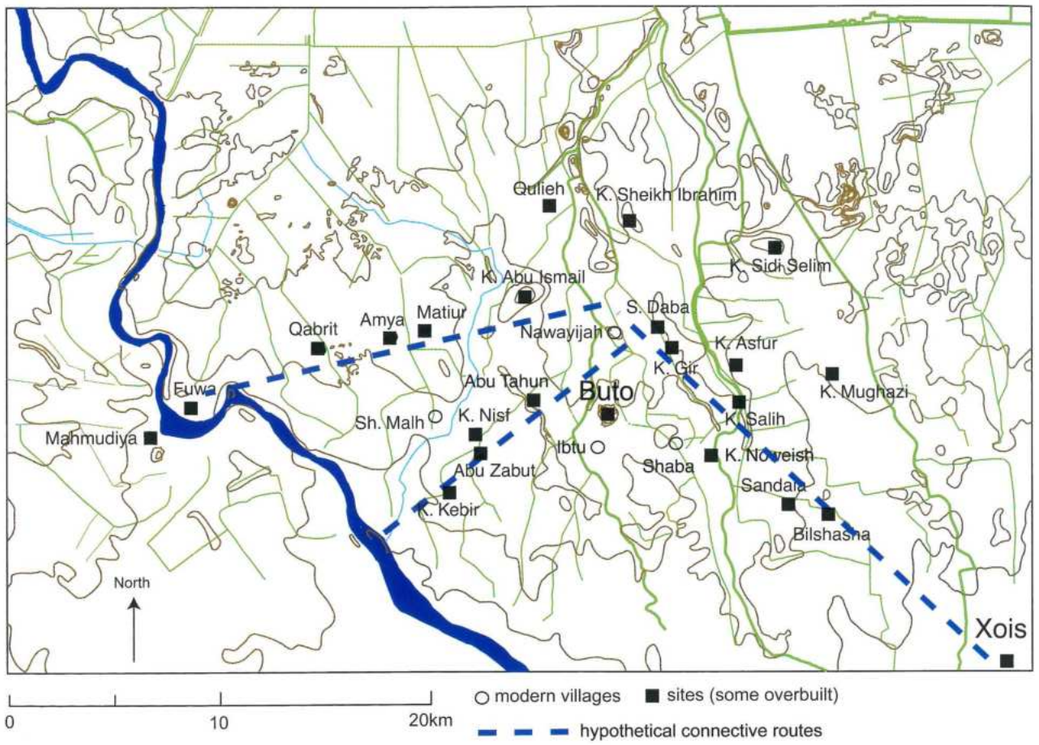


Figure 16.5 Hypothetical connective routes from east to west, starting at Xoïs to Buto and modern Fuwa/Mahmudiya. Mapped onto the modern delta showing main canals, subsidiary canals, contour lines and the Rosetta Branch. (Map: P. Wilson and R. Dickinson, after Survey of Egypt 1:50,000 map, 1997.)

(Tell Farain), Athribis in the centre (Benha) and Thmuis on the east (Timai el-Amdid). The Roman Period clearly saw continued development of the Delta infrastructure as is evident from the 'Butic river', a canal excavated across the Delta, connecting the main river branches, according to the geographer Claudius Ptolemy. It is suggested that it ran close to Hermopolis Parva on the west, south of Buto, to Tell Timai and then to Tanis, with the canal bank or levee alongside it creating a raised trackway.[74] By design, this may have created a boundary drain for the northern area, with an artificial connecting waterway into which drains from the south could empty and from which water could be directed away from the marshy zone. At one stroke the canal would have created a water route network, linking distributaries such as the Saïtic branch or its descendants with the main branches and creating a focus for the settlement network with collection and distribution nodes. The evidence for the canal, however, is slight. Ball cites a passage from Josephus, describing how Titus marched soldiers to Nikopolis outside Alexandra and then sailed directly to Mendes. Ball interprets the passage as meaning that there was a direct canal between the two places—the Butic. It is just as likely that either the ship sailed around the northern coast and down through Lake Menzala or that it sailed down the Canopic, joined the Pelusiac branch and then sailed north to Thmuis. The Peutinger map also purports to show a set of linking roads—perhaps alongside canals—across the Delta between Pelusium, Heracleopolis, three unidentified places, Buto and then Hermopolis Parva.[75] Ball identified a series of mounds near Thmuis (Tell Timai el-Amdid), including Tell Qanan, which led from Thmuis to Tanis (Sa el-Hagar) and could have been the excavated spoil heaps of the canal. In defence of the Butic canal, it is noticeable that certain groups of sites in the Buto area have an east-west alignment, which may suggest a roadway alongside a canal. Beginning at Tell el-Qabrit, Tell el-Amya, and Tell Matiur, passing south of Kom Abu Ismail, then through Kom Ismail, Kom el-Daba and Kom el-Gir to Kom el-Asfur, there is a good east-west alignment of places. To the south of Buto there is another striking alignment of (from the west) Shabas el-Malh, Kom el-Nisf, Ibtu (just south of Tell Farain) and Shaba.[76] All of these lines could arrive at Fuwa on the Rosetta branch, clearly a key

74 Ball 1942: 128. The canal is mapped to the south of Buto, see also Bietak 1975: 92–3 and 176 Abb. 43.

75 Ball 1942: 151–4. The map is a twelfth century copy, but may be based on documents from the second to third centuries.

76 The sketch map of Edgar 1911, in his survey around Buto, strongly suggests these alignments.

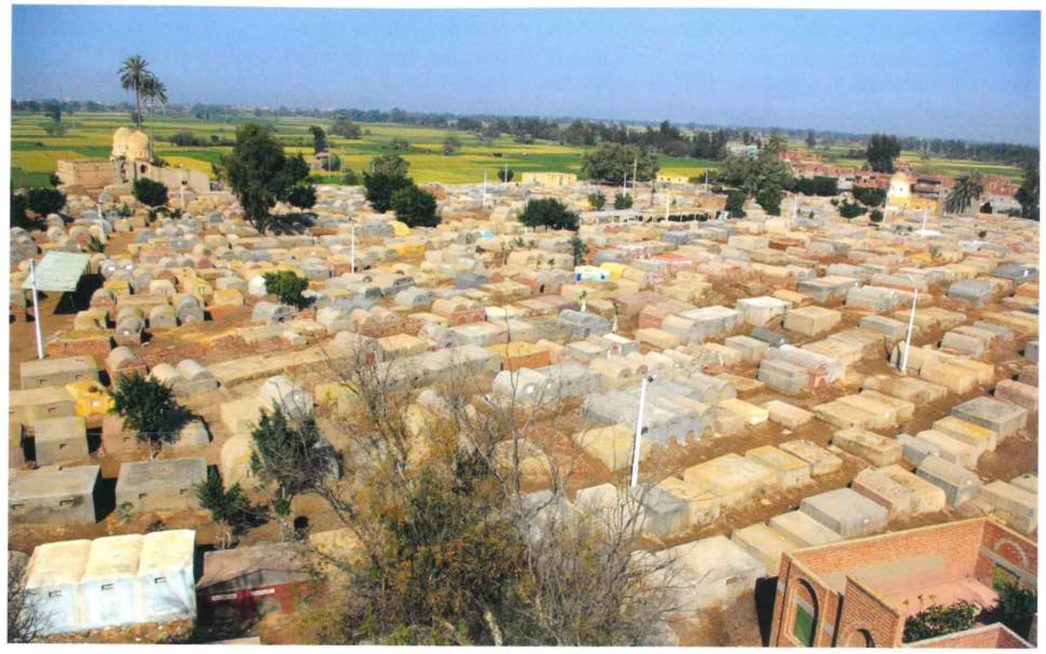


Figure 16.6 View west over the modern cemetery at Shabas Shuhada upon a mound consisting of Roman-Late Roman Period structures and pottery. (Photo: P. Wilson).

bisection of river branches and the point at which the Alexandria canal began from Mahmudiyah on the west bank (Figure 16.5). It seems likely that the Romans would have invested in such east–west projects in order to link their stations, garrisons and towns more effectively. In the floodplain, however, the yearly floods would have made such tracks difficult to maintain and the Butic canal may have had a relatively short life due to sedimentation and destruction by flood. The canal does not seem to have survived in the topographical record, except for settlements which sprang up alongside it, perhaps maintaining crossway links with larger north-south waterways.

In the large administrative centres in general, the main change during the Roman Period was that the temples received increasingly less investment, until they eventually went out of use and in their 'decommissioning' phase were used as quarries for stone and soil.[77] By the third century, such a change moved the focal areas of a settlement from around the temple enclosures to the edges and sides of the town area. Nevertheless, hydraulic installations, such as bath-houses throughout the Delta,[78] and the apparent Roman reorganisation of the urban space of Athribis,[79] suggest that the Romano-Egyptian culture had a strong base in the Delta in general. In the north of Egypt, the Roman Period at Buto shows areas of housing in the temple area (Kom B), perhaps connected with the dismantling of the temple, industrial areas, bath houses and a cemetery on Kom A and more workshops on Kom C.[80] Sites around Buto date most often to the Roman Period, suggesting that they are satellite settlements,[81] but the impact of the Roman 'expansion' at the other northern sites has been less well investigated. The problem is exemplified by the case of the city of Cabasa, a new administrative area and city was established, perhaps in the Late Ptolemaic or Early Roman Period.[82] The city may have been intended to form a focus for the intensification of settlement due to the increased level of agricultural exploitation and to manage the changed waterway system. The identification of the site associated with this city is not yet certain. The Cabasa[83] element may be represented in the modern toponym Shabas, which was used of at least four towns south of Buto: Shabas el-Shuhada, Shabas el-Umayyir, Shabas el-Mehl and, perhaps, Shabas Sanhur. Amélineau, Ball, and subsequent authors[84] have favoured Shabas el-Shuhada as Cabasa, because it is in the centre of this group and there is indeed a three-metre high mound underneath the modern cemetery at the site, with stratified burials and Roman-Late Roman pottery (Figure 16.6).[85] At Shabas el-Ummayyir, however, there are also parts

77 Bagnall 1993: 261–8.

78 For example, at Schedia, Kom el-Ahmar, Sersena (Cleopatris), Athribis and Saïs. Trümper 2009.

79 Dabrowski 1962.

80 Summary in Leclère 2008: 212–16.

81 Schiestl 2012.

82 Mentioned by Pliny: Helck 1974: 41–2 and 162–3.

83 Timm 1984–2007 (5): 2218–22.

84 Amélineau 1893: 419–21 (Schabas); Ball 1942: 109, 122, 164, 178.

85 See www.dur.ac.uk/penelope.wilson/Delta/Survey.html.

of a higher mound, partly removed to make way for a new school, also with Roman pottery, so the identification is still uncertain.[86] As the two sites are within the Nashart and Masraf 8 canal system, which is a candidate for one of the ancient drains,[87] both may have some claim to be connected with the ancient Cabasa. Edgar also noted the Shabas element in a group of sites centred on the modern Tell el-Qabrit,[88] a group which may also be a candidate for the new capital of Cabasa. This kind of problem in identifying main cities, even administrative centres, known from textual records, with remains on the ground, exemplifies the wider problem of Delta archaeology.

As for the earlier levels, the relevant strata of the Roman Period may still be buried at many of the sites and further work is necessary to establish the pattern of development and organisation of the areas.

Byzantine boom and Islamic Period bust

The predominance of sites dating to the Late Antique Period (fourth–seventh century) according to pottery survey is noticeable in the north Delta as well as in Middle Egypt around Amarna.[89] There are two main problems with the survey collections. Although they included material from ditches around the sites, in order to obtain pottery that may have come from deeper strata, it is possible that this material could also have been spread out from the central part of the sites. This means that the material may only reflect the last phase of the site. Furthermore, pottery can have a wide temporal range, although these cultural markers may lag behind chronological developments. For example, the Early Roman Period includes the first century BC to the second century AD as a distinct unit of material culture, reflecting the joint Hellenistic culture of the eastern Mediterranean.

The site of Tell Mutubis (Kom el-Ahmar)[90] has been more intensively surveyed in order to understand the development of the town from its origins to a period of *floruit* in the Late Antique Period and abandonment around the ninth–tenth century. The site covers an area of around 36 ha, with a central mound rising to a height of 12 m above the field level. The site location is to the west of the northern zone, with a strategic situation east of the Bolbitine branch and west of the marsh zone of Burullus. The town could conceivably have controlled access across the Delta and, in the Roman Period, have formed a link to the Butic canal. Survey material was collected from systematic grid-squares across the tell, from mud excavated from ditches around the tell, as well as from robber holes, in order to create a pottery typology corpus for the site. The overwhelming date of the pottery found at the site was from the Late Roman Period (fourth–seventh century); very little discernible material of earlier periods could be detected.[91] One possible diagnostic sherd dated to the Ptolemaic Period, but it is of a type which could equally have been made in the Roman Period. The glass also seems to fall into Late Antique date range, with most material dateable from the fourth century onward and a few possible examples from the third century.[92] Standing buildings were noted in the sections of the mound and included substantial mud brick walls reinforced with fired brick courses (Figure 16.7), as well as some fired brick structures, including tanks. The geological investigation of the palaeo-landscape suggests that the site was founded on land emerging after a change in the fluvial regime, perhaps no earlier than the Late Ptolemaic to Early Roman Period, depending upon the date of the pottery from the earliest features.[93] The latest material suggests that the site was already in decline in the seventh century at the time of the Arab conquest and perhaps abandoned around that time. The abundance of Late Roman 1 type amphora fragments, African and Egyptian Red Slip Ware, Late Roman D-ware and Roman cooking pots suggests a domestic occupation and consumer culture, which fits within the general pattern of the Late Antique Period in North Africa as a whole.[94]

The expansion in Late Antique sites fits within a period of changing political and economic focus from Rome to Constantinople to Fustat (Cairo). During this period documentary evidence shows that agricultural land was owned by villagers and city dwellers alike; there were large 'estates,' such as that of Aurelius Appianus in the Fayum, and, by the sixth century, the property holdings of the church and monasteries were substantial.[95] In this period, wheat was shipped out to Constantinople and other major Christian centres in the Levant, such as Antioch, when trans-shipment may have been easier through the northern lagoonal area and ports on Burullus. An account of boats dating to the fourth century mentions home ports of boats in the following nomes of the north Delta: Metelite, Prosopite, Phtenote, Lower Diospolite, Elearchia, Nilopolite.[96] The northern waterways could thus have aided the movement of goods

86 See www.dur.ac.uk/penelope.wilson/Delta/Survey.html; Schiestl 2012: 19–20.
87 Wilson 2012: 111–12.
88 Edgar 1911.
89 Surveys in the Delta: Wilson and Grigoropoulos 2009: 276–81; Rowland and Wilson 2006; Ballet and Von der Way 1993. Survey in Middle Egypt: Kemp 2005; Parcak 2005.
90 SCA register number 090175.
91 Mikaël Pesenti and Aude Simony pers. comm. for the Mutubis Project.
92 Daniela Rosenow pers. comm. for the Mutubis Project.
93 Information from Benjamin Pennington for the Mutubis Project.
94 Dossey 2010: 62–97.
95 Bagnall 1993: 148–53 and 289–93.
96 *P.Oxyrhynchus* XXIV 2415 in Lobel et al. 1957: 176–9; now dated to the fourth century, Sijpesteijn and Worp 2011: 175–80; listed by Bagnall 1993: 37.

Figure 16.7 The eastern side of the mound at Tell Mutubis, showing a wall of mud brick with fired brick courses. The rampart in the photograph is 4 m high. (Photo: P. Wilson).

in a slightly different direction to the Rome focus of the Roman Period.

In addition, the bishoprics in the north Delta were certainly very active, including that of Parallos, in the area of Baltim, where a Bishop Nonnos is known from AD 339 and also his successors up to the late sixth century.[97] It should be expected that almost all of the Late Antique sites identified would have had church buildings, ecclesiastical administrative buildings or, in some cases, monasteries. Forty-four bishoprics are recorded in the Delta out of about one hundred in the whole of Egypt, including Libya and the Pentapolis of Cyrenaica, perhaps not too surprisingly in view of the relative proximity to Alexandria.[98] Historical sources point to another factor in this area that was of importance, when the area of Bashmur in the north served as one of the last places of resistance to the Arab expansion.[99]

At other sites where pottery was collected in the EES survey, there was evidence for some continuation at a few sites into the ninth and tenth century, namely Sidi Selim, Abu Ismail and Foqaa. The dating depended upon the appearance of specific types of material in the ceramic collections, namely glazed wares in kaolin fabrics. The problem is that Late Antique, 'Coptic' pottery, such as white slipped forms and even glass vessels, continue from the seventh century into the ninth century, so that they are evidence of an underlying continuity of material culture, not of chronology.[100] It seems that, given the early Arab ceramics, there was some form of occupation well after the Arab expansion and into the Fatimid Period, when the rural ar-Rif of the Delta was important for its produce and particularly flax and linen.[101] A waster from a Late Roman 7 type amphora found at Kom Khawalid hints at the possibility of pottery production in the northern Delta.

The changing northern environment may have contributed to the decline in settlement. The Canopic branch seems to have silted up around the eighth century AD, leading to problems of irrigation and movement in the western Delta. The Sebennytic branch itself had silted up by the early Medieval Period, perhaps with some earlier, gradual problems, such as sea incursions into the area, and it is possible that this led to the eventual real decline of the area as the focus of attention for the main arteries of transport switched to the Rosetta and Damietta branches of the river. Both river branches had been the life-blood of the areas through which they flowed.

97 Worp 1994: 304.
98 Wipszycka 1983: 183–6.
99 Megally in *Coptic Encyclopedia*: 349b–51b.
100 Grigoropoulos reflecting comments on the difficulty of dating Late Antique to Early Arab pottery in general, in Wilson and Grigoropolous 2009: 282–6.
101 Sanders 1998: 161–5, who does not suggest a decline after the tenth century.

Figure 16.8 The isolated site of Mastarua, looking north towards the Mediterranean Sea over low scrubby mounds showing patterns of structures. (Photo: P. Wilson).

Medieval Burullus

The ports and harbourages of the northern coast are equally as hard to detect, but those that are known are documented or have archaeological material from the Late Antique to Medieval Period only. At Mastarua, there may have been a settlement from the Late Antique to Medieval Period called Nastarawa, which is mentioned often in the Arabic Itineraries of travellers in the north.[102] For example, Idrisi (AD 1154) notes that Nastarawa al-Beheira Bashmur was between el-Mahagum (location unknown) and el-Burullus, while others suggest that it may have been an island approachable only by causeways, although it seems to be near the sea-shore (Abu el-Fida).[103] At the site itself, the scrubby grass shows undulations in the local topography, while the differential growth of grass shows rectangular building traces, also visible from satellites, and green clumps of grass may represent the interior of buildings and individual rooms (Figure 16.8). It seems more than likely, therefore, that there may be buildings still buried under the surface accumulations of sand and soil. Pottery of Late Antique and Islamic date litters the surface and a red granite column was seen during an exploratory visit in 2012.[104] The presence of a modern coastguard station at the site shows its continuing strategic importance perhaps as a monitoring station. Most interestingly, it lies at the north end of the series of levee sites running through Lake Burullus, perhaps from one of the versions of the Saïtic branch of the Nile and so could have had direct control of the river mouth, enabling access to it. The importance of this site and of Burullus, along with other coastal sites, such as Rashid (Rosetta), Tinnis and Dumyat (Damietta), is indicated when, under the Patriarch Kosmas (AD 851–858), walls or installations of some kind were built there against the Byzantines.[105]

This activity suggested by the archaeological evidence indicates that settlements of various types and farming communities continued to be viable and successful into the Late Antique and Early Arab Period. The towns offered trans-shipment points across the network of Delta waterways, ensuring fast movement of goods. The settlements also offered high ground above the flood plain upon which towns were built purposely to sit out the

102 Amélineau 1893: 275–6; 1984–1992 (4): 1739–42.
103 Guest 1912: 960–1.
104 http://www.dur.ac.uk/penelope.wilson/Delta/Burullus.html.
105 Timm 1984–2007 (1): 450–1, from Petrus ibn Rahib and also in the *History of the Patriarchs* II (1): 10 (15).

inundation. Additional resources, such as fish, reeds and papyrus, could have ensured that the inundation months were not unproductive, so that there was the possibility of all-year-round exploitation of the Delta environment. The end of the Byzantine boom may have been a gradual phenomenon, noticeable only two centuries into the Islamic Period, as is also the case in other parts of the Islamic world.[106] The Islamic Period also coincided with the increased unsustainability of the high mound settlements, when supplying them with water became too difficult and people moved down onto cleaner, less crowded sites on new levees. Such displacement of settlements from older mounds has also been noted in Upper Egypt and may be a general phenomenon of the early Islamic Period.[107] In addition, when the Arab trade routes switched towards Arabia and Iraq, the new routes along the Red Sea may have proved more attractive as ports. Whatever 'harbours' had been established in the north were relegated to being the fishing ports that they are today. There is some evidence that Venetian merchants preferred to come through the Burullus channel to trade in northern Egypt in the fourteenth century,[108] perhaps partly because of the treacherous *boghaze* mouths of the Nile at Rosetta and Damietta. By then, however, the boom was over and many of the settlements were already abandoned mounds, sometimes the inhabitants being displaced to new, but nearby places, perhaps in the cases of Sidi Selim, Mutubis and Tell el-Daba-Tida.

Conclusion

Any assessment of rural development, settlement boom and population movement within the ancient world is dependent upon the quality of the surviving evidence and how it can be interpreted. The problem for the north of Egypt in comparison to the rest of the Nile Valley is that the northern climate is not conducive to the survival of large amounts of papyri, archaeological work has been concentrated at the site of Buto and survey work is just beginning to make some limited progress. Furthermore, the historical record is patchy for all periods and has particular concerns which do not always provide the kind of detail that historians and archaeologists would like. It is possible, however, to begin to sketch out a way in which the evidence that does exist can be used within the historical context and to demonstrate the gaps in our knowledge that can be filled with further work, as well as to raise questions about the themes that seem to be especially pertinent for understanding the development of the northern Delta. Firstly, an environmentally determinist argument has underlain this paper, suggesting that due to the combined effects of sea-level change and river flow, the Sebennytic and Canopic branch between them created the kind of environmental conditions that could be immediately exploited by a canny regime from the seventh century BC through to the Roman empire. Grain and other commodities were produced by estates and shipped onward by an efficient fleet of boats along well-managed waterways, served by small harbourages and landing places. In other words, an almost perfect set of conditions existed in this part of Egypt, which encouraged state intervention in the development of agricultural land and the management of other more water-based resources.

Secondly, the tension between religious change and state management of lands and resources plays a key role in the impetus for the development of land use and settlement boom. As land ownership in Egypt changed from the Pharaonic pagan temples to Roman Imperial cults and then to the Christian church, and finally to Islamic administration, the organisation of settlement hierarchies and perhaps of internal settlement administration may also have changed and be seen in subtle developments in material culture, as well as the built environment. Thirdly, the focal points of the empires which Egypt served also may have played their part in the trajectories of economic systems throughout the eastern Mediterranean, which can be detected in the Delta. From the Ptolemaic empire with its focus on Alexandria, to Rome, to Constantinople and then to Cairo, Arabia, and Baghdad, the shipping routes, the direction of the flow of people and the consumer options of the towns and cities all had a profound impact upon the life and momentum of settlement and population density within the northern Delta.

Finally, the abandonment of sites and displacement of inhabitants to smaller more pristine towns suggests that there was clean break with the past around the eighth–ninth century AD, reflecting a marked cultural change and real disconnection with the systems and life-patterns of Late Antiquity. Inevitably more targeted work in the north of Egypt remains to be carried out to add to the material presented here and to rehabilitate this little-known page of Egyptian history in the unique environmental setting of the northern Egyptian Delta, as well as within the wider context of Eastern Mediterranean and North African history.

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106 For example, see the papers concerning the Near East in King et al. 1994.
107 Gascoigne 2005.
108 Cooper 2008: 68–9 and 109–10.

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