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Myos Hormos – Quseir al-Qadim

Roman and Islamic Ports on the Red Sea

Volume 2: Finds from the excavations 1999-2003

Edited by

David Peacock
Lucy Blue

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Julian Whitewright

BAR International Series 2286
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Illustrations by Penny Copeland and Julian Whitewright

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Foreword and Acknowledgements

Between 1999 and 2003 the University of Southampton conducted excavations on the site of Quseir al-Qadim, a place that had not been examined since the excavations by the Oriental Institute of the University of Chicago ended in 1982. The new work was prompted by the discovery that the site of Quseir al-Qadim was, in all probability, not that of the minor port of Leucos Limen, as had been previously thought, but none other than Myos Hormos (Peacock 1993). This port, together with its sister harbour Berenike, articulated Rome's trade with India and the East. Further impetus for the project came from the building of the Mövenpick Hotel adjacent to the site as it was clear that the antiquities would come under increased pressure as tourism developed on this part of the Red Sea coast.

The initial volume, already published (Peacock and Blue 2006), concerns the survey of the site, its hinterland and the excavations. In this volume we discuss the finds from the excavations, but the pottery, textiles, palaeobotany, ostraca and paper documents will be subject of further volumes. They were found in abundance or require lengthy study and could not be accommodated in a single volume. Work is in progress on dedicated volumes for each category. This volume has a chapter on each where an attempt is made to give an overview or to present some specific aspect in detail.

The volume contains contributions from a wide spectrum of authors and while we have imposed editorial constraints we have attempted to acknowledge that these are individual contributions from those who have specialised in their subject. Some authors present a complete catalogue of finds (e.g. coins, metal, leather), but in other cases this was not possible because of the sheer volume of material. The glass, lamp, and wood chapters are good examples of a more selective approach dictated by the number of finds

One of the major investors in the Mövenpick project, Mr Peder Wallenberg, was the key to our success, because through the Peder Sager Wallenberg Charitable Trust, he financed the work reported here. Without his interest and continuing support none of this would have been possible and we remain greatly indebted to a man who combines twin virtues of good business sense and an appreciation of the importance of heritage to the community and to visitors alike.

We warmly thank the Supreme Council of Antiquities (now Ministry of Culture) for granting permission for this work and in particular general secretaries Professor Gaballa Ali Gaballa and Dr Zahi Hawas. We were also greatly helped by others in Cairo, particularly Mr Magdi Abu Elula, Mr Magdy el Ghandour, and Mr Mohammed Sogheir. In Qena we were afforded every facility by the regional directors, Mr Hussein Afyouni and particularly his successor, Mr Ahmed Gaber. We were blessed with some of the best inspectors that any project could want: not only did they remind us of Antiquities regulations, but they took a close interest in the work and helped us in every way imaginable. We would like to thank most warmly, Mr Mohammed Hamed, Mr Mohammed Ryan, and Mr Mohammed Abu el-Wafa Hassan who were with us throughout much of the work and Mr Ashraf Mubarak Nasr who was with us in 2000 and 2001. In the final season we were fortunate to have Mr Ramadan Ahmed Mohammed Abdel Moniem who equally helped us in so many ways. Their ability to solve problems and their other contributions made the work a pleasure from beginning to end.

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We received hospitality from the Flamenco Hotel who gave us a warm welcome through the managing director Mr Tarek Ali and local managers Mr Clemens Faber and Mr Christian Fuchs. Similarly, Mr Cypert Schwarz and Mr Robert Fellmeyer of the Mövenpick Hotel afforded us every assistance.

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Finally, we thank our anonymous referees who each looked at their specialist chapters. The reader will be grateful for their input which enabled us to eliminate certain errors and to make substantial improvements.

David Peacock, Lucy Blue
Southampton

1 Introduction

David Peacock and Lucy Blue

The site of Quseir al-Qadim (old Quseir)[1] lies about 8 km north of the town of al Quseir, which is situated on the Red Sea coast about 500 km south of Suez (Figure 1.1). It occupies a coastal ridge which rises to about 8 m above sea level, forming a southward facing peninsula defined by the sea to the east and by a silted lagoon or *sabkha* to the south and the west (Figure 1.2). It has been demonstrated that in Roman times, this would have been a body of open water approached through a deep water channel, the entrance to which is marked by a break in the coral reef bordering the coast and a sandy cove today known to tourists as 'Serena Beach' (Peacock and Blue 2006; Blue 2006a), and that this would have served as the harbour during the Roman period.

The site, which occupies about 10 ha, has an undulating topography resulting from the decay of ancient mudbrick buildings, but the main evidence that this was once an important archaeological site is the abundance of potsherds, glass and even textiles and wood, which lie on the surface. It is at once evident that two phases of occupation are represented because among the sherds are those of both Roman and Islamic date.

The climate gives few concessions to life as this is one of the driest parts of the world, where it seldom rains. Rare torrential rains of 1995 led to water accumulating in the *sabkha*, but in recent years there has been no rain at all. The vegetation comprises mainly *Zilla spinosa* with occasional Christ's Thorn trees (*Zizyphus spina Christi*) in the inland wadis. Fourteen km to the west at Bi'r an-Nakhil, is a small oasis with palm trees. The fauna is equally sparse apart from small birds and sometimes the larger birds of prey which live off them. Large mammals seen infrequently include Dorcas gazelle (*Gazella Dorcas*), Rupell's sand fox (*Vulpes rupelli*) and very rarely, ibex (*Capra ibex*).

The site lies partly on Quaternary gravels and partly on the underlying Quaternary coral reef, which give way westwards to a band of phosphate bearing Tertiary sediments, here about 5-8 km wide, through which occasional inliers of dark Precambrian rocks protrude. Until recently the extraction of phosphate was an important element in the economy of the region, but it is now concentrated at Hamrawein, 17 km to the north. Eight km inland the Precambrian rocks form a distinct north-south range of hills forming the eastern edge of the wadi an-Nakhil, to the north and south of which are the granite massifs of Gebel Hamrawein and Ras Zereib. Access to the interior is via two wadis: the wadi Quseir al-Qadim and the wadi al-'Anz, which joins the former a few km inland. From the wadi Quseir al-Qadim there is relatively easy access to the wadi al-'Ambaji and the wadi an-Nakhil, both of which connect with a major route across the Red Sea Mountains to the River Nile at Quft. The site is thus well connected by sea to the south and across the Indian Ocean and by land to the Nile and hence the Mediterranean.

The site was excavated in 1978, 1980 and 1982 by an American team (Whitcomb and Johnson 1979, 1982a), who believed it to be the relatively minor site of Leucos Limen (the white harbour). However, in the 1990s it became apparent that this was in reality Myos Hormos, a major port of trade with India (Casson 1989). In view of the significance of the site it was felt appropriate to renew archaeological investigations and in 1999, with the kind permission of the Supreme Council for Antiquities, the University of Southampton began a series of excavations (Figure 1.3), sponsored by the Peder Sager Wallenberg Charitable Trust. These ended in 2003 and an account of the excavations has already been published (Peacock and Blue 2006). In this the second volume we publish an account of the portable finds, the best of which are now housed in the Supreme Council for Antiquities repository at Quft. Other material which could not be accommodated was buried on site.

In this volume we attempt to give an overview of the exceptional material recovered. However, while it is exciting to excavate a site with almost total preservation, there are major logistical problems. Firstly, the range of specialist skills required is far greater than those usually needed on an archaeological excavation. It was not always possible to find the appropriate specialists

[1] The Medieval name of the site was Quseir, but the site became known as Quseir al-Qadim (Old Quseir) when the modern town of Quseir was established following the abandonment of the original settlement. Quseir al-Qadim is retained here, to avoid confusion with the current town of Quseir.

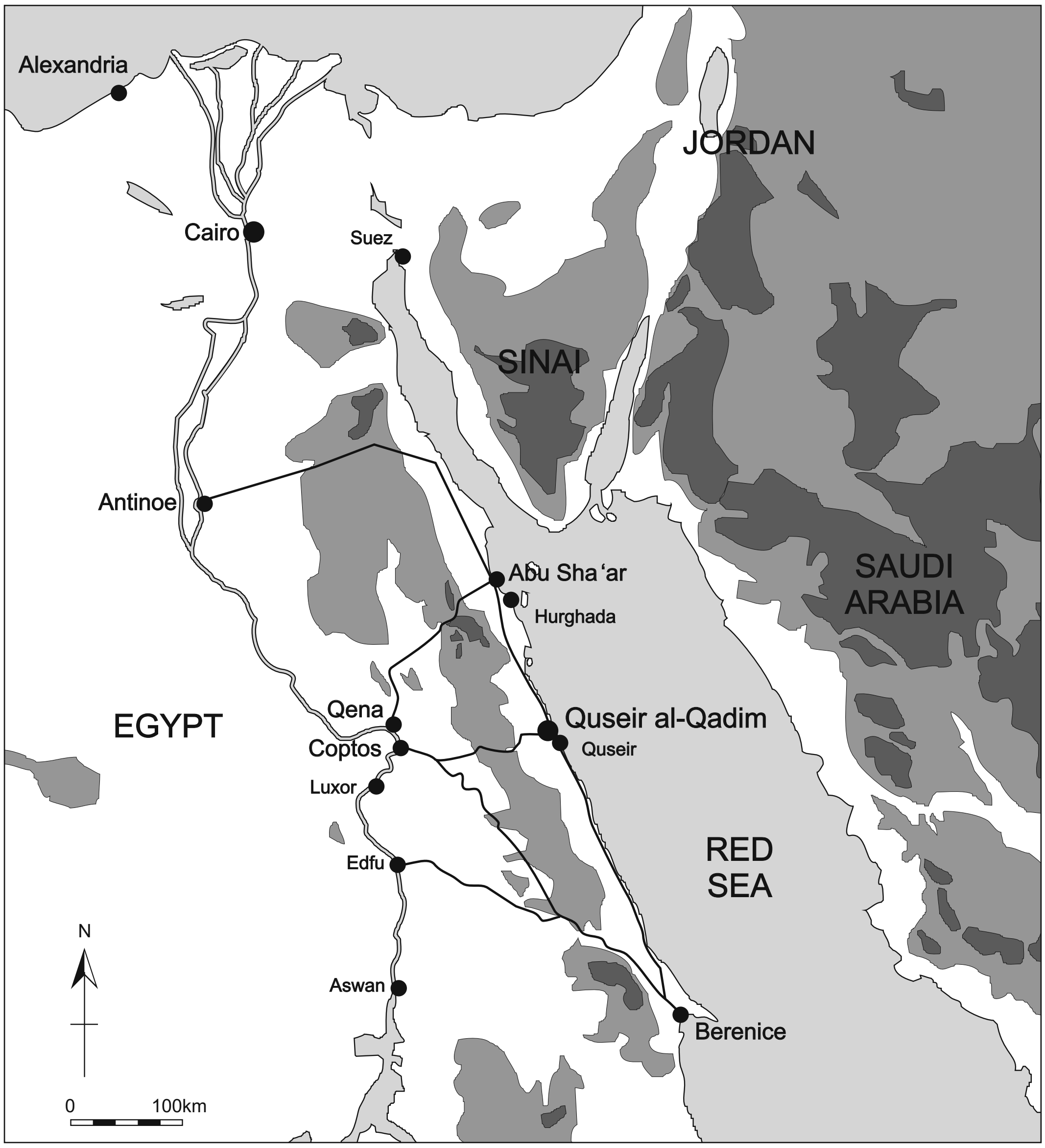


Figure 1.1 Location of Myos Hormos/Quseir al-Qadim on the Egyptian Red Sea coast.

or to fund their work, so multi-tasking was a necessity. Secondly, in some cases such as the pottery, textiles, botanical remains and written material, finds were so numerous that they demand a volume each. These are in progress, but here we give a summary or a taster of each aspect to give an impression of the *richesse* to come. The remaining categories of finds are as fully published as possible, although aspects may be further developed in future works.

After this Introduction, the first five chapters deal with ceramic artefacts. Firstly, in Chapter 2, Roberta Tomber and her co-authors discuss sherds with exotic scripts which emphasise the far-flung connections of Myos Hormos, while a rather different type of inscription, the amphora stopper is reviewed by Ross Thomas in Chapter 3. He adopts a broad canvas and attempts to place the Quseir finds in the context of finds from the rest of the Eastern Desert region of Egypt, including both the Red Sea and its linked hinterland. This is followed by an essay by Lucy Blue on the remarkable wharf made of re-used amphorae. Since our first publication in 2006, it has become clear that this mode of construction is by no means unique and was commonly used to overcome the problems of marshy ground in places as far apart as Cadiz and the Po Delta. Finally, Rebecca Bridgman reports on the small but highly significant collection of oriental ceramics imported in the Islamic period and David Peacock summarises the finds of Roman and Islamic lamps.

Glass was a frequent find and in Chapter 7 David Peacock presents a full catalogue which complements and expands the work of Carol Meyer (1992) on the material from the Chicago excavations. The painted sherds, in particular, point to the delicate and exotic material reaching the site. Islamic glass is comparatively rare with the exception of glass bangles. These are concentrated near the cemetery and it is argued that they may have been broken in a mourning ceremony.

Coins were neither numerous nor well preserved, but in Chapter 8, David Peacock describes the few that could be identified, including a Ptolemaic one of the 2nd century BC, perhaps the earliest dated artefact yet found at Quseir although some of the lamps are potentially of the same date. Similarly, Islamic coins were neither abundant nor well conserved, with the exception of an important hoard of Ayyubid coins, which included gold dinars, half dinars and silver dirams that was recovered preserved in a cloth bag in Trench 8/8a (Peacock and Blue 2006, 139). This is not included in this volume as it has been published in detail by Cécile Bresc (2008). Finally, Penny Copeland concludes the section of metallic finds by discussing the numerous non numismatic pieces. Nails were perhaps the most frequent find, but unfortunately these are all too often neglected. Here she attempts to rectify the balance and gives them prominence, which is particularly appropriate in a report on a site where wooden ships would have been serviced and perhaps built.

Stone artefacts are described by David Peacock in Chapter 11. A wide range of geological materials were imported to the site from the Mediterranean regions as well as further afield in the Red Sea. Raw materials apart, the site has produced a useful collection of steatite stone pots which may have originated in the Eastern Desert, but equally could have come, perhaps more probably, from Saudi Arabia or Yemen. Decorative stones were very rare except for some minor statuary in white marble and rare fragments of polished wall sheathing from rocks outcropping in Wadis Atalla and Semna.

Organic finds were well preserved because of the exceptionally dry conditions. They are discussed in chapters on leather artefacts by Jill Phillips, bone and shell artefacts by Sheila Hamilton-Dyer and wood by Julian Whitewright. All of these materials could have been worked on site - this surely must have been the case at least with shell and with wood, the latter a skill demanded in ship maintenance and repair. However, this may not have been the case with the very numerous textiles which will be the subject of a separate monograph. Fiona Handley gives a taste of *richesse* to come in Chapter 22, but also discusses sails in detail. She also gives a full and seperate account of cordage and basketry.

Environmental work was a major problem given the quantity of material and the near perfect preservation. More that 50,000 plant identifications were made, which obviously cannot be reported in full in this volume, but in Chapter 18 Marijke van der Veen and her colleagues summarise the evidence for trade and cuisine. The oriental imports are particularly striking and include exotic spices and fruits ranging from pepper to coconuts, cardamom and water melon. The maritime wood used in ship building and repair were equally exotic and a full account by Rowena Gale and Marijke van der Veen appears as Chapter 17. The faunal remains reported by Sheila Hamilton-Dyer in Chapter 20, naturally show a marine bias, but substantial quantities of land mammals were also used and consumed as part of a varied diet.

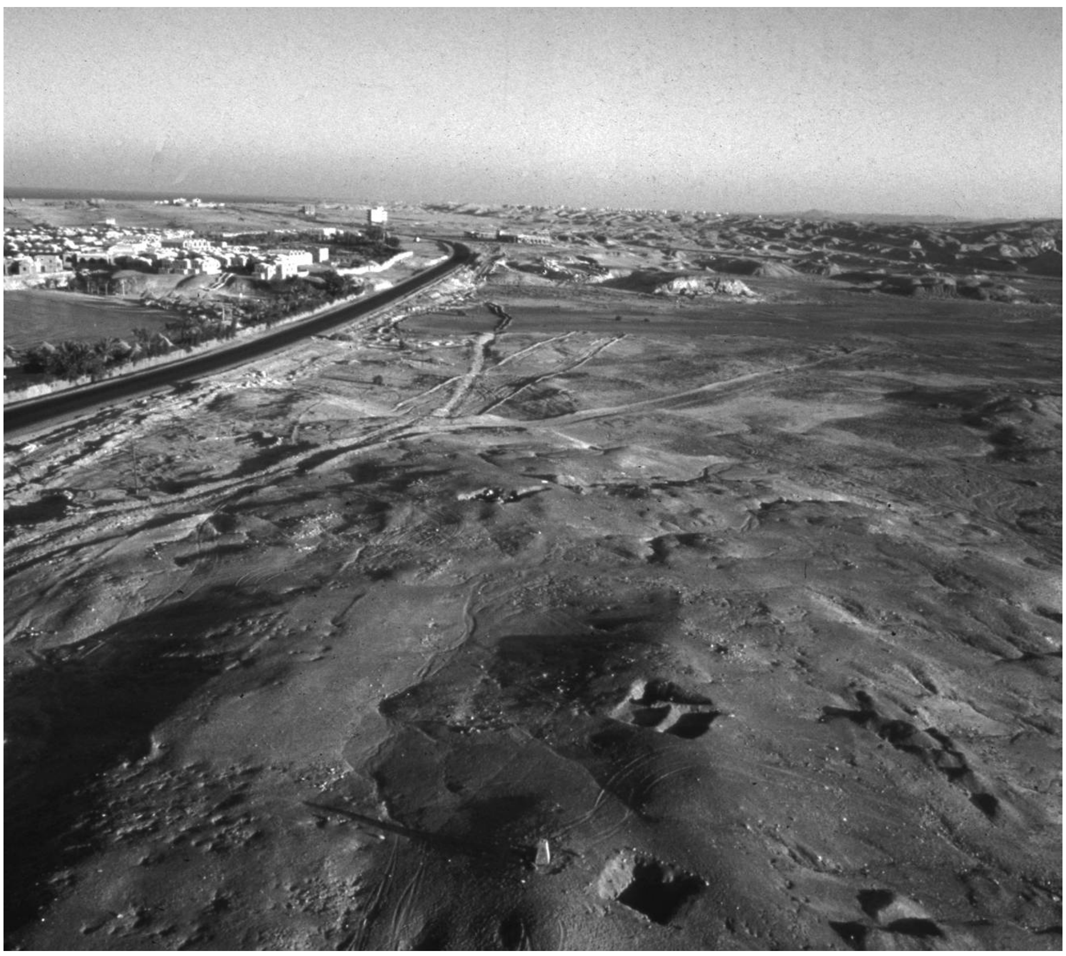


Figure 1.2 Aerial view of the site of Myos Hormos/Quseir al-Qadim looking South (Photo: Ayman S. Taher).

It is seldom that archaeologists get the chance to examine a Muslim cemetery, but here it was an imperative as the main cemetery lay on the beach and erosion led to human remains appearing on the surface – a phenomenon not appreciated by tourists wanting to relax by the sea. For this reason the entire cemetery had to be excavated and the bodies re-interred further inland in the hills, but overlooking the sea, a duty which was done with full Muslim rites. This gave a unique opportunity to study the bodies and the data formed the basis of Anne Macklin's doctoral thesis defended in the University of Southampton in 2005. In Chapter 19 she presents the salient points arising from this work.

Written evidence came to light for both the Roman and Islamic periods and will be the subject of separate monographs. Here Wilfried Van Rengen provides details of the most important papyrus of the Roman period, a contract drawn up at 'Myos Hormos on the Erythrean sea' on 25th March AD 93. Ammonius, son of Eudaimon acknowledges an interest bearing loan of 200 drachmae from Lucius Longinus a soldier serving on the ship 'Seahorse'. Anne Regourd adopts a difference stance and gives an overview of the Islamic paper documents as a taste of her forthcoming monograph. They enhance our view of the nature of the Islamic ports, the goods travelling through it and the merchants involved in the trade.

Throughout this work the theme of the sea and maritime activity constantly recurs. Most aspects of life at Myos Hormos/Quseir al-Qadim relate in some manner to ships and shipping – the life blood and *raison d'être* of the port. It is appropriate therefore that one of the longest contributions to this volume (Chapter 15) attempts to draw this evidence together. Lucy Blue, Julian Whitewright, and Ross Thomas discuss hull remains, rigging, sails, woodworking and ship maintenance, in effect, bringing together and placing the other chapters in context.

The volume concludes with an overview of what we now know of the nature and function of the ports of Myos Hormos and Quseir al-Qadim and a discussion of outstanding problems which can only be resolved with further work.

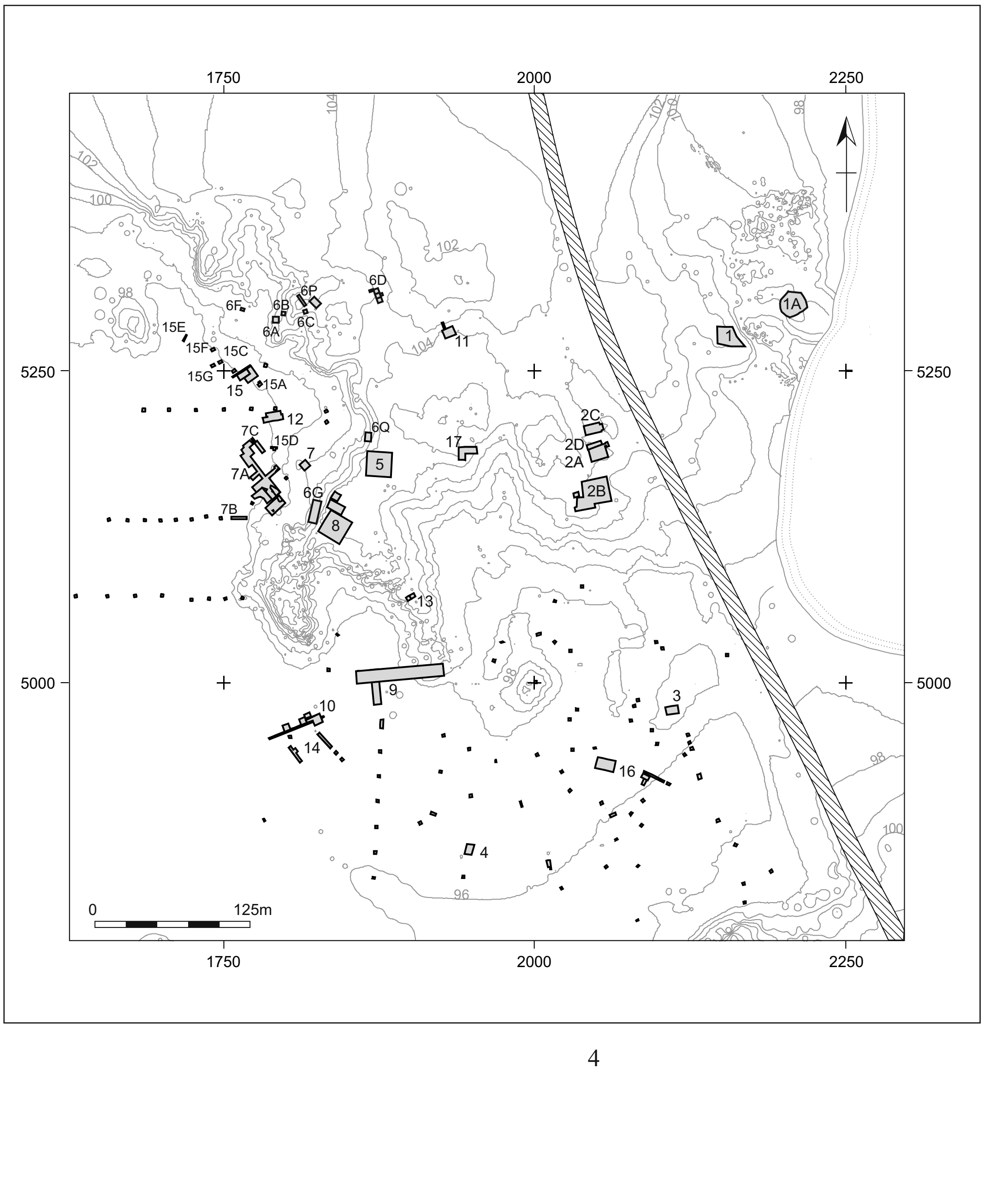


Figure 1.3 Areas excavated by the University of Southampton between 1999 and 2003.

2 Pots with writing

Roberta Tomber, with David Graf, John F. Healy and contributions by Christiane Römer-Strehl and Grzegorz Majcherek

Introduction

Approximately 800 *ostraca* were recorded from the excavations. Among these, a small number are of particular interest because of their ceramic type in combination with the written inscription or graffito, and some of these are described below. Dating in the catalogue refers to the overall date for the context as published in Peacock and Blue (2006), not the individual vessel. Most contributions are based on photographic examination with the exception of a few sherds that were examined by the first author *in situ*.

2.1 South Arabian vessels

Roberta Tomber and David Graf

A large number of storage jars with footring base and simple everted rim were recovered from all phases of the excavation (Fig. 2.1). The type, discussed in full elsewhere, has abundant organic tempering and is most likely sourced to the Hadramawt of Yemen where it was produced between the 1st century BC or AD and 4th century AD (Tomber 2004a, 353-5). The provenance of these organic storage jars is confirmed not only through typology and fabric, but further supported by a pre-firing, South Arabian monogram on one body sherd (Fig. 2.2); a second vessel has a pre-firing South Arabian inscription (Fig. 2.3). Another has a badly pitted surface and therefore is difficult to decipher, but appears to have Greek graffito (Brankaer 2003, 45; Fig. 2.4), probably post-firing although it is difficult to be certain from the photograph.

Many of the Quseir vessels have a dark internal lining and a number have remnants of a plaster seal around the inside of the mouth: both features indicate the vessels were used to transport liquid foodstuffs from Yemen to Egypt. One suggestion is that they carried Arabian wine as mentioned in the *Periplus* 49 (Casson 1989), as an export to northwest India, but not to Egypt. These vessels probably travelled to Quseir alongside basalt ballast from the same region reported by Peacock *et al*. (2007).

Catalogue

1. Complete organic storage jar rim with a skin of plaster around the outside of the rim and shoulder and inside to the base of the neck. The fabric is dull brown-red in colour with a cream-coloured outside surface and some blackening on the rim top. The clay is calcareous with a micaceous, silty matrix and occasional larger inclusions up to c. 1 mm. Its distinguishing feature is common voids from organic tempering. The join between the rim and the body is evidenced by diagonal wiping marks. Possibly 1st or early 2nd century AD [Tr. 6P] (Fig. 2.1).

2. High-footed organic storage jar base. A pale pink-brown

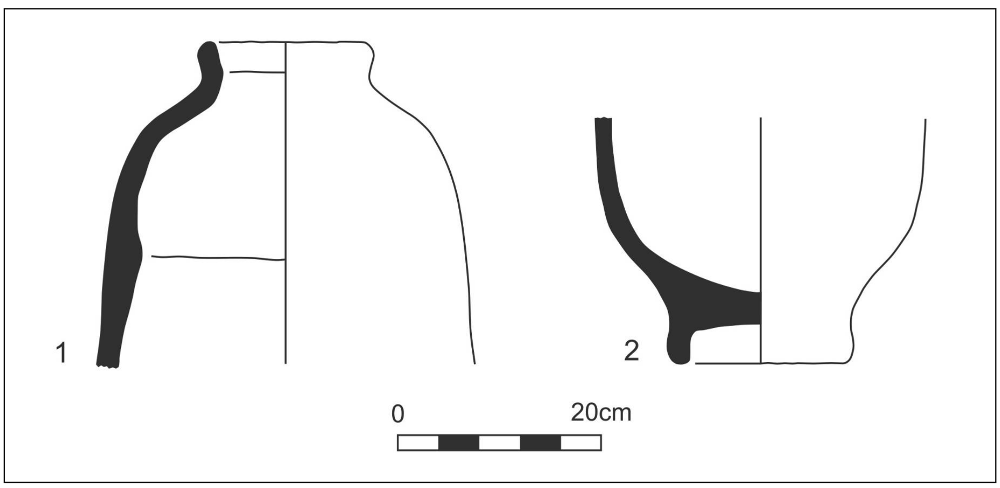


Figure 2.1. South Arabian Organic Storage Jar base and rim, Nos 1 & 2.

Figure 2.2. Body-sherd from South Arabian Organic Storage Jar with painted inscription, No. 3.

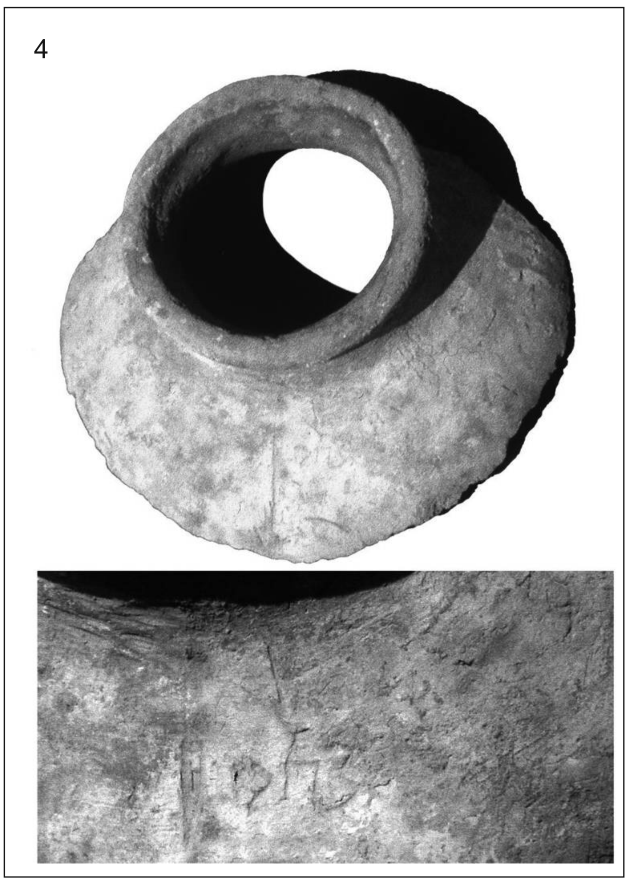


Figure 2.3. South Arabian Organic Storage Jar with incised pre-firing inscription, No. 4.

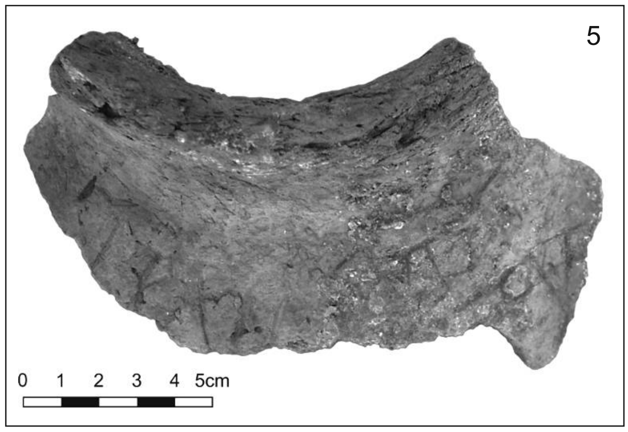


Figure 2.4. South Arabian Organic Storage Jar with post-firing Greek graffito, No. 5.

clay with a cream surface outside and abundant organic impressions on the surfaces; inside is a decayed lining, now cream coloured. The fabric is the same as for the rim described above. Second half of the 2nd century AD or later [Tr. 6H (4035)] (Fig. 2.1).

3. Body sherd from an organic storage jar. No fabric description is available but the photo shows it to belong to this organic fabric group and to have a cream-coloured surface. 2nd century AD [O.312 from Tr. 6H (4060)] (Fig. 2.2).

Graf writes that;

> The *dipinti* monogram in black appears to be either the Ancient South Arabian (ASA) letter Ḥ (if in the correct position) or Ṣ (if in reverse position, i.e. upside-down). It is well executed, but it is difficult to determine which letter is represented as there does not appear to be any recognizable anatomical part of the vessel extant that would provide the orientation of the very stylized ASA letter or monogram. There may also have been other letters painted on the vessel that are now barely if at all visible. As a result, what the letter or monogram may represent cannot be ascertained. Other ASA letters appears elsewhere. For example, the ASA letter S^1 is found on South Arabian vessels from Jurash (Khamis Mushayt) in the ‘Asir province of SW Saudi Arabia (W Glanzman, pers. comm., 2008) and at Berenike in Egypt (SE Sidebotham pers. comm., 2009). What they signal is presently unknown. The discussion of South Arabian monograms is primarily restricted to coins (Munro-Hay 2003, 31, 89-103, chart 2) and even here, there is no exact equivalency with this *dipinti* monogram. For a discussion of ASA, see Nebes and Stein (2004).

4. Organic storage jar rim. No fabric description is available but the photo shows it to belong to this organic fabric group and to have a cream-coloured surface and pale brown break. Late 1st/early 2nd century AD [O.784 from Tr. 6Q (4165)] (Fig. 2.3).

As noted by Graf;

> It appears that several ASA letters were incised on the shoulder before firing. To the far right, there is what could represent the ASA letter *B* (but leaning at a angle 90° to the right) and a rather crudely shaped S^1, but this is far from certain. To the left, and widely separated from the former, are what seem clearly to be the ASA letters *K* and *R*. It is possible that another ASA letter (e.g. perhaps *N* or S^2), but this is less clear. What the ASA letters represent cannot be ascertained, nor can it be determined if there were other letters incised on the jar.

5. Organic storage jar rim. No fabric description is available but the photo shows it to belong to this organic fabric group, red-brown in colour. The vessel is badly abraded. A post-firing graffito, likely to be in Greek, is visible on the shoulder. Late 1st/early 2nd century AD [O.785 from Tr. 6Q (4165)] (Fig. 2.4).

The graffito is most probably the end of a name, followed by a patronymic. If it is a Greek name, which is not necessarily so, there are not many possibilities, such as [N]ikais, son of [---]tos. The line above is less clear, and need not be Greek (W. Van Rengen, pers. comm.).

2.2 Palmyrene vessel

Roberta Tomber and John F. Healey with Christiane Römer-Strehl and Grzegorz Majcherek

A single domestic amphora rim, which if complete would have a footring base, typical of ones found at Palmyra during the 2nd/3rd century AD was found (*contra* Tomber 2008, 79). Good parallels can be found from Tomb C (Higuchi and Izumi 1994, fig. 72, 3) and Tomb F (Higuchi and Saito 2001, fig. 86, E3-4) excavated by the Japanese team at Palmyra, although the clay fabric of ours differs from the local Palmyrene one. Amphora with *dipinti* on the shoulder as found on the Myos Hormos example, are very rare (Fig. 2.5).

Healey describes the inscription as;

> The epigraph consists probably of five letters (reading from right to left). It appears to be in a cursive Palmyrene Aramaic script or a closely associated script from the region of Palmyra (such as very early Syriac). That it is Palmyrene is suggested by the first two letters, which are readily to be compared with Palmyrene forms such as those illustrated in Starcky (1956) and Klugkist (1982, 11-34). These comparisons suggest the letters should be read as Q or M followed by B. Palmyrene M and Q are often indistinguishable, especially in cursive writing. Both letters here have a distinctively Palmyrene form, with a deep concave curve on the right of the Q/M and on the top of the B (as already implied, there are Syriac forms of these letters which are not much different (Healey 2000).
>
> The final (probably fifth) letter touches the fourth letter, but it appears to be a separate graph and, if it *is* separate, it is unmistakably the final form of N which is characteristic of the Palmyrene cursive.
>
> The fourth letter is probably a medial N, though L could not be excluded.
>
> The remaining letter, the third, is unclear: there may be a loop at the apex? And it does not correspond well to any of the attested Palmyrene forms. It brings to mind the looped W of Nabataean (Healey 1993, 292-7).
>
> We therefore appear to have:
> *qbw(?)nn* or *qbw(?)ln* or *mbw(?)nn* or *mbw(?)ln*
>
> Unfortunately, there is no immediately obvious or easy explanation of any of these on the basis of known Palmyrene (or Syriac or Nabataean or other Aramaic). Could this indicate the contents, their weight or origin or even the name of the owner as is sometimes found on Roman transport containers? The *-n* ending could be the feminine plural absolute nominal ending.
>
> In the absence of a better explanation, we might be dealing with a personal name, though there does not seem to be any suitable candidate in the compendium of Palmyrene names by Stark (1971). If a common noun is involved, perhaps referring to the content of the jar, it is possible that we are dealing with some form of the word *qb*, possibly followed by a numeral. *qab* is a fairly common Aramaic dry measure, though there is some evidence for its use for liquids. There is also a Palmyrene noun *qbt'*, but this usually means 'vaulted room' (Hillers and Cussini 1996, 403; the interpretation of this word by some scholars as 'crater' is implausible and would not in any case fit here).
>
> Despite the difficulties of precise interpretation this graffito is important in at least two respects: it provides a very rare example of Palmyrene Aramaic not carved in stone but written in ink; and it shows some kind of contact between Myos Hormos and Palmyra.

Contact between the Egyptian coast of the Red Sea and Palmyra is known historically and a Palmyrene dedication from the 'Palmyrene Red Sea Shipowners' occurs at Coptos (Casson 1989, 34; Sidebotham 1986, 95-6). Two Palmyrene inscriptions have been excavated at Berenike. The first, dated to 8 September 215 AD, is a dedication in Greek by a Palmyrene archer to the emperor Caracalla (Verhoogt 1998). The second comprises a partial bilingual dedication in Palmyrene and Greek dating to AD 180/85-212 (Dijkstra and Verhoogt 1999).

Healey further notes about this second inscription;

> Unfortunately the Palmyrene is damaged, though the Greek helps with its restoration. (It may be noted that the reading of *glyp'* in line 2 is improbable. So far as one can see from the published plate, *glwp'* is just as likely and it would have the advantage of being attested as a spelling of this word for 'sculptor' in both Palmyrene and Syriac, whereas *glyp'* is not otherwise attested at all).

In addition, of two Aramaic epigraphs from the 1998 Berenike excavations, Schmitz (2000) noted that 'the letter shapes ... are closer to late Palmyrene examples than to other styles of late Aramaic writing' and of the second he states that 'The script appears to be Palmyrene'. More recently four ostraca from Berenike bear script that may be Palmyrene Cursive (1 *ostracon*) and Cursive Aramatic script related to Nabataean and Palmyrene Cursive (3 *ostraca*) (Bagnall *et al*. 2005, 104-5 citing M. Dijkstra pers. comm.).

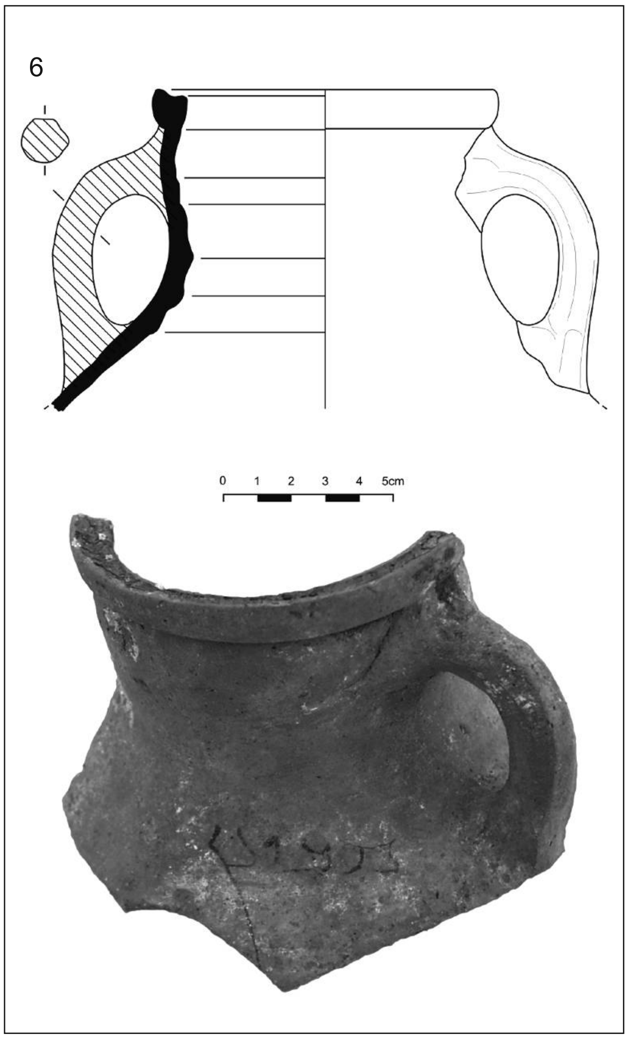


Figure 2.5. Palmyrene amphora with painted inscription, No. 6.

Catalogue

6. Rim and handle of what would have been a double-handled amphora. The rim is grooved on the top and there appears to be a black lining inside. No fabric description is available but the photo shows it to be orange-brown. Late 1st/early 2nd century AD [O.795 from Tr. 6Q (4165)] (Fig. 2.5).

2.3 Indian vessels

Included in this category are recently translated graffiti on the rim of an Indian storage jar (Fig. 2.6). A post-firing graffito is twice written on opposite sides of the rim, inscribed upside down. Therefore, the pot was either empty or stoppered when the graffiti were added. The graffiti were originally reported on in *The Hindu* by Sri Iravatham Mahadevan (2007), who dated the script to the 1st century BC and suggested the reading: '*paanai oRi*' meaning 'pot (suspended) in a rope net'. An alternative reading of '*Panai ORi*', a personal male name, has been suggested by Kasinathan (2007) and Selvakumar (2008). This second reading is in keeping with previous Tamil-Brahmi graffiti from Myos Hormos and Berenike that also give male personal names (Mahadevan 1996; Saloman 1991, 734-5). At least some of the Indian jars found at sites of the Red Sea may have been used as transport containers. A unique example of this is a large Indian storage jar found *in situ* at Berenike and containing 7.5 kg of black pepper from southwest India (Tomber 2008, 76; Cappers 2006, 114).

Another smaller jar, interpreted on the grounds of fabric and form as also Indian, has a post-firing graffito of a South Arabian monogram (Fig. 2.7; Tomber 2004a, 352, fig. 2). These smaller jars may also have been used as transport containers, although sooting indicates that at some point in its lifecycle this pot was used for cooking.

Catalogue

7. A narrow-necked storage jar with everted rim and sharp neck cordon, comprising two rims and one joining body sherd. No fabric description is available but the photo shows a thick black break and red-brown surface, probably slipped. The vessel appears to have been burnt in part inside, outside and over the break. Second half of the 2nd century AD or later [O.780 from Tr. 6H (4162)] (Fig. 2.6).

8. Jar with over-turned rim and a slight indentation inside, approximately 75% of the rim extant. Finger wiping is visible on the inside of the body wall; outside and on the rim top it is heavily sooted over a red-brown slip; inside the surface is brown with some concretion or residue. The fabric is brown with a black core, composed of a fine matrix containing occasional clay pellets up to 1.5 mm. 1st century AD [Tr. 8 (8173)] (Fig. 2.7).

Graf writes;

> The ASA letters/monogram was incised post-firing on the neck. The monogram appears to be the ASA letter *Q* superimposed horizontally on the

> ASA letter *Ḥ* The latter ASA letter also appears on South Arabian sherds from Myos Hormos (see also catalogue nos 2 and 3, above).

2.4 Roman amphora

A number of papyrus and *ostracon* archives relating to 1st century AD trade are known from the Eastern Desert, including the Nicanor archive from Coptos (Fuks 1951) and more recently a group of excavated *ostraca* from Berenike (Bagnall *et al*. 2000, 2005). From these texts a regional lexicon of those involved in Eastern trade is slowly being amassed that enables links between traders and sites to be established. One such text from Myos Hormos is a Dressel 2-4 amphora made from a Cilician fabric with a written inscription that mentions Miresis, a rare name but one of Nikanor's son who was active at Myos Hormos and Berenike between AD 41 and 62. Van Rengen (2003, 43) argues that the amphora was brought to Myos Hormos by the Nikanor firm around the mid-1st century AD. Recently, Aulus, son of Miresis, has been recorded from an *ostracon* at Berenike, providing the first tentative link between the Nicanor archive and the Berenike documents (Bagnall *et al*. 2005, 91-2).

Van Rengen (2003, 43) describes the Myos Hormos inscription as;

> The endings of the five lines of text, four of which are painted in black ink, are preserved. In Lines

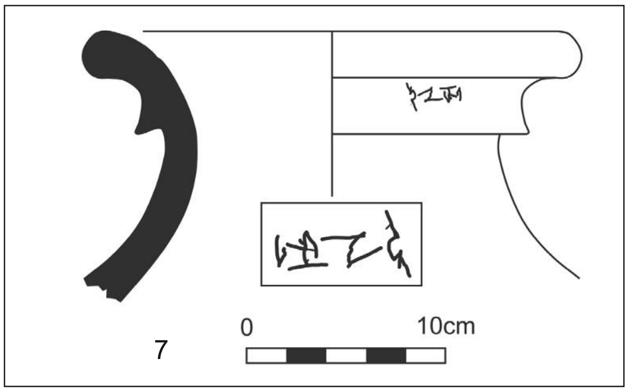


Figure 2.6. Indian Storage Jar with post-firing Tamil Brahmi graffiti, No. 7.

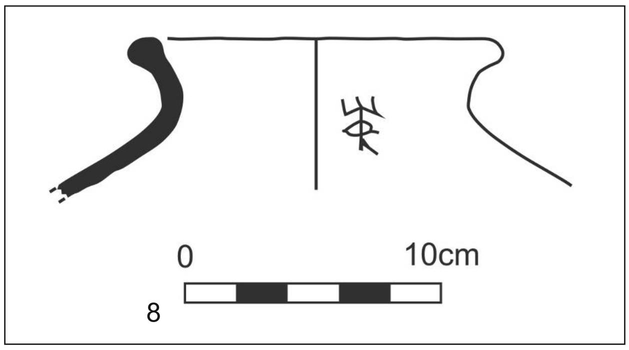


Figure 2.7. Indian Cooking Pot with post-firing South Arabian monogram, No. 8.

Figure 2.8. Cilician Dressel 2-4 amphora with dipinti, No. 9.

1-2, the address (sender Herakleitos, addressee: Publius) can be completed without difficulty, lines 3-4 remain enigmatic, but in line 5, which is obviously written with a pen, a certain Miresis appears.

The vessel is in a fabric with abundant, densely packed inclusions of quartz and limestone, along with some volcanic minerals. The similarities between this fabric and Late Roman Amphora 1 have been noted elsewhere (Tomber 1988). A source in Cilicia was therefore argued, and fits well with the kiln evidence compiled by Empereur and Picon from Yumurtalik where they identified the manufacture of Dressel 2-4 amphora during surface reconnaissance. Chemical analyses on Dressel 2-4 amphora from Yumutalik and Séleucie de Piérie demonstrates production at Yumurtalik and at an unknown workshop in the region (Empereur and Picon 1989, 227-8, figs 2, 8). Earlier the Yumurtalik fabric was tentatively equated with the *ladikena* (Tomber 1988), mentioned in the Nicanor archive and the Berenike ostraca (Bagnall *et al*. 2000, 17-18). As Reynolds correctly notes, Cilicia lies outside the immediate region of Laodicea and if these are indeed *ladikena* they may have taken their name after their export port (Reynolds 2005, 564-5) or as part of an extended hinterland. Reynolds also suggests that instead of, or in addition to, the Dressel 2-4, the East Cilician Pompeii 5 or products of Ras Basit may be *ladikena* (*ibid.*). Further information on the amphorae and fabrics from Cilicia and Ras Basit is needed before this interesting debate can progress further.

Catalogue

9. Approximately one-third of a Dressel 2-4 amphora, comprising, rim, handle and shoulder with inscription. Cilician, buff coloured fabric. Second half of the 2^{nd} century AD or later [O.741 from Tr. 6G] (Fig. 2.8).

2.5 Summary

These pots with writing raise a number of interesting points, suggesting the presence of foreigners at the site through Tamil and Arabian graffiti. The Greek graffito on our Arabian pot (Fig. 2.4) and the Arabian monogram on the Indian one (Fig. 2.7), indicate that imported pots crossed boundaries and were used by different ethnic groups. The amphora with Palmyrene and the painted and incised pre-firing Arabian script, will all have been inscribed before reaching the site, but nevertheless enlarge our range of imported goods and aid in source identification of the pottery itself. All these vessels as well as the Roman amphora, highlight the fruitful combination of epigraphic and ceramic studies and the contribution they can make to our understanding of Roman trade in the East. Trench 6Q was particularly rich, with South Arabian, Greek and Palmyrene inscriptions present. The few sherds published here serve as a taster to the overall diversity of the Quseir ceramic assemblage, both in the source areas represented and the functional context of the pots, which will be published in full in a subsequent volume.

Acknowledgements

Roberta Tomber thanks Prof. K. Rajan for the transcription of Tamil Brahmi on Figure 2.6. A full report on the pottery from Myos Hormos and its sister port Berenike, supported by a British Academy Small Grant, is in progress and will be published by Roberta Tomber.

3 Roman Vessel Stoppers

Ross Thomas

Introduction

Vessel stoppers are both archaeological artefact and historical document. They were intended to seal vessels, usually amphorae, securely and in a manner that facilitated easy opening without fouling the liquid contents contained within. The seals were also intended as a medium to record contents, origin, destination or ownership. This information was essentially designed to convey data on commercial matters, although they also carried other subtle meanings, perhaps betraying an individual's ethnicity, class or status. Occasionally the epigraphic information allows us to trace historically recorded individuals and to link this qualitative data to quantitative data provided by archaeology. In order to benefit from the diverse forms of information provided by such artefacts, it is necessary to draw upon equally diverse lines of enquiry. These include epigraphic methods such as onomastics and prosopography applied to text, archaeological typology based upon an analysis of technical features and plaster, and provenancing of stoppers by botanical or geological means. Utilising these techniques, a typology has been developed for the stoppers of Myos Hormos that helps explain the production, movement and consumption of commodities and the role of individuals in the trade of these commodities. Comparisons with stoppers from other Eastern Desert and Red Sea sites provide further information about Myos Hormos' role within the trade networks of the Eastern Desert, Red Sea and Indian Ocean.

3.1 Background

Since the 6th century BC the bark of the cork tree was used for sealing wine containers (Cashman *et al*. 1999, 285) so that nowadays bungs are referred to as 'corks' even when constructed from man-made materials. In antiquity cork, wood, pottery, clay, textile, stone or leaves were used as plugs, over which a plaster was poured to form a seal. The Latin term for the operation of sealing wine containers was *gypsare* (Beltran Lloris 1970, 70) or γυψιζω (Mayerson 2001, 218), although gypsum was not always used. After a plug was placed in the neck of a vessel, a seal of gypsum or lime plaster was applied. Occasionally the lime plaster was hydraulic, made by adding *pozzolana* (volcanic ash) or finely ground ceramics (*cocciopesto* or *terrazzetto*). Other traditions used pitch or mud-clay seals. The seal was then frequently stamped when wet or inscribed when dry. Of the commodities transported, wine, olive oil and fish products were of particular importance. They were transported widely across the Roman world as commodities involved in the *Annona* as well as in free trade or supplies for the military (Bodel 2001, 147). Wine and olive oil was also frequently traded across the Mediterranean as production rarely satisfied demand in many provinces of the Roman Empire. This was especially the case in Egypt, where other (cheaper) vegetable oils supplemented this demand. Fish products were traded long distances from major production areas in the western Mediterranean (Bernal *et al.* 2003; Hipercor *et al.* 2004; Trakadas 2004) reaching eastern sites such as Masada in Israel (Lernau *et al.* 1996). There is now a growing body of evidence that they were also produced in some quantity in the Red Sea region (Chapter 16, this volume; Lepiksaar 1995; Van Neer *et al.* 2004; Van Neer and Parker forthcoming).

Evidence for the development of amphora stoppers starts in 14th century BC Egypt, when organic material was used to plug amphorae necks (Hope 1978, 14) over which a mud seal was applied before being stamped with hieroglyphic script bearing information on its contents and origin. They were often decorated with a fine layer of gypsum plaster and painted blue, red, yellow or white, with floral motifs or plain washes. Canaanite amphorae of the 8th century BC utilised unfired clay or wood (Zemer 1977). Terracotta, bone and limestone stoppers began to be used in the Hellenistic period (Zemer 1977, 90), although cork was first used by the Greeks in the 6th century BC and rapidly became popular (Beltran Lloris 1970). In Italy during the 3rd century BC various plugs were sealed with pitch, resin or gypsum (Holescher 1968, 133). However, by the end of the Republican Period, hydraulic plaster made with *pozzolana*, was most frequently used to seal plugs made of cork (Hesnard and Gianfrotta 1989, 393). Over the course of the Imperial Roman period, a diverse range of amphora cargos were being transported across the Mediterranean, where different methods of sealing amphorae were used for specific amphorae forms or specific contents. Important features to note are the occurrence of pitch sealants and fermentation holes on stoppers from wine amphorae.

The object of this study will be to highlight the technical features and epigraphic evidence of stopper types, relating this to contents and origin and other amphora studies in the context of Myos Hormos.

3.2 Previous Studies of Stoppers

Early approaches to amphora stoppers focussed on well preserved, decorated and or inscribed examples, with little attention paid to context. In some cases they were motivated by an interest in the decoration, specifically religious iconography (Winlock and Crum 1973, 79-81) or the historical content of the inscriptions (Smith 1883, 158-61). The earliest study of Imperial Roman stoppers from Egypt is a description of one find from Alexandria (Smith 1883, 158-61). Unfortunately, there are no data on the composition and little about context, other than it being from Alexandria, and from a Rhodian amphora.

The appearance of a large number of well preserved Byzantine period examples from the Monastery of Epiphanius in Egypt, excavated in the 1920s (Winlock and Crum 1973, 79-81), allowed a more extensive analysis of stoppers. Particular attention was paid to depictions of religious figures or symbols, subsequently paralleled by stoppers later excavated in Egypt (Bruyère 1966; Egloff 1977). Unfortunately, limited discussion of fabric and a lack of section drawings make any modern attempt to reconstruct typologies for these stoppers impossible. Technological details were noted, with the identification of fermentation holes, suggesting the presence of wine.

In the Mediterranean the development of underwater archaeology and the discovery of wrecks with cargoes of well-preserved stoppers in amphora necks, provided superb contextual information. These finds complemented those from land sites, enabling a comprehensive typological classification of Republican and Early Imperial Roman stoppers from Spain to be made (Beltran Lloris 1970). Despite useful discussion of regional trends, no fabric analysis was attempted, and the numbers were not quantified or contextualised, making this typology of limited use for comparative studies. Broad surveys of the methods of closure for amphorae were also attempted (Holscher 1968; Zemer 1977).

Stamped stoppers of hydraulic *pozzolana* plaster from shipwrecks, have been compared with amphora stamps and inscriptions on anchors, but produced no evidence for a relationship between amphora stamps (amphora producer) and stopper stamps (cargo owner; Hesnard and Gianfrotta 1989). However, a strong relationship was found between anchor inscriptions (ship owner) and cargo (*ibid.*). This study, focussing on the last two centuries BC has greatly increased our understanding of the roles of *mercantor, navicular*i, and the Roman aristocracy who owned vineyards in Central Italy and traded with Gaul. However, the stoppers were all constructed in the same way from cork plugs and plaster seals, making any chronological or regional differences typologically invisible. Furthermore, the plaster was not analysed for its mineral composition, which could have helped to source their origin. More recent analysis of amphora stoppers from Spain and North Africa have been carried out, with particular reference to the trade in fish products, linking stopper types with specific commodities and amphora forms (Bernal *et al.* 2003; Bernal *et al*. 2004).

Excavations in the Eastern Desert produced a large quantity of stoppers dating to the Early Imperial period. Excavations at Quseir al-Qadim (Myos Hormos) in 1978 and 1980 revealed a small number of well preserved amphora stoppers catalogued with some discussion of their technology and epigraphy relating to the status of the individual names stamped on the plaster (Bagnall 1979, 243-4; Johnson 1979, 233-6). Excavations since 1994 at Berenike have catalogued all stopper finds, recognising that stoppers are of particular importance in understanding trade in the Roman period (Cashman *et al.* 1999, 285). These catalogues (Sundelin 1996; Dieleman 1998; Cashman *et al.* 1999; Bos and Helms 2000; Bos 2007; Moulder 2007) have recorded technological details that in previous studies would have been ignored. Epigraphic studies of sealings from Koptos (Cuvigny 1998) and the Fayum (Milne 1906; Nachtergael 2000; Mayerson 2001; Vandorpe 2005) and the Red Sea and Eastern Desert region, have been the subject of a recent article based on an extensive corpus of material (Denecker and Vandorpe 2007). However, this corpus is not as comprehensive as claimed, since it neglects data from Mons Claudianus (Thomas and Tomber 2006), developed from interim reports. Additional observations by the author reflect on material from Sikait, Mons Porphyrites and Aila.

3.3 Technical Features of Stoppers

The decisions made in constructing a stopper bear a direct relationship to choices relating to the contents of a vessel for transport. For this reason, the typology presented here is based on technical features with a significant functional relation to the different contents and the presentation of the seal. These features include the plug and the seal, both of which are amenable to fabric analysis, stamped or written text and symbols, painted decoration, pitch sealant, fermentation holes, and removal devices, such as pull-strings, ceramic tabs or textile. When the stopper is found *in situ* it is important to note the associated amphora and its archaeological context.

The plugs that were analysed to understand their properties and origin include various ceramic fabrics, date palm, stone, cork and wood. The ceramic fabrics were identified in the field with a hand-lens and microscope. Organic remains included cork stoppers (from Iberia, the Mediterranean islands or the Mahgreb, see Cashman *et al*. 1999, 285) and palm fibre, identified by Marijke van der

Veen in the field. Ceramic fabrics identified include;

- Nile Silt. A dark brown or red fabric, from the alluvial clays of the Nile floodplain and Delta (Cockle 1981, 93).
- Marl. A strong pale fabric from clay beds of the lower desert adjacent to the Nile floodplain. Sometimes mixed with Nile silt (Cockle 1981, 93).
- Maraeotis. A pale buff, cream or very pale orange coloured fabric from the region around Alexandria (Hayes 1996).
- Imported. Fabrics including those of eastern Mediterranean Peacock and Williams form 10 fabrics, Italian and Laodicean fabrics (for descriptions of fabrics see Tomber 2000; Tomber 2006).

Seals were made from bitumen, mud or plaster, but the more common plaster seals have attracted most attention. Plaster was poured on top of the plug, where it had two functions, to hermetically seal the amphorae and to provide a surface on which to stamp or write details pertaining to ownership, origins or contents. A number of different plasters were used in antiquity. Gypsum plaster (calcium sulphate) and lime based plasters (calcium carbonate), were used. Lime based plasters could be made hydraulic with additives (Franzini *et al*. 1999; Elsen 2006) of volcanic ash (*pozzolana*), ceramic fragments (*cocciopesto* or *terrazzetto*), organic ash (PFA) or certain hydrated clay minerals (Gibbons 2003). These plasters can be identified though macro and microscopic methods of their mineral composition. Geological tests used included the Moh hardness scale, measurement of the streak colour and reaction to hydrochloric acid. These were rapid and easily applied to all examples in the field. The results are tabulated below. A more accurate, but slower method, uses a microscope in the field. Previous microscopic analysis of Republican *pozzolana* seals over cork plugs has identified augite and other volcanic minerals (Beltran 1970, 73).

In conclusion, the mineralogy of the amphora stoppers is complex. Field microscopy of samples R1, R2, R3 and R5 have a very fine-grained matrix of calcium carbonates and calcium sulphates, tentatively identified as gypsum, calcite and aragonite. Particularly R3 and possibly R5 had a higher quantity of aggregates (pottery, quartz, feldspar, and biotite mica), that strengthened the mixture, possibly making it slightly hydraulic much like *cocciopesto* or *terrazzetto*.

Type	Moh hardness scale	Colour of streak	Hydrochloric acid reaction	Interpretation, Majority,	Micro-scope
Gypsum	2	White	No		
Calcite	2.5-3	White	Yes		
Lime based mortars	Can be over 4	Off white	Yes		
1 (Egyptian) 1 Imported+Egyptian)	2 (1-3) 3.7 (3-5)	White Off white to yellow/brown	2/4 minor 2/2	Gypsum/lime Lime mortars	R1 R5
2 (Egyptian) 2 (Egyptian)	1.9 (1-4) 2.7 (2-4)	White Off white	3/4	Gypsum/lime Lime mortars	R2 R3
3 (Egyptian)	1.9 (1-4)	White to off white	0/1	Gypsum/lime	
4 (Western Med)	5	Yellow/brown	1/1	Lime mortar	R4
5C (Tripolitanian)	2.3 (1-3)	White to yellow	1/1	Lime mortars?	
5A-B (Egyptian)	2.3 (1-3) 3.6 (2-5)	White Off white	5/5 minor	Gypsum/lime Lime mortars	
9 (Mixed)	2.1 (1-5) 3.2 (2-5)	White Off white to yellow	2/3 minor	Gypsum/lime Lime mortars	

Table 3.1. Results of analysis of plaster seals. Munsel colours consisted mostly of bright white, though 'off whites' with pale shades of grey, pink, brown were found (10YR7/1, 10YR7/2, 10YR8/2, 10YR8/3, 10YR8/4, 5YR8/2, 7.5YR8/4) and yellow or brown examples (10YR6/4, 10YR4/2).

Sample R4 clearly possessed pozzolanic properties provided by the addition of lava, pyroxenes, amphiboles, micas, feldspars and iron ore or slag fragments. These, as well as calcite and quartz, fit the main mineralogical phases identified in Italian pozzolanic hydraulic mortars studied in Rome (Sabbioni *et al.* 2001, 543).

Many Myos Hormos plaster stoppers have stamps bearing a name in Greek text surrounding a symbol. The names appear to relate to ownership by a trader and the symbols (indirectly relate) to the origin, as they usually depict specific regional deities from Egypt. These stamped seals were then painted red. Stamped commercial seals such as these are associated with technical features such as pitch and fermentation holes that identify their contents as wine (see discussion below). The names then represent those of traders in wine and betray evidence of their group affiliations (Roman, Greek or Egyptian) and status (freedman, merchant or estate owner). A number of mud stoppers are also stamped with the seals of estate owners and instead represent the wine transported for tax or by small-scale wine traders. Blue and black ink was used to write *dipinti* on some of the stoppers. Such writing usually recorded ownership or contents of oil or fish products. Occasionally such writing went over wine trader's stamps signifying a change in ownership.

Pitch or similar substances is rarely preserved or recorded in archaeological excavations (Heron and Pollard 1988, 429) although it is well represented at Myos Hormos. Since its introduction in the Ptolemaic period, Egyptians coated the inside of wine amphorae with a sealant (Holscher 1968, 132) preventing leaking, absorption and extending its storage life. Some of this, from the neck, adhered to the stopper when it was removed. Resin also acted as a preservative for wine and added a flavour (Plutarch, Theophrastus *Historia Plantarium* 9.3.1-3) so that it was popular among Romans as it gave 'the wine a more attractive fragrance and to add body' (Meiggs 1982, 468). Pliny and Columella frequently refer to pine pitch being used for this purpose (Pliny *N.H.,*16.21.52) confirmed by chemical analysis of a variety of amphorae and their sealants (Heron and Pollard 1988, 433-4) and it may be that the Myos Hormos examples are also pine pitch rather than bitumen or mastic. Olive oil amphorae were not sealed by pitch as it ruined the flavour (Columella quoted by Heron and Pollard 1988; 444), indeed gas chromatography studies at other sites shows signs of traces of olive oil fatty acids remaining in the pores of certain amphorae such as Peacock and Williams Form 25 (Condemin *et al*. 1976). From this it is clear that wine amphorae were usually sealed and olive oil amphorae were not. Fish amphorae are also unlikely to have been sealed, though this is less certain.

Holes are occasionally found in the top of amphora stoppers, and have previously been interpreted as an outlet for fermentation gases which would otherwise have caused the jars to burst. A small hole would be drilled and this was stopped with a wisp of straw through which the gas could escape, but which probably prevented ingress of air (Winlock and Crum 1973, 79). However, they are rarely found as most fermentation holes are temporary and would be sealed off once fermentation was complete. They would only have been needed on young wine that was still fermenting and where the neck or shoulder of an amphora was not pierced instead (Winlock and Crum 1973, 79). Despite this reasonable explanation, two recent studies have criticized the hypothesis, arguing that the holes were not necessary, because the porosity of the fabric prevented the build up of gas. They suggest instead that the holes were drilled when removing the stopper (Mayerson 2001; Denecker and Vandorpe 2007, 116), a view which takes no account of the sealant. This view also ignores evidence to the contrary including the evidence on some examples of later filling of fermentation holes, the presence of removal devices (discussed below) and association with pitch lining (i.e. its only found on wine amphora).

Removal devices have been commonly found. Bos has identified a number of 'pop-up' devices, namely strings, a central cord, ceramic tabs and textile (Bos and Helms 2000, figs. 12-4). In the Myos Hormos examples, textile and cord imprints suggest two types of pop-up devices in use, although the actual cordage and textile was rarely preserved. A cross of string passing beneath the stopper, emerging at four or more points roughly equidistant around the circumference was commonly seen on well preserved examples. This must have been placed prior to sealing and may have also helped lower the stopper into the amphora neck (Sundelin 1996, 298-99).

A number of stoppers were also found still in their amphora necks, when the pop-up devices had clearly failed to work successfully. This allows us to assign stoppers to their parent amphorae. The diameters and shape of the stoppers may also give a rough idea of the type of amphora that was sealed, though this is usually less clear.

3.4 Eastern Desert Typology

With specific reference to stoppers from Myos Hormos

The following typology was developed around the material recovered from Mons Claudianus (Thomas and Tomber 2006), based on the author's work at Myos Hormos (Thomas 2001b; 2001a; 2002; 2003) and adapted with the assemblages seen in Aqaba, Sikait, the Fourth Cataract region of Sudan, from the records of the Mons Porphyrites (Bailey 2007b) and from published reports on stoppers from Berenike (Sundelin 1996; Dieleman 1998; Cashman *et al*. 1999; Bos and Helms 2000; Bos 2007), Koptos (Cuvigny 1998) and the Fayum (Milne 1906; Nachtergael 2000). The typology is divided into:

- Greco-Roman style wine amphora stoppers (Types 1-4 and 5C).

- Egyptian/Nubian amphora stopper forms (Types 5A-B, 6-8; Type 8 was not present at Myos Hormos).
- Uncommon forms usually employed in small vessels (Types 9-17).

Greco-Roman wine amphora stoppers.

Type 1. Round cut sherd plug with plaster seal.

Type 1 stoppers were constructed by placing a round cut sherd into the neck of an amphora, often coated on the underside with pine pitch, occasionally with removal strings underneath and rarely with a hole drilled, before sealing with gypsum or plaster. They would then be stamped and painted with a red wash. The plug is often found separate from the seal, or the seal is not preserved at all. The plugs, when found alone, can be mistaken for gaming pieces or fishing weights. However, they are very rough, while fishing weights tend to be water worn with central holes, and gaming pieces more carefully made and often decorated. The plugs may also have been reused as fishing weights or gaming pieces.

Two hundred and five Type 1 stoppers were found at Myos Hormos, from small vessels (costrels) from 21.5 mm diameter to amphora stoppers ranging from 49.7-195 mm in diameter. They were found in deposits dating from the late 1st century BC through to the Mamluk period (although the Islamic period examples were not stamped, pitched or pierced). Where identified the ceramic fabric is normally Egyptian; Nile 68.5%, Egyptian Marl 12.6%, imported in 12.6% (including eastern Mediterranean Peacock and Williams Form 10, Laodician and Italian Terra Sigillata) and Alexandrian fabric in 6.3%. Because the plug is durable, it was even found in areas of poor preservation and accounts for the largest single group at Myos Hormos (31%), though this means that it was often preserved without its seal. Despite this, Type 1 stoppers were clearly used to seal wine amphora in 38.5% of the cases that were well enough preserved to retain traces of pitch (26%), fermentation holes (2%), stamps (14%) or red wash (17%). Stamps usually possessed an abbreviated name in Greek text encircling a central symbol, the most popular one being a cobra. String pulls were found on 15% of examples. All technical features are underrepresented due to the high number of poorly preserved examples of this form. This form is associated with costrels, though mostly with amphorae averaging 88 mm in diameter. Alexandrian forms were smaller (84 mm) and imported forms larger (94 mm). An imported example was found in a Peacock and Williams Form 27, was either Gaulish or a North African copy. This example was stamped, but without an inscription. This form was used widely in the Roman Empire, across the Mediterranean (Hesnard and Gianfrotta 1989) and has been found at Aila, Mons Porphyrites (Bailey 2007b), Mons Claudianus and Berenike (Bos and Helms 2000; Thomas and Tomber 2006). At Myos Hormos this form usually represented Egyptian wine, though occasionally imported wine from France/North Africa, Italy and also the eastern Mediterranean.

Type 2. Plaster plug and seal with ceramic temper.

These stoppers were constructed from a mixture of ceramic sherds and plaster much like hydraulic plaster, known as *cocciopesto* or *terrazzetto*. It is possible that this shared its hydraulic qualities. It is likely that they were created by placing string, textile or another organic material underneath before adding the plaster and sherd mixture, to avoid contamination of the contents. Some were forced into the neck of the amphora before sealing. Others may have been pre-made prior to insertion to prevent contamination. Then the seal was sealed with hydraulic plaster or gypsum, stamped and painted red. Due to their similarity, poorly preserved examples may be misinterpreted as *cocciopesto* or *terrazzetto* and could have been reused as such, or as stoppers again, though removal often obliterated them.

One hundred and twenty Type 2 stoppers were found at Myos Hormos, from rare small vessels such as costrels (21 mm), to common amphora stoppers averaging 92 mm diameter (56-136 mm diameter). They were found in late 1st century BC to 3rd century AD deposits at Myos Hormos. Where identified they were usually Egyptian; Nile silt (89%), Egyptian Marl (7%) and rarely imported (4%). The imported examples were larger (100 mm diameter). The seals suggest gypsum plaster was used, though also that a hydraulic plaster with high feldspar content was used with the sherds making a stronger, waterproof plug. 71% were clearly wine stoppers, suggested by the presence of pitch (42%, fermentation holes (3%), stamped (54%) and red wash (53%). In 3% of cases names were written on in black ink on black seals, or over stamped examples. String impressions were preserved on 40% of the examples.

Three Type 2 stoppers were found in Peacock and Williams Form 10 (Dressel 2-4) amphora of eastern Mediterranean origin. The sherds in the stopper suggested an Egyptian origin (ST127, ST275 and ST438, see Fig. 3.1) for the stopper, confirming the reuse of these amphorae for Egyptian wine. These stoppers have also been found at Berenike, Mons Porphyrites (Bailey 2007b) and Mons Claudianus. This stopper form usually represents Egyptian wine.

Type 3. Ceramic plug disk, dish or bowl with plaster seal.

These stoppers (Figure 3.3) were made by placing a purpose-made, or reused ceramic disk, dish or bowl into an amphora neck. They often had pull strings passing underneath. A plaster seal was then poured on top, stamped and painted red. Some examples, when the seal is not preserved could be mistaken for cups or flat dishes, and could have been reused as such in antiquity. Alternatively in some cases these stoppers may have been constructed from reused cups. They can be sub divided into groups based upon the form of the plug. Type 3A are mould made dishes often with a pattern in relief on one side and were known in Egypt as πωμα/ πωματ, mould made wine

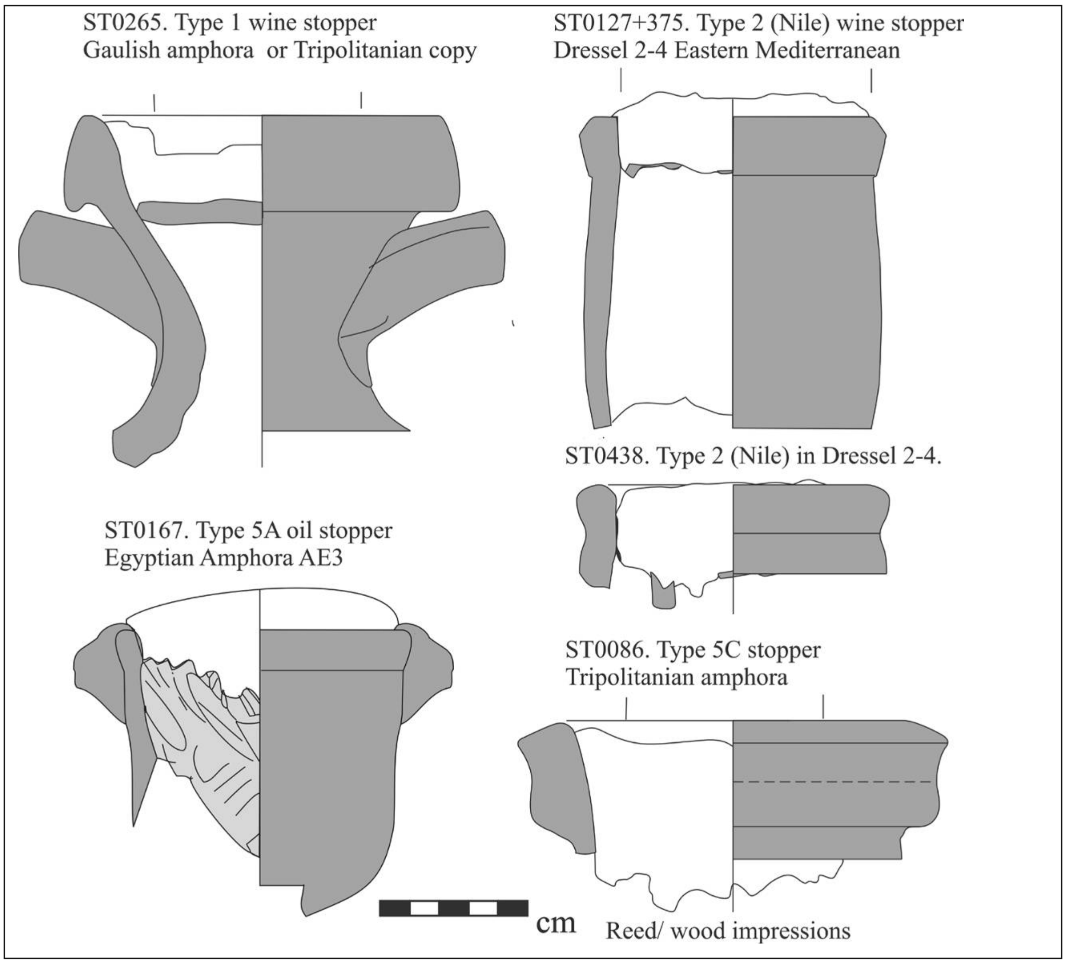


Figure 3.1. Myos Hormos stoppers within their amphora necks (the white section of the stopper represents the plaster seal) (Ross Thomas).

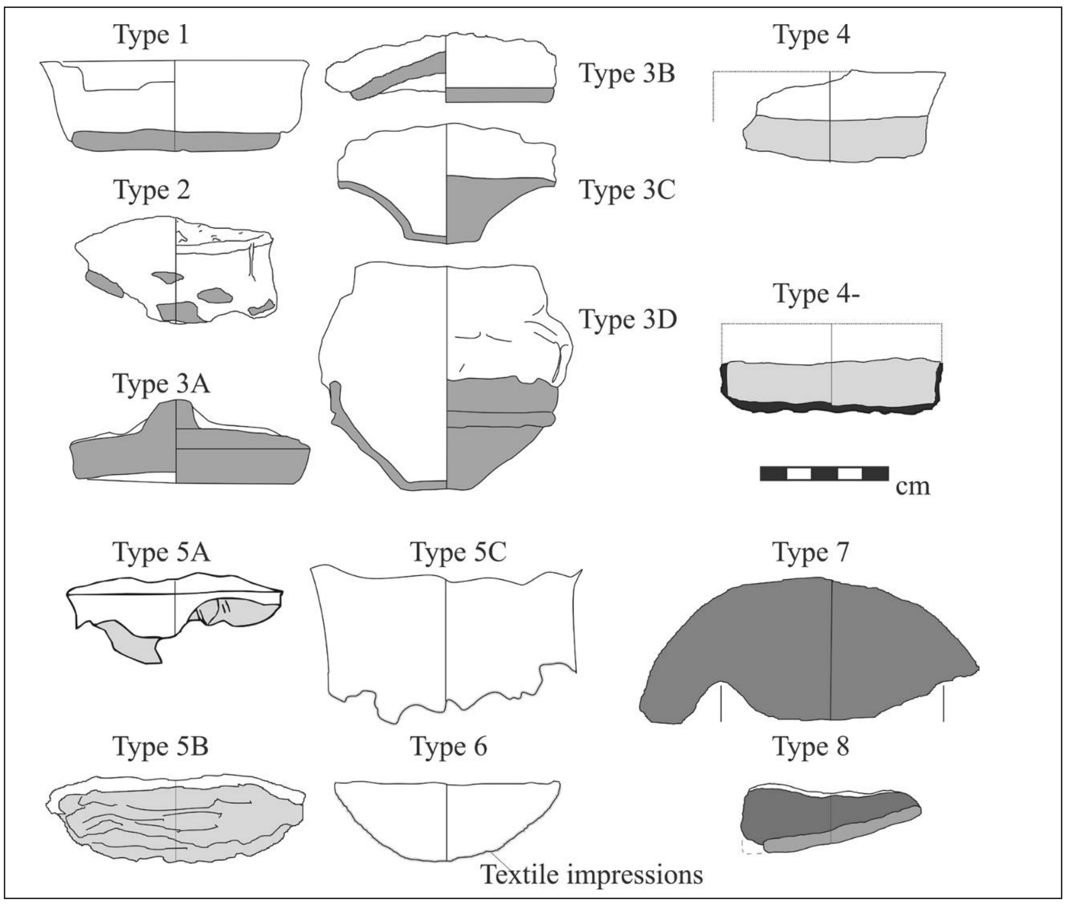


Figure 3.2. Common amphora stopper forms from the Eastern Desert. (Ross Thomas)

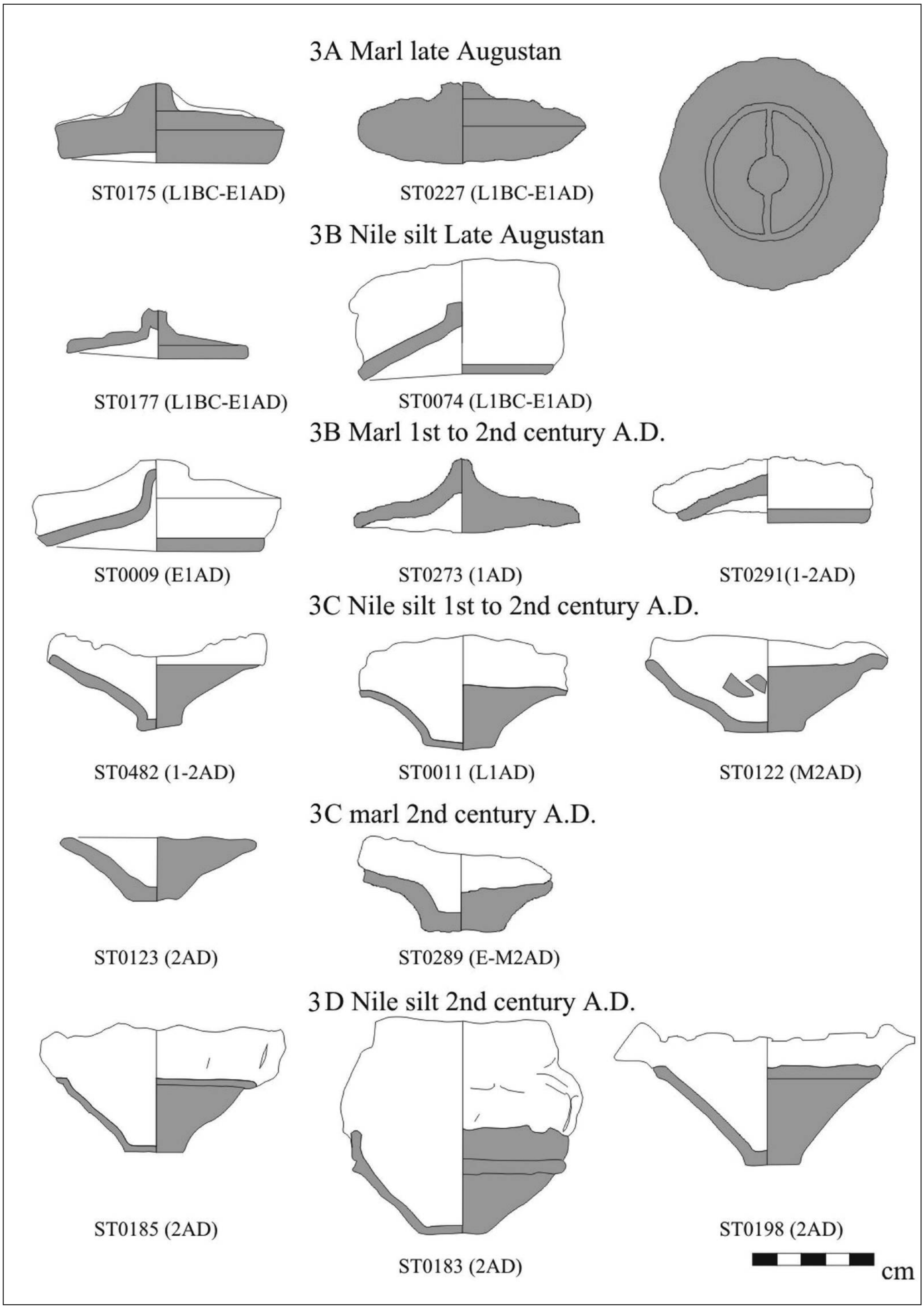


Figure 3.3. Type 3 stopper variants in Egyptian fabrics (Ross Thomas).

stoppers (P.Cair.Zen III 59481 discusses an order of 2000 mould made wine amphora lids for the potter Paesis; Mayerson 2001, 217). Type 3B are wheel made disks with a nipple or handle used to lower into the neck prior to sealing. Type 3C are a wheel made shallow dish with a narrow base, placed in the neck with the base facing down. Type 3D are deep cups, probably reused coarse-ware cups. Both Type 3C and 3D may be for what were known as 'hollow lidded' (κοιλοπομα) amphorae in antiquity (O. Ber I 39, 84; Bagnall *et al.* 2000, 23).

Ninety one Type 3 stoppers were found at Myos Hormos. They were used as small vessel stoppers 32-44 mm diameter, but mainly as amphora stoppers 50-180 mm diameter, averaging 88 mm diameter. Type 3A average 92 mm diameter and only found in marl fabrics dating to the late Augustan period. Type 3B stoppers average 94 mm diameter and were found in Nile silt fabric dating to the late Augustan period and in Egyptian Marls dating to the 1st and 2nd centuries AD. Type 3C stoppers averaged 89 mm diameter and were found in Nile silt fabrics dating to the 1st and 2nd centuries AD and in marl fabrics dating to the 2nd century AD. Type 3D stoppers were only found in Nile silt fabric dating to the 2nd century AD.

The seals were usually soft (Moh 2 or 3) and white; when tested with hydrochloric acid no reaction was noticed suggesting gypsum plaster was used. 46% had preserved clear indications of being used as wine stoppers. 21% were pitched, 1% had fermentation holes, 25% were stamped and 20% were painted red. None had messages written on in black ink. 20% of the Type 3 stoppers had traces of sting pulls preserved as removal devices. Type 3 stoppers vary in diameter depending upon the date and provenance of the ceramic fabric. This suggests that these represent stoppers from a variety of amphora forms. All of those found in Myos Hormos were Egyptian in origin. At Aila, Type 3B and 3C were found to be made of the local fabric, proving that purpose-made stoppers of at least two types were made for Aila amphorae. In the Mediterranean, stoppers similar to Type 3A have been found with Italian Peacock and Williams Form 8 amphorae in Alexandria's harbour area QB1 (http,//www.cealex.org/sitecealex/amphores/AMPH_SUITE_F.HTM). Stoppers similar to Type 3B have also been found in wrecks carrying cargoes of Peacock and Williams Form 14 (Benoit 1956, 24), Peacock and Williams Form 15 and Peacock and Williams Form 25 (Parker 1992, 289), whilst 'ceramic stoppers' have been described as being associated with wrecks containing amphorae of Peacock and Williams Form 10, Peacock and Williams Form 16, Peacock and Williams Form 19, Peacock and Williams Form 21 and Peacock and Williams Form 33 (Parker 1992, 319 & 343). In the Eastern Desert, these appear to represent Egyptian wine amphora stoppers.

Type 4. Cork plug with plaster seal.
Cork from the western Mediterranean was a surprisingly frequent find in the Red Sea ports, accounting for 4% of the total at Myos Hormos. The stoppers were constructed by placing a pitched cork disc in the neck of an amphora with pull strings passing underneath, before sealing with a seal of *pozzolanic* plaster. They are however, probably underrepresented in the archaeological record as they were frequently refashioned into fishing floats, or mistakenly identified as floats by finds specialists when fragmentary.

Twenty seven Type 4 stoppers were found at Myos Hormos dating from the late 1st century AD to the late 2nd century AD. However, the vast majority come from early 1st century AD contexts and the later examples may be residual (Fig. 3.4). The plugs clearly represent western Mediterranean imports (Italian, Spanish or French in origin) and are considerably smaller than other amphora stoppers averaging 72 mm diameter (51-99 mm). The plaster seal from one example (ST005) was pozzolanic, with traces of other volcanics suggesting potentially an Italian source near the Bay of Naples. Despite the poor level of preservation of these forms, 15% still showed traces of their use as wine stoppers, 7% had traces of pitch and 7% had a fermentation hole. No examples were had stamps preserved, though one did have a pull string.

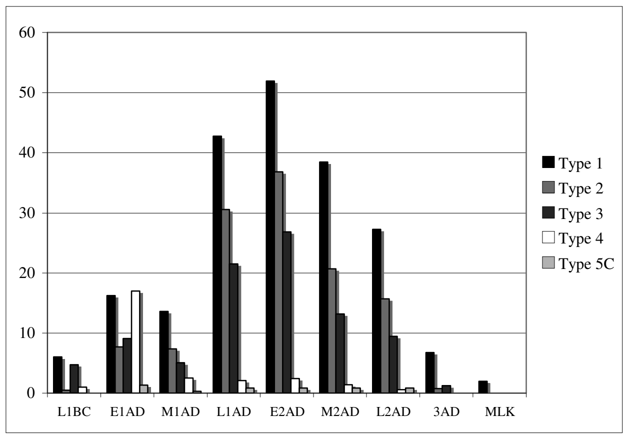


Figure 3.4. Commercial wine amphora stoppers of Greco-Roman style, distribution at Myos Hormos.

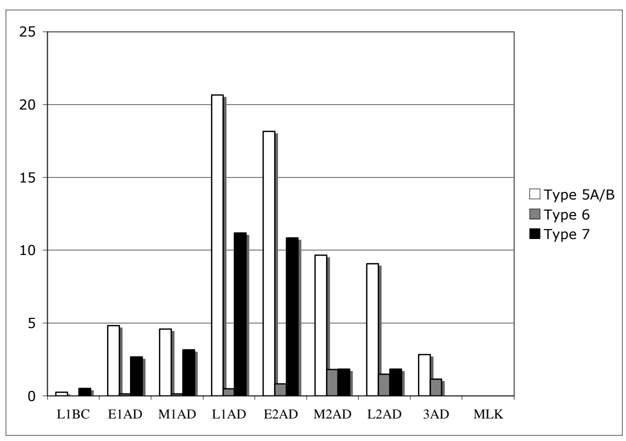


Figure 3.5. Egyptian estate wines, oil and fish stoppers. Distribution at Myos Hormos.

Though no cork stoppers were found inside amphorae at Myos Hormos, the small diameters suggest a different form of amphora was used with cork plugs. In the Mediterranean, during the Imperial period, cork stoppers have been found in wreck assemblages associated with Italian, French and Spanish wine amphora forms Peacock and Williams Form 6 (Parker 1992, 439, 102), Peacock and Williams Form 10 (Ferrini 2000, 152; Parker 1992, 134, 307) and Peacock and Williams Form 27 (Parker 1992, 331). However, in Tunisia cork stoppers were occasionally used to seal oil amphorae forms Peacock and Williams Form 34 (Parker 1992, 193) and Late Roman form Peacock and Williams Form 35 (Abela 2000, 156). In the Red Sea region cork stoppers were only found at the ports of Berenike and Myos Hormos, concentrated in Late Augustan to 1st century AD context, and represent wine from the western Mediterranean (Fig. 3.4).

Type 5C. Organic (reed?) bung with plaster seal.
It is important to recognise the distinction between Type 5C and Types 5A-B. The Type 5C bung is made from a woody reed (not palm), only visible from its impression. It would have been woven from the woody material and placed in a pitched amphora before being sealed with plaster, stamped and painted red. These rare stoppers account for 1% (six in total) of all found at Quseir al-Qadim and are usually very poorly preserved and easily mistaken for Types 5A-B. Signs of use as wine stoppers (being pitched, stamped and painted red), were present on 33% of examples. One had a fermentation hole. The remaining four were very poorly preserved, though half had pull strings. They were 70 to 99 mm in diameter (84 mm average) and one was found in the neck of a Tripolitanian amphora (Peacock and Williams Form 36). It is likely that these represent imported Tripolitanian wine from the 1st and 2nd centuries AD, though Peacock and Williams Form 36 is commonly used for oil, and the other examples cannot be securely associated with a Tripolitanian provenance.

Egyptian/Nubian amphora stoppers.
Type 5A-B. Palm bung with plaster seal.
Palm stoppers were created by placing a bung of folded (Type 5A) or woven (Type 5B) palm fibre into the neck of a jar, with string pulls, before sealing with plaster with gypsum. Then Greek *tituli picti* or a pattern was often written on in black ink (19%) displaying ownership, contents or origin. Despite their fragile nature, 69 were found at Myos Hormos, accounting for 11% of all stoppers. Type 5A-B stoppers were not sealed with pitch, pierced, stamped or painted red. 17% possessed pull strings. One example was found in the neck of an AE3 Egyptian amphora and they vary in diameter from 50-135 mm (average 82 mm). They were also commonly used on small vessels such as Egyptian jugs and costrels (diameter 7-42 mm). They are found in all periods of occupation at Myos Hormos and are also found in Berenike, Mons Claudianus and Mons Porphyrites (Thomas and Tomber 2006, 256-7). At Mons Claudianus the *tituli picti* on Type 5 stoppers contained the names of individuals known to work at that site, as well as contents, such as salted fish and oil (Thomas and Tomber 2006, 256-7, V327, O9012, V526, O826, O1015). The use of AE3 amphorae for oil and fish products has been confirmed by additional *dipinti* written on the amphorae (Cuvigny 2006, 177-8). These stoppers were used for Egyptian oils or fish products.

Type 6. Textile plug with plaster seal.
This is a rare (six examples, 1% of all) variant of Type 5A, but with the use of textile instead of palm fibre. The textile bung is placed in the neck and the plaster pored over. Because the textile, or textile impressions are rarely preserved, it is probably underrepresented. There were no signs or pitch, fermentation holes, stamps, writing, painting or string pulls. Instead the textile itself appears to have operated as its opening devise. They were used for costrels (26-31 mm diameter) and amphorae (75-95 mm diameter). It is likely that these are a variant of Type 5A-B and were not used to seal wine amphorae, but possibly for Egyptian oils or fish products.

Type 7. Traditional Egyptian mud seal.
Type 7 was constructed by placing an organic bung of palm fibre into the neck of a jar before sealing the neck and over the rim (mushroom shaped in section) with a large mud seal, before stamping with small oval or rectangular seals in Greek script or symbols. Occasionally the seal was then painted. Despite their fragile nature, 32 were recovered accounting for 5% of the total (Fig. 3.5). They were found in all periods of Myos Hormos' occupation. None of the mud stoppers show any technical features that would identify them as wine stoppers, such as pitch or fermentation holes, despite 34% being well preserved examples with stamps. One did have a pull string, though this is unusual for this form. They were used rarely on small vessels (36 mm) and on amphorae with necks 55-109 mm diameter (84 mm average).

This Nile form represents a tradition of jar stopper going back to the Dynastic period (Hope 1978). Though many examples have been found in the Fayum region (Milne 1906; Nachtergael 2000), it is not exclusively Egyptian as the author has recognised similar stoppers of late Meroitic date, in the Fourth Cataract region of Sudan. This form of stopper has previously been assumed to represent local trade in wine from the estates (Denecker and Vandorpe 2007, 119-20), as suggested by examples found in the Fayum (Nachtergael 2000). They were however, clearly traded in some quantity to the Eastern Desert quarries of Mons Porphyrites, Mons Claudianus (Thomas and Tomber 2006) and Red Sea ports of Berenike and Myos Hormos (Thomas 2001a).

Type 8. Sherd plug with mud and plaster seal.
This Egyptian wine amphora stopper form appears to copy Type 1 wine stopper. It was not found at Myos Hormos and is described in full in Thomas and Tomber (2006).

Uncommon amphora stopper forms (Fig. 3.6).

Type 9. Plaster seal.

Type 9 is a plain plaster seal that represents the poor state of preservation of 8% of all stoppers found at Myos Hormos. It usually represents poorly preserved (8% of) examples of either Types 1-4 or 5-6, which may not be more accurately defined. They vary from small vessel stoppers 14 mm across, to large amphora stoppers 144 mm in diameter. For this reason some will have evidence of pitch, fermentation holes, stamps and red paint, whilst others will have inscriptions written in black ink making it possible to divide them into Type 9 (equivalent to Types 1-4; Greco-Roman ceramic or cork types) or Type 9 (from Types 5-6; Egyptian/Nubian organic types).

Type 10. Amphora spike plug with plaster seal.

A single example, 100 mm across, of this rough stopper was found in 1978 by the Chicago team (Johnson 1979, 233-6), bearing a crossed out message written in ink. Plaster was poured over a roughly broken amphora spike, before being written on. Another example from Mons Claudianus listed its contents as salted fish (Thomas and Tomber 2006, O4097). It is possible that this is a locally made stopper used in the transport of locally produced fish products.

Type 11. Textile or leather bung with ceramic plug.

These roughly made, re-usable stoppers were produced by pressing a cut-to-fit round cut sherd or small wooden disc into the neck of an amphora over a leather or textile bung or seal. Nine examples (1%) were used for small vessels (diameter 19-64 mm) such as costrels, that were frequently resealed, an important feature if used for carrying water whilst travelling. One example had traces of pitch. These were also found at Mons Claudianus (Thomas and Tomber 2006).

Type 12. Wooden stopper.

Type 12 stoppers are rare (five examples <1%) and highly variable (34 mm - 277 mm diameter) in form and function. One example has traces of pitch and a hole, looking like the plug of a Type 4 cork stopper. One is a highly decorated lid, another like a larger wooden variant of Type 11 with fibres adhering to it. It is likely that they are locally made stoppers or lids for a variety of household purposes. They are unlikely to be transport amphora stoppers. They were also found at Berenike (Bos and Helms 2000, 275-304) and Mons Claudianus (Thomas and Tomber 2006, 245-6).

Type 13. Pitch plug.

Rare pitch stoppers (eight examples, 1% of assemblage), were constructed from a mixture of pitch or bitumen mixed with aggregates or temper made up of organics such as fibres or cordage, pottery sherds, sand and small stones, before being pressed over the rims of small vessels or amphora necks (diameter 36 mm to 89 mm). No other technical features have been noticed. Whilst the precise material has not been identified at Myos Hormos, similar stoppers from Berenike dating to the 5th century AD were found to be made of bitumen (Bos 2007, 266) and resin (Moulder 2007, 283). Analysis of the bitumen used in examples from Berenike, suggested that the nearby Egyptian source of Gebel Zeit was not involved, but a Dead Sea source was more likely (Harrell 2007, 169). Type 13 stoppers were also found at Mons Claudianus (Thomas and Tomber 2006, 246). It is likely that this represents stoppers used in the transport of Jordanian products, possibly via Aila, or of stoppers made from reused bitumen from the same source, however this could only be confirmed by gas chromatography analysis.

Type 14. Stone plug with plaster seal.

Type 14 stoppers are made from a stone plug with a plaster seal and the examples from Mons Claudianus used a stone disk (Type 14A) and resemble Type 1 stoppers (Thomas and Tomber 2006). The single example from Myos Hormos is a variant (Type 14B) and was produced like a Type 2 stopper, using small pebbles. It had traces of pitch, was stamped and painted red, suggesting it was used to seal a wine amphora with a neck of 110 mm diameter. Other stone stoppers (Type 14A) have been found at Berenike (Bos 2007, 280), as well as Late Roman variants using coral disks (Type 14C) and shell (Type 14D, ibid). It is possible that these all represent a locally made wine stoppers copying Types 1 and 2, begging the question why are the wine amphorae being resealed?

Type 15. Brick plug with domed plaster seal.

Type 15 stoppers are created by placing a roughly shaped brick stopper into the neck of an amphora before sealing with plaster. The 10 examples (2%) were only found in mixed Islamic and Roman deposits, suggesting that these date to the Mamluk period. They were quite large, 80 mm to 118 mm diameter (94 mm average). They possessed no specific technical features to suggest their contents, though one example did have traces of small fish bones suggesting they may have been used to contain fish products of some kind (S. Hamilton-Dyer pers.com).

Type 16. Vertically placed sherds plug with domed plaster seal.

Type 16 stoppers were created by forcing sherds vertically into the neck of an amphora before covering with a domed plaster seal. The 14 examples make up the single biggest group of Islamic period stoppers at Quseir al-Qadim, only found in Islamic contexts. The plugs have been identified as Islamic Egyptian sherds (R. Bridgman pers.com) fitting with the Mamluk period occupation of the site. There are no technical features that can be used to distinguish what they were used to seal, though wine is unlikely as there were no traces of pitch lining, fermentation holes or writing to suggest this was the case. Fish may have been contained due to the close similarity to Type 15 stoppers, though they were much smaller in diameter 65-95 mm (83 mm average).

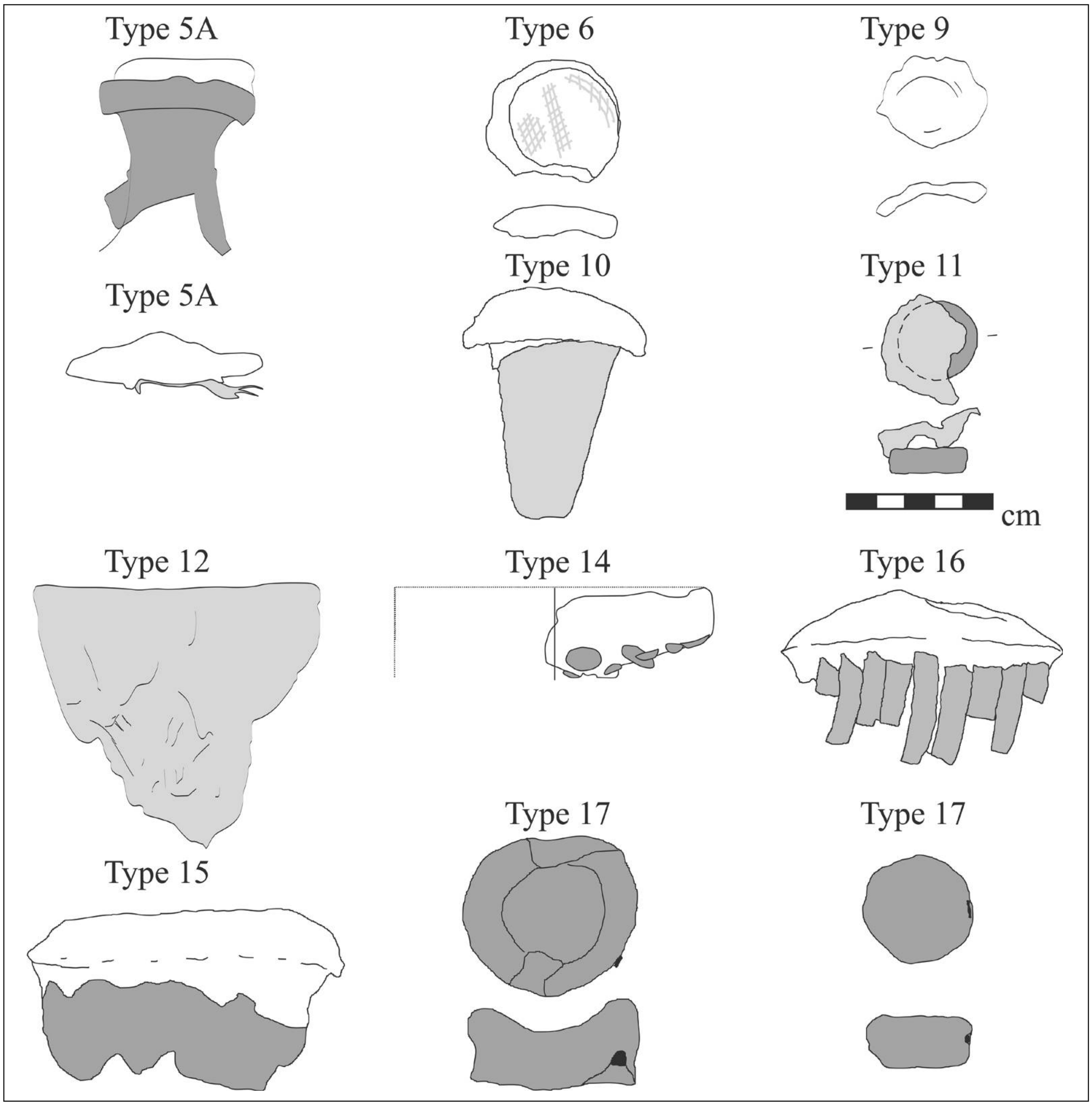


Figure 3.6. Uncommon Roman and Mamluk stopper types from Myos Hormos/ Quseir al-Qadim (Ross Thomas).

Type 17. Marl plug with stick.
Type 17 stoppers are small marl moulded ceramic disks (unidentified possibly imported), with no plaster seal and a stick in the side to facilitate removal. Only two examples were found in late 1st to early 2nd century AD deposits at Myos Hormos, of 37-57 mm diameter, and they provide us with no further significant features as to their purpose or origin.

3.5 Text and Symbol

Text and symbols come in three forms on Roman amphora stoppers; *dipinti* (commercial or inscriptions of ownership written in ink), personal or estate stamps, and commercial stamps. The context of each type of text is important as it can inform much about the contents and their origin, how they are being traded, the traders identity, the date of the trade and consumption patterns at different sites.

Ink inscriptions were used on the surface of Types 5A and 5B non-wine stoppers to record information concerning contents, orgin and ownership. When clear they are usually commercial in nature stating the contents (identification, quality, quantity and/or origin), destination and ownership. Contents detailed on examples from Mons Claudianus includes, ταρικ[ου] or ταρειχειω (ταριχου), salted fish (MCV526, MCO4097 Thomas and Tomber 2006, 256), and χρηστον or *olium* olive oil (MCO826, MCO1015 Thomas and Tomber 2006, 256). Either the destination or origin may be detailed on ST0076 Κοπτ ΑΡ ..ΛωνΘ,

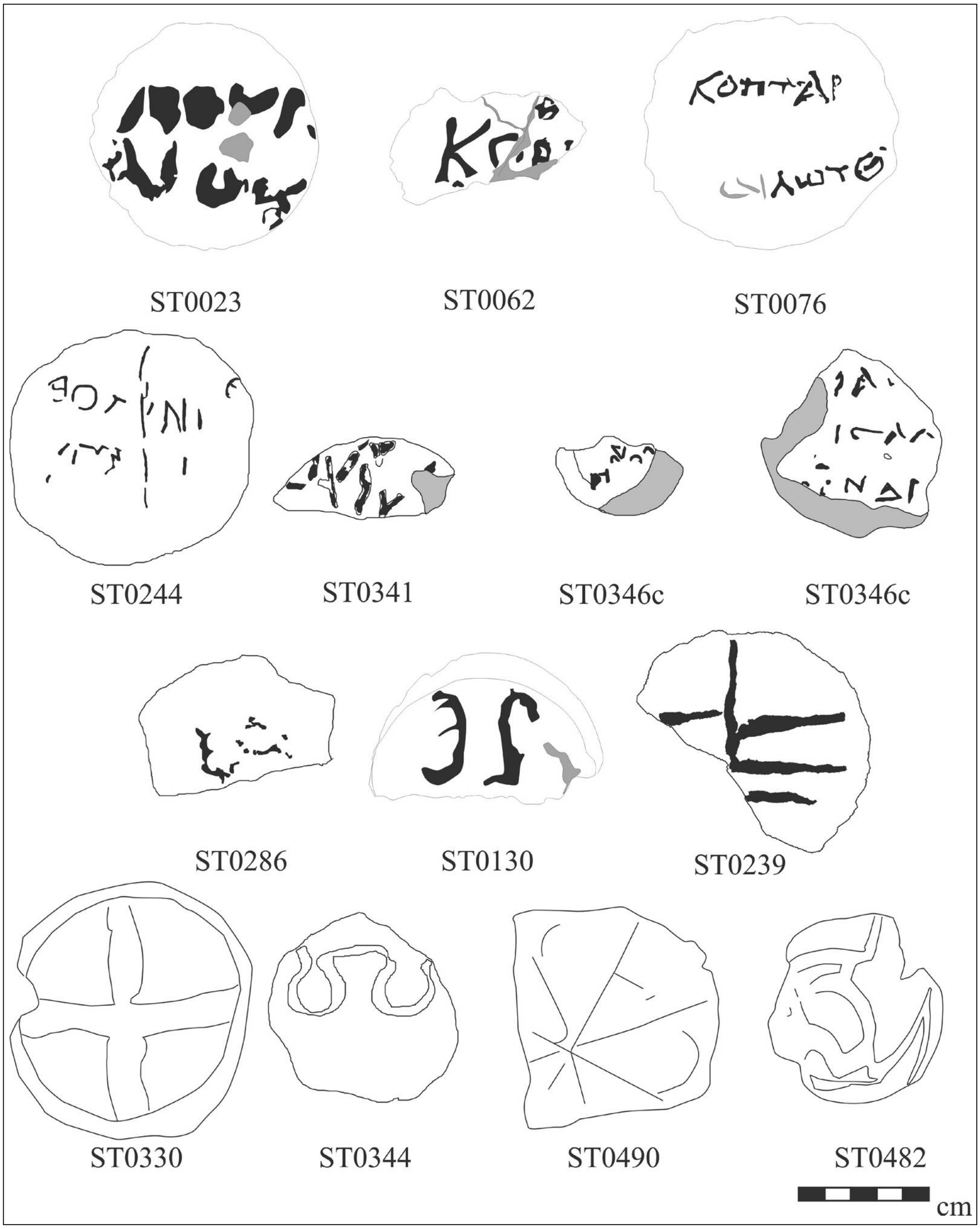


Figure 3.7. Painted, written and inscribed text and decoration on Roman stoppers (Ross Thomas).

as Koptos (Fig. 3.7 ST0076). Most examples appear to refer to ownership by individuals (often including their role or status) at the site in which they were disposed of. Two examples from Mons Claudianus were recognised from other documents as individuals named Φθαυς Σελευκου and Πολυδ[ευκες] working at the quarry (MCO6593a, MCO9012 Thomas and Tomber 2006, 256-8). The name Λουλαιου is recorded on ST0023 (Fig. 3.7). On rare occasions such *dipinti* have been written over or around a stamped wine seal, representing a final change in ownership at Myos Hormos (ST0035 Fig. 3.14). On one rare occasion written text was completed in the form of a commercial stamp that clearly represent the same wine trader; Φαβιανος Ιουλ[ιος] on ST0343 also known as Φαβια[νος] Ιουλιου Αδια from stamped example ST0264 (Fig. 3.13). However, the majority merely possess patterns or symbols that cannot be clearly read.[1]

Personal or estate stamps have been found on a number of mud stoppers (Type 7). In the Fayum the stamps for these seals were found to record the estate from which they came and the year they were produced (Nachtergael 2000, 156-61) and other seals have been found across the Fayum region relating to further estates and individuals', where symbols were also often preserved (Milne 1906). At Berenike an example with an ankh was recorded (Plate 15-28; Moulder 2007, 282-3) that is similar to examples ST0367 and ST0341 from Myos Hormos. The only extant examples with text from Myos Hormos reads Σεπ[τιμυς?] (Fig. 3.9).

Circular commercial stamps were commonly found on stopper Types 1-3 and 5C that possessed pitch and fermentation holes (Fig. 3.8). After the seal had solidified the plaster was given a wash of red water-soluble pigment. They were found on 17% of Type 1 stoppers, 54% of Type 2 stoppers and 25% of Type 3 stoppers, though this is low due to the poor state of preservation, particularly of Types 1 and 3 stoppers found at Myos Hormos. It is likely that almost all stoppers of these types were stamped in antiquity. They occur with the names of the trader and occasionally a symbol. Their common occurrence and the fact that stamps were clearly used on a large numbers of stoppers suggests that these seals were the common practice for, and instantly recognisable as, wine amphorae (possibly signified by the red pigment) belonging to specific traders. The fact they were stamped implies that they were traded in significant quantities. Greek was the common language used for such labels. Epigraphic studies have identified some of these traders as account (Λογος) holders in the Nicanor archive (Fuks 1951), transporting wine to be loaded onto ships at Berenike (Cuvigny 1998; Denecker and Vandorpe 2007, 120-1), suggesting that these represent large scale merchants (*mercator, negotiator*), or ship owners (*navicularius*), possibly also specialising in wine (*oinopolai*) who operated through agents and not small scale merchants (Εμπορος) (Denecker and Vandorpe 2007). There are however, also stamps with the title tax farmer preserved (Αραβαρχ), though these are rare (Figs 3.13 and 3.14 ST0068, ST0132).

On the stamps a number of symbols also occur. These include circular and linear patterns, birds, stars (MCV606,

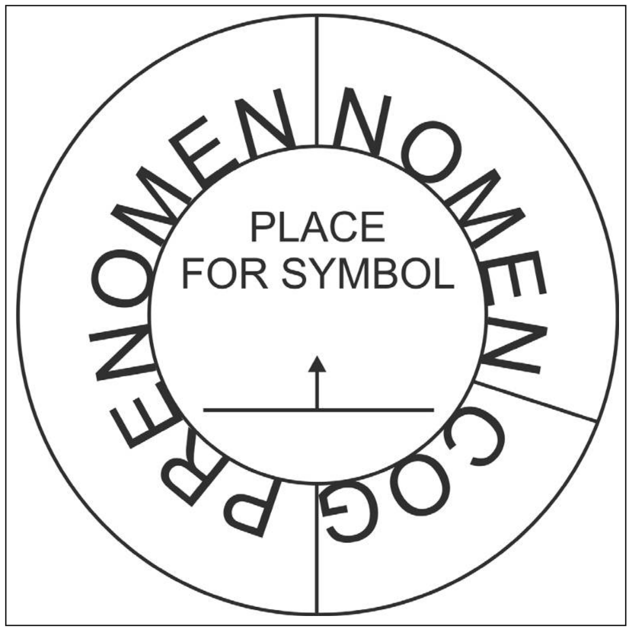


Figure 3.8. Layout of commercial wine stamps.

MCV359, MC624) that are also found in the Byzantine period (Bruyère 1966; Egloff 1977). Laurel wreaths, female figures and cobras are the most common symbols in the Myos Hormos assemblage. A woman holding a horn (probably the horn of plenty called cornucopia) was found on four examples bearing the name Tiberius Claudius Agath (ST0127, ST0375, ST0404, ST0316). A single example of a female figure was found on an imported Gaulish stopper, without a name (ST0265). Four examples with laurel wreaths were also found, similar to examples from Berenike (Bos and Helms 2000, 275-304; Bos 2007, 258-69; Sundelin 1996, 306), though no extant names can be associated with them (ST0417, ST0402, ST0359 and ST0246). Thirty six cobra stamps have been identified at Myos Hormos by the Chicago and Southampton teams. They account for 42% of all commercial wine stamps found at that port. Seven Cobra stamps have also been found at Mons Claudianus (V114 V412, V152, V172, V242, V379, V637 Thomas and Tomber 2006, 252-4) and a further seven are known to the author from Berenike (BE95-3184-Y038 Sundelin 1996; BE96-3664-Y019 Dieleman 1998; BE97-1967-Y008 Cashman *et al.* 1999; BE98-4123-Y097 Bos and Helms 2000; BE99-1150-Y037, BE99-1149-Y024 Bos 2007; BE00-1179-Y043 Moulder 2007). Three features are visible; the striking cobra, a disc framed by horns above the cobra's head, and vegetation growing from beneath the cobra's body. These diagnostic features help identify the cobra as the I'rt or Uraeus, the protective cobra goddess represented on the crown of the Pharaoh and later the Emperor (Hart 1986, 220). In the Middle Kingdom this cobra goddess was identified with *Wadjt* of the Nile Delta, who protected the Pharaoh from his enemies by spitting fire (*ibid*.), and as a symbol of the Pharaoh-Emperor, it may represent a link to the Emperor. In later periods the I'rt was associated with *Renetutet* 'the nurturer' a fertility goddess of the Fayum who was commonly depicted with papyrus stalks sprouting around her symbolising her

[1] I would like to thank Roger Bagnall for his alternative readings of the following stoppers. ST0023 could read Λουκ[ι]ανου. ST0076 could read KOMAR[OS] FILWTA.. The reading of stopper 4 in (Johnson 1979) that ST0004 is similar to, is unlikely as there are no parallels for such a name. ST0133: Τιβεριου Κλαυδιος Ιουλιου is not a likely sequence of names, as Iulius is not a cognomen. ST0132: more likely the title Arabarches or Arabarchos. ST0264: Ιουλιος Φαβιανος, with Iulius as the nomen.

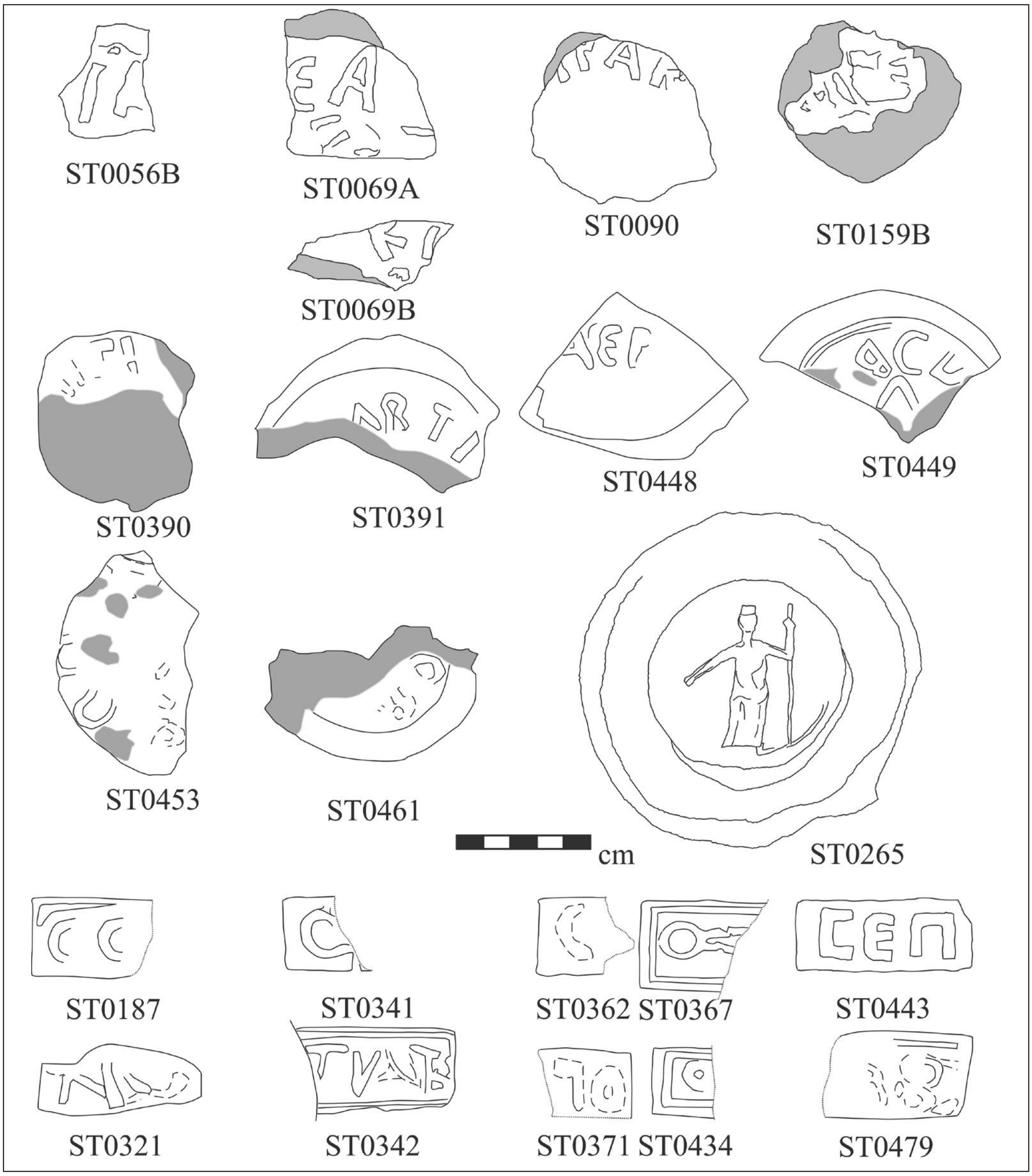


Figure 3.9. Egyptian estate, imported commercial and unidentified wine stamps (Ross Thomas).

fertility, and was depicted with the sun disc of *R'* and the horns of Hathor in the Roman period following a process of amalgamation (*Renetutet-Isis-Hathor*) of Egyptian deities during the Ptolemaic and Roman periods (Roberts 1995), that became known in Greek as *Hermouthis* (Hart 1986, 185). Depictions of Renetutet have been recognised on wine jar stoppers dating to the 14th century BC and interpreted as representing wine from the Fayum (Hope 1978). Such stamps may represent produce from the Fayum, one '*of Egypt's major … viticulture centres of the Ptolemaic to Roman period*' (Sidebotham 1986, 488). If this is so, the Fayum must have accounted for over a third of Egyptian wine that reached the Eastern Desert.

Stamped stoppers from the combined assemblages of Koptos, Berenike, Myos Hormos and Mons Claudianus (Table 3.2) carry stamped text in various states of preservation. These stamps are only found on wine stoppers, of Types 1, 2 and 3, although most are badly damaged. Fabric analysis of the Myos Hormos examples suggests these represent traders in Egyptian wine. Two epigraphic approaches were attempted to fully benefit from this assemblage. Firstly, looking at names and how they are laid out with regards to cultural indicators of ascription to group identities or ethnicity (onomastics). Secondly, to specifically learn about individuals involved in this trade (prosopography). To do this, comparison with other sites is necessary.

The names preserved are Greek, Egyptian and Roman as well as the names of Imperial freedmen. These forms were important for signifying individuals' ethnicity and status. Egyptian ethnicity was directly linked to status during the Early Imperial period (Goudrian 1992, 89). Individuals were classified as either Greek (*Helen*) or Egyptian (*Aigyptoi*), there were no Greco-Egyptians (*ibid*). Distinctions in status was present in the Law code, *Gnomon of the Idios Logos* (code established by Augustus and amended over time) define distinctions in status between Romans, Latins, Greeks, Alexandrians and Egyptians (Bowman and Rathbone 1992, 113). Roman demarcation of an urban based 'Hellenic' elite (was used) to rule and exploit the native population' (*ibid* 114). The term *Aigyptoi* '*acquired connotations of administrative, fiscal and cultural inferiority*' (*ibid*). Clearly those that wished to trade in wine would benefit from appearing Greek through speaking the language and possessing a Greek name. It is perhaps hardly surprising then when reviewing the Nicanor Archive that the account holders that dealt with the wine had Greek or Roman names, whilst those with Egyptian names appear to specialise in trading grain and rush mats (Fuks 1951). The stopper stamps, while fragmentary, almost always carry Greek lettering, suggesting a Hellenic monopoly on this trade, which would require an ablity to read and write Greek. Indeed, the occurrence of one *Satyros son of Anubionos* (that is the son of an *Aigyptoi*, taking a Hellenic name), suggests it was also favourable to emphasise, as much as possible, being a Helen (ST0110).

The most common names involved in this trade possessed the Roman *tria nomina*, of a *praenomen, nomen* and a *cognomen* (Bodel 2001, 83). The *praenomen* in these examples was usually Greek, and the *nomen* and *cognomen* that of the Emperors' Claudius or Nero (Tiberius Claudius, MC92V605, P.Petrie, 297,275, 276; Bagnall *et al*. 1999; 201-205). This suggests that these individuals were most likely freedmen acting on behalf of the emperors. Also one example from Myos Hormos specifically states the individual, one Kepẹ Onios is a freedman with the phrase 'Σεβ(αστου) απελευθ(ερος)' the Latin *Augusti libertus*, 'freedman of the emperor' (Bagnall 1979, 243, ST0004). Freedmen were able to operate in this way because Egyptian law after the *Gnomon of the Idios Logos*, operated on the Roman practice that freedmen acquiring the status of their ex-master (Bowman and Rathbone 1992, 113). Lastly, two stoppers bear the stamps of the *arabarch* (ST0132 and ST0068), the general farmer of the taxes for the Eastern Desert. This individual, or a representative, possibly called Horus, would have received one quarter of all goods passing through the Eastern Desert. Horus and other tax farmer generals like him would have been a powerful individual involved in the Erythraean Sea trade (Jean Bingen, pers. com).

Previous prosopographic surveys have highlighted the relationship between two names on amphora stoppers (Gaius Iulius Epaphroditos and Gaius Norbanus Ptolemaios) and archives (Denecker and Vandorpe 2007) from Koptos (Fuks 1951), Oxyrhynchus (Bagnal 1993; Rathbone 1991) and Berenike (Bagnall *et al*. 2000). A number of these traders, owned or ran estates, held official posts (*strategos* and *epistrategos*) and worked as tax-farmers (Cuvigny 1998; Denecker and Vandorpe 2007). This study of stoppers from Myos Hormos has provided additional examples of these and new individuals. Greco-Egyptian names are represented, such as *Satyros Anoubionos*. A tax farmer called *Horos* is also represented. Roman names in the form of a *Tria Nomina* are also represented by Egyptian wine traders *Fabianos Iulius Adia* and *Primus L. Titus*. However, Greek, Egyptian and Roman traders were outnumbered in the archaeological record by evidence for traders who were freedmen or slaves of the emperors. Slaves of Augustus were already known as *Gaioṣ Iulius Epafroditos* from Berenike and Koptos (Cuvigny 1998, Stopper #7, O.Beren I 80-5, O.Beren 147-8) though freedmen of Nero's and Claudius' vastly outnumber those of other emperors, as represented by the *tria nomena*; *Tiberius Claudius*. One such *Agath(okles)*[2] is represented a number of times, with stoppers sealing Egyptian wine amphorae in reused eastern Mediterranean Peacock and Williams Form 10 amphorae. This individual was known from the Nicanor archive for transporting wine from AD 48-50, though these stoppers have been found in deposits of the 1st and early 2nd centuries AD. *Tiberious Claudius Hermio(s)* is the most represented, who traded Egyptian wine in the late 1st and early 2nd centuries AD. One of the Egyptian wine traders Hermoidas may represent this individual (P.Petrie; 241). Alternatively an Oxyrhynchus wine trader called *Hermas* who was recorded buying 3068 drachmas of wine in the Fayum (Rowlandson 1996, 232), may be the same individual. Another common freedman's name is *Iulius*, identified at both Myos Hormos and Mons Claudianus from mid 1st century to early 2nd century AD deposits. Known freedmen traders *Tiberious Claudius Aniktas* (a slave in AD 33/4 of the Emperor Tiberius and later a tax farmer (Denecker and Vandorpe 2007, 122), presumably freed by either Nero or Claudius) and *Tiberious Claudius Serapion*, are also probably represented from fragmentary 1st and 2nd century AD Myos Hormos stoppers (ST0353, 375). Another *Kepe Onios* and *Titus Flavius ?allis* (Freedman of Emperor Vespasian, Titus or Domitian (Johnson 1979, 235, Pl.75h) and the putative identification of the freedman *Chrestos* (Denecker and Vandorpe 2007, 123), mean that at least 13 of the Egyptian wine traders known from this region were Imperial slaves or freedmen and who owned or ran estates in Egypt, held influential offices such as tax farmer, as well as exported wine for shipping on the Red Sea.

2. The name could be read *Agathionos*, but the author prefers the current reading Agath(okles) oino (wine).

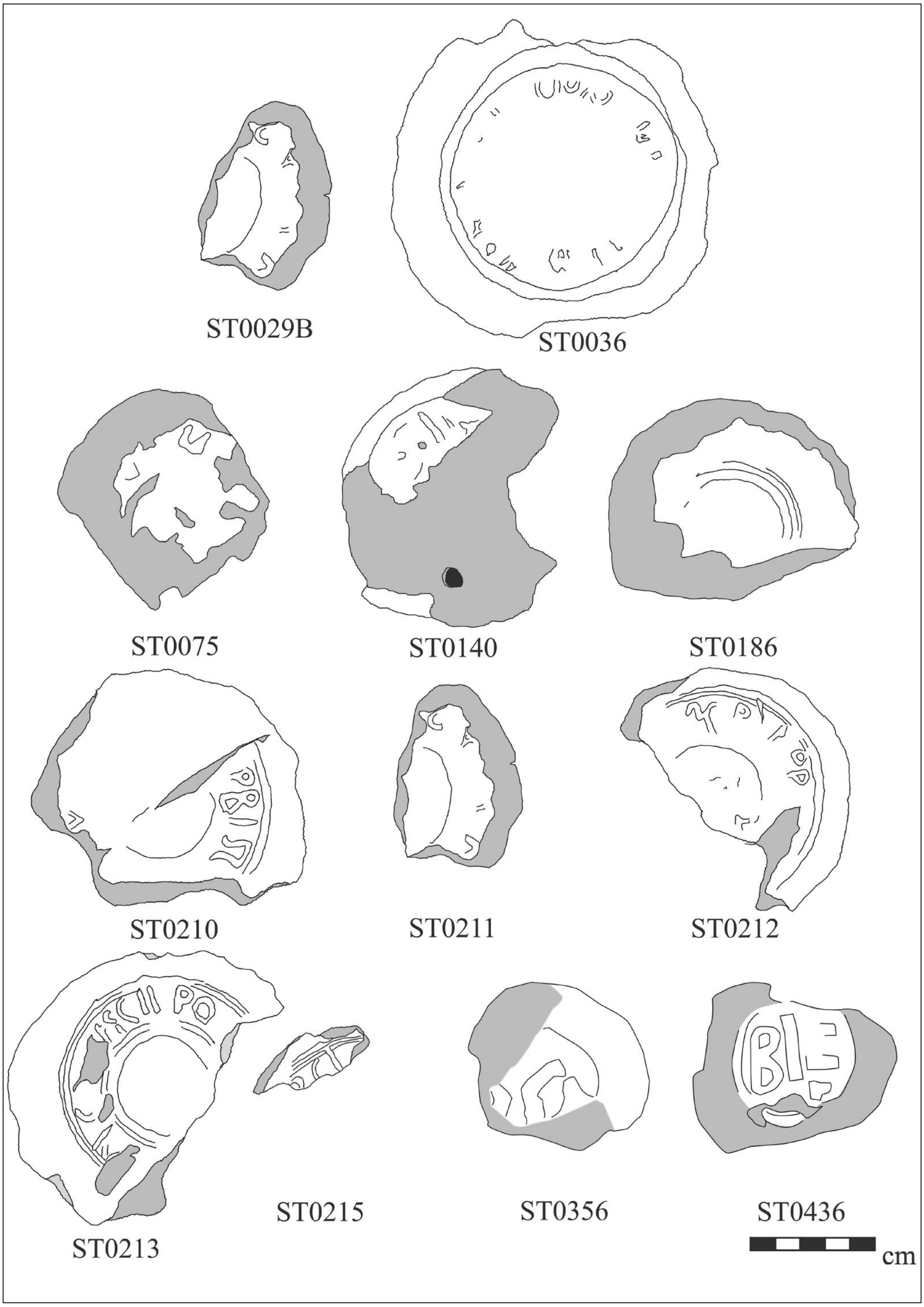


Figure 3.10. Commercial wine stamp fragments with putative reconstruction (Ross Thomas).

Name of merchant	Context	Reference
Traders known to operate from Myos Hormos		
Σατυρου Ανουβιωνος	2^{nd}AD Myos Hormos	ST0110
Ερμοιδας	AD35 Myos Hormos	P.Petrie 241.
Αραβαρξ Ωρ[ο]ς	M1^{st}-M2^{nd}AD Myos Hormos	ST0068
[Α]ραβαρ[ξ]	2^{nd}AD Myos Hormos	ST0132
Τιβεριου Κλαυδιος	1^{st}–2^{nd}AD Myos Hormos	ST0284, ST0409, ST0195, ST0189, BE99-1149-Y024
Τιβε(ριου) Κλαυδιος Αγαθ οινο	L1^{st}-E2^{nd}AD Myos Hormos	ST0127, ST0316, ST0365, ST0404
[Τιβεριου Κ]λα(υδιος)Αγαθ ο	2^{nd}AD Myos Hormos	ST0185
Τιβεριου Κλαυδιος Αγαθοκλης	AD48-50 Myos Hormos, Koptos	P.Petrie. 275-6
Τι(βεριου) Κλαυ(διος) Αν[ικ]τας	M1^{st}-L1^{st}AD Myos Hormos	ST0353
Τιβε(ριου) Κλαυδ(ιος) Ερμιου	L1^{st}-E2^{nd}AD Myos Hormos	ST0071, ST0080, ST0257, ST0259, ST0263, ST0304, ST0372, ST0401?, ST0439, ST0477?, ST0491?
[Τιβεριου Κλαυδιος?] Ερμιου	L1^{st}-E2^{nd}AD Myos Hormos	ST0050, ST0066 BE96-3664-Y019?
Τιβε[ριου Κλαυ]διο(ς) Ιουλιου	M1^{st}-M2^{nd}AD Myos Hormos	ST0133, ST0386, ST0094, ST0194?, ST0442?
Τιβεριου Κλαυδιος Θεοδωρος	AD48-50 Myos Hormos, Koptos	P.Petrie. 275-6
Τιβ(εριου) [Κ]λαυ(διος) Σε[ραπιο]ν	2^{nd}AD Myos Hormos	ST0375
Κεπε ονιοσ Σεβ(αστου) απελευθ(ερος)	1^{st}-2^{nd}AD Myos Hormos	ST0004, (Johnson 1979, Stopper #4).
Tituș Flaviuș [..̃.]allis	1^{st}-2^{nd}AD Myos Hormos	(Johnson 1979, Stopper #75h)
Φαβιανος Ιουλιου Αδια	M1^{st}-E2^{nd}AD Myos Hormos	ST0198, ST0264, ST0343, ST0452
Αδια	L1^{st}-E2^{nd}AD Myos Hormos	ST0463, ST0497
Λουκιος Ιουαιος Φ..	AD41 Myos Hormos	P.Petrie 261.
Γαιυς Νορβανυς Πτολεμαιος	AD36-65 Myos Hormos, Koptos	(Cuvigny 1998, Stopper #2-3), O.Petrie 244, 257
Traders known to operate from elsewhere in the Eastern Desert and Koptos		
Ερμερωτος Αθενιον	AD57 Berenike	P.Petrie 287.
Κορνηλιος	AD26 Berenike	O.Petrie 227, 246.
Απ[ολ]λ[ω]ωνιου αρ[αβαρχ]	AD2-41 Koptos	(Cuvigny 1998, Stopper #5)
Γαιου Ιολιου Επαφροδιτου	AD18/19 Berenike, Koptos	(Cuvigny 1998, Stopper #7), O.Beren I 80-5, O.Beren 147-8.
Γ [–] Ευθηνιως	E2^{nd}+AD Mons Claudianus	(Thomas and Tomber 2006, 252-3 MCV172)
˜Iulius? Secundus	E2^{nd}+AD Mons Claudianus	(Thomas and Tomber 2006, 254-5 MCV172)
Κλαυδιος Ανικτας Αρα(βαρχ)	Eastern Desert, Koptos	(Milne 1906 Stopper #33014-5) O.Petrie 238, 239
Τιβεριου Κλαυδιος Δοριον	Berenike	O.Beren I 51-66.
Clau(dius) Hermo[?ke]rdon	Koptos	(Cuvigny 1998)
Τ[ιβεριου Κλαυδιος] Ιουλοω	E2^{nd}+AD Mons Claudianus	(Thomas and Tomber 2006, 252-4 MCV242)
Τιβ(εριου) Κλα(υδιος) Λατι[...]ου	Mons Claudianus	(Thomas and Tomber 2006, 254-5 MCV605)
Τιβεριου Κλαυδιος Σεραπιον	AD41-68 Berenike, Koptos	O.Petrie 297
Τιβεριου Κλαυδιος Σερενυς	Koptos	(Cuvigny 1998, Stopper #4)
Chrestos	Koptos	(Cuvigny 1998)
Primus L. Titus	Koptos	(Cuvigny 1998)
Αυλος Γαβινιος Εψδαμιων	AD19 Koptos	P.Petrie 225.
Μαρκος Λαιλος Ημεναιος	AD34 Berenike	P.Petrie 240.
Μαρκος Ιουλιος Αλεξανδρος	AD37-66 Koptos	P.Petrie 252, 266-7, 271, 282
Μακρο	AD44 Berenike	O.Petrie 268, 270.

Table 3.2. List of traders names as represented by amphora stoppers, ostraca and papyri.

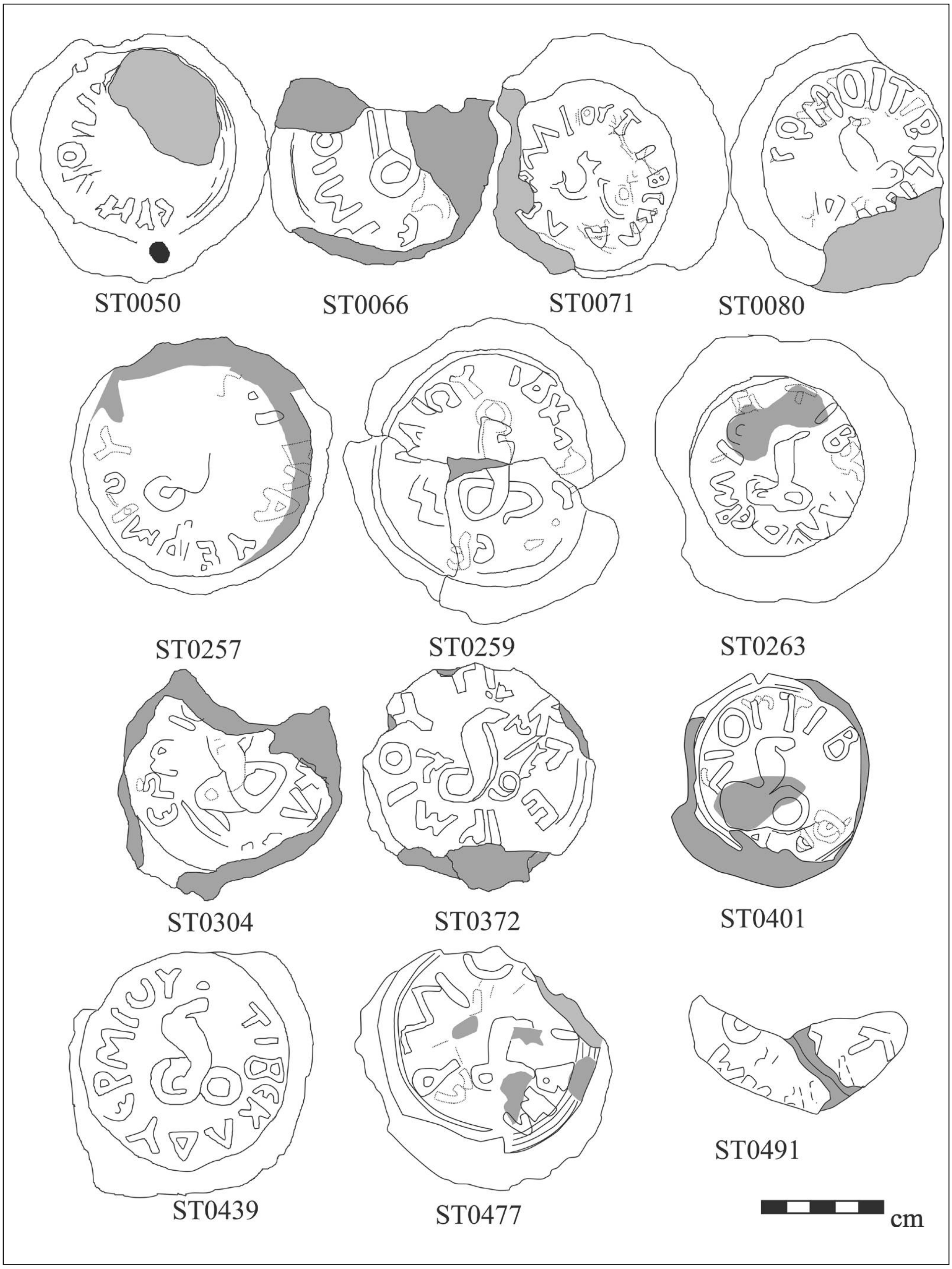


Figure 3.11. Commercial wine stamp of Tiberius Claudius Hermes (Ross Thomas).

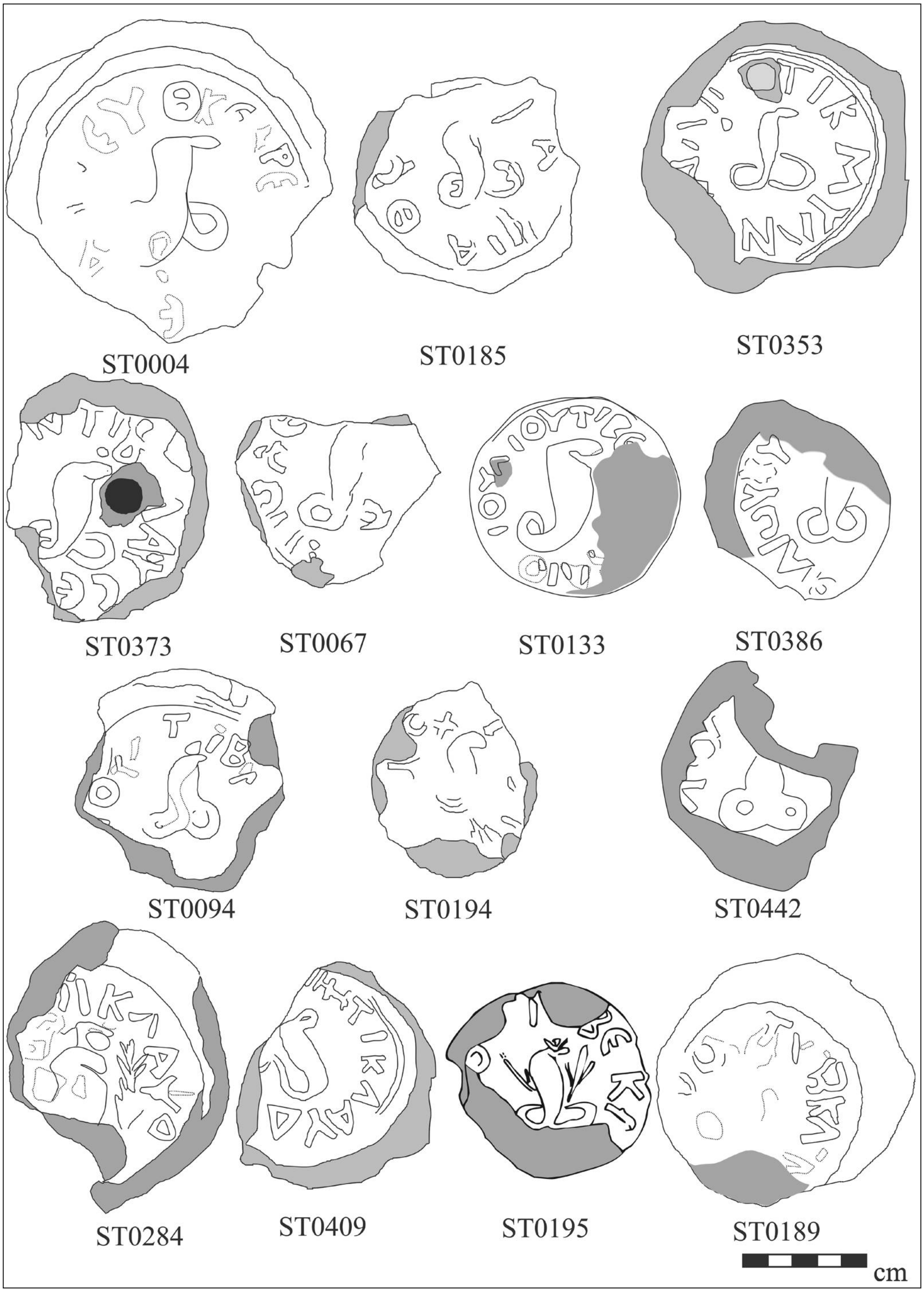


Figure 3.12. Commercial wine stamps of Freedmen Kepe Onios, Tiberius Claudius Iulius, Se[rapio]n, Agath(okles) and An[ik]tas (Ross Thomas).

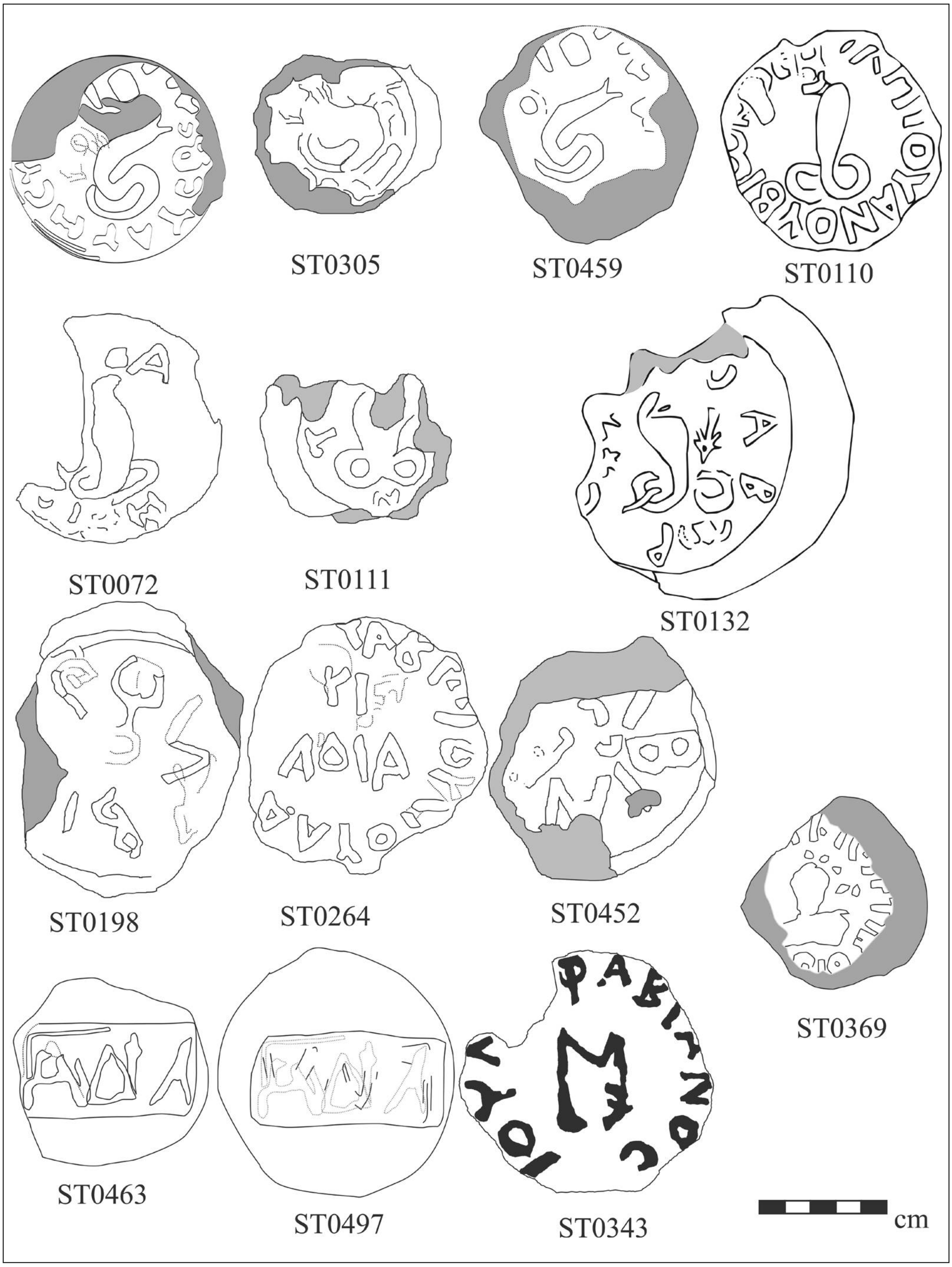


Figure 3.13. Commercial wine stamps of tax-farmer Horos, Satyros Anoubionos and Fabianos Iulius Adia (Ross Thomas).

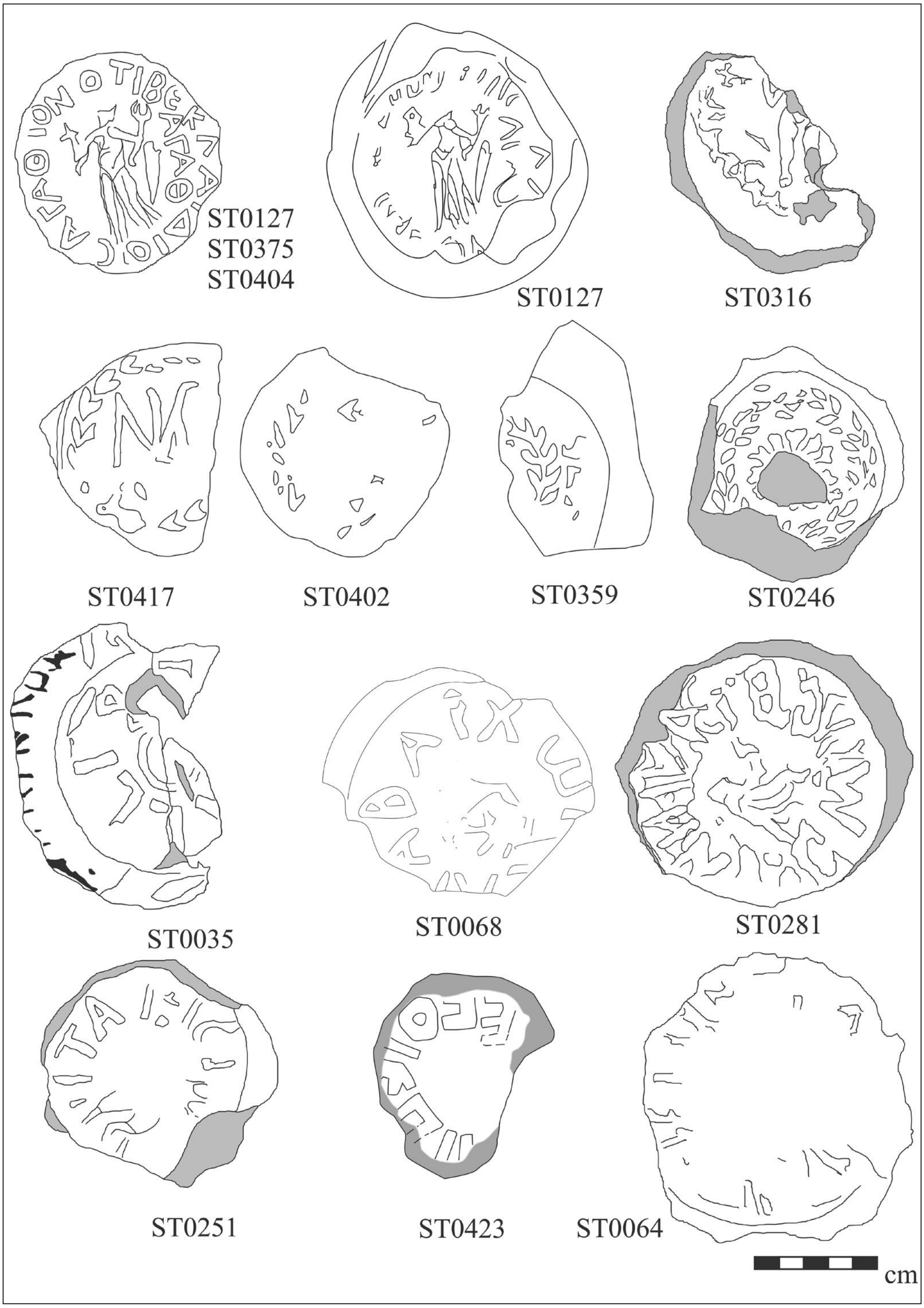


Figure 3.14. Commercial wine stamps of Tiberius Claudius Agath(okles), a tax-farmer and others' unidentified (Ross Thomas).

3.6 Interpretation

Production, Trade, Consumption and Re-use of Amphora Stoppers.

Six hundred and thirty-two stoppers were found at Myos Hormos, each carrying valuable information in the form of technological features, decoration, text and their archaeological context. From this it has been possible to elucidate the local stopper production techniques in relation to the wine, oil and fish products arriving at and passing through Myos Hormos. Evidence for contents suggests that the majority of goods were produced in Egypt, including sources in Alexandria, the Fayum and Upper Egypt confirmed by fabric analysis and texts. The contents mostly consisted of wine (>75%), though type and quantity of wine changed over time. In the Augustan period, western Mediterranean wine (Types 4 and 5C) was imported, though this rapidly declined in significance over the mid 1st century AD in favour of commercial (Types 1-3) and estate wine (Type 7) from Egypt. Mud stoppers (Type 17) not intended for commercial use, were found to be more significant in the mid and late 1st century AD during the peak of activity at the port, just when there was a major shift from imported to Egyptian products. There was a further rise in consumption in the early 2nd century AD, possibly relating to the building of the Trajanic Canal and Via Hadriana that would have improved the supply routes to Myos Hormos. During this peak period, Egyptians with Hellenised names were involved in the wine trade, though the majority of the wine was supplied by freedmen of Claudius and Nero. The wine was of Egyptian origin, but transported in eastern Mediterranean Peacock and Williams Form 10 amphorae. The occurrence of *Uraeus/ Renetutet* symbols on the stamped stoppers suggests a source in Fayum for much of this wine. Alternatively, this may have been some reference to an Imperial connection (Uraeus as protective symbol of the Pharaoh). Over the course of the 2nd century AD consumption of amphorae goods dropped, though wine remained a high proportion of what was consumed. By the 3rd century AD very few stoppers are present in the archaeological records, though a higher proportion of oil or fish product stoppers are represented (Fig. 3.12 and Fig. 3.15).

Five hundred and seventy three stoppers were found in secure Roman contexts at Myos Hormos. Stoppers were found in the *sebakh* adjacent to domestic areas and within the landfill of the harbour installations. Seventy two stoppers were found in the harbour area (Trenches 7, 7A, 12 and 15) or 12% of all artefacts found there. The western ridge with its rich rubbish deposits (Trenches 5, 8, 6G, 6Q) produced the majority, 258 stoppers, 11% of all artefacts found there. The central area (Trenches 17, 2B-D) produced 104 stoppers or 10% of all artefacts found there. To the north, rubbish dumps (Trenches 6A, 6D-E, 6K, 6P) produced 138 stoppers, 17% of all small finds from that area. Finally, the southern foreshore produced just one Roman example (Trench 10) (under 0.5% of all artefacts from there). From the consumption patterns, it is possible to see that across the settlement area wine, oil and fish products were important to the harbours inhabitants, accounting for over 10% of small finds across the settled areas and amongst the dumps. More detailed analysis suggests that wine consumption was concentrated in the main settlement area to the east and north, associated with warehouse installations. Lower proportions of stoppers were found in the western part of the site, where activities relating to fishing were identified. Instead in the west, stoppers were concentrated in the dumps of Trench 6Q and Trench 6G.

Other sites in the Eastern Desert and the Red Sea coast provide excellent comparative material. Like Myos Hormos, the 305 Early Roman from Berenike, include a high proportion of wine stoppers, a larger proportion of which were imported western Mediterranean wine dating to the Augustan to the late 1st century AD. In the early 2nd century the quantity of stoppers and quality (mostly Egyptian) drops off significantly at Berenike. Over the course of the 2nd century AD, Berenike becomes less involved in wine trade, with a further drop in the 3rd century (Figure 3.16). At Aila, 57 stoppers were recorded during the 2003 season, representing activity from the Nabataean to Byzantine periods. The stoppers were mostly local in fabric, with some from Egyptian and Gaza. Aila fabric stoppers copied Types 3B and 3C and may be interpreted as from wine amphorae, though this cannot be proven. The 213 stoppers from Mons Claudianus represent a more balanced consumption pattern, representing a mixture of estate produced Egyptian wine, commercial Egyptian wine, oil and fish products and no imported wine, with a peak of activity in the early 2nd century AD contexts. Wine traders operating in the Red Sea ports also supplied Mons Claudianus, though this may have been redirected tax seized by the Eastern Desert tax-farmers. The assemblage represents military supplies and the occasional private purchase, represented by personal names of known workers from the site on Type 5 stoppers. It is likely that the small assemblages from Sikait (four) and Mons Porphyrites (eight; also see Bailey 2007b, 306) also represent Military supplies (Fig. 3.18; Fig. 3.19).

In conclusion, studies of stoppers can inform us about production, provenance, transport, trade, traders and consumption patterns from the sites in which they were found and the places they were made. For the Red Sea ports, there are really only four groups of stopper, commercial Egyptian wine, (Types 1-3), imported commercial wine (Types 1, 4, 5C), Egyptian estate wine seals (Type 7), fish and oil stoppers (Types 5A-B and 6), the rest being locally made or rare unidentified stoppers for a variety of local (and potentially imported) products. The fabric from which they are made tells us the provenance and that imported amphorae were frequently re-used. The red painted stamps were clearly important labels for the wine trade, and the traders who co-ordinated this trade were mostly Imperial freedmen (though Egyptians, Romans and

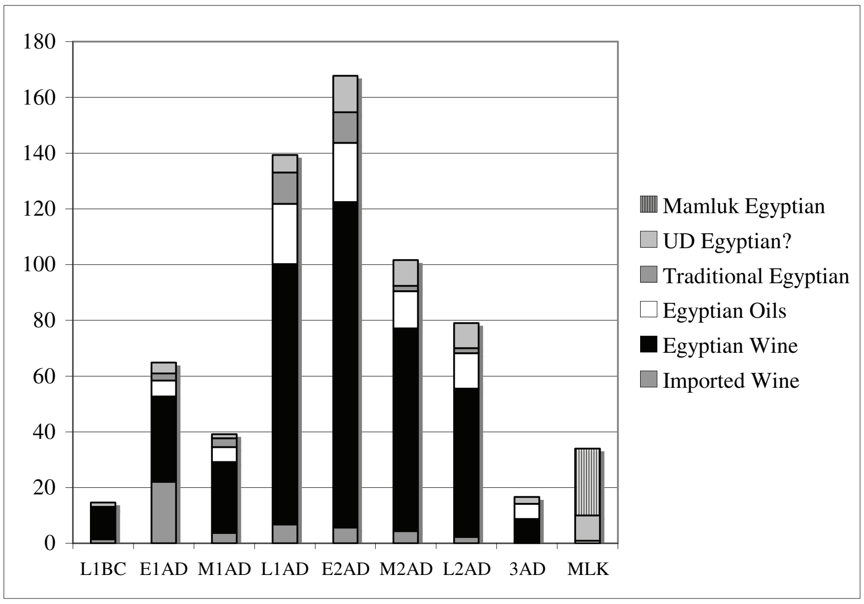


Figure 3.15. Distribution of wine stoppers through time in Myos Hormos.

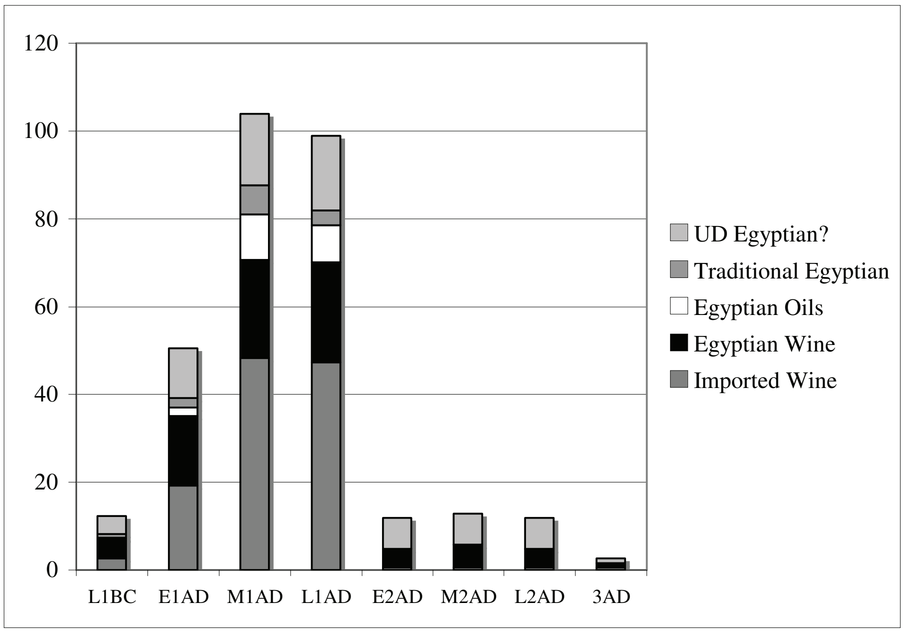


Figure 3.16. Distribution of wine stoppers over time in Berenike.

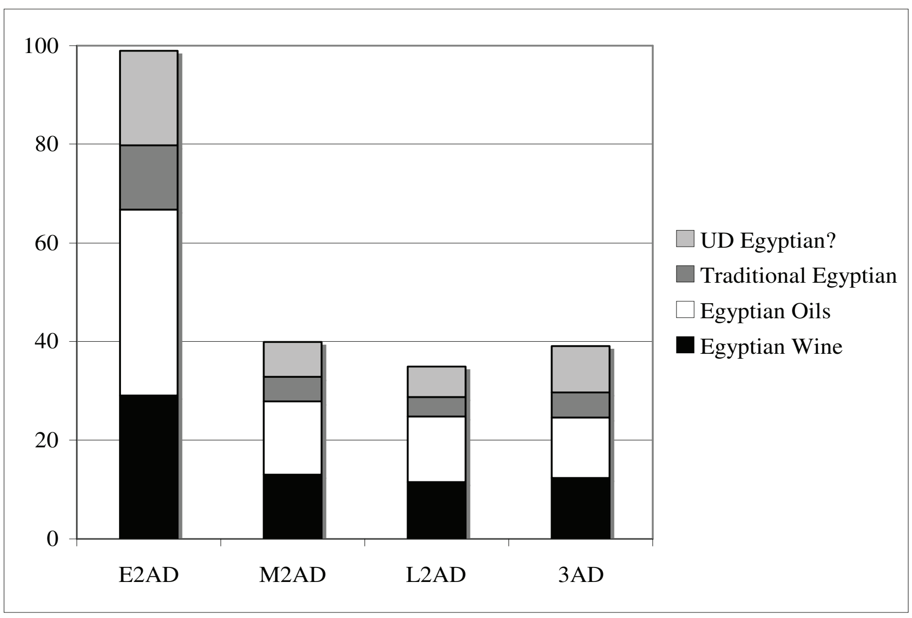


Figure 3.17. Distribution of wine stoppers over time in Mons Claudianus.

Greeks were also involved), who also held other important positions such as *strategos*, *epistrategos* and tax-farmers or ran Imperial estates. Clearly a significant proportion of this wine found its way into local diets, via tolls, tax and possibly the trader's agents in the ports. In the course of transportation, stoppers may be re-stamped (MCV114, Thomas and Tomber 2006, 252-3) or written on with a new owner's name. Amphorae of fish and oil were frequently found with the names of the final owner, as if they had been transported from the Nile or another Eastern Desert site specifically to satisfy individual needs. There is no evidence of the mass transport of fish or oil intended for Red Sea trade. It is possible that some of the fish consumed at Mons Claudianus were produced at Myos Hormos, though a Nile source is also possible, though less likely according to the faunal assemblages (Hamilton-Dyer 2001a). Consumption practices at the ports are represented by a large number of amphora stoppers including a large proportion of wine stoppers. This is particularly high in areas associated with ship maintenance or warehouses and not at all like the consumption practices represented by military supplies at Mons Claudianus (Thomas and Tomber 2006). Finally, a number of stopper elements may be re-used. Cork disks make good fishing floats for lines or nets, and ceramic plugs with holes are very similar to net weights and could be easily modified for just such a purpose.

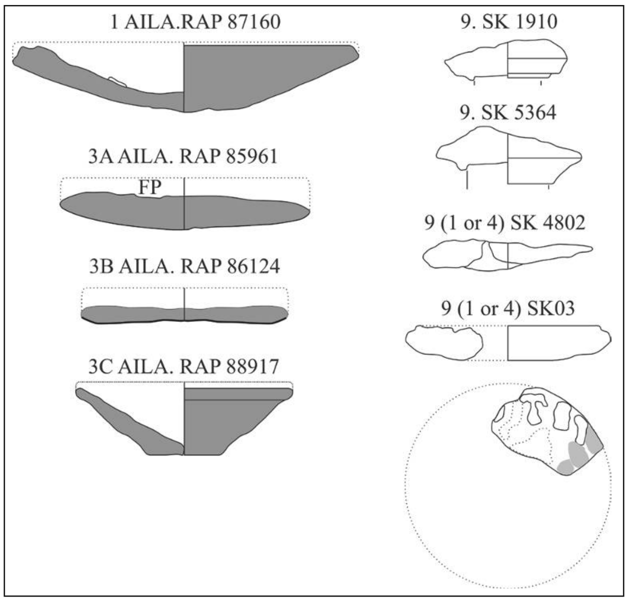


Figure 3.18. Stoppers from Sikait and Aila. Note figure print in hand-made Aila Type 3B stopper (Ross Thomas).

Acknowledgements

I would like to thank Lucy Blue and David Peacock for the opportunity to study the Myos Hormos stoppers as part of my Masters thesis at the University of Southampton, and their ongoing support for this study to publication. Roberta Tomber (Roman ceramics), Wilfried Van Rengen (Epigraphy), Rebecca Bridgeman (Islamic ceramics), Jill Phillips (small finds), Marijke van der Veen (flora) and Sheila Hamilton-Dyre (fauna) have also helped with specialist areas of this study.

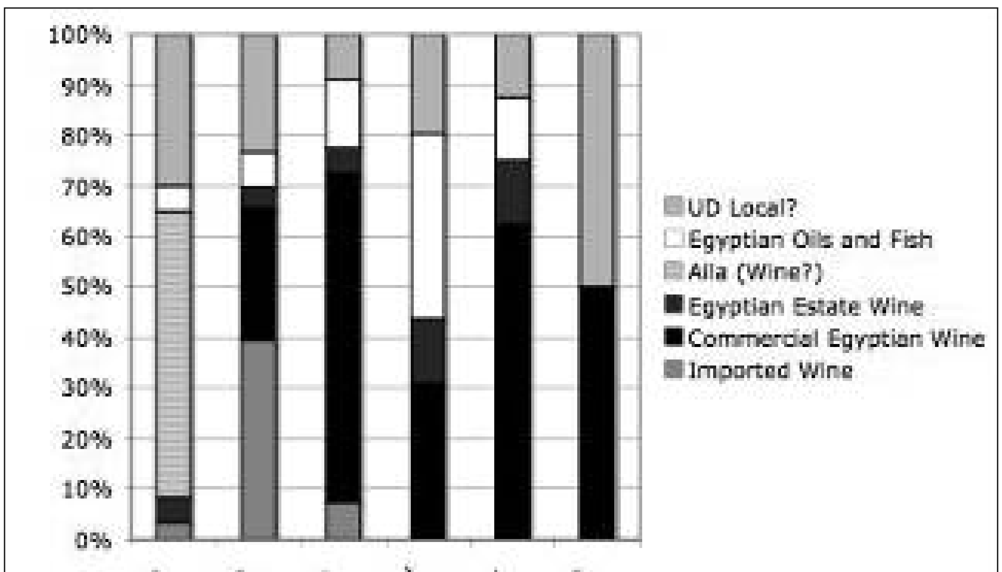


Figure 3.19. Provisioning of Eastern Desert and Red Sea settlements based on stoppers.

4 The Amphora Wharf: The context and construction of Roman amphora installations

Lucy Blue

Introduction

This chapter aims to explore Roman harbour installations such as the example excavated at Myos Hormos (Blue and Peacock 2006, 67-94) in an attempt to place it in context, particularly with respect to harbour technology. It appears that this particular type of Roman harbour installation, constructed from amphora, has been identified across the length and at the extremities of the Empire, with many characteristics in common.

4.1 Harbour Varieties: Traditional Construction Techniques

Wharf, jetty, quay – the construction of such features in the Greco-Roman world usually take quite a specific form (Blackman 1982a & b): bonded masonry, ashlar lined quays, mortar, hydraulic and concrete, are commonly associated with their construction – but rarely amphorae. Amphorae are after all the containers of trade not the material from which wharfs that received goods of trade were normally constructed.

This chapter examines an alternative approach to harbour technology that is witnessed across the breadth of the Roman world – recycled amphorae. It will briefly explore the range and variety of construction types from Myos Hormos (Blue and Peacock 2006, 67-94) to Cadiz on the Atlantic coast of Spain (Bernal *et al.* 2005), and will also discuss a range of approaches to this method of constructing harbours also identified in northern Italy and southern France (Pesavento Mattioli 1998).

4.2 Myos Hormos

The Roman harbour of Myos Hormos was essentially located on the fringes of the Empire and in many respects reflects this isolated location in terms of its architecture (Peacock and Blue 2006, 67-94). This is particularly noticeable when considering what has been interpreted as rudimentary harbour installations located in a now-silted lagoon in lee of the main settlement area.

The Roman Harbour lies at the head of a bay or *mersa*, behind which is a silted lagoon or *sabkha*. The small inlet cuts the Late-Pleistocene coral reef which runs parallel to the shore (Plaziat *et al.* 1995). The main area of the site (over 10 hectares) is located on the northern arm of this reef terrace, approximately 8 m above the silted lagoon, overlooking the entrance to the bay to the south and west. The silted lagoon extends some 700 m inland to the west, is approximately 2 km long (north to south), and is linked to the back of the bay by a silted channel. Two wadi systems drain into the western reaches of the lagoon. This is the region of the Roman harbour, in the lee of the western base of the ancient coral reef, on the eastern edge of the now silted lagoon (Fig. 4.1).

Excavations conducted to the west of the site were to reveal part of a late 1st century BC to early 3rd century AD Roman waterfront (Peacock and Blue 2006, 65–94). The development of the harbour extended from the edge of a narrow strip of the Late Pleistocene coral bedrock that supported the main area of the upper town and levelled out after sloping steeply down from the main site and extended westwards towards the water's edge. Initial development of the harbour involved reclamation of the mangrove swamp, presumably in order to extend the working area of the harbour-front. This was undertaken by placing amphorae along the water's edge and packing them into the shallow inter-tidal mud. This feature took a different form depending on its location within the harbour.

In main wharf area (Trench 7A; Fig. 4.2) the amphorae were generally placed upright in single rows and together with a series of stone walls, acted to reinforce the natural topography or bedrock that extended out into the lagoon. The amphorae were packed with earth, broken amphora sherds and stones, and were sealed by a trampled earth surface. The structure formed an artificial extension to the foreshore that facilitated and extended access across the waterlogged sediments at the margins of the lagoon in the form of land-reclamation or a 'hard'.

This 'hard' extended further out into the lagoon perpendicular to the shore in a northerly curving jetty or mole, again with an amphora base and covered with a packed-earth surface. The central section of the jetty was formed of amphorae laid on their sides extending out parallel to the shore in two rows. They were supported on

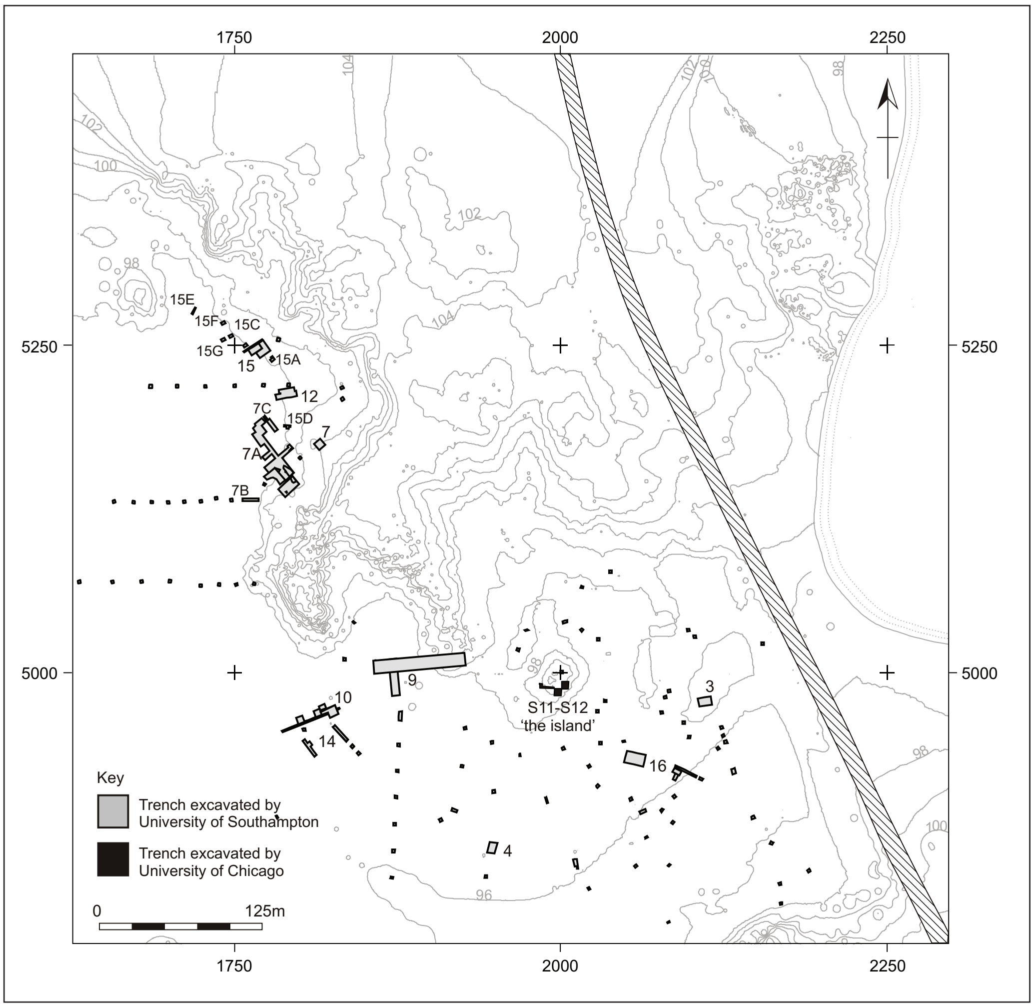
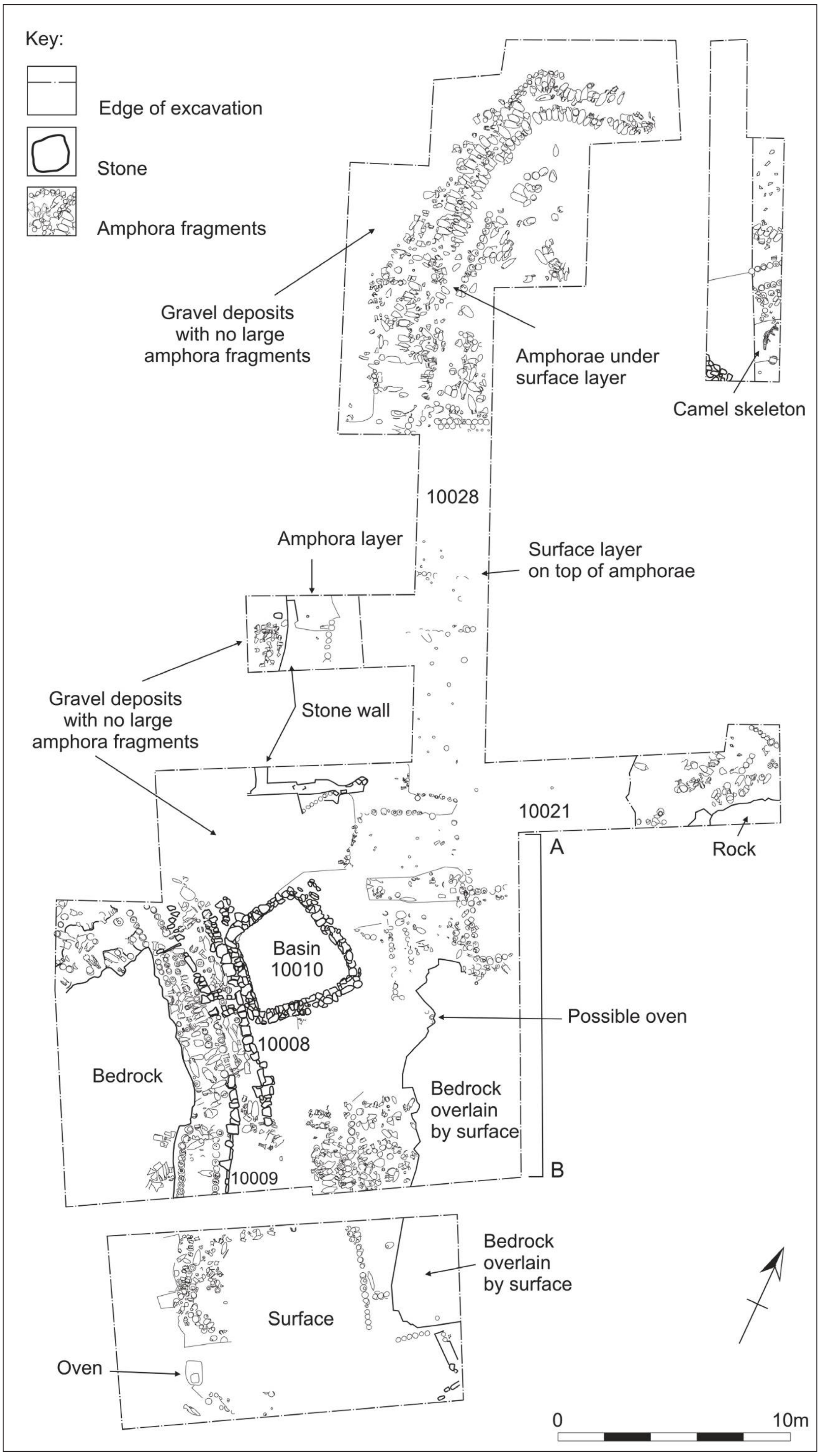


Figure 4.1. Location of harbour and Roman waterfront, Myos Hormos (Trenches 7, 12 & 15).

Figure 4.2a. Trench 7A, Roman Myos Hormos, looking south.

Figure 4.2b. Plan of Trench 7A, Roman Myos Hormos



both sides by two rows of amphorae located in upright positions that contained them on either side. The amphorae in this rudimentary jetty construction in contrast to those closer to the shore, were generally hollow. The top of the amphora jetty is embedded in clay and covered by the packed-earth surface and is believed to have facilitated access from ship to shore. The amphorae within it date the feature to the late 1st BC to early 1st century AD, although activity in the area may have continued into the early 2nd century AD. The amphora represented in this construction predominantly consisted of Dressel 2-4, Nile silt types and some Dressel 6, thus representing a range of local and imported types to Egypt (Peacock and Blue 2006, 73).

A further harbour-like feature was noted to the north of the 'jetty' (Trench 15; Thomas 2006, 87–94), that took the form of a stone sea-defence wall. This was subsequently replaced by a second surface constructed of a line of amphorae laid in front of the former sea-wall, apparently to consolidate the earlier surface that had been damaged by inundation. Subsequent rebuilding and consolidation was noted through to the early 2nd century AD (Thomas 2006, 87–94).

A similar arrangement was noted in surrounding satellite trenches, although no associated wall was identified. Like the 'jetty' to the south, these features date to the late 1st century BC and early 1st century AD. Between this area and the 'jetty' to the south, a similar feature was uncovered (Trench 12; Blue 2006, 81–4). A line of amphorae, acting more as a retaining wall or gabion, was sealed by an earth surface and backed inland by a stone wall. Although this feature is similar in form to the others identified, its date is more ambiguous, possibly relating to a mid-to-late 1st century AD period. Despite this apparent discontinuity in the dating of these features, it does appear that they equate to a continuous waterfront feature backed by an area where a series of workshops and industrial units have been identified undertaking various activities including boat repairs and the unloading of vessels. By the beginning of the 3rd century AD the harbour had been abandoned.

The discovery of this installation in 2002 presented us with a challenge: what had inspired this seemingly unique construction? Why had its builders determined to use amphorae as the essential building component and not stone masonry or even wood, the primary materials used in the construction of Roman harbour installations in the Mediterranean region (Blackman 1982a & b)? Was the context, a seemingly remote, work-a-day harbour on the Red Sea coast of Egypt, one of the reasons for this rudimentary construction choice? Was the environment the critical factor, or were amphorae simply the most readily available building material and found in abundance? These were some of the many questions that we confronted, which were only answerable by comparison with other similar finds.

4.3 Other Examples of Waterfront Amphora Installations

Subsequent enquiries indicated that the waterfront installations at Myos Hormos are not unique. In fact over 100 installations constructed with the use of amphorae have been discovered (not all in a maritime context) (Pesavento Mattioli 1998; Peña 2007; Bernal *et al.* 2005). Of those amphorae that have been identified reused in waterfront installations, a huge variety of vessel types and capacity have been noted. They were arranged in numerous different positions and contexts (some placed deliberately, some randomly; some filled, some empty, some broken, larger numbers almost intact or just missing necks and shoulders) thus indicating a range of constructional approaches. They are invariably found associated with public structures and were frequently linked to improvements or reinforcement of the coastal interface, in conjunction with drainage-related features, or in lagoonal or riverine environments. They performed a number of different roles which ranged from facilitating the movement of goods from ship to shore, to the stabilization and drainage of the waterfront.

The majority of waterfront installations of this nature identified in the literature to date were discovered in northern Italy particularly the Po Valley, Venice Lagoon and Rhone River Middle and Lower Valley region (Pesavento Mattioli 1998; Peňa 2007; Fig. 4.3). The Italian examples are referred to as *"banchi d'anfore"* (Tirelli and Toniolo 1998, 87-100). Selected examples will be discussed below to illustrate the range of structure types and application and the specific period of time within which these structures were built.

Cadiz: Los Cargaderos, San Fernando
(Bernal *et al.* 2005)
Within the island archipelago of Cadiz, a critical port of Roman trade on the Atlantic coast of Spain, a series of maritime installations and wharfage areas that supported the infrastructure and specifically the main harbour of Cadiz, have been identified. One such example, Los Cargaderos, was located in a marshy lagoonal area within the archipelago at the mouth of the River "Caño de Sancti Petri" (Bernal *et al*. 2005; Fig. 4.4). The site was discovered during rescue excavations associated with an area of *c*. 20 m^2 of what was formerly one of the many islands in the Cadiz Archipelago, the Isla de San Fernando. The island that not only provided wharf structures for the distribution of amphorae from nearby kiln sites, also supported associated industrial activities, is now due to a process of subsequent coastal progradation, some 300 m from the shoreline.

Excavation was conducted over an area of 20 m^2 and focused on two trenches of 5 x 2 m where a series of sections of amphorae wharfs were revealed (Fig. 4.5). The wharf structure was supported by a series of wooden pegs that were positioned either side of each of the rows of amphorae, separating the lines of amphorae. The wooden

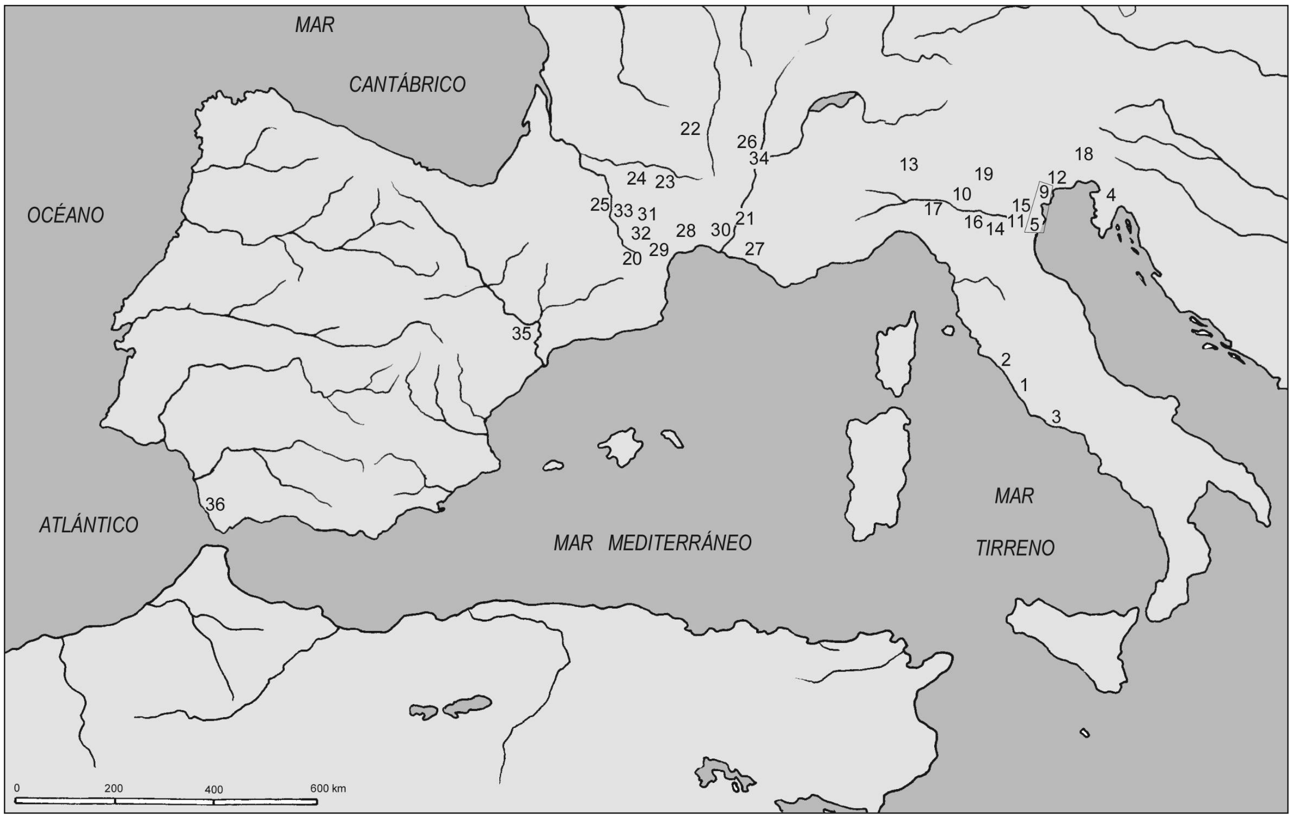


Figure 4.3. Location of amphora installations across the Mediterranean (Bernal et al. *2005, fig. 7) (with thanks to D. Bernal).*

pegs were not always well preserved, but those that have survived were radiocarbon dated to Cal BC 110 to AD 130 (Cal BP 2060 to 1820) – 130 AD (95% probability) (Bernal *et al*. 2005, 222). The amphorae were arranged in five lines, two levels deep, they interlocked head to toe, and their direction alternated alignment between each row both horizontally and vertically. A pavement or floor of pebbles and small stones packed with silt and sand, covered the amphorae. The top layer of the amphorae was more fragmentary. The full extent and width of the structures is not clear as excavation was limited due to its rescue nature. Many pottery fragments were identified in the fill which helped date this structure, as well as provide more detail as to the nature of its construction. Despite the fact that comprehensive excavation was not feasible, the fragments that were uncovered indicate the former arrangement of the structure. Some amphorae were deliberately pierced with holes and laid purposefully to act in a drainage capacity. Most amphorae recovered were deposited empty. The majority of the amphorae were largely *garum* amphorae manufactured in the Cadiz area e.g. Dressel 7/11, Beltrán II A & B, Dressel 20, Dressel 14, Dressel 2/4 (Bernal *et al*. 2005, 204). The majority of comparative examples found in Italy and France that performed a similar drainage function, were also constructed of amphorae placed horizontally (Pesavento Mattioli 1998; Peña 2007).

Thus, this site has revealed a Roman wharf similar in structure and date to the installation discovered at Myos Hormos, it was constructed primarily of reused amphorae, and goods were transferred from this wharf between big

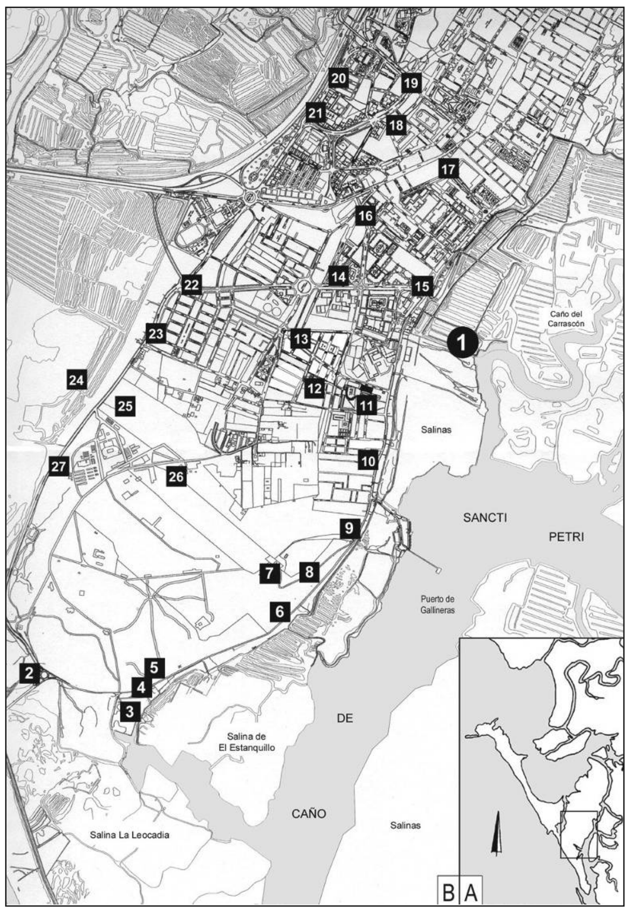


Figure 4.4. Location of site Los Cargaderos (1), San Fernando, Cadiz, Spain (Bernal et al. *2005, fig. 1) (with thanks to D. Bernal).*

freighters and small barges or *scaphae* (Bernal *et al*. 2005, 217). In addition, the wharf acted as the retaining wall of the river bank, helped regulated the river course, and served to facilitate drainage and consolidation of the surface area.

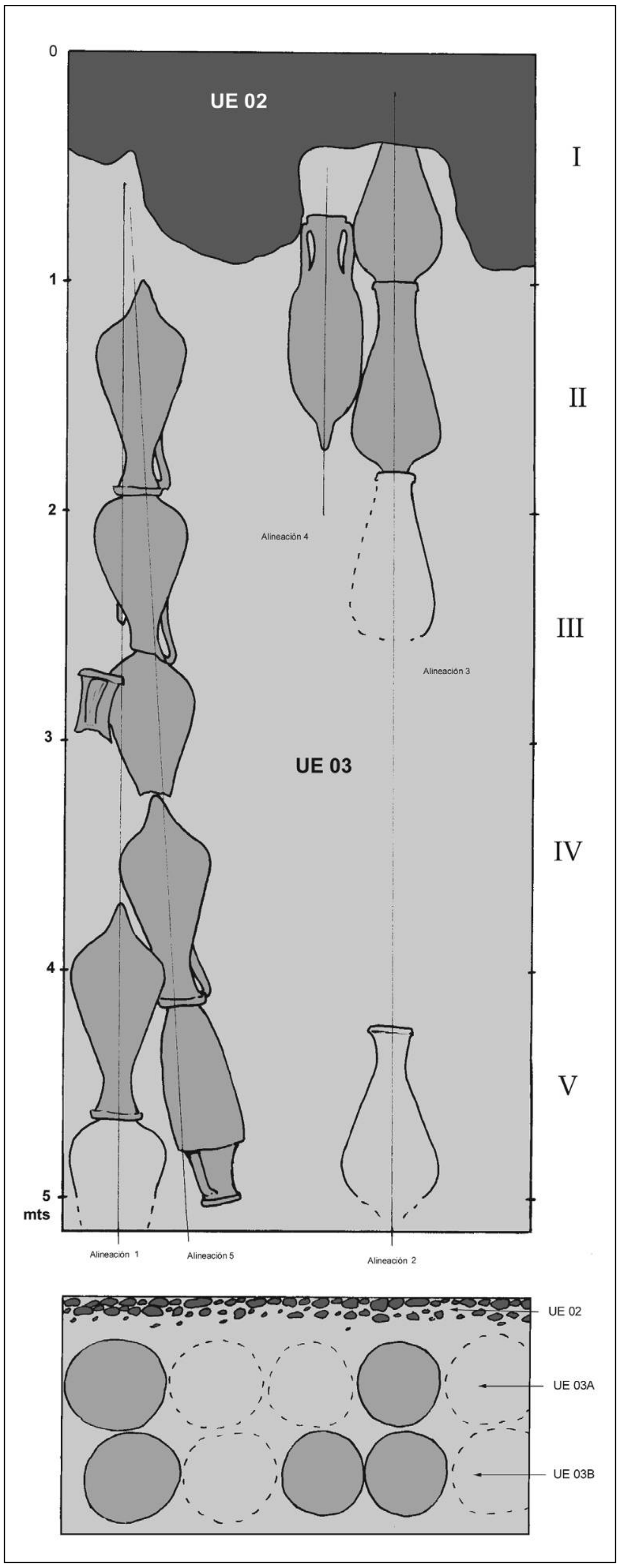


Figure 4.5. Plan of amphora wharf, Los Cargaderos, San Fernando, Cadiz, Spain Bernal et al. *2005, fig. 6 (with thanks to D. Bernal).*

Venice Lagoon

(Fozzatti and Toniolo 1998)

Research conducted in the region of the Venice Lagoon has highlighted an important series of submerged and semi-submerged Roman structures. Twenty-nine cases of dike streets and port structures were noted, all of which are closely related to canals or the shores of the lagoon (Fozzati and Toniolo 1998, 197-208). A variety of types of structures and uses were noted. They all contained a variety of ceramics, the majority constructed of amphorae contained within wooden structures or shuttering. Some were composed of complete amphorae, others were less complete, some almost fragmentary in nature. They appear to have performed a variety of functions including acting as a revetment or reinforcement to the river bank, drainage and reinforcement of the canal system, as well as functioning as wharf structures.

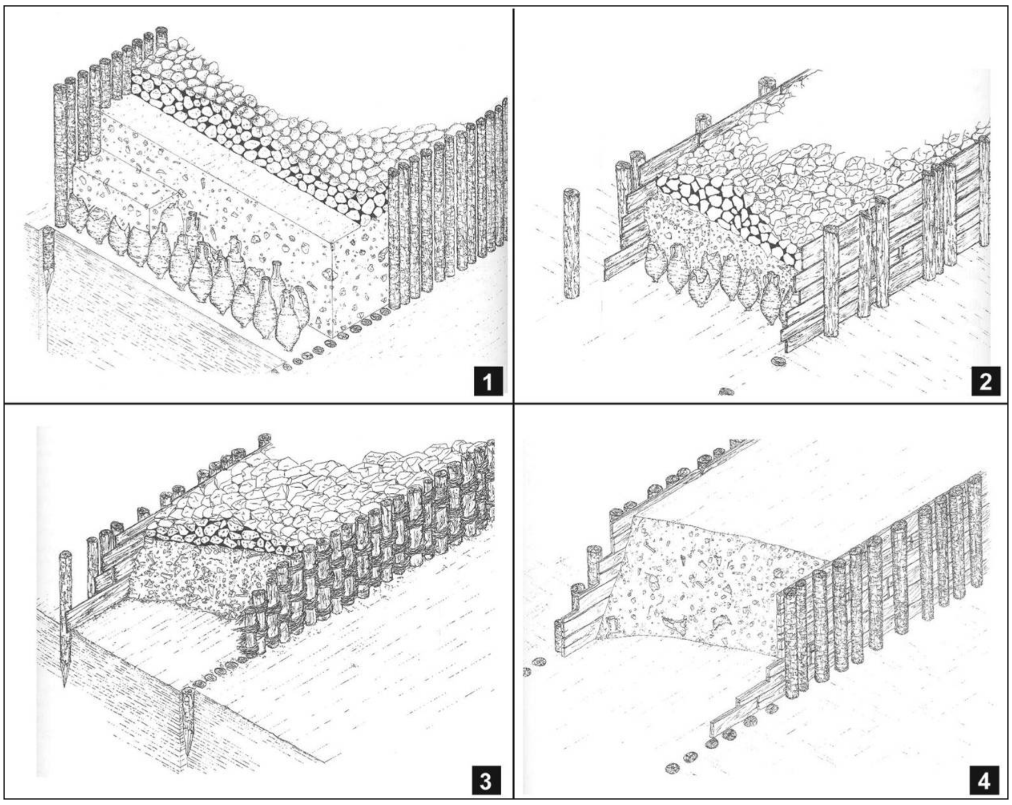
Four examples are described in the publication by Fozzatti and Toniolo (1998, 201-206), all of which are located in the northern part of Venice Lagoon connected to the shore. They are discussed here due to their maritime context, their close proximity to each other, and the variety of approach that was adopted in their construction: Canale dell'Arco, Canale S. Felice, Canale Catene and Canale delle Vignole (Fig. 4.6).

1. Canale dell'Arco (25 x 6 m; height of 4 m) – This feature is contained by wooden posts. The base of the structure is supported by a line of vertically placed amphorae, packed with fragments of pottery and sand. Above was a layer of packed small stones and silt. This layer was topped with small pebbles which formed the base of the 'street'. The majority of amphorae associated with this structure are Dressel 6A amphorae. The structure is located on the right bank of the current channel and was predominantly used for commercial transactions, loading and unloading. It has parallels with the example from Cadiz (Bernal *et al.* 2005, 199).

2. Canale S. Felice (12 x 4 m; 6-8 m deep) - This example is not well preserved because of subsequent damage due to dredging. Widely spaced wooden posts (three parallel lines of wooden posts placed vertically at a distance 0.7 m apart) were discovered supported by internal planks or shuttering (which partly acted as cross members). They served to box in the structure. Complete amphorae were identified at the base of this structure, and like the Canale dell'Arco, this structure was also packed with sand and ceramics. The top of the structure was partly covered with large stone blocks. Dressel 6A amphorae constituted the main make up of this structure i.e. late BC to early AD. Dressel 7/11 typical of 1st century AD northern Italy were also present. A few later fragments of 2nd - 3rd century AD date have been interpreted as indicative of reuse and repair of the structure (Fozzati and Toniolo 1998, 203).

3. Canale Catene – This structure is 20 m long and is now

Figure 4.6. Construction techniques of all four structures: Canale dell'Arco (1), Canale S. Felice (2), Canale Catene (3) and Canale delle Vignole (4), Venice Lagoon (from Fozzatti and Toniolo 1998).



2 m below sea-level. Some 125 wooden (pine) poles that essentially contained this structure were placed vertically in two parallel lines. The poles were supported by horizontal wooden planks on the inside and a weave of branches reinforced the outside. The upper section indicates that it was once exposed and has since been eroded, thus obscuring the original height. Contained within this structure were fragmentary pieces of amphorae that were packed with clay. In contrast to previous examples, no complete amphorae were identified, although the date of this structure does compare favourably to the other structures (Fozzati and Toniolo 1998, 203-204).

4. Canale delle Vignole (6 m in length and c. 2.2 – 3 m wide along its extant length) – The final structure consists of two component parts - one is connected to the shore of the canal and then returns perpendicular to the shore into the canal. This comprises a wooden skeleton, with vertical wooden poles and horizontal planks and contains a fill of amphorae and bricks fragments and pebbles, and is only distinguished from the other features by its irregular shape.

In summary, the structures identified in the northern reaches of the Venice Lagoon have the following features in common:

- Canale dell'Arco, Canale S. Felice and Canale Catene are covered by a paving of pebbles.
- Canale dell'Arco and Canale S. Felice contain compact fairly intact amphorae.
- All four structures are elevated tracks for the transit and traffic of goods in a waterfront location, facilitating at the same time a link with terrestrial routes.
- All four structures offer some degree of reinforcement and consolidation to the associated river banks.
- The main construction period of all four features dates to around the first half of the 1st century AD.
- The majority of the amphorae used in the construction of the features were locally produced.
- All four structures were primarily built to facilitate trade activities in the lagoonal area.

Concordia Sagittaria (Venice)
(Da Villa and Sardini 1998, 113-127)
The site of Concordia Sagittaria is located near the mouths of two large rivers: Piave and Tagliamento, within a small network of water canals, on the west side of the Venetian Plain. As a further example to be discovered in the Venice area, it comprises a wooden jetty and several canals found both inside and outside the city walls. Two examples are particularly relevant to this discussion and are found near *Piazzale* and *Via Fornasatta* (Bernal *et al.* 2005, 198; Da Villa and Sardini 1998, 115-127).

The site of *Via Fornasatta,* located to the southeast of the Roman city, includes the foundations of a large building on the banks of an ancient canal. In one of the trenches, known as *Area 3000,* a concentration of two parallel rows of horizontally placed interlocked amphorae were uncovered (orientation NW-SE) (Da Villa and Sardini 1998, 127). The amphorae were contained by a wooden poled fence and covered by a layer of bricks, pebbles and amphorae fragments that are found beneath the ancient pavement. The majority of the amphorae were Dressel 6B and Dressel 2/4, with one example of Dressel 25 and two similar to Almagro 50, dating the complex to the second half of the 1st and beginning of the 2nd centuries AD.

The structures in *Piazzale* where similar in nature to those uncovered at the nearby site of *via Fornasatta*, which was also located close to the canal. Both sites are found within a geographical depression, mainly occupied by a canal that was once connected to the sea and that has displayed drainage technology along its banks from the Iron Age onwards (Da Villa and Sandrini 1998, 127). Again these examples have parallels with those found at Los Cargaderos, Cadiz (Bernal *et al.* 2005, 198).

Other examples of a similar nature have been found further up the Po Delta. The site of Cremona a fluvial port that acted in support of the port of Ravenna, supported a dock-like structure with amphorae placed horizontally within a wooden framework, comparable to Cadiz. The structure also assisted drainage (Pitcher 1998, 129). A further example of a fluvial dock in the Po Delta was discovered at the site of Oderzo, ancient *Opitergium* (Tirelli, Ferrarini and Cipriano 1998, 135). This features dates to the 1st century AD and is composed of a row of amphorae, only partially interlocked, and wooden fences that helped retained the shores of the canal. Whilst not explicitly maritime, these examples are interesting since despite being inland they were still dependent upon communication with the sea and the maritime trade network that had developed around Venice Lagoon.

4.4 Conclusion

In conclusion, a number of observations can be made with regard to the location, nature, function and date of these features. It would appear that the use of amphorae in association with public waterfront areas became popular in specific locations in the Roman world towards the middle of the 1st BC, reaching a peak of use in the 1st century AD and continuing through to the early 2nd century AD (although there are a few examples from late antiquity) (Peña 2007, 182). The amphorae were deployed for a variety of uses from the reinforcement and consolidation of waterfront areas and mobile shores, to providing the primary component of wharfage areas. When empty the amphorae effectively formed a chamber of air and the application of these fairly robust but light containers, served to spread the load across the structure. Unlike a denser, heavier material such as stone which would have sunk relatively quickly, the amphorae served to reduce the pressure and spread the weight across the invariably soft, silty sands and muds, upon which they were positioned. In a similar way to which amphorae were employed in church roofs for their lightness and strength, they were essentially used in silty environments as they were ideal for the task. Thus, the examples discussed above were all common to lacustrine/lagoonal, rivers, estuaries, sheltered archipelagos or waterfront areas that were prone to silting. They not only appear to have consolidated waterfronts but also allowed for drainage of the area as water passed between the amphorae. Peña (2007, 182-192) believes that a drainage related capacity was in fact their primary function. The specific alignment and arrangement of amphorae varied widely between and within sites, as demonstrated by the examples described from Venice Lagoon (Fozzatti and Toniolo 1998). In some cases complete or almost complete, amphorae were employed, in others only fragments of amphorae were used; some were aligned head to toe, others were placed vertically – thus demonstrating the broad range of applications in which the vessels were specifically employed.

They functioned as the primary mechanism of securing waterfront access, as in the example of Myos Hormos, but they were also deployed in smaller anchorage areas or fluvial docks within a larger port complex, as demonstrated at Cadiz. Thus, their location and context reflects not only a response to the fact that they fulfilled the requirements of their task but also the level of technology and the amount of investment, scale and effort employed in these particular waterfront constructions.

The amphora installations discovered at Myos Hormos thus have a context in a much broader Roman maritime landscape that extended the length of the Empire. Their construction represents a technique that demonstrates a huge variety of approaches and is focused within a relatively narrow period of time. They were essential to the facilitation of the movement of cargo from seagoing to riverine/lacustrine vessels, and as such not only have implications for the study of ports and their hinterlands, but also the technological applications utilised within ports, in turn indicating technological choice and reflecting on the social context of monumental and not so monumental, Roman harbour installations.

Acknowledgements
Thanks are due to Arturo Rey da Silva, Roberta Tomber and Dario Bernal.

5 Celadon and *Qingbai* Sherds: Preliminary Thoughts on the Medieval Ceramics

Rebecca Bridgman

Introduction

A total of 19 fragments of celadon and *qingbai* pottery were recovered during the recent excavations at Quseir al-Qadim. Of these, only seven were diagnostic sherds that could be compared with similar vessels from production contexts in China or Thailand and from consumption contexts in locations as distant as Fustat in Egypt (Scanlon 1970) and Satingpra in Malaysia (Stargardt 2000). Although these imported Asian ceramics represent only a very small percentage of the overall assemblage at Quseir, their presence is important because of the distance they travelled from production to consumption contexts, and because they provide important chronological markers for less well dated artefacts.

Perhaps unsurprisingly, Chinese celadon and *qingbai* sherds are similar in type to those recovered during the excavations by the University of Chicago's team (Carswell 1982; Whitcomb 1979a; Strange Burke 2007, 156-169). In contrast to the Chicago excavations, work by Southampton University also yielded a sherd of Thai celadon, a ware type not recovered during the Chicago excavations. The following discussion interprets these Asian ceramics, where possible, drawing upon most recent archaeological evidence from production contexts in China (Ho 1994) and Thailand (Brown 2000).

5.1 Ceramic Trade

Under Song and Yuan Dynasties an economic boom in China, fuelled by political unrest and the resultant need to raise revenue, led to development of a significant export trade and the movement of considerable quantities of goods (Jacq-Hergoualc'h 2002, 392-4). Ceramics were an important export commodity for China during the medieval period, with their production and distribution particularly encouraged by the Song Dynasty in order to limit the export of more precious metals (Guy 1990, 15). To meet demand, kilns at production centres numbered in the hundreds at any one location, resulting in contemporary reports of thick smoke in the sky and fires visible at night (Kamei 1994, 46). In textual sources, Chinese porcelain production at these kilns is categorised into four main types, defined largely by colour and occasionally by texture, incorporating white wares (with a soft paste), green wares (celadons), blueish white wares (*qingbai*) and miscellaneous types including stoneware jars (Guy 1990, 19-20).

In recent decades, archaeological research has contributed to our understanding of the production and distribution of these wares. Kiln sites in China have now been investigated and published, providing a clear chronology for celadons, in particular those from the site of *Longquan* (Kamei 1994). The extent of the trade networks through which these ceramics were distributed are well attested and stretched from the southern shores of China (Tampoe 1989, 97-116). Archaeological evidence from sites such as Fustat (Scanlon 1970) has long provided physical evidence of the existence of these networks. Furthermore, recent discoveries of Chinese ceramics at locations, including Satingpra on the Malay Peninsula (Stargardt 2000) and Sharma on the Red Sea (Bing 2004), have facilitated a development in our understanding of those medieval economies.

Six diagnostic sherds of Chinese porcelain were discovered during Southampton University's excavations at Quseir. Of these five were identified as *Longquan* wares and one was identified as a *qingbai* ware. In the following sections the dating of these sherds will be discussed in the light of recently published typologies.

***Longquan* wares**

Production of *Longquan* wares began, either at the end of the 10th century (Ren 1994, 30), or mid 11th century AD continuing into the first half of the 14th century AD, during which time there was considerable variation in form, fabrics and decoration (Kamei 1994, 52, 66).

Of the five sherds of *Longquan* ceramics from recent excavations at Quseir, four display a grey fabric and one displays a much lighter off white fabric. The grey fabric sherds include two from the body of a vessel with carved or incised decoration on the interior only (for example see Figure 5.1, No. 4) and two rim fragments, one beaded or rolled (Figure 5.1, No. 5) and one slightly everted with incised decoration on the interior (Figure 5.1, No. 6).

Based on Kamei's (1994) typology of *Longquan* ceramics, it is possible to suggest a 12th century AD date for these body sherds. Given their relatively small size, it is difficult to refine this dating further, although it could be suggested that, as one has combed decoration, it maybe of slightly earlier date within this century. Nevertheless, this would seem to be slightly at odds with Ren's typology (1994, 36-7) in which a late 12th century AD date is suggested for thickly potted vessels with decoration on the interior, as noted on the Quseir body sherds. The everted rim sherd is also problematic to date precisely on typological grounds due to the small size of the sherd. As this rim was recovered from the same stratigraphic context as one of the decorated sherds discussed above, it seems probable that it can be attributed to a phase in Kamei's typology (*ibid*) phase dated to between the end of the 12th century AD and the first quarter of the 13th century AD. Finally, the rim sherd with incised decoration on the interior is similar in shape to Kamei's typology for vessels produced between the mid and end of the 12th century AD (*ibid*). The date for the grey fabric celadons from Quseir would, thus, appear to centre on the mid to end of the 12th century AD. Despite this relatively accurate dating of ceramics, it is important to note that other kiln sites in China copied *Longquan* production. In Fujian province, similar vessels to those from *Longquan*, also with a grey fabric and incised decoration, were produced but these imitations are slightly later in date (Ye 1994, 125).

The final sherd of Chinese porcelain, with an off white fabric, is a rim sherd of 140 mm diameter and lotus petals carved on the exterior, which is a classic decorative feature of *Longquan* production (Vainker 1991, 109). This type of bowl is amongst the most numerous of the Chinese ceramics, dating to the late Song period, from the entrepôt site of Satingpra on the Malay Peninsula (Stargardt 2000, 348-349). In addition at Old Hormuz, a site occupied between the mid 13th and mid 14th century AD, this bowl type was prevalent amongst the assemblage (Morgan 1991, 78). Kamei (1994, 61) dates this sharply defined lotus petal decoration on a bowl with a straight rim, like that from Quseir, to between the second quarter and the end of the 13th century AD. A sherd with very similar decoration, recovered during excavations by the Chicago team, was assigned an earlier date, to the Northern Song (AD 960-1127) by Carswell (1982, 194). However, more recent publications indicate that this style of lotus petal decoration on *Longquan* ceramics copied that of earlier Northern Song wares (Vainker 1991, 109) and, thus, can be assigned a later date.

Qingbai **Wares**

These are white porcelains with a bluish glaze which were produced predominantly at the Jingdezhen kilns, in Jiangxi province, under Song and Yuan Dynasties (Scott 2002, 6). Although these wares are not strictly speaking celadons (Niklès 2002, 239), they are frequently grouped with *Longquan* ceramics with which they are broadly contemporary. The sherd recovered during recent excavations at Quseir is a fragment of a low foot ring with incised decoration on the interior. This sherd displays a number of characteristics of Jingdezhen. Most notably, the Quseir sherd has 'burn marks' on the unglazed underside of the footring, which results from the re-oxidisation of a natural iron impurity in the clay (Pierson 2002, 16).

In terms of date, the reddish circle left on the underside of this base would seem to indicate that, like the *qingbai* products of Northern and Southern Song Dynasties (*ibid*, 16), the vessel from Quseir was fired upright on clay pads or rings. The low shape of the foot ring can help further refine this chronology because this form is associated with Southern, rather than Northern Song Dynasties (*ibid*, 20), thus indicating a 12th or 13th century AD date. The Southern Song was a period when export of *qingbai* flourished reaching destinations including central Islamic lands (Teo 2002). Finally, the incised decoration on the Quseir sherd, in the form of scrolls which are possibly part of a floral motif, has parallels with *qingbai* sherds dated to the Southern Song period (for example see Barnes 2002, 41).

Thai celadon

During the 14th century AD, political change in China resulted in new economic policies which had far reaching effects on the production and distribution of ceramics. In AD 1371, the participation of the newly founded Ming Dynasty in overseas trade became increasingly limited and the use of certain goods imported into China was banned (Guy 1990, 30-32). Although Chinese ceramics were still exchanged, through tributary trade or emissary gifts, they are found in much smaller quantities on sites in South-East Asia indicating the restrictions of Ming economic policies (*ibid*, 45). As a result, other production centres in South-East Asia became active, possibly due to Chinese merchants, or even potters, moving location to maintain their livelihoods (Brown 2000, 59, 65). At this time, potteries in Thailand, particularly those centred on the kingdom of Sukothai, changed supply focus from a purely domestic to an international market (*ibid*).

Between AD 1220 and 1250, the Thai kingdom centred on Sukhothai was founded and by the end of the 13th century AD had become sufficiently powerful to send diplomatic missions to the Mongol court in China (*ibid*). However, by AD 1378 a new power in the region centred on Ayudhya was emerging as an important power in the Menam Chaophraya Basin, and began to impose a degree of control over the kingdom of Sukhothai (Guy 1990, 59). Ayudhya was an international entrepôt and it was from this centre that pottery, which continued to be produced at hundreds of kilns in the kingdom of Sukhothai, was distributed (*ibid*, 60). Examples of pottery produced at the Swankhalok, located in the kingdom of Sukhothai, 60 km to the north of the capital, have been found at locations including New Hormuz (Morgan 1991, 78-

80) and Fustat, although the principal market for Thai ceramics was South-East Asia (Guy 1990, 62-66). Furthermore, excavated shipwrecks, whose finds include Thai ceramics of possible Sukhothai origin, bear further witness to this same ceramic trade (Atkinson *et al*. 1989, 305-306).

Recent investigation of kilns at both Swankhalok and Sukhothai have greatly increased our understanding of their products (Brown 2000, 60-77). These kilns produced a range of wares of which one of the most recognisable are the underglaze iron decorated examples (*ibid*, 67). The sherd identified as a Thai product from recent excavations at Quseir is an example of this underglaze iron decoration type, most likely from the Sukhothai kilns which operated between the mid 14th and 16th centuries (*ibid*, 66-70). Furthermore, the scroll painted immediately below the rim of this vessel is identical to decorative motifs on products of the kilns of Sukhothai and to an example of an intact vessel dated to the second half of the 14th century AD (*ibid*, 66-70, Plate XXIXc).

5.2 Discussion

The context which led to the production and trade of these South-East Asian ceramics are of undoubted importance to the interpretation of the medieval port of Quseir. However, by noting their presence it is only possible to re-assert the involvement of the site and the wider Red Sea as a whole, in a trading network that was focused on the Indian Ocean but reached as far as Asia (for further information on that trade see Fischel 1958). In order to interpret fully the South-East Asian ceramics from Quseir, it is necessary to examine their quantity, rather than simply their presence. Despite the obvious importance of this pottery, it must be emphasised that here they represent only a very small percentage of the overall assemblage. Only 19 sherds of celadon and *qingbai* ceramics, were identified by the Southampton team. This small number of sherds recovered over the length of Southampton's five seasons of fieldwork at the site can be contextualised when compared to the 9043 fragments of medieval pottery quantified by the end of the second season's work alone in 2000. This same paucity of South-East Asian ceramics was noted in recent analyses of the material excavated by the team from Chicago University (Strange Burke 2007, 157-158). In order to consider fully these ceramics from Quseir, it is necessary to compare the few sherds found there with the much larger quantities identified at a variety of other sites in the same region. For example, up to investigations in 2002 at Sharma, more than 1,050 sherds of Chinese pottery had been identified (Bing 2004, 255). At Old Hormuz, *Longquan* lotus petal vessels similar to those from Quseir, comprise 59% of the ceramic assemblage (Morgan 1991, 78). Using only surface collection, the Japanese team working at ʿAydhab identified 63 Chinese sherds of varying date (Peacock and Peacock 2008, 37). Finally, at Fustat, an undoubted consumer of Chinese wares over several centuries, a total of 600,000 to 700,000 sherds have been noted (Mikami 1980, 70).

The relative lack of celadons and *qingbai* sherds at Quseir would seem to indicate that there was very little consumption, or possibly even transhipment, of these vessels types at this site. Even if the port was used as a transhipment point for such goods, then surely there would be more fragments present from broken vessels lost in this process. What seems more likely is that the trade in South-East Asian ceramics largely by-passed Quseir. It is interesting to speculate why Quseir appears to have, so rarely, been the recipient of such ceramics at a time when other sites in the region were actively involved in trading these items. Perhaps the relative paucity of such a commodity, apparently fairly easily obtainable through Indian Ocean trading mechanisms, may highlight the limited scale of Quseir's involvement in economic systems beyond the Red Sea region. This hypothesis is interesting as it would seem to concur with evidence from the site's excavated texts, which Guo (2004, 43) has recently suggested may indicate Quseir's limited involvement in the spice trade. Although it would be wrong to deny any involvement in the Indian Ocean trade, as this is clearly witnessed by evidence including other categories of ceramics (Strange Burke 2007, 151-156); it may be that Quseir was more focused on the Red Sea region. In this way, Quseir may have differed from nearby sites including Sharma and ʿAydhab.

5.3 Conclusions

Excavations by Southampton University at Quseir have yielded a small but important corpus of South-East Asian ceramics dating to between the mid-to-late 12th and late 14th centuries AD, with the focus of activity towards the beginning of that period. By considering not only the presence but also the quantity of these vessels within a regional context, it is possible to re-consider the role Quseir may have played in trading networks of the Red Sea and beyond. Further analyses of both ceramics and other artefact categories, undoubtedly has the potential to develop our understanding not only of the site but also the wider region.

Acknowledgements
I am most grateful to Prof. David Peacock and Dr Roberta Tomber, who provided invaluable guidance in the study of the Islamic ceramics excavated at Quseir during excavations by the University of Southampton. In addition, I would like to acknowledge the important work of Prof. Donald Whitcomb and, more recently Dr Katherine Strange Burke, who have both analysed material recovered by Chicago University. Finally, thanks to the Barakat Trust who provided a grant which, in part, helped fund the work presented here.

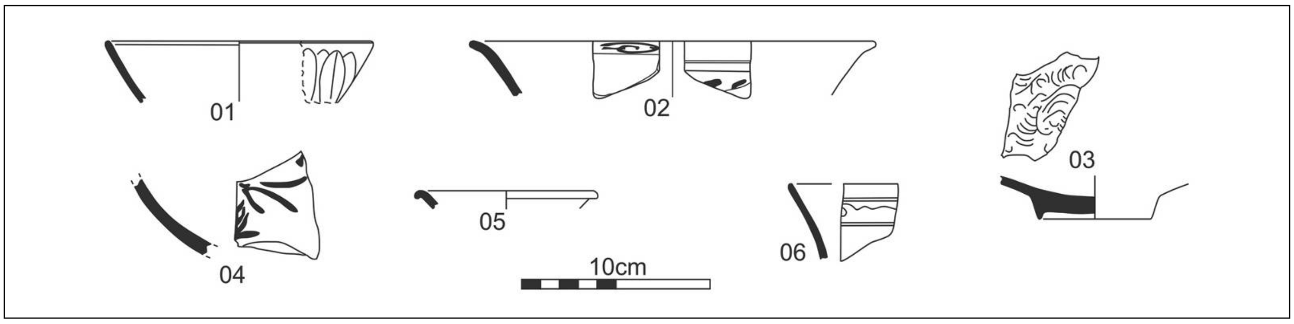


Figure 5.1. Asian ceramics included in the catalogue.

Catalogue

Methodology

All sherds were examined in the field with at 20x magnification with a hand lens. Note that a Munsell chart was used to describe colours, except in the case of most of the Asian sherds where their unusual colour made this methodology problematic.

1) Tr. 5 (3026) PRN 14 (*longquan* celadon)

Form: plain rim of a bowl

Fabric: off white clay, highly fired, hard with no inclusions visible at this magnification

Surface: exterior body has moulded decoration in the form of lotus petals. A blueish grey glaze covers the surface except for a small band on the rim (cf. Morgan 1991, 73, figure 7, catalogue number 26; Kamei 1994, 74, figure 9, catalogue number 14).

Date: mid-to-late 13th century

2) Tr. 3 (2028) PRN 356 (Thai celadon)

Form: slightly everted, plain rim of a bowl

Fabric: grey, highly fired, hard with no inclusions visible at this magnification

Surface: cream slip with dark brown, iron rich, under glaze paint forming a scroll on the interior rim and horizontal lines on exterior; clear glaze, crazed in places (cf. Brown 2000, 68 (classic scroll motif), plate XXIXc).

Date: Second half of 14th century

3) Tr. 2E (6002) PRN 262 (*qingbai)*

Form: low foot ring, part of a bowl

Fabric: blueish white fabric, highly fired, hard with no individual inclusions visible at this magnification.

Surface: interior surface incised with scrolling lines under a light blue glaze with glass like appearance. On the exterior the glaze continues to the underside of the foot ring; a small circular area on the underside of the foot ring is unglazed with black and brown burn marks around the area where the glaze ends (cf. Bing 2004, 276, figure 4.1).

Date: mid-12th century

4) Tr. 2B (2044) PRN 242 (*longquan* celadon)

Form: body sherd

Fabric: grey, highly fired, hard fabric with very common small sub-rounded quartz inclusions (measuring <0.25 mm) barely visible at this magnification.

Surface: carved vegetal decoration on interior surface, sherd is covered with a slightly pitted and crazed olive green glaze (cf. Kamei 1994, 71, figure 5, catalogue numbers 25, 28).

Date: Second half of 12th century.

5) Tr. 2B (2044), No PRN (*longquan* celadon rim)

Form: everted bead rim

Fabric: grey, highly fired, hard fabric with at least common quantities of sub-rounded quartz inclusions, which measure <0.25 mm

Surface: thick olive green glaze, measuring up to 1 mm (cf. Kamei 1994, 73, figure 7, catalogue number 5).

Date: first quarter of 13th century

6) Tr. 2B (1523), no PRN, (*longquan* celadon rim)

Form: slightly everted plain rim

Fabric: grey, hard, highly fired with no inclusions visible at this magnification

Surface: on the interior rim an incised wavey line is enclosed above and below by concentric lines with olive green glaze over entire surface. One small impurity is present on the surface, possibly a kiln scar (cf. Kamei 1994, 71, figure 5, catalogue number 25).

*Date***:** Second half of 12th century

6 Ceramic Lamps

David Peacock

Introduction

Two hundred and five lamps were recovered in the course of the excavations. Of these 16 (8%) came from reasonably secure Islamic contexts, although four are clearly residual, and the remainder were from Roman contexts or are of distinctive Roman types. Eighty-nine (47%) came from the Roman *sebakh* excavations. None of the Islamic lamps was complete, but 47 (25%) of the Roman ones were. There is clearly some bias in the numbers as fewer Islamic *sebakhs* were excavated, but nevertheless it seems that lamps were much less used during the Islamic period. Presumably the need for lighting would have been met by the use of torches, or tapers.

In this chapter we discuss 80 lamps. The remainder are small fragments which add little as they repeat better preserved examples, or in some cases they are complete but the surface and consequently the decoration has been eroded away.

6.1 Ptolemaic and early Roman Lamps

These lamps comprise the bulk of the finds. They were classified by form then subdivided by decoration in the following manner:

Type I: Plain undecorated lamps without handle and spout. They look and feel like a potato and hence the colloquial term potato lamp is retained.
Type II: Spouted lamps with decoration on the upper surface and sometimes a basal ring. The decoration is variable but two end members can be distinguished. Type IIA frog motif or stylised decoration derived from it. Type IIB corn decoration.
Type III: Pear shaped lamps, where the spout is contiguous with the body. Generally two types of decoration Type IIIA radial lines on upper surface; Type IIIB nodular lumps on upper surface. Both may have a nodular protrusion which served as a handle.
Type IV: Black gloss lamps
Type V: Discus lamps with distinct discus. Type VA 'Firmalampen' from Italy; Type VB other more local products.
In addition there is a number of anomalous lamps which do not fit this classification or which cut across it. These are discussed separately.

The earliest deposits, principally those of Trench 7A, produced a range of lamp types which may date to the Ptolemaic era or to the immediately subsequent early Roman period (Augustan to early 1st century AD).

Type IV Black gloss lamps (Fig. 6.1)
Black gloss pottery has a long life in the Mediterranean where it was characteristic of the Hellensistic and Republican periods. Little seems to have persisted into the Imperial period. The best wares, in a fine pinkish buff fabric with a high quality gloss slip, were made in the east (e.g. Athens) or in Campania, but it was widely imitated and coarser versions are common. At Myos Hormos, only one lamp seems to be of an imported fabric, but even that is a little coarser than the best Greek or Campanian wares. The other two are coarse imitations presumably of Egyptian origin.
1. Body sherd in a fine slightly sandy pinkish buff fabric. Black gloss on outer surface. This is an import perhaps from Athens [CL 98 from Tr. 7A (10012)].
2. Near complete lamp in fine grey fabric with a dull black gloss or colour coat on outer surface. Discus plain, but tri-leaf decoration in relief on rim. Long spout and strap handle both broken off. Plain base without foot-ring. 89 x 60 x 28 mm [CL1 25 from Tr. 7A (10029)].
3. Near complete lamp in similar fabric and finish to No. 2. Broken strap handle, no spout. Discus plain but has three supplementary small holes in addition to filler (differentiating it from No. 2). Rim decorated with floral pattern in relief. Base without foot-ring. 70 x 62 x 34 mm [CL 121 from Tr. 7A (10025)].
4. Discus and rim of similar lamp in the same fabric. The discus has raised rim and blurred floral or *ovalo* relief decoration around it on the rim. 61 x 52 mm [CL 119 from Tr. 7A (10037)].

Type IIA Early frog lamps (Fig. 6.1)
The frog was commonly used to decorate Egyptian lamps and was almost exclusively an Egyptian motif perhaps because it was associated with birth and fertility. Only rarely was the complete frog depicted and it was often represented by a stylised body perhaps representing the warty skin or perhaps combining the frog with another motif such as

Figure 6.1. Black gloss lamps (1-4), Early frog lamps (5-7).

corn or palm branches. Sometimes this dominated the decoration to the exclusion of parts of the frog's anatomy. The lamps from Trench 7A have no handle and a prominent splayed spout, but in some cases the frog motif has already disintegrated. They seem to date from the Ptolemaic and Early Roman period and confirm Shier's (1978) suggested chronology for this type. They are comparatively scarce when compared with later occurrences.

5. Complete lamp in typical red-brown Nile clay with no handle and a protruding splayed spout. Frog motif highly stylised and legs barely visible. Vestigial incised ring on base. 74 x 57 x 30 mm (c.f. Knowles 2006, no. 16, undated) [CL 124 from Tr. 7A (10037)].

6. Complete frog lamp very similar to No. 1, but with more distinct decoration and even longer splayed spout. No handle. Incised ring on base. 104 x 85 x 35 mm (c.f. Knowles 2006, no. 7, undated) [CL 108 from Tr. 7A (10026/7)].

7. Base of similar lamp 43 mm diameter. Upper part missing. Distinct ring on base [CL115 from Tr. 7A (10016)].

Type VA and Imported lamps (Fig. 6.2)

Type VA equate with what Loeschcke (1919) called Firmalampen (factory lamps). These were produced in quantity in the main centres of the Mediterranean, particularly Italy and widely traded. They are characterised by a fine pale fabric usually covered with a red or red-brown slip. They are usually finely made and often have a decorated discus.

8. Lamp in fine pale buff clay with traces of a maroon slip. Concentric ridges on rim and signs of indistinct figures on discus [CL 113 from Tr. 7A (10036)].

9. Fragment of rim and spout in fine pinkish buff clay with

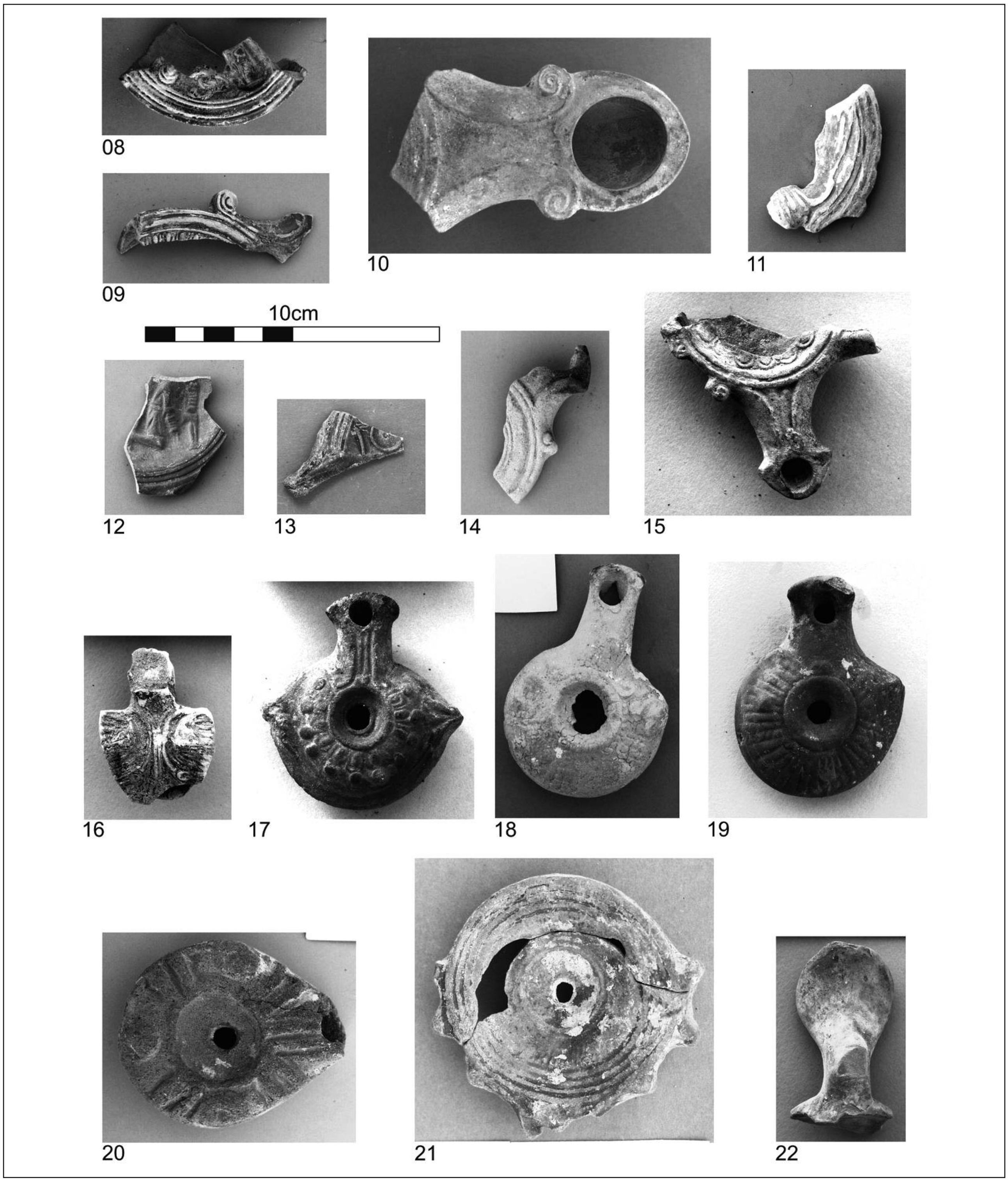


Figure 6.2. Type VA & imported lamps (9-16), Miscellaneous early lamps (17-22).

dark red slip. Concentric ridges on rim and voluted spout. Ovalo design on discus [CL 133 from Tr. 7A (10021)].

10. Spout and part of rim of very large lamp in fine red-brown clay with traces of redder slip. Rim has concentric ridges and spout ornamented with volutes [CL 100 from Tr. 7A (10026)].

11. Rim of lamp in fine pale buff clay with reddish slip [CL 178 from Tr. 7A (10062)].

12. Fragment of discus of lamp in slightly sandy red brown clay with darker slip. Concentric ridges on rim and kneeling figure on discus (probably a gladiatorial scene as Bailey 1980, Q761, late 1st BC to early 2nd century AD) [CL 175 from Tr. 7A (surface)].

13. Fragment of spout, rim and discus in fine pinkish clay with darker red-brown slip. Grooving on rim, discus pattern unclear [CL 75 from Tr. 7A (10003)].

14. Volute spout in fine pinkish buff clay. Surface eroded with no slip remaining [CL 148 from Tr. 7A (10014)].

15. Fragment of a multi-spout lamp in a slightly sandy pinkish buff clay. Rim with concentric ridges, discus with traces of ovolo pattern [CL 68 from Tr. 7A (10069)].
16. Handle in light buff clay with traces of slip. Perforation underneath. Palmette design [CL 92 from Tr. 7A (10016)].

Miscellaneous early lamps (Fig. 6.2)
17. Lamp with two knob handles at side. Extended splayed spout, dot and ovalo pattern on top. Red brown Egyptian clay with traces of reddish surface wash. 70 x 65 mm [CL 90 from Tr. 7A (10027)].
18. Lamp with single knob handle on side. Extended played spout. Very worn and decoration indistinct, but possibly similar to frog motif. Soft buff clay with traces of red wash or slip on surface. 80 x 54 mm [CL 93 from Tr. 7A (10018)].
19. Lamp with single knob handle on side. Extended splayed spout. Very worn and decoration indistinct, but seems to be radial lines. Form as Type II but with radial decoration. Incised basal ring. Buff Egyptian fabric (c.f. Bailey 1973, Q561EA, late 1st BC – early 1st AD) [CL 99 from Tr. 7A (10011)].
20. Type IIIA lamp with radial decoration and possibly nodules. Coarse sandy red clay with traces of white slip. 74 x 61 x 32 mm (c.f. Knowles no. 85, undated) [CL 112 from Tr. 7A (10029)].
21. Discus of lamp with concentric circles and traces of side handle. Red brown clay with red slip. 81 mm diameter [CL 63 from Tr. 7A (10003)].
22. Handle in light buff fabric. Perhaps a simplified version of No. 68 below [CL 127 from Tr. 7A (10037)].

6.2 Lamps of the 1st and 2nd centuries AD

Forty lamps can be dated with reasonable certainty to the 1st and 2nd centuries AD as they derive largely from the *sebakh* excavations. During this period there seems to be an increase in lamps in the typical Egyptian fabrics. Characteristically the lamps are small, piriform, and usually without a handle or well demarcated spout. Ornament is lacking or simple and blurred. The potato lamp and the corn lamp seem to appear in this period.

Of the 31 lamps, eight are un-diagnostic fragments, three are worn firma lamps, almost certainly residual. The remainder comprises eight frog, five corn, nine potato and 13 discus lamps, all in Egyptian fabrics.

Type IIA: Frog lamps (Fig. 6.3)
23. Small but distinct frog lamp with typical warty decoration and clear hind legs, in brown Nile clay fabric. Prominent spout but no basal ring. 77 x 61 x 31 mm [CL 45 from Tr. 6H (4030)].
24. Top of lamp in buff Nile fabric. Decoration very blurred and indistinct. Prominent spout. 81 x 67 mm [CL 47 from Tr. 6H (4030)].
25. Fragment of top of lamp in red brown fabric with buff surface. Very faint blurred warty decoration [CL 170 from Tr. 12 (7302)].
26. Fragment of frog lamp in buff Nile clay. Very blurred decoration but legs just visible [CL 91 from Tr. 10 (3506)].
27. Very worn frog lamp with vestigial knob handle. Incised basal ring. 105 x 89 mm [CL 2 from Tr. 6A (4009)].
28. Upper part of frog lamp, red buff clay, slight traces of slip. Weakly splayed spout [CL 167 from Tr. 6P (4100)].

Type IIB: Corn lamps (Fig. 6.3)
These are very similar to frog lamps to which they may be related, but the decoration usually comprises stylised ears of corn rather than a frog, and they do not have a well demarcated spout.
29. Small globular lamp in brown Nile fabric. two ears of corn, emerging from a nodule (a seed?) surround the fill hole. Type III pear shaped. Basal marks in form of opposed λ. 82 x 79 x 29 mm [CL26 from Tr. 6H (4030)].
30. Fragment of the top of a lamp with a clear herringbone pattern, representing an ear of corn. Red brown Nile fabric [CL53 from Tr. 6H (4030)].
31. Fragment of top of a small globular lamp with very blurred and faint decoration, possibly representing an ear of corn. Pale buff Nile clay [CL64 from Tr. 6D (4014)].
32. Corn lamp with missing spout and suggestion of skewomorphic frogs legs. 69 x 60 29 mm [CL146 from Tr. 6H (4095)].
33. Corn lamp with nodular protuberances in buff fabric. Spout, but conical rather than splayed (c.f. Knowles no. 62, Trajanic?) [CL138 from Tr. 6J (4090)].

Type I: Potato lamps (Fig. 6.4)
These are the ultimate in simple utilitarian tools. Typically, they are small pear shaped globular lamps, without a well demarcated spout and no handle. Decoration is vestigial or absent. When they appear in the ground, they look and feel like potatoes and so this colloquial terminology is retained here for convenience.
34. Typical potato lamp in buff Nile fabric. 80 x 68 x 33 mm [CL 3 from Tr. 6D (4014)].
35. Typical potato lamp in buff Nile clay. Poorly defined nodules on upper surface around fill hole may be an attempt at decoration. Pear shaped with no spout and no basal marks. 81 x 70 x 38 mm [CL 152 from Tr. 12 (7302)].
36. Fragment of lamp top in brown Nile clay. Traces of faint radial decoration [CL 65 from Tr. 6D (4014)].
37. Somewhat atypical lamp in brown Nile clay. Worn flaky surface, extended spout and vestigial side knobs. 70 x 54 x 26 mm [CL 27 from Tr. 6H (4030)].
38. Lamp in red brown Nile clay. Rather more piriform than usual. Perhaps indistinct nodules around fill hole. 78 x 59 x 32 mm [CL 128 from Tr. 6H (4085)]. Trajanic.
39. Top half of pear shaped lamp in buff Nile clay. Rim round fill hole and raised lumps around that. 79 x 65 mm [CL 129 from Tr. 6H (4085)]. Trajanic.
40. Fragment of top in red buff Nile clay. Very faint or absent decoration [CL 130 from Tr. 6H (4085)]. Trajanic.
41. Small lamp in flaky red buff Nile clay. Surface not preserved, and no decoration visible. 63 x 50 x 30 mm [CL 131 from Tr. 6H (4085)]. Trajanic.

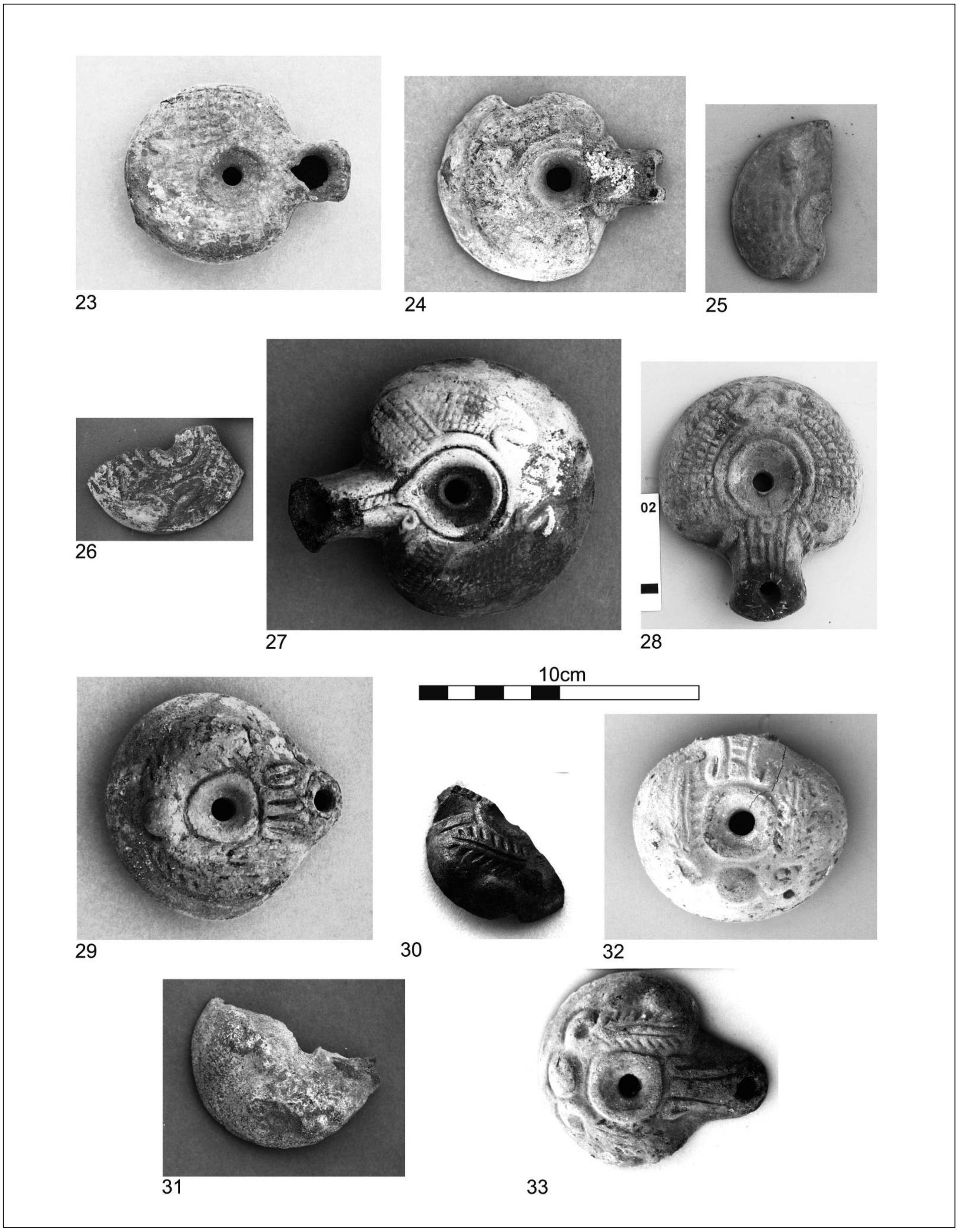


Figure 6.3. Frog lamps (23-28), Corn lamps (29-33).

Type V: Discus lamps (Fig. 6.5)
These seem to be small, crude Egyptian copies of the classical lamp design. Unlike any of the above they are flat rather than globular and characteristically have a decorated rim, and a concave discus, sometimes with a semblance of a design.

42. Small lamp in coarse red brown Nile clay with reddish wash on surface. Rim decorated with indistinct moulded ovalo design. Indistinct motif on discus and prominent spout.

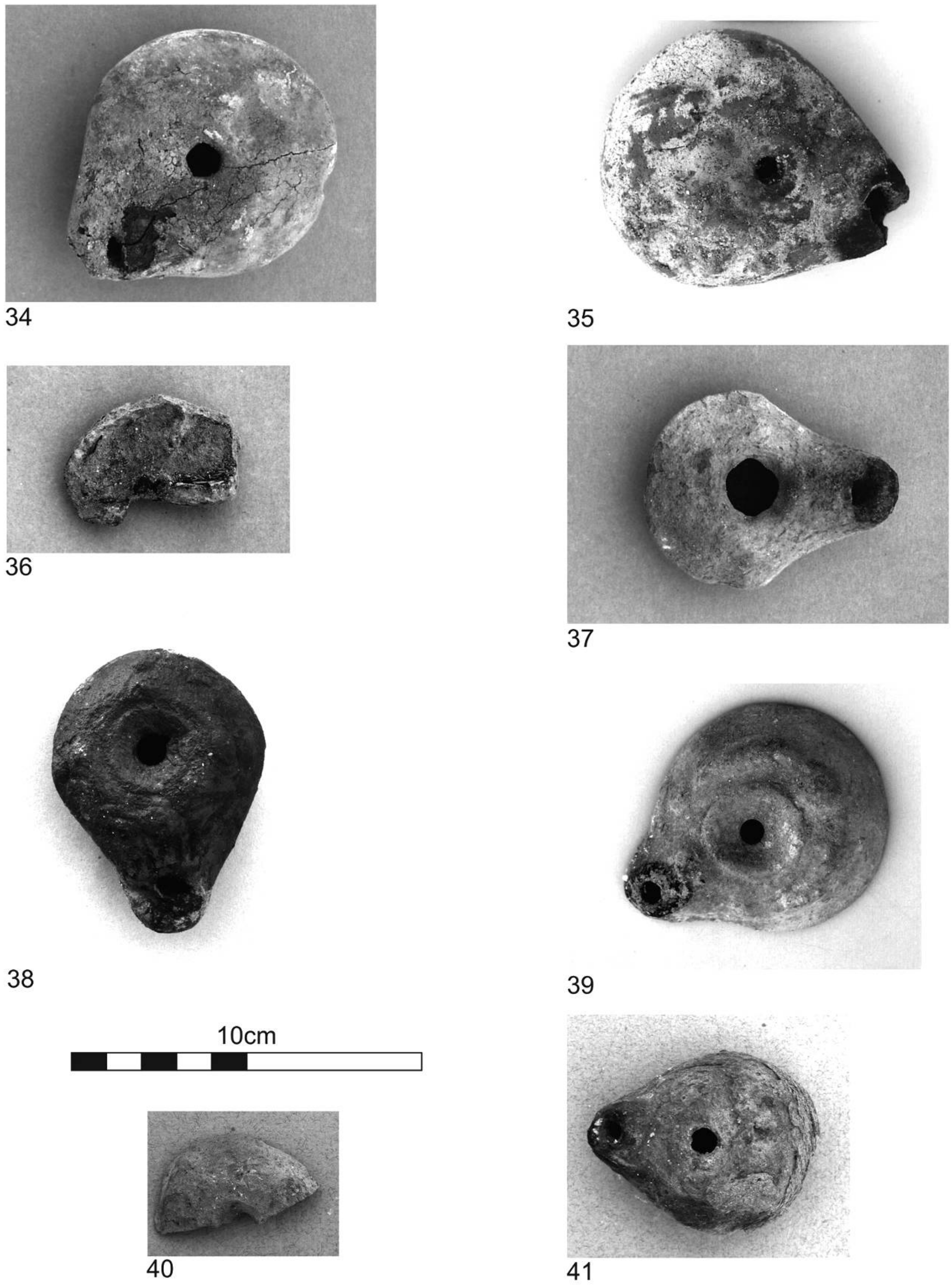


Figure 6.4. Potato lamps.

No basal marking. 74 x 59 x 29 mm [CL 18 from Tr. 6H (4030)].
43. Fragment of small lamp in brown Nile clay. Rim decorated with raised dots, discus apparently plain. Prominent spout [CL 122 from Tr. 8 (8181)].
44. Piriform lamp in buff Nile clay with reddish surface slip. Plain discus but with very indistinct, burred radial decoration on rim. 68 x 54 x 23 mm [CL 159 from Tr. 8A (8378)].
45. Discus of lamp with figure carrying a cornucopia. Ovolo decoration on rim. Reddish brown clay [CL 192 from Tr. 6Q (4165)].
46. Handle of Type VA firmalamp. The handle has a 13 mm perforation placed below the body of the lamp and extends to a hollow triangular plate with palmette decoration. Fine grey clay with reddish surface (c.f. Bailey 1980, Q1005, AD 30-70) [CL 9 from Tr. 6A (40090].
47. Handle similar to above. Also hollow. Red brown clay [CL 60 from Tr. 6B (4008)].
48. Discus lamp with radial decoration on discus and ovolo design on rim. Red brown fabric. 83 x 27 x 4 mm [CL 188 from Tr. 6G (4161)].
49. Discus of firmalamp with female figure, crater and

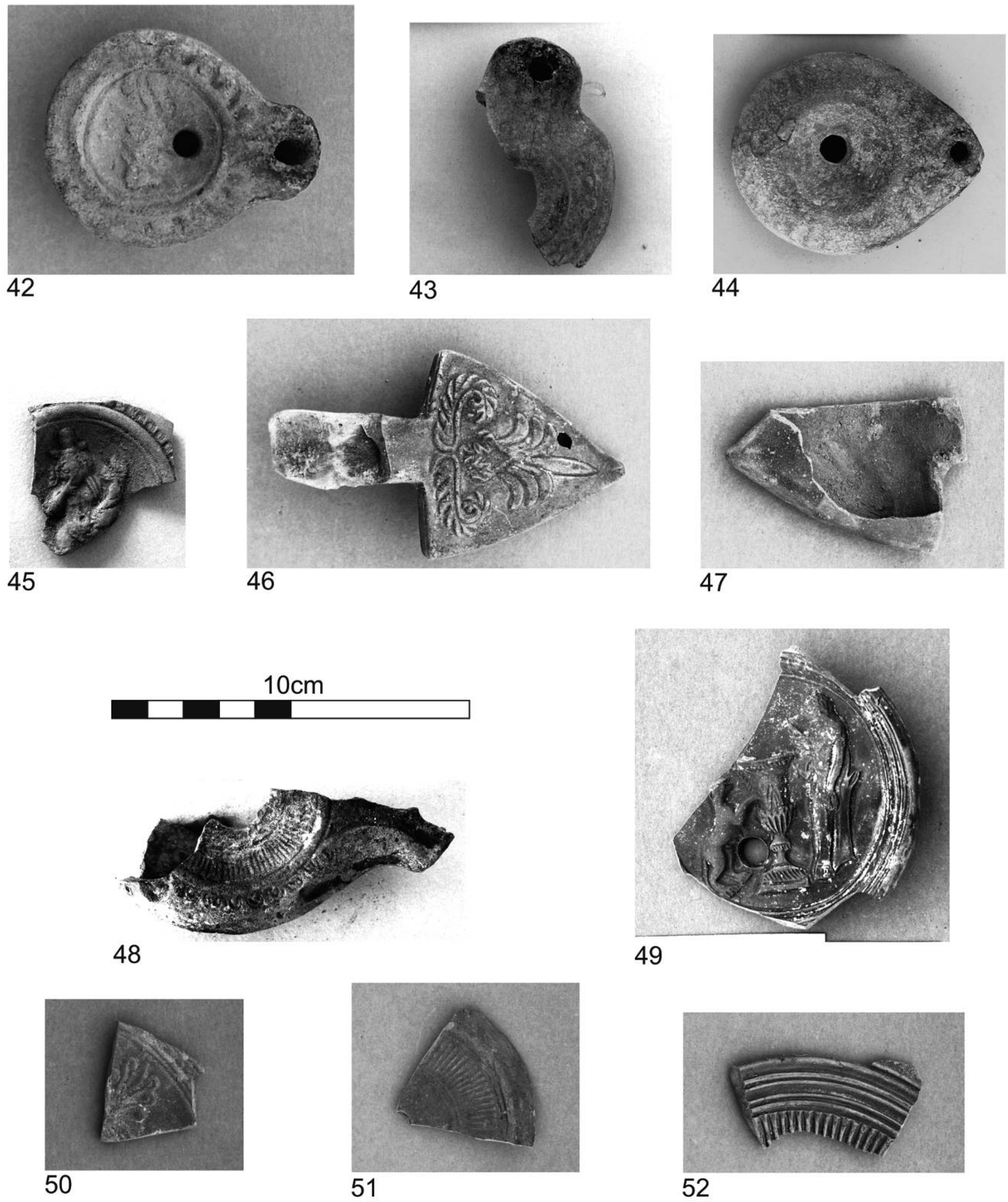


Figure 6.5. Discus lamps.

begging dog. Fine buff fabric with red brown slip [CL 8 from Tr. 7 (5019)].
50. Fragment of discus with palmette design. Red brown clay and slip [CL 23 from Tr. 6C (4012)].
51. Fragment of discus with radial pattern. Buff clay with dark red brown slip [CL 41 from Tr. 6A (4009)].
52. Fragment of firmalamp with concentric rings on rim and radial pattern on discus. Buff clay with dark brown slip [CL 62 from Tr. 6B (4007)].

Miscellaneous lamps (Fig. 6.6)
53. Small spouted lamp with a band of cross hatched decoration on top [CL143 from Tr. 6G (4095)].
54. Spouted lamp with radial decoration on top (c.f. Bailey 2001, no. 9, 1st century BC) [CL 137 from Tr. 6J (4090)].
55. Spouted lamp possibly related to frog lamps, but with a much devolved warty skin design arranged in a radial pattern (c.f. Bailey 1988 Q2178MLA, dated 3rd-4th century AD, but ours is probably 2nd century) [CL 5 from Tr. 6A (4009)].
56. Type IIIB pear shaped lamp in buff fabric with nodular decoration on top [CL 77 from Tr. 6J (4040)].
57. Pear shaped lamp with radial decoration. In reddish clay [CL 134 from Tr. 6J (4040)].
58. Type IIIB pear shaped lamp with four nodules on top arranged in a square pattern and joined by tooled lines [CL 177 from Tr. 6H (4080)].
59. Pear shaped lamp with faint radial decoration. Red brown clay [CL 158 from Tr. 6G (4095)].
60. Pear shaped lamp with nodular decoration. Buff clay

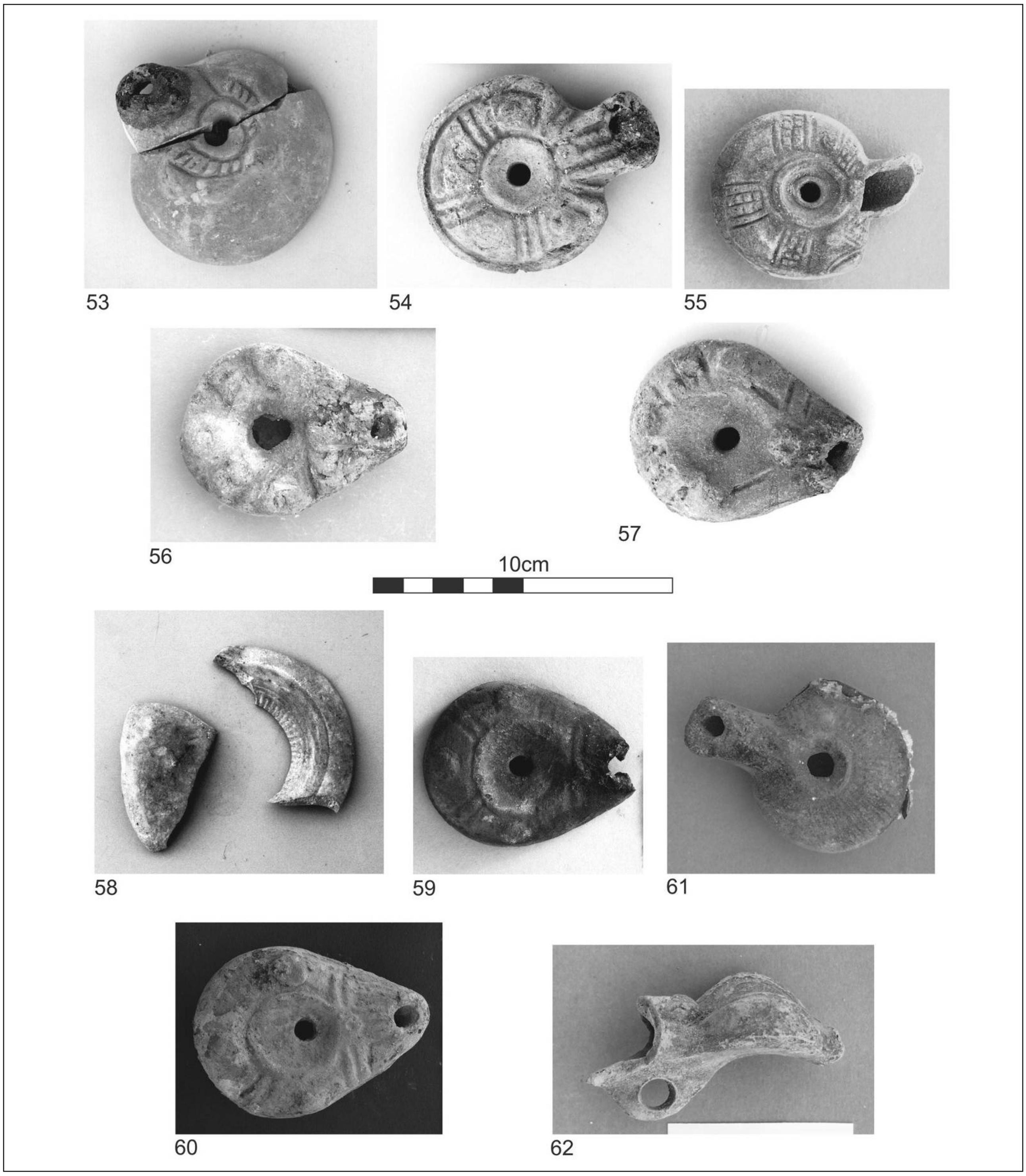


Figure 6.6. Miscellaneous lamps.

[CL 203 from Tr. 6Q]
61. Spouted lamp with radial decoration on top. 74 x 53 x 24 mm. Buff clay [CL 4 from Tr. 7 (5022)].
62. Handle of lamp with perforation underneath. The handle takes the form of female genitals with pubic hair. Red-buff clay with black slip [CL 10 from Tr. 6B (4007)].

Roman lamps from less securely dated deposits (Fig. 6.7)
63. Very small spouted lamp with distinct radiate pattern on rim. Red brown clay. 69 x 57 x 24 mm [CL 165 from Tr. 8A (8340)].
64. Similar lamp to above, No. 63. Red brown clay. 68 x 57 x 25 mm [CL 155 from Tr. 8A (8326)].
65. Discus of lamp with scallop decoration. Hard red-purple clay with similar slip [CL 88 from Tr. 8 (8005)].
66. Small lamp with nodules on upper surface. Unfeatured base. Red brown clay [C 114 from Tr. 8 (8173)].
67. Spouted lamp with nodular decoration on rim and splayed spout. 76 x 57 x 27 mm. Buff clay [CL 154 from

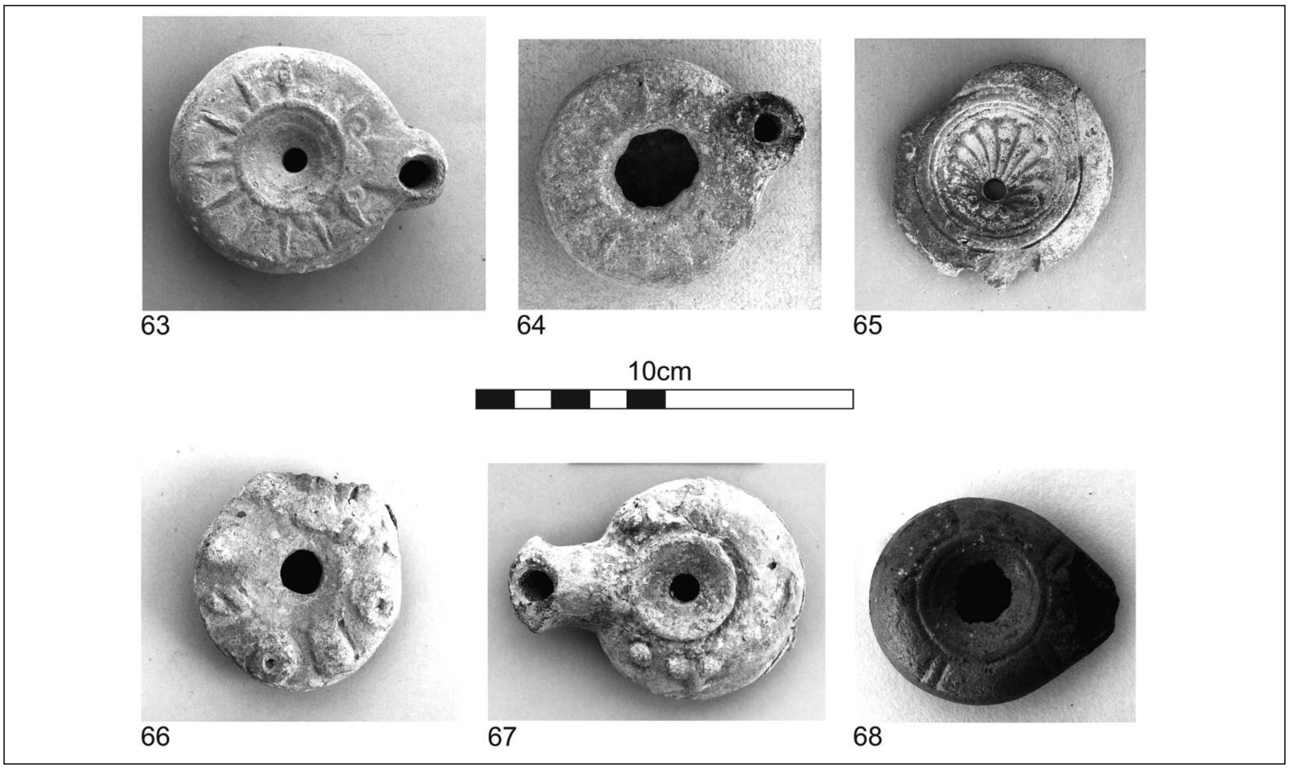


Figure 6.7. Roman lamps from less securely dated deposits.

Tr. 8A (8327)].
68. Small pear shaped lamp in red buff clay with traces of red slip. Faint radial decoration on rim. 63 x 52 x 23 mm [CL 163 from Tr. 8A (8326)].

6.3 Islamic Lamps

Of the 16 lamps from distinct Islamic contexts, four are of well known Roman types and are clearly residual. Six of the remainder are green glazed either on a quartz frit or on earthenware, although one is brown, possibly because of burning or over-firing. One is nearly complete. One lamp, which might be Roman rather than Islamic, is in a black or blackened fabric and is decorated with dots on the discus and tendril pattern on the rim, while the remaining lamps are all small fragments of open bowls in brown earthenware. Burning suggests use as lamps. No examples of the typical elongate pear-shaped earthenware Islamic lamps were found (e.g. Fehévári 2000, 31) but as these date from the 7th /8th centuries this is hardly surprising.

Glazed lamps (Fig. 6.8)

69. Near complete lamp in pale buff frit with green glaze. Deep long spout, ring base and raised fill hole, which is now broken off, but which would have supported a small funnel. Stub handle broken off. Basal foot ring. 57 mm x 22 mm (c.f. Kawatoko and Shindo 2010, L186, Mamluk; see also Kawatoko 1987) [CL 193 from Tr. 16 (16021)].
70. Base and part of spout in brownish frit or earthen ware with green glaze. Basal ring and long spout as in No. 69 [CL 207 from Tr. 16 (16006)].
71. Base and stub of spout in brownish frit with green glaze. Basal ring as No. 70 above [CL 208 from Tr. 16 (16500)].
72. Basal fragment of body of lamp in whitish frit, glazed dark green inside and out [CL 40 from Tr. 1 (surface)].
73. Base of lamp in dark frit with brown glaze inside and out (?burnt) [CL 35 from Tr. 1 (surface)].
74. Base of lamp in red brown fabric with turquoise / olive green glaze. Base ring and signs of spout now broken off. 81 mm diameter [CL 37 from Tr. 2B (1529)].

Unglazed earthenware lamps (Fig. 6.9)

75. Small bowl with signs of burnish suggesting use as lamp. Red-brown earthenware [CL 66 from Tr. 5 (3014)].
76. Body fragment of lamp showing signs of burning [CL 67 from Tr. 5 (3012)].
77. Fragments of open bowls possibly used as lamps [CL 69 from Tr. 5 (3000)].
78. Small bowl red-brown earthenware showing signs of burning. 70 mm diameter [CL 49 from Tr. 5 (3014)].
79. Rim and part of discus with dot pattern. Rim with interlocking tendrils. Grey fabric with blackened surface (burnt). The ornament is not typically Roman and bears a similarity to Islamic lamp motifs e.g. Fehérvári (2000, 31), although the form might suggest a Roman date [CL 30 from Tr. 3 (2017)].
80. Small open bowl with lug handle in red-brown earthenware [CL 36 from Tr. 3 (2027)].

Acknowledgement

I thank Dr Don Bailey for his assistance in compiling this chapter.

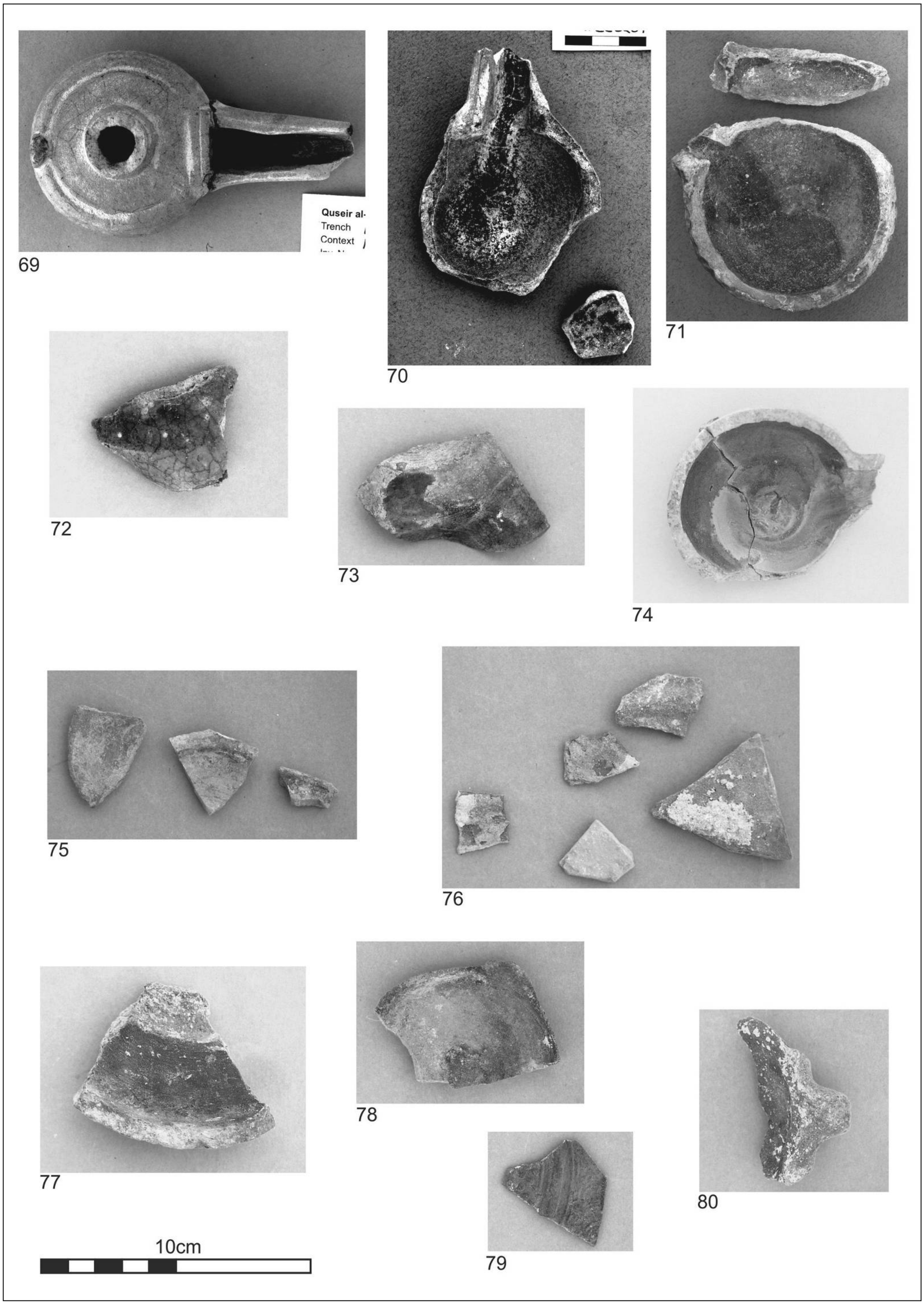


Figure 6.8. Islamic glazed lamps (69-74), unglazed earthenware lamps (75-80)

7 Glass

David Peacock

Introduction

A considerable quantity of glass was found in the excavations, the bulk of it from Roman deposits. Glass occurs in quantity in rubbish deposits or *sebakh* and most of those excavated were of Roman date, which accounts for the bias. The task of reporting the glass is made particularly easy because of the extensive report on the glass from the earlier American excavations by Meyer (1992). There seems little point in reiterating the thorough discussion and parallels cited by Meyer and this account should be read in conjunction with her work which contains an exhaustive literature search. Here we are concerned with more recent publications and with data which throws new light on this remarkable collection of glass. There is little overlap with the Karanis glass, which is hardly surprising as it is supposed to be later, although as Harden (1936) notes glass was precious and might survive as an heirloom for generations.

In recent years glass has been more extensively analysed by scientific means, which has contributed to an understanding of technology and provenance. It was not possible to apply this approach to this collection, but all significant pieces have been kept and placed in the care of the Supreme Council for Antiquities (SCA). A next step could be to embark on a programme of analysis, but it lay beyond the scope of this project to undertake this.

7.1 Roman Glass

Unguentaria

A common glass find on Roman sites are the toilet bottles, commonly called *unguentaria*. However, according to the web glossary of the Corning Glass Museum, it appears that the term was invented in the 19th century, on analogy with *unguentarius* (perfume seller) and similar Latin words used by the Romans in connection with perfumes. The precise function of these vessels is thus an open question.

Eighty-nine examples were found in the excavations, the bulk of which (58%) came from the Roman *sebakh* excavations. Fifteen percent were found in Trench 8, 9% in Trench 5, 5% in Trench 7, and the remainder in small numbers (one to three examples) in Trenches 1, 2B, 2D, 3, 7A and the sedimentology pits. In Trenches 3 and 5 they were found in Islamic contexts.

Two types can be recognised in roughly equal quantities. Type 1 comprises thin-walled bottles with a long slender neck, generally in a clear or pale green glass, while Type 2 is a small, squat, thick-based bottle in dark green glass. The earliest example is that from Trench 7A, which dates to the very late 1st century BC or the very early years of the following millennium. Unfortunately, it comprises a small undiagnostic rim fragment and gives no clue to the complete vessel form. Meyer (1992, 30) suggests that the thick bases were designed to cheat the customer. However, this is not the only possible explanation. They could be designed to contain a high value substance which was available in smaller quantities and which required the protection of a sturdy vessel. Meyer notes that similar flasks are not common, but paralleled at Karanis, En-Gedi and Dura Eurapos. Both types are found in firm Roman contexts, and a number occur in Islamic contexts in Trenches 3 and 5. They comprise rims and necks which are difficult to ascribe to a type and it is possible that they belong to a quite different form. Equally they could be residual Roman material.

In the Roman world, *unguentaria* are generally found in pottery or glass versions, both of which occur in funerary and secular deposits. Here they are found exclusively with domestic rubbish: suggestinmg a function that was part of everyday life. They are generally considered to be perfume bottles, but this is only one possibility, perhaps deriving from the name. Fleming (1997, 35) suggests that the contents would be eye lotion prepared from elderflower or psyllium, skin smoothing oils made from red sage or vervain and antiseptic prepared from thyme or aloes.

Recently, Avery-Peck, Harrington and Neusner (2004, 383), writing in the context of finds from Jerusalem, have reviewed earlier suggestions about contents of these vessels. The idea that they were *lacrimaria*, to hold the tears of mourners, has lost favour, but they could be *balsamaria*, which as the name suggests, would be containers for balsam. Other suggestions include oil for illumination, unguents, water, wine, honey or powdered/granular spices or incense.

There is now some hard evidence deriving from scientific content analysis. Pérez-Arantegui *et al*. (1996) examined the contents of two glass *unguentaria* from Celsa and found that they contained a mixture of gypsum and calcite, coloured with hematite, and impregnated with a binder of animal origin, which is suggestive of cosmetics. Agozzino *et al*. (2007) examined two pottery *unguentaria* from the Sicilian necropoli of Adranon and Hymera. The one from Hymera was empty suggesting it was buried solely for ritual purposes, while that from Adranon showed abundant traces of lipids used in balm making.

The content of these vessels is thus difficult to assess with certainty. In the case of the Quseir finds it seems likely that they contained either cosmetics or *medicalments*, the latter being more probable in this work-a-day place. There is a little tenuous evidence supporting this as the red powder found in No. 12 below might be significant. Unfortunately, for a variety of reasons, it was not analysed, but it seems probable that it was either: red ochre (iron oxide), red lead (lead oxide), vermillion (mercuric sulphide) or realgar (arsenic sulphide). Of these, red ochre is unlikely as it was a common pigment which would not be contained in small vials (unless mixed with other things to create a cosmetic), vermillion was so expensive it would be unlikely on a site like this, leaving red lead and realgar as the strongest possibilities. Of these, the writer favours realgar which during the New Kingdom at least, was mixed with orpiment to make a pigment. However, Pliny (*HN* xxxiv, 55) discusses its medicinal properties. It was apparently used as a strong antiseptic employed in ophthalmic preparations and as a cure for diverse complaints such as cough or asthma. It is reputed to occur on St John's Island in the Red Sea (Lucas and Harris 1962, 348). It is not impossible therefore, that Type 2 *unguentaria* were used for bottling a local Red Sea product and this would account for Quseir being the most prolific site for this variety. It would also account for the use of strong green vials with a limited capacity. Until analysis has been done this must remain no more than a highly speculative possibility.

Type 1 (Fig. 7.1)

1. Rim, neck and shoulder. Rim rolled up and smoothed down - light turquoise [G1393 from Tr. 6H (4030)].
2. Body, base and neck dark blue-green glass [G1416 from Tr. 6H (4030)].
3. Rim and neck in green translucent glass [G1670 from Tr. 6H (4065)].
4. Lop-sided rim blue-green but weathered glass Rim folded-in [G1828 from Tr. 8 (8113)].
5. Rim and neck with lop-sided folded-in rim. Thick blue-green glass [G1832 from Tr. 8 (8108)].
6. Neck with folded-in rim in blue-green glass [G5000 from Tr. 6H (4080)].
7. Neck with folded-in rim in blue-green glass [G5001 from Tr. 6H (4080)].
8. Neck with turned down rim in turquoise glass [G5004 from Tr. 6H (4080)].
9. Neck with folded-in rim in pale green-blue glass [G5006 from Tr. 6H (4080)]
10. Neck with folded-in rim in pale green-blue glass [G5007 from Tr. 6J (4040)].
11. Hollow base in pale blue-green semi opaque glass [G5127 from Tr. 6G (4160)].

Type 2 (Figs. 7.1 and 7.2)

12. Complete glass unguentarium in opaque olive green glass with folded-in rim. Pontil scar on base. Traces of preserved red powder, c.f. Harden 803 [G1657 from Tr. 2D (1266)].
13. *Unguentarium* with solid base in dark blue glass [G5009 from Tr. 6J (4040)].
14. Base with pontil scar in green glass [G5011 from Tr. 6H (4080)].
15. Small *unguentarium* in deep turquoise glass [G5096 from Tr. 6G (4160)].
16. Thick base in dark green glass [G5154 from Tr. 6H (4095)].
17. Complete vessel in dark green glass [G5174 from Tr. 8A (8360)].
18. Complete vessel in dark green glass [G5185 from Tr. 6G (4095)].
19. Conical base as No. 18 [G5202 from Tr. 6J (4040)]. Not illustrated.
20. Thick base in dark green glass with pontil scar [G5216 from Tr. 6G (4095)].

Window glass (Fig. 7.2)

Window glass is very common in northern provinces such as Britain, where it is found in both military and civilian contexts. No doubt its use would be prompted by climatic conditions. It could be made by either of two methods: it could be cast in flat slabs or it could be blown into a cylinder which would then be split and opened to form a flat plate (Harden 1961).

Only three fragments of potential window glass were found in Trenches 6G and 6H. They comprise flat colourless pieces, with many bubbles, and were made by the older technique of casting. The scarcity of window glass suggests that glazing was a luxury reserved for some of the more official/higher status buildings. However, it would not be a necessity at Myos Hormos, where its main purpose might be to protect again the wind.

21. Large flat fragment in opaque, light green, very bubbly glass with random marks on one surface [G5022 from Tr. 6H (4080)]. Not illustrated.
22. Large flat piece of pale blue-green glass with matt side and shiny side with indentations and bubbles [G5066 from Tr. 6H (4075)]. Not illustrated.
23. Large flat corner fragment traces of red paint along edge, perhaps from window frame. 4 mm thick. One surface has marks which may result from an instrument used to smooth the molten glass surface [G5183 from Tr. 6G (4095)].

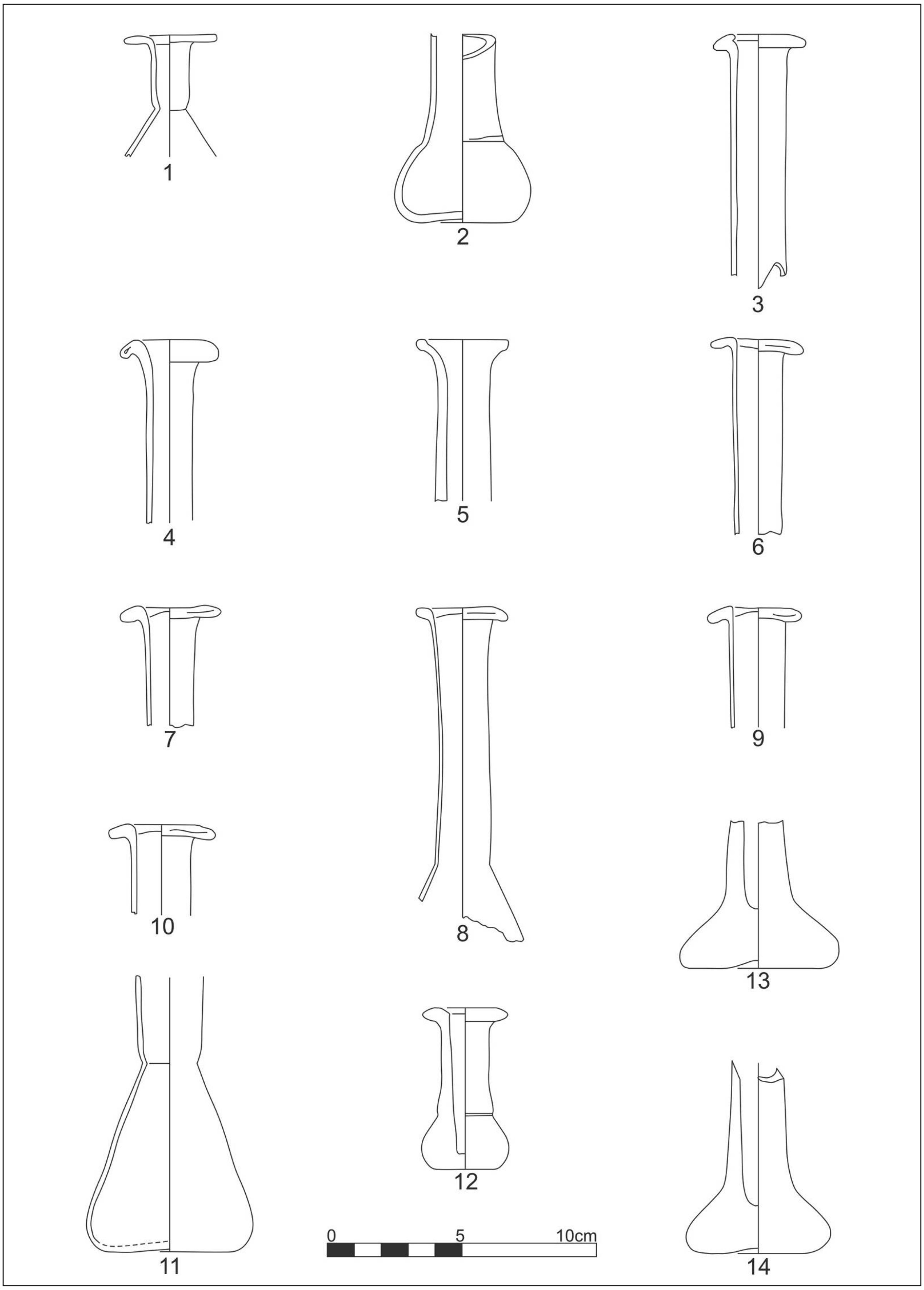


Fig. 7.1. Unguentaria (Type 1: 1-11, Type 2: 12-14).

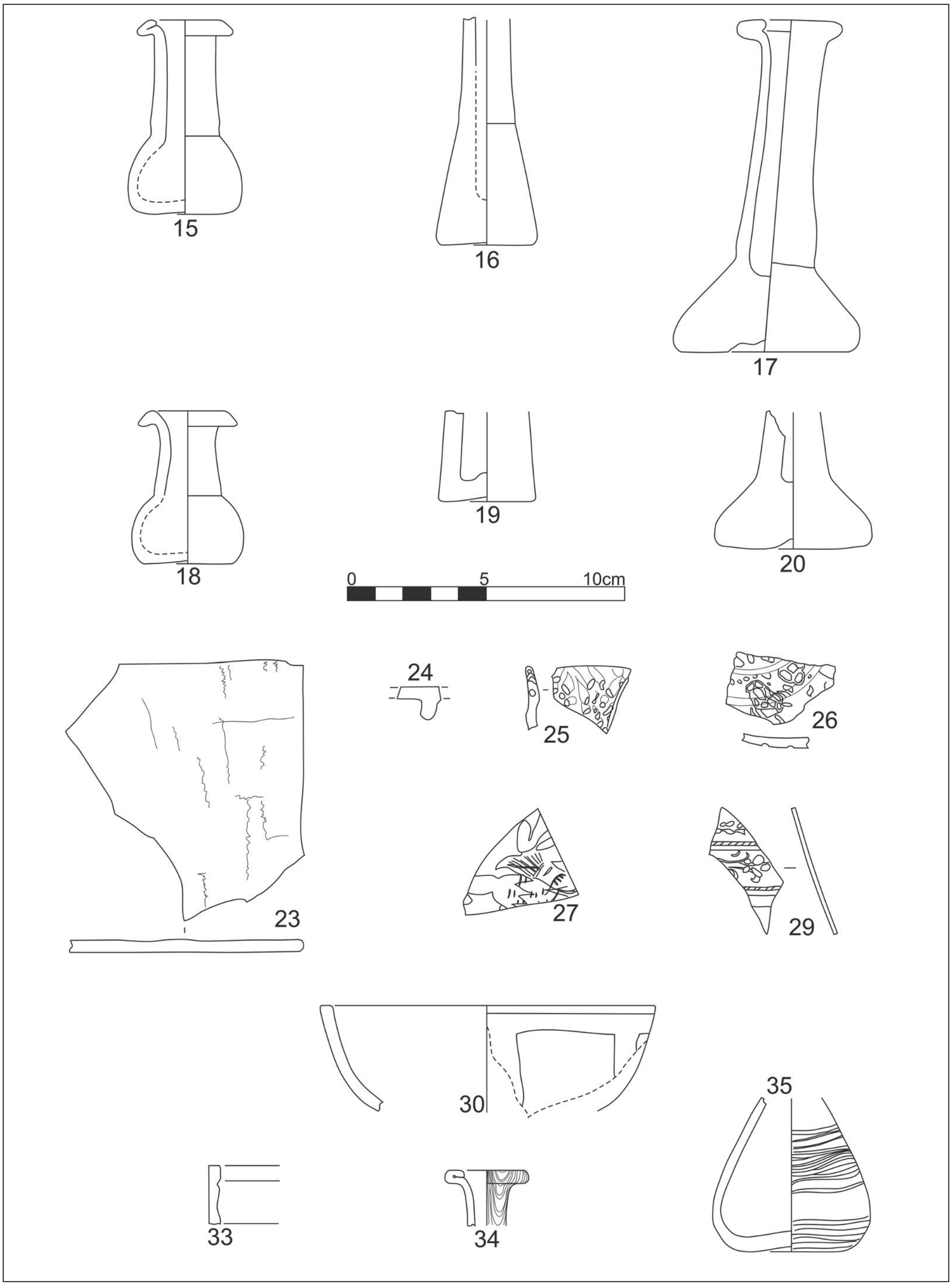


Fig. 7.2. Unguentaria, (Type 2: 15-20), window glass (23) and multi-coloured glass (24-35.)

Beads
No glass beads were found in secure Roman contexts, but potential 'Indo-Pacific' beads were found in Islamic contexts where they might be residual (see below, 7.2 *Islamic Glass Beads*).

Multicoloured glass (Figs 7.2 and 7.3)
Fourteen pieces of multicoloured glass were recovered, mainly from the Roman *sebakhs*, but one came from Trench 7A and two from Trench 8. There are three varieties: millefiore, painted and marbled - a streaky effect due to working together two or more colours and sometimes marvering them to produce attractive streaks.

Three small pieces of millefiore glass were recovered, two of which may come from the same vessel. They were made by drawing out multicoloured composite glass rods, which would then be cut into small pieces and fused in a mould.
24. Fragment of millefiori vessel with basal ring, green/turquoise/yellow [G5043 from Tr. 6H (4030)].
25. Millefiori glass fragment. Base colour turquoise with tubes of yellow and green. Possibly same vessel as above [G5093 from Tr. 6J (4155)].
26. Small millefiori fragment in green glass with yellow rods. Floral motif with red centred flower and green petals rimmed in yellow [G5144 from Tr. 6H (4090)].

Six pieces of glass bore painted decoration. The most elaborate was G1787 which bore a clear image of a bird, perhaps in a tree. Two more had lines with floral decoration in between (G1457 and G5090), while the remaining three had abstract decoration of dots (G1477) or lines (G1804 and G1684).
27. Fragment of clear glass with painted decoration. Appears to be a bird, perhaps in a tree [G1787 from Tr. 8 (8000)].
28. Clear glass with a floral pattern in red, yellow and black [G1457 from Tr. 6H (4030)].
29. Fragment of painted glass with bands of red and yellow, green leaves and yellow stems [G5090 from Tr. 6J (4155)].
30. Two fragments of cobalt blue bowl, rim and body thick walls with red lines painted on outside [G1804 from Tr. 8 (8021)].
31. Clear glass with broad yellow band, narrow red stripe and faint red band above, yellow band with green dots possibly foliage [G1684 from Tr. 6D (4015)].
32. Clear green tinted glass with opaque green/yellow painted spots on outside [G1477 from Tr. 6A (4001)].

Five vessels showed evidence of the mixing of two different glass colours to produce a streaky effect. G5026 and G5049 may come from the same vessel. They are flat and red-brown with white swirls. G5073 has swirls of black and white perhaps accentuated by marvering, while G5146 was the base of an unguentarium in a streaky white / pale greenish-buff glass. G1656 from Trench 7A is a body sherd of a pillar bowl in a glass composed of alternate yellow and brown vertical streaks.
33. Fragments of possibly a flat glass tray in opaque marbled glass, orange, possibly with cut line decoration along edge [G5026 from Tr. 8 (8000) and G5049 from Tr. 6H (4030). Tr. 8 lies near to and above Tr. 6H].
34. Marvered and Dragged decorated glass, black with white and olive green. Folded over rim [G5073 from Tr. 6P (4110)].
35. Small unguent bottle in pale green glass with whiter outer layer, marvered [G5146 from Tr. 6H (4080) and Tr. 6J (4090)].
36. Body sherd of pillar moulded bowl in glass with alternate dark and light vertical amber streaking [G 1656 from Tr. 7A (10003)].

Pillar moulded bowls (Figs. 7.4)
Pillar moulded bowls were particularly popular between the mid 1st century BC to the mid 1st century AD and achieved a very broad distribution from Britain to Arabia and as far as Afghanistan or Arikamedu in India (Price and Cottam 1998; Ghosh 1990, 23; Jasim 2006; Whitehouse 2000, 94). The most far flung is a millefiori bowl from a tomb at Ganguan in Jiangshu, China, dated to AD 67 (Whitehouse 2000, 96). Roman glass was of course well known to the Chinese, who may have regarded it on a par with crystal (Leslie and Gardiner 1996, 212). In the west pillar moulded bowls appear to have continued into the early years of the 2nd century AD (Cool and Price 1994).

Seventy-six fragments of pillar moulded bowls were found. Of these 55 % came from the *sebakh* excavations (Trench 6), 15 % from each of Trench 2B and Trench 7, 9% from Trench 7A and one example from Trench 5 and each of three sedimentology pits.

The dominant colour at was blue-green (28%), followed by green (24%), amber (9%), blue (8%), turquoise (6%), clear (6%), olive green (5%), purple (4%) and blue-black (3%). There were single examples in polychrome, cobalt blue and yellow.
37. Blue/green rim and body [G1378 from Tr. 6H (4030)].
38. Fragment in a translucent green glass [G1698 from Tr. 6D (4015)].
39. Fragment in iridescent greenish glass [G5005 from Tr. 7A (10014)].
40. Fragment in iridescent blue glass [G5010 from Tr. 7A (100120].
41. Fragment in dense plum – purple glass [G5125 from Tr. 6G (4160)].
42. Fragment in greenish glass [G5103 from Tr. 6Q (4165)].
43. Fragment in green-blue glass [G5118 from Tr. 6Q (4170)].

Indented beakers (Fig. 7.4)
These vessels have indented sides presumably to give a good grip while holding to drink. The number of indents seems to vary from four to six.
44. Base of indented beaker with no foot-ring but with

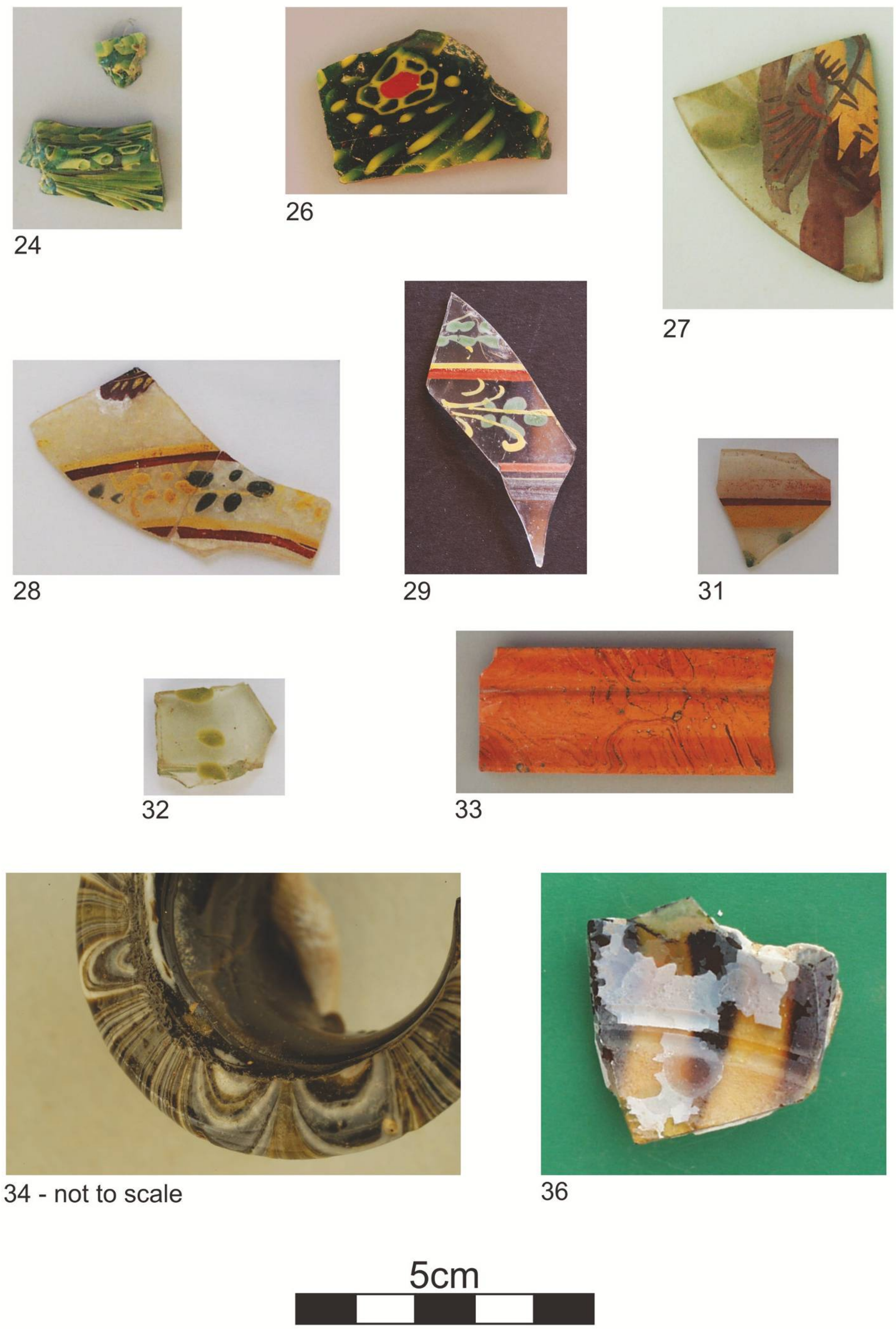


Fig. 7.3 Multi-coloured glass.

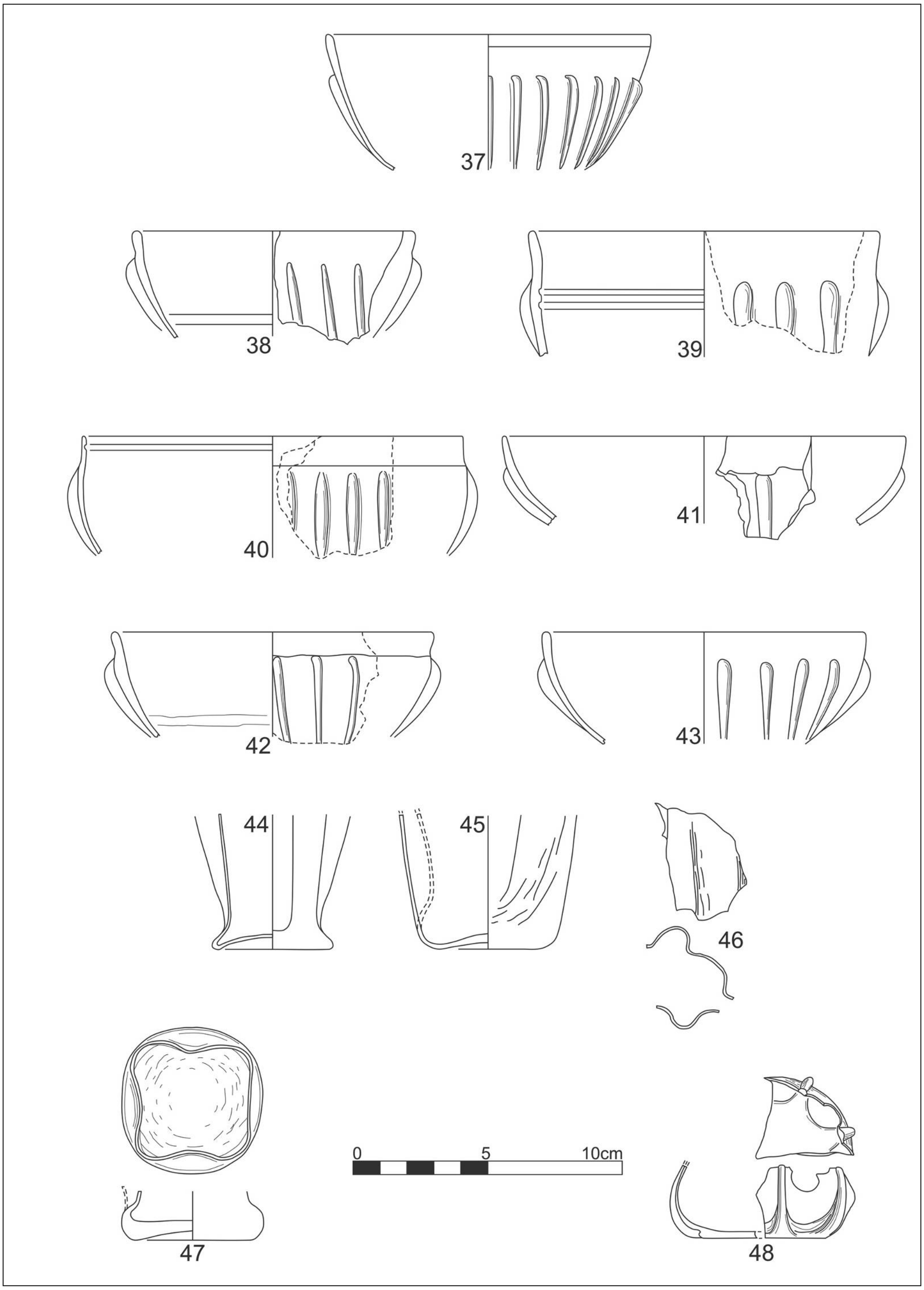


Fig. 7.4. Pillar moulded bowls (37-43) and indented beakers (44-48).

kick-up. Clear glass with olive green tint [G5129 from Tr. 6Q (4166)].
45. Base with shallow kick-up in glass with pale green tint [G5036 from Tr. 6J (4040)].
46. Wall of indented beaker, in glass with pale green tint [G5089 from Tr. 6Q (4170)].
47. Base of round beaker with shallow kick-up and four indentations in bubbly glass with opal appearance [G5054 from Tr. 6J (4040)].
48. Flat base with indentation and ribs between in glass with green tint [G5058 from Tr. 6J (4040)].

Other decorated glass
Many vessels are decorated with simple, parallel, incised or cut lines around their girth. This section will discuss the more complex ornament including cut motifs, faceting, 'rice grain' ornament, appliqué and other moulded wares. Forty-nine sherds fall into this category. Faceted glass is the most abundant (45%), followed by cut designs (41%) and 10% has the 'rice grain' motif. Appliqué and other moulded decoration are represented by a single sherd each.

The bulk of the finds came from the *sebakh* excavations (59%) followed by Trench 2B (14%), Trench 8 (12%), Tremch 2D (10%) and Trench 8A (4%).

Faceted wares (Fig. 7.5) have a surface covered in dimples which may be round or vertical ovals and usually about 5-10 mm across. The glass is clear or greenish and is of variable thickness. The commonest form comprises beakers with a band of decoration around the girth and reserved areas above and below. They have a prominent basal foot-ring. Small bowls with a vestigial basal kick–up and no foot-ring, are also found.
49. Rim of faceted beaker in glass with a yellowish tint. Elongate facets [G1238 from Tr. 2D (1266)].
50. Rim and body fragment of a faceted beaker in clear glass. c.f. Harden 409 [G1399 from Tr. 6H (4030)].
51. Faceted beaker with extremely thick and deep cut decoration grooves in a yellow tinted glass [G1419 from Tr. 6H (40300)].
52. Base of faceted beaker in clear glass, with two cordons and a foot ring [G1500 from Tr. 6E (4015)].
53. Base fragment of faceted beaker in clear glass [G5105 from Tr. 6Q (4165)].
54. Body fragment of a faceted beaker with elongate facets in clear glass [G5123 from Tr. 6Q (4170)].
55. Body sherd of faceted beaker with elongate facets. In clear glass [G5154 from Tr. 2D (1266)].
56. Rim of faceted beaker in clear glass [G5190 from Tr. 6G (4095)].
57. Base fragment of faceted bowl, very similar in style to the beakers. In clear glass, with a basal kick-up [G5037 from Tr. 6J (4040)].
58. Base fragment with indented pontil mark. Faceted greenish glass [G5109 from Tr. 6Q (4165)].
59. Basal fragment of faceted clear glass possibly from a square vessel [G5120 from Tr. 6Q (4170)].
60. Fragment of bowl in faceted greenish glass [G5044 from Tr. 6H (4030)].
61. Fragment of faceted glass, very thick cells separated by vertical pillars of glass. Green tint [G5059 from Tr. 6J (4040)].
62. Body sherd of bowl with large round facets in clear glass [G5145 from Tr. 6J (4095)].
63. Body sherd of faceted bowl in clear glass. Oval facets placed horizontally [G5161 from Tr. 2D (1266)].

Rice grain decoration (Fig. 7.6) is similar to faceted, but comprises elongate, widely spaced indentations reminiscent of rice. The predominant form seems to be bowls.
64. Bowl with widely spaced oval 'rice shaped' indentations in clear glass [G1439 from Tr. 6H (4030)].
65. Several fragment of the same vessel. Bowl with elongate rice indentations in clear glass [G1809 from Tr. 8 (8081)].
66. Body sherds with widely spaced rice decoration in clear glass [G5212 from Tr. 8A (8319)].
67. Base of bowl with vestigial foot-ring and very elongate decoration in clear glass [G1786 from Tr. 8 (8000)].
68. Flat rimmed bowl with decoration on outer part of rim in clear glass [G5156 from Tr. 2D (1266)].

Cut decoration (Fig. 7.6) is engraved into the glass surface, sometimes as an accompaniment to moulded decoration. Bowls and plates were the favoured items for this treatment.
69. Cut glass bowl with a clear engraving of a fish. Clear glass [G5077 from Tr. 6J (4155)].
70. Fragment of a very thick bowl in clear glass with an obscure engraved and moulded motif [G5117 from Tr. 6G (4161)].
71. Body sherd in clear glass with cut ornament on outside. Motif unclear [G5060 from Tr. 6J (4040)].
72. Plate with cut floral motif on rim and moulded ovalos on edge in clear glass [G5159 from Tr. 2D (1266)].
73. Plate with ovalos, dots and engraved design on inside [G5067 from Tr. 6H (4075)].
74. Small plate or bowl with overhung rim in clear glass with cut lines on outside of rim giving the appearance of a serrated edge [G1749 from Tr. 2B (2029)].

Appliqué decoration (Fig. 7.6) is represented by a single sherd bearing an applied crenulated string.
75. Body sherd of a clear glass vessel with applied strips [G5180 from Tr. 8A (51800].

Other moulded decoration is represented by a single body sherd of mould blown glass with protrusions (Fig. 7.6). A similar vessel was found at ed-Dur (Whitehouse 2000, 112) where it is dated to the 1st century AD. Whitehouse notes that this type of decoration had a wide distribution from southern England to Portugal and Israel. Finds from Pompeii and Herculaneum demonstrate that it was in use in 79 AD but it is not clear how long they continued after that.

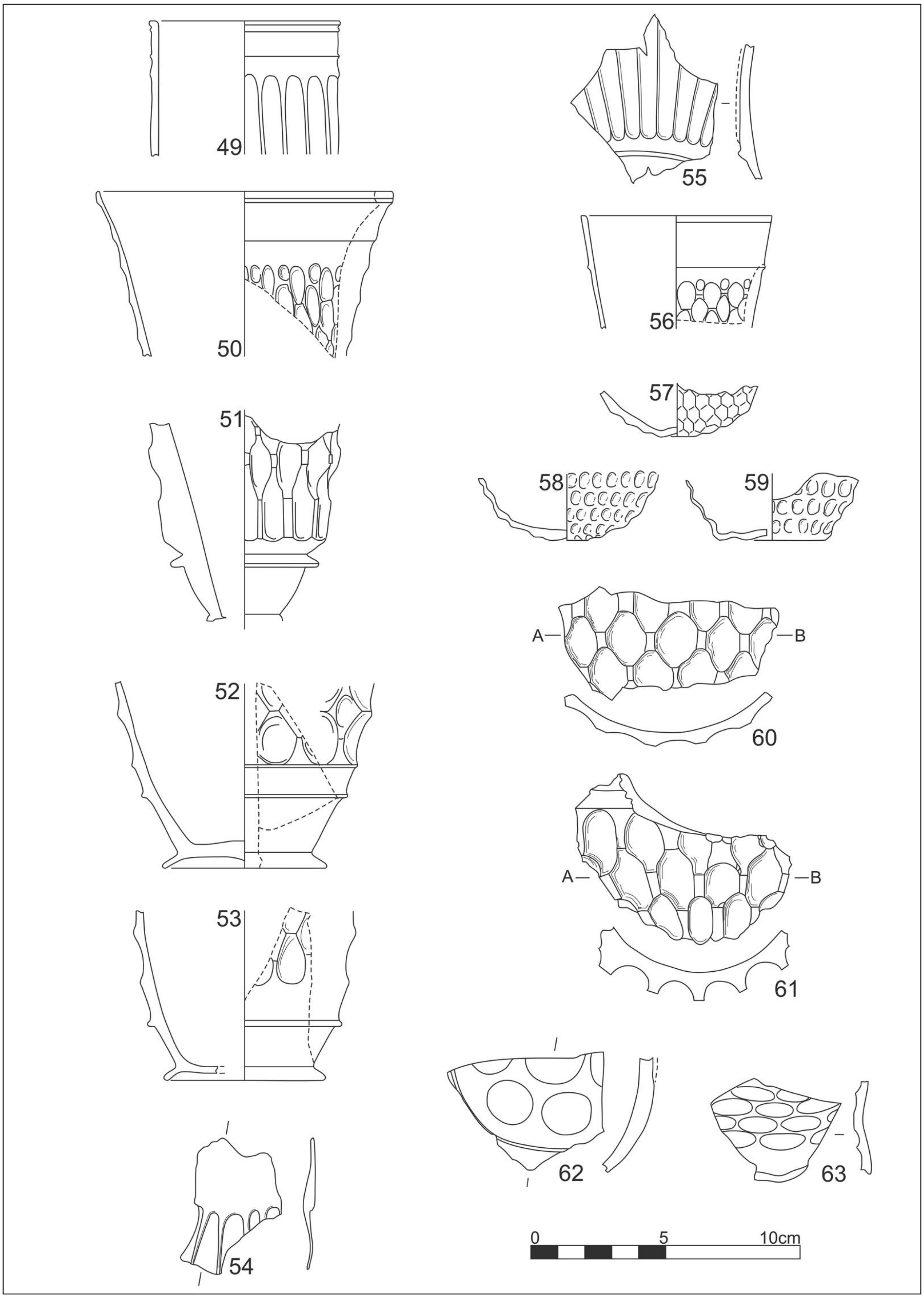


Fig. 7.5. Faceted glass.

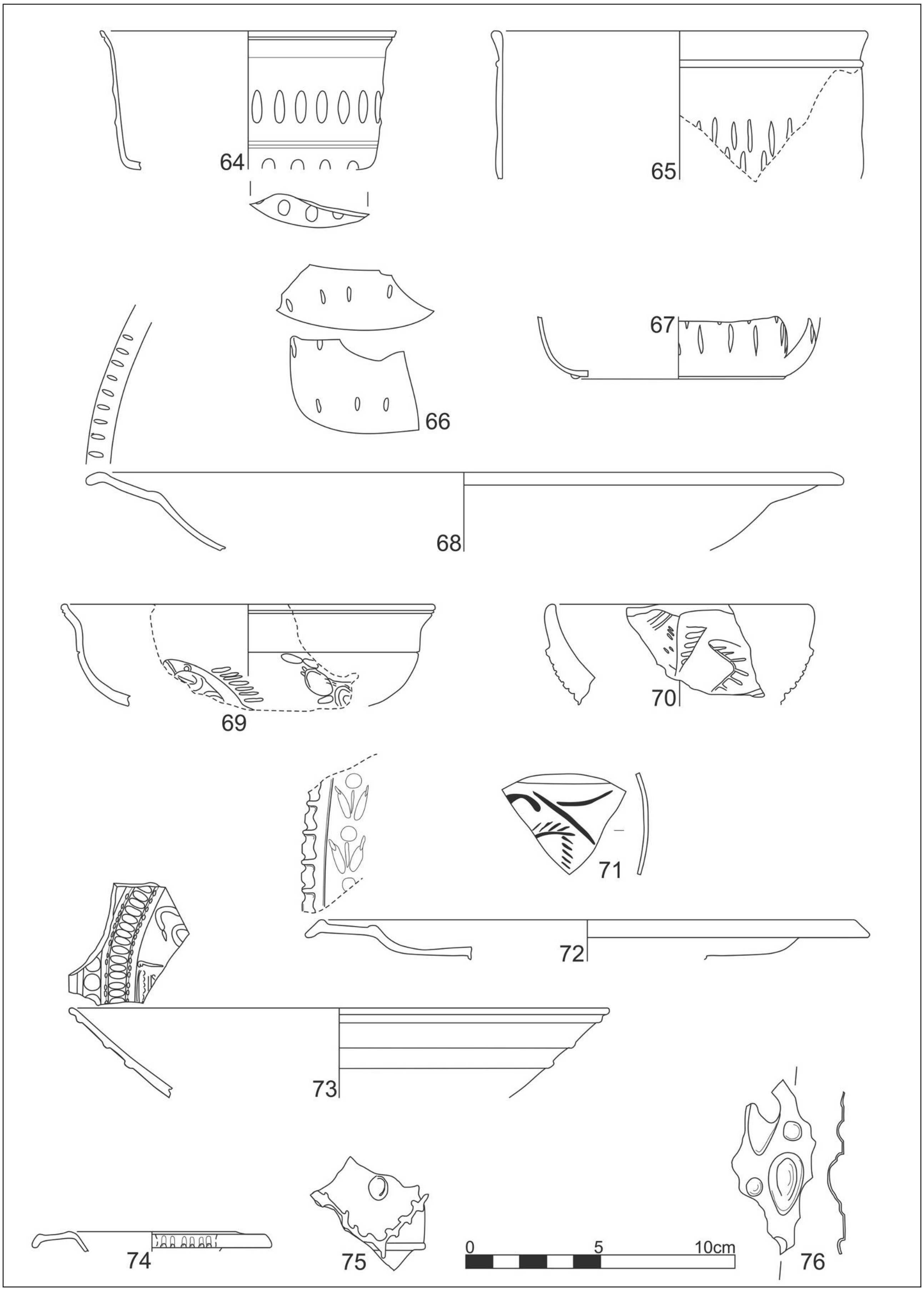


Fig. 7.6. Rice grain (64-68), cut appliqué (69-75) and moulded decoration (76).

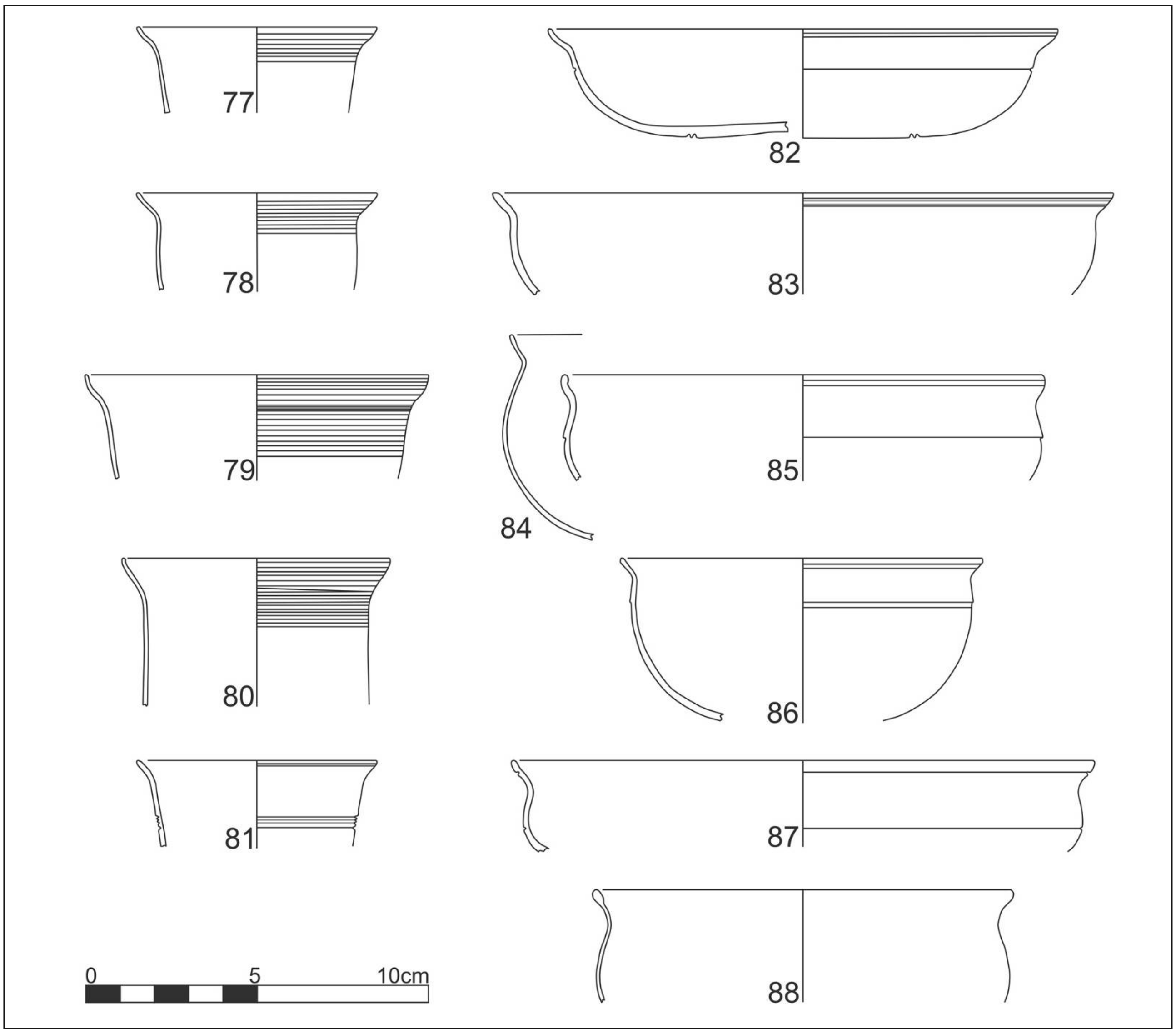


Fig. 7.7. Everted rim beakers (77-81) and rounded bowls with everted rim (82-88).

76. Body sherd with pear-shaped 'raindrop' or 'lotus bud' motif about 1 cm long mixed with round protrusions about 0.5 cm across. Clear glass [G5128 from Tr. 6Q (5128)].

Everted rim beakers (Fig. 7.7)
These are a very distinctive form having a sinuous squared rim with fine cut lines immediately beneath. They are in a fine clear glass. Two bowls were found with the same rim form and similar but more restrained decoration (see below). In small fragments the rim might be indistinguishable from that of the beakers
77. Fine glass rim with cut line decoration in opaque colourless glass [G5041 from Tr. 6J (4040)].
78. Fragment of a fine everted rim, with fine line decoration. Clear bubbly glass [G5048 from Tr. 6H (4030)].
79. Fragment of rim with fine line cut decoration. Clear glass [G5071 from Tr. 6H (4075)].
80. Fragment of rim with 12 lines of cut groove design. Clear glass [G5108 from Tr. 6Q (4165)].
81. Rim fragment in clear glass with sparse cut line decoration [G5201 from Tr. 6J (4040)].

Rounded bowls with everted rim (Fig. 7.7)
These bowls seem to relate to the above as they have a similar rim form and often have fine cut lines, though usually in less profusion than on the beakers.
82. Everted rim bowl, very similar to the beakers with double cut line around edge of rim and base, single cut below rim. In clear glass [G5110 from Tr. 6Q (4165)].
83. Similar fragment in clear glass. Cut lines just below rim [G5166 from Tr. 6G (5166)].
84. Undecorated bowl in thin opaque colourless glass [G5052 from Tr. 6J (4040)].
85. Similar bowl in slightly opaque colourless glass with cut line decoration [G5061 from Tr. 6J (40400].
86. Profile of hemispherical bowl in fine clear glass with two lines of cut decoration [G5063 from Tr. 6J (4040)].
87. Bowl fragment in clear glass. Two lines of cut decoration [G5075 from Tr. 6J (4155)].
88. Bowl with slightly expanded rim in fine bluish, bubbly glass [G5068 from Tr. 6H (4075)].

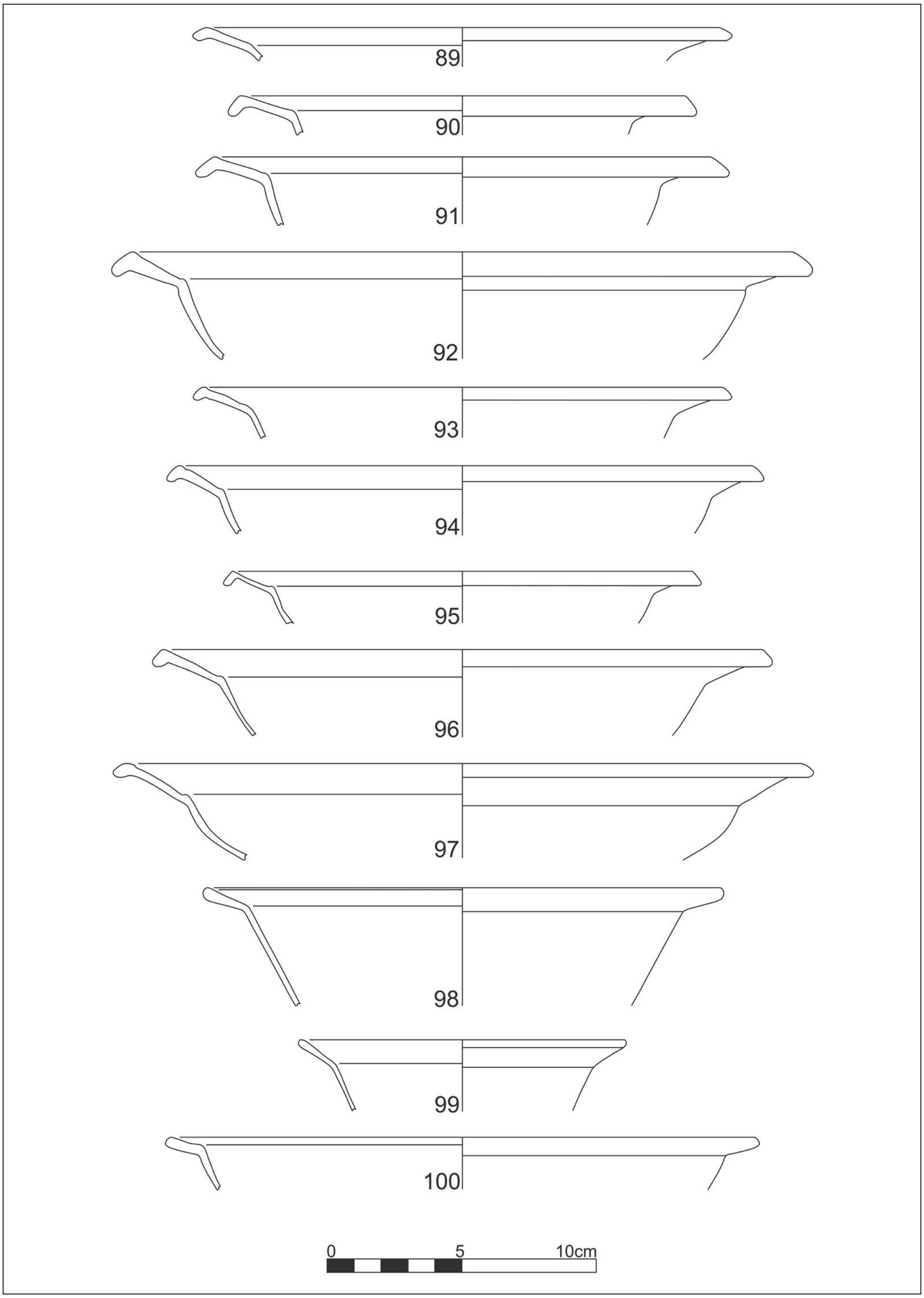


Fig. 7.8. Broad rim bowls.

Broad rim bowls (Figs. 7.8 and 7.9)
These are usually in clear glass and have a broad flat rim up to about 2 cm wide. They are found in a number of variants, the commonest of which terminates in a downward hook. They seem to have been cast in moulds.
89. Rim fragment in clear glass [G5067 from Tr. 6H (4075)].
90. Rim fragment of bowl with overhanging rim in clear glass [G5099 from Tr. 6Q (4165)].
91. Rim fragment of bowl with overhanging rim in glass with a greenish hue [G5107 from Tr. 6Q (4165)].
92. Rim fragment of bowl with overhanging rim in opaque colourless glass [G5100 from Tr. 6Q (4165)].
93. Rim fragment of bowl with overhanging rim in clear glass [G5113 from Tr. 6Q (4165)].
94. Rim fragment of bowl with overhanging rim in clear glass [G5116 from Tr. 6Q (4165)].
95. Rim fragment of bowl with overhanging rim in clear glass [G5121 from Tr. 6Q (4170)].
96. Rim fragment of bowl with overhanging rim in clear glass [G5132 from Tr. 6Q (4166)].
97. Rim fragment of bowl with overhanging rim in clear glass [G5160 from Tr. 2D (1266)].

In some cases the terminal hook is missing.
98. Rim of steep sided bowl with broad rim in clear glass [G1420 from Tr. 6H (4030)].
99. Similar bowl but with greenish tint [G1686 from Tr. 6E (40150].
100. Similar rim in clear glass [G5074 from Tr. 6P (4110)].
101. Similar but rather flatter rim with terminal expansion in clear glass [G5091 from Tr. 6J (4155)].
102. Steep sided bowl in clear glass [G5094 from Tr. 6G (4160)].
103. Shallow bowl with heavier rim in pale green glass [G5115 from Tr. 6Q (4165)].
104. Steep sided bowl with incised line on inner surface of rim. Clear glass [G5176 from Tr. 2B (28020].

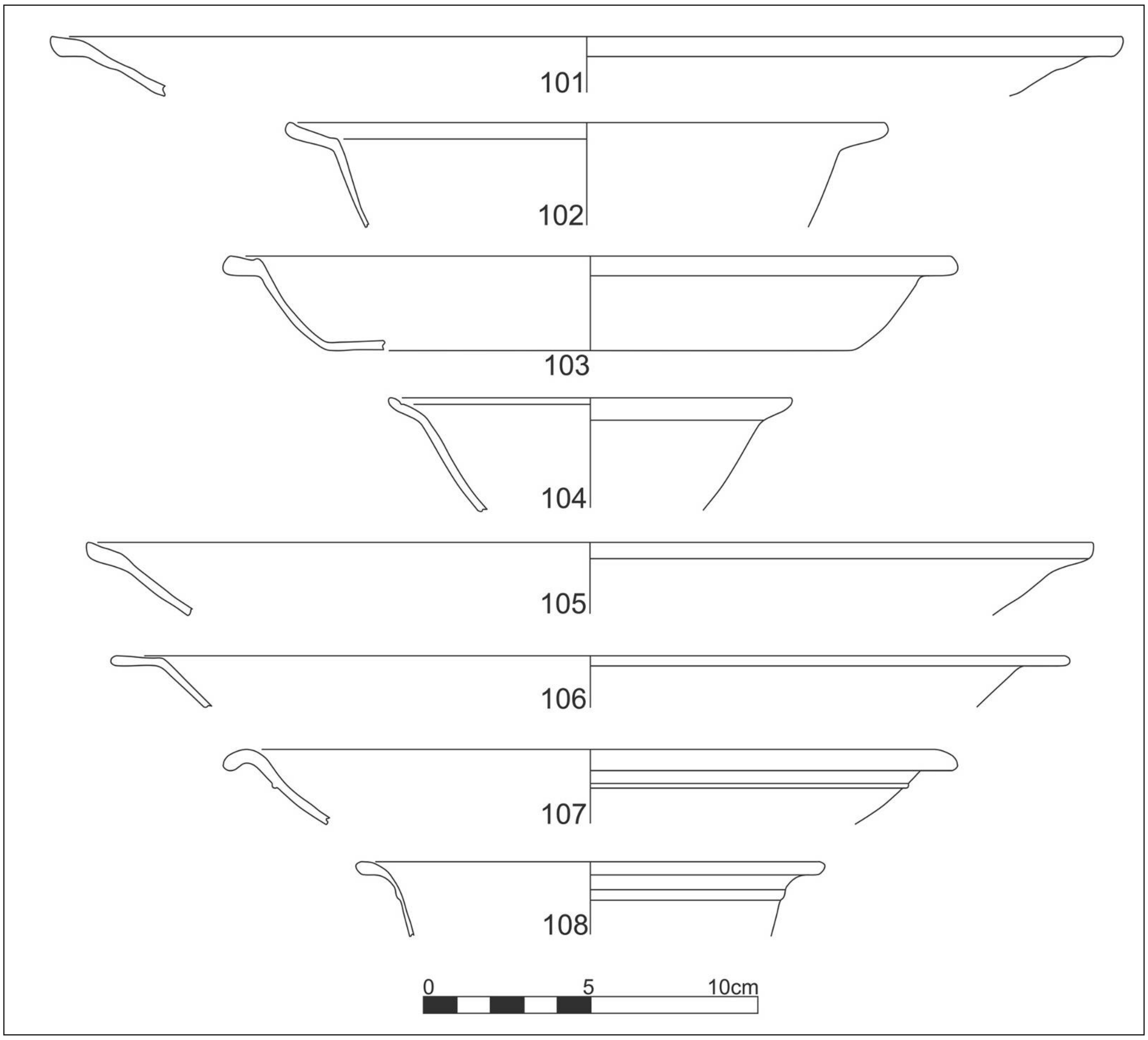


Fig. 7.9. Broad rim bowls, continued.

105. Flat flaring rim in clear glass [G5046 from Tr. 6H (4030)].

More rarely the rim is flat or rolled over
106. Flat rim in high quality clear glass [G1833 from Tr. 8 (8100)].
107. Rolled over rim in clear glass [G5209 from Tr. 8A (8357)].
108. Flat expanded rim with cordon beneath in clear glass [G5033 from Tr. 6J (4040)].

Bowls with a simple flared rim (Fig. 7.10)
These are in a clear glass and the straight rim flares outwards with a rounded termination and no or minimal expansion.
109. Simple flared rim in clear glass [G1724 from Tr. 2B (1538)].
110. Simple flared rim, similar but flatter, in clear glass [G5030 from Tr. 6J (4040)].
111. Simple flared rim, similar but flatter, in clear glass [G5040 from Tr. 6J (4040)].
112. Simple flared rim with cordon, in clear glass [G5133 from Tr. 6Q (4166)].
113. Simple steep sided rim with internal incised line. *Cf.* Whitehouse (2000, fig. 4) for parallel from ed-Dur [G5191 from Tr. 6G (4095)].

Bowls with a flared expanded rim (Fig. 7.10)
These are similar to the above but have an expanded rim termination that may be slightly rolled over in some cases.
114. Bowl with flared rim expanded at end. Translucent colourless glass [G5027 from Tr. 2B (2306)].
115. Similar but with slightly rolled rim. Clear glass [G5028 from Tr. 8 (8005)].
116. Similar to No. 109, but more expanded. Clear glass [G5029 from Tr. 8 (8005)].
117. Similar rim in grey-purple opaque glass with yellow trailed thread across inner surface [G5031 from Tr. 6J (4040)].
118. Similar to No. 109 in clear glass [G5034 from Tr. 6J (4040)].
119. Bowl with markedly expanded rim. Clear glass [G5039 from Tr. 6J (4040)].
120. Bowl with expanded and rolled over rim. Clear glass [G5047 from Tr. 6H (4030)].
121. Bowl with marked terminal expansion of rim. Bubbly clear glass [G5064 from Tr. 6J (4040)].
122. Heavy flared rim without expansion in pale greenish glass [G5124 from Tr. 6Q (4170)].
123. Expanded rim in clear glass [G5149 Tr. 6J (4090)].

Bead rim bowls (Fig. 7.11)
These have near vertical walls terminating in a rounded beaded rim.
124. Straight sided vessel. Rolled over rim with void in middle in blue-green tinted glass [G5050 from Tr. 6J (4040)].
125. Similar rim in slightly opaque clear glass [G5051 from Tr. 6J (4040)].
126. Similar rim in slightly opaque clear glass, but no void and cordon beneath rim [G5070 from Tr. 6H (4075)].
127. Straight sided vessel in thicker clear glass with less pronounced beading [G5111 from Tr. 6Q (4165)].

Miscellaneous bowls (Fig. 7.11)
These forms do not fit the above classification.
128. Complete profile of dish with marked foot–ring, in yellowish glass [G1299 from Tr. 7 (5001)].
129. Bowl with squared rim in clear glass [G1424 from Tr. 6H (4030)].
130. Thick rim with groove just below in clear glass [G1795 from Tr. 8 (8000)].
131. Bowl with sinuous profile in clear glass [G5204 from Tr. 6J (4040)].
132. Straight sided bowl with slightly expanded rim and cordon beneath. Clear glass [G1798 from Tr. 8 (8000)].

Bottles and flagons (Fig 7.12)
These may have no handles, one handle or two handles and they may be round or square. The defining feature is the narrow neck.
133. Bottle neck sherd with folded in rim. Light blue-green glass [G5002 from Tr. 6D (4070)].
134. Rim of flagon with trefoil mouth. Clear glass. These seem to date from before AD 79, but see Harden 723 and 725 (Whitehouse 2000, 103) [G5045 from Tr. 6J (4040)].
135. Aryballos rim, neck and two handles, with trailed on fine threads on neck and body, in glass with light green tint [G1821 from Tr. 8 (8066)].
136. Two handled flagon with folded rim in green glass [G5098 from Tr. 6G (5098)].
137. Neck with folded over rim and a single handle in glass with a pale green tint [G5085 from Tr. 6Q (4165)].
138. Smaller folded rim and a single volute handle in greenish glass [G5217 from Tr. 6G (4095)].
139. Neck with looped, folded-in rim and single handle in pale green glass [G5015 from Tr. 6H (4975)].
140. Neck with S shaped folded rim and traces of a single handle in turquoise glass [G5183 from Tr. 6G (4095)].
141. Handle from flagon or bottle in turquoise glass [G5197 from Tr. 8 (8001)].
142. Handle in turquoise glass [G5189 from Tr. 6G (4095)].
143. Base of square bottle showing ‘cut’ pattern left by mould [G5012 from Tr. 6H (4080)].

Jars (Figs 7.13)
These vessels have a wide neck and may have been designed for storing non-liquid commodities.
144. Rim, shoulder and neck of large vessel in clear glass. S shaped folded rim [G1468 from Tr. 6H (4035)].
145. Wide flared rim in clear glass [G1596 from Tr. 8 (8001)].
146. Vessel with flared everted rim and cordon. Clear glass [G5038 from Tr. 6J (4040)].
147. Similar but profile preserved to carination in body. Clear glass [G1460 from Tr. 6H (4035)].

148. Body fragment with carination and basal foot-ring. Single incised line on underside of body. Clear glass [G1440 from Tr. 6H (4030)].
149. Flared rim with of double ring pattern decoration in clear glass [G5087 from Tr. 6Q (4165)].
150. Flared rim and shoulder of jar with incised line on neck and a very fine incised line on rim. Clear glass (c.f. Whitehouse 2000, fig. 15) for similar jar from ed-Dur, Harden 608 [G1672 from Tr. 6H (4035)].
151. Flared rim with incised lines on neck and below rim in clear glass [G5102 from Tr. 6Q (5102)].
152. Neck fragment with bead rim in purple opaque glass [G5032 from Tr. 6J (4040)].
153. Short necked jar with three incised grooves on girth

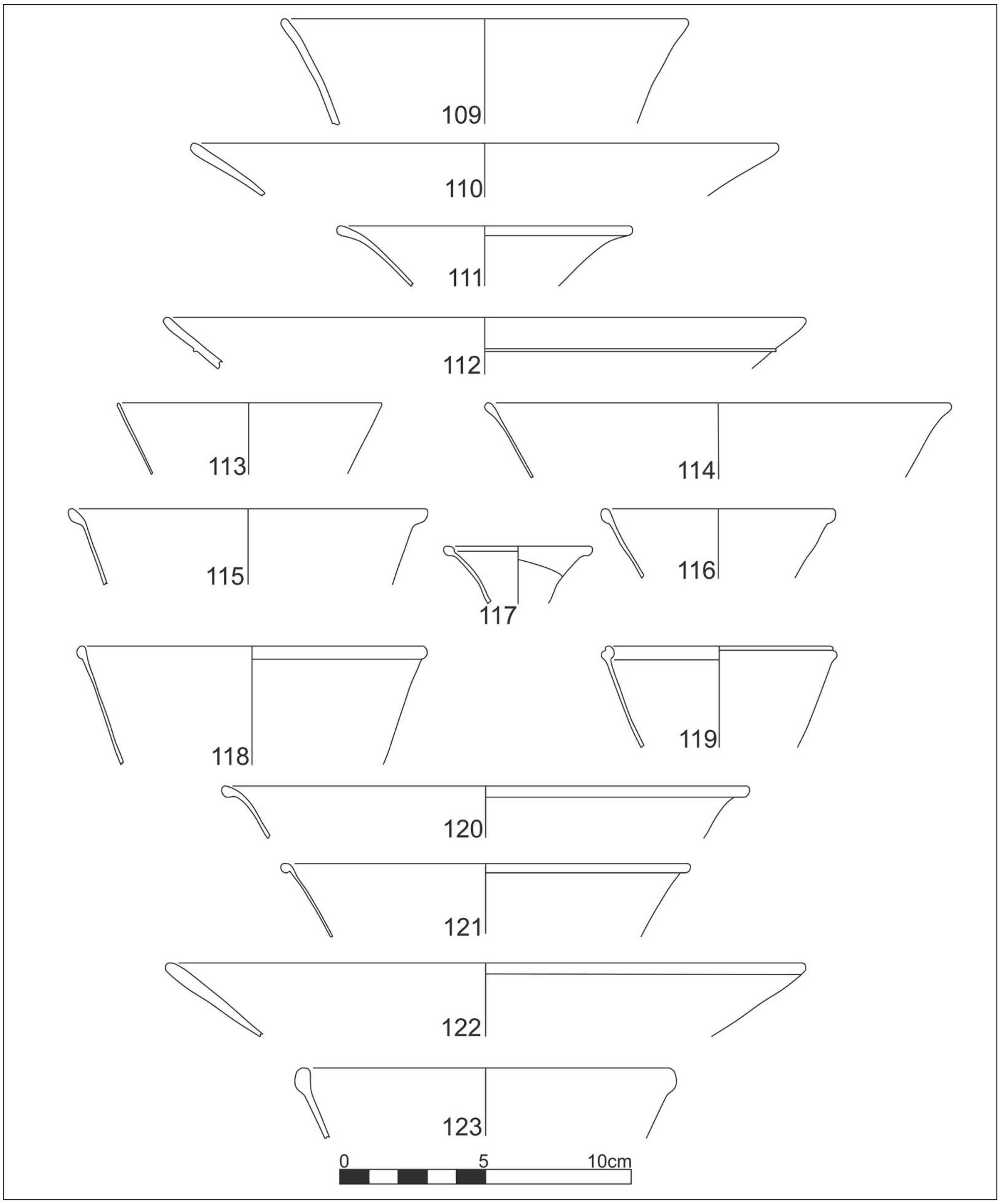


Fig. 7.10. Bowls with simple fared rim (109-113) and bowls with a flared expanded rim (114-123).

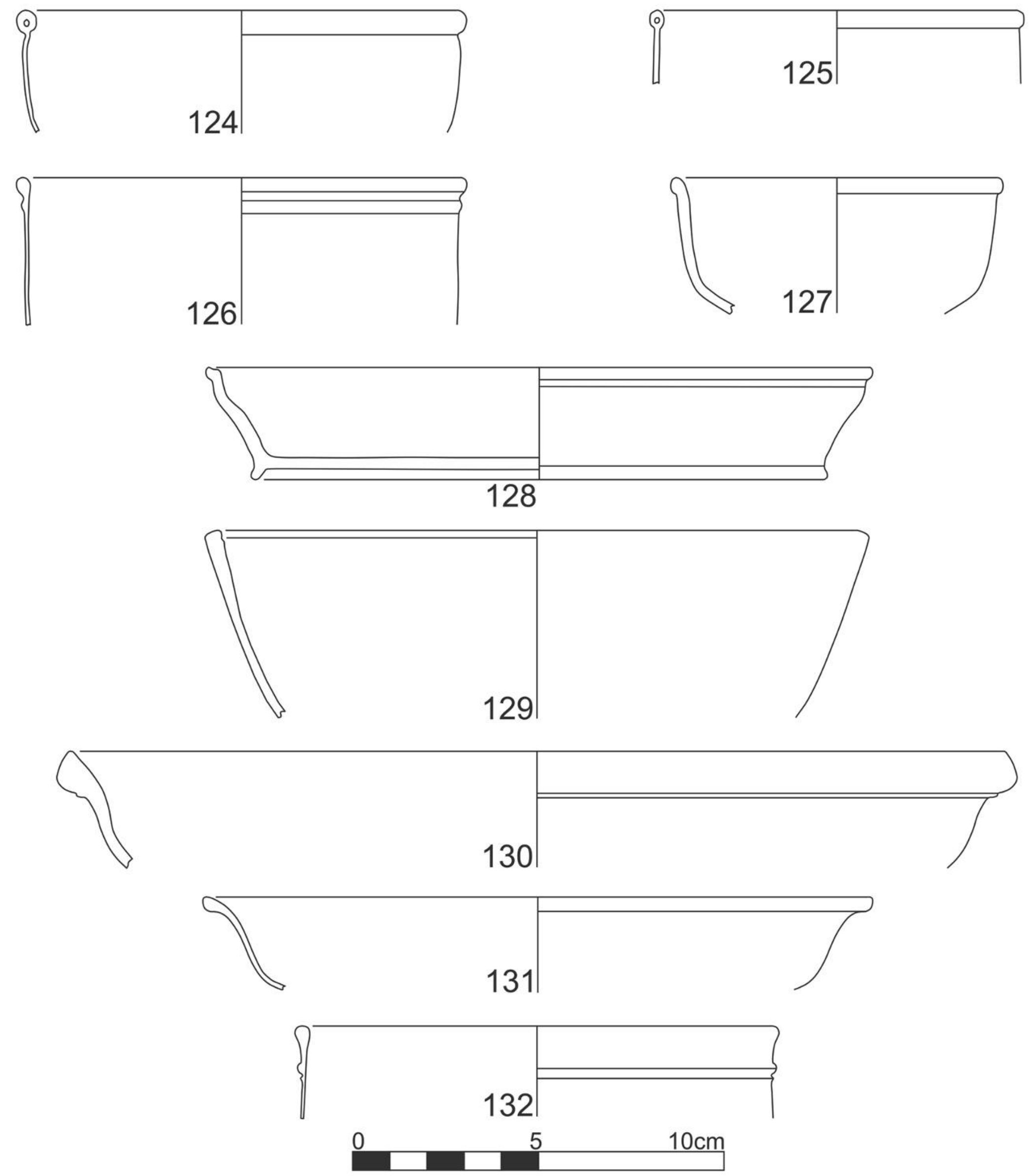


Fig. 7.11 Bead rim bowls (124-127) and miscellaneous bowls (128-132).

[G5101 from Tr. 6Q (4165)].
154. Jar lid? In clear glass [G5056 from Tr. 6J (4040)].

Bases (Fig. 7.13)
155. Base with kick-up and no foot-ring in clear glass [G5162 from Tr. 2D (1266)].
156. Base of beaker with cordon and splayed foot-ring in clear glass [G5018 from Tr. 6J (4040)].
157. Similar base in clear bubbly glass [G5017 from Tr. 6J (4040)].
158. Base with near vertical foot-ring in clear glass [G5086 from Tr. 6Q (5086)].
159. Similar but from a flatter vessel, in clear glass [G5199 from Tr. 6J (4040)].
160. Similar base of bowl in clear bubbly glass [G5016 from Tr. 6J (4040)].
161. Base with kick-up and rolled foot-ring in clear bubbly glass [G5042 from Tr. 6J (4040)].

7.2 Islamic Glass

The amount of glass found in Islamic contexts (late Ayyubid but largely Mamluk) was small in comparison to the large quantities of Roman glass recovered. It comprised vessels, bangles, beads, and a single weight in addition to many indeterminate body sherds.

Glass bangles (Fig. 7.14)
At Quseir al-Qadim glass bangles seem to be uniquely associated with Islamic deposits. A total of 60 fragments were found, 62% comprising largely surface finds from the area of Trench 1. Eighteen percent came from excavated contexts in Trench 3, 11% from Trench 2B, 5% from Trench 2C and 2% each from Trench 2E and Trench 9. Of

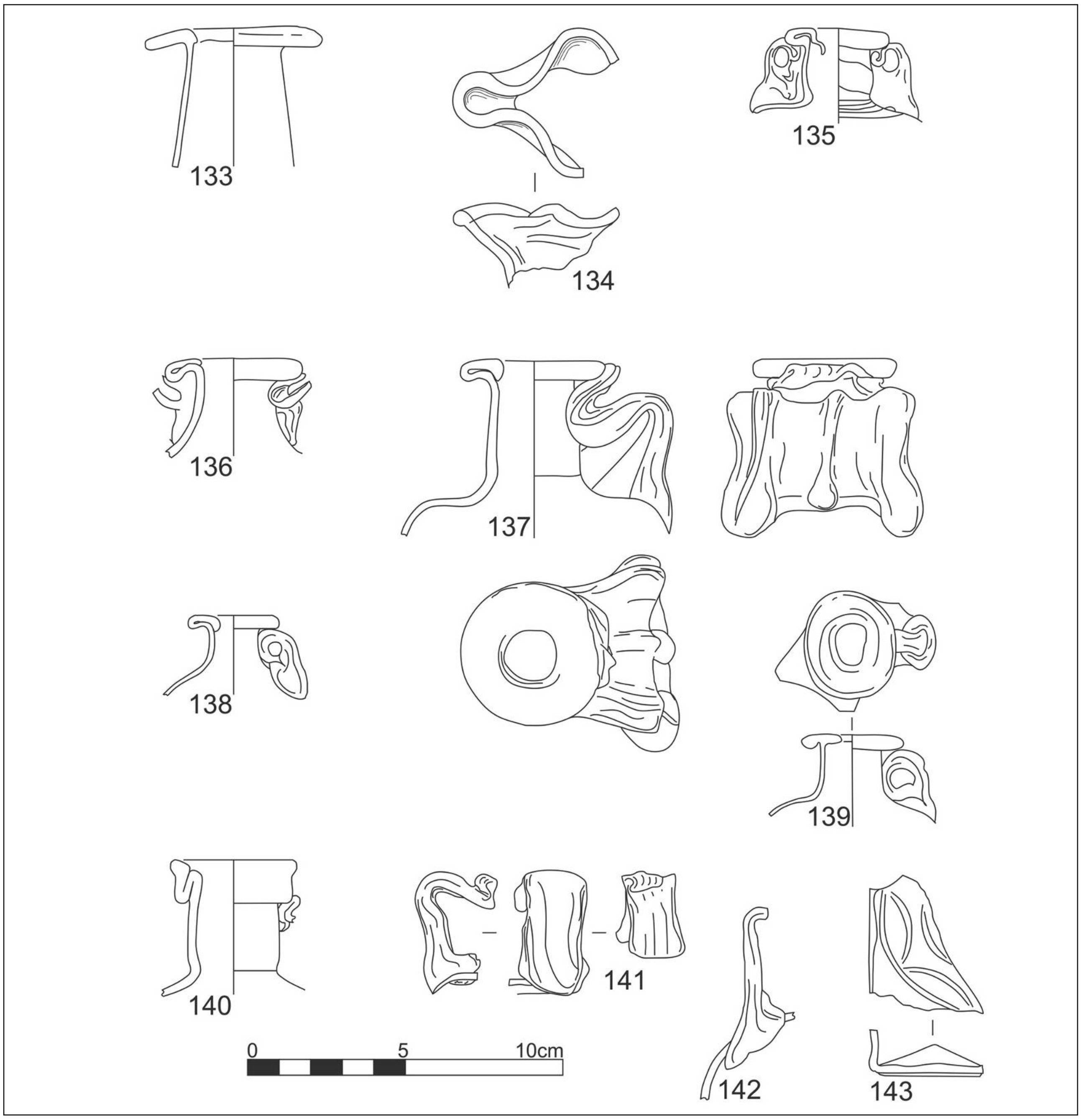


Fig. 7.12 Bottles and flagons.

these 50% are on a blue glass base, 16 % on black and 8% green. The remaining colours are purple, turquoise, yellow and polychrome, all in minimal quantities. The bangles usually have a standard internal diameter of either c. 50 or 60 mm, with very few as small as 45 mm or as large as 70 mm. In cross section they may be triangular, round or hemispherical, and they may be plain or decorated straight or twisted. Most are triangular or round, in equal numbers, with many fewer 'D' shaped or twisted.

Glass bangles are still very popular in countries such as India and Pakistan where they are worn because they are decorative and make an attractive jangle. Production is usually in the hands of Muslims amongst whom they are particularly popular. Glass bangles are, of course, very easily broken, but they are affordable and easily replaced. A 19th century treatise in Persian describes the manufacture in detail and states that a man could produce 400 in a working day (Yahya 1820). Clearly, they must qualify as an early mass-produced artefact and would have been very cheap.

There is evidence for production in Aden at Khanfar, where extensive waste and glass slag has been found and Whitcomb (1982a, 237) was of the opinion that the Quseir examples could have been imported from that source (Lankester Harding 1964). Meyer (1992, 93) also drew attention to this site and added Kawd am-Saila where glass waste has also been found. More recently, the Aden region has been re-examined by King and Tonghini

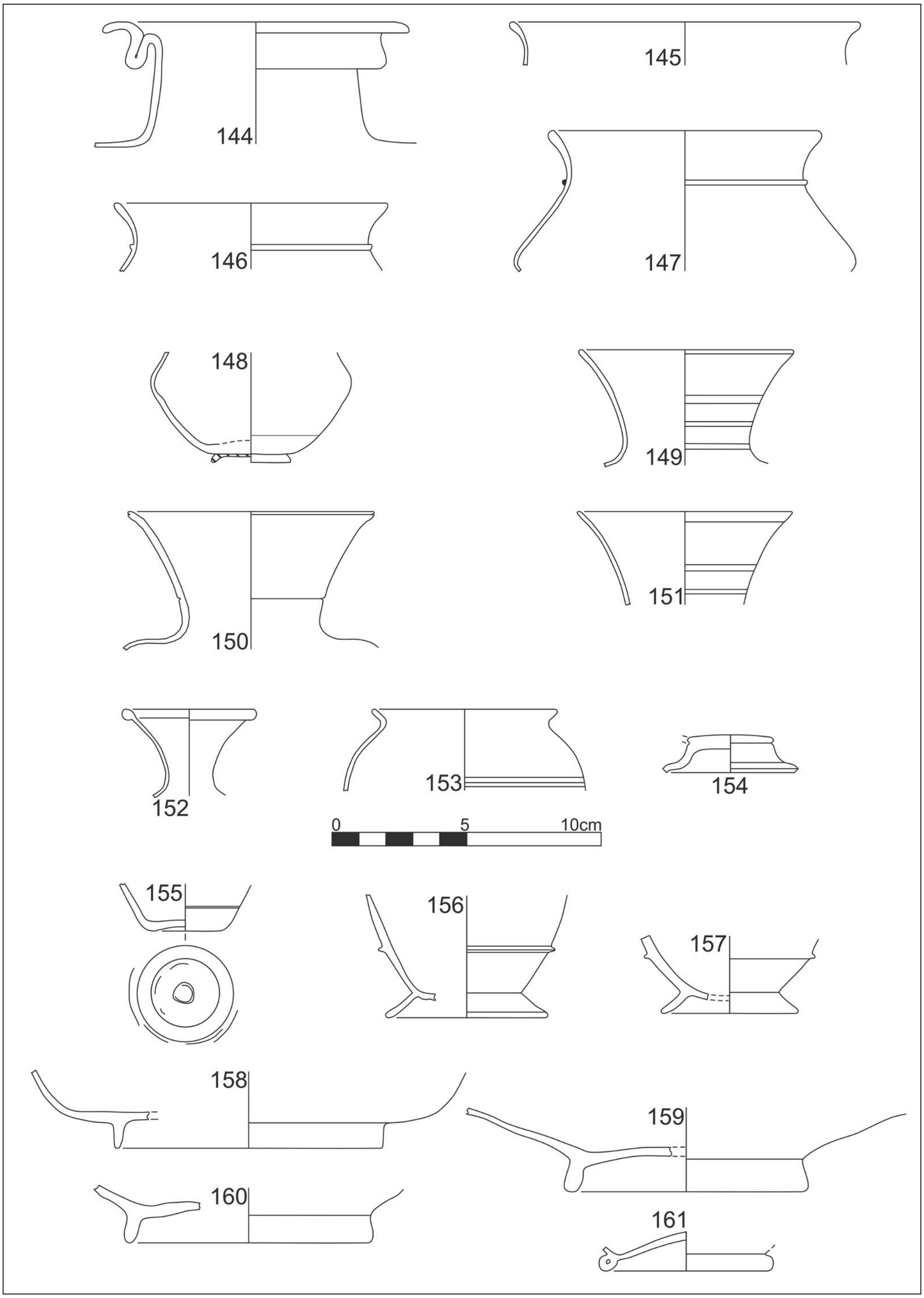


Fig. 7.13 Jars (144-150) and bases (155-161).

(1996). In contradiction to the above, they remark that glass was common on all sites except Khanfar. It appears that bangles were a common find and King and Tonghini (1996, 37) recognised five types:

1. plain green with a triangular section.
2. green with a multicoloured rod and a triangular section.
3. as above but with a more external rod with pressed decoration and triangular section.
4. dark blue with pressed decoration on exterior and hemispherical section.
5. dark blue with a round section – one example.

It appears therefore that the predominant base colour is green in southern Yemen. Only 8% of the Quseir bangles are this colour, suggesting that not many were imported from the Aden region. It is not impossible that some came from India, which seems to be the home of glass bangles, but Syria would be another possibility. Hansman (1985, 80) drew attention to production waste at Khuzistan in southern Iran and suggested this could be the place of manufacture of the finds from the 14th-18th century port of Julfār in the Emirates. Some might be of Indian manufacture.

They seem to have been favoured as a mark of married status, like the wedding ring in Europe (Russell and Lal 1995, 193), and a married woman would have several on her arm. Apparently the tighter the fit, the less the likelihood of breakage and efforts might be made to lubricate a bride's hands so that she could take the smallest size possible. On the death of a husband, a wife might deliberately break her bangles (Dikshit 1969). The breaking of bangles seems to have been a widespread symbol of mourning. Thus, Blank (2001, 84) describes the ritual of bangle breaking in commemorating the death of the Prophet's grandson, Imam Husain. He lost his life in the battle of Karbala (61AH/AD680), now in central Iraq, and as a mark of respect and grief, the Muslim women of Gujarat would break bangles at replicas of his tomb or in emotionally charged processions.

At Quseir al-Qadim the bangle fragments are concentrated in the eastern part of the site in the area of Trench 1 whence 62% of finds came. Meyer's (1992, 178) catalogue of illustrated pieces indicates a similar concentration in the eastern part of the site. This is, of course, the area of greatest Islamic occupation and in closest proximity to the cemetery which suggests that they might have been deliberately broken in a mourning ritual. The majority come from the surface and so they cannot be conclusively dated. They could belong to any period when the cemetery was visible and a known point of reverence.

A selection of the more ornate examples are illustrated but the majority are plain and undecorated.

162. Bangle in a black opaque base imposed with yellow/red/white/black abstract pattern. 60 mm internal diameter 'D' shaped cross section [G1004 from Tr. 1 (surface)].

163. Blue glass - plain with slight horizontal ridges. 50 mm internal diameter, triangular profile [G1008 from Tr. 1 (surface)].

164. Blue glass small with triangular profile Diameter uncertain, triangular cross section [G1015 from Tr. 1 (surface)].

165. Bichrome: black with thin yellow side stripes and yellow prunts. 46 mm internal diameter, round cross section [G1022 from Tr. 1F (400)].

166. Twisted in blue-black and white. 60 mm internal diameter, twisted [G1129 from Tr. 1A (2)].

167. Two fragments in elaborate polychrome with 'floral' decoration on a light green base. 60 mm internal diameter, round profile [G1136 from Tr. 1D (300)]

168. Twisted in blue and white. 60 mm internal diameter, twisted [G1137 from Tr. 1D (300)]

169. Polychrome fragment. Translucent green glass with stripe of red/white herringbone and side stripes of yellow opaque glass. 60 mm internal diameter, ttraingular cross section [G1640 from Tr. 1D (300)].

170. Twisted spiral fragment. Very dark olive green core with spirals of opaque white glass. 50 mm diameter [G1641 from Tr. 1D (300)].

171. Polychrome fragment. Opaque black core with narrow black and white side stripes. 50 mm diameter, round profile [G1643 from Pit 9050 (9052)].

172. Twisted spiral fragment. Black opaque core with applied spirals of yellow and white opaque glass. 70 mm internal diameter [G1644 from Tr. 3 (2014)].

Glass weight (Fig 7.14)

A single glass weight was found. It is in an opaque blue-green glass and has a diameter of c. 27 mm. As it is broken the weight was not recorded. The upper surface has an impression bearing symbols or possibly letters. It is possible to distinguish what appears to be a crescent and perhaps a bird. It comes from an Islamic context [G5072 from Tr. 8A (8251)].

Glass weights are not uncommon on early Islamic sites. Their purpose is not exactly clear, but Goitein (1967, 110) suggested that they were used by Jewish communities for the precise weighing of coins and weights, which was the preserve of the Jews. Certainly they would not be subject to trimming and adulteration as, for example, would lead. Morton (1985) on the other hand thought they were for weighing quantities of food-stuffs. However, the matter cannot be easily resolved, as Shatzmiller (1994, 224) states they bear no trade names of either makers or users.

The single find from Quseir al-Qadim might indicate a small Jewish presence, but the paucity might reflect the date of the site as they are prevalent in the Ummayad period becoming increasingly scarce in succeeding centuries (*ibid*).

Fig. 7.14. Islamic glass bangles (162-172), glass weight (G5072) and decorated bead (B13).

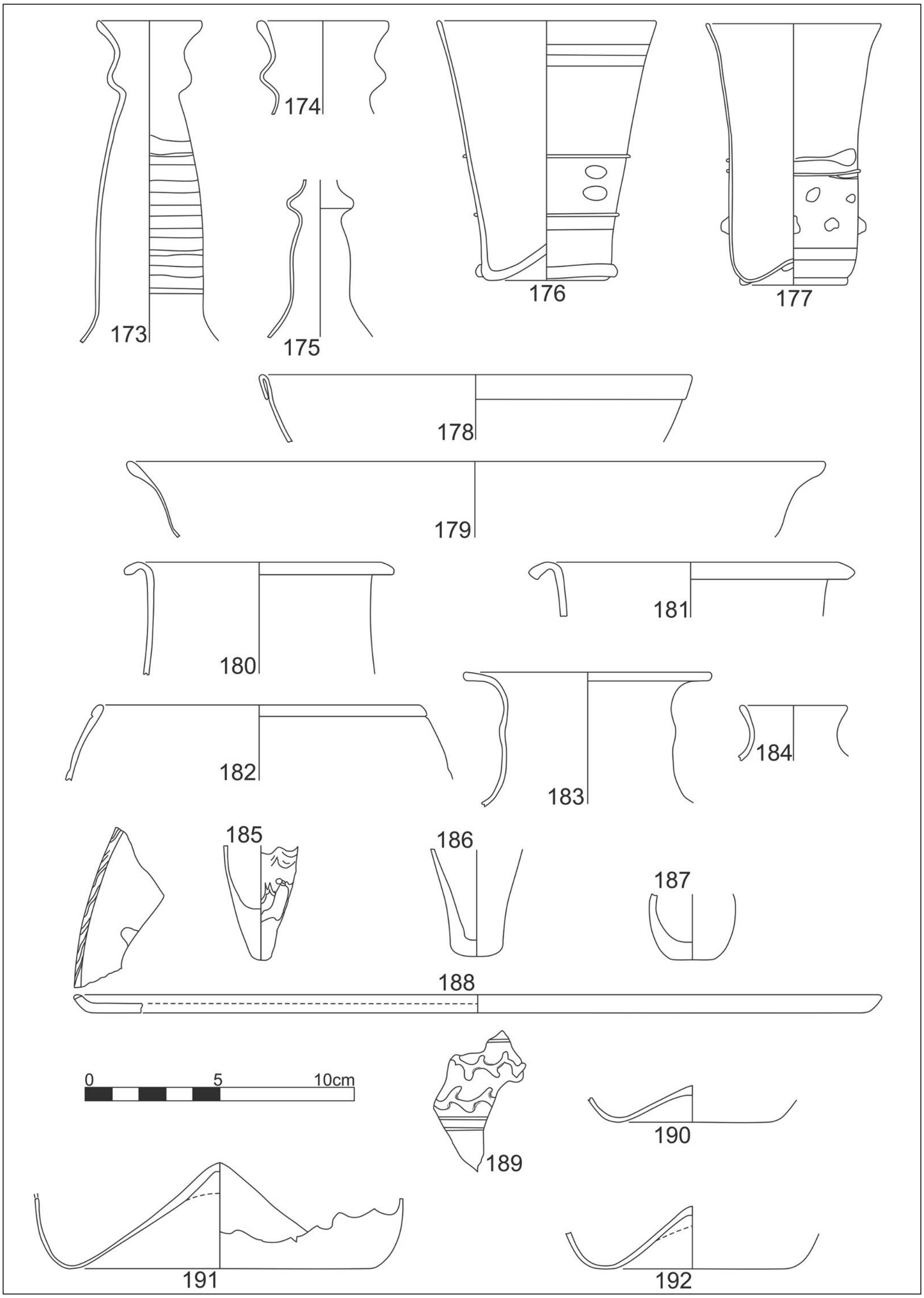


Fig. 7.15. Islamic glass vessels.

Glass beads

Glass beads come from Islamic contexts and eleven were found. Six came from Trench 13, three from Trench 1 and one each from Trenches 5 and 2B. They are all small (< 5 mm) and only one is decorated. Four are blue in colour, three are yellow, and two are either black or green. Particularly striking are two bright blue clear glass beads, both from Islamic contexts [B21 from Tr. 2B (1508) and B17 from Tr. 13 (5022)]. These seem to be very similar to what Francis (1991, 2002) has termed 'Indo-Pacific' and which have a very wide distribution in space and time. They seem to have been made in the 1st century AD at Arikamedu, but there are many other places of production. The examples from Quseir al-Qadim could be residual Roman, but might be from a later phase of the same tradition. This is reinforced by the absence of similar beads on sites such as Fustat (Scanlon and Pinder-Wilson 2001, 119).

The decorated bead is blue with white spots each with a blue centre in the manner of an eye [B13 from Tr. 13 (5520)] (Fig. 7.14). It resembles beads that are still made in Anatolia, from whence it may derive (Küçükerman 1988, figs 45-7), although Meyer (1992, 41) draws attention to the Rhodes bead factory as a possible source. While they could be Roman in date, this example came from firm Islamic contexts, as did Meyer's.

Glass vessels (Fig 7.15)

Very few recognisable vessels were found in the current excavations and only 20 profiles are deemed worthy of illustration. Meyer (1992) had access to a much larger collection and established a typology, which will be loosely adhered to in this section. There seems little point in reiterating the parallels she cites and only newer or more significant parallels are quoted.

Among the collection from the recent excavations the following forms can be recognised:

Bubble neck bottles

Two examples were found in Trench 16 and one in sedimentology Pit 7900.

173. Neck and rim with expansion below, perhaps to facilitate holding. Brown decorated with thread trailed decoration [G5079 from Tr. 16 (16023)].

174. Rim and expansion of similar brown glass bottle [G5139 Tr. 16 (16070)].

175. Neck of bottle in green glass [G5008 from Pit 7900 (7902)].

Unfortunately this form has a long life and a wide-spread distribution.

Beakers with appliqué decoration

Two examples were found both with near complete profiles.

176. Clear glass with trailed blue lines. The base, in blue glass, has a kick-up [G1665 and G1587 from Tr. 2E (6002)].

177. Clear glass with blue trailed decoration and blue base ring. The applied prunts are both clear and blue. Basal kick-up [G5076 from Tr. 16 (16031)].

Bowl with folded over rim

178. The single example is similar in technique to Meyer's 'fruit-stand' with a folded over hollow rim. Yellowish-pale brown glass [G5208 from Tr. 8A (8251)].

Other bowls

179. Bowl in green glass, perhaps similar to Meyer's 'green bowls'. Everted thickened rim [G1792 from Tr. 8 (8000)].

180. Similar to Meyer's 'basket bowl'. Flattened slightly hooked rim in clear glass [G5140 from Tr. 13 (5520)].

181. Similar rim in yellow-green glass [G1733 from Tr. 2B (2008)].

182. Dark blue-black inturned bowl, with white bead just below rim [G1025 from Tr. 1 (surface)].

Necked jars

183. Rim, neck and shoulder of jar in olive green glass. Rim markedly flared [G1595 from Tr. 2C (1018)].

184. Curved upright neck in brown glass [G5134 from Tr. 13 (5520)].

Vial bases

185. Base in dark brown glass with white marvered streaks. The basal point is square in cross section [G5086 from Tr. 16 (16039)].

186. Base in brown-black glass [G5138 from Tr. 13 (5550)].

187. Thickened flat base in opaque dark glass [G5142 from Tr. 16A (16515)].

Plate

188. Flat plate in dark opaque glass. Everted rim with blue and pink barley-sugar twist edge decoration and red patch near centre [G5083 from Tr. 13 (surface)].

Decorated body sherd

189. Body sherd in clear glass with two lines of pinched decoration, two trailed lines above and one below [G1786 from Tr. 2B (15190)].

Kick-up bases

190. Olive green with pontil scar [G1596 from Tr. 2C (1018)].

191. Very bubbly amber glass with pontil scar [G5019 from Tr. 8 (8000)].

192. Olive green slightly opaque glass with pontil scar [G5013 from Tr. 9 (7001)].

8 Terracotta Figurines

Ross Thomas

Introduction

Terracotta figurines are artistic representations of Greek and Egyptian religion produced cheaply and in great quantities for domestic religion practiced within the house, as was common for the Roman period (Bailey 2006, 261; 1996; 2008; 2009). The examples recovered date from the 1st century BC through to 2nd century AD, but represent religious and artistic practices that developed in Greek and Egyptian society prior to the Roman annexation of Egypt. Terracotta figurines were either modelled by hand or, as in the majority of the cases found at Myos Hormos, were mould made, pressed against a bivalvular mould carved in reverse into wood, plaster or stone. All examples here appear to have been brought from the Nile, made from Nile silt clay pressed into the mould. The separate halves and protuberances (such as arms), were joined with barbotine (clay and water). A good example of this is C257, where the front and the back of the head were made in a bivalvular mould and pressed together, the two halves subsequently separated when broken or discarded. The figurines were hollow with a vent to allow for the escape of steam during firing in a kiln at about 600 to 800°C. The figurine was subsequently slipped, in these cases usually with a white gypsum slip, and then painted with natural mineral dyes in black and red, though yellow and blue were also common in antiquity.

The figurines have a religious function, most likely used in the household, though it is possible that they are discarded votive offerings from a temple, broken as part of the ritual or to avoid recovery and reuse (Bailey 2006, 261-5; 1996; 2008; 2009). Their low cost would have made them widely available and show that at least some of the inhabitants of Myos Hormos predictably followed the common religious practices of Greco-Roman Egypt. They are the most common religious representations found on site, with only a single copper alloy representation of Herakles from Trench 7A (M444 see Chapter 10, this volume) and a marble arm of a small statuette from Trench 8 (L119 see Chapter 11, this volume) being the only other material representations of gods and goddesses found on site. The identifiable statuettes come in four main groups; depictions of the goddess Isis-Hathor, female beneficent demons, Sothic dogs, and what resembles a phallus or finger. Isis depictions include 'Hathor' style Isis figurines, naked, standing straight with arms at their sides. A second type has the sun disk and the horns of Hathor. The third is Isis suckling the infant Harpokrates (Horus).

The figurines, all fragmentary pieces, were distributed widely across the whole site within domestic rubbish deposits. All areas had Isis and benificient demon figurines represented, but all phallus/finger examples were found in the northern area. The Sothic dog was found in the harbour area, significant perhaps as it represents the dog star used for navigation and to help determine the timing of the sailing season (see below). Six statuettes were from late 1st to 2nd century AD dumps within the town, from Trench 2B in the east and Trench 6Q in the west. Six statuettes were from 1st BC to 2nd AD harbour deposits of Trenches 10A and 7A but mainly from Trench 12. The majority (12) were found in 1st century AD rubbish dumps to the north of the town (Trenches 6P and 6E), mainly around the northern tower (Trench 6P).

8.1 Catalogue

1. Faience or ceramic. Small naked torso from a figurine, probably male. Late 1st-2nd century AD. No parallel [C0005 from Tr. 2B (1538)] (Fig. 8.1).
2. Fragment of moulded figure of a dog. Front legs, chest and neck of a Sothic dog, or spitz-type hound, with typical double strand collar with bell shaped pendant bulla. The Sothic dog of Isis was associated with Sirius, the brightest star and part of the constellation Canis Major, whose heliacal rising (rising before the sun on the eastern horizon) marked the Nile flood and the dog days, so named because of its close proximity to the sun was believed to be the cause of the hot summer days. It was believed to be the residence of the soul of Isis. It also marks the time when sailors would leave from Myos Hormos to reach the Arabian ports of Cella or Cane (Pliny *NH* VI XXVI 101-4). Red-brown fabric, probably Nile silt, with traces of black and white paint preserved in the hollows of the fur. Mid-1st/early 2nd century AD (cp. Ashmolean Museum 1872.1047 and 1949.746, Fayum; Bailey 2006, 37, 275; Bayer-Niemeier 1988, no. 643, dated AD 200 and no. 627, dated second half of 2nd century AD; British Museum 1972,

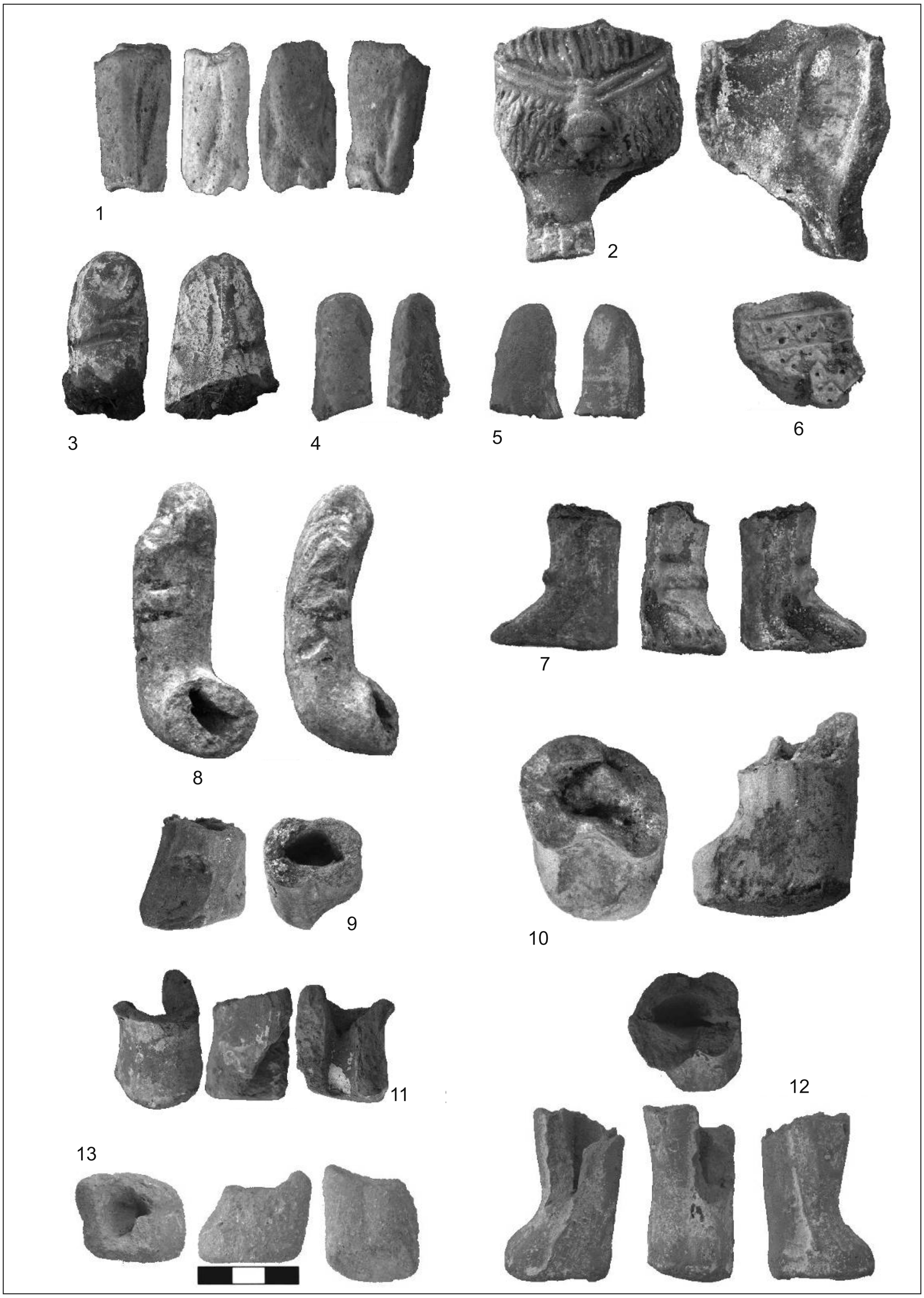


Figure 8.1. Terracotta figurines from Myos Hormos, nos 1-13.

0125.5 from Fustat and BM49537 from Oxyrhynchus and BM61601, all 1st-2nd century AD; Besques 1992, no. D/E 4540, Middle Egypt, late Hellenistic; Fischer 1994, no. 1125, dated 2nd-3rd century AD; Petrie Museum uc48334 and uc48304, from Memphis) [C214 from Tr. 12 (7361)] (Fig. 8.1).

3. Figurine member fragment made of Nile silt. Uncertain whether this represents a Phallus or finger. 1st century AD, no good parallels [C261 from Tr. 6P (4110)] (Fig. 8.1).

4. Figurine member fragment made of Nile silt. Uncertain whether this represents a Phallus or finger. 1st century AD, no good parallels [C264 from Tr. 6P (4110)] (Fig. 8.1).

5. Figurine member fragment made of Nile silt. Uncertain whether this represents a Phallus or finger. 1st century AD, no good parallels [C260 from Tr. 6P (4110)] (Fig. 8.1).

6. Ceramic figurine fragment with incised pattern of lines and dots. Burnt. Late 1st-2nd century AD, no good parallels [C040 from Tr. 2B (1008)] (Fig. 8.1).

7. Mould made, ceramic figurine of a right foot with anklet and painted decoration. Late 1st century AD, parallels with naked Isis-Hathor statues listed with catalogue No. 19 below [C013 from Tr. 6E (4015)] (Fig. 8.1).

8. Moulded ceramic figurine outstretched and raised right forearm and hand. Probably from a beneficent demon, a protective spirit (Bailey 2006, 269-70, nos 13- 21). First half 2nd century AD [C248 from Tr. 12 (7318)] (Fig. 8.1).

9. Moulded ceramic figurine legs and feet, probably covered by long skirt (Bailey 2006, 266-7, nos 5, 7-8). May be from a representation of Isis-Hathor, or more likely a benificient demon. Late 1st /early 2nd century AD [C280 from Tr. 6Q (4165)] (Fig. 8.1).

10. Nile silt moulded ceramic figurine legs and feet, probably covered by long skirt, covered with a whitewash (Bailey 2006, 266-7, nos 5, 7-8). May be from a representation of Isis-Hathor, or more likely a benificient demon. Mid-1st/early 2nd century AD [C236 from Tr. 12 (7328)] (Fig. 8.1).

11. Nile silt moulded ceramic figurine legs and feet, probably covered by long skirt (Bailey 2006, 266-7, nos 5, 7-8). May be from a representation of Isis-Hathor, or more likely a benificient demon. 1st century AD [C262 from Tr. 6P (4110)] (Fig. 8.1).

12. Nile silt moulded ceramic figurine naked legs and feet (Bailey 2006, 266-7, nos 5, 7-8), painted black over whitewash. May be from a representation of Isis-Hathor, or more likely a benificient demon. 1st century AD. [C258 from Tr. 6P (4110)] (Fig. 8.1).

13. Moulded ceramic figurine legs and feet, probably covered by long skirt (Bailey 2006, 266-7, nos 5, 7-8). May be from a representation of Isis-Hathor, or more likely a benificient demon. Late 1st/2nd century AD [C038 from Tr. 2B (1008)] (Fig. 8.1).

14. Mould made figure Isis-Hathor wearing a headdress including the sun-disc and horns of Hathor flanked by leaves. The hair is collected at the back in a bun. Covered in whitewash, over painted with red and black details for the hair, eyes and sun. Late 1st/early 2nd century AD, good parallels as a depiction of Isis-Hathor (British Museum BM37575 & BM37586 Egypt 3rd century BC to Roman; Warmenbol 1998, 270, pl. 2:2) [C285 from Tr. 6Q (4170)] (Fig. 8.2).

15. Nile silt benificient demon. Mould made figurine head with curly hair with centre parting, made from Nile silt and in two parts. Face is painted white with black hair and details around the eyes. Drilled hole for earring. 1st century AD, good parallels for this as a benificient demon (Allard Pierson Museum 7468; Ashmolean Museum, 1966.1060; Bayer-Niemeier, 1988, no. 261, also no. 307, late 3rd century AD; Besques 1992, no. E 392, Middle Egypt, 1st century AD; British Museum BM49531 Oxyrhynchus 2nd-early 3rd century AD, BM68547 Naukratis 2nd century AD; Castiglione 1969, pl. xic, early 3rd century AD; Török 1995, nos 174–7) [C257 from Tr. 6P (4110)] (Fig. 8.2).

16. Mould made figurine head with high built up hair with many curls, made from Nile silt. Face is painted white with black hair and details around the eyes. Drilled holes for earrings. Mid-1st/mid-2nd century AD, good parallels for this as a benificient demon (Bailey 2006, 268, nos 9-11 Mons Claudianus Trajanic - Antonine; Bayer-Niemeier 1988, nos 316, and 328, Fayum, Antonine; British Museum BM37599, Elephantine, late 1st-2nd century AD) [C247 from Tr. 12 (7326)] (Fig. 8.2).

17. Ceramic mould made figurine head with high built up hair with many curls. Face is painted white with black hair and details around the eyes. Drilled hole at top. Late 1st/early 2nd century AD, see parallels listed for catalogue No. 16 above as a benificient demon [C281 from Tr. 6Q (4165)] (Fig. 8.3).

18. Nile silt back of head and hair with traces of paint. Goddess or more likely a benificient demon. Late 1st century AD, no good parallel [C017 from Tr. 6E (4015)] (Fig. 8.3).

19. Mould made ceramic representation of Isis-Hathor. Part of hand on naked thigh. Closest parallels are of Hathor figures, representations of a naked standing Isis-Hath or. Late 1st BC-early 1st century AD, parallels dating from the 3rd century BC to 3rd century AD are well known and apply to C013, C210 and C259 also (Ashmolean Museum, no. 1896-1908.E7732, Naukratis; British Museum BM22153 2nd century AD, Tanis, BM37578, Egypt 3rd-2nd century BC, BM26265 and BM26265 Tuna el-Gebel, 2nd-1st century BC; Dunand 1979: no. 52 & 54; Dunand 1990: no. 328, Antinoopolis; Fischer 1994: 331-2, no. 810-1, 813, late 1st AD; Fjeldhagen 1995, no. 50, late 1st AD; Nachtergael 1985, 232) [C177 from Tr. 7A (10011)] (Fig. 8.3).

20. Fragment of the right thigh and pubic area of a mould made, ceramic figurine of naked Isis-Hathor. Slipped in gypsum or whitewash then painted. Late 1st/early 2nd century AD, parallels listed with catalogue No. 19 above [C210 from Tr. 6P (4100)] (Fig. 8.3).

21. Nile silt Isis-Hathor? Fragment of the right thigh and pubic area of a mould made, ceramic figurine of naked Isis-Hathor. Made of Nile silt and slipped in gypsum or white wash then painted. 1st century AD, parallels listed with catalogue No. 19 above [C259 from Tr. 6P (4110)] (Fig. 8.3).

22. Ceramic figurine fragment of a female wearing a shawl seated on a high backed throne with head tilted to the right and right arm above left breast as if breast feeding. Traces of white paint and poorly preserved. 1st century AD, good parallels exist for this composition as Isis suckling Harpokrates (Bayer-Niemeier 1988, nos 220 and 221, mid 3rd century AD; British museum BM37497, Saqqara AD 200; Dunand 1979, nos 1-4 Fayum and Theadelphia; Dunand 1990, nos 369-372 Antinoopolis, 2nd–3rd century AD; Fischer 1994, 342 nos 844, 849, mid-2nd/early 3rd century AD; Petrie Museum uc50481-2 and uc50522, Fayum; Pingiatoglou 1993, no. 8, 2nd century AD; Tran Tam Tinh, 1978, pl. ccxxi, 1st century AD) [C265 from Tr. 6P (4110)] (Fig. 8.3).

23. Fragment of a Nile silt figurine. Painted corner fragment of a base or seat like those of the Isis suckling Harpokrates example catalogue No. 23. 1st century AD, too fragmentary for parallel [C263 from Tr. 6P (4110)] (Fig. 8.3).

24. Two painted fragments of a statuette. 1st century BC-2nd century AD, unidentified with no parallel [C252 from Tr. 10A (3774)] (Fig. 8.3).

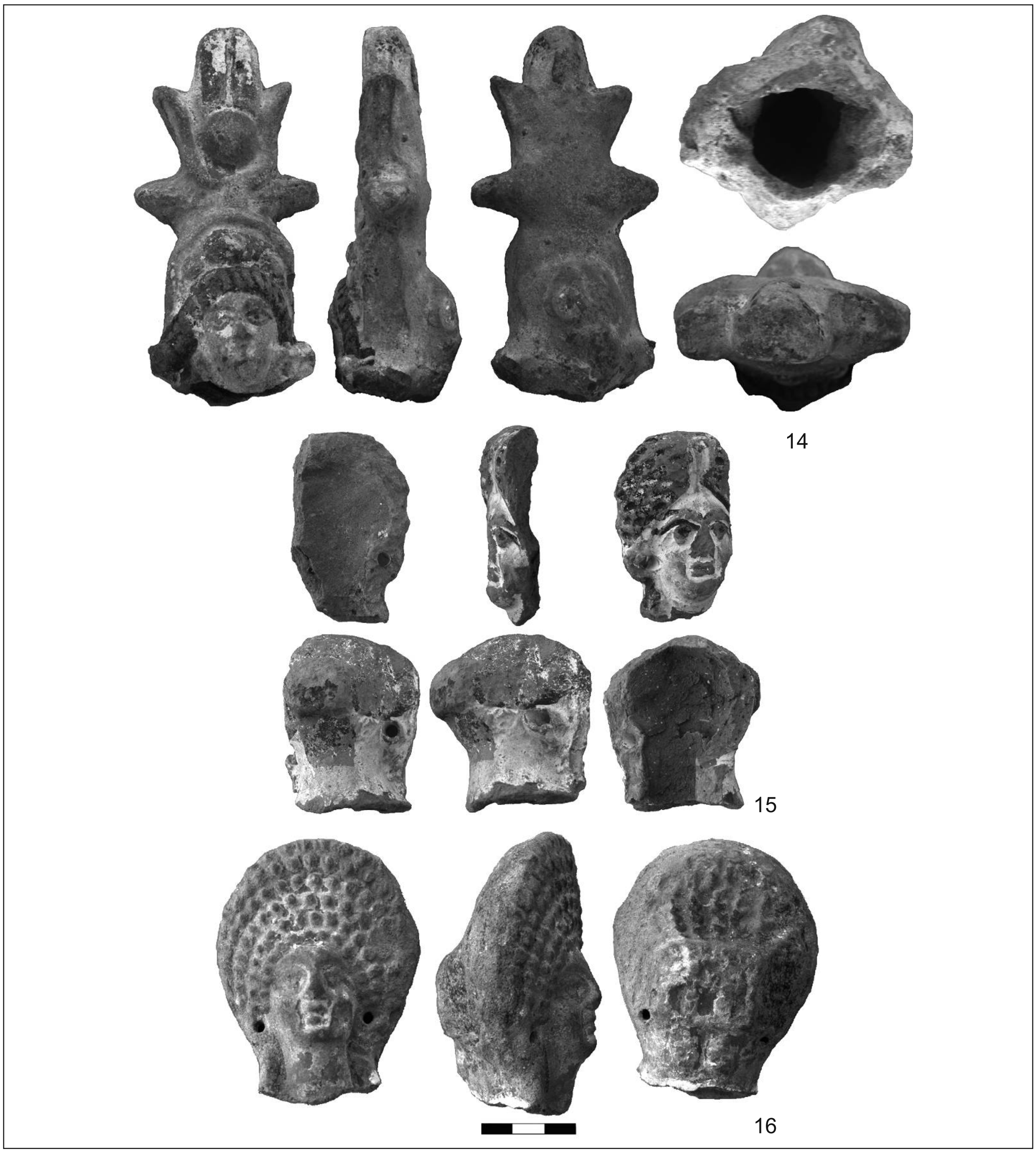


Figure 8.2. Terracotta figurines from Myos Hormos, nos 14-16.

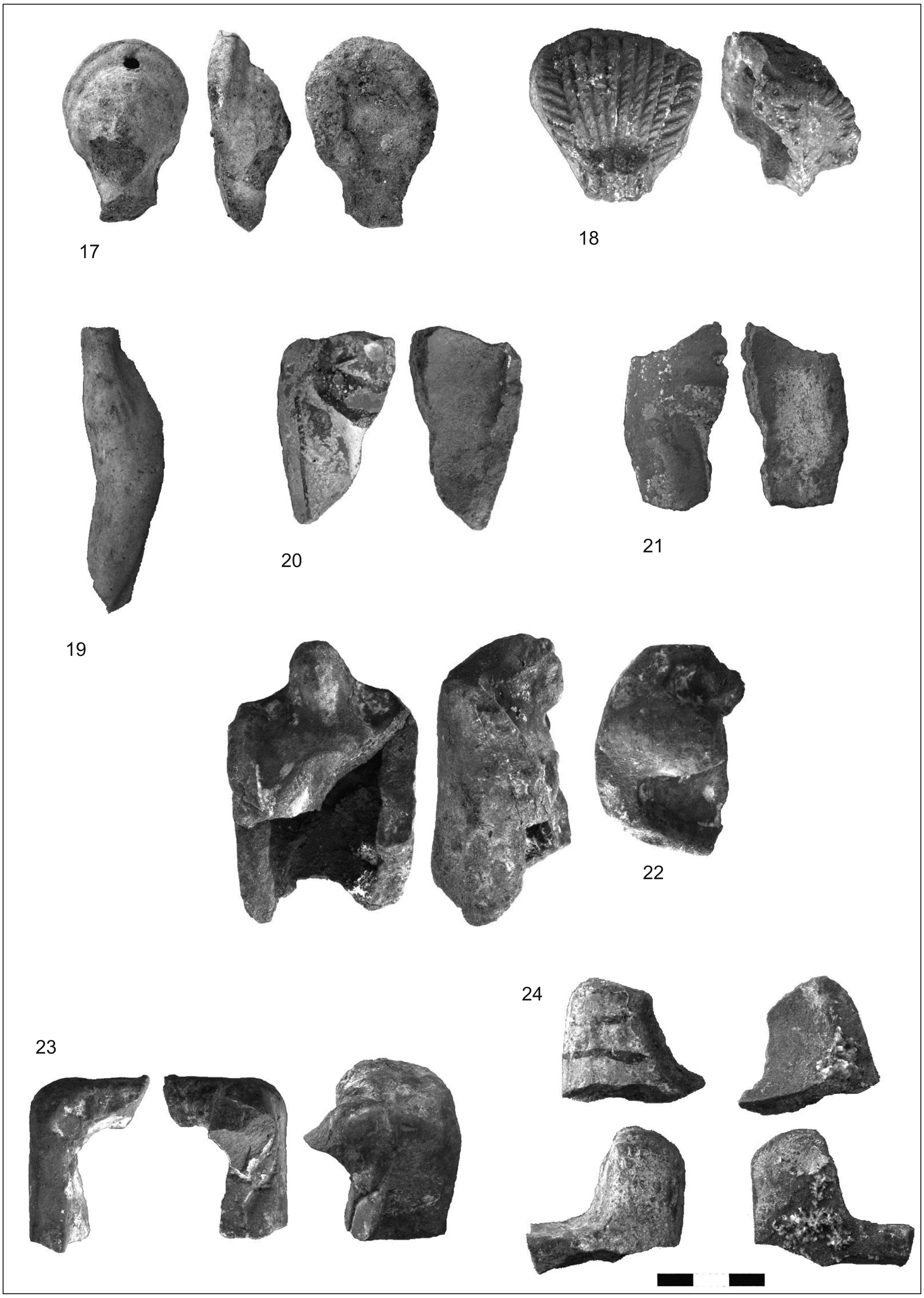


Figure 8.3. Terracotta figurines from Myos Hormos, nos 17-24.

9 Ptolemaic and Roman Coins

David Peacock

Introduction

Comparatively few Ptolemaic and Roman coins were found, perhaps due to the absence of secure late Roman deposits. Those coins that were recovered present problems and are difficult to identify with certainty. Firstly, the acidic sand conditions do not favour the good preservation of metal and many are badly eroded and decayed even after careful cleaning. As a result of this most coins are a mere palimpsest of the originals and have little more than a silhouette of a head or reverse motif. Lettering, which can be important in precise identification, is generally absent. Identifications must be based on size and general similarities to better preserved, published examples. There is thus a measure of uncertainty in most identifications and sometimes it is possible to do little more than suggest a broad time span within which the coin may fall. Secondly, they are mostly very worn and were clearly in circulation for a very long time: it seems that Myos Hormos was starved of newly minted issues, which in turn might suggest that their main function was to facilitate internal transactions rather than being a medium for long distance trade. In Britain before the introduction of decimal currency in 1971, it was not unusual to find Victorian coins, 100 years old or more, still in circulation and it appears that the same may have been true of Myos Hormos.

This report is arranged by trench. It begins with the deposit which the pottery suggests to be earliest (Trench 7A), followed by the harbour-side Trenches 12, 15 and 7. Finally, finds from the upper town (Trench 8A) and *sebakh* Trenches (6) are listed. Only fourteen coins show sufficient detail to make them worth reporting and all seem to be, unsurprisingly, from the Alexandria mint. They range in date from 2nd century BC to 2nd AD (Antoninus Pius) and most are of bronze, with three of billon. Perhaps the only surprising aspect is the three coins, potentially ascribable to Livia, wife of Augustus. See also Appendix 1, where Sidebotham lists more coins including one earlier Ptolemaic example

Abbreviations: Authors and their catalogue number are quoted, with full references to be found in the bibliography. RPC = Roman provincial coinage.

9.1 Trench 7A

1. AE 26 mm.
Obv. Vague bust, could be male or female, facing right.
Rev. Indistinct standing figure probably facing left. Appears to be holding something on right arm. Possibly Athena holding Nike.
Comment: This coin is very worn and difficult to identify with any certainty. It might be Livia, c.f. Geissen 42. AD 12/13. Athena holding Nike was commonly used under Antoninus Pius, given the find context this seems unlikely [N65 from Trench 7A (10014)].

2. AE 20 mm
Obv. Worn female head facing right with hair bun.
Rev. Worn and illegible.
Comment: c.f. Noeske 383 for similar head profile and coin size. Svoronos 1872. Probably Cleopatra VII, 51-30 BC [N65bis from Trench 7A (10014)].

3. AE 26 mm
Obv. Worn female head facing right with hair bun
Rev. Worn traces of feet of eagle facing left.
Comment: This matches exactly Noeske 380 and Svoronos 1871-2. Cleopatra VII. 51-30 BC [N67 from Trench 7A (10012)].

4. AE 31 mm.
Obv. Totally corroded away
Rev. Two eagles side by side, traces of lettering around periphery of which only Π is legible. Punch hole in middle.
Comment: This is a Ptolemaic coin close to Svoronos 1424 or Noeske 212. Ptolemy VI Philometor, 180-146 BC. The double eagle was also used by other rulers such as Ptolemy IX Soter and Ptolemy II Philadelphus, but inspection of the illustrations furnished by Svoronos, suggests that Soter's eagles are generally closer together and in the case of Philadelphus, the right eagle is taller than the left. Here the left eagle is very slightly taller [N070 from Trench 7A (10012)].

5. AE, 25 mm.
Obv. Totally corroded and illegible.
Rev. Six ears of corn tied together. Traces of inscription across diameter of which only the letters]EB[are reasonably certain. Probably ΣΕΒΑΣΤΟΣ,
Comment: cf. RPC 5026. Milne 18-19. Augustus, AD 1-5 [N205 from Trench 7A (10012)].

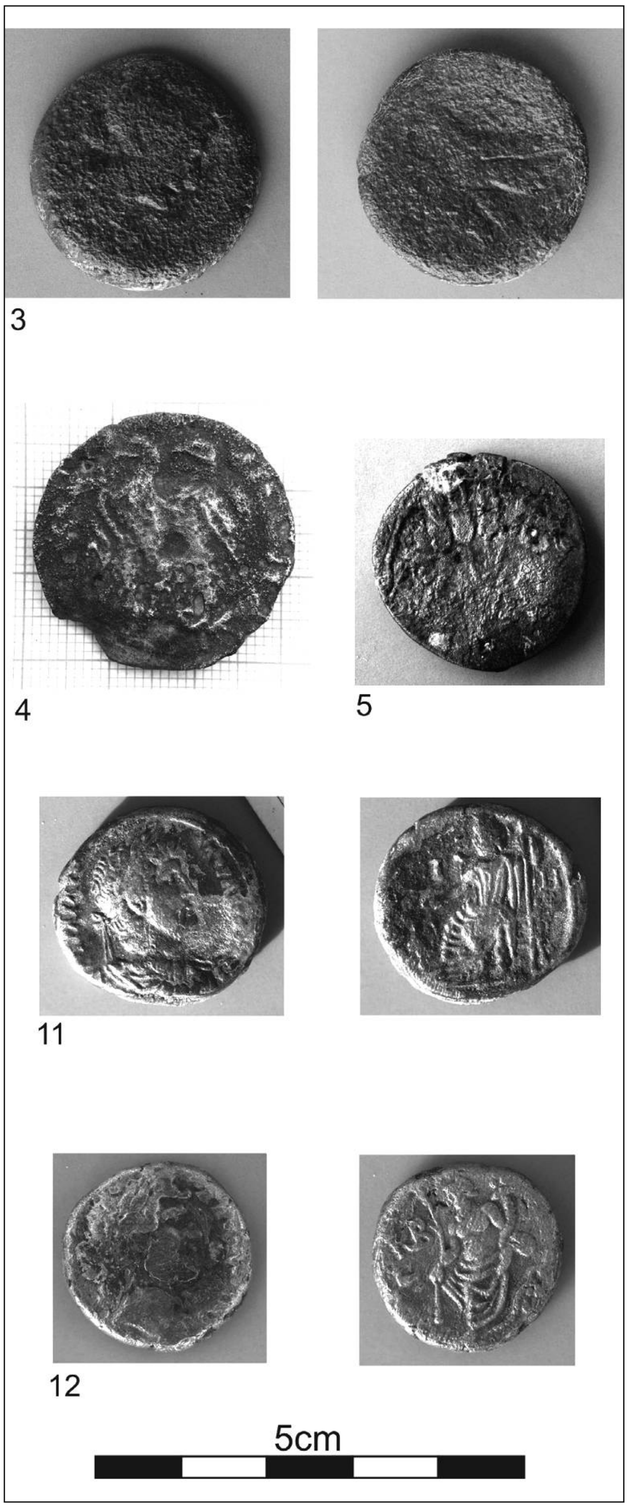


Fig. 9.1. Selected coins from the catalogue.

Comment on Trench 7A

The five coins from Trench 7A are of considerable interest. The presence of three Ptolemaic coins suggests that Ptolemaic occupation might be found in this area perhaps well below the current water table. No. 4 is 2nd century BC in date and is the earliest object yet found on the site. The latest coins are No. 5, Augustus and No. 1, perhaps his wife Livia. Both are worn, suggesting late Augustan deposition. This accords well with the pottery dates (Peacock and Blue 2006, 73).

9.2 Trenches 7, 12 & 15 (Harbour-side)

6. Billon 26 mm.
Obv. Radiate male head facing right
Rev. Female head facing left. With legend ΠΟΠΠΑ[.
Comment: This is a coin of Nero and his wife Poppaea. c.f. Förschner 112, Geissen 157-9, Milne 217-221, AD 63-64 [N201 from Trench 15 (150230].

7. AE 24 mm
Obv. Corroded female head facing right.
Rev. Corroded wreath, laurel or oak, with trace of lettering in middle.
Comment: The condition of this coin makes its identification very difficult, but the distinctive line of the nose compares with Dattari Tav 1, 72. If this is correct the head would be that of Livia and thus the wreath would also be in keeping. c.f. Milne 30-31 [N206 from Trench 12 (7374)].

8. Billon 24 mm
Obv. Very worn male head facing right. Laureate but not radiate.
Rev. Head of a youth or god, probably unadorned. Corroded with a crack across brow.
Comment: This coin is difficult to place with certainty, but it appears to be an issue of Hadrian. The reverse head resembles Hermanubis, c.f. Milne 1207 [N215 from Tr. 12 (3705)].

9. AE 25.5 mm
Obv. Completely worn away.
Rev. Very worn outline of Canopus probably facing right.
Comment: This coin cannot be dated very precisely but the use of the Canopus motif suggests the 2nd century (Trajan – Antoninus Pius). c.f. Milne 635, Geissen 375-6 [N200 from Tr. 12 (7351)].

10. AE 33 mm
Obv. Faint profile of a rather long head facing right. Laureate and bearded.
Rev. Faint traces of the lower part of a reclining figure, perhaps with one hand raised. It could be Euthenia or Nilus, but the preservation does not permit distinction.
Comment: The shape of the head suggests an Antonine emperor, almost certainly Antoninus Pius. The size would also fit this assignation as would the reverse motif. It is certainly 2nd century in date, perhaps AD 138-145. This is much later than the pottery from this trench which suggests a date in the range Augustan to 1st century AD. The coin may be a later deposition or it is possible that the pottery is residual. c.f. Förschner 591, Geissen, 1445-9 [N55 from Trench 7 (2023)].

Comment on the harbour-side sites

One of the four coins from the harbour-side installations might be contemporary with the mole revealed in Trench 7A, but the other three are probably later and of these one is certainly Neronian, another probably Hadrianic. No. 10 is from Trench 7, which is near the harbour but not a wharf. It is the latest coin identified, but is something of a problem as it does not correspond with the dated pottery from this trench.

9.3 Trench 8A

11. Billon 23 mm Weight 12.9g
Obv. Hadrian facing right, robed and laureate, facing right. Lettering to left illegible, to right,]ΔPIA[(from AΔPIANOC)
Rev. Serapis seated and robed, holding sceptre in left hand and pointing with right to Cerberus at feet. To his left is I, to right H indicating regnal year 18.
Comment: This is a coin of Hadrian dating to AD 133-4. c.f. Emmett 892, Milne 1398-1399 [N174 from Trench 8A (8363)].

12. AE 22.5 mm Weight 12.3g
Obv. Worn head facing right, with illegible inscription, probably laureate.
Rev. Nilus half draped and seated with crocodile beneath. Reed in right hand and cornucopia in left. KB to left of reed indicating regnal year 22.
Comment: This is a coin of Hadrian dating to AD 137-8. c.f. Milne 1065, 1351, Geissen 1241, Dattari, 1438 [N175 from Trench 8A (8390)].

9.4 Trench 6 (*sebakh*)

13. AE 24 mm
Obv. Very worn head facing right. Clearly female and probably with hair bun.
Rev. Worn wreath of either laurel or oak with traces of lettering in the middle.
Comment: This is a coin of Livia, AD 11-12. c.f. Milne 30 [N49 from Trench 6B (4007)].

14 AE 28 mm
Obv. Very worn undraped bust, clearly laureate.
Rev. Nilus reclining, half draped with crocodile underneath, but wear obscures further detail.
Comment: The crocodile is exceptionally large, but this might be a coin of Trajan, AD 132-3, although wear precludes definitive identification. c.f. Milne 1351-2, Geissen 1063 [N69 from Trench 6J (4040)].

Acknowledgement
Thanks go to Dr D. F. Williams for his invaluable assistance with the identification of the coins.

10 Metal and Metal-working

Penny Copeland

Introduction

Several thousand metal and related objects were discovered during the excavations and these are discussed below under three headings: metal artefacts, nails and fastenings, and metal-working debris and residues. This report attempts to catalogue those items which have definite form, but omits the many hundreds of fragments of unidentifiable metal and corrosion products.

The preservation of metal varied widely across the site. Generally artefacts found in the upper town areas i.e. well above the water-table, are in a reasonable condition although the sea air has caused the iron to corrode, even when enclosed in the *sebakh* or rubbish heaps. However, corrosion levels even within grouped items vary suggesting that some items may already have decayed before they were discarded. A substantial number of iron objects were encased in heavy concretions but the iron fragments were generally small and virtually beyond recognition, although when broken open the majority seem to have been nails. The copper alloy artefacts show the most variation. Some from the upper town areas, are in excellent condition, but those found close to the water-table in the harbour area are usually substantially corroded.

Alloys

The term copper alloy has been used throughout this chapter where the dominant metal appears to be copper. All items which showed copper-based corrosion products are designated ‘copper alloys’ in this report. The range of types in use through time and the lack of facilities on site, prevented more precise determination. Roman items are most likely to be a high tin bronze, an alloy of copper and tin but often with lead added for casting. However, brass, an alloy of copper with zinc, was introduced during the Roman period and again had lead added for casting (Craddock 1979, 69). A general trend in the Roman world from around the 2nd century AD was the diminution of bronze and unalloyed copper and the increasing use of quaternary alloys, particularly after the introduction of brass in the coinage system of Augustus (Guimlia-Mair 2005, 285).

The most common alloy in the Islamic world was brass. ‘Bronze is virtually unknown in the Islamic period, with the exception of some special products such as mirrors’ (Ward 1993, 29). Unfortunately, the difference in alloys is not evident on visual inspection.

Value and wealth

With the exception of the hoard of Islamic coins (Bresc 2008), only one object of precious metal was found [M495/L197 from Tr. 15 (15004)], a small stone plaque with applied gold leaf (see Chapter 11, this volume). In Pharaonic times stone objects would sometimes be decorated with an application of gold leaf on a ground of gypsum plaster (Scheel 1989, 33) and it appears that this technique was still in use in the Roman (or late Ptolemaic) Period.

The lack of Roman artefacts of precious metals begs the question whether this is due to the industrial nature of the site with few opportunities for the inhabitants to display their wealth, or because due to impovorished life-styles and poverty there were few opportunities for the acquisition of wealth. Among the metalwork we have evidence of some prosperity in the jewellery and decorated furniture, and therefore must assume that some precious metals were around but that the inhabitants were careful with such rarities.

During the Islamic occupation we would not expect vessels of gold and silver as they are condemned in the *Hadith* and hoarding is forbidden in The Quran. There were exceptions to this, but at a Hajj port we might expect strict religious observance. The coin hoard (Bresc 2008) is an obvious and rather surprising exception. It is possible that high tin bronze, which resembles silver, and brass and gilded copper, were used instead of precious metals because the former were more acceptable in religious terms (Ward 1993, 14-15). They were often manufactured from sheet metal in the same manner as gold and silver to complete the illusion (Ward 1993, 33). Steel was also greatly valued during the Islamic period as it was rare, costly and the prerogative of the rich (Ward 1993, 30). Unfortunately, as the composition of the metalwork has not been determined, the number and type of steel artefacts cannot be ascertained.

Egyptian metalwork appears to have declined dramatically during the early Islamic period with the demise of the renowned metal foundries of the Roman and Byzantine periods, but metal production was revived under the Fatimids (Ward 1993, 42). The Mamluks were great patrons of metalwork with a desire to show off rank with decoration (Ward 1993, 108, 113), although there is little evidence of this in the Mamluk metalwork from the site. However, there are more metal items (excluding nails) during the Islamic occupation, suggesting the presence of prosperous merchants.

10.1 Artefacts

Binding and Edging strips (Fig. 10.1)

Many of the artefacts in this category are related to furniture and/or containers of some kind. There are some decorative copper alloy strips which, together with the copper alloy studs and clips found, suggest there was a range of decorated domestic artefacts, possibly furniture at the site during both periods of the site. A small number of iron edging strips corroborates the work-a-day nature of the site, where the day to day stresses on equipment led to the need for strong reinforcement of many objects.

Islamic

1. Copper alloy clip bent around a blunt ended object. Formed from a flat strip (1 mm thick) with one end possibly decorated with a floret. L: 15.5 mm W: 12 mm D: 8.4 mm [M471 from Tr. 1 (Room E)].
2. Copper alloy cut strip 4 mm wide and approx. 20 mm long shaped around a pole or staff [M4 from Tr. 2C (1011)].
3. Crushed iron circular ring binding with irregular edge. L: 41.6 mm W: 12.2 mm D: 7.3-4.9 mm [M247 from Tr. 8A (8251)].
4. Copper alloy strip of plate with right angle bend to form corner. L: 27.7 mm W: 11.1 mm D: 1.8 mm [M277 from Tr. 8A (8361)].
5. Copper alloy section of flat circle 2 mm thick, broken in three pieces. Diameter 220 mm [M54 from Tr. 9 (7001)].

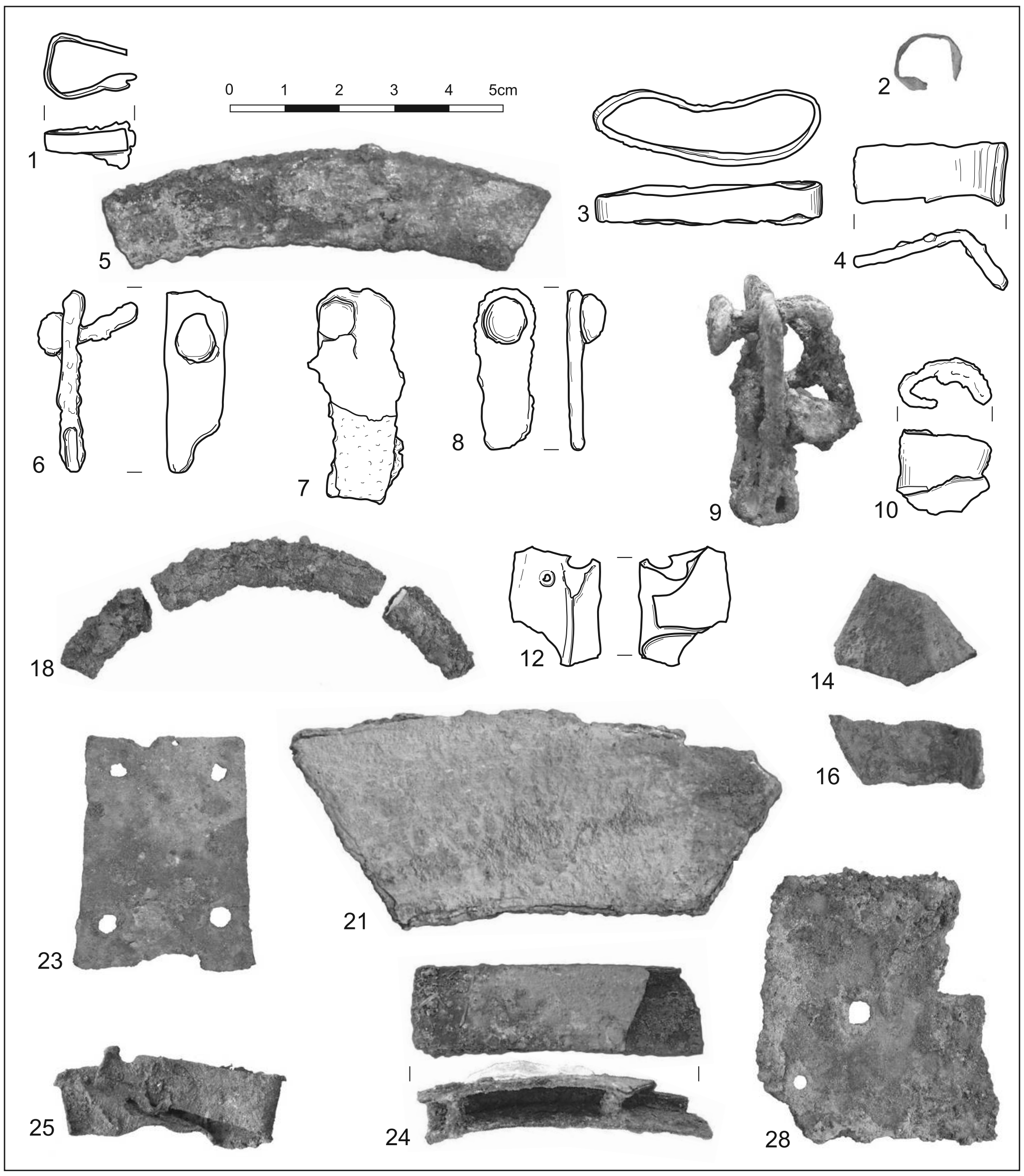


Figure 10.1. Metal binding and edging strips. Islamic items Nos 1-5, Roman items Nos 6-25, uncertain date item No. 28.

Roman

6. Copper alloy binding or edging strip with domed pin/stud *in situ*. L: 34 mm W: 10.9 mm D: 3.5 mm [M265 from Tr. 12 (7342)].

7. Copper alloy piece of iron riveted to a piece of copper alloy strip with small copper alloy stud. L: 38 mm W: 14 mm D: 7.5 mm [M288 from Tr. 10A (3723)].

8. Copper alloy strip of plate with dome headed stud *in situ*. Shank of stud broken off. L: 28.7 mm W: 10.3 mm D: 7.3 mm [M274 from Tr. 7A (surface)].

9. Copper alloy triangular shaped bracket with nails through top and bottom, both bent over at the back. A narrow clip covers part of the tapered end. Iron staining suggests the bracket was on an iron object, since deteriorated. L: 40.7 mm W: 30.3 mm D: 2.2 mm [M465 from Tr. 7A (10012)].

10. Iron clip or band of metal bent inwards, approximately 1.3 mm thick. L: 16.8 mm W: 11.2 mm D: 8.5 mm [M212 from Tr. 10A (3799)].

11. Copper alloy strip. L: 79.2 mm W: 8.8 mm D: 3.9 mm. [M418 from Tr. 14B (14543)]. Not illustrated.

12. Copper alloy folded plate with sunken ridge detail and tiny hole from stud. L: 17.8 mm W: 16.1 mm D: 6.5 mm [M107 from Tr. 11A (7211)]. Not illustrated.

13. Copper alloy plate bent over at the top. L: 15.2 mm W: 10 mm D: 1.3 mm [M116 from Tr. 6D (4070)].

14. Copper alloy fragment bent perpendicular to form corner. L: 28.5 mm total W: 17.4 mm D: 1.5 mm [M47 from Tr. 6E (4015)].

15. Copper alloy fragment bent perpendicular to form corner. L: 29.8 mm total W: 8.3 mm D: 2 mm [M46 from Tr. 6H (4030)]. Not illustrated.

16. Copper alloy strip of plate with corner bend. L: 31.1 mm W: 13.4 mm D: 1.4 mm [M355 from Tr. 17 (17022)].

17. Copper alloy strip of plate with corner bend. L: 23.2 mm W: 16 mm D: 0.8 mm [M374 from Tr. 6Q (4165)]. Not illustrated.

18. Broken flat copper alloy arc of plate. External diameter 70 mm Internal diameter 59.4 mm D: 1.5 mm [M119 from Tr. 12 (7302)].

19. Copper alloy plate with corner and edge detail. L: 27 mm W: 16 mm D: 3.5 mm [M361 from Tr. 6P (4110)]. Not illustrated.

20. Four fragments of very thin copper alloy band, including a corner piece, possibly part of a long strip. L: 84 mm total W: 15.4 mm [M56 from Tr. 7A (10014)]. Not illustrated.

21. Slightly curved fragment of iron sheet, possibly originally covered in lead. Original diameter c.300 mm. L: 88.6 mm W: 38.7 mm D: 5.4 mm [M58 from Tr. 7A (10012)].

22. Copper alloy curved piece of cut plate. L: 16 mm W: 9.7 mm D: 1.9 mm [M183 from Tr. 12 (7307)]. Not illustrated.

23. Copper alloy flat bracket plate with nail holes. One broken end possible from hinge being ripped off. L: 42.3 mm W: 32.1 mm D: 1 mm [M244 from Tr. 6GH (4095)].

24. Folded copper alloy sheet held in place by two rivets. No trace of timber survives but the edging strip has a slight curve suggesting it was originally from a large bowl or bucket. L: 52.9 mm H: 16 mm D: 10 mm [M67 from Tr. 7A (10034)].

25. Folded strip of copper alloy sheet. L: c. 75 mm W: 12 mm [M55 from Tr. 6J (4040)].

Uncertain date

26. Copper alloy sheet with cut edge and two holes. L: 44.7 mm W: 29.8 mm D: 1.2 mm [M52 from Tr. 9 (7013)]. Not illustrated.

27. Copper alloy curve piece of cut plate. L: 13.1 mm W: 9.7 mm D: 1.9 mm [M183 from Tr. 12 (7307)]. Not illustrated.

28. Piece of copper alloy sheet, slightly dished, with three holes in a line. L: 47.4 mm W: 42.1 mm D: 1 mm [M100 from Tr. 11A (7200)].

Button and loop fasteners (Fig. 10.2)

Button and loop fasteners are found in many Roman military sites suggesting that they were items of military equipment although their precise function has not been identified. They are often associated with horse harnesses, but they may also have been used to attach a sword or dagger to a belt (Chapman 2005, 159). The buttons may also be *phalerae* - small discs for a variety of purposes: badge of rank of the equestrian *Ordo*, bosses to decorate and reinforce a helmet and pendant ornaments attached to a horse harness. As military rewards they were awarded in sets of five, seven or nine (Maxfield 1981, 91). Myos Hormos had military associations but these cannot be taken as corroborative evidence.

29. Small copper alloy button and loop shaft. Diameter: 11.9 mm D: 3.9 mm Shank 11.6 mm long [M256 from Tr. 10A (3725)].

30. Copper alloy button with metal shank ending in small half circle. Button has concentric circle design. Diameter 20 mm, L: 13.4 mm [M76 from Tr. 6H (4080)].

31. Circular copper alloy disc with broken hook attachment. Possible button and loop. Diameter: 38.5 mm D: 0.5 mm [M344 from Tr.6P (4110)].

32. Circular copper alloy disc with turned moulding and central depression. Reverse is smooth. Possible *phalera* or button and loop for military purposes although there are no surviving fastenings on the rear. Diameter: 29.8 mm D: 3.2 mm [M493 from Tr. 6H (4075)].

Fish hooks and fishing equipment (Figs 10.3, 10.4, and 10.5)

Numerous small fish hooks were found at the site, mainly from the Roman contexts but some also from the Islamic (see Chapter 16, this volume, for a general discussion of fishing). The style of small fish hooks appears to change little between the two periods and consists of a barbed hook with a spade end to hold the line. Some of the Roman hooks have clear impressions of very fine line surviving. However, there are variations in shape within these generalities. Other equipment was also found including hooks for

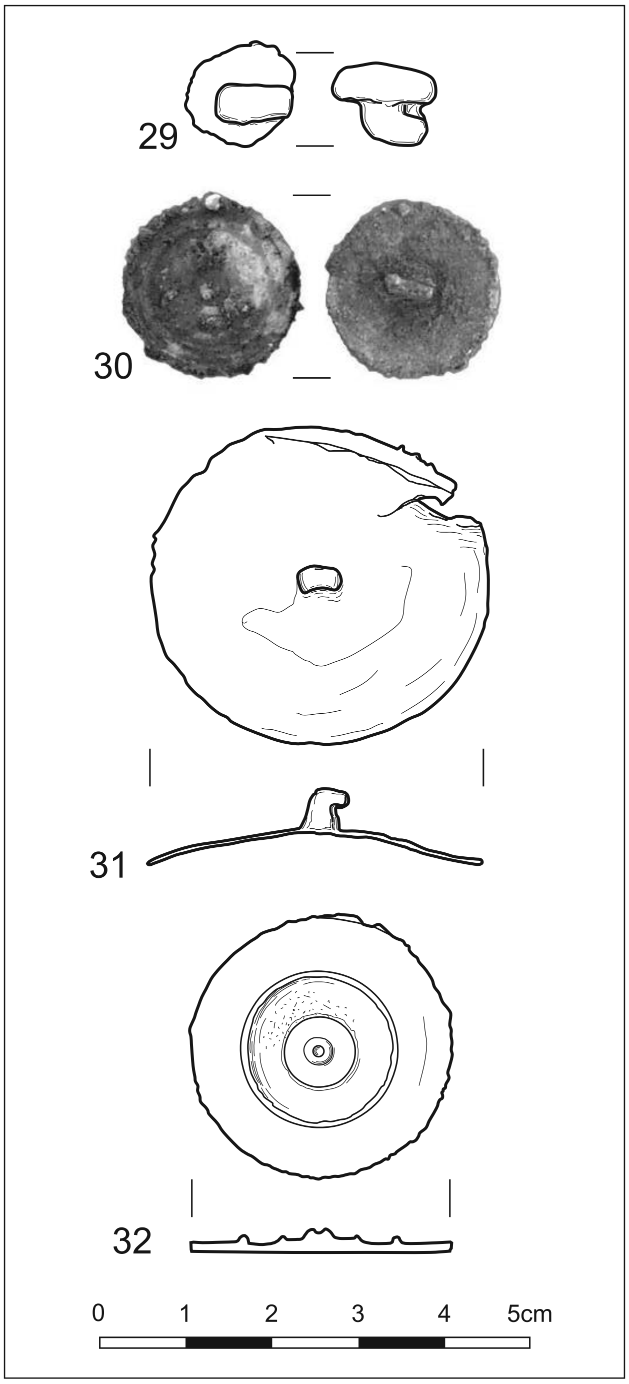


Figure 10.2. Metal button and loop fasteners, Nos 29-32.

retrieving shell fish (crochets) and fishing weights. The largest fish hook found, from an Islamic context, is in iron, and is attached to cordage showing it was one of many suspended from the line. An iron fish hook is unusual but this is mirrored elsewhere. Fish hooks of iron are found from the early Islamic period onwards in the Arabian Gulf (Beech 2004, 71).

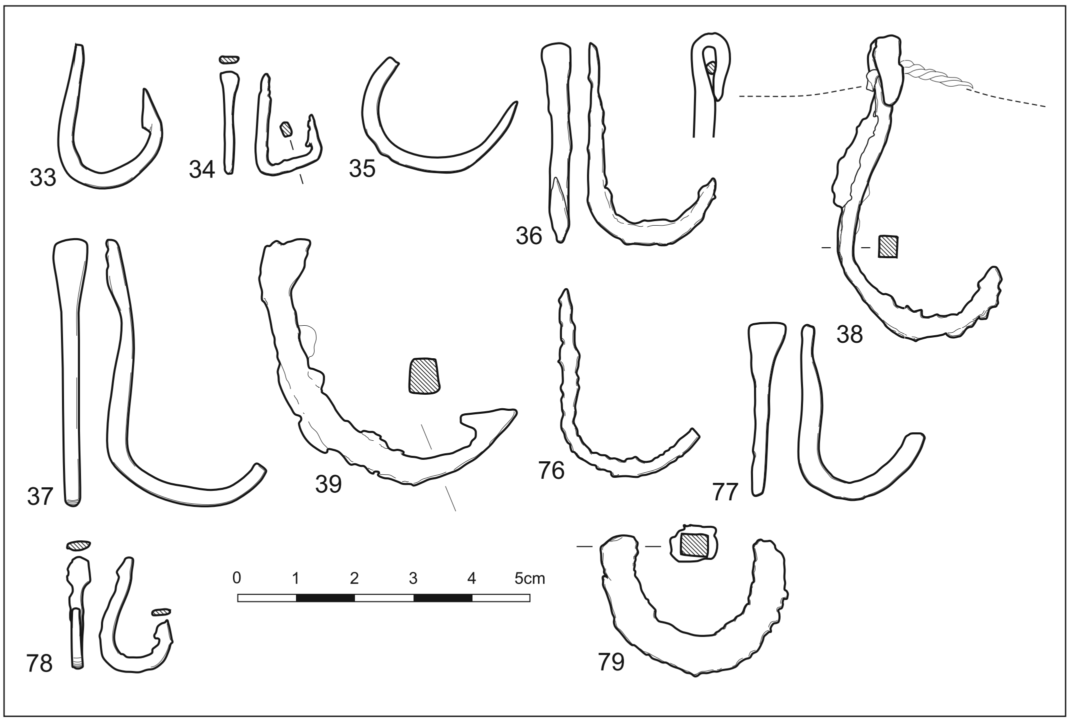
Islamic

33. Copper alloy fish hook with broken barb and spade end. L: 23.9 mm W: 17.9 mm D: 3.6 mm [M33 from Tr. 5 (3014)].
34. Small copper alloy barbed fish hook with spade end. L: 17.5 mm W: 11.51 mm D: 3.25 mm [M334 from Tr. 13 (5521)].
35. Broken wide mouthed copper alloy fish hook. L: 18.4 mm W: 26.8 mm D: 2.7 mm [M232 from Tr. 16 (16045)]
36. Large copper alloy fish hook with spade end. Tip missing. L: 35.9 mm W: 22.2 mm D: 4.5 mm [M451 from Tr. 2B (1508)].
37. Large copper alloy fish hook with spade end. Tip broken. L: 45.4 mm W: 30.6 mm D: 5.13 mm [M44 from Tr.13100 (13101)].
38. Iron fish hook formed from a rectangular section strip folded at the top to create an eyelet. Point is created from flattening rod. Hook retains part of its cordage through its eye. The cordage continues up to a cross line, showing it was one of a line of hooks. L: 51.5 mm W: 28.2 mm D: 3.5 mm [M459 from Tr. 2C (1020)].
39. Iron fish hook with pronounced barb. Opposite end is thickened along line of the hook, possible for a broken eye similar to M459. L: 45 mm W: 36 mm D: 5 mm [M481 from Tr. 2B (2316)].

Roman

40. Copper alloy fragment of fish hook L: 18.2 mm W: 13.1 mm D: 3.4 mm [M14 from Tr. 7 (5024)]. Not Illustrated.
41. Copper alloy spade end of fishing hook. L: 13.8 mm W: 3.2 mm D: 2.5 mm [M260 from Tr. 12 (7374)]. Not illustrated.
42. Small copper alloy fish hook of round profile, with spade end. Vestige of barb. L: 20.3 mm W: 14.4 mm D: 2.56 mm [M104 from Tr. 10C (3814)].
43. Copper alloy fragment of barbed fish hook. L: 12 mm D: 2.2 mm [M84 from Tr. 10A (3703)].
44. Copper alloy fragment of fish hook. L: 11.2 mm W: 10.9 mm D: 2.5 mm [M35 from Tr. 7 (5019)].
45. Broken copper alloy fish hook. L: 21.5 mm W: 11.3 mm D: 3.6 mm [M38 from Tr. 7 (5022)].
46. Small copper alloy barbed fish hook with spade end. L: 16 mm W: 13.9 mm D: 2.6 mm [M40 from Tr. 6E (4015)].
47. Small copper alloy fish hook with spade end. L: 14.8 mm W: 9.8 mm D: 1.95 mm [M23 from Tr. 6D (4014)].
48. Small copper alloy barbed fish hook with spade end. L: 13.9 mm W: 11.2 mm D: 2.1 mm [M25 from Tr. 6H (4030)].
49. Small fine copper alloy fish hook with spade end. L: 12.9 mm W: 9.7 mm D: 1.7 mm [M25 from Tr. 6H (4030)].
50. Fine copper alloy barbed fishing hook of rounded shape with spade end. L: 14.9 mm W: 12.6 mm D: 2.3 mm [M245 from Tr. 6GH (4095)].
51. Small copper alloy barbed fish hook with evidence of twine on spade end. L: 15.8 mm W: 12.9 mm D: 3.5 mm [M51 from Tr. 6J (4040)].
52. Fine copper alloy barbed fish hook with spade end. L: 16.8 mm W: 11.52 mm D: 2.7 mm [M369 from Tr. 6Q (4165)].
53. Copper alloy fish hook with fixing end broken. L: 26.2 mm W: 17.7 mm D: 4.3 mm [M45 from Tr. 7A (10003)].

Figure 10.3. Islamic and uncertain date metal fish hooks , nos 33-39, 76-79.



54. Fragment of copper alloy fish hook with spade end. L: 19.1 mm W: 17 mm D: 3 mm [M64 from Tr. 7A (10014)].
55. Copper alloy fish hook with spade end. L: 21 mm W: 16.5 mm D: 4 mm [M69 from Tr. 7A (10031)].
56. Small copper alloy fish hook with spade end. L: 15.4 mm W: 13.4 mm D: 3 mm [M75 from Tr. 7A (10026)].
57. Fine flat copper alloy barbed fish hook with spade end. L: 11 mm W: 8.2 mm D: 2 mm [M314 from Tr. 7A (10027)].
58. Group of five copper alloy small fishing hooks, barbed with spade end. Possibly stored around rod. L: 24 mm W: 16 mm D: 15 mm [M231 from Tr. 6P (4110)].
59. Copper alloy fish hook with spade end. L: 27.1 mm W: 16.2 mm D: 3.6 mm [M20 from Tr. 7 (5024)].
60. Copper alloy barbed fish hook with broken shaft. L: 17.6 mm W: 18.7 mm D: 3.17 mm [M240 from Tr. 10A (3778)].
61. Copper alloy fish hook with spade end. Tip is probably missing. Impression of twine or cordage surviving in corrosion. Possible ridge below cordage for supporting a weight or cordage. L: 35.1 mm W: 20.7 mm D: 3.52 mm [M40 from Tr. 6E (4015)].
62. Broken copper alloy fish hook with spade end with transverse flattening. L: 27.3 mm W: 16.7 mm D: 5 mm [M17 from Tr. 6H (4035)].
63. Copper alloy fish hook with barb. Spade end has surviving fine twine or cord surviving around it. L: 26.5 mm W: 18.8 mm D: 4 mm [M25 from Tr. 6H (4030)].
64. Copper alloy spade ended fish hook with barb. L: 30.4 mm W: 21.1 mm D: 5.7 mm [M123 from Tr. 6P (4100)].
65. Copper alloy hook with spade end and barb. L: 38.1 mm W: 22.2 mm D: 4.2 mm [M85 from Tr. 6H (4085)].
66. Copper alloy hook with spade end and barb. L: 31.1 mm W: 19.3 D: 4 mm [M85 from Tr. 6H (4085)].
67. Copper alloy hook with spade end and barb. L: 25.2 mm W: 19.6 mm D: 4 mm [M85 from Tr. 6H (4085)].
68. Three copper alloy hooks corroded together, all approximately the same size so possibly a small set. L: 30 mm W: 22 mm D: 12 mm [M85 from Tr. 6H (4085)].
69. Copper alloy fragment of barbed fish hook. W: 29.3 mm L: 6.5 mm D: 5.2 mm [M476 from Tr. 12 (7332)].
70. Broken copper alloy fish hook with spade end. L: 29.9 mm W: 4.1 mm D: 2.3 mm [M19 from Tr. 6E (4015)].
71. Large copper alloy fish hook with spade end. Tip broken. L: 33.5 mm W: 27.8 mm D: 3.2 mm [M25 from Tr. 6H (4030)].
72. Large copper alloy fish hook with spade end, tip missing. L: 33.1 mm W: 20.2 mm D: 3 mm [M81 from Tr. 6H (4080)].
73. Large copper alloy fish hook with spade end. L: 63.3 mm W: 43.8 mm D: 7.2 mm [M20 from Tr. 7 (5024)].
74. Concretion of four copper alloy fishing hooks nested within each other. Detail is obscured by corrosion. L: 41 mm W: 30 mm D: 15.9 mm [M173 from Tr. 12 (7327)].
75. Possible large iron fish hook, details obscured by corrosion and sulphur. L: 58.36 mm W: 34.7 mm D: 14.6 mm [M311 from Tr. 7A (10011)].

Uncertain date

76. Large copper alloy fish hook with spade end. Tip broken. L: 33.6 mm W: 23.1 mm D: 8.1 mm [M59 from Tr. 8 (8000)].
77. Flattened copper alloy fish hook with spade end. Tip missing. L: 31.5 mm W: 21.8 mm D: 2.3 mm [M98 from Tr. 8A (8319)].
78. Copper alloy barbed fish hook with very tip missing. Spade end has shoulders to retain line. L: 19.1 mm W: 12.9 mm D: 2.11 mm [M291 from Tr. 8A (8262)].
79. Iron fish hook broken at shaft. L: 23.2 mm W: 32.2 mm D: 4.6 mm [M264 from Tr. 8A (8324)].

Roman crochets

80. Copper alloy hook with long shaft and elongated hook end. Possible crochet for shellfish. L: 31.4 mm W: 11.2 mm D: 3.3 mm [M272 from Tr. 6GH (4095)].

81. Copper alloy hook with long shaft, possible crochet for removing shellfish from rock. L: 65.6 mm W: 17.3 mm D: 3 mm [M64 from Tr. 7A (10014)].

Fittings and household objects (Fig. 10.6)

A number of fittings were found, mostly for small household objects, in copper alloy. These suggest some comfort but the general lack of items from the Islamic period may indicate a less settled community. The single chain, from an Islamic context, has double figure-of-eight links and may well have originally been from a hanging lamp.

Islamic

82. Copper alloy length of double figure of eight link chain. Possibly for a hanging lamp or other household use. L: 85.5 mm W: 5.17 mm D: 1.5 mm [M15 from Tr. 5 (3014)].

83. Sheet of iron with a small ledge. Possibly the side of a box. L: 103.1 mm W: 48.4 mm D: 4.3 mm [M337 from Tr. 16 (16011)].

84. Iron nail with knocked over and flattened head, with small pointed hook at end. Possible tenter or shearboard hook. L: 32.6 mm W: 13.4 mm D: 11.7 mm [M386 from Tr. 13 (5533)].

Roman

85. Copper alloy handle from ornamental box or container. L: 38.8 mm W: 9.5 mm D: 4 mm [M143 from Tr. 12 (7327)].

86. Curved length of rectangular section copper alloy. Broken handle from bucket. L: 46.8 mm W: 6.4 mm D: 4.4 mm [M229 from Tr. 6GH (4095)].

87. Part of copper alloy handle for a bucket or dish.

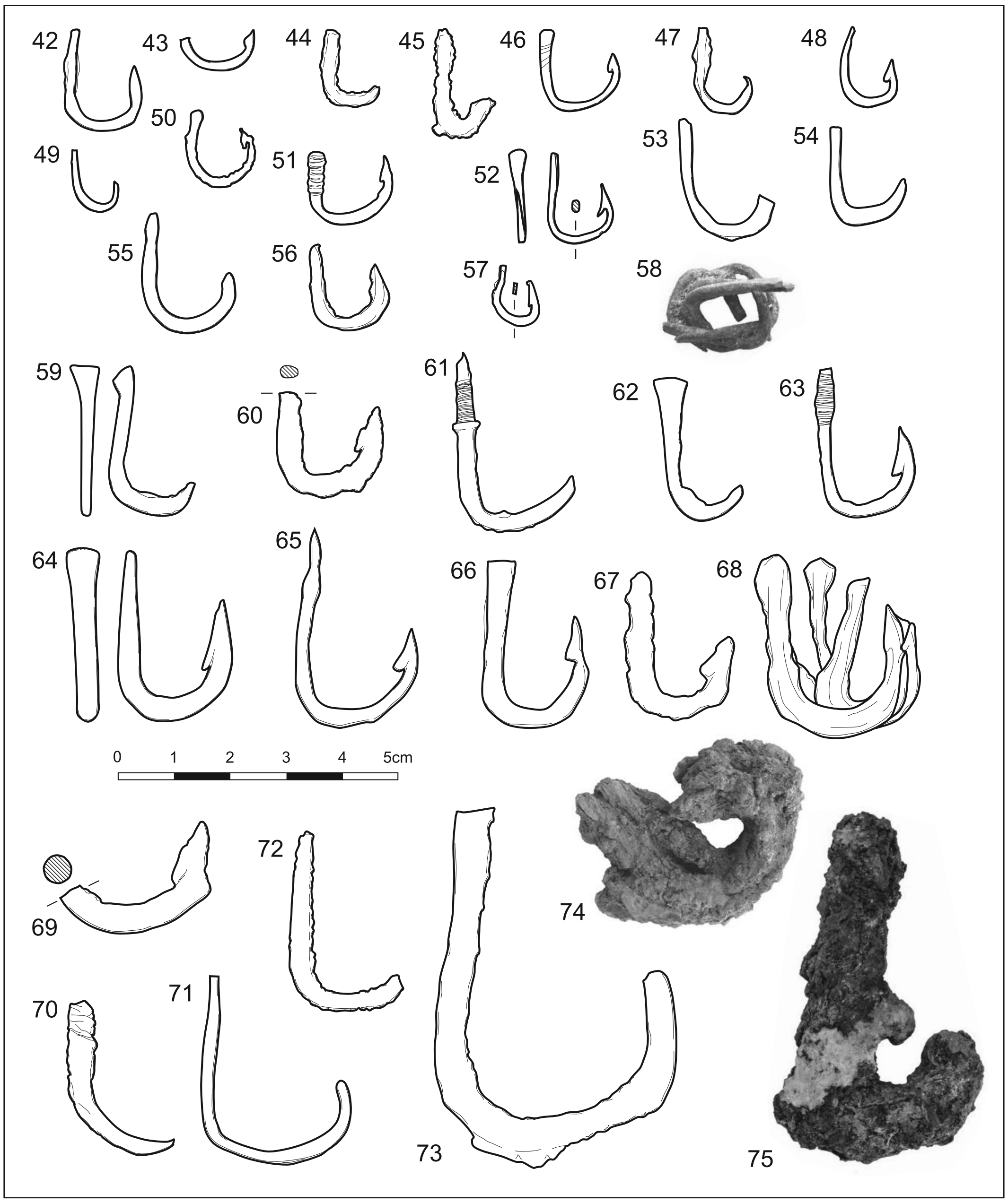


Figure 10.4. Roman metal fish hooks, Nos 42-75.

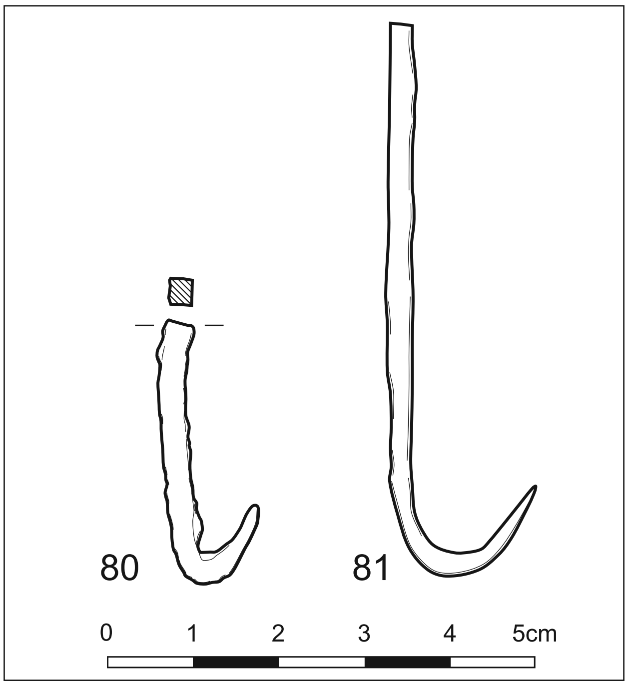


Figure 10.5. Roman copper alloy long hooks or crochets, Nos 80-81.

Rectangular in section at handle, round in section where it was attached. Crushed out of shape. L: 17.9 mm W: 9.1 mm D: 5.1 mm [M298 from Tr. 7A (10023)].
88. Very small copper alloy hook with long square section shaft, an arm from a household item such as a lamp or scales. L: 39.8 mm W: 10.3 mm D: 5 mm [M484 from Tr. 10A (3505)].
89. Moulded copper alloy bracket, possibly one leg and part of a ring for a small stand. L: 78 mm W: 42 mm D: 10 mm [M83 from Tr. 7A (10032)].
90. Rectangular section strip of copper alloy, shaped like a bracket or low, wide leg for a small stand. L: 31.1 mm W: 10.8 mm D: 3.7 mm [M343 from Tr. 6P (4110)].
91. Copper alloy decorative fish tail. L: 18 mm W: 5.1 mm D: 2.6 mm [M282 from Tr. 12 (7301)].
92. Copper alloy bar with widened top, similar to cut nail. L: 33.4 mm W: 16.3 mm D: 10.8 mm [M447 from Tr. 6H (4085)].
93. Corroded copper alloy bar with triangular section. L: 21.2 mm W: 5.3 mm D: 3.7 mm [M457 from Tr. 12 (7333)].
94. Rectangular section copper alloy rod with shaped ends. L: 26.6 mm W: 4.3 mm D: 3.9 mm [M455 from Tr. 12 (7371)].
95. Small copper alloy moulded fragment of ornament. L: 30.9 mm W: 9.6 mm L: 9.8 mm [M252 from Tr. 12 (7306)].
96. Short copper alloy strip with a rounded end like a vessel foot ring. L: 12.5 mm W: 8.4 mm D: 6 mm [M261 from Tr. 12 (7374)]. Not illustrated.
97. Folded or flattened tube of copper alloy plate 0.6 mm thick. L: 14 mm W: 11 mm [M105 from Tr. 10C (3814)]. Not illustrated.

Uncertain date
98. Small moulded fragment of copper alloy ornament. L: 17.2 mm W: 8.4 mm L: 8.3 mm [M257 from Tr. 8A (8356)]. Not illustrated.

Gaming pieces and toys (Fig. 10.7)
Two copper alloy *astragaloi* were found in Islamic contexts. One [M31 from Tr. 2E (6009)] is a relatively realistic copy of the *astagalus* of a sheep or goat. The second one is a very angular and stylised version of the same bone [M454 from Tr. 3 (2021)]. A further artefact appears to be part of an *astragalus* from a Roman context. The discovery of *astragloi* in Islamic contexts suggests that the game continued to be played well after the Roman period. A further possible toy in the shape of an axle for a child's toy was found.

Islamic
99. Copper alloy astragalus stylised by making shape considerably more angular. L: 24.8 mm W: 12.3 mm D: 0.9 mm [M454 from Tr. 3 (2021)].
100. Copper alloy imitation of *astragalus* gaming piece [M31 from Tr. 2E (6009)].

Roman
101. Copper alloy moulded shape with flat back. Similar to half an *astragalus*, possibly a failed casting? L: 29 mm W: 12 mm D: 5.7 mm [M420 from Tr. 12 (7373)].
102. Lead bar with iron core passing through a piece of pottery fabric. Possible axle from toy cart? L: 50.2 mm W: 8.3 mm [M113 from Tr. 7A (10016)].

Jewellery (Figs 10.8 and 10.9)
A number of items of jewellery and personal adornment were found at the site suggesting the presence of both men and women. Although some items are well-made, there is nothing of exceptional quality. The majority of the items are from the Islamic period and may indicate higher presence of women during that time as many are commonly associated with females.

The Roman intaglio ring with figure of Goddess Fortuna, poorly carved in carnelian, and inserted into a plain copper alloy ring demonstrates the site's links with the sea. Fortuna was the one of the most popular goddesses in the Roman Empire and she is shown in this case holding a cornucopia in one hand and a steering oar in the other. The maritime associations of her depiction are supported by finds in other maritime locations. A coin of Domitian with a reverse depicting a Fortuna in a similar stance was found under the mast step of a Roman cargo vessel at Blackfriars, London (Henig 1974, 97-98). A further intaglio was found but the stone had been burnt and was fractured beyond recognition.

M37 from Trench 7 (5007) is a possible "Aucissa" type of brooch, often found on military sites in Continental Europe in first century (Johns 1996, 157).

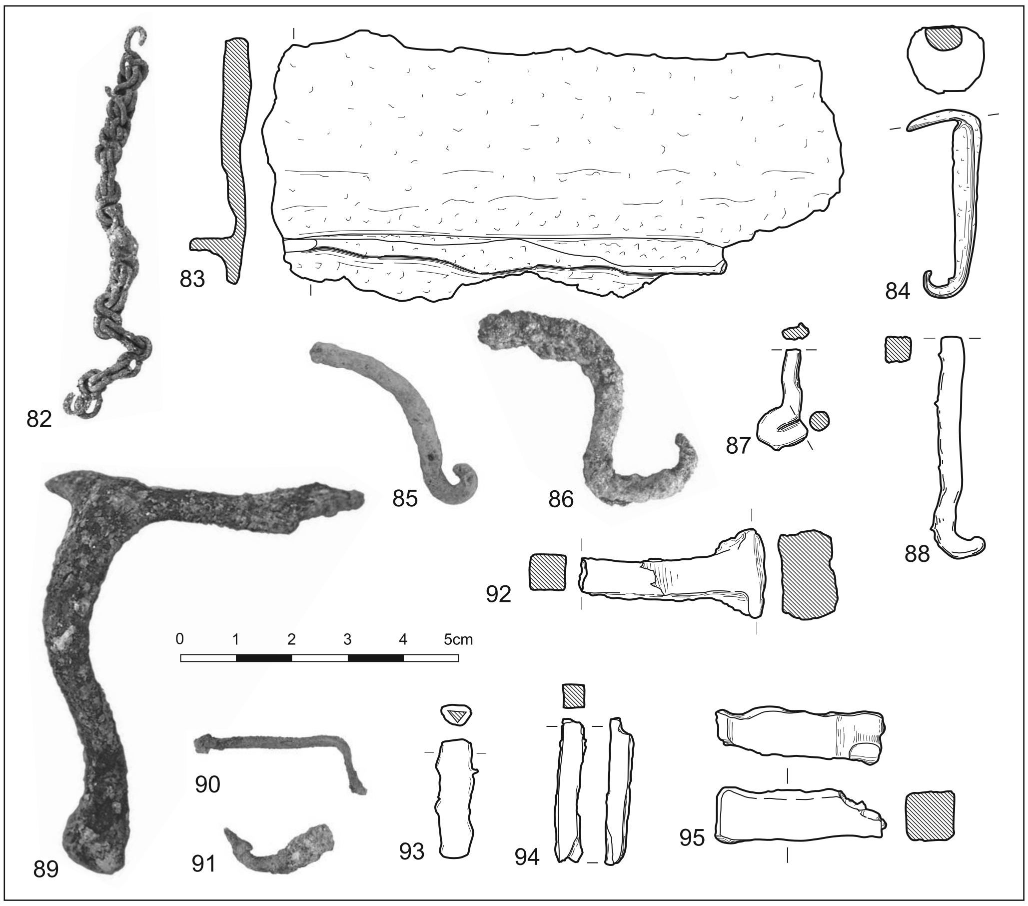


Figure 10.6. Metal fittings and everyday household objects. Islamic items Nos 82-84, Roman items Nos 85-95.

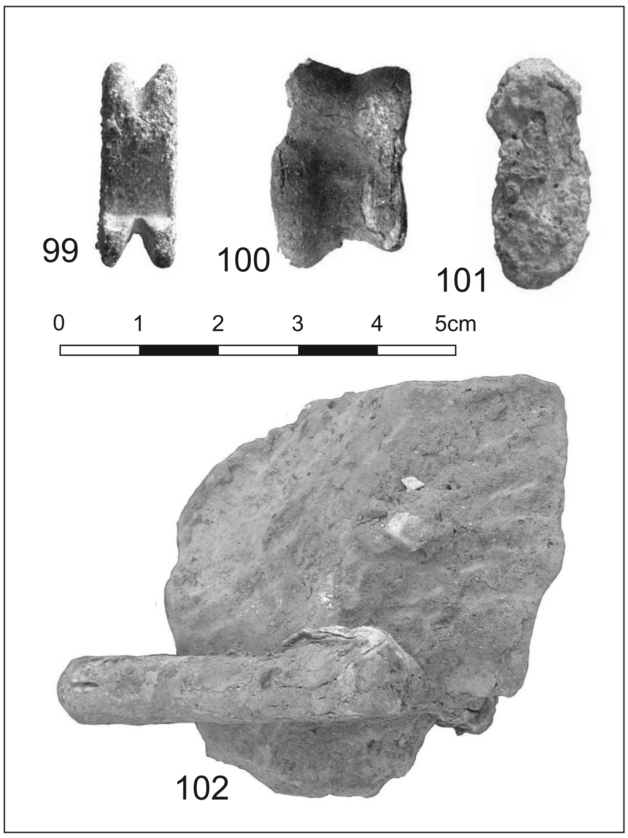


Figure 10.7. Metal gaming pieces and toys. Islamic items Nos 99, 100, Roman items Nos 101, 102.

Islamic

103. Broken copper alloy ring with animal hide shaped bezel. External diameter 22 mm, Internal diameter 15 mm bezel L: 11.8 mm W: 8.7 mm D: 6.9 mm [M78 from Tr. 2B (2322)].

104. Copper alloy ring formed of welded band 4 mm wide. 20 mm diameter. [M3 from Tr. 1 (surface)].

105. Part of oval section copper alloy ring. Diameter: 20 mm D: 4.9 mm [M394 from Tr. 16A (16514)].

106. Curved copper alloy rod slightly tapering away from a terminal knob. Diameter c. 17 mm D: 2.4 mm [M33 from Tr. 5 (3014)].

107. Copper alloy ring formed of an unjoined circle with terminals widening from 2 mm to 5 mm depth. 16 mm diameter [M1 from Tr. 1 (surface)].

108. Copper alloy penannular ring made from strip of flat metal. Ends rounded off. L: 22.6 mm W: 18.2 mm D: 4.7 mm [M397 from Tr. 16 (16019)].

109. Broken penannular copper alloy ring of round section with high lead content. L: 21.4 mm W: 10.4 mm D: 2.4 mm [M350 from Tr. 13 (surface)].

110. Small iron ring, sub-circular. L: 16.7 mm W: 16.4 mm D: 2.2 mm [M468 from Tr. 1 (surface)].

111. Pair of very fine copper alloy wire earrings. Wire is 0.9 mm in section including corrosion. Links are L: 12.7 mm W: 6.8 mm and L: 8.4 mm W: 5.3 mm respectively [M438 from Tr. 1 (surface)].

112. Copper alloy earring made from small penannular wire circle. L: 14 mm W: 13.2 mm D: 2.1 mm [M48 from

Tr. 5 (3014)].
113. Copper alloy earring formed of a circle of wire narrowing from 1.78 to 1.06 mm to fix into a rounded terminal knob. Diameter 17.8 mm [M32 from Tr. 5 (3026)].
114. Copper alloy earring formed of a circular length of wire with a loop at one end. L: 24 mm W: 19 mm D: 1 mm [M2 from Tr. 1 (surface)].
115. Copper alloy earring with knob terminal, possibly a corroded looped end. L: 32 mm W: 26 mm D: 4 mm [M10 from Tr. 4 (4008)].
116. Copper alloy penannular bangle made from a length of round section rod with diameter 2.8 mm, curved back on itself. One surviving knob terminal. Diameter: 38.6 mm [M39 from Tr. 5 (3109)].
117. Two broken parts of oval copper alloy bangle. One surviving terminal in knot shape. L: 59.3 mm W: 39 mm D: 4 mm [M452 from Tr. 2B (1508)].
118. Part of copper alloy bangle in round section metal. One surviving knob terminal. Appears to have casting marks suggesting the bangle was cast straight and then curved to shape. Possibly with high lead content. Diameter: 40.4 mm D: 5.5 mm [M473 from Tr. 2D (1251)].
119. Copper alloy tine of large buckle in lamb's tongue shape. Attachments to the buckle ring are broken showing solder, possibly silver. Solder is also visible on surface suggesting further decoration. L: 53.5 mm W: 29 mm D: 5.2 mm plus 13.7 mm attachment. [M453 from Tr. 2B (1508)].
120. Shaped piece of copper alloy plate with a round shape punched through. Possibly part of a belt buckle in a Scandinavian style. L: 19.2 mm W: 13.3 mm D: 1.6 mm [M94 from Tr. 9A (7108)].
121. Large iron buckle tine with fire welded loop. Upper surface is decorated with notches at the sides and faint lines across the surface. Tine widens away from the loop but ends in a narrow central tooth. L: 61.5 mm W: 13.2 mm D: 9.31 mm [M363 from Tr. 13 (5519)].
122. Iron buckle tine formed of a bar looped over at one end to form eyelet. End is flattened. L: 50.8 mm W: 12.8 mm D: 5.9 mm [M18 from Tr. 2E (6001)].
123. Curved strip of copper alloy wire with slightly flattened end. Possibly part of a brooch pin. L: 23 mm W: 4.2 mm D: 2.4 mm [M475 from Tr. 2D (1251)].

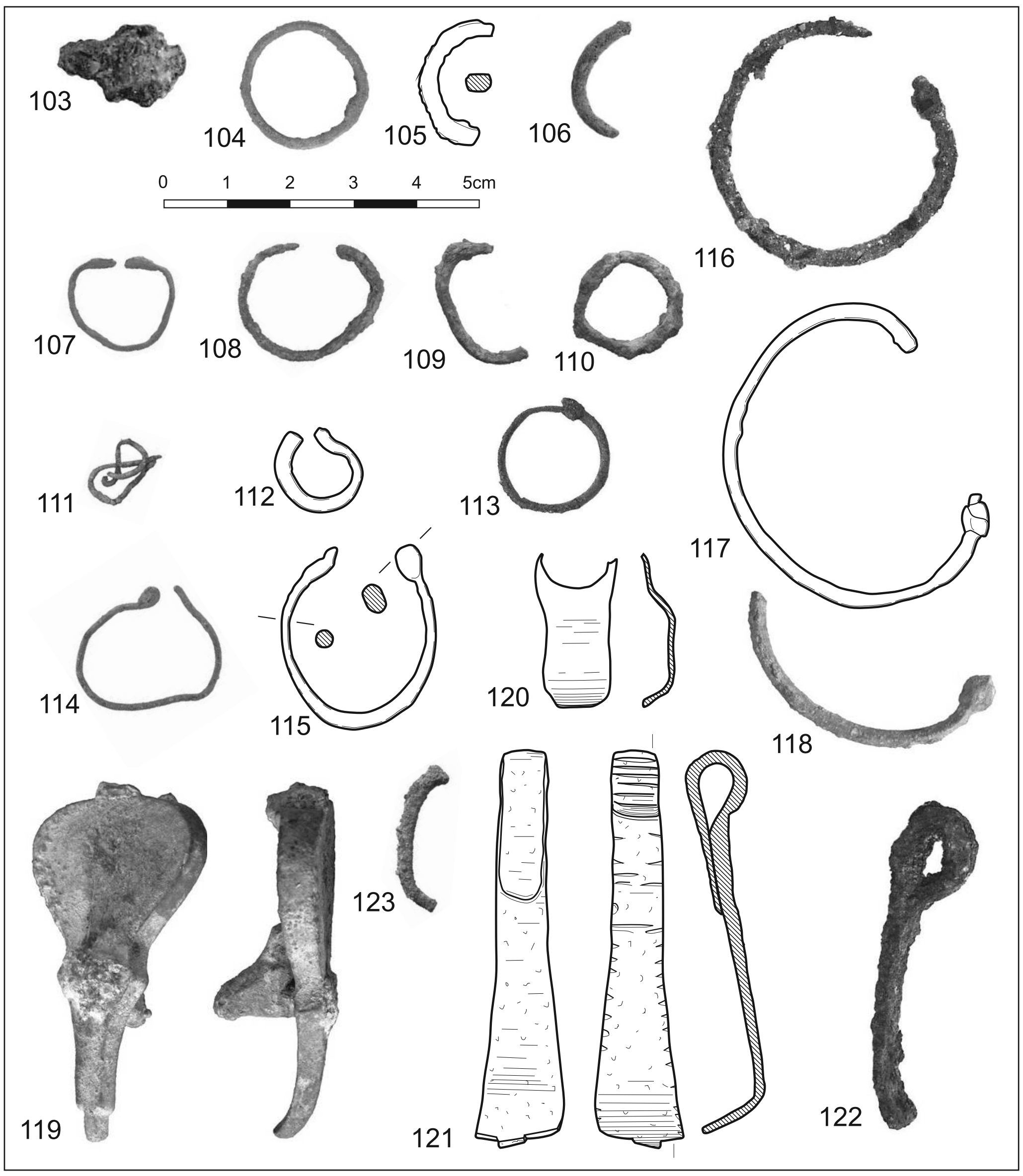


Figure 10.8. Islamic metal jewellery and decorative items, Nos 103-123.

Roman

124. Copper alloy ring with intaglio in a dark stone. Intaglio shows a roughly carved figure of the goddess Fortuna holding a cornuopia and with her hand on the steering oar attached to a rudder. She wears a headress but the detail is insufficient to identify the type. L: 20.3 mm W: 17.2 mm D: 3 mm [M16 from Tr. 2B (2121)].
125. Plain copper alloy intaglio ring with burnt and smashed stone inset. L: 22.4 mm W: 18.4 mm D: 1.7 mm [M87 from Tr. 6H (4085)].
126. Copper alloy ring of round section wire. Ring formed of overlapping wires. L: 25.7 mm W: 23 mm D: 2.3 mm [M354 from Tr. 6Q (4165)].
127. Small round section copper alloy ring. External diameter 20 mm D: 4 mm [M82 from Tr. 7A (10019)].
128. Copper alloy finger ring with part missing. Oval section. L: 19 mm W: 16.9 mm D: 2.8 mm [M437 from Tr. 7A (10023)].
129. Copper alloy ear-ring made from a length of round section rod curved back on itself into a terminal. L: 16.6 mm W: 11.8 mm D: 2.5 mm [M34 from Tr. 7 (5024)].
130. Copper alloy bow shaped fibula in "Aucissa" style suggesting a military origin. Hinged iron pin broken off. Extensive corrosion crust obscuring much of the detail. L: 54.7 mm W: 17 mm D: 12.8 mm [M37 from Tr. 7 (5007)].
131. Broken copper alloy bangle made of twisted square section strip. Surviving terminal is flattened. L: 60.7 mm W: 30.2 mm D: 3 mm [M490 from Pit 9650].
132. Flat copper alloy fragment with tube-like eyelet, probably moulded. Possible fragment of buckle tine. L: 22.3 mm W: 11 mm D: 9.5 mm [M109 from Tr. 10 (3773)]. Not illustrated.
133. Fragment of copper alloy buckle with cross piece broken off at eyelet. L: 13.7 mm W: 9.4 mm D: 5.9 mm. Not illustrated [M134 from Tr. 10C (3704)].
134. Fragment of plain small copper alloy belt buckle tine. L: 20.9 mm W: 5.9 mm D: 3.4 mm [M400 from Tr. 12 (7340)].
135. Large plain copper alloy hoop shaped buckle with bar and tine missing. L: 43.2 mm W: 40.9 mm D: 4.2 mm [M36 from Tr. 7 (5023)].
136. Copper alloy buckle piece. Bent rod with circular teminals containing remnants of iron rods. L: 36.8 mm W: 2.3 mm D: 6.5 mm [M27 from Tr. 6H (4030)].
137. Plain copper alloy buckle, tine shaped as elongated diamond with flat ends. L: 28.2 mm W: 25.4 mm D: 2.3 mm [M77 from Tr. 6H (4080)].
138. Plain copper alloy hoop shaped buckle without tine. L: 26.3 mm W: 23.4 mm D: 5.3 mm [M45 from Tr. 7A (10003)].

Uncertain date

139. Section of copper alloy ear-ring with knob terminal including further tapering piece. L: 24 mm W: 18 [M49 from Tr. 8 (8000)].
140. Small copper alloy buckle with iron cross bar holding tine. L: 25.0 mm W: 25.4 mm [M146 from Tr. 8A (8356)].

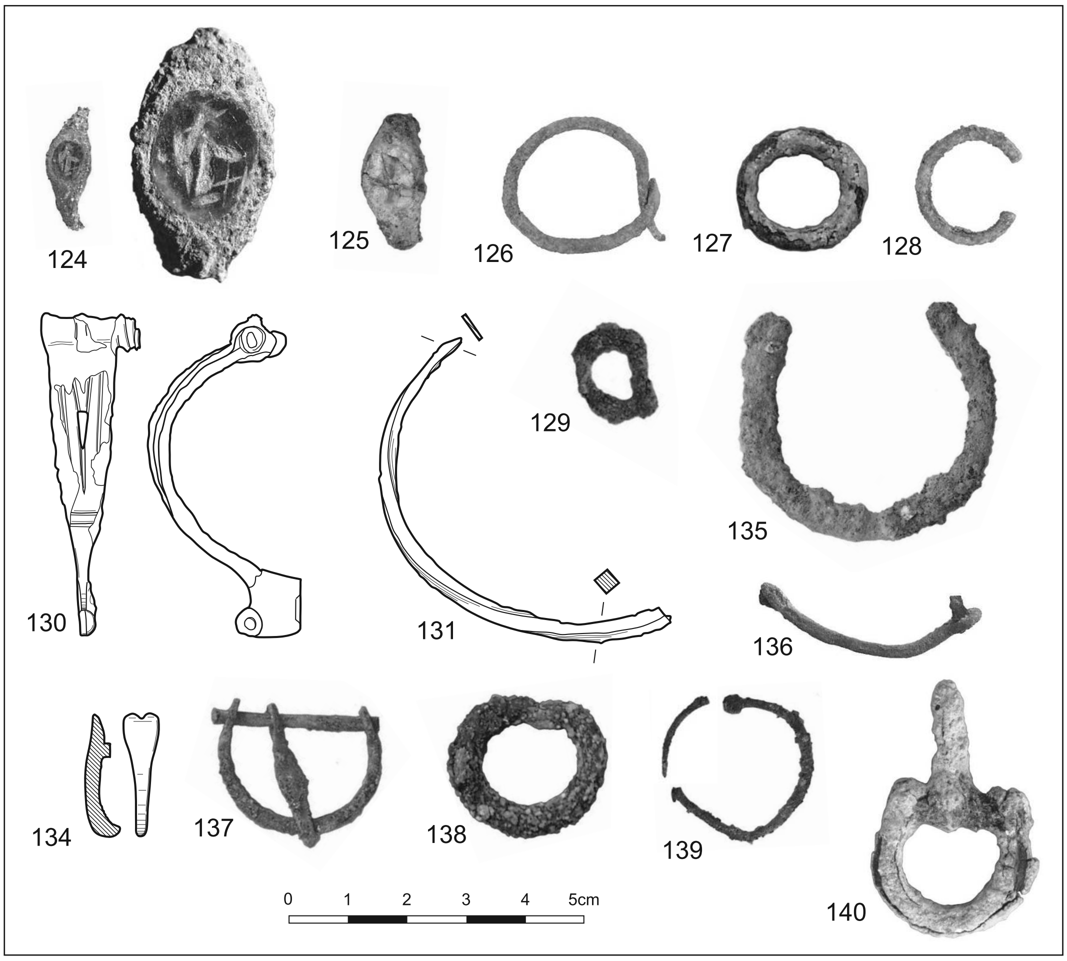


Figure 10.9. Roman and uncertain date metal jewellery and decorative items Roman items nos 124-137, uncertain date items nos 139-140.

Keys (Fig. 10.10)
Although no recognisable part of a lock was found, a number of keys were recovered. Some took the form of push keys suggesting doors with simple locks or chests of thick timber.

Islamic
141. Copper alloy push key with eyelet at one end and broken flat area at the other, the remnants of a loop. Eyelet is circular on outer circumference but with a rectangular hole punched through. Tool has tapering square section in centre as if made from a bit. L: 91.9 mm W: 8.9 mm D: 8.9 mm [M375 from Tr. 13 (5514)].
142. Flat section of copper alloy plate, probably part of a key. L: 22.5 mm W: 8.7 mm D: 3 mm [M30 from Tr. 2E (6014)].

Roman
143. Small moulded copper alloy key for a box. End is a single block folded back toward head suggesting it was used as a push key. L: 45 mm W: 14.5 mm D: 10.5 mm [M8 from Tr. 2D (1266)].
144. Circular piece of copper alloy with small square central hole. Piece has radiating depressions from hole. Radiations end where shape appears to continue into a shaft suggesting it was part of a key. L: 22 mm W: 18 mm D: 4.6 mm [M398 from Tr. 12 (7342)].
145. A piece of round section copper alloy rod bent back on itself to form a small eyelet. Loop was worked until perpendicular to the shaft. Possibly a rudimentary push key. L: 16.5 mm W: 7.6 mm D: 7 mm [M458 from Tr. 12 (7333)].
146. Iron shank with end split to curve round and form a circle at right angles to shaft. Possible corrosion of wire close to loop end. Possible push key. L: 58.7 mm W: 10 mm D: 10 mm [M40 from Tr. 6E (4015)].
147. Possible iron ward key with handle end broken off. Lock end concreted. L: 64.1 mm W: 21.5 mm D: 6.42 mm [M305 from Tr. 10 (3528)].
148. Iron concretion around a copper alloy object. The copper alloy object has a shaft with two prongs. Possible key corroded into the remains of the lock. L: 36 mm W: 18 mm [M222 from Tr. 10C (3708)]. Not illustrated.
149. Copper alloy shaft of two thicknesses. Possibly the corroded remains of a key with the notched section broken off. L: 44 mm W: 7.8 mm D: 7.7 mm [M456 from Tr. 10A (3776)].

Knives (Fig. 10.11)
Many knife fragments were found, the majority being broken blade fragments rather than whole discarded knives. Many of these are found in Trench 10, where evidence for metal-working would suggest that either the knives or fragments of them were being reworked or melted down. Although generally too corroded to identify methods of manufacturing, one fragment [M331 from Tr. 10 (3528)] shows a construction similar to that of Tylecote A/a steel plate sandwiched between two plates of iron (Tylecote 1981, 46). Only those fragments which are identifiable as fragments of knife, rather than plate metal, are included here. All knife fragments found are iron based.

Islamic
150. Distinctive curved iron knife blade with traces of mineralised fabric sheath. No surviving handle. L: 110.7 mm W: 20.5 mm D: 6.4 mm (without concretions) [M489 from Tr. 3 (2073)].
151. Fragment of iron knife blade and handle tang. L: 66.1 mm W: 22.7 mm D: 8.7 mm [M402 from Tr. 16 (16017)].
152. Copper alloy edging strip folded over wood. Edging strip was originally rivetted, later held together with fine iron strips. Possible base of sheath. L: 27.7 mm W: 18.8 mm D: 8.8 mm [M327 from Tr. 13 (5522)].

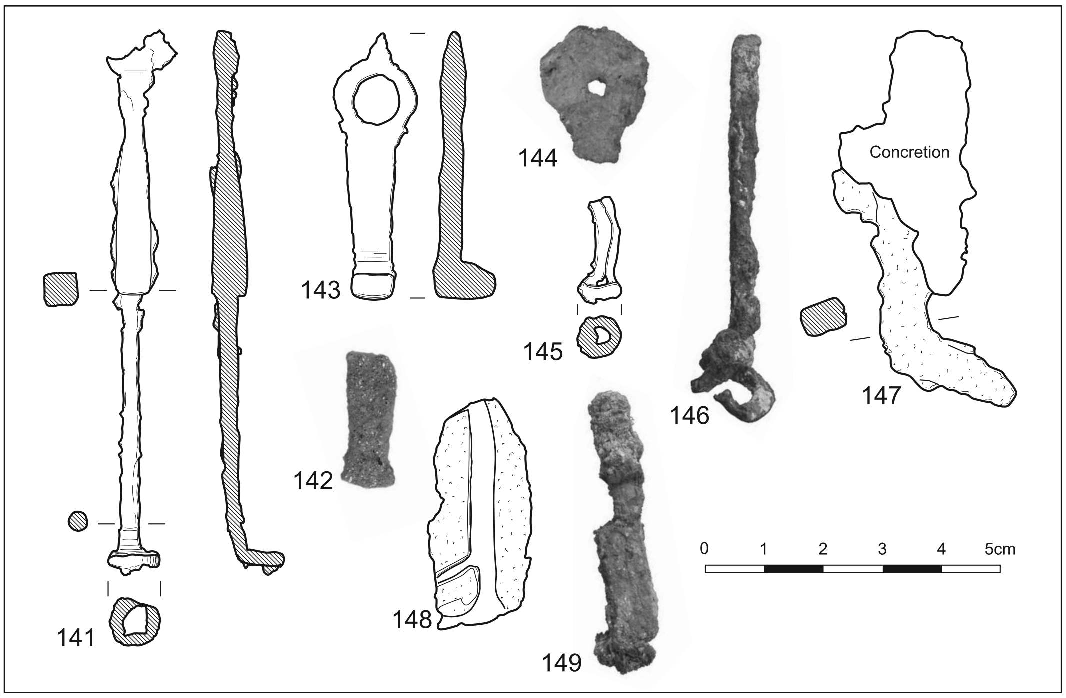
Roman
153. Iron knife made of three layers, although corrosion obscures the profile. No obvious tapering down to the cutting edge. L: 123.5 mm W: 21.3 mm D: 11.1 mm [M331 from Tr. 10 (3528)].
154. Iron knife fragment. Slightly thinning. L: 69.1 mm W: 24.3 mm D: 8.9-8.2 mm [M434 from Tr. 10 (3501)].
155. Broken iron knife point. L: 28.2 mm W: 21.8 mm D: 7.1 mm [M427 from Tr. 10 (3530)]. Not illustrated.
156. Fragment of iron knife. L: 49 mm W: 18.1 mm D: 9.1 mm [M479 from Tr. 10 (3507)]. Not illustrated.
157. Fragment of iron knife. L: 43.5 mm W: 18 mm D: 9.8 mm [M479 from Tr. 10 (3507)]. Not illustrated.
158. Fragment of iron knife. L: 29.2 mm W: 15.5 mm D: 5.5 mm [M479 from Tr. 10 (3507)]. Not illustrated.
159. Fragment of iron knife. L: 29 mm W: 13.3 mm D: 5.9 mm [M479 from Tr.10 (3507)]. Not illustrated.
160. Fragment of iron knife. L: 23 mm W: 12.6 mm D: 5.9 mm [M479 from Tr. 10 (3507)]. Not illustrated.
161. Fragment of iron knife L: 34.5 mm W: 14.3 mm D: 7.3 mm [M479 from Tr. 10 (3507)]. Not illustrated.
162. Fragment of iron knife. L: 33.5 mm W: 22.7 mm D: 6.6 mm [M479 from Tr. 10 (3507)]. Not illustrated.
163. Fragment of iron knife. L: 41 mm W: 17.5 mm D: 12.9 mm [M479 from Tr. 10 (3507)]. Not illustrated.
164. Fragment of iron knife. L: 33.7 mm W: 19.3 mm D: 14.2 mm [M479 from Tr. 10 (3507)]. Not illustrated.
165. Fragment of iron knife. L: 37.43 mm W: 16.8 mm D: 7.9 mm [M480 from Tr. 10 (3507)].
166. Iron knife fragment. L: 48.5 mm W: 26.5 mm D: 9 mm [M290 from Tr. 12 (7332)]. Not illustrated.
167. Iron knife fragment. L: 35.2 mm W: 20.4 mm D: 9.1 mm [M290 from Tr. 12 (7332)]. Not illustrated.
168. Fragment of iron knife blade. L: 35.7 mm W: 13.8 mm D: 8.0 mm [M209 from Tr. 10A (3785)]. Not illustrated.
169. Iron knife blade fragment. L: 27.5 mm W: 29 mm D: 8.8-3.4 mm [M211 from Tr.10A (3776)].
170. Iron knife blade fragment. L: 21.5 mm W: 23.7 mm D: 6.01-1.29 mm [M211 from Tr.10A (3776)].
171. Iron knife blade fragment, bent and broken tip. L: 30 mm W: 17.9 mm D: 5.6 mm [M211 from Tr.10A (3776)].

Not illustrated.
172. Iron knife blade fragment. L: 19 mm W: 20.5 mm D: 5.2-2.0 mm [M212 from Tr. 10A (3799)].
173. Iron knife blade fragment. L: 39.7 mm W: 13.8 mm D: 4.1-2.0 mm [M212 from Tr. 10A (3799)].
174. Broken tip of iron knife. L: 17.3 mm W: 14.2 mm D: 2.6 mm [M207 from Tr. 10C (3796)]. Not illustrated.
175. Possible iron knife fragment. L: 51 mm W: 17.1 mm D: 4.9-2.9 mm [M221 from Tr.10C (3807)].
176. Iron knife fragment with thin blade. L: 41 mm W: 21.5 D: 3.3-1.3 mm [M222 from Tr. 10C (3708)].
177. Fragment of possible iron knife. L: 38.5 mm W: 24.3 mm D: 6.6 mm [M300 from Tr. 7A (10029)]. Not illustrated.
178. Fragment of iron knife blade. Triangular profile. L: 50.5 mm W: 22 mm D: 11.1 mm (M464 from Tr. 7A (10012)].

Lead sheet (Fig. 10.12)
An amount of lead sheet was found, some of which can be considered lead sheathing for the hulls of ships (see Chapter 15, this volume). The remainder may indicate some level of plumbing or water management within the settlement.

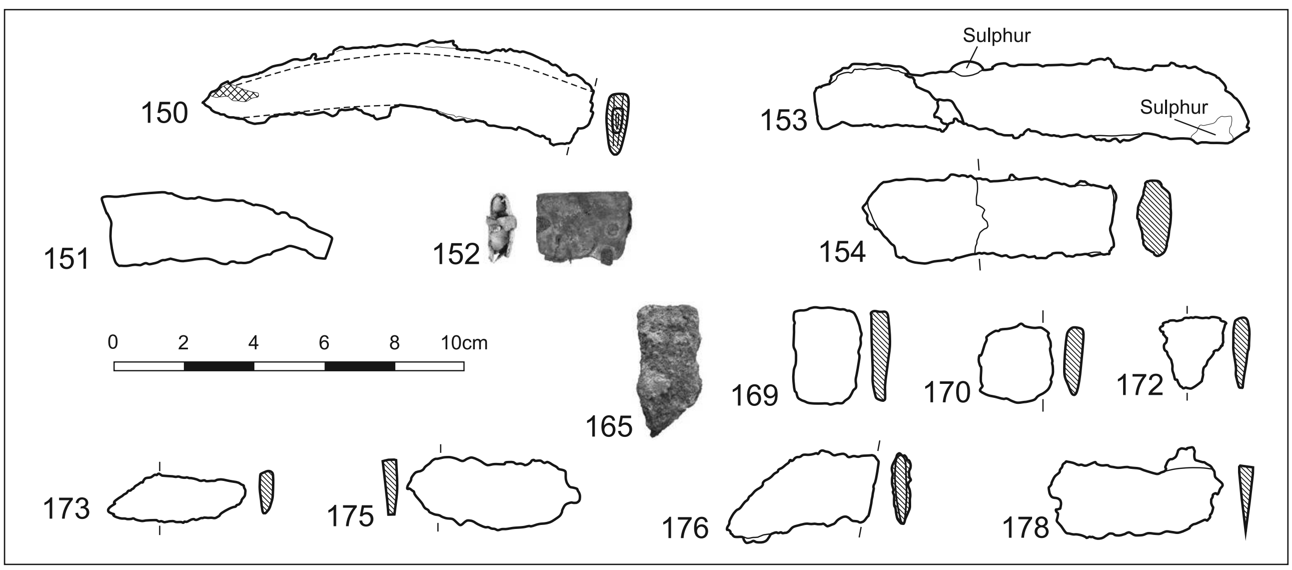
Islamic
179. Flattened length of lead piping. L: 40.7 mm W: 18.6 mm D: 11.9 mm [M320 from Tr. 9 (7040)]. Not illustrated.

Roman
180. Folded narrow lead sheet off-cut. L: c. 240 mm W: 18.5-10.1 mm [M57 from Tr. 7A (0013)].
181. Folded lead sheet in rectangular compressed pack. L: 51.7 mm W: 43.4 mm D: 22.8 mm [M57 from Tr. 7A (10013)].



Left. Figure 10.10. Metal keys. Islamic items Nos 141-142, Roman items Nos 143-149.

Below. Figure 10.11. Metal knives and sheaths. Islamic items Nos 150-151. Roman items Nos 152-178.



182. Fine lead strip folded in half and folded again. Possibly collapsed section of pipe. L: 38.9 mm W: 30.7 mm D: 12.7 mm [M362 from Tr. 14A (14000)].
183. Fine strip of lead sheet 0.5 mm thick, with two folds. L: 17.8 mm W: 27.9 mm D: 4.4 mm [M378 from Tr. 6P (4110)].
184. Folded sheet of lead.L: 26.1 mm W: 18.7 mm D: 10.9 mm [M353 from Tr. 15 (15017)].
185. Sub-Square lead sheet with series of tack holes, including a quincunx pattern. Tack holes have a rectangular profile of varying size, suggesting reuse or retacking. L: 108.6 mm W: 105 mm [M79 from Tr. 7A (10014)] (see also Chapter 15, this volume, Fig. 15.8).
186. Lead sheet 2 mm thick with square hole and indentation from tack being pushed in. L: 51.8 mm W: 45.6 mm [M21 from Tr. 6B (4007)] (see also Chapter 15, this volume, Fig. 15.8).
187. Lead sheet, part folded and shaped. Two round perforations. L: 44.4 mm W: 42.6 mm D: 3.2 mm [M72 from Tr. 6D (4070)].
188. Fragment of lead sheathing. Sheet has rectangular tack holes through, one with imprint of underside of tack with bobbles. L: 65.9 mm W: 24.2 mm D: 0.9 mm [M122 from Tr. 6P (4100)].
189. Fragment of lead sheathing (1.3 mm thick) with pitch stain on one side, mild corrosion on the other. Two small holes but no obvious nail holes. Partly folded. L: 146.7 mm W: 123 mm D: 10.8 mm [M491 from Tr. 8A (8308)].
190. Triangular lead sheet, folded. L: 150 mm W: 70 mm D: 2.9 mm [M53 from Tr. 7A (10013)]. Not illustrated.
191. Piece of lead sheet. L: 26.9 mm W: 18.5 mm D: 4.3 mm [M318 from Tr. 7A (10027)]. Not illustrated.
192. Tube of lead sheet, narrower than its diameter, now flattened. L: 53.2 mm W: 29.3 mm D: 11.7 mm [M91 from Tr. 6P (4100)].
193. Folded-over lead sheet with iron sheet core. Possible lead rim to iron vessel reused as a weight for fishing line. L: 43.1 mm W: 10.6 mm D: 12.5 mm [M302 from Tr. 7A (10031)].
194. Bent-over lead sheet, possibly a fishing net weight. L: 21.9 mm W: 17.3 mm D: 17.6 mm [M319 from Tr. 7A (10021)].
195. Fragment of lead sheet. L: 49.6 mm W: 31.6 mm D: 16.1 mm, plus a further four fragments [M66 from Tr. 7A (10026)]. Not illustrated.
196. Fragment of lead sheet. L: 23.9 W: 12.7. Not illustrated [M74 from Tr. 7A (10023)].
197. Six fragments of lead plate [M491 from Tr. 8A (8308)]. Not illustrated.
198. Four lead sheet fragments, possibly from vessel [M461 from Tr. 7A (10012)]. Not illustrated
199. 15+ lead fragments [M472 from Tr. 7A (10025)]. Not Illustrated.
200. Five fragments of lead sheet [M483 from Tr. 7A (10024)]. Not Illustrated.

Uncertain date
200. Tapering lead off-cut, folded twice. L: c.250 mm W: 23-2 mm D: 2.8 mm [M50 from Tr. 8 (8011)].
201. Rectangular lead off-cut formed into roll. L: 125 mm W: 40 mm D: 1.8 mm [M50 from Tr. 8 (8011)].

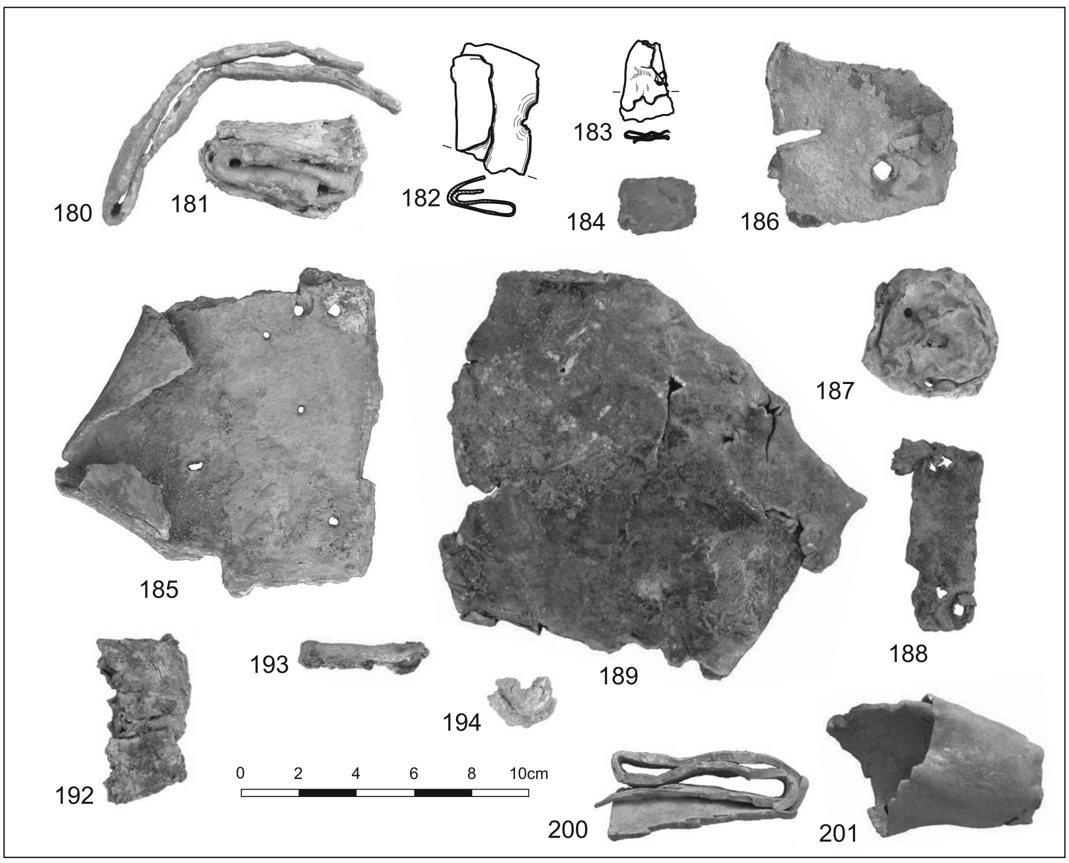


Figure 10.12. Lead sheet pieces and artefacts. Roman items Nos 179-193, Uncertain date items Nos 199-200.

Maritime objects (Fig. 10.13)
Several objects commonly associated with sails and rigging as well as fishing equipment, were found in Roman contents. The ship evidence is discussed more fully in Chapter 15, this volume, and the lead sheathing is discussed more fully above and below under Nails and Fastenings (Section 10.2).

202. Lead weight formed from a shaped roll of lead. Corrosion obscures detail. L: 70.2 mm W: 29.7 mm D: 25.7 mm [M433 from Tr. 7A (10015)].
203. Lead fishing weight, key hole shaped with a small hole for cordage to pass through. Likely to be a plummet for line fishing rather than a net weight (pers. comm. A. Trakadas). Weight 35g. L: 37.8 mm W: 14.3 mm D: 10 mm [M463 from Tr. 7A (10012)].
204. Circular iron piece with central hole and groove around outside. Very corroded and incomplete. Possible sheave block wheel. L: 36.3 mm W: 32.0 mm D: 20.7 mm [M157 from Tr. 12 (7316)].
205. Circular iron object with groove around outer diameter. Sheave block wheel. Diameter: c. 43.5 mm D: 22.4 mm [M168 from Tr. 12 (7326)].
206. Circular iron object, originally formed of two circular disks. Possible sheave block wheel. Diameter: c. 43.5 mm D: 22.4 mm [M168 from Tr. 12 (7326)].

Military equipment (Fig. 10.14)
Three items of Roman military equipment were found, insufficient to confirm the army's presence but confirmation of association. M269 from Trench 6GH (4095) is a belt or strap end mount showing a corroded ram's head damaged in the centre. The ram may indicate the 1st Minervia Legion who had either Minerva or her zodiac sign of the ram for their insignia (Le Bohec 2000, 246). Alternatively, it may show the horns of Ammon which can be linked to many gods, e.g. Zeus or Serapis (Henig and MacGregor 2004, 36, 40). Zeus Ammon is a Libyan god (Henig and MacGregor 2004, 30), Ammon being the sun god. M61 from Trench 6H (4075) is a mount showing an eagle with partly outstretched wings standing on a globe. This image is thought to relate to the divination of Augustus by Tiberius in AD34-36 who issued coins showing this image in celebration of the *apotheosis*, possibly related to the eagle leaving Augustus' funeral pyre (Gradel 2004, 293).

207. Copper alloy belt or strap adornment. Appears to show a ram's head but corroded and damaged in centre. Ram may indicate 1st Minervia Legion. L: 25.9 mm W: 15 mm D: 1 mm [M269 from Tr. 6GH (4095)].
208. Broken copper alloy ovoid stamped metal disc mount. The mount has an eagle with slightly opened wings standing on a globe, edged in beading. L: 17.2 mm W: 14.4 mm D: 1 mm [M61 from Tr. 6H (4075)].
209. Small lead slingshot with dented side. Possibly used as buckshot weight or net weight but no stringing found with it. Weight 14g. L: 34 mm W: 15 mm D: 14 mm [M45 from Tr. 7A (10003)].

Miscellaneous (Fig. 10.15)
Islamic
210. Small tightly wrapped roll of lead, possible weight. L: 20.9 mm W: 18.8 mm D: 12.4 mm [M89 from Tr. 9A (7108)].

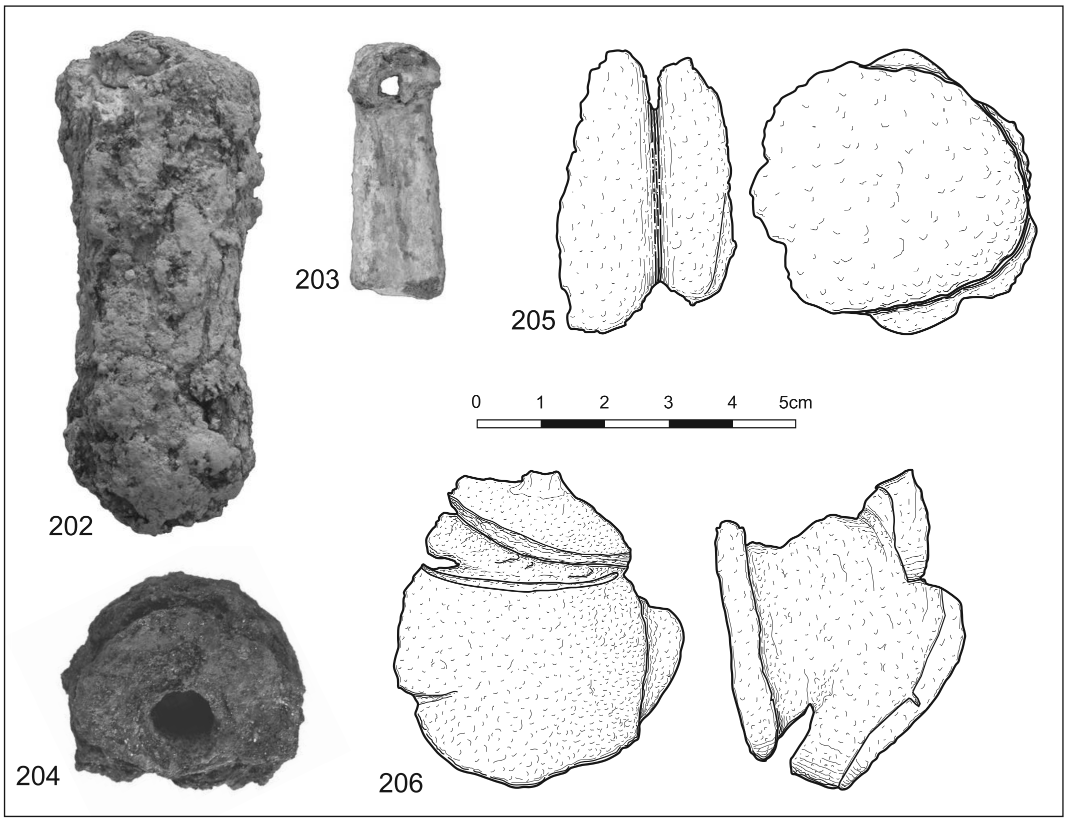


Figure 10.13. Metal maritime objects, Nos 202-206.

211. Flat rectangular piece of copper alloy, possible Islamic coin blank. L: 9.7 mm W: 8.4 mm D: 4.5 mm [M132 from Tr. 12 (7322)]. Not illustrated.

Roman

212. Two broken fragments of tapering round section wires. One fragment tapering and serpentine, one slightly pointed and curved. L: 94.4 mm W: 34.8 mm D: 3.7-2.3 mm [M118 from Tr. 12 (7302)].

213. Moulded copper alloy fragment of vessel or fitting. L: 45.8 mm W: 15.8 mm D: 7.6 mm [M128 from Tr. 12 (7302)].

214. Small moulded copper alloy item. L: 18 mm W: 16.5 mm D: 15.2 mm [M243 from Tr. 10A (3776)].

215. Moulded copper alloy strip with two bends. L: 38.1 mm W: 7.9 mm D: 2.1 mm [M265 from Tr. 12 (7342)].

216. Moulded copper alloy fragment of vessel or fitting. L: 37.9 mm W: 15.2 mm D: 5.2 mm [M425 from Tr. 10A (3707)].

217. Fragment of moulded copper alloy. L: 29 mm W: 15 mm D: 5 mm [M167 from Tr. 10C (3825)]. Not illustrated.

218. Fragment of flattened copper alloy tube. L: 17.8 mm W: 14.5 mm D: 2.11 mm [M161 from Tr. 12 (7305)]. Not illustrated

219. Flattened copper alloy tube. L: 22.7 mm W: 10.8 mm D: 3.81 mm [M172 from Tr. 12 (7327)]. Not illustrated.

220. Tube of folded copper alloy sheet. L: 26.4 mm Diameter: 3.7 mm [M192 from Tr. 12 (7336)]. Not illustrated.

221. Round section copper alloy rod with a claw shape coming from it. Possible ornamentation. L: 20.4 mm W: 9.2 mm D: 4.5 mm [M155 from Tr. 10C (3709)].

222. Short length of rectangular section copper alloy rod tapering gently. L: 23.3 mm W: 8.8-8 mm D: 7.8-7.4 mm [M293 from Tr. 12 (7304)].

223. Rectangular section copper alloy rod tapering gently to a blunt end. L: 43.3 mm W: 6.7-6 mm D: 7.7-5.2 mm [M271 from Tr. 6GH (4095)].

224. Possible lead plug for nail hole. Diameter 7.5 mm. L: 17.1 mm W: 16 mm D: 8 mm [M182 from Tr. 7A (10014)].

225. Irregular shaped iron disc with dimples on either side. Corrosion obscuring interpretation L: 36.6 mm W: 31.8 mm D: 6.52 mm [M326 from Tr. 7A (10021)]. Not illustrated.

Personal and medicinal items (Fig. 10.16)

A number of items for personal hygiene, dress and medicine were found, often with decoration, particularly in the Islamic period. Many of the probe like objects have different interpretations depending on the context in which they are found. A number found at the site are interpreted here as probes which could have either a cosmetic use or a medicinal use. For example the swelling at the end of M34 [Tr. 7 (5024)] has been interpreted as an olivary end which could operate like a dropper (Baker 2004, 139). Double ended probes are often interpreted as kohl applicators. Kohl sticks in general are known in North Africa and the Middle East over a long period of time The ones found at Quseir with round sections and square sectioned panels in the centre are very similar to those found in Shanga, Ethiopia and are reported as being common in East African sites (Horton *et al.* 1996, 359).

Islamic

226. Decorative copper alloy finial of probe or kohl applicator. Shaft has engraved lines with bevelled areas on a square section shank. A flat plate sits above the shaft continuing to a stylised image of a bird with a small head, possibly a dove or a wading bird of some kind. Shaft is missing, presumed broken below decoration. L: 61 mm W: 13.5 mm D: 3.5 mm [M198 from Tr. 13 (5500)].

227. Double ended copper alloy kohl applicator or probe. Round section with square section in centre with incised

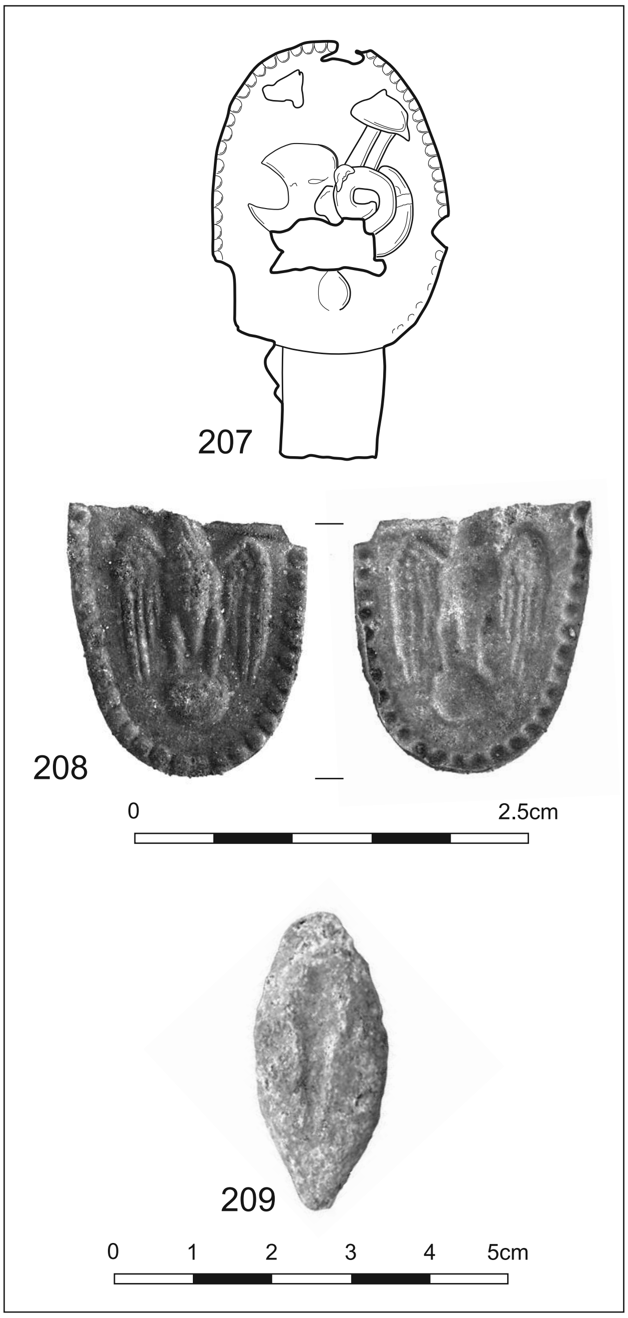


Figure 10.14. Metal military equipment Nos 207-209.

decoration. Closely resembling a fragment found by Whitcomb and Johnson in 1980 (Whitcomb and Johnson 1982, 339). L: 145 mm W: 3.4 mm D: 3.3 mm [M364 from Tr. 13 (5533)].

228. Broken copper alloy kohl applicator or cosmetic tool with slight swelling at end. L: 48.4 mm W: 4.7 mm D: 3.8 mm [M403A from Tr.8A (8395)].

229. Flat iron spike with large flat rectangular end. Pointed end is bent up as though to end in a hook. Possibly a multi-purpose tool as a tongue depressor and cautery with hook. A similar object was found in 1978 but without the hooked end (Whitcomb 1979a, 198). L: 151.2 mm W: 49.6 mm D: 3 mm [M368 from Tr. 13 (5523)].

230. Copper alloy spike with half-moon shape wedge at one end. Possible tongue depressor or razor (alternatively a miniature reille (Marbach 2004, 94)). L: 160 mm W: 55 mm D: 3 mm [M5 from Tr. 2C (1012)].

231. Fine square profile iron bar. Possible probe fragment. L: 34.1 mm W: 2.5 mm D: 2.5 mm [M308 from Tr. 9A (7108)]. Not illustrated.

Roman

232. Double ended cosmetic or pharmaceutical copper alloy tool, one surviving olive shaped end, square section length in centre. L: 127 mm W: 4.4 mm D: 4 mm [M34 from Tr. 7 (5024)].

233. Straight copper alloy tool with a pointed end and a blunter, flattened end. Spatula or probe. L: 75.7 mm W: 3.3 mm D: 2.4 mm [M340 from Tr. 14A (14013)].

234. Broken cosmetic or pharmaceutical copper alloy tool, one surviving olive shaped end, square section end suggesting formerly double ended. L: 58.8 mm W: 5 mm D: 5 mm [M40 from Tr. 6E (4015)].

235. Copper alloy long handled spoon or cochlearia with tiny bowl. Created by folding a strip of metal. A further long straight section of metal may be part of the assembly. L: 30.7 mm W: 6 mm D: 2.2 mm [M26 from Tr. 6H (4030)].

236. Copper alloy round/oval headed pin on square section shaft (2.1 mm wide). L: 21 mm W: 7.4 mm D: 6.2 mm [M435 from Tr. 6H (4085)].

237. Small moulded copper alloy finial from broken hair pin or cosmetic tool. L: 22.5 mm W: 8.7 mm D: 8.2 mm [M411 from Tr. 9775 (9775)].

238. Fine square profile iron bar becoming round and going to a point, possibly a hair pin. L: 68.4 mm W: 3.1 mm D: 2.9 mm [M228 from Tr. 7A (10062)].

239. Small copper alloy hook with longer shaft, possibly for surgical use. L: 46.3 mm W: 12.6 mm L: 7.1 mm [M160 from Tr. 12 (7305)].

240. Iron stud with some corrosion. Possible hobnail. L: 29.8 mm W: 12.2 mm D: 13.6 mm [M303 from Tr. 10 (3528)].

Uncertain date

241. Tapering copper alloy shaft widening to a rounded teminal at one end. Opposite end broken. Possible a cosmetic tool or probe. L: 52 mm W: 5.6 mm D: 5.6 mm [M424 from Tr. 8A (8250)].

Religious objects (Fig. 10.17)

Two religious objects were found in the Roman deposits of the site, one representing the Egyptian panoply of gods, the other a Greek/Roman god.

242. Carved slate plaque depicting feather headress. Flat

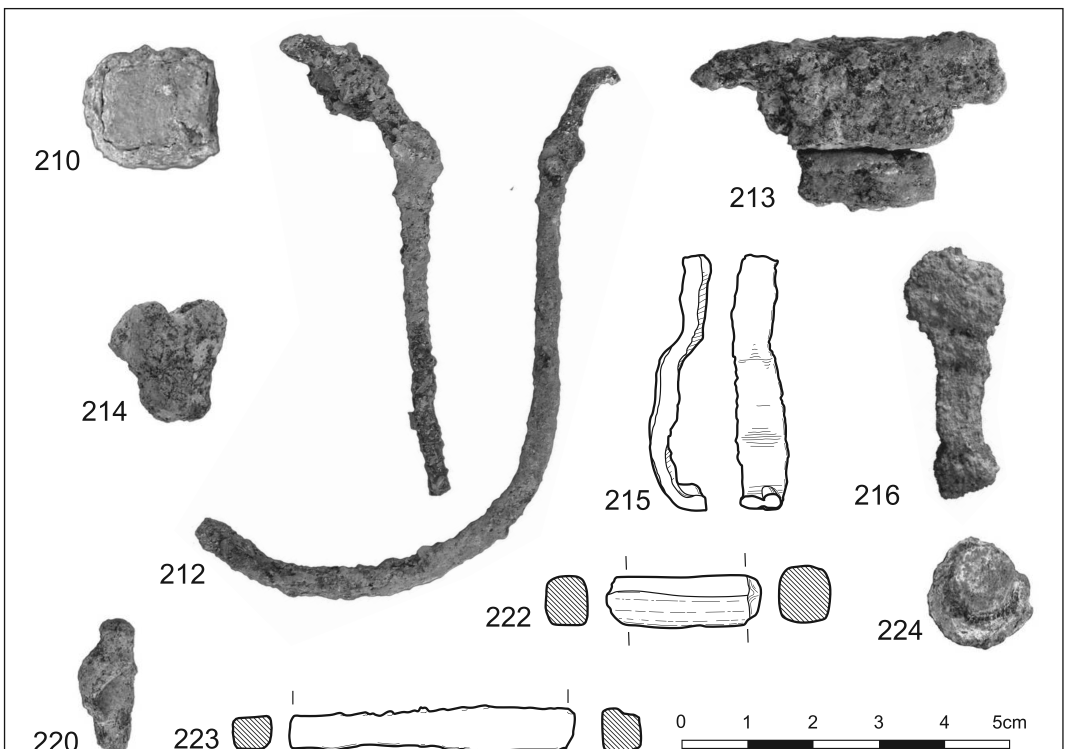
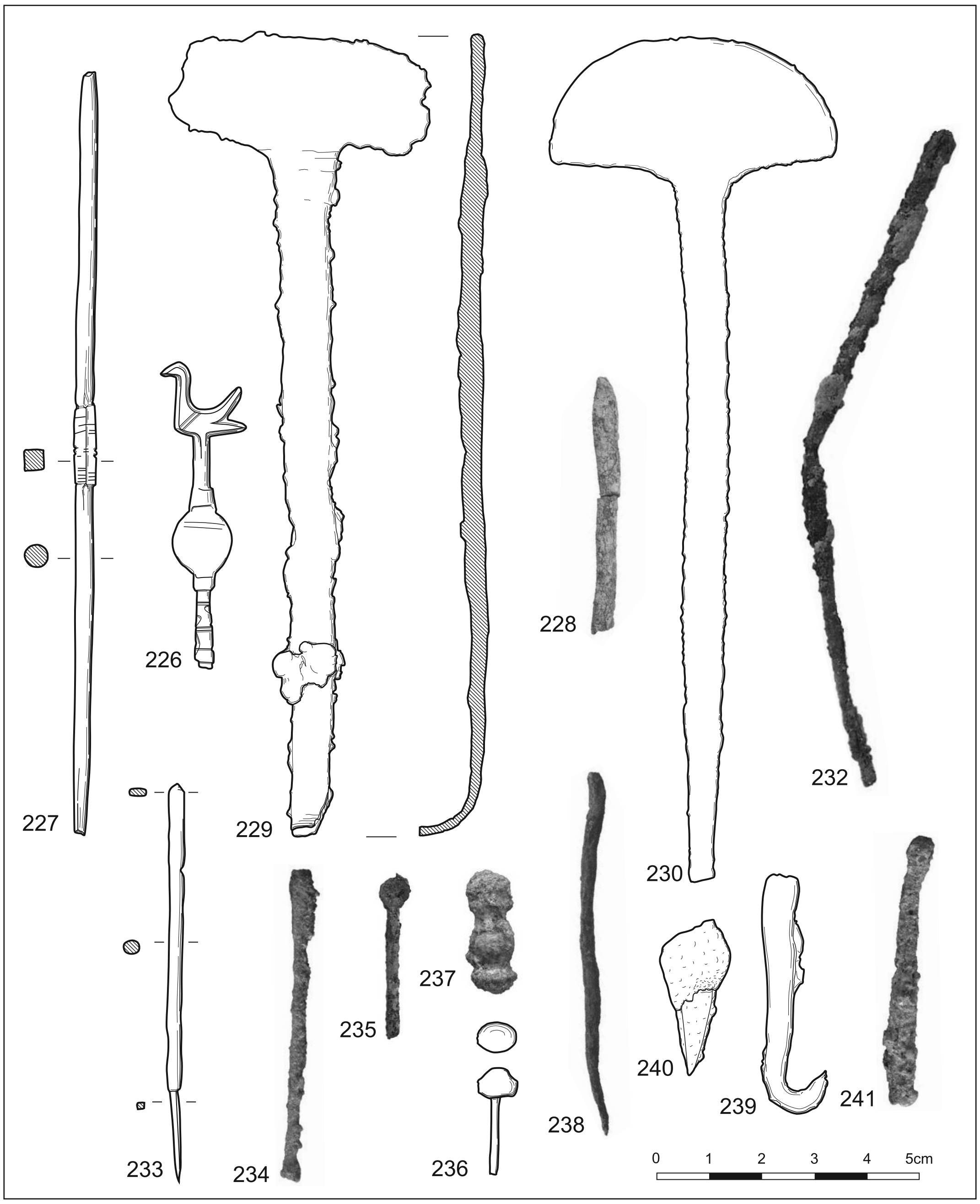


Figure 10.15. Miscellaneous metal artefacts. Islamic item No. 210, Roman items Nos 212-224.

Figure 10.16. Metal items of personal hygiene and medicinal use. Islamic items Nos 226-230, Roman items Nos 232-240, uncertain date item No. 241.



backed. Gold leaf seems to have washed into one area of the front but there is evidence for the gypsum adherent in the recessed areas. L: 77 mm W: 42 mm D: 9.3 mm (discussed more fully and illustrated in Chapter 11, this volume) [M495/L197 from Tr. 15 (15004)].
243. Small copper alloy figurine of Heracles/Hercules with part of right leg missing. All detail obscured by corrosion and battering. Likely to have high lead content. L: 75.7 mm W: 34.7 mm D: 10.4 mm [M444 from Tr. 7A (10012)].

Scale weights (Fig. 10.18)
Biconical circular weights were found in Islamic contexts. Central indentations probably indicate they were created on a lathe from blank disks, rather than lead filled containers. There are six weights in all, all similar in style [e.g. M441 from Tr. 3 (2028)]. Allowing for variations due to corrosion the weights represent three measures, approximately 15g, 30g and 60g. This is approximately comparable to measures of a half ounce, ounce (or *uncia* c. 27.29g) and two ounces using the Byzantine pound (Sams 1982, 207). There is, however, little published on weights in the later Islamic world. The style of weight is long-lived; similar weights were found at the Crypti Balbi Rome dating up to the 10th century (personal observation). The weights have some corrosion and concretion making their precise original weight difficult to assess accurately.

Islamic
244. Circular copper alloy scale weight with bevelled sides. Top and bottom surfaces have incised concentric circles. Broken in half approximately. Weight: 15g L: 20 W: 12.5 mm D: 15.5 [M439 from Tr. 2B (1007)].
245. Circular copper alloy scale weight with bevelled sides. Top and bottom surfaces have incised concentric

circles barely visible. Weight: 15g L: 20.4 W: 19.6 mm D: 16.4 [M440 from Tr. 2C (1019)].
246. Circular copper alloy scale weight with bevelled sides. Top and bottom surfaces have incised concentric circles, one of which appears roughly done. Weight: 30g L: 21.3 mm W: 21.7 mm D: 13.7 mm [M443 from Tr. 1 (surface)].
247. Circular copper alloy scale weight with bevelled sides. Top and bottom surfaces have incised concentric circles. Weight: 60g L: 25.7 mm W: 25.7 mm D: 18.6 mm [M443 from Tr.1 (surface)].
248. Circular copper alloy scale weight with bevelled sides. Top and bottom surfaces have incised concentric circles. Weight: 55g L: 28.4 mm W: 27 mm D: 22.3 mm [M442 from Tr. 1 (surface)].
249. Oval copper alloy scale weight with bevelled sides. Top and bottom surfaces plain. Weight: 55g L: 29.5 W: 26.4 mm D: 13.2 [M441 from Tr. 3 (2028)].

Roman
250. Star-shaped piece of copper alloy with four points and central hole. Possibly the top of the chains holding a balance pan. L: 22.6 mm W: 21.2 [M73 from Tr. 9 (7024)].

Seal (Fig. 10.19)
251. Roman lead seal applied to cordage when molten. Seal appears to have sealed in one end of string against a longer length. Almond shape with oval depression on upper surface and a small central motif (unreadable). Reverse has imprint of cloth. L: 17.3 mm W: 11 mm D: 6.5 mm [M477 from Tr. 2D (1265)].

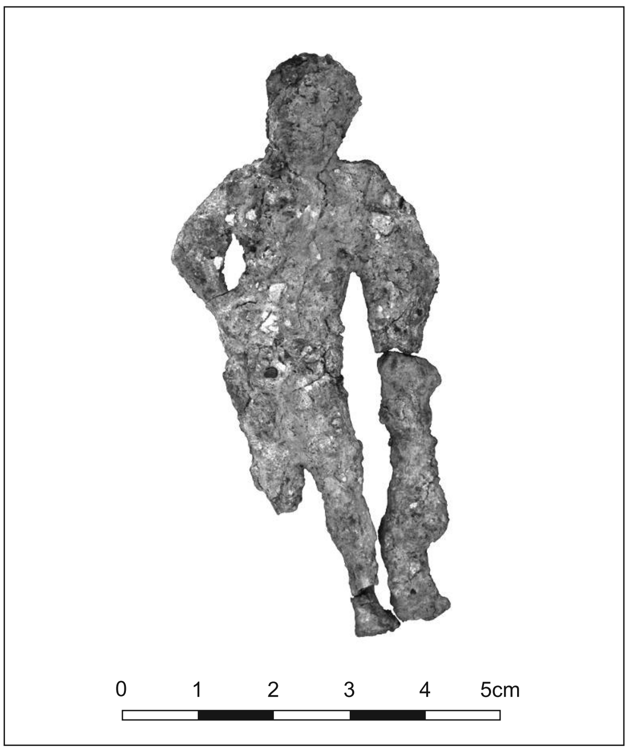


Figure 10.17. Small copper alloy figure of Hercules, No. 243.

Sheet metal (Figs 10.20 and 10.21)
A large number of fragments of sheet metal were found, both in copper alloy and iron, throughout the trenches. The fragments are generally small (less than 10cm) in size and therefore their original use is lost. However, many of the fragments were found in the metal-working areas and therefore may be related, possibly scrap for melting down or reworking.

Styli (Fig. 10.22)
Two possible styli were found from Roman contexts.

252. Broken section of flattened copper alloy tube, tapering. Possible stylus. L: 17.6 mm W: 5.0-3.7 mm L2.0 mm [M112 from Tr.12 (7313)]. Not illustrated.
253. Thin copper alloy tube flattened at one end to form a point. Some flattening to remainder post deposition. Possible stylus with ink tube. L: 43.5 mm W: 4.8 mm D: 1.1 mm [M106 Tr. 10C (3814)].

Tools (Figure 10.23)
Tools from both periods demonstrate the presence of craftsmen and industry at the site. Within the Roman period the majority of the tools were found by the port but within the Islamic trenches the tools were mostly present in the town area.

Islamic
254. Straight steel needle, notch hammered in then hole drilled. L: 37.2 mm W: 0.8 mm D: 0.4 mm [M492 and 03T185 from Tr. 13 (5533)].

255. Iron awl or bit with square section handle. Tool shaft is round in section. Broken at working end. L: 59.9 mm W: 7.9 mm D: 7.8 mm (M385 from Tr. 13 (5533)].
256. Rectangular section iron bar curled over at end to create a small eyelet. L: 34 mm W: 6.4 mm D: 11.6 mm [M419 from Tr. 16 (16015)].
257. Iron bar, slightly tapering. L: 84.4 mm W: 12.3 mm D: 3.4 mm [M41 from Tr. 2E (6001)].
258. Wide iron caulking tool with square end for striking flattening out until wider and 1.6 mm thick. L: 87.3 mm W: 22 mm D: 13.3 mm [M295 from Tr. 8A (8251)].
259. Iron chisel. L: 140.2 mm W: 27.7 mm D: 30.1 mm [M328 from Tr. 8A (8395)].
260. Iron chisel with broken end. L: 89 mm W: 32 mm D: 30.4 mm [M462 from Tr. 8 (8003)].

Roman
261. Top of large copper alloy needle. L: 34 mm W: 8 mm D: 6 mm [M130 from Tr. 12 (7302)].
262. Broken iron blade possibly from small bill hook or sickle. L: 85.1 mm W: 23.7 mm D: 10.1 mm [M329 from Tr.10 (3528)].
263. Possible fragment of iron strigil or file. L: 62 mm W: 24.6 mm D: 6.9 mm [M221 from Tr. 10C (3807)].
264. Small iron chisel with broken tip L: 95.9 mm W: 24.8 mm D: 24 mm [M97 from Tr. 12 (7315)].

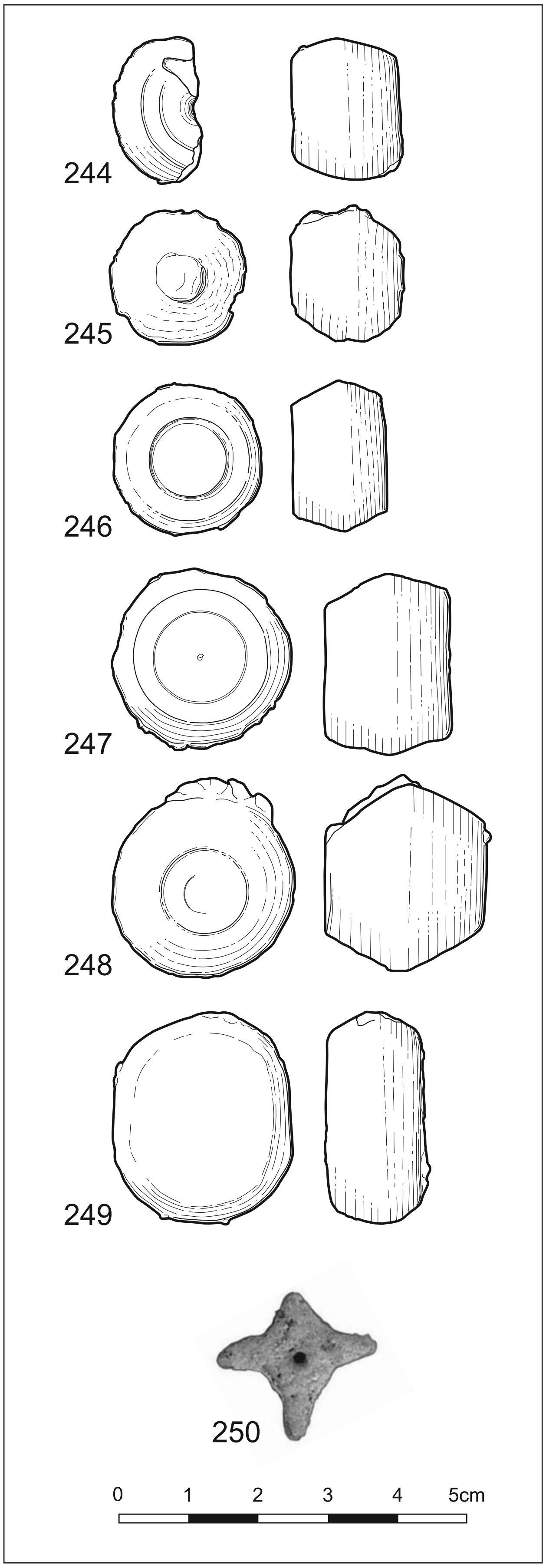


Figure 10.18. Copper alloy scale and scale weights. Islamic items Nos 244-249, Roman No. 250.

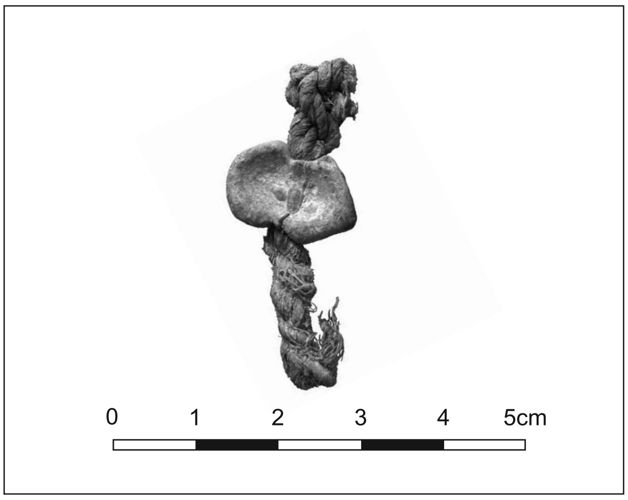


Figure 10.19. Roman lead seal, No. 251.

265. Small iron chisel with no head. L: 83.9 mm W: 14.2 mm D: 13.1 mm [M127 from Tr. 12 (7302)].
266. Iron chisel or small pick. L: 127.8 mm W: 13.7 mm D: 12.6 mm [M460 from Tr. 15D (15111)].
267. Iron rod tapering to point. Possible small chisel. L: 92.7 mm W: 18.2 mm 12.7 mm (M380 from Tr. 6P (4110)].
268. Square section iron rod tapering gently along its most of its length to a point. Other end is cut away to form a wedge shape. Possible broken tool. L: 95.2 mm W: 11.3 mm D: 9.1 mm [M214 from Tr.10A (3784)].
269. Rectangular section iron rod tapering gently to a blunt end. Opposite end appears sheared off to create a wedge shape. L: 77.3 mm W: 11.1 mm D: 8.25 mm [M223 from Tr.10C (3802)].
270. Length of very large oval section iron rod, gently tapering. Possibly part of pick or other heavy duty tool. L: 135.1 mm W: 43.5 mm D: 35 mm [M485A from Tr. 7A (10011)].
271. Flat wide iron strip with small pointed hook at end. Possible tenter or shearboard hook, alternatively a cuirass tie-hook. Very corroded. L: 30.8 mm W: 10.8 mm D: 5.7 mm [M268 from Tr. 12 (7349)].
272. Tapering rod of iron with a rounded tall head. Rod has been bent almost into loop. Possibly terminal of a substantial chain. L: 92.7 mm W: 54.2 mm D: 15.5 mm [M284 from Tr. 12 (7316)].
273. Iron rod bent back on itself forming eyelet, shaft bent to right angle, possibly to form a substantial hook for a crane? L: 45.1 mm W: 38.9 mm D: 16.9 mm (M310 from Tr. 7A (10011)].
274. Weight or plumb bob: two layers of lead sheet wrapped around a tubular iron core c.5 mm in diameter, to form an arrow shape in the round. Weight 133g. Possible plummet or small sounding weight. L: 64.2 mm W: 23.4 mm D: 23 mm [M90 from Tr. 10A (3798)].
275. Rectangular section iron rod with copper corrosion. Possible small hammer head. L: 78.8 mm W: 9.7 mm D: 8.1 mm [M407 from Tr. 10C (3808)].
276. Iron ferrule held in place by square shank nail hammered through ferrule into wood. Broken tip may suggest it is in fact part of a larger tool such as a spade

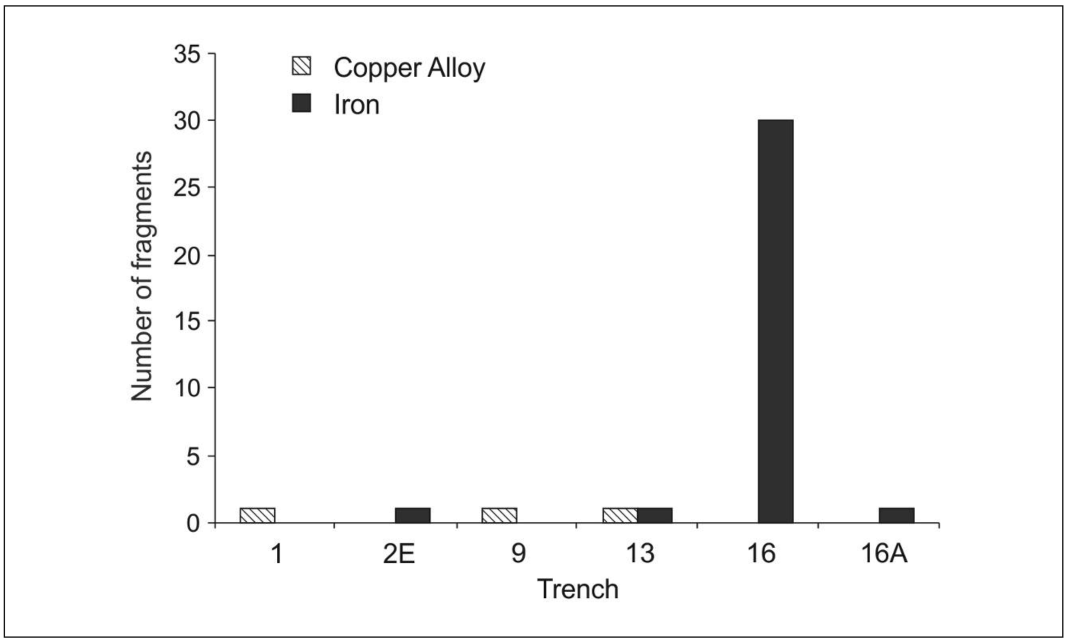


Figure 10.20. Distribution of copper sheet by trench.

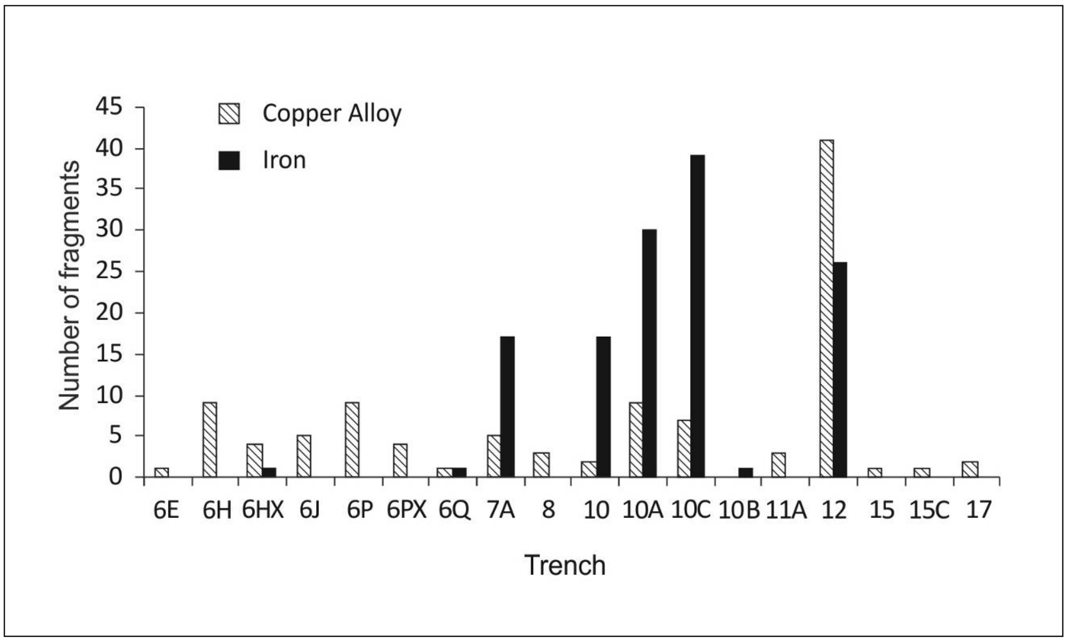
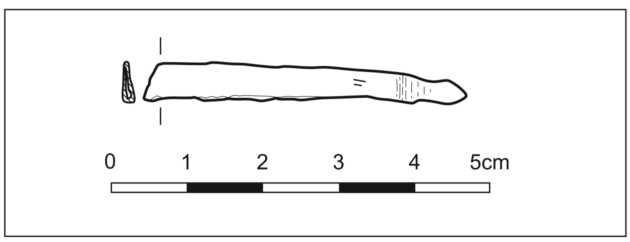


Figure 10.21. Distribution of iron sheet by trench.

Below. Figure 10.22. Roman copper alloy stylus No. 253.



or billhook which has also been rehafted. L: 55.8 mm W: 31.8 mm D: 30 mm [M11 and W148 from Tr. 6H (4030)]
277. Iron chisel with bent shank and heavily concreted. L: 9.3 mm W: 26.6 mm D: 26 mm [M202 from Tr. 12 (7376)]. Not illustrated.

Trappings (Fig. 10.24)
A number of pieces of trappings were found many of which may be related to horses and haulage. Some of the loops and rings may be part of a saddle [e.g. M126 from Tr. 12 (7317) and M333 from Tr. 17 (17028)] (Mayer-Kuester 2006, 252), together with some of the split ended nails.

Islamic
278. Flat profile piece of iron in a U-shape, possibly a donkey shoe. L: 80.5 mm W: 73.3 mm D: 12.7 mm [M470 from Tr. 4 (4002)].
279. Broken penannular hoop of copper alloy with higher lead content. One blunt end. L: 20.3 mm W: 19.7 mm D: 2.5 mm [M32 from Tr. 5 (3026)].
280. Sub-circular iron ring, any detail obscured by corrosion. L: 31.1 mm W: 26.8 mm D: 6 mm [M396 from Tr. 16 (16003)].
281. Iron ring with flat rod folded around it. Possibly acted as a dividing ring. External diameter: 35.4 mm D: 5.2 mm [M28 from Tr. 2E (6000)].

Roman

282. Circular copper alloy ring of round section. Fine rectangular section strip folded over ring. Possible dividing ring. External diameter: 33.8 mm D: 6.55 mm [M333 from Tr. 17 (17028)].

283. Circular copper alloy ring with two rectangular strips folded over the ring. Harness dividing ring. External diameter: 25.6 mm D: 5.9 mm [M377 from Tr. 17 (17028)].

284. Round section copper alloy rod curved to form a loop with flattened ends. L: 23.1 mm W: 14.5 mm D: 3.1 mm [M43 from Tr. 6B (4008)].

285. Iron loop and shaft made by bending a rod over. Shaft is broken. L: 41.6 mm W: 22.5 mm D: 12.7 mm [M126 from Tr. 12 (7317)].

286. Copper alloy circle formed by bending a single round section rod back on itself. L: 46.4 mm W: 20.5 mm D: 4.1 mm [M68 from Tr. 7A (10026)].

287. Subcircular copper alloy ring with horned bezel top around a cross bar. Possible mount, guiding ring or bezel. L: 26 mm W: 26 mm D: 2 mm [M86 from Tr. 6H (4085)].

288. Round section copper alloy strip bent to form overlapping sub-circular ring. L: 21.4 mm W: 18.3 mm D: 3.8 mm [M227 from Tr. 7A (10011)].

289. Sub-circular iron ring. External diameter: 22.6 mm D: 4.7 mm [M70 from Tr. 7A (10260)].

Uncertain date

290. Small broken iron ring. External diameter: 33.8 mm D: 10.4 mm [M60 from Tr. 8 (8000)]. Not illustrated.

Vessels (Fig. 10.25)

The most remarkable vessel was a broken metal handled jar with an inscription on the interior. The interior had a coarse black coating, like sand, likely to be the core material from lost wax method of casting hollow vessels (Lucas 1989, 222). The inscription was in reverse on the inside of the vessel and would not have been visible from the outside.

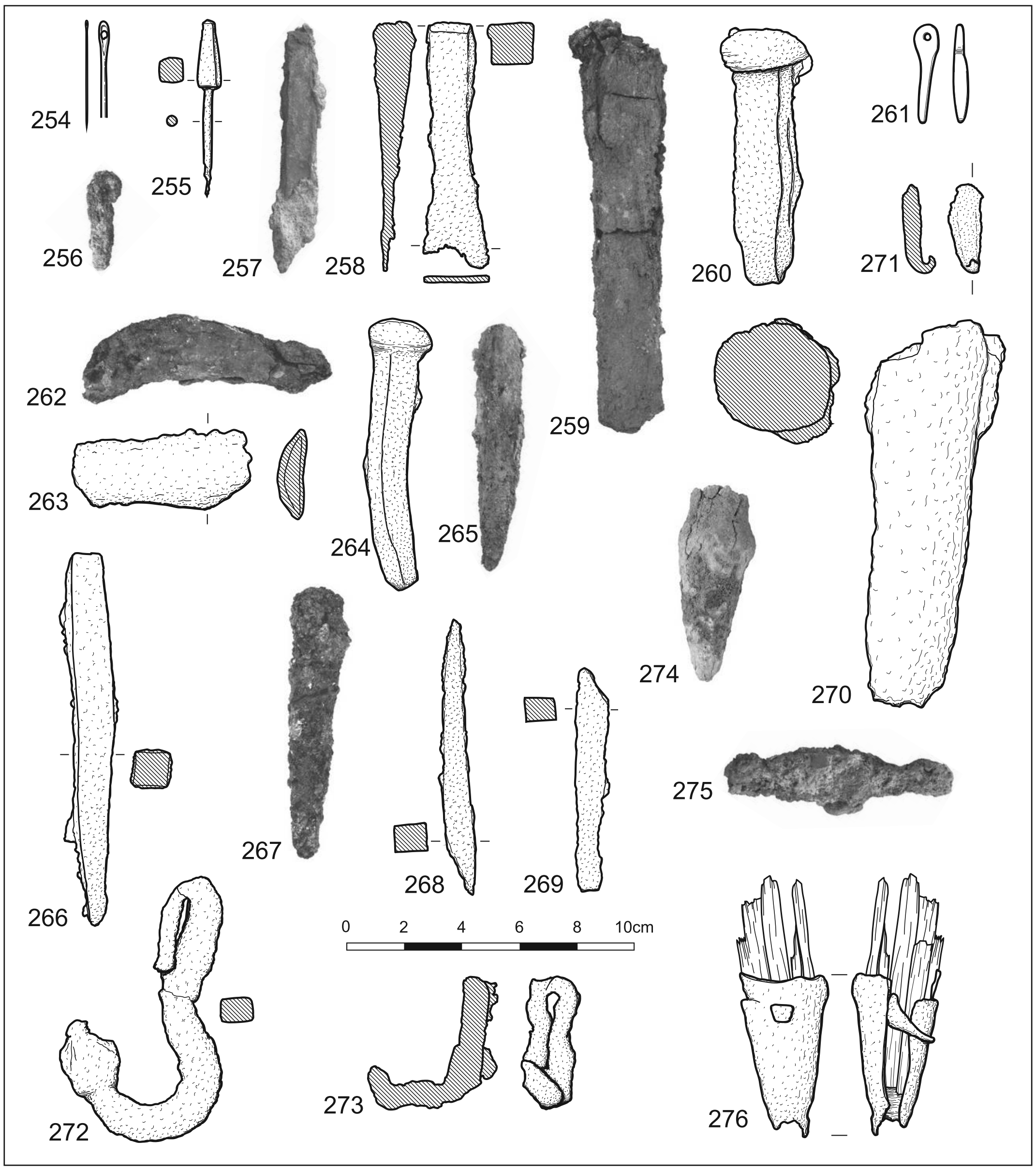


Figure 10.23. Metal tools. Islamic items Nos 254-260, Roman items Nos 261-277.

Islamic
291. Flat sheet of copper alloy folded over to form a simple rim. Possibly originally part of a box or dish. L: 151 mm W: 55 mm D: 7.3 mm [M297 from Tr. 16A (16518)].
292. Fragment of copper alloy vessel rim. Outer diameter: 120 mm Inner diameter: 90 mm [M410 from Tr. 16A (16514)].
293. Tiny fragment of fine copper alloy bowl with bead rim. H: 10 mm W: 9 mm D: 1.5 mm [M30 from Tr. 2E (6014)]. Not illustrated.

Roman
294. Fragments of a handled copper alloy jar, corroded on the outside but the interior is protected by the burnt contents. There is a Greek inscription around the inside of shoulder but the writing is mirrored and protruding suggesting it was engraved on the core. Fine lines on interior suggest that the mould core was formed on a wheel. It is possible that this is a failed experiment to copy an original jar with an inscription. H: 165 mm W: 128 mm. Rim diameter 66.5mm [M233 from Tr. 7A (10005)].
295. Fragment of small copper alloy dish with small everted rim and carinated base. Rim diameter 120 mm assuming no crushing H: 59 mm W: 29 mm W: 2.5 mm [M22 from Tr. 2B (2097)].
296. Fragment of plain copper alloy bowl with simple rounded rim. Diameter: 160 mm H: 22.7 mm D: 2 mm [M345 from Tr. 6P (4110)].
297. Small copper alloy container with straight sides and simple rim, made from single fine beaten sheet. Riveted split in side. Possible leather band around top. Crushed flat. Rim diameter: c. 60 mm Base diameter: c. 40 mm Height: 43.4 mm [M230 from Tr. 6GH (4095)].
298. Fragment of copper alloy jar with flanged rim. Rim diameter 90 mm H: 19 mm [M80 from Tr. 7A (10029)].
299. Rim of copper alloy vessel. Diameter c.220 mm H: 25 mm W: 27.2 mm D: 1.7 mm [M62 from Tr. 8 (8070)].

Wire (Fig. 10.26)
The majority of the wire found was round in section suggesting it was drawn however some fragments including M322 from Trench 7A (10031), were rectangular in section suggesting they had a particular function such as inlay. Copper and silver wire was used as inlay between 1100-1300 AD and inlaid brass became immensely fashionable with prestigious objects being made from it. Mosul metal-workers in Egypt were already famous for their inlay work in this period (Ward 1993, 74, 84) so it is possible their specialism could date back to the Roman period. Only one object may be inlaid [M478 from Tr. 6H (4085)]. However, the rectangular wire M322 may be an element of inlay either broken or in preparation.

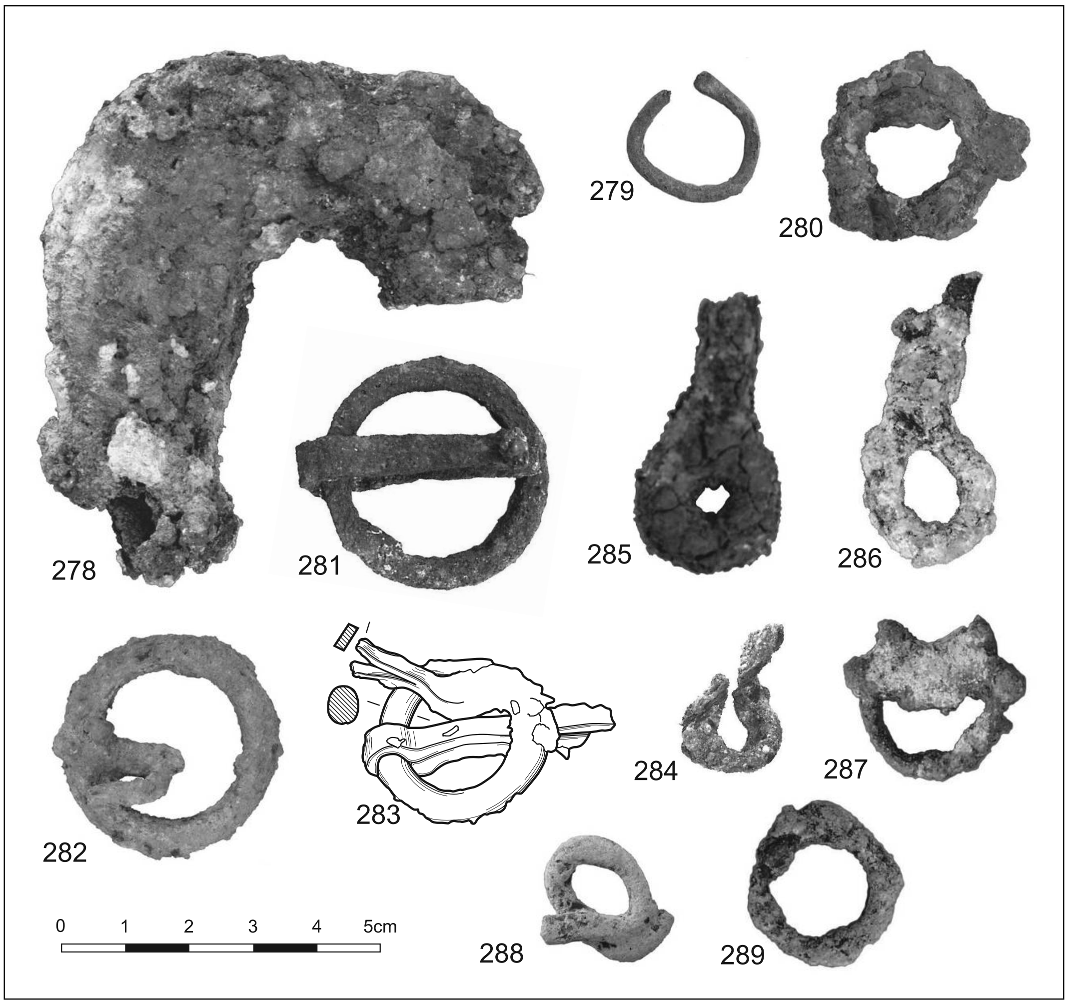


Figure 10.24. Metal trappings and harness fragments Islamic items Nos 278-281, Roman items Nos 282-289.

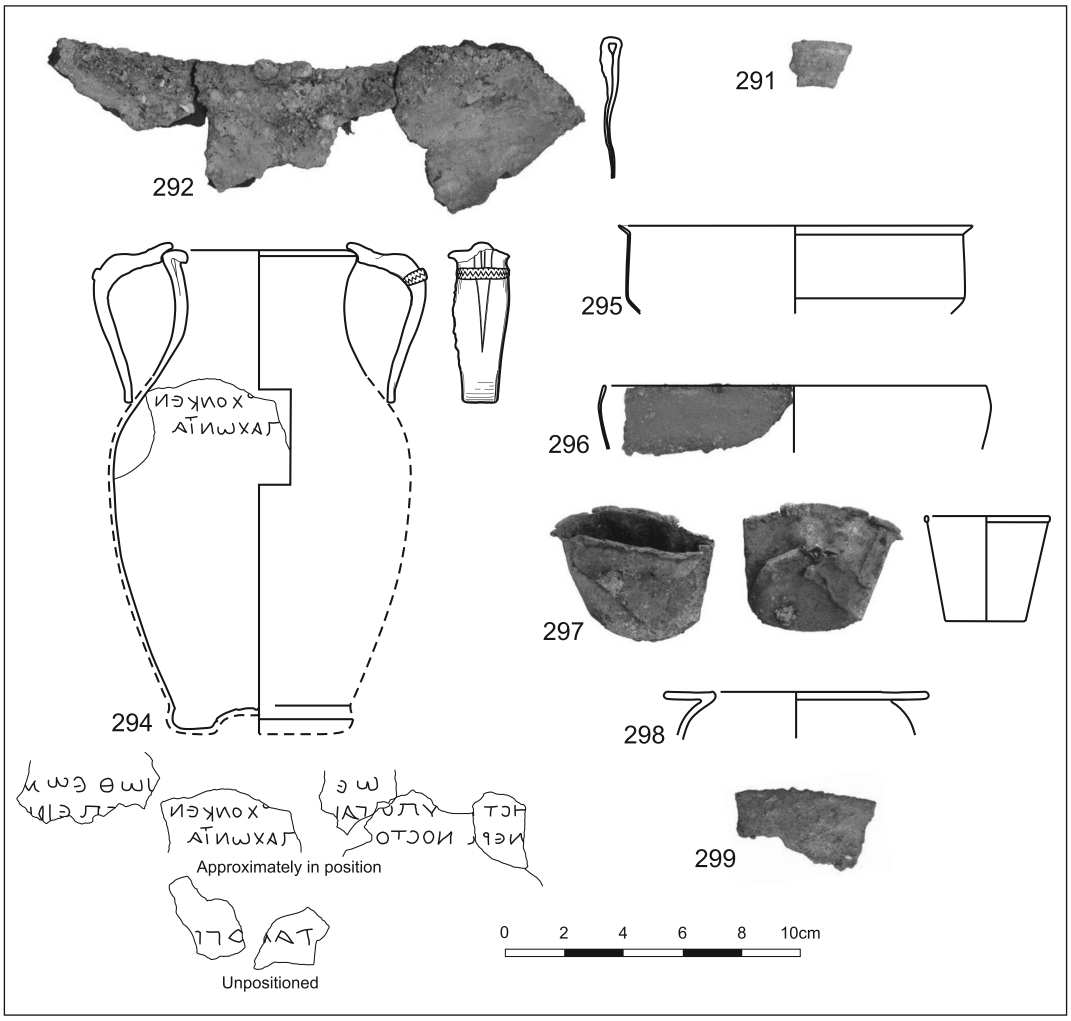


Figure 10.25. Copper alloy vessels. Islamic items Nos 291-292, Roman items Nos 294-299.

Islamic

300. Round section copper alloy wire (diameter 0.9 mm) twisted together and looped around and twisted back on istelf to form an long loop. L: 58.4 mm W: 6.1 mm D: 2.8 mm [M467 from Tr. 1 (surface)].

301. Twisted fine copper alloy wire 0.5 mm diameter formed to create an eyelet 12.1 mm long. End of wire currently hook shaped but it is unlikely that it would be strong enough to hold a fish. L: 38.4 mm W.11.1 mm [M30 from Tr. 2E (6014)].

302. Fine copper alloy wire twisted around in a group. Average wire diameter 0.6 mm. L: 31.1 mm W: 25.79 mm [M347 from Tr. 16 (16049)].

Roman

303. Corroded copper alloy block with wires pressed in. L: 29 mm W: 21.8 mm D: 20.4 mm [M478 from Tr. 6H (4085)]. Not illustrated.

304. Short piece of copper alloy cylinder with length of wire coming from one end L: 61.8 mm W: 10.3 mm D: 1.5 mm [M12 from Tr.7A (10003)].

305. Fragment of round copper alloy profile wire. Diameter 0.5 mm [M322 from Tr. 7A (10031)]. Not illustrated.

306. Rectangular profile copper alloy wire tightly wrapped around iron nail shank. W: 1.5 mm D: 0.7 mm [M322 from Tr. 7A (10031)].

10.2 Nails and Fastenings

Nails of all types were found in very large quantities all over the site, with nearly two thousand recorded in total (Figs 10.27-10.33). They are a variety of shapes and sizes from an enormous ship nail [M436] found on the largest island in the *sabkha*, to the tiny studs found in domestic locations. Due to time constraints and the vast number of nails, particularly in the Roman harbour area, only a sample was studied for the years 2000 and 2001, although in 1999, 2002 and 2003 they were studied in their entirety. The catalogue below represents a sample of the variety found.

Iron nails were ubiquitous through out the site (see Figs. 10.27 and 10.28). However, a great number were identified only from lumps of concretion in the harbour area. Although many were found in the town area, none appeared to be *in situ* or close to structures, and the general lack of timber (despite good preservation) suggests they may have been removed along with the wood. This is in contrast with Berenike, where most of the iron nails were found in association with architecture i.e. for flooring, roofing, screens, balconies and gates during the 1994/5 and 1999/2000 seasons (Hense 1996, 227; 2007, 213-218). The resettlement of Quseir in the Islamic period may have lead to the stripping of any substantial timbers for use as firewood or for other purposes and the recycling of their nails. A number of copper alloy pins were however still in place in brackets or edging strips suggesting furniture since decayed.

The variation of sizes of the iron nails is unlikely to relate to chance during manufacture and a variety of shapes is more likely to represent a variety of uses. For example the sizes of the ship nails used in Serçe Limani wreck were largely consistent: plank nails had smaller heads (c. 2.5 mm), frame/keel nails larger (up to 4 cm) and bolts had deep heads (4 cm) and thick shafts (Bass *et al.* 2004, 98-99). Similarly the copper alloy nails show quite a variation in size suggesting a variety of applications.

Huge quantities of concretions were also found in the Roman harbour area. They were generally small with a square internal section where the original metal had completely corroded away and are almost certainly broken nail fragments.

A variety of copper alloy nails were found, some quite substantial. Copper nails and bolts were used in Roman shipbuilding but with a general transition towards more iron nails after the 2nd century (Parker 1992, 27). However, many of the copper alloy nails are Islamic (see Fig. 10.29 for distribution by trench). A considerable number of copper alloy tacks were found in the Roman deposits. While a few were found in the upper town area, the majority were sheathing tacks found close to the Roman shoreline. Nails and tacks are rarely studied because they change very little over time, have little stylistic variation, and are almost never decorated. Consequently there is little published material, particularly in Egypt. However, sheathing tacks are worthy of further study.

The copper alloy tacks (and one iron version) are unusual because of what appears to be ornament or decoration, yet which seems to be functional. The underside of many (but not all) of the heads had protuberances in a variety of arrangements. Figures 10.30 and 10.31 show the variation in styles and their frequency. These varied from just three small protruding hemishperes to ten, with the most common style No. 14 including extended protuberances forming 'dividing bars'. It is likely that these hemishperes are to prevent the tack twisting in place and possibly working loose. They have been found in other maritime locations such as Berenike and many shipwrecks and it may be that their discovery at Myos Hormos represents a ship repairing yard, if not a ship building location. They are complemented by the numerous of iron concretions found in the Roman harbour.

Lead sheathing has been found protecting the hull on a variety of ancient wooden shipwrecks around the Mediterranean. 'It normally consists of large sheets, one to two millimeters thick, laid over some sort of fibre impregnated with resin or pitch and held in place by copper tacks in a characteristic 'quincunx' pattern' (Hocker 1995, 197 quoting Casson 1995, 210). An example of this has been found (see [M79] above). Generally it is assumed to be an anti-fouling device but Hocker (1995, 198-99) also believes that it sealed the joints and seams between the planks. The use of continuous lead sheathing appears to have been abandoned towards the end of the 2nd century as witnessed on the Procchio wreck (160-200AD) (Parker 1992, 27). However, it is thought that the copper tacks were poisonous to many of the marine borers and barnacles and could therefore act as an antifouling agent alone (Parker 1992, 199). The Lake Nemi sheathing tacks were 99.6% copper (Fitzgerald 1994, 195) and were spaced 3-6 cm apart, although 8-10 cm spacings are also recorded on the Punic ship at Marsala, however, average spacing is around 7cm (Kahanov 1999, 220). The tacks are usually copper although in the Marsala ship they were of leaded bronze. Heads of tacks are always round and usually 1.5-2 cm in diameter although in the Lake Nemi barges they were 2.5-

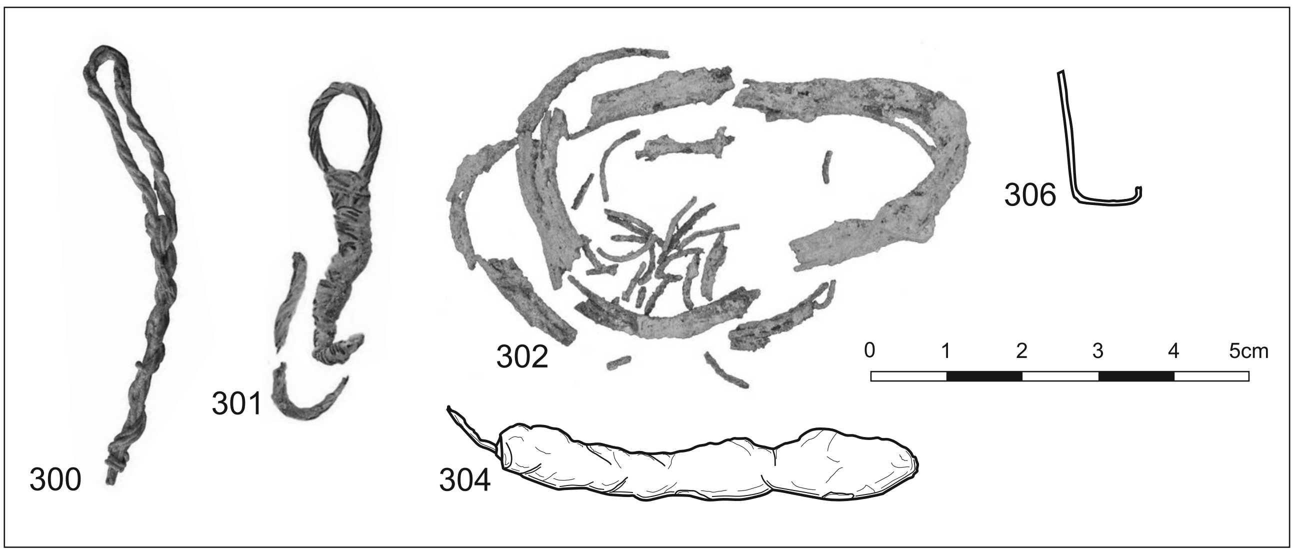


Figure 10.26. Copper alloy wire. Islamic items Nos 300-302, Roman items Nos 303-306.

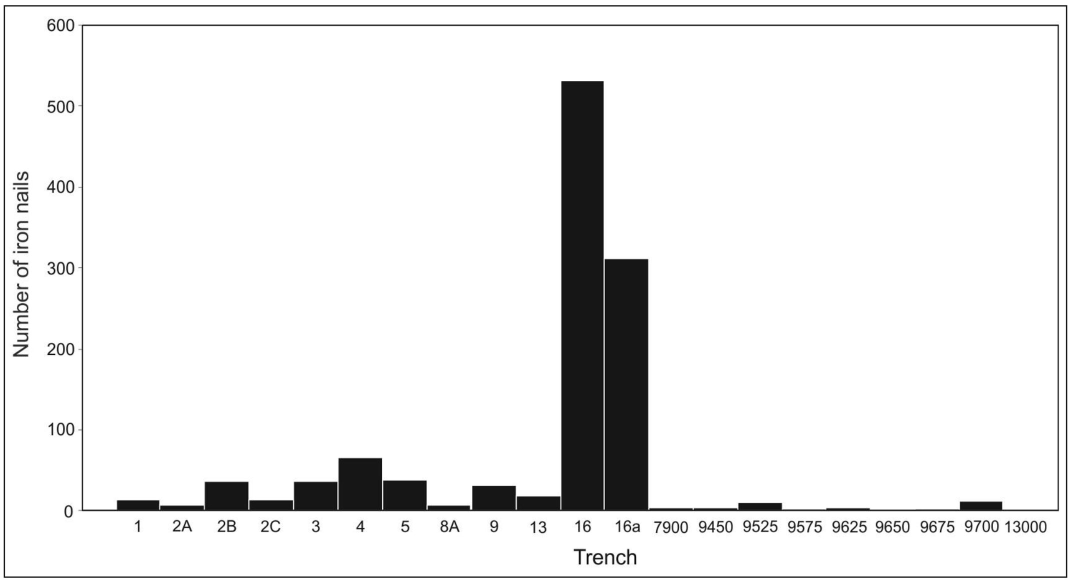


Figure 10.27. Distribution of Islamic iron nails by trench.

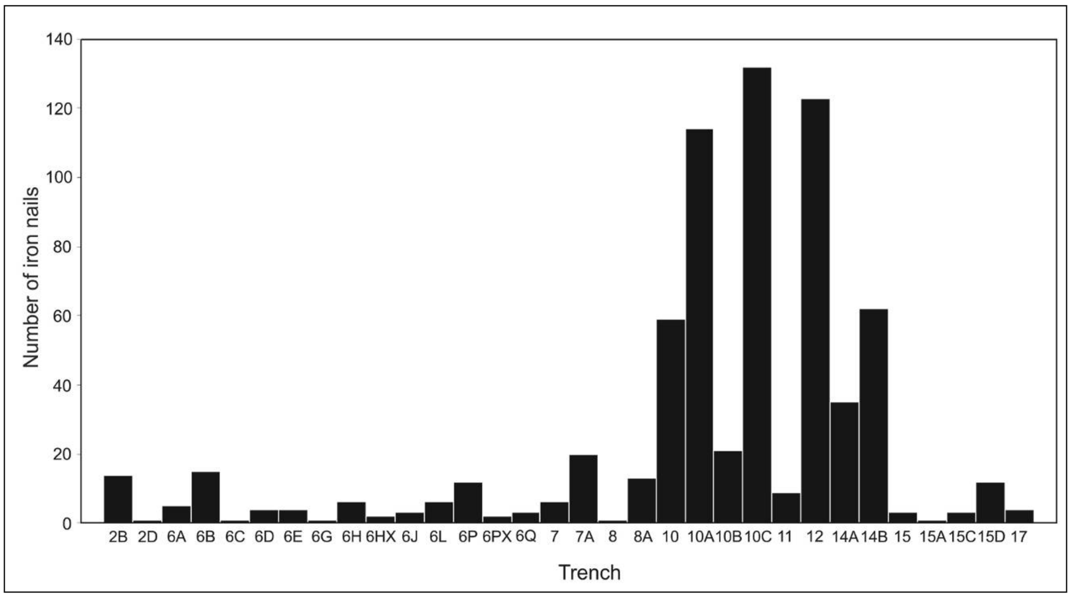


Figure 10.28. Distribution of Roman iron nails by trench.

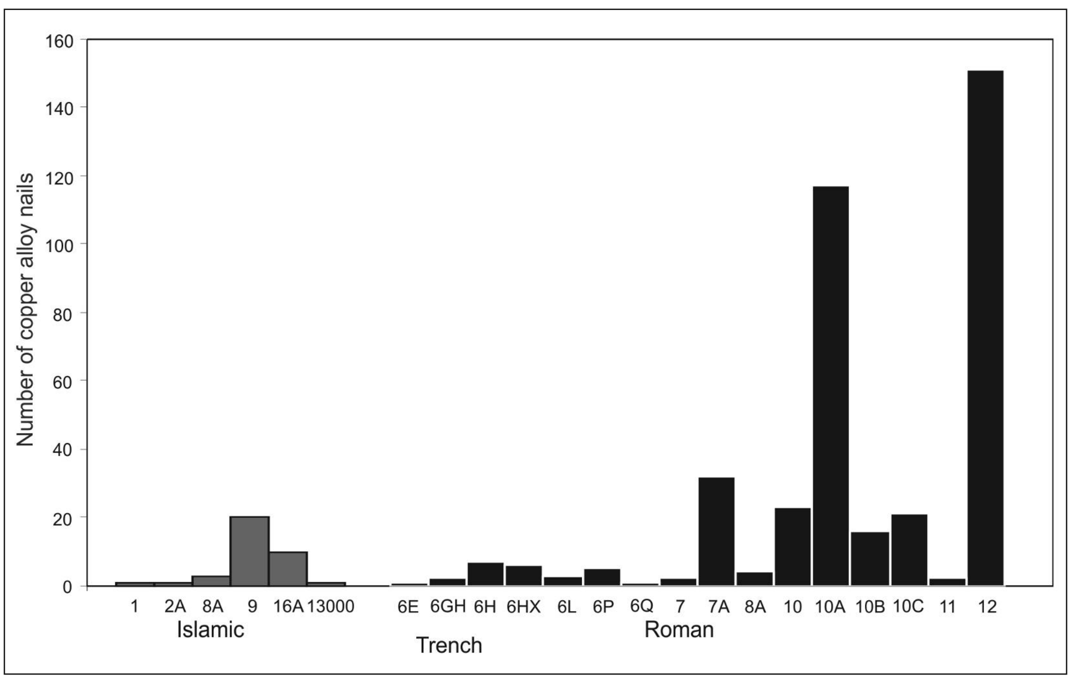


Figure 10.29. Distribution of Islamic and Roman copper alloy nails by trench.

3 cm (Fitzgerald 1994, 195). Those found at Myos Hormos exhibit both sizes but the larger size is often due to the presence of corrosion products.

Tack heads with protrusions were first found on the Punic ships dating from mid 3rd century BC and occur on wrecks dating up to 100AD. Fitzgerald (1994, 201) states that earlier tacks did not have protrusions, however there are a quantity of tacks at Myos Hormos without hemishperes suggesting there is not a complete change from the early to late period. The Albenga wreck (early 1st century) tacks had protrusions of points and bars. The Lake Nemi barges had hemispheres in at least four different patterns (Fitzgerald 1994, 202), indicating the widespread use of different patterns of protrusions.

The most common style of hemisphere pattern, No. 14 is found in many locations across the site, so the arrangement does not appear to reflect individuals working at Quseir although it may represent workshops elsewhere. It would be interesting to compare the styles with those of other locations to see if there is an pattern.

It is generally assumed that nails are constructed from shanks cut from bars with heads formed from with a widening of the bar or the addition of a further disk of metal depending on the size of the head and shaft. This may be the case with some of the tacks found, but the level of corrosion generally prevents confirmation. It would be possible to create the hemishperes by hammering a hot disk into a mould to form them. However, there is a single example of a copper alloy shank [M372 from Tr. 6Q (4165)] that appears to have waste flanges on either side where a two part mould has been badly fitted together. No examples of nail or tack moulds have been found at Quseir, and the delicacy of some of the hemishperes suggests that the mould would have to be fine-grained - either clay, stone or iron.

There is little lead sheathing on the site, despite the number of tacks (see above), so it is possible that towards the end of the Roman occupation of the site the ships were no longer being sheathed and the lead taken off for reuse. This contrasts with Berenike where considerable evidence of lead working was found, particularly in a 'post-Ptolemaic' phase II structure which contained around 70 kg of lead slag and some worked lead interpreted as being for sheathing (BE00-36) (Sidebotham 2007, 35, 37, 41). It is therefore possible that boats were not re-sheathed at Myos Hormos, but patched.

Islamic

307. Large copper alloy nail with square shaft and rounded head. L: 125 mm W: 17 mm D: 17 mm [M9 from Tr. 1 (201)].

308. Substantial copper alloy nail with domed head, bent shaft and missing tip. L: 56.5 mm W: 13.3 mm D: 13 mm [M278 from Tr. 8A (8361)].

309. Very small copper alloy nail. L: 23 mm W: 6.7 mm D: 6.7 mm [M275 from Tr. 8A (8395)].

310. Almond shaped copper alloy rove with small square hole. (3.5 mm). L: 26.5 mm W: 21.7 mm D: 0.6 mm [M384 from Tr. 13 (5519)].

311. Large iron nail. L: 101 mm W: 25 mm D: 27 mm [M296 from Tr. 8A (8251)].

312. Substantial iron nail with wood traces on shaft. Broken shaft. L: 59 mm W: 35.8 mm D: 31 mm [M301 from Tr. 9 (7039)].

313. Iron nail head completely flattened with shaft bent over close to head (possibly reused as a small jar lid?). L: 34 mm W: 31 mm D: 11 mm [M196 from Tr. 5 (3014)].

314. Iron nail with clenched tip. L: 77 mm W: 25.3 mm D: 24 mm [M246 from Tr. 8A (8251)].

315. Iron nail in good condition. L: 61 mm W: 16.4 mm D: 12 mm [M352 from Tr. 13 (5509)].

316. Iron tack with broken tip. L: 28 mm W: 25.4 mm D: 22.5 mm [M367 from Tr. 13 (5533)].

317. Small iron nail. L: 25.5 mm W: 13.4 mm D: 11.8 mm [M408 from Tr. 16A (16515)].

Roman

318. Clenched copper alloy nail with iron corrosion at either end suggesting iron roves. L: 30.3 mm W: 23.4 mm D: 8.9 mm [M388 from Tr. 12 (7339)].

319. Sheared off large domed copper alloy nail head. L: 23.3 mm W: 21 mm D: 6.3 mm [M342 from Tr. 15 (15007)].

320. Large copper alloy nail with domed slightly cupped head, in very good condition but with broken shank. L: 57 mm W: 22 mm D: 21 mm [M371 from Tr. 6Q (4165)].

321. Copper alloy bolt top with broken shank. L: 26 mm W: 19.7 mm D: 20 mm [M159 from Tr. 12 (7316)].

322. Copper alloy bolt with broken shaft. L: 32 mm W: 18 mm D: 16 mm [M216 from Tr. 10A (3800)].

323. Oval headed copper alloy bolt with no flange to the head L: 20.6 mm W: 15.9 mm D: 12 mm [M406 from Tr. 10A (3729)].

324. Substantial copper alloy nail with domed head and broken shaft. L: 31 mm W: 19 mm D: 18 mm [M258 from Tr. 10A (3723)].

325. Copper alloy nail with domed, hollow head and square section shank. L: 54.1 mm W: 14.4 mm D: 14 mm [M373 from Tr. 6Q (4165)].

326. Rectangular headed copper alloy tack. L: 39 mm W: 19.9 mm D: 17.3 mm [M279 from Tr. 10A (3752)].

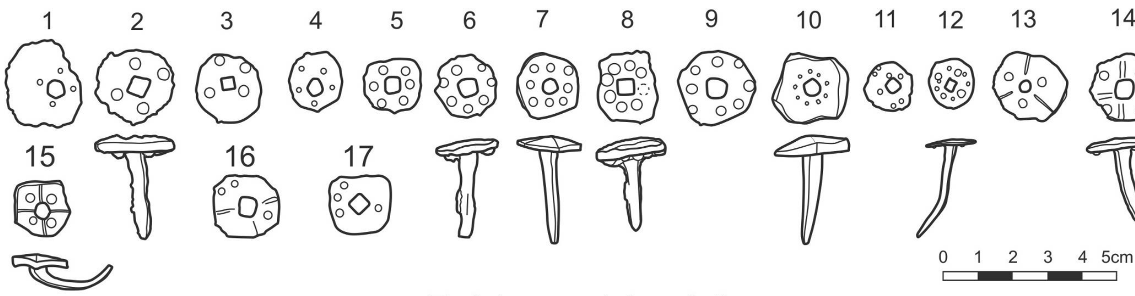
327. Copper alloy sheathing tack with split end. L: 37.2 mm W: 20.2 mm D: 20 mm [M125 from Tr. 6P (4100)].

328. Square headed copper alloy nail with slight bend in shaft. L: 74.2 mm W: 13.5 mm D: 13.5 mm [M409 from Tr. 15A (15094)].

329. Clenched copper alloy nail. L: 49.1 mm W: 11.4 mm D 11 mm [M237 from Tr. 10A (3729)].

330. Small copper alloy nail with domed head. L: 30 mm W: 11.1 mm D: 10 mm [M241 from Tr. 12 (7321)].

331. Small headed copper alloy stud with round shank. L: 17 mm W: 11.2 mm D: 11 mm [M191 from Tr. 10 (3773 III)].



Tack type and description

1 Four hemispheres arranged in a square close to the shank
[M323 from Tr. 10 (3526)] minimal corrosion, obvious splaying of the head - Illustrated
[M448 from Tr. 6HX (4085)] edges broken, mild corrosion

2 Four hemispheres arranged in a square some distance from the shank
[M448 from Tr. 6HX (4085)] corroded - Illustrated
[M117 from Tr. 6D (4070)] mild corrosion
[M124 from Tr. 6P (4100)] mild corrosion, head retains thickness so possibly unused
[M131 from Tr. 12 (7302)] corroded
[M145 from Tr. 10A (3832)] slightly off square, corroded
[M235 from Tr. 10A (3727)] used and mild corrosion - 2 examples with one hemisphere off square

3 Four off centre hemispheres
[M250 from Tr. 10C (3703)] corroded - Illustrated

4 Five hemispheres in an approximate circle around shank
[M466 from Tr. 12 (7351)] minimal corrosion - Illustrated
[M210 from Tr. 10A (3785)] corroded giving the impression of the hemispheres being close to the shank
[M242 from Tr. 10A (3776)] broken and corroded

5 Six hemispheres in an approximate circle around shank
[M190 from Tr. 6L (4075)] good condition - Illustrated
[M421 from Tr. 15 (15068)] mild corrosion some hemispheres not visible
[M423 from Tr. 10A (3717)] corroded
[M446 from Tr. 6HX (4085)] bent head showing use, mildly corroded
[M449 from Tr. 6HX (4080)] corroded but good example

6 Seven hemispheres in an approximate circle around shank
[M270 from Tr. 6GH (4095)] mild corrosion- Illustrated
[M249 from Tr. 10A (3729)] corroded
[M315 from Tr. 7A (10027)] corroded

7 Eight hemispheres arranged in an approximate rectangle around the shank
[M124 from Tr. 6P (4100)] mild corrosion - Illustrated
[M194 from Tr. 10C (3806)] off centre from shank, corroded
[M253 from Tr. 10B (3763)] corroded

8 Eight hemispheres in an approximate circle around shank
[M266 from Tr. 12 (7342)] very corroded - Illustrated
[M415 from Tr. 17 (17001)] mild corrosion

9 Eight hemispheres partly in line, partly in circle
[M426 from Tr. 10B (3714)] mild corrosion - Illustrated

10 Nine hemispheres in an approximate circle around shank
[M124 from Tr. 6P (4100)] good condition, head thick so possible unused - Illustrated
[M195 from Tr. 10C (3827)] corroded

11 Possible double row of hemispheres
[M348 from Tr. 6Q (4170)] mild corrosion but surface deteriorated – Illustrated

12 Ten hemispheres, possibly a reworked mould from four hemispheres with six smaller hemispheres added around
[M252A from Tr. 6GH (4095)] good condition - Illustrated

13 Three dividing bars with single interspersed hemispheres
[M494 from Tr. 7 (5021)] corrosion cleaned off - Illustrated

14 Four dividing bars with single interspersed hemispheres some distance from the shank. The dividing bars are slightly skewed from the square
[M449 from Tr. 6HX (4080)] corroded – Illustrated
[M88 from Tr. 10A (2716)] 2 examples corroded
[M124 from Tr. 6P (4100)] mild corrosion
[M125 from Tr. 6P (4100)] on a split ended tack
[M139 from Tr. 10C (3708)] corroded
[M190 from Tr. 6L (4075)] mild corrosion
[M234 from Tr. 10A (6722)] corroded
[M235 from Tr. 10A (3727)] mild corrosion
[M236 from Tr. 7A (10028)] part destroyed
[M254 from Tr. 6JH (4090)] mild corrosion
[M273 from Tr. 12 (7321)] corroded
[M285 from Tr. 12 (7351)] corroded
[M286 from Tr. 12 (7348)] mild corrosion
[M289 from Tr. 8A (8399)] corroded
[M292 from Tr. 10 (3745)] corroded
[M312 from Tr. 7A (10027)] mild corrosion
[M348 from Tr. 6Q (4170)] mild corrosion with damage
[M356 from Tr. 6J (4155)] mild corrosion
[M379 from Tr. 6PX (4110)] very mild corrosion
[M392 from Tr. 14B (14514)] corroded
[M432 from Tr. 7A (10011)] mild corrosion

15 Four dividing bars with single interspersed hemispheres close to the shank. The dividing bars are slightly skewed from the square
[M190 from Tr. 6L (4075)] mild corrosion - Illustrated
[M141 from Tr. 12 (7327)] mild corroded
[M253 from Tr. 7A (10011)] corroded
[M306 from Tr. 7A (10027)] mild corrosion

16 Three or possible four dividing bars with one or two hemispheres in each compartment
[M428 from Tr. 10A (3703)] some damage - Illustrated

17 Iron with hemispheres visible
[M93 from Tr.6P (4105)] possible originally with 9 hemispheres - see type 10 – Illustrated

Figure 10.30. Copper alloy sheathing tack designs.

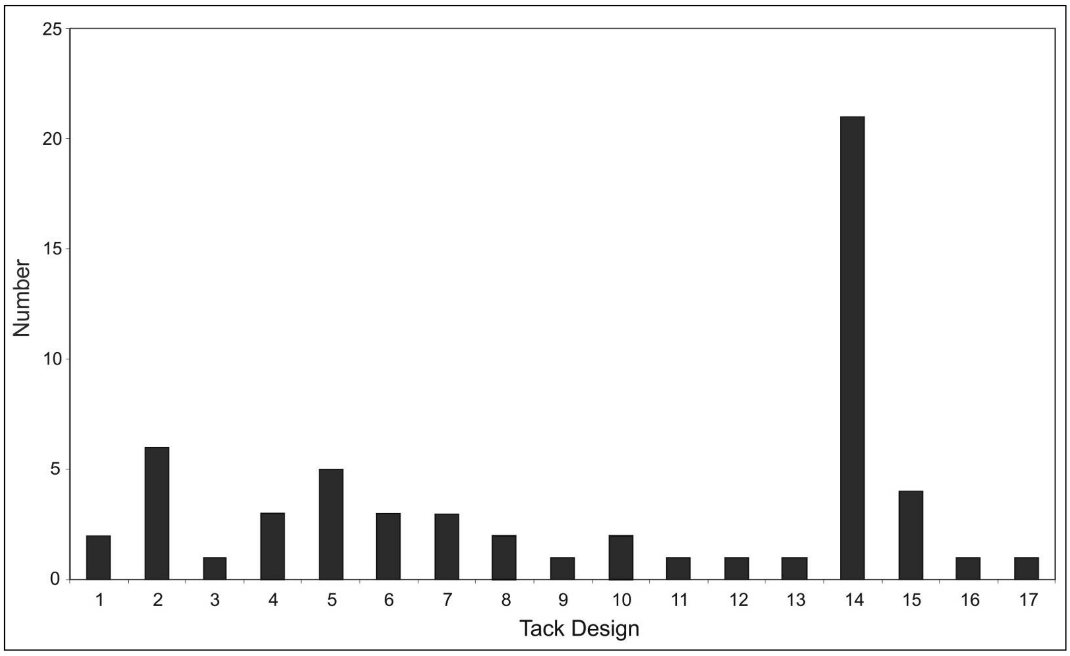


Figure 10.31. Copper alloy sheathing tack design frequency.

332. Small copper alloy nail with split end and domed head. L: 34 mm W: 9.5 mm D: 9 mm [M159 from Tr. 12 (7316)].
333. Small flat headed copper alloy nail. L: 36.7 mm W: 10.1 mm D: 9.7 mm [M486 from Tr. 6H (4085)].
334. Small copper alloy nail with flat head and square section shaft, broken tip. L: 28 mm W: 9.8 mm D: 9.7 mm [M267 from Tr. 12 (7342)].
335. Fine copper alloy nail with concretions on shaft. L: 32 mm W: 11.8 D: 11.5 mm [M294 from Tr. 12 (7321)].
336. Small copper alloy nail with square shank broken close to flat head. L: 19.25 mm W: 10.7 mm D: 10 mm [M142 from Tr. 12 (7327)].
337. Copper alloy tack shaft with evidence of moulding. Shaft has flanges at narrow end indicating it was made in a two piece mould. L: 36.4 mm W: 3.9 mm D: 3.7 mm [M372 from Tr. 6Q (4165)].
338. Copper alloy cut nail with flat profile. L: 35 mm W: 9 mm D: 2.9 mm [M351 from Tr. 17 (17021)].
339. Small copper alloy tack with faceted head and shank broken close to head. L: 11 mm W: 9.3 mm D: 9 mm [M142 from Tr. 12 (7327)].
340. Very small copper alloy nail with tip bent back. L: 18.5 mm W: 8.2 mm D: 8.3 mm [M339 from Tr. 15 (15008)].
341. Small copper alloy nail with round shank. L: 22 mm W: 11.9 mm D: 11.7 mm [M101 from Tr. 10 (3797)].
342. Hollow domed copper alloy stud with broken shank. L: 11 mm W: 12.4 mm D: 11.2 mm [M395 from Tr. 15C (15096)].
343. Very small copper alloy pin with domed hollow head and broken tip. L: 16 mm W: 7.9 mm D: 7.9 mm [M280 from Tr. 10A (3775)].
344. Copper alloy domed decorative stud with hollow head. 0.5 mm thick, and wire in centre curved to form a loop. Diameter: 12.6 mm Height: 4 mm [M248A from Tr. 6H (4090)].
345. Copper alloy nail with clenched tip. L: 50 mm W: 12.9 mm D: 13 mm (M137 from Tr. 12 (7314)]. Not illustrated.
346. Small plain pottery jar filled with 10 corroded copper alloy sheathing tacks, mainly with round heads and square shafts. [M88 and C182 from Tr. 10A (2716)].
347. Copper alloy nail head beaten out, possibly to form jar lid. L: 25.7 mm W: 22.3 mm D: 5.8 mm [M162 from Tr. 12 (7305)]. Not illustrated.
348. Copper alloy sheathing tack with no protruberances on underside. L: 32.8 mm W: 18.2 mm [M254 from Tr. 6JH (4090)]. Not illustrated.
349. Copper alloy washer formed from flat circle. Outer diameter: 14.5 mm Inner diameter: 15.6 mm D: 2 mm [M110 from Tr. 12 (7326)]. Not illustrated.
350. Large iron nail, corroded and concreted with square section shank and point missing. L: 17.7 mm W: 33 mm D: 30 mm [M307 from Tr. 7A (10014B)].
351. Large iron nail with bent square section shank. L: 81 mm W: 19.9 mm D: 19 mm [M158 from Tr. 12 (7316)].
352. Large iron nail with small head and broken shank. L: 29 mm W: 14.4 mm D: 14 mm [M262 from Tr. 12 (7328)].
353. Iron nail with domed head and broken shaft. L: 55 mm W: 17 mm D: 17 mm [M341 from Tr. 6G (4160)].
354. Iron nail/stud with short square section shaft, in good condition. L: 33 mm W: 18.5 mm D: 18.5 [M149 from Tr. 6P (4105)].
355. Iron nail shaft wrapped in reed fibre. L: 22.9 mm W: 12.3 mm D: 12 mm [M309 from Tr. 6B (4008)].
356. Clenched iron nail shaft L: 40.5 mm W: 9.5 mm D: 9.5 mm [M304 from Tr. 7A (10027)].
357. Folded iron clip or staple. L: 23.4 mm W: 23.38 mm D: 6.9 mm [M290 from Tr. 12 (7332)]. Not illustrated.
358. Long iron nail with broken shank. L: 141 mm W: 15.4 mm D: 15 mm [M121 from Tr. 6P (4100)].
359. Iron nail in good condition. L: 103.9 mm W: 13.7 mm D: 13 mm [M136 from Tr. 6L (4075)].
360. Iron nail with twisted broken shank. L: 69.4 mm W:

14.3 mm D: 14 mm [M121 from Tr. 6P (4100)].
361. Complete iron nail with slight bend in shank. L: 69.5 mm W: 15 mm D: 15 mm [M365 from Tr. 17 (17031)].
362. Iron nail in reasonable condition. L: 71.68 mm W: 15.8 mm D: 15 mm [M136 from Tr. 6L (4075)].
363. Iron nail shank with split end, each end bent back on itself. Head missing. L: 49.7 mm W: 15.5 mm D: 6.7 mm [M121 from Tr. 6P (4100)].
364. Iron nail with split end, each end bent back on itself. L: 46.5 mm W: 15.7 mm D: 15.7 mm [M95 from Tr. 6P (4100)].
365. Iron nail with broken shank where originally split ended. L: 63 mm W: 16.1 mm D: 15 mm [M255 from Tr. 11B (7202)].

Uncertain date
366. Rectangular copper alloy rove, slightly domed. L: 21.2 mm W: 19.3 mm D: 1.7 mm [M120 from Tr. 11A (7201)].
367. Huge iron ship nail L: 247 mm W: 28.9 mm D: 27.6 mm [M436 from Guinea Fowl Island (surface)].

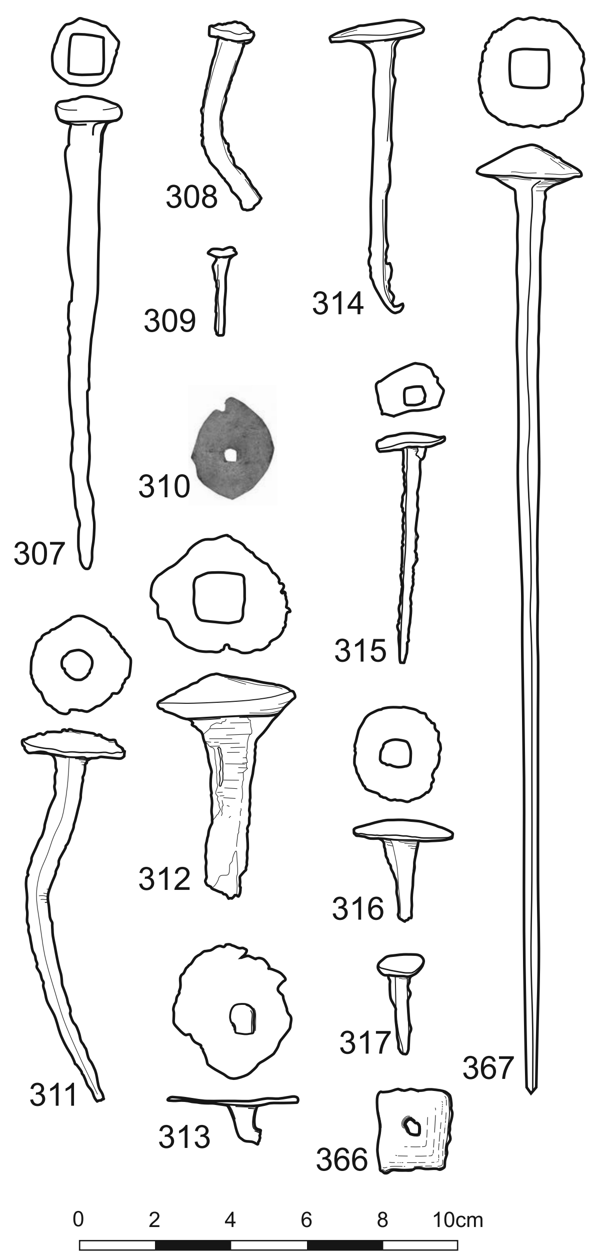


Figure 10.32. Islamic and uncertain date nails and fastenings. Copper alloy items Nos 307-310, 366, iron items Nos 311-317, uncertain date Nos 366 and 367.

10.3 Metal-Working

The large amount of metalwork found at the site should be considered in the context of evidence for metal-working (Fig. 10.34 and Fig. 10.35). The structures found in the excavation have been explored in Peacock and Blue 2006, but the debris is considered here. In general, the preservation of the slag and metal-working debris was good, although the crucibles were generally heat damaged beyond reconstruction. It is possible that some of the crucibles were also used for melting precious metals or making steel as only a few bore copper traces. There are a number of bars of metal which might be pre-forms for nails, in addition to other copper alloy and lead metal-working debris, particularly from Trench 10.

Islamic metal-working

There are a few indications of metal-working at Quseir al-Qadim in the Islamic period. Trench 16 revealed burnt material and surfaces with slag, iron and crucibles. The slag from this area includes smithing bottoms but no tap-slag was found. Hammerscale was found, including evidence for fire-welding [Tr. 16A (16039)] and therefore it seems most likely that there was smithing rather than smelting in Trench 16. Trench 16A similarly had signs of industrial activity in its earliest phase with a feature containing a crucible, some metal and shells, which was interpreted as either a kiln or furnace with a tapping channel (Blue 2006, 111). This suggests that the furnace had been used for both smelting of iron (using shell as a flux) and for melting copper or an alloy, although no diagnostic tap-slag was found. In the Islamic period, brass was made in crucibles using the cementation process (Craddock 1979, 70) and good casting brass is thought to generally contain around two-fifths of scrap copper alloy and one fifth lead (brass had to be cast (Humphrey *et al.* 1998, 331)). This is similar to Pliny's alloy for statuary bronze which is two thirds new metal, one third scrap to which was added 12% lead (Craddock 1979, 70, 72). In Trench 1A (002) 2.4 kg of galena (lead sulphide) were found suggesting that lead working may have been carried out in the vicinity and perhaps the owner of the house was involved. Amongst the items found is a large piece of lead [M99 from Tr. 8A (8356)] which appears to be unshaped molten lead, set hard, incorporating burnt wood and charcoal with droplets of molten lead on the surface.

In general the amount of slag present in both Trenches 16 and 16A is very small suggesting limited activity close to

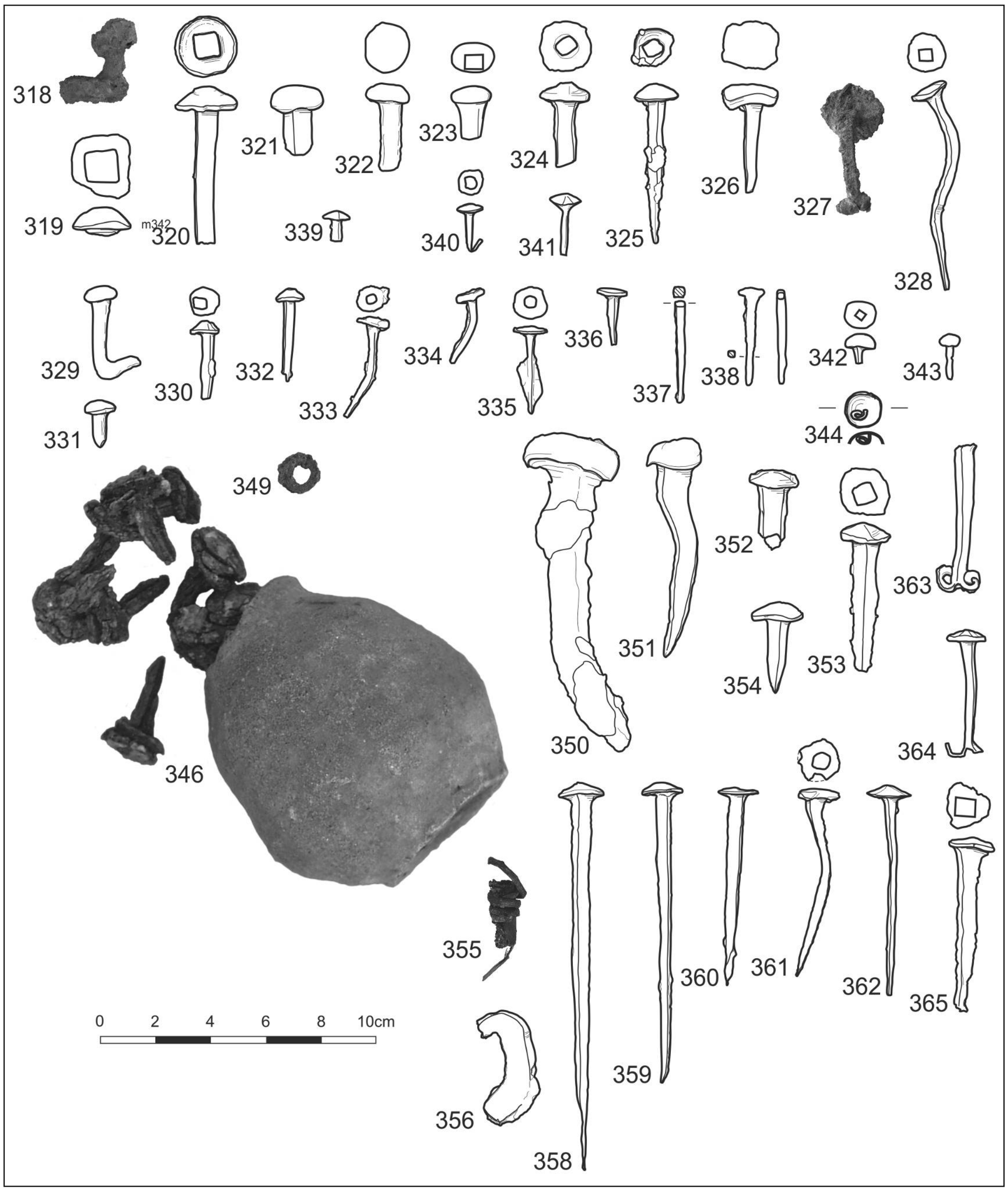


Figure 10.33. Roman nails and fastenings. Copper alloy items Nos 318-344, iron items Nos 350-365.

the Islamic harbour and hence well placed for servicing ships. However, the fragments of ships found suggest sewn boats rather than nailed (see Chapter 15, this volume, for more detail), leading to a reduced necessity for metal-working. The location of the forges may be pragmatic rather than functional i.e. deliberately downwind of the town rather than closer to the port.

In the town area of Quseir al-Qadim, Trench 8A contained a piece of tap-slag and Trench 13 contained two pieces of copper alloy slag, but neither trenches displayed other evidence for metal-working, so we must presume the items were discarded. However, Islamic metal-workers could be both itinerant and workshop based (Ward 1993, 22).

368. Lump of unshaped lead with charcoal embedded and smaller droplets of lead on surface. Rounded base suggesting lead cooled in basin. L: 101 mm W: 49 mm D: 11.5 mm [M99 from Tr. 8A (8356)].

369. Brown/red bubbly fragment, possibly a pouring spill. 1g [V51 from Tr. 13 (5501)]. Not illustrated.

370. Sherd of cindery slag, compressed showing impression of wattle 31g [V55 from Tr. 16 (16056)]. Not illustrated.

371. Oval plano-convex bottom, bubbly on upper surface, some glossy brown/purple vitrified patches around rim, white efflourescence. Possible copper smelting slag. 425g [V58 from Tr. 13 (5550)]. Not illustrated.

Roman metal-working

Structure 2 in Trench 10 has clear signs of being a metal-working zone. A furnace, possibly with a slag tapping channel approximately 1 m long, was dated to the Early Roman period. The base of two further bowl furnaces were found in Structure 3, and they date to mid/late 1st century AD (Whittaker *et al*. 2006, 78-81). They were associated with clear evidence for metal-working

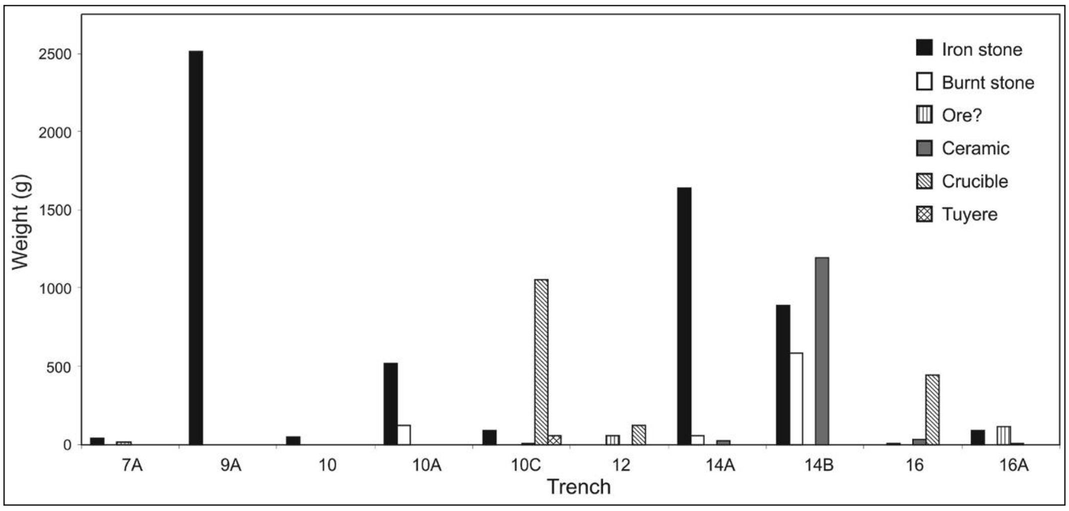


Figure 10.34. Metal working debris by trench.

including iron smelting and smithing, the debris including tap-slag, smithing bottoms and hammerscale.

In addition there is abundant evidence for copper alloy smelting and working. At least eight crucible fragments have been found from Trenches 10A, B and C. Also, there are several other fragments coated with slag which have been parts of furnace walls or smithing hearths (see Freestone 1997, 247) before being dumped as slag. The parallel lines of mudbrick in Trench 10 might relate to crucibles rather than a tapping channel. A Ptolemaic example at the funerary temple of Seti I, Thebes such a similar construction which, in the absence of slag, was interpreted as a hearth for accommodating crucibles (Scheel 1989, 27).

Whilst there is a large amount of slag from Trench 10, it is small compared to what might be expected in a primary production area. Normally, at Roman smelting sites 1-100 tons might be expected (Crew 1995, 4) and there might also be evidence of ore roasting. None has been found so it seems likely that the smelting was to extract more iron from slag, or to re-smelt smithing bottoms. Similarly, there is no evidence the primary production of copper. Each smithing bottom probably only represents one day's work (Serneels and Perret 2003, 471-475), so a minimal quantity of debris suggests a gradual winding down of work rather than an abrupt cessation.

One small piece of slag (not illustrated) from Trench 10A (3829) appears to have had chaff inclusions raising the speculation that dung was being used a fuel. Perhaps speciality charcoal was imported from the Nile Valley for smithing while local shrubs and fuel would be used for everyday fires (van der Veen 2001, 222)

Trench 12 produced a range of metal-working debris including small amounts of tap-slag, slag containing copper and crucibles. However, there is insufficient quantities to confirm the presence of metal-working on this site although there were certainly areas of intense burning and hearths which are suggestive of such activity (Blue 2006b, 83). Trench 12 is in what might have been a prime location for ship repairing so it is possible it had a more specialised, small scale function in smithing and copper alloy smelting.

Trench 14 is close to Trench 10 on the waterfront and similar slag debris was visible (Whittaker 2006, 86). Hammerscale, together with burnt stone, and fragments of overfired ceramic material such as furnace lining or the remains of a tuyère, suggest iron smithing in the vicinity.

Slag and possible furnace lining was found in Trench 7A, and generally around the *sabkha*, although no structures were found with it. The only non-lagoonal Roman finds were from Trench 6H where fuel ash slag and a smithing bottom with traces of copper alloy, were found in the *sebakh*. Whitcomb and Johnson's excavations revealed what they interpreted as an iron-working furnace with stalls, in a large room of the "Villa East" (Whitcomb and Johnson 1982a, 35) close to an iron working furnace previously found in 1978 (Whitcomb 1979a, 25-27). This small furnace was built into the floor with an amphora neck used for a horizontal draft. Slag adhering to the walls may suggest a forge rather than smelting. The "Villa East" is on the high ground in the Roman town directly above the harbour structures seen in Trench 7A. Although the nature of this metal-working is unsure, stone moulds apparently for making jewellery, were found in Trench F10A, which might have been a latrine (Whitcomb 1979a, 203). Trench 6H may be a likely location for the deposit of some of the metal-working residues of this area. At Berenike iron tap-slag demonstrating small scale iron smelting, and crucibles for copper alloy, were also found in the town, near Trench BE94-1 (Hense 1995, 56-57).

It is possible that iron blooms, ore or primary slag for the metal-working, arrived by sea, perhaps shipped as ballast. The wreck of the "Procchio" had iron slag in its hull which Parker (1992, 343) has interpreted as ballast. Iron was generally imported in the Pharaonic period, but there are exhausted Greco-Roman iron ore mines in Wadi Hammamat (Scheel 1989, 17).

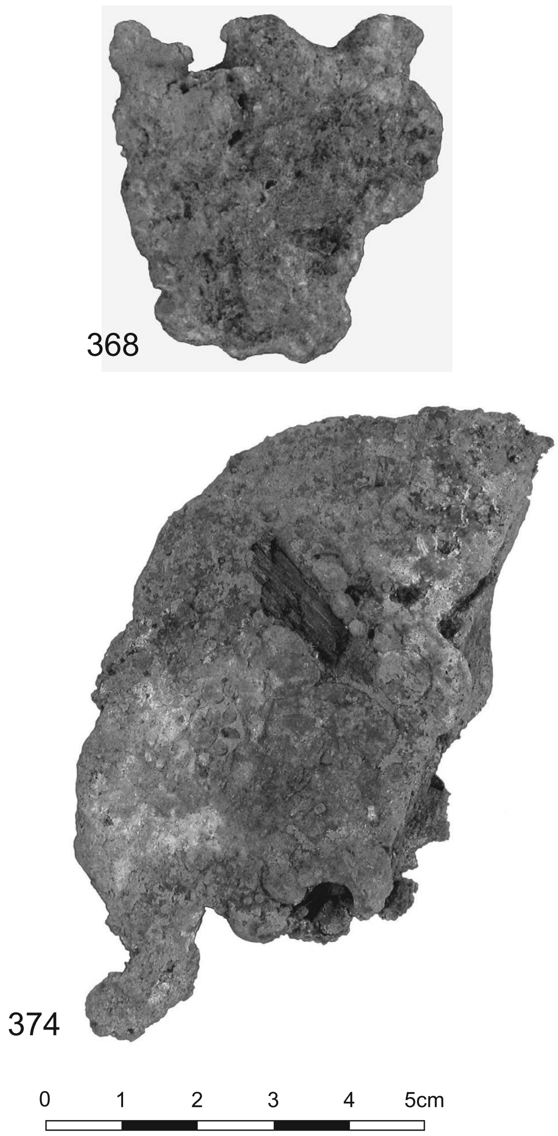


Figure 10.35. Metal working debris. Islamic item No. 368, Roman item No. 374.

The location of the principal metal-working areas, close to the waterfront of the ancient lagoon and the possible harbour installations, makes it likely that metal-working is related to ship building or repair, with a separate metal-working area in the town for domestic or civic uses. The furnaces or forges could also be used to melt the 'gum' for caulking as mentioned in the Berenike *Ostrakon* (Bagnall *et al.* 2005, 45-7) and the melting of lead for sheathing. M472 [Tr. 7A (10025)] is a lump of previously molten lead found close to the harbour. Obviously molten lead has a variety of uses but it suggests that some process demanded the melting of lead.

Despite the number of copper alloy tacks found there was little lead sheathing found (see above) (compare this with the 40kg of lead slag found from one context alone at Berenike Trench 36 [066] (Sidebotham 2007, 35). This may have been recycled or reused as an additive to a copper alloy mix to increase fluidity and to act as a flux to lower the melting point of copper, which was common practice in bronze casting (Craddock 1979, 75). Galena for lead-making is found at Gebel Rosas, 70 km from Quseir (see Chapter 11, this volume).

372. Very corroded fragment of lead bar. L: 33.9 mm W: 24.6 mm D: 17.2 mm [M317 from Tr. 12 (7374)]. Not illustrated.
373. Part of squared lead block. L: 56.7 mm W: 55.3 mm D: 28.6 mm [M474 from Tr. 10 (3507)]. Not illustrated.
374. Lead, possibly spilt when molten. L: 46 mm W: 43 mm D: 5.9 mm [M472 from Tr. 7A (10025)].
375. Fine copper alloy rod with rectangular section. L: 21.5 mm W: 2.2 mm D: 1.9 mm [M404 from Tr. 10A (3727)]. Not illustrated.
376. Length of copper alloy bar with rectangular section. Possible raw metal for working. L: 40.1 mm W: 5.9 mm D: 4.6 mm [M135 from Tr. 10C (3704)]. Not illustrated.
377. Long broken bar of copper alloy with square central core L: 127.5 mm W: 10.4 mm D: 10.4 mm [M151 from Tr. 7A (10029)]. Not illustrated.
378. Sub-circular copper slag bottom, bubbly on upper surface, plano-convex in shape, emerald green corrosion on bottom and top. Charcoal and shell on base 235g [V60 from Tr. 10 (3554)]. Not illustrated.
379. Plano-convex slag bottom, top smooth and vitreous, glassy in patches inside. Black charcoal and quartz inclusions. Porosity at top and bottom 255g [V74 from Tr. 10C (3814)]. Not illustrated.
380. Body sherds of crucible with slag adhering. Fragment is flat and possibly used as furnace lining [V42 from Tr. 10C (3704)]. Not illustrated.
381. Crucible of max diameter 14 cm. Internal surface completely slagged with pale grey cinder. Further crucible joined to inside with liquid slag. Crucible fabric is very coarse tempered with quartz and very porous. Outer layer is more reduced fired than inner layer which has iron staining. Not illustrated. 680g [V62 from Tr. 10C (3833)]
382. Tap slag with molten top, and very porous. 12g [V63 from Tr. 10C (3830)].
Crucible fragment with grey ashy body with hint of purple suggesting it was used for silver. Only visible inclusions are quartz at outer edge. Inner surface smooth and vitrified to a depth of 2 mm. Some brown slag adhering 43g [V66 from Tr. 10C (3827)]. Not illustrated.

Acknowledgments
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11 Stone

David Peacock

Introduction

Two hundred and fifteen portable stone finds were recovered from the 1999-2003 excavations. The majority are finished artefacts, but some raw materials were recovered. As Quseir lacks good stone, nearly everything was imported to the site providing important information on the trading links in both Roman and Islamic Quseir. Twenty seven different rock types were identified, excluding the local building materials such as coral, anhydrite, shelly sandstone and mudbrick. This is a truly remarkable collection which will be considered in two ways. Firstly, it will be discussed in terms of materials and the probable origins and secondly, in terms of the artefacts – their date, typology and use.

11.1 Raw Materials: Rocks & Minerals

Alabaster

Five fragments of alabaster were found in the excavations, all in Roman contexts. One was a worked block, possibly part of a bowl the others were fragments of bowls or mortaria. Alabaster is almost certainly quarried in Egypt where workings, some of them Roman, are known from various localities in the desert on the east side of the Nile. The nearest to Quseir would be those in the Asiut area (Lucas 1989, 60) [L64 from Tr. 7 (5022), L74 from Tr. 6A (4001), L73 from Tr. 6B (4007), L203 from Tr. 6Q (4165), L170 from Tr. 12 (7328)] (Fig. 11.1).

Amber

A single, much decayed piece of amber was found in the Islamic harbour area. The source would have been the shores of the Baltic, providing a fascinating link with the north. This is probably the most far travelled of all the lithic materials imported into Quseir al-Qadim. According to Goitein (1967, IV, 207) amber was commonly used for jewellery in Egypt from 1100 AD onwards, becoming a flood in the Mamluk period [V44 from Tr. 16, 16016].

Amethyst

A single piece of unworked amethyst, presumably for use in jewellery was found in Roman contexts. The main sources during the Pharaonic period were in the south, to the north-west of Abu Simbel and in Wadi el Hudi, south-west of Aswan (Lucas 1989, 389). However, in the Roman period deposits were worked at Gebel Abu Diyeiba near Safaga, which would be the nearest source to Quseir (Lucas 1989, 389). Pliny (*NH* XXXVII, 40) refers to Egyptian amethyst, but notes other sources such as India, Arabia, Cyprus, and Armenia [L81 from Tr. 6E (4015)].

Asbestos

Asbestos crystals were found in Roman contexts. In the Roman world it was used for weaving into textiles to make them fireproof (Strabo *Geog*. X, 1,6; Dioscorides V, 155; Pliny *NH* XIX, 19-20, XXXVI, 139). This could have come from a source in Egypt, but in the Greek world the main sources were around Mount Olympus and in Euboea. The Troodos Mountains of Cyprus were also an important source (Caley and Richards 1956, 88). In 12th and 13th centuries the Chinese seemed to regard Mosul in Iraq as a source of asbestos cloth (Hirth and Rockhill 1911, 140) [L134 from Tr. 7A (10027)].

Basaltic lava

Numerous fragments of lava, mainly basaltic, were found in both Roman and Islamic contexts. Most of this material appears to be from a water-front location and has been interpreted as imported ships' ballast (Peacock, Williams and James 2007).

Some basalt artefacts were found including 18 rotary quern fragments and four pounders. Much of this material cannot be securely dated but nine querns are probably Roman and only two Islamic. It is unclear whether this material represents reworked ballast or specially imported material, but some of it is currently being analysed to ascertain origins [Many finds but see catalogue of illustrated material below for contexts].

Beryl

A single crystal of beryl was found in Islamic contexts. This gemstone may have come from Mons Smaragdus or Wadi Sikait where Beryl can still be found in some quantity. According to Schneider (1892) the locality was well known to Arab historians, but there is little evidence for Islamic activity. This single crystal may have been a Roman import picked up on site by the later Islamic inhabitants [L156 from Tr. 8A (8253)].

Conglomerate
A large piece of the indurated green conglomerate from Wadi Hammamat was seen lying on the surface of the site, mid way between Trenches 8 and 13. This is generally known as *Breccia Verde* or in the classical world as *lapis hecatonalithos*. The block on the site was unworked and it is unclear whether it was brought to the site in Roman, Islamic or modern times.

Coral
Two pieces of massive coral were recovered from Roman contexts. One was a bowl, the other a worked block, possibly architectural. They were almost certainly quarried locally [L66 from Tr. 6A (4005) and L68 from Tr. 6B (4008)].

Diorite
A pounder in diorite of uncertain origin was found in Roman contexts. Another, a cut piece, may have been a component of opus sectile. The latter came from the same context as the Semna diorite below [From Tr. 8A , amphora neck and Tr. 7A (10014)].

Galena
A lump of galena found in Islamic deposits. The principal Egyptian deposits are 70 km south of Quseir, at Gebel Rosas, meaning the lead mountain, whence this example may derive. It is of course the principal ore of lead, but from Pharaonic to Coptic times it was employed in making kohl, an eye paint (Lucas 1989, 81) [From Tr. 1A (2)].

Granite
Two querns, one from a Roman the other from an Islamic context, were made of granite, but not necessarily from the same outcrop. The source is unclear but likely to lie in the Red Sea Mountains [L80 from Tr. 5 (3028) and L70 from Tr. 7 (5002)].

Jadeite
Small pieces of polished green jadeite or nephrite were used for jewellery and are found in both Roman and Islamic contexts. This material occurs only in highly specialised geological contexts and the main sources lie in Burma and China, but also in Kashmir and Siberia. A few specimens of Pharaonic jadeite are well documented (Lucas 1989, 396), but according to Thorley (1971), it was unknown in the Roman world. However, a small piece was found at Mons Claudianus as well as a single unworked piece at Quseir and it appears that some got through albeit in minute quantities [L139 fromTr. 2B (2304)].

Nummulitic Limestone
This is found solely in Roman deposits, where it seems to have been used for making pounding basins. It is a rock of Eocene Age formed around the shores of the ancient Tethys and has a wide distribution with outcrops in Spain, France, Greece, Algeria, and Asia Minor. It was also available in Egypt and much was used in the construction of the pyramids. Herodotus considered the rock to contain the preserved lentils from pyramid builders' meals. It is not possible to characterise this rock and thus to give a precise source, apart from suggesting the Eocene formations of Egypt, perhaps the Giza plateau, where Nummulitic limestone was well known and extensively exploited [L75 from Tr. 2B (2030)].

Obsidian
Two samples of obsidian were found in the excavations at Quseir al-Qadim. One came from Trench 7A associated with late Augustan or early 1st century AD amphorae many of which were Italian Dressel 2-4 wine jars. A few pieces of pumice were found in the same deposit. The other from the harbour-side Trench 12 and is also Roman in date.

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Obsidian is referred to in the *Periplus* (5:2.16-18) where there is mention of a source in a very wide bay, almost certainly Howakil Bay to the southeast of Adulis in modern Eritrea. Henry Salt (1814, 190) landed on the northern shore of the bay at Aréna.

> *"Near this spot I was delighted with the sight of a great many pieces of a black substance, bearing a very high polish, that lay scattered about on the ground at a short distance from the sea; and I collected nearly a hundred specimens of it, most of which were two three and four inches in diameter. One of the natives told me that a few miles further in the interior, pieces are found of much larger dimensions. This substance has been analyzed since my return to England, and proves to be the true opsian, or obsidian, stone, which answers most exactly to the following description given by Pliny: "Among the different sorts of glass may be enumerated the obsidian found by Obsidius in Aethiopia, of a very deep black colour, sometimes a little transparent (on the edges) but opaque in its general appearance, (when in a mass) and reflecting images, like mirrors placed against a wall. Many make gems of it, and we have seen solid images of the divine Augustus cut out of this substance; who ordered four obsidian elephants to be placed, as curiosities, in the Temple of Concord, andc".*

It is very tempting to suggest that this was the source of the obsidian from Quseir. However, the association with Mediterranean, specifically southern Italian, amphorae could indicate an alternative source. Within this area, the sources closest to the area of origin of the amphorae would be Pantelleria, Lipari or the Pontine Islands. The obsidian of Pantelleria is very scarce even in the outcrops on the island, but invariably has a distinctive green colour (Peacock 1985). It can be eliminated as a potential source.

Williams-Thorpe (1993) has published a useful review of obsidian characterisation studies and sources in the Mediterranean. Francaviglia (1995) has also attempted to define parameters for discriminating between obsidians of Mediterranean origin. Obsidians are often classified chemically on their content of the oxides of aluminium, calcium and the alkalis, sodium and potassium. On this basis the samples from Quseir would be described as subalkaline, as Al_2O_3 is slightly in excess of Na_2O plus K_2O. The typical compositions given by Williams-Thorpe (1993, table 1) suggest that the obsidians of the Pontine Islands and Lipari are also subalkaline, but more strongly so as aluminium is substantially in excess of alkalis. The obsidian from Pantelleria is strongly peralkaline.

The trace element distributions also show marked differences. The Italian sources have markedly lower Zr, higher Y, higher Sr, lower Rb, higher Zn, and lower V. The contrast is complete and convincing suggesting that these sources are highly improbable.

The eastern sources in the Aegean and Turkey are less probable as there is no evidence of a trade connection between these areas and Quseir. Equally it is possible to detect chemical differences with the Quseir samples (c.f. Francaviglia 1995).

As a Mediterranean source is improbable, it seems that the Quseir obsidian should originate further south in the Red Sea. We were able to obtain a small sample from Adulis, but as this is not a source area it must have been imported from elsewhere presumably in Eritrea. We were able to obtain 15 samples from north of Ghela'elo. These took the form of pebbles from a recent gravel deposit which was almost certainly contiguous with the one from which Salt took his samples. Flakes were obtained from Mersa Fatma, Dahlak Khebir and Aliko in the same general region, while from the south of the country we had flakes from the beach at Beylul and near Bera'esoli. All of the samples hover around the subalkaline - peralkaline boundary, a majority just falling into the subalkaline field. This seems to be a regional characteristic.

Amongst the trace elements, Zr:Ba, Zr:Nb and Zr:Rb were adopted by Cann and Renfrew (1964) and more recently by Francaviglia (1995). In this case the Ba:Zr plot is least satisfactory. There seem to be two groups, one with high Ba and generally lower Zr, the other with minimal Ba and high Zr. The former is typical of northerly sources, the latter of southern. One of the Quseir samples, the piece from Mersa Fatma and the Aliko samples fall in the first group, the other Quseir sample, that from Adulis and the piece from Dahlak, fall into the second group. However, plots of Nb:Zr and Rb:Zr show a clear break between northern and southern sources, with only one sample from the south falling within the plot for Ghela'elo. This is however a waste flake rather than an outcrop sample and may have been imported to Bera'esoli from the north.

The sample is a very small one and it is hard to judge from single analyses, but it is only possible to argue from the data available in the light of the broader obsidian studies outlined above. The tentative conclusion is that the Quseir pieces, that from Adulis, and that from Dahlak, all originated in the Ghela'elo area. It seems entirely probable that Adulis was a distribution centre though which material reached Egypt and the Dahlak Islands [From L145 from Tr. 7A (10029) and L157 from Tr. 12 (7300)].

Phosphate

Pieces of phosphate ore are found in Roman contexts. It is unclear what their purpose was, but they must derive from the local phosphate beds, until recently extensively mined in the Quseir area [L82 from Tr. 7 (5031), L177 from Tr. 7A (10036), L176 from Tr. 12 (7318) and L81 from Tr. 6E (4015)].

Pumice

Pumice is the only rock which will float on water and for this reason was thought, by ancient authors, to have been formed in some manner from the action of waves. The main source was the Aegean around volcanic islands such as Thera, Melos or Nisyros, but it is also found around the Italian coast. Pliny (*NH* XXXVI, 154) states the main sources to be the Aeolian Islands, Melos and Nisyros. At Quseir, the examples are all Roman and they are associated particularly with Italian amphorae. It seems therefore that Italy is the most likely source, but this needs to be confirmed by analysis.

Pumice would have been used as an abrasive, perhaps cosmetically or perhaps in household cleaning tasks. Equally, it might have had a role in giving decorative stones their final polish. However, it also had many pharmaceutical uses, in the preparation of eye ointment, in poultices or in tooth powder (Pliny *NH* XXXVI, 156) [L90 and L114 from Tr. 7A (10003 and 10012)].

Quartzite

A single quartzite pounder was recovered from Roman contexts. It may have been either imported or (more probably) a pebble picked up locally [L124 from Tr. 7A (10012)].

Sandstone

Seven artefacts were of sandstone although not all of the same variety. They are found in both Roman and Islamic contexts. The Roman artefacts include two whetstones, a pounder and a decorative window frame, the latter probably made from a rock available to the north of the site. The source of all these artefacts is unclear except the window frame which appears to be very similar to materials outcropping around Qasr Hadie, the look-out post to the north of the site.

Three querns were of sandstone, one securely dated to the Islamic period, a thin upper stone of quern in hard reddish-buff sandstone [L53 from Tr. 2B (1532), L54 from Tr. 2B (1525), L56 from Tr. 2B (1538), L77 from Tr. Tr. 6E

(4015), L187 from Tr. 8A (8293), L211 from Tr. 6Q (4166) and L201 from Tr. 13 (surface)].

Schist
A single fragment of a schist bowl was found in Roman contexts. Schists occur in the Eastern Desert often associated with steatite (see below). This piece may simply be a variant of steatite [L86 from Tr. 7A (10006)].

Semna Diorite
A single fragment of diorite from the quarries in Wadi Semna and another probably from this source, were recovered from Roman contexts. A further example was found in the Islamic harbour area. In all cases one surface is polished and they were clearly intended as flooring or wall cladding. As there is no evidence of Islamic working at Semna, the later piece could be Roman and hence residual [L149 from Tr. 7A (10014) and L198 from Tr. 16 (16016)].

Serpentine
A single fragment of *serpentina moschinata* was found in Roman contexts. One surface is polished and it was clearly intended as flooring or wall sheathing. The rock would have come from Wadi Atalla, deep in the Red Sea Mountains to the north of Hammamat, where outcrops are known [L149 from Tr. 7A (10014)].

Slate
Fragments of slate are found in both Roman and Islamic contexts. The source is unclear, but it is likely to be fairly local. At Mons Porphyrites there was an established subsidiary industry engaged in producing slate vessels almost certainly utilising local Dokhan slate (Peacock 2007b). This was not active in Islamic times and the pieces from these late contexts may have been Roman material picked up on site [L11 from Tr. 2B (1008), L32 from Tr. 2B (1576), L71 from Tr. 2B (2007), L202 from Tr. 6H (4162), L180 from Tr. 9A (7105), L197 from Tr. 15 (15004)].

Steatite
Steatite or soapstone was one of the most important stones found in the Quseir excavations, with 109 finds. There are a few pieces in secure Roman deposits, but it is par excellence characteristic of the Islamic period. Of the material from well dated contexts, only seven are securely Roman, but 57 are almost certainly Islamic. The Roman material comprises shapeless fragment or sometimes fragments of heavy bowls, but one piece of figurative sculpture was found. The Islamic material is dominated by fine thin walled bowls, often sufficiently prized to show evidence of repair with string or rivets. A few censers, a clear Islamic type, were also found at Quseir. Steatite was used in the Pharaonic period (Lucas 1989, 420) as well as the Roman, but not in the prodigious quantities seen in the Islamic. Its appeal lay in the ease of cutting, which could be performed with a metal knife and no doubt the longevity and heat resistance of a pot made of steatite made it particularly desirable. The source of this material is uncertain, but will be discussed further below (see steatite and related pots).

Sulphur
Native sulphur was encountered in Roman deposits, but not in Islamic. It was used as a fumigant or in medicines. It is typically found in volcanic areas such as Greece or Italy but El Shazly and Mansour (1962) have noted an occurrence at Um Reigha on the Red Sea coast. Other Egyptian occurrences are also concentrated on the Red Sea coast at Bir Ranga and Ras Benas although it is also found in the thermal springs at Helwan (Lucas 1989, 269). Graeco-Roman sulphur has also been found at Tanis (Petrie 1889) [L37 from Tr. 2B (1528) and L133, two fragments from Tr. 7A (10011)].

Talc
A little talc was found in Roman deposits. It is a form of steatite which occurs at various localities in the Eastern Desert and the material at Quseir al-Qadim probably did not come from far away. Its purpose is unclear. For further discussion see steatite above [From L140 from Tr. 7A (10014) and L152 from Tr. 7A (10017)].

White marble
A single example of pure white marble was found in Roman contexts, where it was used for minor statuary. It has not been analysed hence it is difficult to be sure of the source, but the grain structure and the purity point to the Aegean or Anatolia rather than Italy [L119 from Tr. 8 (8016)].

11.2 Artefact Catalogue

Alabaster vessels
All the alabaster was found in securely dated Roman deposits. Two or possibly three of the items were from square or rectangular shallow dishes, one was the wall of a pot with a snake design on the outside and the other a round mortarium or shallow bowl (Fig. 11.1).

1. About one quarter of a round shallow mortarium or dish with a smooth interior stained with red and black pigments. One lug present. Radius c. 175 mm, rim 22 mm, lug 21 x 53 mm [L64 from Tr. 7 (5022)].
2. Corner of square or rectangular dish. Rim 24 mm wide and 30 mm deep [L74 from Tr. 6A (4001)]. Not illustrated.
3. Rim of a square dish as above [L170 from Tr. 12 (7328)].
4. Worked alabaster block. Possibly part of a square dish or one in the very early stages of being made [L73 from Tr. 6B (4007)]. Not illustrated.
5. Part of the wall of an alabaster pot, smooth on the inside with a snake carved on the outer surface. 7 mm thick [L203 from Tr. 6Q (4165)].

Censers
Four fragments of censers or incense burners were found, all made of steatite (Fig. 11.2). They are of a type which dates to the Islamic period and can be paralleled in the

Arabian Peninsular, where they could have been made (e.g. Hallett 1990, pl 19, 3 from Timna' although this is in unglazed pottery). Similar, but more elaborate steatite incense burners are known from Iran (e.g. Hallett 1990, pl. 22).

6. Leg decorated with incised marks and notches down one edge [L45 from Tr. 2B (1581)].

7. Square body of burner decorated with incised lines and notches down edge. It would have had legs and perhaps horns [L128 from Tr. 8 (8066)].

8. Leg decorated with incised marks and notches down two edges [L141 from Tr. 8 (8066)].

9. Leg decorated with incised marks but no notches down edge [L207 from Tr. 16A (16512)].

Counter

Only one was found, which is perhaps surprising.

10. Small circular counter in fine black polished stone. 16 mm diameter x 4 mm [L200 from Tr. 14B (14527)]. Not illustrated.

Fishing weights

Four stones were found with string around them – sometimes wrapped in textile. Of these two are certainly Islamic and one is certainly Roman. They are clearly weights, probably for fishing. They could have been used to weight nets or perhaps lines which would have been equipped with hooks. All are of local pebbles, but were not studied in detail as this would have involved cutting the textile and string.

11. Irregular piece of basalt, 5 cm across, with a hole and string threaded through it [L84 from Tr. 2E (6000)]. Not illustrated.

Hammer

One stone was found with a hole and a wooden haft. It was clearly intended as a hammer although there was no evidence of use (Fig. 11.3).

12. Miniature hammer 50 mm long with head 28 x 10 mm. In indurated grey mudstone. Wood tapered to fit hole [L83 from Tr. 2B (20530].

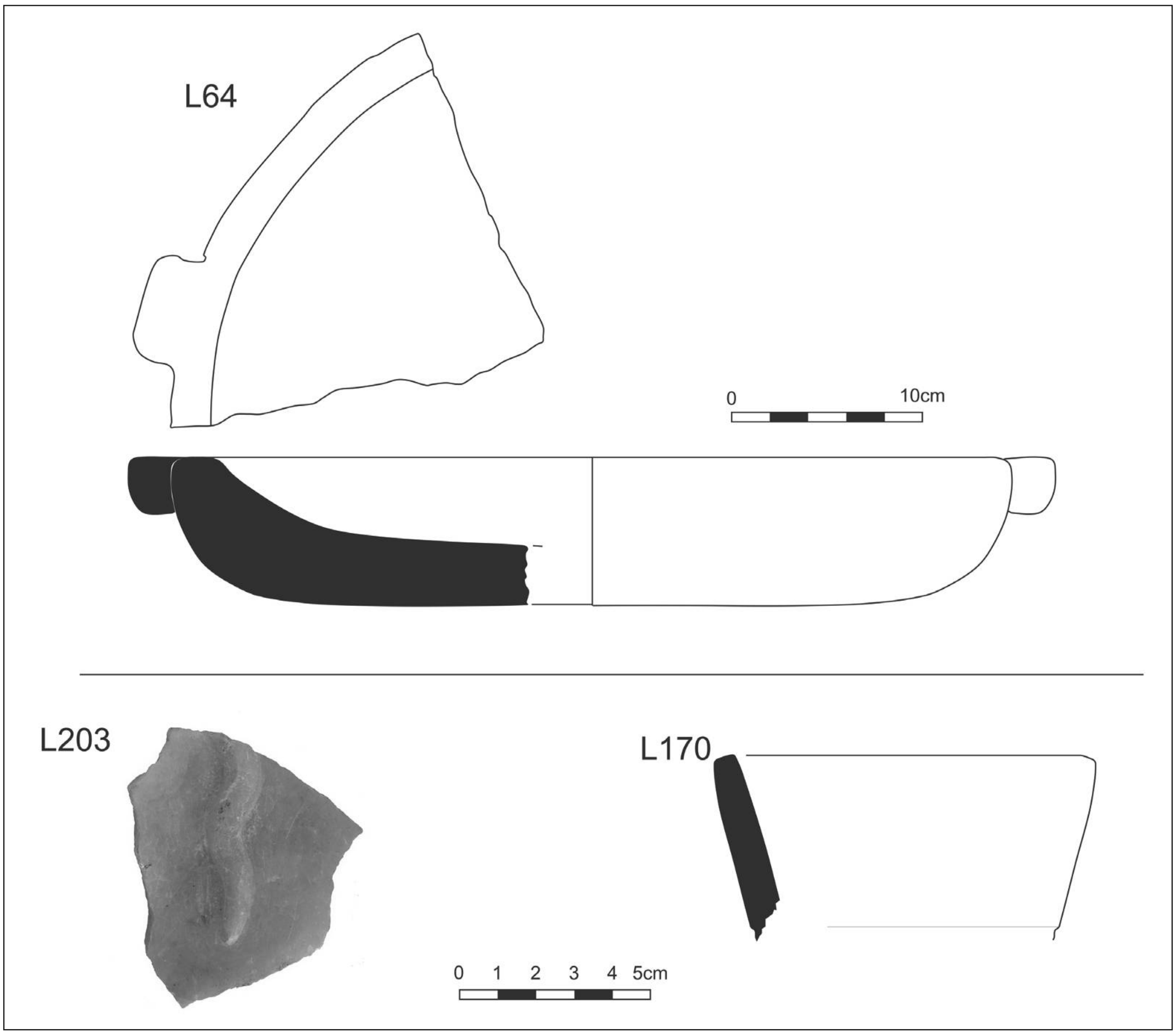


Figure 11.1. Alabaster vessels. Nos 1, 3 and 5.

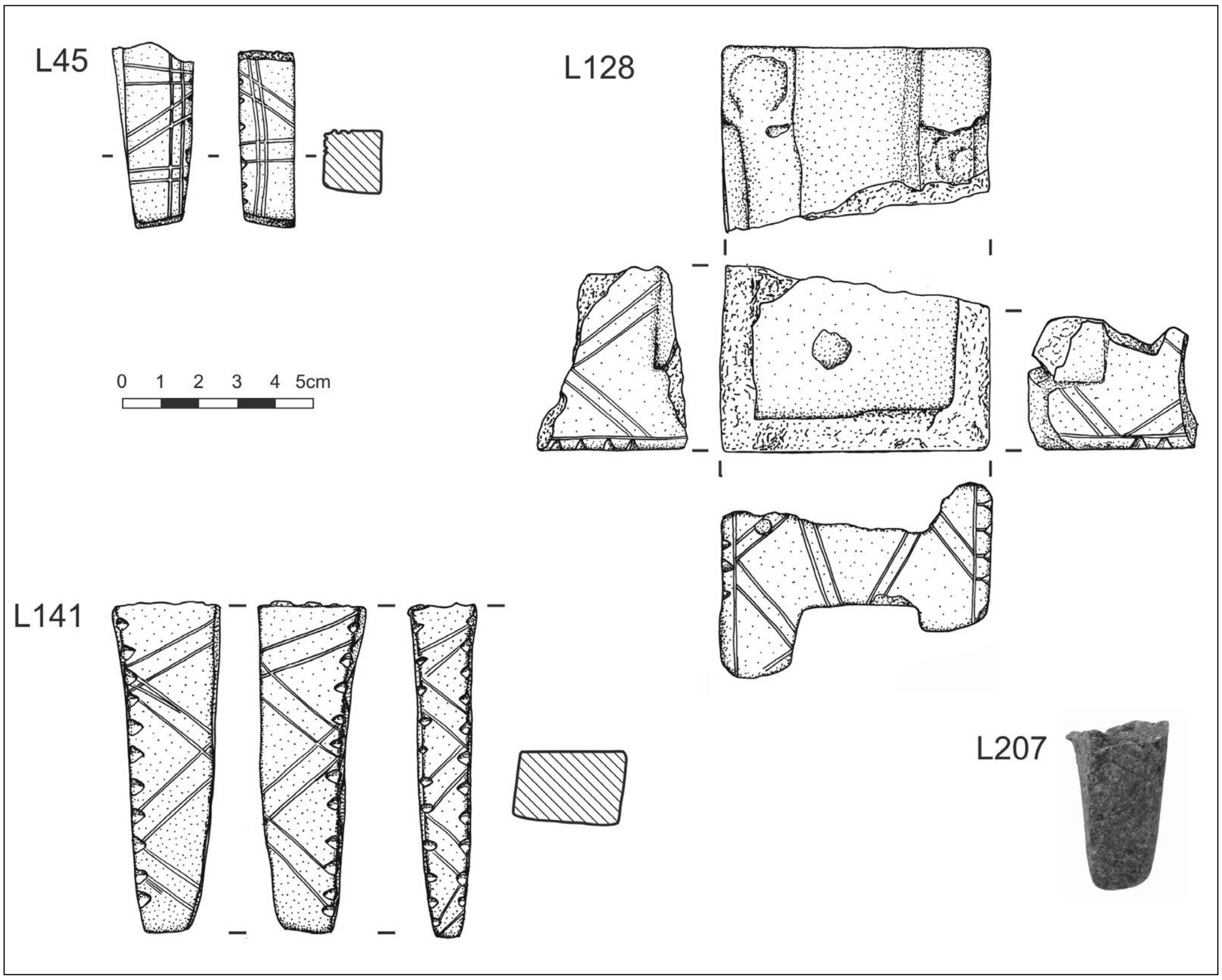


Figure 11.2 Censers. Nos 6-9.

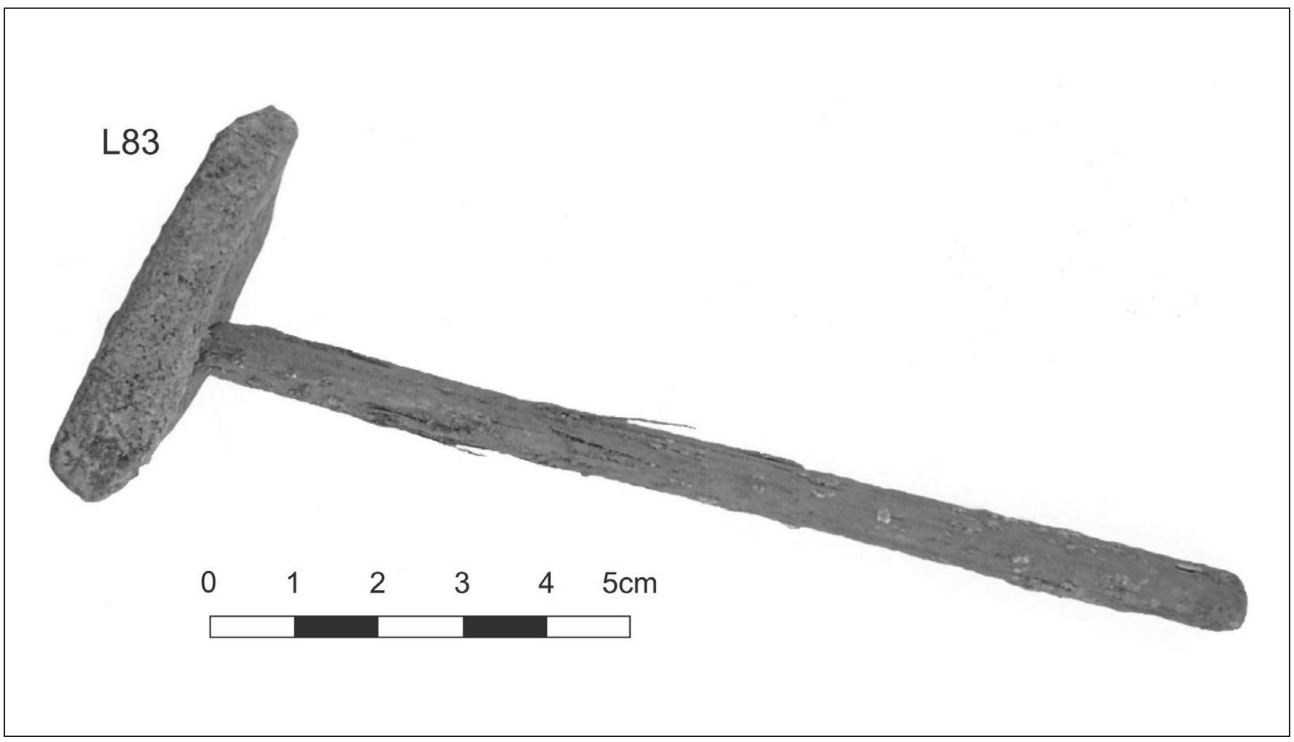


Figure 11.3 Hammer. No. 12.

Lamp

A single stone lamp was found, made of steatite and from an Islamic context (Fig. 11.4).

13. The lamp is ovoid in shape with one end open (?to accommodate the wick) and a flat base. The outer surface is decorated with incised diagonal lines in different directions. 137 x 74 x 37 mm, walls 14 -17 mm. It is a somewhat crude version of the boat-shaped lamps widely distributed in the Arab world and illustrated by Hallett (1990, pl. 5-6) from Aqaba, Iran, Fustat and Iraq [L44 from Tr. 4 (4008)].

Polished stone slabs (None illustrated)

Four small slabs of polished stone were found, two in Semna diorite and one in *Serpentina moschinata* from Wadi Atalla. One was in an epidotised diorite of uncertain origin. They were clearly destined for use as wall sheathing or flooring. Their use in *opus sectile* is less likely because of their thickness. Three of these come from early Roman deposits and one (No. 16) from an Islamic context. The latter may be residual.

14. Square cut piece of polished stone in Semna diorite. 62 x 55 x 23 mm [L149 from Tr. 7A (10014)].

15. Small square cut piece of polished stone in *Serpentina moschinata* from Wadi Atalla [L149 from Tr. 7A (10014)].

16. Piece of polished Semna diorite 84 x 31 x 21 mm [L198 from Tr. 16 (16016)].

17. Tapering piece of epidotised diorite 116 x109 x 24 mm. Possibly flooring rather than *opus sectile* [L89 from Tr. 7A (10014)].

Pounders and pestles

Pounders are shaped pieces of stone, either round or elongate, which seem to have been destined for some form of grinding or pounding activity. They range from balls of stone to obvious pestles and many may have been used for food preparation. One is early Roman (No. 18 below), but the others cannot be dated closely. Two were of basalt, one of diorite, one of quartzite and one was probably hard fossil coral (Fig. 11.5).

18. Pounder in indurated reddish quartzite 80 mm x 57 mm [L124 from Tr. 7A (10012)].

19. Small pestle in buff sandstone [L55 from Tr. 2B (1532)].

20. Small pounder or pestle in diorite 72 mm x 54 mm [L193 from Tr. 8A amphora neck].

21. Rounded ball of dark indurated fossil coral, probably used as pounder [L113 from Tr. 8 (8000)].

22. Conical artefact with indented end, possibly used as a pestle. Rock uncertain [L130 from Tr. 8 (8066)].

Querns

Querns were found equally distributed between Roman and Islamic deposits (Fig. 11.6), where dates could be ascertained. Many were found as shapeless fragments with one smooth surface indicating their derivation. Of the 26 fragments, 21 or 80% were of lava, three were of sandstone and two were of granite. The lava is currently being analysed, but most seems to be basaltic.

Williams-Thorpe and Thorpe (1993, 294) have suggested that some Egyptian Roman millstones may have come from the Aegean volcanic arc. This may not apply to the Islamic ones. Here it is interesting to note that the Cairo Geniza documents refer to Isaac Nīsābūrī, a Persian and resident of Alexandria, receiving 20 millstones from Syria

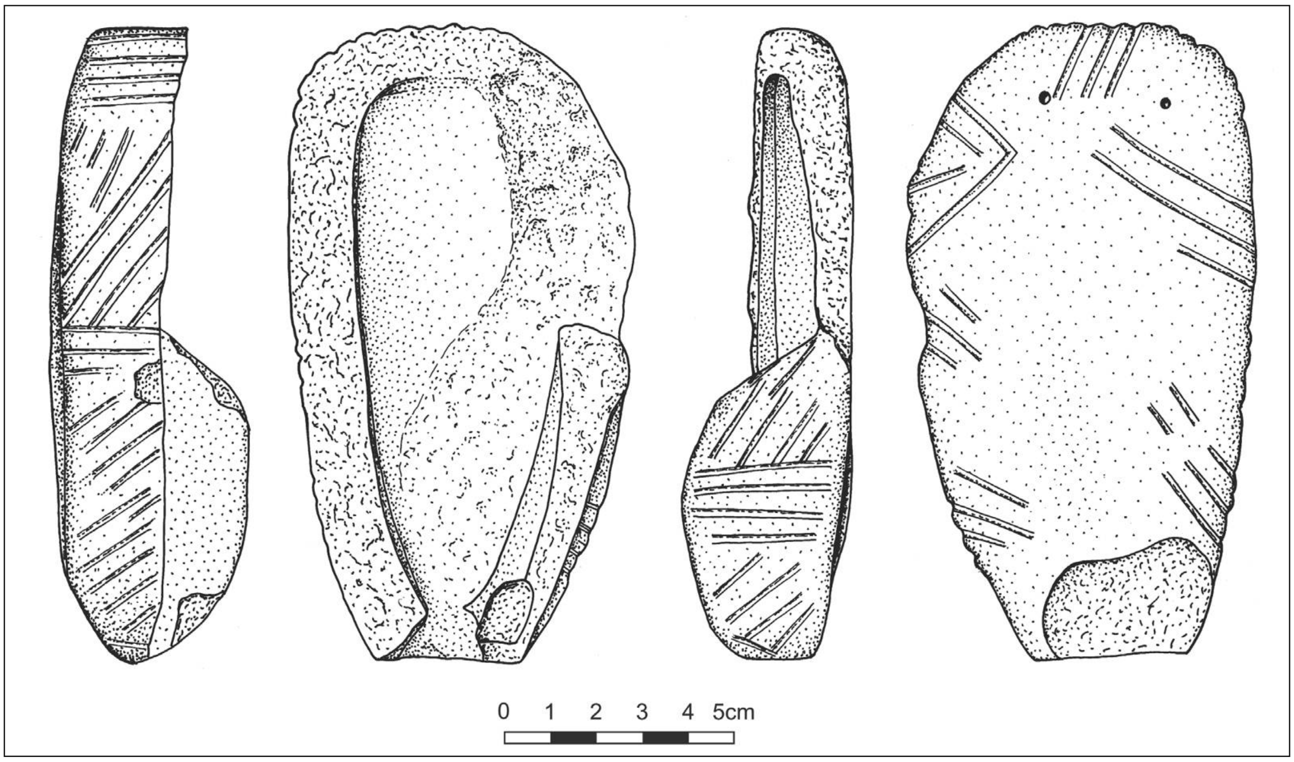


Figure 11.4. Stone lamp. No. 13.

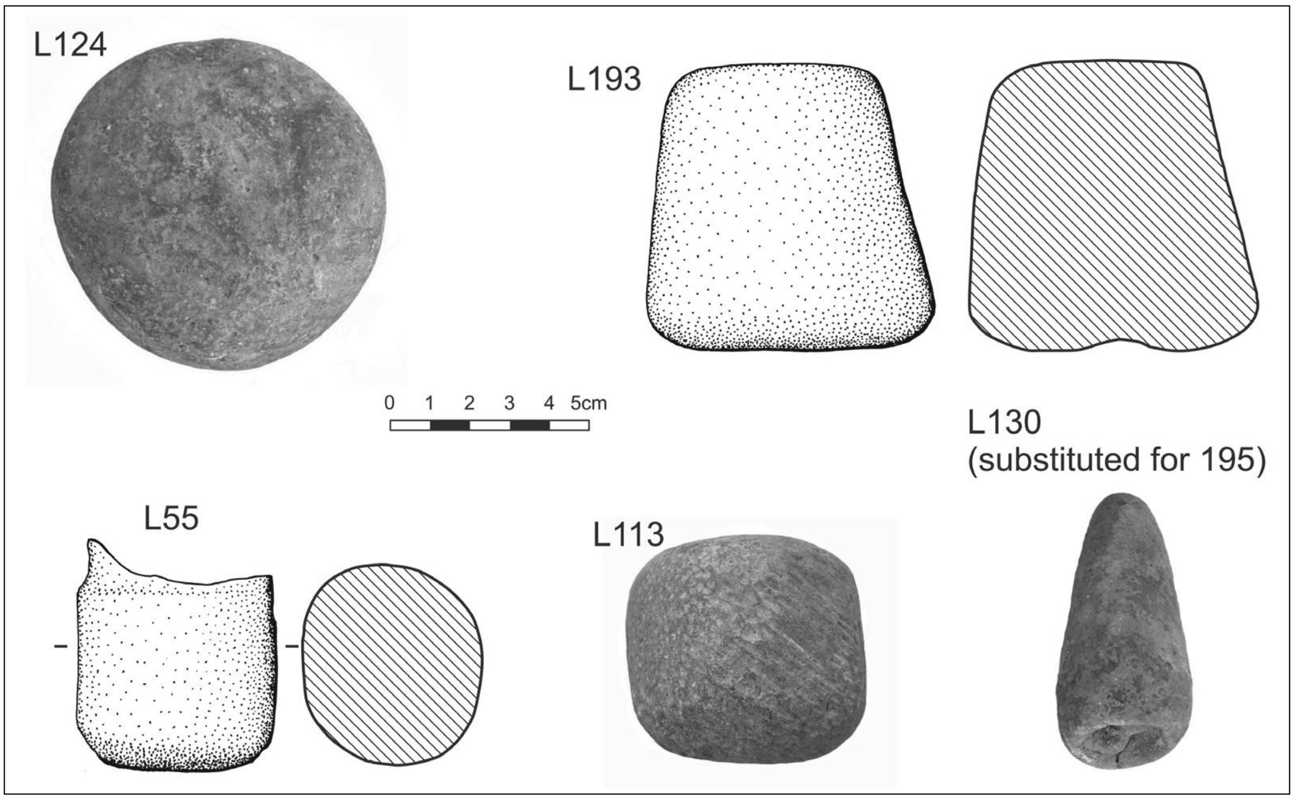


Figure 11.5. Pounders and Pestles. Nos 18-22.

in about 1100 AD (Goitein 1967, I, 60, 153). At the time, Syria would of course have included what is now Lebanon, Jordan and Israel. Perhaps the most surprising thing is that he hoped for a good profit from such a small consignment. It is interesting to note that he dealt in a wide range of goods of which millstones were only one item. These included dyes, herbs, glass, silk, textiles, coral, perfumes and wax, largely, but not exclusively, from Tunisia or Syria. This is earlier than the material from Quseir, but provides an interesting insight into Islamic period sources.

Lever mills have been found in Roman contexts at Quseir (Whitcomb and Johnson 1982a, pl. 54), but all the examples recovered in these excavations were rotary, with both upper and lower stones represented.

23. Very thin (1.5 cm) upper stone in lava with marked rim around hopper [L18 from Tr. 2C (1012)].

24. Thin upper stone in lava [L23 from Tr. 2B (1510)].

25. Upper stone in lava 10 cm, diameter c. 44 cm, with 14 cm diameter hopper orifice [L65 from Tr. 5 (3000)]. Probably Islamic.

26. Lower stone 6.5 cm thick, 30 cm diameter, in andesite closely resembling the rock from Assos, Turkey (*Lapis sarcophagus*). Iron spindle still preserved in centre. [L70 from Tr. 7 (5002)]. Roman.

27. Fragment of upper stone 10 cm thick, c. 40 cm diameter, with hopper orifice 6 cm diameter. In lava. [L160 from Tr. 8A (8308)]. Probably Roman but some Islamic material in this context.

28. Thin upper stone of quern c. 35 cm diameter, in hard reddish-buff sandstone. Hopper orifice c. 8 cm [L201 from Tr. 13 (surface)]. Probably Islamic.

29. Thin (3.5 cm) upper stone in lava, diameter c. 36 cm, with marked rim around hopper which has a 12 cm orifice. Handle hole. c.f. in No. 23 above [L215 from Tr. 2B (1502)].

Sculpture

Three pieces of minor sculpture were found all, unsurprisingly, in Roman contexts. One was a sophisticated white marble arm, the other a crude representation of a man in steatite. The final piece was in gilded slate (Fig. 11.7).

30. Marble arm bent at the elbow. Traces of an iron peg suggest that it could have been from a composite sculpture made by fixing different components together. Alternatively it might have been repaired [L119. from Tr. 8 (8016)]. Mid 2nd century AD.

31. A somewhat primitive relief carving, in steatite, of a man with beard and a raised right arm. 185 x 61 x 30 mm [L161 from Tr. 8A (8328)]. Mid 2nd century AD.

32. Part of small statuette in slate originally covered with gold leaf. It has the form of a wing with a pattern of diagonal lines and hemispherical protuberance where it joined the rest of the statue. Dr Don Bailey kindly comments 'I think that it is a feathered headdress of the type normally worn by Amun and Amun-Re, but has a solar disc, which is usually omitted from figures and reliefs of that god. It was once slotted into a three-dimensional figure of a god. Wilkinson (2003, 115) has a bronze figure of Min, showing the position of such a headdress (feathers and disc) as worn by figures of this god, modelled in the round. This is, of course, Pan-Min, god of the Eastern Desert, and known from the stele from the Black Porphyry Village and Bradford Quarry of

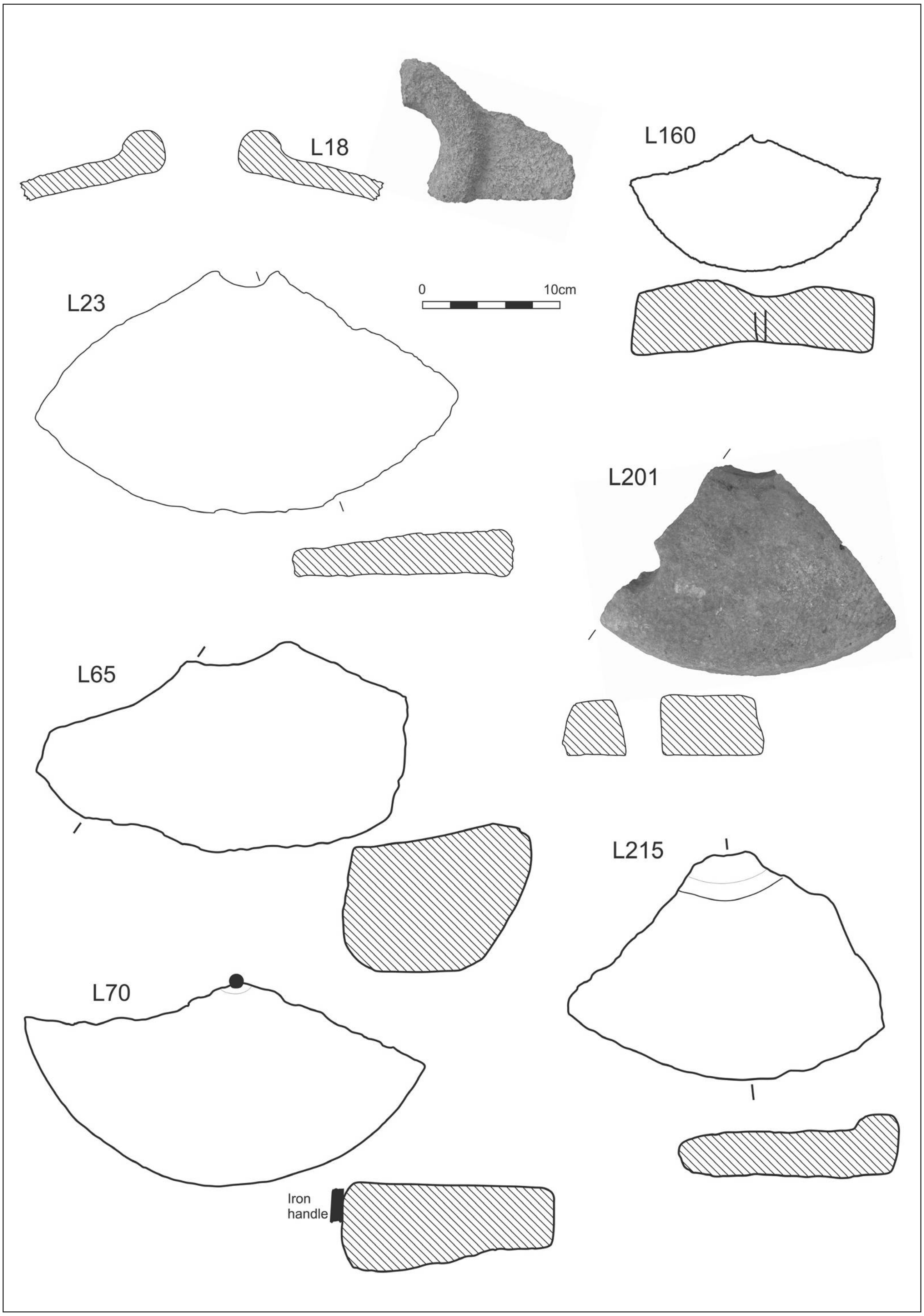


Figure 11.6. Querns. Nos 23-29.

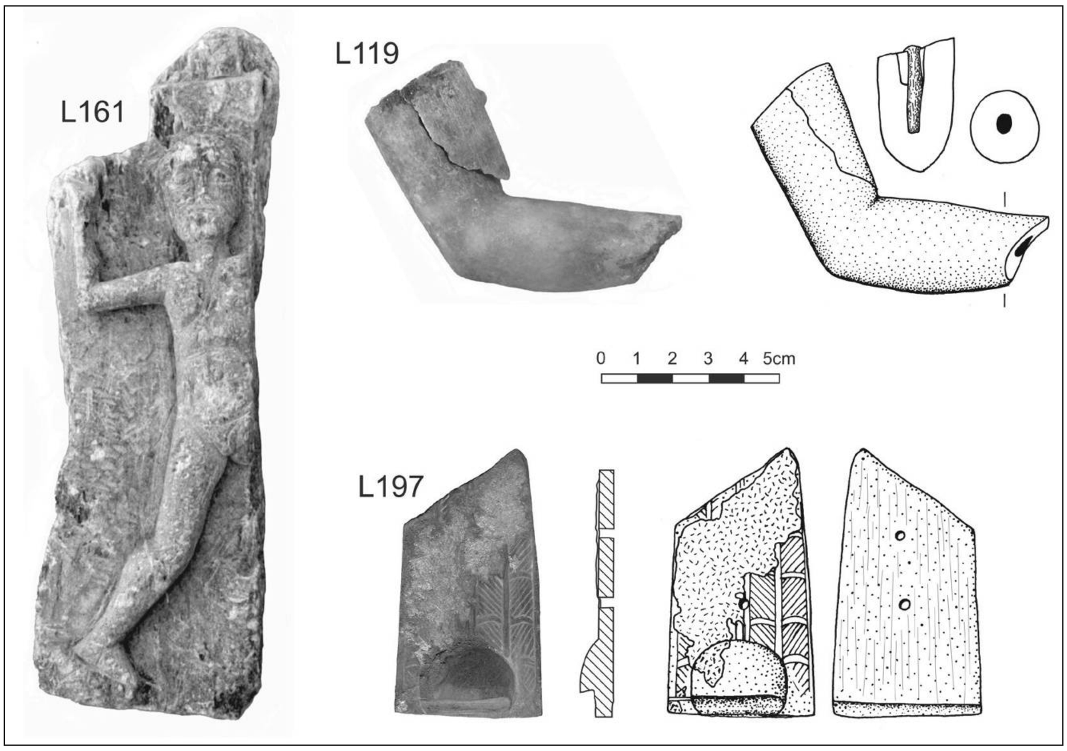


Figure 11.7. Sculpture. Nos 30-32.

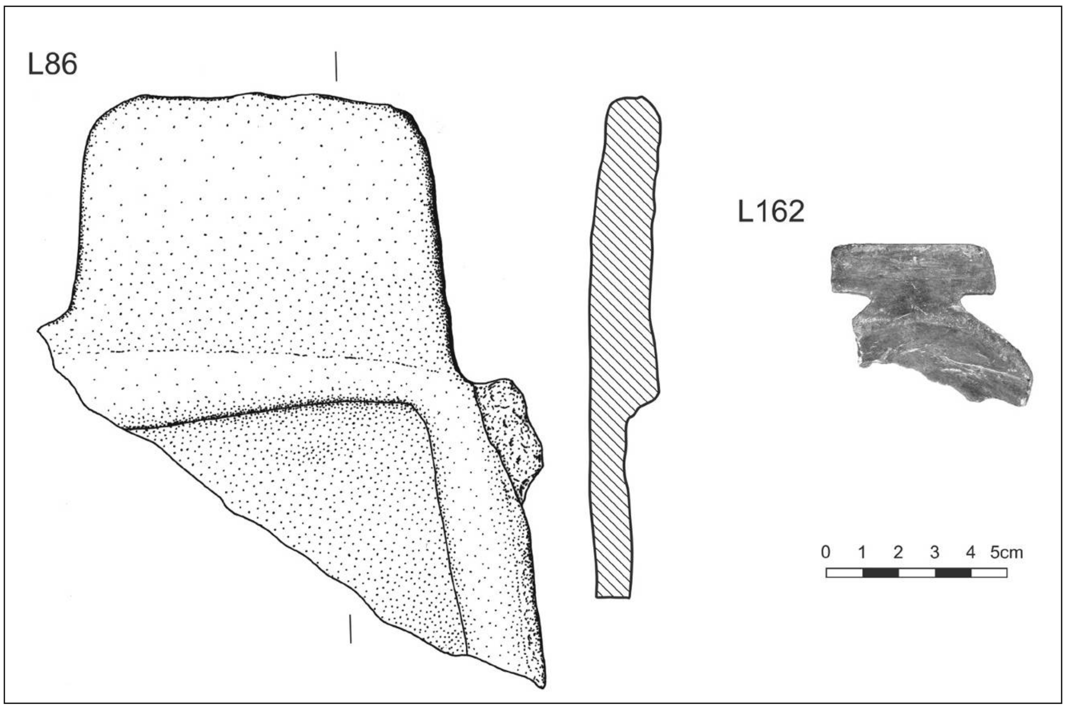


Figure 11.8. Stone pots. Nos 33-34.

Mons Porphyrites, and many another examples rock-cut in desert routes. The headdress is difficult to date as the same details are found from Pharaonic times onward. A Late Period date is probable, but it could be Ptolemaic or Roman' [L197 from Tr. 15 (15004)].

Stone pots

Steatite was certainly quarried in Roman times and 13 fragments were found in secure Roman deposits, in addition to the sculptural piece described above. Unfortunately, they usually comprise shapeless fragments or in some cases rather thick basal sherds from vessels of indeterminate form. These generally range between 10 and 15 mm thick. Only two pieces are worthy of illustration (Fig. 11.8).

33. Part of a shallow square or rectangular dish with a large handle. 175 x 128 x 32 mm. It is in a schistose facies, but probably comes from a steatite outcrop. [L86 from Tr. 7A (10006)].

34. Fragment of a small bowl 60 mm in diameter with a T-shaped handle 44 x 13 mm [L162 from Tr. 12 (7332)].

Steatite pots are however *par excellence* associated with the Islamic period and it was popular over wide areas of the Middle East from Egypt to Iran and from Syria to the Yemen and East Africa. They were considered to be particularly good for cooking as they imparted a good flavour to the food, they kept food hot for longer periods than pottery and they had good resistance to thermal shock when used on an open fire. It is not surprising that many of the Quseir sherds show signs of sooting or of repair with string or iron rivets after breakage: they were clearly prized household items which could not be readily replaced.

Soft stones are highly gradational and steatite can grade into other hydrolyzed rocks such as chlorite schist or serpentinised schist or amphibolitic varieties. As a result differences in petrology may have little significance in determining origins and this line of research has not been pursued. Rocks of these types are found in the Eastern Desert of Egypt south of Quseir where Harrell and Brown (2000; 2008) mention a quarry between Marsa Alam and Edfu with others near Wadi Miya and Aswan in the southern part of the desert, and Wadi Atalla near Hammamat, which would be the nearest source to Quseir (information courtesy J. Harrell).

Soft stone industries are also known from four sites in the western part of Saudi Arabia, but all these are Abbasid in date and the earliest evidence for settlement at Quseir is late Ayyubid with most of the material datable to the Mamluk period. In other words on current evidence they would be a little too early for Quseir. Yemen was, and still is, a major producer of stone pots (Al-Kamali 1998). This source may have considerable relevance because documents from the Cairo Geniza specifically mention, several times, the import of 'Yemenite stone pots' (Goitein 1955, 82). Most of the Geniza documents date between the 10th and 13th centuries with fewer between 1250 and 1500 AD, but they are indicative and suggest that Yemen must be taken seriously as a potential source.

Soft stones were also exploited down the African coast where Chittick (1974, 412) attributed the Kilwa chlorite schist to Madagascar. Soft stone was also exploited in Iran from a very early period (Kohl, Harbottle and Sayre 1979, 131-59).

The source of our soft stones is difficult to determine with certainty. Harrell and Brown (2008) describe one quarry in the Gebel Rod el-Baram, to the south of Quseir, in some detail. Unfortunately, they publish photographs rather than drawings of the rough-outs which makes typological comparison difficult, but there seems to be very little overlap with our material except perhaps with the bowls (L7, L22 and L40), although these are simple forms (Fig. 11.9). The frequent presence of repair rivet holes suggests that replacements were not readily available, which might imply a more distant source perhaps in Yemen, but Saudi Arabia is just across the Red Sea and cannot be ignored.

35. Near complete profile of a bag shaped cooking pot with a thickened rim and a sagging base (to improve thermal resistance). c.f. Hallett 1990, pl. 24, from Ghubayra [L59 from Tr. 2C (1025)].
36. Rim of a large thin walled pot [L16 from Tr. 9 (9050)].
37. Rim of a large vertically sided, thin walled pot with a thin rim. One drilled hole [L38 from Tr. 2C (1027)].
38. Complete profile of a small cup [L40 from Tr. 1A (503)].
39. Rim of dish with hole drilled in base [L7 from Tr. 2B (1508)].
40. Thin walled globular pot with repair holes [L135 from Tr. 9 (7001)].
41. Similar pot but with walls thickening downwards [L5 from Tr. 2B (surface)].
42. Open bowl with traces of burning [L10 from Tr. 2B (1502)].
43. Globular pot with body cordon [L13 from Tr. 2B (1500)].
44. Basal fragment with a flanged cordon and tooling below. Repair hole in base. c.f. Hallett 1990, pl. 3, 4-6, from Mabiyat [L57 from Tr. 2D (1251)].
45. Profile of bowl with tooling on outer surface [L22 from Tr. 3 (2048)].
46. Basal sherd with inscribed wavy line inside [L52 from Tr. 2B (1519)].
47. Body sherd with three drilled holes. [L41a from Tr. 2B (1502)].
48. Sagging base of large cooking pot [L41b from Tr. 2B (1502)].

Whetstones and other sharpening stones

Very few whetstones were recovered considering the extent of the excavations. However, eight artefacts fall in this category, five of which were pebble whetstones i.e. pebbles, possibly of local origin, which were picked up and utilised. One is a slab of sandstone which has lines on it perhaps from use for sharpening, and only two are from shaped whetstones (Fig. 11.10).

49. Smooth pebble used as a whetstone with abrasion marks on the surface [L69 from Tr. 2E (6004)]. Not illustrated.
50. Fragment of a smooth, shaped whetstone 41 mm square in a grey indurated sandstone [L105 from Tr. 6E (4015)]. Not illustrated.
51. Fragment of a shaped whetstone, 10 mm square. With abrasion marks. In buff bedded and indurated mudstone – cut across the bedding [L155 from Tr. 10B (33719)].
52. Smooth elongate pebble used as a whetstone. Buff sandstone [L169a from Tr. 12 (7339)]. Not illustrated.
53. Smooth elongate pebble probably used as a whetstone. Green epidotised quartzite [L169b from Tr. 12 (7339)]. Not illustrated.
54. Block of re-buff sandstone 142 x 123 x 36 mm with incised lines probably resulting from sharpening [L178 from Tr. 8A (8293)].

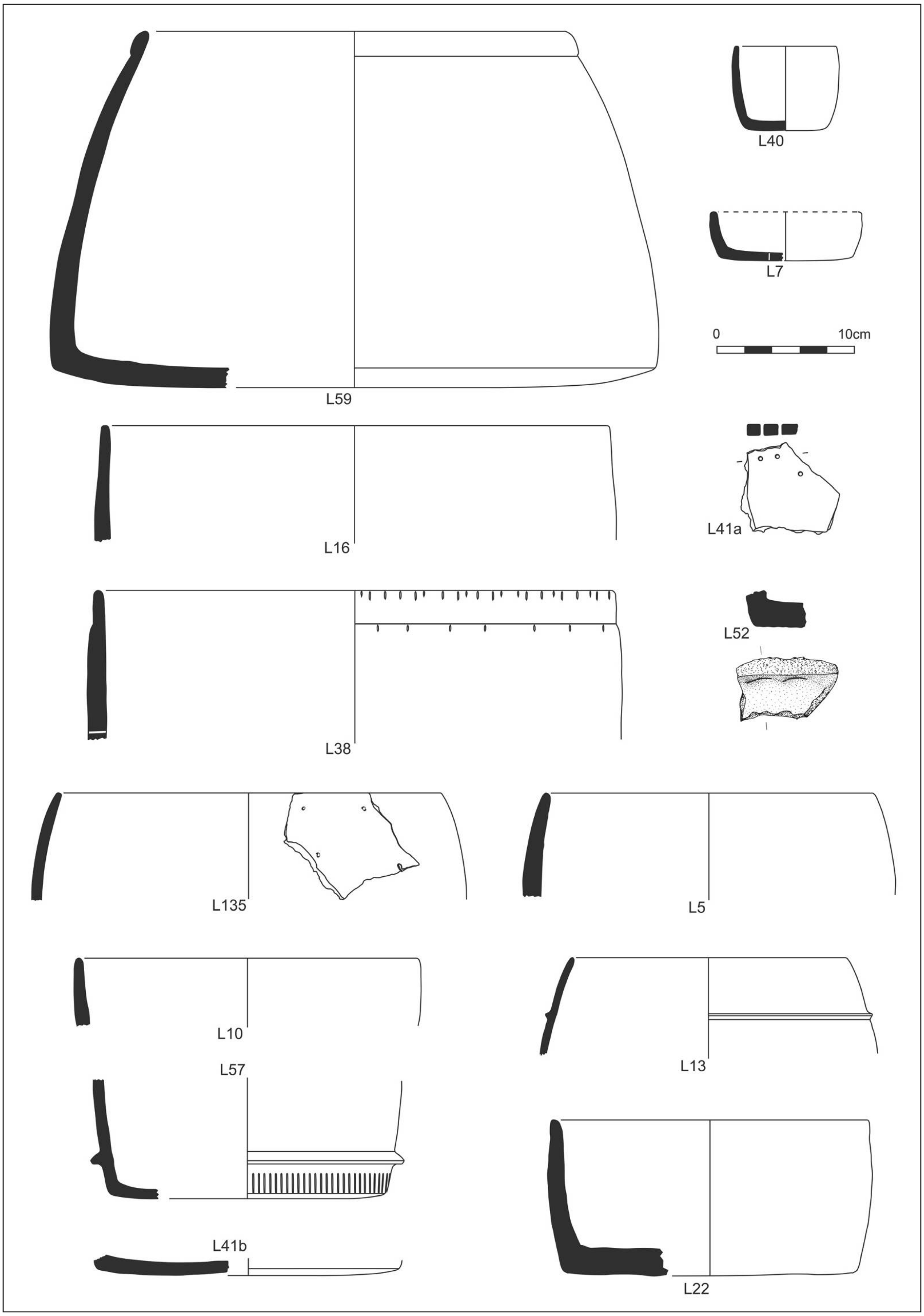


Figure 11.9. Soft stone pots. Nos 35-48.

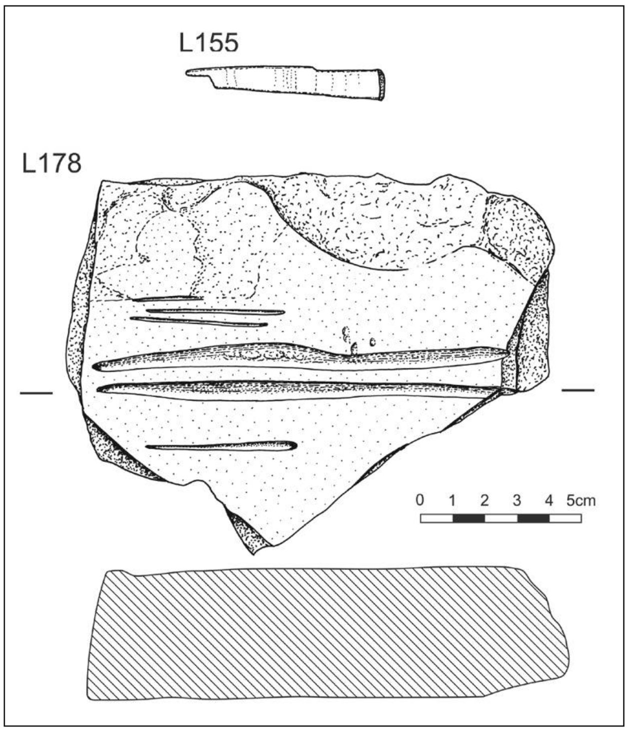


Figure 11.10. Whetstones. No. 51 and No. 54.

Window or grille

55. A window frame or grille (Fig. 11.11) in shelly sandstone probably from the hills to the north of the site was found in Trench 6Q. It comprises a 220 mm square slab, 50 mm thick, with four slats cut in it about 10 mm wide [L211 from Tr. 6Q (4166)].

Mortarium

56. Large pounding bowl (Fig. 11.12) in a hard white limestone, possibly for de-husking grain [L210 from Tr. 17 (17037)].

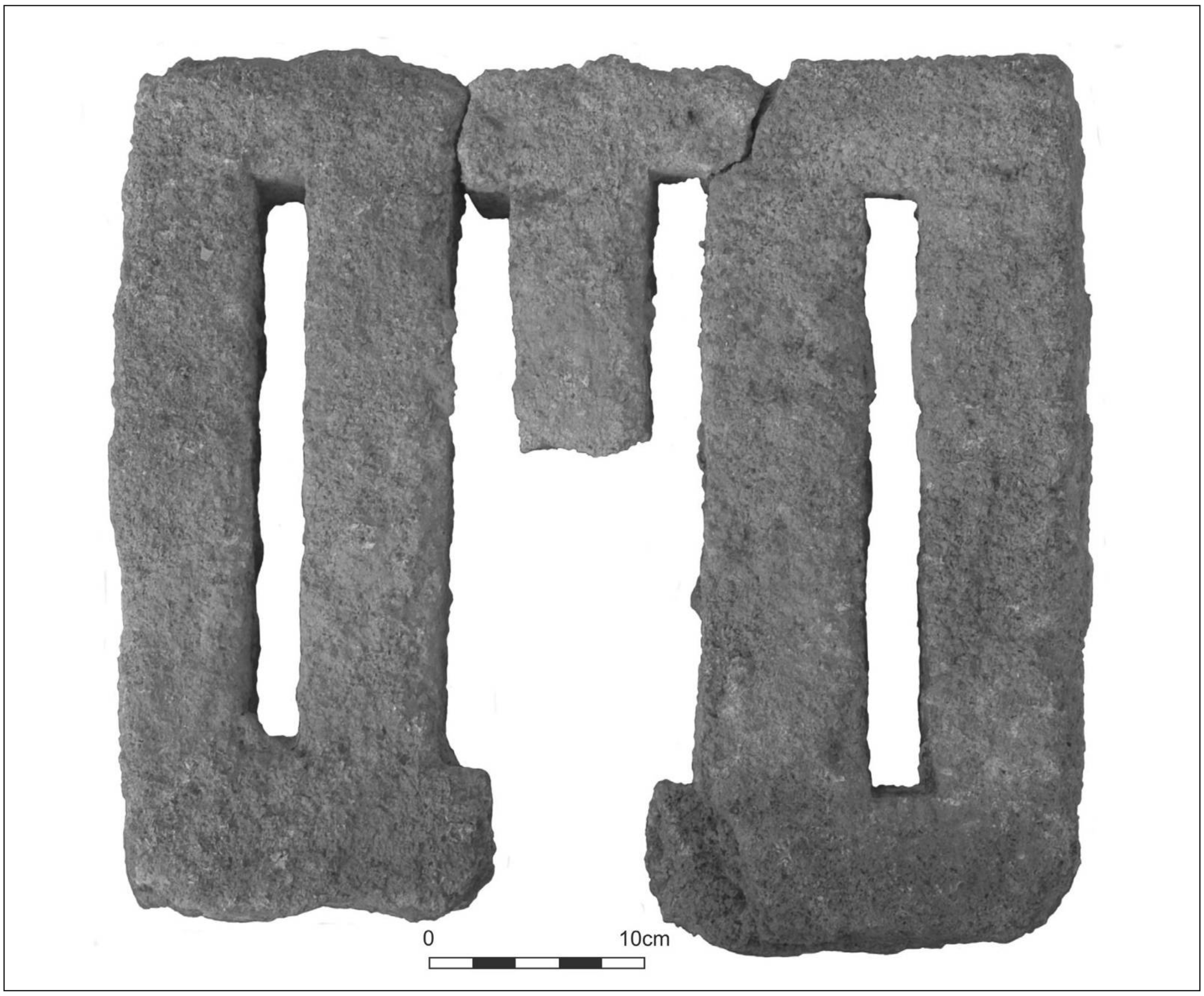


Figure 11.11. Stone window or grille. No. 55.

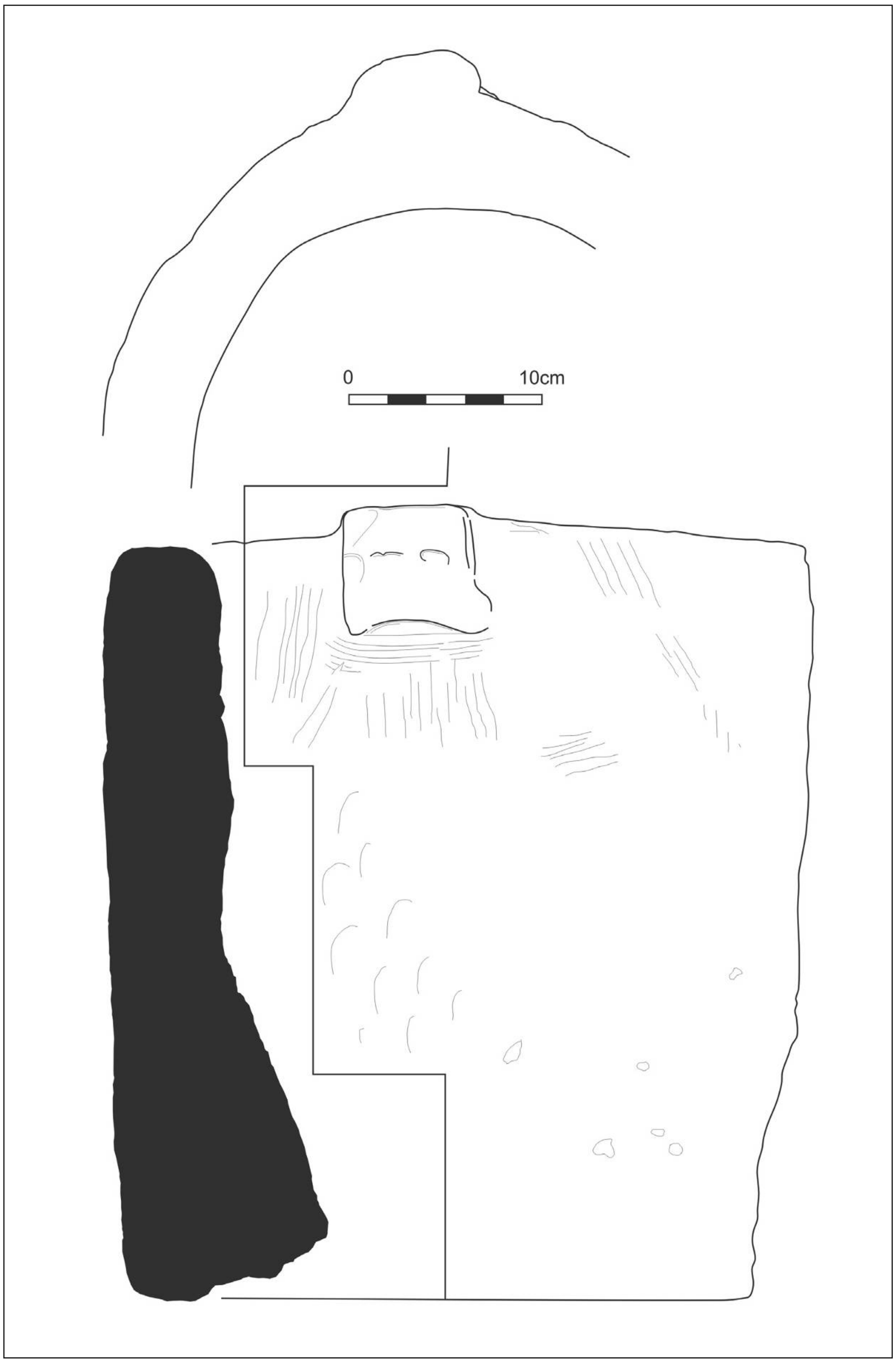


Figure 11.12. Mortarium. No. 56.

12 Leather

Jillian Phillips

Introduction

The exceptional preservation of organic materials at Quseir al-Qadim led to the recovery of over 350 well-preserved leather objects and over 1000 unassigned fragments. These were found throughout the site with the exception of the harbour areas which were less conducive to preservation of organics. Although some of the finds were complete or almost complete many were fragments of worn out articles suggesting that leather objects were of great importance in the daily life at Quseir al-Qadim as nothing was discarded until every last bit was utilised, repaired or reused. The unassigned fragments, scraps of leather often showing stitching, repairs and joins, were found in various trenches often in a similar context. Of the items recorded, a large number are associated with footwear of different styles and sizes from both the Roman and Islamic periods. The preservation extends to the fine thonging, sinews and twine used for stitching these articles, thus enabling the type of stitches used and the methods of construction to be recorded and analysed. Scraps of leather used for patches were recovered, again confirming that valuable materials were being salvaged and repaired for their continued use in everyday life (Fig. 12.1).

The study of leather has received limited attention in archaeological studies due to the nature of preservation and therefore comparative material is restricted. However, the Mons Claudianus publication is extremely useful as it summarises our understanding of the study of Roman leather to date in this part of Egypt (Winterbottom 2001). More recently Veldmeijer (2007) has given a preliminary account of the leather from Berenike. The reader is referred to these works for a more extensive bibliography.

12.1 Principal Finds

Shoes were generally made of leather or alternatively cordage might be used for a type of espadrille or sandal. The latter are discussed in Chapter 21 (this volume), here we are concerned only with leather shoes which are found in both Roman and Islamic contexts.

The Roman period produced a complete small child's shoe (LE0276), part of a left ankle boot (LE0302), many soles of shoes with a variety of stitch patterns and soles of sandals with ears attached. It seems that the principal type of sole was from a sandal The sandals would have been foot shaped with a strap fixed to a slot between the first and second toes, dividing at the front of the ankle and passing around the ankle, held to the sole by two side straps that are attached to the sole at each side of the heel. These side straps were called ears, and are often found detached from the sole. The ears are of varying shapes and sizes and the slits that hold the ankle strap can vary in shape from holes to slits. Often the soles were made of multiple layers of leather sewn together using very thin strips of fine leather known as thronging. Several stitch patterns were noted, the most common showing a series of double incisions around the

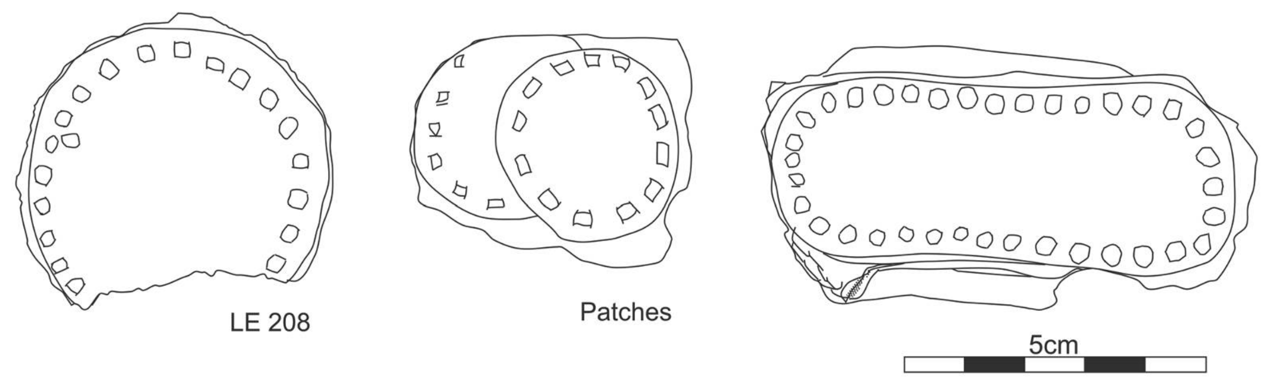


Figure 12.1. Selection of leather patches.

perimeter with a row of double incisions down the centre. The majority of the footwear items came from *sebakh* trenches.

The majority of the Islamic footwear was of a moccasin type with seven complete shoes, three of which were children's. One complete boot and one complete sandal were also discovered. Most of the shoes came from Trench 13 with others from Trench 8A, Trench 2B and Trench 2C. Many soles, often multilayered with ears, also came from Trench 8A and Trench 13, which comprised a rich Islamic *sebakh*.

Parts of water bags and associated components comprise the next largest group of leather artefacts, with a high proportion of both spouts and handles from each period. Handles are mainly constructed of either rolled leather covered and stitched or lengths of palm fibre bent and enclosed in leather to form loops which are attached to the containers.

Examples of different trims, plaits, decoration and patches were found for both periods. Patches can be used for a variety of reasons, repairs to worn or damaged areas, to patch flaws and holes in the animals skins, and to also cover any of the animals orifices that would be present in the original skin. The many patches that were found reiterate the fact that leather articles were of great value, to be repaired and reused for as long as possible. Many of the repairs were executed in a very simple way.

Lock stitch was the most common type of stitch that was used. This involved the use of two fibrous threads being simultaneously passed through a series of holes in opposite directions in order to provide strength. In many cases fine leather thonging was used to hold items together. Plain closed seams were used to sew two pieces of leather together, firstly stitching the leather together and then opening the pieces and flattening the seam. LE028 (e.g. Fig 12.20 below) shows a fine example of this seam holding the sole to the main part of the shoe. Around the edge of this shoe a thin strip of leather is sewn, folded over and then stitched into place using fine stitches. Down the centre of the moccasin type shoes a piped seam is often used as a decorative way of joining the pieces together. Two pieces of leather are stitched together holding a narrow strip in between them which is then trimmed to form the piped seam. The Islamic period produced many individual items including a child's hat, an animal skin waistcoat, a leather collar, knife sheaths, a book cover and a 'Hegap' amulet (see below).

In certain trenches, large quantities of small fragments of leather were found, concentrated in specific areas. Trench 2D is one example where Room A, Mamluk in date, proved rich in leather fragments. Over 163 fragments were found which included off-cuts, patches, pieces with stitches and plaits along with parts of shoes and sandals. Room D in the same trench also produced leather shoes along with fishing net fragments, Islamic script and a cooking pot.

Trench 2B produced the most fragments, 232 in total. Sixty-six fragments came from a single context [2007], a large organic area which was also rich in a variety of finds including a large proportion of goat hair. A second context [2030] of mixed period contained a further 50 fragments.

The Roman Trench 6P had over 60 varying fragments and Trench 8 in the Roman [8022] contained 27 fragments.

Trench 8A yielded 164 fragments with a single context [8251] supplying 111 of them. Interestingly this context also produced part of a wooden saddle cinch (W360) see Chapter 14, Fig. 14.4 (this volume) which may indicate that some of the fragments may have some association with saddlery. A rather unusual find LE0251 (see Fig. 12.30 below) was found in close association and this although on first inspection looked like a part of a water bag, the quality seems far superior. The stitching is very even and the triangular finish on the cross pieces may indicate some type of decorative cover or perhaps a finer water carrier

Trench 13, the Islamic *sebakh* had, understandably, a total of 226 fragments which included patches, stitched pieces, fragments with straps attached, hemmed pieces and shaped hide.

The concentration of fragments could indicate the disposal of waste from small repair workshops and in cases where one or two fragments were found, perhaps these repairs was carried out during the daily routine in a more domestic environment.

All measurements in the ensuing catalogues were made with Vernier callipers and are quoted to the nearest 0.1 mm, although it is acknowledged that this level of accuracy is rarely significant.

12.2 Selected Catalogue: Roman

Footwear

Shoes

1. Child's Shoe. (Fig. 12.2). Small right shoe. The sole is made of a single piece of hide and stitched to the upper with a series of small stitches. The enclosed upper had a seam at the side of the heel and also possibly at the waist. There is evidence of a strap attachment at the left waist with some over sewing around the heel. 125.1 x 55.6/43.5 mm [LE0276 from Tr. 6P (4105)].
2. Sandal. (Fig. 12.3). The major part of a sandal with two ears with a thick dark thong passed through the left ear (6.7 mm). The sandal is made of three thickness of leather, two thick and one thinner, with an extra piece sewn at the heel. Two small squares holes (9.5 x 10.0 mm), 18.9 mm apart are roughly cut for the toe strap. The edge is sewn around the front to the inner in small running stitches using fine thonging. Four further rows of running stitches are sewn across the shoe from the instep to the heel. The sole is in two pieces, with the thicker piece towards the heel, and

each piece is sewn around perimeter again using small running stitches. 240 x 88.9 x 9.3 mm [LE0293 from Tr. 6P (4120)].

3. Ankle Boot. (Fig. 12.4). Part of a left ankle boot which appears to have a side fastening. The fastening has a tongue which is attached to the right-hand side of the opening with a plain closed seam. There are six lace holes containing narrow thongs of leather (5.8 mm wide) down the left-hand side of the boot. The upper has an extra layer on the outside of the quarters, shaped and sewn in place using tiny stitches holes. The top edge of the boot is folded over and stitched into place. There is a possible sole which is attached with a series of overstitches. The edge of the heel is worn [LE0302 from Tr. 6P (4120)].

Parts of shoes

4. Sole of shoe. A piece of very thick hide cut into the shape of a simple shoe sole. It comprises of one straight cut edge, a rounded heel and a single hole where a toe strap may have been. 154 x 75.8 / 72.1 mm [LE015 from Tr. 6C (4012)].

5. Sole of shoe. This is possibly the sole and the lower part of shoe. There is a curved edge, some fibre threads and some stitch holes. 93.9 x 48.9 x 14.3 mm [LE0187 from Tr. 6H (4025)].

6. Heel of shoe. A single layer of thick hide. The heel section shows a few stitches of fine thonging with a circular indentation. 64.2 x 53.5 x 5.7 mm [LE0179 from Tr. 6D (4015)].

7. Sole of shoe. This is one thick layer overlain with two layers of finer hide. It is sewn together with a series of long, average 20 mm, stitches using a 2-ply fibre. There is a series of pairs of nails down the centre of the sole. 105.2 x 63.5 x 14.8 mm [LE0192 from Tr. 6J (4040)].

8. Sole of shoe with ears. A piece of thick hide simply cut to the shape of the sole of a shoe with two straight cut edges. There are two slits towards the outer edge of the heel which are threaded through with a strip of leather 21.5 to 23.8 mm wide with holes in both shaped ends. This strap forms the ears which will hold the ankle strap in place. One ear is bound through the slit with a piece of fine leather and held in place with a small rivet. 185 x 89.2 / 77.5 mm [LE0206 from Tr. 6L (4075)].

9. Sole of shoe. Left foot. The waist of the sole. Consisting of two layers held together with a series of running stitches down centre and either side. There is a diamond shaped pattern on the surface of the leather which could be an imprint. 118.5 x 79.0 mm [LE0224 from Tr. 6H (4080)].

10. Sole of shoe. Right foot. A sole fragment with stitch lines around the perimeter and forming a V-shape at the heel. There are some fine thonging stitches. 55.4 x 63.8 x 2.9 mm [LE0269 from Tr. 6GH (4095)].

11. Part of shoe. Possibly a sole with a series of running stitches along one edge holding a fragment of leather, another possible layer in place. The fragment is stitched using fine thonging with a transverse line of stitching on one edge. 93.9 x 100.4 x 2.1 mm [LE0271 from Tr. 6P (4100)].

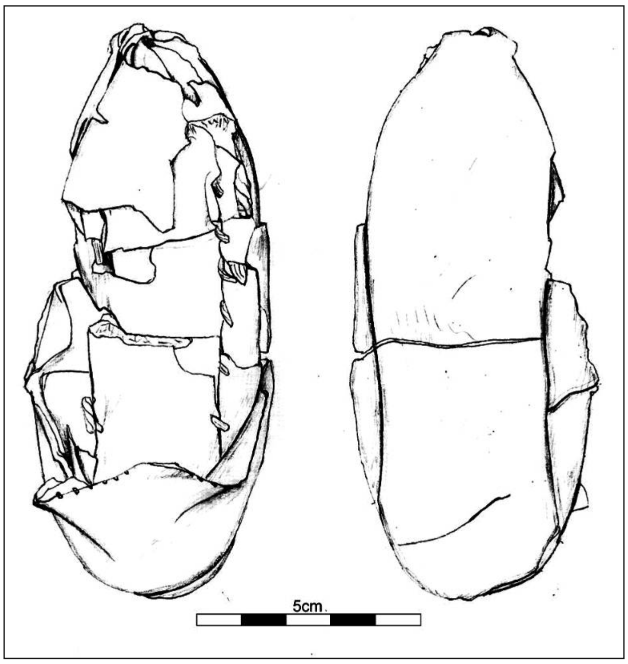


Figure 12.2. Child's shoe from Trench 6P, LE0276, No. 1.

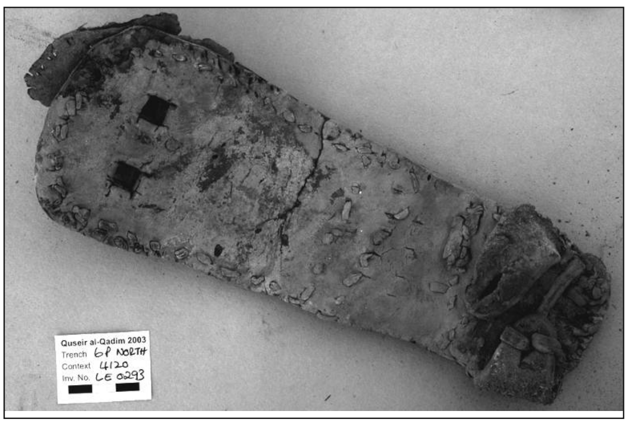


Figure 12.3. Sandal LE0293, No. 2.

12. Sole of shoe. Right Foot. An insole and two further layers which are sewn around the edge with a series of small stitches using fine thonging. There is a central line of stitches on the lower two layers. 210 x 87.5 /42.5 x 9.2 mm [LE0273 from Tr. 6P (4100)].

13. Sole of shoe. Waist of sole. One layer with stitch holes, sewn edges and three transverse lines across the waist using small stitches with fine thronging. 106.3 x 72.4 x 8.0 mm [LE0298 from Tr. 6P (4120)].

14. Sole of shoe. This consists of four layers of leather with the bottom layer slightly thicker than layers 1-3. The evidence of stitching suggests this is not the sole. There are stitching holes around edge of the layers, with the upper layer showing thong stitches and stitch holes. 136.9 x 81.5 mm [LE0334 from Tr. 6A (4165)].

15. Sole of shoe. Right foot. An insole with stitching around the edge. The leather is gathered just in front of the heel suggesting some kind of attachment. The underside of leather is scored in a cross diagonal pattern with a double lined star on the heel and two parallel lines down the

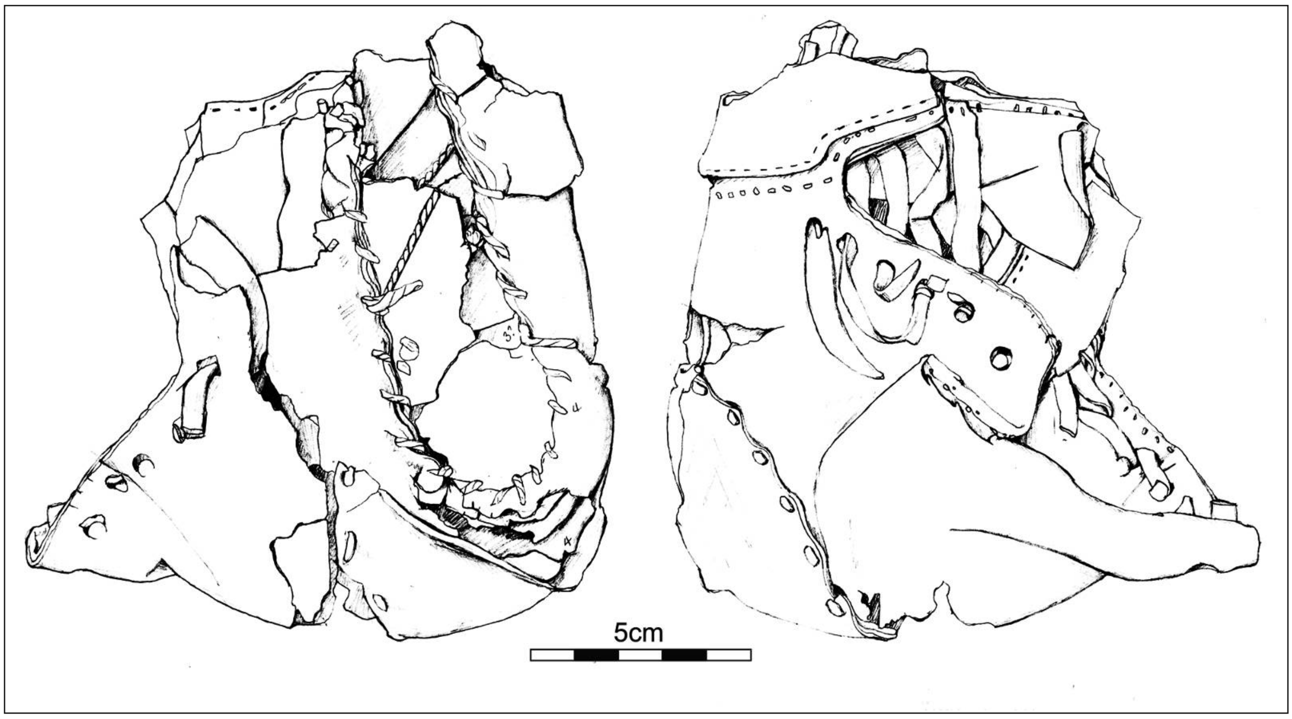


Figure 12.4. Remains of a Roman ankle boot LE0302, No. 3.

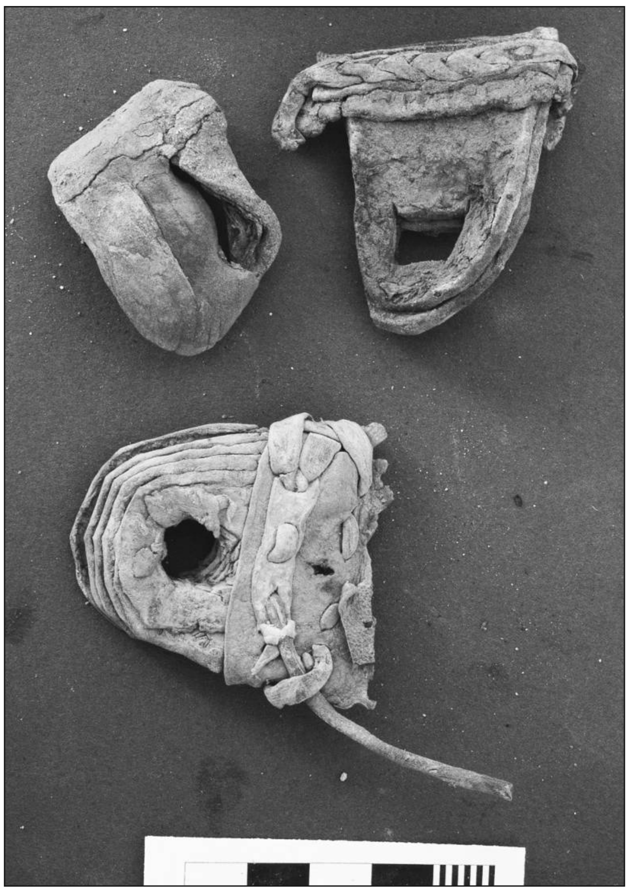


Figure 12.5. Selection of detached leather ears.

centre. 165 x 55.6 x 3.9 mm [LE0348 from Tr. 6Q (4170)].
16. Sole of shoe. Two fragments of part of a sole. The heel fragment of two layers is sewn together with fine thonging and held together with iron tacks. The toe section has a square cut hole to hold the toe strap. There is stitching around the edge [LE0349A from Tr. 6Q (4170)].

Figure 12.6. Decorative leatherwork fragment LE0139, No. 27.

Detached ears (Fig. 12.5).
17. Detached ears. These are two separate pieces each containing an ear which connect together to form part of a sole. Each piece has a small slit (11.1 and 12.7 mm).which would have held the ankle strap. There are a series of holes forming a square shape on the insole. One of the ears has been repaired using stitching in fine thonging [LE0221 from Tr. 6H (4080)].
18. Detached ear. A rounded piece of leather with two slits. The resulting central piece has a small slit in the end. 90 x 28.2 x 5.5 mm [LE0274 from Tr. 6P (4100)].
19. Detached ear. Two slits in strap with centre piece tied in knot. 26.0 x 53 mm [LE0291 from Tr. 6P (4110)].
20. Detached ear. A torn off ear which had been re-stitched to the main part of the sole using a series of running

stitches and thonging. It has a single rounded slit 17.2 mm long. 74.8 x 16.2 / 50.1 mm [LE 0299 from Tr. 6P (4120)].

Miscellaneous

21. Patch. Three circular patches 24.8, 24.6 and 20.2 mm in diameter. All are attached to a further piece of leather using small running stitches and fine thonging and thus showing a repair [LE0217 from Tr. 6K (4050)].
22. Strap. Fine strap with a single hole. The strap is stitched very uniformly in back stitch (4.3 mm) using a fine fibre twine. 51.4 x 17.8 x 1.9 mm [LE0279 from Tr. 6P (4100)].
23. Trim. Two pieces of leather are folded in half and sewn together using fine thonging and small running stitches. One end has a small protrusion tied round with fine thonging [LE0218 from Tr. 6K (4050)].
24. Trim. A folded rounded piece of leather with a second piece attached using large running stitches. This may be edging with a cut edge [LE0292 from Tr. 6P (4110)].
25. Plait. Twelve narrow thongs of hide plaited and knotted at one end with goat hair. 12-ply plait. 250 x 14.2 x 7.9 mm [LE0311 from Tr. 7 (surface)].
26. Plait. Plaited and knotted thongs. Many thongs, 2.9 mm wide, are woven into a flat piece then divided into two and plaited using about. Twelve strands in each of the plaits. These are then loosely knotted. In the woven area there appears to be a hole which could be part of a fastener or handle [LE0316 from Tr. 7 (5501)].
27. Decoration (Fig. 12.6). A fragment of a decorative piece of fine leather, possibly part of a shoe. Two pieces of leather are centrally stitched, folded over and stitched down with tiny fibre stitches. Fine rolled leather straps running from the centre, some with branches off, areas between branches worked into curved areas. 7.3 x 12.9 x 4.3 mm [LE0139 from Tr. 7A (10100)].
28. Fastener. Toggle. An oval shaped solid piece of leather with an upper surface worked through to provide the top with shank. 34.6 x 16 x 4.3 mm [LE0356 from Tr. 8 (8028)].

Water bags

29. Water Bag. Part of water carrying bag (Fig. 12.7). Two continuous narrow strips of leather are holding in place a separate piece of leather which is repairing a circular aperture (100.9 x 110 mm). The narrow strips of leather are sewn in place using thonging and small stitches. There are two circular repair patches (32 mm in diameter) which are neatly sewn to both faces using small stitches and narrow thonging [LE0239 from Tr. 8A (8251)].
30. Handle. A looped type handle with a central hole. A piece of leather passes through the central hole and is stitched into place. Possible handle from leather water bag. 48.1 x 114.4 mm [LE0222 from Tr. 6H (4080)].
31. Handle. A piece of leather folded over 3-ply plant fibre twine. Stitched using large lock stitches (10 mm long) and fine 2-ply twine. Wound round twice and fastened in a reef knot [LE0223 from Tr. 6H (4080)].
32. Handle. Four layers with a rounded edging of fine leather held in place with a series of running stitches. Centre is reinforced with a square of leather sewn into place with small running stitches with central circular hole [LE0272 from Tr. 6P (4100)].
33. Handle. Looped handle formed by lengths of palm fibres tied together in a series of places, then sewn together with fine thread and large stitches. Covered with leather and sewn with large stitches. It is a possible handle from leather water bag [LE0290 from Tr. 6P (4110)].
34. Handle. A handle formed from a bundle of palm fibres covered with leather. The fibres are flattened in the body of the strap and turned over at the top. The main body of the handle is covered with a flat piece of leather folded over and sewn into place with a series of running stitches in narrow thonging stitches 5 mm wide and averaging 13

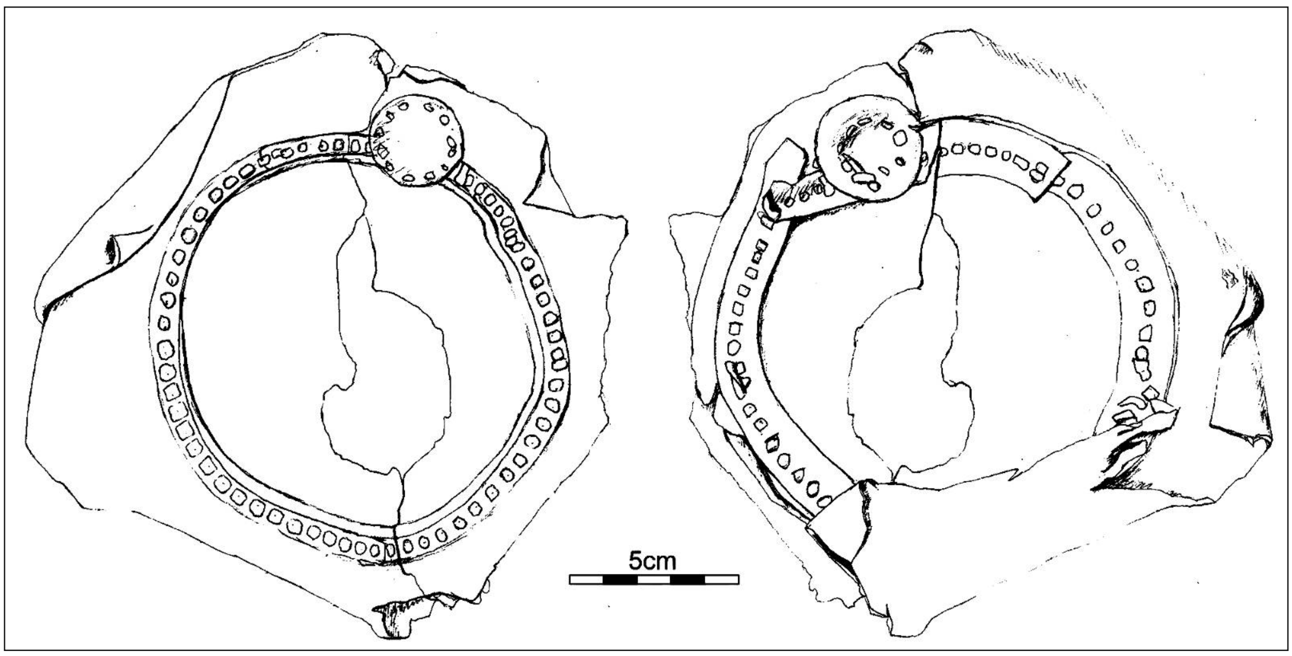


Figure 12.7. Partial remains of a watercarrier, No. 29.

mm long. The neck of the handle is bound with narrow strips of leather about 14 mm wide. The ends of these strips are tucked into the fibres. 460 x 39.6 x 12.7 mm [LE0294 from Tr. 6P (4110)].

35. Handle. A looped handle is formed by a piece of leather encasing lengths of palm fibres and is sewn into position using a series of back stitches and fine thonging. A flat piece of leather is placed from front to back and held in place by a narrow strip of leather with a row of running stitches down either side. The body of the water bag contains a small repair patch, held in place with a circle of back stitches. This is possibly a handle from leather water bag. 111.2 x 88.3 x 16.8 mm [LE0297 from Tr. 6P (4120)].

36. Handle. A looped handle formed by a piece of leather rolled over lengths of palm fibre and sewn in place with a double row of running stitches. A further piece of leather is passed from front to back and this is held in place by a narrow strip of leather stitched down either side with a series of small running stitches. Possible handle from leather water bag. 99.6 x 55.9 x 15.6 mm [LE0347 from Tr. 6Q (4170)].

37. Handle. A looped handle formed by a piece of leather rolled over lengths of palm fibre and sewn into position with a series of linen stitches. A small piece of leather is passed between the sides of the loop and sewn into place using thonging back stitches. Possible handle from leather water bag. 67.0 x 40.7 x 12 mm [LE0350 from Tr. 6Q (4166)].

12.3 Selected Catalogue: Islamic

General Objects

38. Child's Leather Hat. (Fig. 12.8). A small hat made of four triangular pieces of leather stitched together and lined with textiles. One of the panels, smaller than the others, has been tooled with a worked circular pattern. It may be that the panels of the hat had been made from different pieces of leather as there is a variance in the colour and texture of the finish. The panels have been stitched together using a plain closed seam which was then opened and tiny stitches were used to keep it open. Around the edge of the hat a folded strip of leather was attached, using a series of back stitches and fine twine, to hold the lining in place. The lining of the hat was a rough cotton 's' spun weave fabric joined together with a lock stitch. The depth of hat was 68.9 mm [LE0089 from Tr. 2B (1578)].

39. Leather Collar. (Fig. 12.9). This collar was made of a piece of leather folded and formed into a triangular shape. It appears to have been damaged by some kind of decay which has produced a series of holes. The triangular piece is folded in at the wide end to a depth of 23 mm and the edges sewn together with a series of running stitches, edge to edge. It is wrapped and tied at one end with a narrow piece of leather thonging approximately 2.7 mm in width. A further piece of leather is attached to the collar and then threaded through stitch holes and sewn to the rest if the garment with larger running stitches (14.7 mm). 270 x 57 x 0.5 mm [LE0024 from Tr. 2C (1018)].

40. Knife Sheath. (Fig. 12.10). This is a single piece of leather folded and sewn along one edge using reverse stitching and fine thonging to form a triangular container suitable for small knife. On the widest edge a narrow thong is passed around the top through a series of slits. 99.3 x 27.8 / 10.3 mm [LE0141 from Tr. 5 (3014)].

41. Spine of Book. (Fig. 12.11). This is a piece of fine skin with crenulation type edging possibly showing the remnants of stitching. The tooled design of Islamic/ Arabic lettering or symbols is enclosed by two horizontal tooled lines. 79.5 x 36.4 x 0.9 mm [LE0162 from Tr. 5 (3029)].

42. Animal Skin (Possible) Waistcoat. (Fig. 12.12). Pieces of animal skin are sewn together to form some kind of

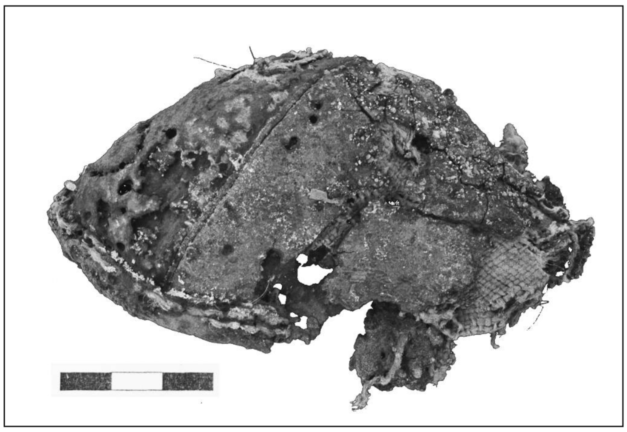


Figure 12.8. Childs leather hat, LE0089, No. 38.

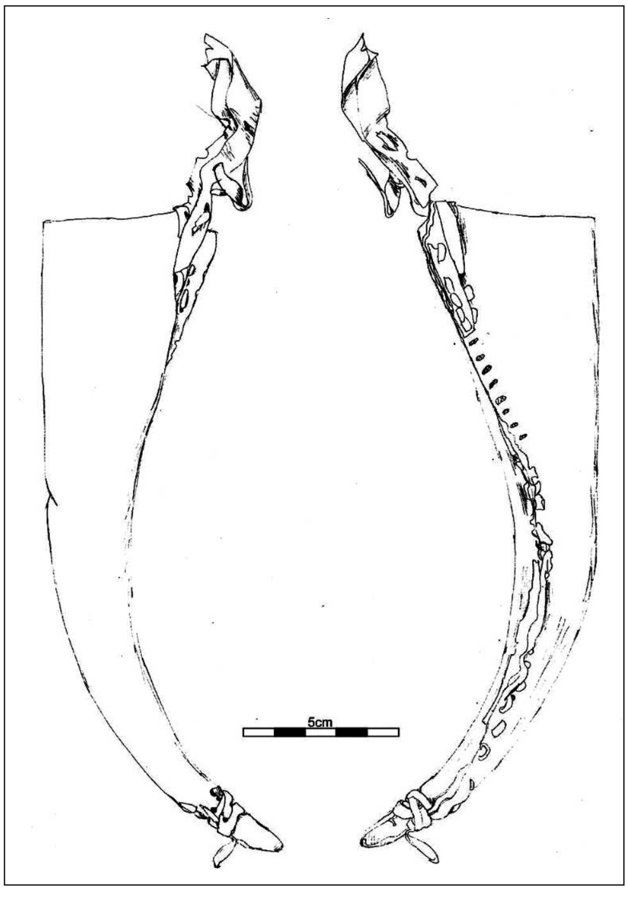


Figure 12.9. Leather collar, LE0024, No. 39.

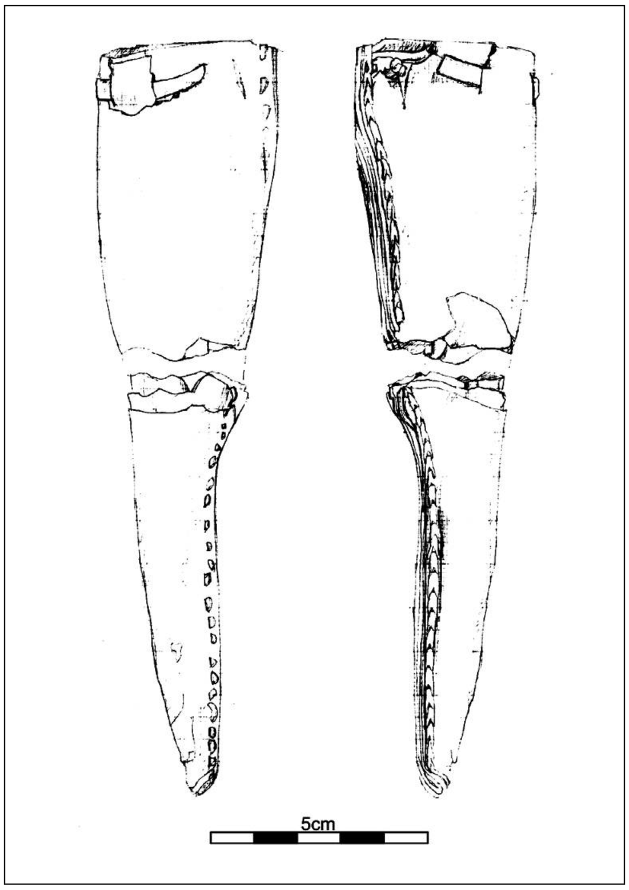


Figure 12.10. Knife sheath, LE0141, No. 40.

Figure 12.11. Book spine, LE0162, No. 41.

Figure 12.12. Animal skin, LE0254 comprising a waistcoat, a detail of the stitching is shown on the inset, No 42.

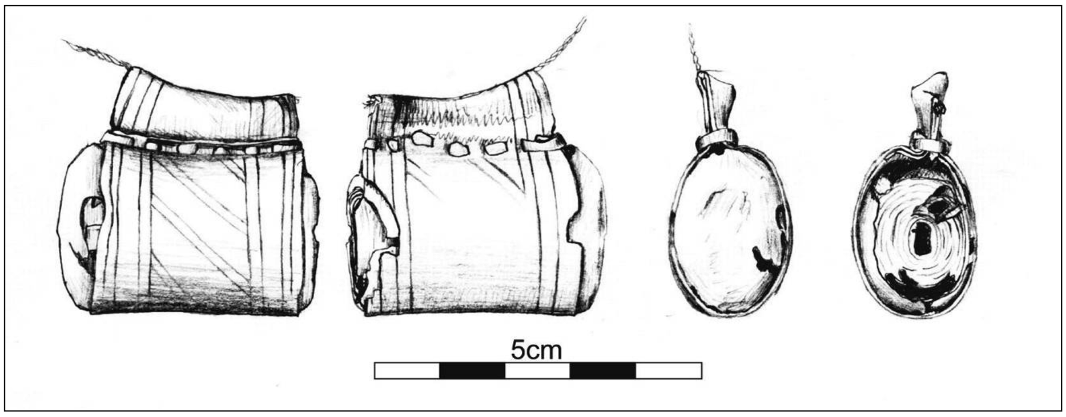


Figure 12.13. 'Hegap' amulet, LE0283, No. 43.

Figure 12.14. Remains of a book cover, No. 44.

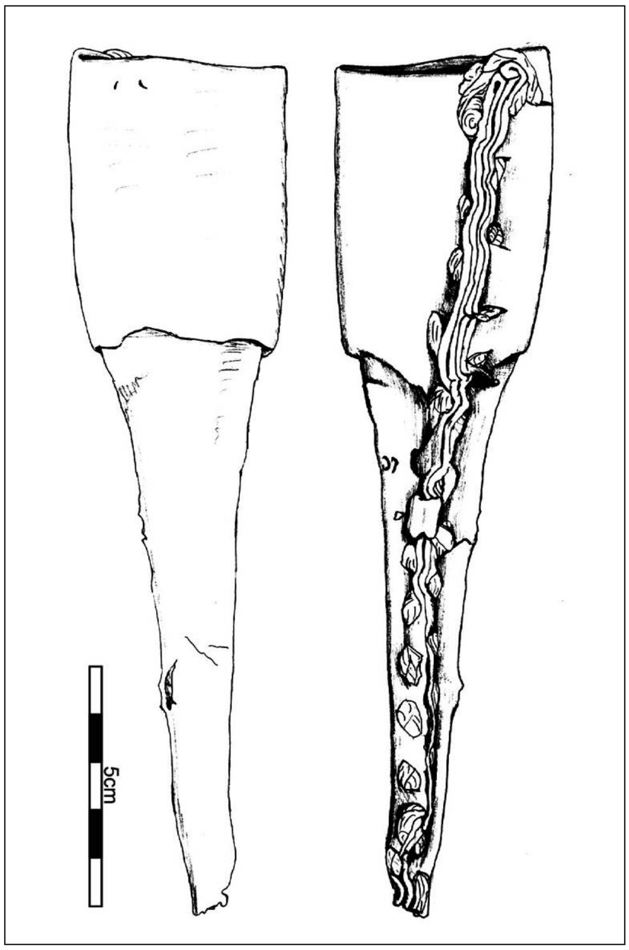


Figure 12.15 Knife sheath, LE0335, No. 46.

garment possibly a waistcoat. The seams are lapped seams and some of the unstitched edges of the skin have been overcast with twine thread. Several fur patches have been attached to the garment using a series of running stitches [LE0254 / LE 0261 from Tr. 8A (8251) and (8293)].

43. 'Hegap' Amulet. (Fig. 12.13). A small leather amulet, the 'Hegap' was a roll of fine paper covered by a piece of leather and sewn carefully in place using small running stitches to contain the paper roll. Further pieces of leather covered each end and the top section was folded over to allow the fine 2-ply twist twine to be threaded through. It is believed that the scroll of paper contained words from the Koran. Amulets are often worn to protect their wearer by their religious associations. 37.0 x 26.0 x 18.6 mm [LE0283 from Tr. 8A (8251)].

44. Book Cover. (Fig 12.14). Two pairs of two pieces of leather are sewn together very close to the edge and then again c.10 mm away from the first line of stitching. Small running stitches were sewn using fine linen two-ply coloured (yellow/ blue) thread. Within this narrow area is a 'curly V-shaped' pattern. The small hole in the bottom left hand corner is reinforced by a series of small running stitches around the hole. The bottom edges of the first pieces of leather have a raw hem c. 8 mm deep. The second piece of leather is decorated with an intricate tooled pattern. This forms one of the outside covers. The

decoration consists of a series of lines running vertically and parallel to the spine and horizontally, just above the hem line. Within these lines is a band of Arabic symbols which included the repeated Arabic word for 'Haj'. The fourth word on the second line is 'Mercy'. 77.8 x 44.3 x 0.9 mm [LE0286 from Tr. 13 (5500)].

45. Hobble or wrist band. Two pieces of soft leather with some eyelet holes containing soft fibre twine fastened through and knotted. The leather is folded over and sewn together using a plain closed seam and stitched using 2-ply fibrous vegetable fibre cord. The leather has retained a rounded shape which appears was fastened around something – this could have been a wrist or a small animal's leg [LE0325 from Tr. 13 (5510)].

46. Knife Sheath (Fig. 12.15). A sheath for a narrow bladed knife approximately 100 mm long. A shaped piece of hide is folded over at the top and sewn together down one side to provide a neat container for a knife. The stitches, which are rather large in comparison with the size of the knife sheath, use a fibrous amber coloured 2-ply 'S' twist thread. The stitches length vary in size from 6.7 to 9.4 mm along the blade length but are even less even along the handle area where they are holding together four layers of leather with an average thickness of 0.9 mm. 178 x 43.6 x 11.6 mm [LE 0335 from Tr. 13 (5514)].

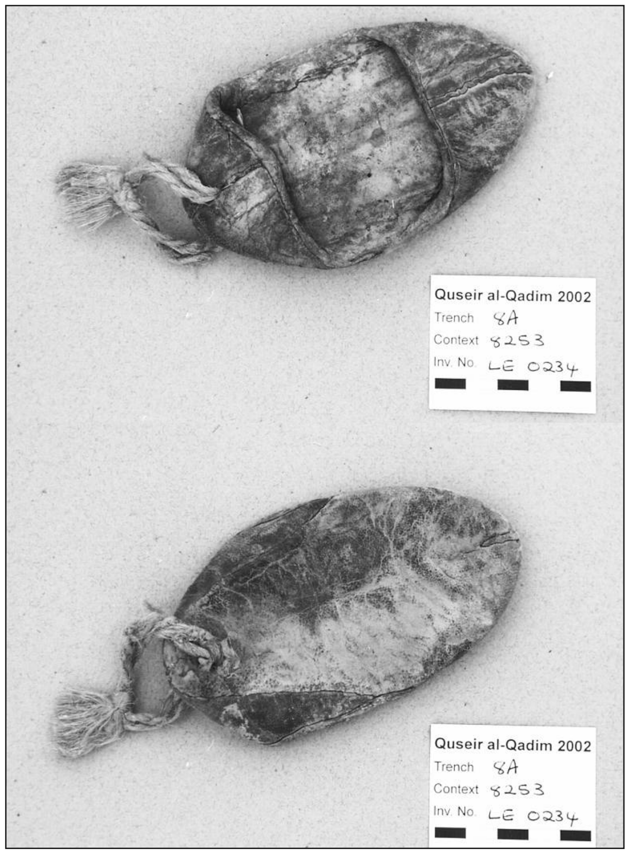


Figure 12.16. Child's shoe, LE0234, No. 47.

Footwear

Shoes

47. Child's Shoe. (Fig. 12.16). Complete small child's shoe. Right foot. Moccasin type shoe with a hole in the heel that contains a double loop of 2-ply twine passed through and tied in simple knot. The sole and front of the shoe are one single piece with a piped seam down the centre front finishing just under the toe. The sides are attached with a piped seam and a small inset of leather. The insole is attached with running stitches and the leather edging around the perimeter of the shoe is folded and attached to the inside with a few tiny twine stitches and a plain closed seam. 120.2 x 69.6 mm [LE0234 from Tr. 8A (8253)].

48. Child's Shoe. (Fig. 12.17). Complete child's shoe. Right foot. The shoe is made from a single piece of soft leather with a small triangular piece added at the heel using plain closed seams. The toe and heel have a piped seam. The insole is stitched into place using fibrous thread. The leather edging around the perimeter of the shoe is folded and attached to the inside catching a few stitches spaced well apart. 138.8 x 72.9 x 9.6 mm [LE0252 from Tr. 8A (8251)].

49. Child's Shoe. (Fig. 12.18). Complete small child's shoe – moccasin type. Left foot. The upper is attached to a single layer sole with running stitches around the perimeter using a fine cotton twine. Welted seam at the heel of the shoe. 133.9 x 62.1 x 4.0 mm [LE0306 from Tr. 13 (surface)].

50. Shoe (Fig. 12.19). Left foot. One complete moccasin type shoe. The sole is rounded up the sides and attached to the upper with a plain closed seam. There are three layers, sole, insole and lining. The edge of the shoe is trimmed all

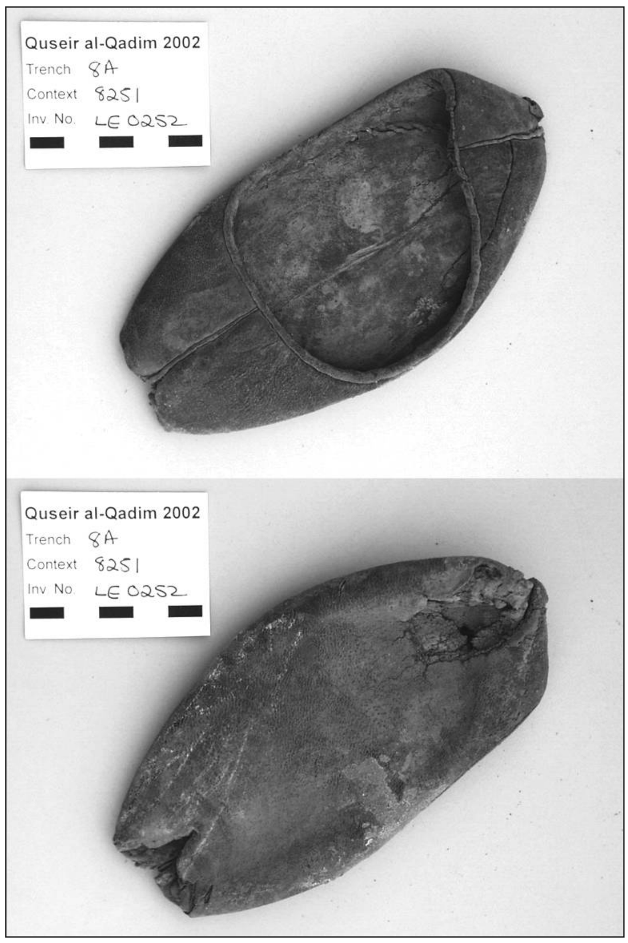
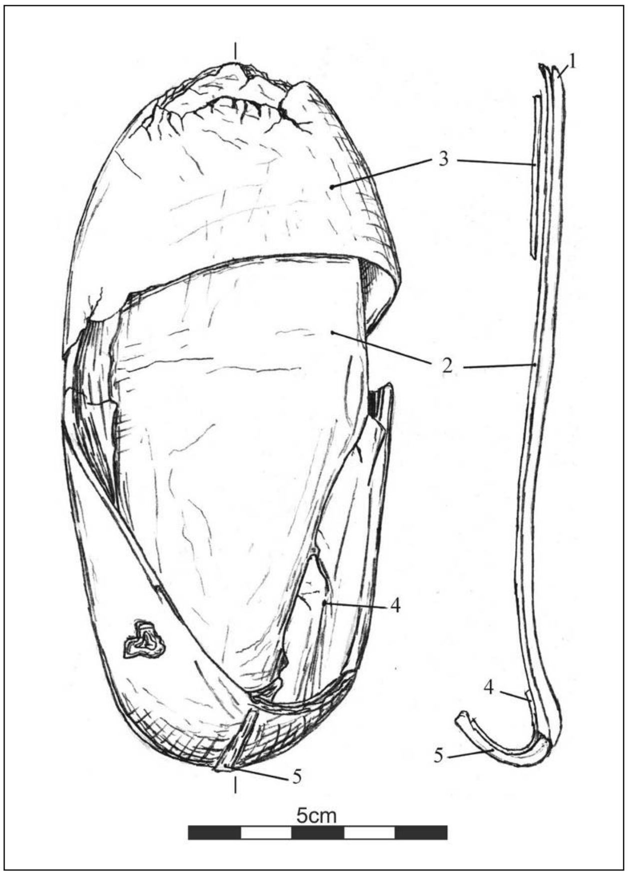
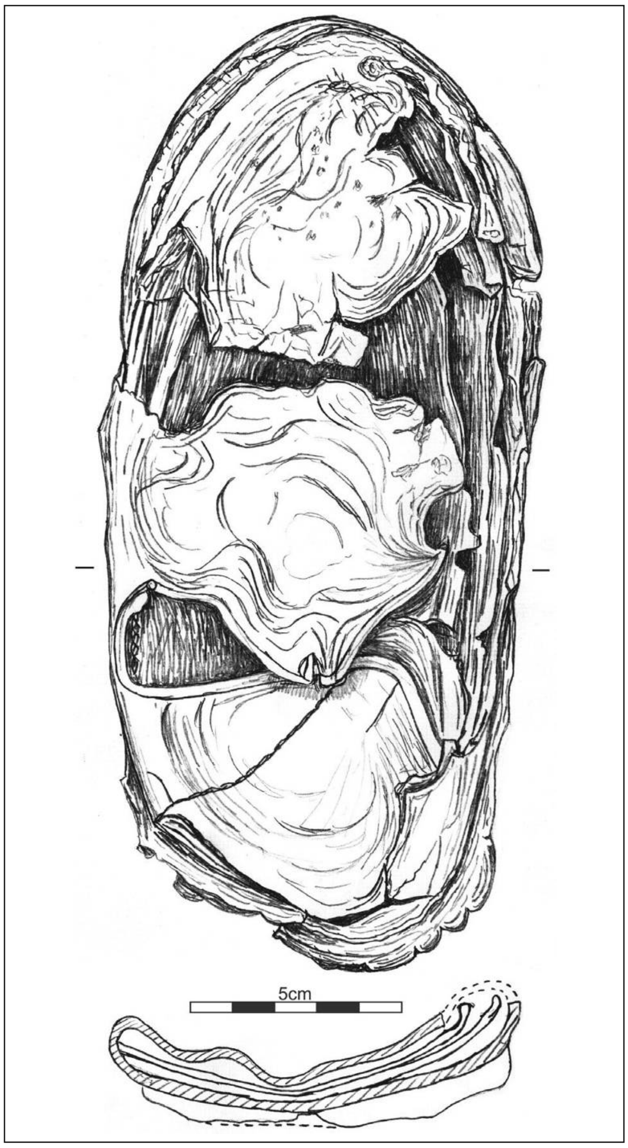


Figure 12.17. Child's shoe, No. 48.

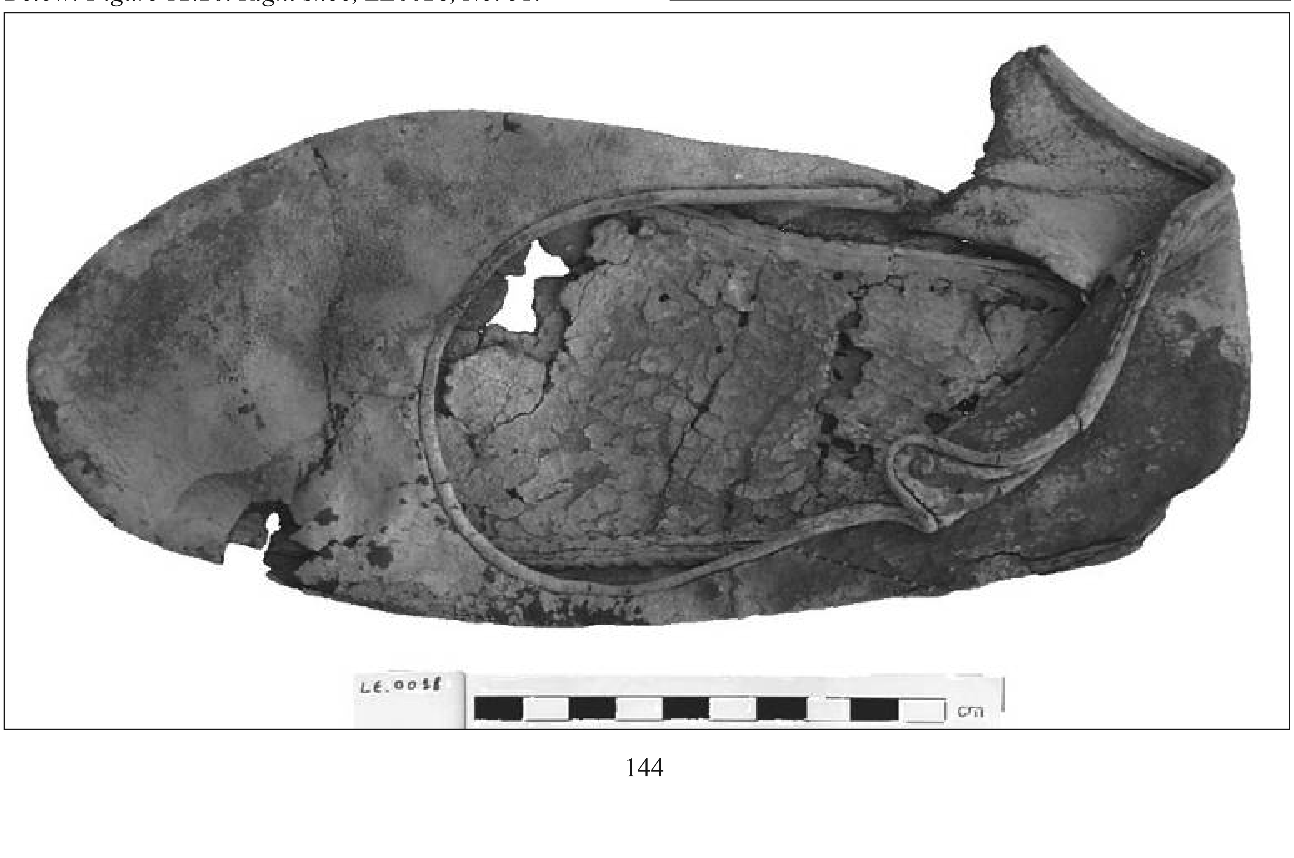


Top: Figure 12.18. Child's shoe, LE0306, No. 49.



Right: Figure 12.19. Complete shoe, LE0020 , No. 50.

Below: Figure 12.20. Right shoe, LE0028, No. 51.



around the upper edge. The upper edge is shaped around the heel and up to a soft point at the vault. 220 x 97 mm [LE0020 from Tr. 2B (1004)].

51. Shoe (Fig. 12.20). Right foot. One piece moccasin type shoe with ankle fastening. This shoe consists of a sole with a small piece attached at the seat, possibly at a later date, to extend wear and attached with a series of small running stitches using fibrous twine: Insole layer attached to the sole using a plain closed seam and small thonging stitches. The upper is a plain vamp with edging around the whole of the upper shoe. The edging comprises of a narrow piece of leather attached to outer edge, turned over and then stitched into place. The upper is made of one single piece with a diagonal plain closed seam just before the fastener which is situated on the left side of the shoe. The fastener is made of a small knot of leather. The strap from the right side is missing. 250 x 106 mm [LE028 from Tr. 2C (1025)].

52. Shoe (Fig. 12.21). Complete right shoe – moccasin type. The upper consists of a single piece of leather used to make the front and sides with two triangular strengthening insets at the heel. This is attached to the inner sole using small tight stitches. The whole shoe appears to be made from a single piece of leather. There is a cotton woven fabric lining sandwiched between the sole and the inner sole. The centre line, down the middle of the upper, and the back line at the heel of the shoe have been joined using welted seams. A plain closed seam is used around the top of the shoe to hold the edging in place then attached to the lining with a series of hemming stitches. 240 x 115 mm [LE0342 from Tr. 13 (5514)].

53. Shoe. (Fig. 12.22). Complete left shoe – moccasin type. This shoe is very similar to No. 52 and could be one of a pair. A traditional type of shoe with a central join using a welted seam down the front of the upper and the heel. There is no separate sole. The shoe is lined with a woven fabric and piped around the upper edge of the shoe. 240 x 110 mm [LE0346 from Tr. 13 (5515)].

54. Boot. (Fig. 12.23). Complete ankle boot with decorative fasteners. Right boot. The sole has a repair patch (88 x 123 mm) sewn into place with relatively small stitches. The original sole has also had secondary stitching on the right edge however it has split again. The upper has split on the outer edge near the repair suggesting that the wearer of the boot walked on the outside of his foot. The remainder of the upper boot and towards the toes appears in good order. The boot has six decorative fasteners, thongs which pass through loops down the heel and then through eyelets either side of the central opening. The right hand ends fasten through a small piece of leather with an eyelet slit in to hold it in place. The left hand ends of the thongs finish in a knot which would have been threaded through the eyelet to fasten the boot. The upper part of the boot is made by two pieces which are joined diagonally down the

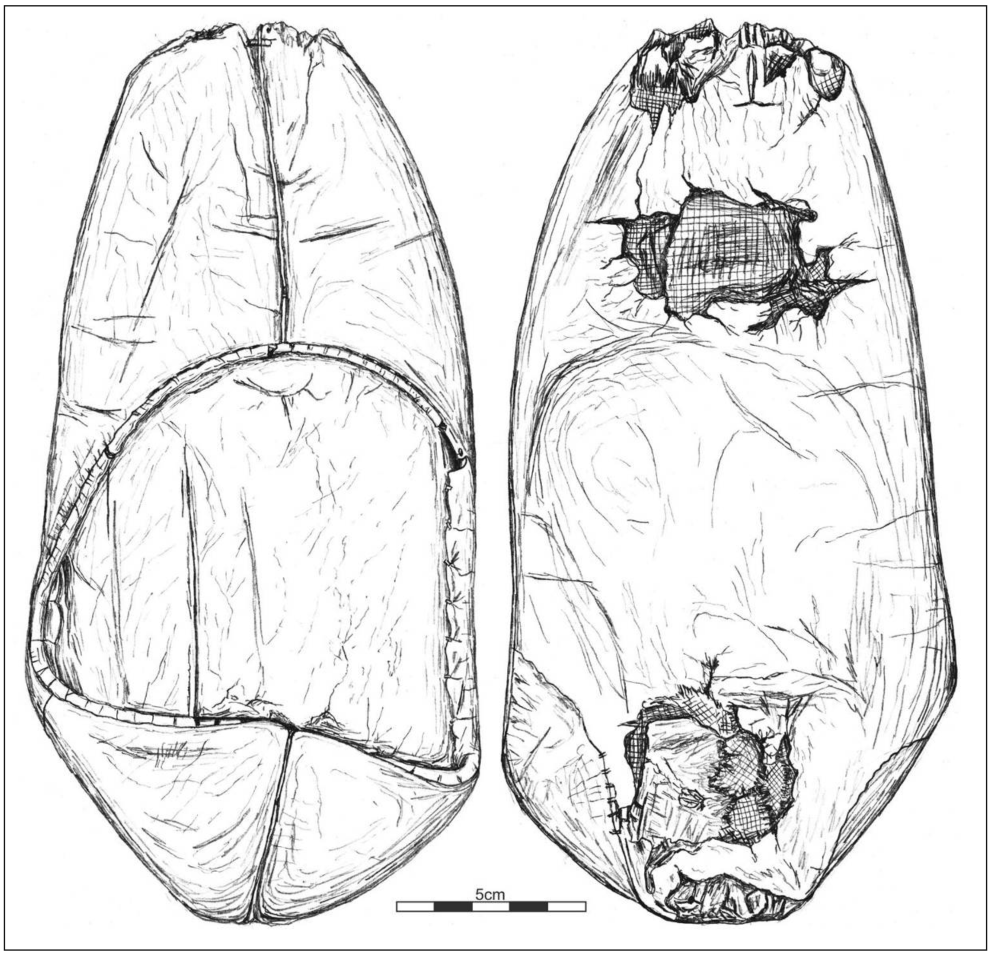
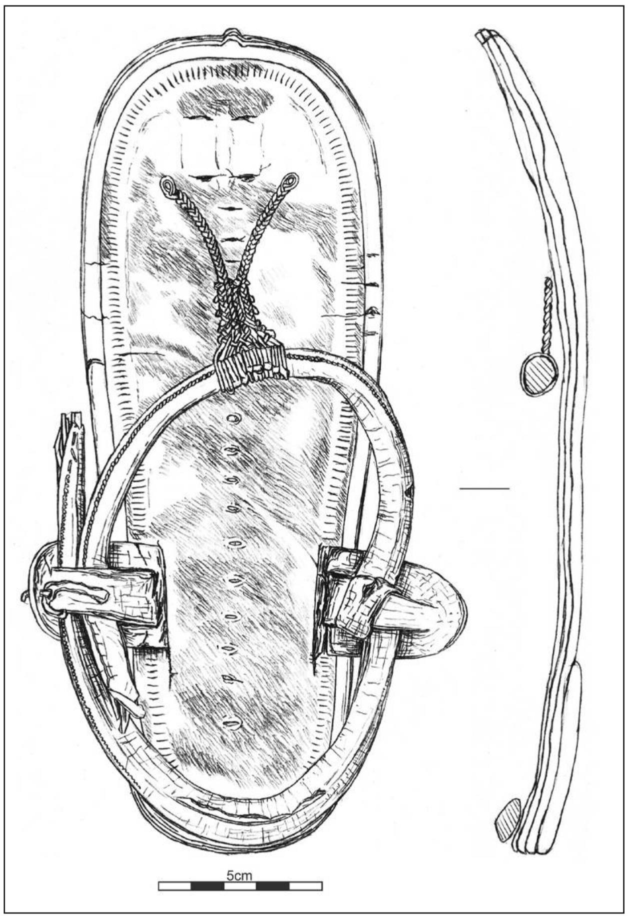
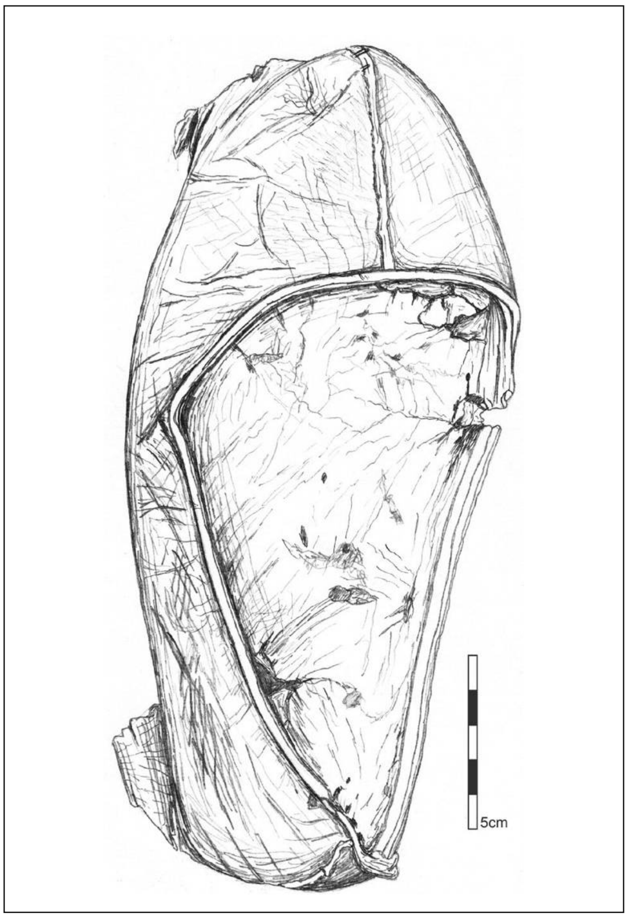
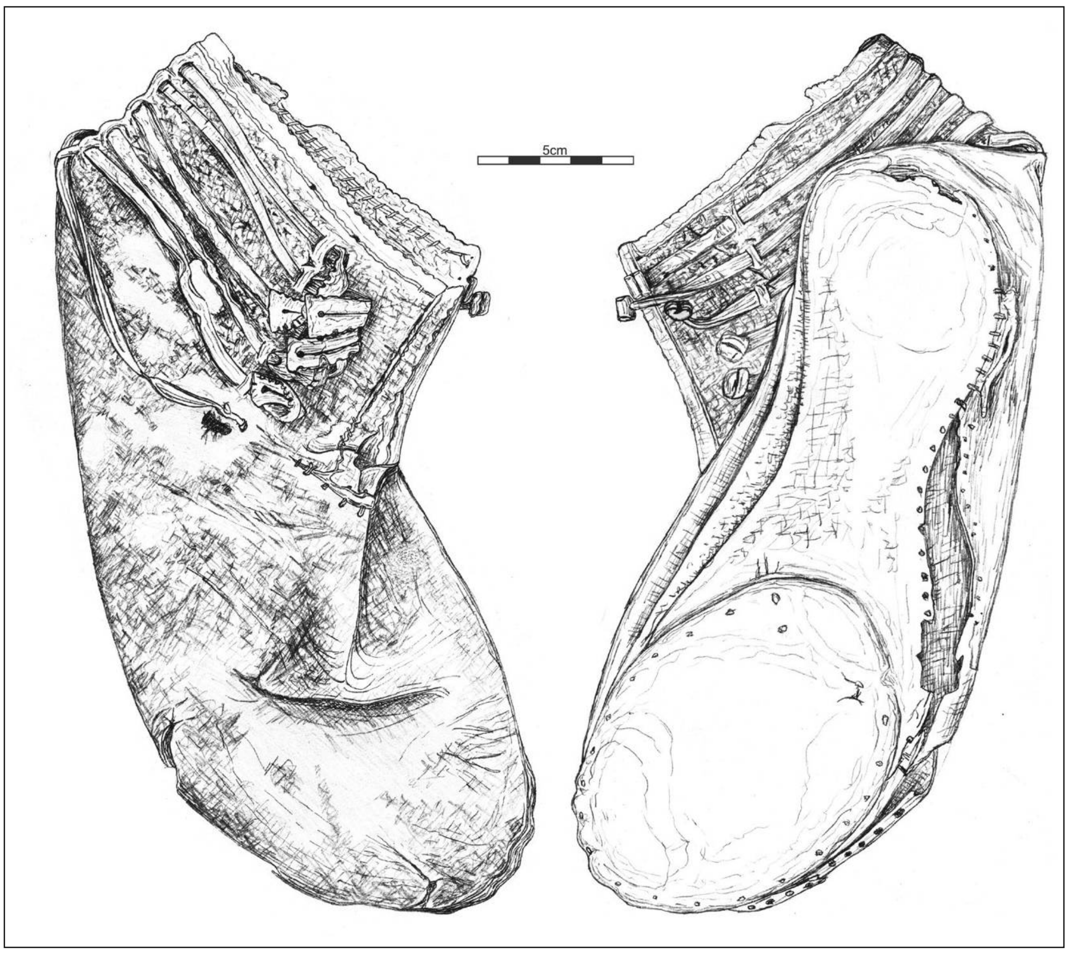


Figure 12.21. Complete right shoe, moccasin type, LE0342, No. 52.







Above left:
Figure 12.22. Complete left shoe of a moccasin type, LE0346, No. 53.

Above right:
Figure 12.24. Complete sandal, LE0367, No. 52.

Left:
Figure 12.23. Complete ankle boot, LE0354, No. 54.

left hand side from inside the left fasteners to the base of the heel with a triangular piece to allow flexibility around heel. The sixth left hand eyelet is missing. A row of back stitches runs along the top edge and down either side of the front opening. There is a slight overlap of the right hand side over the left. The upper edge has a trimmed decorated edge. 250 x 90 mm [LE0354 from Tr. 13 (5515)].

55. Sandal. (Fig. 12.24). Complete sandal. The main body of the sole is made of three layers of leather, each layer approximately 3 mm thick. There is an extra piece at the heel which is of equal thickness. The top layer appears to have been carved out to allow an inner sole to be dropped in, and this is made of natural animal skin, possibly camel, with the fur layer uppermost. This leaves a plain edge around the perimeter of the sandal. This inner layer is cut around the area that holds the ears. All of the layers have been shaped to provide a decorative point at the centre front of the sole. There is a single line of small stitches down the centre of the sandal with the stitches running parallel to each other. At the forepart of the sole the top layer shows evidence of two raised areas with slits at either end that correspond with the decorative toe hold. These may have contained some type of fastening from the toehold to the sole. The layers are stitched together around the perimeter of the shoe using a cotton type 2-ply twine of yellow and blue. A double row of stitches is visible around both the toe and heel providing reinforcement. There are two slits which are 35.5 mm wide, towards the centre of the lower layer through which the strap for the ears passes. In the upper layer the slits are towards the outer edge and are 40 mm wide. The strap which forms the ears is 33.3 mm wide and has two slits and rounded ends. The strap which passes around the heel and through the decoration that is used as a toe strap had been broken, instead of being repaired the strap had been held firm by passing it through the ear on the right hand side and then wrapping it round, on the left hand side. The broken ends of the strap were both put through the slit of the ear and held in place by a single large stitch passing through both pieces of leather and thus securing it to the ear. The leather 'rope' that passes through the ears is sewn together by placing the leather over some fibre to create a rounded effect then sewing the edges together with a series of tiny stitches, using a lock stitch and two fine cotton threads. The heel of the rope has been worn down indicating that the strap was never fixed in place and the person put his heel on the strap. The toe hold is made of very fine leather thonging worked into a four-strand plait, joined with other thongs to provide a decorative panel which is then attached to the round strap with a series of small knots. 240 x 90 x 13 mm [LE0367 from Tr. 13 (5518)].

Parts of shoes

56. Sole of shoe. (Fig. 12.25). Left foot. Twelve layers of fine leather are sewn together with a series of fine leather thonging to form a very thick sole. The layers are sewn together with a series of stitches using fine thonging with some of the thongs knotted at the ends. Around the perimeter is the evidence of a double row of a series of small stitches. 175 x 69 x 12 mm [LE0026 from Tr. 2B (1005)].

57. Sole of shoe. This consists of an insole and 13 further layers of leather. These are sewn together with a series of stitches using very small diagonal incisions, sewn in parallel lines approximately 20 mm apart. 136 x 55 x 24 mm [LE0034 from Tr. 2B (1502)].

58. Sole of shoe. There are six layers of leather forming the sole of a sandal sole, the two lower layers cut to incorporate the ears. The ears are roughly shaped with simple holes. The stitch pattern on the low layer shows three rows of stitching two on either edge and one down the centre. The stitches average 3 mm long and are 20 mm apart. This lower layer appears to have been attached later as a repair. The main part of the shoe has stitches closer together and more substantial pieces of thronging. 134 x 137 x 13 mm [LE0035 from Tr. 2B (1007)].

59. Sole of shoe. Right shoe. Insole and one layer sewn around the edge with a series of small thong stitches. Two slits at the front of the sole show evidence of a toe strap. The lower layer shows animal hair [LE0054 from Tr. 2B (1530)].

60. Sole of shoe. Insole and five layers stitched around the perimeter and down the centre using slits and thronging. 154 x 92.4 x 14.3 mm [LE0056 from Tr. 2B (1508)].

61. Sole of shoe. Insole and seven layers of leather with the remains of ears on four of the layers. There are two slits at the forepart of the shoe for the toe strap. There is a double row of stitches around the perimeter of shoe on the lower layers but not on the insole [LE0093 from Tr. 2B (1507)].

62. Sole of shoe. Insole and 12 or 13 layers sewn together using thonging. The stitches around the perimeter are widely spaced. There are four transverse rows of stitches across the shoe and a single round flat headed iron tack in the sole. 153.9 x 71.6 x 35.8 mm [LE0138 from Tr. 2B (2001)].

63. Sole of shoe. The sole comprises of a single layer of leather with central line of stitching. 68.3 x 99.3 x 2.9 mm [LE0219 from Tr. 2B (2307)].

64. Sole of shoe. Insole and 13 further layers showing shape of shoe. Some stitching around the perimeter using running stitches and leather thronging. 180 x 70.7 x 44.9 mm [LE0110 from Tr. 2C (1025)].

65. Sole of shoe (Fig. 12.26). Left foot. Insole and three layers which form the sole of a sandal including the shape of the ears. There are two slits at the toe of the sandal with strip of leather still *in situ* indicating where the toe strap would have been. It is sewn just inside the edge of the sandal with series of palm fibre stitches [LE0132 from Tr. 2D (1255)].

66. Sole of shoe. A single piece of shaped leather with a distinctive stitch pattern. It is stitched around the perimeter and also down centre line using running stitches and fine thronging [LE0133 from Tr. 2D (1255)].

67. Sole of shoe. The insole heel section shows a particular stitch pattern of double stitches around the heel using

Figure 12.25. Sole of a shoe, LE0026, No. 56.

Figure 12.26. Insole of a sandal, LE0132, No. 65.

thronging [LE0157 from Tr. 5 (3026)].
68. Sole of shoe. Insole plus one layer is cut very naively and sewn together with a series of stitches using a 'blue' fibre. There is one iron shoe tack in the centre of the heel. 50.5 x 55 x 8.9 mm [LE0181 from Tr. 5 (3107)].
69. Sole of shoe with ears. The main part of a sandal. This comprises of four layers of thick hide. Three of the layers are approximately 5 mm thick with the top layer 2.6 mm thick. The bottom layer had attached ears; one has been re-attached with two large headed tacks one of which is squared headed and the other round. The ear has a circular hole 10 mm in diameter. The sandal layers are sewn together using fine natural fibre and held together using small tacks. A series of incised lines are present on the ears and the lower layer. 154 x 76.1 x 14.8 mm [LE0238 from Tr. 8A (8250)].
70. Sole of shoe with ears. There are five layers of leather with the ears on the middle layer. There is a strap passing

through the layer with the ears. The sole is stitched around the perimeter and down the centre with series of small running stitches. A section of triangular leather at heel is tucked into the lower layer secured by large running stitches using fine thonging. There is one metal tack in the sole [LE0264 from Tr. 8A (8251)].

71. Sole of shoe. Right Foot. A large fragment of the sole is attached to the upper using neat and even lock stitch and fibrous twine [LE0243 from Tr. 8A (8251)].

72. Sole of shoe. Right Foot. There are four layers of thick leather (4.5 mm) sewn round with a double bank of fine stitches through three of the layers. A possible toe strap fixing has been repaired with a patch and large running stitches [LE0265 from Tr. 8A (8251)].

73. Sole of shoe. Right foot. This is from a large shoe worn through at both at the heel and the toe comprising of an insole and one layer (1.9 mm thick) sewn together using fibre thread and lock stitch. 250 x 91.6 mm [LE0258 from Tr. 8A (8250)].

74. Sole of shoe with ears (Fig. 12.27). Sole of shoe with two ears made of four layers, the lower and upper c. 4.5 mm thick and the inner pieces c. 2.3 mm thick. These have been stitched together using small diagonal pairs of stitches situated within 15 mm of the perimeter of the shoe. At the toe of the shoe are a series of large overcasting stitches using a soft fibrous twine. The holes in the ears are oval. The heel is worn down and the shoe split just in front of the heel. One of the ears has been stitched back to the sole using the soft fibrous twine. 220 x 85.9 x 14.6 mm [LE0309 from Tr. 13 (surface)].

75. Sole of Shoe with ears (Fig. 12.28). Right foot. Two thick (3.3 mm) shaped pieces of leather incorporate the ears. They are sewn together with a double row of parallel stitches and enclose four narrow pieces of (possibly) felt that fit within the stitching and provide a padded area. The top piece has only a single row of parallel stitching. A narrow piece of leather is passed between two slits with remnants of the toe strap; this piece has a zigzag finish that may not be part of the original design. The ears with circular holes, have tooled lines towards the sole. 245 x 93 x 8.7 mm [LE0339 from Tr. 13 (5515)].

76. Sole of shoe with ears. Possible right foot. The sole is made of three layers of leather; the top layer is shaped with ears with circular holes. The second layer is also shaped to contain the ears but only passes under the heel area providing an extra level at the seat of the sole. The layers are stitched together through all layers with a series of three lines of running stitches using narrow thonging (3 mm wide). There is a central row of stitching with a single row down either side of the shoe. The stitches vary in length from 1.7 to 3.9 mm and there is an extra row of stitching on the outer forepart of the shoe. 175 x 80.6 x 5.8 mm [LE0359 from Tr. 13 (5550)].

77. Inner sole. A piece of compressed cotton fabric with the shape of a heel of a shoe. Possibly used as inner sole. 73.7 x 54.0 x 4.2 mm [LE0368 from Tr. 2B (2319)].

78. Shoe fragment. The toe, waist and heel part of a moccasin type shoe. The welted seam down the centre front passes under the foot and finishes well past the toes. The stitching goes through the inner sole and lining. Down the inside of the heel an extra piece of leather is stitched and folded over to cover an oval thicker piece which has taken the shape of the heel. There is a trim around the perimeter of the shoe which is sewn in place using a plain closed seam, folded over and stitched into place using a series of small hemming stitches [LE0153 from Tr. 5 (3026)].

79. Shoe fragment. Four layers of folded leather sewn together with a series of twine stitches and held together with several small metal tacks (5 x 7 mm). All the leather is folded the same way and the tacks appear to be on the outer edge. 73 x 11 x 12 mm [LE0002 from Tr. 1 (surface)].

80. Shoe fragment. This comprises if two full layers with

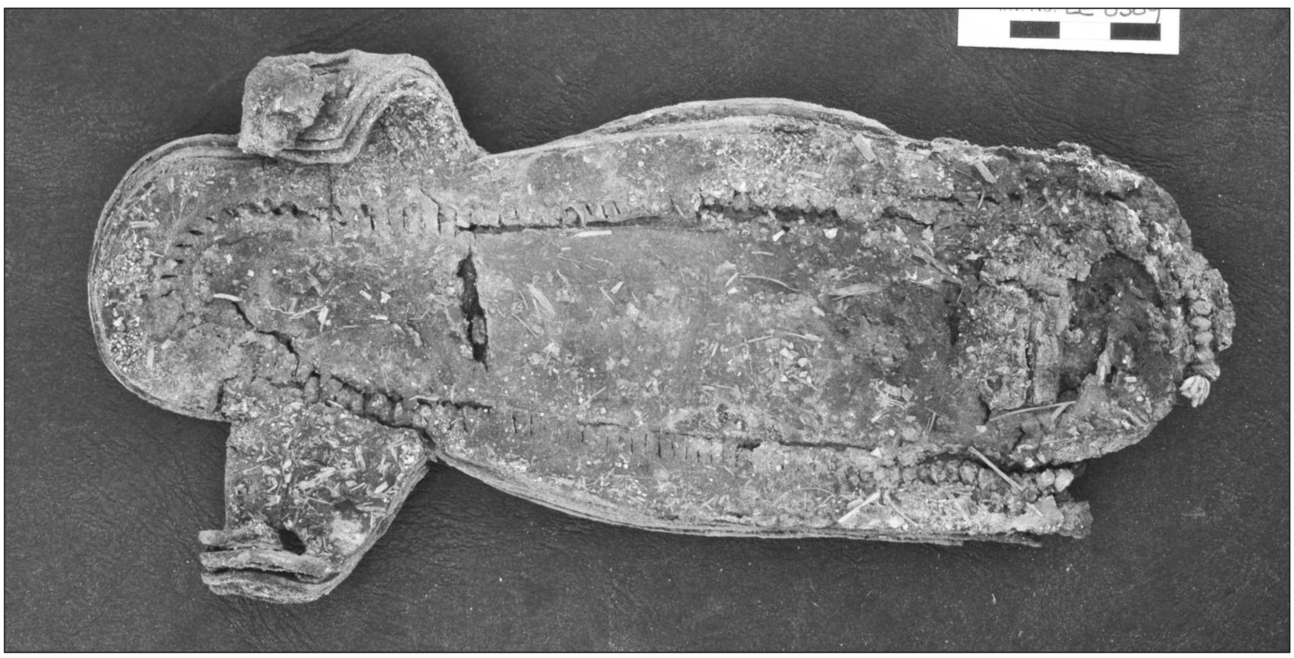


Figure 12.27. Sole of a shoe with ears, LE0309, No. 74.

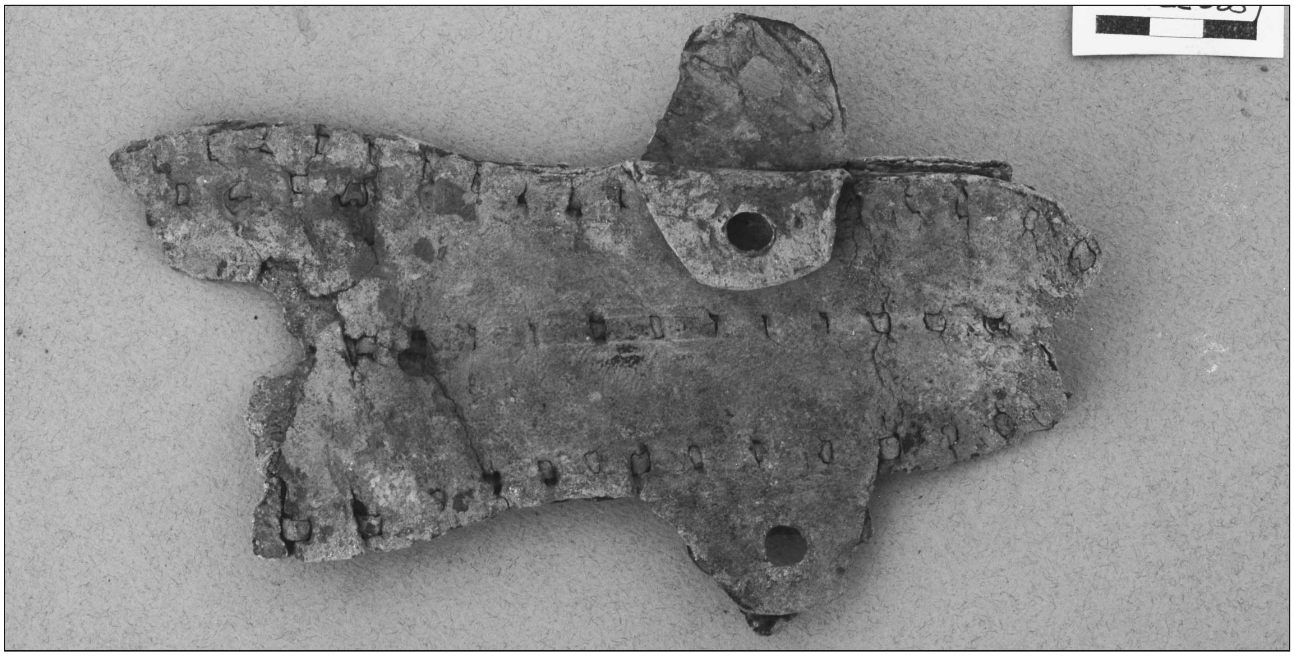


Figure 12.28. Sole of a shoe with ears, LE0339, No. 75.

a half layer on top. There appears to be reinforcing at the front. A series of two stitches down the middle and large thonging stitches are holding the half piece in place. This could be evidence of repairing the shoe. 192 x 99.8 x 12.8 mm [LE0312 from Tr.13 (surface)].
81. Shoe fragment. A shoe upper with one cut edge. This is a piece of fine soft leather with a series of stitches. 70.5 x 78.9 x 1.1 mm [LE 0317 from Tr. 13 (5502)].
82. Shoe fragment. Part of a very soft leather shoe, possibly moccasin type, with the upper and sides shaped. Around one edge the trim is sewn using a plain closed seam then folded and hemmed into position using very neat stitches which do not show [LE0337 from Tr. 13 (5522)].
83. Shoe fragment. Forepart of moccasin type shoe. This is a rounded shape with a plain closed seam. The trim around the edge is folded over and stitched close to the edge using tiny twine stitches. 110.9 x 111.5 mm [LE0268 from Tr. 8A (8251)].
84. Shoe fragment. The toe part of a moccasin type shoe. Two pieces are sewn together with an inset seam to form the front of shoe. This is edged with a narrow strip containing length of twine, folded over and stitched into place. This is sewn to a single piece of the sole and lined with an inner sole. 90.2 x 124.7 x 1.8 mm [LE0253 from Tr. 8A (8251)].

Detached ears
85. Detached ear. A round ended ear with two vertical slits 17.9 and 19.5 mm long. There is a piece of thonging stitched through at the base of the ear with one end tied in a simple knot. 80.4 x 25.0 x 2.2 mm [LE0088 from Tr. 2B (1578)].
86. Detached ear. A round ended piece of hide with circular hole (16 x 12 mm) to which is attached, by a single stitch, a small triangular piece of leather. 52 x 47 x 4 mm [LE0036 from Tr. 2C (1012)].
87. Detached ear. A round ended single piece of leather with two vertical slits 20.4 and 20.5 mm long. 43 x 29.4 mm [LE0037A from Tr. 2C (1033)].
88. Detached ear. Two pieces of roughly cut hide with square hole joined together by a narrow strip of leather attached to the base of the ear with chain stitching. 47 x 52 x 4 mm [LE0037B from Tr. 2C (1033)].
89. Detached ear. Five layers of leather with a central hole bound and stitched with series of running stitches using thonging. There is a strip of leather 5 mm wide bound around the base of the ear and stitched into position using thronging. 47 x 47 mm [LE0037C from Tr. 2C (1033)].
90. Detached ear. A single piece of shaped leather with a circular hole (8.5 mm in diameter). This was either broken or cut off a sandal. 45.7 x 38.5 x 4.5 mm [LE0304 from Tr. 13 (surface)].
91. Detached ear. A piece of shaped leather with two worn slits (16.8 / 16.0 mm) used for holding the strap. This was probably torn off a sandal. 63.4 x 35.3 x 2.7 mm [LE0314 from Tr. 13 (surface)].
92. Detached ear. Two different shaped pieces of leather placed together and stitched at the base and with a large circular hole (8.9 mm in diameter). This was either broken or torn off a sandal. 62.0 x 47.5 x 3.4 mm [LE0320 from Tr. 13 (5508)].
93. Detached ear. A single piece of leather with a damaged circular hole (13.6 in diameter). This was either broken or torn off a sandal. 50.7 x 44.8 mm [LE0336 from Tr. 13 (5522)].
94. Detached ear. A shoe strap with two slits (17.4 mm long), probably an ear. This was probably torn off a sandal. 76.7 x 25.1 x 3.1 mm [LE0344 from Tr. 13 (5524)].
95. Detached ear. A shaped piece of cut leather with two slits (19 / 19.2 mm long). This was probably torn off a sandal. 41.5 x 26.5 x 2.4 mm [LE0262 from Tr. 8A (8251)].

Water bags

96. Spout. Part of a leather container used for carrying liquids. The main piece of leather has been gathered together and a strip attached (21.4 mm wide) by a double row of even thong running stitches to form the neck. 73.1 x 43.2 x 17.5 mm [LE0094 from Tr. 2B (1513)].

97. Spout. A piece of folded and pleated leather bound with a strip and joined with a series of small thong stitches. It is sewn round with four rows of large stitches. Part of leather water bag. 87.9 x 43.4 x 15.8 mm [LE0307 from Tr. 13 (surface)].

98. Spout. A piece of leather gathered together with a band of leather which is fastened around and held in place with a series of thong running stitches. Smaller thong stitches hold the two ends of the band together. 44.7 x 34.9 x 15.5 mm [LE0318 from Tr. 13 (5501)].

99. Handle. A piece of folded leather is rolled and sewn together with a series of irregular stitches using narrow thonging 140 x 18 mm [LE0003 from Tr. 1 (surface)].

100. Handle. A piece of leather rolled, bound and then covered is sewn together to form a handle. The inner roll is bound with a fine piece of leather and sewn into position. The outer covering is folded under and sewn using a series of small running stitches using fine leather thonging. On the opposite side to the stitching is a series of holes. Around one end is a series of long running stitches, and at the other end are a series of small thonging stitches holding the edging in place. 124 x 36 x 24 mm [LE0031 from Tr. 1 (surface)].

101. Handle/ Spout. A piece of leather gathered together and tied around with textiles and cordage including 2-ply soft cotton twine and 3-ply white soft cordage with a single knot at the end. 66.1 x 22.9 mm [LE0095 from Tr. 2B (1513)].

102. Handle. A loop of leather which is rolled and folded and then stitched together to form a loop. There is a large thonging stitch at the base of the loop. 63 x 23 x 10 mm [LE0014 from Tr. 2B (surface)].

103. Handle. A simple loop which consists of a piece of folded leather and stitched using thonging and running stitches. It is then folded in half and dropped into a seam and stitched into place [LE0085 from Tr. 2B (1507)].

104. Handle. A wrapped round handle. A piece of rolled leather is stitched in place with a further piece of leather placed tightly around it. This piece of leather is stitched through the middle and around each end using thonging stitches [LE0086 from Tr. 2B (surface)].

105. Handle. A leather bag with basketry rim. A circle of palm fibre is bound together with further palm fibre. A leather lining has been attached by running stitches and chain stitches. 155 mm in diameter [LE0144 from Tr. 2B (2007)].

106. Handles (Fig. 12.29). Two handles with associated leather. Shaped palm fibre has been covered with leather, which has been folded and slotted into the rim and then stitched in place with large thong stitches. A single piece of leather passes through the loop and is attached to the rim with large running stitches. The rim is made of palm fibre covered with leather [LE0150 from Tr. 2B (2007)].

107. Handle. A wrapped round handle. A piece of leather neatly wrapped around gathered leather to form a handle. It is held in place with two rows of back stitching in fine thonging. There are smaller running stitches holding either end in place. 84.1 x 24.9 x 8.7 mm [LE0184 from Tr. 2B (2113)].

108. Handle. A wrapped round handle. There are several pieces of leather folded with a piece wrapped round and sewn into position with two rows of large running stitches. There are smaller stitches holding one end in place. 27.3 x 92.8 mm [LE0220 from Tr. 2B (2307)].

109. Handle. Handle with associated leather. Shaped palm fibre is covered with folded leather which is attached to a possible water bag. A single piece of leather is passed through the loop and sewn into position using narrow thronging [LE0118 from Tr. 2C (1044)].

110. Handle. A folded piece of leather with a single turn knot at one end. It is stitched using narrow thonging which passes through the handle in a criss-cross pattern. Two pieces of fine thonging are used on the top section of the handle. 106.6 x 14.6 mm [LE0050 from Tr. 3 (2004)].

111. Handle. The handle of a container approximately 240 mm in diameter. Lengths of palm fibres are bound together using flat lengths of palm. This is then covered with leather and sewn into place with a series of back stitches. The thonging used for the stitches has been split to allow the stitch to be passed through the split. Each stitch is c. 20 mm long. This rim must have been attached to the body of

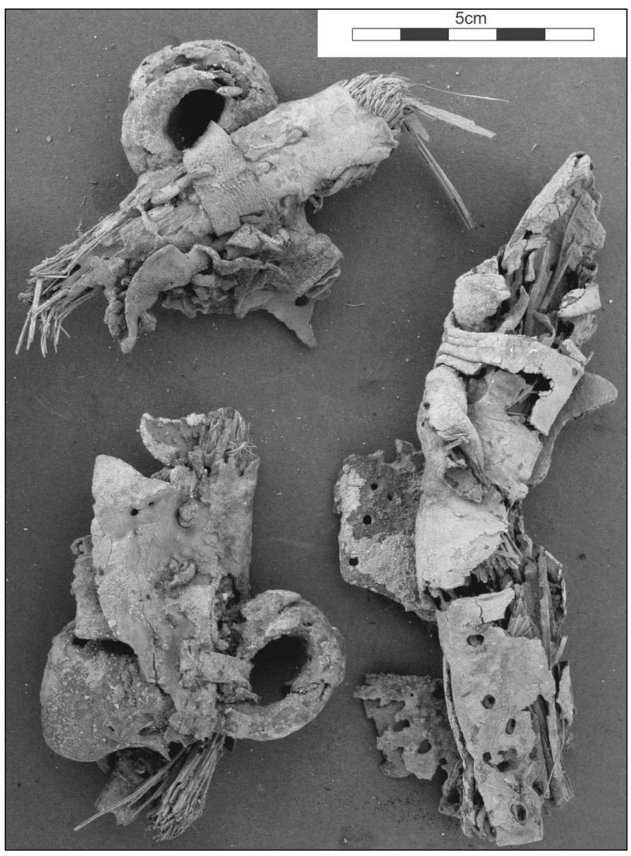


Figure 12.29. Two handles and associated leather from water bag, LE0150, No. 106.

the container as lengths of torn hide are evident (see No. 112). 30.5 x 14.7 mm [LE0323. Tr. 13 (5522)].

112. Handle. Two pieces. Strands of palm fibre fastened together and covered with leather. One piece with a handle is constructed of a rolled up piece of leather stitched into place with a series of large stitches. The other piece is constructed in the same manner as No. 111. Both pieces have been sewn using 'split' stitches (see No. 111) [LE0327 from Tr. 13 (5520)].

113. Handle. Folded and stitched piece of leather with patches, sewn with a series of thonging stitches. A piece of leather which has been re-used to make a rolled handle. 203 x 42 x 7.6 mm [LE0353 from Tr. 13 (5518)].

114. Handle. A piece of soft skin folded over to hold a further piece of skin in position and sewn in place using narrow thonging to stitch a double row of back stitches. Two slits are cut in the top of the fold and two narrow (11.3 mm) strips folded in half and inserted to create loops. These are held in place with a series of back stitches around the raw edges [LE0361 from Tr. 13 (5519].

115. Handle. A plaited handle. Six strands of narrow leather are plaited around a central core of palm fibre. The strands vary in width from 3.3–7.9 mm. At each end a single piece of leather has been wrapped round, over lapped and sewn into place with a series of thonging stitches and over sewing. The handle appears to have been cut from the original item. 146.1 x 11.0 x 15.0 mm [LE0362 from Tr. 13 (5519)].

116. Handle. A loop is attached to a gathered piece of leather with a narrow piece passed through the loop and sewn with a series of thonging stitches [LE0241 from Tr. 8A (8251)].

117. Handle. A folded piece of leather with 'criss-cross' tooling on one side, with thonging running stitches along one side. It is bound and sewn at one end. 145.5 x 14.7 x 6.4 mm [LE0255 from Tr. 8A (8251)].

118. Handle or possibly association with saddle (Fig. 12.30). Large piece of hide with two decorative strips which are used to form a handle. The decorative strips are made of a double thickness of hide attached with neat even running stitches on the outside with a few knots on the inside. The triangular handle is made by rounded lengths of leather neatly wrapped around and sewn with a series of larger thronged stitches. It is difficult to tell if the handle has been attached or is part of the decorative strips. This is part of a piece of quality leather work [LE0251 from Tr. 8A (8257)].

Miscellaneous

119. Patches. A variety of patches from Islamic contexts were also noted including possible shoe repairs, many of them circular in shape, numerous were double sided, and others were attached either side of the object under repair. They were recovered from a range of contexts and were rarely larger than 220 mm usually more like 50 mm in size. They were invariably attached to the object being repaired by running stitches or fine thonging stitches.

a) LE0308 from Tr. 12 (surface).
b) LE0250 from Tr 8A (8257).
c) LE0032 from Tr. 1 (surface).
d) LE0033 from Tr. 1 (surface).

120. Straps. Some eight straps were also located in Islamic contexts, some with fasteners attached, others believed to be part of belts. Some were decorated with small slit holes and incised decoration, and others had eyelets. They were recovered from Trench 13 and reached a maximum length of 250 mm.

a) LE0319 from Tr. 13 (5508).
b) LE0310 from Tr. 13 (surface).
c) LE0305 from Tr. 13 (surface).
d) LE0338 from Tr. 13 (5513).
e) LE0364 from Tr. 13 (5519).

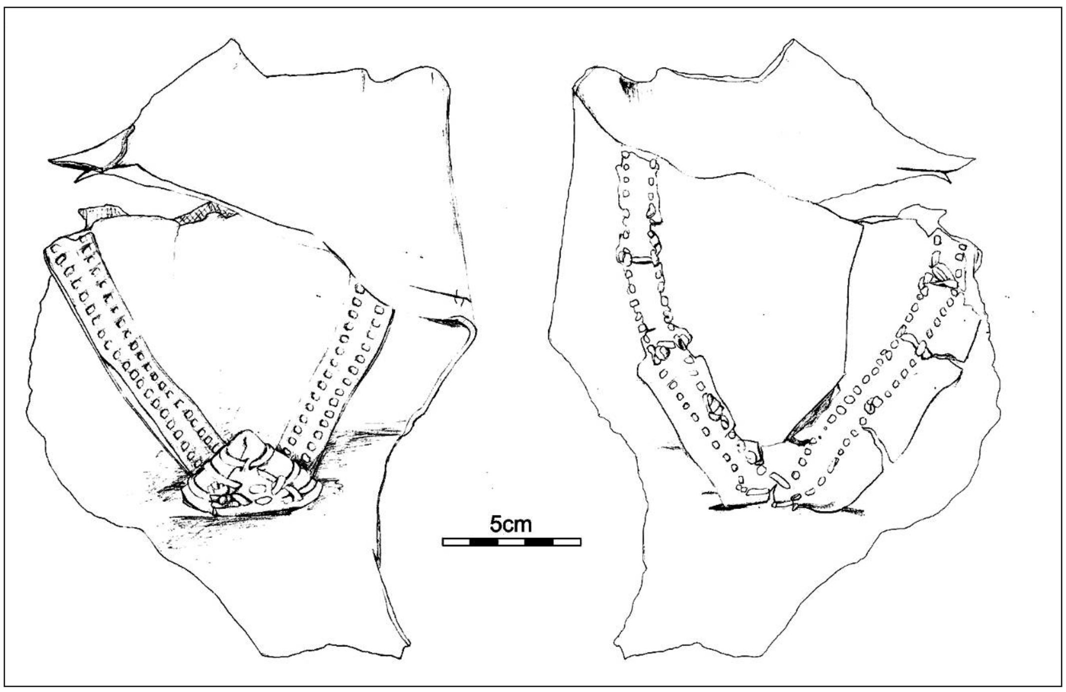


Figure 12.30. Leather fragment, LE251, with handle, found in association with wooden saddle cinch.

f) LE0330 from Tr. 13 (5520).
g) LE0358 from Tr. 13 (5550).

121. Plaits. Six plaits were recovered from Trench 8 and Trench 13. Many of them were decorated but were very thin up to a maximum 4 mm wide.
a) LE0201 from Tr. 8 (8000).
b) LE0363 from Tr. 13 (5519).
c) LE0311 from Tr. 13 (surface).
d) LE0316 from Tr. 13 (5501).
e) LE0341 from Tr. 13 (5523).
f) LE0357 from Tr. 13 (5550).

122. Trims. Four trims were recorded, three from Trench 13 and one from Trench 8A, secured by running stitches and thonging stitches.
a) LE0360 from Tr. 13 (5550).
b) LE0321 from Tr. 13 (5520).
c) LE0331 from Tr. 13 (5520).
d) LE0255 from Tr. 8A (8251).

123. Edging. Four edging trims were recovered and each consisted of two layers of folded leather and a narrow strip of leather attached using a series of small thonging running stitches.
a) LE057 from Tr. 2B (1526)
b) LE134 from Tr. 2B (2003).
c) LE182 from Tr. 5 (3086).
d) LE331 from Tr. 13 (5520).

124. Decorations. Decorations included buttons, a toggle, a small eyelet, four lengths of plaited leather and a tassle, recovered from a variety of trenches.
a) Button. LE0101 from Tr. 2C.
b) Toggle. LE0356 from Tr. 8.
c) Eyelet. LE0080 from Tr. 2B.
d) Plaited leather. LE0124 from Tr. 2D.

125. Fastners. One fastener was recovered from Trench 8A and consisted of two pieces of leather cut into a series of slits at each end and joined together by lacing the slits together with a single narrow piece fed through each alternate slit and fastened off at one end [LE0257 from Tr. 8A].

13 Worked Faunal Materials

Sheila Hamilton-Dyer

Introduction

Artefacts made using faunal materials are often found in small numbers at archaeological sites, usually of bone or shell and occasionally ivory. It is rare, however, to find objects made from the less durable materials such as horn and, on this site, turtle-shell. Being composed of keratin these, like hair, are rarely preserved. The unusual dry conditions at Quseir al-Qadim have preserved many items that would normally have decayed. Notable are the numerous brail rings made of cattle or ibex horn. These are discussed further in the maritime section (Chapter 15 below) and not detailed below. Apart from these and the extremely rare occurrence of turtle-shell objects, many items are directly comparable to objects reported from Mons Claudianus (Hamilton-Dyer 2001b) and Mons Porphyrites (Hamilton-Dyer 2007b) where more detailed discussions will be found. Shell use is also discussed in Hamilton-Dyer (2003b).

13.1 Ivory

Items of ivory are uncommon, but reveal the working of hippo tusk on the site, at least in the early phase of the Roman occupation, in addition to the more usual Indian elephant ivory (Fig. 13.1). In comparison with the several finished and some part-made ivory and bone gaming dice from Mons Claudianus and Mons Porphyrites, only one was recovered from Quseir, made of ivory of undetermined type. Elephant ivory was used for three bracelets. One of these, FR244, was clearly considered of sufficient value to be carefully repaired by criss-cross sewing with fine woollen thread, not once but five times.

Catalogue:

1. Cubic gaming dice of standard form with spots totalling seven on opposite sides. Incised single-ring-and-dot markings, the three and four deeply incised, the rest shallow. Could be of several ivory types including hippo. Size: 7.5 mm^2 [FR133 from Tr. 6H (4030)] (Fig. 13.1).
2. Part of a large 'ring', probably a bracelet, rest not recovered. Elephant ivory angled and turned line design [FR149 from Tr. 7A (10003)] (Fig. 13.1).
3. Fragment of plain bracelet of elephant ivory. Size: Width 6.4 mm, Thickness 2.8 mm [FR180 from Tr. 8 (8000)] (Fig. 13.1).
4. Elephant ivory bracelet, broken and mended in five places with string. Decorated with three sets of incised ring and dot in black [FR244 from Tr. 8A (8251)] (Fig. 13.1).
5. Hippo tusk sawn off-cut (root) in pieces. Size: Thickest section 7.6 mm [FR154 from Tr. 7A (10003)].
6. Sawn tusk tip, probably hippo. Size: 28 mm x 17.3 mm x 11.7 mm [FR235 From Tr. 7A (10014)].
7. Elephant ivory sawn off-cut [FR362 from Tr. 12 (7339)].
8. Elephant ivory sawn off-cut [FR363 from Tr. 12 (7327)].
9. Elephant ivory sawn off-cut [FR364 from Tr. 6P (4105)].

13.2 Bone

Items made from mammal bone include those with minimal finishing such as pegs, awls and tags as well as those more extensively finished such as dress pins (Fig. 13.2). One of these FR199 is finely carved in the form of a hand holding a ball. Sometimes it is possible to tell which species and element they are from, such as sheep astragalus game pieces FR311, but in many cases they could be identified only as large ungulate limb shaft. Several items are clearly made from turtle bone, a most unusual find e.g. FR91, FR100. Even rarer is the sawn section of dugong rib FR243. This is not butchery waste as saws were reserved for specialist use, including bone and horn working. Most of the worked bone items come from contexts of definite Roman date, only a few are from Islamic or possibly Islamic contexts, such as the two sheep bones tied with woollen thread, FR313 and FR314. These might have been toys or divination aids.

Catalogue:

10. Small piece of turtle carapace with rope attached through central hole, line/net weight or float? Weight 11g. Size: Hole Diameter 9.2 mm, Thickness of bone 7.5 mm, Max width 42.5 mm [FR100 Tr. 1D (300)] (Fig. 13.2).
11. Knob, finial for dress pin? small. Size: Height 14.5 mm; Diameter Upper 8.2 mm, Lower 8.5 mm, Between 7.0 mm, Base 4.5 mm [FR150 from Tr. 5 (3014)] (Fig. 13.2).
12. Canine tooth pendant ?donkey ?camel, hole drilled midway, polished. Size: Length 46.1 mm, Hole Diameter

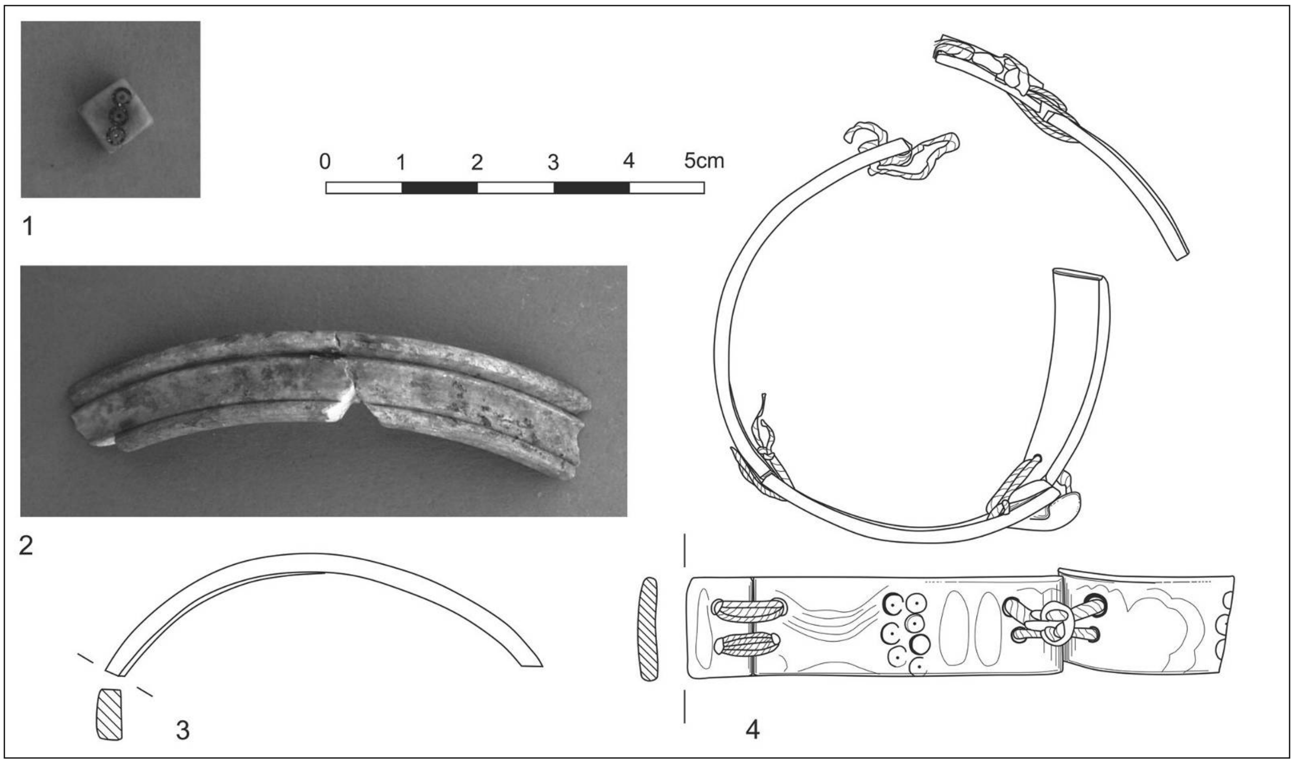
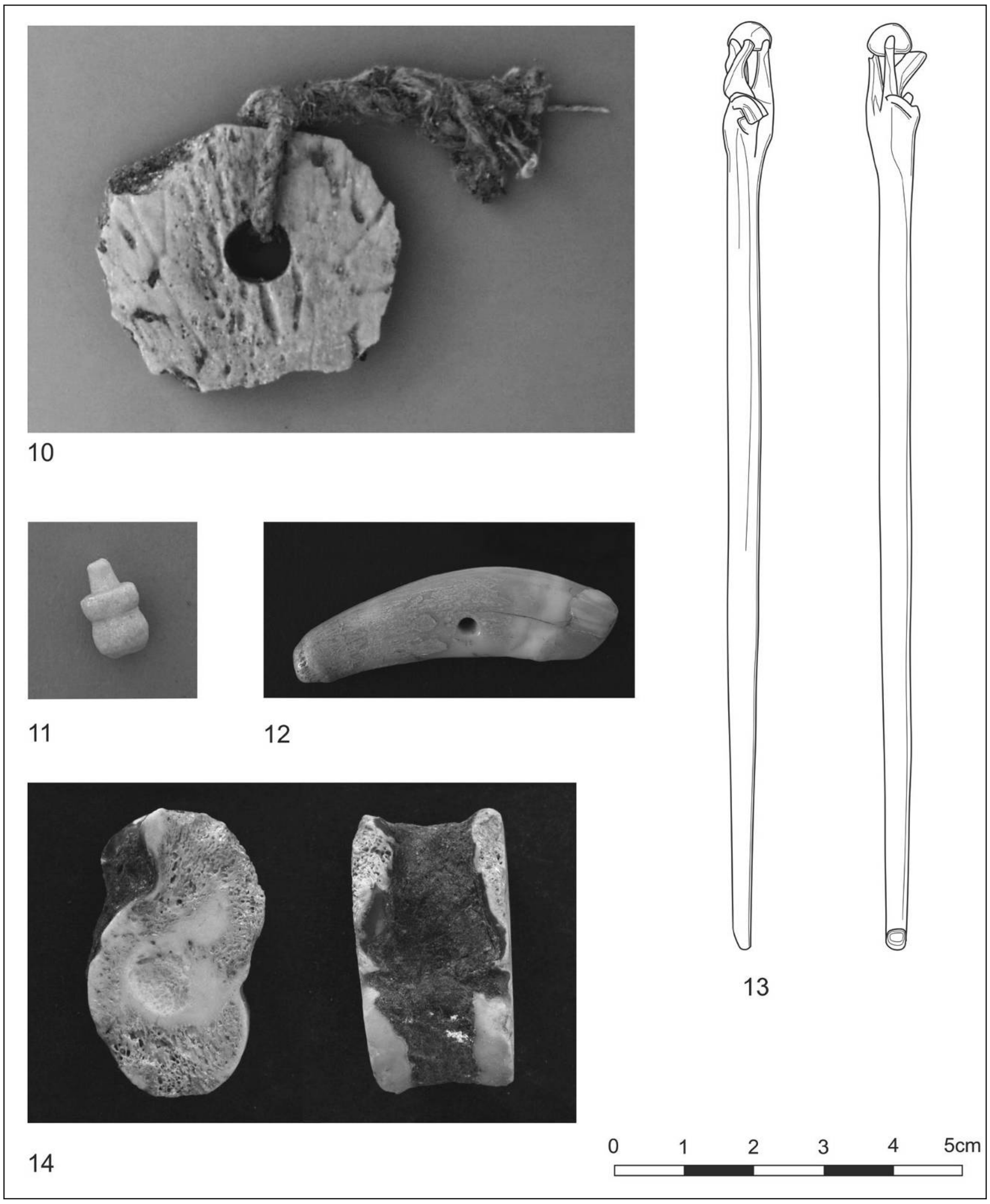


Figure 13.1. Ivory. Nos 1-4.

2.4 mm [FR310 from Tr. 14B (14527)] (Fig. 13.2).
13. Dress/hair pin, complete except for tip broken at end. Hand holding ball. Triangular cross section at carving. Size: Length 133 mm, Max Width 8 mm [FR199 from Tr. 6L (4075)] (Fig. 13.2).
14. Sheep/goat astragalus, left, large. Gaming piece with sides flattened and ?pitch found in middle. Size: Height 38 mm, Width 20.3 mm, Depth 22.3 mm [FR311 from Tr.13 (5509)] (Fig. 13.2).
15. Section of Dugong rib, sawn. Size: 70 mm x 28 mm x 18 mm [FR243 from Tr. 7A (10011)].
16. Sheep left astragalus with lateral face ground flat. Probable gaming piece [FR123 from Tr. 2B (1573)].
17. Scoop of cattle or camel limb bone shaft [FR141 from Tr. 7A (10003)].
18. Plate, label, end of comb? With three holes. Size: Diameter Complete Hole 6.5 mm, Thickness 4.8 mm [FR148 from Tr. 7A (10003)].
19. End of peg, awl. Burnt, whittled out of camel? limb shaft. Size: Max Thickness 9.3 mm x 8.9 mm [FR151 from Tr. 7A (10003)].
20. Peg, broken, probably from camel limb shaft. Size: Diameter Shaft 10.9 mm, Knob 15 mm [FR152 from Tr. 7A (10003)].
21. Proneural plate (cf. green turtle) with drilled hole. Size: Diameter Hole 7.8 mm [FR153 from Tr. 7A (10003)].
22. Part of broken ?label/tag probably made from rib. Polished. Size: Thickness 2.8 mm [FR177 from Tr. 7A (10011)].
23. Awl/peg/pin beater, fragmented probably large ungulate limb shaft, e.g. camel [FR178 from Tr 7A (10012)].
24. Complete (recently broken) large awl/peg of ?camel limb shaft. Size: Max Thickness 11.4 mm [FR179 from Tr. 7A (10012)].
25. Scoop/chisel probably camel limb shaft [FR187 from Tr. 7A (10012)].
26. Scoop/chisel probably camel limb shaft [FR188. From Tr. 7A (10012)].
27. Scoop/chisel probably camel limb shaft (Fragment recent break) [FR189 from Tr. 7A (10012)].
28. Scoop/chisel probably camel limb shaft. (Fragment recent break). With trace of red paint [FR190 from Tr. 7A (10012)].
29. Spatula? probably of large ungulate rib [FR191 from Tr. 8 (8022)].
30. Tube formed from a sheep/goat right tibia shaft, may have had thin 2-ply threaded through. Slightly polished. Size: Length 104 mm [FR192 from Tr. 8 (8066)].
31. Counter with central hole, countersunk on domed side. Size: Diameter 26.8 mm, Hole 3.3 mm; Max thickness 6.9 mm [FR193 from Tr. 6D (4070)].
32. Half of a turned bone ring. Size: Diameter 28 mm, Width 5.9 mm, Thickness 7.1 mm [FR194 from Tr. 6D (4070)].
33. Fragment of turtle rib plate with sawn edge and drilled hole. Size: Diameter Hole 7.9 mm; 56 mm x 42 mm x 7 mm [FR234 from Tr. 7A (10020)].
34. Cattle metacarpus ends sawn off, trimmed possibly intended as handle. Size: Length 137 mm [FR236 from Tr. 7A (10014)].
35. Tube made from sheep/goat right tibia with sawn off ends. Size: Length 80 mm [FR237 from Tr. 7A (10014)].
36. Off-cut? of rib? sawn. Size: Length 10 mm, Thickness 4.4 mm [FR238 from Tr. 6H (4080)].
37. Sawn off-cut ?rib. Size: 68 mm x 20 mm x 6.9 mm [FR239 from Tr. 7A (10018)].

Figure 13.2.
Bone. Nos 10-14.



38. Sheep/goat astragalus left. Lateral and medial sides smoothed flat. Probable gaming piece. Size: Length 35.7 mm [FR240 from Tr. 7A (10024)].
39. Pin/needle, blunt end missing. Size: 66 mm x 3.9 mm [FR241 from Tr. 7A (10026)].
40. Sheep/goat astragalus with smoothed lateral and medial sides. Probable gaming piece. Size: Length 6 mm [FR242 from Tr. 7A (10011)].
41. Awl/peg fragment of thick bone ?camel. Size: 60 mm x 12 mm [FR245 from Tr. 7A (10029)].
42. Off-cut? of camel metatarsus shaft, cut and smoothed. Size: 205 mm x 34 mm x 11 mm [FR246 from Tr. 7A (10029)].
43. Off-cut? of ?cattle scapula neck with sawn/smoothed edges. Size: 100 mm x 45 mm [FR247 from Tr. 7A (10029)].
44. Broken object ?latch. Size: 172 mm x 18 mm x 4.6 mm [FR255 from Tr. 6G (4095)].
45. Sheep 1st phalanx with black fine wool thread tied round middle. Size: Length 39 mm [FR313 from Tr. 13 (5524)].
46. Tube formed by shaft of large bird tibia or tarsometatarsus e.g. Egret? Stork? squarish section. Size: 76 mm x 7.4 mm x 5.5 mm, SD 7.3 mm [FR314 from Tr. 6B (4007)].
47. Sheep/goat rib tied to basketry ‘stick’ with pale brown wool [FR318 from Tr. 13 (5520)].
48. Five assorted large mammal limb shaft off-cuts. Not recorded in detail [FR248 from Tr. 7A (10029)].
49. Sawn off-cut, proximal end of donkey metatarsus [FR360 from Tr. 12 (7328)].
50. Sawn off-cut, proximal end of camel metapodial [FR361 from Tr. 7A (10003)].

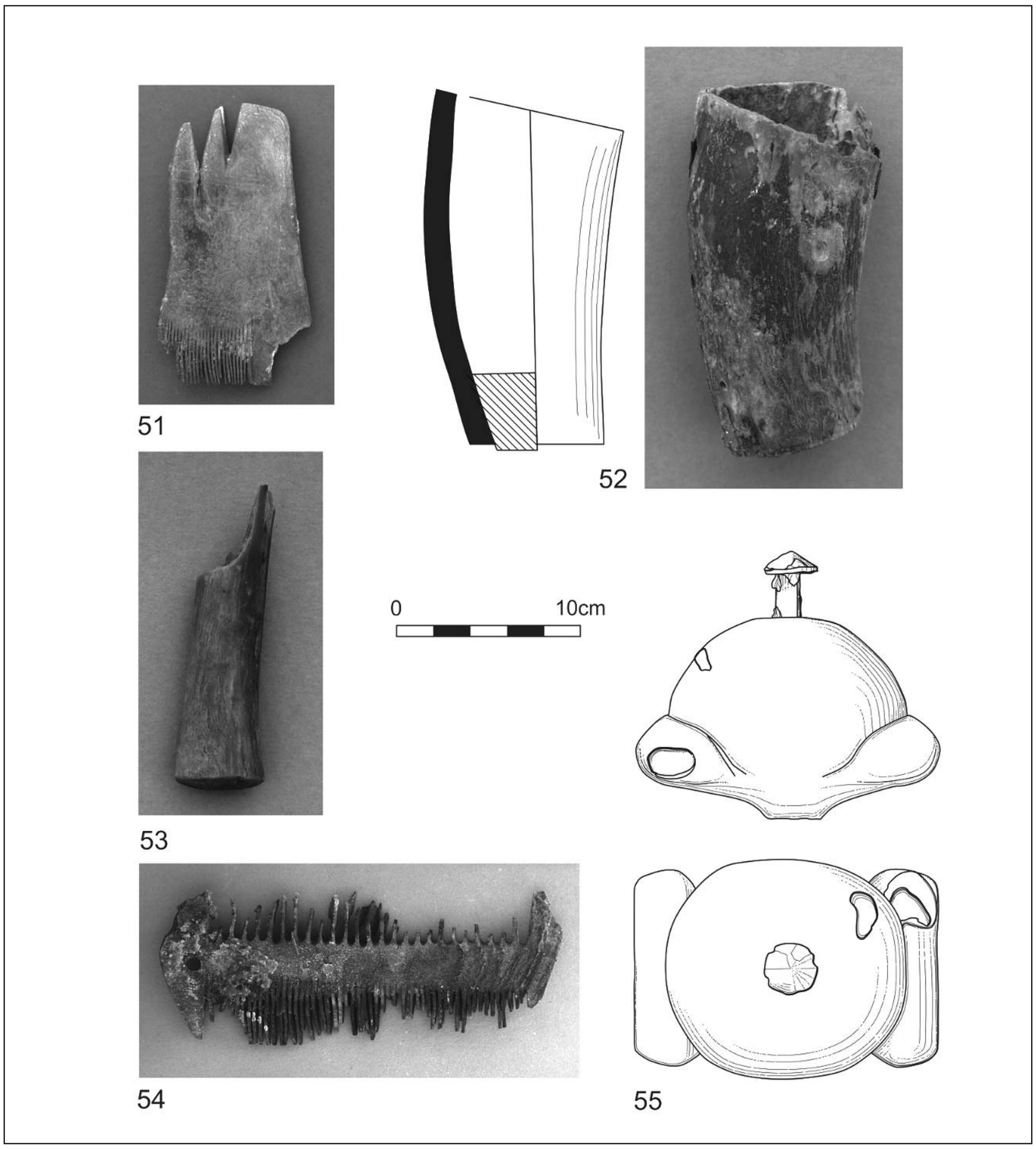


Figure 13.3. Horn. Nos 51-55.

13.3 Horn

Apart from the numerous brail rings, horn objects are not as common as those of bone but they are more frequent than they were at the quarry sites of Mons Claudianus and Mons Porphyrites (Fig. 13.3). There are examples of combs made in horn, normally only reported as being made from bone or sometimes boxwood. One is not of typical Roman style (No. 51) and this is probably Islamic. Cattle horn was used for the drinking cup (No. 52) but other species were also used. Both ibex and gazelle were identified in the worked off-cuts at Mons Claudianus and are likely species here too. One object, probably a handle (FR44), seems to have been made from a different species, perhaps oryx antelope. In addition to the material listed below the bone assemblage contained examples of cattle and goat cranial fragments showing where the horn, and its bony core, had been sawn off and also some sawn fragments of ibex horn. Almost all of the sawn horns and horn cores came from the Roman Trenches 6 and 7A.

Catalogue:

51. Piece of horn formed into a comb, with small teeth at one end and large (two) at the other. The layers of horn have been used for levels of fine teeth. The reverse side is smooth. Size: 72 mm x 44 mm x 3 mm [FR007 from Tr. 2C (1012)] (Fig. 13.3).
52. Horn cup, base plugged with pitch at narrow end, cattle horn. Size: Diameter base 36.4 mm, top 46.4 mm x 51.9 mm, Diameter (internal) base 22.5 mm, Top 38.9 mm x 46.4 mm, Outer curve 95.0 mm, Inner shorter side 75 mm, plug height 21.7 mm [FR041 from Tr. 6B (4008)] (Fig. 13.3).
53. Horn handle (knife?), made from ibex?. Size: 14.8 mm x 19.5 mm, 23.8 at end [FR097 from Tr. 2C (1019)] (Fig. 13.3).
54. Comb with a hanging hole at one end and teeth of two sizes, 25 teeth and 55 [FR170 from Tr. 6J (4040)] (Fig. 13.3).
55. Solid horn object with metal nail/bolt fixed through domed 'top' [FR181 from Tr. 8 (8000)] (Fig. 13.3).

56. Fragment of horn object or off-cut. Horn sawn off at tip [FR042 from Tr. 2B (2008)].
57. Sawn fragment of large cattle horn, perhaps horn cup. Size: Length 105 mm [FR043 from Tr. 6C (4012)].
58. Cylindrical ?handle formed from a very dense dark and nearly straight horn, possibly Oryx or similar. Broken at wide end. Size: Diameter of cut tip 15.3 mm, at widest end 18.1 mm, Length 113 mm [FR044 from Tr. 5 (3005)].
59. Broken horn ?Sheath ?Handle. Size: Max Thickness 11.2 mm, 15 mm [FR124 from Tr. 2B (1530)].
60. Horn tip shaped for ?stopper ?peg. Size: Diameter 15.6 mm, Height 26.4 mm [FR142 from Tr. 6DE (4015)].
61. Fragment of bracelet. Size: Diameter Outer approx 45 mm, Inner approx 38 mm; Thickness Edge 2.0 mm, Centre 3.6 mm; Width 8.3 mm [FR147 from Tr. 5 (3014)].
62. Comb, fragment of one end. Size: 35 mm x 20 mm x 3 mm [FR226 from Tr. 6M (4075)].
63. Horn ring/bracelet broken. Flat, very square edge (not a brail ring). Size: Diameter External 61 mm, Internal 45 mm; Thickness 4.8-5.4 mm [FR312 from Tr. 13 (5520)].

13.4 Turtle-Shell

Turtle-shell, commonly mistakenly recorded as tortoiseshell, is extremely rare from archaeological sites. The material is thin and, although flexible, becomes brittle with age. Like hair, hoof and horn, it is composed of keratin, a type of protein, which is usually destroyed by chemical, bacterial and insect action. The exact species used have not been determined. Some of the turtle bones can be positively identified as green turtle and at least one other species is present in the bone assemblage. In addition to green turtle, hawksbill and loggerhead are also present in the area. Leatherback, however, as its name suggests does not have the hard shell covering of these other species and can be excluded. Almost all of the worked turtle-shell is from Islamic, or probably Islamic, deposits and is mainly the waste of a single activity (Fig. 13.4). Exceptions are use for finger rings and bracelets, in one notable case the bracelet was found *in situ* on a child's skeleton. The main use for the turtle-shell appears to be the mass production of fine, flat rings, possibly used in fishing. The waste pieces include the outer circles and the inner waste disc, these last often showing the central point of the scribe used to mark out the circles. The finished article, of which there are a few broken examples, is not a large thick, pierced, ring like the Roman horn brail rings but is narrow, flat and smaller, of about 2 or 3 cm across. As this is such a rare material to find in any circumstance it is difficult to prove what the end result was intended for; as far as this author is aware there are no published *comparanda*. One possible use, given the coastal nature of the site and the other maritime objects found, is that these are associated with fishing activities. It is possible that they are the slip rings for seine nets, a tough waterproof ring that would allow the encircling rope to be gathered up smoothly when closing the net.

Catalogue:
64. Off-cut, two complete circles removed, thickness measured at ring cuts. Also shows edge of larger ring cut-out. Size: Thickness 3.8 mm [FR082 from Tr. 3 (2014)] (Fig. 13.4).
65. Off-cuts and ring [FR119 from Tr. 3 (2046)] (Fig. 13.4).
  a. Off-cut from large ring. Size: Thickness 3.4 mm.
  b. Ring off-cut. Size: Thickness 1.7 mm.
  c. Centre. Size: Diameter 13 mm, Thickness 3.0 mm.
  d. Size: Diameter 16 mm, Thickness 1.7 mm.
  e. Size: Diameter 14 mm, Thickness 4.6 mm.
  f. Size: Diameter 16 mm, Thickness 3.3 mm.
  g. Ring. Size: Diameter External 43 mm, Internal 24 mm; Thickness 4.3 mm
66. Various ring off-cuts of mixed sizes and part ring [FR120 from Tr. 3 (2024)] (Fig. 13.4).
  a. Off-cut. Size: Thickness 4.3 mm.
  b. Size: Thickness 1.9 mm.
  c. Size: Thickness 1.8 mm.
  d. Size: Thickness 2.5 mm.
  e. Centre.Size: Diameter 18 mm, Thickness 3.1 mm.
  f. Size: Diameter 15 mm, Thickness 4 mm.
  g. Ring. Tapered, widest at base of cut. Size: Thickness 3.4 mm.
67. Flat ring, made of turtle shell. Size: Diameter 60 mm (inside), 6 mm wide x 2 mm deep [FR001 from Tr. 2C (1012)].
68. Flat ring, made of turtle shell. Size: Diameter 40 mm (inside), 4 mm wide x 2 mm deep [FR002 from Tr. 1 (surface)].
69. Finger ring to fit small fingers. Size: 21.5 mm x 17.5 mm x 7 mm [FR011 from Tr. 2D (1254)].
70. Broken ring. Size: 2.5 mm thickness [FR014 from Tr. 3 (2057)].
71. Broken ring. Size: 2.4 mm thickness [FR015 from Tr. 2D (1257)].
72. Broken ring. Size: 3.3 mm thickness [FR016 from Tr. 3 (2004)].
73. Inner waste disc from ring, centre point on one side only. Size: Diameter 14 mm, Thickness 4.2 mm [FR017 from Tr. 3 (2004)]
74. Outer waste from ring. Size: 2.6 mm Thickness at ring cut [FR018 from Tr. 3 (2004)].
75. Central inner waste disc from ring, centre mark on one side. Size: Diameter 15 mm, Thickness 3.8 mm [FR019 from Tr. 3 (2013)].
76. Outer waste from ring making. Size: Thickness 3.8 mm [FR020. From Tr. 2A (1000)].
77. Outer waste from ring making. Size: Thickness 3.2 mm [FR021. From Tr. 3 (2060)].
78. Outer waste from ring making. Size: Thickness 3.1 mm [FR022 from Tr. 3 (2042)].
79. Three waste inner discs from rings [FR029 from Tr. 3 (2047)].
  a. Size: Diameter 13 mm, Thickness 2.9 mm.
  b. Size: Diameter 15 mm, Thickness 3.7 mm.
  c. Size: Diameter 19 mm, Thickness 3.1 mm.

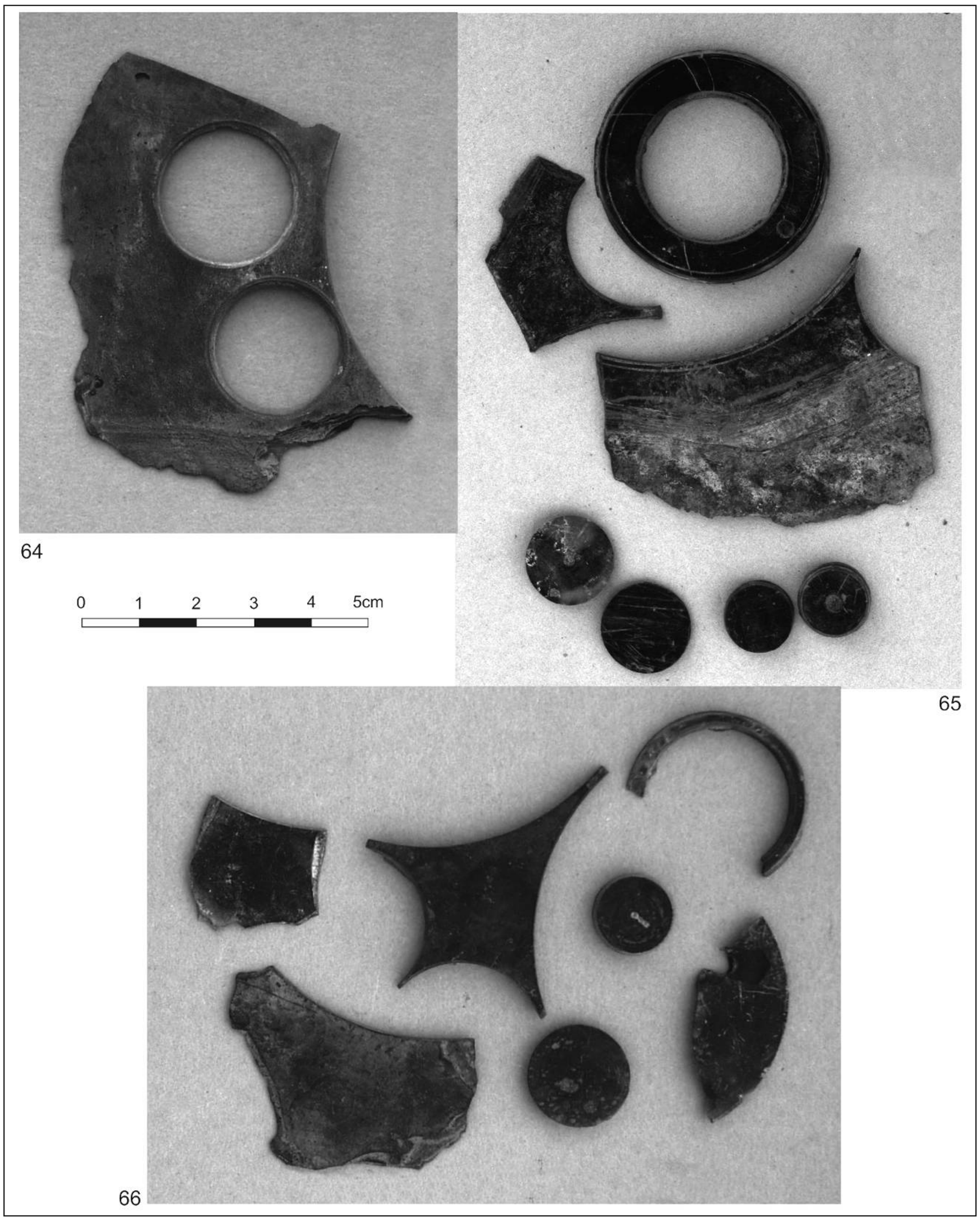


Figure 13.4. Turtle-shell. Nos 64-66.

80. Broken ring. Size: Thickness 1.9 mm [FR030 from Tr. 3 (2047)].
81. Outer waste from rings. Size: Thickness 1.9 mm [FR031 from Tr. 3 (2047)].
82. Complete ring. Size: Diameter 34 mm (External), 24 mm (Internal), Thickness 2.5 mm [FR032 from Tr. 1 Mausoleum (1000)].
83. Off-cut with cut-outs for six rings. Size: Thickness at cuts 3.3 mm [FR045 from Tr. 2B (2017)].
84. Broken ring ?bracelet. Has more rounded edges than usual. Size: Diameter - External 57 mm, Internal 46 mm; Thickness 2.8 mm - 3.7 mm [FR046 from Tr. 5 (3014)].
85. Broken ring ?bracelet. Size: Thickness 2.5 mm [FR047 from Tr. 5 (3026)].
86. Broken ring. Size: Thickness 2.0 mm [FR048 from Tr. 5 (3014)].
87. Bracelet found *in situ* round child arm bones. Slightly warped. Ends do not join, small piece missing, not in burial. Size: Diameter - External 53 mm, Internal 43 mm [FR049 from Tr. 1A, Mausoleum (1010)].
88. Ring or centre off-cut. Size: Diameter - External 15 mm, Internal 4 mm; Thickness 2.7 mm [FR050 from Tr. 2B (2040)].
89. Degraded ring off-cut. Size: Thickness 2.1 mm [FR066 from Pit 9050 (9050)].
90. Three degraded ring off-cuts, poor [FR068 from Pit 9075 (9076)].
91. Degraded ring of uneven thickness [FR070 from Tr. 2C (1014)].
92. Broken ring (finger ring?) rounded outer profile, thickest part 5.9 mm [FR071 from Tr. 2B (1515)].
93. One ring, slightly tapered cut. Size: Thickness 4.4 mm

[FR072 from Tr. 1E (400)].
94. Broken ring/bracelet. Size: Thickness 2.9 mm [FR073 from Tr. 2C (1044)].
95. Central off-cut from ring, centre point marked on one side. Size: Diameter 11 mm, Thickness 3.2 mm [FR074 from Tr. 3 (2021)].
96. Off-cut from ring cutting, three cut-outs and scribe lines visible. Size: Thickness 1.8 mm [FR075 from Tr. 3 (2014)].
97. Two off-cuts from ring cutting, one from large ring. Size: Thickness 2.6 mm [FR076 from Tr. 3 (2013)].
98. Two off-cuts from ring cutting. Size: Thickness 1.8 mm [FR077 from Tr. 3 (2018)].
99. Broken/unfinished ring. Size: Thickness 3.2 mm [FR078 from Tr. 3 (2015)].
100. Off-cut from ring cutting, holes for one large and two smaller rings, scribe lines visible. Size: Thickness 2.9 mm [FR080 from Tr. 3 (2028)].
101. Three centre off-cuts, one with second scribe line [FR081 from Tr. 3 (2014)].
  a. Size: Diameter 12 mm, Thickness 4.0 mm.
  b. Size: Diameter 11 mm, Thickness 2.2 mm.
  c. Size: Diameter 12 mm, Thickness 3.4 mm.
102. Twelve assorted off-cuts from making rings of mixed sizes [FR083 from Tr. 3 (2014)].
  a. Size: Thickness 3.3 mm.
  b. Size: Thickness 2.9 mm.
  c. Size: Thickness 2.5 mm.
  d. Size: Thickness 1.7 mm.
  e. Size: Thickness 2.9 mm.
  f. Size: Thickness 2.7 mm.
  g. Size: Thickness 2.2 mm.
103. Off-cut with deep scribe mark. Size: Thickness 2.5 mm [FR084 from Tr. 3 (2014)].
104. Off-cuts and broken ring [FR085 from Tr. 3 (2027)].
  a. Large ring off-cut. Size: Thickness 2.5 mm.
  b. Off-cut from rings of two sizes. Size: Thickness 3.6 mm.
  c. Off-cut from three rings. Size: Thickness 2.3 mm.
  d. Centre. Size: Diameter 14 mm, Thickness 3.2 mm.
  e. Ring. Size: Thickness 2.3 mm.
105. Assorted off-cuts from making rings of mixed sizes [FR086 from Tr. 3 (2027)].
  a. Size: Thickness 1.8 mm.
  b. Size: Thickness 2.1 mm.
  c. Size: Thickness 2.6 mm.
  d. Size: Thickness 3.2 mm.
  e. Size: Thickness 2.6 mm.
  f. Size: Thickness 3.3 mm.
106. Broken ring and centre off-cut not from same, but, possible standard size? [FR087 from Tr. 3 (2027)].
  a. Off-cut. Size: Diameter 35 mm, Thickness 1.6 mm to 1.7 mm.
  b. Ring Size: Diameter External 42 mm, Internal 36 mm; Thickness 1.7 mm to 2.0 mm.
107. Off-cut centres and ring, off-cut centre e. has a through hole [FR088 from Tr. 3 (2027)].
  a. Centre Size: Diameter 18 mm, Thickness 4.5 mm.
  b. Size: Diameter 15 mm, Thickness 2.8 mm.
  c. Size: Diameter 14 mm, Thickness 2.5 mm.
  d. Size: Diameter 14 mm, Thickness 3.8 mm.
  e. Size: Diameter 13 mm, Thickness 1.9 mm.
  f. Ring, Size: Diameter External 37 mm, Internal 27 mm; Thickness 2.0 mm.
108. Broken ring. Size: Diameter External 51 mm, Internal 42 mm; Thickness 1.8 mm [FR098 from Tr. 2B (surface)].
109. Complete small ring. Size: Diameter External 27 mm, Internal 17 mm; Thickness 4.3 mm [FR108 from Tr. 3 (2059)].
110. Ring with multiple scribe lines both sides. Size: External 43 mm, Internal 21 mm; Thickness 2.7 mm [FR109 from Tr. 2B (surface)].
111. Off-cut from large ring. Size: Thickness 1.7 mm [FR110 from Tr. 1E (350)].
112. Two off-cuts [FR111 from Tr. 1D (300)].
  a. Off-cut from three rings. Size: Thickness 2.8 mm.
  b. Centre with multiple scribe lines. Size: Diameter 13 mm, Thickness 3.5 mm.
113. Rough ring not scribed. Size: Thickness 2.1 mm [FR112 from Tr. 2C (1033)].
114. Off-cut. Size: Thickness 2.9 mm [FR113 from Tr. 3 (2002)].
115. Two off-cuts [FR114 from Tr. 3 (2048)].
  a. Off-cut Size: Thickness 1.8 mm.
  b. Centre Size: Diameter 38 mm, Thickness 1.2 mm.
116. Off-cut. Size: Thickness 2.9 mm [FR115 from Tr. 3 (2042)].
117. Broken ring, rodent gnawed. Size: Diameter External 45 mm, Internal 38 mm; Thickness 2.7 mm [FR116 from Tr. 3 (2043)].
118. Possible comb? scribe marks on one edge. Size: Thickness 1.4 mm [FR117 from Tr. 1 (surface)].
119. Ring off-cuts [FR118 from Pit 9050 (9052)].
  a. Off-cut Size: Thickness 2.3 mm.
  b. Size: Thickness 1.4 mm.
  c. Size: Thickness 1.7 mm.
  d. Centre Size: Diameter 11 mm, Thickness 1.9 mm.
120. Ring off-cuts [FR121 from Tr. 3 (2021)].
  a. Off-cut. Size: Thickness 3.1 mm.
  b. Size: Thickness 2.5 mm.
121. Off-cuts and rings [FR122 from Tr. 3 (2021)].
  a. Centre. Size: Diameter 17 mm, Thickness 3.9 mm.
  b. Size: Diameter 14 mm, Thickness 3.2 mm.
  c. Size: Diameter 18 mm, Thickness 2.1 mm.
  d. Small ring. Size: Diameter External 18 mm, Internal 14 mm; Thickness 2.8 mm.
  e. Ring. Size: Diameter External 38 mm, Internal 26 mm; Thickness 3.8 mm.
122. Ring centre off-cut with centre scribe point. Size: Diameter 33 mm, Thickness 3.8 mm [FR128 from Tr. 5 (3026)].
123. Disk with central hole and scribe lines. Size: Diameter 14.7 mm, Hole 3.0 mm; Thickness 2.7 mm [FR143 from Tr. 5 (3014)].
124. Fragment of ring. Size: Diameter Outer approx 64 mm, Inner approx 50; Thickness 2.0 mm [FR146 from Tr. 5 (3014)].

125. Finger ring, very thin. Size: Diameter 19.3 mm, Thickness 1.4 mm [FR168 from Tr. 9 (7001)].
126. Large ring, broken. Size: Diameter Outer approx 75 mm, Inner 65 mm; Thickness 2.2 mm; Width 4.7 mm [FR169 from Tr. 8 (8000)].
127. Fragment of large narrow ring. Size: Width 3.2 mm, Thickness 1.0 mm [FR183 from Tr. 2E (6040)].
128. Fragment with hole and zigzag edge. Size: 45 mm x 30 mm x 1 mm [FR231 from Tr. 9 (7001)].
129. Two flat rings [FR232 from Tr. 8A (8270)].
  a. Complete ring. Size: Diameter External 20.8 mm, Internal 16.9 mm; Thickness 2.0 mm.
  b. Broken ring, unfinished. Size: Diameter External 18.0 mm, Internal 14.0 mm; Thickness 2.0 mm.
130. Complete ring. Finger ring? Slightly rounded outer face compared to most. Size: Diameter External 19.2 mm, Internal 15.2 mm; Thickness 4.0 mm [FR233 from Tr. 8A (8251)].
131. Ring broken in two, part missing. Size: Diameter External 45 mm, Internal 40 mm; Thickness 3.8 mm [FR256 from Tr. 8A (8257)].
132. Off-cut with three disc cut-outs. Size: Length 37 mm, Thickness 2.7 mm [FR317 from Tr. 3 (2048)].
133 Cut turtle rib plate with waisted cuts. Fishing equipment e.g. line winder? [FR091 from Tr. 2D].
134. Part of turtle pleural plate with rib trimmed off, hole drilled and knotted 2-ply cord still in position. Possible pitch sealant along one edge. Size: Diameter Hole 7.6 mm [FR182 from Tr. 6J (4040)].

13.5 Marine Invertebrates

Mollusc shells were surprisingly common at the inland Roman quarry sites of Mons Claudianus and Mons Porphyrites, both as food waste and as artefacts (Fig. 13.5). In keeping with its coastal location the Quseir assemblages have huge amounts of shell waste. Some of these had secondary use with or without modification, such as clam shell ink pots (Fig. 13.6) and carved pearl oyster counters, while others were deliberately chosen as a primary source material, such as sea-urchin spines for pendants. The discarded valves of giant clam were frequently found with traces of black ink, often in the same deposits as ostraca. Several contained traces of red ochre. In one single case a clam shell contained traces of a purple pigment. Although a few, largely intact, shells of the purple dye producing species were identified, there is no evidence at Quseir for the production of the dye at this site, which involves the crushing and fermenting of large numbers of the molluscs. A few examples of simple conch spoons were found but not of the complex style encountered at Mons Porphyrites, a craft apparently unique to that site (Hamilton-Dyer 2003b; 2007b). There are two examples of large cowries with the dorsum removed; at Mons Porphyrites cowries had also been used to make spoons.

In contrast to the Roman levels, Islamic deposits contained very little shell in general and use for artefacts seem to be limited to limpets, cowries and other small types drilled for use as beads or in divination. The money cowrie *Cypraea moneta* was particularly common in the Islamic levels and is likely to have been used with other species in divination (see section on marine invertebrates Chapter 20 below). Because these have no visible signs of modification they are not listed below.

Catalogue:
135. Two limpets with three holes in ?for threading [FR096 from Tr. 2C (1033)] (Fig. 13.5).
136. Round coral used as a fish weight? with a hole through and markings on one side, weight 28g [FR099 from Tr. 2B (1521)] (Fig. 13.5).
137. *Lambis* conch body whorl fragment, shaped for long spoon/scoop [FR163 from Tr. 7A (10017)] (Fig. 13.5).
138. *Heterocentrotus ma mmillatus* sea-urchin spine with carved decoration [FR165 from Tr. 8 (8028)] (Fig. 13.5).
139. *Lambis* conch body whorl fragment, possible spoon blank?. Size: Thickest part 7.8 mm [FR164 from Tr. 6J (4040)] (Fig. 13.5).
140. Pendant, teardrop with spiral formed from part of shell, pierced for threading. Size: Height 16.4 mm, Width 12.1 mm, Thickness 3.7 mm [FR314 from Tr. 14B (14502)] (Fig. 13.5).
141. *Cypraea grayana* cowrie with base cut/sawn off to make the shell sit flat. Small hole pierced in hump near apex [FR166 from Tr. 8].
142. Giant clam *Tridacna* used as ink pot. Size: Shell width 180 mm [FR033 from Tr. 6B (4007)].
143. Giant clam *Tridacna* used as paint pot, traces of purple pigment. Size: Shell width 290 mm [FR034 from Tr. 6A (4005)] (Fig 13.6).
144. *Tridacna* clam paint pot – red pigment [FR198 from Tr. 7A (10023)] (Fig 13.6).
145. Paint pot - *Tridacna* clam with red pigment. Size: 235 mm x 140 mm [FR200 from Tr. 8 (8108)].
146. Black ink pot of *Tridacna* clam, flaky and eroded but very clear. Size: Length 195 mm [FR267 from Tr. 12 (7308)] (Fig 13.6).
147. Three shells tied on 2-ply hair thread. *Nerita albicilla*, *Strombus gibberulus albus*, *Cerithium caeruleum*. Shells beach worn [FR307 from Tr. 13 (5508)] (Fig. 13.5).
148. Giant clam shell, *Tridacna*, paint pot with remains of red ochre adhered to the sides, up to 40 mm. Size: 142.52 mm x 72.36 mm [FR012 from Tr. 2B (1568)].
149. Oyster shell with slit cut out of centre (Size: 54.73 mm long x 12 mm wide) and rounded at each end. Size: 136 mm x 143 mm [FR013 from Tr. 2D (1263)].
150. Cone shell with hole in top, *Conus pennaceus*. Size: Original height *c.* 60 mm [FR027 from Tr. 3 (2004)].
151. Two *Nerita albicilla* shells with natural parasite holes - may have been collected for stringing [FR028 from Tr. 3 (2004)].
152. Two upper portions of small cone shells, *Conus*, with hole in anterior, threaded onto fragment of cloth [FR036 from Tr. 5 (3026)].
153. Cone shell, *Conus*, small rounded species with hole

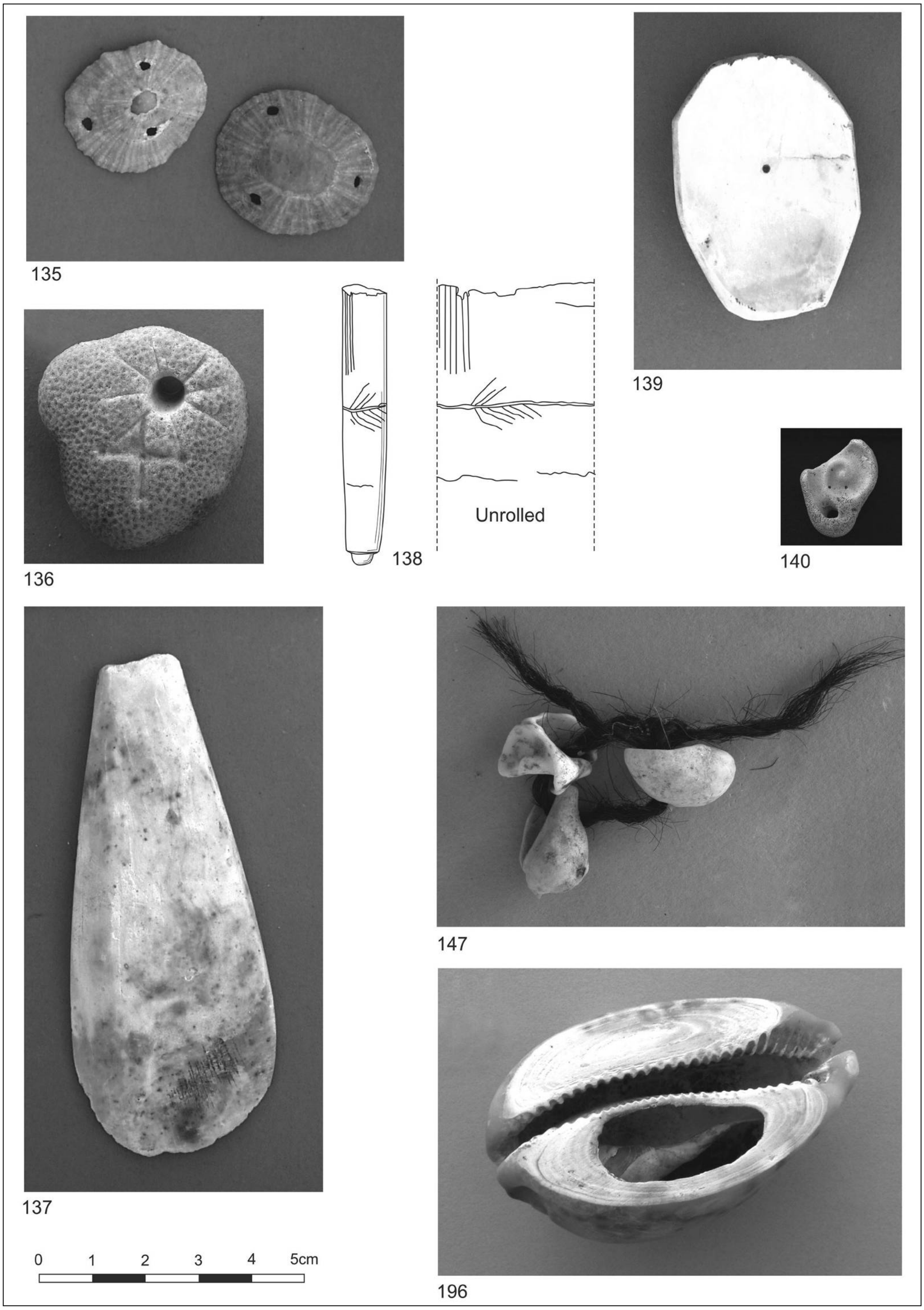


Figure 13.5. Marine Invertebrates. Nos 135-140, 147 & 196.

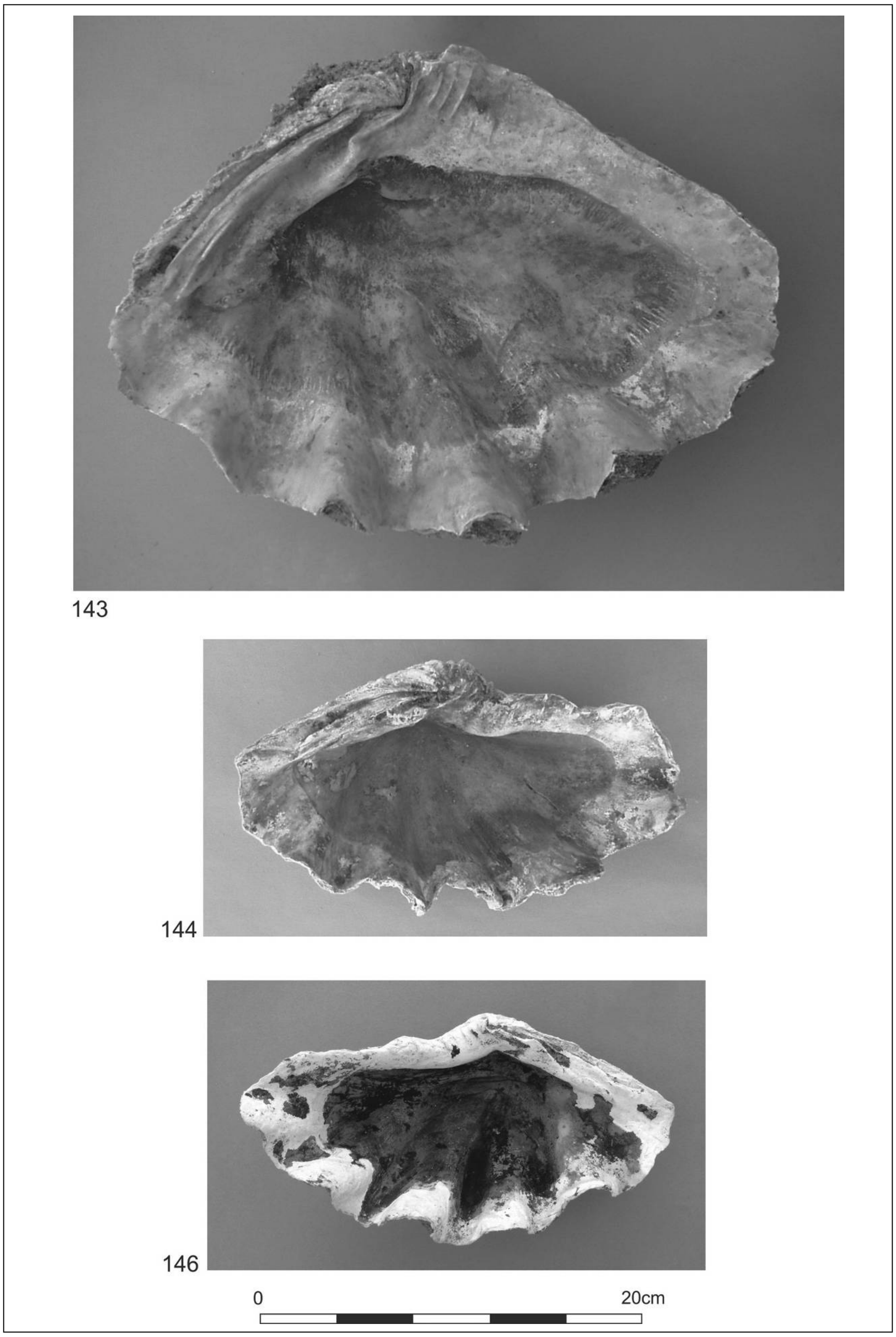


Figure 13.6. Clam shell paint pots. Nos 143-144 & 146.

for threading in apex. Size: Height 13.3 mm [FR037 from Tr. 2B (2046)].
154. Two slate-pencil sea urchin, *Heterocentrotus mammillatus*, spines drilled through near attachment, e.g. for pendant. Size: Length 73.4 mm and 77.8 mm [FR040 from Tr. 6B (4007)].
155. Large round star coral drilled to form ?fishing weight. Size: 89 mm x 88 mm and 44.7 mm thick. Weight: 269g [FR069 from Tr. 2B (1520)].
156. *Engina mendicara* shell pierced for threading and with small fragments of string/thread still attached [FR089 from Tr. 2C (1025)].
157. Two small/medium *Conus* with hole in apex and one inside for threading, very degraded [FR090 from Tr. 2C (1041)].
158. Limpet with four holes ?for threading [FR101 from

Tr. 2A (1000)].
159. Two small 'triangles' of pearl oyster, one with scribed lines criss-cross [FR102 from Tr. 2A (1000)].
160. Fragment of pearl oyster, back stripped and edge crenulated [FR129 from Tr. 6G (4025)].
161. Medium cone shell with hole in apex and one in side probably for threading, rather worn [FR130 from Tr. 2E (6101)].
162. Small *Tridacna* clam used as inkpot [FR156 from Tr. 6H (4030)].
163. Small *Conus* pierced at apex. Size: Diameter piercing 3.3 mm, Height 17.7 mm [FR157 from Tr. 2B (2098)].
164. Small *Conus* pierced at apex and slightly flattened base. Size: Diameter piercing 1.8 mm, Height 31.8 mm [FR158 from Tr. 2B (2126)].
165. Small *Conus* pierced at apex and slightly flattened at base. Size: Diameter piercing 7.2 mm, Height 29.0 mm [FR159 from Tr. 2B (2097)].
166. Small *Conus* with pierced apex and side. Size: Diameter Apex piercing 3.2 mm, Height 31.6 mm [FR160 from Tr. 2B (2101)].
167. *Terebra crenulata* with two piercings towards base. Size: Incomplete height 75.4 mm, Diameter Lower hole 7.2 mm [FR161 from Tr. 5 (3026)].
168. Spider conch, *Lambis*, body whorl shaped, smoothed ?scoop ?dish. Size: approx 90 mm x 70 mm [FR162 from Tr. 7A (10003)].
169. Smoothed section of gastropod spire found in place as a finger ring [FR167 from Tr. 1 (Cemetery)]
170. Two small *Tridacna* clam ink pots [FR186 from Tr. 6H (4030)].
171. *Heterocentrotus mammillatus* sea-urchin spine with four scribed lines [FR195 from Tr. 6K (4050)].
172. *Cypraea pantherina* cowrie with dorsum removed [FR196 from Tr. 6K (4050)].
173. *Cypraea pantherina* cowrie with dorsum removed [FR197 from Tr. 7 (5002)].
174. Paint pot - *Tridacna* clam with red pigment. Size: 230 mm x 120 mm [FR201 from Tr. 8 (8108)].
175. Paint pot - *Tridacna* clam with red pigment. Size: 85 mm x 80 mm [FR202 from Tr. 7A (10021)].
176. Paint pot/scoop - small Gari clam with red pigment. Size: 55 mm x 35 mm [FR203 from Tr. 7A (10027)].
177. Paint pot/palette - pearl oyster with red pigment. Size: 140 mm x 120 mm [FR204 from Tr. Tr. 7A (10014)].
178. Ink pot - *Codakia tigerana* with black ink. Size: 75 mm x 70 mm [FR205 from Tr. 6H (4085)].
179. Ink pot - *Tridacna* clam with black ink. Size: 135 mm x 75 mm [FR206 from Tr. 6H (4085)].
180. Ink pot - *Tridacna* clam with black ink. Size: 120 mm x 75 mm [FR207 from Tr. 6H (4090)].
181. Pitch pot - *Tridacna* clam containing black/brown pitch. Size: 210 mm x 125 mm [FR208 from Tr. 6H (4090)].
182. Scoop of conch shell, edges all cut smooth. Size: 80 mm x 32 mm [FR209 from Tr. 7A (10024)].
183. Scoop of conch shell, eroded. Size: 130 mm x 40 mm [FR210 from Tr. 7A (10029)].
184. Scoop of conch shell. Size: 90 mm x 45 mm [FR211 from Tr. 6H (4085)].
185. Scoop/bowl of conch with smoothed edges. Size: 75 mm x 60 mm [FR212 from Tr. 6H (4085)].
186. Broken section of top shell, *Tectus dentatus*, with regularly placed piercings, made from inside? Size: Length 60 mm, Depth 20 mm [FR213 from Tr. 6H (4085)].
187. Fragment of pearl oyster ?palette with worked edges (denticulated). Size: 50 mm x 20 mm x 2 mm [FR214 from Tr. 7A (10011)].
188. Palette x 2, broken, of pearl oyster with trimmed edge [FR215 from Tr. 6H (4080)].
189. Bowl - of spider conch fragment, with outer knobs smoothed to make the bowl sit flat. Size: 70 mm x 70 mm [FR216 from Tr. 6H (4080)].
190. Slate - pencil sea urchin spine, with spiral incised round and longitudinal groove. Size: 37 mm x 7 mm [FR217 from Tr. 10A (3712)].
191. Money Cowrie, *Cypraea moneta*, dorsum removed, probably 'bead'. Size: Length 19 mm [FR218 from Tr. 8A (8253)].
192. Money Cowrie, *Cypraea moneta*, dorsum removed, probably 'bead'. Size: Length 17 mm [FR219 from Tr. 8A (8251)].
193. Cowrie, *Cypraea grayana*, pierced anterior dorsum, probably 'pendant'. Size: Length 45 mm [FR220 from Tr. 8A (8161)].
194. Cowrie, *Cypraea grayana*, pierced anterior dorsum, probably 'pendant'. Size: Length 55 mm [FR221 from Tr. 7A (10019)].
195. Cowrie, *Cypraea grayana*, base cut flat and smoothed, broken. Size: Length 60 mm [FR222 from Tr. 6H (4080)].
196. Cowrie, *Cypraea grayana*, base cut flat and smoothed. Size: Length 65 mm [FR223 from Tr. 6H (4090)] (Fig. 13.5).
197. Scoop, small, of conch, eroded. Size: 45 mm x 28 mm [FR224 from Tr. 2B (2322)].
198. ?Inlay of pearl oyster. Size: 45 mm x 22 mm x 3 mm [FR225 from Tr. 2B (2324)].
199. Black ink pot fragment of *Tridacna* clam [FR249 from Tr. 8A (8319)].
200. Black ink pot of *Tridacna* clam. Size: Length 150 mm [FR250 from Tr. 6H (4095)].
201. Red paint pot of *Tridacna* clam. Size: Length 150 mm [FR251 from Tr. 10 (3798)].
202. Red paint pot fragment of *Tridacna* clam [FR252 from Tr. 10A (3723)].
203. Pearl oyster 'palette' in two pieces with denticulated edge [FR253 from Tr. 6H (4095)].
204. Spoon/bowl of spider conch, smoothed and shaped. Etched centre of bowl – may have been used/contained an acidic substance [FR254 from Tr. 8A (8324)].
205. Small black ink pot of *Tridacna* clam. Size: Length 80 mm [FR266 from Tr. 12 (7305)].
206. Black ink pot half *Tridacna* clam small. Size: 60 mm x 50 mm [FR272 from Tr. 6P (4100)].
207. Red paint pot of *Anadara uropigimelana*. Size: Length 62 mm [FR273 from Tr. 6P (4100)].

208. Pearl oyster scoop/palette fragment [FR274 from Tr. 10C (3827)].
209. *Tridacna* clam ink pot. Size: Length 100 mm [FR286 from Tr. 8A (8250)].
210. *Tridacna* clam ink pot, small, poor condition. Size: Length 86 mm [FR287 from Tr. 12 (7339)].
211. *Anadara antiquata* ink pot, poor condition. Size: Length 72 mm [FR288 from Tr. 12 (7327)].
212. *Anadara antiquata* ink pot. Size: Length 73 mm [FR289 from Tr. 12 (7321)].
213. Conch shell scoop, poor condition. Size: Length 70 mm [FR290 from Tr. 12 (7342)].
214. *Tridacna* clam ink pot. Size: Length 110 mm [FR291 from Tr. 6H (4162)].
215. *Tridacna* clam red paint pot. Recent breaks. Size: Length180 mm [FR292 from Tr. 6H (4162)].
216. *Tridacna* clam red paint pot. Also ink? Not complete [FR293 from Tr. 6Q (4165)].
217. *Tridacna* clam red paint pot complete. Size: Length 195 mm [FR294 from Tr. 6Q (4165)].
218. *Tridacna* clam red paint pot incomplete. Size: Length 95 mm [FR295 from Tr. 6Q (4165)].
219. Spider conch bowl with blob of pitch or glue. Size: 95 mm x 85 mm [FR296 from Tr. 6Q (4165)].
220. *Tridacna* clam ink pot small. Size: Length 90 mm [FR297 from Tr. 6P (4110)].
221. Spider conch apex fragment splashed with red paint [FR298 from Tr. 6P (4110)].
222. *Tridacna* clam ink pot. Very large. Size: Length 280 mm [FR299 from Tr. 8A (8358)].
223. Pearl oyster red paint pot (modern break, may have been disturbed from elsewhere). Very dark red pigment. Size: Length 112 mm [FR300 from Tr. 13 (5520)].
224. Small *Conus* pierced or natural hole in apex ?bend. Size: 14 mm x 25 mm [FR301 from Tr. 13 (5511)].
225. Cowrie ‘pendant’ two punched holes in dorsum. Size: Length 37 mm [FR302 from Tr. 16A (16515)].
226. *Anadara* paint pot with dark purple/red ink/paint. Size: Length 64 mm [FR303 from Tr. 17 (17028)].
227. Limpet with two square punched holes, done from inside. Size: Length 37 mm [FR304 from Tr. 16A (17028)].
228. Pearl oyster fragment with scribed disc removed. Size: Length 52 mm [FR305 from Tr. 16 (16039)].
229. Pearl oyster ‘pendant’ roughly oval/oblong with disc cut from centre. Size: Pendant - 44.5 mm x 37.8 mm, Thickness Top c. 6.1 mm, Bottom c. 8.2 mm; Disc-Diameter 16.7 mm [FR306 from Tr. 16 (16044)].
230. Shell ‘pendant’ with square punched hole. Size: Height 50.4 mm [FR308 from Tr. 6P (4110)].
231. Top of *Conus*, pierced ?counter ?bead. Size: Length 17 mm [FR309 from Tr. 14B (14001)].
232. ‘Counter’, oval convex/concave polished fragment of shell. Size: Height 15 mm, Width 11.3 mm, Thickness 1.6 mm [FR315 from Tr. 14A (14001)].
233. Spoon bowl of conch, broken off at narrow end [FR358 from Tr. 6G (4160)].
234. Cowrie, *Cypraea grayana*, pierced anterior dorsum, probably ‘pendant’, Size: Length 55 mm [FR359 from Tr. 6P (4105)].

14 Wooden Artefacts

Julian Whitewright

Introduction

Excavation of Roman and Islamic contexts at Quseir al-Qadim led to the recording of well over 600 wooden remains. Despite the quantity, it seems that the majority of the artefacts were probably re-used and not deposited in their original form. The most frequent re-uses are likely to have been as fuel for cooking fires, while larger, potentially more useful items, could have been recycled in the manufacture of other objects. As a result, the majority of the wood recovered from the site is small and fragmentary. Many finds were obviously part of a larger wooden object and thus interpretation of them remains extremely difficult. A similar pattern of recycling and re-use has been observed in the contemporary Roman port of Berenike (Vermeeren 1999a; 2000).

The focus of this chapter has therefore been on selected wooden artefacts that are readily identifiable, either in their own right or on the basis of external comparison. These are presented in two main groups, corresponding to the Roman and Islamic periods of occupation at the site, on the basis of their excavated archaeological context. Further contextual information can be found in Peacock and Blue (2006). Related discussion of the artefacts and the wider interpretation of the wooden remains from the site then follows.

14.1 Selected Catalogue - Roman

Combs

Sixteen combs date to this period of occupation; all have convex ends and are of a form common throughout the Roman world. Their most likely use is for personal cosmetic or grooming purposes. Similar comparative examples have been excavated from the contemporaneous site of Mons Claudianus (Hamilton-Dyer and Goddard 2001, 373-5, fig. 12.3). *Length* (L) refers to the surviving length of the central body of the comb. *Width* (W) is measured parallel to the teeth across the whole extent of the comb. *Central-width* (CW) refers only to the width of the central area. *Thickness* (T) also refers to the central body of the comb. The *gauge* measurement (G) is the average distance between the points of the teeth (if apparent), the coarse gauge first.

1. Comb end with two different gauges of teeth. Convex end. L: 43 mm, W: 53 mm, CW: 13 mm, G: 3 mm, 1 mm [W143 from Tr. 6H (4030)].
2. Comb end, same gauge teeth (badly degraded) on both sides. Convex end. L: 50 mm, W: 41 mm, CW: 9 mm, G: 3 mm [W144 from Tr. 6H (4030)].
3. Partial comb with narrow central body and two different gauges of teeth. L: 16 mm, W: 50 mm, CW: 9 mm, T: 6 mm, G: 5 mm, 1.5 mm [W255 from Tr. 6J (4040)].
4. Complete comb with two different gauges of teeth. Convex ends L: 107 mm, W: 55 mm, CW: 15 mm, T: 7 mm, G: 2.5 mm, 1.5 mm [W257from Tr. 6J (4040)].
5. Comb end and majority of narrow central body. Two different gauges of teeth. Convex end. L: 94 mm, W: 61 mm, CW: 9.5 mm, T: 17 mm, G: 3 mm, 1 mm [W284 from Tr. 6J (4040)] (Fig. 14.1).
6. Comb end with two different gauges of teeth. Incised lines run along length of central body, probably to guide teeth cutting. Convex end. L: 50 mm, W: 55 mm, CW: 13 mm, T: 7 mm, G: 3 mm, 1 mm [W339 from Tr. 6H (4080)].
7. Complete comb with two different gauges of teeth. Convex ends. L: 57 mm, W: 41 mm, CW: 9 mm, T: 6 mm, G: 2 mm, 1 mm [W343 from Tr. 6H (4085)].
8. Comb end with two different gauges of teeth. Convex ends. L: 40 mm, W: 48 mm, CW: 7 mm, T: 7 mm, G: 1.5 mm, 0.8 mm [W362 from Tr. 6H (4085)].
9. Comb end and majority of central body. Two gauges different of teeth. Convex end. L: 60 mm, W: 50 mm, CW: 10 mm, G: 2.5 mm, 1 mm [W381 from Tr. 6JH (4090)].
10. Complete comb with narrow central body and two different gauges of teeth. Fine gauge has suffered some damage. Convex ends. L: 77 mm, W: 47 mm, CW: 10 mm, G: 2.5 mm, 1 mm [W426 from Tr. 6P (4100)].
11. Comb end with two different gauges of teeth. Convex end. L: 64 mm, W: 59 mm, CW: 9 mm, T: 12 mm, G: 2.5 mm, 1.5 mm [W430 from Tr. 8A (8375)].
12. Comb end with wide central body and two different gauges of teeth. Convex end. L: 62 mm, W: 54 mm, CW: 20 mm, T: 8 mm, G: 3 mm, 1 mm [W439 from Tr. 8A (8344)].
13. Comb end with two different gauges of teeth. Convex end. L: 42 mm, W: 50 mm, CW: 11 mm, T: 8 mm, G: 2.5 mm, 1.5 mm [W440 from Tr. 8A (8344)].
14. Comb end with two different gauges of teeth. Convex end. L: 38 mm, W: 55 mm, CW: 14 mm, T: 8 mm, G: 2

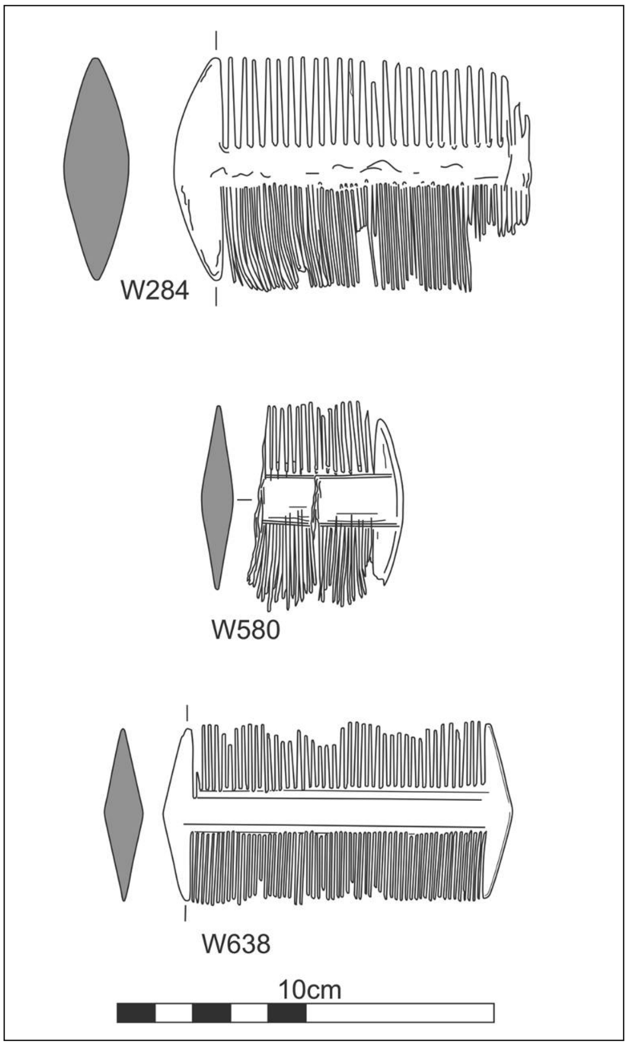


Figure 14.1. Combs from Myos Hormos. Nos 5, 14 & 16.

mm, 1 mm [W580 from Tr. 6Q (4165)] (Fig. 14.1).
15. Degraded partial comb with two gauges of teeth. L: 16 mm, W: 56 mm, CW: 11 mm, T: 14 mm [W597 from Tr. 6Q (4165)].
16. Complete comb, broken in half, with two rows of similarly sized teeth. Convex ends. Main body incised with two lines, one probably to aid the cutting of the teeth, the other seems purely decorative. L: 93 mm, W: 47 mm, CW: 11 mm, T: 16 mm, G: 2 mm, 1 mm [W638 from Tr. 6Q (4170)] (Fig. 14.1).

Wooden vessels

Eleven wooden vessels were dated to the Roman period. Several of these were turned with stepped rims to facilitate a lid, and these have been interpreted as boxes on contemporary Roman sites (see Hamilton-Dyer and Goddard 2001, 377, fig. 12.4). In some cases the vessels are decorated with simple bands of colour on the sides.
17. Remains of a turned wooden bowl. Diameter: 70 mm. Vertical sides, stepped rim. Incised single line running around the vessel 4 mm below the rim [W093 from Tr. 6E (4015)].
18. Remains of a plain, undecorated large wooden bowl. Diameter uncertain. Rounded vertical rim 2nd century AD [W151 from Tr. 6H (4030)].
19. Remains of a turned wooden bowl. Diameter: 134 mm, height: 54 mm. Rounded body and outward flattened rim. Foot-ring base, Diameter: 56 mm. The remains of two flat handles are visible on the rim. As these could not have been lathe turned, the rim must have been finished after the main body of the vessel was made. 2nd century AD [W260 from Tr. 6H (4030)] (Fig. 14.2).
20. Fragmentary remains of wooden vessel. Diameter unknown, height: 62 mm. Vertical sides, upright rim and flat base. 3rd century AD [W293 from Tr. 6J (4040)].
21. Remains of a shallow, turned wooden bowl. Diameter: 150 mm. Thin walled, rounded body with plain, vertical rim. Foot-ring base, diameter: 100 mm. 2nd century AD [W355 from Tr. 6HX (4085)].
22. Fragment of wooden vessel rim, probably a bowl. Diameter 110 mm. Late 1st to early 2nd century AD [W435 from Tr. 6P (4105)].
23. Remains of a wooden bowl. Diameter: 100 mm, height: 63 mm. Conical sides with carination below the rim. Foot-ring base, diameter: 60 mm. Late 1st to early 2nd century AD [W446 from Tr. 6P (4105)].
24. Remains of turned wooden bowl. Diameter: 130 mm, height: 64 mm. Vertical sides, upright rim and flat base. Dark-red band of paint running around exterior. Early 2nd century AD [W573 from Tr. 6J (4155)] (Fig. 14.2).
25. Remains of turned wooden bowl. Diameter: 179 mm, height: 52 mm. Flared sides, double rim and foot-ring base. Raised banding on exterior and incised bands on interior. Dark-red bands of paint applied to exterior. Late 1st to early 2nd century AD [W641 from Tr. 6Q (4170)] (Fig. 14.2).
26. Remains of turned vessel. Diameter: 95 mm. Narrow utilitarian vessel with upright sides and a stepped rim to facilitate a lid. Black paint/pitch on interior of vessel. Late 1st to early 2nd century AD [W661 from Tr. 6Q (4170)] (Fig. 14.2).
27. Vessel formed from cutting a piece of bamboo. Diameter 90 mm, height: 80 mm. coated on both sides with pitch/gesso. Late 1st to early 2nd century AD [W662 from Tr. 6Q (4170)].

Spatulas

A distinctive group of wooden items were excavated from the Roman phases of the site. These took the form of small spatulas, most easily described as being 'paddle-shaped'. A similar style of spatula was excavated from Berenike (Vermeeren 1999a, fig. 17-5). In most cases the ends of the spatulas were stained with a reddish pigment. It can be suggested that these artefacts may have been used in the preparation or mixing of some form of paint or dye. Three examples are included here.
28. Wooden spatula, paddle-shaped and stained red at the broad end. L: 105 mm, W: 12 mm, tapering to 5.3 mm, T: 4 mm. Mid-2nd century AD [W367 from Tr. 6H (4080)] (Fig. 14.3).
29. Wooden spatula, paddle-shaped and stained red at the broad end. L: 175 mm, W: 17 mm, tapering to 4 mm, T: 3

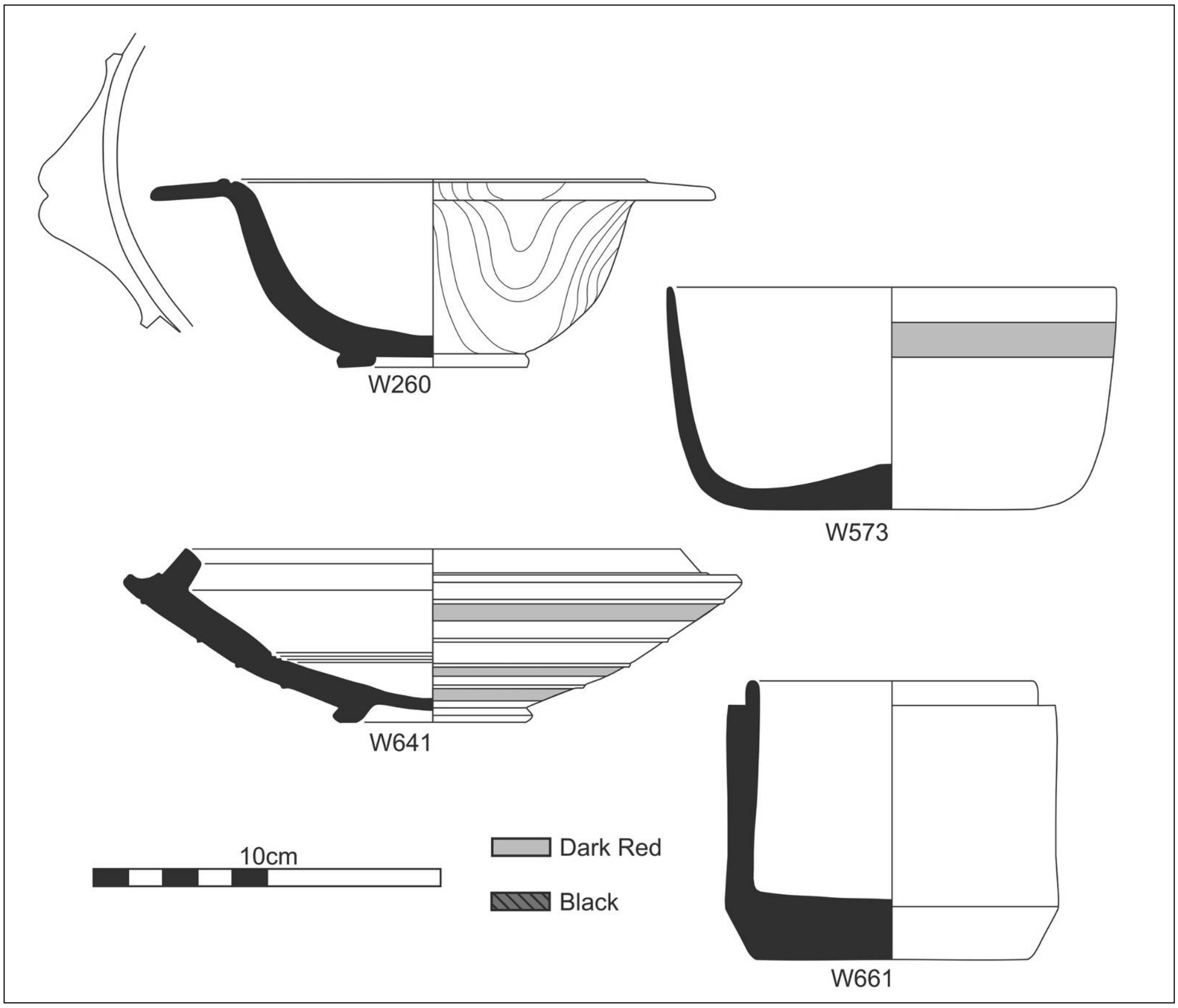


Figure 14.2. Wooden vessels from Myos Hormos. Nos 19 & 24-26.

mm. Late 1st century AD [W385 from Tr. 6E (4015)].
30. Wooden spatula, paddle-shaped and stained red at the broad end. L: 138 mm, W: 23 mm, tapering to 5 mm, T: 4 mm. Late 1st century AD [W447 from Tr. 6P (4105)].

Miscellaneous

A range of unusual or unique artefacts were excavated from Myos Hormos which did not fit any of the more general artefact classes.

31. Four-sided gaming dice. Rectangular in shape, square section. Each side has a different number of round marks gauged into them; one, two, three, four. One is opposite three and two is opposite four. The marks are centred on each long side of the dice. Comparable examples have proved elusive, however, this type of dice is traditionally associated with India. L: 56 mm, W: 10 mm, T: 9.5 mm [W345 from Tr. 8 (8001)] (Fig. 14.4).

32. Four-sided gaming dice. Rectangular in shape, square section. Each side has a different number of round marks gauged into them; one, two, three, four. One is opposite three and two is opposite four. The marks are centred on each long side of the dice. Comparable examples have

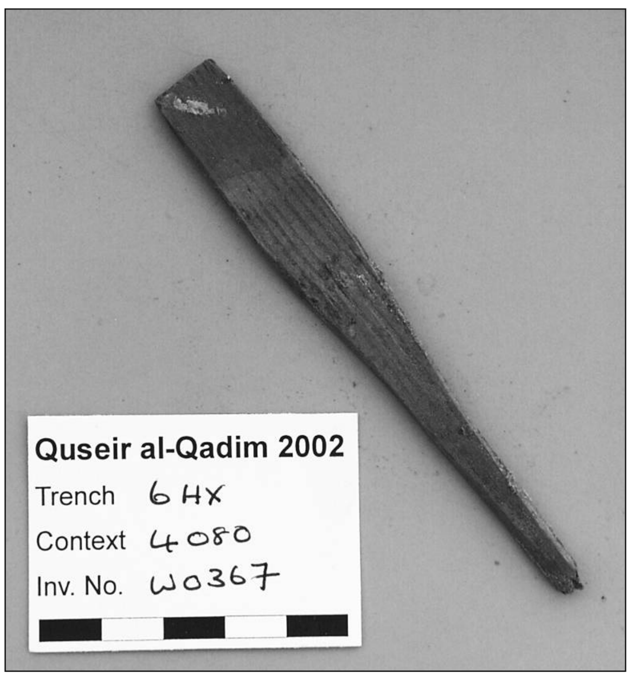


Figure 14.3. Wooden spatula with red staining. No. 28.

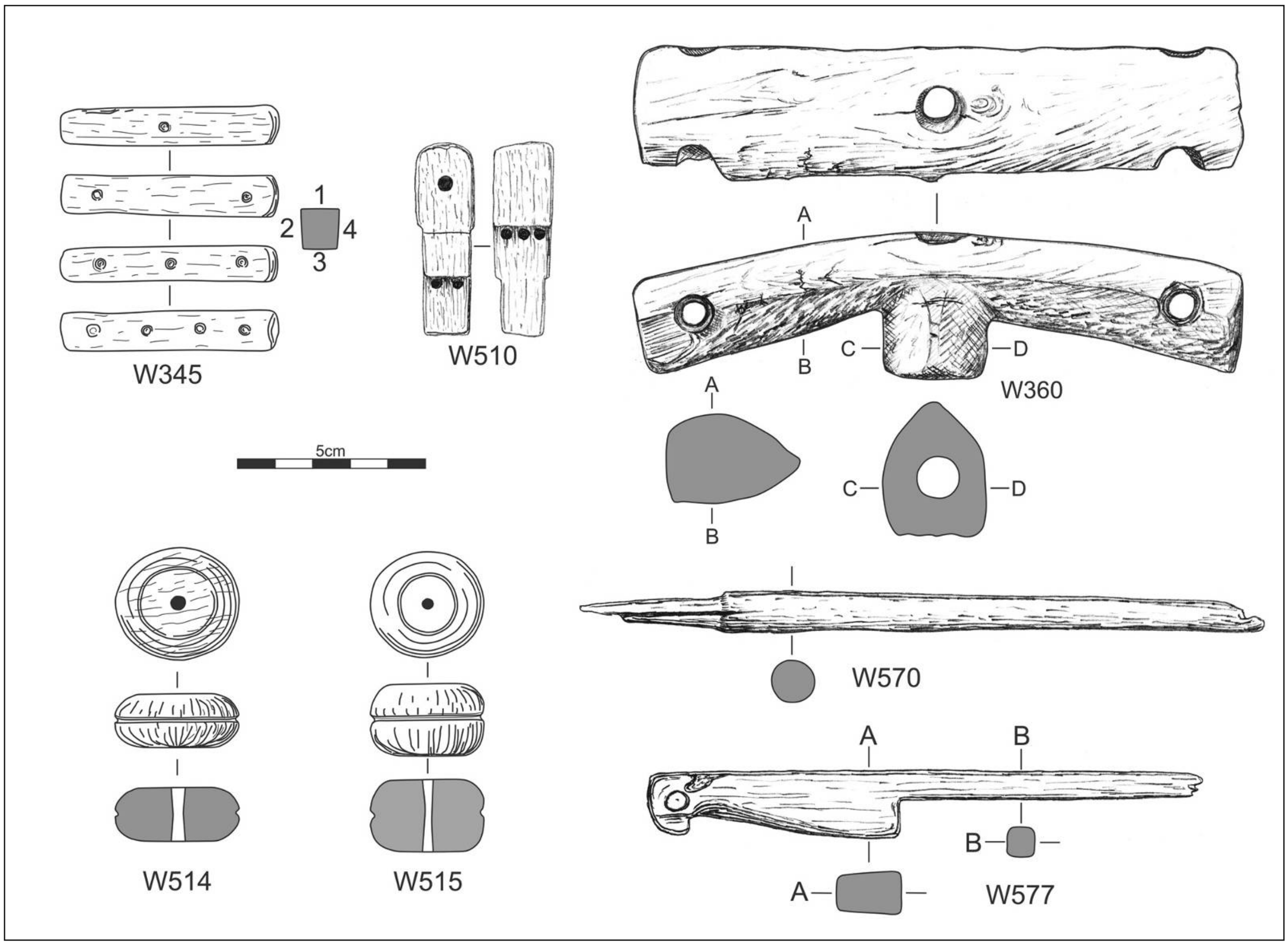


Figure 14.4. Miscellaneus wooden artefacts from Myos Hormos. Nos 31, & 33-38.

proved elusive, however, this type of dice is traditionally associated with India. L: 95 mm, W: 14 mm, T: 14 mm [W346 from Tr. 8 (8000)].

33. Cinch Bar. Utilised for attaching the quarter straps of a horse saddle to the cinch (a good comparative example can be seen in Williams 1981, 120, figs 57c and 60). L: 162 mm, W: 33 mm, T: 39 mm. Late-Roman, based on comparative evidence [W360 from Tr. 8A (8251)] (Fig. 14.4).

34. Generally rectangular shaped piece of wood with gradually stepped sides. Three holes in-line in centre of piece running through from side to side. Remaining side are pierced by one hole and two holes in-line. L: 50 mm, W: 16 mm, T: 15 mm. Early 1st century AD [W510 from Tr. 6PX (4110)] (Fig. 14.4).

35. Wooden Roundel. Small circular wooden disc, flattened top and bottom with a central hole. Incised groove running around exterior (comparative examples in Hamilton-Dyer and Goddard 2001, 376, fig. 12.4). Diameter: 30 mm, T: 14 mm. Early 1st century AD [W514 from Tr. 6P (4110)] (Fig. 14.4).

36. Wooden Roundel. Small circular wooden disc, flattened top and bottom with a central hole. Incised groove running around exterior (comparative examples in Hamilton-Dyer and Goddard 2001, 376, fig. 12.4). Diameter: 28 mm, T: 17 mm. Early 1st century AD [W515 from Tr. 6P (4110)] (Fig. 14.4).

37. Wooden pen with split-nib. Made from a solid piece of wood, round in section. One end has been sharpened and cut to form a nib. L: 186 mm, Diameter: 11.5 mm. 2nd century AD [W570 from Tr. 6G (4160)] (Fig. 14.4).

38. Hook-shaped wooden object, planed into a rectangular in section with a hole through the hooked-end. Possible interpretation as a sneck-lifter. L: 147 mm, W: 17.5 mm and 7.5 mm, T: 8 mm. 2nd century AD [W577 from Tr. 6G (4160)] (Fig. 14.4).

Screening and panelling

The remains of material possibly used as screening or panelling within the buildings dating to the late 2nd or early 3rd century AD was excavated from Trench 8A [W642 from Tr. 8A (8313)]. These remains comprise plywood, covered in fabric and coated in plaster, then painted. Plywood is recorded as being manufactured in Egypt since c. 2600 BC (Killen 1994, 9). This consisted of thin pieces of wood set at right angles to one another, up to six layers thick. Our examples are made from three layers of sawn strips of wood which are bonded together. Regularly spaced saw marks are visible on the surface of the wood. They are typically at about 70° to the grain and their spacing varies from piece to piece. The outer surface carried sheets of textile to which a reddish plaster had been applied. The textile was a linen/bast fabric, s-spun and typical of the common fabric found at Myos Hormos (F. Handley pers. comm.). Egyptian plaster was commonly made from gypsum, and deposits in the vicinity of the site may have been the source. In its final form, such panelling would be relatively flimsy and it seems likely that it would have been used to face interior walls or as interior partitions.

14.2 Selected Catalogue - Islamic

Combs

Sixteen combs were excavated from Islamic deposits. In contrast to those from the Roman period these exhibit both convex and concave ends. In some cases the central bodywork of the comb has been decorated with a latticework design, or with incised lines. Such combs are common in the wider Islamic period within Egypt. Combs also have a strong association with maritime sites, usually concerned with the grooming of lice and other pests. Comparable examples have been found on shipwreck sites such as the 11th century Serçe Limani (Bass 2004, 276-9) site in Turkey and the 16th century *Mary Rose* site in England. Their presence on these sites simply serves to illustrate their ubiquitous nature across a wide temporal and spatial distribution. *Length* (L) refers to the surviving length of the central body of the comb. *Width* (W) is measured parallel to the teeth across the whole extent of the comb. *Central-width* (CW) refers only to the width of the central area. *Thickness* (T) also refers to the central body of the comb. The *gauge* measurement (G) is the average distance between the points of the teeth (if apparent), the coarse gauge first.

39. Partial comb with two different gauges of teeth. Main body incised with three double lines. L: 22 mm, W: 100 mm, CW: 29 mm, T: 6 mm, G: 2.5 mm, 1 mm [W018 from Tr. 2B (1009)].

40. Comb end with two different gauges of teeth. Straight ends. Faint, indeterminable painted design in black on one side. L: 66 mm, W: 95 mm, CW: 26 mm, T: 9.5 mm, G: 2.5 mm, 1.2 mm [W026 from Area 1 (surface)].

41. Comb end with two different gauges of teeth. Convex end. L: 29 mm, W: 45 mm, CW: 6 mm, G: 2.5 mm, 1.5 mm [W097 from Tr. 5 (3024)].

42. Comb end with two different gauges of teeth. Shallow concave end. L: 45 mm, W: 100 mm, CW: 21 mm, T: 8.5 mm, G: 4 mm, 1.5 mm [W098 from Tr. 5 (3026)].

43. Complete comb with two different gauges of teeth, remains are broken into three pieces. Triple incised lines run along outside of central body. Ends are very convex, bordering on semi-circular. L: 85 mm, W: 63 mm, CW: 21 mm, G: 3 mm, 1 mm [W118 from Tr. 2D (1266)].

44. Partial comb with two different gauges of teeth, remains are in two pieces. L: 58 mm, W: 98 mm, CW: 26 mm, G: 2.5 mm, 1.5 mm [W121 from Tr. 2B (1507)].

45. Complete comb with two different gauges of teeth. Wide central body with concave ends, no decoration. L: 89 mm, W: 99 mm, CW: 35 mm, T: 8 mm, G: 3 mm, 1.3 mm [W326 from Tr. 2B (2316)].

46. Comb end, damaged leaving only one side intact. One row of widely spaced teeth survive and one concave

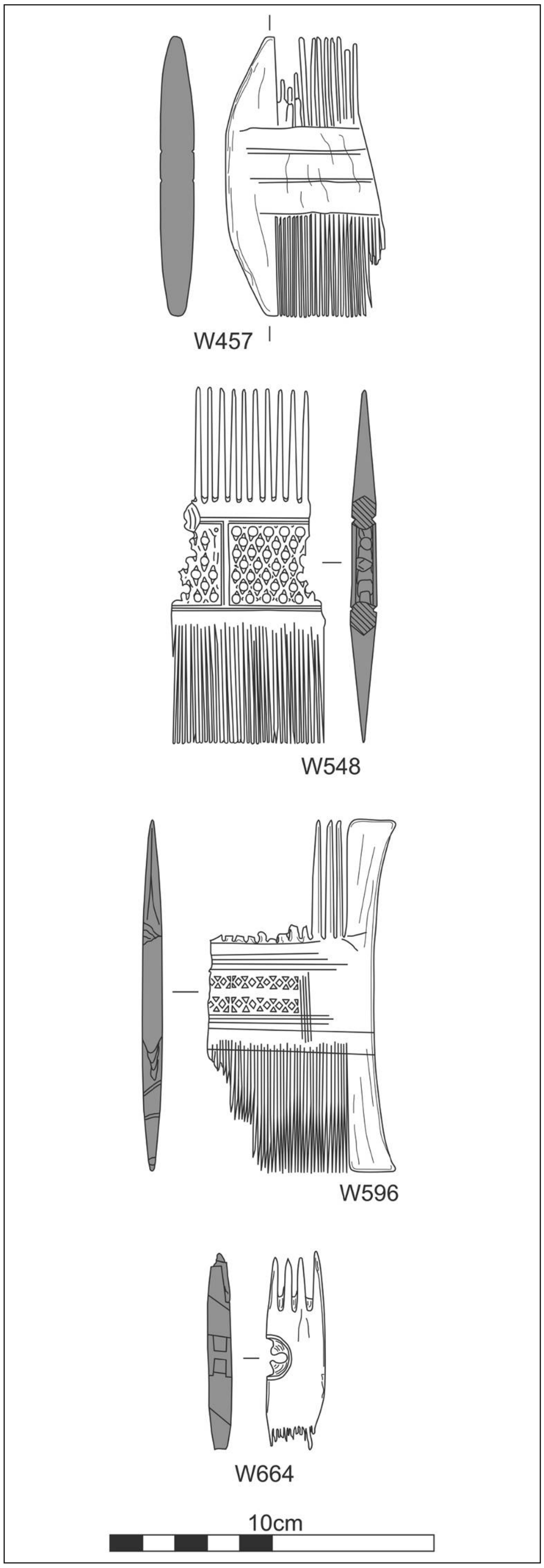


Figure 14.5. Islamic combs from Quseir al-Qadim. Nos 50 & 52-54.

arm of the comb end. Teeth bordered by a single incised line running along the length of the comb. L: 32 mm, W: 63 mm (incomplete), CW: 20 mm, T: 9 mm, G: 2.5 mm [W341 from Tr. 8A (8250)].
47. Comb fragment with two different gauges of teeth, both damaged and incomplete. Two incised lines run along the central body. L: 17 mm, W: 38 mm, CW: 13 mm, T: 6 mm [W347 from Tr. 8 (8000)].
48. Fragment of comb with two different gauges of teeth. Small gauge virtually all damaged and incomplete. L: 57 mm, W: 72 mm (incomplete), CW: 17 mm, T: 4 mm [W357 from Tr. 8A (8251)].
49. Complete comb with two different gauges of teeth. Comb remains are broken into three pieces. Fine gauge of teeth and one end are damaged. Convex ends. L: 101 mm, W: 60 mm, CW: 7.5 mm, T: 13 mm, G: 2.5 mm, 1.2 mm [W358 from Tr. 8A (8251)].
50. Comb end with two different gauges of teeth. Three unevenly spaced incised lines run along the central body. Convex end. L: 22 mm, W: 43 mm, CW: 13 mm, T: 5 mm, G: 1.2 mm, 0.6 mm [W457 from Tr. 8A (8293)] (Fig. 14.5).
51. Comb end with two different gauges of teeth. Large gauge teeth are alternately short and long. Convex end. L: 30 mm, W: 53 mm, CW: 7 mm, T: 6 mm, G: 4 mm, 1.3 mm [W474 from Tr. 8A (8251)].
52. Part of a comb with two surviving gauges of teeth. Decorative latticework on centre of body, bordered by incised lines. L: 47 mm, W: 110 mm, CW: 38 mm, T: 8 mm, G: 4 mm, 1.5 mm [W548 from Tr. 13 (5508)] (Fig. 14.5).
53. Comb end with two surviving gauges of teeth. End is concave, with 7 mm between tips and centre of curve. Decorative work on central body comprising incised diamonds and triangles bordered by incised lines. L: 51 mm, W: 108 mm, CW: 31 mm, T: 6 mm, G: 3.5 mm, 1 mm [W596 from Tr. 13 (5518)] (Fig. 14.5).
54. Degraded part of a comb, remains indicate two gauges of teeth, now incomplete. Decorative latticework on central body. L: 18 mm, W: 57 mm (incomplete), CW: 35 mm, T: 7 mm [W664 from Tr. 13 (5507)] (Fig. 14.5).

Wooden vessels

Twenty-two wooden vessels were dated to the Islamic period. Like the wooden vessels from the Roman period they range from plain, utilitarian types, to highly decorated examples.
55. Remains of a wooden bowl. Diameter: 90 mm. Two bands of darker colour circling the base of the vessel [W013 from Tr. 2C (1012)].
56. Small turned wooden vessel. Diameter: 30 mm. Flat base and vertical sides. Plain surfaces with no decoration [W053 from Tr. 2C (1033)].
57. Fragment of small turned wooden vessel, diameter uncertain, 42 mm in height from base to rim. Vertical sides and flat rim. Decorated with a double line of red banding below the rim and a further line at the bottom of the sides [W120 from Tr. 1 (surface)].
58. Remains of a wooden vessel, diameter uncertain. Stepped rim to facilitate lid. Blackening on interior [W123 from Tr. 2B (1521)].
59. Remains of a wooden vessel, diameter uncertain. Rounded base, vertical sides and rim. Banded pattern just below rim. Split in the wood running down from the rim were repaired with a metal fastening, the remains of which

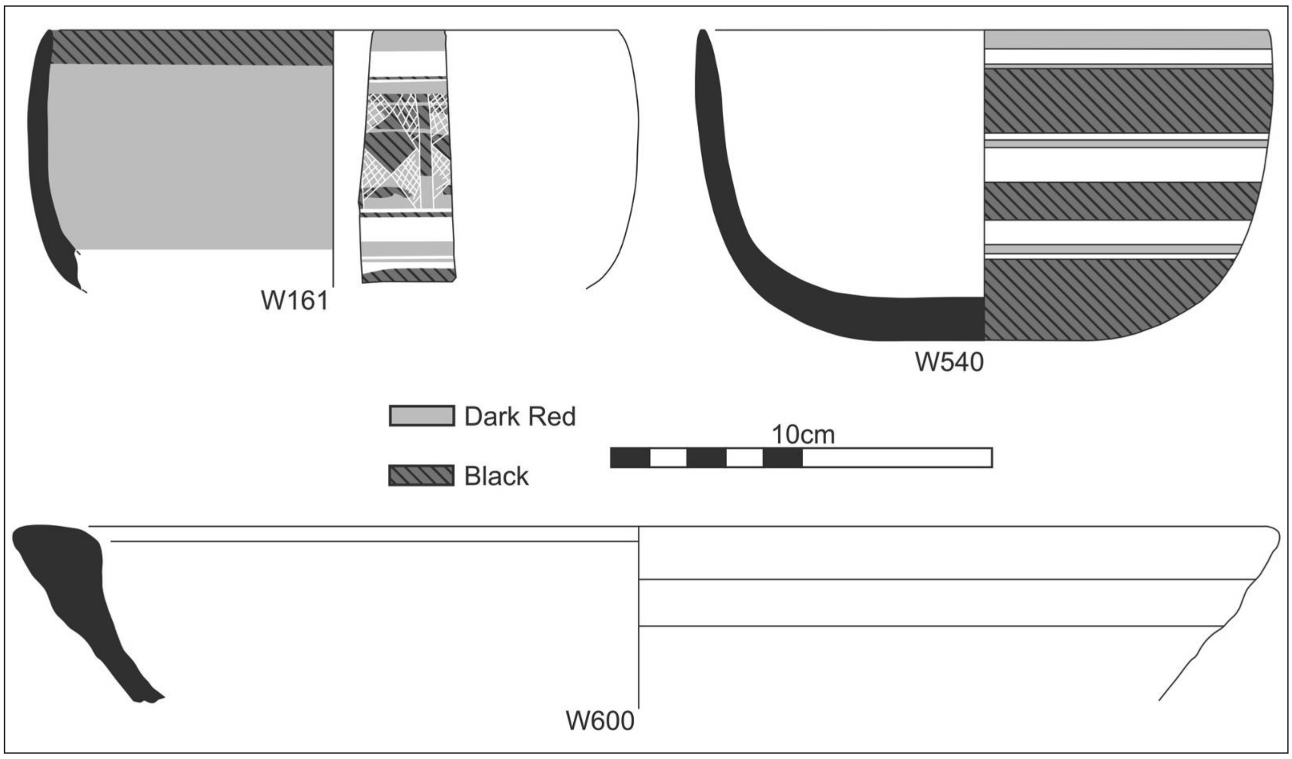


Figure 14.6. Wooden vessels from Quseir al-Qadim. Nos 62 & 75-76.

have discoloured the wood [W128 from Tr. 2C (1027)].
60. Body fragment of wooden vessel, diameter and orientation uncertain. Painted red on interior, exterior has red beading bordered by brown and blue areas [W133 from Tr. 2B (1005)].
61. Remains of badly degraded and broken wooden vessel with tall vertical sides and rim, diameter uncertain. Decorated with two broad bands of blue and red below the rim on the interior wall. Exterior may have been decorated with black and white bands [W141 from Tr. 1 (surface)].
62. Base to rim remains of a turned, decorated wooden vessel. Diameter 150 mm, with a flat base, vertical sides and rim. Painted red on interior with a black band around the rim. Exterior decorated with band of red, cream and black, centre of the exterior wall comprises a black and red geometric pattern [W161 from Tr. 5 (3109)] (Fig. 14.6).
63. Remains of a turned wooden vessel, diameter uncertain, 88 mm in height. Flat base, vertical sides and rim, undecorated [W163 from Tr. 5 (3110)].
64. Remains of a turned wooden vessel, base diameter 65 mm. Flat base, vertical sides and rim, undecorated [W235 from Tr. 5 (3019)].
65. Fragment of wooden vessel, covered with turtle shell on interior and exterior [W243 from Tr. 5 (3019)].
66. Fragment of turned wooden vessel, diameter uncertain. Rounded body and stepped rim [W323 from Tr. 9 (7001)].
67. Fragment of turned wooden vessel, diameter uncertain. Rounded body and vertical rim. Traces of red pigment towards base on exterior wall [W363 from Tr. 8A (8251)].
68. Fragment of turned wooden vessel, diameter uncertain [W376 from Tr. 8A (8251)].
69. Remains of turned wooden vessel. Diameter: 260 mm. Rounded body and vertical rim. Two incised lines applied to exterior wall during manufacture [W377 from Tr. 8A (8251)].
70. Remains of turned wooden vessel. Diameter: 140 mm. Vertical body and rim remain. Vessel is decorated with red paint on the interior and bands of red, black and cream on the exterior [W379 from Tr. 8A (8251)].
71. Remains of turned wooden vessel, diameter uncertain. Flat to rounded base with vertical sides and rim. Interior coated in black paint/pitch, exterior wall decorated with bands of dark red, ochre and black [W390 from Tr. 8A (8251)].
72. Fragment of turned wooden vessel, diameter uncertain [W393 from Tr. 8A (8251)].
73. Fragment of wooden bowl body, diameter uncertain. Rounded body. Interior coating (possibly pitch) survives in places. Exterior is decorated with a broad band of red colour [W468 from Tr. 8A (8252)].
74. Fragment of wooden vessel, diameter uncertain. Vertical sides and stepped rim, flat base. Incised line of decoration 3 mm below rim. Mamluk [W481 from Tr. 5 (3026)].
75. Remains of turned wooden bowl. Diameter: 152 mm, height: 82 mm. Rounded body and base, plain vertical rim. Suggestion of the remains of dark red colour on the interior. Exterior decoration of alternating bands of thin red bands, plain bands and thick black bands [W540 from Tr. 13 (surface)] (Fig. 14.6).
76. Fragment of wooden bowl. Diameter: 340 mm. Wide rim, bulging on the interior [W600 from Tr. 13 (5521)] (Fig. 14.6).

Pens

Eight pens were excavated from Quseir al-Qadim. These were made from reed, mainly with split nibs and in some cases a decorated shaft. Some of these have the non-nib end trimmed off, but the remains indicated that this end had also previously been used as a nib before being trimmed.
77. Split-nibbed pen, round section. L: 95 mm, Diameter: 8 mm [W075a from Tr. 5 (3005)].
78. Split-nibbed pen, round section. L: 82 mm, Diameter: 8 mm [W075b from Tr. 5 (3005)].
79. Split-nibbed pen, round section. Worked to a nib at both ends, but one end has been snapped off, other end coated in black pigment. L: 91 mm, Diameter: 7 mm [W076a from Tr. 5 (3014)].
80. Pen, flat-sided point. Round section. Hole 40 mm from point, which is coated in black pigment. L: 235 mm, Diameter: 9 mm [W076b from Tr. 5 (3014)].
81. Split-nibbed pen, decorated with swirly lines running along its length. Round section. L: 130 mm, Diameter: 10 mm [W549 from Tr. 13 (5509)] (Fig. 14.7).
82. Split-nibbed pen, plain shaft with round section. Black pigmentation at nib end. L: 170 mm, Diameter: 8 mm [W557 from Tr. 13 (5510)].
83. Split-nibbed pen, round section, Black pigmentation at nib end. Other end trimmed off. Decorated with diagonal curls and swirls enclosed by three bands running around the body of the pen. L: 120 mm, Diameter: 8 mm [W644 from Tr. 13 (5519)] (Fig. 14.8).
84. Split-nibbed pen, round section. Other end trimmed off. Limited decoration of banding running around the body of the pen. L: 167 mm, Diameter: 8 mm [W645 from Tr. 13 (5519)].

Spoons

A number of wooden spoons were excavated from Quseir al-Qadim, presumably representing items used on a day-to-day basis across the site.
85. Wooden spoon, carved. Bowl and handle both incomplete. Projected bowl dimensions, L: 48 mm, W: 35 mm; surviving handle length: 85 mm [W002 from Tr. 2C (1011)].
86. Wooden spoon, carved. Bowl incomplete due to damage, handle tapers over its length, but is incomplete. Mamluk. Projected bowl dimensions, L: 55 mm, W: 35 mm; surviving handle length: 47 mm [W165 from Tr. 5 (3109)].
87. Spoon bowl, carved, partially preserved. Some of the handle also survives, round in section, Diameter: 7 mm, L: 72 mm, W: 22 mm, T: 12 mm [W575 from Tr. 13 (5508)] (Fig. 14.7).
88. Spoon bowl, carved, complete. Remnants of handle remain. L: 74 mm, W: 45 mm, T: 12.5 mm [W643 from Tr. 13 (5519)] (Fig. 14.7).

Miscellaneous

A range of wooden objects were excavated from Quseir al-Qadim which do not fit into any of the above categories.

89. Decorated triangular piece of wood, probably part of a book binding/hinge. One side is plain, the other displays carved decoration in the form of curves and scrolls. L: 70 mm, W: 45 mm, T: 6 mm [W506 from Tr. 8A (surface)] (Fig. 14.7).

90. Carved wooden object, possibly a key. Square sectioned body with protruding asymmetrical four-pointed stars, notched out section on one side. Damaged towards one end. L: 139 mm, W: 33 mm, T: 14 mm [W542 Tr. 13 (surface)] (Fig. 14.7).

91. Two pieces of wood, joined together by sewing. Although the use of sewing was common in Indian Ocean shipbuilding (see Chapter 15, this volume), the small size of this find suggests it does not have an overtly ship-related function. It is most likely part of a container, possibly a bucket stave. L: 220 mm, W: 35 mm, T: 5 mm [W568 from Tr. 13 (5508)] (Fig. 14.7).

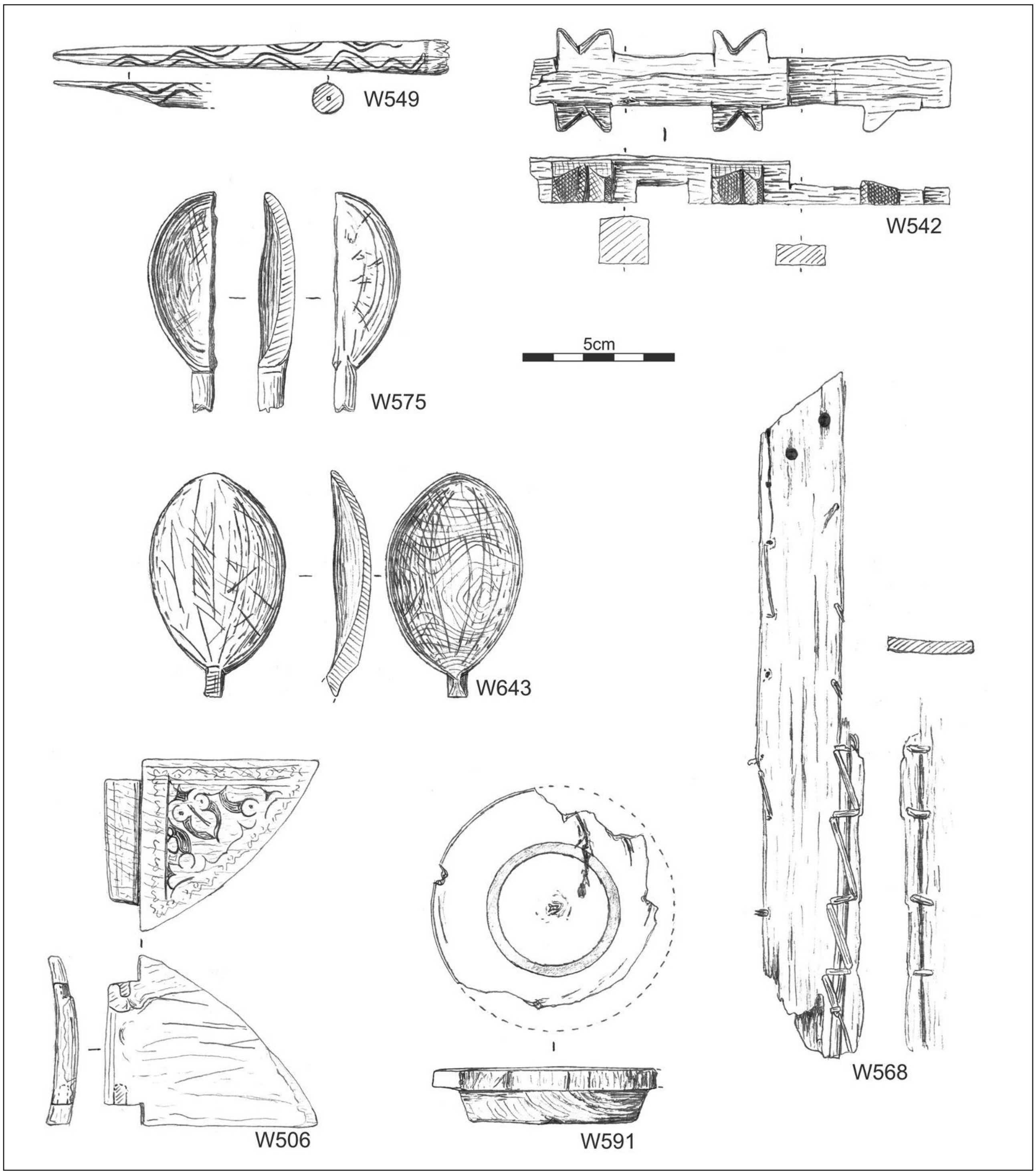


Figure 14.7. Miscellaneus wooden artefacts from Quseir al-Qadim. Nos 81 & 87-92.

Figure 14.8. Decorated pen from Trench 13. No. 83.

92. Turned wooden stopper/lid. Tapered body, Upper surface decorated with a circular red band. Diameter: 71 mm, vessel neck Diameter: 62 mm, T: 17 mm [W591 from Tr. 13 (5509)] (Fig. 14.7).

93. Carved wooden chess piece. Octagonal tapering body, curving and dividing to two points projecting horizontally at the front. This form of chess piece is generally assumed to be a "Bishop", having developed from an elephant shape rendered abstract to conform to Muslim practices (Hammond 1950: 104). Comparative pieces have been found in Nishapur, Iran (12th century) (Metropolitan Museum of Art accession Nos. 1971.193a–ff, 40.170.149) and Ribe, Denmark (P. Copeland pers. comm.) L: 39 mm, W: 25mm, T: 25mm [W28 from Tr. 2B (1586)] (Fig. 14.9).

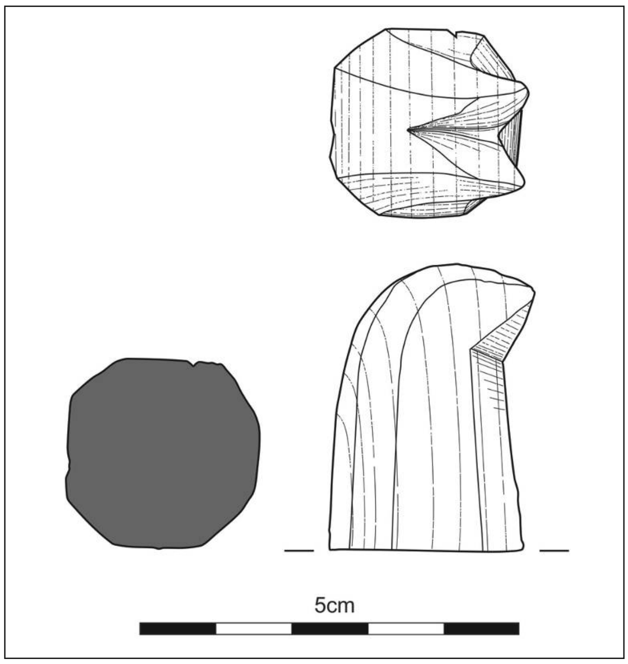


Figure 14.9. Chess piece from Trench 2B. No. 93.

14.3 Discussion

The wooden remains which are the subject of this chapter can be divided into three broad categories which are considered further below;

- Waste material produced during woodworking
- Recognisable objects or items, or their surviving parts (see catalogue above for examples)
- Wooden elements used in buildings

Wood-working waste material

Such material can generally be classed as the by-product of woodworking: off-cuts, chippings and splinters resulting from processing of raw timber or the secondary re-use of existing wooden artefacts. This waste material was common in the *sebakh* deposits of both periods. Its presence is in some ways surprising, as in a region with a relative dearth of fire wood, it might be expected that nearly all of it would have ended up as fuel. In reality the quantities excavated are very small, particularly when compared to the levels of similar material produced during experimental archaeological research in ancient woodworking practices. The waste material that has survived is nevertheless important as it provides evidence for the broad-range of woodworking tools used at the site in both periods: saws, adzes, axes, planes and drills, which themselves witness a correspondingly broad range of woodworking activity. The marks from a similar range of tools were evident in the wooden remains excavated at the contemporary site of Berenike (Vermeeren 1999a, 320; 2000, 342).

It can be safely assumed that the shipping frequenting Myos Hormos/Quseir al-Qadim would have required refit and repair at most times of the year. This is further confirmed by the presence of wooden hull remains (this volume, Chapter 15) suggesting that both shipbuilding and ship-breaking was taking place during both periods of occupation. Again, these observations are reinforced by similar practices evident at Berenike in the Roman period (Vermeeren 2000a, 340-1). The tools in use at the site, evidenced by the surviving wood chippings are consistent with those that could be expected to be used for shipbuilding activities (as well as general carpentry) in the Roman and Islamic period (c.f. Chapter 15, this volume).

Wooden artefacts

A second group of wooden remains can be distinguished on the basis of their manufacture for a specific, identifiable purpose, including combs, bowls, dice, stoppers, pens and utensils. These are representative of the everyday items, often utilitarian, that the inhabitants of the port would have used in both periods. The most striking thing about this group of artefacts is the similarity of surviving artefact types across the entire occupation of the site. Based on artefact type alone, it is very difficult to distinguish between the Roman and Islamic periods. This is perhaps less surprising when the ongoing need for everyday items such as bowls, combs, spoons, etc, is considered. The two periods of occupation illustrate little difference in this regard.

Similarly, the most common deposition of wooden artefacts in either period is in the rubbish dumps of the site. These dumps seem to be relatively informal areas, often in the corners of buildings (presumably abandoned) or against the exterior walls. In one case (Trench 6G) a *sebakh* seems to have been more actively managed with the provision of a retaining wall (Van Rengen and Thomas 2006, 149). The nature of this deposition (as rubbish), means that groups of artefacts that might normally be associated with one another (e.g. complete grooming kits) often lose their artefactual connections, both within material groupings, as well as across artefacts of different materials.

The main observable difference in the wooden artefacts from either period is purely subjective. Namely that artefacts from the Islamic period of the site appear to be more decorated than comparable items from the Roman period. A far greater proportion of Islamic combs are decorated (Figure 14.9), often with a more complex design than simply incised lines, which may be related to cutting the teeth (see below), than those from Roman contexts. Likewise, a higher proportion of wooden bowls are decorated from the Islamic period, than from the Roman period (Figure 14.9). The author wishes to draw no conclusions about the reason for these differences, but nevertheless feels that the reader should be made aware of them.

Maritime wooden artefacts

The role of Myos Hormos/Quseir al-Qadim as a port has resulted in the recovery of a large number of artefacts directly related to maritime activity. These artefacts have been interpreted on the basis of function, rather than material; pulley sheaves, brail-rings, ship-planks, etc are related to the construction and rigging of the ships and boats and consequently described in Chapter 15 of this volume. A further group of wooden artefacts, directly relating to fishing activity are described in Chapter 16 alongside other equipment in other materials (fish hooks, nets, traps, etc).

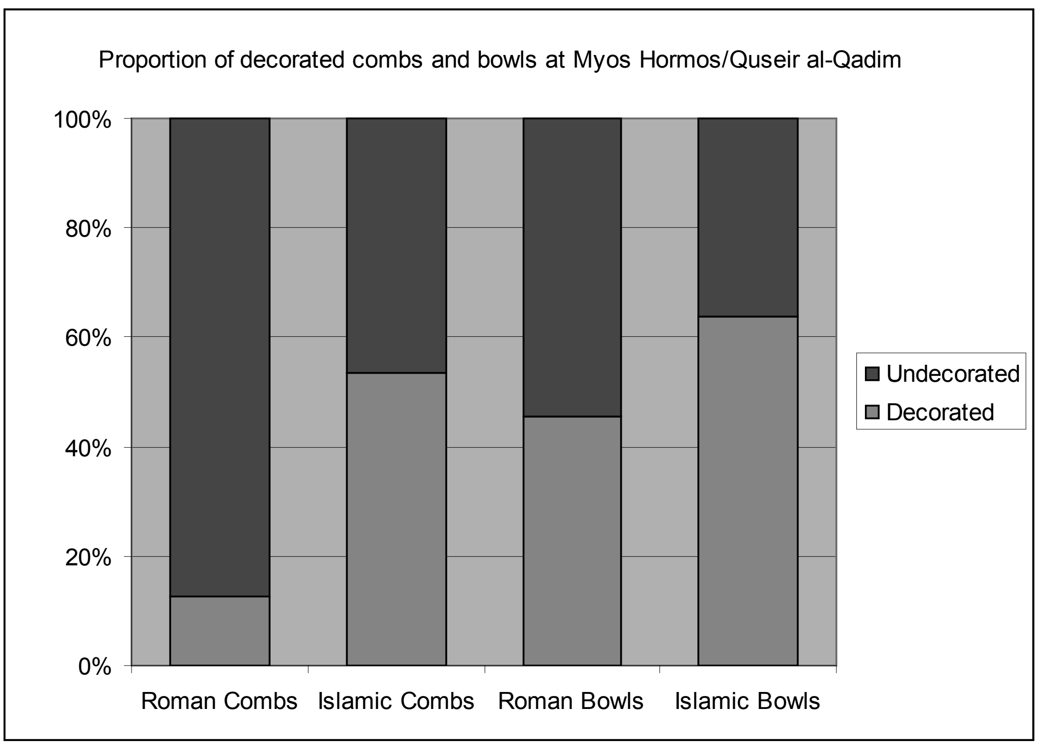


Figure 14.9. Graph illustrating the different proportions of decorated combs and bowls excavated from Myos Hormos/ Quseir al-Qadim. All excavated artefacts of these types are included.

Combs
All combs excavated from the site were one-piece combs. These are generally rectangular in shape with a row of teeth on either side, one usually coarse and the other fine. The central area of the comb can be decorated, either with simple patterning comprised of lines or with latticework cut into the body. Likewise the comb-ends are formed in a variety of ways, ranging from heavily concave ends through straight pieces, to very convex end pieces. In several cases where a single incised line is present it has been overlapped by the subsequent cutting of the teeth. In these cases it can be argued that the primary purpose of the line was to guide the cutting of the teeth, rather than as decoration.

The comb teeth are generally cut in two different ways (Fig. 14.5), either with a single cut from one side (e.g. W664) or with a double cut from either side (e.g. W548 and W596). In the latter case the point of the cut is in the centre of the cross-section. The double cut ensures that the comb's body is the same on both sides, while the single cut, especially when this is diagonal, leads to the two sides of the body being offset from one another (e.g. W664). The teeth are not always vertical when viewed from the side. For example W596 has a visible angle on the teeth of c. 5° from bottom-right to top-left. A considered and detailed discussion of comb distribution and manufacture in ancient and medieval Europe and the Middle East is provided by Bass (2004, 278-9).

Wooden Vessels
Thirty-three wooden vessels were excavated, dateable either to the Roman or Islamic periods of occupation. These represent a range of vessels, probably utilised within the houses of the port and serve to illustrate that not only ceramic vessels were used by its inhabitants. In nearly all cases the vessels are lathe turned, some remain plain while others are coated in a layer of *gesso* (plaster) before being decorated. Decoration generally consists of bands of colour, usually red, black, cream or ochre. In some cases decoration is created during the manufacturing process by lathe incised lines. The majority of the decorative elements, in both groups of artefacts were on the exterior walls of the vessel. The decoration was therefore meant to be seen primarily by people other than the user of the vessel.

Dice
Two dice were excavated from the upper contexts of Trench 8, identified by the excavator as being Roman in character (R.Thomas pers. comm.). The presence of such items at the site is not surprising and are representative of some of the activities that people may have undertaken during their spare time; gambling, gaming, etc. A wide corpus of artefacts related to gaming and gambling were excavated from the contemporary site at Abu Sha'ar (see Mulvin and Sidebotham 2004). The potentially significance lies in that the dice are not the cubic dice, numbered from one to six, that most Europeans are used to. Rather, they are rectangular stick dice, carrying only four numbered sides. Although comparative archaeological examples have proved impossible to locate, such dice are traditionally associated with the Indian Subcontinent, rather than Europe. Such items may have been brought to the site by sailors or merchants who had travelled to India as part of the trading activities based at the port. The possibility must also remain that such personal items were the property of Indian merchants or sailors residing at Myos Hormos. The presence of such individuals is attested by other archaeological (Tomber 2000, 630) and epigraphic (Saloman 1991, 731-6) evidence from Egypt and should not therefore be surprising.

Building elements
Finally, there is limited evidence from the Roman period for the wooden elements that were used within buildings at Myos Hormos. These come in two forms, screening or panelling, comprised of plastered plywood and more substantial wooden remains that formed thresholds, door-posts and similar structural features. The former was discussed above and little more can be added here, a few more words can be added about the latter. The best example of these timbers (W383) occurs in Trench 8A where it is used as a doorway threshold for a storage room dating to the early/mid-2nd century AD (Thomas and Masser 2006, 136). Notably, the timber carries many features that are not needed for its final purpose, but which are indicative of its original function as a piece of ship's planking. The maritime aspect of this timber is discussed in Chapter 15.

Little in the way of interpretation can be offered from these scant remains, other than perhaps a basic picture of the physical makeup of the buildings in the area of Myos Hormos around Trenches 8 and 8A. Such buildings were comprised of stone and mudbrick walls, the interior of which may have been lined or divided up using lightweight screening/panelling, probably painted red. Doorways were completed with sturdy wooden elements, in some cases formed from re-used ship's timbers. This final observation adds further emphasis to the impression of the importance of re-using and recycling wooden material at the site.

14.4 Conclusion

The data available from the corpus of wooden artefacts surviving at the site does not permit interpretation of the behavioural choices made by the site's inhabitants in a statistical, quantifiable manner. That exercise must be left to future volumes concerning the mass of ceramic data recovered during excavation and the analysis of consumption and use trends visible in that material. The wooden artefacts instead offer a much more informal, yet direct view into the everyday lives of the residents of Myos Hormos/Quseir al-Qadim. Through these artefacts we are able to connect with less tangible activities that are often absent from the wider archaeological record. We can get a feel for the manner in which people maintained their appearance, played games during their spare time or simply ate their food. Although often classed as an unglamorous, workmanlike material, many of the wooden artefacts are decorated, often with striking designs or patterns. The people of the site obviously cared for the aesthetic appearance of the items with which they conducted their lives. Even items that would inevitably be destroyed through use, such as reed pens, carried carefully worked decoration. Despite this, in both periods, when an item had reached the end of its useful life it was recycled, burnt or simply discarded on the rubbish dumps of the town.

The abiding impression of Myos Hormos/Quseir al-Qadim provided by the wooden artefacts is one of continuity. The large chronological gap in the occupation of the site is obvious. Likewise, there are obvious differences between Roman and medieval Islamic religous and social systems. Yet despite these reasons for differences, what we actually see are similarities in the way in which people conducted their lives in what must have been a relatively harsh and unforgiving location.

15 Ships and Ships' Fittings

Lucy Blue, Julian Whitewright and Ross Thomas

Introduction

From at least the middle of the 2nd millennium BC, Egypt was sending vessels to the mouth of the Red Sea, to Punt and beyond, to bring back myrrh and frankincense, along with other exotic artefacts of trade and tribute (Casson 1989, 11, nt.2; Bard and Fattovich 2003-4). However, it was not until descriptions given by the Classical geographers and accounts in the 1st century AD *Periplus Maris Erythraei* (Casson 1989) of voyages within the Red Sea and beyond, that detailed evidence for these seafaring activities was forthcoming. From the Ptolemaic period merchants plied the route to Arabia and India in ever-increasing numbers. Strabo (Geog. 2.5.12) states that 'Now 120 ships sail from Myos Hormos to India' contrasting this with the limited evidence of such voyages of the past. Both the archaeological and documentary evidence indicate that the harbour of Myos Hormos, with its sister port Berenike to the south, played a major role in facilitating trade along the northern reaches of the Red Sea coast and the Indian Ocean (Sidebotham 1986; 2011; Casson 1989; Peacock and Blue 2006; Tomber 2008). However, activity at the port of Myos Hormos ceased sometime in the 3rd century AD, to be revived some 1000 years later when the Islamic port of Quseir al-Qadim was created. It is described by Arab geographers as the Red Sea port of Qus (Garcin 1976; Whitcomb and Johnson 1979, 3) and for a while operated alongside the chief port in this region, 'Aydhab, facilitating trade and overseeing the protection of pilgrimage to the Holy Cities. Yaqut (626/1228) describes it as 'a harbour of Yemenite ships', and Qalqashandi writing in the 14th century, recorded how ships frequented the port in order to transport merchandise the shortest distance across the mountains to Qus (Al-Qalqashandi 1913–20, iii, 465, cited by Whitcomb and Johnson 1979, 4). Archaeological evidence confirms activity at the site until the beginning of the 16th century when operations appear to have shifted south to the present town of Quseir (Peacock 2006, 4).

Excellent organic preservation has permitted the recovery of maritime finds to supplement the meagre historical accounts. Whitcomb and Johnson (1979, 203) record metal nails indicating ship building activities, fishing hooks, sail makers awls and needles, as well as toggles and pulleys. The list has now been substantially supplemented by the Southampton excavations. Direct evidence for ship construction is limited but the discovery of the Roman harbour front (see Chapter 4, this volume) and the recovery of maritime finds including wooden and horn brail rings, sheaves, sail fragments and a deadeye, fragments of lead sheathing and hull planking, contribute to an enhanced appreciation of the maritime context (c.f. Whitewright 2007). This chapter will highlight the specific artefacts that provide detail of the ships and their rigging in both the Roman and later Islamic periods.

15.1 Hull Remains

Lucy Blue and Julian Whitewright

Hull remains are extremely rare finds in the Red Sea. To date no single ancient shipwreck preserving hull features has been recovered from the region and historical accounts provide limited detailed accounts of vessel construction. The finds, particularly from the Roman contexts at Quseir al-Qadim, together with material recovered from its sister port Berenike (Vermeeren 1999a, 316), have revealed detail of Roman hull planking hitherto unavailable, adding greatly to our understanding of the vessels and their construction. The recovery of reused Islamic sewn timbers, previously utilised in ship building, remains a unique archaeological find.

Roman hull remains *(Julian Whitewright)*

Two pieces of wooden planking were excavated during the 2002 season, both reused in secondary Roman contexts, from Trench 8A (Fig. 15.1). One piece (W467) is fragmentary while the other [W383] is relatively complete, although altered from its original state. Both planks were fashioned by sawing. The larger piece (W383) appears to have been reused at least once before ending up in a 2nd century AD context as a structural element in a doorway. The dimensions and shapes of the planks have been altered due to reuse and degradation, however both display mortise and tenon joints with a number of tenons and pegs (treenails), that would have secured the tenons, still *in situ*. W383 is 862 mm in length, with an average width of 130 mm and a consistent thickness of 50 mm. The average dimensions of the mortises of the larger plank are 70-90 mm deep by 60 mm wide, the one visible tenon is 6 mm thick and the pegs are 12 mm in diameter. The mortice and tenon joints are spaced at an average of 80 mm apart. Three additional features are present on the plank, probably resulting from reuse. At either end of the plank a recess as been carved, these are equidistant from a pair of square holes which are arranged in the centre of the plank. The second, smaller plank (W467) is 275 mm in length and of consistent width (60 mm) and thickness (30 mm). The smaller plank had one mortise that was 60 mm wide, the tenon was still in place and measured 40 mm wide; the peg hole is 5 mm in diameter.

Interpretation
The most characteristic feature of the planking elements described above is the remains of mortice and tenon joinery along the plank edges. This type of edge fastening is typical of the shell-first tradition of shipbuilding which was common in the Mediterranean until the late antique period (for examples see Pomey 2004; Steffy 1994, 23-78). The use of mortice and tenon edge fastening may indicate that the planks are reused fragments of ships, built in the Mediterranean tradition which visited Myos Hormos during the Roman occupation of the site and which were subsequently repaired or broken up there. Little is known about the construction of indigenous ships of the Indian Ocean during this period, but they are generally described, by Mediterranean observers as being of the sewn construction technique (Procopius I.xix.23-26; *Periplus* 36; Hourani 1995, 92). The remains of planking from Myos Hormos and comparable reused planks from Berenike (Vermeeren 1999a, 316) may indicate that at least some of the shipping engaged in the trade between

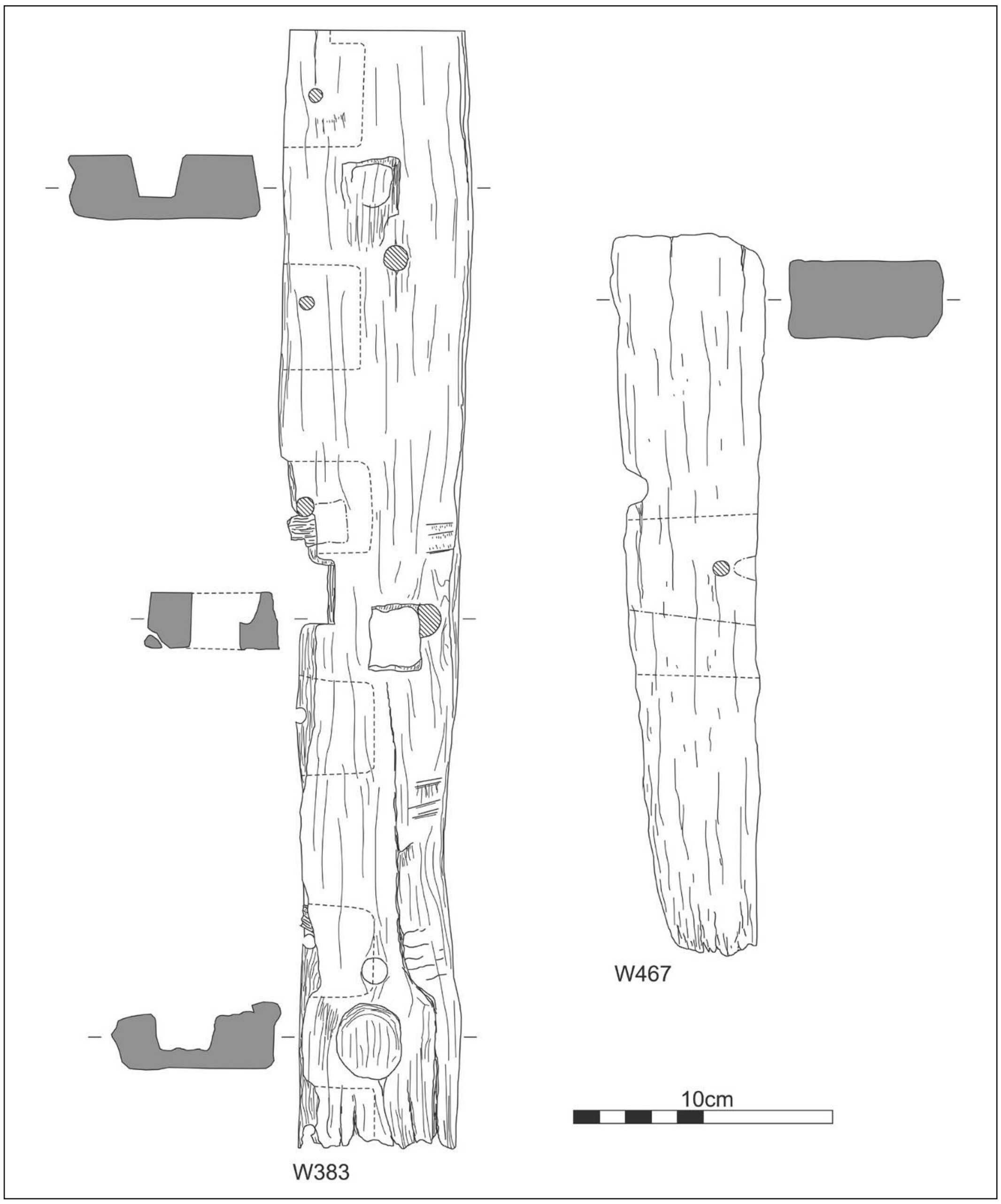


Figure 15.1. Re-used planks from Myos Hormos.

the Red Sea and the wider Indian Ocean was constructed according to the Mediterranean shipbuilding tradition of the time.

Islamic hull remains *(Lucy Blue)*
Excavation of medieval Quseir al-Qadim was more limited than the investigation of the Roman settlement, although the medieval necropolis (Trench 1A) proved to be a fruitful source for Islamic ship finds (Fig. 15.2).

The necropolis, first excavated by Whitcomb and Johnson (1979, 57-61, plate 18), besides numerous skeletal remains (see chapter 21, this volume) produced wall remains some 0.5 m in height, possibly a monument or mausoleum, both above and adjacent to the burials. A single piece of blue and white Chinese porcelain dating to the early to mid 15th century AD was recovered from the base of this structure.

Grave structures were rarely encountered but one, Tomb 1 (Burial 61) was a mudbrick lined, cist-type grave c. 1 m below the surface and sealed with timber planks (Fig. 15.3). Within the grave the body of a 35-40 year old woman was found (Macklin 2000, 49). A second burial (Tomb 2) was located just to the south of Tomb 1. It was also overlain with planks, but in this case the mudbrick grave lining was absent. Tomb 2 was covered with short, stocky and irregularly shaped reused timbers that had once been fastened by iron nails. The planks associated with Tomb 1 were more regular in shape, and had originally been fastened by fibres, sewn through holes along their edges (Fig. 15.4). In this reused context, the planks were no longer attached to each other, lying some 20-40 mm apart over the top of the grave. It is likely that both sets of timbers were reused boat timbers, as one displayed the characteristics of sewn boat timbers, and the other possibly boat timbers that had been secured by iron nails

Tomb 1 (Burial 61)
Eight planks were excavated (between 700–980 mm in length; 100-160 mm in breadth; 30-35 mm average thickness; Table 15.1). Of those timbers whose species was identified, the majority (Planks 1-6) represent an unidentified hardwood, probably non-native to Egypt, but not *Tectona* sp. or teak wood as preliminary identification indicated (Blue 2006c; also Chapter 17, this volume). Plank 7 is tentatively identified as cf. *Afzelia*, belonging to the *Leguminosae* family (Chapter 17, this volume). All planks had traces of what is believed to be bitumen, pitch or mastic on at least one side (some had traces on both sides and/or along the plank edges). The substance was not scientifically analysed and so the term 'bitumen' is used as shorthand for what might have been any of these

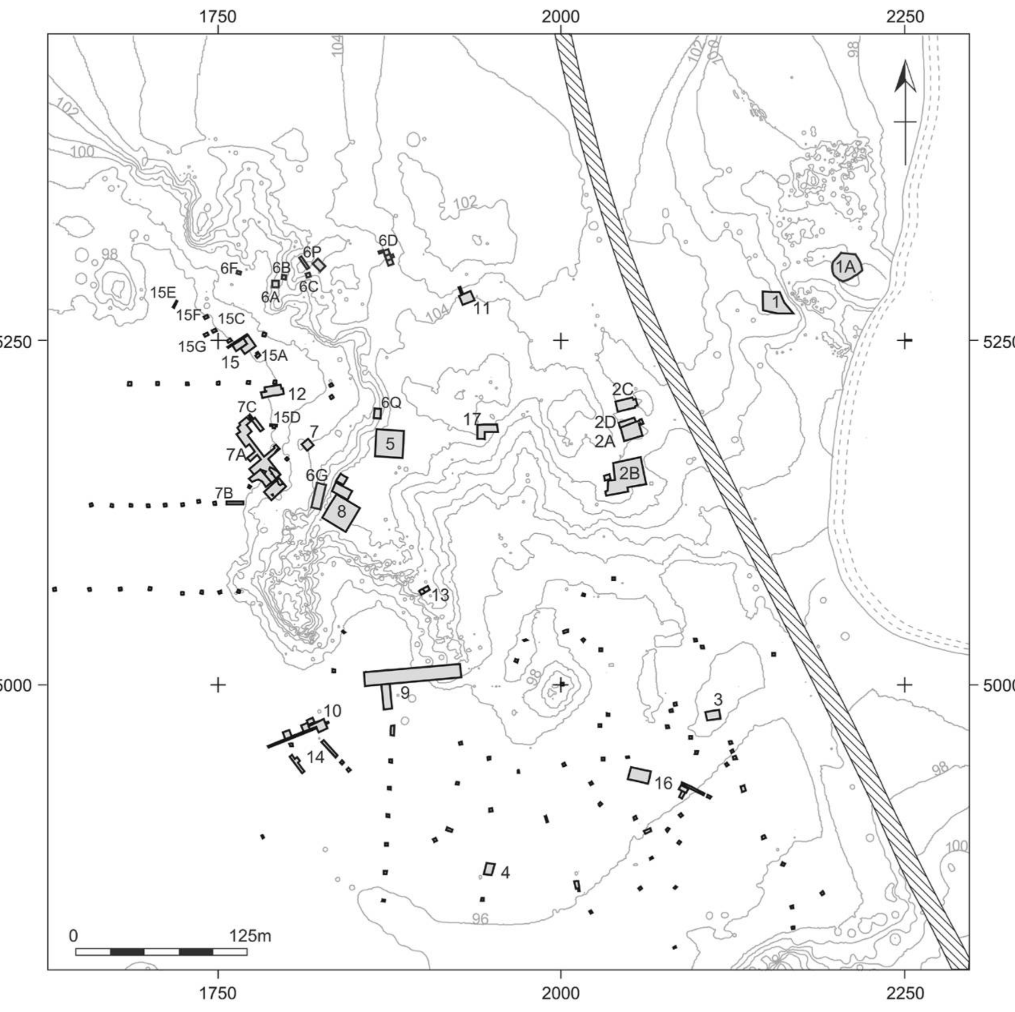


Figure 15.2.
Site plan showing the location of trenches excavated during fieldwork.

Plank Number	Length	Breadth	Width
Plank 1	98	12.5	2
Plank 2	86	10	3.5
Plank 3	97.5	13.5	2
Plank 4	c.44	c.13-16	c.3-3.5
Plank 5	76	15	3.5-4
Plank 6	90	16	3
Plank 7	77	11.5	3.5–4.5
Plank 8	70	11.5	4

Table 15. 1. Tomb 1, Burial 61, Plank dimensions (cm), preservation of Plank 4 was relatively poor.

substances. The majority had matting on the same side. Some planks also had traces of burning on one side, while all but one (Plank 8) had drilled holes, with a maximum diameter of 15 mm and average 10 mm, located along the edges, generally but not always, along both. Four planks with holes had coconut coir and wooden treenails still *in situ* extending through the thickness. The majority of holes were located along the longitudinal edges and were generally driven at a slight angle through the plank thickness. They were located at a regular distance from the edge (this varied from plank to plank from 20-35 mm, but tended to be similar on the same plank). They were positioned 20-65 mm apart (average 40-65 mm). A number, located along the plank edges were fed by a channel or groove recessed into the wood on one side of the timber. The recess extended at a right angle from the hole to the plank edge. Some of these recessed channels had coconut coir *in situ* (Fig. 15.5). Some planks had additional holes drilled into the centre of the plank often in pairs. They extended along the length and the average distance between pairs of holes was 70 mm.

One of the eight planks (Plank 6) had what could be interpreted as a 'frame palimpsest' on one side (Fig. 15.5). The impression or shadow was c. 65 mm wide and was located on the opposite side to the recessed stitching, the bitumen and the matting. Some planks had notches (Nos. 2 and 3) on their edges, while others were scarfed at the ends (Nos 1, 8 and 3) or had bevelled edges (Plank 6; Fig. 15.5).

Interpretation of the timbers from Tomb 1

The characteristics of the timbers recovered from Tomb 1 would appear to indicate that they were formally used in the construction of a sewn plank-built vessel. The timbers had been deliberately planked to an appropriate thickness and regular shape. The presence of holes along the plank edges, stitched with coir and subsequently pegged, is a common characteristic of sewn constructed vessels (McGrail and Kentley 1985), although at present there is no indication of the former sewing pattern, other than the association between the holes and recesses for stitches, described above. Future analysis of the relationship of holes within and between planks may help identify the sewing sequence and perhaps explain the presence of seemingly random holes in the planks – were they integral to the sewn vessel or associated with a later reuse or repair? The fact that both the bitumen and the recesses for the coir stitches are uniformly located on the same side of the planks, would indicate that this particular side of the planks had originally been on the outside of the hull. The practice of cutting recessed channels from the stitch hole to the edge of the plank on the outside of the hull has been identified as a feature of sewn boat construction and is seen as a means of protecting the coir stitch. As Severin (1985, 283) observed in the construction of the Omani Boom Sohar 'a groove was cut between the pairs of holes, on the outside of the hull, so that the cord was recessed and protected from chafe'.

Plank 6 (Fig. 15.5) has what is probably the palimpsest of a frame on the alternate side from the bitumen and recesses for the coir stitching, originally positioned inside the hull. A pair of holes associated with this may indicate how the frame had originally been secured to the hull. It seems that the frame was originally lashed to the plank by coir passing through the holes. A number of additional centrally placed pairs of holes have been identified but no additional frame impressions are discernible. However, a number of these central pairs of holes are associated with recesses for coir stitches on one side of the plank, again the same side as the bitumen, the side that is believed to be the exterior of the former hull of the vessel.

Tomb 2

Seven planks were found (between 370-500 mm in length; 190-250 mm in breadth; 25-55 mm thick; on a second tomb (Table 15.2). All the planks appear to have been deliberately cut to a regular length, perhaps to fit the tomb. All the planks were of similar rectangular dimensions with the exception of Plank 1 that was scarfed so that one edge was 370 mm and the other side 85 mm. The timber has been identified as common Egyptian species (Chapter 17, this volume)

Plank Number	Length	Breadth	Width
Plank 1	37-38.5	20	2.5
Plank 2	48	23	5.5
Plank 3	50	24	4
Plank 4	50	23	5
Plank 5	50	25	5
Plank 6	50	23.5	5
Plank 7	37	19	5.5

Table 15.2. Characteristics of planks from Tomb 2, all dimension given in cms.

All planks except Plank 1, had traces of bitumen on one side and iron nails or holes where iron nails had been. Those still *in situ* were nailed from the pitch side of the plank and the head of the nail was always flush with the plank, and did not always extend through its entire width.

Figure 15.3. Tomb 1, sealed with timber planks.

Figure 15.4. Tomb 1, Plank 6 in situ.

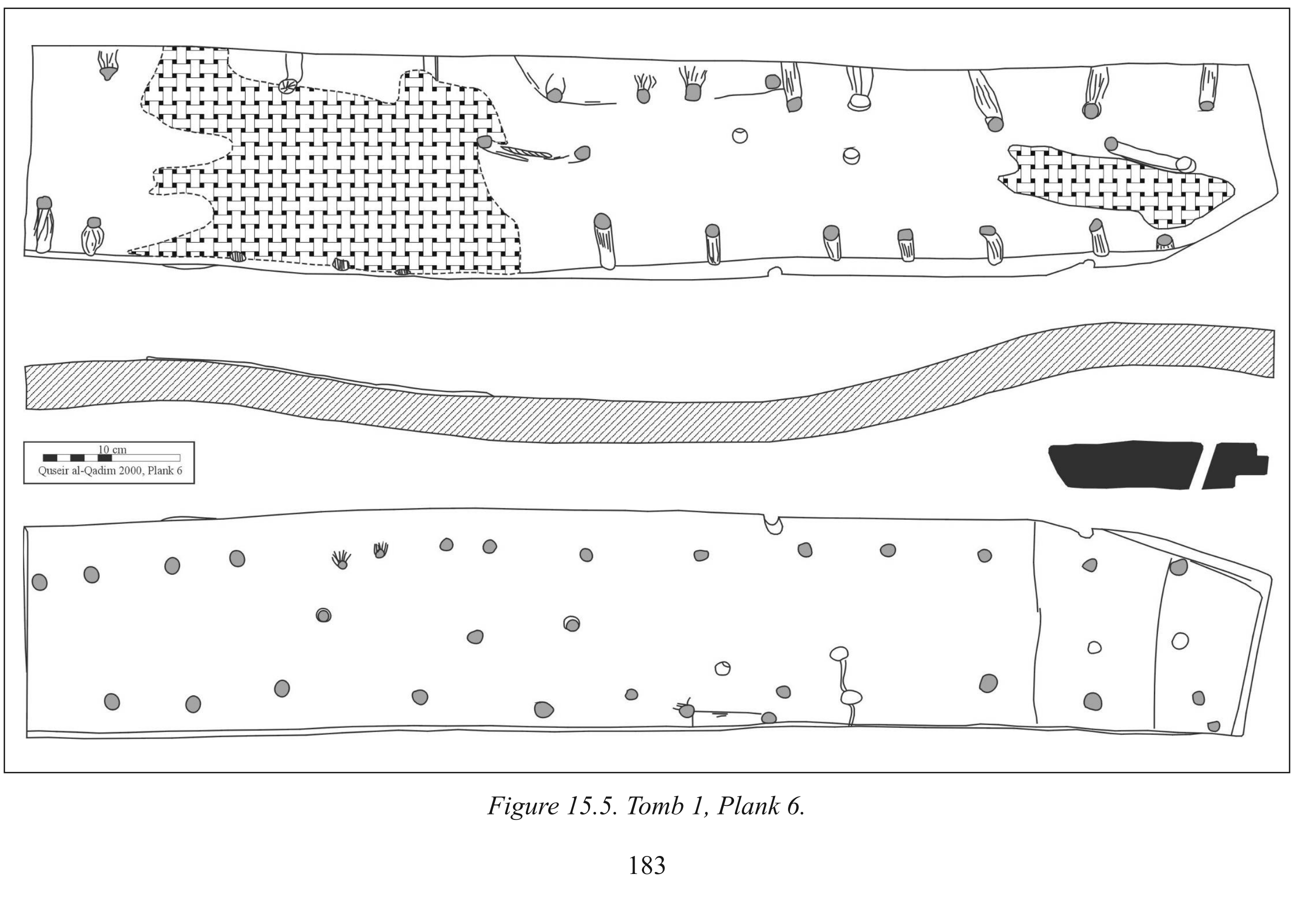


Figure 15.5. Tomb 1, Plank 6.

Some displayed tool marks and when damaged or naturally cracked, wadding was placed in the holes to act as a filling. Three of the planks had matting on one side, the same side as the bitumen.

Interpretation of timbers from Tomb 2

The timbers from Tomb 2 were much more regular in shape, being stockier and generally shorter than those from Tomb 1. It is assumed that they were cut to fit the tomb and had originally been much bigger. All timbers with iron nails still *in situ* had been nailed from the same pitched side, giving the impression of nailing from the outside of the hull to the inside.

Dating of the burials

No grave goods were found in association with the burials, other than traces of cloth wrappings. However, the construction of overlying walls suggests that the burials pre-date the buildings and were earlier, but no later than 15th century AD. The earliest occupation of the medieval Islamic site of Quseir al-Qadim is late Ayyubid, giving a potential date range between the late 12th and early 15th centuries AD. However, the planks have obviously been reused and thus their original use as planks in a vessel of sewn construction could pre-date the medieval Islamic necropolis.

Interpretation

Recent discoveries at the medieval Islamic site of Quseir al-Qadim afford direct archaeological evidence for the construction of both sewn and iron nailed plank-built vessels of the Indian Ocean, broadly between the end of the 12th and the beginning of the 15th centuries AD. The practice of sewing planks with coconut coir for the construction of boat hulls, is believed to have been widely practiced in the Indian Ocean region and is still employed in the construction of sewn vessels in southern India and nearby islands today (personal observation; Hourani 1995, 91; Villiers 1952, 40; Johnstone and Muir 1962; Johnstone 1988, 178). The distinguishing feature of Arab craft of the Indian Ocean from antiquity through to the late 20th century, is generally agreed to be 'the use of fibre, rather than nails, to sew the planks of hulls together' (Said 1991, 107), although very limited evidence exists to support this theory. The Quseir al-Qadim planks thus provide an insight into medieval boatbuilding techniques of the Indian Ocean.

The earliest sewn boats come from Ras al-Jinz in Oman where they date to the third millennium BC (Cleuziou and Tosi 2000). The first historical reference to 'small sewn boats' is in the 1st century AD *Periplus* (Casson 1989, 141, 15.5.30), but most of the evidence for traditional Arab practice is restricted to later references by travellers, historians and geographers, and to a few sketchy iconographic depictions.

In the 6th century AD Persian Gulf, it appears that 'all the boats which are found in India and on this sea… are bound together with a kind of cording' (Procopius *Bel. Pers.* I.19.23). Abu-Zaid Hassan of Siraf, writing in the 10th century AD, describes how the people of Oman travelled to the Maldives and Laccadives and having felled and prepared the timbers, stripped the bark of coconut trees to produce yarn 'wherewith they sew the planks together'. In the 12th century AD Ibn-Jubayr describes the sewn vessels built at 'Aydhab in more detail, 'For they are stitched with cords of coir, which is the husk of the coconut, this they thrash until it becomes stringy, then they twist from it cords with which they stitch the ship' (Hourani 1995, 92; McGrail 2001, 72).

Images of sewn boats may date from as early as the 2nd century BC (Mookerji 1912, 32). The painting that accompanies the 1237 AD manuscript of Al Harīrī's Maqamat from Iraq, is a most convincing example. It shows a double-ended vessel with sewn planking (Hourani 1995, 92, plate 7). Beyond the Indian Ocean, a recent archaeological discovery of a 9th century AD shipwreck of a sewn constructed vessel in Indonesian waters, but of Arab (western Indian Ocean) origin, provides detail of the stitching technique employed (Flecker 2000).

Marco Polo visited the Persian Gulf twice at the end of the 13th century AD and describes the ships as 'bad' and states how 'many get lost for they have no iron fastenings, being only stitched together with cord made from the husk of Indian nut' (Villiers 1952, 40; Johnstone and Muir 1962). In the 14th century, Friar Odoric described sailing from Bombay to Ormuz in a similar 'bark compact together only with hempe' (Johnstone 1988, 178). Vasco da Gamo noted Arab vessels along the coast of Mozambique in the 15th century AD built without nails, their planks being held together by cords, as did Lancaster a century later (Johnstone and Muir 1962; Stanley 1898, 26). There are still a number of examples of stitched vessels in use around the shores of the Red Sea and Indian Ocean, including the *sambuk* of the Dhofari coast of Oman; and the *masula* and the *vallam* of India (McGrail and Kentley 1985).

The implication therefore is that iron nails were not adopted in the construction of boats and ships in the region until the arrival of the Portuguese and that even then the practice of attaching planks by means of stitching was not abandoned (Moreland 1939; Hornell 1942; Johnstone and Muir 1962). However, if the timbers from Tomb 2 at Quseir al-Qadim are in fact reused ship timbers then the introduction of iron nails in the construction of vessels may well have occurred prior to the Portuguese arrival.

Timber from the Islamic Harbour

The probable extent of the Islamic harbour has been suggested (Blue 2006a) on the basis of sedimentological analysis. In the course of this work, a timber from a ship or boat was excavated from Pit 8600, located in sediment associated with the Islamic harbour area. The timber (Fig.

15.6) was recorded before being preserved *in situ*. It is likely to be part of the framing system of a vessel, either a half frame or futtock. The timber is square in section with a width of 90 mm and a thickness of 100 mm, it is 1.23 m from tip to tip. The timber appears to be unused; there are no marks or holes as a result of nailing/tree-nailing/sewing on any of the surfaces. A series of saw marks survive along the entirety of one side. This implies that the timber was originally manufactured as part of a pair of frames. This involves shaping the wood before sawing it down the centre to produce a pair of identical framing timbers, hence the saw marks on one side only. Why the timber was then deemed surplus to requirements will probably remain a mystery, but it does indicate that boat repair or building was being carried out at the Islamic harbour of Quseir al-Qadim. The location of this find just on the edge of what is believed to be the land/ marine embayment interface at the back of the former channel/Islamic harbour, perhaps indicates an area of boat building activity. This find compliments what are believed to be the remains of wood chippings perhaps also associated with boat repair uncovered in Trench 16A (Peacock and Blue 2006).

15.2 Shipbuilding, Maintenance and Repair in the Roman Era

Ross Thomas

Further details on ship and boat hulls come from a range of artefacts made from wood, copper, iron, pitch and lead as well as faunal evidence of antifouling (removal of shellfish from the hull). In combination these artefacts can inform us about the maintenance of hulls. Because the artefacts represent a range of different hull maintenance activities, the evidence for woodworking, wood treatment, antifouling and lead sheathing will be treated separately in the following sections.

Woodworking

Wood was probably an expensive commodity in Myos Hormos because it had to be transported across the Eastern Desert, where it was taxed (Lewis 1983, 141; Bülow-Jacobsen 2003, 420; O.Krok.41). Large straight pieces required for planking were exceptionally expensive (Lewis 1983, 141; Meyer 1992, 48; O.Krok.41, Bülow-Jacobsen 2003, 420; Bagnall *et al*. 2005; Sidebotham 2007) and have only been found to date in the archaeological record following a long history of reuse and removal from their original maritime context, such as structural elements around the Roman town in Myos Hormos (Thomas and Masser 2006). The by-product of woodworking, the chips and shavings of the shipwright's craft, are preserved in some areas of Myos Hormos, when not used as fuel. Their preservation was restricted to the anaerobic conditions of the silted lagoon and the desiccation of the sites in higher places. Despite these limiting factors, the occurrence of woodchips indicates woodworking, of which most is likely to represent ship or boat building.

In the Roman harbour, woodchips were absent in the north (Trenches 6F, 12 & 15), though found in the main area (Trenches 7, 7A & Pit 10100). Just east of the harbour,

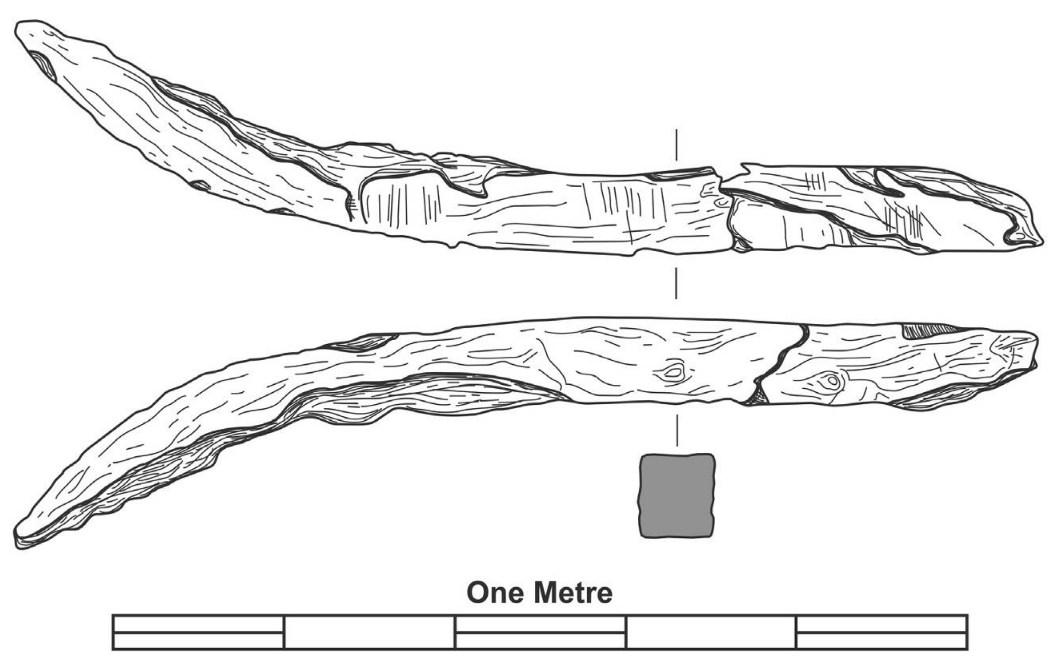


Figure 15.6. Timber framing element from the Islamic harbour.

there were large quantities in the rubbish dumps adjacent to the Roman town (Trenches 6A, 6B, 6C, 6G, 6H, 6J, 6Q, and 6P). There is a noticeable absence in the south (Trenches 9 and 10), though large quantities were found in Trench 14. Woodchips were rare (Trenches 8 and 11) or absent in the Roman town and rubbish dumps to the north (Trenches 6E and 6D), except Trenches 17 and 2B, where considerable quantities of woodchips were found alongside maritime artefacts.

Among the wood species used in the construction of hull and rig were a predominance of Indian and East African teak and blackwood (Chapter 17, this volume). The presence of woodchips confirms that the wood used was shaped (or re-shaped) in Myos Hormos, as was also the case at Berenike (Vermeeren 2000b), where the identified woodchips were mainly teak, but also included local lagoon or desert species (acacia, mangrove, palm and tamarisk), Mediterranean conifers, oak and elm and bamboo (Vermeeren 2000a, table 2). The context suggests that these woodchips most probably result from the work of shipwrights.

Wood treatment

Teak was renowned in antiquity for its resistance to decay (Vermeeren 2000a, 8, quoting Theophrastus). Despite this, all-wooden hulls require constant maintenance to protect the wood from rotting, joints from leaking and to prevent marine borers from damaging the wood. Greco-Roman ships from the Hellenistic period to the 3rd century AD were sealed with pine pitch (Meiggs 1982, 467) or bitumen and often sheathed with lead sheets, attached by broad headed copper tacks, for protection against boring molluscs such as Teredo navalis (Parker 1992; Hocker 1995; Steinmayer and MacIntosh Turfa 1996).

Waterproofing was made from a composite of resin or pitch mixed with hardening agents, fibre or material and/or wax as well as pigments (Hocker 1995, 199; Collombini *et al*. 2003, 659). This was applied to the outside, to protect from borers, rot and fouling and inside to protect from rot caused by bilge water and can be found in boats of the classical Mediterranean (Parker 1992, 27; Hocker 1995, 199). Numerous resinous lumps have been found at Berenike and in Myos Hormos (Thomas and Masser 2006), though a direct association with ship maintenance is unproven as pine pitch was also used for sealing wine amphorae (Thomas and Tomber 2006). We know that some of this pitch was applied to ships hull, because it was found on numerous barnacles with wood impressions (Trench 10 and 14) that had been removed whilst 'antifouling' ships or boats (Whittaker 2006; Whittaker *et al*. 2006). The hearths in the harbour area may have been used to heat the bitumen to use in the sealing boats hulls as it was associated with other artefacts from ships (Trench 12, Blue 2006b; Trench 15, Thomas 2006; Trench 14, Whittaker 2006; Trench 10, Whittaker *et al*. 2006). The sealant was clearly transported across the desert, as indicated by a papyrus from Berenike, listing as a type of gum used for 'outfitting a ship' (Bagnall *et al*. 2005, 45-7). Pitch sealant was also found on ships planks reused in the construction of structures in Berenike (Trench 10, Vermeeren 2000a, 5, table 2).

Antifouling

Pitched hulls were not always sheathed with lead at Myos Hormos, and pitch alone was no proof against fouling or marine borers. Fouling is the growth of various shellfish and seaweed on the hull of the boat that both reduces efficiency when travelling through the water and can weaken the hull itself. Thus removal of this growth would have been an important occupation of boat crews. Barnacles with wood and pitch impressions were found on the southern foreshore (Fig. 15.7) (Trench 14, Whittaker 2006; and Trench 10, fig. 14. 2, Whittaker *et al*. 2006). They are a variant of acorn barnacle that can grow very rapidly, slowing a boat by up to 40% after just six months growth (S. Hamilton-Dyer pers.comm). The barnacles live from one to seven years, though are likely to have been removed at the first opportunity by boat crews, because of the detrimental effect on vessel performance. The Greeks used pitch to dissuade growth, whilst the Romans knew that copper nails poisoned them (Hocker 1995, 197; Laidlaw 1952, 211-2) possibly explaining the extensive numbers of copper alloy tacks recovered from Myos Hormos.

Lead sheathing

Lead sheathing is attested on the hulls of 5th century BC to 2nd century AD wrecks in the Mediterranean (Parker 1992, 199). It consists of large sheets 1-2 mm thick that were laid over the pitch waterproofing and held in place by copper tacks in a characteristic "quincunx' pattern (Hocker 1995, 197). Lead sheeting fitting this description was found in Myos Hormos in the harbour area (Trenches 7 and 7A, Blue and Peacock 2006, 67-94) alongside flat headed, square sectioned tacks with grips (Fig. 15.8). The tacks are almost always made from a copper alloy, although one iron example was found. They have heads c. 20 mm diameter with grips on the inside. The shafts are square in section and usually a little over 30 mm long. Many other nails and possibly roves from clenched nails (Fig. 15.8) were also found that may represent shipbuilding and ship maintenance, though only these sheathing tacks can be exclusively associated with maritime activity (see Chapter 10, this Volume). The sheeting is c. 2 mm thick and possesses clear impressions of the sheathing tacks heads with grips and square shafts (Fig. 15.8). In the harbour areas a number of hearths (in Trenches 12 and 15, Blue 2006b; Thomas 2006) and metal working installations (Trenches 10 and 14, Whittaker 2006; Whittaker, *et al*. 2006) were associated with these artefacts (Whittaker *et al*. 2006) suggesting they were made or modified there. The sheeting was also found in a 2nd to 3rd century store of fragmentary damaged artefacts in Trench 8 ([8308 and 8356], Thomas and Masser 2006) alongside tacks and elements of hull, possibly for re-use. A few examples were found in trash dumps between the town and harbour (Trenches 6G, 6H, 6J, 6B, 6C, 6D and 6L, Van

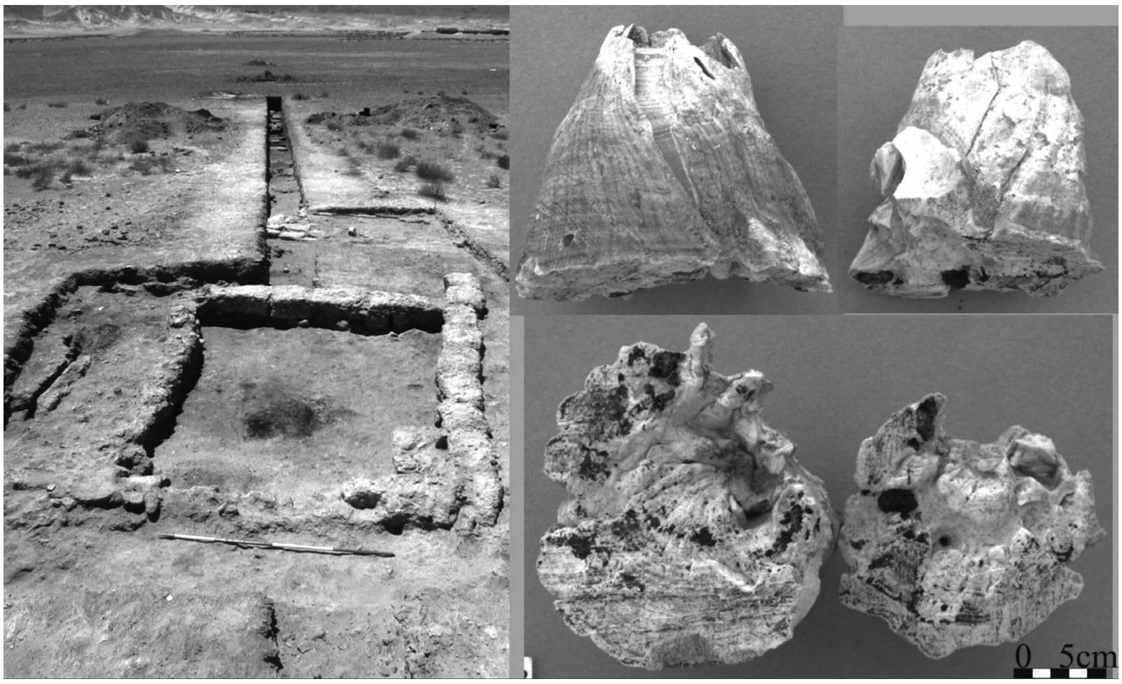


Figure 15.7. Barnacles (right) with pitch and wood, from Trench 10 & 14 (left).

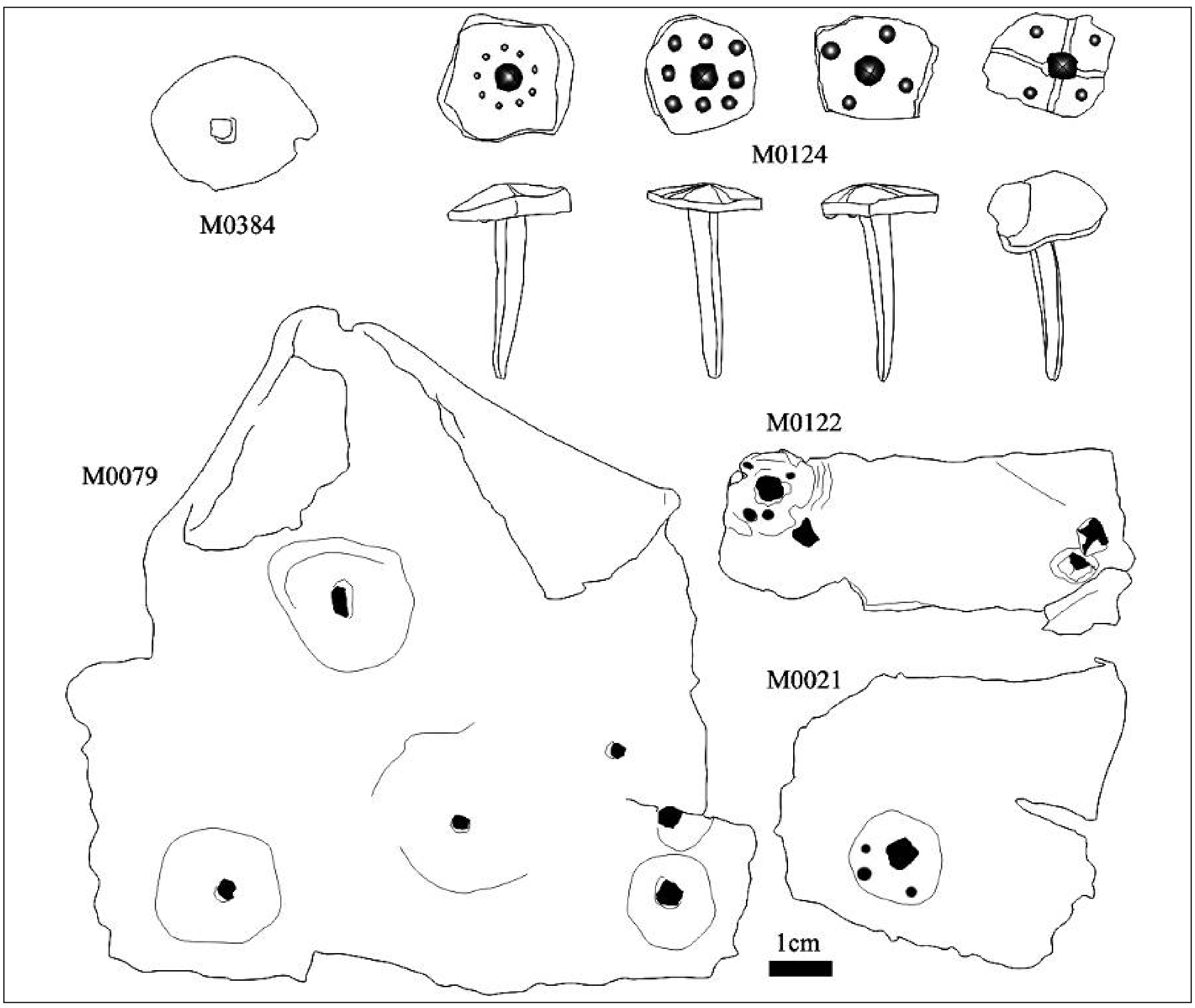


Figure 15.8. Lead sheathing, tacks and putative rove.

Rengen and Thomas 2006), though they were rare in the Roman town.

Large quantities of lead sheeting were also found at Berenike, where 95 kg of lead sheet was found in Ptolemaic deposits from Trench 36 alone (Sidebotham and Wendrich 2007, 36). The large quantity of lead found there may be explained by the construction and fitting out of large vessels called *elephantagas*, built from the Ptolemaic period onwards to transport elephants from Africa to Egypt, as discussed in a papyrus from the Fayum (Sidebotham 2007) and a number of classical sources (Agatharchides; Strabo; Diodorus). Storage of sheathing in Myos Hormos may represent preparation for repairs, as suggested by spare rolls of sheathing found on wrecks off the coast of Israel (Rosen and Galili 2007, 2).

The perceived benefits of lead sheathing are various and debated. Complete sheathing could prolong the life of a seriously deteriorated hull (Hocker 1995, 197), possibly by protecting the pitch sealant from wear or detritus, by forming a barrier against fouling and marine borers, by sealing joints and seams, by increasing rigidity, preventing sagging, by patching areas of damage or rot and perhaps by ballasting, though the latter is now widely discredited (Parker 1992, 199; Hocker 1995, 198-200; Kahanov 1999).

By the 3rd century AD lead sheathing was abandoned across the Mediterranean, possibly due to cost, particularly growing labour costs. It was replaced by driven or clamp seamed caulking, imported from northern Europe (Parker 1992, 199; Hocker 1995, 202). Though lead may have been cheap in antiquity (Hocker 1995, 199-200), we can only assume that the transportation of this heavy material would also have made it an expensive material at Myos Hormos. At Myos Hormos a putative caulking wedge was found in Trench 6B (W078), which may suggest the adoption of caulking methods similar to those seen in the Mediterranean.

Conclusions

Ship maintenance activities required to keep a ship suitable for ocean-going seafaring, involved the use of various skills, materials and installations. When combined, the artefactual evidence provides firm indications of where these activities were taking place. In the Roman period these activities appeared to be centred on two areas adjacent to the harbour, near Trenches 7A and 14, though smaller quantities of evidence was generally scattered around a wide area of the harbour facilities. These locations were also the places where ships were being loaded and unloaded as suggested by the proximity of basalt ballast dumps (discussed in more detail by Peacock *et al*. 2007). What is unusual is the presence of woodchips and ballast near Trenches 2B and 17, on the higher ground and some distance from the sea. The woodworking may represent the creation of other objects, or transportable elements (such as rigging elements), and the presence of ballast stones might result from reuse of a readily available resource.

The vocations of the people who made and maintained these vessels appear on a tariff posted at the Coptos toll-house in AD 90 (Lewis 1983, 141; Meyer 1992, 48). Amongst those listed were various maritime artisans, skilled workers, shipyard hands and caulkers (Table 15.3). Their relatively high taxation suggests that they were well paid for their skills, and that there were a number of different specializations recognized within the port communities. We know from the Coptos tariff and various letters (Bagnall *et al*. 2005; Sidebotham 2007) that the transport of people and materials from the Nile was both regular and expensive. The maintenance of wooden ships is constant, suggesting Myos Hormos was probably busy year round, sourcing and fitting the relevant materials to get the boats fit for use. The evidence for the sourcing of these materials is also preserved in the written record, where wood for shipbuilding was transported from the Nile (Bülow-Jacobsen 2003, 420; O.Krok.41). From Berenike an ostracon included an inventory of maritime equipment (O.Ber. II 131) that includes sail braces, pulleys, rope, mast belts, "gum" and "kilns" in which to melt it[1] deposited near to various customs documentation. These letters confirm the busy sourcing of materials required by those maintaining the ships. The high quality of these ships was recognised by the Tamil writers of Southern India who described them as 'the good vessels, masterpieces of the Yavana' (i.e. Greek or Roman) (from the c. AD 150 Tamil poem the Kauliliya Arthasastra; Sidebotham 1986, 23).

Description	Tariff
Skipper in the Red Sea Trade (Lewis 1983)	8 dr.
Red Sea Pilot (Meyer 1992)	8 dr.
Red Sea Bows-man	10 dr.
Guard	10 dr.
Sailor	5 dr.
Caulker/Shipyard hand	5 dr.
Artisan (Lewis 1983)	8 dr.
Skilled Worker (Meyer 1992)	8 dr.

Table 15.3. Section of the Coptos tarif (Lewis 1983; Meyer 1992).

1. Here "kilns" are preferred to "branding irons" discussed in O Ber II (Bagnall *et. al*. 2005, 47). The reason for this is that we know archaeologically that the gum (most likely made from pine pitch) was used in the sealing of hull elements and that a method of melting it was required. The alternative translations is also correct, but out of keeping with the context of the document.

15.3 Rigging Components from Myos Hormos/Quseir al-Qadim

Julian Whitewright

The high levels of maritime activity in the ancient Mediterranean are indicated by the large number of ancient shipwrecks so far found and examined (e.g. Parker 1992). Some of these have well preserved remains of the hull or cargo and have provided valuable information relating to the economy or shipbuilding traditions. In contrast to the relative wealth of information on ship construction, our knowledge of the rigging of ancient vessels is limited as remains of ropes, sails and pulley blocks of ancient vessels rarely survive in the archaeological record. Studies into the rigging of ancient ships have continued to rely on alternative lines of evidence, such as iconography and ancient texts. One of the features of Quseir al-Qadim is the preservation of organic material and a large corpus of artefacts were identified as deriving from sailing vessels, providing a substantial contribution to the study of shipping (Whitewright 2007). In contrast to the Roman period, Islamic period excavations at the site produced virtually no rigging components, despite good organic preservation of other wooden and textile artefacts. The possible reasons for this are discussed below.

The Roman Period - Myos Hormos

Given the continued maritime activity from the Augustan period to the 3rd century AD (Peacock and Blue 2006, 174-5) it is perhaps unsurprising that substantial evidence of maritime activity was recovered. Most artefacts came from the Roman *sebakhs* and were thus deposited in a non-maritime context, suggesting discard after manufacture or use, rather than during use. Rigging components included 169 brail rings, a deadeye, various sheaves from rigging blocks and several fragments of sailcloth.

Deadeye

A deadeye (Fig. 15.9) was excavated in the 2001 season and dated by association to the mid-to-late 2nd century AD (Thomas and Masser 2006, 131-2). This component forms part of the standing rigging of a vessel, providing lateral and longitudinal support to the mast. Deadeyes are usually rigged in pairs, allowing them to be tensioned, at the base of shrouds which provide lateral support for the mast. Components of a similar shape and function are still found on traditional square rigged sailing vessels. The deadeye from Myos Hormos consists of an oval shaped piece of Blackwood (*Dalbergia* sp.), pierced by three holes set alongside one another in the centre of the block. It measures 214 mm long, 144 mm wide and 55 mm thick, although the reverse side had been heavily degraded. The outside edge had been grooved in order to take a rope strop which could have been up to 28 mm in diameter. The three central holes could have carried ropes of up to 25 mm in diameter. Comparable deadeyes have been excavated from the Grado (Beltrame and Gaddi 2005, 80), Laurons 2 (Ximénès and Moerman 1990, 7 and fig. 2) and Nin (Brusic and Domjan 1985, 81 and fig. 6.9) shipwrecks in the Mediterranean area.

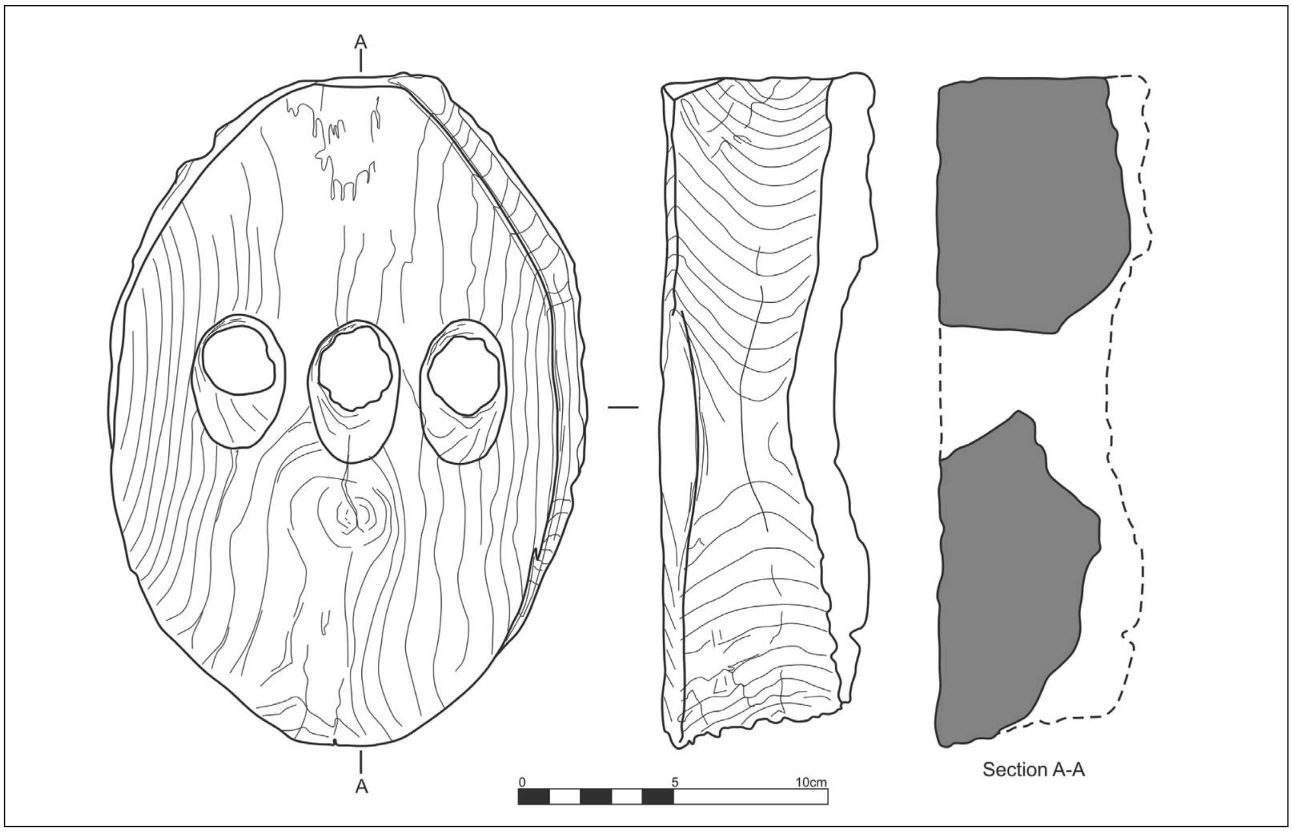


Figure 15.9. Deadeye from the Roman port of Myos Hormos.

Rigging Block Sheaves

The 2001-2 excavations also produced seven sheaves from several different rigging blocks (Fig. 15.10). A sheave is the moving part of a pulley block and they are generally round in section. By rotating as rope is pulled through the block, they serve to reduce the friction on the rope and the amount of effort required to move the rope. The sheaves all date to the latter half of the 2nd century AD with the exception of one (W0198 in Fig. 15.10) which is Early Roman in date. Unfortunately, the finds consisted of the sheaves only, no shells or axles were found. Such finds being part of a block and tackle, would probably have been used in some aspect of a vessel's running rigging. They could also have been utilised in other, non-nautical activities at the site, such as in the movement of heavy objects, so it is impossible to be sure that they were maritime. Six of the sheaves were flat, circular discs of wood ranging in size from 46 mm to 81 mm diameter. The outer edges of the disc sheaves, where not decayed, were grooved to carry the associated rope, while their thickness, and so the diameter of the rope they could carry, was very consistent at between 14-16 mm. This may indicate the use of a standard diameter rope. It might be possible to account for the difference in sheave diameter by the use of bigger sheaves in blocks designed to resist higher loads. Comparative disc sheaves, or blocks utilising disc sheaves have been excavated from the Cavalière (Charlin *et al*. 1978, 57-60), County Hall (Marsden 1974, fig. 8.2), Grand Ribaud D (Hesnard *et al*. 1988, 105-126), La Ciotat (Benoit 1962, 168-9, fig. 46), Laurons 2 (Ximénès and Moerman 1990, 5-6 and fig. 1), Madrague de Giens (Joncheray 1975, 103), Port Vendres 1 (Liou 1975, 572-3) and 2 (Colls *et al*. 1977, fig. 2) shipwrecks and from a terrestrial context at the site of Kenchreai (Shaw 1967, fig. 1). Disc sheaved blocks are also visible in the depiction of naval spoils on the triumphal arch at Orange (Amy 1962, pl. 25).

The seventh sheave excavated at Myos Hormos (W0270), although damaged was clearly cylindrical and a distinctively Mediterranean type style. Comparable examples have been excavated from the Roman harbour of Caesarea Maritima (Oleson 1983; Oleson *et al*. 1994, 104, fig. 33 and pl. 22) and also from the Agde D (Liou 1973, 578 and fig. 10), Cap del Vol (Foerster 1980, fig. 5), Chrétienne C (Joncheray 1975, 103 and fig. 50.1), Comacchio (Berti 1990), Grado (Beltrame and Gaddi 2005, fig. 2), Grand Ribaud D (Hesnard *et al*. 1988, 105-126), Kyrenia (Swiny and Katzev 1973, 351 and fig. 12) and Tradelière (Joncheray 1975, 103) wrecks. A sheave block of this type was also recovered from a looted and dredged late 4th/early 3rd century BC site in the Sea of Marmara (Pulak 1985, 3). W0270 represents the only evidence of the use of this form of sheave block at Myos Hormos. The size of the sheave suggests a block of similar size to the block found at Caesarea Maritima; 130 mm long by 90 mm wide. The sheaves from Myos Hormos

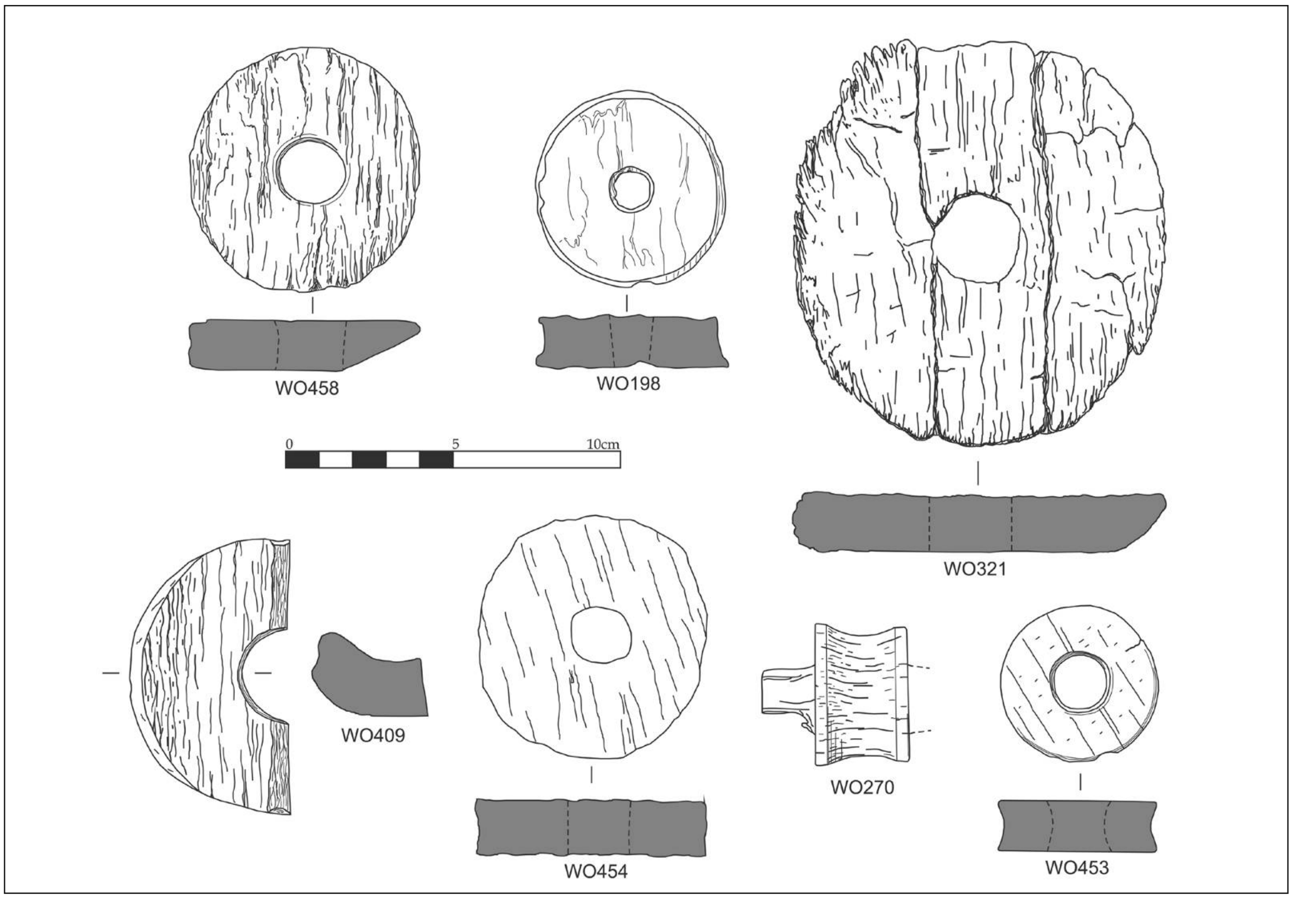


Figure 15.10. Roman rigging block sheaves from Myos Hormos.

were made from a variety of wood types including Indian Teak, Blackwood and Alder, the details are described in Chapter 17 of this volume.

Wooden Toggle

A single wooden toggle was excavated from a Roman deposit dating to the late 2nd - early 3rd century AD (Phase 2/3) from Trench 8A (Thomas and Masser 2006). The toggle (Fig. 15.12) was 73 mm in length with a circular cross-section 16 mm in diameter at the widest point tapering to 7 mm at the ends. The central notch which would have carried the rope eye was 11 mm in cross-sectional diameter with a width of 6-8 mm. Although not definitively maritime in function, toggles are a well documented part of the Mediterranean sailing rig. Their function is usually to secure the end of one rope to a soft eye in another length of rope. Their size can be variable, depending both on the size of the sailing vessel and the position of the toggle in the rig. Comparative examples of toggles have been excavated from the Grado (Beltrame and Gaddi 2005, 81-3), Kyrenia (Swiny and Katzev 1973, 351), Laurons 2 (Ximénès and Moerman 1990, 9-11 and fig. 5), Nin (Brusic and Domjan 1985) and Port Vendres 1 (Liou 1975, 573) wrecks.

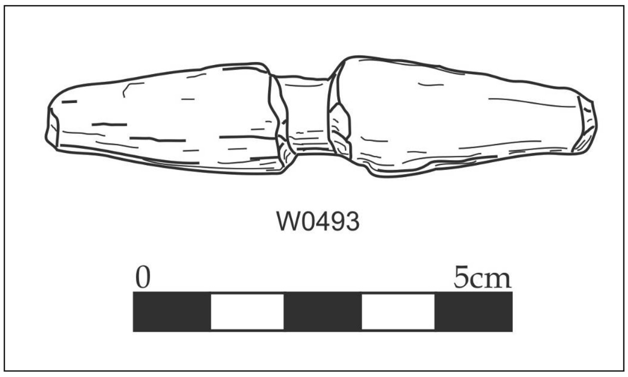


Figure 15.11. Wooden toggle from Myos Hormos.

Brail Rings

Brail rings were by far the most numerous class of maritime artefact from Myos Hormos. They were excavated during every field season, principally from the Roman *sebakhs*, and encompass the full Roman chronology of the site. The 169 brail rings excavated can be classified into two groups, based on the material from which they are made. One hundred and eighteen of them were made from cattle horn and the remaining 51 were made from wood. In most cases the wooden brail rings are manufactured with the grain running across the flat face of the ring, this technique is mirrored in the horn rings, which are cut from flattened pieces of animal horn (Hamilton-Dyer, pers. comm.). The use of these two types of materials is consistent with finds of brail rings from Berenike, which were also made from wood and horn (Wild and Wild 2001, 214). A sample of brail rings made from both wood (Fig. 15.12) and horn (Fig. 15.13) is included here in order to illustrate the characteristics of these artefacts. Details of the different wood species employed in their manufacture are described in Chapter 17, this volume. Comparative examples, made from lead as well as wood, have been excavated from the Cavalière (Charlin *et al*. 1978, 57-60), Grand Congloué (Benoit 1961, 178-9, pl. 30), Grand Ribaud D (Hesnard *et al*. 1988, 105-126), Kyrenia (H. Swiny pers. comm.) and Straton's Tower (Fitzgerald 1994, 169) shipwrecks and the anchorage of Dor (Kingsley and Raveh 1996, 55 and pl. 49) in the Mediterranean.

Although superficially similar, there are differences between individual rings from Myos Hormos which should be noted. The most obvious of these is the large variation in size ranging from 27 mm to 90 mm in diameter. In the sample illustrated (Fig. 15.12) here it is possible to see both the differences in size and cross-section. The latter range from almost circular (W0482), to oval (W0584) to square or rectangular (W0258) in shape. Horn rings (Fig. 15.13) do not usually exhibit rounded cross-sections but vary between square (FR334) and flattened rectangular (FR352). The majority of the brail rings are pierced with two holes directly through the body of the ring, although some have a single hole. These holes would have provided the point at which the brail ring was attached to its sail, as indicated by a brail ring still attached to the fragment of sail cloth (discussed below, Fig. 15.14). Although there is a large difference in the external diameter of the brail rings, there is relatively little difference in the size of the attachment holes. These range from 4-7 mm and the largest brail ring (FR352) has an attachment hole only 1 mm larger than that visible on the smallest ring (FR342).

Roman Sail Fragments

In 2003 a small fragment of Roman sail was found, dating to the late 1st or early 2nd century AD. It was possible to clearly distinguish this from other textiles because of the remains of a wooden brail ring was still attached. Sewn to the sailcloth was a reinforcement strip of heavier material and it was to this that the ring was attached. It measured 50 mm in diameter and its orientation (assumed to be with the holes uppermost) confirmed that the reinforcement strip ran horizontally across the face of the sail. Discovery of this fragment (T331) (Fig. 15.14) permitted the identification of other pieces of reinforcement webbing and fragments of sail (described in Chapter 22, this volume). One of these strips (T27) measured 1.32 m in length. The brail rings were no longer in place but there were remains of the twine used to attach them. Two sets of attachments spaced 0.81 m apart were found and these corresponded to the holes on the attached ring (T331). The webbing strip (T27) also runs along the length of a seam joining two different pieces of cotton sail together (Chapter 22, this volume). Another example (T392) is the remains of the edge of a sail and indicates that in that example the webbing strips were 0.6 m apart. Remains of sails are particularly rare in the archaeological record, but comparable ancient examples come from Edfu (Rougé 1987) on the Nile and the Red Sea port of Berenike (Wild and Wild 2001), discussed further below.

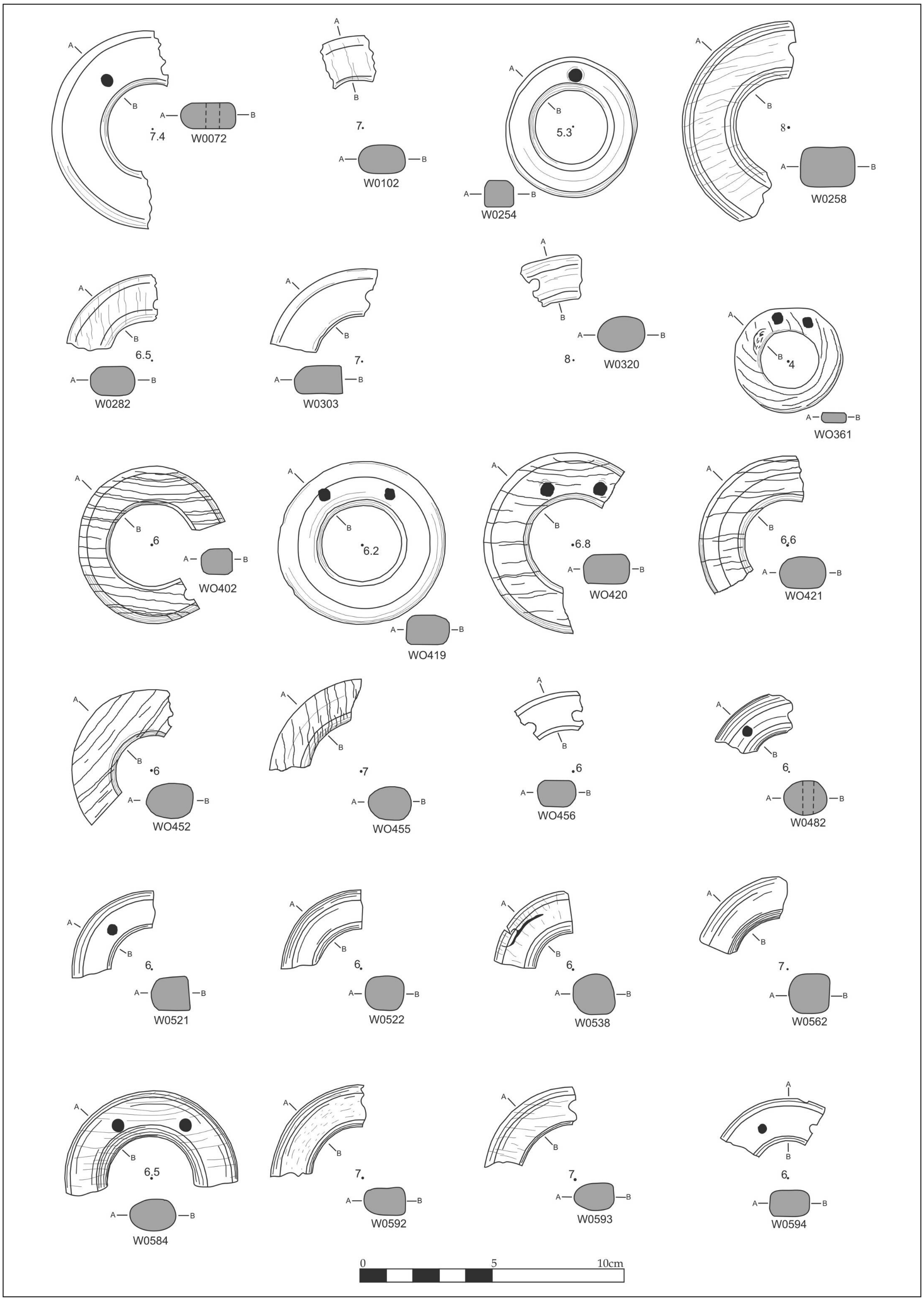


Figure 15.12. Sample of wooden brail-rings from Myos Hormos.

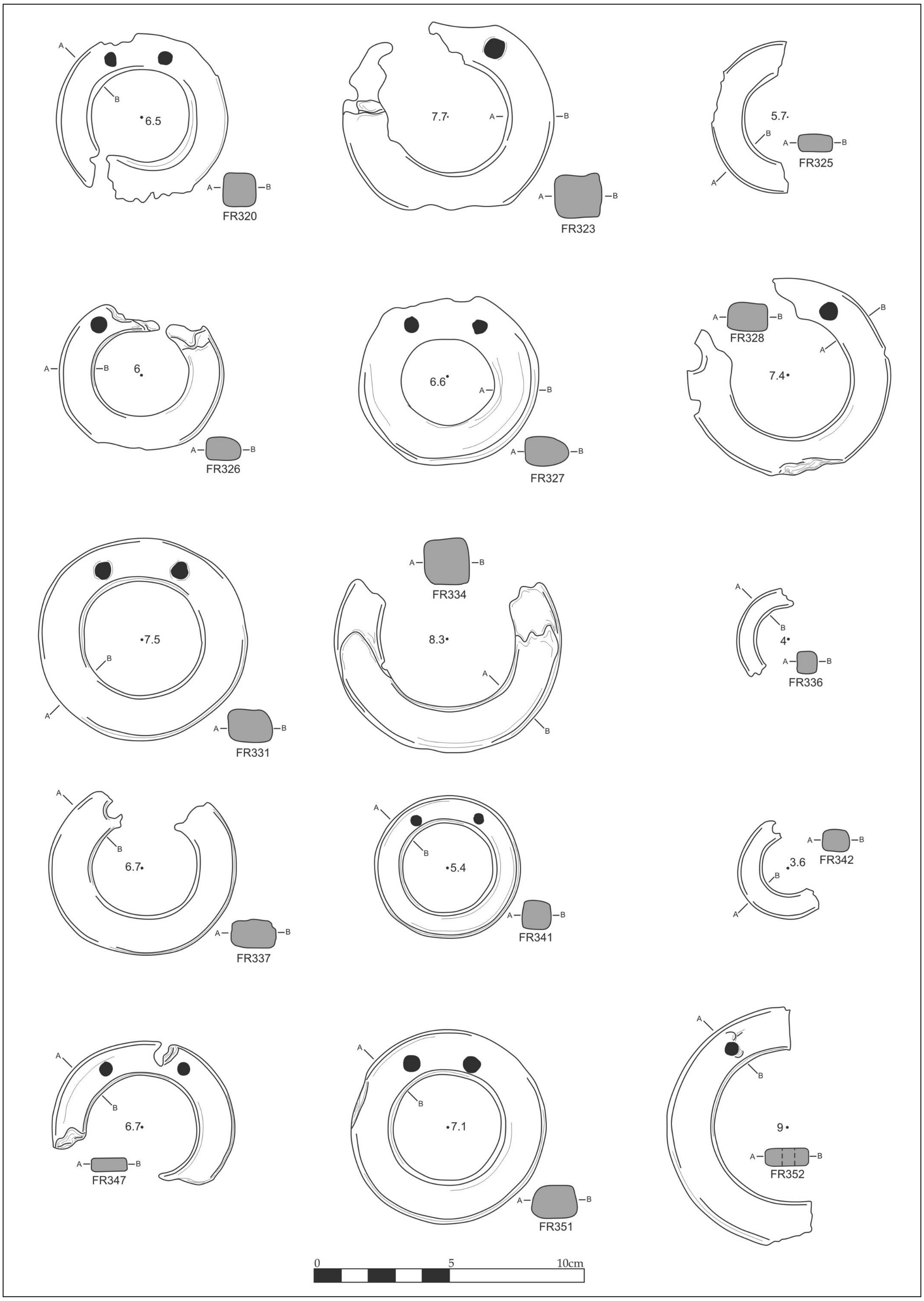


Figure 15.13. Sample of horn brail-rings from Myos Hormos.

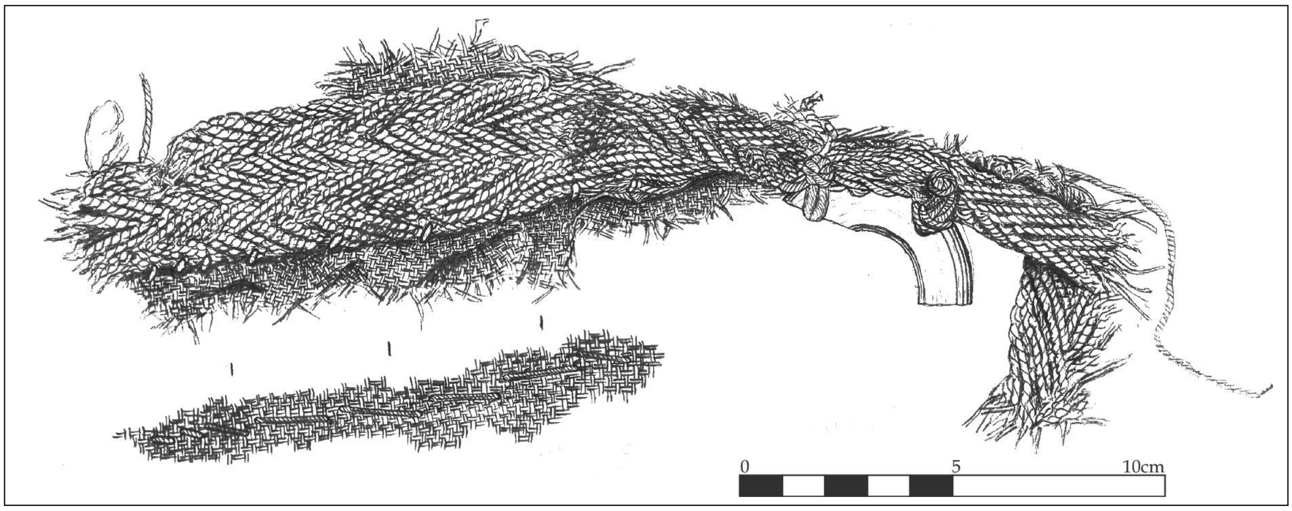


Figure 15.14. Fragement of cotton sail (T331) and wooden brail-ring from Myos Hormos.

The Roman Period - Myos Hormos: Discussion

The general form of the deadeye, sheaves, brail rings and sailcloth is consistent with finds from classical contexts within the Mediterranean basin and represents most of the components required to rig a sailing vessel (Whitewright 2009b). Brails and brail rings are characteristic of the Mediterranean square-sail rig of antiquity and they would not be needed on any of the other sailing rigs known to have been used at this time in the Mediterranean or Indian Ocean. It seems reasonable therefore, to assume that Roman sailing vessels engaged in trade in the Indian Ocean were outwardly similar in appearance, operation and capability to their Mediterranean counterparts, at least in the sailing rig. This is further reinforced by the graffito of a ship found at Berenike which is of Mediterranean appearance (Sidebotham 1996, 315-7). However, more detailed comparison with finds from the Mediterranean reveals that there are differences with the Red Sea. There is of course, the possibility that the material from Myos Hormos is also representative of sailing vessels of Indian Ocean origin, albeit rigged in a Mediterranean style. Given the nature and extent of trade between India and Egypt during this period this possibility should not be discounted.

Roman deadeyes

The deadeye excavated at Myos Hormos bears further comparison with deadeyes excavated from the Roman wrecks of Grado (Beltrame and Gaddi 2005) and Laurons 2 (Ximénès and Moerman 1990). These two wrecks date to the mid-to-late 2nd century respectively and are so contemporary with the deadeye from Myos Hormos. Five identifiable deadeyes were recovered from the Grado wreck (Beltrame and Gaddi 2005, 79) and fourteen from the Laurons 2 wreck (Ximénès and Moerman 1990, 7). Both wrecks are of interest because of the difference in the type of deadeye exhibited within the context of a single sailing rig. Of the five deadeyes recovered from Grado, two are pierced with three large holes to receive shroud rope, while the remaining three are pierced with two large holes. All five have secondary holes to receive seizing line (Beltrame and Gaddi 2005, 79-80). In the Laurons 2 wreck, six deadeyes were pierced with three holes and eight deadeyes were pierced with two holes (Ximénès and Moerman 1990, 7). All had secondary holes to receive seizing line, some of which remained in place on one example (Ximénès and Moerman 1990, 7-8, figs 2 and 3). The largest deadeye from Grado was 147 mm in length, 92 mm wide and 26 mm thick, while the smallest was 116 mm x 78 mm x 20 mm. Although the largest deadeye was a three holed type, a two holed type of comparable size was also found (Beltrame and Gaddi 2005, 79-80). The deadeyes from the Laurons 2 wreck were all of comparable size; 115 mm x 90 mm x 30 mm (Ximénès and Moerman 1990, 8).

The most obvious difference between the Mediterranean deadeyes just described and our example, is the smaller size and the arrangement of the rope holes. The Myos Hormos deadeye is 67 mm longer, 52 mm wider and twice as thick as the largest deadeye from Grado and nearly 100 mm longer, 50 mm wider and nearly twice as thick as the Laurons 2 deadeyes. The Grado vessel has been reconstructed as being some 16.5 m in length and 5.9 m wide (Beltrame and Gaddi 2005, 79) and the Laurons 2 vessel 15 m in length and 5 m wide (Gassend *et al*. 1984, 103). The general similarity in the dimensions of the two vessels is reflected in the similar sizes of the deadeyes used to support the single mast on each vessel. The much larger size of the Myos Hormos deadeye points to the simple conclusion that it was used to rig a much larger vessel than either Grado or Laurons 2. However, it may not be that simple. The Myos Hormos deadeye has three holes set alongside each other in the centre of the block, while the three-holed examples from Grado and Laurons 2 have one hole set above or below the other two (Beltrame and Gaddi 2005, fig. 1; Ximénès and Moerman 1990, fig. 2). The holes in all three examples are actually similar in size (c. 25 mm). This indicates that although the Myos Hormos deadeye was substantially larger than the examples from Grado and Laurons 2, it would have used the same size of rope between pairs of deadeyes. It may therefore be the case that personal preference or the availability of materials, not a difference in ship size, allowed the maker the Myos Hormos deadeye to arrange the three holes alongside one another rather than one above or below the others. It is also worth noting that the Myos Hormos deadeye lacked the small secondary holes, present on all the Grado and Laurons 2 examples (which were used to secure the outer rope strop). This indicates a difference in the approach to securing the deadeye to the main shroud rope. The deadeyes from Grado and Laurons 2 were secured by a rope seizing passing through the block as well as around the shroud, but that from Myos Hormos must have simply been secured by a seizing around the shroud.

The differences in the form of the deadeye from Myos Hormos and comparative examples from Grado and Laurons 2 is significant, especially as both were designed to fulfil a similar function within contemporary sailing vessels. On the basis of such evidence, the Roman sailing rig should not just be viewed in the generic terms derived from reliance on the iconographic and textual sources. A detailed understanding of the rig is required. There may have been significant differences in the rigging traditions prevalent in the Roman world which can only be viewed through the archaeological record because of the 'fine detail' which analysis of such material affords us. It is unlikely that such fine detail and therefore small technical differences can be reliably inferred from the iconographic or textual record alone. The example outlined above, highlights the importance of comparing the detail of ancient rigging with other sources.

Brail rings

The brail rings excavated at Myos Hormos provide another example of the diversity of rigging material, both within a region and across the wider Roman world. The most important characteristic of the brail rings rigged on a single sail is that the diameter of the rings is uniform enough so that a small ring cannot fit inside a large ring when the sail is furled. Such an occurrence is likely to result in a tangle or jam when the crew attempt to unfurl the sail.

The first point of note regarding the brail rings from Myos Hormos is the difference in diameter between the largest (90 mm) and the smallest (27 mm) brail ring, possibly reflecting some of the relative size differences between the largest and smallest vessels. Brail rings provide direct proportional evidence for the size of brailing lines because a larger brail ring will carry a larger rope. Larger diameter rope will logically be utilised on larger vessels, with larger sails. The picture may be complicated slightly from the 2nd century AD when it is possible that two-masted ships may have been present in the *Erythraean* Sea. Such vessels were certainly in use in the Mediterranean at this time (for examples see Casson 1995, fig. 14.2 and 169). Evidence from this period on Southern-Indian coinage shows vessels rigged with two masts (Elliot 1885, pl. 1, fig. 38, pl. 2, fig. 45) as does a contemporary graffito on a pottery sherd from the Indian port of Alagankulam in Tamil Nadu (Rajan 2002, fig. 4b; Sridhar 2005, 67-73, fig. 7, pl. 23; Tchernia 1998). Although the sail-plan of these vessels is unclear, they at least show that ships with two equally-sized masts were in use in this region as well as in the Mediterranean at this time (c.f. Deloche 1996, 243-4; McGrail 2001, 253-5). Such vessels may have used two smaller sails rather than one great mainsail, providing us with a sample of smaller brail rings than would otherwise be expected for a vessel of the same size rigged with a single square-sail. Likewise a vessel rigged with an artemon would also have produced smaller rings in association with this sail as well as larger rings from the mainsail.

The variation in the size of brail rings from Myos Hormos can be usefully contrasted with the brail rings from the Kyrenia ship where a total of 171 lead brail rings were excavated (L. Swiny pers. comm.). Of these, 131 were similar to those from Myos Hormos (with two holes punched through the body of the ring) and measured between 59 mm and 67 mm in diameter (*ibid*). The remainder, which measured between 65 mm and 72 mm in diameter, had a rectangular lug on one side where the attachment holes were located (*ibid*). Lead brail rings found on the Grand-Congloué wreck are also made in two different forms, one type with a lug and one without (Benoit 1961, 178). Like the brail rings from the Kyrenia shipwreck the largest number (around 80) have a consistent diameter of c. 80 mm and are made without a lug, this group are not pierced with any attachment holes (*ibid*), the assumption must be that they were simply attached by ties around the body of the ring. The brail rings manufactured with attachment lugs are of a greater dimension; between 90-120 mm (*ibid*). Further detailed analysis of the brail rings from the Grand-Congloué site is problematic because they are representative of at least two shipwrecks mixed together during excavation (see Parker 1992, 200-201).

There are two points of note here. Firstly, the relatively close size of the two forms of brail rings found on the Kyrenia wreck, which in part backs up the observations made regarding the diversity in size of the Myos Hormos brail rings. The brail rings from Kyrenia are similar in size because they come from a single vessel which would have required a single size of brail ring for a single sail, rather than a variety of sizes for a variety of vessels. The group of 80 brail rings from the Grand Congloué site which are similar in form and diameter may also be representative of a single vessel. The second point is the two distinct types of brail ring form (one group being made with lugs for the attachment holes and one group without) which are exhibited in the finds from the Kyrenia, given their similarity in size and deposition within the context of a single wreck site. The two different forms possibly represent two different approaches to the problem of providing a fair-lead for the brailing lines on a single ancient sailing vessel. As such they demonstrate that it is possible to encounter different contemporary forms of a single piece of technology, both designed to fulfil the same function within the sailing rig of a single vessel.

The wooden brail rings from Myos Hormos also show a lack of uniformity in the way they were made, which can be seen mainly in their cross-sectional form, different makers clearly had differing techniques which resulted in different end results. There seems no reason at present to suggest that any of the different forms would have been superior to any of the others, it may have just been a matter of personal choice. Diversity in cross-sectional form was also present in the lead brail rings from the Grand-Congloué shipwreck where three different forms of cross-section were observed (Benoit 1961, 178).

The material used in the manufacture of the brail rings found at Myos Hormos is also significant. Horn rings comprise 70% of the total number of brail rings excavated. The use of cattle horn may indicate the reuse of horn from animals slaughtered at the site for food (S. Hamilton-Dyer pers. comm.; c.f. Chapter 20, this volume). Alternatively, the horn rings could have been manufactured on the Nile, as a bi-product of cattle slaughtered there, before being transported to the coast. Written evidence records the transport of shipbuilding timber to Myos Hormos from the Nile (Bülow-Jacobsen 1998, 66) and associated rigging material could easily be carried along the same route (see Meyer 1992, 48).

The remaining brail rings were all wooden as in Mediterranean finds from the Cavalière (Charlin *et al*. 1978, 57-60) and Grand Ribaud D (Hesnard *et al*. 1988, 105-126) shipwrecks. These finds are of small numbers of brail rings, making meaningful comparative analysis of diameter difficult. Furthermore, in the case of the Myos Hormos rings the wood is generally of non-Mediterranean origin. Analysis has shown that in the examples sampled, the majority of species used were either Indian or East African Blackwood (*Dalbergia* sp.), with only a small number derived from local or Mediterranean sources (Chapter 17, this volume). This corresponds closely with the known trade routes of vessels leaving Myos Hormos (above), which sailed to both India and East Africa (Casson 1980; 1989; Schoff 1912). The evidence suggests vessels being refitted at Myos Hormos with locally produced horn brail rings prior to their outbound voyage, the replaced rings were simply deposited in the rubbish dumps of the town. Brail rings lost or broken along the route would be replaced using local materials, as required. It is this diversity of origin which probably explains the differences in the cross-section of the wooden brail rings. Different vessels visited many ports around the Indian Ocean in the course of trade and may have replaced damaged or broken rigging at each. It is impossible to tell whether the rings were made in overseas ports and bought by the visiting vessels or made on board by the sailors from wood procured whenever they made landfall.

Sails

The published archaeological evidence for sails in the Roman era is very limited, coming entirely from the Red Sea port of Berenike (Wild and Wild 2001) with an additional fragment wrapped around a mummy, found at Edfu on the Nile (Black 1996; Rougé 1987). The sail fragments excavated at Myos Hormos therefore provide important new evidence of the physical properties of ancient sailcloth.

The sailcloth from Edfu was made from Egyptian linen reinforced with locally produced flax (Wild 2002, 13; Wild and Wild 2001, 213). The use of linen is consistent with the historical evidence, which points to this as favoured for sail-making in the ancient Mediterranean (Black and Samuel 1991, 220). In contrast, the sailcloth from Berenike was made in and reinforced with, Indian cotton (Wild and Wild 2001, 211-220). Similarly, that excavated at Myos Hormos are also of Indian cotton (Handley 2003, 57). This suggests that much of the fleet engaged in the India trade may have been fitted out with imported Indian cotton or repaired upon arrival in India using Indian products (Wild and Wild 2001, 217-218). If the sails were made in Egypt (using cotton produced in India), they could represent part of a return bulk trade in relatively low value cotton. Indian cotton is mentioned in the *Periplus* (41) as being one of the products of the land around the port of Barygaza, which might be a possible source of the cotton used in the sailcloth.

Roman sails are often depicted in the iconography with a series of vertical and horizontal lines running across their face. These have been interpreted as being light ropes or strips of textile or leather used to reinforce the sailcloth, the vertical lines could also be brailing lines (Casson 1995, 68-9, 234). The sail fragments from Berenike and Edfu serve to confirm this interpretation. The fragments from Berenike were made with cotton reinforcement strips running both vertically and horizontally (Wild and Wild 2001, 214). Likewise the sail from Edfu, has a brail ring attached to the horizontal strip at the point of intersection with the vertical one (Black 1996, figs 5 and 6). One sail fragment from Myos Hormos (T392) represents the edge of a fragment of sail including the remains of the webbing strip running away from the edge of the sail. The remains of the brail ring attachment is present, its alignment indicating that the webbing strip ran vertically up the face of the sail. The two attachment holes must have been uppermost to allow the brail ring to function. The surviving edge is probably the head of the sail as there would be no reason for brail rings to be attached to the foot of the sail. In contrast to this, the sail fragment T331 shows no sign of a vertical webbing strip at the point of attachment of the brail ring to a horizontal webbing strip. A third piece of webbing and sailcloth (T27) has two brail ring attachment points which indicate that the webbing ran in a vertical direction. No evidence for horizontal webbing is present at either brail ring attachment point.

This would seem to indicate that there were at least three possible approaches to sail-making in use amongst the shipping engaged in the India trade. One involved the use of vertical and horizontal reinforcement webbing strips intersecting across the face of the sail and to which the brail rings were attached. A second technique, identified at Myos Hormos utilized only horizontal webbing strips to reinforce the sail, while a third technique seems to have utilised only vertical webbing strips. It is possible that as well as reinforcing the sailcloth, the webbing strips also served to reduce the amount of stretch to which the sailcloth would have been subject while under sail.

Conclusion

The maritime finds from Myos Hormos add to our knowledge of rigging and sails in the ancient world and especially in the Red Sea-Indian Ocean region. It is likely that Roman sailing vessels in the Red Sea and Indian Ocean were rigged with the same set of component parts as their Mediterranean counterparts, although these seem to have been made largely from materials derived from Egypt and the Indian Ocean rather than the Mediterranean.

There are some intriguing passages in the *Periplus* which describes vessels from Barygaza on the west coast of India trading with the ports on the south coast of the Gulf of Aden (14). Further on, the author of the *Periplus* says of Eudaemon Arabia (Aden) that 'because in the early days of the city when the voyage was not yet made from India to Egypt, and when they did not dare to sail from Egypt to the ports across this ocean, but all came together at this place and it received cargoes from both countries' (26 tr. Schoff 1912). The implication in this passage might be that at the time of writing Indian vessels did make the voyage from India to Egypt whereas before they did not. It is obvious from texts such as the *Periplus*, along with epigraphic (Salomon 1991, 731-6) and ceramic (Tomber 2000, 630) evidence pointing to the presence of Indian merchants in Egypt, that trade in the Indian Ocean consisted of far more than just Roman trade. A series of interconnecting networks of trade and exchange, of varying size and intensity extended over the Indian Ocean in the early first millennium AD. Roman trade with India merely represented a part of one of these networks (c.f. De Romanis and Tchernia 1997; Ray 2003). It seems very likely that both Roman and Indian Ocean sailing vessels were present at Myos Hormos. It is possible that the rigging components constructed from Indian materials may have originated on board Indian ships. Although circumstantial, the archaeological evidence may represent the first appearance of indigenous ancient Indian Ocean shipping in the region.

The evidence from Myos Hormos also seems to indicate that the manufacture of rigging material was by no means a uniform trade across the ancient world. The detailed characteristics of a vessel rigged in one location would have been different from a vessel rigged elsewhere. This point is emphasised by the comparison of deadeyes from Myos Hormos and Grado, brail rings from Myos Hormos and Kyrenia and also by the contrast in sail-making techniques in the sailcloth found at Myos Hormos and Berenike. Such differences may be representative of regional traditions or variations within the overall Mediterranean tradition.

The Islamic Period - Quseir al-Qadim

In contrast to the Roman occupation of the site, excavations of areas occupied during the Islamic period resulted in almost no corresponding rigging components. Only one single item which can be positively identified comes from an Islamic context. The reasons for the contrast in number of excavated rigging components are unclear. Although the excavation of the Islamic phases also encompassed areas of *sebakh*, they were fewer in number and may have been ones in which no rigging components were deposited. A further explanation may be offered by way of the different rigging traditions in use during the two phases of occupation of the site. The rigging of Roman ships comprised a series of components which fulfilled a specific role within the overall rig. Within this system, many wooden elements can be identified which had to be included within the rig for it to function properly. It is these elements, deadeyes, brail rings and sheaves, which can be identified from the Roman period, rather than the lengths of rope which connected them together (which were more prone to re-use or decay).

In contrast to this, the lateen/settee rig which seems to have been in use during the Islamic period of the site has fewer rigging components and these are more flexible in their function within the overall rig (Whitewright 2009b, 493). The reduction in the total number of rigging components present in the Islamic shipping, may partially account for the absence of rigging components in the archaeological record. Despite this, it is still puzzling why components common to both periods, such as disc sheaves, have not been excavated from the Islamic port of Quseir al-Qadim.

Arab rigging components

Although the rigging components represented in the archaeological record of the Islamic phase of the site is limited in number compared to the Roman, they are still significant as this type of evidence is rare. In contrast to the rich shipwreck evidence of the Mediterranean, only one wreck of western Indian Ocean origin has so far been positively identified (see Flecker 2000). This 9th century AD wreck served to confirm that the sewn method of construction often described by textual sources from the Indian Ocean was used in long distance sailing vessels. However, no evidence relating to the rigging components utilised on the vessel survived.

Most scholars have traditionally assumed that sailors in the Indian Ocean have always used the lateen sail (e.g. Boxhall 1989, 290; Hourani 1951, 100-101), although some restrict its use to the last thousand years (Villiers

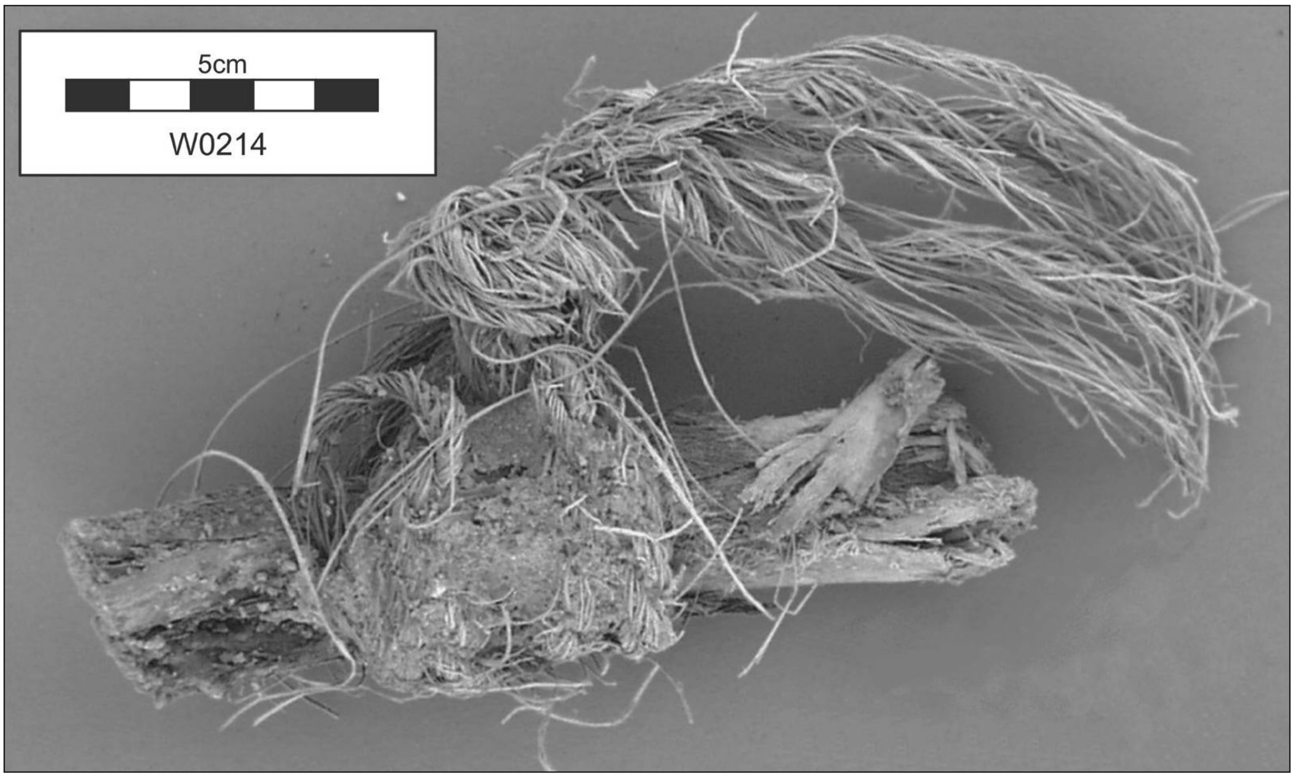


Figure 15.15. Fragment of a running stay from a lateen sailing rig.

1952, 73). This is largely based on the current use of the lateen rig on traditional craft. In reality of the situation is far more complex as there is iconographic evidence for the continued use of the square-sail in the Indian Ocean (for examples see Garlake and Garlake 1964, fig. 1; Lydekker 1919; Nicolle 1989, 183-5, fig. 49a and b; Sridhar 2005, fig. 24). However, iconographic evidence for the lateen sail in the Inidian Ocean does not appear until the 16th century (Garlake and Garlake 1964, fig. 4.3). Prior to this it's use is indicated primarily by textual sources. The geometric proportions described for sails suggests that the lateen sail was in use in the Indian Ocean from at least the 9th or 10th centuries AD (Whitewright In-Press).

The rigging component (W0214) (Fig. 15.15) excavated at Quseir al-Qadim provides rare archaeological evidence for the type of sailing rig being used in the Indian Ocean during the Mamluk period. The lower element of a running stay from a small sailing vessel, was identified following its excavation from a stratified context in a building dating to the Mamluk period (Flatman and Thomas 2006). The associated ceramic evidence suggests a date in the 13th or 14th centuries (R. Bridgman pers. comm.). The find is consistent with the foot of a running stay (*saghla*) observed by the author on a modern Arabic sailing vessel on the Red Sea coast. In each case an identical knot was used to secure the *saghla* to the rope of the stay. Similar arrangements have been documented by 20th century ethnographic observers of Arab sailing vessels (see Johnstone and Muir 1964, fig. 6). This kind of running stay is characteristic of the Indian Ocean lateen rig, rather than any other type, the find providing the earliest archaeological evidence for the use of the lateen rig in the Indian Ocean.

The absence of rigging components associated with the Mediterranean square-sail rig probably indicate that this may have fallen out of use on the Red Sea and Indian Ocean by the Mamluk period.

Roman and Islamic Cordage

In the course of the excavations a range of examples of cordage was found (discussed fully in Chapter 21, this volume). These varied from small pieces of string to larger ropes up to 25 mm in diameter. It is impossible to say with any certainty which of these finds were used in a maritime context prior to their deposition. Some must have been used in the service of the vessels using the port, while others were not. It also seems probable that rope originally used on board a sailing vessel could have been reused in a non-maritime context before deposition. Despite this some observations can be made with respect to the cordage from a maritime perspective, regarding both periods of occupation of the site.

In both phases of occupation a variety of different materials were utilised to produce the cordage found on the site. These included animal hair, flax, cane, grass, palm, and reed (see Chapter 21, this volume). It seems likely that both the mending and construction of rope took place in both the Roman and Islamic port, this is suggested by the quantity of raw, partially prepared and spun fibres demonstrating various stages in the rope-making process (Richardson 2002, 78 and 80). The largest thicknesses of rope recovered, measured 25 mm in diameter for the Roman period, and 23 mm in diameter for the Islamic period. The size of the Roman rope correlates well with the deadeye described above which could have been served with rope up to 28 mm in diameter. A variety of knots and splices were excavated including many that could have fulfilled a nautical or terrestrial function; stopper knots, clove hitches and eye splices being the most common in both periods of the site. Although difficult to quantify from a purely maritime perspective, it is clear that both the Roman and Islamic ports were provided with a full range of cordage and there was probably some form of rope making facility.

Conclusion

The site provides important information on the rigging of sailing vessels in the Indian Ocean region during both Roman and Islamic period. Finds recovered from Roman deposits suggest that the Mediterranean rigging tradition extended to Indian Ocean via Myos Hormos. These vessels would have been rigged with a brailed square-sail of Mediterranean type, but the materials used are mostly non-Mediterranean in origin, raising the possibility that Indian Ocean cultures utilised similar rigging.

It is possible to observe variant forms of rigging by comparing finds from Myos Hormos with those from the Mediterranean. Similarly, fragments of sailcloth and reinforcement strip, exceptionally rare in the archaeological record, indicate that at the least three different techniques of sail-making were in use in the Red Sea.

By contrast the Islamic deposits produced virtually no distinct rigging components and only one artefact could be identified as belonging to a sailing vessel. However, this small component of a vessel's running stay is currently the earliest direct archaeological evidence for the use of the lateen sail in the Indian Ocean in the late 13th/early 14th century.

Acknowledgements

Thanks are due to Marijke van der Veen for identifying the wood of some the rigging components and to Sheila Hamilton-Dyer for providing information relating to the manufacture of the horn brail-rings.

15.4 Maritime Rock Art from Wadi Quseir al-Qadim

Julian Whitewright

The excavation and survey of the site of Myos Hormos/Quseir al-Qadim incorporated a regional survey of the immediate hinterland surrounding the site (Peacock 2006). In the course of this, a large number of rock engravings were recorded towards the western end of Wadi Quseir al-Qadim (Peacock 2006, fig. 2.1). These engravings included a number of short incisions, symbols, animals and birds, human body parts and Greek inscriptions (Van Rengen *et al*. 2006, 17). Six carvings of ships or boats were also discovered and recorded. The presence of ship depictions in the rock art of the Eastern Desert is fairly widespread and a survey conducted by Rohl (2000) has revealed vessels in a variety of locations.

The dating of rock art is often problematic and based on stylistic comparison. Artists from all periods often create a reflection of what they perceive to be representative of a boat or ship, rather than an accurate rendering of the subject matter, some elements being exaggerated or omitted (see Tzalas 1990). Iconographic depictions of Egyptian watercraft often retain elements or conventions which are distinctive to certain periods, for example the use of multiple steering oars on vessels from the Old Kingdom (c. 2613-2181 BC). Where characteristics are identifiable in the depictions of boats and ships it may be possible to assign those depictions to certain periods.

Catalogue of vessels

Vessel One

This image (Fig. 15.16) comprises a curved hull with a single-mast stepped amidships. A long diagonal line extends over one end of the vessel and probably represents a large steering oar. On this basis it seems reasonable to attribute that end of the vessel as the stern. A vertical line extending downward from the inboard portion of the steering oar may be a support, or a tiller to operate it. This vertical line ends at a horizontal line which continues forwards to the mast, the line becomes broken on the forward side of the mast. This line may represent an internal platform or cabin the majority of which lies toward the stern of the vessel. Two lines run downward from the masthead towards the bow and stern of the vessel and probably represent a forestay and backstay. A series of fifteen diagonal lines are shown running downwards along the side of the vessel, these begin near the bow and continue until just aft of amidships. They probably represent oars or paddles being used in the propulsion of the vessel.

Vessel Two

This image (Fig. 15.17) also exhibits the curved hull shape which is typical of Egyptian ship depictions from the Pharaonic period, although it is less pronounced than the curvature seen in Vessel One. The artist has depicted the ship with a single mast which is stepped amidships. The bow and stern of the vessel are distinguished by the presence of a steering oar. This is depicted as protruding over the stern quarter of the vessel. A central structure is shown either side of the mast, which may represent a cabin. Some details of the rigging are also discernable. A long horizontal line which runs above the central structure probably represents a yard or boom, the absence of a corresponding upper line may signify a yard which has been lowered. A series of lines run downwards from the masthead of the vessel, two towards the bow and four

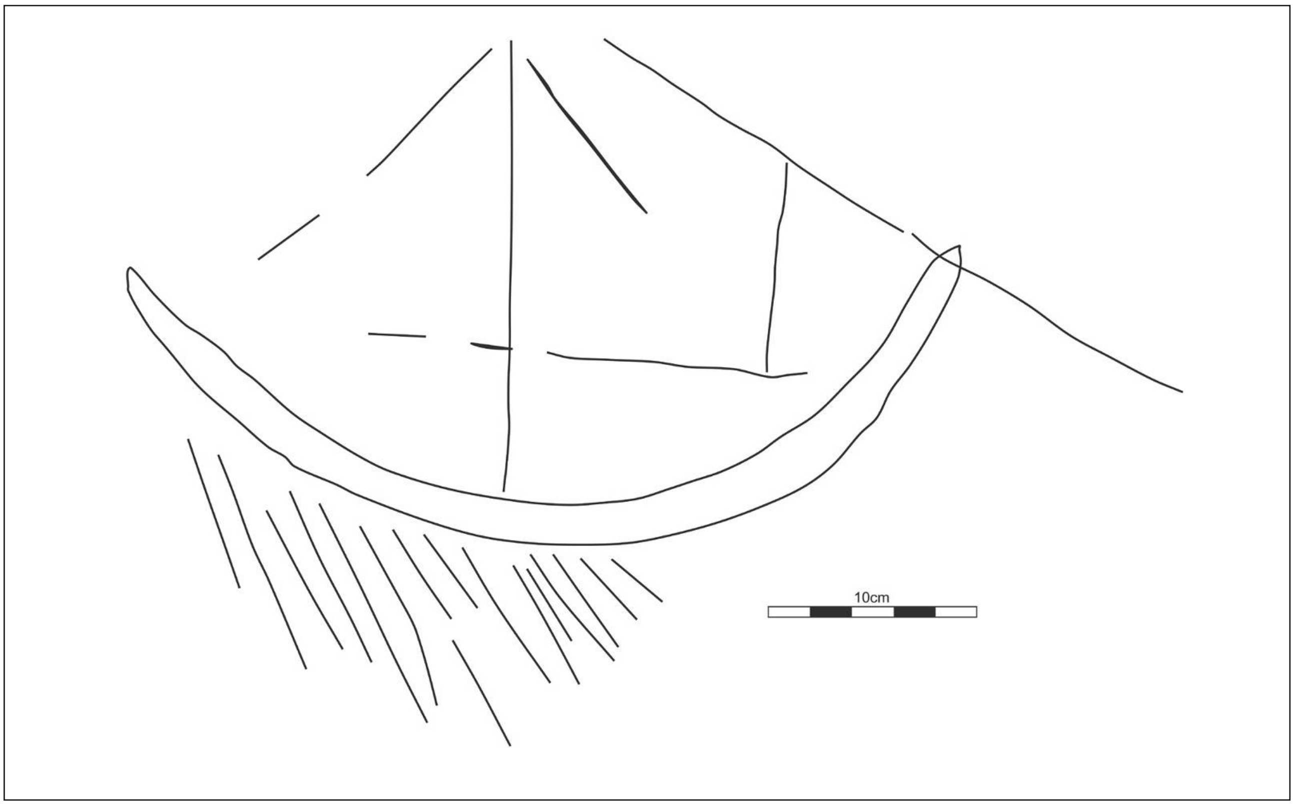


Figure 15.16. Vessel One from the rock art site in Wadi Quseir al-Qadim.

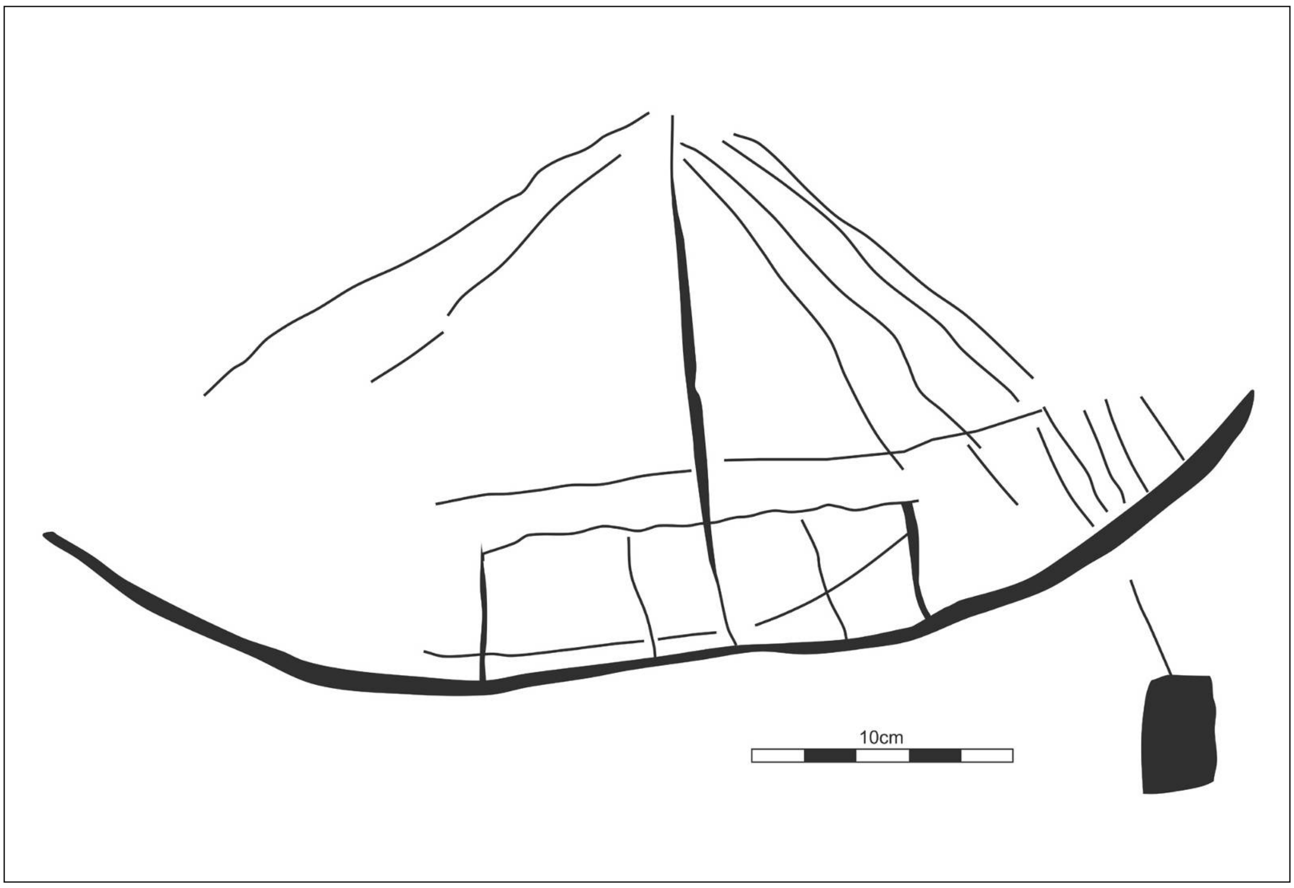


Figure 15.17. Vessel Two from the rock art site in Wadi Quseir al-Qadim.

towards the stern. The furthest forward of these is probably representative of a forestay, the remaining forward line may be a second forestay or a lift for the yard/boom. The lines aft of the mast are harder to identify, they may represent the vessel's backstay, halyard or yard/boom lifts. Finally, a series of five nearly vertical lines are carved in the stern area of the vessel. These are also open to interpretation. The forward two may be disjointed continuations of the aftermost lines from the masthead. The remaining three may represent crew at the stern of the vessel, or other rigging elements which are incomplete.

Vessel Three

This image (Fig. 15.18) represents a far more enigmatic depiction of a sailing vessel. The hull of the vessel is curved and the single-mast is stepped amidships. A single line is carved towards one end of the vessel which may represent a steering oar, however, this feature is ambiguous and so identification of bow and stern must remain doubtful. A curving horizontal line is shown above the hull of the vessel which probably represents a boom or lowered yard. Four lines run from the yard/boom to the masthead, three on one side and one on the other, these may be interpreted as representing a series of lifts rigged in support of the yard/boom. An animal has been carved over the depiction of the vessel and probably represents some form of cattle or goat. Below this and also overlaying the vessel, is a pointed motif, reminiscent of the end of a trident.

Dating of Vessels 1-3

The identification of the basic characteristics of Vessel One, allow it to be placed within the broader context of iconographic depictions of Pharaonic period shipping. The large steering oar, set over the stern of the vessel has direct parallels with images and models of riverine craft from the Middle Kingdom period (c. 2040-1782 BC) such as the sailing boat from the tomb of Intefiqer (Davies 1920, pl. 18; c.f. Jones 1995 48; Landström 1978, 16; Vinson 1994, fig. 21). Likewise the situating of the support for the steering on a structure towards the stern of the vessel, the abundance of oars and the location of the mast are all consistent with vessels from this period. Recent survey and excavation at the site of Marsā Gawāsīs, 50km north of Quseir al-Qadim, has uncovered Middle Kingdom and early New Kingdom remains, including structural elements of ships (Bard *et al*. 2007; Fattovich 2004; Ward and Zazzaro 2010). The site at Marsā Gawāsīs is one of the most likely departure points for Egyptian shipping engaged in the Red Sea trade with the land of Punt. In light of the use of Marsā Gawāsīs as an anchorage during the Middle Kingdom and early New Kingdom, the presence of depictions of contemporary vessels in the rock art of the Eastern Desert at the time is perhaps unsurprising.

The principle feature of Vessel Two is probably the steering oar. As well as distinguishing the bow and stern of the vessel it can provide some clues as to the possible period the vessel was from. The single steering oar is depicted by the artist as set over the stern quarter of the vessel which and is also depicted with a central structure spread equally on either side of the mast. These are typical conventions of artists depicting vessels during the New Kingdom (c. 1570-1070 BC) and can be seen on the sailing vessel in the tomb of Rekhmire at Thebes (Davies 1947, pl. 68; c.f.

Figure 15.18. Vessel Three from the rock art site in Wadi Quseir al-Qadim.

Vinson 1994, 38-40). These features can be contrasted with those on vessels from the Middle Kingdom where any structures or cabins are set towards the stern of the vessel and steering oars are set over the very stern of the vessel. Vessel Three lacks any significant features which might allow an attempt to place it in a specific period. It simply displays the basic features which might be expected of an Egyptian watercraft from the Pharaonic period. In light of the possible dates for Vessels One and Two, it must simply suffice to say that Vessel Three could be a depiction of a sailing vessel from either of these periods. It probably does not belong to a later period.

Vessel Four

The fourth vessel (Fig. 15.19) is depicted with a hull which is far less curved than on the previous vessels. This hull form is usually referred to as Papyriform (Jones 1995, 19; Landström 1978, 6-7). A pair of steering oars are shown towards one end of the vessel which serve to distinguish the bow and the stern. The artist has also depicted the vessel with a central structure, no mast or indication of one is shown. There is a curved design in the bow of the vessel which may represent a stem post and a round object carved at the very stern of the vessel. The whole vessel is carried by at least six people, identifiable by their heads, who are arranged in pairs. The whole group, consisting of boat and bearers, are placed on a square structure. Vessel Four almost certainly represents a funerary or sacred bark comparable with models and depictions from Egyptian tombs (e.g. Davies 1948, pl. 25; Jones 1995, 18-22, figs 8, 10 and pl. VII). Such comparative evidence includes depictions where vessels are borne on the shoulders of people in the manner of Vessel Four.

Vessel Four indicates the extent to which boats and ships played an important (non-maritime) role in the belief system of ancient Egypt. Funerary barks are depicted in tombs from the Middle Kingdom onwards (Jones 1995, 18; Vinson 1994, 51) and occur in two types of scene. The first depicts a journey that the deceased was believed to make to the sacred sites of Busiris or Abydos traditionally associated with the God Osiris' birth and death (*ibid*). The second type of scene depicts the actual crossing of the Nile on the day of the burial and the overland journey to the necropolis, usually situated on the west bank (Jones 1995, 18). Having crossed the Nile, the coffin was transferred to a papyri form boat, or boat shaped bier for its final journey across the desert (Jones 1995, 19). The scene in which Vessel Four is included may represent the record or memory of such an event in the Eastern Desert, perhaps even the transportation of the deceased from the Eastern Desert to the Nile via the Wadi Quseir al-Qadim.

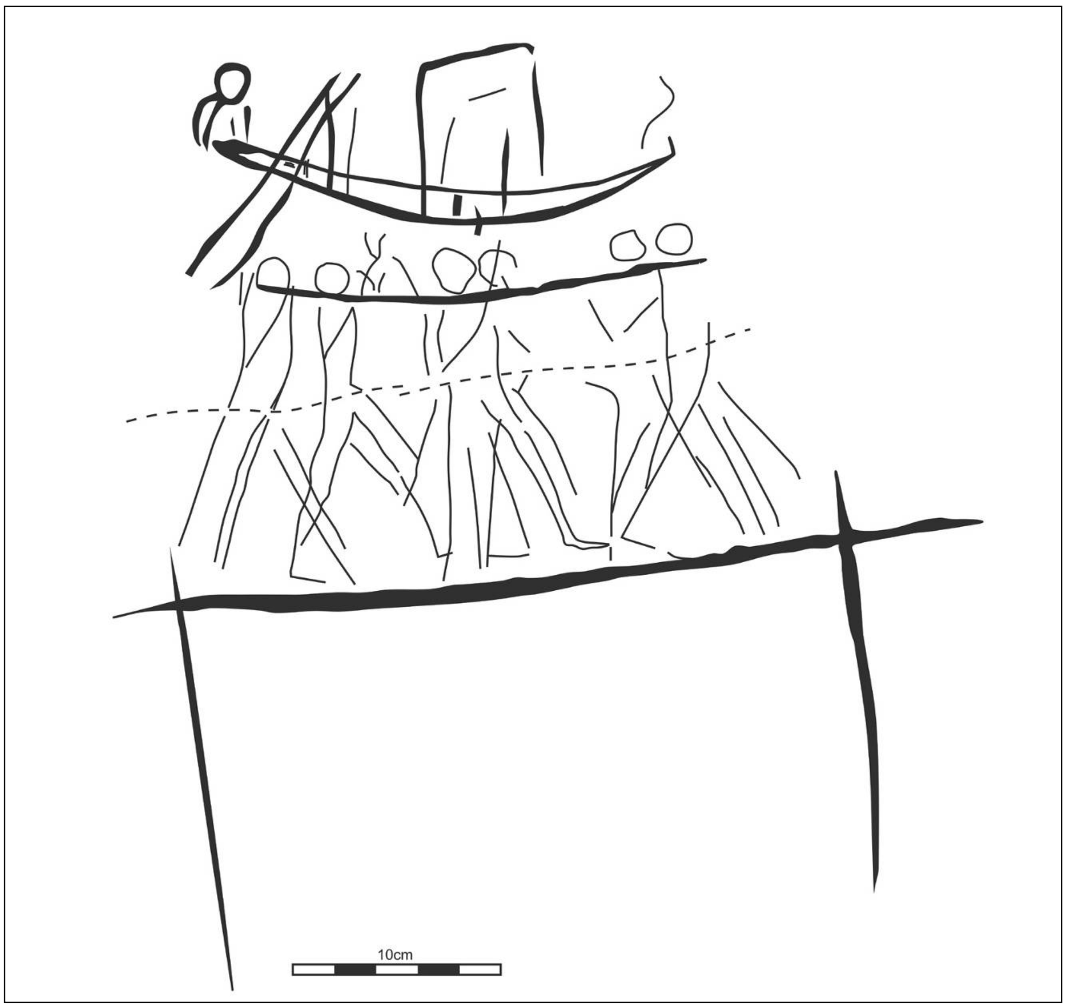


Figure 15.19. Vessel Four from the rock art site in Wadi Quseir al-Qadim.

An alternative explanation may be that Vessel Four was a type of sacred bark used in religious festivals. Their outward appearance is the same as that of a pilgrimage bark but they were carried in procession by priests during religious festivals (Jones 1995, 20; Vinson 1994, 51). The bark was the transport of the divine image of the god in imitation of the gods who were believed to cross the sky in their magical boats (Jones 1995, 20). The depiction could have been created in commemoration of such a religious event. The appearance of pilgrimage and funerary barks from the Middle Kingdom onwards corresponds to the earliest period in which Vessel One may have been depicted. Depictions and models of vessels similar to Vessel Four continue to be found during the New Kingdom.

It is therefore possible to tentatively identify the type of vessel represented by Vessel Four, in addition to its probable social context. However, the period to which Vessel Four belongs remains an extremely broad one and it can only be stated that the depiction probably dates from the Middle Kingdom or New Kingdom of the Pharaonic Period.

Vessel Five

Unlike the previous four vessels, Vessel Five (Fig. 15.20) represents a type of ship not specifically associated with Egypt. It is likely to be much later in date than the vessels discussed above. The carving shows a sailing ship with two masts, both of which appear to be carrying triangular sails. This probably represents a ship with a lateen/settee sailing rig which has a distinctive triangular shape, rather than the square-sail rig of earlier periods. The positioning of the masts, forward and aft of amidships is consistent with a sailing vessel rigged with one large mainsail (forward) and a smaller mizzen sail (aft). A series of lines leading from the top of the mainmast to the deck, aft of the mast, may represent the halyard system of the vessel. Such rigging components are often incorporated into depictions of lateen/settee rigged vessels and are characteristic of the lateen/settee rig during the early medieval period (Whitewright 2009a, 100). However, Vessel Five exhibits none of the other rigging components, such as hook-shaped mastheads, that are also associated with lateen/settee rigged ships from that period.

The lateen/settee rig was probably invented in the Mediterranean, where it began to come to prominence from the 5th century AD (Whitewright 2009a). It is unclear when it first began to be used in the Red Sea and Indian Ocean, but it must have been at some time between the 5th century AD and the 10th century AD when Arab literary sources indicate the use of a lateen/settee rig (Hourani 1951, 103; Whitewright In-Press). Given the abandonment of the site of Myos Hormos from the 3rd century AD and its reuse during the medieval Islamic period, it is this later period which provides the most likely date for the carving of Vessel Five. At this time there are likely to have been many people travelling the route between the Nile and the Red Sea who would have travelled on sailing vessels either side of their desert journey. Vessel Five may represent the memory of such vessels in the minds of a medieval traveller. Alternatively it may have been created

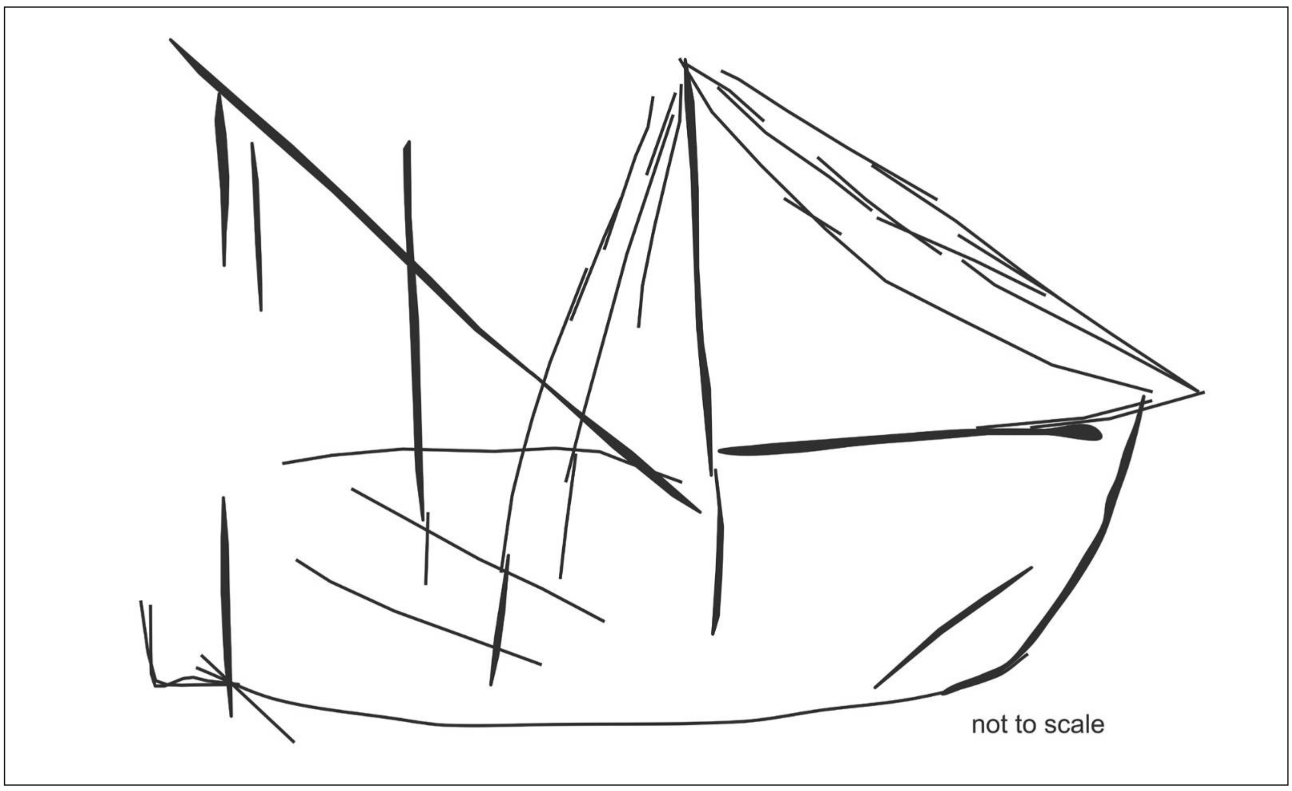


Figure 15.20. Vessel Five from the rock art site in Wadi Quseir al-Qadim.

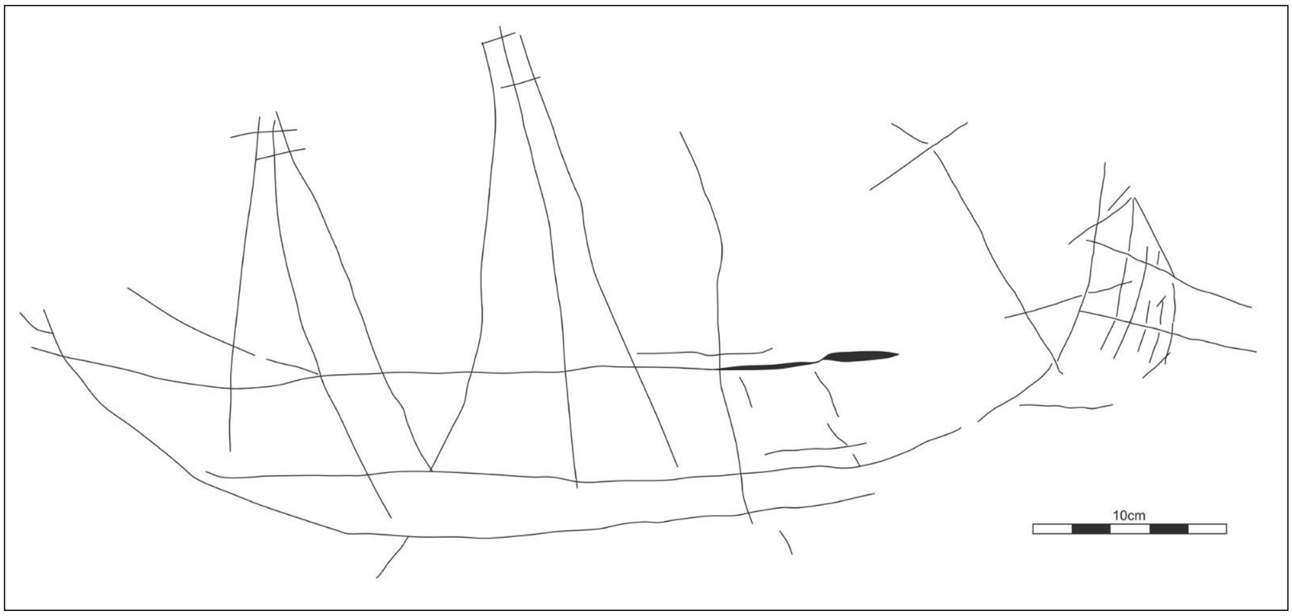


Figure 15.21. Vessel Six from the rock art site in Wadi Quseir al-Qadim.

after the abandonment of the site of Quseir al-Qadim and the establishment of the modern town of al-Quseir. The identifiable features of Vessel Five would fit those seen on indigenous Indian Ocean sailing vessels from the medieval period up to the present day (for examples of the latter see Burningham 2006).

Vessel Six

This depiction (Fig. 15.21) shows a three-masted ship towing a smaller vessel astern. The three masts are equally spaced along the length of the vessel and the artist has depicted the central (main) mast as larger than the other two (foremast and mizzen). The foremast and mainmast are both shown with lines either side of the mast running from the deck to the masthead where they terminate at a square object drawn on the top of the mast. These lines may be interpreted as showing the shrouds of the vessel, in this case the left hand line represents the portside shroud (nearest) and the right hand line the starboard shroud (furthest away) from the perspective of the viewer. The stern of the vessel is cut off in a manner which may suggest a transom stern rather than a double-ended hull. The smaller vessel towed astern has a single mast and two lines protruding from the hull probably represent oars.

Dating Vessel Six is complex because there are two main periods when it may have been created. Three-masted vessels are unknown in the Pharaonic period iconographic record and were not used in the Mediterranean until the mid-3rd century BC (Basch 1987, 473; Casson 1995, 191-199). Vessel Six must therefore be later than the 3rd century BC. Standing rigging of the type probably depicted on Vessel Six is not associated with lateen/settee rigged vessels such as Vessel Five (Whitewright 2009b). But it is associated with both Mediterranean square-sail ships from the Roman period and fully square-rigged European ships from the late-medieval period onwards. The latter type of vessel is not seen in the Indian Ocean until after Vasco de Gama's rounding of Africa in 1498. Vessel Six may therefore belong to either of two periods, the Roman period or the post-medieval period. Mediterranean square-sail vessels from the Roman period are commonly depicted towing a smaller vessel astern (e.g. Jashemski 1974, Ill. 2). But, artists usually show square-sail ships from this period with the sails or yards set, when viewed from the side (Jashemski 1974; Sidebotham 1996, Ill.2), this feature is absent from Vessel Six as no sails or yards are depicted. The area of Quseir al-Qadim was visited at least twice by square-rigged European ships possibly represented by Vessel Six. First by a Portuguese fleet in March 1541 (Facey 2004, 16) and by a British fleet in August 1799 (Harre 2004, 100; Le Quesne 2004, 152-3), on both occasions the modern town of Quseir came under attack. The final detail of the vessel to consider is the shape of the stern. Roman vessels are usually shown in the iconographic record with a double-ended, symmetrical hull (e.g. Casson 1995, fig. 14.3, 144 and 147). Occasionally a type of vessel with a rounded stern and concave stem post is shown (e.g. Casson 1995, fig. 14.5, 163 and 191). Vessel Six does not fit either of these categories, it has a rounded stem post and a squared stern which strongly suggests a transom. Such a constructional feature was not seen in the Indian Ocean until the arrival of the Portuguese in 1498, after which it became adopted into local shipbuilding traditions (Hornell 1946, 237). However, despite the adoption of the transom stern by Indian Ocean shipwrights, vessels were still rigged with the lateen/settee sail which has become characteristic of the Indian Ocean region.

Vessel Six certainly post-dates the 3rd century BC and is probably not a representation of a type of vessel indigenous to the Indian Ocean and Red Sea region. The ship had three masts supported by standing rigging, this element suggests a square-rig of some sort. The transom stern of the vessel indicates that it must have been depicted after this constructional feature became common in the Indian Ocean. Finally, the combination of a three-masted, probably square-rig and a transom stern indicates that Vessel Six probably belonged to a European tradition of shipbuilding. The depiction of such a vessel must therefore date to the post-medieval period and might be associated with the often destructive visits of European warships to the region in this period. European square-rigged naval and merchant sailing ships were gradually replaced with steam driven vessels during the latter half of the 19th century. It is therefore unlikely that any square-rigged vessels visited the area after this time and this probably represents the latest date at which Vessel Six may have been created.

Conclusion

The ships and boats carved at the rock art site in Wadi Quseir al-Qadim are all distinctively different types of watercraft. This much is obvious from even a cursory glance at them. More detailed analysis of the depictions allows an identification of the wider cultural context and possible period during which they were created. Vessels One to Four form a group of watercraft which are probably representative of the Pharaonic period in the Eastern Desert. Within this general period it is possible to conclude that Vessel One dates to the Middle Kingdom and Vessel Two to the New Kingdom. Vessel Three is more ambiguous and therefore impossible to date more specifically than being 'Pharaonic'. Vessel Four is representative of a specific type of boat used in funerary and religious ceremonies from the Middle Kingdom onwards. In contrast to this, Vessels Five and Six can be attributed to a much later period. Vessel Five was probably created between the occupation of the site during the Islamic medieval period and the modern era. Meanwhile comparative evidence suggests that Vessel Six is post-medieval in date, but probably no later than the late 19th century.

The ships and boats depicted in Wadi Quseir al-Qadim therefore cover a wide period of time. For much of this time there is no associated archaeological evidence for the use of the site of Quseir al-Qadim. Conversely, during the two main phases of occupation of the site, as Roman Myos Hormos and Islamic Quseir al Qadim, there is little or no associated maritime rock art. However, many of the Greek inscriptions also present at the rock art site have been assigned a date contemporary with the use of the port in the Roman Period (Van Rengen 2006). It is therefore possible that the location of the rock art may have been visited on a regular basis from at least the Middle Kingdom of the Pharaonic period onwards.

Depictions and inscriptions of boats in the Eastern Desert, especially where routes between the Nile and the Red Sea are known to have existed, have often been associated with the physical transportation of watercraft or their component parts (Wachsmann 1998, 238). The absence of a Pharaonic site in the vicinity of Quseir al-Qadim (Marsā Gawāsīs is some 50km distant) suggests that the physical transportation of watercraft along Wadi Quseir al-Qadim did not occur during that period. During the Roman occupation of the site, shipbuilding equipment was also known to have been transported from the Nile to Myos Hormos (Bülow-Jacobsen 1998, 66). Yet the only engravings which can be assigned to this period are religious dedications rather than records of maritime activity (Van Rengen *et al*. 2006, 23). Such dedications may be echoes of the earlier depiction of ritual ceremony symbolised by Vessel Four.

The rock art site in Wadi Quseir al-Qadim should not simply be seen as evidence for the transportion of watercraft from the Nile to the Red Sea. Although the early images of ships may be a memory of such an event, it seems more likely that they are related to activity at Marsā Gawāsīs, than to the transport of Pharaonic ships along Wadi Quseir al-Qadim. Depictions from the Pharaonic period also include the portrayal of ritual activity and remind us of the important role which watercraft played in the ceremonial life of ancient Egypt. Visitors to the site continued to record religious dedications in the Roman period, perhaps indicating an appreciation of the existing ritual imagery and suggesting the possible use of the site as a religious sanctuary (Van Rengen *et al*. 2006, 23). The site continued to be visited during the later medieval and post-medieval period when visitors added further maritime imagery to those already in existence.

The rock art site can therefore be viewed in two ways. On the one hand it represents a simple record of the variety of watercraft that people travelling through the Eastern Desert experienced, either at the Nile or the Red Sea, over a period of time stretching from the Middle Kingdom to the 19th century AD. Identification of the long use of the site, through interpretation of the ship and boat imagery, allows the ritual imagery, which comes from a variety of periods, to be put into context. The site was obviously one to which people travelling in the Eastern Desert were prepared to associate their particular rituals or beliefs by inscribing them on the wadi wall alongside those of earlier visitors. The enduring nature of the site is perhaps indicated by the presence of depictions of shipping representing the most recent history of the locality and its people.

15.5 Maritime Activities in the Roman Period

Ross Thomas

Myos Hormos was a port constructed in a desert region with limited resources and limited water, making it expensive (Lewis 1983, 141; Meyer 1992, 48) and occasionally dangerous (De Romanis 2003; Cuvigny 2003b) to reach. This is likely to have limited the people wanting to live at Myos Hormos to those with a very specific Red Sea economic interest. It is not surprising

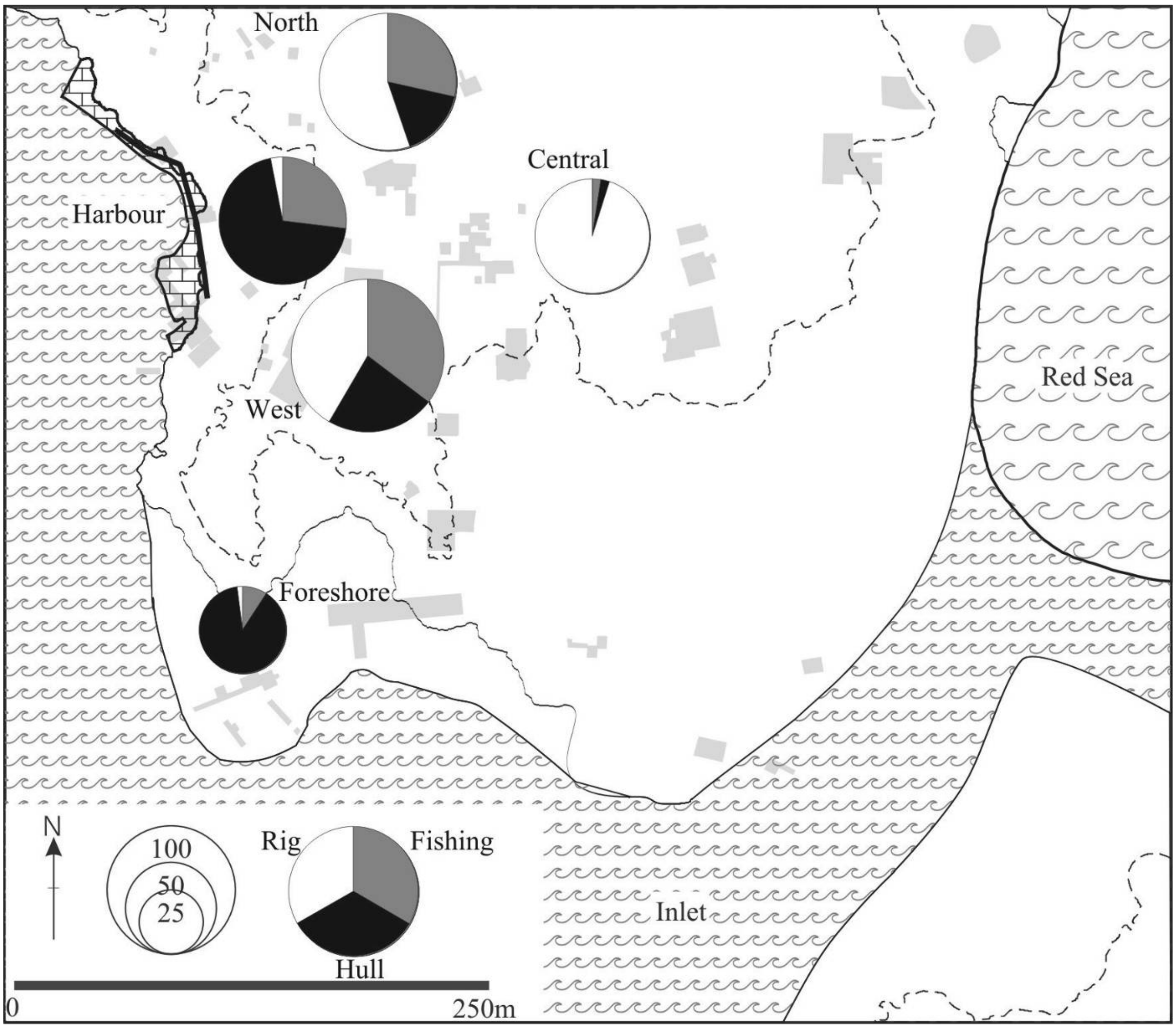


Figure 15.22. Number and proportion of maritime artefacts relating to rig, hull and fishing across the site (plan of inlet after Blue 2006a, 59 & fig 4.13).

that many excavated deposits indicate the importance of maritime activities to the Roman period inhabitants. A number of different activities were present in the assemblage representing specific vocations and relating to the layout of the harbour. The significance of maritime activities in the understanding of the demography of ports is generally ignored by archaeologists and here we attempt to fill this lacuna.

Maritime activities are represented by the artefacts discussed in this chapter (Table 15.4). They include elements of ships sail and rig (sail, webbing, brail rings, dead eyes and sheaves), of the hull and its maintenance (planks, tenons, dowels, mortices, pitch, lead sheathing and copper tacks), nets and creels (bast-fibre and flax netting, ceramic, stone and lead net weights, cork and wooden floats), fishing lines (stone, coral, ceramic and lead line weights, copper and iron hooks, wooden gorges and cork and wooden floats). These artefacts were found discarded in rubbish dumps, either in a damaged form, or following reuse within structures (e.g. plank fragments) or shoes (e.g. net fragments). Sometimes artefacts used for one maritime purpose may then be re-used in another function relating to the sea (e.g. fragments of lead sheathing reused as line or net weights).

The significance of the sea is highlighted by the prevalence of maritime artefacts across the site. They account for 10% of all artefacts excluding pottery, although their distribution is uneven. They are most prevalent in the northern and harbour areas of the site, where they account for 15-16% of the artefacts. In the western and central areas of the Roman town, they account for 7% of all artefacts. It was possible to identify what types of maritime activity were concentrated in each area (Fig. 15.22).

Ship hull maintenance was clearly undertaken around the harbour area, where concentrations of woodchips and basalt ballast were found (described in section 15.2). Elements of rigging sail were stored (and possibly created or maintained) in the dryer central area of the site. The greatest proportion of sail and rig elements (described in section 15.3) were found in the centre of town, where Handley has also recognised a concentration of sail textiles and webbing (75% from Trench 17 and 12% from Trench 2D were maritime, compared with only 2% to 6% from Trenches 6A, 6B, 6C, 6D, 6E, 6G, 6P, 6Q and 7, c.f. Chapter 22, this volume). The greatest quantity and variety of fishing equipment were found in the western and northern areas of the site. These included a full range of basket traps, nets, gorge and hooked lines, illustrating a variety of specialised fishing techniques used by the people in that immediate vicinity (see Chapter 16, this volume). The association of finds with buildings and installations of domestic and industrial function permits further detailed interpretation.

In the central area during the 1st and 2nd centuries AD, ships rigging accounts for the majority of the maritime artefacts. This area is typified by large two-storey buildings (Fig. 15. 23), putatively identified as warehouses with domestic occupation on the first floor above an open storage area on the ground floor (Masser 2006, 145). Evidence for storage amphorae and their sealing is preserved as well as domestic artefacts including Egyptian luxuries that were rare elsewhere on site. The people living in central Building A are likely to have been associated with Red Sea trade and to have been wealthier than the other inhabitants of Myos Hormos, such as those in Trench 8. The presence of so many sail and rig elements may represent the storage and maintenance of these items in this dry and secure environment of the warehouses. Sail and rig elements are the least sturdy, being most prone to problems of damp and this would seem a sensible place to store and work on them. This also illustrates the close relationship between ship maintenance and merchant activity, especially in wine. A number of wine amphora stoppers were found, including those of wine traders who were freedmen of the emperor (Claudius or Nero) called Τιβε(ριου) Κλ<α>υ(διου) Ερμιου (ST0439) and Τιβε(ριου) Κλαυδ[ιου] Σε[κου]ν(δου) (ST0373), whilst a third may represent either individual (the genitive was lost ST0409, c.f. Chapter 3, this volume).

Myos Hormos	**Maritime Artefacts**		**% of Maritime Artefacts/area**		
Location	Count	% of finds	Fishing	Hull	Rig
Trench 17	25	*59.5%*	*0.0%*	*8.0%*	*92.0%*
Trench 2B	45	*6.1%*	*0.0%*	*0.0%*	*100.0%*
Trench 2C	1	*0.5%*	*0.0%*	*0.0%*	*100.0%*
Trench 2D	5	*4.5%*	*0.0%*	*0.0%*	*100.0%*
Central	**76**	***7.0%***	***0.0%***	***2.6%***	***97.4%***
Trench 7	7	*6.7%*	*57.1%*	*14.3%*	*28.6%*
Trench 12	25	*12.4%*	*24.0%*	*76.0%*	*0.0%*
Trench 15	3	*16.7%*	*0.0%*	*100.0%*	*0.0%*
Trench 7A	55	*20.7%*	*25.5%*	*70.9%*	*3.6%*
Harbour	**90**	***15.3%***	***26.7%***	***68.9%***	***4.4%***
Trench 6A, B & C	16	*6.9%*	*0.0%*	*12.5%*	*87.5%*
Trench 6D & E	43	*15.8%*	*25.6%*	*16.3%*	*58.1%*
Trench 6K	1	*3.8%*	*0.0%*	*0.0%*	*100.0%*
Trench 6P	74	*25.9%*	*20.3%*	*13.5%*	*66.2%*
Northern	**134**	***16.4%***	***19.4%***	***14.2%***	***66.4%***
Trench 9	1	*2.7%*	*0.0%*	*100.0%*	*0.0%*
Trench 10	37	*28.0%*	*10.8%*	*89.2%*	*0.0%*
Trench 16	1	*1.7%*	*0.0%*	*100.0%*	*0.0%*
Trench 14	2	*10.5%*	*0.0%*	*100.0%*	*0.0%*
Southern	**41**	***16.6%***	***9.8%***	***90.2%***	***0.0%***
Trench 5	4	*1.1%*	*0.0%*	*0.0%*	*100.0%*
Trench 8	42	*6.7%*	*31.0%*	*33.3%*	*35.7%*
Trench 6G, H & J	83	*7.5%*	*32.5%*	*15.7%*	*51.8%*
Trench 6Q	29	*16.2%*	*20.7%*	*10.3%*	*69.0%*
Western	**158**	***7.0%***	***29.1%***	***19.0%***	***51.9%***
Total	**498**	***10.0%***	***20.0%***	***30.1%***	***49.9%***

Table 15.4. Significance of maritime artefacts across Myos Hormos. The percentage of small finds that were maritime artefacts (column 3) was calculated from the finds archive which does not include pottery and faunal remains.

The late Augustan harbour facilities and their subsequent rebuilt sea defences, installations and buildings (Blue and Peacock 2006, 175) were the source of many of the artefacts representing hull maintenance. It is easy to imagine the ships being dragged ashore onto the man-made foreshore for maintenance work, in front of structures housing metal working installations and hearths used for heating pitch and to create materials to make the hulls water tight (Blue 2006b, 84; Thomas 2006b, 94) although some of the extant buildings in this area may be later in date. To the south, evidence of antifouling was preserved in the form of barnacles still retaining pitch and impressions of the wooden planks (Whittaker 2006, 80, see chapter 3; Whittaker *et al*. 2006). The limited number and range of fishing hooks and weights were also found in the harbour area, suggests that fishing boats may have been housed there.

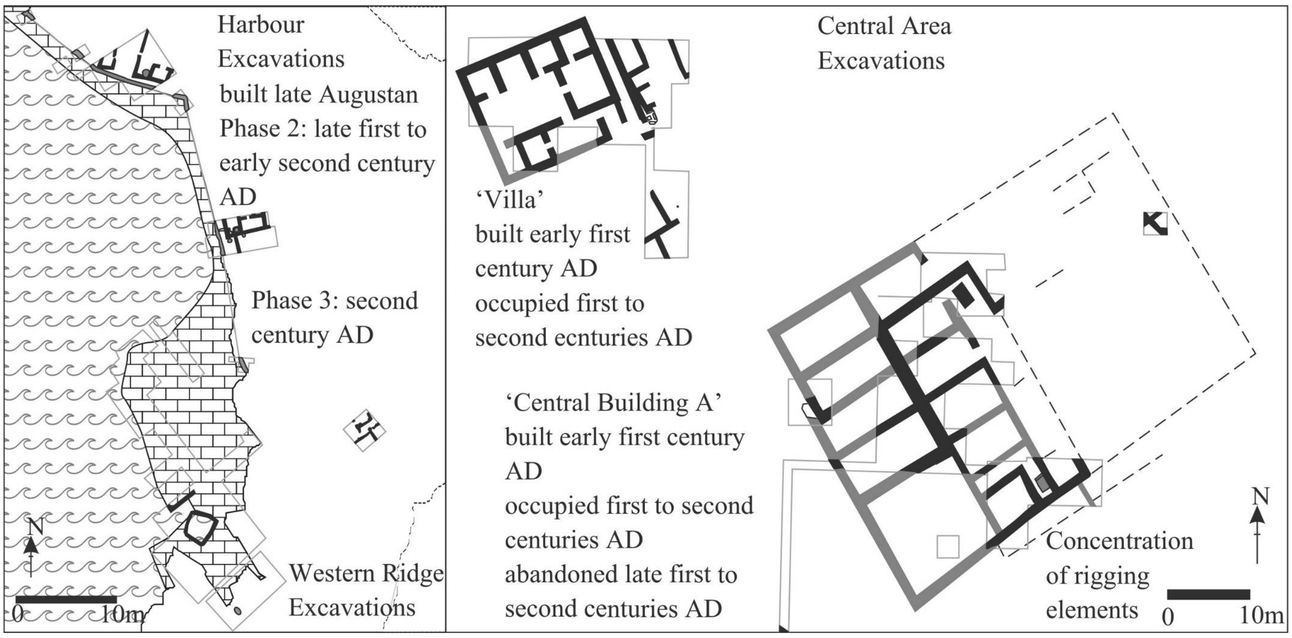


Figure 15.23. The harbour and central areas. Central Building A was re-excavated as Trench 17 in 2003 (Plan after Thomas 2006, 88; Masser 2006, 143; Whitcomb 1982, 33 & 38).

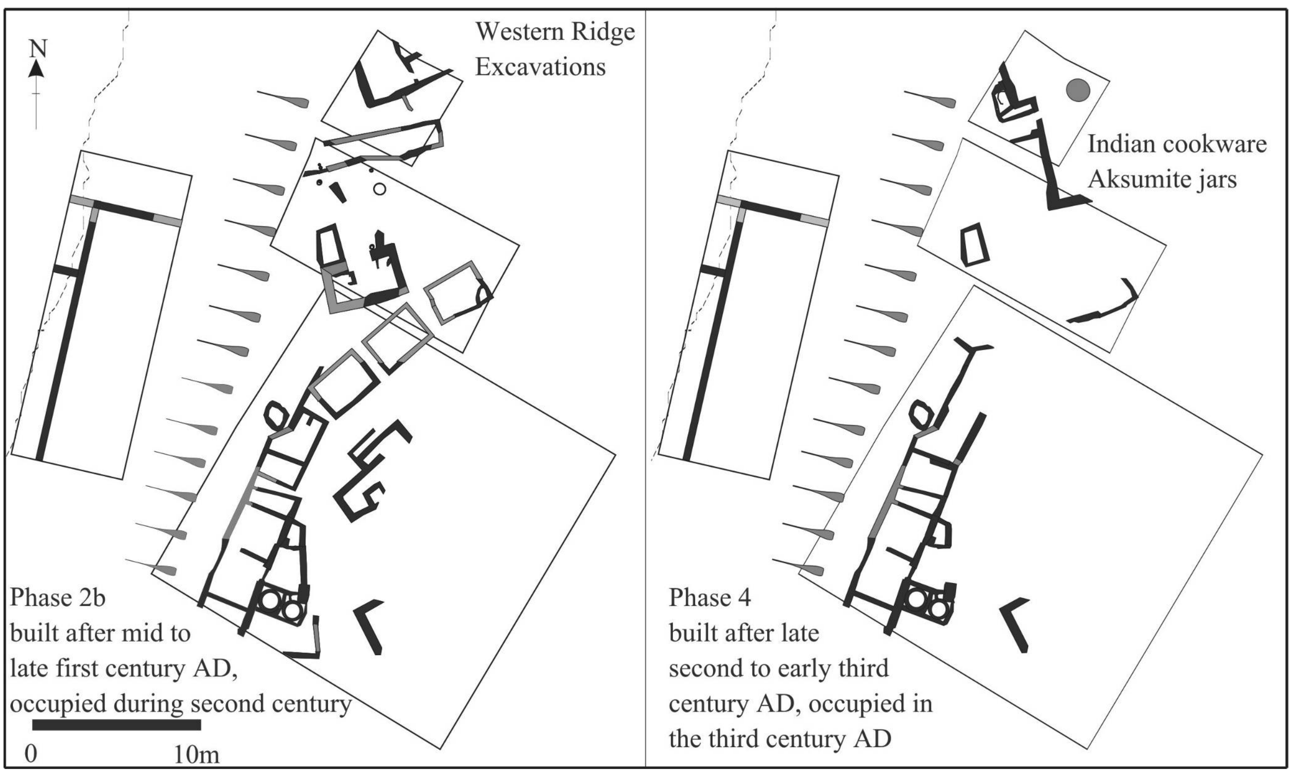


Fig. 15 24. Trenches 6G and 8 in the 2nd and 3rd centuries AD (Thomas and Masser 2006, 131).

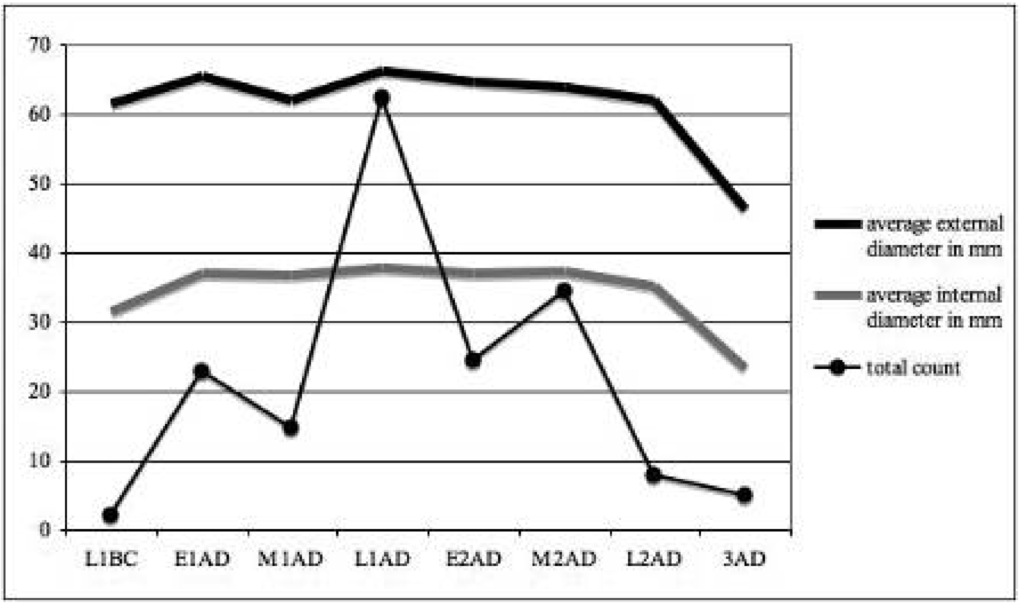


Fig. 15.25. Brail ring diameter and count distribution over time. Temporal scale divided into early (E), mid (M) and late (L) portions of each century BC or AD.

On the western ridge, a complicated series of phases shows a number of different activities taking place (Fig. 15.24), but the prevalence of fishing equipment across the site, along with a concentration of shellfish jewellery, shell bowls and scoops (see Chapter 13, this volume), suggests that these were quite different people to those inhabiting the central area. It was also in this area that the Pakubis ostracon was found. Here we found a wide variety and quantity of fishing equipment. The northern area also contained many examples of fishing equipment, concentrated in Trenches 6P and 6D (see Chapter 16, this volume). There were also many sail elements within the rubbish dumps of this area. The final phase of occupation on the western ridge (during the 3rd century AD) was located only in a small area to the north of Trench 8 (Fig. 15.24) and shows a complete change from the earlier periods and other areas. Here a significant range of imported Aksumite and Indian pottery forms, such as cooking pots, lamps and jars, suggests close cultural contact with the southern Red Sea and possibly India (Thomas and Masser 2006, 137-8). A variety of ship elements were also found in this location (above).

The decline of Myos Hormos in the 3rd century AD can be better understood through maritime activities. Hull maintenance seems to stop in the harbour area and on the southern shore during the 2nd century AD, as there is no evidence of activity in these areas during the 3rd century AD. A small pile of salvaged lead sheathing (possibly retained for use as repair patches) and ship elements found from 3rd century AD deposits in Trench 8, are all that represent any form of ship maintenance activity during this period. The distribution of quantity and diameter of the brail rings found at Myos Hormos can also suggest the changing scale and form of maritime activity over time (Fig. 15.25), although a direct correlation between brail ring and ship size cannot be assumed (Whitewright 2007, 288; c.f. discussion of brail ring size in Section 15.3 of this chapter).

If sail maintenance is related to the size and number of brail rings, then the busiest period of activity would be in the early 1st century AD and the mid-2nd century AD. The late 1st century AD is represented by the largest brail rings, suggesting that a greater number of large vessels were using the port during this period. Particularly marked is the small size of the few brail rings from the 3rd century AD, which averaged over a third smaller than those from the 1st century AD. This probably relates to the reduced traffic and limited size of vessels, perhaps part of a wider Red Sea phenomenon at this time.

16 Fishing Activity

Ross Thomas

Introduction

The evidence for fishing at Quseir al-Qadim is represented by three main groups: artefacts, supplemented by faunal remains; and documentary or iconographic data.[1] The fishing techniques used can suggest what species of fish were targeted, while fish remains can confirm this and gauge their efficiency. Historical sources and modern ethnographic accounts furnish useful comparative material (see Wendrich and Van Neer 1994; Hamilton-Dyer 2001a; Bekker-Nielsen 2002; 2004; Beech 2004).

The fishing industry at Quseir was conducted on three levels: fishing, processing and marketing. Fish was either marketed fresh, or was processed by salting, drying, pickling, smoking or fermenting into sauces. These processes required specialist knowledge, installations and ingredients. All of these activities had social implications and signatures.

16.1 Roman Period Fishing

Line fishing

Fishing by hand line uses particular equipment that is archaeologically attested in the form of line sinks (weights), floats, fishing hooks and gorges. Line sinks appear in a variety of forms and sizes, constructed using lead, stone, coral and ceramic. Stone and ceramic sinks were often drilled, or notched to accommodate a line (Fig. 16.1); lead sinks were constructed from off-cuts of lead sheet, folded and pierced; while floats were constructed from wood or cork, possibly from discarded cork amphora stoppers. However, sinks and floats were also used on fishing nets and distinguishing between their function is problematic.

Hooks can be made from shell, bone or metal (Beech 2004, 67), but only metal ones have so far been identified from Myos Hormos and Berenike (Veldemeijer 2004), examples from Myos Hormos appearing either as small copper alloy hooks 10 mm by 20 mm long, or as larger iron hooks, 30 mm-50 mm long or more (Fig. 16. 1) (see Chapter 10, this Volume). Both occur as barbed or non-barbed varieties; whilst a barb will keep the fish attached for longer, it is more difficult to unhook and fouls more easily (Beech 2004, 67). The size of the hook is likely to relate to the type of fish sought. The smaller hooks are generally found in groups, occasionally concreted together, suggesting that they may represent multiple hooked lines (see groups M0311 and M0025 in Fig. 16. 1) described by Oppian for catching saddled sea bream (Oppian *Halieutika,* 3.78; 3.468ff; Bekker-Nielsen 2004a, 89-90). Indeed other species of sea bream were consumed at many Eastern Desert and Red Sea sites (Wendrich and Van Neer 1994; Van Neer and Lentacker 1996; Van Neer and Ervynck 1998; Van Neer and Ervynck 1999; Hamilton-Dyer 2001a; 2003).

A gorge is a straight piece of shell, bone or wood attached to a line, baited and laid parallel with the line. Fish eating the bait, are caught by tensioning the line, causing the gorge to stick in the throat or belly of the fish (Beech 2004, 68). Larger iron hooks and gorges (Fig. 16.1) would have been baited to attract larger fish or shark species. The gorge fishing method is not found in the Mediterranean, but is known from archaeological sites in the Persian Gulf (Beech 2004, 68). All the Myos Hormos examples were made from wood, but were very similar in form to bone examples from Ra's al-Hamra RH5 in Oman (Charpentier *et al*. 2004). The examples from Myos Hormos were usually made from a twig of locally available wood (such as mangrove) or may have been whittled down from a larger piece until they were approximately 40 mm long. They were sharpened at one end and notched at the other to attach the line. Gorges are likely to have been used to catch larger fish and sharks and so represent the use of a specific technique to fill a specific demand (S. Hamilton-Dyer pers. comm.). Putative gorges from Islamic contexts were made of tamarisk (Hiebert 1991, 155).

Fishing nets

A number of net fragments, as well as net weights and floats were found at Myos Hormos (Fig. 16.2). Net weights are sometimes distinguished from line sinks because of technical differences. Weights could be made

[1] Fishing equipment encompasses a range or artefact types, the ID numbers of these are prefixed in the following way; L= Lithic, W= Wood, CB= Cordage and Basketry, M= Metal, C= Ceramic and FR= Faunal Remains.

from stone, coral or potsherds, with holes drilled or grooves cut round the outside to accommodate attachment to the net. They could also be made from punctured lead sheeting, often rolled to prevent fouling the net, a common feature of fishing equipment found on wrecks in the eastern Mediterranean, such as the 7th century Dor and Yassi Ada wrecks (Galili *et al*. 2002; Kuniholm 1982). At Myos Hormos lead scraps from hull repairs would have been readily available. Some net weights of fired ceramic were found in Roman deposits, though theses were more common in Islamic or mixed deposits (Fig. 16.2). These also had a tubular profile, in order to limit net fouling. This tubular construction makes identification of these as net weights more certain. Floats were made from wood or cork that could be fashioned from amphora stoppers or off-cuts of wood.

Nets can be used for both passive and active forms of fishing. In passive net fishing they are left unmanned to trap fishes, whilst in active techniques they are dragged or thrown. Here they were commonly made from bast fibre, but those from Abu Sha'ar and Berenike were identified as flax, tied with mesh knots (Wendrich and Van Neer 1994, 183; Veldemeijer 2004, 101). Nets were generally of two sizes. The least common nets had a fine mesh with a string diameter of c.1 mm and mesh spacing averaging 12 mm. These putative casting nets were used to catch small fish species on the shore or from a boat. The more common coarser nets had string diameter of c. 3.8 mm and mesh spacing averaging 35 mm. Coarse nets would have been used for larger fish, perhaps by dragging or trawling as described by the classical authors and depicted in mosaics (Fig. 16.2, 15.4, mosaic 46 of the Sousse Museum, Bekker-Nielsen 2002, 216; 2004a, 83-7). After fishing nets had outlived their usefulness, they were sometimes reused, the cordage plaited into the soles of sandals (CB0304, CB0155, Chapter 21, this volume, Fig. 21.21), a phenomenon also recognized at Abu Sha'ar (Wendrich and Van Neer 1994, 184).

Fishing traps

Passive net traps were also used in antiquity (Table 16.1) that and could be left unmanned to catch fish. Almost complete bag nets were found at Myos Hormos (CB0462, CB0143, CB0162, CB0058, Fig. 16.3; Richardson 2001; 2002). These bag nets may have been used as creels or keep nets. Creels also known as 'fishing pots' are bag nets made from grass, palm or bast fibre that were set up as a trap or trailed behind boats. Veldemeijer has argued that similar finds from Berenike were not used as creels because the materials used would absorb water, become heavy and be easily damaged or more difficult to repair (Veldemeijer 2004, 104; Veldemeijer and van Rode 2004, 10). However, the materials used in the construction of the

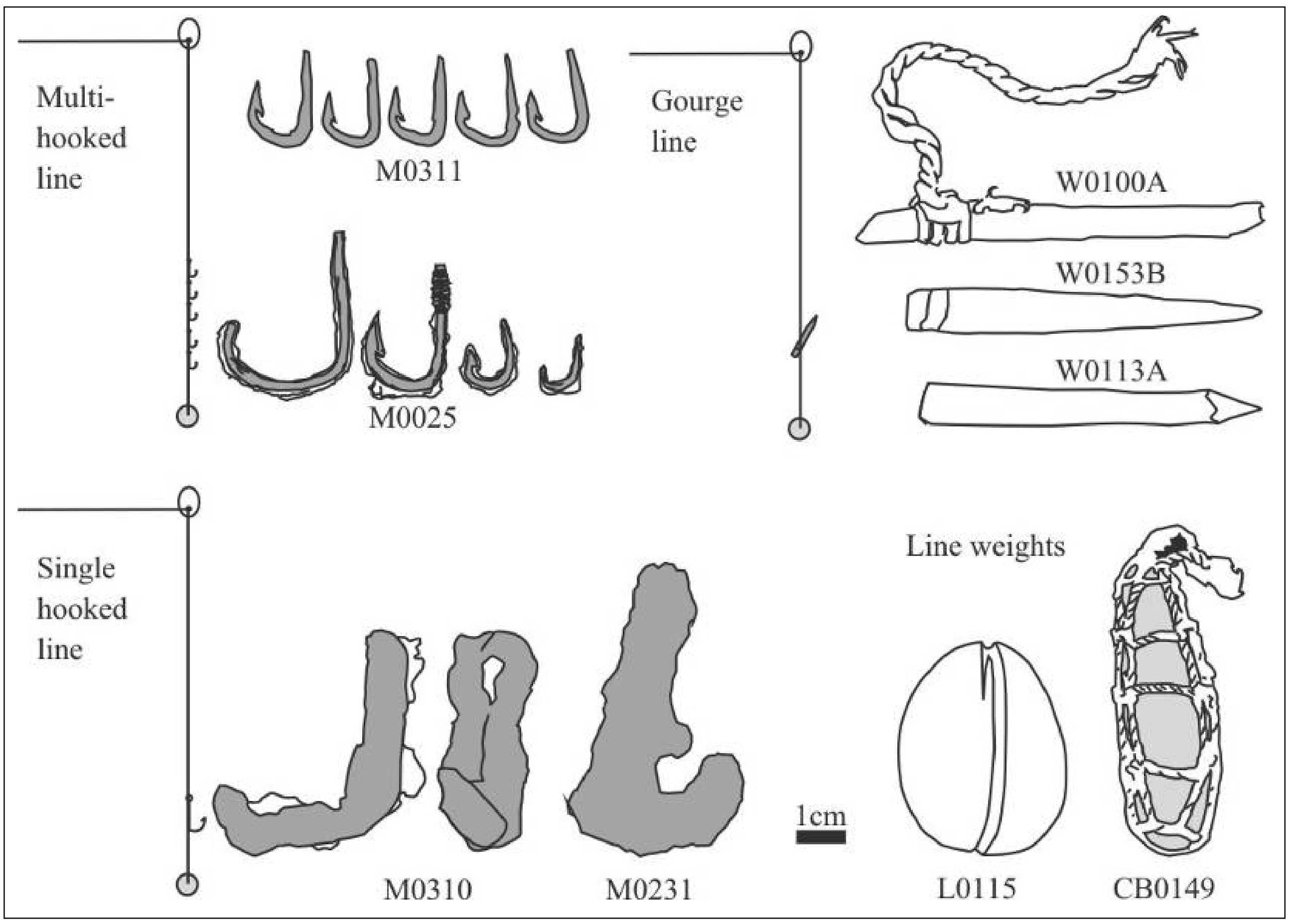


Figure 16.1. Fishing line techniques (Ross Thomas).

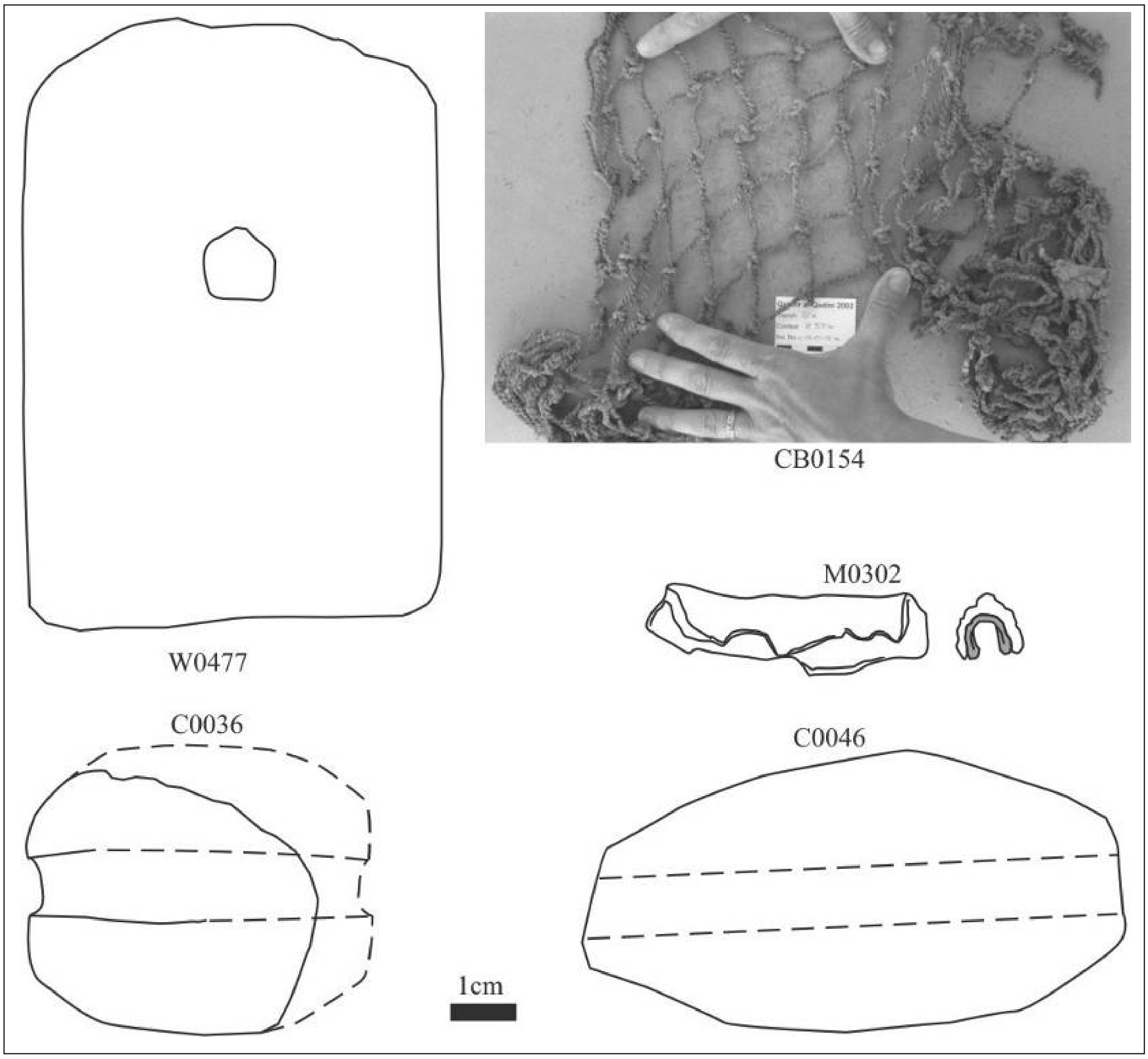


Figure 16.2. Fishing net equipment (Ross Thomas).

net bags may have been dependent upon availability and in a passive trap weight and strength would not have been as critical as that required for active fishing nets. These bag nets were in deposits alongside other fishing equipment, suggesting these were used for fishing activities (Trenches 6H, 6J, 6P and 6Q).

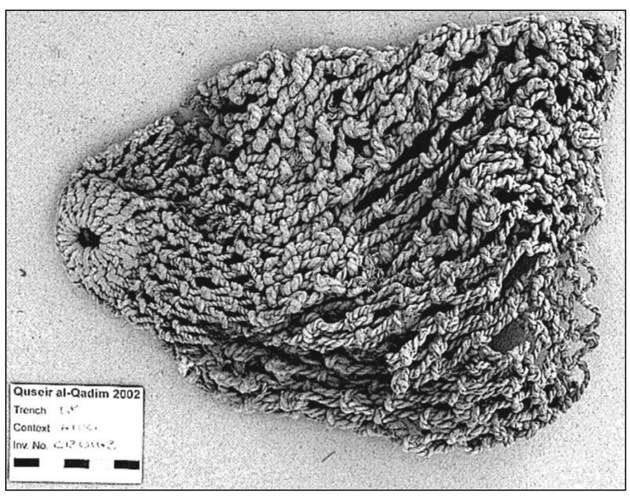


Figure 16.3. Putative creel CB0143.

Basket traps, tidal or baited, are today made from woven palm fibre, attached by cord to a float to mark their position, that is usually placed between 4-12 m in depth (Beech 2004). Whilst there are fragments of basketry, constructed from wood, basketry, grass and cordage, preserved across Myos Hormos (for example CB0142, CB0173 and W0476), none can be securely identified as basket traps. However, at Abu Sha'ar fragments of basketry made from rushes have been positively identified as basket traps. The construction identifies the two basket traps as a 'conical four system trap' and a 'spiral construction twinned trap' (Wendrich and Van Neer 1994, 186-7).

Greek term	English term	Function	Material
κάλυμμα	Cover/veil net	Fine net for small fish	λίνόν (flax)
ἀμφίβληστρον	Casting-net	Circular, cast from above	λίνόν (flax)
γρῖφος	Draw-net	Category of nets	λίνόν (flax)
(γρῖφος) γάγγαμον	Drag-net	Small net drawn through water	λίνόν (flax)
(γρῖφος) ποχ περιηγ ς	Round bag-net	Medium net? Or a scoop net on a pole	λίνόν (flax)
σαγήνη	Seine	Large net drawn to shore	λίνόν (flax)
Σκολι ς π ναγρος	Crooked trawl	Large drag net	λίνόν (flax)
πέζα	Ground-net	Passive trap	λίνόν (flax)
σφαιρ ν	Ball-net, or creel	Passive trap	λίνόν (flax)
κύρτος	Basket trap	Passive trap	Wickerwork

Table 16.1. Greco-Roman fishing techniques (after Bekker-Nielsen 2002; 2004 a&b).

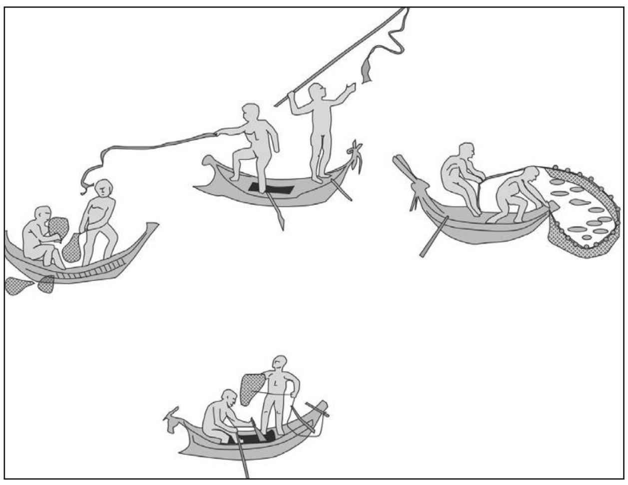


Figure 16.4. 3rd century AD depiction of fishermen from North Africa. Interpretive line drawing after photograph of Mosaic 46 in the Sousse Museum (R. Thomas).

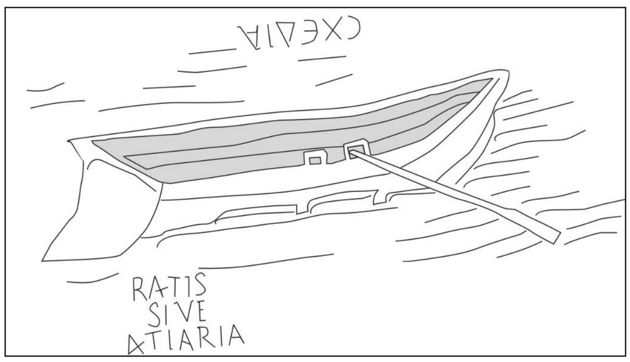


Figure 16.5. The 3rd century AD Althibarus mosaic, depicting the fishing boat Cχεδια (Σχεδια). Interpretive line drawing, after photograph of the Althibarus mosaic of the Bardo Museum, Tunis (R. Thomas).

A number of pits dug into the foreshore were revealed during the excavation of Trenches 10 and 14 (Whittaker 2006, 84-7) and a was pond built into the harbour facilities of Trench 7A (Peacock and Blue 2006). It is possible that these features were used as tidal traps. If this was indeed their function, these pond tidal traps would have trapped feeding fish at low tide. They may have also been used to keep fish or shellfish alive or for other purposes not related to fishing.

Such tidal traps and ponds were utilised by the indigenous peoples of the Red Sea, the *Ichthyophagi* (Agatharchides *On the Erythraean Sea*, 5.32-3), despite the limitations of the tidal range of the Red Sea that would have restricted their effectiveness. Agatharchides describes them utilising stone traps permanently installed across channels and inter-tidal pools (Agatharchides *On the Erythraean Sea*, 5.32). Such traps have been recognized at an Ababda village near Qulan, where the inhabitants have claimed that the 'old' Ababda used it (Tony Rouphael pers.comm).

Fishing techniques

A combination of literary (Table 16.1), iconographic (Fig. 16. 4) and ethnographic data (Table 16. 2) can enhance our understanding of how the fishing artefacts discovered at sites along the Red Sea shore were used. Using Bekker-Nielsen's (2002) study of Greek fishing terminology from the *Halieutika* of Oppian, the artefacts recovered can form, the basis of a typology of fishing methods.

Nets in antiquity were described as λίνον ('made of flax'), δικτυόν ('webbed') or κύρτος ('wheel'). However, a number of different nets were used, involving different deployment strategies and different target species. Casting nets were used to catch fish from above, whilst a range of draw, drag and seine nets were used to catch them from below. Passive traps were also used, with ground nets (like gill nets), creels or basket traps set on the sea floor. Line fishing was also described, for example the multiple-hooked line technique was very successful in catching sea bream (Bekker-Nielsen 2002, 216; 2004a, b, 83-7, quoting Oppian's *Halieutika*). The mosaic illustrated above (Fig. 16.4) shows how a range of fishing activities might take place aboard small fishing vessels. They depict the use of fishing lines, a drag net (γρῖφος right hand side), creels (σφαίρων left hand side) and what is most probably a casting net (ἀμφίβληστρον at the bottom).

The classical authors and iconographic depictions illustrate all the variety of fishing technology represented at Myos Hormos with the exception of gorges, but they also stress the importance of small boats in the ancient fishing economy for which we have no evidence. Ostraca from both Myos Hormos and Maximianon do however mention small fishing boats called *schedia.* One is a permit for *Pakubis Ichthyophagos* to move a number of boats to another port (O.Myos 512, Van Rengen forthcoming), and another mentions an order of fish for one *Ioulius Maximus* from Maximianon, delayed because the boats had not yet returned (Bülow-Jacobsen *et al*. 1994). The literal meaning of *schedia* (Latin, *ratis* or *ratiaria*) is raft, or flat-bottomed boat (Liddell *et al*. 1891). It is a term that is frequently used in descriptions by ancient geographers of indigenous Red Sea boat types (Strabo *Geography*, 16.4.16; *Periplus* 7). A *schedia* is labelled on the 3rd century AD Althibarus mosaic (Fig. 16. 5), where it is depicted as a small flat-bottomed rowing boat. The only depictions of indigenous Red Sea vessels date to the Pharonic period, where flat-bottomed boats are depicted with triangular sails (Kitchen 1993, 605). The remains of only two early Roman fishing boat wrecks are known (Parker 1992, 25-6), one from Fiumicino, Italy of the 2nd century AD, the other from Galilee, Israel dating to the 1st century AD (Boetto 2006; Wachsmann 1987; Steffy 1994, 65), but neither need resemble those on the Red Sea.

Ethnographic studies of traditional and modern fishing techniques in the Red Sea region and the Arabian Gulf have also provided useful information as to how fishing equipment relates to fish types and hence to archaeologically recovered faunal remains (Table 16.2, Wendrich and Van Neer 1994; Hamilton-Dyer 2001a; Beech 2004). From this it is clear that a mixture of strategies must have been used in different environments to catch the range of species consumed at Myos Hormos (Hamilton-Dyer 2003a). Line techniques would have been required to catch both reef

Common name	Tidal trap	Basket trap	Trawl net	Casting net	Hooked line	Multiple line	Trolling line
Parrotfish		B	W	W			
Grouper		B			B,W	B	
Emperor		B			B,H,W		
Trigger				W	W		
Shark					W	B	
Seabream	B	B	W		B,H	O	
Jacks and Trevallies	B	B	W		B,W		B
Surgeon and Unicorn			W	W			
Snapper	B	B	W		H		
Wrasse			W		W		
Goatfish				W			
Mullet	B			W,B			
Barracuda	B		W	W			B
Gar-pike and Needlefish	B			W			
Squirrel			W	W			
Gerres	B						
Sardine				B			
Rabbit	B	B		W			
Grunt		B	W		B,W		
Mackerel					B		B
Tuna							B

Table 16.2. Ethnographic data on species caught with different fishing techniques in the Red Sea and Persian Gulf (source listed in table as W, Wendrich and Van Neer 1994; H, Hamilton-Dyer 2001a; B, Beech 2004; O, Oppian referred to in Bekker-Nielsen 2004b). Fish species listed in approximate order of occurrence at Myos Hormos (Hamilton-Dyer 2003a).

and open water species such as shark, mackerel and tuna, and would have also been effective for catching barracuda, jacks and trevallies. Net and trap techniques must have been used to catch parrotfish (the most commonly consumed and exported fish of Myos Hormos), as well as mullets, sardines and a range of reef species. Commonly consumed reef fish such as grouper, emperor, trigger, seabream, snapper and wrasse could have been caught with a variety of trap, net and line techniques, which may explain why they were so commonly caught. The effort and expense involved in developing and practicing a variety of fishing techniques implies that there was a significant demand for dietary variation.

Fish processing and marketing

Evidence for the production and marketing of fish from Myos Hormos comes from faunal remains, ostraka, papyri and the *dipinti* on fish transport amphorae. Faunal remains inform us of fish species caught and fish sauces imported from the Nile found at Myos Hormos (Van Neer *et al*. 2007; see also Chapter 20, this volume), but most of the detailed information on preserved fish products comes from other sites in the Eastern Desert that purchased fish from the fishermen of Myos Hormos (Hamilton-Dyer 2001a; Bülow-Jacobsen 2003; Leguilloux 2003; Van Neer, *et al*. 2004; Tomber 2006). This helps us appreciate the potential extent of trade in both fresh and preserved fish from Myos Hormos, much of which was traded locally, along the desert road to the Nile (Cuvigny 2003a, 573; Leguilloux 2003). The identification of fish species and fish sauces from the faunal remains (Hamilton-Dyer 2001a; Leguilloux 2003; Van Neer *et al*. 2004) is complemented by descriptions of fresh and preserved fish products traded along the Myos Hormos road (Bülow-Jacobsen 2003; Leguilloux 2003) and to other sites in the Eastern Desert (Hamilton-Dyer 2001; Tomber 2006).

Demand for fresh fish (*O.Claud* II 233, 241-2, οψαρια, *O.Krok* 1,63, *O.Max* 639, 1138, 1463), included the ordering of specific species (Table 16. 3) that were clearly popular, such as parrotfish (σκάρος, *O.Max.*793) and rock mullet (τρίγλη, O.Max707, 869, 1300), and as

English	Greek	Reference
Shellfish	βάλανος	(Bülow-Jacobsen 2003)
Unknown fish	γλαυκισκάριν	(Bülow-Jacobsen 2003)
Parrotfish	σκάρος	*O.Max.* 793, *O.Krok.* 1, *O.Krok.* 63,
Salted/dried parrotfish	τεμάχιον (σκάρος)	*O.Max*.793
Mullet	κεστρεῖς	*O.Krok*.1, *O.Krok*.63,
Rock mullet	τρίγλη	*O.Max*.707, *O.Max.*1300, *O.Max*.869
Fish (fresh)	όψάριν	*O.Krok*.1, *O.Krok*.63, *O.Max.*1138, *O.Max.*1463, *O.Claud*.241
Tarichos pickled in brine.	ταρίχιον	*O.Claud.*1264
Temachion salted or dried	τεμάχιον	*O.Max*.876 *O.Claud*.233
Hallex fish sauce	άληξ	*O.Max*.279, *O.Max.*1512
Garum fish sauce	γάρος	(Tomber 2006: 210)
Filleted and 'cooked for preserving' (smoked?)		*O.Max*.639
Little fish	Ιχτηύδιον (ἰχθύδιον)	*O.Claud*.242

Table 16.3. Fish species and fish products exported most likely from Myos Hormos to settlements along the Myos Hormos road and in the Eastern Desert. Ostracon number given where available from source sites Maximianon, Krokodilo (Bülow-Jacobsen 2003; Leguilloux 2003) and Mons Claudianus (Hamilton-Dyer 2001a; Tomber 2006).

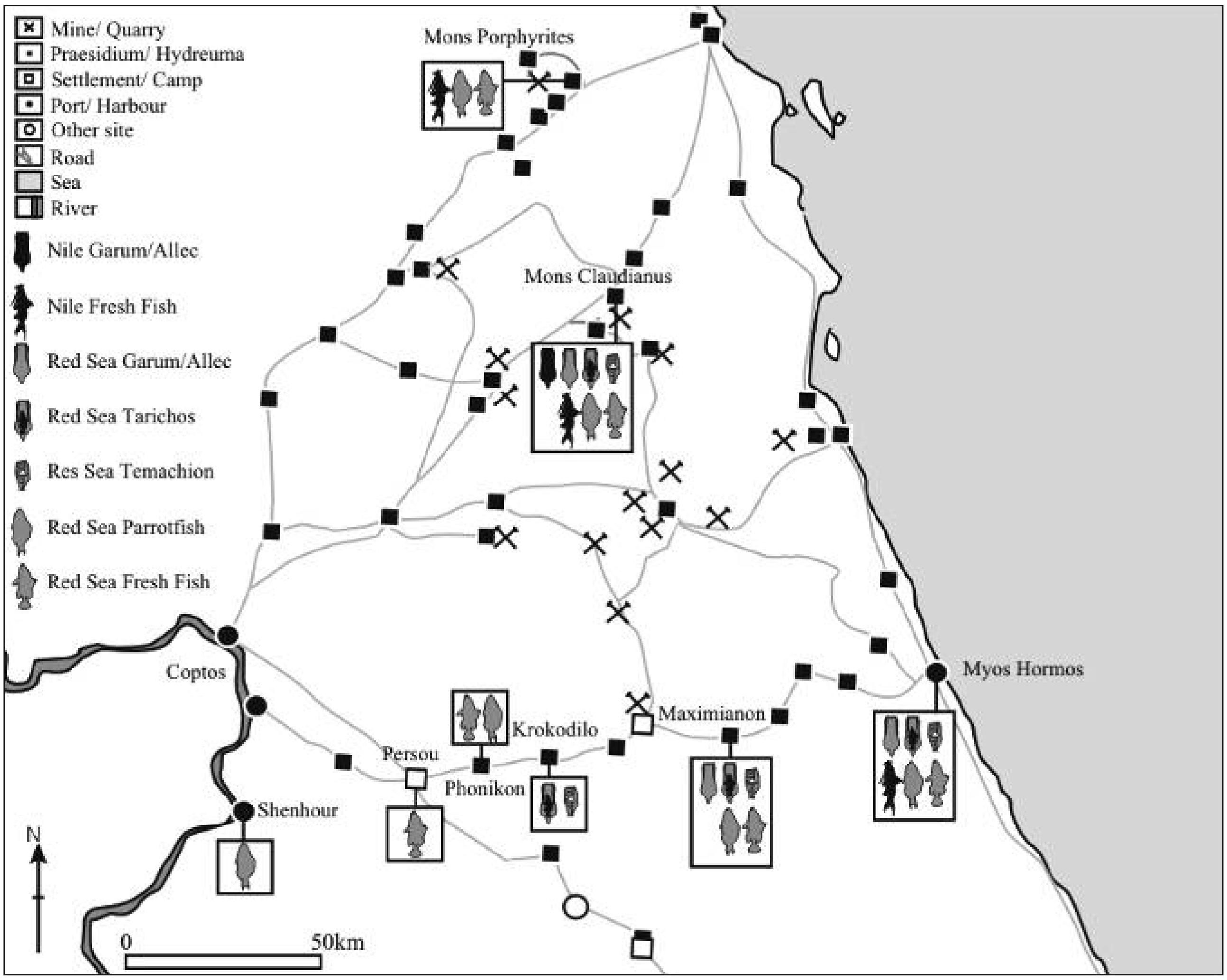


Figure 16.6. Exportation of fish and fish products. Data after (Hamilton-Dyer 2001; Bülow-Jacobsen 2003; Leguilloux 2003; Van Neer et al. 2004; Tomber 2006).

yet unidentified species (γλαυκισκάριν, Bülow-Jacobsen 2003), as well as small fish (ἰχθύδιον, *O.Claud.*242) and shellfish (βάλανος, Bülow-Jacobsen 2003). However, the environment of the Eastern Desert would dictate the need for some form of preservation before export (Curtis 1991**;** Trakadas 2004; Van Neer *et al*. 2007; Wilson 2006).

Fish preserves imported from the Red Sea ports (most likely Myos Hormos) to Mons Claudianus, Maximianon, and Krokodilo include; salted, dried, smoked, pickled and fish sauces (recipes varied in different regions, Curtis 1991; Trakadas 2004; Van Neer *et al*. 2004; Wilson 2006). Not all these methods are archaeologically visible, particularly as the environment naturally encourages desiccation. The products were known as; *temachia.* (sliced and either dried/and or salted *O.Max*.876), *tarichos* (pickled in brine), *allex* or *garum* (fish sauce produced through fermentation of small fish and fish guts *O.Max*.279, 1512) and possibly, in one case, smoked fish (*O.Max.*639). These preservation techniques would have permitted fish caught at Myos Hormos to be exported to the Nile, explaining the long distance parrotfish remains had travelled to reach the late Roman site of Shenhour on the Nile (Van Neer *et al*. 2004). Whilst it is likely that Mons Porphyrites and Mons Claudianus were also supplied by more local sources in the Safaga or Abu Sha'ar regions, Myos Hormos was most likely the major fish producer north of Berenike on the Red Sea, marketing its products across the Eastern Desert (Fig. 16.6).

Fishing and society

The role of fishing to Red Sea port communities cannot be underestimated. Despite the consumption of Nile and Eastern Desert fauna (Van Neer and Lentacker 1996; Van Neer and Ervynck 1998; Van Neer and Ervynck 1999; Hamilton-Dyer 2001a), Red Sea fish and shellfish (and to some degree turtle and sea mammals) were important to most people's diet at these sites. Whilst it is likely that individuals occasionally fished to supplement their diet, there were clearly specialist fishermen. This is suggested by a permit granted to one Pakubis *Ichthyophagos* at Myos Hormos (*O.Myos*.512, Van Rengen forthcoming), to move his *schedia* to *Philoteras* 60 km to the north (presumably used for fishing). Another ostrakon sent by *Ioulius Maximus* to *Gaius Apoliuanus* based at the Roman Eastern Desert fort of *Maximianon*, described how he was unable to send fish because the *schedia* had not yet returned to Myos Hormos (Bülow-Jacobsen *et al*. 1994). At Mons Claudianus fish were supplied to the fort by people labelled 'Arabs' (*O.Claud* 529, *O.Claud* 830, Cuvigny 2003b, 346). The epigraphic record suggests that these specialist fishermen were the indigenous inhabitants of the Red Sea coast known to the classical geographers as the *Arabaegypti Ichthyophagi* (Agatharchides *On the Erythraean Sea*, 5.32-40; Strabo *Geog.* 16.4.5-20; Pliny *NH* 6.176; Ptolemy *Geog.* 4.5.101). The Pakubis ostrakon also shows that moving fishing boats required a permit, implying taxation (in fish?) upon return. Also the labelling of fishermen with the ethnonyms *Ichthyophagi* and Arabs, suggests that certain ethnic groups specialized in this vocation.

Fishing, involving boats (*contra* Agatharchides *On the Erythraean Sea*, 5.32-40), might lead to a surplus that would demand specialist processing and marketing. Red Sea fish was regularly traded up to 200 km from the coast and must have become a valuable dietary supplement for the settlements in the desert. For this reason the efficiency and economic importance of ancient fishing methods should not be underestimated. The people and their technology was seen as primitive by the Greco-Roman writers (Agatharchides *On the Erythraean Sea*, 5.32-40; Strabo *Geog.* 16.4.5-20; Pliny *NH*, 6.176) and subsequently this view was uncritically accepted until recently. The notion that the ancient fishing economy was small-scale, has been effectively countered by Bekker-Nielsen and others (see contributions in Bekker-Nielsen 2004a). In reality the Red Sea fishing economy supplied a range of Eastern Desert and even Nile settlements, included the production delicacies and its transport over long distance. The technology used was as complicated as that of the Mediterranean, but also included Red Sea specific technologies, such as gorges. The technology was finely adapted to the social and economic environment in which it was practiced. There was no need for more sophisticated methods where the resources were abundant and could be harvested by simple means.

16.2 Islamic Period Fishing

In Ayyubid and Mamluk Quseir al-Qadim fishing equipment was commonplace, being found in all trenches from the Islamic town and harbour. Fishing nets and fishing lines were frequent with 128 artefacts, found in Trenches 1, 3, 4, 8A, and 9, but concentrated in Trenches 2, 5, 13 and 16 (Table 16.4). Site formation processes have played a significant role in the survival of maritime artefacts and the degree of preservation afforded in the Islamic harbour area (Blue 2006a) was limited particularly when compared to the upper Islamic town area. In addition areas of the Islamic town were built upon Roman deposits (Trenches 2A, 2B, 2E, 5 and 8A), causing problems of residuality.

A variety of fishing techniques are represented in the Islamic deposits. Line fishing appears to have been more common than net fishing in the Islamic period, but the most common is gorge fishing, which is far more prevalent in the Islamic period than in the Roman. In fact it represents the majority of all fishing equipment found on the site (88 artefacts). All examples were made from whittled wood, or tamarisk twigs sharpened at one, or more rarely both, ends (Fig. 16.7). Some examples still had the line attached, or evidence for a groove where it had formerly been attached.

Metal fishing hooks are less common than gorges, with only 12 found in Islamic contexts. Like Roman examples they can be divided into two groups. Small copper alloy hooks that were used in multiples on lines (Trenches 2B, 5, 2B, 2E, 13 and 16) and more rarely larger barbed iron hooks. One example of the latter, still on its line, appeared to have a second line coming off of it, possibly designed for another hook, suggesting that the larger iron hooks may also have been used in multiples. The difference in size suggests that they had different target species. A range of weights and floats was also found. Some large coral weights looked too clumsy for net weights as they would snag, but were too large for line weights. They may have been used at the bottom corners of a drag net or seine, or as a line weight on a multiple hooked line with large hooks.

Trench	Net weights	Nets	Gorges	Hooks	line weights	line floats	% of all finds
1	2	0	0	0	2	0	3.5%
2	3	1	9	6	4	0	2.0%
3	1	0	0	0	0	0	0.8%
4	1	0	0	0	0	0	NA
5	0	0	12	3	0	2	4.8%
8	0	2	2	0	0	0	1.0%
9	2	0	0	0	1	0	NA
13	1	2	65	1	0	0	11.3%
16	4	0	0	1	0	0	4.5%
Total	14	5	88	11	5	2	

Table 16.4. Distribution of Islamic period fishing equipment. Displays the proportion of all small finds that are fishing equipment.

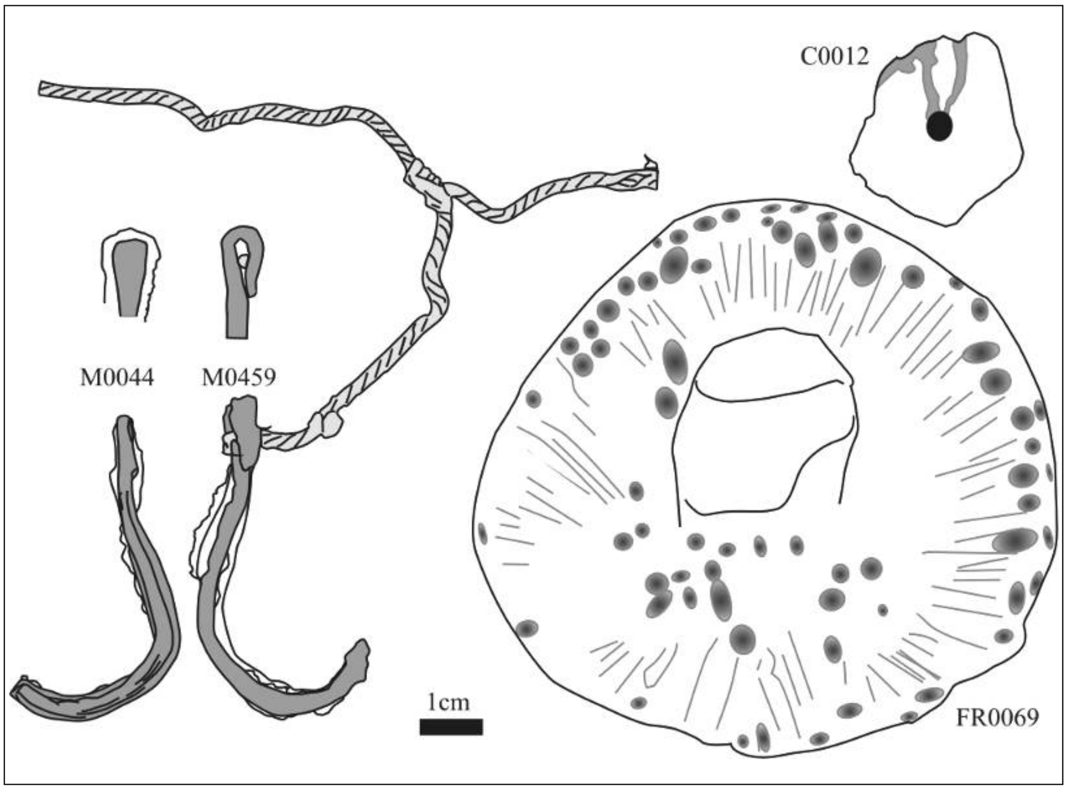


Figure 16.7. Islamic period fishing line methods, gorges, small and large hooks, weights and floats.

Interestingly one of these weights (FR0099) had a cross (crucifix?) inscribed into it. Otherwise line weights were made from an assortment of materials, including lead, coral, stone and even turtle carapace (FR0100).

Large, camel hair (CB0171) and fine meshed nets (CB403 and CB447) were found as well as a putative creel (CB0184). However, both the creel (CB0184) and the coarse (CB0171) nets were rare and only found in Trench 8A, which was built upon a Roman dump casting doubt as to whether they were Islamic or residual Roman. The materials and construction of the camel hair and putative creel nets, suggests that these may have been used for net bags, rather than fishing nets. Specially fired ceramic net weights were also found across the site (in Trenches 1, 2, 3, 4, 9, 13 and 16). These weights were tubular in design so as not to snag on the net itself. A net repairing tool was also found in Trench 2B (Fig. 16.8).

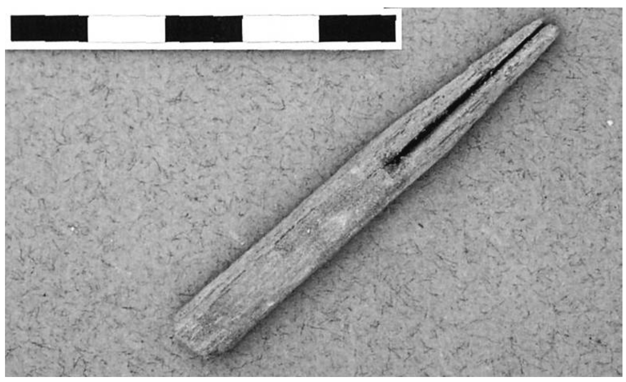


Figure 16.8 Net repairing tool, W365, scale=5 cm.

Some evidence of fish processing is present from an Mamluk context [2320] of Trench 2B, where a large (>100 mm diameter) stopper (ST0221) with a brick plug and plaster seal was found to have imbedded with small fish bones suggesting the transport of fish sauces either to or from Quseir al-Qadim during this period.

In summary, a wide variety of fishing techniques are represented in the Islamic period. The techniques used are similar to those of the Roman period and whilst there is some possibility that residual material has re-appeared in Islamic deposits, it is far more likely that there were similar fishing traditions, dictated by the same environment and needs (Beech 2004). Activity across the site seems to be quite high, with a small number of fishing items were found in all trenches. However, they appear to have been most significant in Trenches 5, 13 and 16, suggesting that fishing was widely practiced nearby. In Trenches 1, 2, 3, 4, 8A, 9 and 13, fishing artefacts were too few to suggest that fishing activities were significant for the inhabitants of these areas.

17 Wood identifications of the maritime artefacts and timbers

Rowena Gale and Marijke van der Veen

Introduction

The arid conditions at the site favoured the preservation of many wooden objects and other organic materials. Here the identification of maritime artefacts is presented, including objects associated with sailing ships (brail rings, sheaves, etc.) of Roman date, and remains of ship timbers associated with two burials of Islamic date. The identifications of the remaining wooden artefacts is published in a further volume dedicated entirely to the plant remains, with a discussion of the trade in spices, foodways, wood and charcoal (van der Veen forthcoming). The identification of the woods used in these artefacts and timbers may point to the geographical origin of the wood and thus help determine where the ships were constructed or repaired.

17.1 Methods

The samples were prepared using standard methods (Gale and Cutler 2000). The wood structure was matched to prepared reference slides of modern wood in the first author's own collection and anatomical atlases and reference books were consulted including Gale and Cutler (2000), Gamble (1972), Fahn *et al*. (1986), Neumann *et al*. (2001), Miles (1978) and Parsa Pajouh and Schweingruber (1985).

Wood structure is rarely sufficiently diagnostic to enable identification to species level. Sometimes differences in vessel size or the cellular distribution of the axial parenchyma (or other tissues) may suggest individual species/groups of species, for example in *Acacia,* but since cell size and distribution is strongly influenced by edaphic factors (climate, topography, soil conditions etc.), the maturity of the wood and the part of the tree (trunk, branch, root), the wood structure can vary significantly within a single tree. Thus, reliance on such features can be misleading. In addition, naming to species level can be particularly risky when only small fragments of wood are available for examination, especially when these originate from degraded archaeological material.

Despite the excellent preservation conditions at the site, not all wood was found to be in good condition: some fragments were firm and structurally sound, but a high proportion (most notably the tomb samples) was degraded and difficult to section and examine. The results are listed in Tables 17.1 and 17.2. Appendix 17.1 contains a short report on the identifications of a small number of wooden gorges.

17.2 Roman Maritime Artefacts

(Table 17.1) (see also Chapter 15, this volume)

Results

Of the 16 brail rings that were sampled for wood identification 12 were identified as *Dalbergia* sp. (possibly African blackwood or 'ebony'), a further two as cf. *Dalbergia*, two more as *Tamarix* sp. (tamarisk), one as cf. *Olea* (olive), one as cf. *Wrightia*, and one as cf. Pomoideae. Two sheave samples and the deadeye were also identified as *Dalbergia* sp., while one further sheave sample and the pulley were made of *Tectona grandis* (teak), and one sheave sample of *Alnus* sp. (alder). The two remaining sheave samples were too degraded to allow identification. With the exception of the brail rings made of *Tamarix* and *Olea*, all the woods identified in this group of artefacts originate from outside Egypt.

Discussion

While most of the maritime artefacts were made of non-native tree species, it is very difficult to be certain about the origin of the wood. The only two items that give a definite connection with India are the pulley [W471 from Tr. 8A (8319)] and one of the sheaves [W454 from Tr. 8A (8193)]. Both are made of teak wood, *Tectona grandis* (Lamiaceae; also placed in Verbenaceae). This tree is native to the Indian subcontinent, though also occurs in the Malayan archipelago and Indo-China (GRIN; Lincoln 1986). It has also been found at the sister site of Quseir, Berenike in large quantities (Vermeeren 1999; 2000b). The timber is strong, durable and hard and used for flooring, furniture and cabinet making. Nowadays it is considered one of the most suitable timbers for external construction work (Lincoln 1986, 268 and 299). Teak wood is also well documented as being one of the main types of wood utilised for shipbuilding in the Indian Ocean (Hourani 1951, 89-91).

Trench-Context	Sample No.	Artefact	Identification	Comments	Date (centuries AD)
2B-1521	W0046	Brail Ring	*Dalbergia* sp.		L1-M2
2B-1553	W0058	Brail Ring	cf. Pomoideae		L1-M2
6B-4008	W0069	Brail Ring	*Dalbergia* sp.		E1
6C-4017	W0072	Brail Ring	*Dalbergia* sp.		E1
2B-1586	W0117	Brail Ring	*Dalbergia* sp.		L1-M2
6C-4025	W0142	Brail Ring	*cf. Olea* sp.	sample degraded	E1
8-8000	W0258	Brail Ring	*Dalbergia* sp.		M2-M3
6D-4070	W0303	Brail Ring	*cf. Dalbergia* sp	sample degraded	L1
2B-2300	W0320	Brail Ring	*cf. Dalbergia sp*	sample degraded	L1-M2
6H-4085	W0361	Brail Ring	*cf. Wrightia* sp.		L1-E2
2C-1033	W0424	Brail Ring	*Tamarix* sp.		1-2
6P-4100	W0455	Brail Ring	*Dalbergia* sp.		L1-E2
6P-4110	W0509	Brail Ring	*Tamarix sp.*		E1
6P-4115	W0521	Brail Ring	*Dalbergia* sp.		L1-E2
17-17012	W0592	Brail Ring	*Dalbergia* sp.		L1-2
17-17012	W0594	Brail Ring	*Dalbergia* sp.		L1-2
8-8007	W0294	Deadeye	*Dalbergia* sp.		E-M2
8-8003	W0275	Sheave	*Alnus* sp.		Early Roman
8-8089	W0321	Sheave	indet.	too degraded	M-L2
8A-8309	W0409	Sheave	indet.	?shrub	M2-M3
8A-8293	W0453	Sheave	*Dalbergia* sp.		L2-E3
8A-8293	W0454	Sheave	*Tectona grandis*		L2-E3
8-8353	W0458	Sheave	*Dalbergia* sp.		M-L2
8A-8319	W0471	Pulley	*Tectona grandis*		E-M3

Table 17.1. Maritime artefacts from Roman deposits.

An additional possible link with India is one brail ring [W361 from Tr. 6H (4085)] provisionally identified as cf. *Wrightia* sp. (Apocynaceae). This genus comprises several tropical trees and shrubs native to tropical and temperate Asia, including two (*W. arborea* and *W. tinctoria*) from India, which yield useful timber, dyes and medicines (Usher 1974, 611; Mabberley 1989, 617).

Most of the brail rings and some of the sheaves were made of *Dalbergia* sp. (Fabaceae – Faboideae; also placed in Papilionaceae). This genus comprises species native to both tropical Africa and India. These are similar in structure and are difficult to separate when only small samples are available for analysis. Moreover, as mentioned above, the structure of the wood may vary slightly along the trunk of the same tree and the size of the vessels may vary according to the amount of moisture available. Thus, distinguishing between the different species of *Dalbergia* is extremely difficult, if not impossible. On the basis of the structure and colour (very dark) of the available samples, *Dalbergia melanoxylon*, African blackwood or African ebony, is likely, though not certain. It is native in dry wooded grassland south of the Sahara, i.e. in tropical East, West and South Africa (GRIN; Hepper 1990, 46). This wood is the 'ebony' of the ancient world, in contrast to *Diospyros ebenum* (Ebenaceae), from the Indian Subcontinent, which is the ebony we know today. It was well known in Pharaonic Egypt (*hbny*), used in furniture and carvings, often contrasted with the lighter coloured boxwood (Ward 2000; Meiggs 1982, 282). Queen Hatshepsut (15th century BC) is reported to have brought back tribute in ebony from her campaigns to the south and Tuthmosis III returned after the battle of Megiddo with chairs made of ebony, ivory and gold. Lucan, describing the extravagances of Cleopatra's palace, claims that the posts of the doors ware made of solid ebony. It does not appear to have been common in the Roman world, in that references to this wood in Roman ancient texts are rare (Meiggs 1982, 282-6).

It is worth noting that one brail ring and two bowls recovered at Quseir al-Qadim during the American excavations in 1980-82, were identified as belonging to *Dalbergia* sp. (Hiebert 1991, table 4 and catalogue, 147 and 159). In the text, however, this wood is referred to as 'rosewood, found in eastern Iran and throughout India and in the appendix it is actually listed as *Dalbergia sissoo* (Hiebert 1991, 139 and 144 respectively). Thus, while Hiebert presents a cautious identification in both the table and the catalogue, in the text and appendix he assumes a species of Indian origin. We also give a cautious identification, *Dalbergia* sp., and would like to stress the difficulty of identifying these samples to species level, but tentatively suggest that African blackwood rather than rosewood is the more likely identification for our samples. (It has not been possible to compare Hiebert's samples with ours).

One of the brail rings [W142 from Tr. 6A (4025)] is provisionally identified as cf. *Olea* sp. (olive wood). Olive is not native in Egypt, but was probably cultivated in Egypt by the time of the New Kingdom, as garlands made with olive leaves were found in Tutankhamun's tomb (Hepper 1990, 16). Olive wood is hard, heavy, strong and durable and has been used to make small decorative items, carvings, furniture, dowels and pegs and as fuel. Egyptian artefacts include numerous stelae (Gale *et al*. 2000, 342-3). Olive wood is also used extensively within the Mediterranean shipbuilding tradition of antiquity. It is particularly used in small elements requiring strength and durability such as mortice and tenon joints. Documented examples have been found on several shipwreck sites (for examples see Beltrame and Gaddi 2007, 146; Santamaria 1995, 187).

A further ring [W58 from Tr. 2B (1553)] is provisionally identified as cf. Pomoideae. This represents a subfamily of the Rosaceae and includes a number of anatomically similar genera, most of which bear edible fruit, e.g. *Crataegus*, hawthorn; *Cydonia,* quince; *Malus,* apple; *Pyrus*, pear; and *Sorbus,* rowan, whitebeam and service tree. These are mostly widespread throughout Europe and Asia and none is native to Egypt, though some may have been cultivated in Egypt. The wood is hard, close-grained and hardwearing, ideal for cogs and other machine parts, but also for carving, tool handles, stoppers, bungs and domestic items (Gale and Cutler 2000, 184). This identification may be the first recorded find of this wood in Egypt.

Two further rings [W424 from Tr. 2C (1033) and W509 from Tr. 6P (4110)] are identified as *Tamarix* sp., tamarisk (Tamaricaceae), a large genus of evergreen trees and shrubs occurring in Eurasia and Africa (Mabberley 1989, 569). Deep-rooted species can survive in arid or desert sites and are common on sandy soils and dunes; some species tolerate saline conditions (Fahn *et al*. 1986, 164-71; Gale *et al*. 2000, 345). *T. aphylla*, which attains a height of 10 m, produces useful sized timber but *T. nilotica*, which grows along the River Nile, is more diminutive. Tamarisk wood is coarse and dense. Round-wood from shrubbier species provides a useful source of firewood. Archaeological records of use in Egypt include coffins, pegs, a box lid, throw sticks, a flange on a chariot wheel, a statuette and stelae (Gale *et al*. 2000, 345). Tamarisk has also been utilised in shipbuilding, particularly framing elements, in the Levant during the late-antique and early-medieval periods (for examples see Mor and Kahanov 2006; Barkai and Kahanov 2007). Tamarisk grows near the site of Quseir today and may thus represent one of the few species of wood obtained locally.

Finally, one of the sheaves [W275 from Tr. 8 (8003)] was made of alder, *Alnus* sp. (Betulaceae). Alder species typically grow in damp soils and wetland and are common throughout Europe and North Africa, extending south to Assam and southeast Asia (Mabberley 1989, 20). The wood is light, soft and easy to work, and particularly durable when immersed in water. European sites demonstrate the use of alder wood for piles, revetments, clogs, writing tablets, tool handles, bowls, musical instruments, fish traps, arrow shafts, wheels and sword handles (Gale and Cutler 2000, 34). The identification appears to be the first record of this species from Egypt.

There is no clear chronological patterning in the type of wood used, though teak wood does not appear until the mid to late 2nd century in the contexts examined, though the number of items identified is possibly too small to detect any patterning. *Dahlbergia* is used from the start of the maritime activity at the site.

17.3 Medieval Islamic Ship Timbers

(Table 17.2) (See also Chapter 15, this volume)

Results

The timbers associated with Burial 61 (Tomb 1) were found to seal a mudbrick lined, cist-type grave containing the body of a woman (Chapters 15 and 19, this volume; Blue 2006c). These timbers were regularly shaped planks, which must originally have been fastened together with fibres sewn through holes along the edges. A few of the holes still contained fibres and wooden pegs. The wood was in very poor condition, very degraded and structurally collapsed, and it was not possible to obtain transverse sections on these samples. Planks 1-6 represent an unidentified hardwood, probably non-native to Egypt, but not *Dalbergia* sp. or *Tectona* sp., teak wood, as the preliminary identification now proven incorrect, suggested. Plank 7 is tentatively identified as cf. *Afzelia*, belonging to the Leguminosae family. The peg found in Plank 5 is also unidentifiable, but those from Plank 6 may belong to the Salicaceae family (*Populus* (poplar) or *Salix* (willow).

The timbers from Tomb 2 were shorter than those from Tomb 1, more irregularly shaped and had originally been fastened with iron nails. They covered the burial, but here no mudbrick grave was present (Chapter 15, this volume). Two of the planks were identified as *Ficus sycomorus* (sycamore fig) and one as cf. *Acacia nilotica* (Nile acacia). Both are common Egyptian trees (N.B. the preliminary identification as teak wood was proven incorrect).

Discussion

The two tombs differ from one another both in the physical appearance of the timbers and in the type of wood used for the timbers. While it is not possible to identify the majority

Tomb 1 (Burial 61)	Identification	Comments
plank 1	Indet.	Very degraded, probably exotic, but NOT Tectona or Dalbergia
plank 2	Indet.	Very degraded, probably exotic, but NOT Tectona or Dalbergia
plank 3	Indet.	Very degraded, probably exotic, but NOT Tectona or Dalbergia
plank 4	Indet.	Very degraded, probably exotic, but NOT Tectona or Dalbergia
plank 5	Indet.	Very degraded and structurally collapsed
plank 6	Indet.	Very degraded, probably exotic, but NOT Tectona or Dalbergia
plank 6 - 2nd sample	Indet.	Very degraded, probably exotic, but NOT Tectona or Dalbergia
plank 7	*cf. Afzelia*	
plank 5 - end peg	Indet.	Very degraded, narrow roundwood; ?shrub
plank 6 - peg	Indet.	Degraded and structurally collapsed; also knotty
plank 6 - peg - 2nd sample	Indet.	Similar to above; possibly Salicaceae (*Populus*/*Salix*)
Tomb 2	**Identification**	**Comments**
plank 1	*cf. Acacia nilotica*	
plank 1 - 2nd sample	*cf.* Leguminosae	may possibly be cf. *Acacia*
plank 4	*Ficus sycomorus*	
plank 4 - 2nd sample	*Ficus sycomorus*	
plank 5	*Ficus sycomorus*	
plank 5 - 2nd sample	*Ficus sycomorus*	

Table 17.2. Ship timbers found associated with medieval Islamic burials.

of timbers from Tomb 1, it is clear that they were made from a non-native hardwood, but not *Dalbergia* sp. nor *Tectona grandis*. Only one plank was provisionally identified as cf. *Afzelia* (Leguminosae). There are 13 species of *Afzelia* growing in the Old World tropics (Mabberley 1989, 13) and several are important as commercial timbers from tropical West Africa and East Africa. The wood is very durable and stable and is used for heavy construction work, bridges, docks, garden furniture and interior and exterior joinery (Lincoln 1986, 22). A few species are native in tropical Asia, and Gamble (1972, 280) lists two that are native to India (*A. retusa* and *A bijuga*), both growing in coastal forests. A further species is native to Malaysia (*A. rhomboidea*; GRIN). A 9th century Arab or Indian shipwreck found in Indonesian waters was recently identified as constructed with timbers of *Afzelia africana* (Flecker 2008).

One of the pegs from Plank 6 was identified as possibly Salicaceae, *Populus* sp. (poplar) or *Salix* sp. (willow). There are about 400 species of willow growing in cold to temperate regions (Mabberley 1989, 515-6) and 35 species of poplar growing in northern temperate regions (Mabberley 1989, 472). Some species of poplar have been used for construction. Willow is fairly perishable except when kept permanently wet when it is very durable (Edlin 1949). Gamble (1972, 685-92) states that there are 26 indigenous species of *Salix* in India and five or six indigenous species of *Populus*. But both also occur in Egypt, poplar only rarely, but two species of willow can be found along the banks of the Nile and in the Delta. Willow leaves were used in Tutankhamun's garlands (Hepper 1990, 17; Täckholm 1974).

In contrast, the timbers from Tomb 2 are all from local Egyptian species, *Ficus sycomorus* and *Acacia nilotica*. The sycamore fig (Moraceae) has a wide distribution in tropical Africa, from West Africa to East Africa and including the southern Arabian peninsula. It is thought to have been brought into cultivation in Egypt in antiquity and was used there from the early dynastic period onwards (Hepper 1990, 58; Zohary and Hopf 1993, 156-7). The tree was particularly valued in Egypt but much less so in neighbouring countries, although it was cultivated in the warmer parts of Israel and along the shores of the Mediterranean (Lebanon, Cyprus and Tunisia). It was widely used in Pharaonic times (*nht*) for boat building, coffins, statuettes, boxes, dovetail tennons, models and vases. When Queen Hatshepsut (15th century BC) needed barges to transport her obelisks, a call for cutting sycamore fig trees was issued across the land (Ward 2000, 18-19).

Nile acacia, *Acacia nilotica* (Leguminosae – Mimosoideae) is a common tree in the Nile valley, Delta and oases. The genus *Acacia* is widespread in tropical Africa. Archaeological records indicate that the hard, durable wood has been used for boat-building, furniture, construction work, coffins, bows, arrows, dowels, tool handles, and charcoal and firewood (Gale *et al*. 2000, 335-6). The hardness of the wood was valued for manufacturing tenons and several boats of Pharaonic date have been found to contain acacia tenons, as do coffins dating to the Old, Middle and New Kingdoms (Ward 2000, 15-16).

17.4 Conclusion

A total of 24 maritime wooden artefacts dating to the Roman period (late 1st – early 3rd centuries AD), as well as 17 samples from maritime timbers dating to the medieval Islamic period (12th-15th centuries AD), were identified.

Three of the Roman artefacts, a pulley, a sheave and a brail ring, were made of woods likely to originate from India (i.e. *Tectona grandis* (teak) and cf. *Wrightia*). Most of the remaining artefacts were made of *Dalbergia* sp., which is likely to represent African blackwood or ebony (*Dalbergia melanoxylon*) originating from tropical Africa, and widely used in Egypt since Pharaonic times. However, rosewood (*Dalbergia sissoo*) and thus an Indian origin, cannot be ruled out. The rings made of *Tamarix* sp. and possibly that of cf. *Olea* sp. imply some local manufacture of rings. There are thus two possible interpretations of the evidence: firstly, the rings and other artefacts were made in Egypt, but some were repaired with wood obtained while on the journey, though the use of recycled ship timbers and/or driftwood cannot be ruled out. Secondly, the rings and other artefacts are all made of wood from India or Africa, possibly pointing to an Indian or African origin of the ships. We regard the former as more likely.

The Islamic period timbers from Tomb 1 originate from outside Egypt, but a definite identification, and thus origin, was not possible. Those from Tomb 2 are made of wood commonly available in Egypt, i.e. sycamore fig (*Ficus sycomorus*) and Nile acacia (*Acacia nilotica*), confirming that the differences in construction (sewn planks versus iron nailed planks) extended to the wood used. This suggests that the boats were manufactured in different locations, one in Egypt, and the other outside Egypt (see also Chapter 15, this volume).

Appendix 17.1 Fishing Gorges

Wood identification of Roman and Islamic period fishing gorges

Six of the gorges, fishing implements sometimes used instead of hooks (see Chapter 16, this volume), were sampled for wood identification. Four different wood species were identified (Table 17.3).

Two of the gorges were made of tamarisk, *Tamarix* sp. Tamarisk is a large genus of evergreen trees and shrubs occurring in Eurasia and Africa (Mabberley 1989, 569). Deep-rooted species can survive in arid or desert areas, and are common on sandy soils and dunes; some species tolerate saline conditions (Fahn *et al*. 1986, 164-171; Gale *et al*. 2000, 345). Five species of tamarisk occur in Egypt, of which *T. aphylla* and *T. nilotica* are the most common and widespread. *T. aphylla*, which attains a height of 10 m, produces useful sized timber but *T. nilotica*, which grows along the River Nile, is more diminutive. Tamarisk wood is coarse and dense. It is rarely, if ever, possible to identify the wood to species level. Archaeological records of use in Egypt include coffins, pegs, a box lid, throw sticks, a flange on a chariot wheel, a statuette and stelae (Gale *et al*. 2000, 345), and the wood was, and is, commonly used in 'turned' objects, furniture, staffs, etc. (Ward 2000, 19). Tamarisk grows near the site of Quseir today and the wood for these two gorges may have been obtained locally.

Two further gorges were made of Salicaceae, possibly *Salix* sp., willow. Identification of this genus and distinction from the related genus *Populus*, poplar, is often difficult due to the similarity in wood structure, especially with juvenile wood. Two species of willow can be found along the banks of the Nile and in the Delta, *S. subserrata* and *S. tetrasperma*. The wood is soft, light-weight and resistant to splitting. Archaeological records of willow in Egypt include chariot parts, boat-building, shields (exploiting its non-splintering properties), stelae and domestic items (Gale *et al*. 2000, 344-5). Coppiced or pollarded rods were used for basketry. Additionally, willow leaves, suggesting locally grown trees, were used in Tutankhamun's garlands (Hepper 1990, 17; Täckholm 1974). These two gorges may thus have been manufactured using wood obtainable in Egypt.

One of the gorges was made of teak wood, *Tectona grandis*. Teak is native to the Indian subcontinent, though also occurs in the Malayan archipelago and Indo-China (GRIN; Lincoln 1986). The timber is strong, durable and hard and used for flooring, furniture and cabinet making. It was also used for several other Roman period artefacts found at Quseir: a pulley [W0471 from Tr. 8 (8319)] and one of the sheaves [W0454 from Tr. 8 (8293)]. It has also been found at Berenike (Vermeeren 1999a). While teakwood originates from outside Egypt, this small artefact could have been manufactured from recycled ship timber (or driftwood).

Finally, one of the gorges was made of the wood of a member of the Cupressaceae, a family of tough, hardy evergreen trees and shrubs from the Mediterranean and parts of North Africa and Asia, including several growing in mountainous regions (Gale *et al*. 2000, 351). It includes genera such as cypress, *Cupressus*, and juniper, *Juniperus*; the latter has one species occurring in Egypt, *J. phoenicea*, though this is very rare and only occurs in the mountains of northern Sinai (Täckholm 1974, 50). This object may thus also have been manufactured from imported wood, again possibly from driftwood or recycled ship timber.

To conclude, two of the three Roman period gorges were made of wood that originated outside Egypt, but possibly available as recycled ship timber (or driftwood) at Quseir. The three Islamic period gorges were manufactured from wood obtainable within Egypt, including one made from wood growing near the site itself. The variety of wood species identified suggests that these artefacts were made of whatever wood was at hand, without much consideration of specific qualities.

Period	Trench-Context	Sample No.	Artefact	Identification	Comments
Roman	6E-4015	W0113 C	gorge	*Tectona grandis*	
Roman	6E-4015	W0153 A	gorge	Cupressaceae	
Roman	6E-4015	W0153 B	gorge	*Tamarix* sp.	
Islamic	5-3022	W0090	gorge	Salicaceae, *cf. Salix* sp.	
Islamic	5-3017	W0104	damaged, but probably a gorge	Salicaceae, *cf. Salix* sp.	roundwood
Islamic	5-3021	W0106	rare, double pointed gorge	*Tamarix* sp.	roundwood

Table 17.3. Wood identifications of fishing gorges from Roman and Islamic contexts.

18 Plant Remains - Evidence for trade and cuisine

Marijke van der Veen, Alison Cox and Jacob Morales

Introduction

Spices and the trade in other lucrative commodities from the East were central to Myos Hormos'/Quseir al-Qadim's existence during both the Roman and Islamic periods, and the study of their remnants at the port offers useful insights into the scale and nature of the trade, thus supplementing what is known from classical and early Islamic sources. Plant products formed a key constituent of such trade, though many other goods were also transported, including precious stones, cloth (cotton and silk), ivory, ceramics, etc. In addition to providing information about the foodstuffs traded, the plant remains recovered at the site also inform us about the nature of food and fodder consumption by the port's inhabitants (humans and animals). The extremely dry conditions at the site also resulted in much wood being preserved, thus allowing us to determine how the local woody vegetation was exploited for day-to-day artefacts and firewood, and whether importation of wood from elsewhere was a regular occurrence.

Three aspects determine that the plant remains from this site are of exceptional international importance; firstly, excellent preservation condition of most specimens, the size of the data set and the high species diversity place the archaeobotanical assemblage from Quseir amongst the richest in the world; secondly, the occurrence of two major cultural periods (Roman and medieval Islamic) at the same location, while local environmental conditions and site function barely changed in the intervening period, allow us to rule out changes in environment and site function when interpreting differences in the botanical assemblages between the two periods. And finally, the function and location of the site offer a rare opportunity to study the early stages of the rise of our modern global economy.

In this chapter the analysis of the plant remains recovered during the five years of excavations is briefly introduced. The size of the dataset is such (>50,000 identifications) that the material needs a separate volume to fully describe, analyse and interpret the results (van der Veen forthcoming). Here the themes that will be addressed in the monograph are briefly introduced and some preliminary results presented, while the analysis of the wooden maritime artefacts is presented in Gale and van der Veen (Chapter 17, this volume).

18.1 Methods

During excavation sediment samples were collected from most well-dated deposits, especially from the large *sebakh* (refuse) deposits. To increase the chances of recovery (the remains come in a wide range of sizes and ubiquity levels) three separate sample types were distinguished: 'small samples' (2 litres in volume) sieved using manual water flotation and a 0.5 mm mesh, and sorted under a microscope using x10 magnification; 'large samples' (c. 20 litres) dry-sieved over a 2 mm mesh and sorted by eye, and 'handpicked samples' representing larger seeds and nut fragments recognized during excavation by the excavators. All samples were sorted for the extraction of plant remains (grains, seeds, fruit stones, nut shells, leaves), charcoal, animal and fish bones (for the latter two see Hamilton-Dyer, Chapter 20, this volume). Additionally, samples of animal droppings (sheep/goat, camel and donkey) and wooden artefacts were collected. The majority of the botanical remains are preserved in desiccated form, witness to the extremely arid conditions on the Red Sea coastal plain, but some carbonized remains are also present. Preservation is generally excellent, although some of the remains are affected by salt damage.

18.2 Spice Trade

It is worth highlighting here that the use of the word 'spices' has changed somewhat over time. While today we tend to identify spices with products of tropical plants possessing strong flavours and used as seasonings, in antiquity spices included not just condiments, but also aromatics (perfumes), medicines (especially antidotes against poison), and incense (Miller 1969). What is more, many of these products were used in ritual/religious contexts rather than in cuisine. Certain fragrant woods, oils and resins, as well as plants now usually referred to as herbs were included within the term spices. Many, but not all, were of tropical origin; cumin, dill, coriander and parsley, for example, were widely grown in the Mediterranean, frankincense and myrrh came from Southern Arabia and Somalia, but black pepper, cinnamon and ginger did, of course, come from further east.

The analysis and identification of the remains is not yet completed, but many imports have already been recovered. The most common ones are black pepper, rice and coconut, with smaller amounts of citrus fruits, aubergine, taro, and cardamom (the latter three exclusively found in Islamic deposits). Several spices and other imports are currently being identified. Most, if not all, of the imported spices occur in low frequencies, suggesting that the people working and living in the port had only limited access to these precious imports. Several spices known from classical sources as traded via Myos Hormos (e.g. cinnamon) appear not to occur at all in the archaeobotanical record, suggesting that they were too expensive to be obtained by local port workers and that great care was taken not to spill any during trans-shipment from ship to caravan. Changes in the range and frequency of imports and the implications of this for our understanding of trade routes, scale of the trade, etc. will be discussed in a forthcoming monograph, as will the distribution of discarded imports across the site (van der Veen forthcoming). Some of the findings are presented below.

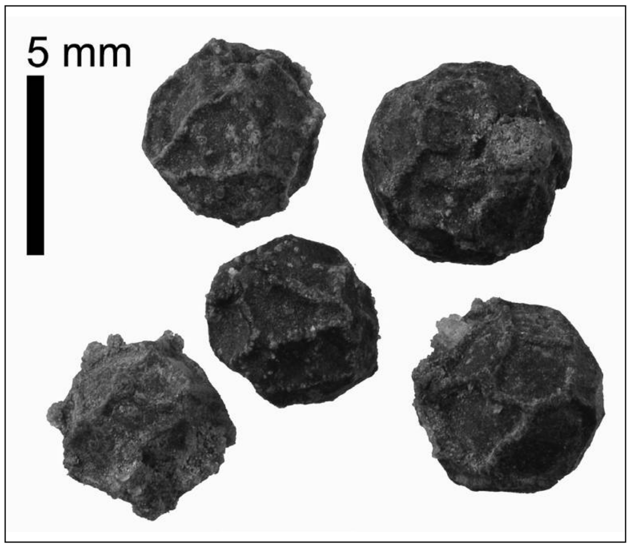


*Fig. 18.1. Black pepper (*Piper nigrum*) from Roman Quseir (Trench 6B [4008]), early 1st century AD.*

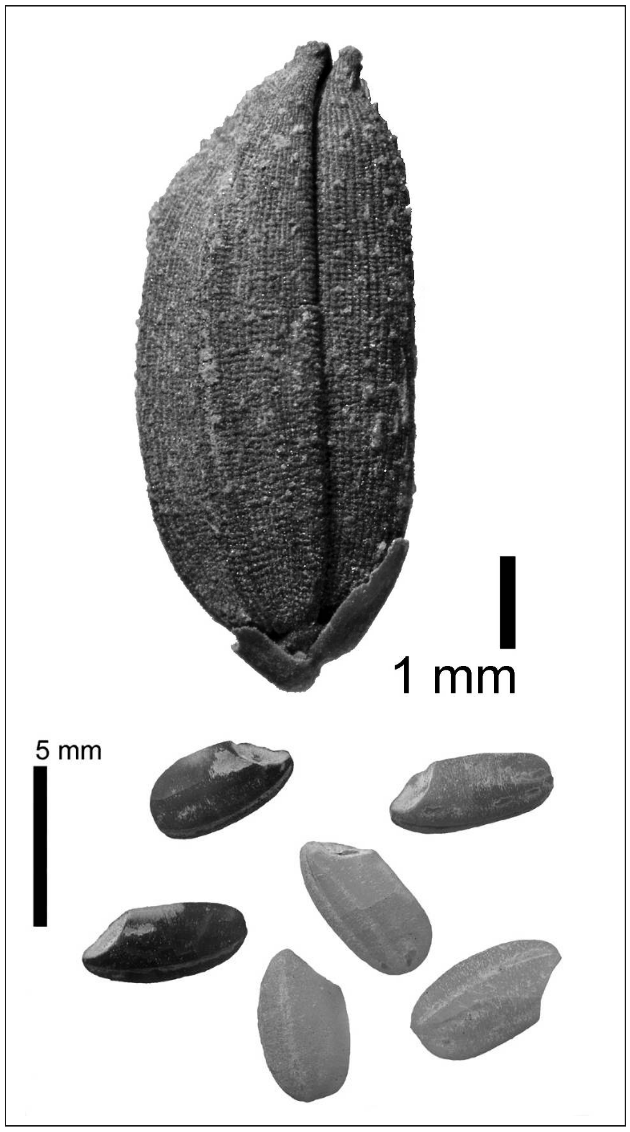


*Fig. 18.2. Rice (*Oryza sativa*); top – hulled grain from Roman Quseir (Trench 6C [4012]), early 1st century AD; bottom – naked grains from Islamic Quseir (Trench 13 [5523]), Islamic period.*

Black pepper *(Piper nigrum)*
Originates in southwest India and has been found in both Roman and Islamic deposits; the earliest finds so far date to the early 1st century AD (Fig. 18.1). Peppercorns formed an important and profitable article of commerce in Rome's sea trade with India and special spice warehouses (*horrea piperataria*) were constructed and maintained in Rome. Pepper was used chiefly as a culinary spice and quickly became an essential part of the everyday life of respectable households in Rome (Warmington 1928, 180-183). It maintained this status throughout the medieval and post-medieval periods and represented one of the main sources of wealth for merchants such as the Kārimī who operated out of Quseir during the Mamluk period (Fischel 1958). A reminder that spices were frequently used for purposes other than cuisine comes from Roman period Berenike, where much of the pepper is found in carbonised form (with the exception of that recovered from a *dolium*) (Cappers 2006, 114). Here pepper is regularly found in deposits associated with temples, shrines and altars, suggesting its use in ritual offerings (hence the charring).

Rice (*Oryza sativa*)
Represents another import; it has been found in small quantities in both Roman and Islamic deposits (Fig. 18.2). It almost certainly originates in China and/or South East Asia and was first domesticated there (Smartt and Simmonds 1995). During the Roman period it was one of the food plants imported from India. It still needs to be established at what point in time it became a crop cultivated in Egypt, but documentary evidence suggests it was grown in the Fayyum by the Mamluk period

(Canard 1959). The rice remains at Islamic Quseir may thus already represent local Egyptian production rather than imports from India.

Coconut (*Cocos nucifera*)
Native to South East Asia (Smartt and Simmonds 1995). Like pepper and rice, it has been found in deposits dating to the early 1st century AD, as well as in 2nd century and later Islamic layers. The remains of coconut consist of fragments of the epicarp and fibrous husk and of the nutshell (Figs 18.3 and 18.4). In all cases the endosperm, the white coconut 'meat', had been removed.

Cardamom (*Elettaria cardamomum*)
Originates in South Asia (India). While the Romans were familiar with this spice, it has so far been found exclusively in the Islamic deposits (mostly as fruit capsules, but also one seed (Fig. 18.5).

Aubergine (*Solanum melongena*)
Found in several Islamic contexts. A native of South Asia, it was first cultivated in India (Smartt and Simmonds 1995). The remains of aubergine at Quseir consist of seeds and the calyx. The latter are small (c. 30 mm wide), suggesting a small egg-sized fruit (its other common name is egg-plant). Like rice, it remains to be established exactly when the status of this crop changed from import to a locally grown crop in Egypt.

Taro (*Colocasia esculenta*)
Another introduction from South East Asia, though it has an early presence in the Pacific (Matthews 1995; Fullagar *et al*. 2006). Taro represents a unique find; few if any archaeological macro-remains have been reported to date. The remains consist of tuber fragments and are recorded in just a few samples. It is only found in Islamic deposits.

Citrus
Two citrus fruits have so far been identified; one is the citron (*Citrus* cf. *medica*) in both Roman and Islamic layers. The other is a small fruit, probably lemon or lime (*Citrus* x *limon* or *Citrus* x *aurantifolia*), occurring exclusively in Islamic deposits. Citron was introduced to the Mediterranean region during the early Greco-Roman period and was soon cultivated in Egypt (Schnebel 1925). It was used primarily in medicine and perfumery, though André (1981) recounts the use of the fruit as a flavouring in meat dishes by Apicius (*de Re Coquinaria* IV.3.5). Remains of citron have also been found at Roman Mons Claudianus and Mons Porphyrites (van der Veen 2001, van der Veen and Tabinor 2007). Lemon and lime were first introduced in the Islamic period; all originate in South East Asia. From historical texts we know that both lemon and lime were cultivated in Al-Andalus (medieval Islamic Spain) from the 11th/12nd centuries AD, where they were used as medicine and in cosmetics (Abu L-Jayr 1991).

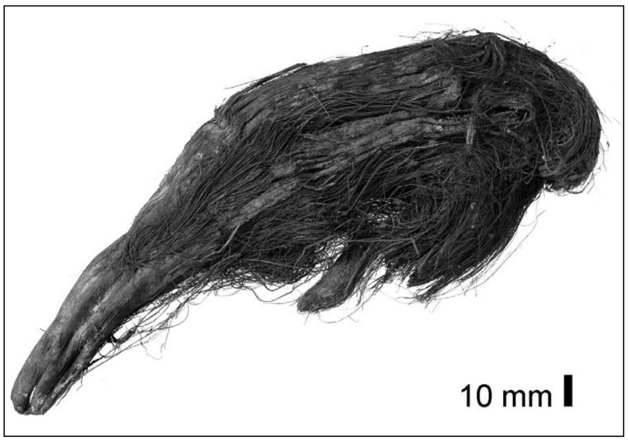


*Fig. 18.3. Epicarp and fibrous husk of coconut (*Cocos nucifera*) from Roman Quseir (Trench 6H [4030]), mid-2nd century AD.*

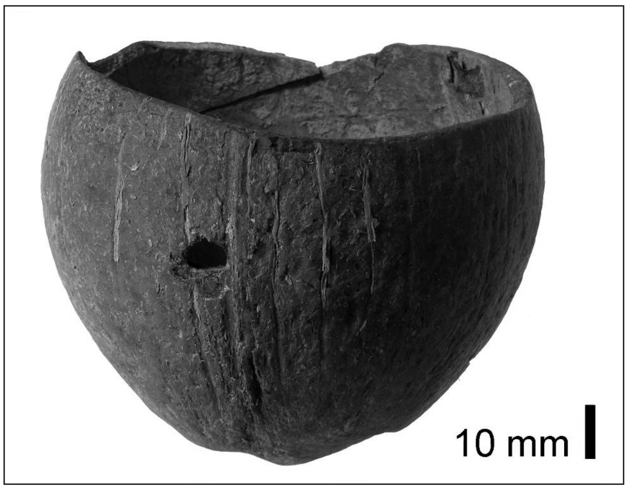


*Fig. 18.4. Nutshell of coconut (*Cocos nucifera*) from Islamic Quseir (Trench 5 [3029]), Islamic period.*

*Fig. 18.5. Capsule fragments of cardamom (*Elettaria cardamomum*) from Islamic Quseir (Trench 13 [5522]), Islamic period.*

18.3 Food Consumption Patterns

Two of the most notable aspects of the data are (a) the sheer variety of plant foods present and (b) the marked difference in range of foods between the two periods of occupation. To date some 77 plant foods have been identified – 50 for the Roman period and 69 for the Islamic period. Here some of the foods are briefly introduced, after which the chronological patterning is illustrated by some examples.

Hulled barley (*Hordeum vulgare*) and hard wheat (*Triticum durum*) are the two principal grain crops recovered. Grains and chaff (primarily rachis segments) are present in virtually every sample. These two cereals represent the main staple crops in both periods, barley having been grown in Egypt since the Pre-Dynastic period, while hard wheat replaced emmer wheat as the principal wheat crop during the Ptolemaic period (contrary to Watson (1983) and Insoll (1999) who claim that hard or durum wheat was an Islamic introduction). Sorghum (*Sorghum bicolor*) and pearl millet (*Pennisetum glaucum*) were found in several Islamic contexts. Both these two cereals originate from Africa south of the Sahara. The timing of their domestication and widespread cultivation in Africa is still a matter of some debate, especially in the case of sorghum (e.g. Fuller 2007; Pelling 2005; 2008; Rowley-Conwy *et al*. 1998; 1999), but they may have become fodder and/or food crops of some importance in Egypt during the early Islamic period.

A number of pulse crops have been found, including lentils (*Lens culinaris*), fava beans (*Vicia faba*, var. *minor*), chickpeas (*Cicer arietinum*), and termis beans (*Lupinus albus*). Lentils are particularly common in the Roman period and fava beans in the Islamic period. Fruits found include dates (*Phoenix dactylifera*), grapes (*Vitis vinifera*), olives (*Olea europaea*), sebesten or Egyptian plum (*Cordia myxa*), as well as watermelon (*Citrullus lanatus*), sumac (*Rhus* cf. *coriaria*) and carob (*Ceratonia siliqua*). Vegetables include artichoke (*Cynara* cf. *scolymus*), onion (*Allium cepa*), garlic (*Allium sativum*), aubergine (*Solanum melongena*) and the herbs coriander (*Coriandrum sativum*) and fennel (*Foeniculum vulgare*). Nuts include hazelnuts (*Corylus avellana*), walnuts (*Juglans regia*), pine kernels (*Pinus pinea*) and pistachio (*Pistacia vera*).

While many plants are consumed in both periods, there are clear shifts in emphasis and popularity. For example, in terms of the pulses (Fig. 18.6), lentils and white lupin are common in the Roman period, but in the Islamic period it is fava bean, chickpea and cowpea. Similarly, with nuts (Fig. 18.7): in the Roman period pine nut and walnut are the most common, whereas during the Islamic period it is hazelnut and pistachio. Figure 18.8 gives the relative abundance of the fruits within each period and indicates that while dates and grapes were important in both periods, olives and sebesten are common in the Roman period, compared to watermelon, melon/cucumber, sumac and carob in the Islamic period.

The fact that many of the foods were available in both periods, but in each period a few selected species were consumed more than others, suggests a cultural preference. All the pulses (with the exception of *Vigna unguiculata*), for example, were already present in Pharaonic Egypt, but at Roman Quseir lentil and lupin were favoured, compared with fava bean and chickpea at Islamic Quseir. Such patterning allows us to study the cultural role of food and identify how food may have been used to create social/cultural identities, something increasingly seen as an important part of any archaeobotanical analysis (e.g. Samuel 1999; Palmer and van der Veen 2002; Fuller 2005) and archaeology more generally (e.g. Dietler and Hayden 2001; Gosden and Hather 1999; Jones 2007; Miracle and Milner 2002; Parker Pearson 2003; Twiss 2007; van der Veen 2003). A full exploration of these issues presented presented in the final volume (van der Veen forthcoming).

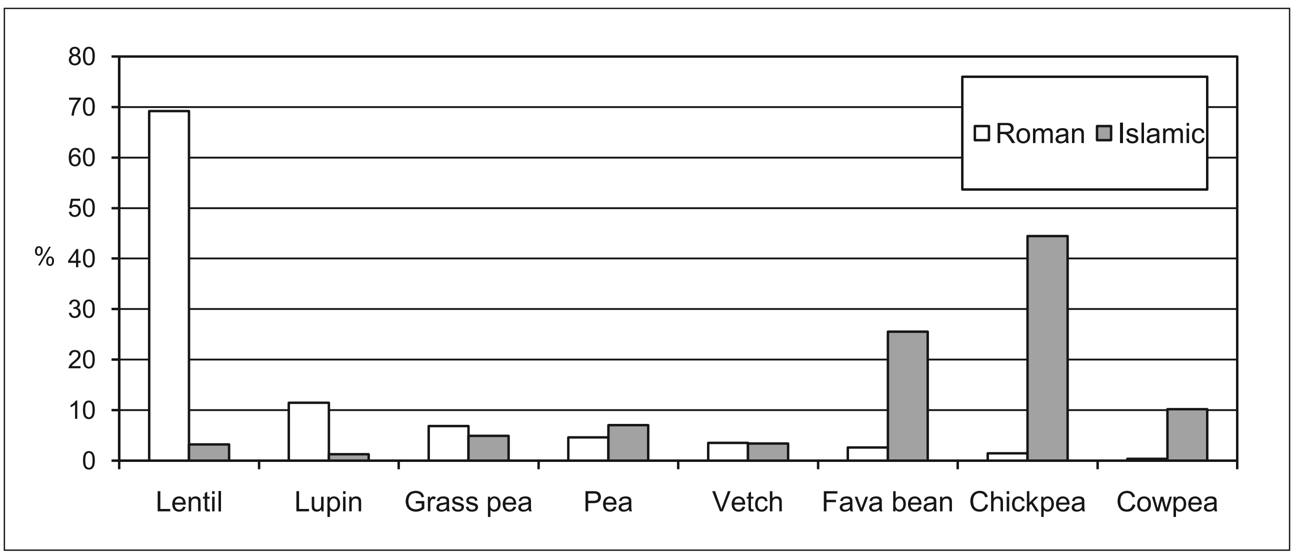


Fig. 18.6. Relative proportions of pulses within each period of occupation, based on preliminary results (N ≥ 1,000).

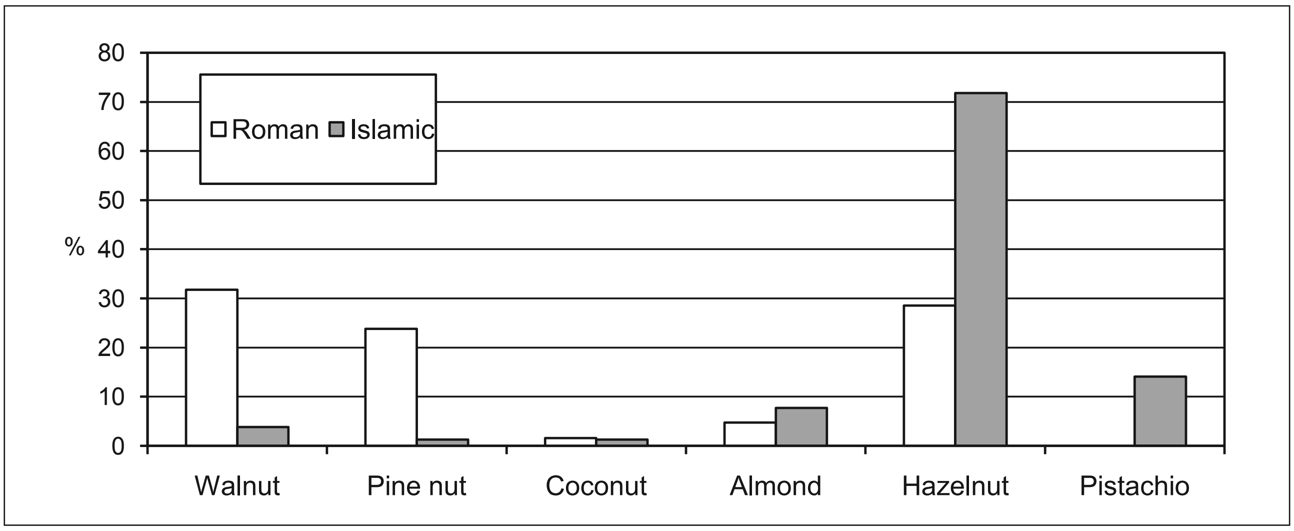


Fig.18.7. Relative proportions of nuts with each period of occupation, based on preliminary results (N ≥ 200).

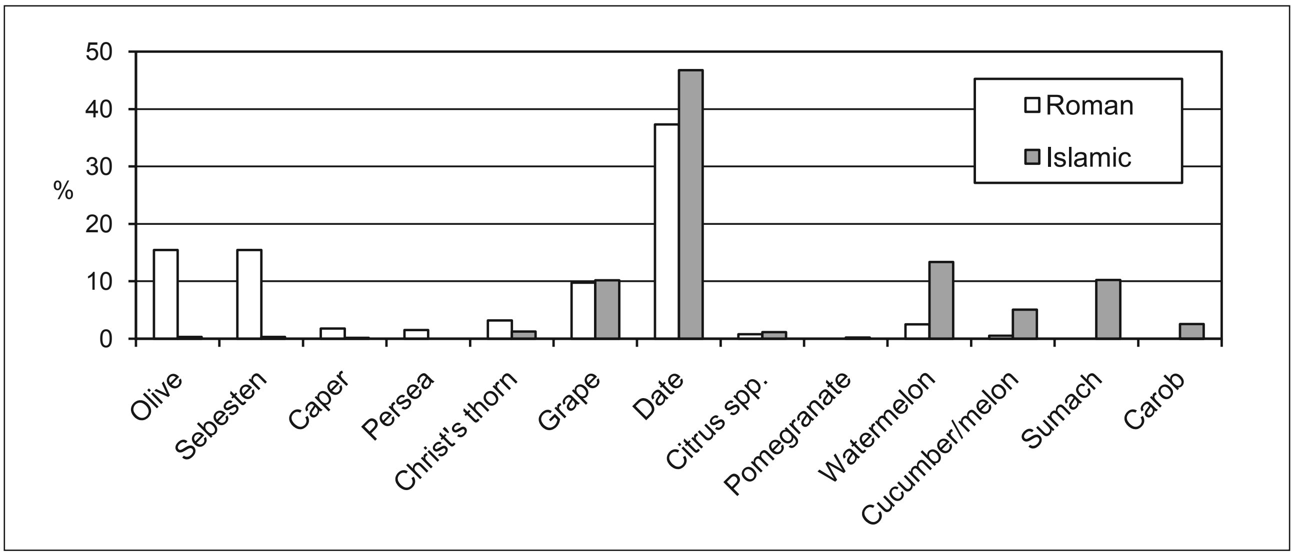


Fig. 18.8. Relative proportions of fruits within each period of occupation, based on preliminary results (N ≥ 5,000).

18.4 Identifying Foodways

In addition to observing and interpreting differences in the types of food eaten during the Roman and Islamic periods, it is also possible to identify variations in the way such foods were consumed. Such food habits serve to mark boundaries between social classes, geographical regions, nations, cultures, genders, and religions and are increasingly the focus of archaeological research. The term 'foodways' in the heading of this section, is used here to refer to the complex, culturally specific practices relating to food, i.e. what is eaten, how it is eaten, how it is acquired, how it is prepared, and who participates in the meal. A good example of the identification of different foodways at Myos Hormos/Quseir is the watermelon, which is presented below. Other examples are given in the final volume (van der Veen forthcoming).

During analysis of the seeds of the watermelon, *Citrullus lanatus*, it became clear that there were substantial variations in the size of the seeds. Measurements of the seed length and width showed that the size difference was directly correlated to the two separate periods of occupation (Figs. 18.9 and 18.10), with the Roman seeds measuring c. 9.5-11 mm long by 5.5-7 mm wide and the Islamic period ones c. 12-16 mm long by 7-9 mm wide. The number of measurable seeds of Roman date was rather small (many seeds were damaged and could not be measured), thus to increase the Roman dataset we also measured the watermelon seeds from two further Roman sites, Mons Claudianus and Mons Porphyrites (van der Veen 2001; van der Veen and Tabinor 2007), both quarry settlements located nearby in the Eastern Desert and of similar date (Fig. 18.11). This confirmed that the watermelon seeds from all three Roman sites are significantly smaller than those from the Islamic layers at Quseir, suggesting that a change in variety or subspecies had occurred in between the Roman and Islamic periods (Cox and van der Veen 2008).

Watermelon is mostly consumed for its refreshing fruit flesh, but there are several areas of the world, including

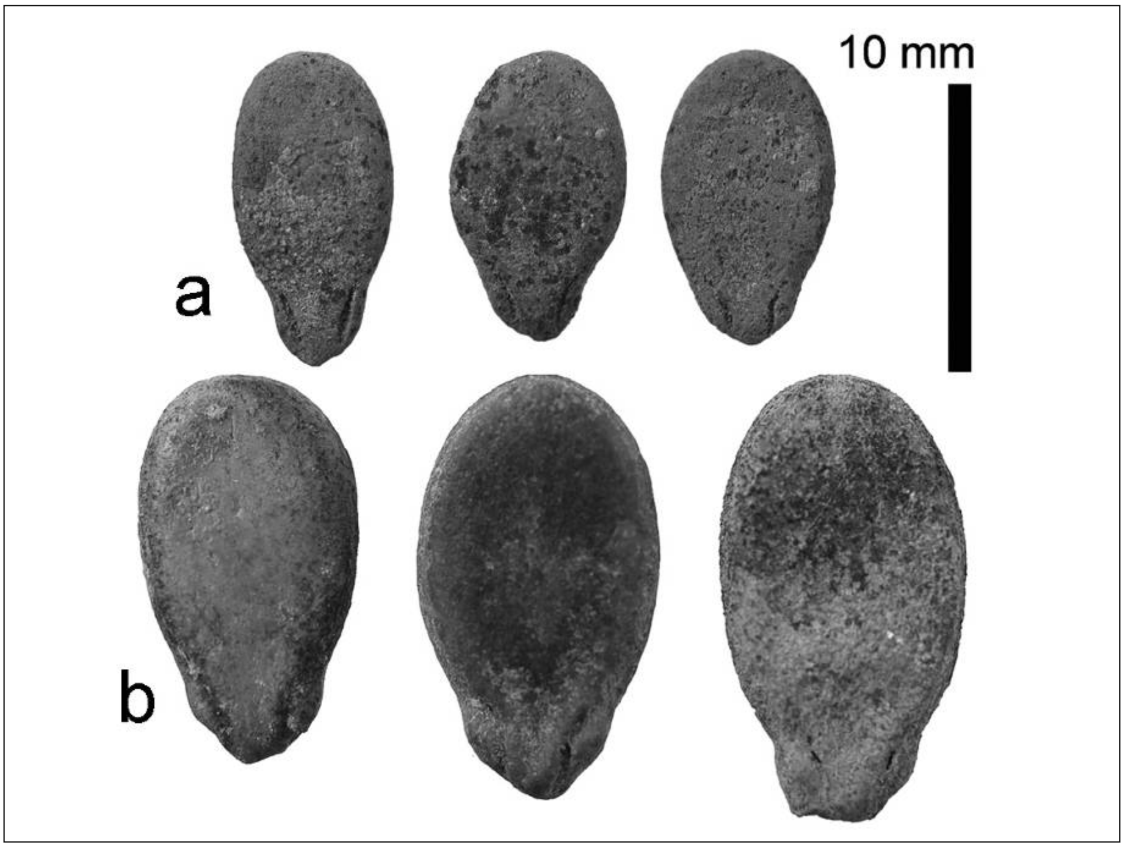


*Fig. 18.9. Size differences in the seeds of watermelon (*Citrullus lanatus*) from Quseir; (a) seeds of Roman date; (b) seeds of Islamic date.*

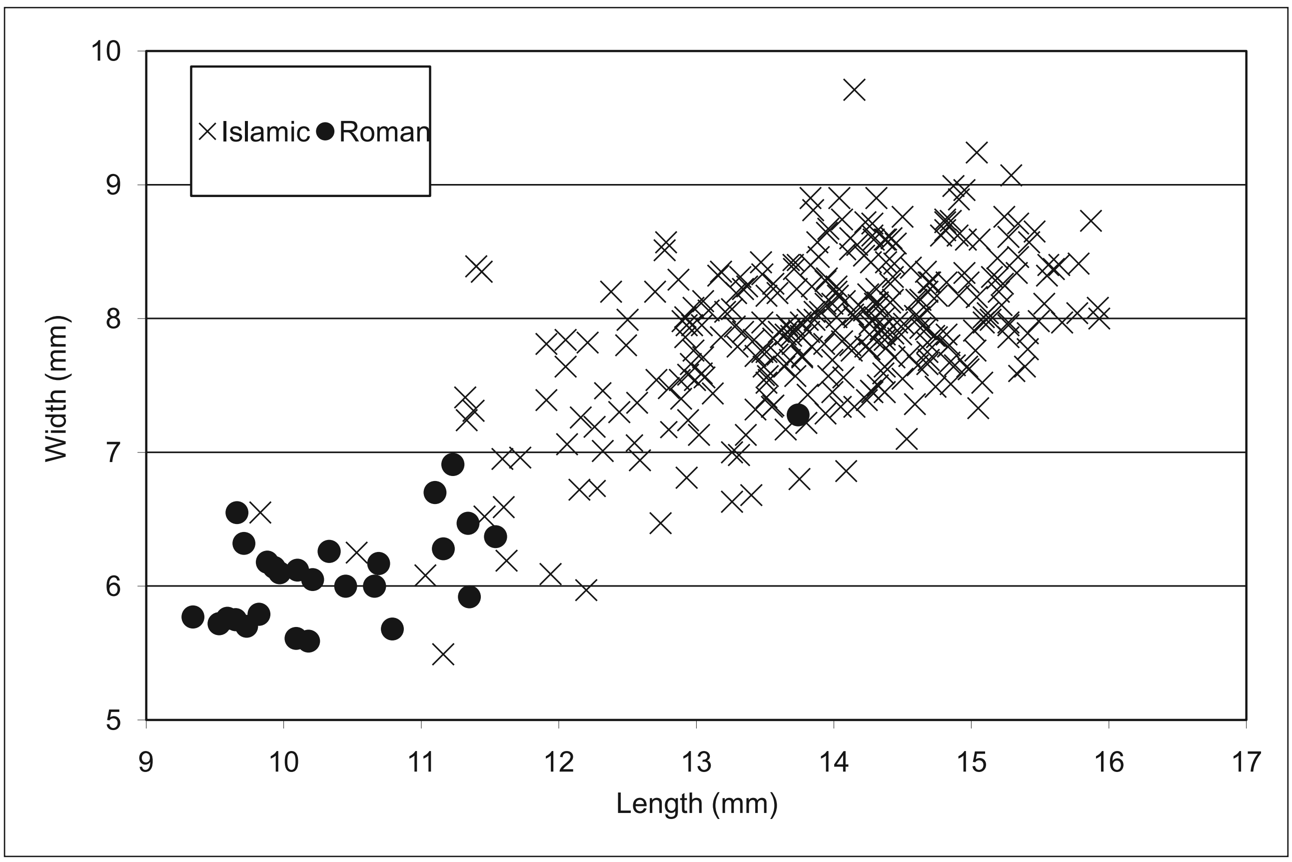


Fig. 18.10. Measurements of Roman and Islamic period watermelon seeds from Quseir.

North Africa and the eastern Mediterranean, where the seeds of watermelon and other genera of the Cucurbitacae family are also eaten, as a snack food. This raises the question whether the watermelon seeds from Quseir represent the consumption of the fruit flesh, the seeds or both. To determine whether the eating of the seeds results in a distinct signature (i.e. distinct break patterns created by splitting the seed coat to remove the edible part), several volunteers were asked to consume a few handfuls of seeds and the leftovers were identified in terms of breakage pattern. Significant similarities were identified and breakage categories were defined. Subsequently, the archaeological material was classified using the same categories (see Cox and van der Veen (2008) for a full description of the methodology and results). The analyses identified a clear divergence between the Roman and Islamic assemblages: the Roman seeds are smaller, mostly intact (i.e. seed coat not split and edible part not eaten) and c. 80 per cent show some evidence of animal damage. There is thus no evidence that the human occupants of Roman Quseir al-Qadim, Mons Claudianus or Mons Porphyrites ate the seeds of watermelon. In contrast, the seeds from Islamic Quseir are larger and only half of them are still intact. Of the other half, less than ten per cent show evidence of animal damage. The breakage pattern on the remaining seeds is very similar to that identified from the modern samples, though with some deviation. The evidence strongly suggests that at Islamic Quseir the seeds of watermelon were sometimes consumed by humans. Exactly when the consumption of seed eating started in Egypt is yet to be determined, but the next step in the research will be the analysis of the watermelon seeds from late-antique Berenike, Egypt (by kind permission of René Cappers, Groningen University).

18.5 Animal Fodder

There is sufficient animal dung found across the site to suggest that animals had a strong presence in some parts of the settlement. Apart from animal droppings of donkey, sheep/goat and camel, there is abundant evidence of fodder (cereal chaff and straw in various degrees of decomposition) and plant material consumed by animals (such as watermelon seeds damaged by animals). Preliminary analysis suggests considerable chronological differences in animal diet and spatial patterning of such remains.

18.6 Daily Routines

Anthropologists like Bourdieu (1990) have highlighted how the day-to-day activities of life are ordered according to socially perceived norms. The daily recreation of these norms helps to define group identity, be it cultural, ethnic, religious or otherwise. The concept of identity is primarily concerned with a sense of belonging, of belonging to certain groups and not others (Díaz-Andreu and Lucy 2005, 1-2). Through the reproduction of the material

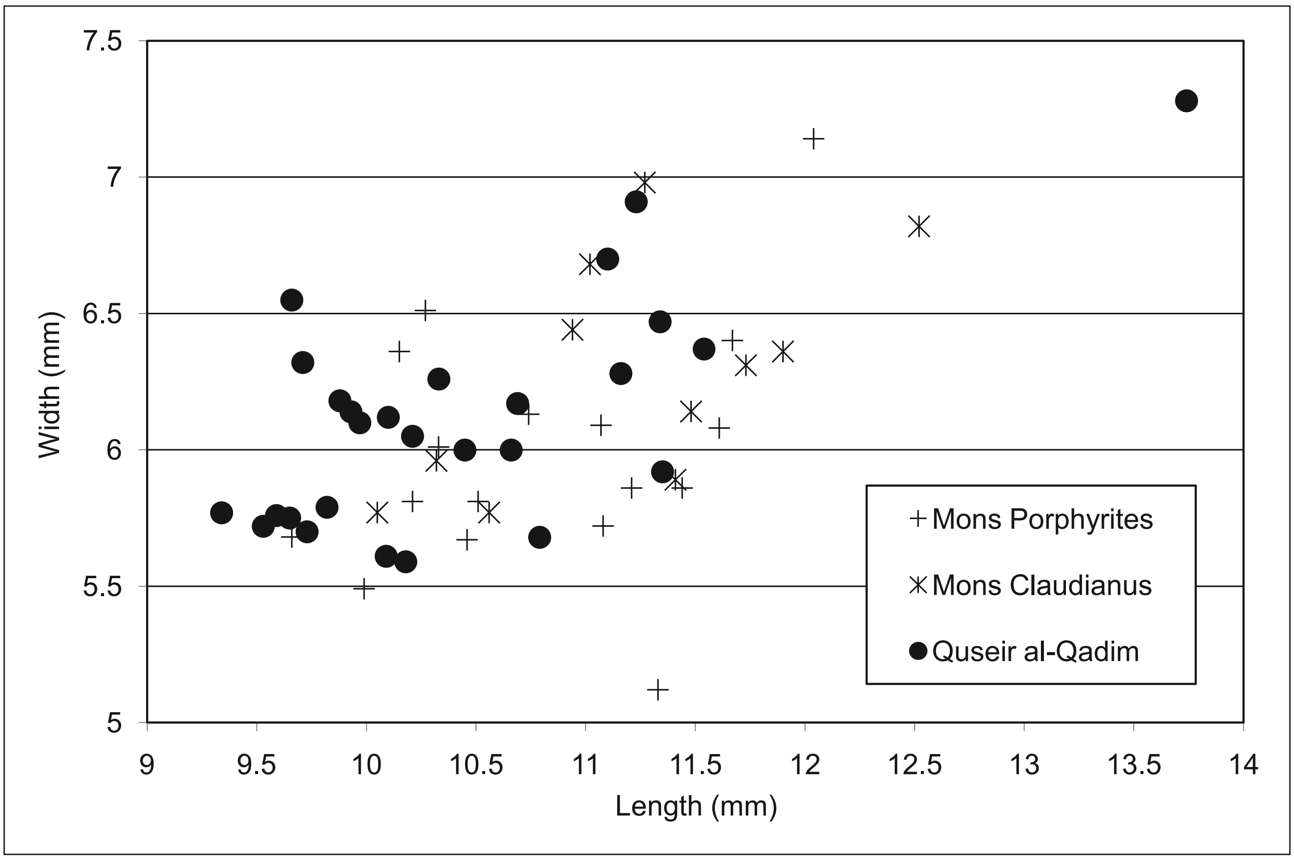


Fig. 18.11. Measurements of the Roman period watermelon seeds from Quseir, Mons Claudianus and Mons Porphyrites.

conditions of their lives people reproduce their personal and group identities. Archaeologists are ideally placed to study such routine practices as much of our work concerns the study of material conditions. In the case of plant remains, this involves routines such as the daily practice of food intake, waste disposal, looking after working animals, manufacturing of daily objects in wood and using firewood. This enables us to recognize how cultural identity was created, maintained and changed, over time. The plant remains from Quseir will be used to study these practices.

18.7 The Introduction of Summer Crops

As indicated above, foodstuffs other than spices were traded through the port and this included not just luxury foods but also crops that subsequently became important components of the local agricultural system, not just in Egypt, but in the eastern Mediterranean and North Africa more widely. Of particular interest are the so-called summer crops, such as sorghum, pearl millet, aubergine, sugarcane, and taro. These species originate in regions with warm wet summers, and could only be cultivated in the Middle East and North Africa once new irrigation techniques allowed the cultivation of field crops during the summer months (the dry period in the Middle East). The introduction of these crops has been widely attributed to the early Islamic period (Watson 1983), but Rowley-Conwy (1989), Samuel (2001), Pelling (2005; 2008) and Clapham and Rowley-Conwy (2007) have published archaeobotanical evidence suggesting that cultivation of some of these summer crops started earlier, and may have been introduced gradually, rather than as part of the unification of the Near East and North Africa by Islam, as Watson (1983) had argued. Clearly, the results from Quseir are going to make an important contribution to this debate as many of the summer crops concerned have been found in Islamic though not in Roman period deposits.

18.8 Fuel Use

The collection of firewood may seem a mundane task, but in an arid region like the Red Sea coast of Egypt, the lack of substantial stands of woody vegetation must have been a serious limiting factor for a settlement the size of Myos Hormos/Quseir, while overuse of the limited vegetation could have rapidly depleted such stands. Was additional firewood brought in from the Nile Valley, was driftwood used, and do we see a shift in practices between or within the Roman and Islamic periods? These issues are addressed in the final volume (van der Veen forthcoming).

18.9 Wood Used in Artefacts

Large numbers of wooden artefacts have been recovered during the excavations (see Chapter 14, this volume), including mundane objects such as combs, spoons, bowls, lids, needles and pegs, as well as maritime artefacts such as brail rings, pulleys, sheaves and ship timbers (see Chapter 15, this volume). The type and origin of the woods used in these artefacts helps identify how specialised or not their manufacture was and whether objects were obtained through long-distance contact or made from imported timbers. The wood identifications of the maritime artefacts are discussed in Gale and van der Veen (Chapter 17, this volume); the other artefacts are presented in the final volume (van der Veen forthcoming).

Acknowledgements

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19 The Muslim Necropolis

Anne Macklin

Introduction

People's religious beliefs are often reflected in the way they bury their dead and the examination of the necropolis of Quseir al-Qadim was undertaken with this in mind. It is clear that the necropolis at Quseir al-Qadim was exclusively Muslim in nature, and thus a site of considerable importance as an opportunity to excavate and examine Islamic human skeletal remains in a burial context is rare. The interpretation of the burials draws on the discipline of archaeology in the context of religious practice.

The necropolis was, at first sight, considered to be an anomaly in terms of Islamic burial practice as several of the burials contained more than one skeleton and often contained both male and female adults and children. However, certain conditions do exist whereby this type of burial practice is permitted (Macklin 2005), and these have implications on the circumstances surrounding the possible cause of death of those interned within the necropolis.

Whitcomb and Johnson (1979, 1982a) had previously located what was thought to be a small cluster of burials to the east of the Quseir-Safaga highway; however the area was not fully excavated. The current excavation was undertaken in the context of rescue, as the area was threatened by development. The land had been acquired by the Mövenpick Hotel and was designated for building, in addition to which eroded skeletal material was appearing on the bathing beach. Fig. 19.1 shows the location of the necropolis directly adjacent to the tourist beach and dive centre.

A second smaller area of burials suggested by the presence of human bones that had been disturbed by commercial trench digging lay immediately to the east of the road. Further burials dated to AD 1400-1450 were encountered in the lagoon near to Whitcomb and Johnson's so-called island (Peacock and Blue 2006, 57), but not investigated further. The western necropolis (to the east of the Quseir-Safaga road) had been largely destroyed, but some human remains were located in several spoil heaps of rubble in the area. Two disturbed burials were located:

- Burial 1 showed damaged, disarticulated remains,

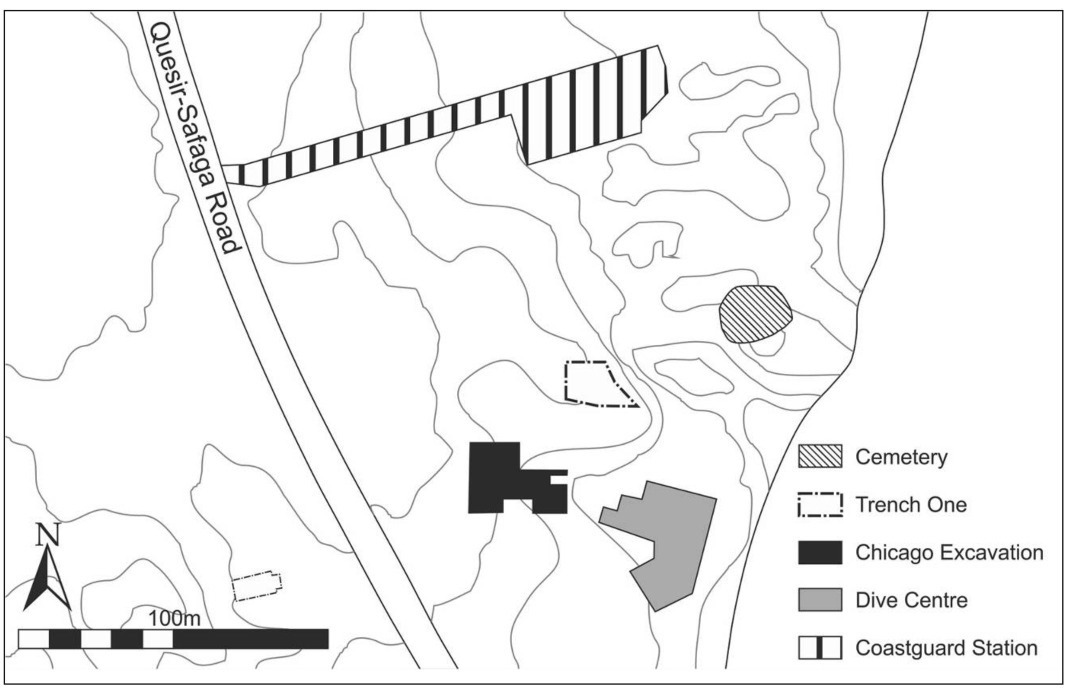


Figure 19.1. Cemetery location in relation to existing structures and excavations.

which was less than 20% complete.

- Burial 2 could not be removed or recorded in any detail due to its eroded nature, and remains *in situ*. No ensuing excavation was undertaken and the extensive damage prevented dating.

On the limited evidence available, the burials may not be Islamic as they do not appear to conform to the prescribed orientation for Islamic burial i.e. the body was not placed on it's right side and did not face toward the east in the general direction of Mecca.

19.1 The Necropolis

The main Islamic necropolis took the form of a small gravely knoll. Part of this necropolis is believed to have already been destroyed, perhaps during the construction of the nearby hotel complex. The knoll had also been disturbed by the prevailing weather conditions as well as human intervention, and a few scattered, very badly eroded human bones were identified on the surface to the south of the main concentration. The University of Chicago had previously excavated the area and located seven burials, which they left *in situ* as they were Islamic and at that particular time were not under threat of destruction (Whitcomb and Johnson 1978, 57).

Small structures believed to be mausolea, and mentioned by Whitcomb and Johnson (1979, 57) were visible at the apex of the mound (Figs 19.2 and 19.3). These structures consisted of a series of low stone walls, which appeared to have been constructed of coral blocks and mudbrick. The walls, which were preserved to a height of 0.5 m, were barely one course and were covered with a mixture of sand and pebble mix. To the right of the structure, looking west, was what appeared to be the remains of a single step leading into the structure. The exposed walls were found to be covered with a layer of *sebakh* i.e. basketry, rope, glass, together with newspaper and hessian sacking.

Located in the corner of the structure was an extensively fragmented inscribed ostrich egg shell, which was recovered and later reconstructed. This has already been published (Peacock and Blue 2006, 158-9). Similar fragments which may date to 15th century, were also discovered by the University of Chicago team (Whitcomb and Johnson 1979, 57).

The summit structures were excavated to a depth of 1 m, exposing a number of co-mingled, disarticulated human remains, which were subsequently recorded, recovered and later examined. During the excavation and subsequent deconstruction of these surface structures, sherds of what are thought to be Mamluk, (either Syrian or Egyptian), Blue and White ceramics, were recovered. This supports Whitcomb and Johnson's (1979, 57) hypothesis that the eastern area of the site is strictly Mamluk, although Whitcomb and Johnson state that occupation subsequent to AD 1400 may have been a possibility (Whitcomb and Johnson 1982a, 148). It appears therefore that this necropolis probably dates to the late 14th to mid 15th century AD.

Burials (Fig. 19.4)

Overall, 85 skeletons and a considerable number of co-mingled, disarticulated remains were recovered from the necropolis, the majority complete and undamaged. The interments comprised 48 single occupancies and 11 multiple occupancies (two or more grave occupants) (For details of individual burials and pathologies see Macklin (2005)).

Grave construction

Only three individual graves discovered in the necropolis were of a distinct construction (Burials 3, 61 and 70). The remaining burials were not covered and the bodies were placed directly into the gravel.

Burial 3

Burial 3 was constructed of several upright stone slabs that defined the shape of the grave with larger stones slabs laid across the top to form a canopy over the body. Layers of basketry matting overlaid the structure, which may have formed part of the funerary bier used to transport the deceased to the grave. No inscriptions were found on the

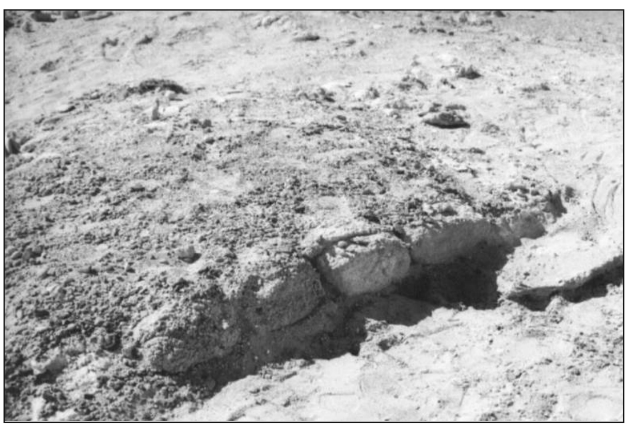


Figure 19.2. Summit structure prior to excavation facing northeast.

Figure 19.3. Summit structure prior to excavation facing south-southwest.

grave structure. The body had been shrouded and placed in the grave on the right side facing south-southeast. Preservation of the burial was excellent and the bones were 100% complete on removal. The body was aged 11-12 yrs ± 36 months (Macklin 2005).

Burial 61 (also known as Tomb 1) (Fig. 19.5)
Burial 61 was the most elaborately constructed cist-type grave located in the necropolis. It was constructed of a surrounding single outer layer of 19 mudbricks of uniform size. Inside this outer cordon were eight wooden timbers of varying sizes most of which appear to be hardwoods (see Chapters 15 and 17 this volume). All the timbers showed traces of bitumen or pitch adhering to at least one side in addition to the remains of matting on the underside, perhaps suggesting the funeral bier used to transport the deceased to the grave. They showed a series of holes along their edges, some displaying residue of coir stitching and pegs in situ. They are believed to be reused sewn ship timbers (see Chapter 15 this volume). A number of irregular shaped mudbricks overlaid the timbers at one end of the grave. Their function was unclear.

Excavation of Burial 61 revealed a mudbrick lined, cist-type structure, five bricks deep, containing a female between 35-40 years of age, laid on her right side facing south-southeast. Remains of shrouding were visible although the shrouding of this burial was very different to other adult burials found at this site (Macklin 2005). As expected in Islamic burials, no grave goods were found with the burial although green goods i.e. date stones,

Figure 19.5. Construction of Burial 61 during excavation. The third plank from the right is 12.5 cm wide.

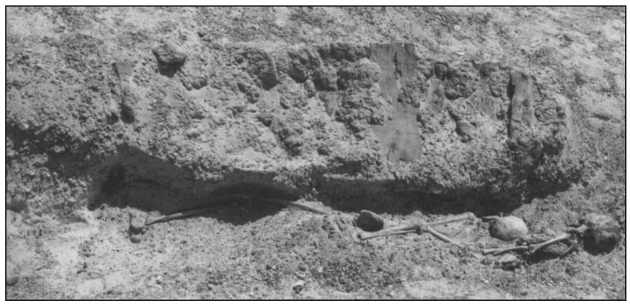


Figure 19.6. Collapsed grave construction under excavation, looking south.

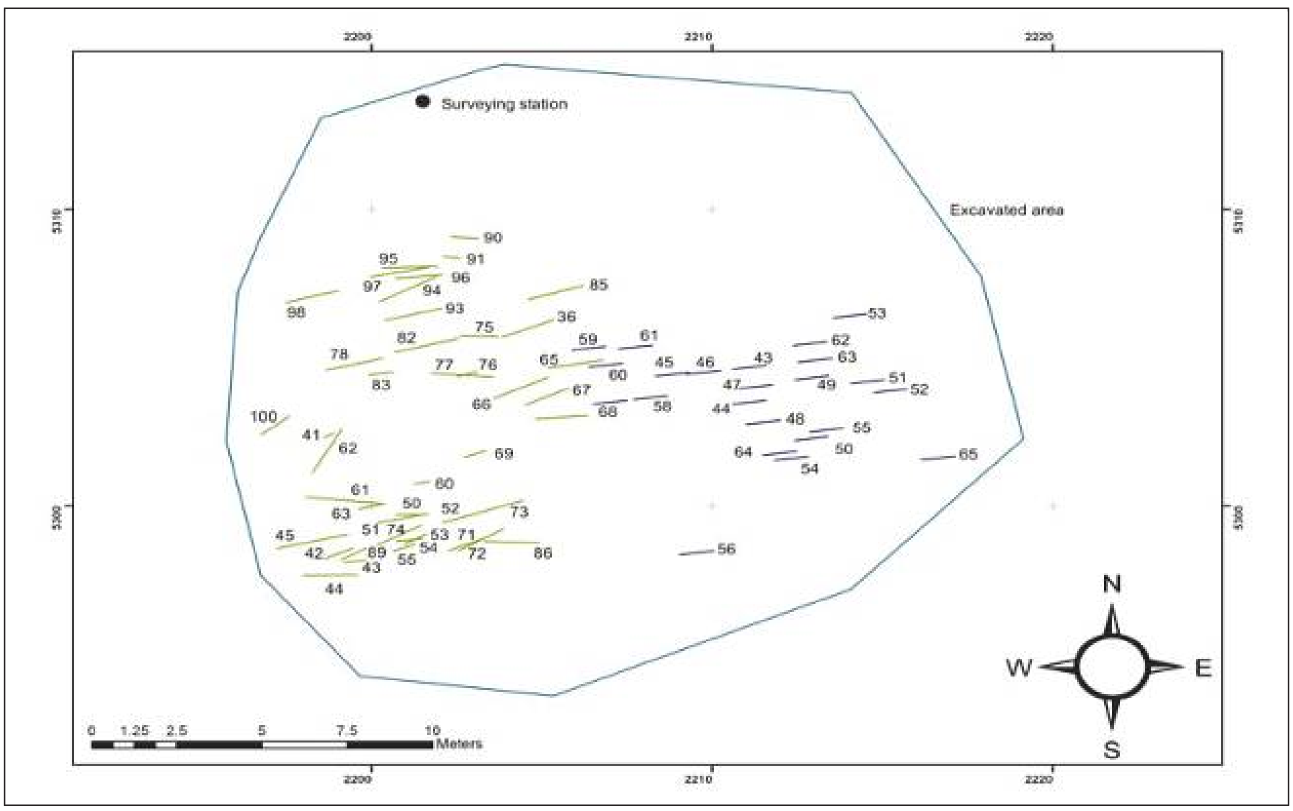


Figure 19.4. Burial orientation at the necropolis.

hazelnuts, flower buds and leaves were in abundance throughout the remaining shrouding. Great care had been taken in this burial and although this is not uncommon in female burials, it was certainly an anomaly in this necropolis.

Burial 70 (also known as Tomb 2) (Fig.19.6)
Burial 70 appeared to be similar to the construction of Burial 61, although on closer inspection this proved not to be the case. The grave canopy had collapsed sideways, sloping towards the north and rested directly adjacent to skeletons 71 and 72. No remains were found within the grave and the orientation of skeletons 71 and 72 would suggest they were not the occupants of the grave structure prior to its collapse. The collapsed canopy was oval in shape and was covered at the lower section by several broken mudbricks. Directly under the canopy were timbers similar to those seen in Burial 61, although these were irregularly shaped and originally fastened with iron nails rather than sewn as in Burial 61. The woods were local Egyptian species *Ficus sycomorus* and *Acacia nilotica* (see chapters 15 and 17, this volume).

Nature of the remaining burials
Eighty five skeletons were recovered from the necropolis, interred as 48 single and 11 multiple interments. The latter included male, female and infant occupants. All the bodies had been laid directly into the ground with no visible grave cut marking the location of the grave: it seems that gravel was simply placed over the bodies. There was however, evidence of internal cemetery patterning as all the bodies were interred with attention to body position and

Rightside	Supine	Semi supine	Head R.shoulder	Head R.shoulder, Torso front	Sitting	?
60	3	3	1	7	1	10

Table 19.1. Burial position of individuals of the necropolis.

Condition	Adult(M)	Adult(F)	Infant	Child	Adolescent
Failure to unite Distal seg. Sternum	1				
Failure to unite acromia	2				
Ossification of thyroid and costal cartilage	6	1			
Dental abscess	4	2			1
Caries	6	4			
Hypoplasia	1	3		2	
Periodontal disease	6	2			
Cribra orbitalia	2	3	3	2	
Porotic hyperostosis			2	2	
Nasal turbinate hypertrophy	1	1			
Sacralized L5	1	1			
Ankylosis		1			
Spondylolysis	1				
Spina Bifida Occulta		1			
Partial Spina Bifida		1			
Fractures	8	1	1		
Schmorl's nodes	4	1			
Periostitis/Osteomyelitis					1
Sternal aperture	1				
Osteophytosis (vertebrae)	10	5			
Osteoarthritis	8	4			
Compressions fracture	1	1			
Depression frac. skull	1				
Osteoma		1			

Table 19.2. Conditions observed in human remains of the eastern necropolis (Macklin 2005).

orientation. The majority were placed on their right side, facing south-southeast in the general direction of Mecca (Table 19.1). A minority had been placed in a supine position with the head resting on the right shoulder facing south-southeast. For specific details of body orientation see Macklin (2005). It was not possible to excavate and view the necropolis in its entirety due to environmental conditions (Macklin 2005) therefore each burial, whether single or multiple occupancy, was recorded and recovered upon its immediate discovery.

Examination of the human remains
The human remains recovered from the necropolis were examined in the field prior to their re-interment and as a result various analyses could not be undertaken. These include x-rays, pathological or histological testing which were beyond the scope of the permit. Nevertheless, extensive examination of the remains was carried out including cranial and post-cranial measurement, estimation of age, sex and stature and screening for pathological conditions, dental disease and evidence of traumatic injury. Estimation of age and sex was determined for adults only, as was cranial measurement, due to time limitations and lack of resources. Methods used for analysis are standard prescribed measurements (Buikstra *et al.* 1994).

Pathologies
Dental disease
Table 19.3; Table 19.4; Table 19.5 (Macklin 2005).

Activity related pathologies
Fractures
Table 19.6 (see Macklin 2005).

Degenerative conditions (see Macklin 2005)
Sixteen males (36-50+ years old) and five females (21-50+ years old) showed osteoarthritic conditions. (Table 19.7).

Selected burials and associated pathologies
For specific details of all burials including orientation, body position, pathologies etc. refer to Macklin (2005). A selection of burials of particular interest are included below:

Burial 12
Burial 12 was a female aged 35-50 years, lying on the

Tr.	Number of teeth	Number of carious teeth	% incidence of caries	Tooth positions observed	Positions showing evidence of ante-mortem tooth loss	% incidence of ante-mortem tooth loss	Total decayed and missing %
1a	1132	17	1.5	1230	115	9.3	11.8
5	53	0	0	64	8	12.5	15

Table 19.3. Prevalence of caries and ante-mortem tooth-loss.

Tr.	Tooth positions observed	Number of abscesses	% incidence of abscesses	Number of infections	% incidence of infection
1a	1230	11	0.8	5	0.4
5	64	0	0	0	0

Table 19.4. Prevalence of abscesses and active infections.

Tr.	Number of individuals	Number of tooth positions observed	Number of teeth lost ante-mortem	Total ante-mortem tooth loss 12-20yrs	Total ante-mortem tooth loss 21-35yrs	Total ante-mortem tooth loss 36-50yrs	Total ante-mortem tooth loss 50+yrs
1a	80	1230	109	2	8	46	51
5	2	64	8			4	4

Table 19.5. Ante-mortem tooth loss by age category.

Tr.	Depressed skull fracture	Clavicle	Spinal Process	Ribs	Distal Ulna	Distal fibula
1a	1	2	1	15	4	1

Table 19.6. Number of fractures observed.

Tr.	SK. No	Sex	OA: No eburnation	OA with eburnation
5	1	M		Ist metacarpal articular surface
1	11	F		Basal condyles, articular surface C1
1	12	F		L. clavicle and articular surface acromion process
1	15	M		R. clavicle articular facet, R. corocoid, R. acromion
1	35	M	R. clavicle and acromion	
1	36	M		L and R dis. femoral condyles, prox. R. tibia
1	51	F	L.dis.humerus 1st and 2nd dis.manual phalanges articulating surface of medial phalanges L. dis.humerus L. 2nd and 3rd prox.pedal phalanges Medial phalange articulating surface	
1	62	F		Spinal process L4
1	65	M	Dis.tibia, talus and calcaneus	L. dis. humerus and prox.ulna articulating surface L. trochlea notch and articular surface dis.humerus
1	72	M		R. mandibular and basal condyles
1	73	M		L. Prox.humerus and Glenoid cavity 1st-3rd L. dis.metacarpals R. dis.tibia, articulating talus
1	85	M		R. dis.femur, articulating surface R. tibia

Table 19.7. Individual cases of osteoarthritis.

right side adjacent to what appeared to be a partition wall between this and an adjacent burial who's occupants were both male (Fig. 19.7). The remains were in a particularly poor state of preservation as they were encased in caliche, which proved difficult to remove without damaging the remains.

The condition of the skeleton indicates clear evidence of healing cribra orbitalia. The lower lumbar vertebrae were ankylosed at its right aspect, the left aspect was unaffected. This condition is the bony fusion of two or more contiguous vertebrae, usually found along the anterior at lateral margins of the centra (Mann and Murphy 1990) and although this condition is referred to as Ankylosing Spondylitis (Fig. 19.8) it is often confused with other degenerative conditions of the spine such as DISH (Diffuse Ideopathic Skeletal Hyperostosis). Upper lumbar vertebrae of this skeleton showed chronic osteophytosis. This skeleton also showed chronic osteophytosis of the upper thoracic vertebrae and moderate to severe osteophytosis of the lower thoracic vertebrae.

Additional conditions noted include, severe enthesophytes at the olecran process (insertion point of the triceps muscle). Bilateral enthesophytes were present on the radial tuberosities (insertion point of the biceps brachi muscle). These insertion points appeared to be more developed on the left side of the body. In addition, there were bilateral enthesophytes of the Achilles tendon insertion sites.

Skeletons 13 and 15 displayed similar conditions to skeleton 12.

Burial 30
Burial 30 was an adolescent aged 15-20 years old. Sex was not determined due to the immature nature of the remains. The condition of this skeleton showed what appeared to be chronic infection of the right distal tibia and fibula, probably caused by trauma such as a break in the bones which remained unhealed and became infected. Any specific evidence of trauma was however undetectable due to the chronic nature of the condition. The right distal tibia and fibula showed chronic osteomyelitis, which had radiated to the right talus and calcaneus, which had subsequently become fused. A drainage channel was visible at the centre of the bone.

The area of bone containing the drainage channel had become completely separated from the tibia and what appeared to be new bone growth had surrounded the distal tibia and talus (Figs 19.9 and 19.10). There was evidence of increased vasucularity with periosteal new bone growth. The distal fibula was also affected by the condition and had become partially fused with the distal tibia (Figs 19.11 and 19.12). Increased vascularity (pits) striations and periosteal new bone growth was also in evidence. This condition was certainly active at the time of death.

Burial 32
Burial 32 (Skeleton 48) was a child of 2-3 years of age and interred with skeleton 32 (Fig. 19.13).

This child's remains showed evidence of cribra orbitalia with coalescence of the foramina of the right orbit. Cranial porotic hyperostosis affected both parietal and occipital regions showing porosity only. The vertebral column appeared to have a degree of curvature which gives an overall 'hunchback' appearance.

Burial 33 (Skeleton 56)
Although this skeleton did not display any degenerative condition it was interesting as the left foot and head had been removed prior to burial. The remains were completely articulated prior to removal. However, there was no evidence of cut marks or trauma to the cervical vertebrae that would suggest violent decapitation, although the distal tibia and fibula showed distinct evidence of traumatic removal of the lower limb.

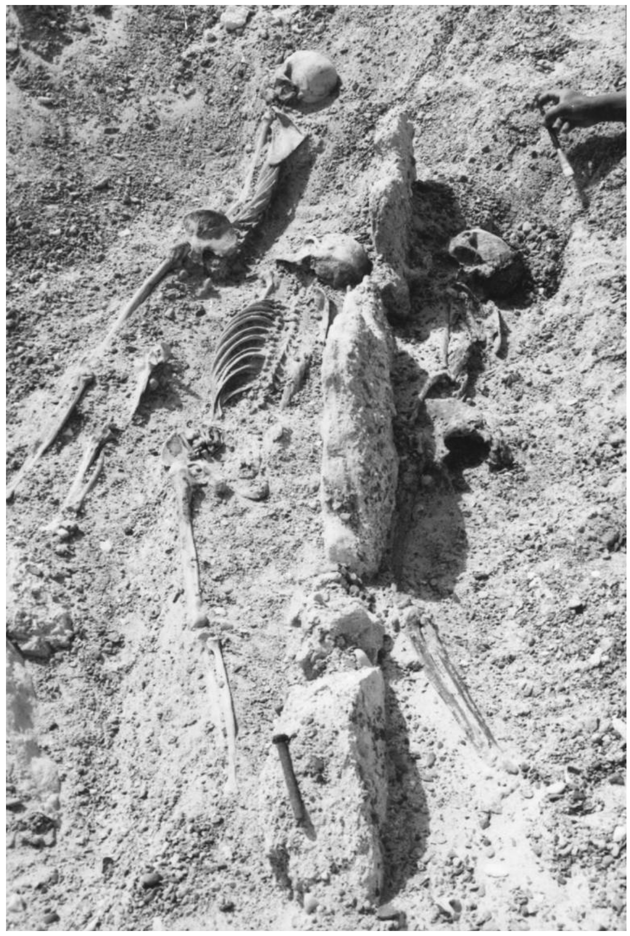


Figure 19.7. Burial 12.

Age and degeneration of the population in the necropolis
The skeletal population of Quseir al-Qadim did not display a high prevalence of degenerative disease other than what may be considered as 'normal wear and tear' of increasing age. 9.4% (8) males (31-50+ yrs) and 4.7% (4) females (31-30+ yrs), displayed osteoarthritis in varying degrees of severity (Table 19.7). Of the eight males displaying osteoarthritis the majority also displayed osteophytosis and Schmorl's nodes, a characteristic of heavy load bearing associated with the vertebral column. Calcification of the costal and thyroid cartilage is a further characteristic of increasing age and was also displayed in four males and two females. Scheuer and Black (2000, 168) state that ossification of the laryngeal and tracheal cartilage generally occur in the late twenties but is however, variable in the rate of ossification between males and females and by way of its variability was not used in estimating the age of an individual.

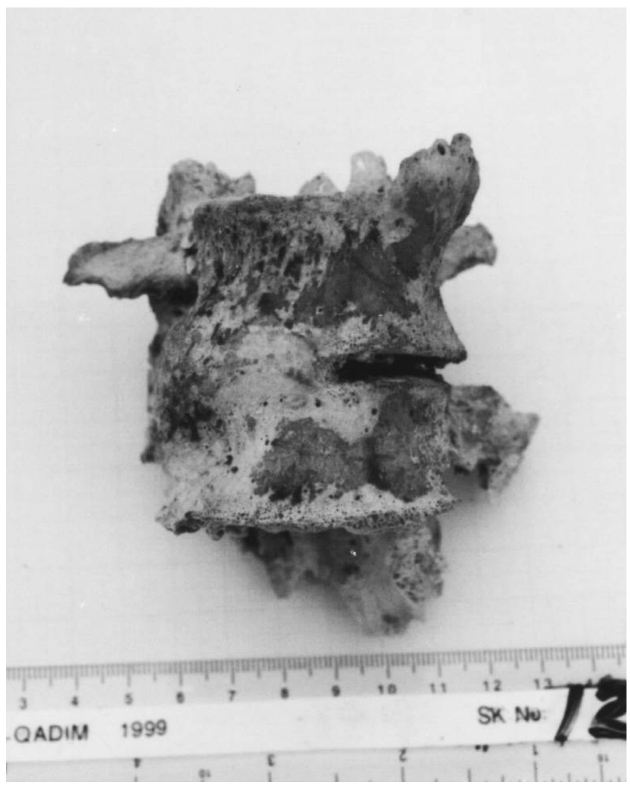


Figure 19.8. Ankylosis of Lumbar vertebrae.

It is unfortunate that activity related phenomena such as muscle insertion points could not be examined due to time limitations, as this may have provided further indications as to the likelihood of this group's activity. However, the patterns of osteophytosis, Schmorl's nodes and some fractures, although healed, indicate a group of individuals whom perhaps practiced the same activities, occupation or similar levels of occupational stress. Nevertheless,

Figure 19.9. Drainage channel position.

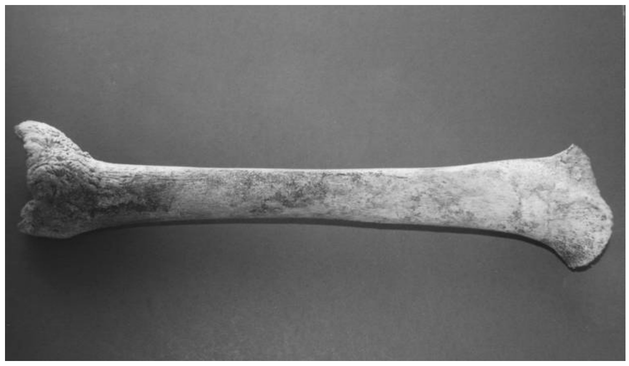


Figure 19.11. Right tibia osteomyelitis.

Figure 19.10. Collapse of bone over talus.

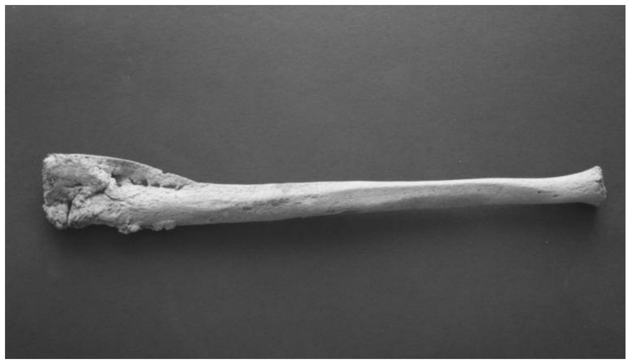


Figure 19.12. Right fibula osteomyelitis.

consideration has to be given to factors that contribute to osteoarthritic changes, not least of all age and obesity, which greatly influence the development of this condition. A number of archaeological or ethnographic studies have been published on this subject (Merbs 1989; Lai and Lovell 1992; Bridges 1994). These studies concentrated on observing living populations and monitoring osteoarthritic changes over various stages of life and hence reconstructed activity related phenomena. Degenerative wear and tear was only observed in a minority of the skeletal population at Quseir al-Qadim.

19.2 Discussion

The necropolis is recognised as a unique find. Muslim burials conform to a very specific set of funerary rituals, a deviation from which was witnessed at Quseir al-Qadim. Instructions for the burial of all Muslims are clear (Sabiq 1995; Mawdudi 1986; Sakr 1995; Sedki 2001; Sajid 2003; Mallam pers.comm.). The burial of more than one body in a grave is forbidden and considered unlawful to the point of being sinful (*harām*). Both Muslim and Bukhari Hadīh emphasise the swift burial of the dead, stating that if the deceased was good, he would be hastened to goodness, and if he was evil, they would be ridding themselves of his evil influence. These traditions show the connection between punishment and the grave, in particular, the ideology that the evil of a corpse could extend to others even if those persons are alive. Mallam (pers. comm.) considers this to be the primary reason why there should only be one corpse buried in a grave; the evil passes from one to another, and

Figure 19.13. Burial 32 (Skeleton 48).

more so in death than in life. However, in situations such as war, natural disaster and episodic disease, when there may be a large number of corpses, mass burial is permitted and due to the conditions of death: the victims would be classified as martyrs, they could not be classed as evil and therefore would not suffer torment in the grave (Sabiq 1995; Mawdudi 1986; Sakr 1995; Sajid 2003; Mallam per. comm.). Nevertheless, al-Bukhari (vol 2, Book 23, 427) stated, *'Allāh's apostle used to shroud two Martyrs of Uhud in one sheet and then say, 'Which one of them knew the Qur'ān more?' When one of the two was pointed out, he would put him in the grave first saying, 'I will be a witness for them on the day of resurrection'.* Thus, if more than one Muslim is to be buried in a single grave, the most pious among them should be placed in the grave first.

As a result, we are able to make some inferences regarding the possible circumstances that surround the death of Muslims who are buried at Quseir al-Qadim outside the 'norm' prescribed by Islam.

The excavation of a Muslim site is a rare opportunity, even rarer is the opportunity to excavate and examine Muslim human remains. However, Quseir al-Qadim appears to be unlike the small number of Muslim necropolises that have been excavated to date. Prominska's project at Kom el-Dikka, Alexandria, Egypt, excavated a vast Muslim necropolis which appears to have consisted of three phases; the lower necropolis 7th-8th centuries, middle necropolis 9th-12th centuries, and the upper necropolis 13th-14th centuries. Tombs of the lower necropolis conformed to 'normal' Muslim burial instruction and contained only one individual per grave, whereas tombs of the middle and upper necropolises held the remains of several bodies, only the most recent being anatomically articulated. Previous burials had simply been pushed aside in order to receive a new body, suggesting that grave occupants had been added to the tombs over some considerable time (Prominska 1972). This was certainly not the case at Quseir al-Qadim as those graves containing more than one body shows evidence for mass burial at one time, not over a period of time. Each skeleton was found completely articulated and showed no evidence of movement subsequent to its initial interment. In spite of this difference it may be possible that both Kom el-Dikka and Quseir al-Qadim burials had some aspects of burial in common.

Another circumstance when it is permitted to bury more than one Muslim in the same grave, is when there is scarcity of graves, often associated with a large number of corpses. A number of earthquakes affected Cairo in the 12th-14th centuries (Ambrasey *et al*. 1994), however, there is no mention of Alexandria, therefore a major earthquake event seems unlikely as a cause of death for those buried at Kom al-Dikka. According to Tucker (1981), Egypt suffered numerous episodes of torrential rain and cold weather conditions but again nothing is specifically mentioned for Alexandria. However, Alexandria, like Quseir al-Qadim, was a fair sized port and so shipwreck cannot be ruled out. Nevertheless, during 9th-15th centuries plague and famine were prolific throughout all of Egypt, and could account for an increase in burials at both Quseir al-Qadim and Kom el-Dikka. Dols (1977, 143-237) records the vast plague epidemic of Mamlūk Egypt and numerous re-occurrences during 9th-15th centuries, particularly during 13th-15th centuries. Dols pays particular attention to numbers of slaves, children and 'foreigners' who succumbed to the disease. Quseir al-Qadim was linked with the Nile Valley, Alexandria and hence the Mediterranean, a route through which the plague endemic of the 14th century would have easily spread.

The nature of the burials of the Kom el-Dikka do appear to be similar to those observed at Quseir al-Qadim. Throughout the three phases of necropolis, by far the greatest number of deaths occurred in the youngest age group. Prominska's age group for infants is 0-9 years and an increase in infant deaths is demonstrated throughout the first two phases, with a huge increase in the number of infant deaths in the third phase during the 13th-14th centuries. This increase in the number of deaths is mirrored throughout all age groups but is particularly noticeable amongst the infant age group (Prominska 1972, 86). Although there are no burials for comparison earlier than the 14th-15th centuries at Quseir al-Qadim, the burials still show a high death rate of infants (Macklin 2005). The number of deaths of infants and older adults (36-50 years) at Quseir al-Qadim is indicative of a population who's younger and older age groups are more susceptible to the consequences of, for example famine and disease. Famine, of course brings with it not only malnutrition but also a reduced immunity and therefore a greater susceptibility to disease. This is not to say that the necropolis at Quseir al-Qadim was the result of a large scale famine. A reduced calorific intake also determines a compromised immune system and thus, the victims succumb to the effects of disease more easily. Tucker's '*Miscellanea*' (1981) records numerous accounts of climatic changes, natural disasters, famine and pandemics in 12-15th centuries in Mamlūk Egypt and it is highly likely that Kom el-Dikka and Quseir al-Qadim did experience one or more of these phenomenon during their active history. Ancient seaports are, as some modern ports, notorious 'disease pools' allowing the wide dissemination of disease.

19.3 Conclusion

The overall aim of this research was to locate, excavate, remove, record, analyse and interpret the necropolis of Quseir al-Qadim. This was accomplished over three seasons of excavations and, at times, under difficult conditions. However, a wealth of information has been drawn from the excavation of the necropolis.

The burial patterns, such as body orientation and direction of gaze clearly indicated that the skeletal population buried at Quseir al-Qadim were Muslim. It was established that the necropolis at Quseir al-Qadim did not conform to what appears to be the 'norm' in Muslim burial practice from a Sūnni Muslim perspective. Many of the burials observed at Quseir al-Qadim contained more than one individual, often containing both male and female, adults and children. Normal Muslim burial practice states that only one person should be buried in a grave and no children should be buried with adults; that is unless it is for one of three distinct reasons. These are:

i) If they all died at the same time from the same disease.
ii) If they all died at the same time during a disaster, such as an earthquake or shipwreck.
iii) If they all died at the same time due to warfare.

Stature regression equations were attempted but proved unsatisfactory. However, the apparent range of body stature witnessed suggests a diverse population, perhaps not unsurprising at an active port site which would have been a transit centre for people travelling from other regions. It would be unlikely that the entire skeletal population originated from a single local community.

Even though it is not possible to ascertain the relationship between the necropolis and other burial areas, it would appear from the surrounding archaeological remains that the necropolis was isolated.

i) The ancient harbour mouth is situated a short distance to the south of the necropolis.
ii) Islamic living quarters (Trench 1) were located some distance to the west of the necropolis (up to the existing roadway).
iii) Essentially an open coastline lies to the north, east and south of the necropolis.

To the writer's knowledge, no skeletal remains have been located in the immediate vicinity, beyond the necropolis, although local evidence does suggest that skeletal remains were observed during the foundation work of the Sub-Ex Dive Centre located directly between the harbour mouth and the necropolis. Unfortunately this can be neither verified nor discounted. However, if this were indeed the case the necropolis may have extended south towards the harbour mouth. Thus, it is possible that the necropolis represents an isolated burial area close to the sea, linked to the burial of shipwreck victims, close to the environment they once inhabited. Victims of drowning would not display any skeletal trace of traumatic injury or tissue trauma, however severe, as is essentially the case with the bodies discovered at the necropolis.

Another scenario to consider is endemic disease. It is quite likely that the skeletal population of Quseir al-Qadim may have been victims of an episode of endemic disease, a phenomenon rife in Egypt during 13th-16th centuries (Dols 1977; Tucker 1981). Although the plague is normally associated with endemic disease, and was certainly rampant at this time, we cannot categorically establish whether these are indeed victims of plague *per se* as this condition dispatches its victims before the disease is able to manifest itself upon the skeleton, and in fact this is not restricted to plague, rather any disease such as cholera and smallpox or even influenza or measles, which dispatches its victims quickly, will have a zero impact in the skeletal record.

Finally, there is no clear indication of the population's health. The majority of the older age groups 35-50+ years showed a number of degenerative conditions, although important conditions may not show. Wood *et al*. (1992) present an osteological paradox that outlines two types of skeleton, healthy and unhealthy. The healthy skeleton will show for example, conditions caused by degeneration, trauma, fractures or breakages, infections etc, providing of course the disease or condition was suffered for a long enough period of time to enable it to manifest upon the bone tissue. Paradoxically, the unhealthy skeleton would not show these manifestations. This is simply because the individual did not survive long enough for the condition to manifest upon the bone tissue.

Apart from degenerative conditions such as osteoarthritis and osteophytosis, very few pathological conditions were observed at Quseir al-Qadim. Due to this and the generally young age of the population, it is most likely that this group of individuals were either victims of episodic disease, or died as a result of a natural disaster such as shipwreck. Although the latter cannot be disregarded, the former is probably the most likely cause of the demise of this population.

20 Faunal Remains

Sheila Hamilton-Dyer

20.1 Vertebrates Excluding Fish

Introduction and methodology

Animal bones were collected by hand from all excavated areas. Fish remains were separated from those of other vertebrates and reserved for later analysis. Non-fish vertebrates were recorded onto paper data sheets during the excavation seasons. Most of the remains were retrieved from very light dry substrates and did not require any cleaning other than an occasional light brushing. Material from Trench 7A was recovered from a damp, sometimes clayey, substrate. These bones were often fragile and limited cleaning by washing was carried out at the time of analysis only where crucial to see details such as toothwear. The larger part of the data in the paper records has been transferred to an *Access* database, but some trenches have not yet been digitised and in the case of Trenches 1 and 3 only the species count and the measurements have been transferred to date. The mammal bone not digitised thus far is mainly from Trenches 2, 5 and 8, which include contexts that often contained (non-faunal) material of mixed or uncertain date. As animal bone is very rarely dateable of itself, it is not possible to reliably separate the bone from the two periods

Taxonomic identifications were made using comparative collections supported by reference to Schmid (1972) and Walker (1985) among others. All fragments were identified to species and element where possible with the following exceptions: ribs and vertebrae of the ungulates (other than axis, atlas, and sacrum) were identified only to the level of cattle/horse-sized and sheep/pig-sized. This restriction does not apply to burials and other associated bones where ribs and vertebrae were assigned to species. Unidentified shaft and other fragments were similarly divided. Any fragments that could not be assigned even to this level have been recorded as mammalian only. Where possible sheep and goat were separated using the methods of Boessneck (1969), Payne (1985) and Halstead and Collins (2002). Recently broken bones were joined where possible and have been counted as single specimens. Tooth eruption and wear stages of cattle, sheep and pig mandibles were recorded following Grant (1982). Measurements mainly follow von den Driesch (1976) and are in millimetres unless otherwise stated. Withers height calculations of the domestic ungulates are based on factors recommended by von den Driesch and Boessneck (1974). The archive includes details of metrical and other data not presented in the text.

20.1.1 Roman Trenches

The two main assemblages of animal bone discussed in this report come from the harbour area, Trench 7A, and the *sebakh* area, Trench 6. Smaller amounts of bone were recorded from Trenches 12 and 17, which have also been included here but grouped together in order to obtain a larger sample. All other trenches either produced very little bone or were at least partly disturbed by Islamic activity, which is likely to have included deposition of bone, and are not discussed here. The total Number of Individual Specimens (NISP) analysed below is 7822.

At least 28 species are present in these assemblages; 16 mammals, 11 birds and a reptile, the green turtle. A summary of the taxa distribution is given in Table 20.1. The majority of the remains are of the domestic ungulates, in order of size these are; camel, cattle, equids, pig, sheep and goat. Remains of dog and cat are frequent, mainly as complete or partial skeletons. Other mammals occur as a few remains only and include dugong, whale, ibex, dorcas gazelle, black rat and fragments of hippo and elephant ivory.

The domestic ungulates

Equids

Bones of equids are common but they do not dominate the assemblages as they did at Mons Claudianus (Hamilton-Dyer 2001a). Both horse and donkey are definitely present with donkey the more frequent by a factor of ten. Mule was not positively identified but many bones were not considered diagnostic and all the equid material is treated as a single taxon here, but remain separate in the archive records. All areas of the skeleton are represented with a slight bias in favour of teeth and foot bones; a common finding as these are resistant elements. Most of the bones are fused but some are of sub-adult animals and in one case, a group of bones from Trench 7A, a neonate foal (Fig. 20.1). Some of the bones show butchery marks, both from removal of head or feet and from disjointing and

Trench	7A	6	12	NISP		Trench	7A	6	12	overall %
equid	117	73	36	**226**		equid	*2.4*	*3.6*	*3.7*	***2.9***
cattle	165	106	17	**288**		cattle	*3.4*	*5.2*	*1.8*	***3.7***
cattle/equid size	743	314	171	**1228**		cattle/equid size	*15.4*	*15.4*	*17.6*	***15.7***
camel	34	165	72	**271**		camel	*0.7*	*8.1*	*7.4*	***3.5***
camel size	9	91	115	**215**		camel size	*0.2*	*4.5*	*11.9*	***2.7***
sheep & goat	472	155	25	**652**		sheep & goat	*9.8*	*7.6*	*2.6*	***8.3***
pig	608	231	83	**922**		pig	*12.6*	*11.3*	*8.6*	***11.8***
sheep size	574	231	147	**952**		sheep size	*11.9*	*11.3*	*15.2*	***12.2***
indet. mammal	1394	30	215	**1639**		indet. mammal	*29.0*	*1.5*	*22.2*	***21.0***
dog	375	150	0	**525**		dog	*7.8*	*7.3*	*0*	***6.7***
cat	207	405	14	**626**		cat	*4.3*	*19.8*	*1.4*	***8.0***
wild bovids	2	6	0	**8**		wild bovids	*0.04*	*0.3*	*0*	***0.1***
other mammals	9	5	6	**20**		other mammals	*0.2*	*0.2*	*0.6*	***0.1***
domestic fowl	17	38	52	**107**		domestic fowl	*0.4*	*1.9*	*5.4*	***0.3***
goose	31	0	1	**32**		goose	*0.6*	*0*	*0.1*	***1.4***
other birds	21	14	13	**48**		other birds	*0.4*	*0.7*	*1.3*	***0.4***
turtle	32	29	2	**63**		turtle	*0.7*	*1.4*	*0.2*	***0.6***
Total NISP	**4810**	**2043**	**969**	**7822**						

Table 20.1. Summary of Taxa found at Myos Hormos (Roman Period).

Trench	7A		6		12		All	
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**
Area								
head & neck	46	*27.9*	53	*50.0*	2	*11.8*	101	*35.1*
teeth	81	*49.1*	30	*28.3*	1	*5.9*	112	*38.9*
shoulder	0	*0.0*	2	*1.9*	0	*0.0*	2	*0.7*
pelvis	3	*1.8*	0	*0.0*	0	*0.0*	3	*1.0*
foreleg	6	*3.6*	6	*5.7*	4	*23.5*	16	*5.6*
hindleg	4	*2.4*	6	*5.7*	1	*5.9*	11	*3.8*
hindleg (small bones)	0	*0.0*	0	*0.0*	0	*0.0*	0	*0.0*
feet	25	*15.2*	9	*8.5*	6	*35.3*	40	*13.9*
other	0	*0.0*	0	*0.0*	3	*17.6*	3	*1.0*

Table 20.2. Cattle remains found at Myos Hormos (Roman Period).

meat removal. The marks are far less common than they were at Mons Claudianus where use of donkeys for meat was common in the absence of cattle. A few bones, usually the straight and sturdy metapodia, were sawn for working.

Cattle

Cattle bones are more frequent than those of equids (and camel) and it is probable that a high proportion of the indeterminate cattle/equid material is also of cattle. All parts of the skeleton are represented, although with a bias in favour of the head and against the smaller elements (Table 20.2). The proportion of loose teeth is higher in Trench 7A than in Trench 6, consistent with the less favourable conditions and the higher level of fragmentation. Many, or perhaps all, of the animals were horned as evidenced by the sawn-off horn core bases (Fig. 20.2). Aging information from teeth and epiphysial fusion indicates that the animals were either adult or sub-adult, no calves were found. Measurements indicate that these were substantial animals and are comparable with those found at Berenike (van Neer pers. com.). This, together with the presence of all body parts and the age structure, implies that the cattle were driven in on the hoof from an area with lush pasture. The bones are not of the lighter built animals associated with semi-desert environments, and indeed the Eastern Desert is an arid area that would not support cattle. It is believed that the cattle for Berenike were driven from the Nile Valley (van Neer 1997) and the same would be true for Quseir, via Wadi Hammamat. It is notable that there are almost no cattle remains at Mons Claudianus although the site is at a similar distance from the Nile (Hamilton-Dyer 2001a). It is possible that the desert route to Mons Claudianus, even though it is furnished with several watering stations, was simply too exposed and insufficient in water and fodder for droving. Wadi Hammamat is perhaps slightly more shaded in parts but the same difficulties also apply to Berenike. The only real difference between these sites is that Berenike and Quseir are both coastal, and therefore might also have the possibility of transport of stock by boat that was denied to the isolated quarry sites inland.

Figure 20.1. Neonate foal bones from Trench 7A.

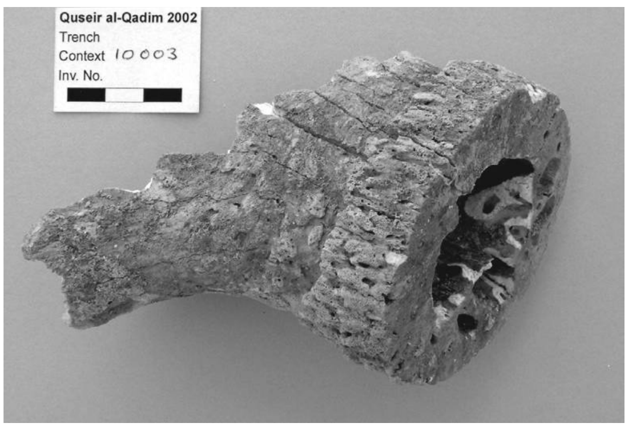


Figure 20.2. Sawn cattle horncore.

Camel

Bones positively identified as camel are about as frequent as those of equids and cattle. Indeterminate material of large size can also probably be attributed to camel with some certainty, on account of bone size and thickness, even where no diagnostic features are present. Camel and camel-sized bones are not, however, as frequent as those of equids and cattle when combined with their indeterminate material. The distribution is uneven across the trenches with Trench 7A containing few bones. All diagnostic elements equate to dromedary. Most elements are present with a slight bias against the smallest bones. The majority of the bones are fused but there are a few of immature animals. Measurements were taken where possible. Length measurements were rarely available because most of the limb bones were incomplete; the bones seemed to be more prone to salt damage and splitting than those of equids and cattle. Skinning and butchery marks were sometimes visible indicating that they were not only used for transport but for meat as well. Some fragments were sawn, in this case indicating working.

Pig

Remains of pig are common and the identified bones are more frequent than the summed total of equids, cattle and camels, although this takes no account of the greater meat weight of these larger animals. All parts of the animal are present, with a typical bias in favour of the head and against the smallest bones. This pattern of anatomical distribution was also found at Mons Claudianus (Table 20.3). Butchery evidence shows that all parts were used and the head usually divided in half. Less of the pig carcase is considered low value in comparison with other animals and both fresh and preserved meats could be represented. Aging evidence from the bones and teeth indicate that most remains are of sub-adult animals or part-grown piglets, as expected, but there are some of fully mature animals too. There are also a few remains of very young, even neonate, piglets. The mandibles include those of both sexes and one of the maxillae is of an old female. It seems likely, therefore, that at least some breeding of resident animals was being practised. Pig remains were frequent

Trench	7A		6		12		All		Mons Claudianus	
Area	Total	%	Total	%	Total	%	Total	%	Total	%
head & neck	188	30.9	97	42.0	18	2.0	303	32.9	492	35.0
teeth	77	12.7	3	1.3	2	0.2	82	8.9	19	1.4
shoulder	31	5.1	9	3.9	4	0.4	44	4.8	70	5.0
pelvis	31	5.1	17	7.4	6	0.7	54	5.9	34	2.4
foreleg	97	16.0	40	17.3	15	1.6	152	16.5	253	18.0
hindleg	71	11.7	37	16.0	13	1.4	121	13.1	179	12.7
hindleg (small bones)	4	0.7	2	0.9	2	0.2	8	0.9	0	0.0
feet	109	17.9	26	11.3	4	0.4	139	15.1	329	23.4
other	0	0.0	0	0.0	19	2.1	19	2.1	29	2.1

Table 20.3. Anatomical distribution of Pig remains from Myos Hormos and Mons Claudianus (Roman Period).

	humerus sheep	humerus goat	radius sheep	radius goat	scapula sheep	tibia all	astragalus sheep	astragalus goat
MAX	36.1	33	40.5		40.1	34	37.7	35.1
MIN	30.2	29.3	30.2	30.8	32.7	24.6	30.3	25.9
N	9	3	6	7	4	17	7	7
MEAN	33.2	30.7	38.2	32.8	36.7	29.3	33.4	31.3
SD	2	1.6	3.7	1.6	3.2	2.8	2.7	3.2
Co. Var.	6	5.2	9.7	4.9	8.7	9.6	8.1	10.2
Measurement codes as per von den Driesch (1976)								

Table 20.4. Sheep and Goat measurements from Myos Hormos (Roman Period).

at Mons Claudianus but the remains there were entirely of young and sub-adult animals with no neonates or old stock (Hamilton-Dyer 2001a). This implies a selection of stock intended for consumption rather than a breeding population. Ostraca mention water for piglets; suggesting that at least some of them were brought in as live animals (from the Nile Valley) and kept until required. Although a woodland animal by nature, they are omnivores and can forage successfully on waste. At the way-station at El-Zerkah in Wadi Hammamat pig bones dominated the assemblage but foot bones are underrepresented and it is suggested that much of the bone there is from preserved pork (Leguilloux 1997). Pig remains are also present at Berenike but are uncommon.

Sheep and goat

Remains of wild small bovids can be difficult to separate from the domestic ovicaprids but it is thought that none, or very few, of the remains are from wild species. A few remains of ibex horn are present but none of the diagnostic bones match this species. Dorcas gazelle remains (two) were separately identified; these are relatively easy to rule out on grounds of small size and morphology. A few of the sheep bones are large, these are probably of rams but the presence of Barbary sheep cannot be entirely ruled out (a selection of the most frequent measurements is given in Table 20.4). The few horn cores present are all of males, but the local sheep today are often only horned in the males. Bones definitely attributable to goat are slightly more frequent than those of sheep. The majority, however, were not distinguished between the two. Overall the combined ovicaprid remains are slightly less frequent than those of pig. As with the other ungulates the bones are from all parts of the animal, with a bias against the smallest elements. The assemblage from Trench 7A has a much higher proportion of loose teeth than Trench 6; this can be attributed to the more fragile nature of this material. The majority of the mandibles with some intact teeth have fully erupted permanent dentition, with teeth in full wear, and would have been well over a year old at death. Several have well worn molars. The loose teeth also follow this pattern. A mandible positively identified as sheep and another indeterminate one came from younger animals, around six months at death.

Epiphysial fusion data also indicates mainly adult animals with very few bones from those that would have been under around a year at death. Not all the bones are fused, however, indicating that some were mature but not aged when killed. None of the remains are from neonates or very young kids/lambs, indicating that these were meat animals supplied from breeding flocks outside the settlement.

Other domestics: Cat and Dog

Cat occurs sporadically throughout the Roman trenches, often as partial skeletons. Several associated bones were recovered from Trench 7A and are of at least four individuals. As noted above, preservation of the bone in this area was not good but generally better for smaller animals. The smallest bones were not usually recovered, partly through lack of preservation but also because small items were difficult to see and extract from the sticky clay in this area.

Some exceptional finds were made near the base of Trench 6, Areas G and H. Two cat mummies were found, an almost complete one from Trench 6H [4030] and a damaged and incomplete one from Trench 6GH [4095]. The complete one has separate bandaging around the front feet (Fig. 20.3) and the head is also tied in cloth strips (Fig. 20.4). The tail was tucked in tight beside the back legs, which were wrapped and tied close to the body (Fig. 20.5). The whole animal appears to have been further wrapped but only remnants of this survive. Inside the wrappings the body was found to be preserved whole, complete with striped tabby fur and at least part of the internal organs. The flesh and innards had changed to an amorphous dark brown brittle material and the internal organs could not be identified. There were, however, the remains of at least one rat within the faecal material inside the gut area. All of the bones have fused epiphyses and several of the bones were loose enough to be extracted and measured (others were too well bonded to the denatured flesh to be removed without breaking). The skull was also partly unwrapped for measurements but the mandibles were left in position, unmeasured. The form and measurements of the skull indicate that this is a domestic cat (Kratochvil 1973); from the size and sturdy build of the bones it was probably male. Previous excavations at Quseir had revealed an *in situ* cat mummy in a niche of one of the buildings of the central complex excavated by Whitcomb and Johnson (1979). The mummy was reported on by Driesch and Boessneck (1983). They found that the animal was a large adult domestic cat, presumed male. The gut area was also preserved and at least six rats were found in the faecal material. This new find can thus be directly compared with the previous, *in situ* one and is of very similar size and nature, although the remnants of cloth have no indication of colour bands. The second, partial, mummy was found in a more fragmentary state and is missing the head. It too had been at least partially wrapped, in a material of coarser weave (Fig. 20.6). This animal was a young tabby-marked cat with all the epiphyses unfused and therefore could not be measured. It is also possible that some of the other partial cat skeletons from this area were originally from mummies. The one recovered from Trench 6P [4120], however, appears to have been just a dead cat discarded with other rubbish, as the complete body is preserved in a natural position. Again, this cat had tabby stripes (Fig. 20.7); the appearance is now dark ginger but this may be due to natural degradation rather than the true colour. One partial skeleton from Trench 6G [4161] is of an adult and is slightly larger than the mummy from context 4030 and also the *in situ* mummy. A selection of measurements of these cats compared with the *in situ* cat is given in Table 20.5.

The deposit in this area is a general *sebakh* or rubbish dump tipped over the 'plateau' edge. It contains material of mixed Roman date including ostraca from the same deposit as the 6H [4030] mummy of Augustinian date, but the deposit is probably a mixed one. The *in situ* mummy can be dated by association with the building, to the 1st -2nd century AD. It seems highly likely that the two (or more) mummies found in the Trench 6 *sebakh* represent the clearance of rooms, probably sometime after the practice of placing mummified cats in niches had fallen out of favour. The deposit may also contain material contemporary with the clearance activity itself. All of the material is exceptionally well preserved and it is not possible to say from the animal remains whether there is mixing and if so of what date range.

Dog bones were recovered in some numbers from Trench 7A and Trench 6 but, as with cat, they are probably from only a limited number of individuals. The bones recovered from Trench 6 represent three or more pups of different sizes and several bones of an adult, possibly female. They

Figure 20.3. Cat mummy: wrapped foreleg.

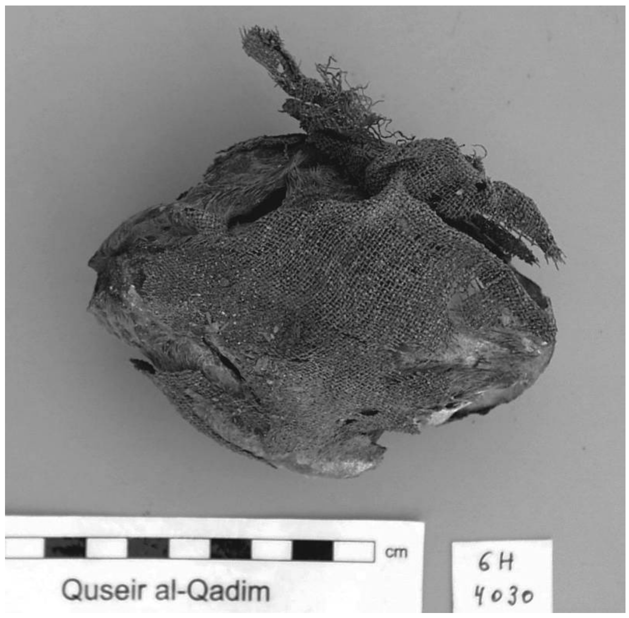


Figure 20.4. Cat mummy: wrapped head.

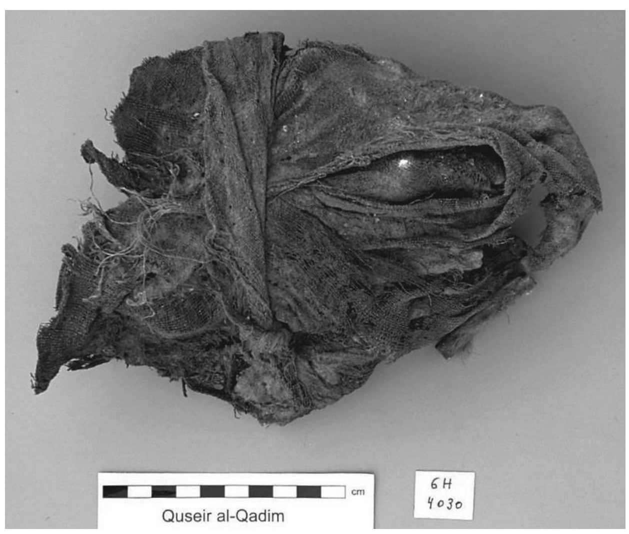


Figure 20.5. Cat mummy: wrapped hind end and tail.

were not noticed as being associated bones but several do clearly belong together. Unlike the cats none of these was associated with any wrapping, or even any *in situ* fur. Similarly in Trench 7A the bones would originally have belonged to complete carcasses but were recovered as individual bones mixed in with the ceramics and other bones. In this case at least ten animals are represented and range from neonate to adult. Most bones are from immature animals, though not all are young pups. With most bones being unfused and very few of the fused bones intact, very few measurements were available and no shoulder heights could be estimated. Unlike at Mons Claudianus and Berenike, no other canids, sandfox for example, have been recovered from Quseir.

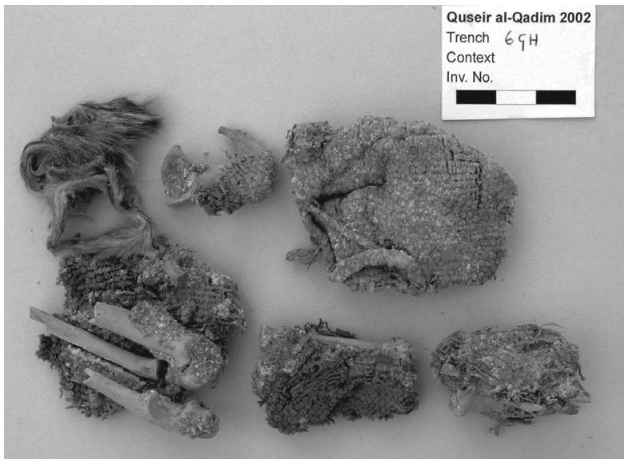


Figure 20.6. Young cat mummy with coarse cloth wrapping.


Figure 20.7. Tabby markings of discarded cat.

Wild mammals

In common with other sites the remains of wild mammals are negligible compared with those of the domesticates.

Ibex is not always easy to distinguish from sheep and goat, but was definitely identified from a few pieces of horn and horn core. None of the caprine bones appeared to be large enough for this species.

Dorcas gazelle was similarly identified by the distinctive horn and horncore in Trench 6 but also by a complete metacarpus from Trench 7A. Dorcas gazelle was also recovered from Berenike, along with a few remains of Barbary sheep and ibex.

The elephant and hippo remains are small sawn offcut chunks of ivory; the hippo only from Trench 7A and the elephant from Trench 6P and Trench 12 as well as Trench 7A, no other remains were found (Fig. 20.8). Remains at Berenike were similarly of ivory only. These finds imply that the raw material was being brought in from elsewhere for trade and working.

The dugong or sea-cow is an entirely aquatic mammal, sometimes suggested as the origin of mermaid sightings. It is a herbivore, feeding on the seagrass beds found in shallow coastal waters all round the Indian Ocean and West Pacific. Now a rare and protected species it has been hunted for meat, oil, leather and bone (UNEP/DEWA, 2002). The bones, even when small, are quite distinctive as the animals are adapted for life in the water. The bones are not only distinctive in shape but are also almost solid. Most mammals have a marrow cavity even in the rib-bones but sea-cows do not in order to achieve neutral buoyancy.

Cat Remains / Measurement	Dreisch & Boessneck	Trench 6 4030	Trench 6 4161	Trench 7A 1003
skull basal length	89.3	89.5		
neurocranium breadth: euryon - euryon	43.5	45.5		
greatest breadth occipital condyles	24.5	24.2		24.2
right mandible ramus height	29.0		31.8	27.2
cheektooth row length	21.0		22.5	22.2
left humerus GL	115.5	113.7	112.2	105.6
humerus SD	8.8	8.6	9.1	7.6
left radius GL	107.5		105.6	
right femur GL=GLC	126.5	124.5	125.5	122.1
left calcaneum GL	31.0	34.5	35.1	32.4
pelvis GL	86.0	88.0		

Table 20.5. Cat remains from Myos Hormos.

Even small pieces of pachyostotic rib are readily identified and have been recorded to species (most large mammal ribs were only allocated to a size group). Despite this slight enhancement of NISP dugong is a rare find; eleven ribs and pieces of ribs were identified and no other bones. Of these few finds two are sawn and three others cut (Fig. 20.9). Dugong was also identified in an early Roman context at Berenike (van Neer and Lentacker 1996) and seven bones were recovered from 5th century deposits at Abu Sha'ar (van Neer and Sidebotham 2000). Quseir is only the third site in the Red Sea region to report the species and this group of 11 bones is the largest so far. The cuts indicate that they were utilised; whether the animals were deliberately hunted, accidently caught in fishing nets or simply washed up dead cannot be established but they have been exploited from Neolithic times (Faure *et al.* 1993).

A piece of cetacean vertebral centrum was recovered from Trench 7A. Although only a fragment and not identified to a species, this is clearly from a whale rather than one of the smaller dolphins that occur in the Red Sea. Few sightings have been made of larger species but there have been occasional standings and sightings of Sperm whale and Bryde's whale in the wider area (de Boer *et al.* 2002). This fragment had chop marks across the centrum, possibly from use as a chopping block, as seen in examples from Britain (Gardiner 1997) and probably came from a stranding.

In addition to the rat found in the mummy (and those in the previous *in situ* mummy), a complete skull was recovered from the base of Trench 6H. This can be positively identified as black rat and, along with rodent gnawing on some bones, again reinforces the evidence for black rat at the port in Roman times. No evidence for black rat was found at the inland quarry sites of Mons Claudianus and Mons Porphyrites. Instead, several other small mammals were identified including the desert dwelling spiny-mouse, as well as the herbivorous Nile grass rat, which may have been brought in with material from the Nile Valley. Neither of these were identified from the excavations at Quseir. At Berenike the recovered remains of spiny mouse and gerbils were considered probably intrusive. Black rat, and gnaw marks matching black rat, were also found at Berenike, but as at Quseir there were no remains of the Nile grass rat.

Birds

The relatively small amounts of bird remains are dominated by those of domestic fowl, some in an extraordinary state of preservation. In addition to bones, there are portions of eggshells and feathers of several colours (all assumed to be of fowl but not proven). The bones are mainly the larger elements, the preserved foot complete with claws and skin from Trench 6 [4100] (Fig. 20.10), was counted as if a single bone but this exceptional find was one of the few occurrences of phalanges. Spurred *metatarsi* indicate probable males, while several bones contained thick

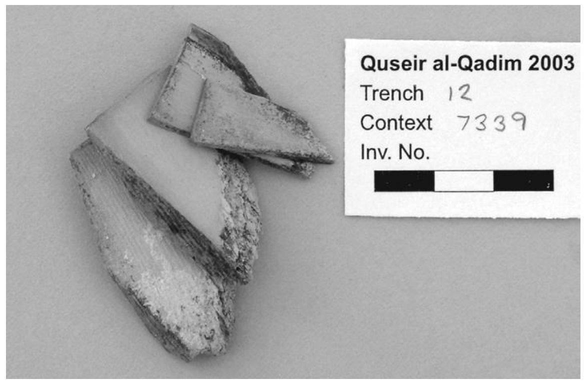


Figure 20.8. Fragment of Hippo ivory.

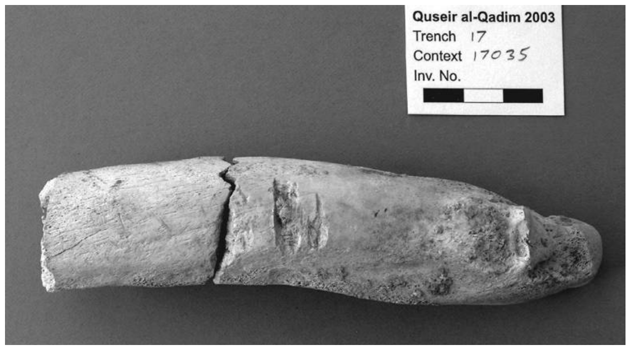


Figure 20.9. Dugong rib with chop marks.

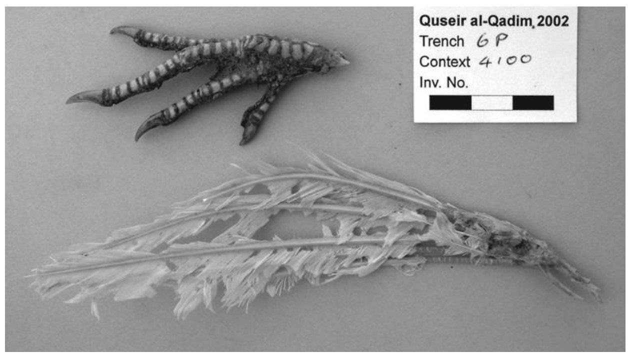


Figure 20.10. Domestic fowl foot and feathered wing tip.

Figure 20.11. Domestic fowl bones with medullary deposits.

deposits of medullary bone (Fig. 20.11), indicating hens killed in the laying season (Driver 1982). The thickness of these deposits was noticed at Mons Claudianus and, especially, at Berenike (Lentacker and Van Neer 1996). Immature birds are also represented. Fewer bones were recovered from Trench 7C than Trench 6, possibly due to difficult recovery conditions rather than a chronological difference. The relatively small Trench 12 contained the largest number of bones, which were of at least three individuals. Other birds identified include goose, two sizes of duck, sandgrouse, quail, brown-necked raven, egret, gull and ostrich (eggshell only). There are also a few partial bones of large birds tentatively identified as swan, stork and crane. Apart from the ostrich shell fragments, which occurred in several trenches, most of these birds are represented by one or two finds only. The 31 bones of goose in Trench 7C [10012] are probably of a single bird. It seems likely that the raven and gull bones are not food refuse but all of the others are potentially consumption refuse. Some of these species are coastal and desert residents, while others, such as the stork and crane, would have died or been killed during their migration. The domestic fowl were probably kept at the site. The duck and goose might also have been domestic birds, in this case presumably brought from the Nile Valley, but it is extremely difficult to distinguish their remains from those of the wild species present in the area.

Reptile: Turtles

The remains of turtles are sporadic but occur in all three trenches; 32 bones were recovered from Trench 7C, one from Trench 12 and 28 from *sebakh* Trench 6. Most of the remains are of the pleural rib plates and peripheral plates of the carapace. Limb bones such as scapula and phalanges are present but less common. A scute, the horny 'tortoiseshell' outer covering, was recovered from Trench 6. Normally, as with hair and horns of mammals, these do not survive as they are not bone but keratin. No doubt this was found because of the unusually good preservation conditions in that area. The few diagnostic remains are of the green turtle, most could not be definitively identified. Turtle remains, probably also green turtle, were found at Berenike (van Neer and Ervynck 1999). One bone is of a different species, as yet unidentified but perhaps Ridley's turtle. Occasional chop marks indicate that they were eaten.

Summary and comparison with other Roman sites in the area

The non-fish vertebrate remains are dominated by the domestic ungulates; remains of wild animals and birds are few and hunting must have been of only minor importance. This is similar to other assemblages in the area, principally Mons Claudianus, Mons Porphyrites, Berenike and the way-stations such as El-Zerkah (Hamilton-Dyer 2001a; 2007a; van Neer and Ervynck 1998; 1999; van Neer 1997). There are differences in the relative proportions of the taxa between these sites however; in comparison with Quseir, Mons Claudianus has many more equid remains, Mons Porphyrites is similar to Mons Claudianus but with less equid, El-Zerkah has more pig and Berenike has more sheep/goat (Table 20.6). These differences are probably related to the relative position and function of the sites. Mons Claudianus (and its sister site Mons Porphyrites) is a large, specialist, desert quarry settlement with difficulties of provisioning, hence the importance of equids for both transport and meat. El-Zerkah is a militarily controlled way-station in Wadi Hammamat. It required provisions

Taxa \ Site	Quseir	Berenike 1st AD	Berenike 3rd-4th AD	El-Zarkeh 1st-2nd AD	Mons Claudianus	Mons Porphyrites
pig	922	102	4	1413	1405	449
sheep/goat	652	285	139	245	477	259
cattle	288	36	9	0	6	5
equid	226	26	0	279	2897	312
camel	271	91	0	481	424	54
wild bovids	8	5	0	0	67	4
Total	**2367**	**545**	**152**	**2418**	**5276**	**1083**
	%	%	%	%	%	%
pig	*15.9*	*7.6*	*1.1*	*47.7*	*12.5*	*17.0*
sheep/goat	*11.2*	*21.1*	*39.0*	*8.3*	*4.3*	*9.8*
cattle	*5.0*	*2.7*	*2.5*	*0*	*0.1*	*0.2*
equid	*3.9*	*1.9*	*0*	*9.4*	*25.8*	*11.8*
camel	*4.7*	*6.7*	*0*	*16.2*	*3.8*	*2.0*
wild bovids	*0.1*	*0.4*	*0*	*0*	*0.6*	*0.2*
Berenike and El-Zerkeh data from Van Neer 1997						
Mons Claudianus data from Hamilton-Dyer 2001a						
Mons Porphyrites data from Hamilton-Dyer 2007a and archive						

Table 20.6. Comparison of taxa from Myos Hormos with other contemporary Eastern Desert Sites.

Trench	13	16	1	3	NISP
equid	0	0	0	3	**3**
cattle	5	4	1	2	**12**
cattle/equid size	28	47	23	59	**157**
camel	7	8	3	15	**33**
camel size	11	4	8	12	**35**
sheep & goat	471	310	161	497	**1439**
pig	1	1	0	0	**2**
sheep size	1026	413	127	606	**2172**
indet mammal	0	75	5	0	**80**
dog	0	0	0	0	**0**
cat	0	0	0	4	**4**
other mammals	0	0	2	26	**28**
fowl	49	32	6	17	**104**
goose	0	0	0	1	**1**
other birds	10	5	5	10	**30**
turtle	3	12	55	59	**129**
Total NISP	**1611**	**911**	**396**	**1311**	**4229**

Trench	13	16	1	3	%
equid	*0*	*0*	*0*	*0.2*	***0.1***
cattle	*0.3*	*0.4*	*0.3*	*0.2*	***0.3***
cattle/equid size	*1.7*	*5.2*	*5.8*	*4.5*	***3.7***
camel	*0.4*	*0.9*	*0.8*	*1.1*	***0.8***
camel size	*0.7*	*0.4*	*2.0*	*0.9*	***0.8***
sheep & goat	*29.2*	*34.0*	*40.7*	*37.9*	***34***
pig	*0.1*	*0.1*	*0*	*0*	***0***
sheep size	*63.7*	*45.3*	*32.1*	*46.2*	***51.4***
indet mammal	*0*	*8.2*	*1.3*	*0*	***1.9***
dog	*0*	*0*	*0*	*0*	***0***
cat	*0*	*0*	*0*	*0.3*	***0.1***
other mammals	*0*	*0*	*0.5*	*2.0*	***0.7***
fowl	*3.0*	*3.5*	*1.5*	*1.3*	***2.5***
goose	*0*	*0*	*0*	*0.1*	***0***
other birds	*0.6*	*0.5*	*1.3*	*0.8*	***0.7***
turtle	*0.2*	*1.3*	*13.9*	*4.5*	***3.1***

Table 20.7. Summary of taxa found at Quseir al-Qadim (Islamic Period).

for those passing through and stationed there and was even less self sufficient. This probably goes some way to explaining the dominance of pork, which may have been largely preserved (Leguilloux 1997). At the coastal town of Berenike to the south there is more reliance on sheep/goat (presumed local provisioning) which becomes even more pronounced in the later, 3rd-4th century AD period (Van Neer and Ervynck 1998; 1999). The port of Quseir is perhaps the one with the best opportunities for transport, trade and local provisioning.

20.1.2 Islamic Trenches

The main deposits of bone for this period come from Trenches 13 and 16. Material from other trenches was recorded in detail on paper but only that from Trenches 1 and 3 has been added to this analysis. The digitised data from these two areas (Trenches 1 and 3) comprises the taxa identification and the measurements only. The condition states of individual specimens were recorded from the two main Trenches 13 and 16. The bone from Trench 13, a midden deposit in the upper area of the settlement, was found to be in exceptional condition with very few specimens recorded as eroded or fragmented. In several cases organic material other than bone was found – hoof, horn, hair, feathers and even some dried flesh. The bone from Trench 16, part of the Islamic harbour, was in good condition although not quite as well preserved and with no remains other than bone. The preservation of Trench 1 bone was similar to that from Trench 13 and Trench 3 was similar to Trench 16. In total 4229 specimens are analysed below; 2522 from Trenches 13 and 16, 1707 from Trenches 1 and 3. The range of taxa is wide but less than in the Roman assemblages, with at least 18 species identified compared with 25 for the Roman. Those absent were rare in the Roman trenches. Coot and sand partridge were not found in the earlier material; bringing the total count to 30 for the site as a whole. A summary of the distribution is given in Table 20.7.

Figure 20.12. Sheep foot with hoof and hairs.

The domestic ungulates

Sheep and goat

Unlike the Roman assemblages the Islamic material is completely dominated by ovicaprid remains; these form over 85% of all the vertebrate material. Both sheep and goat could be positively identified with sheep at twice the number of goat, although most material was recorded only as sheep/goat. This is in contrast with the Roman material where goat was more frequent. The well preserved remains include not only horn cores but also sometimes the horns themselves and similarly hooves including a few with hairs adhering to the flesh of the foot (Fig. 20.12). Combined, these remains indicate that at least some of the animals were horned and that different coat colours existed in the flocks, as today. The goat horns are not of the scimitar shape seen in ibex and the domestic goats from northern

Europe but have a pronounced outward twist, though not as curled as in sheep. Animals of this type can be seen in the local Bedouin flocks today.

Amongst the caprine material are a few very small bones. These do not match the similarly small and slim dorcas gazelle but are of sheep/goat type. Several of the diagnostic fragments are of goat and it is assumed that all these bones are of pigmy goats. These are not achondroplastic dwarfs but are of a well proportioned type. Dwarf and pygmy goats are present in many parts of Africa today (Epstein 1971) and two sizes of goat were found at Shawbak, Petra. Despite a high number of well preserved bones, measurements were not available for much of the material and none from the pygmy examples. This is part because several bones were unfused but mainly because of butchery and other damage. A selection of the most frequent measurements is given in Table 20.8. The range is quite wide; in part this will be due to sexual dimorphism. In the case of the distal tibia measurement sheep and goat have not been separated. In comparison with the Roman metrical data, the measurements are roughly similar but the mean is slightly greater in the Roman material. The data sample is, however, rather small and it is difficult to judge whether the animals had decreased in size (or were from a different flock source), or whether fewer of them were the larger (male) animals.

The anatomical distribution indicates that whole animals were present. There is a typical bias against the smallest elements, as expected in a hand collected assemblage, but no clear patterning amongst the larger bones (Table 20.9). Again, for the head there is a lack of material but mandibles are frequent, suggesting that broken fragments have not survived, were not collected, or were scavenged. The pattern is similar to that of the well preserved Roman assemblages in Trench 6.

Butchery marks were frequently observed on some elements and are rare on others. Overall, 50% of the fragments carried marks. Almost all were chop marks from a cleaver or similar instrument; very few can be classed as knife marks (Table 20.10). Current practise in Syria is to remove the feet and then skin the animal (Loyet 1999), as opposed to skinning round the feet, which often leaves fine marks. Neither are there marks that can be classified

	humerus sheep	humerus goat	radius sheep	radius goat	scapula sheep	tibia all	astragalus sheep	astragalus goat
MAX	36.2	30.3	38.8	29.6	43.4	35.6	37.5	28.3
MIN	28.8	24.4	31.8	25.7	35.7	21.9	24.5	27.3
N	7	2	8	4	4	15	12	2
MEAN	31.5	27.4	36.4	27.5	38.9	28.7	31.1	27.8
SD	2.4	2.9	2.1	1.4	3.3	3.2	3.1	0.5
Co. Var.	7.6	10.6	5.8	5.1	8.5	11.1	10	1.8
Measurement codes as per von den Driesch (1976)								

Table 20.8. Sheep and Goat measurements from Quseir al-Qadim (Islamic Period).

Trench	13		16		All	
Area	Total	%	Total	%	Total	%
head & neck	70	*14.9*	33	*10.6*	103	*13.2*
teeth	6	*1.3*	1	*0.3*	7	*0.9*
shoulder	29	*6.2*	11	*3.5*	40	*5.1*
pelvis	17	*3.6*	15	*4.8*	32	*4.1*
foreleg	113	*24.0*	49	*15.8*	162	*20.7*
hindleg	103	*21.9*	52	*16.8*	155	*19.8*
hindleg (small bones)	2	*0.4*	4	*1.3*	6	*0.8*
feet	125	*26.5*	117	*37.7*	242	*31.0*
other	0	*0*	28	*9.0*	28	*3.6*

Table 20.9. Anatomical distribution of Sheep and Goat remains from Quseir al-Qadim (Islamic Period).

Location \ Butchery Mark	knife mark	axially chopped	other chop mark	spiral break	total butchered	total NISP	% of NISP
horn core base			3		3	10	*30.0*
maxilla			1		1	16	*6.3*
mandible	1		6		7	42	*16.7*
atlas & axis		8	2		10	13	*76.9*
sacrum		1	1		2	3	*66.7*
other vertebrae		18	22		40	242	*16.5*
ribs			61		61	789	*7.7*
scapula		1	13		14	40	*35.0*
humerus	1		26	7	34	67	*50.7*
radius			45		45	81	*55.6*
ulna			3		3	15	*20.0*
pelvis			7		7	31	*22.6*
femur			30	1	31	64	*48.4*
tibia			44	3	47	94	*50.0*
tarsals & carpals	2		2		4	87	*4.6*
metapodia		2	11		13	50	*26.0*
phalanges					0	120	*0*
Total	**4**	**30**	**277**	**11**	**322**	**640**	***50.3***

NB ribs and vertebrae include material recorded as indeterminate, as other animals of this size are negligible

Table 20.10. Butchery marks on Sheep and Goat remains from Quseir al-Qadim (Islamic Period).

	sheep/goat		counts of epiphysial state			
					survival %	
		age (months)	fused	unfused	fused	unfused
group 1	distal scapula	6-10	15	2	*95.0*	*5.0*
	pelvis acetabulum		19	0		
	proximal radius		19	0		
	distal humerus		23	2		
group 2	proximal phalanx	12	66	5	*93.0*	*7.0*
group 3	distal metapodial	15-30	10	9	*61.7*	*38.3*
	proximal calcaneus		4	5		
	distal tibia		15	4		
group 4	femur	30-42	16	15	*48.7*	*51.3*
	proximal tibia		11	11		
	distal radius		5	11		
	proximal humerus		3	2		
	ulna		3	1		
	totals		**209**	**67**		

Age classes adapted from Silver (1969) and Moran & O'Connor (1994)

Table 20.11. Groupings of Sheep and Goats from Quseir al-Qadim at time of death (Islamic Period).

as filleting, with knife or larger blade. Instead, almost all the major bones are chopped through, either near the articulation or across the middle of the shaft, often at a slight angle. This butchery style implies that the meat was probably stewed on the bone, in convenient sized chunks.

Data from epiphysial fusion, tooth eruption and wear is relatively frequent in these well preserved remains. A few bones were identified of animals that would have been under a year at death but the majority were of more mature animals. Most animals were not aged, however, and many would have been under 2-3 years at death (Table 20.11). No neonates or very young animals were found and it seems likely that these remains are mainly of prime meat animals brought in for slaughter. This would seem to fit well with Muslim preference (Insoll 1999, 98).

Other ungulates

Equids are negligible in the Islamic trenches; two teeth and one limb bone, all from Trench 3 and all probably

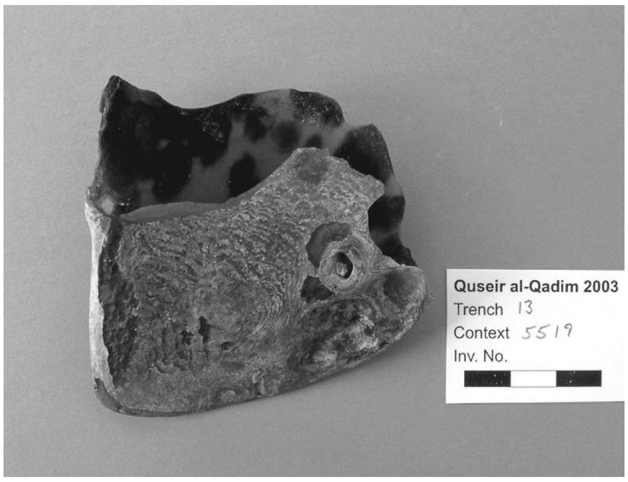


Figure 20.13. Turtle scute showing colour markings.

donkey. Cattle bones and teeth are slightly more frequent at Trench 12 and there are 15 camel bones. A further 12 are almost certainly of camel while 157 are indeterminate. The only remains of wild bovids identified are four remains of dorcas gazelle, two each from Trenches 1 and 3. Pig is represented by two bones only, a phalanx from context [5513] in Trench 13 and a small fragment of mandible from in Trench 16 [14012]. If it is assumed that the dietary code was strictly adhered to then these pig bones need explaining, as they might indicate the presence of non-Muslim traders at the port. In Jordanian assemblages, pig bones are rare or absent in Mamluk assemblages but common in Crusader ones (Brown and Rielly in prep). Residuality is considered to be the probable explanation for small numbers of pig bones at mixed period sites, although some found in the earlier Abbasid-Fatimid assemblages may be contemporary (Rielly pers. comm.). It is highly likely that these few from Quseir are residual from the Roman occupation, where pig bones are very common, as there is a distinct chronological hiatus at Quseir with no Byzantine or early Islamic occupation. Although not detailed here, pig bones were often recorded from some trenches where contexts allocated as Islamic were near or above Roman ones.

Other mammals

Remains of other mammals are extremely rare; there are four bones of cat from Trench 3 and this area also produced a group of rat bones. Unlike the Roman deposits there are no remains of dog, dugong or ibex and there are no ivory offcuts either.

Birds

Bird remains are not a major component but do occur on a regular basis, forming 3.2% of all remains. They are more common from Trenches 13 and 16. The majority, 77%, are of domestic fowl. As with the Roman material we are in the unusual position of also having feathers, some with retained colours. There are also pieces of egg shell comparable with fowl. The other bird species include duck, goose, pigeon, sandgrouse, sand partridge, coot, brown-necked raven and ostrich (shell only). Of these raven and duck are the most frequent but even these are just a few remains. In addition, remains of ostrich eggs with Koranic inscriptions were found in the cemetery area at Trench 1A (see "note on the Ostrich egg" by Agius in Macklin 2006, 157-160) and clearly have a special significance. Today ostrich eggs and ceramic substitutes are sometimes used to decorate mosques in Sudan, symbolising unity (Insoll 1999, 42).

Reptile: Turtles

Turtle remains are almost as frequent as those of birds, but are mainly from Trenches 1 and 3. The 'tortoiseshell' covering was worked to make flat rings or washers. Whether the meat was also used is not clear as no butchery marks were found on the bones. The exact species of most of the remains could not be confirmed. One of the scute or 'tortoiseshell' fragments is translucent and patterned (Fig. 20.13) and might, therefore, be of the hawksbill, whose 'shell' was that most commonly used for combs, glasses and other pre-plastic items. The green turtle does sometimes have a patterned shell, however, and the majority of the worked offcuts are a plain, dark brown, suggesting that most were from the green turtle.

20.2 Fish

Introduction and methodology

Approximately 5000 specimens of fish collected from all areas of the site were recorded on paper along with the other bones. Just over 4000 of these records were transferred to *Access*, the other material remaining available in the archive. A similar recording methodology to that applied to the other vertebrates was also employed for the fish. The main differences relate to the different anatomical structure. The anatomical structures can vary widely between families, with some elements that are large and robust in one family being insignificant in others. With this in mind, the major elements of the jaw apparatus, cranium, pectoral area and vertebrae were recorded along with structures such as the spines and dermal scutes where they are family specific. In parrotfish and wrasse, for example, the pharyngeal mill is large and diagnostic and thus recorded but is small in most fish and not recorded. The majority of the remains were hand collected and, generally, fin rays, ribs, spines and scales were not collected unless of significant size or of unusual appearance. These elements are often indeterminate even with the aid of extensive reference collections. Where these structures were part of a whole or partial fish they were collected but not individually counted.

Although direct access to a reference collection was limited, this was supplemented by numerous photographs of further specimens, and from several years of previous experience on this type of material. Nevertheless, even with a very extensive collection it is not possible to identify all bones of all fish to species. With limits on time and

Figure 20.14. Well-preserved Picasso triggerfish head with markings clearly visible.

resources the bones were recorded to species and genus where immediately apparent and otherwise to family. Only the major elements and those that are peculiarly recognisable (trigger spines for example) were recorded in this manner. All minor and indeterminate elements were counted but no attempt was made to identify even to family. Many of the vertebrae could be identified to family if not to genus and species.

The Red Sea fauna is extensive and most of the fish families commonly exploited for food have numerous and very similar species. In some groups such as groupers most of the bones were therefore classed only at the family, or perhaps, genus level. Occasionally species-specific characteristics, for example in the jaws, enabled closer distinctions. For archaeozoological interpretation this may not be of great import; fishermen and consumers will not worry about minor differences in colour and shape in fish that are similar in size, ecological niche and culinary use. In several cases the identification of an exact species was in fact possible, enabled by the survival of the skin, complete with pattern and even colour. The Arabian Picasso triggerfish *Rhinecanthus assasi*, is such a case – normally one would not separate this to species as there are several with virtually identical bones. It is only because the distinctive pattern was preserved that this is possible (Fig. 20.14).

A restricted suite of measurements was taken, again concentrating on the most diagnostic elements depending on family. Vertebrae were generally not measured except in the case of sharks where they were the only element found. The measurements mainly follow Morales and Rosenlund (1979), others are detailed in archive and include measurements of pharyngeals and jaw bones specific to parrotfish and wrasses. The metrical data are not listed below but are available in archive.

The Species

The taxa represented cover a very wide variety of fish, and including some endemic to the Red Sea. At least 45 different marine species have been identified and six Nile taxa, though it has not always been possible to identify the exact species or genera within the family. The major fish groups represented in all trenches are: parrotfish (*Scariidae*), groupers (*Serranidae*), emperors (*Lethrinidae*), seabreams (*Sparidae*), triggerfish (*Balistidae*) and jacks (*Carangidae*). Other fish remains that occur on a regular basis are mainly from the Roman trenches and include those of sharks and rays, silverbiddies (*Gerreidae*), wrasse (*Labridae*), surgeons and unicornfish (*Acanthuridae*), snappers (*Lutjanidae*), mullet (*Mugillidae*), goatfish (*Mullidae*), morays (*Muraenidae*), puffers (*Tetraeodontidae*), and porcupine fish (*Diodontidae*). Many of the small 'decorative' reef species seen by divers (e.g. Butterflyfish, *Chaetodontidae*) are rarely a deliberate target catch of fishermen today and were similarly rarely encountered in the archaeological assemblages. No freshwater (Nile) species were found in the hand collected material but small specimens of Nile fish were sometimes found in sieved material, the taxa include two types of catfish, three cyprinids and the tigerfish.

The complete list of taxa found in each of the considered trenches is given below (Table 20.12).

20.2.1 Roman Trenches

The majority of the material is from the Trench 6 *sebakh*, accounting for half of all the fish analysed from the entire site. The preservation conditions were exceptional in this area; extremely dry and with relatively small amounts of damage by salt formation. This is particularly conducive to the preservation of fish and sometimes they were even recovered as complete heads or sections of adjoining vertebral column. There is often a taphonomic bias against fish in archaeological assemblages for several reasons. The thin, laminar, structure of fish bone allows chemical and biological degradation to occur more easily and rapidly than in the thicker and more solid bones of mammals, as the destructive agents penetrate easily and more deeply. The thin structures are also more prone to breakage when lifted from a sticky soil matrix; in this deposit all the material was loose in a matrix of other archaeological material and the fine 'dust' of biological breakdown products mixed with wind blown sand. Finally, the small size of many fish and fish bones counts against good recovery by hand; at this site most of the fish are comparatively large and in this trench were easily seen and recovered because of the unusual matrix, only the smallest bones were not seen and were only recovered by sieving. The next largest group of fish bones is from Trench 7C of the harbour edge. This area is much lower and is still wet even though the harbour is now completely silted. The matrix is a sticky clay and it was much more difficult to see bones and retrieve them intact. Surprisingly, those fish bones that were collected were in a better condition than many of the large mammal bones. The physical difference in the two areas is likely to mask subtle differences between them; for example it is

Family	Species	7A	6	12	2	8A	13	3
Carcharhinidae etc	at least two species of shark	X	X	X	X			X
Ginglymostomatidae	cf. *Nebrius ferrugineus*, nurse shark		X					
Dasyatidae	indeterminate stingrays				X			
Muraenidae	morays, including cf. *Gymnothorax* sp.	X	X		X			
	cf. *Siderea grisea*, grey moray							
Clupeidae	small clupeiforms - sardines, anchovies		X		X			
Belonidae	cf. *Tylosurus crocodilus*, houndfish	X	X					
	indeterminate garpikes		X	X				X
Hemirhamphidae	cf. *Hemirhamphus* sp., halfbeaks						X	
Holocentridae	cf. *Sargocentron spiniferum*, sabre squirrelfish	X	X		X	X		X
Serranidae	cf. *Epinephelus chlorostigma*, brownspotted grouper				X			
	cf. *Epinephelus microdon*, smalltooth grouper	X						
	cf. *Epinephelus sumanna*, sumanna grouper		X					
	cf. *Cephalopholis* sp.		X					
	cf. *Variola louti*, lunartail grouper		X				X	
	cf. *Plectropomus* sp.		X		X			X
	indeterminate groupers	X	X	X	X	X	X	X
Carangidae	cf. *Carangoides bajad*, orangespotted trevally				X		X	
	cf. *Caranx ignobilis*, giant trevally		X					
	indeterminate jacks and trevallies	X	X	X	X		X	X
Gerreidae	*Gerres* sp., silverbiddies		X					
Lutjanidae	cf. *Lutjanus* sp., snappers	X	X		X		X	X
	cf. *Pristopomoides filamentosus*, crimson jobfish				X			
Lethrinidae	cf. *Lethrinus* sp., emperors	X	X	X	X	X	X	X
	cf. *L. mahsena*, mahsena		X					
	Monotaxis grandoculis, bigeye emperor		X		X			X
Sparidae	*Acanthopagrus bifasciatus,* doublebar seabream	X	X	X	X	X		X
	Rhabdosargus sarba, yellowfin seabream		X	X	X			
	indeterminate seabreams, probably including but not restricted to *Argyrops sp.*	X	X	X	X		X	X

Table 20.12a. Complete list of taxa found in each of the considered trenches (continued in Table 20.12b).

not possible to establish whether the absence of the small *Gerres* from Trench 7C is genuine or simply that they did not survive. Overall, the major species from both areas have large sturdy bones and are similarly represented. A further small group of material was recovered from an area of buildings in Trench 12. These were dry but more affected by salts than Trench 6.

Regardless of where they are from the fish bones are dominated by remains of the *Scariidae*, parrotfishes. Over half of all the remains are of parrotfish and 60% of all identified remains (Table 20.13). These are plentiful in the Red Sea and make good eating. The pharyngeal bones and the jaws are distinctive between the genera and sometimes the exact species. At least three different species are represented, each one from a different genus (Fig. 20.15). Most of the bones, however, could not be distinguished beyond the family level. The proportions of other common taxa vary between the trenches. In Trench 7C and the small assemblage from Trench 12, sharks and rays are prominent. These fish do not have a fully ossified skeleton and only shark vertebrae and stingray spines were found. It seems highly likely that these taxa were more heavily exploited than the few surviving remains suggest. The remains of groupers were frequent in all three trenches and are of several species. Although some of the species can get to enormous sizes, and some bones of very large specimens were found, most of the bones represent fish

Family	Species	7A	6	12	2	8A	13	3
Mullidae	*Parupeneus* sp., goatfish	X	X		X			
Mugilidae	grey mullets		X		X			
Sphyraenidae	*Sphyraena* cf. *barracuda*, great barracuda	X			X			
Labridae	*Cheilinus* cf. *lunulatus*, broomtail wrasse	X	X					
	Cheilinus sp.		X		X			X
	Coris cf. *aygula*, clown coris		X					
	Thalassoma sp.		X					
	indeterminate wrasses	X	X	X	X			X
Scaridae	*Cetoscarus bicolour*, bicolour parrotfish		X		X	X		
	Hipposcarus harid, longnose parrotfish	X	X		X		X	X
	Scarus ghobban, bluebarred parrotfish		X		X	X		
	Scarus sp. probably including but not restricted to, *S. sordidus*, bullethead parrotfish		X		X		X	
	indeterminate parrotfish	X	X	X	X			X
Acanthuridae	including *Naso literatus*, orangespine unicorn, and *Naso unicornis*, bluespine unicorn	X	X	X	X	X		X
	cf. *Acanthurus* sp., surgeonfish	X	X		X			X
Scombridae	*Euthynnus affinis*, kawakawa		X					
	indeterminate mackerels and tunas		X					
Balistidae	cf. *Abalistes stellaris*, starred triggerfish		X					
	Rhinecanthus assasi, arabian picasso		X		X		X	X
	indeterminate triggerfish	X	X		X			X
Ostraciidae	*Ostracion* cf. *cubicus*, yellow boxfish		X					
Tetraodontidae	*Arothron* sp., pufferfish		X	X				
Diodontidae	*Diodon* cf. *hystrix*, porcupinefish	X	X		X			
Other species not fully identified			X			X		
	Number of Taxa	25	44	22	36	21	23	27
Freshwater taxa								
Siluridae	catfish							
	Synodontis sp.				X			
	Bagrus sp.				X			
Cyprinidae	carps, breams							
	Barbus cf. *bynni*				X			
	Labeo sp.				X			
	Leptocypris niloticus				X			
Alestidae	*Hydrocynus* sp., tigerfish				X			

Table 20.12b. Complete list of taxa found in each of the considered trench (continued from Table 20.12a).

of around 40-60 cm in length. Emperors were frequent in Trench 7C but are of less importance in Trenches 6 and 12. Seabreams were common in all trenches. Most of these fish could be identified as *Rhabdosargus sarba* and *Acanthropagrus bifasciatus* but other species are present including the larger soldier breams, *Argyrops* sp. One fish was commonly found in Trench 6 but was not found in Trench 7C (or 12). These are the silverbiddies or mojarras, *Gerres* sp., a small fish of about 20-30 cm that occurs in sandy, sheltered areas. The individual bones are not large or particularly sturdy but in Trench 6, as at Mons Claudianus, they were often found as complete or partial heads. Vertebrae are rather rare but in two cases represent a discarded tail. These remains are probably from dried, perhaps salted, fish, the head and tail end discarded when the rest was consumed. Mullet are another fish type not

Species \ Trench	7A	6J & 6JH	6G & 6H	6P & 6Q	6K & 6L	6B, 6D & 6E	12 all	Total NISP	%	% ex. Indet.
Sharks/Rays	64	27	8		2	30	37	168	*5.2*	*6.1*
Morays	5		1	2	1		9	11	*0.3*	*0.3*
Garfish	1			9			1	11	*0.3*	*0.4*
Groupers	28	8	22	44	13	27	6	148	*4.6*	*5.4*
Gerres				34	35	20		89	*2.8*	*3.2*
Jacks	10	5	8	33		5	5	66	*2.1*	*2.4*
Snappers	2			2		11		15	*0.5*	*0.5*
Seabream	27	2	10	20	6	36	3	104	*3.2*	*3.8*
Emperors	39	6	5	36	1	21	1	109	*3.4*	*3.9*
Goatfish	4		1	4				9	*0.3*	*0.3*
Wrasse	3	27	7	8		16	1	62	*1.9*	*2.2*
Parrotfish	341	272	233	379	70	331	47	1673	*52.1*	*60.6*
Mullet		3	2	7		9		21	*0.7*	*0.8*
Surgeon/Unicorn	3	9	21	14	5	7	2	61	*1.9*	*2.2*
Trigger	2	2	10	49	2	17		82	*2.6*	*3.0*
Puffer/Porcupine	12	7	8	8	4	2	4	45	*1.4*	*1.6*
Other Species	42	1	13	15	5	13	1	90	*2.8*	*3.3*
Indeterminate	48	31	39	192	58	32	51	451	*14.0*	
Total NISP	**631**	**400**	**388**	**856**	**202**	**577**	**159**	**3213**		

Table 20.13. Distribution of taxa by trench, note the high percentage of parrotfish across all trenches.

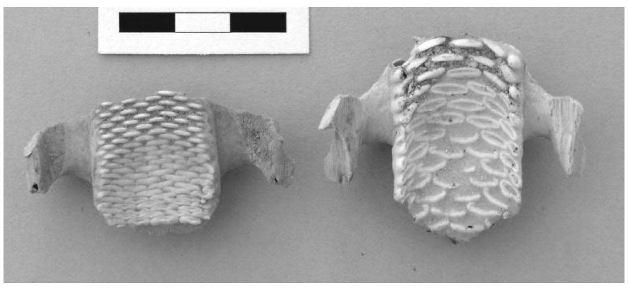


Figure 20.15. Inferior pharyngeal bones from two different parrotfish species.

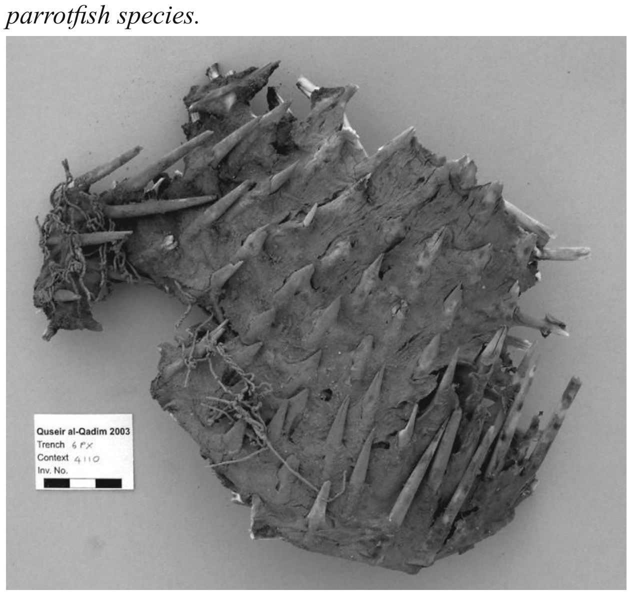


Figure 20.16. Porcupine fish skin and spines with tangled netting to the left of the picture.

found in Trench 7C, these have relatively thin and fragile bones and may not have survived or been collected. Other important food species identified from both of the main areas include jacks, snappers, wrasse, triggerfish, surgeons and unicornfish. Most of the other species were found in relatively small numbers, sometimes as single occurrences. Puffers and porcupinefish are a consistent presence. These related fish would not be eaten by most people but it should be remembered that the potentially lethal pufferfish is enjoyed as fugu in Japan. An alternative, and perhaps more likely, explanation for their presence is as net discards. In one case a piece of a porcupine fish was preserved with the skin and spines intact and the remains of netting tangled round the spines (Fig. 20.16).

20.2.2 Islamic Trenches

The main assemblages analysed for this period, Trenches 3 and 13, are in quite different locations; Trench 3 is part of the Islamic harbour now located in the silted lagoon while Trench 13 is up in the main area of the settlement. All materials from Trench 13 are particularly well preserved and this includes fish remains. Fish from Trench 3 are slightly less well preserved but did not suffer the problems of recovery as found in the mud of the Roman harbour trenches. In total 247 bones were recorded from Trench 13 and 656 from Trench 3 (Table 20.14). In both trenches the parrotfish are the main taxa and are of at least four species. Many of the indeterminate remains, especially in Trench 13, are scales and fins that are probably of parrotfish. The other main taxa in both trenches are groupers, jacks and

Species	Trench 3 Total	Trench 3 %	Trench 3 % ex. Indet.	Trench 13 Total	Trench 13 %	Trench 13 % ex. Indet.	NISP Total	NISP %	NISP % ex. Indet.
Sharks/Rays	7	1.1	1.6	0	0	0	*7*	*0.8*	*1.1*
Morays	0	0	0	0	0	0	*0*	*0*	*0*
Garfish	1	0.2	0.2	1	0.4	0.5	*2*	*0.2*	*0.3*
Groupers	45	6.9	10.2	15	6.1	7.6	*60*	*6.6*	*9.4*
Gerres	0	0	0	0	0	0	*0*	*0*	*0*
Jacks	51	7.8	11.5	7	2.8	3.5	*58*	*6.4*	*9.1*
Snappers	1	0.2	0.2	1	0.4	0.5	*2*	*0.2*	*0.3*
Seabream	16	2.4	3.6	5	2.0	2.5	*21*	*2.3*	*3.3*
Emperors	22	3.4	5.0	27	10.9	13.6	*49*	*5.4*	*7.7*
Goatfish	0	0	0	0	0	0	*0*	*0*	*0*
Wrasse	3	0.5	0.7	0	0	0	*3*	*0.3*	*0.5*
Parrotfish	254	38.7	57.5	141	57.1	71.2	*395*	*43.7*	*61.7*
Mullet	0	0	0	0	0	0	*0*	*0*	*0*
Surgeon/Unicorn	10	1.5	2.3	0	0	0	*10*	*1.1*	*1.6*
Trigger	26	4.0	5.9	1	0.4	0.5	*27*	*3.0*	*4.2*
Puffer/Porcupine	0	0	0	0	0	0	*0*	*0*	*0*
Other Species	6	0.9	1.4	0	0	0	*6*	*0.7*	*0.9*
Indeterminate	214	32.6		49	19.8		*263*	*29.1*	
Total NISP	**656**			**247**			**903**		

Table 20.14. Distribution of taxa from Trench 3 and Trench 13.

	Trench 2B Total	Trench 2B %	Trench 2B % ex. Indet.	Trench 2C & 2E Total	Trench 2C & 2E %	Trench 2C & 2E % ex. Indet.	Trench 8A Total	Trench 8A %	Trench 8A % ex. Indet.	NISP Total	NISP %	NISP % ex. Indet.
Sharks/Rays	**11**	2.0	*3.0*	**0**	0	*0*	**0**	0	*0*	**11**	1.2	*1.7*
Morays	**1**	0.2	*0.3*	**0**	0	*0*	**0**	0	*0*	**1**	0.1	*0.2*
Garfish	**0**	0	*0*	**0**	0	*0*	**0**	0	*0*	**0**	0	*0*
Groupers	**21**	3.8	*5.8*	**60**	22.4	*30.6*	**1**	1.0	*1.1*	**82**	9.0	*12.6*
Gerres	**0**	0	*0*	**0**	0	*0*	**0**	0	*0*	**0**	0	*0*
Jacks	**5**	0.9	*1.4*	**2**	0.7	*1.0*	**0**	0	*0*	**7**	0.8	*1.1*
Snappers	**2**	0.4	*0.6*	**1**	0.4	*0.5*	**0**	0	*0*	**3**	0.3	*0.5*
Seabream	**15**	2.7	*4.1*	**8**	3.0	*4.1*	**4**	4.1	*4.3*	**27**	2.9	*4.1*
Emperors	**35**	6.4	*9.6*	**19**	7.1	*9.7*	**8**	8.2	*8.5*	**62**	6.8	*9.5*
Goatfish	**1**	0.2	*0.3*	**1**	0.4	*0.5*	**0**	0	*0*	**2**	0.2	*0.3*
Wrasse	**0**	0	*0*	**1**	0.4	*0.5*	**0**	0	*0*	**1**	0.1	*0.2*
Parrotfish	**231**	41.9	*63.6*	**100**	37.3	*51.0*	**59**	60.8	*62.8*	**390**	42.6	*59.7*
Mullet	**1**	0.2	*0.3*	**0**	0	*0*	**0**	0	*0*	**1**	0.1	*0.2*
Surgeon/Unicorn	**12**	2.2	*3.3*	**1**	0.4	*0.5*	**3**	3.1	*3.2*	**16**	1.7	*2.5*
Trigger	**20**	3.6	*5.5*	**1**	0.4	*0.5*	**3**	3.1	*3.2*	**24**	2.6	*3.7*
Puffer/Porcupine	**1**	0.2	*0.3*	**0**	0	*0*	**0**	0	*0*	**1**	0.1	*0.2*
Other Species	**7**	1.3	*1.9*	**2**	0.7	*1.0*	**16**	16.5	*17.0*	**25**	2.7	*3.8*
Indeterminate	**188**	34.1		**72**	26.9		**3**	3.1		**263**	28.7	
Total NISP	**551**			**268**			**97**			**916**		

Table 20.15. Distribution of taxa from mixed trenches.

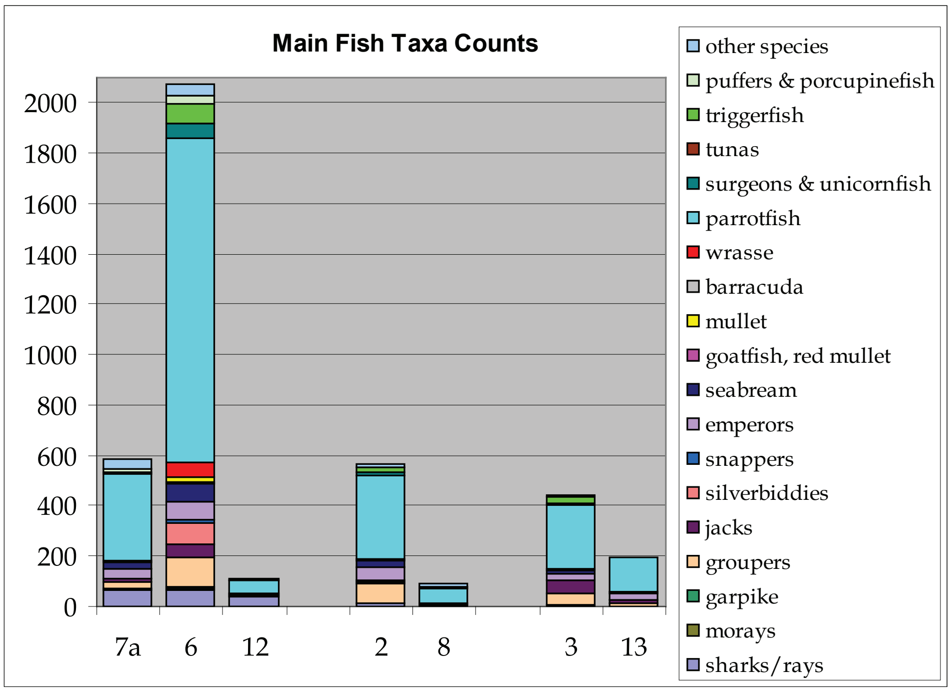


Table 20.16a. Distribution of main fish taxa by count. Total count on the Y-axis and Trench on the X-axis.

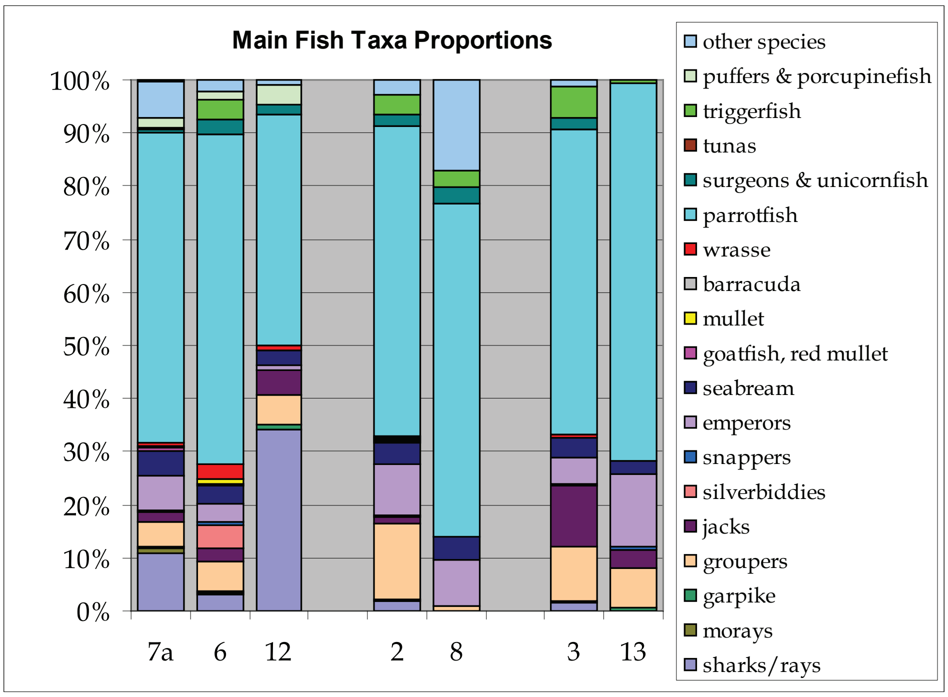


Table 20.16b. Distribution of main fish taxa by proportion. Percentage on the Y-axis and Trench on the X-axis.

emperors. In Trench 3 remains of triggerfish, seabreams and surgeon/unicorn fish were also found in several contexts. Seabreams are the only secondary type frequently found in Trench 13. Other taxa are rare and mainly occur as single bones, they include sharks, garfish, snappers, wrasse and sabre squirrelfish.

The distribution of anatomical elements is difficult to compare for small groups of bones but appears to be broadly similar for both trenches. All areas of the body are represented for the most frequent taxa. For some species, seabreams for example, there is a slight bias in favour of the largest and most sturdy elements. The parrotfish are the most frequent taxa and in both trenches over 60% of the bones are vertebrae. The sturdy and distinctive pharyngeal bones are well represented but not to the exclusion of other elements. These individual headbones appear to be less well represented in Trench 13 but this is due to the occurrence of several complete or partial heads, which were counted as a single specimen rather than as the separate elements. In one case a complete fish was recovered, apparently split open, perhaps dried, but then discarded unused (see discussion). The preservation from Trench 13 is so good that several groups of vertebrae were found still in articulation. In some examples of parrotfish, groupers and seabreams the flesh was also still present and clearly shows that the flesh was filleted off the bone before use, rather than the fish being cooked on the bone. Occasional butchery marks on some bones from Trench 3 indicated similar action but the preservation was less perfect and none of the bones remain in articulation.

20.2.3 Mixed Trenches

In some areas of the site Islamic occupation overlies and cuts into Roman deposits and structures. Individual deposits frequently have material from both periods. In the case of animal bone it rarely possible to divide individual bones without chemical dating. These areas include parts of Trenches 2 and 8A. Some fish bone from these had already been transferred to digital record prior to ceramic and stratigraphic analysis and are included here. The group of fish bone from Trench 8A is small, just 97 bones. It does, however, conform to the general pattern across the entire site with parrotfish dominant. The other taxa are also those most frequent in other trenches (Table 20.15). The preservation of bone from this area was often excellent and included examples of filleted parrotfish.

A much larger group of material was analysed from Trench 2. Some parts of Trench 2, for example Trench 2E, are probably largely Islamic but other deposits have clearly mixed origins and a few contain almost exclusively Roman material. One of these (Trench 2B) included a dump of fine material largely composed of very small fish remains. A small sample of this is the subject of a separate paper (Van Neer *et al* 2007). It contained the only Nile fish from this site and is comparable with similar material from Mons Claudianus (*ibid*). It is suggested that the remains are of a discarded container of *salsamenta*, whole small fish, salted and pickled. In addition to the fish there are remains of plant material and insect contaminants giving clear evidence of production in the Nile Valley. Excluding this material the assemblage from Trench 2 contains a wide variety of taxa dominated, as expected, by parrotfish. The assemblage from Trench 2B has the widest variety, perhaps because there is a Roman component (see discussion below). The most frequent of the secondary taxa are emperors, groupers, triggerfish, seabreams and surgeons. The secondary taxa from Trench 2C and 2D are groupers and emperors, other taxa occur in very small numbers.

20.2.4 Discussion

Distribution of taxa

Parrotfish and Scariidae, clearly dominate the fish remains from both periods and all trenches. These are supplemented by, among others, sharks, groupers, emperors, seabreams, jacks, snappers and triggerfish with a wide variety of other species at a much lower frequency (Table 20.16a & 20.16b). Roman Trench 12 appears to have a much larger proportion of sharks than others but it is difficult to judge how significant this is as it is one of the smallest assemblages and, therefore, just a few bones will greatly bias the results. For the Islamic period the secondary species are dominated by groupers, jacks, emperors and seabreams. Other taxa are at a lower level or absent. In Trench 3 triggerfish are one of the secondary taxa but are almost absent from Trench 13; again this may be a reflection of the small sample size but it is impossible to be certain. There are more species comprising the secondary taxa in the Roman deposits. Some taxa common in the Roman trenches were found to be rare or even absent in the Islamic deposits, in particular moray, silverbiddies, wrasse, mullet, puffers, and porcupinefish.

Processing and use

At first sight, there is little in the anatomical distribution that cannot be explained by the usual effects of taphonomy and small sample sizes, but a more detailed examination shows some interesting differences.

A straight count of the identified elements is a rather crude method of comparison, particularly as the elements are not the same for each taxon, but as the method is the same for both period groups it does offer a direct comparison (Tables 20.17 & 20.18). Even with the accepted limitations, it is curious and notable that the anatomical distribution for the large fish is incomplete. It is common to identify a few adjoining vertebrae or a single jaw from a find locus. This is in great contrast to the parrotfish remains in the deposits, which largely represent disposal of many, and substantially whole, fish. This is also true of some of the smaller fish, despite collection bias. The most obvious explanation is that the remains in these deposits are of consumption refuse, or at least household preparation, and not of shore-side processing of the catch.

There are considerably more parrotfish pharyngeals when compared with vertebrae from the Roman deposits than from the Islamic ones. It was initially thought that the assemblage from the wetter Trench 7C might contain more of these elements because they are both sturdy and also easily seen and collected. Although it has more than from some trenches, they are more common in Trench 6. None of the Islamic trenches has as many as the highest level in the Roman and neither do the Roman trenches have any value as low as the lowest percentage in the Islamic. It would thus seem that the Roman levels have a bias in favour of pharyngeals. The pharyngeal mill is rather gritty and is easily removed when gutting the fish, and indeed parrotfish imported to British shops are without gut and pharyngeals. For the parrotfish remains from the Roman *sebakh* Trench 6 and the Islamic Trench 13, the evidence for processing methods is very clear as several frames still have some flesh from the filleting process (Fig. 20.17). Sometimes axially split heads were also found, with the bones and skin of the face intact but the pharyngeal teeth removed (Fig. 20.18). In one very notable case from Trench 13 a complete fish was recovered, this appeared to have been split open, gutted and had the pharyngeal mill removed but for some reason was then discarded unused (Fig. 20.19). Although less frequently seen today this author has seen similar split and dried fish for sale locally.

This over representation of pharyngeal bones in the Roman trenches is matched by a dearth of these elements at the inland Roman quarry settlement of Mons Claudianus (Hamilton-Dyer 2001a). The assemblages of parrotfish remains from Myos Hormos and Mons Claudianus are of roughly similar size, when combined the overall element distribution is very similar to that of the Islamic assemblage (Table 20.19). Assuming that most of the Islamic fish were for local consumption, the implication is that in the Roman period a high proportion of the parrotfish were being processed at Quseir for use elsewhere. The quarry settlements are an obvious destination. The mix of species found at Mons Claudianus is similar but not identical to that at Quseir (Table 20.20). The most notable difference, although a small proportion of the total, is that medium and large river fish were found at Mons Claudianus. It was thought that these fish, mostly Nile catfish, could have been transported alive. There are slightly higher proportions of groupers and snappers, large fish that perhaps transport fresh better than some other species. The emperors and mullets are also higher, possibly because they can be dried or smoked.

The assemblages at Berenike, 300 km to the south, range from Ptolemaic to Late Roman with no Islamic period assemblage. The number of taxa identified is comparable, those absent are species that occur as just one or two specimens at either site. The major fish types are similar, i.e. parrotfish, groupers and emperors, followed by others including seabreams and jacks (van Neer and Ervynck 1998; 1999). There are, however, notable differences in the proportions of the major taxa. Parrotfish are not as prominent as they are at Quseir, groupers and emperors are of equal or greater importance (Table 20.21). Several of the secondary taxa at Quseir are also less frequent at Berenike. As dry-sieving over 4 mm mesh was routine for many trenches at Berenike but not employed at Quseir, the increase in some of the smaller species is to be expected

Element \ Species	Grouper		Jack		Seabream		Emperor		Parrot		Trigger	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Whole fish												
post- temporal							1	***0.9***	2	***0.1***		
Vomer	1	***0.7***							9	***0.5***		
Inferior pharyngeal									175	***10.5***		
Superior pharyngeal									392	***23.4***		
Premaxilla	8	***5.4***			31	***30.1***	34	***31.2***	107	***6.4***	2	***2.4***
Maxilla	7	***4.7***	1	***1.5***	6	***5.8***	6	***5.5***	19	***1.1***		
Dentary	10	***6.8***			31	***30.1***	26	***23.9***	97	***5.8***	7	***8.5***
Articular	6	***4.1***	2	***3.0***	4	***3.9***	8	***7.3***	8	***0.5***		
Palatine	1	***0.7***					2	***1.8***				
Ceratohyal												
Quadrate	3	***2.0***	2	***3.0***			3	***2.8***	16	***1.0***		
Hyomandibular			1	***1.5***					28	***1.7***	1	***1.2***
Preoperculum	5	***3.4***			1	***1.0***	3	***2.8***	11	***0.7***	2	***2.4***
Operculum	4	***2.7***	1	***1.5***			1	***0.9***	24	***1.4***		
Cranium	1	***0.7***			1	***1.0***	6	***5.5***	58	***3.5***	6	***7.3***
Face	1	***0.7***					4	***3.7***	18	***1.1***	2	***2.4***
Cleithrum	15	***10.1***					1	***0.9***	8	***0.5***		
Urohyal											6	***7.3***
Scute												
Spine											11	***13.4***
Precaudal vertebra	41	***27.7***	15	***22.7***	2	***1.9***	8	***7.3***	243	***14.5***	12	***14.6***
Caudal vertebra	45	***30.4***	42	***63.6***	7	***6.8***	6	***5.5***	442	***26.4***	18	***22.0***
Ultimate vertebra									14	***0.8***		
Unassigned vertebra					20	***19.4***						
Tail and skin			2	***3.0***					2	***0.1***	15	***18.3***
Total	**148**		**66**		**103**		**109**		**1673**		**82**	
N.B. face = group from one side including skin, eye and several bones												

Table 20.17. Anatomical distribution of fish remains at Myos Hormos.

Element \ Species	Grouper No.	%	Jack No.	%	Seabream No.	%	Emperor No.	%	Parrot No.	%	Trigger No.	%
Whole fish									2	0.5		
post- temporal			2	3.3								
Vomer	3	5.0	1	1.7			1	2.0	1	0.3		
Inferior pharyngeal									17	4.3		
Superior pharyngeal									28	7.1		
Premaxilla	3	5.0			6	28.6	10	20.4	23	5.8		
Maxilla	2	3.3	1	1.7	4	19.0	4	8.2	4	1.0		
Dentary	5	8.3	7	11.7	6	28.6	8	16.3	20	5.1	2	7.4
Articular	3	5.0	3	5.0	2	9.5	1	2.0	1	0.3		
Palatine												
Ceratohyal	2	3.3			1	4.8						
Quadrate	3	5.0	1	1.7					3	0.8		
Hyomandibular							1	2.0	12	3.0		
Preoperculum	2	3.3	1	1.7			2	4.1			6	22.2
Operculum	1	1.7	1	1.7					6	1.5		
Cranium									12	3.0	1	3.7
Face	1	1.7							13	3.3		
Cleithrum	3	5.0							2	0.5		
Urohyal											9	33.3
Scute			1	1.7								
Spine											3	11.1
Precaudal vertebra	17	28.3	11	18.3			6	12.2	45	11.4	1	3.7
Caudal vertebra	14	23.3	31	51.7	2	9.5	16	32.7	171	43.3	4	14.8
Ultimate vertebra	1	1.7										
Unassigned vertebra									32	8.1		
Tail and skin									3	0.8	1	3.7
Total	**60**		**60**		**21**		**49**		**395**		**27**	
N.B. face = group from one side including skin, eye and several bones												

Table 20.18. Anatomical distribution of fish remains at Quseir al-Qadim (Islamic Period).

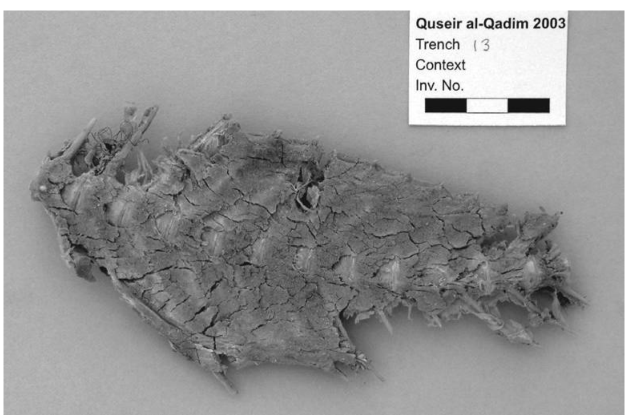


Figure 20.17 (above). Filleted Parrotfish frame.

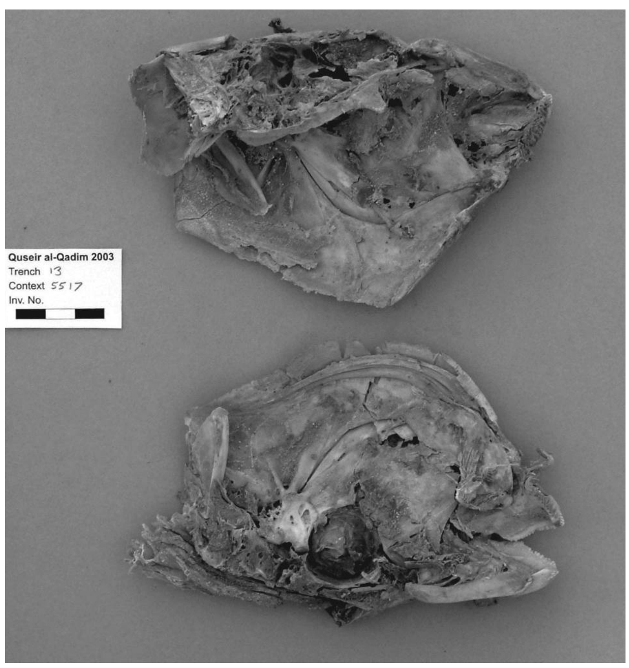


Figure 20.18 (right). Split open Parrotfish head.

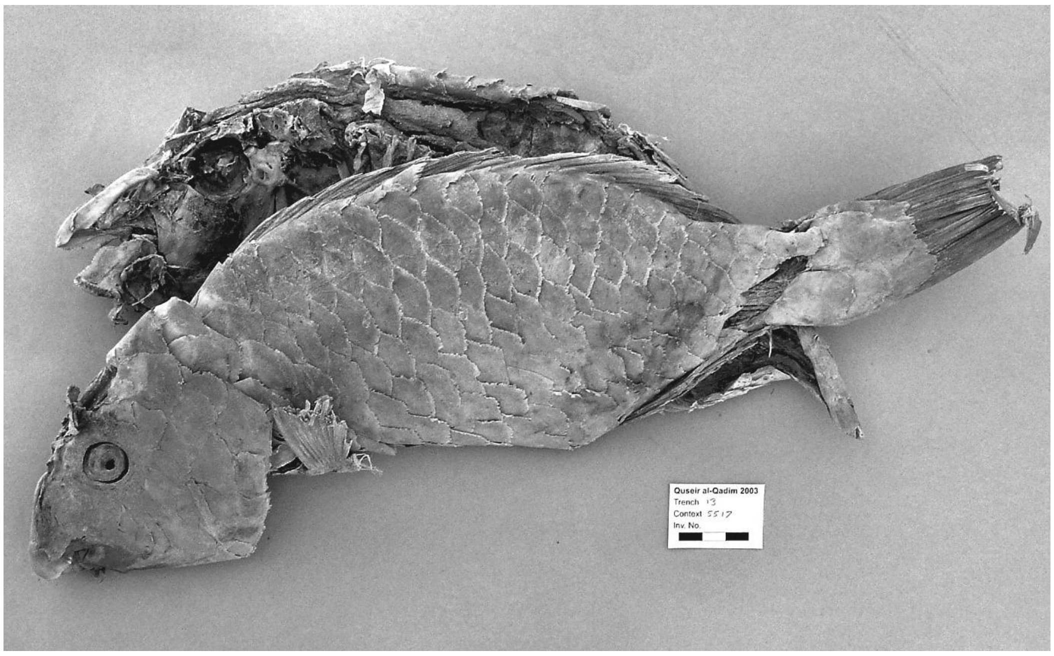
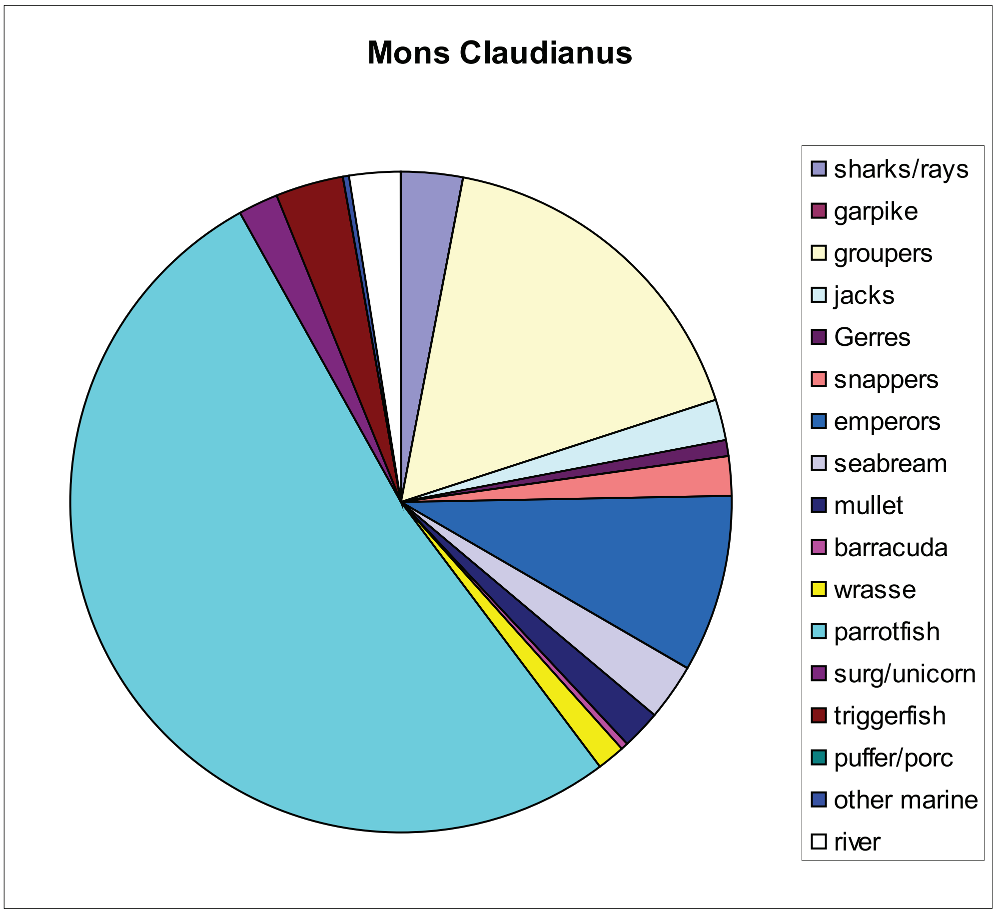


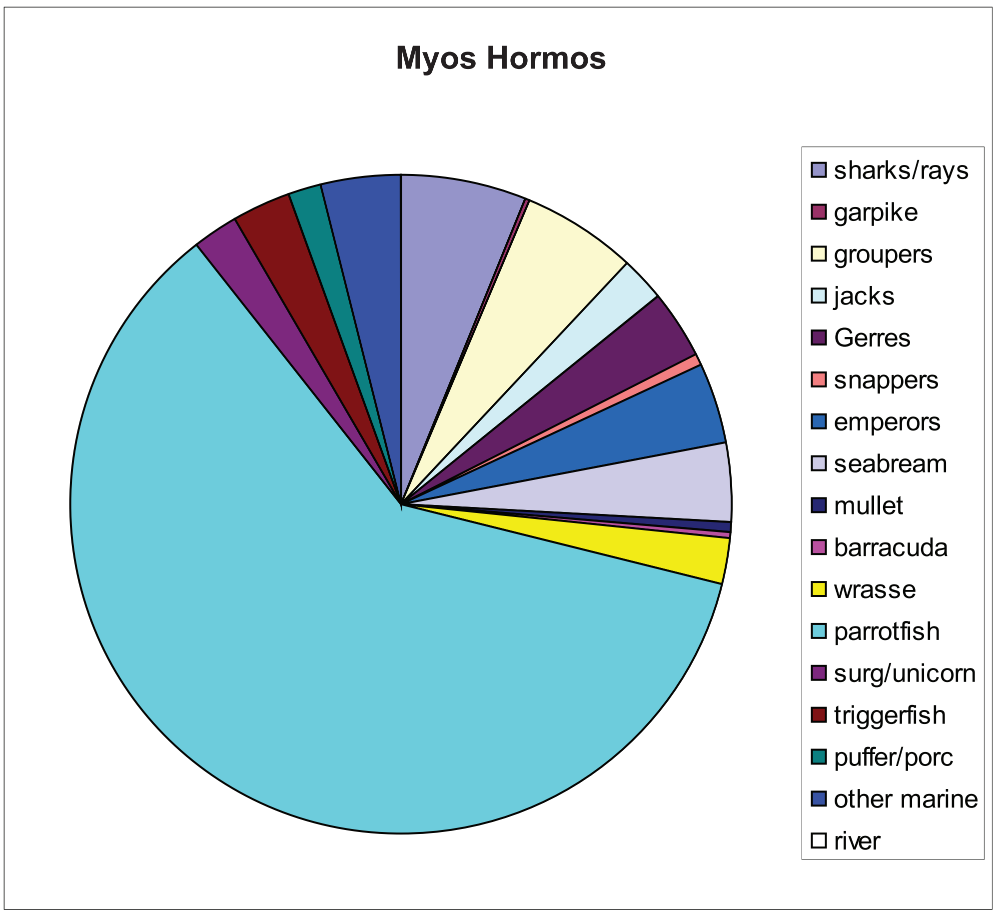
Figure 20.19. Complete, discarded, split Parrotfish.

Element / Site	Mons Claudianus		Myos Hormos		Combined		Quseir al-Qadim	
	No.	%	No.	%	No.	%	No.	%
whole fish							2	***0.5***
post-temporal			2	***0.1***	2	***0.1***		
vomer	1	***0.1***	9	***0.5***	10	***0.3***	1	***0.3***
inferior pharyngeal	10	***0.5***	175	***10.5***	185	***5.2***	17	***4.3***
superior pharyngeal	33	***1.7***	392	***23.4***	425	***11.9***	28	***7.1***
premaxilla	68	***3.6***	107	***6.4***	175	***4.9***	23	***5.8***
maxilla	41	***2.2***	19	***1.1***	60	***1.7***	4	***1.0***
dentary	47	***2.5***	97	***5.8***	144	***4.0***	20	***5.1***
articular	2	***0.1***	8	***0.5***	10	***0.3***	1	***0.3***
other skull bone	21	***1.1***			21	***0.6***		
quadrate	30	***1.6***	16	***1.0***	46	***1.3***	3	***0.8***
hyomandibular	47	***2.5***	28	***1.7***	75	***2.1***	12	***3.0***
preoperculum	29	***1.5***	11	***0.7***	40	***1.1***		
operculum	22	***1.2***	24	***1.4***	46	***1.3***	6	***1.5***
cranium	18	***0.9***	58	***3.5***	76	***2.1***	12	***3.0***
face			18	***1.1***	18	***0.5***	13	***3.3***
cleithrum			8	***0.5***	8	***0.2***	2	***0.5***
urohyal	2	***0.1***			2	***0.1***		
precaudal vertebra	392	***20.6***	243	***14.5***	635	***17.8***	45	***11.4***
caudal vertebra	741	***39.0***	442	***26.4***	1183	***33.1***	171	***43.3***
ultimate vertebra	21	***1.1***	14	***0.8***	35	***1.0***		
unassigned vertebra	345	***18.1***			345	***9.7***	32	***8.1***
scales	29	***1.5***			29	***0.8***		
tail and skin	3	***0.2***	2	***0.1***	5	***0.1***	3	***0.8***
total	**1902**		**1673**		**3575**		**395**	
N.B. face = group from one side including skin, eye and several bones								

Table 20.19. Comparison of anatomical fish remains from Mons Claudianus, Myos Hormos and Quseir al-Qadim.

Table 20.20. Species mix found at Mon Claudianus (top) and Myos Hormos (bottom).





but this does not explain the increase in the larger fish. As at Quseir, *Gerres* and some of the other small species were only found in the major refuse dump and not in other deposits. If this cannot be explained by collection bias and preservational differences, then it may imply a difference in disposal strategy. The main fish taxa are again reef species, those that live in the sandy and silty areas between are slightly less frequent and open water fish are least common of all. The abundance of parrotfish at Quseir might reflect a greater local availability but its role in supplying the desert quarry settlements and supporting road stations may be of significance. Parrotfish appear to have been one of the most important of the fish sent, perhaps because they are not only abundant but are easily dried.

Fishing methods and cultural differences
Three broad habitat preferences are represented by the fish;

Pelagic – fish that occur in open water and include several commercially important circum-tropical species. These include the larger requiem sharks, the larger jacks, and tunas but also smaller, shoaling, fish. Species from this group are the least frequently found.

Coastal sandy-bottom dwellers - these include most of the seabreams, mullets, silverbiddies and rays. The lagoon that provided harbour safe anchorage in Roman and Islamic times is now completely silted land but would have provided habitat for mullet and, in the mangrove roots, shelter for fish fry.

Reef fish – this is the largest group. The coral reefs in this part of the Red Sea can be very shallow right up to the shoreline, with isolated heads on sandy bottoms, as well as larger fringing reefs with a steep drop off. Parrotfish and surgeons can be seen near the site today, grazing over the reef in only a few inches of water, and at the surf line and beyond almost all of the fish in the reef group can be encountered locally. The main species can be divided into grazers (e.g. parrotfish), invertebrate eaters (e.g. seabreams, emperors and wrasse) and fish eaters (e.g. groupers, snappers and sharks).

Of all the fish encountered at Quseir it is the parrotfish that dominate; these are also one of the most important elements of the coral reef biome, grazing the algae of the coral and excreting waste as coral sand. As herbivores they are more common in the food chain than carnivores such as groupers. Not being carnivores they are rarely tempted by baited hook and line but instead are mainly caught by netting. There is only a small tidal range in the Red Sea but it is enough to produce a noticeable difference and it is common practice today for the Quseir fishermen to set nets after the fish come in with the tide to feed on the algae on the reef flats, catching them as they leave when the tide turns. With the excellent preservation at the site numerous examples of netting of different grades have been recovered from the excavations along with sinkers and other equipment (see Chapter 16, this volume). For the carnivorous species, hook and line are employed and there are also several examples of these in the finds.

The size of the fish appears to be similar to those taken today; for parrotfish this is specimens of between 30-80 cm and averaging 50 cm. Juvenile fish of the main taxa were either avoided by the fishing techniques or were used for bait. The largest species such as tuna, sharks and the bigger species of jacks are uncommon but present in small

Species	Berenike (Early Roman)		Myos Hormos	
	No.	%	No.	%
Sharks & rays	2	***0.1***	168	***6.1***
Groupers	633	***24.9***	148	***5.4***
Jacks	168	***6.6***	66	***2.4***
Snappers	2	***0.1***	15	***0.5***
Silverbiddies	3	***0.1***	89	***3.2***
Emperors	598	***23.5***	109	***3.9***
Seabream	216	***8.5***	104	***3.8***
Mullet	173	***6.8***	21	***0.8***
Wrasses	26	***1.0***	62	***2.2***
Parrot	499	***19.6***	1285	***46.5***
Surgeons & unicornfish	11	***0.4***	61	***2.2***
Puffers & porcupinefish	1	***0.0***	45	***1.6***
Triggerfish	60	***2.4***	82	***3.0***
Other	155	***6.1***	507	***18.4***
Total identified	**2547**		**2762**	
Groupers, emperors & parrotfish	1730	***67.9***	1542	***55.8***

Table 20.21. Comparison of fish taxa at Myos Hormos and Berenike (early-Roman).

numbers. Some of the groupers would have been larger than those generally found for sale today. Pressure on fish stocks is high in the Red Sea and these carnivorous fish at the top of the food chain are never as numerous as the herbivore and mollusc eating types. This author has observed a drop in the number of the largest available and an increase in price over the last decade or so. It would seem that in the past these were either more readily available or were specifically targeted. Their presence also implies a certain level of technical skill in boat building and use, for they are not shore caught species. Fishing can be undertaken at any time when the weather is suitable, particularly if a substantial boat is available for access to the deeper waters. Small rowing and sail boats are still used today; these are reliant on calm weather and the strong winds that are so common in the winter months do limit the number of fishing days. According to local sources (D. Agius. pers. comm.) most of the important food fish are caught between May and August, jacks are more often caught in the winter and some types such as groupers and emperors have no seasonal peak.

Small shoaling species such as silverbiddies, *Gerres* sp., are present in Roman deposits, these are useful for drying or salting and as sauces and pickles. Small clupeids that might also be used in this way were present (mainly in sieved samples) but uncommon. They are absent from the Islamic material although similar small fish (marine and Nile species) are exploited today.

There are other species that, while never common in the Roman deposits, are rare or missing from the Islamic assemblages. Most of these are either scaleless, spiky, poisonous or sometimes a combination of these. There are currently differences of opinion as to what seafoods are halal (permitted) and which haram (forbidden). All Muslims seem to agree that scaled fish taken direct from the water are halal. Most consider that amphibious creatures such as frogs and turtles are not permitted. The position on other seafood is variable, many Shia consider non-scaled 'fish' (including crustaceans and molluscs) as forbidden, whereas most Sunni allow all of these seafoods, providing they are not poisonous (such as the pufferfish). Puffers, boxfish and porcupine fish may have been accidental catches in both periods. They may even have been prepared as curios as they are today, or perhaps for some medicinal use. Although deadly the toxin in puffers can be removed by careful filleting to produce the 'fugu' of Japan and similar delicacies in Central America. Moray eels were perhaps not eaten in the Islamic period because they are scaleless and therefore do not pass the 'scaled and finned' test but perhaps might find occasional use for medicinal/ritual reasons.

20.2.5 Conclusion

The major fish resource is the same for both period groups, i.e. parrotfish together with groupers and emperors. These are accompanied by a similar, but not identical, cohort of other species in smaller amounts and then by many further species as a few occurrences only.

Only the largest and most secure deposits have been used in this analysis, these are mainly dumps of mixed general or semi-domestic refuse rather than *in-situ* occupation debris, or waste from a single activity such as bulk processing.

For the Roman assemblage we can compare the results with those of Berenike to the south but for the Islamic material there does not seem to be any comparable work. Certainly there is nothing along the Egyptian coast. Quseir is one of the more northerly ports in the Red Sea and is conveniently placed for access to the Nile by the shortest route. Further north, at Aqaba, parrotfish are again prominent (de Cupere pers. comm.).

The differences between the two periods may be threefold in origin; cultural, technique and distribution. The species list for the Islamic deposits is slightly less extensive than for the Roman levels and, if not due to direct prohibition, may still have a cultural restriction. There is ample evidence in both periods for the use of nets and hooks, and use of different boat types and fishing depths is possible, even probable. During the Roman period it is well attested that marine fish was being supplied in quantity to the desert settlements and route stations, much of this is likely to have come from Myos Hormos. There are slight differences in the species distribution for these sites, probably reflecting a preference for species that can be dried or that travel well. Without the modern luxury of the freezer it is also possible that some fish species were preserved by drying and/or salting and stockpiled when fishing conditions were good, for use and sale when fishing was not possible. A discussion of who was directly involved with the fishing and trading is beyond the remit of this author but is an ongoing subject as discussed by others in this volume and elsewhere.

20.3 Shell

Introduction and Methodology

A huge quantity of over 20,000 mollusc shells and other marine invertebrates were hand-collected from the excavations. Most were complete or substantial portions and, excluding very small pieces, all were recorded. The majority, which account for just under 17,000 specimens, were then transferred to *Access* for further analysis. Those not included in this analysis are from very small areas or have complex stratigraphy with a high level of mixing. For Trenches 1 and 3 only the species totals have been entered into the database. The full records for all trenches remain in the archive. The material has been divided into the two broad dates, Roman and Islamic, and grouped by trench even though it is recognised that for some contexts there may be some residual or intrusive material. Identifications of molluscs were mainly made using Sharabati (1984) and Oliver (1992). Other invertebrates encountered are corals,

Figure 20.20. Loose Turbo radiatus *turban snail operculae.*

Figure 20.21. Turbo radiatus *turban snail with operculum still in position.*

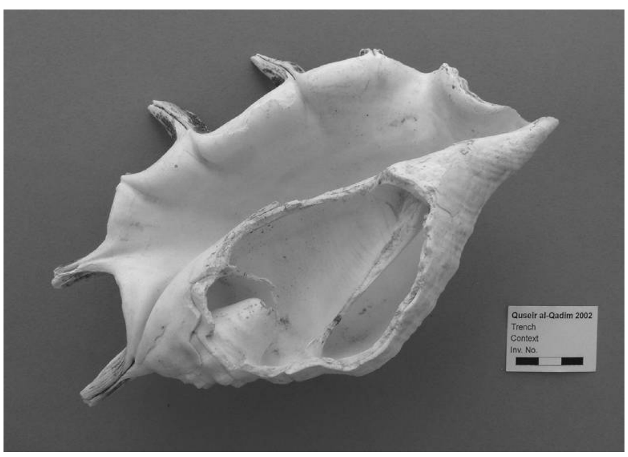


Figure 20.22. Broken open spider conch Lambis truncata sebae.

echinoderms and crustaceans. Most corals were ignored as they are common in both the recent and the fossil reef along the shoreline. Small individual non-reef building corals such as 'mushroom' corals and the organpipe coral were recorded, some had clear anthropogenic associations as they had been modified. Crustacean exoskeletal remains were occasionally found, these include crabs and spiny lobsters (*Palinuridae*) of more than one type but were not further identified. Similarly there are remains of sea urchin tests of several species but only the distinctive spines of the pencil urchin, *Heterocentrotus mammillatus* were recorded to species.

20.3.1 Roman Trenches

The largest groups of material come from Trenches 7C and 6. Three other areas were also analysed; Trench 10 and 12 of the Roman harbour and Trench 8 of the Roman town. These five trenches together account for just over 96% (16,315 specimens) of all the shell material recorded. Almost half (8,086 specimens) came from the *sebakh* dump in Trench 6. In total 120 different species could be identified precisely with a further 44 identified to genus or family. Many of these taxa occur in small numbers only; the assemblages are dominated by a small number of species.

The most frequent of these is a common Indo-Pacific turban snail, *Turbo radiatus*, the speckled silver-mouth. This marine snail can be distinguished from its close relatives by the smooth operculum the animal uses to protect the aperture. Many of these were also found (Fig. 20.20), occasionally still in context (Fig. 20.21). This animal is an algae feeder of the intertidal reefs. This single species accounts for over half of all the shells from the Roman trenches. It is always the dominant species in all these trenches, apart from the small and rather unusual assemblage in Trench 10 where cluster barnacles and oysters are more frequent. Well over 8,400 of these turban shells were recorded from the Roman trenches and almost all were of around the same size, i.e. between 45-65 mm height.

The second most frequent species is the spider conch, *Lambis truncata sebae*, accounting for another thousand shells. This is a large species and most of the shells exceeded 150 mm. Unlike the turbans, many had been broken open (Fig. 20.22). Almost as frequent are the shells of the giant clams, *Tridacna sp.* (Fig. 20.23). Three species are commonly found in the Red Sea; *T. maxima*, *T. squamosa* and *T. crocea*. Almost all could be identified as the largest of these, *T. maxima*. These were quite variable in size, from around 70 mm to over 300 mm, most are around 100 – 150 mm (Table 20.22). This is not a natural population as there are none of the small, young shells. The assemblage represents everything over a certain size, around 70 mm. Several had been used as ink and paint-pots and in one case as a pitch-pot.

Table 20.22.
Size distribution of Tridacna*.*

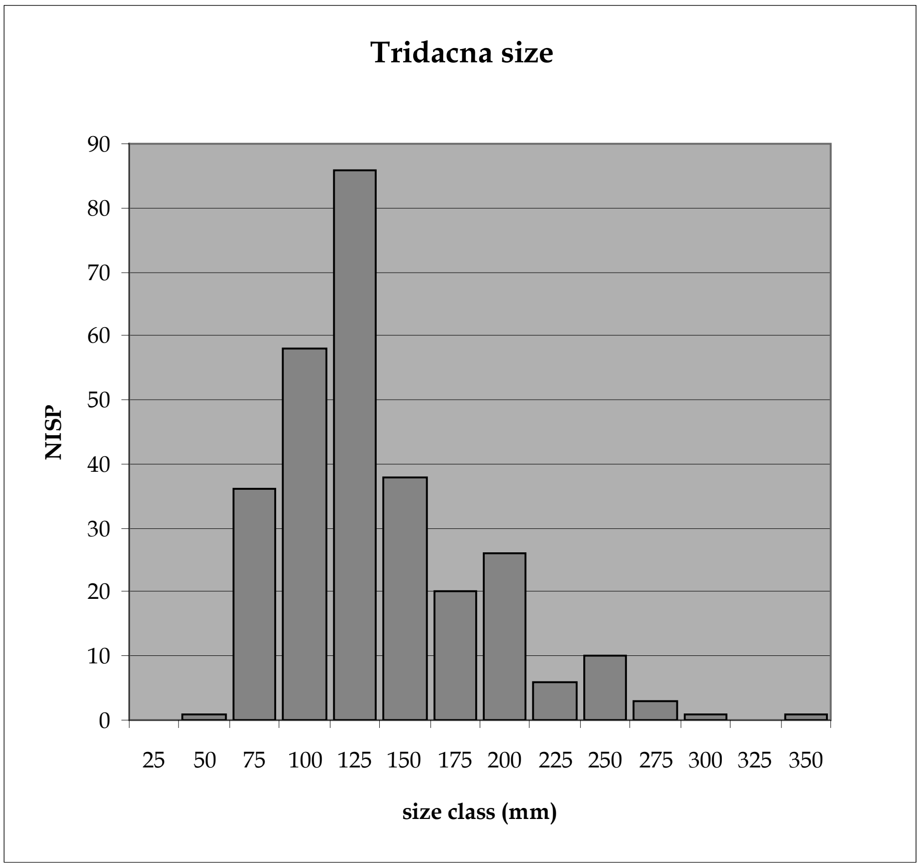


Figure 20.23 (below left). Example of the giant clam, Tridacna.

Figure 20.25 (below right). Saccostrea cucullata *oyster with mangrove root remnants.*

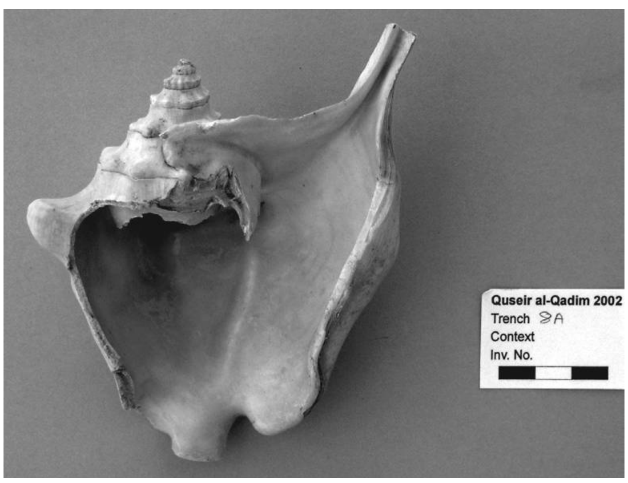
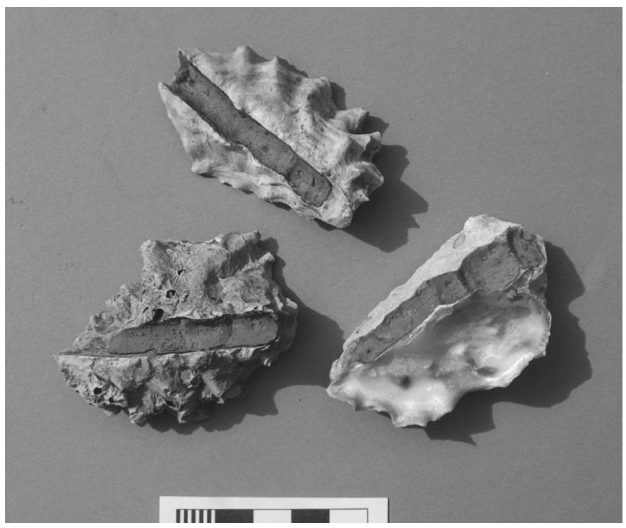


Figure 20.24. Broken open conch Strombus tricornis erythraensis.



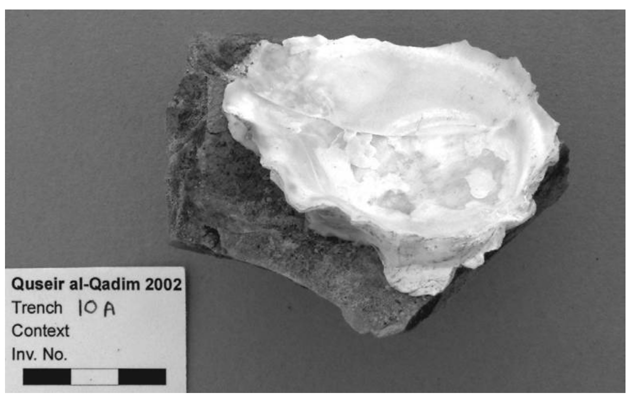


Figure 20.26. Saccostrea cucullata *oyster on pot sherd.*

Figure 20.27. Nerite shells.

The shells of the next most frequent species, the endemic three-knobbed conch, *Strombus tricornis erythraensis*, are also the large-sized part of the population. Like the spider conch many of these shells had been broken open (Fig. 20.24). Less frequent but a consistent presence are the pearl oyster, *Pinctada margaritifera*, and the rock or mangrove oyster, *Saccostrea cucullata*. These unrelated bivalves are common Indo-Pacific food species, the pearl oyster is also the species that produces true pearls and whose nacreous shells are frequently worked. *Saccostrea* is of particular interest in these assemblages as the shells were sometimes found with the impression of the mangrove roots they had grown on (Fig. 20.25), and in one case a pot sherd (Fig. 20.26). This implies either that mangroves were at that time growing in the lagoon or that pot was deliberately used as seeding material in a mangrove lagoon elsewhere. It is interesting to note that at least one of the other species, *Volema pyrum* the crown conch, is associated with mangroves. Neither of these are present in the Islamic assemblages. Today the Quseir lagoon has completely silted up (see Blue 2006a) but further down the coast there are still some lagoons with mangroves and sometimes mangrove clumps between the inner reef and the shore.

The bulk of the shells are clearly of edible species and many of the minor ones would also be edible, some are perhaps more useful as decorative items and some may even have come from beach collection. For some species the reason for their presence is less clear, there are for example quite high numbers of nerites (Fig. 20.27). These small gastropods resemble European winkles and might have been used as food, or they may have been a contaminant of the major collection of turbans, as they feed in the same areas. It is also possible that, although less worthwhile on account of their small size, they were collected at the same time, along with some of the other minor species. The surf clam is a consistent presence and may be of dual purpose, edible and decorative. This might also apply to the pencil urchin as sea urchins are edible but it seems more likely that the spines were collected on the beach. The species is so named beacause these spines can be used as slate pencils but they may have had other uses (Fig. 20.28). They were particularly common from Trench 7C. Collection of many of the species would require only shallow-water wading, but a few would require more effort. The giant clams for example, live in crevices of the coral reef. The two large conch species can both be found on the sandy bottoms of the inner reef flats. The attractive glossy, porcelain-like shells of cowries have been collected through history and, although they may be eaten, it is more likely that they were deliberately collected alive or dead because of their appearance (Fig. 20.29). Cone shells are similarly attractive but many of them are extremely dangerous. The live animal is a predator using venomous darts to paralyse the prey. Those that hunt fish such as the textile cone, *Conus textile*, (Fig. 20.30) can be lethal to humans and it seems likely that these would usually be collected dead from the beach.

Mention should also be made of the gastropod *Helix pomatia*. Although listed along with all the other invertebrates this species is, however, neither marine nor native. It is the familiar Roman or edible snail of Europe. A total of eight were identified, three each from Trenches 7C and 6 and another two from Trench 12 (Fig. 20.31). This species was also found, in greater numbers, at Mons Claudianus and it is discussed whether they had been preserved or deliberately imported for breeding in the Nile Valley (Hamilton-Dyer 2001a).

The distribution of the species across the five areas studied is similar but not identical (Appendix 20A). Overall the variety is relatively low compared with the sheer number of shells, the average number of species per hundred shells is just one. In the *sebakh* it is 1.6 whereas in Trench 7 it is higher at 2.1 and is highest in Trench 8 at 9.2. This last may be a result of mixing – see Islamic section below. The two smaller trenches of the harbour; Trenches 10 and 12, are the most different when compared to everything else. In Trench 10 only 384 specimens were collected, 151 of

Figure 20.28. Slate pencil sea urchin spines.

which were cluster barnacles. These large barnacles can be seen on the rocks and jetties in Safaga and Hurghada today, they are not a species that would be found in the sand or mud of a lagoon. In addition, several had the clear impressions of wood and in at least one case, traces of pitch. These had therefore been knocked off pitch-coated wood (see Chapter 15.2, this volume) One was also found in the *sebakh* deposits of Trench 6. The mangrove oysters were also frequent with 71 of the remaining specimens. Trench 12 is less extreme but has the highest proportion of turbans, over 70% of all the shells.

It is most interesting to compare the results from Quseir with those of the inland sites of Mons Claudianus and Mons Porphyrites. The shells were not systematically collected and recorded at Mons Claudianus but notes and species lists were made and photographs taken. At least 60 species are present at Mons Claudianus, mainly of the two oysters, giant clam and surf clam (Hamilton-Dyer 2001a). The large conch and the turbans are present but only in small numbers. Many of the pearl oyster and giant clam remains are worked offcuts and several items made from shells were also found (Hamilton-Dyer 2001b). Several of the smaller shells had been pierced for use in necklaces – including nerites, dove shell, cowries and the strawberry top, all found at Quseir. The only type of shell not found in Quseir is the tusk shell, *Dentalium* sp., which had been used for beads. The edible snail was more frequent at the inland sites than at Quseir, with 26 specimens. At the time of writing the Mons Claudianus report (Hamilton-Dyer, 2001a), there was only an interim report available for Quseir (Reese 1982) hence the statement that more species were found at Mons Claudianus than in the Roman material at Quseir. With this present study it can be stated that the initial report from Quseir suffered from small sample size and in fact there are slightly more species represented at Quseir, as one might expect. At Mons Porphyrites the assemblages were smaller but the shells were quantified. At Badia an unusual concentration of *Strombus tricornis* was noted, mainly burnt, with few other shells (Hamilton-Dyer 2007b). At the main fort, however, the species were more comparable to Mons Claudianus and can be directly compared to the Quseir assemblage (Appendix 20B). Immediately it can be seen that there is one notable absence at Mons Porphyrites, there are no turbans at all. Over half of the remains are of *S. tricornis* and a further 28% are of pearl oyster. The most frequent of the remainder are top shells, large cowries and the surf clam. Many of these shells, and others, had been modified. Small species were often pierced – for use in bracelets and necklaces for example. The pearl oysters were often trimmed and decorated as dishes or palettes. It is the *S. tricornis* conch and the large cowries that had been modified in the most unusual way, as spoon bowls. There is clear evidence for manufacture on site (Hamilton-Dyer 2003b; 2007b).

Interpretation of marine shells at a coastal site can be problematic; some may be from natural beach and lagoon

Figure 20.29. Cowries.

Figure 20.30. Textile cones Conus textile.

Figure 20.31. Edible snails Helix pomatia *from Roman deposits.*

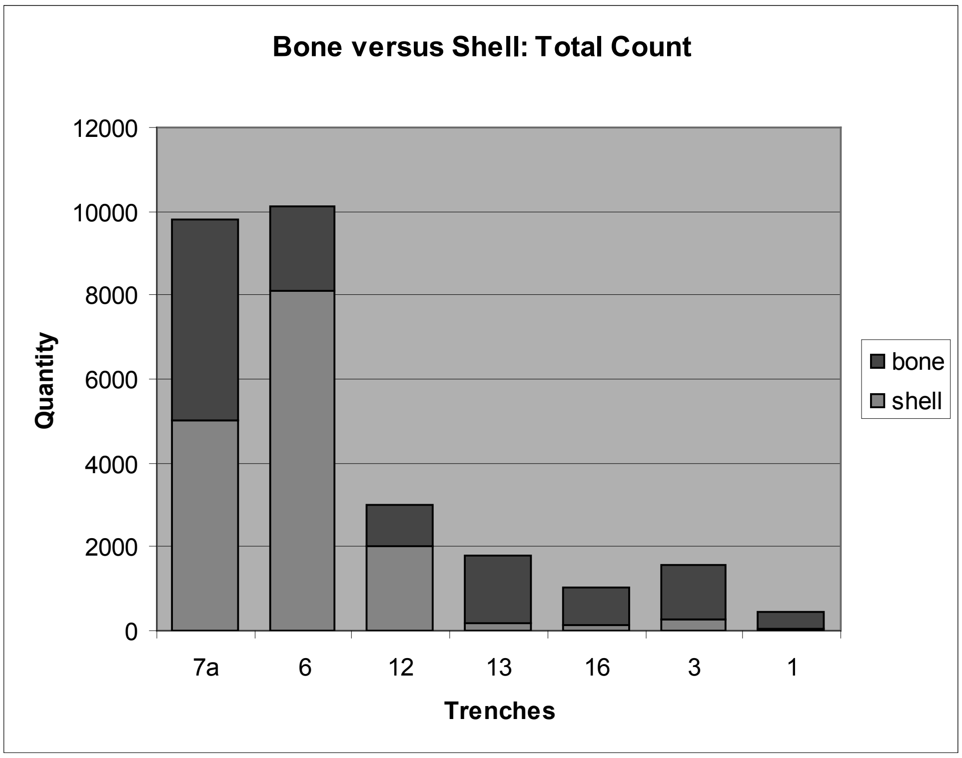


Table 20.23a. Comparison of Shell and Bone (Total Count) across both periods of occupation. Trenches 7A, 6 and 12 correspond to Myos Hormos, Quseir al-Qadim is represented by Trenches 13, 16, 3 and 1.

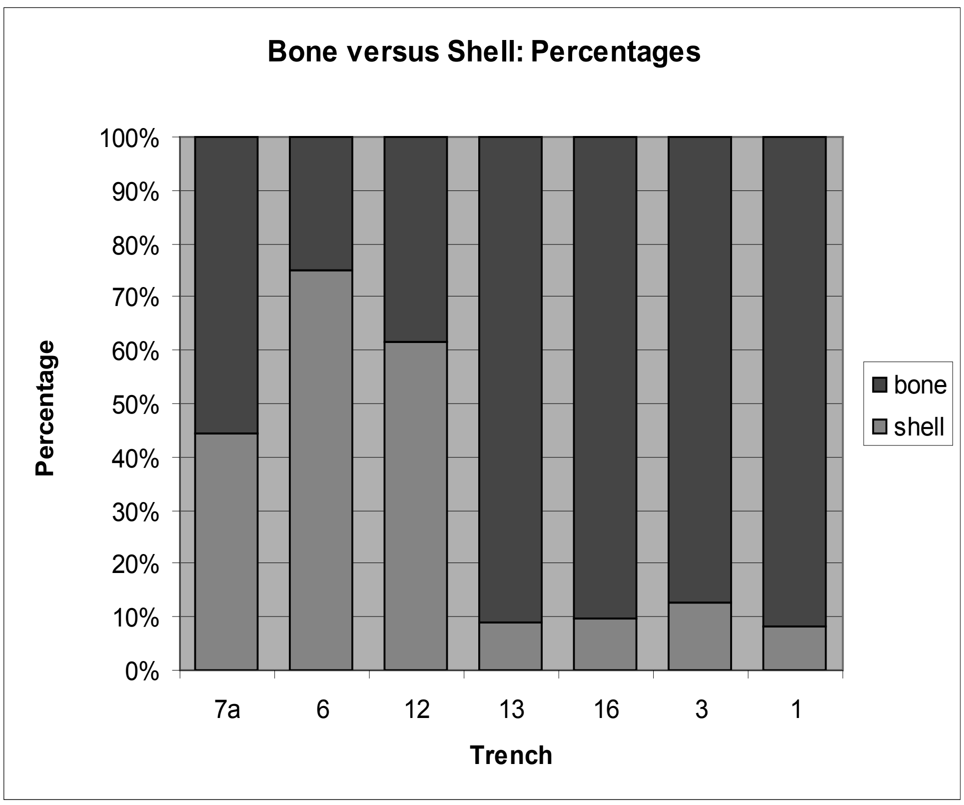


Table 20.23b. Comparison of Shell and Bone (Percentage) across both periods of occupation. Trenches 7A, 6 and 12 correspond to Myos Hormos, Quseir al-Qadim is represented by Trenches 13, 16, 3 and 1.

deposits (inicluding those deposited before occupation at Quseir), some from fish guts and net debris. Those collected deliberately may have been intended for food but others might have been collected for different purposes. The presence of large amounts of marine shells at the inland quarry sites confirms that many, probably most, were deliberately collected and transported for food. Some such as the pearl oyster and tridacna had secondary uses and others were collected (alive or dead) for non-food use. One group of molluscs is highly likely to have been utilised but are usually invisible in the archaeofaunal record; these are the Cephalopoda, octopus, squid and cuttlefish. Cuttlefish 'bone' was sometimes noted.

Three hundred km to the south at Berenike, the other major Roman Red Sea port, the molluscs were also analysed in some detail (van Neer and Ervynck 1998; 1999). Around 13,000 specimens were recorded, of at least 145 taxa. The taxa list is comparable with that of Quseir but not identical. In the main, species present at one site but not at the other occur as one or two shells only. The exceptions include three species of ark shell and *Pitar hebraea*, which are common at Berenike, and the mangrove oyster *Saccostrea cucullata*, which is common at Quseir. The assemblages at Berenike are similarly dominated by a small number of species, though slightly different ones. The turbans, large conch and giant clams are present but are not the most frequent shells. Smaller species tend to be frequent, in particular the ark shells, smaller conch, small oysters and horn shells. The sizes of the shells, though

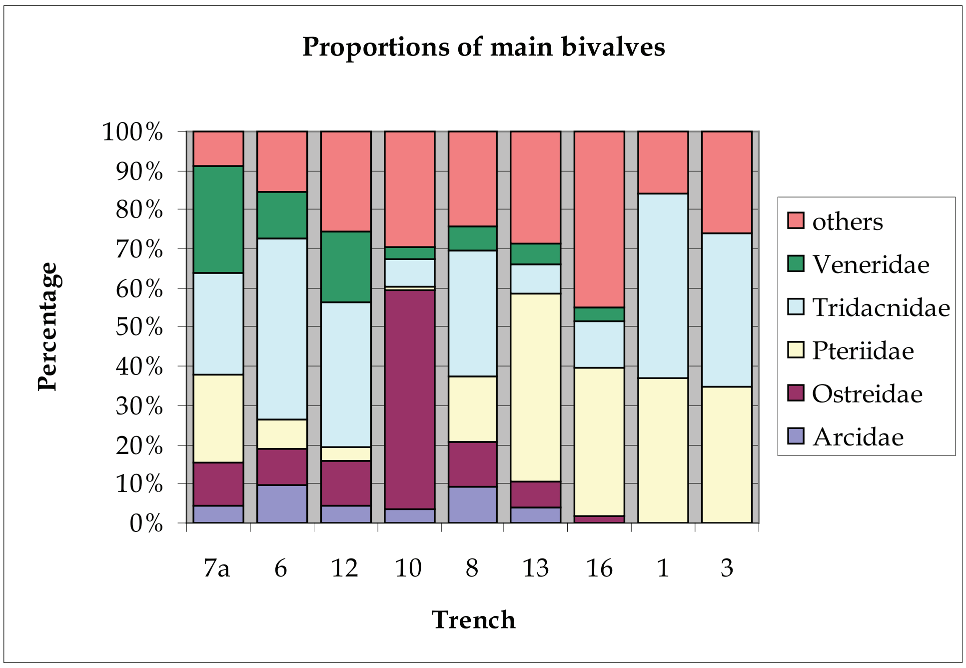


Table 20.24a. Proportion of main bivalves across both periods of occupation. Trenches 7A, 6, 12, 10 and 8 correspond to Myos Hormos, Quseir al-Qadim is represented by Trenches 13, 16, 1 and 3.

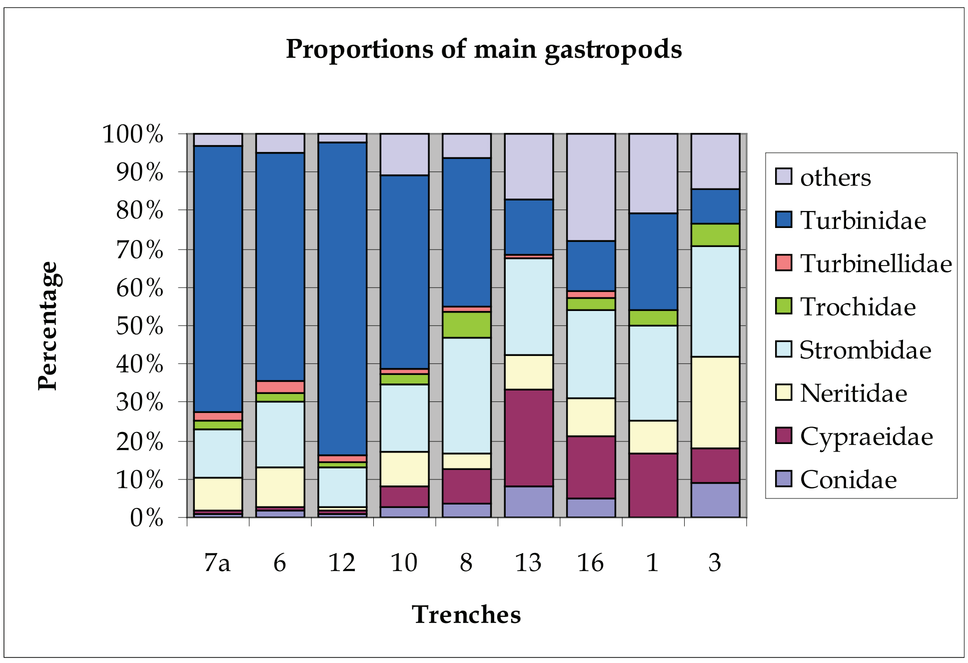


Table 20.24b. Proportion of main gastropods across both periods of occupation. Trenches 7A, 6, 12, 10 and 8 correspond to Myos Hormos, Quseir al-Qadim is represented by Trenches 13, 16, 1 and 3.

generally of smaller species than the bulk at Quseir, again reveal a deliberate collection policy as juvenile ones are missing. The assemblages range in date from Ptolemaic to late Roman and differences between the periods were observed. In Ptolemaic times bivalves from rocky substrates dominate, such as ark shells, jewel box and small oysters, whereas more gastropods were present in the Roman assemblages. It was not clear whether this was a culinary choice or forced by environmental changes. The crown conch is present in small numbers but was not identified. The edible snail, *Helix pomatia*, is once again present.

20.3.2 Islamic Trenches

Four Islamic groups were analysed; Trenches 3 and 16 of the Islamic harbour and Trenches 1 and 13 of the Islamic town. The shells are scattered throughout the contexts and do not occur as large concentrations. In the *sebakh* of Trench 13, a relatively small excavation area, a wide variety of species is present in the 197 specimens (Appendix 20C). The most frequent is the pearl oyster, *Pinctada margaritifera*, at 37 specimens followed by the money cowrie, *Cypraea moneta*, at 22 (Fig. 20.32). Other common species include the turban, *Turbo radiatus*, a small conch species, *S. gibberulus albus* and limpets. Large species such as the spider conch, *Lambis truncata sebae*, and giant clams, *Tridacna sp.* are present in small numbers. Trench 16 is very similar in species and numbers, but has less money cowries. Trench 3 offers the largest group of material at 253 specimens. This trench has slightly less variety in comparison with the number of shells but a greater proportion of them are of the large species. Some of the contexts in this trench have Roman ceramics and therefore this proportion might reflect residual remains, as these edible species are extremely frequent in the Roman sebakh contexts. Reese (1982) also noted that few turbans were found in the Islamic contexts and some were beach worn, rather than the fresh appearance of those from Roman contexts. Trench 1 should also be treated with some caution because of its position close to the shoreline. In this trench the number of specimens is small (the many surface finds were recorded on paper but are disregarded here) but of a wide variety. It is difficult to judge, however, whether these few are Islamic or are of other dates including recent.

20.3.3 Comparison of Roman and Islamic Material

It is immediately apparent that the two assemblages are very different. The Roman trenches contained very large amounts of shell amongst the other remains, whereas the Islamic ones do not. This is not a simple function of excavation area, as the proportion of shells to bones is also much lower (Tables 20.23a and 20.23b). The bulk deposits of the Roman assemblages are species of major food value; particularly turbans, the largest conch species, giant clams and the two oyster types. There also appears to be a deliberate selection, disregarding the smaller, juvenile, individuals of these species. This implies a collection policy that sets out to obtain the maximum food value with the minimum time and effort. Other, less common, species would probably be collected at the same time. The mainly decorative species for both periods could have been collected live, but also as dead shells on the beach. The species that dominate the Roman trenches are present in the Islamic trenches but in much reduced quantities and some may even be residual. Of the two oysters the decorative pearl oyster is common; the edible but unattractive mangrove oyster is virtually absent (Tables 20.24a and 20.24b). It would appear that molluscs were not a major food source in the Islamic period and may even have been used only as fish bait (as they frequently are today). Dried meat from shellfish is available in southeast Arabia, although even there shellfish are not commonly seen in the markets (El Mahi 1999). As molluscs are non-scaled sea animals some Islamic groups may avoid them as being haram. A wide variety of mainly small species is present. These smaller species could be purely decorative (several are pierced) but they would also have been used in divination, especially *Cypraea moneta*, *C. pantherina* and other cowrie species (Regourd 2003b). Some of the pearl oysters may have been used to cast the cowries. Cowries are also used today in Arab childrens games (Sharabati 1981).

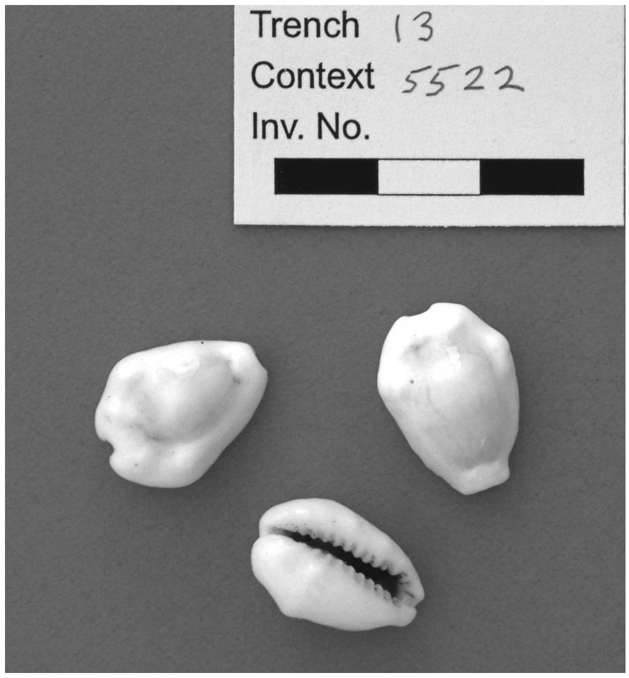


Figure 20.32. Money cowries Cypraea moneta *from Islamic deposits.*

Appendix 20A. Shell species recorded at Myos Hormos, in each case, data is presented for total count and for percentage.

Species			Trench, by count						*Trench, by percentage*					
Family	*Latin*	Common name	7A	6	12	10	8	**Total**	*7A*	*6*	*12*	*10*	*8*	*Total*
Bivalvia														
Arcidae	*Anadara antiquata*	antique ark	32	58	9	5	9	**113**	*0.64*	*0.72*	*0.44*	*1.37*	*1.09*	*0.69*
Arcidae	*Anadara sp.*	ark shell		1			1	**2**		*0.01*			*0.12*	*0.01*
Arcidae	*Anadara uropigimelana*	burnt end ark	5	4	1		3	**13**	*0.1*	*0.05*	*0.05*		*0.36*	*0.08*
Arcidae	*Arcidae indet.*	ark shells		58	2			**60**		*0.72*	*0.1*			*0.37*
Arcidae	*Barbatia fusca*	dusky ark		2				**2**		*0.02*				*0.01*
Cardiidae	*Cardiidae indet.*	cockles	1					**1**	*0.02*					*0.01*
Cardiidae	*Fragum auricula*	heart cockle		4			1	**5**		*0.05*			*0.12*	*0.03*
Cardiidae	*Trachycardium flavum*	golden cockle	4	8	1		1	**14**	*0.08*	*0.1*	*0.05*		*0.12*	*0.09*
Chamidae	*Chama rupelliana*	Ruppell's jewelbox	3	16				**19**	*0.06*	*0.2*				*0.12*
Chamidae	*Chamidae indet.*	jewelbox	4	12	1	20	1	**38**	*0.08*	*0.15*	*0.05*	*5.49*	*0.12*	*0.23*
Glycymerididae	*Glycymerididae indet.*	bittersweet clams	10	4		2	4	**20**	*0.20*	*0.05*		*0.55*	*0.49*	*0.12*
Glycymerididae	*Glycymeris pectunculus*	comb bittersweet	3					**3**	*0.06*					*0.02*
Gryphaeidae	*Hyotissa numisma*	honeycomb oyster	1					**1**	*0.02*					*0.01*
Lucinidae	*Codakia tigerina*	tiger lucine	3	19	2		3	**27**	*0.06*	*0.23*	*0.10*		*0.36*	*0.17*
Lucinidae	*Ctena divergens*	divergent lucine	1	1				**2**	*0.02*	*0.01*				*0.01*
Lucinidae	*Divaricella ornata*	ornate lucine	4	1				**5**	*0.08*	*0.01*				*0.03*
Mesodesmatidae	*Atactodea glabrata*	surf clam	25	56	64	6	5	**156**	*0.50*	*0.69*	*3.15*	*1.65*	*0.61*	*0.96*
Mytilidae	*Brachiodontes variabilis*	variable ribbed mussel				6		**6**				*1.65*		*0.04*
Mytilidae	*Modiolus auriculatus*	ear mussel	9	42		3	6	**60**	*0.18*	*0.52*		*0.82*	*0.73*	*0.37*
Mytilidae	*Mytilidae indet.*	mussels		5				**5**		*0.06*				*0.03*
Ostreidae	*Lopha Cristagalli*	cockscomb oyster		1				**1**		*0.01*				*0.01*
Ostreidae	*Ostreidae indet.*	oysters		33		6		**39**		*0.41*		*1.65*		*0.24*
Ostreidae	*Saccostrea cucullata*	oyster	99	78	31	71	16	**295**	*1.98*	*0.96*	*1.53*	*19.51*	*1.94*	*1.81*
Pectinidae	*Pectinidae indet.*	scallops	2	2				**4**	*0.04*	*0.02*				*0.02*
Pinnidae	*Pinnidae indet.*	pen shells		1				**1**		*0.01*				*0.01*
Psammobidae	*Asaphis violascens*	violet gari					1	**1**					*0.12*	*0.01*
Psammobidae	*Hiatula rupelliana*	Rupell's gari	1	4			1	**6**	*0.02*	*0.05*			*0.12*	*0.04*
Psammobidae	*Psammobidae indet.*	gari clams	1	1	1			**3**	*0.02*	*0.01*	*0.05*			*0.02*
Pteriidae	*Atrina vexillum*	Indo-Pacific pen shell		1			3	**4**		*0.01*			*0.36*	*0.02*
Pteriidae	*Pinctada margaritifera*	pearl oyster	193	90	9	1	21	**314**	*3.85*	*1.11*	*0.44*	*0.27*	*2.55*	*1.92*
Solecurtidae	*Azorinus coarctatus*	constricted azorinus					1	**1**					*0.12*	*0.01*
Spondyliae	*Spondylus marisrubri*	Red Sea thorny oyster	2	6		4		**12**	*0.04*	*0.07*		*1.1*		*0.07*
Spondyliae	*Spondylus rupellina*	Rupell's thorny oyster	1					**1**	*0.02*					*0.01*

Family	*Latin*	Common name	7A	6	12	10	8	**Total**	*7A*	*6*	*12*	*10*	*8*	*Total*
Spondyliae	*Spondylus sp.*	thorny oysters	1					**1**	*0.02*					*0.01*
Tellinidae	*Quidnipagus palatum*	rough-ridged tellin	1	5			9	**15**	*0.02*	*0.06*			*1.09*	*0.09*
Tellinidae	*Tellinella staurella*	cross tellin					1	**1**					*0.12*	*0.01*
Tridacnidae	*Tridacna sp.*	giant clam	228	574	100	10	45	**957**	*4.55*	*7.1*	*4.92*	*2.75*	*5.47*	*5.87*
Veneridae	*Circe calipyga*	Arabian circe	2					**2**	*0.04*					*0.01*
Veneridae	*Circe corrugata*	corrugated circe	38	65	17		1	**121**	*0.76*	*0.8*	*0.84*		*0.12*	*0.74*
Veneridae	*Circe sp.*	circe venus	33	40	7	2	2	**84**	*0.66*	*0.49*	*0.34*	*0.55*	*0.24*	*0.51*
Veneridae	*Dosinia radiata*	rayed venus	5	2	1			**8**	*0.1*	*0.02*	*0.05*			*0.05*
Veneridae	*Gafrarium pectinatum*	comb venus	157	42	24	2	4	**229**	*3.13*	*0.52*	*1.18*	*0.55*	*0.49*	*1.4*
Veneridae	*Marcia hiantina*	hiant venus	1	2			2	**5**	*0.02*	*0.02*			*0.24*	*0.03*
Veneridae	*Pitar sp.*	venus clam	1					**1**	*0.02*					*0.01*
Veneridae	*Tapes sulcarius*	furrowed venus	1					**1**	*0.02*					*0.01*
	Bivalvia indet.	indet. bivalve	1	3				**4**	*0.02*	*0.04*				*0.02*
Gastropoda														
Buccinidae	*Engina mendicaria*	little dove shell		3				**3**		*0.04*				*0.02*
Buccinidae	*Pisania fasciculata*	banded pisania		1				**1**		*0.01*				*0.01*
Bullidae	*Bulla ampulla*	bubble shell		1				**1**		*0.01*				*0.01*
Bursidae	*Bursa granularis*	frog shell	1	4				**5**	*0.02*	*0.05*				*0.03*
Bursidae	*Tutufa bubo*	frog shell	1					**1**	*0.02*					*0.01*
Cassidae	*Casmaria ponderosa*	helmet shell		1				**1**		*0.01*				*0.01*
Cerithiidae	*Cerithium caeruleum*	horn shell	3	30	3		2	**38**	*0.06*	*0.37*	*0.15*		*0.24*	*0.23*
Cerithiidae	*Cerithium erythraeonense*	Red Sea horn shell	5	21	5		2	**33**	*0.1*	*0.26*	*0.25*		*0.24*	*0.20*
Cerithiidae	*Cerithium sp.*	horn shells	3	4				**7**	*0.06*	*0.05*				*0.04*
Cerithiidae	*Clypeomorus sp.*	horn shell					1	**1**					*0.12*	*0.01*
Cerithiidae	*Rhinoclavis fasciatus*	horn shell	1					**1**	*0.02*					*0.01*
Conidae	*Conus arenatus*	sand cone	7	20			6	**33**	*0.14*	*0.25*			*0.73*	*0.20*
Conidae	*Conus catus*	cat cone					1	**1**					*0.12*	*0.01*
Conidae	*Conus generalis maldivas*	cone		1				**1**		*0.01*				*0.01*
Conidae	*Conus namocanus*	cone		1				**1**		*0.01*				*0.01*
Conidae	*Conus pantherina*	panther cone	1					**1**	*0.02*					*0.01*
Conidae	*Conus pennaceus*	feathered cone	1	7			1	**9**	*0.02*	*0.09*			*0.12*	*0.06*
Conidae	*Conus sp.*	cone shells	27	51	14		11	**103**	*0.54*	*0.63*	*0.69*		*1.34*	*0.63*
Conidae	*Conus striatus*	striated cone		2				**2**		*0.02*				*0.01*
Conidae	*Conus tessulatus*	orange-spotted cone					1	**1**					*0.12*	*0.01*
Conidae	*Conus textile*	textile cone	7	30		2	3	**42**	*0.14*	*0.37*		*0.55*	*0.36*	*0.26*
Conidae	*Conus vexillum*	flag cone		8	1		2	**11**		*0.10*	*0.05*		*0.24*	*0.07*

Family	*Latin*	Common name	7A	6	12	10	8	**Total**	*7A*	*6*	*12*	*10*	*8*	*Total*
Conidae	*Conus virgo*	virgin cone		3				**3**		*0.04*				*0.02*
Cymatiidae	*Charonia tritonis*	Triton's trumpet		7				**7**		*0.09*				*0.04*
Cymatiidae	*Cymatium rubeculum*	triton	1					**1**	*0.02*					*0.01*
Cymatiidae	*Cymatium sp.*	triton	1					**1**	*0.02*					*0.01*
Cymatiidae	*Cymatium trilineatum*	three-lined triton		2	1			**3**		*0.02*	*0.05*			*0.02*
Cymatiidae	*Distorsio anus*	anus shell	1		1			**2**	*0.02*		*0.05*			*0.01*
Cypraeidae	*Cypraea annulus*	gold-ringer cowrie		2				**2**		*0.02*				*0.01*
Cypraeidae	*Cypraea carneola*	carnelian cowrie		3			1	**4**		*0.04*			*0.12*	*0.02*
Cypraeidae	*Cypraea caurica*	thick-edged cowrie	2	5			1	**8**	*0.04*	*0.06*			*0.12*	*0.05*
Cypraeidae	*Cypraea grayana*	arabian cowrie	9	16	2		36	**63**	*0.18*	*0.2*	*0.1*		*4.37*	*0.39*
Cypraeidae	*Cypraea lynx*	lynx cowrie		3			2	**5**		*0.04*			*0.24*	*0.03*
Cypraeidae	*Cypraea moneta*	money cowrie	1	2			3	**6**	*0.02*	*0.02*			*0.36*	*0.04*
Cypraeidae	*Cypraea nebrites*	twin-spot/fawn cowrie					1	**1**					*0.12*	*0.01*
Cypraeidae	*Cypraea pantherina*	panther cowrie	3	4	1		2	**10**	*0.06*	*0.05*	*0.05*		*0.24*	*0.06*
Cypraeidae	*Cypraea pulchra*	beautiful cowrie		2			1	**3**		*0.02*			*0.12*	*0.02*
Cypraeidae	*Cypraea sp.*	cowries	16	18	10		11	**55**	*0.32*	*0.22*	*0.49*		*1.34*	*0.34*
Cypraeidae	*Cypraea turdus*	thrush cowrie				4		**4**				*1.1*		*0.02*
Fasciolariidae	*Fusinus leptorhynchus*	spindle shell	1	6	6	1	1	**15**	*0.02*	*0.07*	*0.3*	*0.27*	*0.12*	*0.09*
Fasciolariidae	*Fusus polygonoides*	spindle shell	1	5			1	**7**	*0.02*	*0.06*			*0.12*	*0.04*
Fasciolariidae	*Latirus polygonus*	spindle shell	1	1	2			**4**	*0.02*	*0.01*	*0.1*			*0.02*
Fasciolariidae	*Pleuroploca trapezium*	tulip shell	8	2	1		1	**12**	*0.16*	*0.02*	*0.05*		*0.12*	*0.07*
Haliotidae	*Haliotidae indet.*	abalones		1				**1**		*0.01*				*0.01*
Haliotidae	*Sanhaliotis varia*	abalone		3			1	**4**		*0.04*			*0.12*	*0.02*
Harpidae	*Harpa amouretta*	harp shell		6				**6**		*0.07*				*0.04*
Helicidae	*Helix pomatia*	edible, Roman, snail	3	3	2			**8**	*0.06*	*0.04*	*0.1*			*0.05*
Hipponicidae	*Hipponix sp.*	hoof shell		1				**1**		*0.01*				*0.01*
Littorinidae	*Littorina scabra*	periwinkle		2				**2**		*0.02*				*0.01*
Melongenidae	*Volema pyrum*	crown conch	7	28	5	4	4	**48**	*0.14*	*0.35*	*0.25*	*1.1*	*0.49*	*0.29*
Muricidae	*Chicoreus ramosus*	ram murex	7	4				**11**	*0.14*	*0.05*				*0.07*
Muricidae	*Chicoreus virgineus*	virgin murex	6	14	2	1	1	**24**	*0.12*	*0.17*	*0.1*	*0.27*	*0.12*	*0.15*
Muricidae	*Murex scolpax*	woodcock murex			1			**1**			*0.05*			*0.01*
Muricidae	*Murex tribulus*	bramble murex	1	1				**2**	*0.02*	*0.01*				*0.01*
Nassariidae	*Nassarius arcularius plicatus*	mud snail		15				**15**		*0.19*				*0.09*
Nassariidae	*Nassarius cinctellus*	mud snail		1				**1**		*0.01*				*0.01*
Nassariidae	*Nassarius protrusidens*	mud snail		1				**1**		*0.01*				*0.01*
Naticidae	*Natica gualtieriana*	Gualtier's moon snail	1	5				**6**	*0.02*	*0.06*				*0.04*

Family	*Latin*	Common name	7A	6	12	10	8	**Total**	*7A*	*6*	*12*	*10*	*8*	*Total*
Naticidae	*Polinices melanostomus*	black-mouthed moon snail	4	25				**29**	*0.08*	*0.31*				*0.18*
Naticidae	*Polinices sp.*	moon snail	6	2	1			**9**	*0.12*	*0.02*	*0.05*			*0.06*
Naticidae	*Polinices tumidus*	white moon snail	4	4				**8**	*0.08*	*0.05*				*0.05*
Neritidae	*Nerita albicilla*	ox-palate nerite	280	463	11	7	19	**780**	*5.59*	*5.73*	*0.54*	*1.92*	*2.31*	*4.78*
Neritidae	*Nerita polita*	polished nerite	38	31	1			**70**	*0.76*	*0.38*	*0.05*			*0.43*
Neritidae	*Nerita sp.*	nerites					1	**1**					*0.12*	*0.01*
Neritidae	*Nerita undata*	waved nerite	22	189	9		8	**228**	*0.44*	*2.34*	*0.44*		*0.97*	*1.40*
Neritidae	*Neritopsis radula*	trapdoor nerite		1				**1**		*0.01*				*0.01*
Olividae	*Oliva sp.*	olives	1				1	**2**	*0.02*				*0.12*	*0.01*
Patellidae	*Cellana eucosmia*	star limpet	9					**9**	*0.18*					*0.06*
Patellidae	*Patellidae indet*	limpets	3	24	3		10	**40**	*0.06*	*0.30*	*0.15*		*1.22*	*0.25*
Planaxidae	*Planaxis sulcatus*	cluster winkle	6	2				**8**	*0.12*	*0.02*				*0.05*
Potamididae	*Terebralia sp.*	telescope shells	6					**6**	*0.12*					*0.04*
Strombidae	*Lambis truncata sebae*	spider conch	266	601	54	7	74	**1002**	*5.31*	*7.43*	*2.66*	*1.92*	*8.99*	*6.14*
Strombidae	*Lambis/tricornis*	spider/tricorn conch	11				20	**31**	*0.22*				*2.43*	*0.19*
Strombidae	*Strombidae indet.*	conch	12	67	29		13	**121**	*0.24*	*0.83*	*1.43*		*1.58*	*0.74*
Strombidae	*Strombus fasciatus*	lineated conch	19	50	4	4	3	**80**	*0.38*	*0.62*	*0.20*	*1.10*	*0.36*	*0.49*
Strombidae	*Strombus gibberulus albus*	white hump-backed conch	72	183	22		11	**288**	*1.44*	*2.26*	*1.08*		*1.34*	*1.77*
Strombidae	*Strombus tricornis erythraensis*	Red Sea three-knobbed conch	109	252	66	2	78	**507**	*2.18*	*3.12*	*3.25*	*0.55*	*9.48*	*3.11*
Strombidae	*Tibia insulaechorab*	Arabian tibia	5	1				**6**	*0.10*	*0.01*				*0.04*
Strombidae	*Tibia sp.*	tibia conch	7	2				**9**	*0.14*	*0.02*				*0.06*
Terebridae	*Impages hectica*	sandbeach auger				1		**1**				*0.27*		*0.01*
Terebridae	*Terebra crenulata*	crenulate auger	7	8				**15**	*0.14*	*0.10*				*0.09*
Terebridae	*Terebra dimidiata*	orange auger	2					**2**	*0.04*					*0.01*
Terebridae	*Terebra maculata*	marlin spike	1	5			2	**8**	*0.02*	*0.06*			*0.24*	*0.05*
Terebridae	*Terebra sp.*	augers	5	8	1		4	**18**	*0.10*	*0.10*	*0.05*		*0.49*	*0.11*
Thaididae	*Drupa ricinus hadari*	Hadar’s dye shell		16	2		3	**21**		*0.20*	*0.10*		*0.36*	*0.13*
Thaididae	*Drupa sp.*	dye shell		1				**1**		*0.01*				*0.01*
Thaididae	*Morula granulata*	mulberry dye shell		1				**1**		*0.01*				*0.01*
Thaididae	*Nassa francolina*	francolin dye shell	1	2			1	**4**	*0.02*	*0.02*			*0.12*	*0.02*
Thaididae	*Rapana rapiformis*	turnip dye shell		2				**2**		*0.02*				*0.01*
Thaididae	*Thais savignyi*	Savigny’s dye shell	3	27	1			**31**	*0.06*	*0.33*	*0.05*			*0.19*
Tonnidae	*Malea pomum*	grinning tun	2	9			5	**16**	*0.04*	*0.11*			*0.61*	*0.10*
Tonnidae	*Tonna perdix*	partridge tun	5	23			3	**31**	*0.10*	*0.28*			*0.36*	*0.19*
Trochidae	*Clanculus pharaonius*	strawberry top		15			7	**22**		*0.19*			*0.85*	*0.13*
Trochidae	*Tectus dentatus*	toothed top	58	65	24	2	34	**183**	*1.16*	*0.80*	*1.18*	*0.55*	*4.13*	*1.12*

Family	Latin	Common name	7A	6	12	10	8	Total	7A	6	12	10	8	Total
Trochidae	*Tectus virgatus*	virgin top		1				**1**		*0.01*				*0.01*
Trochidae	*Trochidae indet.*	tops	28	71	2		3	**104**	*0.56*	*0.88*	*0.10*		*0.36*	*0.64*
Trochidae	*Trochus maculatus*	mottled top	7	3				**10**	*0.14*	*0.04*				*0.06*
Turbinellidae	*Vasum turbinellus*	chank	92	184	31	1	10	**318**	*1.84*	*2.28*	*1.53*	*0.27*	*1.22*	*1.95*
Turbinidae	*Turbo radiatus*	turban	2752	3968	1422	38	256	**8436**	*54.92*	*49.07*	*70.01*	*10.44*	*31.11*	*51.71*
Turridae	*Xenoturris cingulifer erythraea*	Red Sea turrid				1		**1**				*0.27*		*0.01*
Vermetidae	*Dendropoma maxima*	giant worm shell		1				**1**		*0.01*				*0.01*
Vermetidae	*Vermetus sp.*	worm shells	1					**1**	*0.02*					*0.01*
	Gastropoda indet.	indet. gastropod	2	4				**6**	*0.04*	*0.05*				*0.04*
Polyplacophora														
Chitonidae	*Acanthopleura haddoni*	Haddon's chiton	5	11	1			**17**	*0.1*	*0.14*	*0.05*			*0.1*
Cephalopoda														
Sepidae	*Sepidae. indet.*	cuttlefish	2	1	1		7	**11**	*0.04*	*0.01*	*0.05*		*0.85*	*0.07*
Cirripedes														
	Cirripedes indet.	acorn barnacle		1				**1**		*0.01*				*0.01*
	Cirripedes indet.	barnacle	3	1	4	151		**159**	*0.06*	*0.01*	*0.20*	*41.48*		*0.97*
Echinodermata														
Echinoidea	*Echinoidea indet.*	sea urchin	1	24				**25**	*0.02*	*0.30*				*0.15*
Echinoidea	*Heterocentrotus mammillatus*	pencil urchin	141	66	15		7	**229**	*2.81*	*0.82*	*0.74*		*0.85*	*1.4*
Crustacea														
Decapoda	*Decapoda indet.*	crab		9				**9**		*0.11*				*0.06*
Decapoda	*Decapoda indet.*	crab/lobster		3				**3**		*0.04*				*0.02*
Decapoda	*Palinuridae indet.*	spiny lobster		9				**9**		*0.11*				*0.06*
Polychaeta														
Serpulidae	*Serpulidae indet.*	tube worms		1			1	**2**		*0.01*			*0.12*	*0.01*
Hexacorallia														
	Hexacorallia indet.	brain coral		1				**1**		*0.01*				*0.01*
	Hexacorallia indet.	branch corals	3	35				**38**	*0.06*	*0.43*				*0.23*
	Hexacorallia indet.	mushroom corals	1	4			1	**6**	*0.02*	*0.05*			*0.12*	*0.04*
	Hexacorallia indet.	other corals	4	13			1	**18**	*0.08*	*0.16*			*0.12*	*0.11*
Octocorallia														
Tubiporidae	*Tubipora musica*	organpipe coral	5	4			2	**11**	*0.10*	*0.05*			*0.24*	*0.07*
		Total specimens	5011	8086	2031	364	823	16315						
		Total taxa	105	131	52	28	76	164						
		Average number of species per 100 specimens	*2.1*	*1.6*	*2.6*	*7.7*	*9.2*	*1.0*						

Appendix 20B. Comparison of excavated shell material: Myos Hormos and Mons Porphyrites.

Family	*Latin*	Common name	MH	MP	*MH*	*MP*
		MH = Myos Hormos, MP = Mons Porphyrites Fort				
Bivalvia						
Arcidae	*Anadara antiquata*	antique ark	113	2	*0.69*	*0.13*
Arcidae	*Anadara sp.*	ark shell	2		*0.01*	
Arcidae	*Anadara uropigimelana*	burnt end ark	13	1	*0.08*	*0.06*
Arcidae	*Arcidae indet.*	ark shells	60		*0.37*	
Arcidae	*Barbatia fusca*	dusky ark	2		*0.01*	
Cardiidae	*Cardiidae indet.*	cockles	1		*0.01*	
Cardiidae	*Fragum auricula*	heart cockle	5		*0.03*	
Cardiidae	*Trachycardium flavum*	golden cockle	14		*0.09*	
Chamidae	*Chama rupelliana*	Ruppell's jewelbox	19		*0.12*	
Chamidae	*Chamidae indet.*	jewelbox	38	4	*0.23*	*0.26*
Glycymerididae	*Glycymerididae indet.*	bittersweet clams	20	3	*0.12*	*0.19*
Glycymerididae	*Glycymeris pectunculus*	comb bittersweet	3		*0.02*	
Gryphaeidae	*Hyotissa numisma*	honeycomb oyster	1		*0.01*	
Lucinidae	*Codakia tigerina*	tiger lucine	27		*0.17*	
Lucinidae	*Ctena divergens*	divergent lucine	2		*0.01*	
Lucinidae	*Divaricella ornata*	ornate lucine	5		*0.03*	
Mesodesmatidae	*Atactodea glabrata*	surf clam	156	45	*0.96*	*2.91*
Mytilidae	*Brachiodontes variabilis*	variable ribbed mussel	6		*0.04*	
Mytilidae	*Modiolus auriculatus*	ear mussel	60		*0.37*	
Mytilidae	*Mytilidae indet.*	mussels	5		*0.03*	
Ostreidae	*Lopha Cristagalli*	cockscomb oyster	1		*0.01*	
Ostreidae	*Ostreidae indet.*	oysters	39		*0.24*	
Ostreidae	*Saccostrea cucullata*	oyster	295	10	*1.81*	*0.65*
Pectinidae	*Pectinidae indet.*	scallops	4		*0.02*	
Pinnidae	*Pinnidae indet.*	pen shells	1		*0.01*	
Psammobidae	*Asaphis violascens*	violet gari	1		*0.01*	
Psammobidae	*Hiatula rupelliana*	Rupell's gari	6	1	*0.04*	*0.06*
Psammobidae	*Psammobidae indet.*	gari clams	3		*0.02*	
Pteriidae	*Atrina vexillum*	Indo-Pacific pen shell	4		*0.02*	
Pteriidae	*Pinctada margaritifera*	pearl oyster	314	441	*1.92*	*28.56*
Solecurtidae	*Azorinus coarctatus*	constricted azorinus	1		*0.01*	
Spondyliae	*Spondylus marisrubri*	Red Sea thorny oyster	12		*0.07*	
Spondyliae	*Spondylus rupellina*	Rupell's thorny oyster	1		*0.01*	
Spondyliae	*Spondylus sp.*	thorny oysters	1		*0.01*	
Tellinidae	*Quidnipagus palatum*	rough-ridged tellin	15	1	*0.09*	*0.06*
Tellinidae	*Tellinella staurella*	cross tellin	1		*0.01*	
Tridacnidae	*Tridacna sp.*	giant clam	957	10	*5.87*	*0.65*
Veneridae	*Circe calipyga*	Arabian circe	2		*0.01*	
Veneridae	*Circe corrugata*	corrugated circe	121		*0.74*	
Veneridae	*Circe sp.*	circe venus	84		*0.51*	
Veneridae	*Dosinia radiata*	rayed venus	8		*0.05*	
Veneridae	*Gafrarium pectinatum*	comb venus	229		*1.40*	
Veneridae	*Marcia hiantina*	hiant venus	5	2	*0.03*	*0.13*
Veneridae	*Pitar sp.*	venus clam	1		*0.01*	
Veneridae	*Tapes sulcarius*	furrowed venus	1	4	*0.01*	*0.26*
	Bivalvia indet.	indet. bivalve	4		*0.02*	
Gastropoda						
Buccinidae	*Engina mendicaria*	little dove shell	3	14	*0.02*	*0.91*
Buccinidae	*Pisania fasciculata*	banded pisania	1		*0.01*	
Bullidae	*Bulla ampulla*	bubble shell	1		*0.01*	
Bursidae	*Bursa granularis*	frog shell	5		*0.03*	

Family	*Latin*	Common name	MH	MP	*MH*	*MP*
		MH = Myos Hormos, MP = Mons Porphyrites Fort				
Bursidae	*Tutufa bubo*	frog shell	1		*0.01*	
Cassidae	*Casmaria ponderosa*	helmet shell	1		*0.01*	
Cerithiidae	*Cerithium caeruleum*	horn shell	38		*0.23*	
Cerithiidae	*Cerithium erythraeonense*	Red Sea horn shell	33		*0.20*	
Cerithiidae	*Cerithium sp.*	horn shells	7	4	*0.04*	*0.26*
Cerithiidae	*Clypeomorus sp.*	horn shell	1	3	*0.01*	*0.19*
Cerithiidae	*Rhinoclavis fasciatus*	horn shell	1		*0.01*	
Conidae	*Conus arenatus*	sand cone	33		*0.20*	
Conidae	*Conus catus*	cat cone	1		*0.01*	
Conidae	*Conus generalis maldivas*	cone	1		*0.01*	
Conidae	*Conus namocanus*	cone	1		*0.01*	
Conidae	*Conus pantherina*	panther cone	1		*0.01*	
Conidae	*Conus pennaceus*	feathered cone	9	1	*0.06*	*0.06*
Conidae	*Conus sp.*	cone shells	103	1	*0.63*	*0.06*
Conidae	*Conus striatus*	striated cone	2		*0.01*	
Conidae	*Conus tessulatus*	orange-spotted cone	1		*0.01*	
Conidae	*Conus textile*	textile cone	42		*0.26*	
Conidae	*Conus vexillum*	flag cone	11	1	*0.07*	*0.06*
Conidae	*Conus virgo*	virgin cone	3		*0.02*	
Cymatiidae	*Charonia tritonis*	Triton's trumpet	7	8	*0.04*	*0.52*
Cymatiidae	*Cymatium rubeculum*	triton	1		*0.01*	
Cymatiidae	*Cymatium sp.*	triton	1		*0.01*	
Cymatiidae	*Cymatium trilineatum*	three-lined triton	3		*0.02*	
Cymatiidae	*Distorsio anus*	anus shell	2		*0.01*	
Cypraeidae	*Cypraea annulus*	gold-ringer cowrie	2		*0.01*	
Cypraeidae	*Cypraea carneola*	carnelian cowrie	4		*0.02*	
Cypraeidae	*Cypraea caurica*	thick-edged cowrie	8		*0.05*	
Cypraeidae	*Cypraea grayana*	arabian cowrie	63	8	*0.39*	*0.52*
Cypraeidae	*Cypraea lynx*	lynx cowrie	5		*0.03*	
Cypraeidae	*Cypraea moneta*	money cowrie	6		*0.04*	
Cypraeidae	*Cypraea nebrites*	twin-spot/fawn cowrie	1		*0.01*	
Cypraeidae	*Cypraea pantherina*	panther cowrie	10	44	*0.06*	*2.85*
Cypraeidae	*Cypraea pulchra*	beautiful cowrie	3		*0.02*	
Cypraeidae	*Cypraea sp.*	cowries	55	5	*0.34*	*0.32*
Cypraeidae	*Cypraea turdus*	thrush cowrie	4		*0.02*	
Fasciolariidae	*Fusinus leptorhynchus*	spindle shell	15		*0.09*	
Fasciolariidae	*Fusus polygonoides*	spindle shell	7		*0.04*	
Fasciolariidae	*Latirus polygonus*	spindle shell	4		*0.02*	
Fasciolariidae	*Pleuroploca trapezium*	tulip shell	12	2	*0.07*	*0.13*
Haliotidae	*Haliotidae indet.*	abalones	1		*0.01*	
Haliotidae	*Sanhaliotis varia*	abalone	4		*0.02*	
Harpidae	*Harpa amouretta*	harp shell	6		*0.04*	
Helicidae	*Helix pomatia*	edible, Roman, snail	8		*0.05*	
Hipponicidae	*Hipponix sp.*	hoof shell	1		*0.01*	
Littorinidae	*Littorina scabra*	periwinkle	2		*0.01*	
Melongenidae	*Volema pyrum*	crown conch	48	7	*0.29*	*0.45*
Muricidae	*Chicoreus ramosus*	ram murex	11	2	*0.07*	*0.13*
Muricidae	*Chicoreus virgineus*	virgin murex	24	3	*0.15*	*0.19*
Muricidae	*Murex scolpax*	woodcock murex	1		*0.01*	
Muricidae	*Murex tribulus*	bramble murex	2		*0.01*	
Nassariidae	*Nassarius arcularius plicatus*	mud snail	15	1	*0.09*	*0.06*
Nassariidae	*Nassarius cinctellus*	mud snail	1		*0.01*	

Family	Latin	Common name	MH	MP	MH	MP
			MH = Myos Hormos, MP = Mons Porphyrites Fort			
Nassariidae	*Nassarius protrusidens*	mud snail	1		*0.01*	
Naticidae	*Natica gualtieriana*	Gualtier's moon snail	6		*0.04*	
Naticidae	*Polinices melanostomus*	black-mouthed moon snail	29		*0.18*	
Naticidae	*Polinices sp.*	moon snail	9		*0.06*	
Naticidae	*Polinices tumidus*	white moon snail	8		*0.05*	
Neritidae	*Nerita albicilla*	ox-palate nerite	780	2	*4.78*	*0.13*
Neritidae	*Nerita polita*	polished nerite	70	1	*0.43*	*0.06*
Neritidae	*Nerita sp.*	nerites	1		*0.01*	
Neritidae	*Nerita undata*	waved nerite	228	1	*1.40*	*0.06*
Neritidae	*Neritopsis radula*	trapdoor nerite	1		*0.01*	
Olividae	*Oliva sp.*	olives	2		*0.01*	
Patellidae	*Cellana eucosmia*	star limpet	9		*0.06*	
Patellidae	*Patellidae indet*	limpets	40		*0.25*	
Planaxidae	*Planaxis sulcatus*	cluster winkle	8		*0.05*	
Potamididae	*Terebralia sp.*	telescope shells	6		*0.04*	
Strombidae	*Lambis truncata sebae*	spider conch	1002		*6.14*	
Strombidae	*Lambis/tricornis*	spider/tricorn conch	31		*0.19*	
Strombidae	*Strombidae indet.*	conch	121		*0.74*	
Strombidae	*Strombus fasciatus*	lineated conch	80	1	*0.49*	*0.06*
Strombidae	*Strombus gibberulus albus*	white hump-backed conch	288	1	*1.77*	*0.06*
Strombidae	*Strombus tricornis erythraensis*	Red Sea three-knobbed conch	507	818	*3.11*	*52.98*
Strombidae	*Tibia insulaechorab*	Arabian tibia	6		*0.04*	
Strombidae	*Tibia sp.*	tibia conch	9		*0.06*	
Terebridae	*Impages hectica*	sandbeach auger	1		*0.01*	
Terebridae	*Terebra crenulata*	crenulate auger	15		*0.09*	
Terebridae	*Terebra dimidiata*	orange auger	2		*0.01*	
Terebridae	*Terebra maculata*	marlin spike	8		*0.05*	
Terebridae	*Terebra sp.*	augers	18	3	*0.11*	*0.19*
Thaididae	*Drupa ricinus hadari*	Hadar's dye shell	21		*0.13*	
Thaididae	*Drupa sp.*	dye shell	1		*0.01*	
Thaididae	*Morula granulata*	mulberry dye shell	1		*0.01*	
Thaididae	*Nassa francolina*	francolin dye shell	4		*0.02*	
Thaididae	*Rapana rapiformis*	turnip dye shell	2		*0.01*	
Thaididae	*Thais savignyi*	Savigny's dye shell	31		*0.19*	
Tonnidae	*Malea pomum*	grinning tun	16		*0.10*	
Tonnidae	*Tonna perdix*	partridge tun	31	4	*0.19*	*0.26*
Trochidae	*Clanculus pharaonius*	strawberry top	22	17	*0.13*	*1.10*
Trochidae	*Tectus dentatus*	toothed top	183	48	*1.12*	*3.11*
Trochidae	*Tectus virgatus*	virgin top	1		*0.01*	
Trochidae	*Trochidae indet.*	tops	104	3	*0.64*	*0.19*
Trochidae	*Trochus maculatus*	mottled top	10		*0.06*	
Turbinellidae	*Vasum turbinellus*	chank	318	1	*1.95*	*0.06*
Turbinidae	*Turbo radiatus*	turban	8436		*51.71*	
Turridae	*Xenoturris cingulifer erythraea*	Red Sea turrid	1		*0.01*	
Vermetidae	*Dendropoma maxima*	giant worm shell	1		*0.01*	
Vermetidae	*Vermetus sp.*	worm shells	1		*0.01*	
	Gastropoda indet.	indet. gastropod	6	5	*0.04*	*0.32*
Polyplacophora						
Chitonidae	*Acanthopleura haddoni*	Haddon's chiton	17		*0.10*	
Cephalopoda						
Sepiidae	*Sepia sp.*	cuttlefish	11		*0.07*	
Cirripedes						

Family	*Latin*	Common name	MH	MP	*MH*	*MP*
			MH = Myos Hormos, MP = Mons Porphyrites Fort			
	Cirripedes indet.	acorn barnacle	1		*0.01*	
	Cirripedes indet.	barnacle	159		*0.97*	
Echinodermata						
Echinoidea	*Echinoidea indet.*	sea urchin	25		*0.15*	
Echinoidea	*Heterocentrotus mammillatus*	pencil urchin	229	1	*1.40*	*0.06*
Crustacea						
Decapoda	*Decapoda indet.*	crab	9		*0.06*	
Decapoda	*Decapoda indet.*	crab/lobster	3		*0.02*	
Decapoda	*Palinuridae indet.*	spiny lobster	9		*0.06*	
Polychaeta						
Serpulidae	*Serpulidae indet.*	tube worms	2	2	*0.01*	*0.13*
Hexacorallia						
	Hexacorallia indet.	brain coral	1		*0.01*	
	Hexacorallia indet.	branch corals	38	6	*0.23*	*0.39*
	Hexacorallia indet.	mushroom corals	6		*0.04*	
	Hexacorallia indet.	other corals	18	1	*0.11*	*0.06*
Octocorallia						
Tubiporidae	*Tubipora musica*	organpipe coral	11	1	*0.07*	*0.06*
		Total specimens	**16315**	**1544**		
		Total taxa	**164**	**45**		
		Average number of species per 100 specimens	***1***	***3***		

Appendix 20C. Shell species recorded at Quseir al-Qadim (Islamic Period), in each case, data is presented for total count and for percentage.

Family	*Latin*	Common name	13	16	1	3	**Total**	*13*	*16*	*1*	*3*	***Total***
Bivalvia												
Arcidae	*Anadara antiquata*	antique ark	1				**1**	*0.51*				*0.16*
Arcidae	*Anadara uropigimelana*	burnt end ark	1				**1**	*0.51*				*0.16*
Arcidae	*Barbatia helblingi*	Helbling's ark	1				**1**	*0.51*				*0.16*
Cardiidae	*Trachycardium flavum*	golden cockle				1	**1**				*0.40*	*0.16*
Chamidae	*Chamidae indet.*	jewelbox	8	11	2	18	**39**	*4.06*	*8.53*	*4.65*	*7.11*	*6.27*
Gryphaeidae	*Hyotissa numisma*	honeycomb oyster				2	**2**				*0.79*	*0.32*
Lucinidae	*Codakia tigerina*	tiger lucine			1	1	**2**			*2.33*	*0.40*	*0.32*
Mesodesmatidae	*Atactodea glabrata*	surf clam	4	4			**8**	*2.03*	*3.10*			*1.29*
Mytilidae	*Modiolus auriculatus*	ear mussel				9	**9**				*3.56*	*1.45*
Mytilidae	*Mytilidae indet.*	mussels	10	8			**18**	*5.08*	*6.20*			*2.89*
Ostreidae	*Ostreidae indet.*	oysters	1				**1**	*0.51*				*0.16*
Ostreidae	*Saccostrea cucullata*	oyster	4	1			**5**	*2.03*	*0.78*			*0.80*
Pectinidae	*Pectinidae indet.*	scallops		1			**1**		*0.78*			*0.16*
Psammobidae	*Hiatula rupelliana*	Rupell's gari		2			**2**		*1.55*			*0.32*
Pteriidae	*Pinctada margaritifera*	pearl oyster	37	22	7	50	**116**	*18.78*	*17.05*	*16.28*	*19.76*	*18.65*
Tellinidae	*Quidnipagus palatum*	rough-ridged tellin				6	**6**				*2.37*	*0.96*
Tridacnidae	*Tridacna sp.*	giant clam	6	7	9	56	**78**	*3.05*	*5.43*	*20.93*	*22.13*	*12.54*
Veneridae	*Circe corrugata*	corrugated circe	3	2			**5**	*1.52*	*1.55*			*0.80*
Veneridae	*Marcia hiantina*	hiant venus	1				**1**	*0.51*				*0.16*
Gastropoda												
Buccinidae	*Engina mendicaria*	little dove shell				2	**2**				*0.79*	*0.32*
Cerithiidae	*Cerithium caeruleum*	horn shell	1	1			**2**	*0.51*	*0.78*			*0.32*
Conidae	*Conus sp.*	cone shells	8	3		8	**19**	*4.06*	*2.33*		*3.16*	*3.05*
Conidae	*Conus taeniatus*	cone				1	**1**				*0.40*	*0.16*
Conidae	*Conus textile*	textile cone	1				**1**	*0.51*				*0.16*
Conidae	*Conus virgo*	virgin cone				1	**1**				*0.40*	*0.16*
Cypraeidae	*Cypraea asellus*	little donkey cowrie	1				**1**	*0.51*				*0.16*
Cypraeidae	*Cypraea caurica*	thick-edged cowrie		1		2	**3**		*0.78*		*0.79*	*0.48*
Cypraeidae	*Cypraea grayana*	arabian cowrie	1				**1**	*0.51*				*0.16*
Cypraeidae	*Cypraea lynx*	lynx cowrie				1	**1**				*0.40*	*0.16*
Cypraeidae	*Cypraea moneta*	money cowrie	22	2	2	3	**29**	*11.17*	*1.55*	*4.65*	*1.19*	*4.66*
Cypraeidae	*Cypraea nebrites*	twin-spot/fawn cowrie		1			**1**		*0.78*			*0.16*

Family	*Latin*	Common name	13	16	1	3	**Total**	*13*	*16*	*1*	*3*	***Total***
Cypraeidae	*Cypraea nucleus*	nucleus cowrie	1				**1**	*0.51*				*0.16*
Cypraeidae	*Cypraea pantherina*	panther cowrie	1		1		**2**	*0.51*		*2.33*		*0.32*
Cypraeidae	*Cypraea sp.*	cowries	2	5	1	4	**12**	*1.02*	*3.88*	*2.33*	*1.58*	*1.93*
Cypraeidae	*Cypraea turdus*	thrush cowrie		1			**1**		*0.78*			*0.16*
Fasciolariidae	*Pleuroploca trapezium*	tulip shell				1	**1**				*0.40*	*0.16*
Harpidae	*Harpa amouretta*	harp shell	1				**1**	*0.51*				*0.16*
Naticidae	*Polinices melanostomus*	black-mouthed moon snail		2			**2**		*1.55*			*0.32*
Neritidae	*Nerita albicilla*	ox-palate nerite	8	6	2	26	**42**	*4.06*	*4.65*	*4.65*	*10.28*	*6.75*
Neritidae	*Nerita polita*	polished nerite	1				**1**	*0.51*				*0.16*
Neritidae	*Nerita undata*	waved nerite	1				**1**	*0.51*				*0.16*
Olividae	*Oliva sp.*	olives	3			1	**4**	*1.52*			*0.4*	*0.64*
Patellidae	*Patellidae indet*	limpets	12	14	3	4	**33**	*6.09*	*10.85*	*6.98*	*1.58*	*5.31*
Pyramidellidae	*Otopleura mitralis*	pyramid shell				1	**1**				*0.4*	*0.16*
Siphonariidae	*Siphonaria sp.*	false limpet				1	**1**				*0.4*	*0.16*
Strombidae	*Lambis truncata sebae*	spider conch	7	3	4	16	**30**	*3.55*	*2.33*	*9.30*	*6.32*	*4.82*
Strombidae	*Strombidae indet.*	conch	2				**2**	*1.02*				*0.32*
Strombidae	*Strombus erythrinus*	elegant conch	1				**1**	*0.51*				*0.16*
Strombidae	*Strombus fasciatus*	lineated conch	2	2			**4**	*1.02*	*1.55*			*0.64*
Strombidae	*Strombus gibberulus albus*	white hump-backed conch	15	5	1	6	**27**	*7.61*	*3.88*	*2.33*	*2.37*	*4.34*
Strombidae	*Strombus mutabilis*	conch				1	**1**				*0.4*	*0.16*
Strombidae	*Strombus tricornis erythraensis*	Red Sea three-knobbed conch	1	4	1	9	**15**	*0.51*	*3.1*	*2.33*	*3.56*	*2.41*
Thaididae	*Morula granulata*	mulberry dye shell				1	**1**				*0.4*	*0.16*
Thaididae	*Nassa francolina*	francolin dye shell	2				**2**	*1.02*				*0.32*
Thaididae	*Thais savignyi*	Savigny's dye shell				1	**1**				*0.4*	*0.16*
Tonnidae	*Malea pomum*	grinning tun				1	**1**				*0.4*	*0.16*
Tonnidae	*Tonna perdix*	partridge tun			1	1	**2**			*2.33*	*0.4*	*0.32*
Trochidae	*Clanculus pharaonius*	strawberry top				2	**2**				*0.79*	*0.32*
Trochidae	*Tectus dentatus*	toothed top		1	1	4	**6**		*0.78*	*2.33*	*1.58*	*0.96*
Trochidae	*Trochidae indet.*	tops		1		2	**3**		*0.78*		*0.79*	*0.48*
Turbinellidae	*Vasum turbinellus*	chank	1	1			**2**	*0.51*	*0.78*			*0.32*
Turbinidae	*Turbo radiatus*	turban	16	8	6	10	**40**	*8.12*	*6.20*	*13.95*	*3.95*	*6.43*
Vermetidae	*Vermetus sp.*	worm shells			1		**1**			*2.33*		*0.16*
Polyplacophora												
Chitonidae	*Acanthopleura haddoni*	Haddon's chiton	1	3			**4**	*0.51*	*2.33*			*0.64*

Family	*Latin*	Common name	13	16	1	3	**Total**	*13*	*16*	*1*	*3*	***Total***
Echinodermata												
Echinoidea	*Heterocentrotus mammillatus*	pencil urchin	6	6			**12**	*3.05*	*4.65*			*1.93*
Hexacorallia												
	Hexacorallia indet.	mushroom corals	1				**1**	*0.51*				*0.16*
Octocorallia												
Tubiporidae	*Tubipora musica*	organpipe coral	1	1			**2**	*0.51*	*0.78*			*0.32*
		Total specimens	**197**	**129**	**43**	**253**	**622**					
		Total taxa	**40**	**30**	**16**	**34**	**67**					
		Average number of species per 100 specimens	*20.3*	*23.3*	*37.2*	*13.4*	*10.8*					

21 Matting, Basketry and Cordage

Fiona J. L. Handley

Introduction

The excavations at Quseir produced a huge amount of matting, basketry and cordage from both the Roman and Islamic occupations at the site. The quantities made recording difficult, as with only a short field season and limited possibilities for storing materials from year to year, often only quite superficial recording took place as a necessity. The main area where information is lacking is in fibre identification, but this is probably a project in its own right. Analysis of the Roman period materials has been facilitated by the publication of comparative assemblages of materials from Mons Porphyrites (Peacock 2007a), sites further afield such as En Rahel (Shamir 1999) and Masada (Bernick 1994), and discussion in publications such as that from the Dakhleh Oasis (Bowen 1999). Above all, it is the work of André Veldmeijer and Willeke Wendrich at Berenike which has set global benchmarks for the recording and analysis of cordage and basketry (Veldmeijer 1998; 1999; 2004; 2005; Veldmeijer and Van Rode 2004; Wendrich 1995; 1998; 1999; 2000; 2007; Wendrich and Veldmeijer 1996). However, for the Islamic period, there is less comparable published material, with only one report (Baginski and Shamir 1998) from Jazirat Faraíun (Coral Island), and little material from Egyptian excavations so far published, apart from some pieces from the previous Chicago excavations at Quseir al-Qadim by Whitcomb (1979a).

This report was compiled from the work of three people who recorded the basketry, matting and cordage at different times at Quseir; the writer (1999-2000), Susan Richardson (2001-2002) and James Philips (2003).[1] Bringing together the recording systems of three different people has been challenging, and inevitably, some of the analysis has suffered. In particular, it has been impossible to create detailed characterisation of the bulk cordage and palm plait matting finds, or analyse their distribution across the site. Observations on these categories of finds therefore remain very general, and this report focuses on presenting a catalogue. The recording of spin and ply of cordage follow Wendrich's (1994) classification system, whereby the initial letter indicates the spin of the fibre, the next letter the ply and the following number the number of strands that make up the ply. Further plies are denoted by a bracketed Z or S, followed by the number of plies making up that ply. The recording here replaces previous spin and ply classifications published in previous interim reports. The definitions of rope and string follow those of Veldmeijer (2005). This report and catalogue presents an overview of the main find types and catalogues more interesting finds individually.

In terms of technique, form and materials used, the local assemblages from the two time periods are directly comparable, and are obviously part of a continuous tradition of regional production that can be traced from the Pharaonic period to the current day in Egypt. In both periods there are few examples of applied decoration, apart from the small number of pieces of cordage which were probably part of the dress of the period, and very rare examples of, for example, stitching in coloured wool. There is also little variation in form, with slight differences probably reflecting changes in other types of material culture than a change in the tradition of production, for example, pot cover diameters would reflect the size of the vessels they were covering. Distribution at the site was mostly limited to deep *sebakhs* where there was excellent organic preservation, although pieces of matting were occasionally found *in situ* in the remains of buildings.

The sources of the materials used in both periods seem reasonably secure. Most of the vegetable materials probably originated in the Nile Valley, either as finished products or as raw or semi-processed materials, although some reeds and grasses may have come from Bir al-Ambaji, 6 km southwest of the site and the nearest source of materials. Animal fibre (wool and goat hair) would possibly be locally produced, although again it would seem likely that some arrived from the Nile Valley. The plaited palm matting, and some of the woven grass roofing material probably arrived ready made (Fig. 21.1 for a photo of roofing material). This woven grass retains much of its

[1] The matting, basketry and cordage at Quseir were recorded using several different recording systems. Some are numbered with the prefix CB (e.g. CB331), others with the year of discovery and an M (matting), B (basketry) or C (cordage) number (e.g. 00C071). In previous publications the latter have appeared with the prefix QAQ which has been left off here for the sake of expediency.

depth, suggesting that it was used mainly as roofing, rather than matting. The other source of materials are of course the places to which Myos Hormos and Quseir were connected through trade. The general uniformity of the assemblage makes anything slightly unusual very distinctive, and the most obvious explanation for variations is trade, though of course without further analysis, particularly of fibres, it is hard to pinpoint the origins of the materials or objects. However, there is increasing evidence for a semi-permanent Indian population at Myos Hormos, and close links to the Yemen during the Islamic period, and these would both seem likely candidates for producing basketry, cordage and matting. Wendrich's identification of matting from India at Berenike (Wendrich 2007) is as yet unmatched at Quseir, although in the late Ayyubid period there is a textual reference to a rope or hawser from Yemen found in a Quseiri document (Regourd, this volume Chapter 24). Presumably a proportion of the bulk matting and cordage was exotic, although this is difficult to assess. Berenike, for the Roman period (Veldmeijer 1998; 1999; 2004; 2005; Veldmeijer and Van Rode 2004; Wendrich 1995; 1998; 1999; 2000; 2007; Wendrich and Veldmeijer 1996) and Coral Island for the Islamic (Baginski and Shamir 1998), had similar if not identical trading connections which may explain the similarities in material with that of Quseir. Data from other excavations in Egypt for both periods is required to highlight the different nature of the Red Sea ports.

Figure 21.1. Example of roofing material.

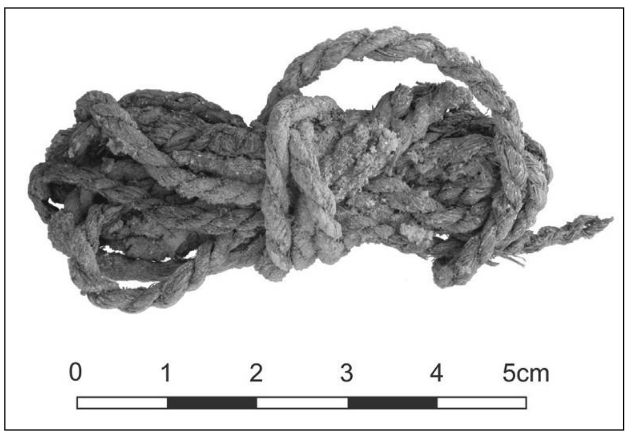


Figure 21.2. Typical rope.

21.1 Roman Matting, Basketry and Cordage

The Roman materials were concentrated in the *sebakh* deposits uncovered in the years 2000-2003. The dry conditions in these trenches meant that preservation was excellent, though the relative sturdiness of some of the cordage, perhaps because it had been treated, meant that it did survive in some contexts with a high water content. Overall the finds reflect Myos Hormos as both a port and a place where people lived, with a mixture of maritime finds, objects that were used around the home, as well as many artefacts related to transport. In particular, the matting, basketry and cordage reveal a good cross section of the ways that objects and materials were carried or transported. Light, bulky materials could be carried in foldable mat carriers, or in open net rope carriers, which could also be used as 'tarpaulins' on decks of ships. Amphorae could be carried in open-bottomed bags or in special rope carriers with their spikes sticking through a grommet. Smaller ceramics were transported in carrier nets, sometimes lined to stop items falling through the mesh. Crates and tub shaped baskets must have had a variety of purposes for storing and moving things around the home or harbour, while smaller things were kept more securely in lidded basketry pots.

Brushes are another important assemblage from Myos Hormos. Some were simply made from grass fibre or palm leaf bound with string, but the sophistication and consistency of the construction of the fan shaped sweeping brushes suggests that these were made and sold by specialists rather than in the household. Other shapes of brush suggest that these were perhaps used as 'bottle' brushes for cleaning inside pots or pipes, and one obviously got dropped in a bucket of pitch. The assemblage highlights the links between different categories of objects, and in particular there seems to be connections between a type of small mat, rope sandal soles, and possibly fishing nets, and it may be that all were made at Myos Hormos by one group in the community, the most obvious candidates being sailors, who were presumably expert rope workers, filling their time while waiting to crew boats.

Cordage
Large quantities of rope and string must have been used around boats, ships and their cargoes at Myos Hormos. In comparison with the Islamic assemblage at the site, the Roman cordage is surprisingly diverse (though this may be a result of the differential survival of the Islamic material), suggesting either a wider variety of fibres was used to create rope (i.e. rope production was less centralised), or ropes came from a wider range of sources.

A sample of 704 pieces of rope and string collected from Roman Trenches (6A, 6B, 6C, 6D, 6E, 6G, 6H and 7) show that 72% were z spun. A third of the rope was in coarse grass fibre, spun as either zS2 or zS3, in a range of diameters from thick string to rope (see Fig. 21.2 for typical rope CB423). This was the everyday rope used in the town, for example it has been found attached to amphora handles, stakes and to various pieces of matting, roofing and saddlery. 17% of the rope was in a stiffer, whole grass or reed (see Figure 21.3 CB426), the use of which is not clear, although there were two examples of it being used as handles. The spin of this rope was variable with two thirds being s spun, suggesting more that one production centre for these ropes. 13% of the rope recorded in this sample was of a fine fibred bast, with a regular z spin in a variety of plies and qualities, though mostly in string dimensions. A similar fibre, that seems to have been treated to give it a harder finish, was used in ropes which were of obvious nautical function. Although they all had diameters of less than 2.5 cm, the plies ranged up to zS2[Z]3, and seemed evenly divided into s and z spins, again suggesting a variety of origins.

Unworked fibre (Fig. 21.4)
This is fibre that has not been spun or been worked into an object, but has been collected in preparation to be used.
1. Coil of palm fibre. 6 x 4 cm [CB331 from Tr. 6Q (4170)].
2. Bundle of grass. 5 x 2.5 cm [CB351 from Tr. 6Q (4170)].
3. Bundle of reeds held with palm leaf in a granny knot and a slither of wood acting as a wedge to keep the knot tight. 30 x 3 cm [Reed 1, Tr. 6B (4007)]. .

String, Rope and Knots (Fig. 21.5)
The most interesting examples of string, rope, and knots have been chosen here to represent the wide variety in the assemblage.
4. Rope, two pieces of zS20[Z]3 bast rope bound together with zS2, probably as a lengthener, cut ends. Each rope 2.8 cm wide. 29.5 x 6.0 cm [CB424 fromTr. 6PX (4110)].
5. Coil of rope, zS2[Z]2 in palm sheath fibre. 15.5 x 10.5 cm [CB426 from Tr. 6Q (4166)].
6. Rope with looped ends, three examples [CB427 from Tr. 6Q (4170)].
7. Two circles of grass rope zS3[Z]3 [CB428 from Tr. 6G (4160)].
8. Rope constructed from fine fishing net with mesh knots in sZ2 formation [00C071 from Tr. 6B (4007)].
9. Knot, possibly decorative, in zS4 palm. [00C141 from Tr. 6H (4030)]. Not illustrated.

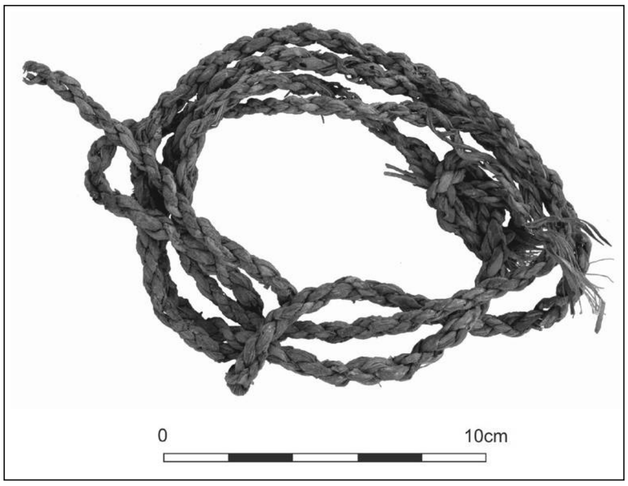


Figure 21.3. Stiff fibred rope.

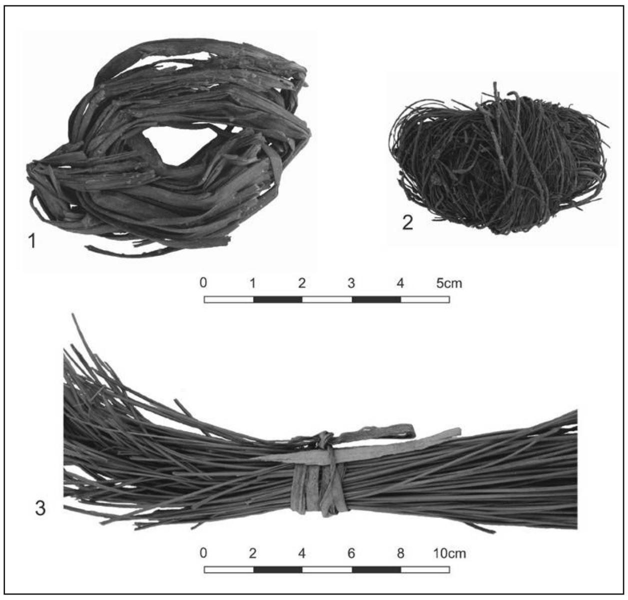


Figure 21.4. Unworked fibre. Nos 1-3.

10. Decorative knot work in zS3 string, with loop [00C182 from Tr. 7 (5002)]. Not illustrated.
11. Braid in complex plaited construction. 24 x 0.6 cm [CB440 from Tr. 6Q (4170)].
12. Rough grass rope zS3 with crown stopper knot. Rope length 6 cm, width 1.04 cm. Stopper 3.06 x 3.03 x 1.66 cm. [CB167 from Tr. 8 (8363)].
13. Crown stopper knot. c 30 x 5 cm [CB408 from Tr. 6Q (4170)].
14. Thick rope, in sZ3 hemp, with thumb knot [CB468 from Tr. 6G (4160)].

Sewn palm fibre plait sheets
Fragments of sewn palm fibre plait sheets were a distinctive component of almost all the contexts with good organic preservation across the site, reflecting the widespread use of this material, as floor coverings, roofing, awnings, and lightweight walls. The most common type of sheet was made from palm leaf strip plaited into 2/2/1 strips, and then sewn together. The method of attaching the strips, either using unspun strips of palm leaf, or zS2 grass

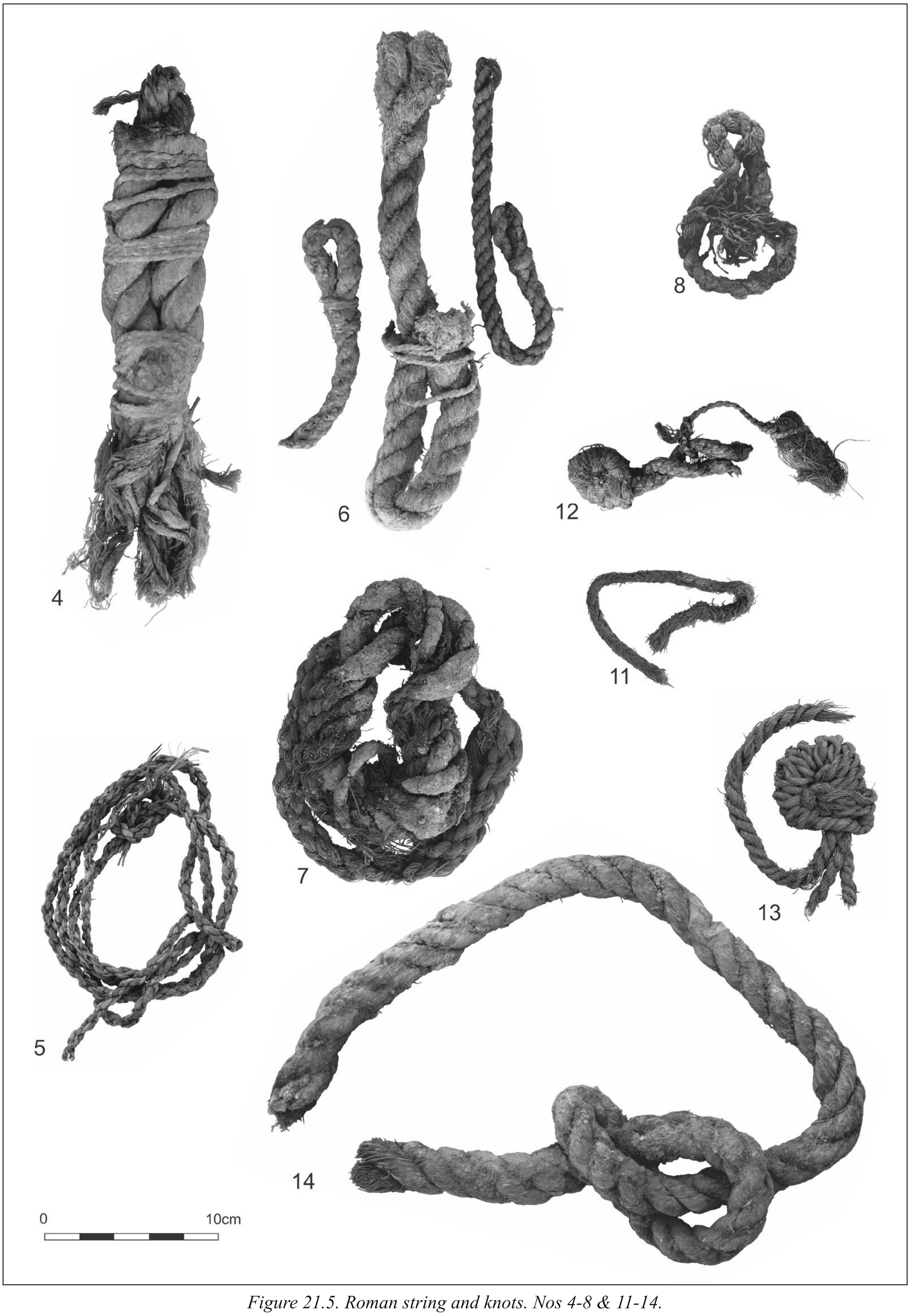


Figure 21.5. Roman string and knots. Nos 4-8 & 11-14.

string, differentiates two production centres, with string associated with the northern Nile Valley, and leaf strips with the southern Nile Valley (Wendrich 1999, 284). From the 54 samples from the 2000 season, twenty-three were held with palm leaf strips and 31 with string, suggesting a roughly even division between sources with a slight bias to the north. Those held with leaf strips tend to be sewn from plaits wider than 8 cm constructed from palm leaves measuring between 0.5-1.2 cm. In contrast, those held with string are sewn from plaits between 2.5-7 cm wide constructed from palm leaves a more uniform 0.4-0.6 cm wide. The only decoration associated with these mats was a rope effect edge, created by twining and plying grass string through the edge of the plaited strips. As well as this type of sheet which dominated the assemblage, there were a wide variety of other sewn plaited sheets, most often in a 1/1 structure, but with varying degrees of strip and plait widths, from a five plait strip 3 cm wide, to a 33 strip plait over 30 cm wide. Figure 21.6 shows a fragment of sewn palm fibre plait sheet with thirty-one strips. The ridges are visible where the sheets are sewn together, and the top has been cut and hemmed down.

15. Fragment of sewn palm fibre plait sheet [CB0217 from Tr. 6P (4120)] (Fig. 21.6).

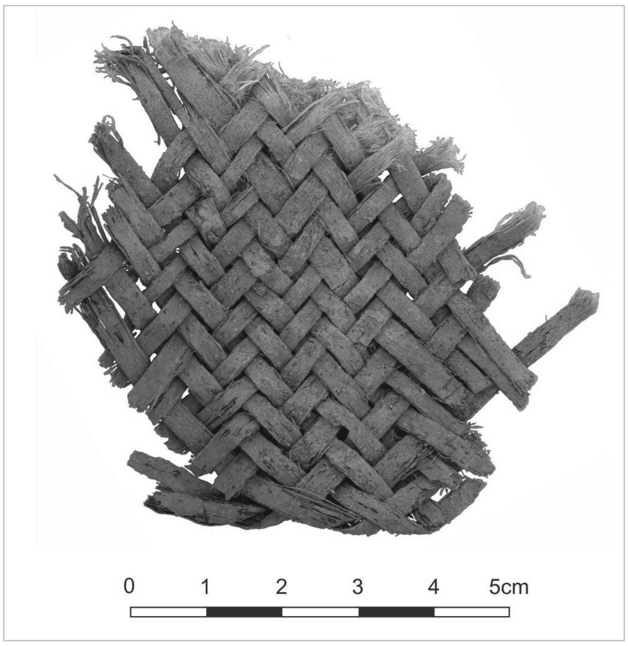


Figure 21.6. Fragment of sewn palm fibre mat comprised of 31 strips. No. 15.

Small mats (Fig. 21.7)

Twenty seven examples were found of a distinctive type of small mat measuring 19 x 10 cm to 25 x 11 cm which was perhaps a buffer or fender or saddlery packing. They were constructed from zS2 bast fibre rope, wound around a frame between 19 and 25 cm apart. The rope is held by passing, either with a needle or a hook, a piece of zS2 bast string through the ply of the rope, which is returned through the next ply (this was deduced by examining the selvedges, and by noting that the thinner string does not always pass cleanly through the ply of the rope, therefore the rope is the passive, not active system, thus ruling out twining as a construction technique). The construction is similar to sewn string matting identified at Berenike (Wendrich 1998, 260) and is identical to that of the rope sandal soles. Indeed some of the more fragmentary examples recorded as the latter may in fact be these mats. However, the wear and impressions on them are very distinct from the shoes.

16. Small pad constructed by sewing rope by splitting the ply. Rope is zS2 bast. Marked on both sides by indentation from a sharp heavy object being pressed against it. 23 x 11 cm [00M057 from Tr. 6H (4030)] (Fig. 21.7).

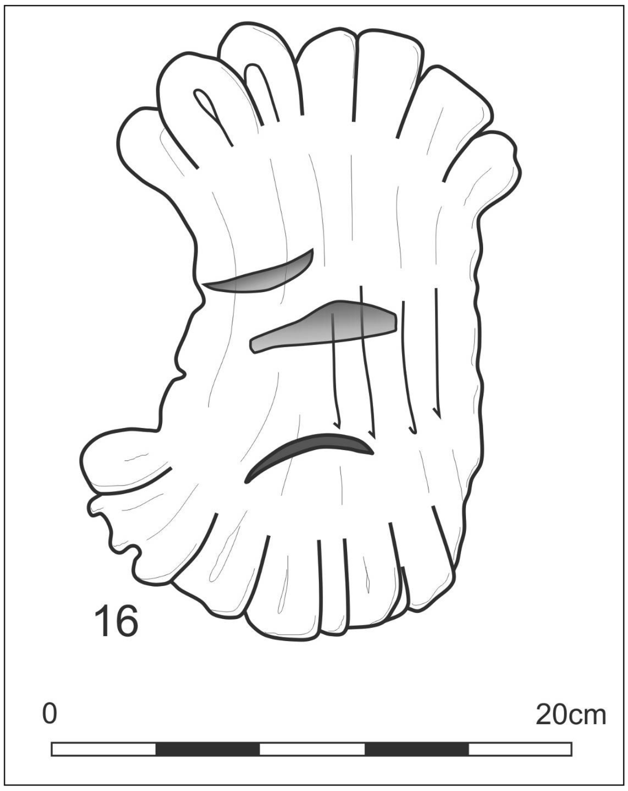


Figure 21.7. Roman small mat. No. 16.

Rigid containers and baskets

These objects were generally very fragmentary as rigid structures are easily broken or crushed both before and after deposition. The large numbers of twined fragments surviving with an open, straight structure, suggest that lightweight crates were probably the most common baskets at the site, being quick to make and relatively disposable. Containers made from palm leaf strip plaits are also delicate, and the two examples found here have been identified because of their reinforcing, in both instances, with leather. The stake and strand containers seem generally more robust and to have come from tub shaped baskets.

17. Fragment of base of possible basket in a woven technique. A large bundle of palm leaves is braided out from the centre (over 2 under 2), presumably more is added. The bundle of leaves is clearly visible on the reverse. 6 x 5 cm [00B032 from Tr. 6H (4030)]. Not illustrated.

Coiled technique (Fig. 21.8)
Five containers were recorded that were made in the coiled technique. This involves a passive system, usually a bundle of stiff grass or cane, being bound with an active system, usually palm leaf, which both secures the bundles and creates the shape of the object.
18. Small dish in coiled technique. Passive system bundles of split reed, active system split reed. External spiral e direction. Height 3.2 cm, diameter of mouth 6.0 cm [CB152 from Tr. 6H (4095)].
19. Small container in coiled technique, passive system split reed, active system palm leaf, with attached string. One end closed by strip of leather 1.5 cm wide wrapped around one end and double stitched with leather thong. 6.1 x 3.3 cm [CB153 from Tr. 6P (4105)].
20. Basket, bucket shaped, in coiled technique. Passive system is split cane, active system is palm leaf. Opening is 14 cm in diameter (no height measurement) [CB339 from Tr. 6Q 4165].
21. Fragment of side of vessel in coiled technique. Passive system is stiff grass 0.6 cm wide, active system is palm leaf 0.25 cm wide. From a vessel of diameter 28 cm Contains pitch. 17 x 2.8 cm [00B030 from Tr. 6H (4030)]. Not illustrated.
22. Unusual basket in coiled technique. Passive system black palm leaf sheath, 0.7 cm wide. Active system very damaged but a combination of z spun bast or possibly cotton threads 0.2 cm wide, and palm leaf. Appearance similar to amphorae cover CB026. Base 5.4 cm diameter. 9 cm height, mouth 17 cm diameter [CB167a from Tr. 6H (4075)].

Twining (Fig. 21.9)
Out of the ten examples, seven were twined with an s twist and three with a z twist, in contrast to Berenike were z twist twining predominates (Wendrich 1995, 72). The s twist is typically Egyptian, which suggests that Myos Hormos, like Berenike, did have some basketry from further south.
23. Centre of base of basket in 2-strand twined technique. Both systems in grass, twined in an s twist. 10 cm diameter [CB420 from Tr. 6Q (4170)]
24. Fragment of basket in 2-strand twined technique with an s twist, very open. Repaired with zS2 string 6 x 3.5 cm [CB337 from Tr. 6Q (4170)].
25. Fragment of basketry in 2-strand twined technique. Passive system is a wide black grass or palm leaf 1.0 cm wide. The active systems are in the same fibre, 0.4 cm wide, twined with a z twist [00B022 from Tr. 6B (4008)]. Not illustrated.
26. Fragment of basketry in 2-strand twined technique, very fragile. Passive system is a thick white palm fibre 0.5-1.1 cm wide, the active systems are in the same fibre 0.5 cm wide, twined with an s twist [00B027 from Tr. 6H (4030)].
27. Fragment of side of vessel in 2-strand twined technique. Passive system is unknown variety of twig 0.3 cm wide, active systems are palm leaves 0.1 cm wide, twined with a z twist. From a vessel of diameter 36 cm. 3.5 x 3.5. cm [00B031from Tr. 6H (4030)]. Not illustrated.
28. Platter or shallow bowl in 2-strand twined technique. Passive system is stiff grass 0.3 cm wide, active systems stiff grass 0.3 cm wide, twined with an s twist. The rim is formed from the passive system plied in an s direction. Form is crushed and folded. Diameter up to 40 cm across [00B033 from Tr. 6H (4030)].
29. Fragment of vessel base in 2-strand twined technique. Passive system is unknown variety of twig 0.3 cm wide, passive systems are whole strands of grass 0.2 cm wide, twined with a z twist. 4 x 2.5 cm [00B034 from Tr. 6G (4025)]. Not illustrated.
30. Two fragments of basket in 2-strand twined technique. Passive system in whole reed, active systems in same, twined with an s twist. Open structure, slightly fanning. 15 x 9 cm, 14 x 4.5 cm [CB338 from Tr. 6P (4100)].
31. Fragment of basket or screen in 2-strand twined technique. Passive system is whole reed, active systems is same, twined with an s twist. 4.9 x 5.9 cm [CB253 from Tr. 6Q (4165)].
32. Fragment of basket in 2-strand twined technique. Passive system is paired thick grass, active systems are thick grass twined with an s twist. 15 x 8.5 cm [CB419 from Tr. 6PX (4110)].

Stake and strand (Fig 21.10)
There were three examples of stake and strand basketry, in which the passive system is woven together by the active system.
33. Basket base fragment in stake and strand technique. Passive system is split reed 0.6 cm wide, active system is split reed 0.4 cm wide. 10 x 10 cm. [00B028 from Tr. 6H (4030)]. Not illustrated.
34. Fragment of side of basket in stake and strand technique. Passive system is whole grass in bunches 1.5 cm wide, active system is single strands of whole grass 0.3 cm wide. Passive system almost covered by active system. Slightly flared shape shows that this was from a large tub like basket probably 70 cm in diameter. 14 x 27 cm [00B045 from Tr. 7 (5002)].
35. Basket fragment in stake and strand technique. Passive system 7 or 8 strands of split reed approximately 2 cm wide. Active system split reed 0.3 cm wide. 18 x 17 cm [CB144 from Tr. 6P (4100)].

Sewn plaited strips (Fig. 21.10)
This is the same technique as described above for sewn plaited palm strip sheets, however in this case, the long strips are sewn in a spiral to create a container rather than a flat sheet.
36. Fragment of sewn palm plait basket with leather edging stitched at outer edge. Passive system palm leaf, 0.5 cm wide, active system palm leaf 0.5 cm wide. 9.0 x 4.6 cm [CB151 from Tr. 6P (4100)]. Not illustrated.
37. Basket or lid, almost complete, lined on both sides with leather (only fragments remain) sewn to the basket with bast sZ2 and sealed with pitch. Internal spiral in e orientation. In palm fibre 1/1 in 0.7cm wide strips. Two

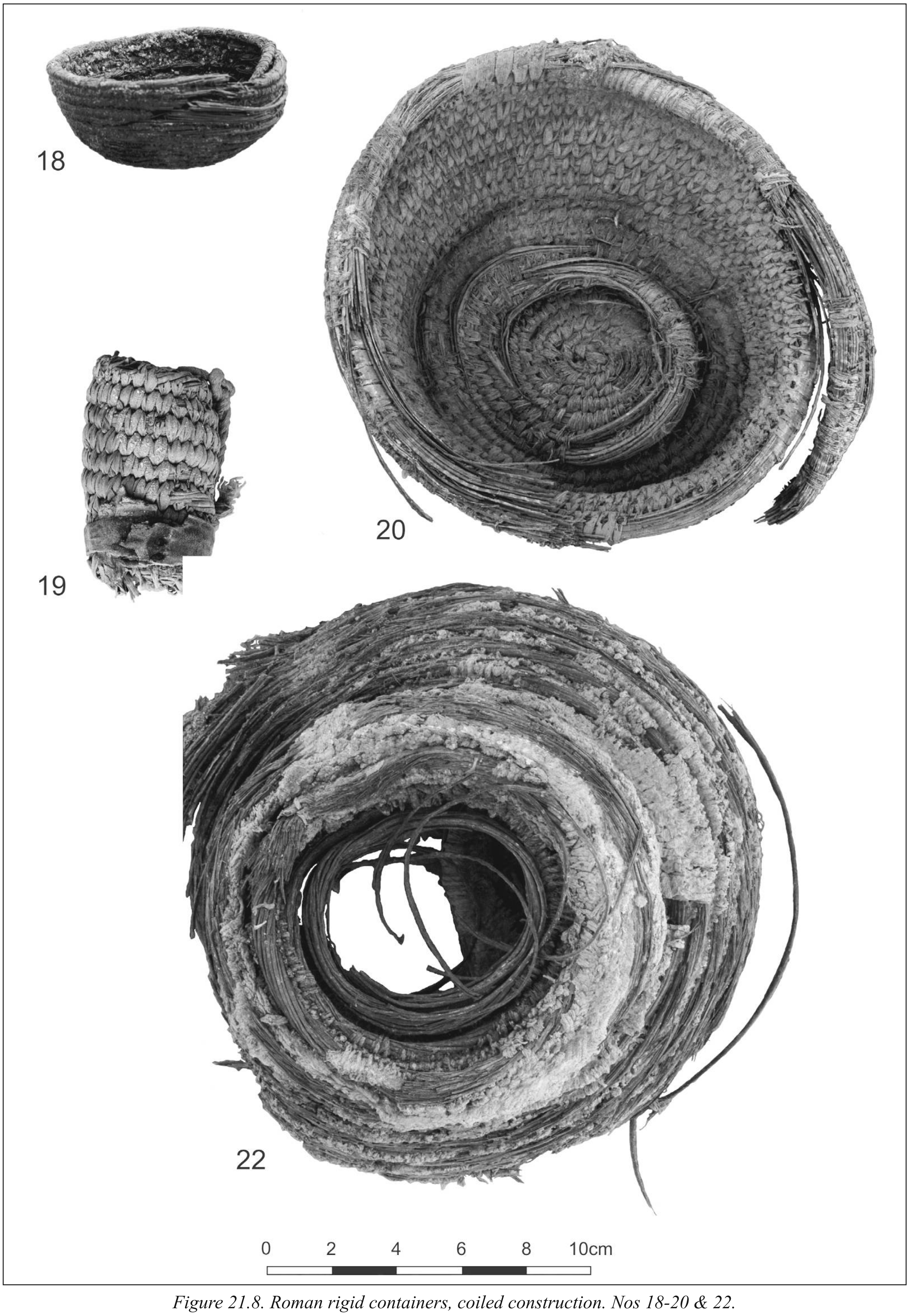


Figure 21.8. Roman rigid containers, coiled construction. Nos 18-20 & 22.

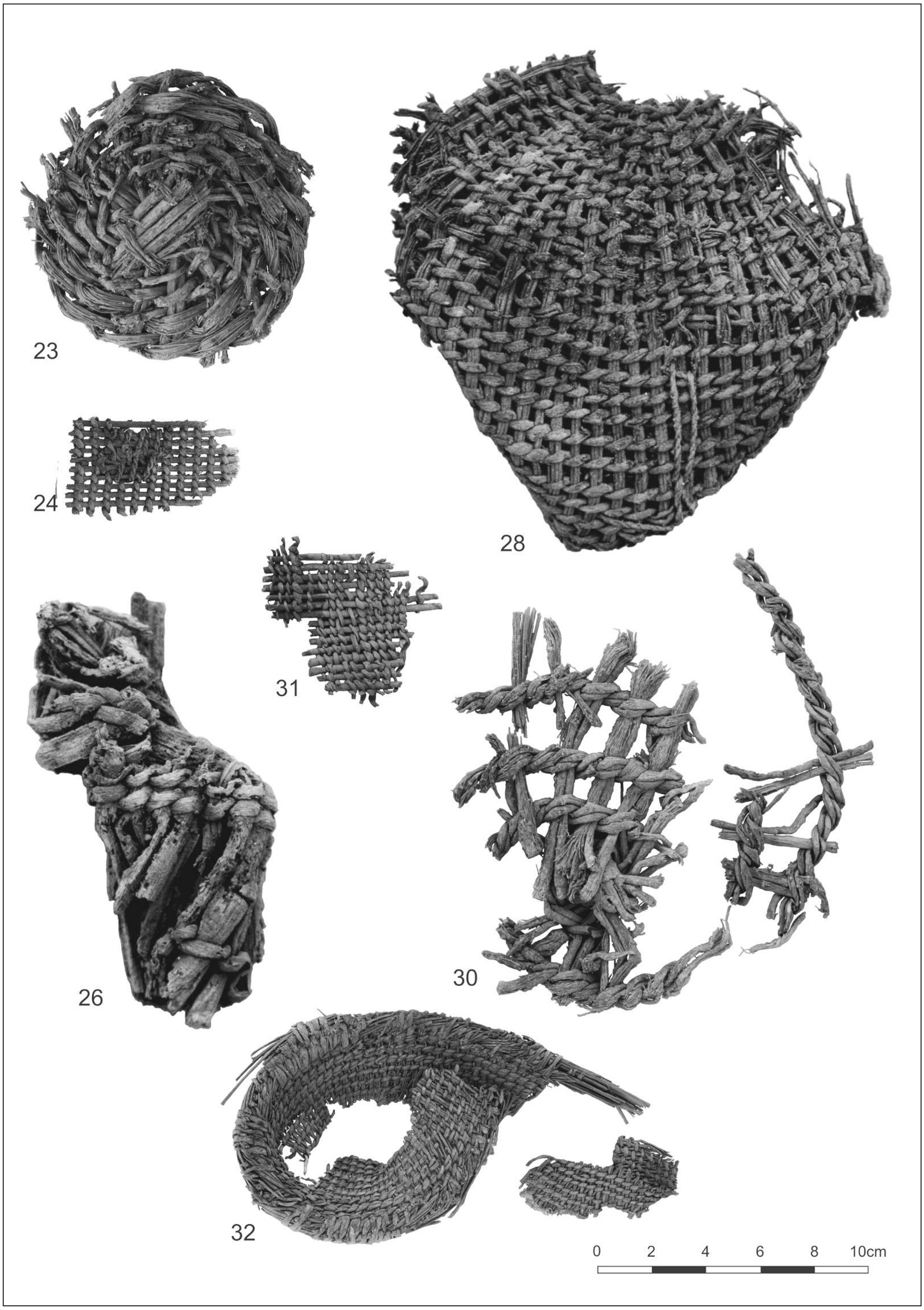


Figure 21.9. Roman rigid containers, twined construction. Nos 23-24, 26, 28 & 30-32.

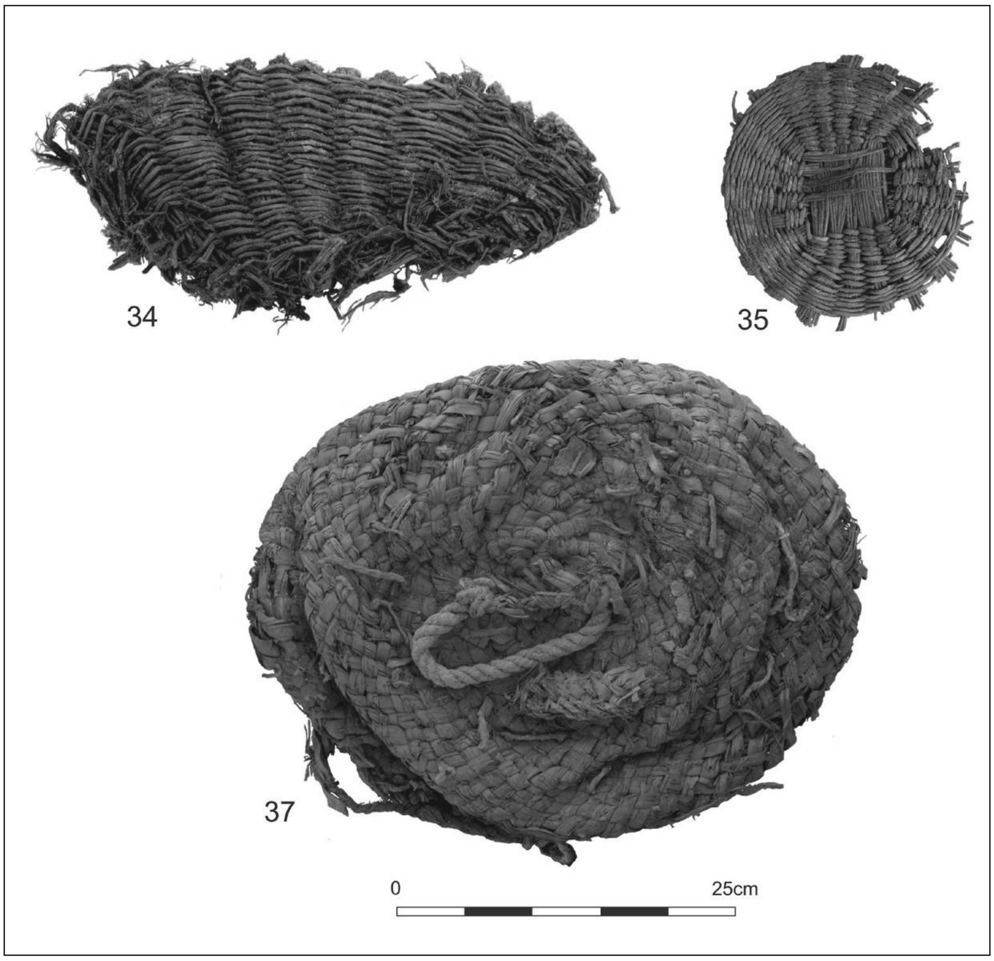


Figure 21.10. Roman rigid containers, in stake and strand and plaited palm strip construction. Nos 34-35 & 37.

rope handles, i) 23 cm long ii) 18 cm long broken. 36 x 30 cm [CB145 from Tr. 6H (4096)].

Pot covers and lids (Fig. 21.11)
Roman pot covers and lids were found less often than in Islamic contexts so are catalogued fully here. There were six examples in the coiled technique of a passive system oversewn in palm leaf strips, one tiny lid twined in cane with a small handle, and one large example which may be more of a platter or basket cover.
38. Pot cover in coiled technique. Passive system palm leaf strips, active system widely spaced palm leaf 0.4 cm wide, poorly made. Diameter 12 cm [CB59 from Tr. 8 (8030)].
39. Pot cover in coiled technique. Passive system split reed, active system grass. Traces of burning at centre. Diameter, possibly complete, 17 cm [CB148 from Tr. 8 (321)].
40. Fragment of pot cover in coiled technique. Passive system bundles of grass, active system palm leaf. 17 cm diameter (not complete) [CB415 from Tr. 6G (4161)].
41. Pot cover in coarsely made coiled technique. Passive system zS2 grass string, active system z spun thread. 6 cm diameter [CB247 from Tr. 6Q (4165)].
42. Pot cover in coiled technique. Passive system palm leaf strips, active system widely spaced palm leaf 0.3 cm wide. 7.5 cm diameter, not complete [CB 252 from Tr. 6G (4161)].
43. Unusual lid or pot cover in coiled basketry technique. Passive system is sZ2[S]2 bast or cotton string 0.25 cm wide, active system is sZ2 bast or cotton string 0.15 cm wide. The end of the passive system extends 6 cm and may be tasselled. Diameter 3.6 cm [00B029 from Tr. 6H (4030)].
44. Tiny lid in 2 strand twined technique, both systems in split reed, twined with a z twist. Length of 3 strand braid as handle. Flattened. 4.6 x 3.1 cm [CB150 from Tr. 6P (4100)].
45. Three fragments of a platter or cover in stake and strand technique. Rigid woven structure in whole reed with decorative edging, plus two fragments of the same. Rigid structure with decorative edging. Probable complete diameter 18 cm. 17 x 13 cm [CB297 from Tr. 6PX (4110)].

Flexible containers
Bags (Fig. 21.12)
There were six examples of bags made from sewn palm fibre plaits. Two of these are complete enough to show that the bottom of the bag was deliberately open, suggesting that these at least were used as amphorae carriers.
46. Bag. Funnel shaped bag in sewn palm fibre plaits. Plaits 4 cm wide, made of 4 strips of 1 cm with plait angle 90 degrees. 1/1 plait construction. Plaits held with folded palm strip. Incomplete base 7.5 cm diameter, 19 cm length of sides, 17 cm across finished opening [CB172 from Tr. 6H (4090)].

47. Bag, roughly tubular shaped, in sewn palm fibre plaits. Width of plait 5.5 cm, made of 9 strips of 1.1 cm in thick palm fibre. Plaits are held with zS2. There is a stitched repair, and the top edge appears to be complete. Mouth is 18 cm, length 30 cm [00M027 from Tr. 6B (4007)]. Not illustrated.
48. Bag, the same as previous example, showing that the bottom was not closed [00M028 from Tr. 6B (4007)]. Not illustrated.
49. Bag, in sewn palm fibre plaits. Width of plait is 1.6 cm, made of 8 strips of 0.3 cm. Plaits held with zS2 string. The coil closes the bottom, and the bag contains leaves. Mouth is 27 cm, 30 cm in length [00M035 from Tr. 6B (4007)].
50. Bag in sewn palm fibre plaits. Width of plait 5.5 cm, made of 7 strips, 1 cm each. Plaits with zS2. Open bottomed. Bottom 9.5 cm, mouth 17 cm, length 11 cm [00M036 from Tr. 6C (4012)]. Not illustrated.
51. Fragment of bag in sewn palm fibre plaits. Width of plait 3 cm, 9 strips of 0.7 cm, plaits held with zS2. Internal spiral in e direction. Mouth is 23 cm (not complete) length 14 cm [00M022 from Tr. 6B (4007)].

Rope carriers or cargo nets (Fig. 21.13)
These three examples of rope carriers or cargo nets are comparable to examples found at Berenike (Wendrich 2007).
52. Carrier in twined rope construction. In z spun palm fibre rope. Twined construction creates a variety of rope plies through the object. Overall appearance of an open grid. Active system twines through to make handles [00C179 from Tr. 7 (5002)].
53. Carrier. Almost identical to above [00C180 from Tr. 7 (5002)]. Not illustrated.
54. Carrier in twined rope construction. In z spun reddish grass rope. Twined construction creates a variety of rope plies through the object. Overall appearance of an open grid [00C176 from Tr. 7 (5002)]. Not illustrated.

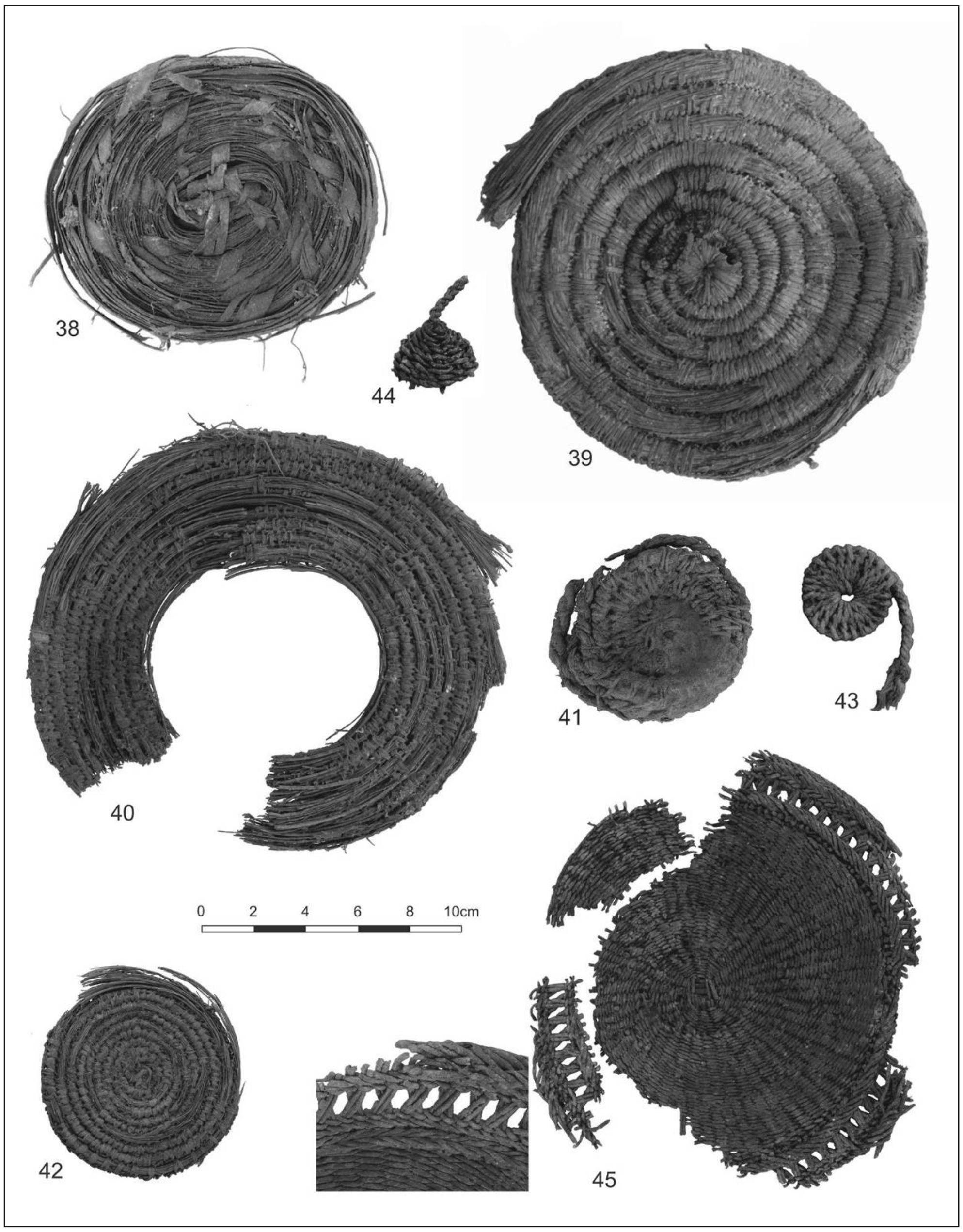


Figure 21.11. Roman pot covers. Nos 38-45.

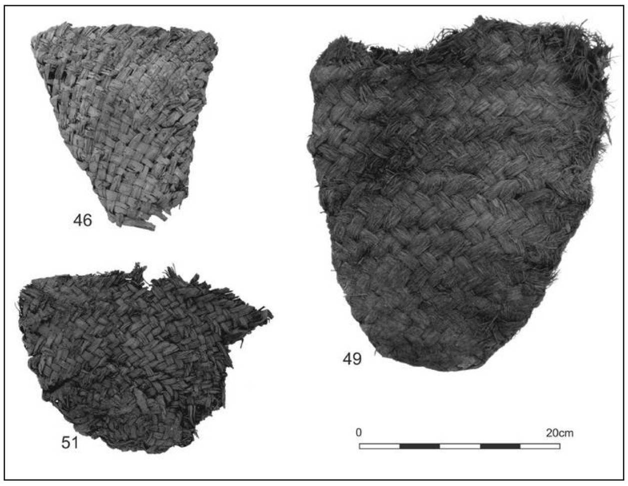
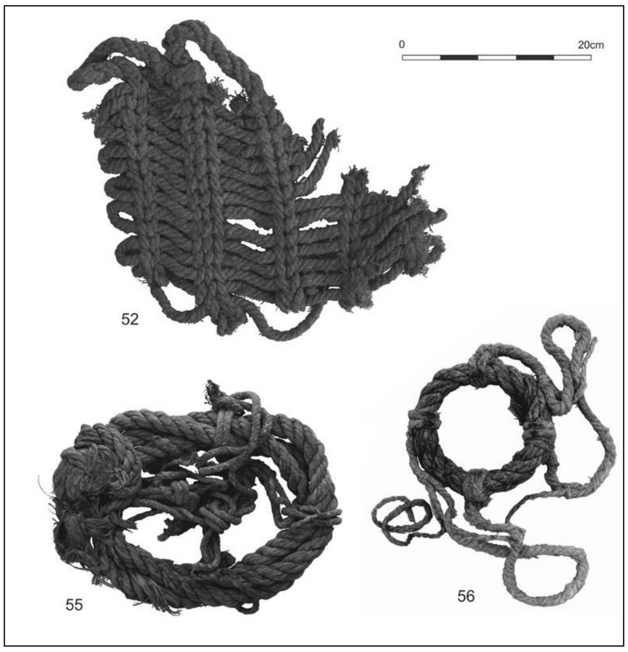


Figure 21.12. Roman bags. Nos 46, 49 & 51.



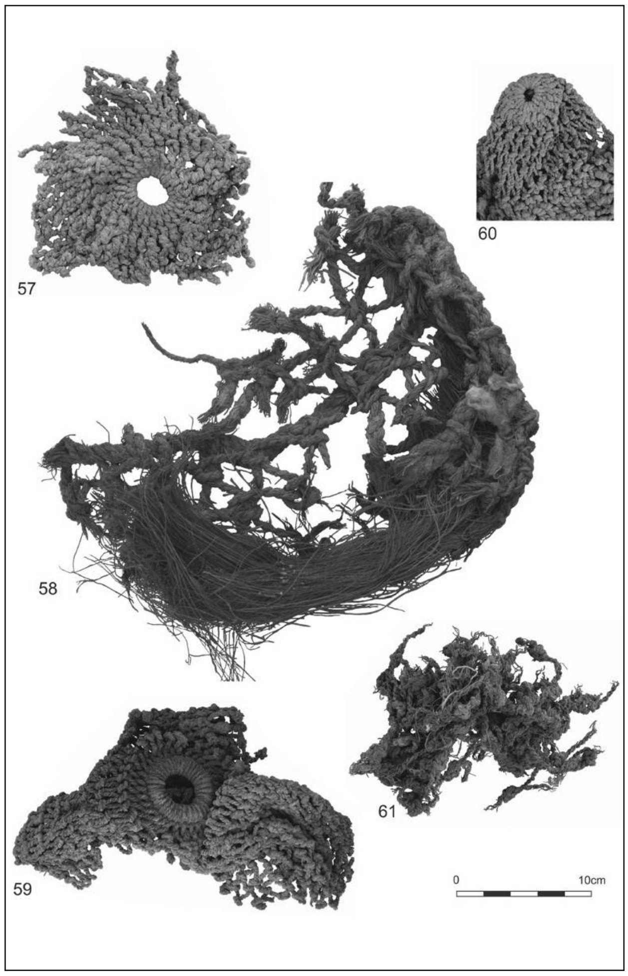


Figure 21.14 (above). Roman carrier nets. Nos 57-61.

Figure 21.13 (left). Roman cargo net and amphora carriers. Nos 52, 55-56.

Rope amphora carriers (Fig. 21.13)
Two examples survive of what must have been a relatively common rope object. These have a very loose structure of loop or grommet with ropes attached that were made specifically for carrying amphorae, making these unwieldy objects easy to tie to camels or donkeys.

55. Remains of amphora carrier. Large coil of rope zS2[Z]3[S]2 1.8 cm wide. Held in four places with lengths of sZ4 rope, which are joined further along their length. Width of coil 24 cm, length of ropes 31 cm [CB165i from Tr. 6P (4105)].

56. Amphora carrier. Constructed from a grommet and rope. Grommet hangs off 2 loops of rope. Grommet in grass fibre 15 cm across, which would hang c. 20 cm below bast zS2[Z]2 ropes [00C107 from Tr. 6D (4014)].

Carrier nets (Fig 21.14)
Carrier nets survive in greater numbers than amphorae carriers, probably because their potential to be reused was more limited. They would also have been used for amphorae as well as other bulky objects, however this does not preclude their reuse as fishing traps. Other similar examples of reef knot netting were found in the following contexts Trenches 6A [4001], 6G [4025] (two examples), and 7 [5001].

57. Base of carrier net constructed in reef knots, in zS2 bast 0.2 cm wide. Partially complete sides, centre formed around rough grass circle. Knots have z-s orientation all rows, 1 cm mesh. 27 x 17 cm [CB58 from Tr. 6J (4040)].

58. Base of carrier net constructed in reef knots, in rough grass. A lining of brown grass, presumably to stop objects falling through the net, is still in place. Has possibly been structurally modified. 34 x 28 cm [CB173 from Tr. 6JH (4090)].

59. Base of carrier net constructed in reef knots, in sZ2 rough grass. Knots z and s, mesh size 2 cm. 20 x 26 cm [CB462 from Tr. 6Q (4170)].

60. Carrier net constructed in reef knots, in zS2 bast 0.3 cm thick. Knots have z - s orientation. 23 x 17 cm [CB143 from Tr. 6P (4100)].

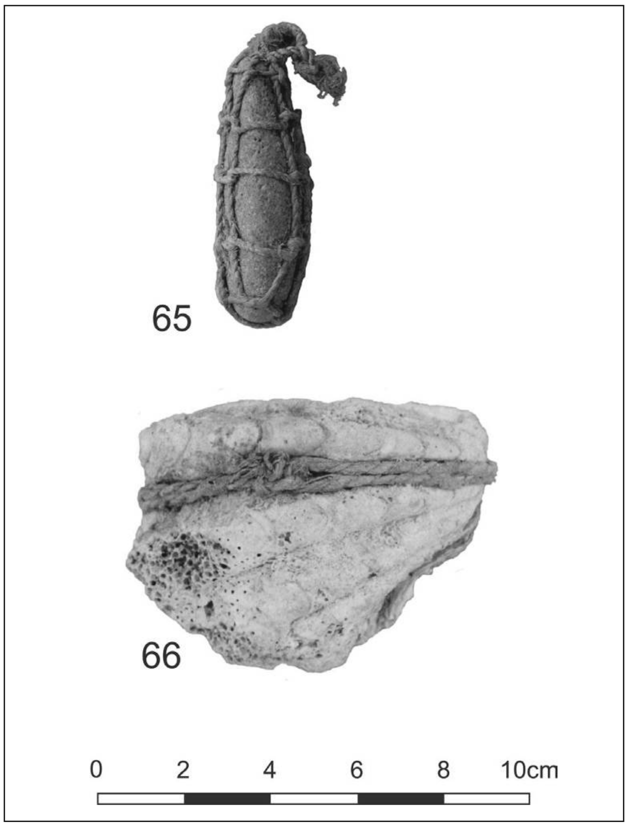


Figure 21.15. Roman maritime objects. Nos 65-66.

61. Carrier net constructed in reef knots, in zS2 rough curly grass, mesh size 3.5 x 4.0 x 3.5 x 4.0 cm [CB445 from Tr. 6G (4161)].
62. Net constructed in reef knots in zS2 bast string. Knots in z and s, mesh size 3 x 2.8 x 3.2 x 2.8 cm. 10 x 6 cm [00C047 from Tr. 6A (4001)]. Not illustrated.
63. Net constructed in reef knots in bast string, knots all in same orientation, mesh size 3 x 3 x 2.8 x 2.5 cm. Seven frags [00C050 from Tr. 6B (4008)]. Not illustrated.
64. Net constructed in reef knots, in zS2 bast 0.3 cm wide. Knots in both s and z directions. Mesh size 2.2 x 2.8 x 3.1 x 2.7 cm [C175 from Tr. 7 (5002)]. Not illustrated.

Maritime Objects (Fig. 21.15)

65. Fishing weight. Pebble encased in sZ2 rough grass string. Mesh pattern made with regular underhand knots. 6 x 2 x 1 cm [CM149 Tr. 6P (4105)].
66. Fishing weight. Clam shell with double strand of zS2 bast string running through a groove in the shell [00C073 from Tr. 6E (4015)].
67. Fender. Very badly decomposed, only zS2 rough grass wrapping identifiable. 16 x 14 x 3.5 cm [00C115 from Tr. 6H (4030)]. Not illustrated.

Fishing nets (Fig. 21.16)

These have been described more fully in Chapter 16, this volume and are included here to complete the catalogue. They are identified by their construction in mesh knots, other examples of mesh knot netting were found in Trenches 6JH [4155] (three examples), Tr. 6G [4160], Trench 6G [4161], Tr.6PX [4110] (two examples), Tr. 6PN [4120] (three examples), Tr. 6Q [4165], Tr. 6Q [4170], and Tr. 6Q [4166].
68. Grommet in sZ3 bast with fragments of fishing net still attached. 4 x 6 cm [CB411 from Tr. 6Q (4170)].
69. Fishing net from pot in zS2 bast 0.3 cm wide constructed with mesh knots, s knots both sides. Diameter of base ring 3.6 cm. 47 x 24 cm [CB142 from Tr. 6HX (4080)]. Not illustrated.
70. Unusual netting constructed in mesh knots, in zS2 grass string 0.3 cm side. Mesh size is 4 cm, alternate z and s knots. 74 x 54 cm [CB154 from Tr. 8 (8356)].
71. Fishing net from pot in zS2 0.4 cm bast constructed in mesh knots, z knots both sides, mesh size 4 cm. Base ring made of sZ2 rough grass string. 37 x 35 cm [CB162 from Tr. 6HX, (4080)].
72. Fishing net from pot in zS2 bast constructed in mesh knots, knots all z orientation, mesh size 4 x 4.5 x 5.0 x 4.0 cm. Base is zS2 bast 0.4 cm wide [CB442 from Tr. 6JH, (4155)].
73. Fishing net in zS2 bast constructed in mesh knots, z knots [CB459 from Tr. 6Q (4166)].
74. Fishing net in zS2 bast constructed in mesh knots, s knots in both directions, mesh size 3.2 x 3 x 2.4 x 3.5 cm [00C060 from Tr. 6A (4005)]. Not illustrated.
75. Fishing net in sZ3 bast constructed with mesh knots, s knots in both directions. Mesh size 2.4 x 3 x 1.9 x 3 [00C072 from Tr. 6B (4007)]. Not illustrated.
76. Fishing net in sZ3 bast constructed in mesh knots, s knots in both directions. Mesh size 2.8 x 3 x 2.7 x 2.7 cm [00C093 from Tr. 6C (4015)]. Not illustrated.
77. Fishing net in zS3 bast constructed in mesh knots,

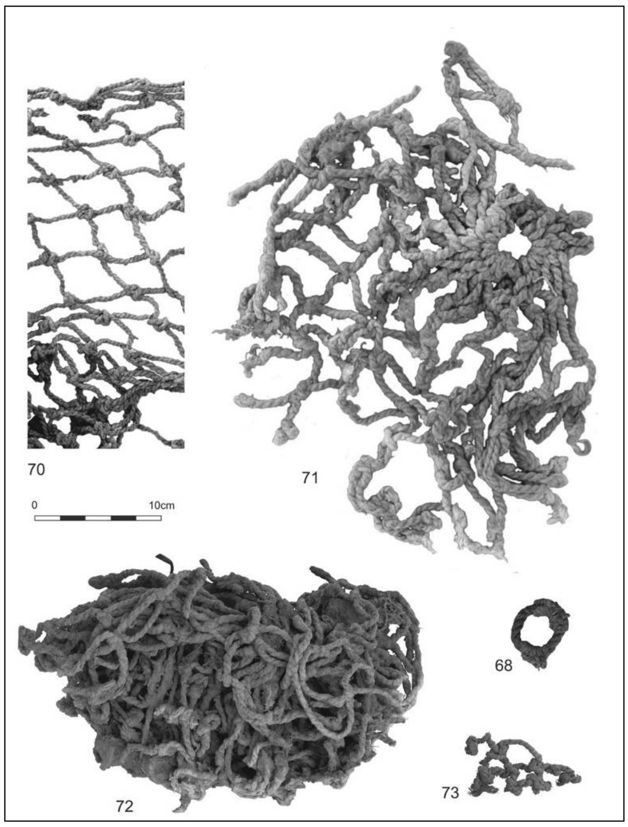


Figure 21.16. Roman fishing nets. Nos 68 & 70-73.

z in both directions. Mesh size 3.5 x 2.1 x 3.4 x 3.2 cm [00C094 from Tr. 6E (4015)]. Not illustrated.
78. Fishing net in sZ3 bast constructed in mesh knots, s in both directions. Mesh size 1.3 x 1.1 x 1.0 x 1.4 cm 00C099 from Tr. 6B (4007)]. Not illustrated.
79. Fishing net in zS2 bast constructed in mesh knots, z in both directions. Mesh size 2.8 x 2.1 x 3.0 x 2.0 cm [00C101 from Tr. 6C (401]. Not illustrated.
80. Fishing net in sZ3 bast constructed in mesh knots, s in both directions. Mesh size 1.3 x 1.1 x 1 x 1.4 cm [00C103 from Tr. 6H (4030)]. Not illustrated.
81. Fishing net in zS2 bast constructed in mesh knots, z in both directions. Mesh size 1.4 x 1.3 x 1.3 x 1.0 cm [00C104 from Tr. 6H (4030)]. Not illustrated.
82. Fishing net in zS2 bast constructed in mesh knots, z in both directions. Mesh size 3 x 3 x 3 x 2.3 cm. 120 x 20 cm [00C130 from Tr. 6H (4030)]. Not illustrated.
83. Fishing net in zS2 bast constructed in mesh knots, z on both sides. Very fragmentary [00C148 from Tr. 6G (4025)]. Not illustrated.
84. Fishing net in mesh knots, s in both directions, very fragmentary [00C183 from Tr. 6H (4030)]. Not illustrated.
85. Fishing net in mesh knots, s in both directions, very fragmentary [00C184 from Tr. 6E (4015)]. Not illustrated.

Brushes

There are five examples of a standardised type of fan shaped hand brush that is identifiable in the assemblage, the rest have a range of forms and are preserved to varying degrees. The fan brushes are made from fibre or leaf, folded over and bound with string to make a handle, the string then divides the fibres into bundles and weaves between them, creating the fan shape. As the fibres at the sweeping edge become loose or dirty they are trimmed down, until just a stub of folded fibre wrapped with string remains.

Fan shaped brushes (Fig. 21.17)

86. Hand brush of palm leaf folded over and tied together with string, impression of missing string remains. 22 x 15 cm [CB119 from Tr. 6E (4015)].
87. Hand brush made from palm leaf. Fan shaped, tied with rough grass zS2 string 0.5 cm diameter. 27 x 14 cm [CB51 from Tr. 6J (4040)].
88. Hand brush in grass fibre, fan shaped, bound with zS2 string, which extends through the fibres holding them in position. Handle end is 6.5 cm, flaring out to 14 cm, over a length of 14 cm [00C133 from Tr. 6H (4030)].
89. Hand brush in palm leaf folded over and bound with zS2 string. The string binds to make a thick handle at one

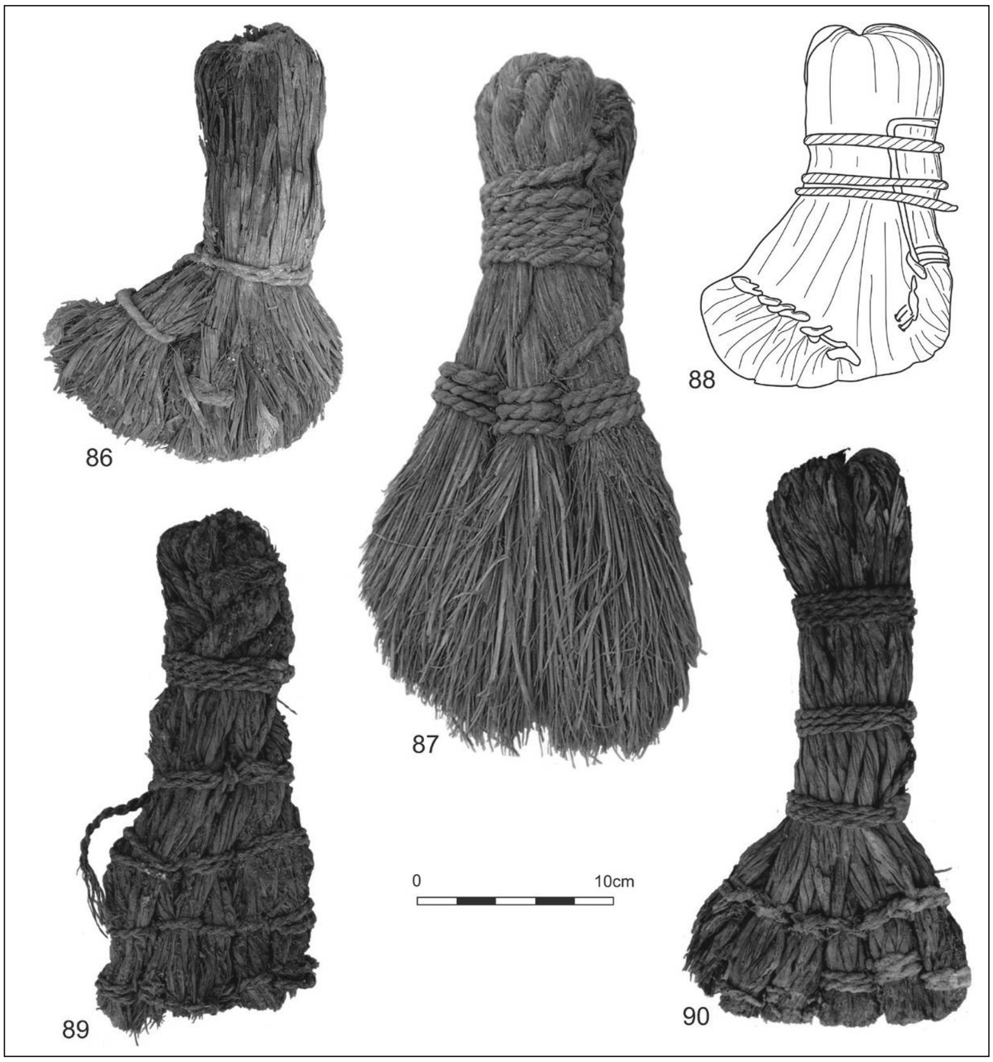


Figure 21.17. Roman fan shaped brushes. Nos 86-90.

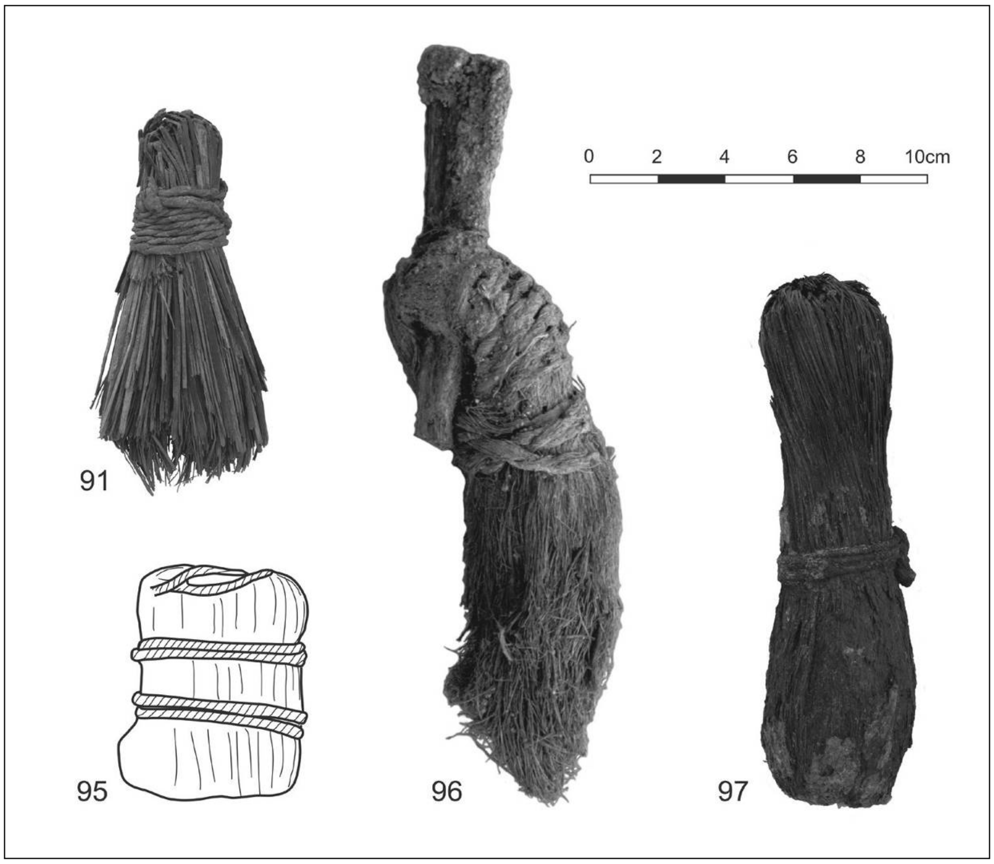


Figure 21.18. Roman brushes: sweeping and dabbing. Nos 91 & 95-97.

Figure 21.19. Other Roman brushes. Nos 98-104.

end, then separates bunches of leaves to make a fan shape. Trimmed just before disposal. Handle end is 6 cm, flaring out to 10 cm, length 23 cm [00C145 from Tr. 6G (4025)].
90. Hand brush in wide palm leaf sheath, folded over and secured with zS2 string into a fan shape. Very sturdily constructed, rough ends have been trimmed. Handle end 6.5 cm wide, sweeping end 13 cm wide, length 26 cm [00C138 from Tr. 6H (4030)].

Other sweeping brushes (Fig. 21.18)
91.Hand brush in folded palm leaf fibre tied with zS2 string. 10.5 x 5 cm [CB329 from Tr. 6Q (4170)].
92. Stiff twigs in a bunch, with wear like a brush. 20 x 7 x 4.5 cm [00C041 from Tr. 6A (4001)]. Not illustrated.
93. Hand brush in a fluffy fibre, bound with zS2 bast string. 16.5 x 5 cm. [00C132 from Tr. 6H (4030)]. Not illustrated.
94. Hand brush in coarse grass, folded over and held with remains of sZ2 string. Handle end 5 cm wide, 11 cm wide at sweeping end, length 20 cm [00C139 from Tr. 6H (4036)]. Not illustrated.
95. Hand brush in coarse grass, folded over and held with zS2 string, same style as 00C139 [C146 from Tr. 6G (4025)].

Dabbing brushes (Fig. 21.18)
96. Hand brush made from rough grass folded around a piece of cut wood and held in place with zS2 0.4 cm rough grass cord. Poorly made, a dabbing rather than sweeping brush. 23 x 6 cm [CB157 from Tr. 6J (4040)].
97. Hand brush in folded grass fibre tied in the middle with sZ3 string, dabbing style, covered in pitch. 15 x 4.5 cm [CB330 from Tr. 6Q (4170)].

Other Brushes (Fig. 21.19)
98. Very small brush made from rough grass, one end tied with z spun bast 0.1cm wide. 1.4 x 0.4 cm [CB47 from Tr. 6J (4040)].
99. Brush. Hank of carefully folded and cut rough grass held in place by a rough grass string z2s 0.3cm wide with a half knot at one end. 11 x 2 x 1 cm [CB156 from Tr. 6H (4080)].
100. Possible brush, constructed from a hank of z spun bast threads wrapped, though not systematically, with threads of the same to make a string 7 x 0.6 cm [00C070 from Tr. 6B (4007)].
101. Small hand brush in hanks of rough grass bound with zS2 twine, possibly the remains of a fan shaped brush. 2.9 x 10.2 cm [CB244 fromTr. 6Q (4165)].
102. Small hand brush in palm sheath fibre bound with zS2 twine, possibly the remains of a fan shaped brush. 3.8 x 9.5 cm [CB245 from Tr. 6Q (4165)].
103. Fragment of small hand brush in palm sheath fibre bound with zS2 twine, possibly the remains of a fan shaped brush. 1.5 x 4.4 cm [CB246 from Tr. 6Q (4165)].
104. Hand brush in broad fibres (unclear whether palm or grass), folded in two, held with zS2 string. 17 x 10 x 5 cm [00C125 from Tr. 7 (5002)].

Clothing and personal adornment (Fig. 21.20)
No images survive of the sun hat recorded in 2002 but it is included here as an important contribution to our knowledge of Roman hats. Tassel finds presumably come from hats and belt endings, or as the necklace with a tassel suggests, were an item of adornment in their own right.
105. Hat. Brim of sunhat, broken in two but almost complete. Slight traces of burning. Dom palm leaf strip, 2/1 plait, strip width 0.5 cm, 5 strips per plait. Width of plait 2 cm, plait angle 90 degrees. Held with z2s rough grass 0.2 cm wide [CB162a from Tr. 6P (4105)]. Not illustrated.
106. Tassel, in wool or possibly silk. Originally attached in s wool at top. Intense colour from orange to claret, bound with pale pink/grey wool, ending in a felted claret red tassel. 18 x 6 mm [00C0116 from Tr. 6B (4007)].

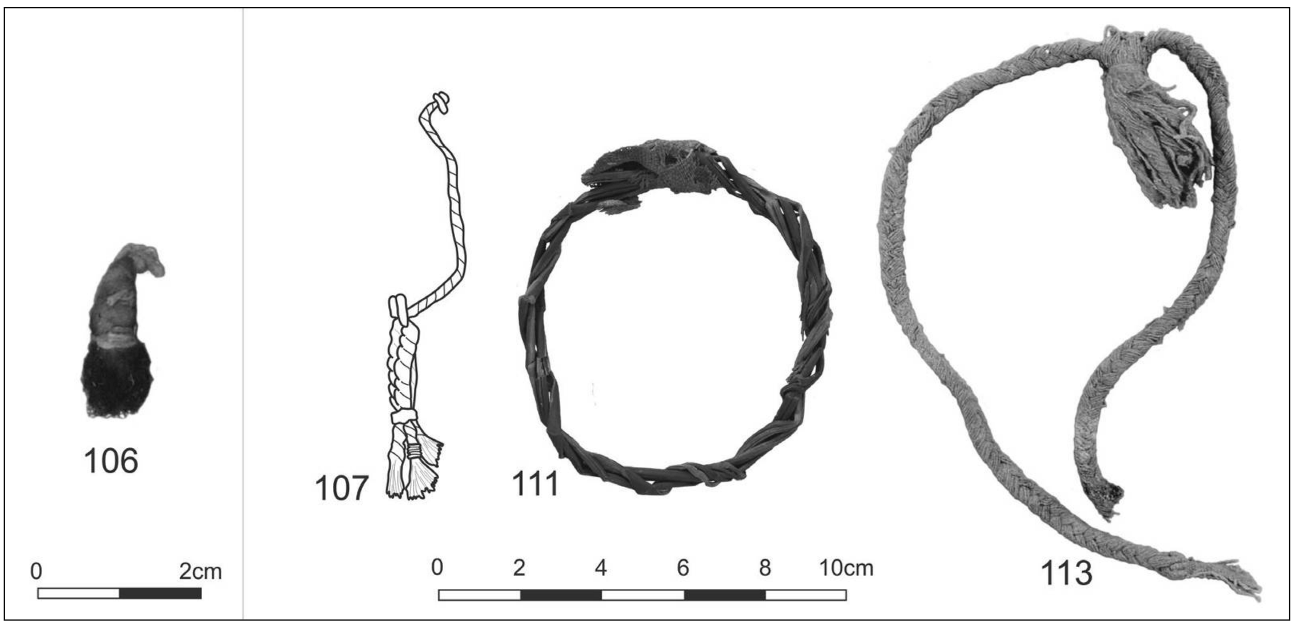


Figure 21.20. Roman personal adornment. Nos 106-107, 111 & 113.

107. Tassel in bast zS2 string. Single strand becomes 3 strands, bound together then reopening into three tassels [C046 from Tr. 6B (4007)].
108. Tassel? constructed from two, three-strand braids in bast, held together at one end by two fine strings, one which spirals down to bind the body of the tassel. 11 x 1 cm [00C068 from Tr. 6B (4007)]. Not illustrated.
109. Tassel or possibly soft brush. Bast fibre, held in three places with rows of zS2 string, then finished in three-strand braid. 15 x 2 cm [00C127 from Tr. 6H (4030)]. Not illustrated.
110. Cord made from z spun bast 0.5 cm wide in natural colour and blue. Formed into two tassels. 70.6 x 16.7 cm [CB163 from Tr. 6JH (4090)]. Not illustrated.
111. Bracelet of unplied grass wound in a z direction, with a piece of bast or cotton fabric tied to it. 8.4 x 7.5 cm [CB223 from Tr. 6P (4110)].
112. Bracelet in fine zS2 bast, constructed from three rows of looping, but all uneven and irregular. 7 x 7 cm, width of bracelet from 1.1-2.5 cm [00C114 from Tr. 6C (4012)]. Not illustrated.
113. Necklace with tassel. Fine linen or cotton 3 strand braid with fine s spun fibres folded over to make tassel, held with same s spun fibres. Tassel 4 cm long [00C084 from Tr. 6E (4015)].

Sandals (Fig. 21.21)
Only two examples of complete sandals survive, with a further 97 examples of rope sandal soles recorded, in varying degrees of completeness and preservation. The

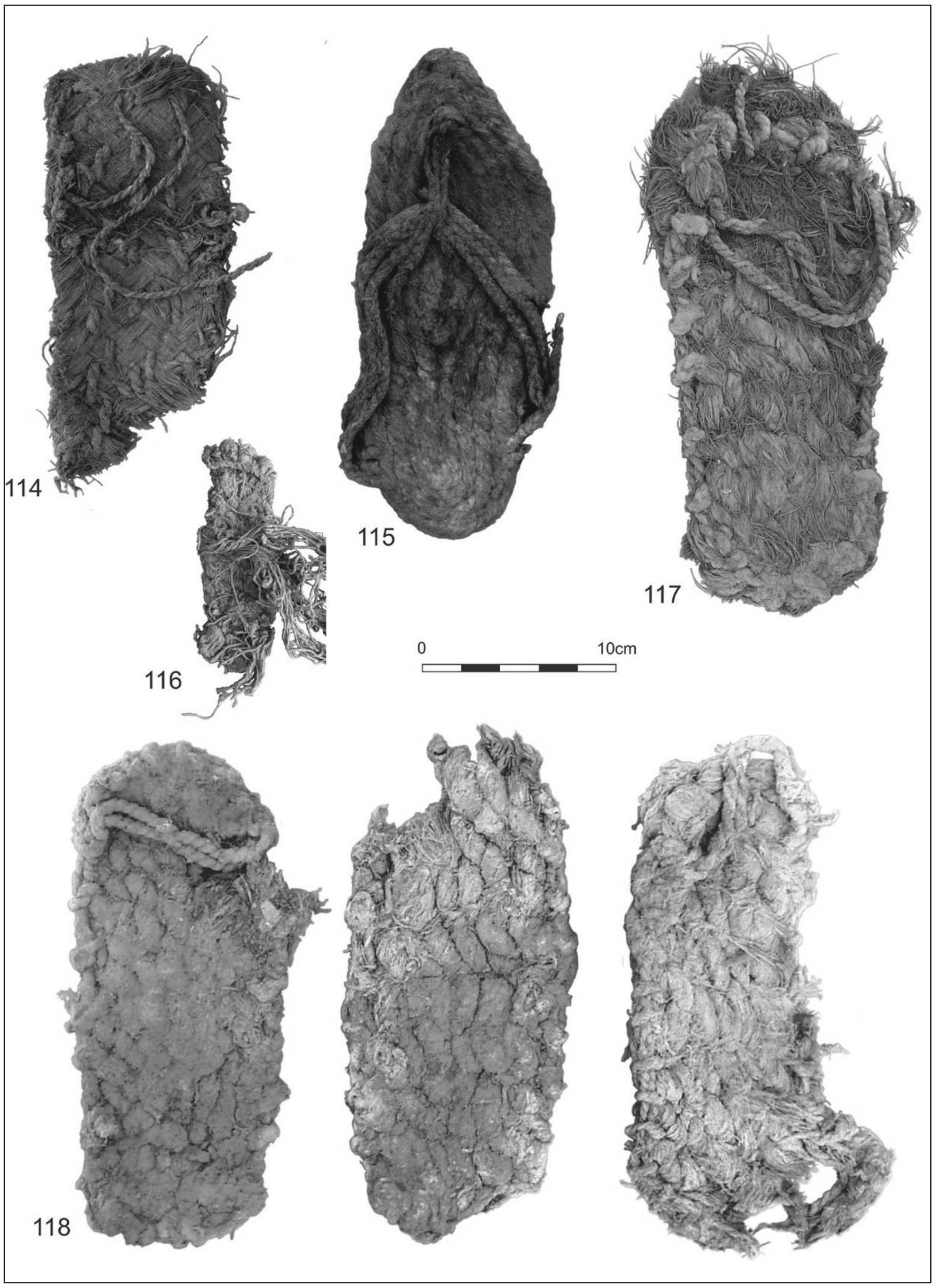


Figure 21.21. Roman sandals. Nos 114-118.

latter were constructed from sewn rope, the rope being wound around some kind of frame and then sewn together, the ply of the rope occasionally being pierced by the needle. The edges were then sometimes reinforced with string in a series of hitches or blanket stitches. Technically and visually they are very similar to the small mats, but can be identified by their wear patterns and compression marks which clearly show foot shapes. Some examples have added string at the front or back (see Cat. No. 117 and 118), or have a back worked to fit around the ankle, which give indications of how the shoe was attached to the foot, either as a band across the toes or across the heel. However, there is no example which clearly shows how they were attached, which is surprising given the numbers found. It is probable therefore, that these were attached to the foot by loose cord or perhaps webbing straps which fell away when removed and were not found with the shoes. This ad-hoc arrangement seems rather unlikely to be a shoe, and these are more likely to be a kind of extra-sole, worn to protect the foot from the rocks and heat of the desert. The most obvious wearers of these would be soldiers, and merchants, and they would be a supplement to a leather sandal or boot. One example is made from plied fishing net and the child's example (No. 116) was found wrapped in a fishing net (see below). It may be that sailors at Myos Hormos produced these simple sandals whilst doing other ropework, and that Myos Hormos was the place to replace your shoe sole before the journey back to the Nile.
114. Sandal, cut from palm leaf plait. Plait constructed in 2/1 plait, width of palm strip 0.9 cm. At least two layers, sewn together with zS2 rough grass string. Remains of strap in zS2 string. Edge stitched with overcast blanket stitch. 21 x 9 cm [CB158 from Tr. 6H (4075)].
115. Plaited palm sandal. Three-strand braid in palm fibre sewn into sole. Foot strap in finer three-strand braid palm fibre. 24 x 9 cm [M039, CB032 from Tr. 6H (4030)].
116. Sole of child's rope sandal wrapped in fishing net. Sandal in same design and material to adult sandals. Strap of 0.2cm sZ2 bast cord. Fragment of fishing net, bast z spun 0.1 cm wide, mesh size 2.05 cm, mesh knot undecipherable, wrapped around shoe. 12 x 3 cm [CB155 from Tr. 6P (4105)].
117. Rope sandal. Constructed from zS2 rope, edges reinforced with zS2 thick string which loops to form double ankle strap. 26 x 10 cm [CB044 from Tr. 8 (8022)].
118. Rope sandal. Constructed from zS2 rope, edges reinforced with zS2 thick string which loops to form double band across front of shoe. 23 x 11 cm [CB146 from Tr. 6J].

Miscellaneous (Fig. 21.22)

An amphora cover of coiled basketry is one of the most interesting finds at the site. Its nearest parallel in terms of construction, which is very distinctive, is a fragment of bucket shaped basket (see above No. 22). In both examples the active system is made from z spun cotton, which raises the question of where this string, and the object originate from. The most obvious answer would be India (because much of the z spun cotton on the Red Sea coast derives from there) which then raises the question of why it has been used to cover an amphorae.

119. Amphora cover in coiled basketry, in poorly preserved fibre. The passive system is a dark brown grass bunched into bundles of 1 cm. The active system is a soft fluffy fibre, possibly cotton, in zS5 thread (decomposing). These randomly pierce and wrap the passive system. The form was created on the shoulders and neck of an amphorae. 26 x 15 x 15 cm [CB0026 from Tr. 6A (4001)].

A hand fan was also discovered which must have been a smart object.
120. Fragment of a hand fan. Passive system is broad split cane, active system is a closely packed grass fibre, woven around the passive system which it covers. One edge is a handle made from cane covered in leather. 7.3 x 4.5 cm [CB248 from Tr. 6JH (4090)].

Two straps were recovered, both appear to be fairly coarsely made.
121. Strap made from 7 strand braid of unspun grass. 18 x 4 cm [CB430 from Tr. 6Q (4165)].
122. Shaped object of twined construction. Possibly the end of a strap. Passive system zS2 string, active system z spun string. Coarsely made, remains of plaited palm strips sewn to it. 17.5 x 10 cm [CB336 from Tr. 6P (4110)].

The only object whose function remains unknown is in a hank of grass that has been carefully bound into a 'pipe' shape, with one end pulled around. It may possibly have been used in cleaning.
123. Object of unknown function. Hank of grass carefully bound with sZ2 string into strange pipe shape. 23 x 1.5 cm [00C129 from Tr. 6H (4030)].

Additional objects

These objects made of palm leaf or strips seem to have been made for fun.

124. Small objects in coils of palm strip rolled into small shapes. Rolls are c 0.8 x 1.9 cm, length of strips about 10 cm. (five examples) [CB222 from Tr. 6P (4110)].
125. Small object in folded palm leaf. 9 x 12 cm [CB221 from Tr. 6P (4105)].

21.2 Islamic Matting, Basketry and Cordage

The Islamic assemblage of matting, basketry and cordage was smaller in quantity, and less varied than the Roman material, which is surprising given that other organic materials, such as the textiles, have roughly equal proportions of Islamic and Roman material. This may be a question of deposition practice, as Trench 13, a key Islamic rubbish dump, contained proportionally little basketry,

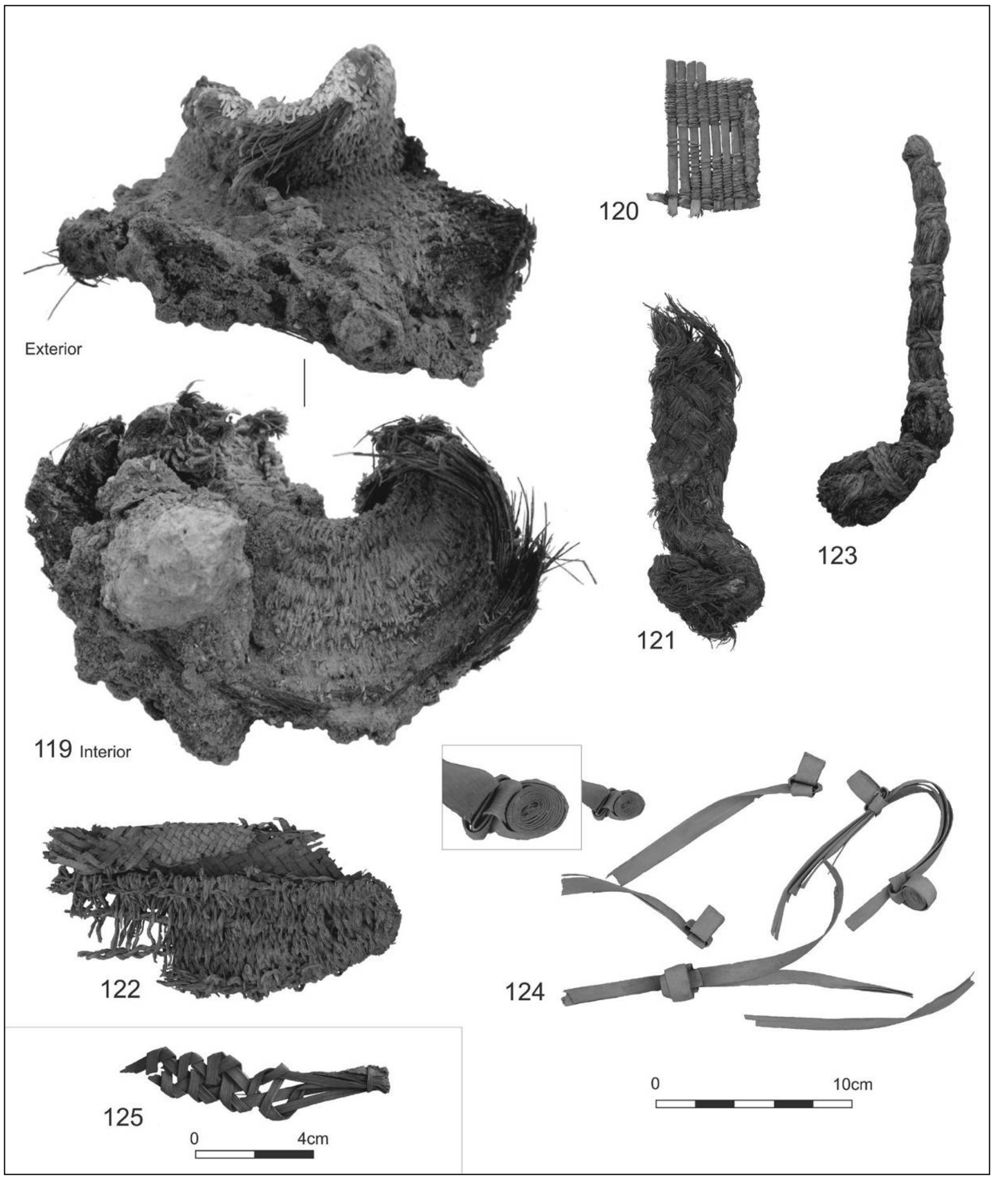


Figure 21.22. Roman miscellaneous items. Nos 119-125.

matting and cordage. The surprisingly low numbers of fishing nets also suggest that the main maritime dumps from the Islamic period have not survived or have not been excavated, while the high numbers of surviving pot covers, sweeping brushes, and decorative cordage support the view that mainly domestic rubbish dumps were excavated. That said, a huge amount of cordage was recorded, especially from Trenches 2C and 2B, which is where the fishing net finds were concentrated.

Cordage

The results of the analysis of a sample of the rope assemblage gives an overview of the Islamic cordage found at the site. Three thousand eight hundred and forty-three pieces of rope and string were found in Trenches 5, 2B, 2C and 2E. The most common type of rope (2147 examples) was a rough grass plied into zS2 and zS3 in a variety of qualities and types. Seven hundred and thirty-six examples were found of a stiffer reed or whole grass string and rope all with a base of zS2. These two types constitute 81% of all the rope in this sample. Whilst the grass fibre rope was the every day cordage of the port, the uses for stiffer grass or reed rope are less clear. It was used to make handles, and twined into ring shapes, but there are no basketry remains constructed of this fibre. The most revealing items are neat coils of the fibre tied with a knot, obviously a prepared fibre ready to be used, perhaps in Quseir, or onboard ship.

The other rope fibres were found in much smaller quantities, with about 20 different fibres distinguished, although not identified. The reeds or whole grasses included two sorts of red coated variety and an orange brown type with darker flecks. There was also a distinctive silky red grass or palm fibre. Cotton and bast fibres were more easily identifiable, including some large examples that appear to have been treated in order to waterproof or harden them. Several very large examples were found in Trench 2C including one measuring 45 x 4.5 cm and others of similar dimensions.

Given the amount of cordage found, only a very small proportion was knotted. In the sample described above, only 31 knots that were clearly not just tangles were identified. The amount of rope that was thrown away at Quseir suggests the enormous quantities that must have passed through the port, and its relative disposability. Although short lengths of rope could not be reused in a ship's rigging, a knot joining two pieces would not interfere with a rope used as a tie for an awning or animal tether, for example.

Ropes and knots (Fig. 21.23)

126. Three lengths of cordage each wound into a circle, 2 grass, 1 reed. 3.5 x 4.5, 6.5 x 6.5, 11 x 9 cm [CB345 from Tr. 13 (5519)].

127. String with 23 granny knots in various orientations, regularly spaced. 16.5 cm long [CB456 from Tr. 13 (5509)].

128. Knots in zS3 grass string [00C173 from Tr. 3 (2002)].

129. Knot in zS3 grass string [99C041 from Tr. 2C (1021)].

130. Knot in 60cm length of zS3[Z]2 bast rope [99C046 from Tr. 2C (1017)]. Not illustrated.

131. Noose with hitch in sZ3 bast string [99C030 from Tr. 2D (1251)].

132. Noose in zS3 bast string [99C031 from Tr. 2D (1251)].

133. Rope with eye-splice in zS4 bast (hard finish). Coxcombing pulls the rope into a hook shape, but it would not take a substantial weight. 11 x 6 cm [00C005 from Tr. 5 (3023)]. Not illustrated.

134. Two lengths of grass rope, rope 1 runs through eyelet of rope 2. Each length is made of sZ4, bound together with hitched zS2 string. Rope 1 is 70 cm, rope 2 is 54 cm [00C026 from Tr. 2D (1255)].

135. Rope zS2[Z]3 with zS3 rope passed through it. 16 x 1.8 cm [CB401 from Tr. 13 (5510)].

136. Long rope with noose and knot in sZ2 bast. The rope fibre seems to be hardened. One end of the rope is eye spliced, and one of the unplied cords of the other end runs through and ties to the other end in a granny knot. The rope length is 108 cm [00C009 from Tr. 5 (3017)].

137. Two lengths of string joined in two knots. String 1 is z spun grass fibre, string 2 is a strip of bast fabric. Flat diameter of the piece is 27 cm [00C024 from Tr. 5 (3014)].

138. Two lengths of zS2 bast string knotted together with attachments. 36 cm long [00C026 from Tr. 5 (3014)]. Not illustrated.

139. Rope, possibly decorative, in zS2[Z]3 bast with a hard finish, 45 cm x 2.4 cm, with z overhand knot. The rope is wormed with sZ2 goat hair string [00C178 from Tr. 13 (5502)]. Not illustrated.

Sewn palm fibre plait sheets (Fig. 21.24)

A huge amount of sewn palm fibre plait sheets were found, the analysis of a sample taken in 1999 and 2000 is representative of the assemblage as a whole. The most numerous type of plait sheet were the 2/2/1 twill strip plait mats made from palm leaf. Six hundred and thirty-five of these were found in a wide variety of qualities, the finest were probably internal screens, the coarser floor or roof coverings, some which have string ties attached. Eighty-one examples were described as fine or very fine, made from leaves less than 0.4 cm in width, and plaited into plait strips more than 12 cm wide. Decoration was limited to using slightly different colours of palm leaf to create a striped effect, using a running stitch worked in two directions as a hem, or creating edging from leather strips or with cord twined and plied through the long edge of the plaits.

A different variety of sheet were made in a 1/1 structure in a thicker palm leaf or fibre. These were constructed from 5 plait strips between 3-4.5 cm wide sewn together. The remains of handles on these suggest that they were used for carrying bulky items. Very similar in appearance, as well as use, to these flat sheets were palm leaf plaits that were sewn into circles. The presence of handles again suggests they were used to carry bulky items, and there are some examples which seem to have been reused as floor mats. From the sample taken in 1999 and 2000, 42 examples of circular sheets were found, 21 examples were found in palm leaf, with a further 21 in thicker palm leaf or fibre.

140. Two fragments of decorated plaited matting. Plaits 2.9 cm wide with 15 strips 0.25 cm wide. Unusual 3/2 structure. Red and green wool decoration in stitches through palm plaits and as an edging. Remains of a handle in zS2[Z]2. 14 x 5.5 cm, 8 x 2.5 cm [CB030, M005, M006 from Tr. 5 (3014)].

141. Fragment of screen. Very fine plaited palm sheet, one edge sandwiched between a split cane, with palm leaf sewn over to bind the sandwich together. 30 x 3 cm [99M007 from Tr. 2D (1251)].

142. Sewn palm plait sheet. Plaits 2.4 cm wide of 5 strips of 0.7 cm in structure 2/1 with plait angle 90 degrees. Plaits held with zS2 0.5 cm cord. Sturdily constructed with multiple pieces of rope running through and forming hooks at edges. 82 x 24 x 8 cm [CB174 from Tr. 8 (8250)].

Rigid containers and baskets

Visually and technically many of these are closely related to the pot covers, often the only distinction between a cover and a vessel is that the latter sometimes displays the beginnings of a vessel side. Relatively coarse twining, as in the Roman periods, seems to provide the majority of everyday baskets or crates, and the two tub shaped baskets made from sewn plaited palm strips represent the other main large container type. Two large baskets in a stiff red cane, probably imported, are also in this general form. The coiled vessels were probably used as containers in homes, as the discovery of cotton threads inside one suggests. Notably, there are no surviving fragments in stake and strand technique for this period.

Coiled technique (Fig. 21.25)

Five containers were recorded that were made in the coiled technique. This involves a passive system, usually a bundle of stiff grass or reed, being bound with an active system, usually palm leaf, which both wraps the bundles and creates the shape of the object.

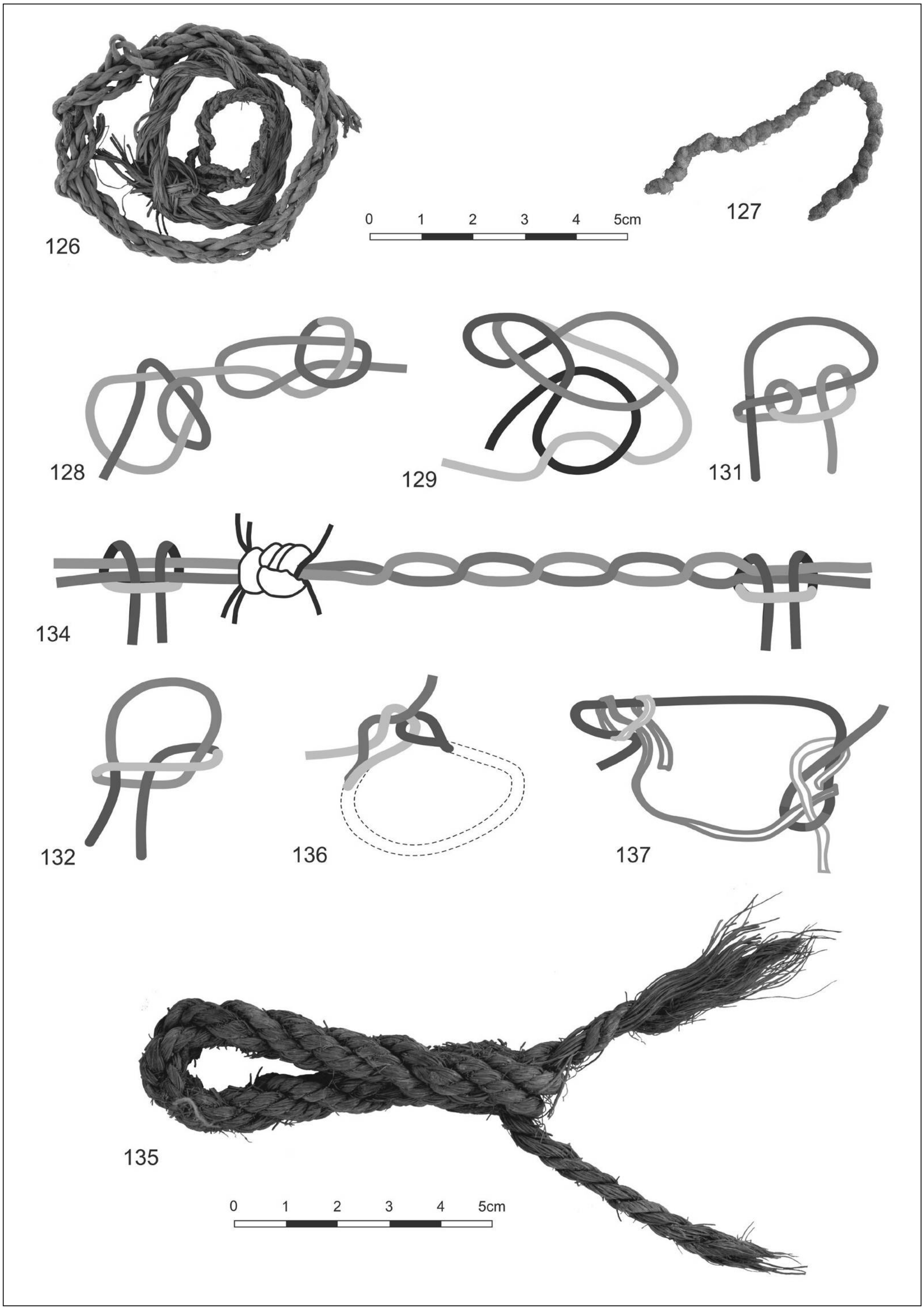


Figure 21.23. Islamic cordage. Nos 126-129, 131-132 & 135-137.

143. Shallow dish in coiled technique. Passive system is split reed 0.5 cm wide, active system is palm leaf 0.4 cm wide. External spiral is in e direction. Diameter 10.2 cm, height 1.5 cm [00B014 from Tr. 5 (3014)].
144. Side of vessel in coiled technique with leather decoration. Passive system is stiff grass 0.3 cm wide, active system is palm leaf 0.2 cm wide. Two pieces each decorated with a small motif, are joined along one edge. 11 x 7.4 cm [00B017, CB027 from Tr. 5 (3014)].
145. Bowl in coiled technique. Passive system bunches of palm leaf 0.5 cm wide. Active system palm leaf, 0.1 cm wide. Inner spiral e orientation. Complete diameter at rim 19.5 cm, base 12 cm, 3.4 cm height [B20 from Tr. 2D (1255)]. Not illustrated.
146. Fragment of base of vessel in coiled technique. Passive system is grass 0.4 cm wide, active system is palm leaf 0.15 cm wide. Internal spiral is e direction. Contains some cotton thread. Diameter 4 cm, height 1.5 cm [00B004 from Tr. 5 (3001)]. Not illustrated.
147. Lower section of vessel in coiled technique. Passive system is split reed 0.5 cm wide, active system is palm leaf 0.25 cm. Internal spiral is in e direction. Diameter 5.2 cm, height 2.4 cm [00B013 from Tr. 5 (3026)]. Not illustrated.

Twining (Fig. 21.25)
Five examples of containers made using the twining technique were found. This technique is similar to the stake and strand technique, except that the active systems also twine around each other before weaving around the passive system.
148. Fragment of basketry in 2-strand twined technique. Passive system is split reed 0.2-0.4 cm width. Active systems is split reed 0.1-0.18 cm, twined with an s twist. 6.5 x 3.0 cm [99B018 from Tr. 2C (1016)]. Not illustrated.
149. Fragment of basketry in 2-strand twined technique. Passive system is split reed 0.7-1.3 cm wide. Active system is whole reed, 0.3 cm wide, twined with an s twist. 8 x 1.3 cm [99B21 from Tr. 2B (1502)]. Not illustrated.
150. Fragment of basket or screen in 2-strand twined technique, passive system is split reed, active system is

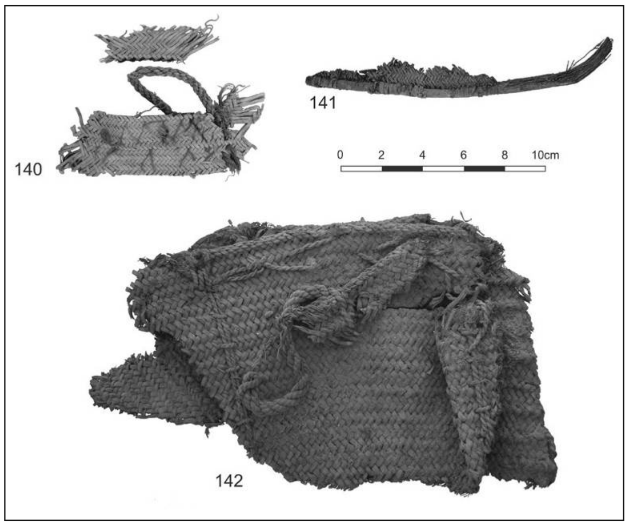


Figure 21.24. Islamic sewn palm fibre matting. Nos 140-142.

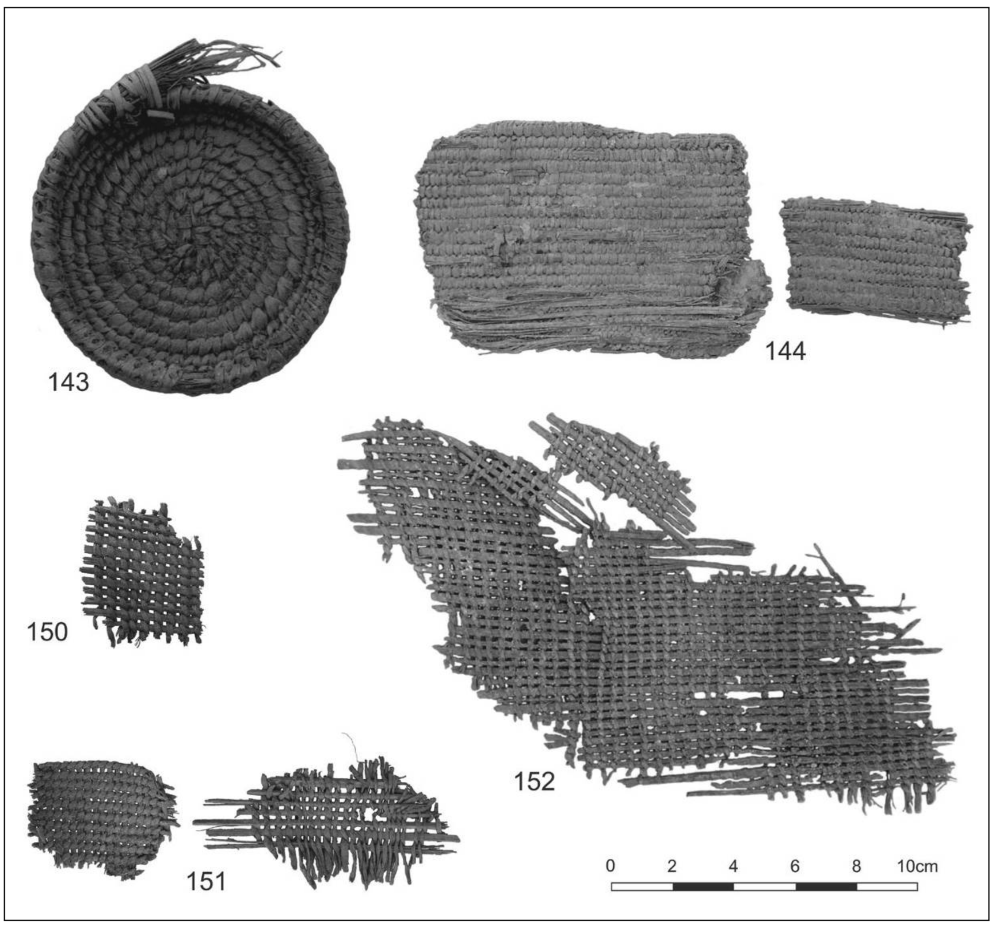


Figure 21.25. Islamic rigid containers. Nos 143-144 & 150-152.

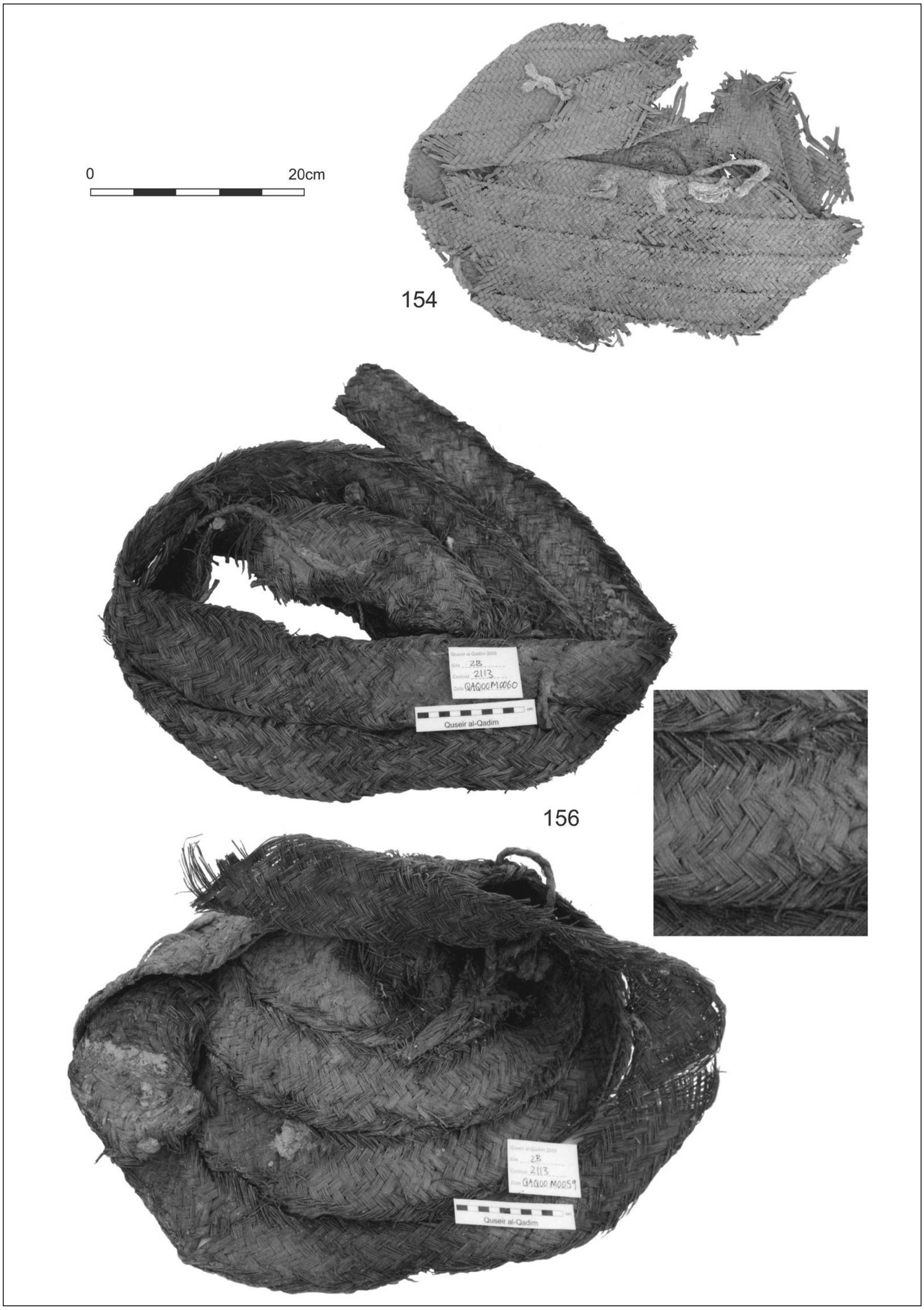


Figure 21.26. Islamic containers, sewn plaited palm construction. Nos 154-156.

split reed twined with an s twist. 4.8 x 4.0 cm [CB210 from Tr. 13 (5510)].
151. Two fragments of basket or screen in 2-strand twined technique. 4.5 x 3.7 cm, 8.5 x 3.7 cm [CB277, CB278 from Tr. 13 (5522)].
152. Fragment of basket or screen, in 2-strand twined technique. Palm sheath 0.2 cm wide, 4 per cm. 18 x 12 cm [CB054 from Tr. 2B (2316)].

Sewn plaited palm strips (Fig. 21.26)
This is the same technique as described above for sewn plaited palm strip sheets, however in this case, the long strips are sewn in a spiral to create a container rather than a flat sheet.
153. Cup container, constructed from folded palm leaf plait, so does not stand unaided. Height 8 cm x base 3.5 cm x opening 5 cm [99M013 from Tr. 2C (1017)]. Not illustrated.
154. Basket in sewn palm plaits, nearly complete. Plait width 2.9 cm, strip width 0.4 cm, 2/1 construction. Plaits held with zS2 bast 0.4 cm wide. Base and sides are formed from one continuous strip. Inner spiral ëeí orientation. String of rough grass zS2 worked through sides 7 cm apart. Fragment of handle of same cord. Traces of blue dyed cotton thread at edge of basket. Mouth diameter c 35 cm, height from base 15 cm [CB056 from Tr. 2B (2320)].
155. Large basket in circular plaited palm leaf. Plait is 14.5 cm wide, of 9 strips 0.9 cm wide. Internal spiral is e orientation. Form is tub shaped, with two handles. Handles in zS2, four plied together, with reinforcing stitches through four plait strips underneath. Base has disintegrated. Circumference of opening 158 cm, sides approximately 20 cm high, base about 50 cm diameter [00M058 from Tr. 2B (2113)]. Not illustrated.

Other
156. Two large baskets, almost complete, in plaited strips of a reddish shiny cane. Plaits made from 13 bundles of about 8 cane strands plaited into strips 7 cm wide. Form is a large tub, with two plaits forming the base, then circling to form the sides which are three plait width high. Internal spiral is in e direction. Crushed, approximate dimensions 45 cm diameter mouth, 25 cm height. [00M060 and 00MO61 from Tr. 2B (2113)].

Pot covers and lids (see figure 21.27)
Pot covers were a common find in Islamic contexts, with 65 examples found. The average minimum diameter was 20 cm, however the frequency distribution graph (Fig. 21.28) shows that they were most often disposed of when they measured between 11-15 cm. Any smaller than this and they would not effectively cover a cup or small pot. It is worth pointing out that it is hard to gauge how many were made specifically to this size, as the pot covers tend to break up from the outside edges, which can easily be trimmed to make smaller and smaller pot covers. From the distribution curve it would seem likely that most were originally made at about 35 cm diameter, with the larger examples, which presumably were for storage jars, being made and used less frequently. All were very similar in structure, with a loose bundle of stiff fibres forming the passive system which was coiled into a spiral, sewn into place with a papery strip of palm leaf, which pierces the previous row of the spiral. One example was kidney shaped suggesting either a practice piece or one designed for a specially shaped pot.
157. Pot cover in coiled technique. Passive system split reed wrapped in palm leaf, active system palm leaf 0.4 cm wide. Stitches radiate out from centre in pattern. Neat starting point clearly visible in centre of reverse. Diameter 18 cm, complete [CB347 from Tr. 13 (5533)].
158. Pot cover in coiled technique. Passive system split reed wrapped in palm leaf, active system palm leaf 0.3 cm wide. Stitches radiate out from centre in pattern. Diameter 14 cm, probably originally 18 cm diameter [CB348 from Tr. 13 (5533)].
159. Pot cover in coiled technique. Passive system split reed 0.8 cm wide. Active system palm leaf 0.3 cm wide. Repaired with large stitches of zS2 string in a cross shape. Diameter 7 cm incomplete [CB170 from Tr. 8A (8251)].
160. Lid or shallow bowl in coiled technique. Passive system split reed, active system palm leaf, hardly covering the reed. Diameter 15 cm, depth 3.5 cm [CB349 from Tr. 13 (5518)].
161. Decorated pot cover in coiled technique. Passive system is bunches of palm leaves 0.35 cm wide. Active system palm leaves, 0.25 cm wide. Z spun string stitches over it, and some yellow wool decoration. Complete, diameter 9.4 cm [99B38 from Tr. 2B (1519)]. Not illustrated.
162. Lid in coiled technique. Passive system is grass 0.3 cm wide, active system is palm leaf 0.2 cm wide. The form is roughly triangular in shape coming up to a point where a small piece of string is attached. Diameter 7 cm, height 2.9 cm [00B012 from Tr. 5 (3026)].
163. Complete lid with lip in coiled technique. Passive system is split reed 0.9 cm wide, active system is palm leaf 0.5 cm wide. Diameter 15 cm, lip 2.7 cm [00B036 from Tr. 2E (6007)]. Not illustrated.
164. Complete lid in coiled technique. Passive system is stiff grass 0.5 cm wide, active system is broad palm leaf 0.3 cm. Complete diameter 18.5-20.5 cm [00B037 from Tr. 2E (6007)]. Not illustrated.
165. Lid or platter in stake and strand technique. Passive system bundles of whole reed, active system single reeds. Passive system plied at the edges to create rope effect. 11.5 cm diameter [CB421 from Tr. 17 (17032)].
166. Pot cover cut from centre of a plaited palm mat. 19 cm diameter. [CB55 from Tr. 2B (2316)].
167. Small object in coiled technique, but kidney shaped. Passive system 0.8 cm wide, active system palm leaf, 0.3 cm wide. 5.8 x 1.1. cm [00B011 from Tr. 5 (3026)].

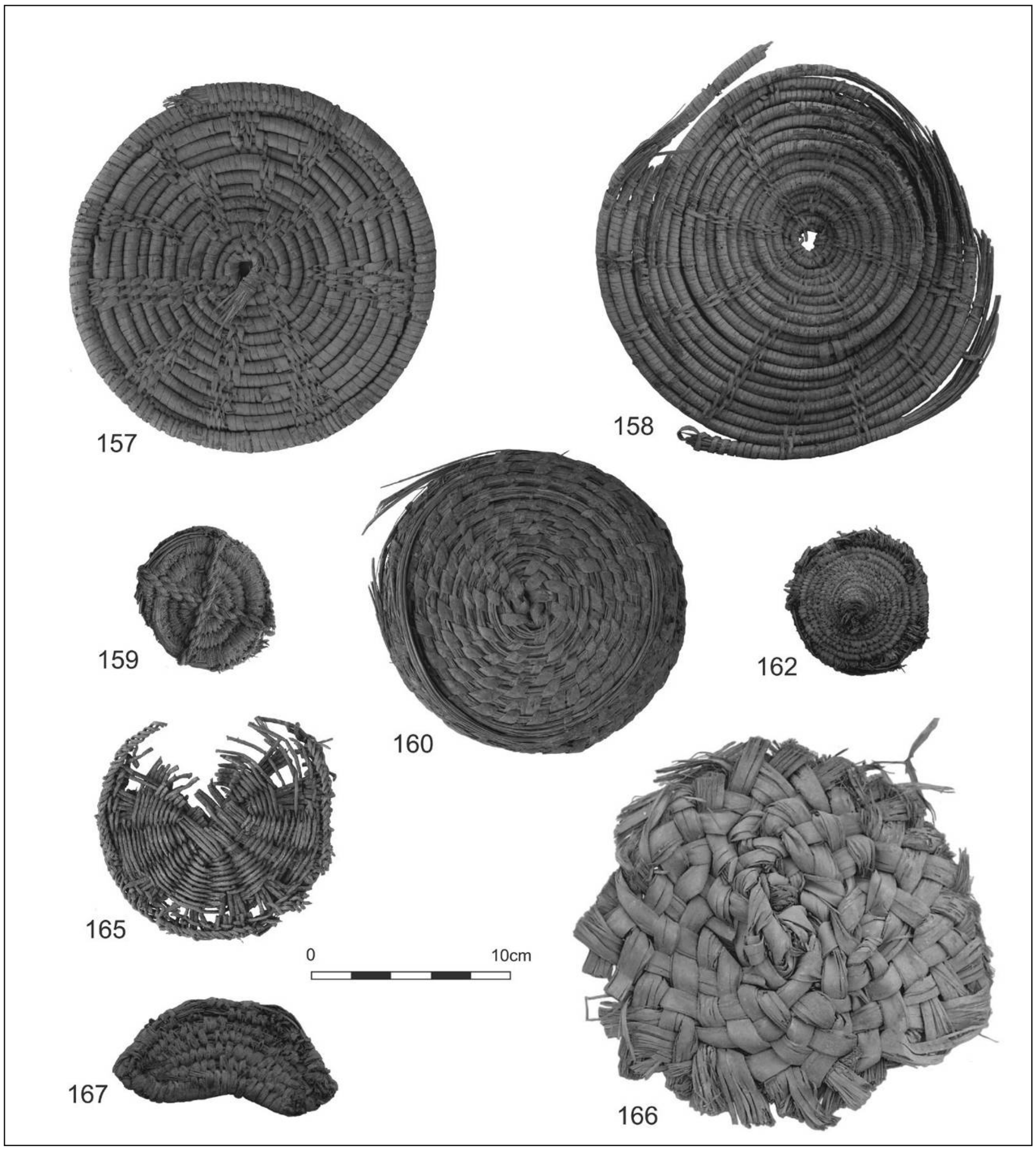


Figure 21.27. Islamic pot covers. Nos 157-160, 162 & 165-167.

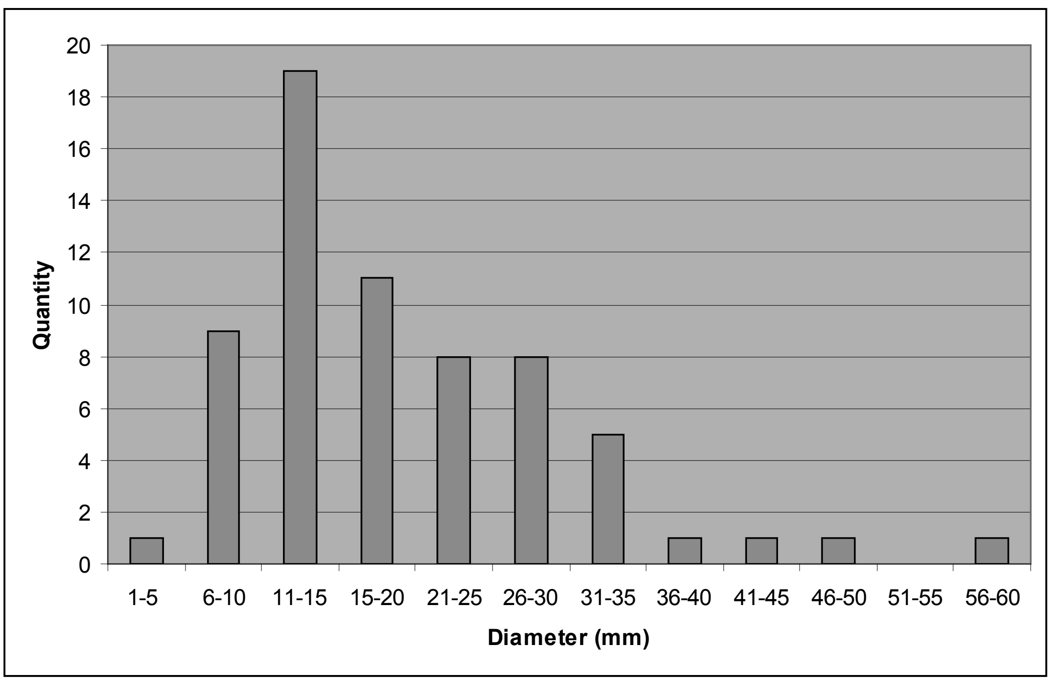


Figure 21.28. Frequency distribution of diameter of Islamic pot covers.

Flexible containers and bags

Bags (Fig. 21.29)

The large sack is a surviving example of what was probably a common type of simple container at Quseir, made from the ubiquitous plaited palm sheets, although their brittle nature means they would have been a temporary storage solution. The double folding at the top suggests that this helped the mouth stay open for materials to be placed inside and taken out. It would not have been strong enough to move around any heavy items, so perhaps it was used as a storage container. The other bags were used to carry small items, perhaps as personal bags, worn over the shoulder, or attached to saddlery.

168. Sack of sewn palm fibre plait, almost complete but in several pieces. Plaits 6 cm wide, made of 5 strips each 1.2 cm wide with a plait angle of 100 degrees with 2/2/1 structure. The plaits are sewn with zS2 rough grass string. The sack is folded double at the top. 73 x 48 x 0.9 cm [CB 168 from Tr. 8 (8252)].

169. Bag of sewn palm fibre plaits. Plaits 3.3 cm wide made of 5 strips each 0.6 cm wide. Plaits held with zS2 0.5cm wide. Flat diameter of mouth 10 cm, length 16 cm, 5 cm at base (broken) [CB182b from Tr. 8 (8251)].

170. Bag made of woven matting. Warp partially s spun hanks of bast 0.2 cm wide, 4 per cm, weft z spun goat's hair 0.1 cm wide. Seam rolled and sewn with bast string. 16 x 9 x 8 cm [CB182a from Tr. 8A (8251)]. Not illustrated.

171. Bag of sewn palm fibre plaits. Plaits 2.8 cm wide made of 7 strips. Plaits attached with sZ2. Handle (broken) in zS3, from one side to the other across the mouth of the bag. Possibly worn over the shoulder. Flat diameter of mouth 18.5 cm, length 15 cm [CB286 from Tr. 13 (5515)].

172. Bag in woven coarse bast. Textile folded and roughly sewn together. Red and black warp strip, fringe of warps forms mouth of bag. Lined with textile. Flat diameter of mouth 12 cm, length 17 cm [CB433 from Tr. 13 5519].

Vessel carriers (Fig. 21.30)

These are similar to the rope amphorae carriers of the Roman period but notably lack the ring for the amphora spike. The reef knot net is also similar to Roman examples, but made in a more complicated plied string, and with a reinforcing strip of weaving presumably worked after the net was finished.

173. Carrier of loose twined rope construction. Made from zS2 rope. Four passive ribs are made from two lengths of rope, the thickest is used to make the handle. This is twined from base with zS2 rope giving appearance of zS2[Z]2.

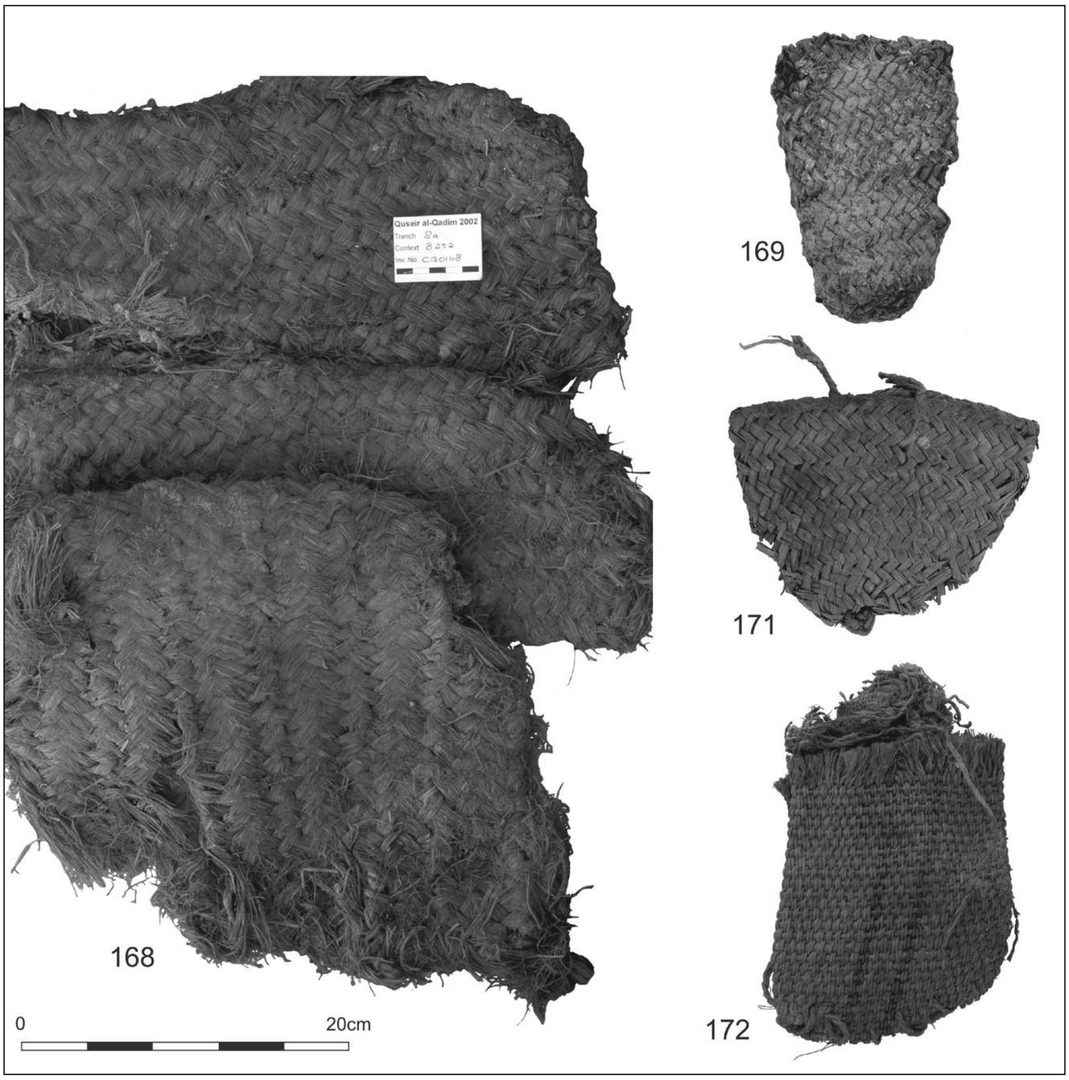


Figure 21.29. Islamic flexible containers. Nos 168-169 & 171-172.

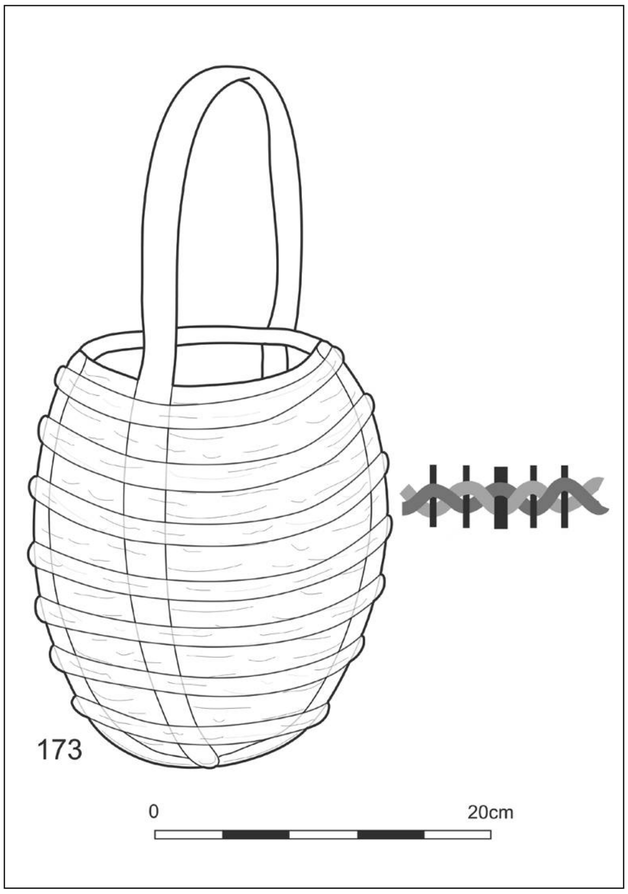


Figure 21.30. Islamic vessel carrier. No. 173.

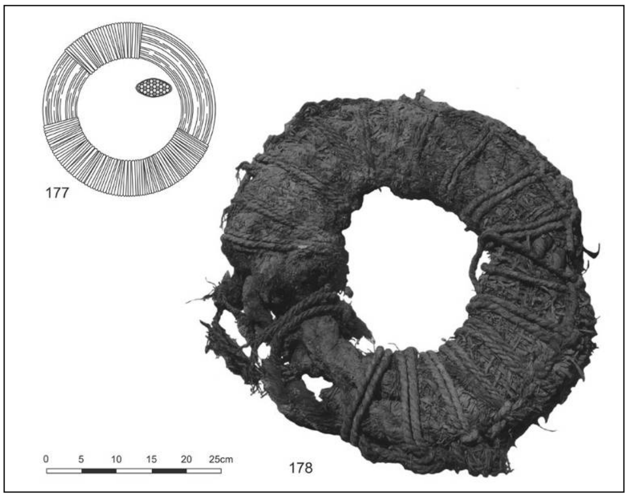


Figure 21.31. Islamic maritime objects. Nos 177-178.

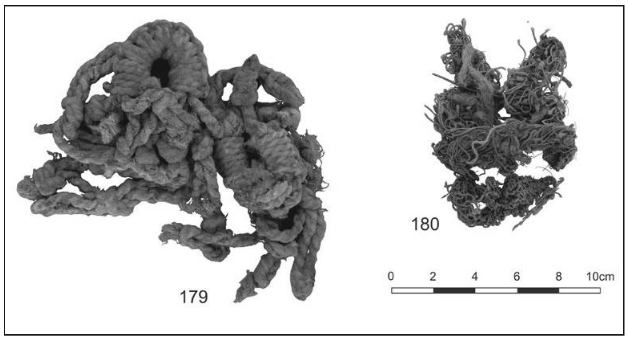


Figure 21.32. Islamic fishing nets. Nos 179-180.

This creates the shape of the carrier, there is no flat base. External spiral in e direction. Height 24 cm, circumference 44cm. Height including handle is about 33 cm [99B22 from Tr. 2B (1508)].
174. Carrier made from twined zS3[Z]2 curly grass rope. The passive system is eight strands of the rope that form a four point cross and are kept in shape by twined z spun string (becoming zS2), which is self spliced. Probably the complete height. Height 20 cm diameter of mouth of bag 17 cm, base 7 cm [00C037 from Tr. 5 (3029)]. Not illustrated.
175. Carrier net in reef knots, in zS3[Z]2 curly grass. Starting cord visible and five rows of reinforcing tabby weave [00C036 from Tr. 5 (3029)]. Not illustrated.

Maritime objects (Fig. 21.31)
Three examples of fenders were found, the largest being solidly constructed and 55 cm across. The general construction is of a core of fibre or rope that is then bound with string or rope. Initially this would have been circular in cross section, but after use, becomes compressed into an oval shape.
176. Fragment of fender. Hanks of unspun bast fibre held with zS2 bast rope, around a pitch core, coxcombed along external circumference. Fragment 10 cm long, width of fender 3.5 cm [99C018 from Tr. 2B (1009)]. Not illustrated.
177. Fender. Constructed from c. 34 strands of zS2 rough grass string in a circle, wrapped with a double thickness of the same string. Diameter of object 25 cm, ring width without wrapping 4.5 cm, with wrapping, 7 cm. Cross section is a flattened oval [99C092 from Tr. 1 (surface)].
178. Fender. Constructed from thick sZ3 rope 5 cm wide, coiled 2/3 times, wrapped in plaited palm sheet (almost completely disintegrated), and then wrapped in sZ3 rope. 55 x 51 cm with depth 8 cm [CB165a, 99C107 from Tr. 2B (1519)].

Fishing nets (Fig. 21.32)
These are discussed more fully in the maritime section.
179. Fishing pot in zS2 bast 0.4 cm wide constructed in mesh knots, worked around 2 half grommets (possibly a broken grommet), mesh size 3 cm [CB184 from Tr. 8A (8251)].
180. Fishing net in sZ2 bast constructed in mesh knots. Knots in s orientation, very fragmentary [CB447 from Tr. 13 (5520)].
181. Fishing net in sZ2 bast constructed in mesh knots, s knots. Mesh size 2.5 x 2.5 x 2.5 x 2.5 cm. 19 x 8 cm [99C039 from Tr. 2C (1033)]. Not illustrated.
182. Fishing net in sZ2 bast constructed in mesh knots, s knots. Mesh size 2 x 2 x 1.7 x 2.2 cm [99C044 from Tr. 2C (1039)]. Not illustrated.
183. Fishing net in mesh knots in bast, s knots. Mesh size 0.5 x 0. 9 x 0.5 x 1.0 cm [99C066 from Tr. 2B (2014)]. Not illustrated.
184. Fishing net in sZ2 bast in mesh knots, s knots. Mesh

size 3.5 x 2.3 x 2.9 x 2.4 cm. Overall tubular shape with a sewn edge created by knotting around the finished edge of one side. Short sewn edge 4.5 cm, sides 14 cm and c18 cm, open end 12 cm. [C069 from Tr. 2B (1509)]. Not illustrated.
185. Fishing net in sZ2 bast in mesh knots, s knots on both sides. Mesh size 3 x 3 x 3 x 3.4 cm. 22 x 16 cm [99C087 from Tr. 2D (1255)]. Not illustrated.
186. Fishing net in zS2 bast in mesh knots, mostly s knots. Mesh size 3.2 x 3.2 x 3.0 x 2.9 cm [00C020 from Tr. 5 (3026)]. Not illustrated.
187. Fishing net in zS2 bast in mesh knots, s knots on both sides [00C096 from Tr. 5 (3079)]. Not illustrated.
188. Fishing net in sZ3 bast in mesh knots, z knots on both sides. Mesh size 2.9 x 3.7 x 3.1 x 3.4 cm [00C098 from Tr. 5 (3017)]. Not illustrated.
189. Fishing net in mesh knots in sZ3 bast, z knots on both sides. Mesh size 2.7 x 3.1 x 3.6 x 3 cm [00C172 from Tr. 3 (2002)]. Not illustrated.

Cleaning brushes (Fig. 21.33)
There was a wide variety of cleaning brushes found, mostly very simply made from fibre or string folded over and bound with string, which also served as a handle. A more unusual example was a longer (51 cm) brush which may have been used to clean inside vessels.
190. Small brush made from a white fibre (possibly cotton) wrapped with sZ3 bast. 8.5 x 1.5 cm [00C008 from Tr. 5 (3046)].
191. Brush, constructed from rough grass fibre folded over and held with loosely twisted grass fibre. 12 x 1.6 cm [00C162 from Tr. 2E (6002)]. Not illustrated.
192. Brush made from grass folded over and held with zS2 rope. There is some rope also in the fibre, suggesting a reuse of grass mat roofing. It appears to be more of a dabbing brush than a sweeping brush 18 x 6 cm [00C120 from Tr. 13 (5526)].
193. Fragment of brush made from z spun grass fibre, tied with zS2 knot. 6.1 x 1.8 cm. [CB251 from Tr. 13 (5522)].
194. Sweeping or 'bottle' brush made of palm leaf strips held together with split cane zS2 string. Tapered shape, widest point 6.7 cm, narrowest point 1.8 cm. 51 cm long. [CB166 from Tr. 8 (8251)].
195. Fragment of fan shaped hand brush made from palm fibre, string disappeared. 4.7 x 6.7 cm [CB211 from Tr. 13 (5510)].

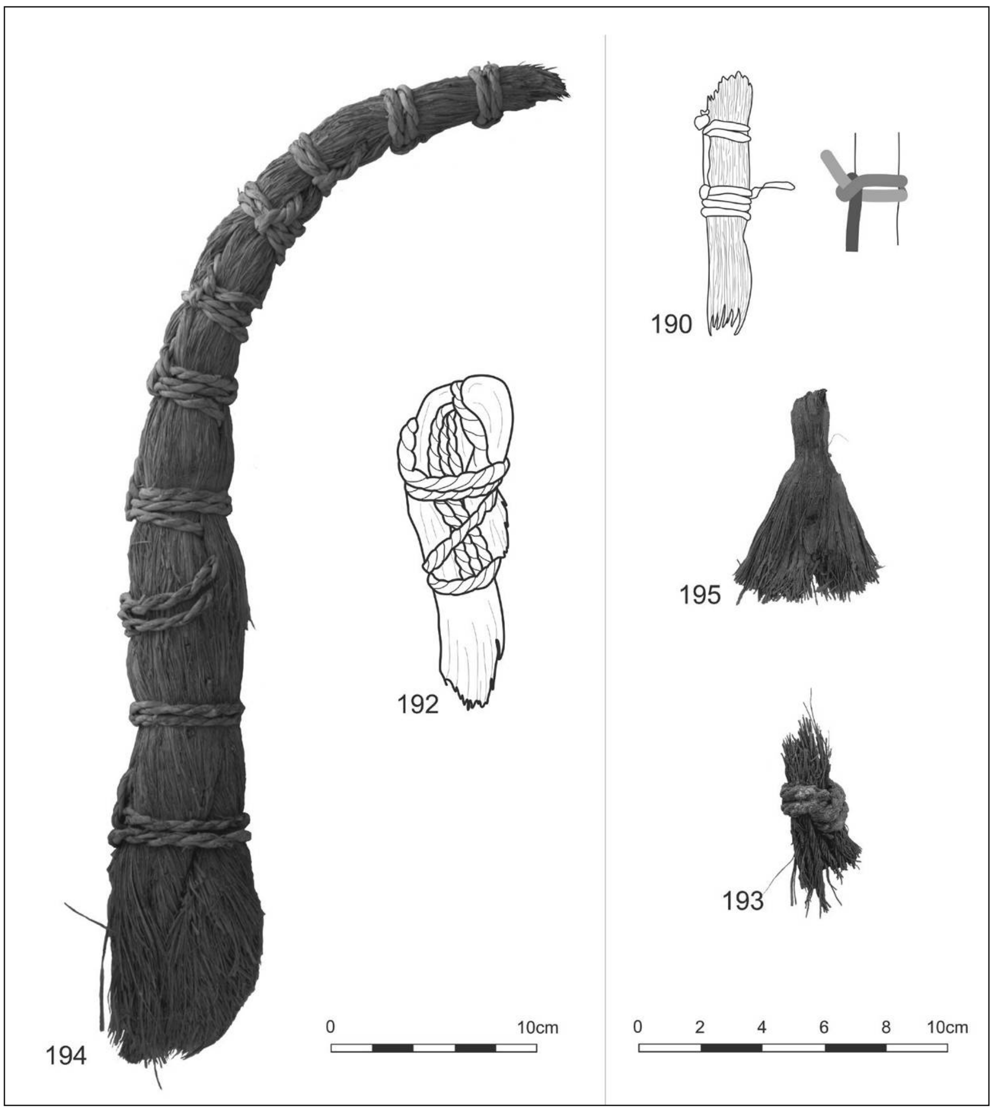


Figure 21.33.
Islamic brushes. Nos 190, & 192-195.

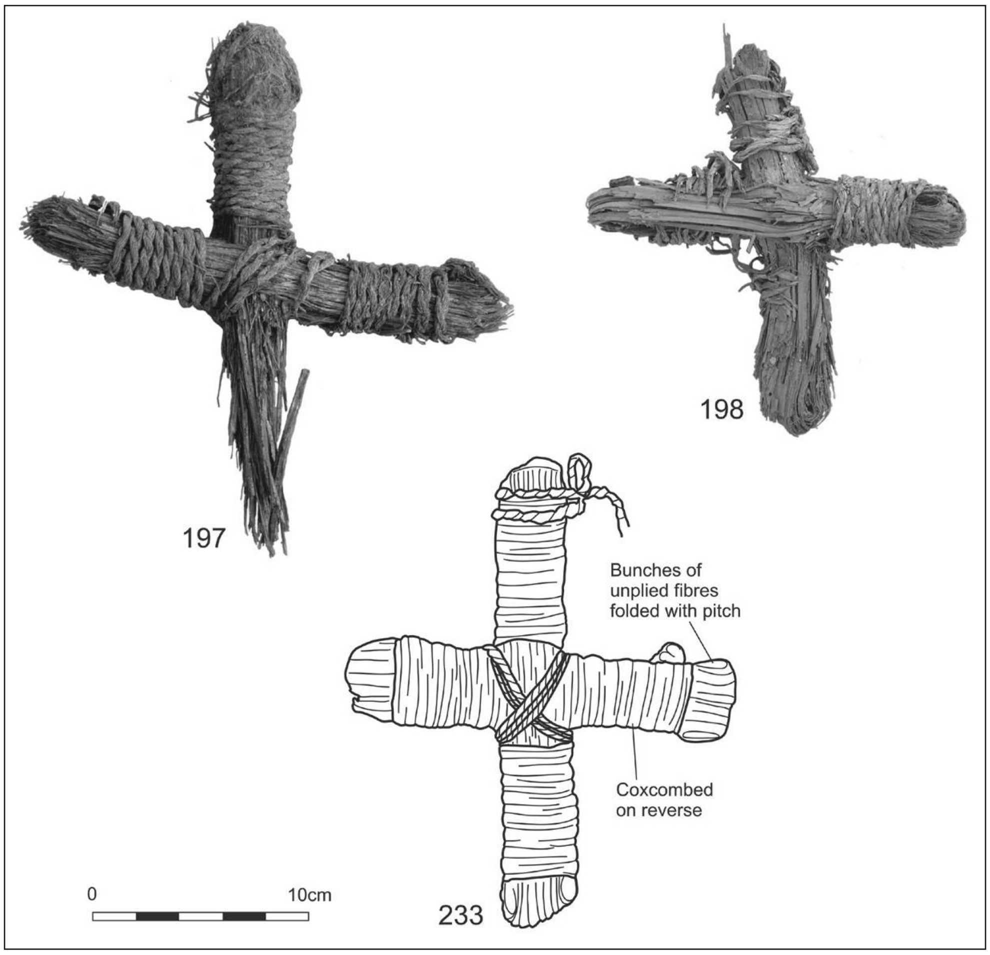


Figure 21.34. Islamic cross-shaped brushes. Nos 197-198 & 233.

Cross shaped cleaning brushes (Fig. 21.34)
Four cross shaped cleaning brushes were found at Quseir, including one from a mixed context (see Cat. No. 232 below). Initially, it was not clear what these objects were used for, as their well made structure, suggesting perhaps a maritime use, was contradicted by their relative weakness, all being made of hanks of rough grass bound with string. Examination of the wear on the ends of the crosses suggests they were used as brushes, probably for dish washing, as the cross shape would stop them being used in any restricted spaces.

196. Cleaning brush in cross shape. Two thick hanks of grass folded over, and one pushed through the other to made a cross shape, then closely wrapped in zS2 rough grass string, coxcombed. 16 x 11 cm [99C061 from Tr. 2C, 1012]. Not illustrated.

197. Cleaning brush in cross shape. Two hanks of rough grass solidly bound by sZ2 0.4 cm rough grass string. 22 x 20 x 2.2 cm [CB181 from Tr. 8 (8251)].

198. Cleaning brush in cross shape. Folded grass, originally tightly bound in string coxcombed along one side. Fragments of wood and pitch remain in the folds of the grass suggesting the cross was bound around these. 17 x 17 x 4 cm [00C119, CB028 from Tr. 2B (2007)].

Decorative cordage (Fig. 21.35)
The following examples were probably used in clothing and give an indication of the range of types of materials and techniques that were used, from simple scraps of fabric attached to string, to complicated constructions incorporating beads.

199. Tassel with small bead. Linen wrapped, with coloured threads probably in silk. Core cord not visible, only wrapping threads in four different colours, with a red bead. 60x 10 mm [00C0038, CB0033 from Tr. 5 (3005)].

200. Tassel. Cord is in three-strand braid in black and blue wool. The tassel is formed in green and orange wool, which is tied in place with green wool. The black and blue wool re-emerges in the tassel. 70 x 20 mm [00C032, CB0034 from Tr. 5 (3014)].

201. Tassel in black thread with sennit construction. Sennit worked in a loop then a bunch of z spun black threads knotted through end of loop to make a tassel. 70 x 15 mm [CB0035, 00C0033 from Tr. 5 (3005)].

202. Tassel. Cord made from 8 strand tubular braid with tassel, blue threads bind the tassel. 0.3 x 0.3 x 24 cm [99C073 from Tr. 2B (1532)]. Not illustrated.

203. Tassel? Or possibly small brush. Core, not visible, tightly wrapped with black goat hair string, which is coxcombed, snaking around the cord. The tassel is short and stubby, and there is another cord coming off close to the tassel. 11 x 1 cm [00C034 from Tr. 5 (3014)].

204. Tassel. Scrap of fabric knotted to a length of bast sZ2 string. String 30 cm, tassel 12 cm [00C040 from Tr. 5 (3005)].

205. Tassel formed from a string of zS3[Z]2 knotted

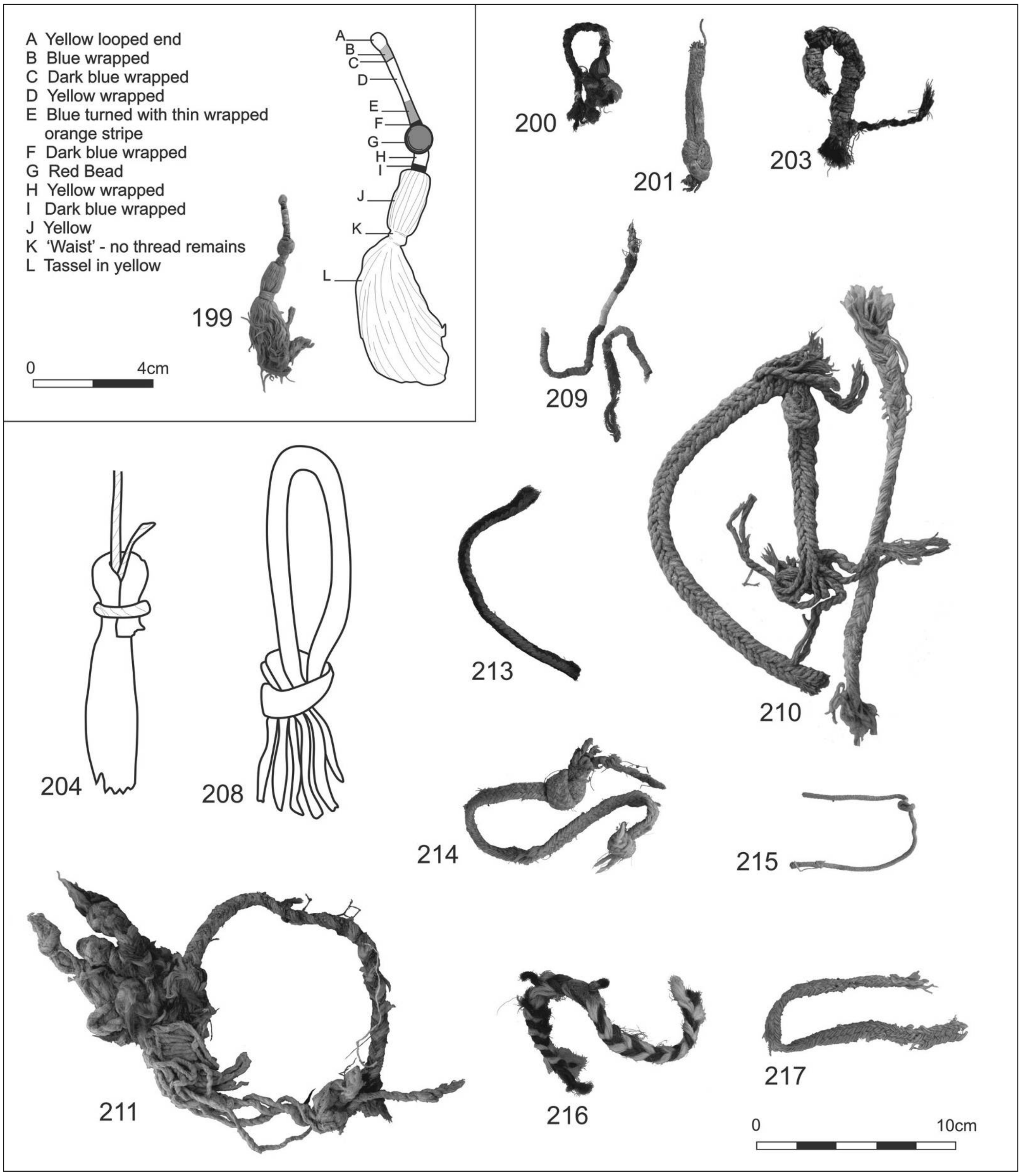


Figure 21.35. Islamic decorative cordage. Nos 199-201, 203-204, 208-211 & 213-217.

around some small pieces of leather. Tassel 2 cm [00C017 from Tr. 5 (3026)]. Not illustrated.

206. Tassel formed from zS2 string with scrap of red and blue cotton fabric attached. Tassel 5 cm [00C018a from Tr. 5 (3026)]. Not illustrated.

207. Tassel formed from zS2 string with scrap of blue and white checked cotton fabric attached. Tassel 10 cm [00C018b from Tr. 5 (3026)]. Not illustrated.

208. Bracelet? Thick string of zS4 grass fibre looped and knotted. Ends of knot appear to have been deliberately unplied. Loop 10 cm, knot 3.5 cm, tassel 6 cm [00C007 from Tr. 5 (3036)].

209. Decorative cord, wool cord bound with multicoloured string in red, green and blue wool and white cotton. 100 x 3 mm [CB0036, 00C0123 from Tr. 2E (6001)].

210. Decorative cord, 7 strand braid of zS2 0.3 cm wide bast dyed pinkish-brown, 2 fragments. 22 x 1 x 0.5 cm, 11 x 1 x 0.5 cm [CB175a from Tr. 8 (8251)].

211. Decorative cord. Six?-strand tubular braid made from red, white and blue wool, all s spun [CB432 from Tr. 8 (8252)].

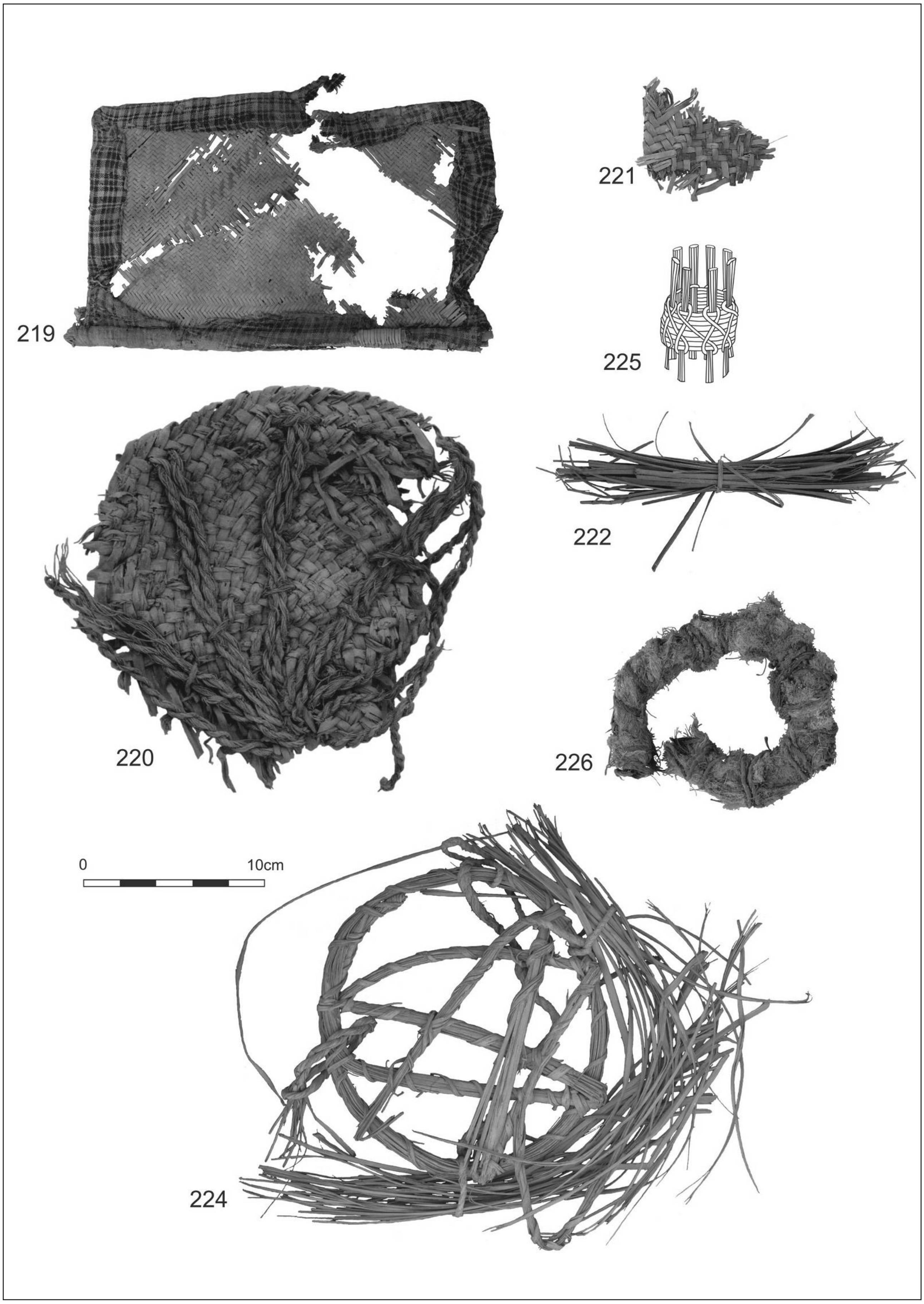


Figure 21.36. Islamic miscellaneous. Nos 219-222 & 224-226.

212. Decorative cord. 3 crowned sennet in unknown fibre. 32 x 0.15 cm [99C025 from Tr. 2D (1266)]. Not illustrated.
213. Decorative cord in blue and red in hollow tube construction (structure not clear). Unused, cut ends. 14 x 5 cm [CB 453 from Tr. 13 (5514)].
214. Decorative cord. Five strand braid in wool, with z orientation overhand knot holding wool string. 19.5 x 0.8 cm [CB406 from Tr. 13 (5521)].
215. Decorative cord. String in bast or cotton in sennit construction with knot. 15.5 x 0.2 cm [CB441 from Tr. 13 (5520)].
216. Decorative cord. Three strand braid in brown and yellow wool. 18 x 0.9 cm [CB465 from Tr. 13 (5520)].
217. Decorative cord. Five strand braid in natural wool. Each strand is paired. 19.5 x 0.8 cm [CB466 from Tr. 13 (5520)].
218. Decorative cord. Rope constructed from a length of dark blue with red stripe cotton textile, twisted then allowed to ply onto itself, and held with an overhand s stopper knot. 38 x 0.7 cm [99C058 from Tr. 2C (1012)]. Not illustrated.

Miscellaneous (Fig. 21.36)

The bundles of fibres recovered from the site indicate that Quseir was either supplying ships with materials for making mats or basketry or production was taking place there. Fans must have been a common object at Quseir but their lightweight structure means purpose-made ones easily break and ones simply cut from palm sheets are indistinguishable as fans. There are two, possibly three, examples. The examples of simple shapes and objects made in palm fibre were probably done for fun, though are less neatly constructed than the Roman examples.
219. Hand fan. Fine plaited palm sheet carefully edged with blue checked fabric, with reinforcing wood spine that acts as a handle. Strips in plait 0.15 cm wide. 22 x 13.5 cm [CB436 from Tr. 13 (5550)].
220. Hand fan. Sewn palm plait coiled mat with long rope stitches. Plait is 2.5 cm wide made of 7 strips of 0.7 cm wide. Plaits held with zS2. Rope is zS2 grass fibre, which radiates out from centre, couched down by another line of stitched rope. 20 x 20 cm [00M013 from Tr. 6B (4008)].
221. Object of unknown use. Fragment of decorated plaited matting with black zig-zag decoration, structure is slightly fan shaped but not part of a basket. 7 x 4.5 cm [CM 0029, 00B008 from Tr. 5 (3026)].
222. Bundle of palm leaves tied together with single palm leaf. 20 x 3.5 cm [CB397 from Tr. 13 (5550)].
223. Three strips of palm leaf tied into a triangle. 4 x 5 cm [99C053 from Tr. 2C (1017)]. Not illustrated.
224. Object of unknown use. Constructed of a ring of palm fibre strips bound with palm strips and shaped to form a pattern in the centre of the circle. A loosely plied loop may have been used for hanging. 24 x 20 cm [CB250 from Tr. 13 (5523)].
225. Decorative? Ring, constructed from zS2 string wound in a circle, bundles of split grass held against the inside and held with a pattern of grass fibre looping around the exterior of the circle. 4 x 3.1 cm [00C157 from Tr. 2E (6007)].
226. Padded grommet, of similar construction to a fender. Ring of zS2[Z]4 palm with bast fibre covering one side, bound with z spun grass fibre, possibly a pot stand or some kind of padding. 12 x 11 cm [CB413 from Tr. 13 (5520)].

21.3 Mixed or undated contexts

These are included here (Fig. 21.37) because although they are not clearly dated, they may have possible comparators at other sites. Several are referred to in the main text.
227. Small pot and lid in coiled technique. Passive system split reed 0.6 cm wide. Active system palm leaf 0.5 cm wide. Form oval, possibly squashed, base missing. Lid 5-7 cm diameter. Base 3-6 cm diameter, height 3.07 cm, base 5 cm across. 7 x 5 x 3.5 cm [CB161 from Tr. 8 (8262)]. Probably Islamic. Not illustrated.
228. Bag constructed from sewn palm fibre plaits. Plaits are 6 cm wide, made from 7 strips, each 1.5 cm wide. The bottom of the vessel is open. Inside was a palm leaf strip 2.2 cm wide made of 7 strips, at least 70 cm long. Base flat diameter is 23 cm, opening up to mouth 34 cm wide, over a length of 38 cm. Probably Roman [00B024 from Tr. 6A (4001)].
229. Basket in sewn palm leaf plaits with reinforcing strips. Plaits 4.5 cm wide, made from 17 strips 0.5 cm wide. Plaits held with zS2. Roughly a tub shape, though crushed. Two extra strips are sewn on, perhaps as handles. Base is 32 cm across, mouth c 70 cm flat diameter. Height 26 cm. Probably Islamic [00M056 from Tr. 7 (5002)]. Not illustrated.
230. Small lid in coiled technique. Passive system split reed 0.5 cm wide. Active system palm leaf, 0.4 cm wide. Diameter 3-4 cm, depth 3 cm. Probably Islamic [CB 160 from Tr. 8 (8262)]. Not illustrated.
231. Bag constructed from sewn palm fibre plaits. Plaits are 1.2 cm wide, made from 3 strips 0.8cm wide. Plaits sewn together with s spun cotton thread. Width 27cm, height 24 cm, mouth 24 cm [99C091 from Tr. 2B (1504)]. Not illustrated.
232. Fragment of carrier matting in twined construction. Structure very open. Passive system 0.8 cm wide zS3 grass rope 3 per 3 cm. Active system 0.5 cm wide z spun twined in 2 rows 5 cm apart. 15 cm is the complete width. 29 x 15 cm. Probably Roman [CB164 from Tr. 8 (8360)]. Not illustrated.
233 Cross shaped brush. Constructed from bunches of unplied rough grass fibres folded and held with pitch, wrapped in zS2 rough grass string which is coxcombed along one side. One arm of the cross has zS2[Z]2 wrapped around it. 22 x 17 cm [99C084 from Tr. 2B (1519]. Probably Islamic (Figure 21.34).
234. Hand brush made of cut hanks of grass tied with zS2 bast string. Has been used at both ends, as a scrubbing

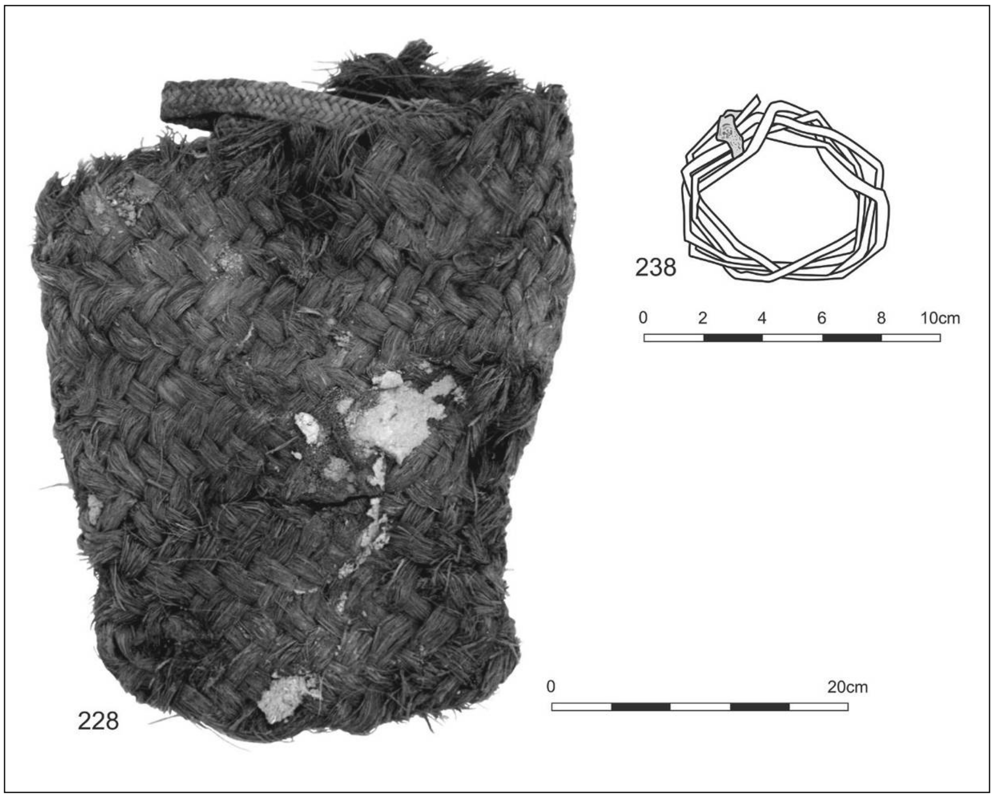


Figure 21.37. Objects from mixed or undated contexts. Nos. 228 & 238.

rather than sweeping brush. 21 x 10 x 3 cm. [CB169 from Tr. 8 (8262)]. Not illustrated.
235. Hand brush made of rough grass fibres, held together with a hank of same fibre. 12 x 3 cm. [99C080 from Tr. 2B (1519)]. Not illustrated.
236. Fishing net, in sZ2 bast 0.1 cm wide, constructed in mesh knots, s in both directions. Mesh size 1.2 x 1.1 x 1.2 x 1.4 cm. Probably Roman. [00C186 from Tr. 2B (2112)]. Not illustrated.
237. Decorative cord. 6 string sennit in stiff black goat hair fibres with some yellow. Probably Islamic. [99C094 from Tr. 2B (1576)]. Not illustrated.
238. Bracelet. Twisted ring of grass with fragment of cowrie shell bead. 75 x 65 x 10 mm. Probably Islamic. [CB0025, 99C0072 from Tr. 2B (1544)].

21.4 Conclusion

The basketry, matting and cordage have an important role to play in answering many questions about day to day life at Myos Hormos and Quseir al-Qadim. With so little material published from other sites in Egypt, especially for the Islamic period, the information from this excavation has a crucial role to play in extending knowledge about this important category of artefacts. Clearly, there is a huge similarity in production techniques between the Roman and Islamic periods, with many objects appearing almost identical across the two phases of occupation. However, it is also apparent that many of the objects are used in different ways, despite being similar in form. Inevitably, this short report and catalogue can only be a limited analysis of this very rich source of data, and as is so often the case, this work has thrown up more questions than it has answered.

22 Textiles: A Preliminary Report

Fiona J. L. Handley

Introduction

This report is a brief overview of the textiles found at Quseir during the excavations between 1999 and 2003. A fuller report, including a complete catalogue, is in preparation.[1] This paper focuses on the initial fieldwork methodology, describes a case study of the analysis undertaken[2] and presents a catalogue of the Roman sails and webbing strips found at the site. The Roman maritime materials have an important contribution to play in understanding many other find types at the site, so from a wide variety of different textiles, these particular examples were selected for consideration in this chapter. Quseir has excellent organic preservation and produced large quantities of textiles during both the Southampton excavations and during the earlier Chicago excavations (Brookner 1979; Eastwood 1982). The Eastern Desert is very arid, with almost no rainfall, and this, combined with the tendency of early inhabitants to deposit their rubbish in *sebakh* heaps several metres thick, means that textiles, along with other organic material, survive in abundance.

Most of the textiles were found as small scraps of fabric that originally came from the sacking, covers, and packaging of a working port. In both periods items of saddlery in the form of girths and straps, as well as saddle padding, make an important contribution to our understanding of transport in the region. The other main groups of textile came from clothing, however, most of these remain unidentified beyond recognition of fabric type, but with such a large sample, several examples of complete or almost complete clothing survive from both periods. These include a child's tunic from the Roman period, and a variety of hats, as well as children's clothing from the Islamic period. Much smaller quantities of other types of textile were found, but there were enough to gain an insight into domestic textiles such Roman cushion covers and mattresses, and Islamic curtains and cushion covers. Fragments of the latter are particularly well represented among the Indian trade textiles found at the site (see Handley and Regourd 2009 for a catalogue of some of these).

During the five seasons of excavation, over 9,800 pieces of textile were recovered. This is an immense number, especially as most archaeological excavations produce few or no textiles, and as a result, there are almost no published methodologies for recording this quantity of material. Archaeological textile recording has tended to emphasise detailed recording of every tiny fragment. In Egypt, where large assemblages of textiles are excavated, this approach is impractical, and the accepted procedure is to select only the 'best' or most 'interesting' pieces, and to ignore the vast majority of material found (for example the Awad Collection). However, the pioneering work of Gillian Vogelsang-Eastwood working at the Chicago Quseir excavations and at Amarna (Eastwood 1982; Eastwood 1990; Kemp and Vogelsang-Eastwood 2001), Lise Bender Jorgensen working at several sites, but especially at Mons Claudianus (Bender Jørgensen 2000; 2004; Bender Jørgensen and Mannering 2001) and John and Felicity Wild at Berenike (Wild 2006; Wild and Wild 1996; 1998a; 1998b; 2000a; 2000b), has demonstrated that every piece of textile should contribute in some way to an understanding of the site where it was found. However, of these sites, only the textiles of Mons Claudianus were on the scale of Quseir, and it is a credit to the diligence and perseverance of Lise Bender Jorgensen and her team that the textiles were, and continue to be, analysed so systematically.

22.1 Methodology

The obvious guidelines for the methodology were the research goals for the excavation as a whole, and from this the following textile specific research questions transpired:

- How were textiles used at the site?
- What can the distribution of textiles tell us about activities that took place?
- What can dress tell us about the inhabitants of, and visitors to, the port?

[1] The analysis of the textiles from Quseir al-Qadim was enabled by a Research Fellowship from the AHRC Centre for Textile Studies and Textile Conservation at the Textile Conservation Centre, University of Southampton, from 2006-2007

[2] Some of this paper was presented at the joint meeting of the AHRC Centre for Textile Studies and Textile Conservation and the Southern Conservation Network, on the 31st January 2007, at the Textile Conservation Centre, University of Southampton.

- What can the textiles reveal about the role of the site as a port and the maritime related activities that took place there?

Many approaches to textile analysis such as high powered microscopy and dye analysis are not available to most researchers working in Egypt. Without special permits, samples cannot to be taken out of the country, and facilities are extremely limited (although improving) within the country itself. This precludes detailed analysis of fibre type, fibre degradation, origin and nature of dyes, and the study of extremely complex weaves such as those done on drawlooms. Very few, if any, textiles were made at the site (the only evidence is five Roman spinning whorls), therefore the focus was on consumption, rather than production.

On the other hand, only a minority of the textiles excavated at Quseir warranted detailed scientific examination, because the importance of these textiles rests in their very ordinariness, repetition, and poor to medium quality. Unlike many of the other textiles from Egypt which survive in European and North American museums, these are either the remains of individual graves, nor the 'best' textiles picked out of accumulated rubbish dumps. Here, in contrast, they are part of a corpus of material culture which reflects the social practices and the social world of Quseir, and which by its everyday nature, affords useful comparative material.

So, the primary objective was to understand the textiles within the context of the world in which they were used, rather than through close examination of, for example, the technical aspects of production. This dictated the system of recording and helped develop the analysis for both time periods. Of course, it also led to the development of more specific research questions to be addressed for both the Roman and Islamic textiles and these will be examined in future publications.

Recording the bulk finds
The approach to recording was based on the division of the assemblage into Roman or Islamic material, and then into those textiles considered worthy of detailed recording (the special finds), and the rest, known as the bulk finds.

The challenge was to find a method of recording some salient information in such bulk finds in the shortest possible time. Most were dirty semi-shredded rags, stuck together with dried mud and whatever happened to be next to them in the rubbish heap, and filled with sand and dust. They were recorded by size (small, medium, large and extra large) and then by what the textiles were probably used for, with a division between utilitarian textiles (involved in transport, industry or packaging), and garment fabrics. Any features such as stitching, cut edges, unusual weave patterns, decoration or unusual markings would mean the textile would be recorded as a special find.

Slightly different recording strategies for the bulk finds were adopted for the two different time periods. The Roman bulk material was divided into coarse sheep's wools, fine sheep's wools and bast fabrics, the wools being classified as garment fabrics and the basts as utilitarian fabrics. Linens and other wool textiles such as goat's hair were recorded as special finds. With hindsight, some of the finer examples of bast fabrics, although coarser than the linens, were probably garment fabrics, which has probably skewed the data a little. For the Islamic period, three types were identified: coarse basts used for a variety of utilitarian purposes, medium quality garment fabrics in blue or blue check in linen and cotton, and medium quality garment fabrics in undyed cotton and linen.

Recording the Special Finds
Once the bulk finds had been extracted and recorded, the remaining special finds textiles were prepared for recording and storage. This involved light surface cleaning with dry brushes, and if necessary, moistening with bottled water in a spray gun to allow further surface cleaning by blotting with pads of clean cotton fabric, and slight flattening to aid recording and storage. No attempt was made to remove wrinkles or to clean beyond what was needed for identification and storage. Pieces that needed unfolding were placed in a humidification 'tent' locally fabricated from a large sealable plastic bag containing a small dish of cotton wool soaked in water, with a water bottle as an internal support to hold the plastic bag away from the fabric. This worked well, although the small size of the 'tent' limited the size of the pieces of fabric that could be unfolded. Only very rarely were textiles immersed in water, and then only if they had been attached to a support such as net fabric. Fragmentary textiles were also loosely stitched to net fabric, and supports for clothing such as hats and sleeves were constructed from acid free tissue paper. The limitations on storage imposed by the Supreme Council for Antiquities meant that packaging had to be kept a minimum. However, this was facilitated by most of textiles being fairly two-dimensional, but vertical compression of the textiles to fit more into the storage boxes was avoided.

The main recording of special finds was done on printed spreadsheets that were later entered into a database. Extra information was recorded in notebooks, and through a variety of labeled diagrams (including measured drawings, and schematic drawings of weave structures and garment construction) and photographs. Eight hundred and sixteen Roman textiles and 1,377 Islamic textiles were recorded as special finds. With such a large quantity of data being collected, it was important while undertaking the recording to bear in mind how the data was to be used. Each fragment was given a one or two word description that acted as a category to help in later analysis. Sixty nine categories were finally established, one of them being 'unknown', but including categories based on use, decorative technique, and fabric type.

22.2 Islamic Textiles: Overview

Before a more detailed analysis of the Roman textiles, specifically those relating to maritime activities is addressed as the main focus of this chapter, a brief overview of the Islamic textiles recovered form the site is presented here:

The Islamic textiles, like the Roman (see below), were numerous and well preserved. Overall, over 7,000 Islamic textile pieces survived, in excess and generally in better condition than the Roman. The broad categories of textiles also resemble those of the Roman period (see below for detail), with utilitarian fragments predominating, alongside household textiles and clothing. The Islamic textile assemblage shows a striking range of patterns and colours, with numerous fragments clearly associated with clothing and dress. Over 200 scraps of fabric were found, interpreted as by-products of clothes-making on site, and it seems clear that at least one location can be regarded as a tailor's workshop (see Handley 2007b for some initial discussion). The assemblage also includes over 70 examples of the Indian trade textiles which add to those published by Eastwood (1990). Some of these (which incorporate writing) have been published by Handley and Regourd (2009). Other household textiles include fragments of rugs and cushion covers.

22.3 Roman Textiles: Spatial Analysis

This case study focuses on the distribution of Roman textiles over the site (with particular reference to those textiles associated with maritime activities). After separating the bulk finds and special finds for recording, the data was re-integrated into contexts so that spatial analysis would be feasible. This was relatively straightforward as almost all the textiles recorded as special finds were either garments or associated with households e.g. as cleaning materials and upholstery furnishings. (There were some special finds within the utilitarian group which included saddlery pads, sails, or textiles with unusual stains from e.g. rusting tack heads). This re-integration gives a pattern of distribution of utilitarian, garment, and 'household' fabrics across the site, which can help answer questions about activities at various locations. It is assumed that industrial and domestic areas were spatially differentiated, and that while all the textiles were reused, they stayed roughly in the same place from first use to eventual deposition. For example, cleaning cloths in the house would come from a torn garment, while in a boat repair yard the cloth would come from a torn sail.

Almost all of the 2,455 Roman textiles found came from the rubbish dumps in the upper town where many of the domestic structures were found. Trenches particularly rich in textile finds were 6G and its associated Trenches (6H, 6I, hereafter 6G) where 52% of the Roman textiles were found, and in 6P where 17% of the Roman textiles were excavated (see Table 22.1).

Outside these particularly rich rubbish dumps were the smaller *sebakhs* associated with buildings. Of these, Trench 8, a narrow street of small structures used for domestic and light industrial activity, situated above Trench 6G and presumably the source of much of its rubbish, produced 96 textiles (4% of the total). The 50 textiles from Trench 11A were from a *sebakh* associated with a domestic occupation, a similar situation existed for Trench 5 where 61 textiles were found (though possibly redeposited), while 47 were found in Trench 7 close to the harbour.

A striking aspect of the distribution of utilitarian, domestic and household fabrics across the site is the consistency between the two largest *sebakhs*, Trenches 6P and 6G, located over 125 m apart. Their date ranges overlap, but may represent a shifting of the centre of the site southwards between the 1st and 2nd centuries. In both cases, the textile finds are almost equally divided between garment and utility textiles, with 1% to 2% household textiles, and this suggests close proximity to domestic contexts.

Trench 6G is the *sebakh* associated with the 'street' of buildings excavated above in Trench 8, and it may therefore be expected that the proportions of types of textiles of

Trench	Garment	House-hold	Utili-tarian	Other	Total	% Gar.	% House.	% Util.	% Oth.
11A	30	0	20	0	**50**	*60*	*0*	*40*	*0*
17	0	1	1	0	**2**	*0*	*50*	*50*	*0*
2b	30	0	28	0	**58**	*52*	*0*	*48*	*0*
2d	5	4	8	0	**17**	*29*	*24*	*47*	*0*
2e	2	0	1	0	**3**	*67*	*0*	*33*	*0*
5	37	0	24	0	**61**	*61*	*0*	*39*	*0*
6AandB	16	0	29	0	**45**	*36*	*0*	*64*	*0*
6C	33	0	18	0	**51**	*65*	*0*	*35*	*0*
6D-E	57	2	55	4	**118**	*48*	*2*	*47*	*3*
6G-I	648	22	594	15	**1279**	*51*	*2*	*46*	*1*
8	82	0	14	0	**96**	*85*	*0*	*15*	*0*
6P	196	8	186	8	**398**	*49*	*2*	*47*	*2*

Table 22.1. Distribution of Roman Textiles

Trench 8 would be similar to those found in Trench 6G. In fact, Trench 8 has a much higher proportion of garments, 85%, than any other location at the site. This would suggest that the residents of the area chose to dispose utilitarian waste further from their houses, while garment fabrics were disposed of close by. In contrast, Trenches 6A and 6B to the north, and Trench 7 to the south, contained the highest proportion of utilitarian textiles (64%), presumably reflecting their proximity to the harbour area.

More nuances of the same activities at the site, are suggested by the special finds data. As a port, sail making and repairing must have been important activities at Myos Hormos. Roman sails were sewn with reinforcing strips which strengthened them and which supported the brail rings through which the ropes that raised and lowered the sails ran (Chapter 15, this volume). Archaeological information on sail making and repairing is furnished by remains of the sails themselves, from pieces of webbing strip, and from other artefacts such as brail rings. There were 63 relevant examples of textile, 54 of which are webbing strips, four are certain sail fragments and three are probably sail fragments, while one may be a tarpaulin. The distribution of these fragments across the site was interesting (Fig. 22.1). Unsurprisingly the areas around Trenches 6G and 6P were numerically the most prolific, but although Trench 17 produced only four textiles, two of them possibly had maritime connections. Interestingly 17 of the 61 brail rings were also found there, but no fragments of webbing strips. It is possible that the area around Trench 17 was used to make or repair sails, perhaps recycling the brail rings from old sails, although the lack of webbing strip fragments is perplexing. This may suggest the repair of sails, rather than making of them, was taking place here.

Of the other trenches, Trench 2D has the next highest percentage of textiles associated with sails, but only 17 textiles in total were found, two of which were fragments of webbing. Removing Trenches 17 and 2D, both with very low numbers of textiles, does not reveal any clear pattern (see Fig. 22.2), as percentages are high in some areas of domestic rubbish (Trench 6C) and in areas of equal mixtures of domestic and utilitarian (Trench 6P), while low in some areas with high numbers of utilitarian textiles (Trenches 6A and 6B, 7). It is possibly significant that no webbing strips were found in Trench 8 which had the most garment fabrics of all. The *sebakh* associated with this

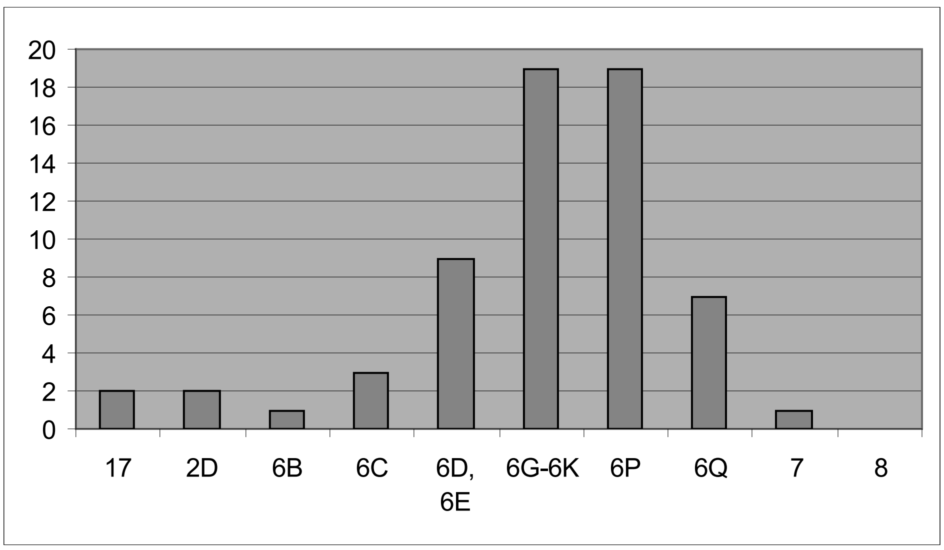


Figure 22.1. Distribution of textiles associated with sails by total number.

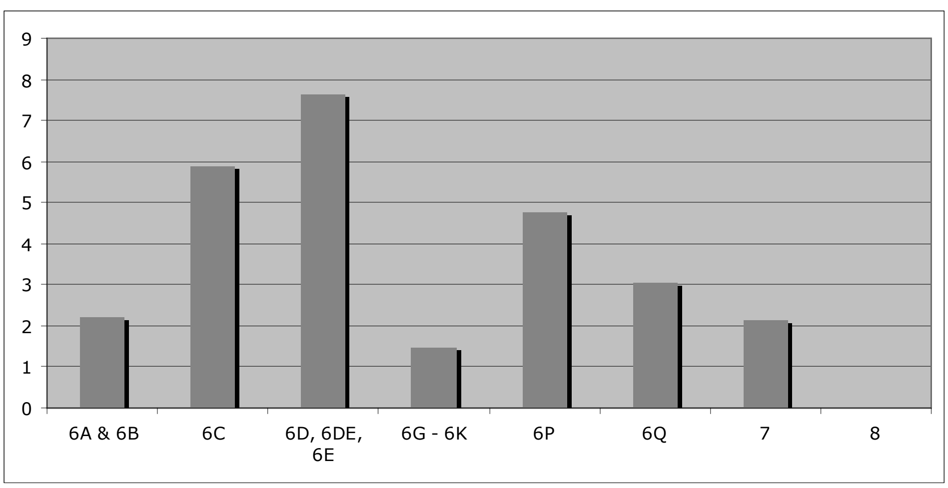


Figure 22.2. Distribution of textiles associated with sails as a % of total textiles in the trench.

trench, spread through Trenches 6G, 6H and 6I, was also low in webbing strips and other maritime textiles (under 2%). This is the more surprising since other maritime artefacts such as rope, lead sheeting and pitch were found in Trench 8 and the adjacent Trench 8A. However, we must also think spatially. Sail making and repairing ideally needs open spaces for laying out large pieces of fabric, therefore the narrow constricted lane in Trench 8 would not be suitable for this activity. The open spaces would also need to be relatively quiet, and this may explain the absence of the activity in the area of the harbour itself.

In conclusion, the distribution of utilitarian and garment fabrics, and types of special finds, is useful for suggesting zones of activities and disposal, at least for the Roman period. The higher proportions of utilitarian fabrics found in *sebakhs* close to the Roman quayside confirm that textiles were deposited in dumps relatively close to where they were used. The distribution of materials involved in sail making and repairing highlights that this activity was not especially linked to either industrial or domestic spaces, but rather to quiet, open spaces away from traffic.

22.4 Sails and Webbing Strips

Sails[3]

There are four convincing examples of sails, four others which were probably sails and one possible tarpaulin. This is the greatest number of Roman sails found at an archaeological site anywhere, including Berenike (Wild and Wild 2001). As with most of the textiles found at Quseir, the thicker areas of the fragments are more likely to be preserved, and in the case of sails, these are the overlaps where pieces of fabric are joined together, or where reinforcements such as webbing strips have been added.

Fragment 03T331[4] is the most obvious sail fragment, identifiable because of the wooden brailing ring sewn onto it (Fig. 22.3). Its background fabric is a z spun cotton tabby (a fabric associated with India see Wild and Wild 2001), with a strip of webbing sewn on, thus neatly demonstrating the combination of reinforcing webbing strip, brailing ring and fabric of possible Indian origin, that one would expect in a sail involved in Indo-Roman trade. The webbing strip is slightly unusual, as unlike almost all the other webbing strips found which are warp faced tabby, or paired warp, this is a warp faced chevron twill, similar to webbing strip 00T294, not illustrated. What is particularly surprising is that the stitches gather together the webbing strip meaning that the fabric of sail would not have sat flat.

Webbing strips are also found on 03T392 (Fig. 22.4 and 22.5), a long narrow piece that is the remains of a hem with webbing strips attached and stitches where brailing rings (judging by the distance apart of the holes) were once sewn. Other pieces of rope pushed through the fabric may have been used as lashings. The webbing strips are 60 cm apart, which reflects the spacing of the checkerboard pattern of sails found in illustrations, and it would seem that the selfbands in the weave (where thicker thread is used to create a subtle stripe effect) would be useful in guiding the placement of the webbing strips.

Another long piece 03T027 is the remains of a seam between two pieces of z spun cotton fabric which has been covered in a strip of webbing. The piece seems to have undergone some repairs, making the structure difficult to decipher, however, there is at least one place where it appears that a brailing ring was once sewn on (Fig. 22.6). 01T106 is a much smaller piece (Fig. 22.7), with a strip of webbing running along the length of its weft, and the edge of the fabric covered by another piece of the same webbing strip, folded and sewn down. The fabric has been very roughly patched with a folded piece of z spun cotton fabric.

These four examples are almost certainly parts of sails. Four further fragments may or may not be. 02T408 is included, but not illustrated, here because it is a length of webbing strip that has one end sewn to a coarse bast fabric, although the webbing strip may be serving as some kind of handle or tie. 03T366 (Fig. 22.8) is a length of webbing strip sewn firmly to a piece of bast fabric, the fragment is too small to ascertain its function. Similarly, 01T215 (Fig. 22.9) is a length of webbing strip sewn to a bast fabric, however, the backing fabric seems slightly gathered along the length which may suggest that this is not a sail. 03T401 (Fig. 22.10) is two pieces of slightly warp faced z spun cotton tabby sewn together along their weft selvedges with coarse overhand stitches.

One other piece may possibly be a textile associated with maritime activities. 02T371 comprises two pieces of fabric seamed together, with a line of running stitches sewn along the edge perpendicular to the seam. The string of the running stitches emerges at the seam and are plied together and knotted, and the end sewn back into the fabric, making a very sturdy and tidy finish (Fig. 22.11).

Detailed catalogue of all potential sail fragments

1. Sail fragment in medium cotton fabric (thread count 7/7, thread spin z/z, tightly spun, threads 0.9/0.7 mm) sewn with webbing strip in chevron pattern (thread count 11/5, thread spin zS2/zS2, threads 0.8/1.2 mm, medium tight spin), and fragment of brailing ring. Stitches in s spun bast fibre. 15 x 4 cm [03T331 from Tr. 6P (4115), brailing ring recorded as WO519] (Fig. 22.3).

[3] All the notation here separated by a '/', denotes warp/weft, so thread spin s/z means the warp was s spun and the weft z spun. Thread counts are in threads per cm. Tabby weaves are single warps and weft, basketweaves have paired warps and wefts. The spin and ply annotations use Wendrich 1994 and replace previously published data on spin and ply.

[4] Textiles at Quseir were recorded on a year by year basis, restarting the numbering system each year, in line with other textile recording systems used in Egypt. Thus, 00T294 was the 294th textile recorded in 2000. In previous publications these have appeared with the prefix QAQ which has been left off here for the sake of expediency.

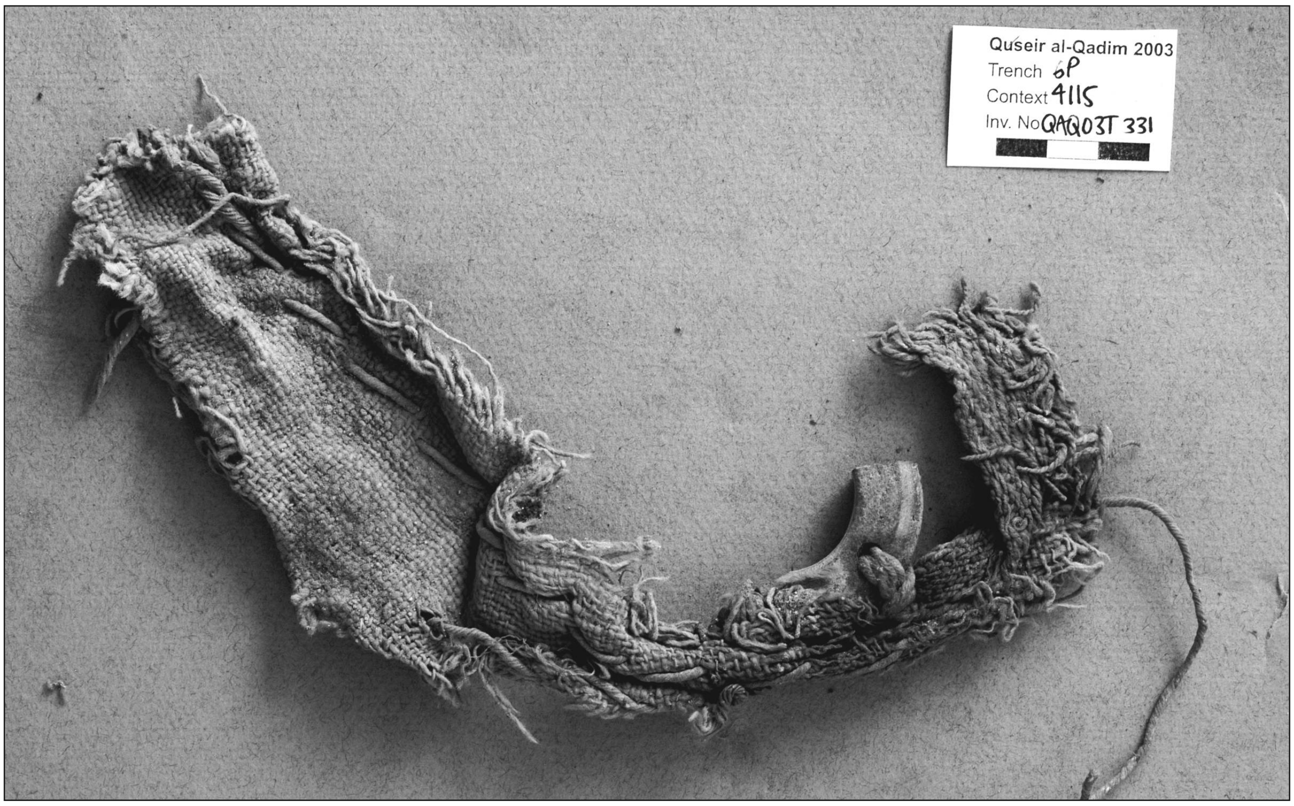


Figure 22.3. Sail fragment 03T331.

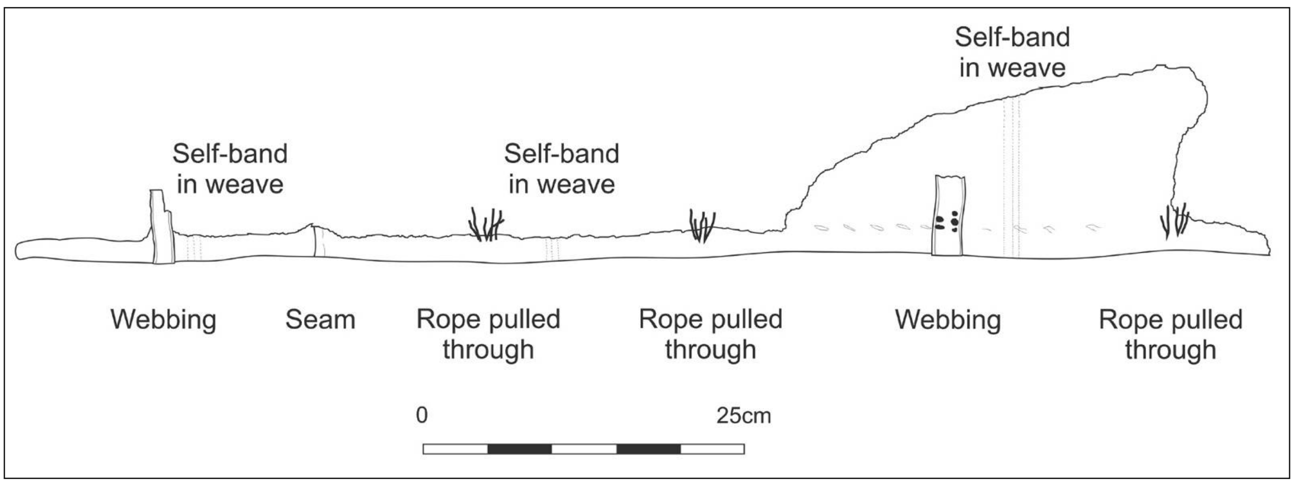


Figure 22.4. Drawing showing structure of sail fragment 03T392.

Figure 22.5. Sail fragment 03T392.

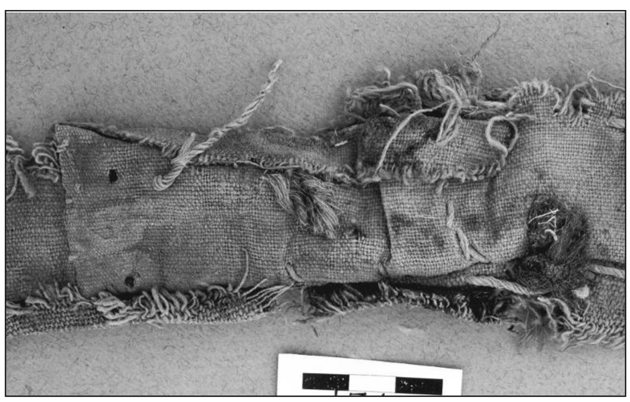


Figure 22.6. Sail fragment 03T027

2. Sail fragment in bast basket-weave (paired warp and weft) fabric (thread count 11/8, thread spin s/s, loose weave) with a 3 cm wide hem, made from weft selvedge turned over and held with overhand stitches in s spun bast every 1.6 cm. There is a short length of seam perpendicular to hem. There are three self bands in the weft. Two webbing strips cut from the same length run parallel to the seam (thread count 20/5, thread spin s/s, thread width 0.6/0.8 mm, medium spin, with two red warp stripes. Paired warp until red stripe then two single reds, two paired white, two single whites to selvedge). The remains of threads holding a missing brailing ring are visible on one of the webbing strips at the hem, and the hem is also pierced in three places with clumps of s spun reddish coloured bast string. 99 x 15 cm [03T392 from Tr. 17 (17027)] (Fig. 22.4 and 22.5).

3. Sail fragment constructed of two cotton tabby fabrics. Fabric 1 has thread count 16/15, thread spin z/z, medium spin, thread size 0.4/0.6 mm, evenly woven with a thin-medium feel. Fabric 2 has thread count 20/12, thread spin z/z, medium spin, thread size 0.3/0.2-0.7 mm, even weave with thin-medium feel, slight open net weave. Fabric 1 and 2 are seamed together, a length of webbing strip is sewn over the seam, with stitches every 2.1-2.4 cm in sZ6 bast thread. Webbing strip 90 x 3.6 cm long, bast, thread count 18/6, thread spin s/s, thread size 0.7/0.9 mm, medium spin, paired warp until the last two at selvedge, warp faced. Holes remaining where brailing rings were attached. There is also some red fibred sZ2 string around seam. 6.5 x 132 cm [03T027 from Tr. 6G (4095)] (Fig. 22.6).

4. Sail fragment in bast tabby fabric (1) patched with cotton tabby fabric (2), and sewn with webbing. Sewing thread is z spun. Fabric 1 has thread count 3/6, thread spin z/z, with a thick feel. Fabric 2 has a thread count 18/13, thread spin z/z, thread size 0.2/0.2 mm. Webbing with two red warp stripes in cotton (thread count 10/5, thread spin zS2/z, thread size 1.2/0.9 mm). 25 x 11 cm [01T106 from Tr. 6J (4040)] (Fig. 22.7).

5. Possible sail fragment in bast tabby (thread count 14/13, thread spin s/s?) sewn to bast webbing strip (thread count 21/6, thread spin s/s, thread size 0.4/0.4 mm). 20 x 10 cm [02T408 from Tr. 6P (4105)].

6. Possible sail fragment in bast tabby (thread count 12/12, thread spin s/s, thread width .4/.4) sewn with sZ2 bast thread to webbing (slightly warp faced, bast, thread count 18/12, thread spin s/s). 8 x 2.5 cm [03T366 from Tr. 6P (4110)] (Fig. 22.8).

7. Possible sail fragment in two pieces of fabric (fabric 1 bast tabby thread count 10/18, thread spin z/z, thread width 0.6/0.3 mm; fabric 2 bast tabby, thread count 12/16, thread spin z/z, thread width 0.4/0.3 mm), with webbing strip (10/18, z/z) sewn on with zS4 bast. It appears that the sail has been reused by cutting back to the webbing that was then thrown away. 19 x 3 cm [01T215 from Tr. 6K (4050)] (Fig. 22.9).

8. Possible sail fragment in cotton tabby (thread count 15/7, thread spin z/z), two pieces seamed together along weft selvedge with zS3 overhand stitches in cotton. 9 x 2.5 cm. [03T401 from Tr. 17 (17027)] (Fig. 22.10).

9. Possible textile associated with maritime activity, such as a tarpaulin or sail. Two pieces of bast tabby (thread count 10/10, thread spin s/s, thread width 0.8/0.7 mm, medium spin), seamed together, line of running stitch close to the weft selvedge of the two pieces, perpendicular to the seam, loose length of thread plied, knotted and sewn down. 9 x 8 cm [02T371 from Tr. 6P (4105)] (Fig. 22.11).

Webbing strips

Fifty four webbing strips were found, and were easily identifiable as they were visually very similar (see Fig. 22.12). They are all flexible warp faced strips, 89% are between 3 and 4.9 cm wide, with an average width of 3.6 cm (see Fig. 22.13).

Most of the thread used in their construction was s spun, with 80% being s spun in both warp and weft. Surprisingly, there was not one example of z spinning in both warp and weft, although 13% were z/s spun, and there were two examples each of zS2/zS2 and z and s/s. Most of them were made in bast, while eight examples were of cotton. The most common weave structure used was paired warps in the centre of the strip, and single warps at the edges. The visual similarity between the webbing strips belies a wide variety of thread qualities and construction techniques. No correlations between the many factors could be found that would suggest any distinct types, for example there was no correlation between fibre type and spin as identified at Berenike, where bast examples were s spun, and cotton z spun (Wild and Wild 2001).

From a sample of 22 well preserved examples, the average total number of warp threads was 63, with a range between 34 and 93. Given that the width of the webbing strips clustered between 3-4 cm wide (Fig. 22.13), the width of the strips were dictated by a visual judgment about whether the number of warps was right, rather than by deciding on a predetermined number of warps to be used. Just over a third (38%) of these webbing strips have a red warp stripe near each of the weft selvedges, often marking the shift from paired warp in the centre to single warps near the edge. These are very distinctive, and perhaps acted as a sewing guide when the strips were being stitched on to the sail. Often the thread has rotted away leaving a gap, suggesting that the dye helped destroy the fibre.

Unlike many of the textiles found in the rubbish dumps, many of these strips have been thrown away when not completely ragged. The average length of strip was 21 cm long, however this is skewed by a few longer lengths that were found. A distribution of the lengths (Fig. 22.14) suggests that most fragments longer than about 25 cm were reused.

Figure 22.7. Sail fragment 01T106.

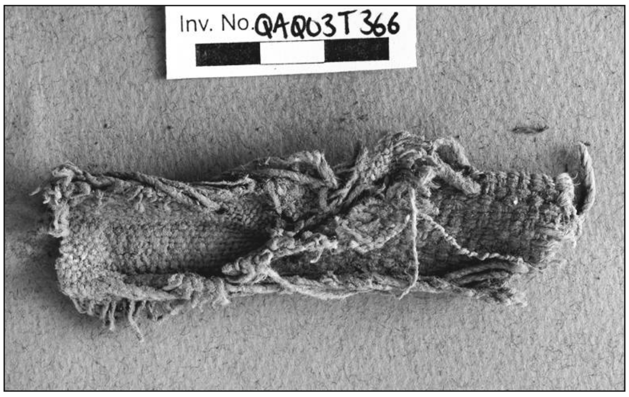


Figure 22.8. Possible sail fragment 03T366.

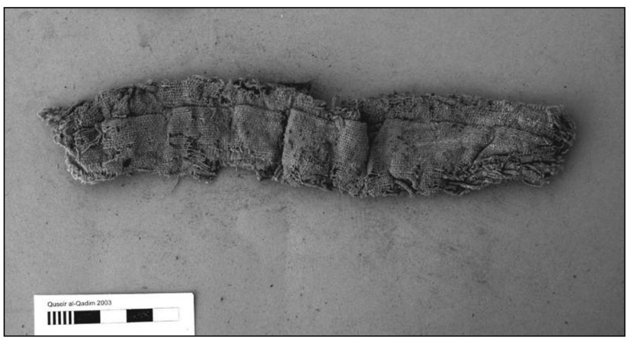


Figure 22.9. Possible sail fragment 01T215.

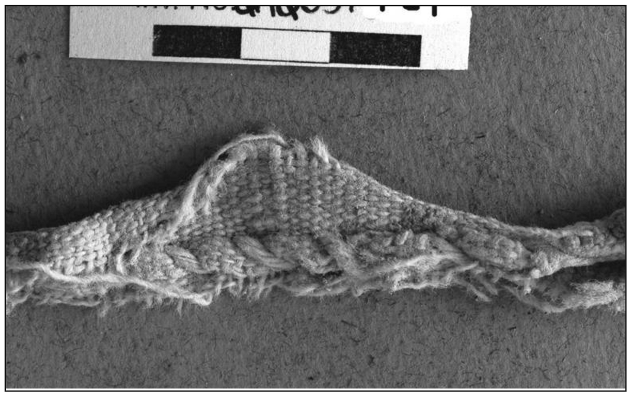


Figure 22.10. Possible sail fragment 03T401.

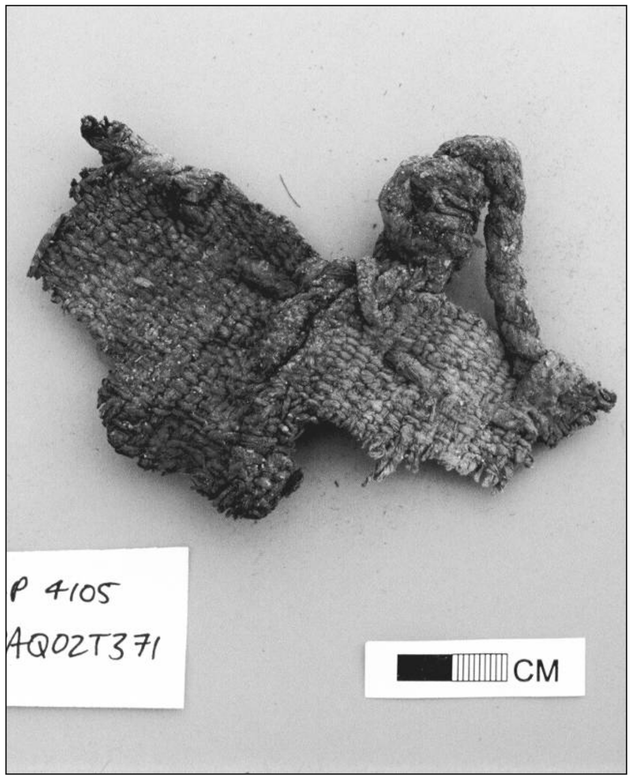


Figure 22.11. Possible sail fragment 02T371.

22.5 Maritime Textiles

The maritime textiles from Myos Hormos present some important data that contributes to our understanding of Roman sails, where the fabric used in sails was made, and clues as to where the sails were made and repaired. In the catalogue outlined above, catalogue entry No. 1 provides a clear combination of the materials that researchers have long suspected constituted a Roman sail used in Indo-Roman trade; a z spun cotton tabby, sewn with a webbing strip with a brailing ring attached.[5] Only the unusual structure of the webbing strip makes it less than a ‘perfect’ example. Catalogue entry No. 3 is also a z spun cotton fabric with webbing and evidence for brailing rings being attached. The association between z spun cotton fabric (presumably of Indian origin) and Roman sails is clearly demonstrated here, as is the role of webbing strips as reinforcements for sails. However, apart from the small fragment catalogue entry number 9, all the other sails or possible sails, are in bast fabrics, and all but one s spun. One of these is repaired with a patch of z spun cotton fabric and a mixture of s and z spun threads are used in construction and repairs. This confirms what would be expected, that Roman sails were made of fabric sourced at both ends of the Indian Ocean trade, and would be constructed and repaired with whatever suitable materials were to hand. In particular, what is surprising is that many of these sails are not necessarily made of the coarse canvas type fabrics of today’s sails, but actually of some fairly loosely woven fabrics, as well as fairly lightweight cottons. Similarly, the need for reinforcing strips means that relatively narrow widths of cloth could be sewn together, and Roman sails may have been rather more of a patchwork of different fabric than again, today’s sails, or indeed contemporary,

[5] see Wild and Wild 2001 for a discussion of the Indian origin of z spun cotton fabrics in Roman Egypt, and of the use of webbing strips in sails.

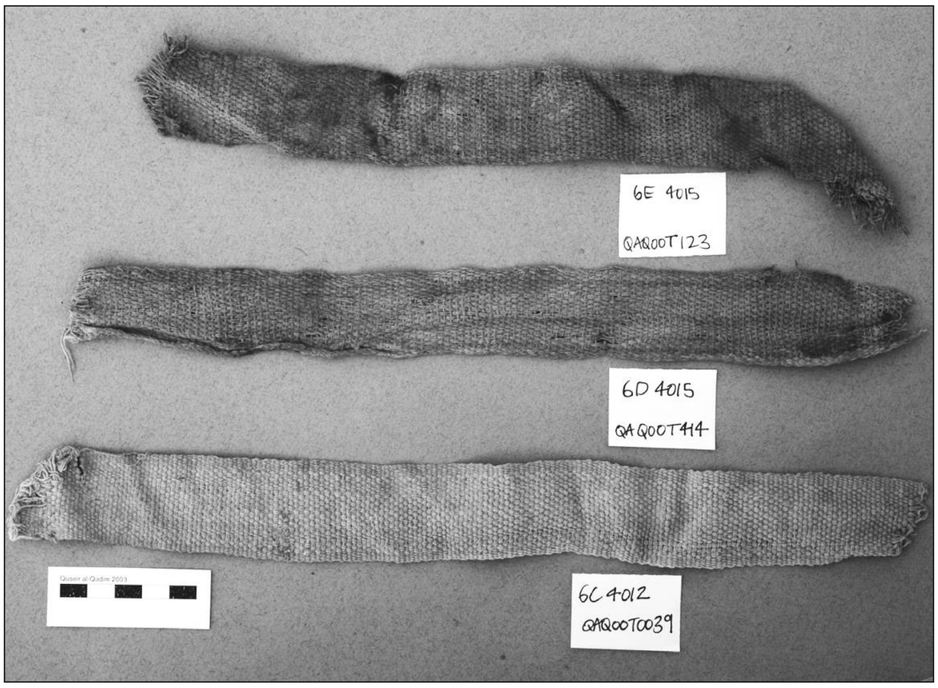


Figure 22.12.
Examples of webbing strips.

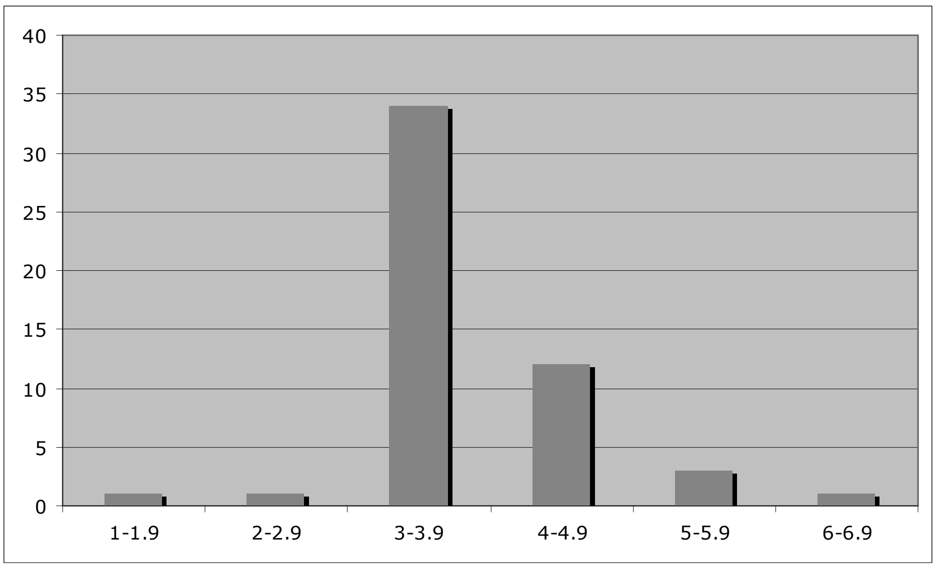


Figure 22.13.
Frequency distribution of widths of webbing strips in cm.

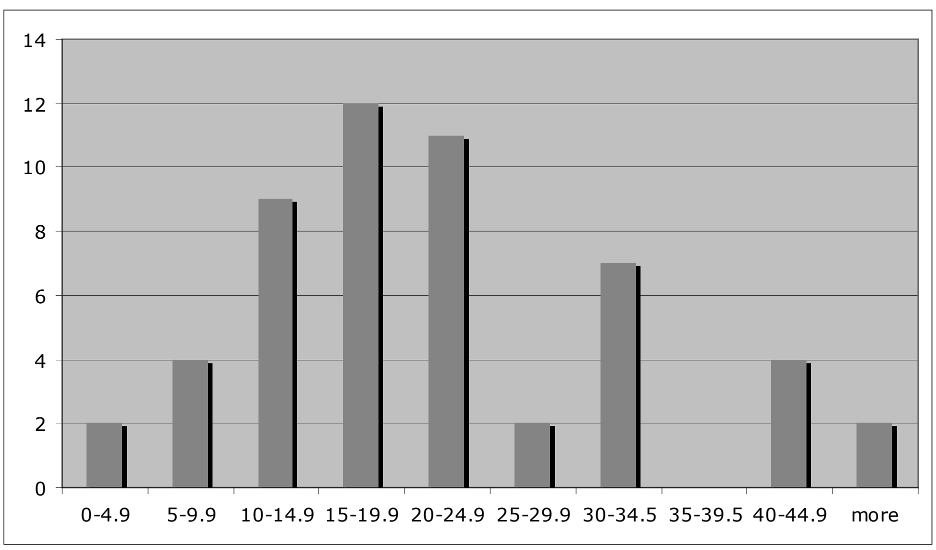


Figure 22.14.
Frequency distribution of lengths of webbing strips in cm.

depictions suggest. It is worth bearing in mind that sails were used by both small vessels running local journeys as well as the larger ocean going vessels, and the qualities needed in a sail in these types of vessel are very different. Smaller vessels probably had less need for brailing rings, but may have used cut down and repaired pieces of larger sails with brailing rings still attached, while the ocean going vessels would have desired the best quality sails possible (for discussion of sails c.f. Chapter 15, this volume).

Identifying areas where sails could have been made, and perhaps ruling out particular areas as inappropriate for sail making, is useful in building up a picture of zones of activities across the site. The other place where sails would be repaired, and possibly made, is onboard ship. The potential for laying out sails would be even more compromised here, and surely the task of non-urgent sail making would be a land-based activity. Repairing holes in sails, sewing on brailing rings and attaching short lengths of webbing, could all be activities that could take place anywhere, depending on the size of the sail. Adaptability, whether to resources or spaces seems to common theme in textile working at Myos Hormos.

	Textile-number	Tr.	Context	Description	Fibre	Warps /cm	Wefts /cm	Spin of warp	Spin of weft	Length (cm)	Width of strip (cm)
1	00T123	6E	4015	Red warp stripes	bast	20	5	s	s		
2	00T154	6E	4015		cotton	18	6	s	s	15	4.5
3	99T921	2D	1265		bast	12	6	z	s	13	4
4	99T921	2D	1265		bast	20	5	z	s	15	4
5	00T166	6C	4012	Paired warp	cotton	18	19	s	s	20	4.5
6	00T183	6C	4012	Paired warp, red warp stripes	cotton	20	6	s	s	21	3.2
7	00T190	7	5017	Paired warp and weft, red warp stripes	cotton	18	10			4	3.2
8	00T198	6D	4014		cotton	14	5	zS2	zS2	14	4
9	00T212	6B	4007	Red or purple warp stripes which have almost disappeared	cotton	11	4	zS2	zS2	16	3.5
10	00T246	6G	4025	Paired warp	cotton	17	5	s	s	18	3
11	00T294	6H	4030	Chevron pattern, paired weft.	cotton	12	6	s	s	15	3.5
12	00T039	6C	4012		bast	16	11	s	s	31	3.5
13	00T414	6D	4015	Pink warp stripes	bast	22	5	s	s	29	3.2
14	00T421	6D	4015	Pink warp stripes	bast	18	5	s	s	15	3.5
15	00T422	6D	4015	Pink warp stripes	bast	18	5	s	s	4.3	3.4
16	00T437	6H	4035		bast	18	8	s	s	27	3.3
17	00T005	6D	4014	Red warp stripes	bast	16	9	s	s	41	3.5
18	00T055	6E	4015		bast	22	12	s	s	30	3.5
19	00T006	6D	4014		bast	16	9	s	s	24	3.2
20	01T111	6J	4040	Warp faced	bast	9	4	s	s	20	6.5
21	01T112	6J	4040		bast	10	5	s	s	16	5.5
22	01T113	6J	4040		bast	11	4	z	s	16	4
23	01T115	6J	4040	Very fragmentary	bast	14	5	s	s	9	4

List/database of webbing strips, continued on following pages.

24	01T116	6J	4040	Probably red warp stripes	bast	28	12	s	s	30	1.8
25	01T214	6K	4050	frayed 1 edge, pink stripe	bast	20	6	s	s	14	3
26	01T229	6K	4050		bast	14	5	s	s	12	3.7
27	01T258	6J	4031	1 edge	bast	12	4	z	s	45	3.8
28	02T194	6JH	4090	Some paired warps	bast	8	4	z	s	20	3.5
29	02T351	6P	4100	Brittle fibres, some paired warps, warp faced	bast	11	6	z	s	9	4
30	02T355	6P	4100	Warp faced, may have pink warp stripes	bast	17	5	s	s	22	3.1
31	02T368	6P	4105	Slightly warp faced, slightly open net, frayed edges	bast	26	6	s	s	24	3.2
32	02T389	6P	4105	Slightly warp faced, slightly open net, probably same as 02T368	bast	21	5	s	s	18	3
33	02T391	6P	4105	Paired warp, single near borders	bast	13	4	s	s	21	4
34	02T404	6P	4105	Warp faced, thick feel, appears to be shaped, dark stripe near selvedege	cotton	18	3	zS2	zS2	13	2.8
35	02T058	6GH	4095	Tied in a knot to 02T59	bast	16	5	s	s	33	3.5
36	02T059	6GH	4095	Tied in an overhand knot to 02T58, probably the same	bast	16	5	s	s	48	3.5
37	02T96	6H	4075	Possibly pink warp stripe	bast	18	10	s	s	15	???
38	03T336	6Q	4170	Paired warp and weft, warp single for last 5 threads near selvedge, just warp faced	bast	19	9	s	s	21	3
39	03T337	6Q	4170	Paired warp	bast	14	4	z	s	66	3.5
40	03T357	6P	4110	Paired warp until red stripe, then 4 ends single, then 2 pairs then 2 single. Slightly warp faced	bast	16	4	s	s	23	3.7

41	03T358	6P	4110	Probably same as 03T357.	bast	18	6	s	s	30	3.6
42	03T359	6P	4110	Paired warp except for last 8 ends next to selvedge, warp faced	bast	19	4	s	s	20	5
43	03T360	6P	4110	Paired warp, warp faced	bast	21	9	s	s	16	3.2
44	03T361	6P	4110	Paired warp, red warp stripes	bast	22	4	s	s	11	3.1
45	03T362	6P	4110	2 pieces of the same tied in knot, paired warp and weft, warp faced	bast	20	9	s	s	30	3.2
46	03T363	6P	4110	Unpaired warp until red stripe, then 2 ends single, then 2 paired, then 4 single, warp faced, knot at end	bast	19	4	s	s	56	3.3
47	03T364	6P	4110	Red warp stripes, one cut end, warp faced	bast	14	5	s	s	6	4.3
48	03T365	6P	4110	2 single warp shots at selved, very wafaced	bast	19	4	s	s	10	3.2
49	03T374	6Q	4165	Paired warp until last 4 ends, slightly warp faced. One end frayed then cut. 2 fragments, the other is 20 x 5 cm	bast	15	4	alter-nate z + s	s	17	5
50	03T375	6Q	4165	Paired warp and weft, slightly warp faced, frayed at both ends	bast	16	8	s	s	34	3.6
51	03T376	6Q	4165	Same as 03T374	bast	19	5	alter-nate z + s	s	10	4.5
52	03T377	6Q	4165	Paired warp until last 2 ends, cut at both ends	bast	17	7	s	s	9	4.8
53	03T378	6Q	4165	Paired warp, slight warp faced, frayed	bast	18	8	s	s	11	3.3
54	03T390	6J	4155	Probably had red warp stripes	bast	12	3	zS2	zS2	41	3

23 The Written Material from the Graeco-Roman Period

Wilfried Van Rengan

Introduction

About 850 ostraca and 180 fragmentary papyri were found during the five seasons of archaeological excavations at Myos Hormos (Quseir al-Qadim) (1999-2003). The majority come from the extensive rubbish heaps (*sebakh*) located on the slopes of the settled higher ground that overlooked the former lagoon. A small minority are finds from the excavations of structures in the Roman town or even from trenches or pits in the ancient harbour. The nature of the texts varies from graffiti, inscriptions or dipinti on jar fragments, to private letters, business documents and a few official documents concerning the Roman army or the administration. The widely differing state of preservation of the texts depends on the place where they were buried: occasionally documents are very well preserved, while in others the ink has faded, the surface of the sherd has flaked off due to salt incrustations, ostraca have broken, and papyri are torn up. The language of the texts is mainly Greek, but there are approximately 40 Latin fragments (mostly inscriptions on jars), one Latin papyrus (a list of names, probably military) and a few texts (graffiti, ostraca, papyrus) in Tamil, South Arabian, Palmyrene, Nabataean or a related language (cf. the contribution of Roberta Tomber *et al*. Chapter 2, this volume). As to chronology, they range from the very beginning of our era to the first half of the 3rd century, the 1st century to the beginning of the 2nd century AD being best represented.

In the past, 75 papyri and ostraca were recovered from the site during excavations carried out by the Oriental Institute of the University of Chicago in 1978, 1980 & 1982 (Bagnall 1986). They included an army roster on papyrus, private letters, accounts and dipinti and inscriptions on pottery fragments. From the recent excavations, only one ostracon has so far been published (Van Rengen 2001), an order adressed to a *duplicarius* Priscus to permit two women to pass to the Temple of Philotera, the deified sister of Ptolemy II.

It is impossible to summarize here in more detail the content of the circa one thousand documents that have been discovered during recent excavations. The study of these texts is well under way and will be thoroughly published in a subsequent volume. In the meantime, a brief contribution will be afforded that concentrates on the written material previously discussed in *Interim Reports* (Van Rengen 1999, 30; 2000, 51-52; 2002, 61-65; 2003, 43-44). To illustrate the importance of the study of even the smallest or at first sight banal documents, a fragmentary papyrus is discussed here, previously mentioned (Van Rengen 2000, 51-52), but subsequently the reading of specific words has been ameliorated: in particular, the soldier Lucius Longinus is no more a *tesserarius*, the exact reading is *tesserarias*, which makes quite a difference.

23.1 Papyrus P.004

A military *tesseraria* (dispatch boat) in Myos Hormos AD 93.

This fragmentary papyrus with writing on both sides was found in three pieces in rubbish dump Trench 6E (Van Rengen and Thomas 2006, 147-9). The side with the writing running parallel to the fibres, the side with the original document, will be presented here. The document on the verso is a draft of a letter to judge from the numerous deletions and additions to the text.

The Papyrus

Only the upper part of the original text is preserved (Figure 23.1) with the upper and left margins respectively about 35 mm and 25 mm wide. On the right, the text runs up to the edge of the sheet. The papyrus was originally folded several times longitudinally causing it to break into three parts: on the left side, two of the folds are clearly visible. The rather regular break at the bottom suggests that it was also folded at least once horizontally. The ink has faded considerably, so that in some places the writing has become nearly illegible. The hand is an impersonal, rounded, upright, not very fluent cursive with few ligatures. The initial letter of the first three lines, and of line 5, is enlarged.

The papyrus records the establishment of a loan of money in the form of a *cheirographon*: Ammonios, son of Eudaimon, acknowledges that he has received an interest-bearing loan of 200 drachmae of the imperial coinage at the rate of a stater per mina a month from Lucius Longinus, a soldier serving in the Roman fleet. The papyrus breaks off after line 9 with the rate of interest. The beginning of

Figure 23.1. Detail of P.004, a papyrus fragment from Trench 6E.

the next line is badly damaged but near the end the month Mesore (25 July-23 August) is mentioned, which most likely refers to the date of the repayment of the loan. If so, since the 200 drachmae were paid out the 29 Phamenoth (25 March), and if the day on which the loan had to be paid back was the 30th of the month, as was customary (Kűhnert 1965, 102), this represents a five-month loan term.

This document is interesting in several respects:

- It was written and the capital of the loan was paid out in Myos Hormos (l. 6-7: 'here at Myos Hormos'). The text starts with the official name of the town: Μυὸϲ Ὅρμοϲ ὁ πρὸϲ τῇ ἐρυθρᾷ θαλάϲϲῃ (l. 1) *Myos Hormos on the Red Sea*.
- The lender, Lucius Longinus, is a sailor serving in the Roman fleet. He is identified by the name of his ship, the *Hippokampos* (*Sea-horse*), which is defined as a *tesseraria*, a dispatch galley. The term is extremely rare: a bilingual (Latin-Greek) inscription from the island of Tenos, traditionally dated c. 20 BC, mentions a *praefectus tesserariarum in Asia navium*, and two vessels of different shape are depicted on the Althiburus Mosaic from Tunesia and referred to as *tesserariae*. In both cases the term occurs without context, so its meaning has generally been established by analogy with the term *tesserarius*: 'Since the *tesserarius* was the officer in the Roman army who passed along the watchword, a ship so called would seem to be a dispatch boat' (Casson 1971, 135).[1] At any rate, the mention of a soldier/sailor on a dispatch boat points clearly to a naval military context. This may inject new life into the discussion about the existence of an naval courier service and about the presence at Myos Hormos of a Red Sea military fleet, the *classis Maris Rubri* (Sidebotham 1986, 68-71), although both issues are not necessarily linked.
- The interest rate of the loan is staggering, in the Roman period even 4% a month was illegal (i.e. 48% per year, the normal rate being 12%). Precisely such a rate gave cause half a century later for two complaints, one to an epistrategus, a Roman official responsible for one of the three main divisions of the country (*P. Fouad* 26), and the other to the prefect of Egypt himself (Whitehorne 1991).

[1] cf. Also Duval 1949, 135, following A. Ernout: 'à l'origine, le "bateau portant le mot d'ordre", puis, plus couramment, un bateau courrier, léger et rapide'.

The text

QQ, Tr. 6E (4015)	inv.P.004	25 March 93
04/03/2000	19 x 11,7 cm	Pl. 000

1 Ἐν Μυὸϲ Ὅρμωι [τῶι] πρὸϲ τῇ ἐρυθρᾷ θαλάϲϲῃ ἔτουϲ
δωδ[ε]κάτ[ου] Αὐ[τοκρά]τοροϲ Καίϲαροϲ Δομιτιανοῦ
Σεβαϲτ[ο]ῦ Γε[ρ]μανικοῦ Φ[α]μενὼθ ἐνάτῃ καὶ εἰκάδι
Ἀμμώνιοϲ Εὐδαίμονοϲ Πέρϲηϲ τῆϲ ἐπιγονῆϲ
Λουκίῳ Λογγίνῳ ϲτρατ[ι]ώτῃ Ἱπποκάμπου τεϲϲαραρί-
αϲ χα[ί]ρειν. Ὁμολογῶ ἔχειν παρὰ ϲοῦ ἐνθάδε ἐπὶ
Μυὸϲ Ὅρμου χρῆϲιν ἔντοκον ἀργυρίου ϲεβαϲτοῦ
νομίϲματοϲ δραχμὰϲ δ[ι]ακόϲιαϲ τοκ[ῶν] ϲτατη-
ριαίων τῆϲ μνᾶϲ ἑκάϲτηϲ τὸν μῆνα ἕκαϲτον
[- - -].οι . ἕωϲ μηνὸϲ Μεϲορὴ - - -

5 read τεϲϲεραρί|αϲ

In Myos Hormos on the Red Sea, in the 12th year of Imperator Caesar Domitianus Augustus Germanicus, the 29th Phamenoth, Ammonios, son of Eudaimon, debtor, to Lucius Longinus soldier from the tesseraria the Seahorse*, greetings. I acknowledge to have received from you here in Myos Hormos a loan of 200 drachmas of silver coinage of the emperor bearing interest at the rate of one stater per mina monthly - - until the ... of the month Mesore ...*

1. I prefer to restore the definite article [τῶι] in the lacuna after Ὅρμωι, rather than a *vacat*, cf. the parallel name of Berenike, Βερενίκη ἡ πρὸς τῇ ἐρυθρᾷ θαλάσσῃ (*O.Ber.*II 125 and 126, l.1)

2-3. the 29th Phamenoth of the 12th year of Domitianus = 25 March 93.
In Egyptian *cheirographa* the date is written at the end, while placing it at the beginning is a Near Eastern habit, see Wolff (1978, 110).[2]

4. Ammonios son of Eudaimon is otherwise unknown.

4. Πέρσης τῆς ἐπιγονῆς literally *Persian belonging to the* ἐπιγονή (military descent), an expression which lost its original meaning and became synonymous with *debtor* during the Late Ptolemaic period (c.f. Pestman 1994, 91, with bibliography; for a different view, see Vandorpe 2008).

5. Lucius Longinus, although he was apparently a sailor (cf. infra), identifies himself as στρατιώτης, a *soldier* (Latin: *miles*), as was customary in the Roman fleet (Starr 1960, 57-58). Two homonyms, both of them 'soldiers', are known from Egyptian documents. The first one, styled στρατιώτης without further specification, appears in a receipt for a load of chaff from Thebes (*O. Wilck*. 1258, AD 88). The second one, whose full name is Lucius Longinus Fabullus, was a sailor, serving in the Alexandrian fleet on the liburnian *Sol* (Λούκιος Λογγῖνος Φαβοῦλλος στρατιώτης κλάσσης Ἀλεξανδρείνης λιβερνοῦ Σώλου). He sold a barn in the Arsinoite nome to a legionary soldier of the 22nd legion (*BGU* 2, 455, 1st century). Neither of them can be identified with certainty with our Lucius Longinus, the cognomen Longinus being too popular in the military milieu. Lucius Longinus is a typical name of a peregrine soldier who by joining the fleet acquired the *latinitas* and therefore received a Latin name.

After στρατιώτης, and in the context of Myos Hormos as a naval station, the genitive Ἱπποκάμπου can only be the name of a ship. A trireme named Ἱπποκάμπη is attested in the fragments of the Athenian navy yards records of the 4th century BC (Casson 1971, 77, n.1).[3] A *hippokampos* is a small fish, a seahorse (*equus marinus*), but the ship's name certainly refers appropriately to the mythical *hippokampos*, a hybrid creature with horse's body and fish's tail, used as a mount by different sea gods or to pull their chariots. In the Roman period it was a popular motif on wall paintings and mosaic floors (*Der neue Pauly* 5, 1998, s.v.).

A soldier serving in the the Roman fleet was usually identified by his name, followed by (a) his rank, (b) the designation of the fleet, (c) the kind of ship he is serving on (frequently preceded by a siglum) and (d) its name (Cuvigny 1996, 169-170). Variations on this scheme are numerous: for instance, (b) or (c) are occasionally omitted or other elements are added. In our papyrus we find (a) + (d) + (c), the mention of the fleet (b) being left out, but, since this is not uncommon, it may be irrelevant: it does not necessarily mean for instance that there was no fleet in Myos Hormos or that the *Hippokampos* did not belong to a fleet (which, in Egypt, would be the *Classis Alexandrina*). Generally, the technical designation of the boat (c) precedes its name (d), but here the order is reversed, as in a few inscriptions from Misenum: *CIL* X.1, 3503 and 3554.[4] The *Hippokampos* is a τεσσαραρία, the transcription of the Latin *tesseraria* (*navis*). In the papyri, for the related term *tesserarius* - used as a noun, denoting the well-known function of 'sergeant of the watch' in the Roman army - the reading τεσσα̲ρα- (also τ/θεσσαλα-) is a common variant spelling for the regular τεσσε̲ρα-. The adjective *tesserarius* applied to a ship is extremely rare. It occurs in an bilingual inscription from Tenos, *IG* XII 5 941 (*ILS* 9220) dated ca. 20 BC, which has been linked to Augustus spending the winter of 21-20 in Samos. Obviously there was a need then for these kind of boats, which were numerous enough to constitute a fleet under the command of a praefectus.

C. Iulius Naso
praef(ectus) tesserar(iarium)
in Asia nav(ium)
Γάϊος Ἰούλιος Νά-
σων ὁ ἐπὶ τῶν τεσ-
σαραρίων ἐν Ἀσίᾳ
πλοίων

C(aius) Iulius Naso, praefectus of the tesserariae in Asia

Since the publication of the Tenos inscription by Hirschfeld in 1902, this praefectus has been considered to be in charge of the Imperial postal traffic (c.f. Hirschfeld 1905, 203 '... den kaiserlichen Depeschenverkehr'; Chapot 1904, 294, n.7 '... la flottille chargée de l'expédition des dépêches, c'est-à-dire de la poste gouvernementale en Asie'). This interpretation, which implies the existence of an organised naval *cursus publicus* has been rejected by Reddé (1986, 449-450). While admitting that the use of ships to deliver official messages was occasionally unavoidable, he concluded that a naval courier service was non-existent and that the *cursus publicus* had to take advantage either of available commercial vessels or of Roman warships (he favours the former possibility). Crogiez and Briand-Ponsart (2002) reached the same conclusion: she denies the existence of a maritime postal service with specialised messengers and separate ships.

[2] I wish to thank Hélène Cuvigny for this reference.

[3] *IG* II^2 1611, l. 78 (Athens 357/6), II^2 1612, l. 23 (Athens 356/5), *SEG* 45, 145, l. 30 (Athens 358/7-353/2)

[4] 3503: ...militavit dupl(icarius) Sole III (= triere)..., *he served as a duplicarius on the trireme Sol*; 3554: ... ex Cerere III..., *from the trireme Ceres*. Cf. Cuvigny 1996, 170. It may be significant that in these cases the type of the ship is represented by a siglum.

Our papyrus now provides evidence of the existence of at least one Roman military dispatch boat in the port of Myos Hormos. The fact that a member of its crew figures as one of the parties in a loan to be repaid after five months, points to a relatively permanent availability of the ship. Does this imply that there actually was an official maritime postal service, in the Red Sea at least? Who would dispatch messages to whom? One might think of a messenger service between Myos Hormos and Berenike for instance, the overland route between these two important Red Sea ports being very time-consuming, since there was no coastal road at the time of the papyrus, but that could be rather far-fetched. It is perhaps more plausible to consider the presence of the *Hippokampos* in a broader military context, as part of a unit of the Roman navy patrolling the Red Sea coast and monitoring commercial activities. The existence of a *classis Maris Rubri* has been much discussed (for the literature see Raschke 1978, 892, nn. 957-958). Sidebotham takes up a neutral position on this matter (Sidebotham 1986, 69-71), but Casson, studying the expression *hormos apodedeigmenos* ('designated harbour', meaning that guards were stationed there) used by the author of the *Periplus* to qualify Myos Hormos (1,1), is of the opinion that his interpretation of the expression 'supports the suggestion of C.G. Starr (1960, 113) that at least a limited number of ships were kept on patrol in the Red Sea' (Casson 1989, 272-274). Our papyrus seems to strengthen this view.

It is significant that in the Tenos inscription the full expression *tesseraria navis* is used, in Greek τεσσαράριον πλοῖον, whereas in our papyrus we simply find τεσσαραρία: within a space of about a century, the Latin term *tesseraria* apparently had become familiar enough to be used substantively.

The term *tesserariae* (plural) figures as a caption between two of the 25 boats pictured on the famous Althiburos mosaic (c. AD 200) which covered the floor of a *frigidarium* in the bath of a private house in Althiburos (modern Abbah Qusur, Africa Proconsularis, Tunisia). They are both light vessels, with slightly differing bow shapes, oared and without sails (Duval 1949, 135). There is no indication of a military context, so it is most unlikely that these pictures would convey any useful information about the shape or the equipment of the *tesseraria* the *Hippokampos* in our papyrus. The preferance here is to follow Casson, when he compares the term *tesseraria* with the Latin *speculatoria navis* "reconnaissance craft" which does 'not designate a special type of vessel but rather any of the smaller galleys ...when employed for such duty' (Casson 1971, 135).

7. ἀργυρίου ϲεβαϲτοῦ νομίϲματοϲ 'silver coinage of the emperor': the billon tetradrachms minted at Alexandria, introduced by Tiberius.

8-9. τοκ[ῶν] ϲτατηριαίων The permissable maximum interest rate on money loans was set by the Romans at a drachma per mina (= 100 drachmas) per month (i.e. 1% a month, 12 % per year). Accordingly, in most loan contracts from the Roman period the formula τόκοϲ δραχμιαῖοϲ τῆϲ μνᾶϲ τὸν μῆνα ἕκαϲτον, *interest of one drachma per mina per month* is found. Our papyrus has τόκοι ϲτατηριαῖοι τῆϲ μνᾶϲ ἑκάϲτηϲ τὸν μῆνα ἕκαϲτον... instead: *interest of one stater per mina per month*, four times the legal interest rate (12% a month, 48 % per year), a stater being the equivalent of four drachmas. The same huge rate of interest occurs in only three other documents, all later than our papyrus, 2nd or 3rd century AD.

-*P.Oxy*. I, 114: a loan from a pawnbroker (l. 3-4: πέπληρωκα τὸν τόκον μέχρι τοῦ Ἐπεὶφ πρὸϲ ϲτατῆρα τῆϲ μνᾶϲ, *I have paid the interest until the month of Epiph at the rate of a stater per mina*).

-*SB* 14401 (=*P. Mich*. inv. 255; Whitehorne 1991), dated 22 October 147, a complaint from Ptolemaios, son of Diodoros, to Publius Marcius Crispus, epistrategus of the Heptanomia, about the excessive rate of interest of 48% he has been charged (ll. 8-11 *Ptolemaios..., committing every impious and forbidden act, by demanding interest at the rate of a stater per mina per month..., in disregard of the prefect's decisions and the ordinances of the emperors* [transl. Whitehorne 1991, 253]).

-*P. Fouad* 26 (text ed. by Waddell), dated 158-159, a copy of a petition to Marcus Sempronius Liberalis, prefect of Egypt, from Pharion, complaining about Heron from whom he has borrowed small sums of money, but who *'is continually inflicting insults and injuries upon me, although he is receiving in full the interest at the rate of a stater, which he forcibly compelled me to promise him*' (ll. 42-45, transl. Waddell).

10. the beginning of the line is lost and only at the end can the text be read with confidence: ἕωϲ μηνὸϲ Μεϲορὴ, *until the month Mesore*, probably followed by the day. This is no doubt the date on which the loan has to be repaid, but it is difficult to imagine what precedes. One can think of something like [ἃϲ καὶ ἀποδώϲω ϲ]οι *which I will pay back in the month Mesore*, but then the construction with ἕωϲ (*until,* the reading is not entirely clear, but it seems to be the only possibility), is awkward. Only one papyrus provides a parallel: *P.Stras*. VII, 663.

24 Arabic Language Documents on Paper

Anne Regourd

Introduction

More than 1000 documentary items were discovered at Quseir al-Qadim during the 1999-2003 campaign (i.e. with writing and paper without writing, and varying in the number of words or lines). Of this total, more than 99% are fragments, a proportion of which bear elements of text, but fewer than a dozen bear a text that is complete, or almost complete. That no texts on papyrus have been found tends to suggest that activity at the port was later than the 4th/10th centuries. Documents on paper make up the greater part of the material written in the Arabic language. In decreasing proportions the remainder consists of items on cloth (13 items, cf. Handley and Regourd 2009), wood (several items), and finally, an inscribed ostrich egg (Peacock and Blue 2006, 158-160, fig. 8.5).

Fragments of the documents were found in Trenches 2A, 2B, 2C, 2D, 2E, 5, 6H, 8, 9, 13, 16 and 16A, but the richest harvest came from Trench 13, a concentration of Ayyubid rubbish probably deposited in the Mamluk epoch (see Peacock and Blue 2006). Of the fragments recovered only PA0278 bears a complete date, 10 rajab 700/1301, early in the Mamluk period. However, it has been possible to date other fragments on the basis of Li Guo's reconstruction of the archives of a family business based at Quseir and headed by Abū Mufarrij (Guo 2004). This business was active during at least the first four decades of the 7th/13th century, the period of the reigns of the Ayyubid sultans al-Malik al-ʿĀdil (d. 615/1217) and his son al-Malik al-Kāmil (d. 635/1238). An organigram of the company, reconstructed by Li Guo, identifies the names and relations of the participants (Guo 2004, 9). As contexts 5500 and 5521 of Trench 13 are each independently datable from the presence in them of a 'document Abū Mufarrij', the intervening context may be dated on the basis of stratigraphic inference. This does not alter our view of the period of activity of the port which extends from the early 13th century, until the early Mamluk period. Comparison of the contexts where paper documents were found with those which are datable from the presence of (mainly Chinese) ceramics, gives ranges from the middle of the 12th to the end of the 13th for Trenches 2B and 5, and of the middle of the 12th for Trench 2E (Bridgman 2009, 138).

What then do the documents on paper from 1999-2003 contribute to our knowledge of the period of occupation and activity at Quseir al-Qadim, and how do they compare with the collection published by the Chicago Team?[1] The results are presented synthetically (further details will be found in publications by Regourd cited below which include a forthcoming monograph).

24.1 Typology of the documents

Apart from letters (whether commercial, private or official), accounts and "shipping notes" previously found at the site, the Southampton Quseir collection contains the first examples of administrative and legal documents including: a report of death [Nos. PA0386, PA0381/1, PA0388, Trench 13 (5500)], whose formula is that of the Geniza, Ayyubid period (*ALAD*: No. 125, 126, 127, 128, 129, mentioned in *MS*, 2, 321, 473-480)[2]; an act for release of debt (*istiqāla*), the only fragment dated, cited above, the date mentioned in the text applies to the document as a whole, as it corresponds to the date of the act as part of a performative formula [No. PA0278, Trench 5 (3017)]; and finally, a note for the recovery of a sum of money where the formula used in this highly fragmented document is akin to legal documents [No. PA0538, Trench 13 (5527)]. The texts classified as 'miscellaneous,' cover not surprisingly, a variety of topics: one has been identified as a Sufi quatrain, while another is a culinary recipe [No. PA0518, Trench 13 (5518), and No. PA0465, Trench 13 (5520)].

24.2 Quseir, an anchorage

Jean-Claude Garcin (1976, 6, note 1) has drawn attention to a variety of references in the Arab chronicles to the port of Quseir, among them "Quseir furḍa al-Qūs". He concludes that the phrase means "Quseir, natural port of Qūs", i.e. Quseir is the nearest port as the crow flies

1 We should distinguish here between the paper documents found by Chicago and the portion of them published by Li Guo, about 80 items (Guo 2004).

2 This document is the subject of two publications: it will appear in the monograph concerning the documents of Quseir (Regourd Forthcoming 2), and also in a separate publication, which explores in detail the historic context in which the document was produced (Regourd Forthcoming 1).

to the town of Qūs, which is on the outside an eastward curve of the Nile closest to the Red Sea coast. In the paper documents from the excavation, Quseir al-Qadim appears either directly as '(al-)Quseir,' or as 'Sāḥil al-Quseir' (c. 15 documents in the collection Southampton and 11 by Guo 2004, RN 1063b, 10, 156-57, address; RN 1003c and 1004d, 13, 163-167, address, and comment; RN 1066a, 16, 173-174, address; RN 1020b, 18, 176, address; RN 980a, 25, 197-198, address; RN1003b, 26, 198-200, address; RN 1093, 37, 227-28, address; RN 967b, 52, 246, recto l. 3; RN 1022, 54, 249-250, recto l. 1; RN 1037a, 55, 251-252, verso l. 1, address; RN 1015c, 70, 287-288, recto l. 3 'sāḥil: the aforesaid port'), while a single published document from the Chicago collection refers to Quseir al-Qadim as *mīna* (Frantz-Murphy 1982, 277-279, RN 594). Interestingly, RN 1085, 36, 225-26, verso, has two boats, *markab*-s, that are "[anchored] at the valley (*wādī*)." This expression of 'the coast of Quseir' suggests that Quseir was an anchorage (c.f. Regourd 2004, 279-280). The site had the advantage of being a bay in which the ships could anchor while lighters carried cargoes between them and landings in the now silted inlet of the sea to the south of the site (cf. Peacock and Blue 2006, 8, fig. 2.2). On the Yemeni coast during the Rasulid epoch the expression 'Sāḥil so' designated anchorages (e.g. Sāḥil al-Ahwāb), that were usually related to a city or a valley (*wādī*) for which they served as an outlet to the sea or as a port. Examples include Sāḥil al-Mawza' of the town of Mawza', Sāḥil al-Jābir, or Ḥadith named Sāḥil Mawr of Wādī Mawr. These names are not as firmly fixed as the toponyms and, according to the chronicles, the same anchorage can be designated by other expressions than 'Sāḥil x', e.g. 'Marsā x' or 'Baḥr x', or much more rarely by the Persian term Bandar (Vallet 2010, especially, 398). Among the documents from the excavation letters are as often addressed to (al-)Quseir as to "Sāḥil al-Quseir", such is the case with PA0207, a letter from 'Aṭiya b. Ḥasan sent to Abū al-Ḥasan b. 'Alī b. Fard al-Ḥawrānī, by hand of the captain of the ship (*rabbān*), Abū Jamīl Ḥārith, and, with PA061, a letter addressed to shaykh Abū al-Naṣr Q[ayyūm?] al-Nārī, "*muqīm bi*-Sāḥil al-Quseir", resident at Quseir. Among the "shipping notes", some merchandise is for delivery to "Sāḥil al-Quseir". We have to date no physical evidence of two distinct locations of inhabitation and activity that would correspond with these expressions being two distinct toponyms. So we must assume that all refer to one settlement at Quseir.

24.3 Quseir, more than a settlement

If Quseir was an anchorage it may be that it was no more than a few wooden shacks by the sea as, for a long time, was Jeddah (Ibn Jobair 1949, 84ff., especially 85-86) and also 'Aydhab (Peacock and Peacock 2008). Hiebert, on the basis of the wooden finds made during the Chicago excavations (tableware, furniture and building materials), argued convincingly in 1991 that Quseir was raised on a temporary basis by Bedouin who had sensed the possibility of making a quick profit (Hiebert 1991). Studies of the material from the Shaykh's house, and particularly the publication of the "archives" of the business of Abū Mufarrij, have subsequently led us to reconsider earlier conclusions. The business, a family one, was set up, flourished, and conducted its import and export trade from a storehouse (*shūna*) of many rooms. Shaykh Najīb, a friend of Abū Mufarrij had to be employed to attend to the movement of goods within the building. The hypothesis has been proposed that the storehouse also served as a *dār al-wakāla* or caravanserai. The living accommodation of Abū Mufarrij and his eldest son, Ibrāhīm, appears to have been intended to provide a home for them and their families. Called "Shaykh", Abū Mufarrij seems to have acted as a government agent, while Ibrāhīm was a reader at the local mosque (Burke and Whitcomb 2007; Guo 2004, chapter 1, and 97). Interestingly, the building revealed in nearby Trench 9 was also interpreted, by the excavators, as a *caravanserai* (Peacock and Blue 2006, 104).

The death certificate (Nos. PA0386, PA0381/1, PA0388) follows, as has been said, the formula of the Ayyubid examples from the Geniza. It raises the question of the activities of the *Dīwān al-mawārith al-sha'ariyya*, the office charged with identifying and collecting for the ministry of finance the portions of estates remaining after the satisfaction of the claims of any legally entitled beneficiaries (Regourd Forthcoming 1). In the present case, there are several entitled beneficiaries, among them the wife of the deceased, who died at Quseir. The paper has been re-used on the back for an unfortunately incomplete personal letter sent by one Ḥusayn b. Riḍwān to his son Muḥiyy al-[Dīn] and in which Quseir is mentioned. These names do not appear in the family tree of Abū Mufarrij nor do they resemble any other names found in the 'archives' of the Company (Guo 2004, 9 and Index). Consideration of this document as a whole suggests the existence, by the end of the Ayyubid period, of a settlement amounting to more than just the storehouse and facilities of a single flourishing trading company (discussed further in Regourd Forthcoming 1).

His accounts (No. PA0248, Fig. 24.1) attest to the presence of a baker trading at Quseir. They mention fine flour (*'alāma*), bread (*khubz*), dry breads (*ka'k*-s), and biscuits made from sugar and almonds with a little rosewater and referred to by the Persian-sounding name, *khushknān*-s. The accounts were found Trench 5 (3014), where Chinese ceramics of the last quarter of the 12th century were also found. However, the building revealed in Trench 5 has been taken to be generally Mamluk (cf. the act of *istiqāla*, No. PA0278, Fig. 24.2). The excavations of 1999-2003 brought to light other artisanal facilities: an area 'interpreted as being associated with the repair and/or construction of wooden boats', a furnace containing metallic slag and burnt shells (Trench 16A, Peacock and Blue 2006, 111-115), and what appear to be the remains of a leatherworker's shop (Handley and Regourd 2009; Handley 2007, 15, on repairing and altering clothes).

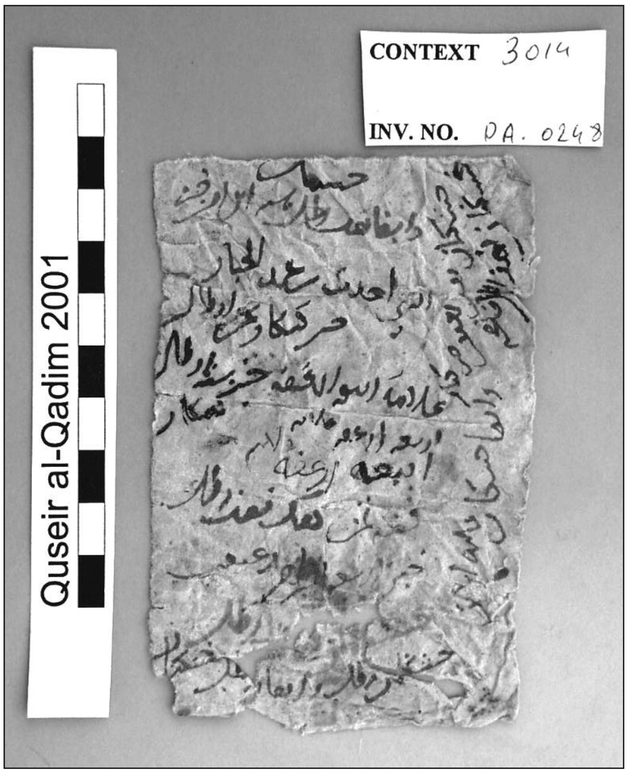


Figure 24.1. No. PA0248, A bakery account.

The act of *istiqāla* (No. PA0278, Fig. 24.2) was found in the building of Trench 5 which has been identified as Mamluk and which shows signs of occupation throughout the period: 'evidence for modifications and possible episodes of disuse and reuse add a temporal dimension to the occupation of the building, suggesting it was in use for a comparatively long period' (Peacock and Blue 2006, 171-172). The analysis carried out in the field suggested that it was found in a re-occupied part of the Mamluk building, and that the material was 'recovered from one of the later deposits in the sequence', but nonetheless 'was related to the occupation of the building' (Peacock and Blue 2006, 171). The very early date of the fragment in the Mamluk period may allow us to confirm the length of time the building was occupied, but suggests that this occupation possibly started during the late Ayyubid period. The presence of such an unusual item, a document on paper, supports the hypothesis that the building was 'an important structure perhaps for administration', particularly when combined with other evidence, i.e. 'the prominent situation of the building, the temporal dimension to the occupation of the building, the quality of the construction, the stone floors, the evidence for decoration in some of the rooms, traces of painted plaster and a carved screen' (Peacock and Blue 2006, 172). But the paper, being a legal document which claims the relief of a debt after something has been sold, refers to commercial activity: the building could be the house of a very rich merchant. Unfortunately, the man mentioned in the text, i.e. Muḥammad b. 'Alī b. 'Abd Allāh, is not the person who is making the claim who thus remains unidentifiable.

The excavations revealed about ten fragments of codices. Three of them from Trench 13 (5508 and 5513), are datable by deduction to the beginning of the 7th/13th century. Their presence suggests activities beyond the commercial, since they were found, with one exception, not on the surface but in deeper contexts. Nos. PA085 and PA014-15, uncovered in 1999, contain examples of Islamic casuistry (*fiqh)* concerning commercial transactions, and PA0497 is fragment of a lexicological work citing a verse of the surat Yūsuf (Fig. 24.3). The very small fragment of text, No. PA0295, has been later annotated in the course of the transmission of knowledge (cf. Regourd 2004, 285, fig. 11 and 13; Guo 1999, 166, mentions without comment the existence of some fragments found by Chicago, which are not documents). Five *qalam*-s (reed pens), four of them bearing evidence of use, were found in Trench 13 and could date to the same period at the beginning of the 7th/13th century (W0549 (5509); W0557 (5510); W0644 (5519); W0645 (5519)).

24.4 Quseir, port of the pilgrimage

The Sufi quatrain highlights the question whether or not at the end of the Ayyubid period Quseir al-Qadim was a point of embarkation to the Holy Places [No. PA0518, year 2003, Trench 13 (5518), a context between 5500 and 5521, which are both late Ayyubid]. PA0518 is one of the few items of the Southampton collection which can be brought in support of this proposition. It is a Maghrebi script and the text is vocalized. However, it is difficult to date on palaeographic grounds. The poem, though almost complete, has not been identified and perhaps never will. As for the provenance of the document, the script, which is very regular and assured, suggests that it comes from a Maghrebi scribe. While historically it is easier to find codices in Maghrebi script copied from Oriental examples and evidence of Maghrebis coming to the Orient to learn Oriental script, examples of the reverse are unusual. The document, which is not a codex, could have been carried

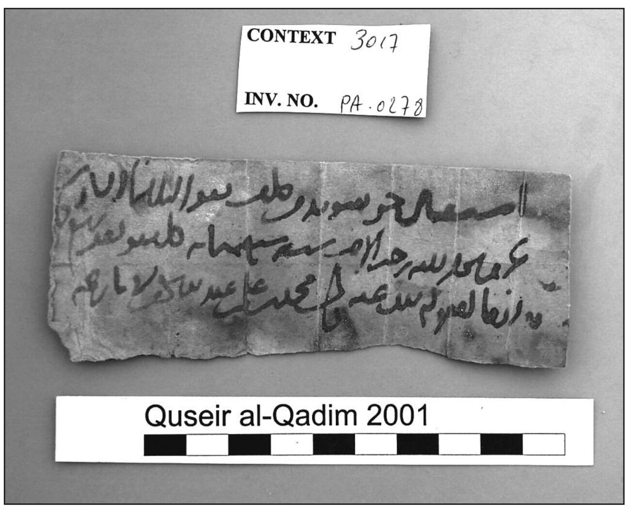


*Figure 24.2. No. PA0278, Fragment of an act for release of debt (*istiqāla*), dated 10 rajab 700/ AD 1301.*

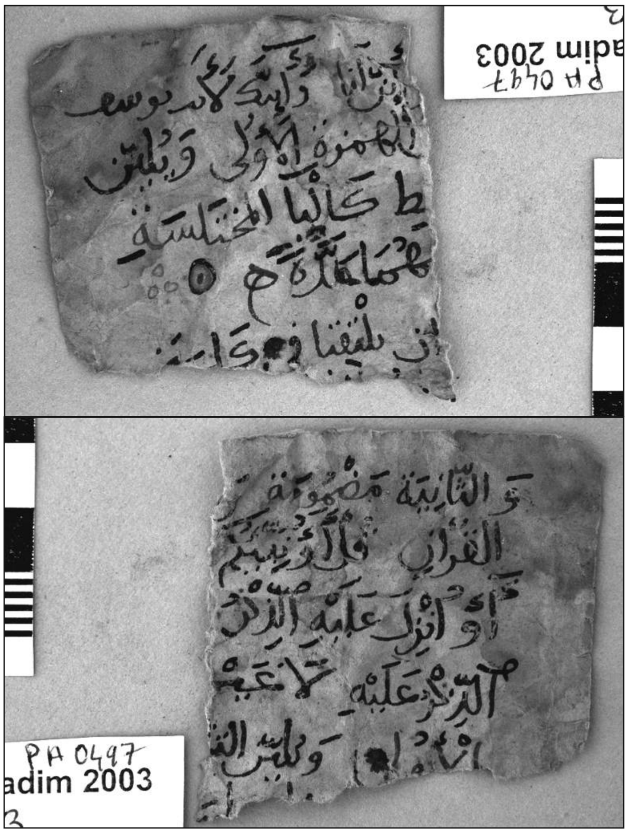


Figure 24.3. No. PA0497, Fragment of a lexicological work citing a verse of the surat Yūsuf.

in an inside pocket, in a belt, or more probably in a case. It is small, blank on the other side and it seems to have been rolled into a tube then pressed flat (dimensions while open 10.3 x 7.4 cm). In addition, the text is perfectly centred on the paper. It is well suited for carriage by a traveller.

It is known that outstanding Magrebi Sufis settled in Lower or Middle Egypt during the 12th-13th centuries. They brought in their wake people from the far west or visitors. The passage through Egypt of Maghrebi pilgrims intending to embark on the journey to Mecca is equally well-attested for this period: the best known being Ibn Jubayr (d. at the beginning of the 13th century), and, later, Ibn Battuta (14th century). The two cases are exemplified by the Sufi Abū al-Hasan al-Shādhilī (c. 593/1196-656/1258) who settled in Alexandria. In the course of a pilgrimage to the Holy places he later died at Humaythirā, near ʻAydhāb, where his tomb became itself the object of devotion (*ziyārāt*) (Lory 1998; Garcin 1976, pl. XIV).

The repetition of the term "*nafaqa*" suggests that the accounts in No. PA0390 concern pilgrims. However, the descent of the ligature between the *nūn* and the *fā'* to a point could suspend this reading (Guo 2004, 61, RN 1015a, 21, 184-185).

24.5 Quseir and international trade

It remains to be determined exactly which commodities passed through the Egyptian ports of the Red Sea and whether any evidence of specialization in particular commodities can be found (a question raised by Garcin 1979). The 1999-2003 campaign has brought new evidence of international trading activity in Quseir al-Qadim in the form of sewn-boat remains (Peacock and Blue 2006, 158), pottery (Bridgman, in Peacock *et al*. 2001, 45-46, 47, nos 1 and 2), and textiles (Handley 2007). The textual evidence is more circumstantial (cf. Guo 2004, 58-66, "The Trade Routes"). Generally speaking, it confirms that the main commodities that passed through Quseir were for the most part grains and flour (*daqīq*), with relatively little spices. But further textual evidence exists for international trade through Quseir al-Qadim during the late Ayyubid period in commodities not previously mentioned in the published literature.

Two documents specially shed light on this matter. The first document is a letter which refers, among other things, to a consignment of coral [No. PA0428, Trench 13 (5509)]. It has been dated to the late Ayyubid period through archaeological evidence.

1. Coral is mentioned here exclusively as a trade item. These are new data with respect to the published documents, the question as to what extent these types of domestic items were sold commercially remains unanswered (Guo 2004, 40).
2. The correspondence refers to a particular type of coral since it appears with an epithet, '*al-rūmī.*' Although no occurrence could be determined of '*al-marjān al-rūmī*', as a fixed expression tending to be part of a terminology used by traders and in the market places as a criterion of quality or price, a reconstruction can be done through '*al-rūmī.*' '*Al-marjān al-rūmī*' could be translated as 'the Christian coral from the Mediterranean Sea.' The exploitation of coral on the Occidental coast of the Mediterranean Sea between the 11th and the 13th centuries is known from Occidental and Arabic sources, in addition to trade between the Mediterranean and Yemen or India. According to another type of source, the letters of Jewish/India traders, coral was to the Fustat traders of the 11th and 12th centuries a commodity which generally came from the West and went to Yemen and India (Goitein 1973, TS 12.291, 88, 85, and TS 13J 22, fol. 30, 247-248; Goitein and Friedman 2008*,* often mentioned, see Index, 867, among them, 33; Bodl. MS. Heb. d. 66 (Cat. 2878), fol. 64 and fol. 65, 188; Add. 3420, fol. 2, 211sq.; TS 13J 6, fol. 32, 228 and 229; ENA 2730, fol. 7, 238, where the recipient is asked to buy corals of the very best quality in the Maghreb, Aden and India are also mentioned as places where corals were in demand). Goitein describes it as 'a great commodity of international trade' (*ibid*., 18; c.f. Goitein and Friedman 2008*,* ULC Add. 3418 and

3421, 170-171 and n. 18). Henri Bresc (2000, 49) noted the slowly growing trade in Mediterranean coral passing through Egypt to India at the start of the 11th-12th centuries.

3. The Quseiri document reports coral to be of good quality: the coral from the Mediterranean was reputed to be of high quality, as a vivid red colour could be obtained after it was polished.
4. Coral passing through Quseir al-Qadim suggests trade between Quseir and the Mediterranean Sea, probably through Cairo.

In conclusion, we can perhaps suggest that coral from the west of the Mediterranean passed through Alexandria and Fustat, thence to Quseir, and on to Yemen or India.

Although the second document, a delivery note found in Quseir, does not mention Quseir, it is from the Ayyubid deposit of Trench 13, where some Abū Mufarrij papers were uncovered (Fig. 24.4). It is not unreasonable to think that the commodities mentioned in it would be traded by those merchants who traded with Quseir or, further, that such commodities would have passed through Quseir al-Qadim. It can be dated to the late Ayyubid period, again through archaeological evidence [No. PA0546, Trench 13 (5519)], and it is in two parts. It records several commodities, among them:

- *Baqqam*, brazilwood, mainly, but not only, used as a dyestuff. We have some indications of a market for brazilwood and pepper in 'Aydhāb in the 12th century, two commodities coming from the east. They are recorded in Goitein 1973, Or 5566 D, fol. 6, 198-199, corr. Goitein and Friedman 2008 VI, 39, as yet unpublished (pepper appears as in our text, just before brazilwood). The writer of the letter was an Indian trader, living in Alexandria. The letter itself mentions 'a shipment of brazilwood which [someone called] Maḍmūn had sent to the writer from Aden to 'Aydhāb, and which he now forwarded to Fustat.' Maḍmūn b. Ḥasan-Japheth was, since the last end of the 11th century, the representative of the merchants in Aden and himself a merchant (Goitein and Friedman 2008, 37-46, 'Maḍmūn b. Ḥasan-Japheth and His Family'). Goitein refers to another letter, dated July 1008, saying: 'This Indian red dye, also called sappan wood, was an important item of medieval international trade and is mentioned in countless Geniza papers' (Goitein 1973, DK 13, 29, n. 9; Goitein and Friedman 2008, 33, 260-261, n. 10, Accounts, Fustat, 1132 AD, numerous references in *MS* I). Elsewhere it is referred to as: 'a wood grown in the East Indies, from which a valuable red dye was made' (*MS* I, 45 + n. 25). Brazilwood, which was sold to Rūm in Mediterranean ports, was on one hand a commodity imposing long journeys and heavy investments, but on another a highly speculative item (*MS* I, 45-46).

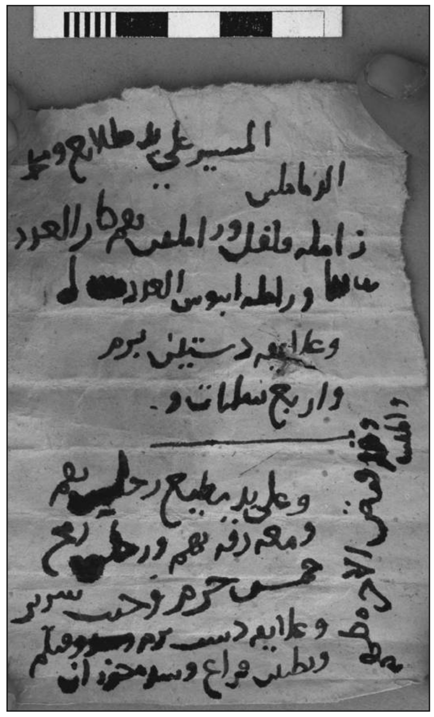


Figure 24.4. No. PA0546, A delivery note from the Ayyubid deposit of Trench 13, mentioning among others, brazilwood, pepper, ebony, spears from India.

- Ebony (*abnūs* or *abanūs*): numerous references in *Nūr al-ma'ārif*. It appears with teak, *sāj*, and a wood called *sīz*; ebony is used in Yemeni handcrafts (M. Jazim ed., 38 + n. 308).
- Other positive references to Yemen are: *makhzan*, pl. *makhāzin* (if correct), *Nūr al-ma'ārif*, 302, n. 2166, a kind of glass bottle; *rumḥ* spears from India were reputed to be of very good quality (M. Jazim, pers.comm.); at least, for *salab*, ropes or hawsers, Kazimirski notices it is a vernacular term used for the fibers of a tree from Yemen, from which ropes were made (Kazimirski 1860, 1118; Piamenta 1991, 228, *salab*).

Apart from *salab*, all the commodities mentioned here from No. PA0546 are 'new' in respect to finds that have been published from Quseir al-Qadim.

All these offer further textual evidence of trade between Quseir al-Qadim and India, through Yemen. We are also able to infer trade along the same route, but in the other direction from India to Quseir through Yemen (Aden), thence to Alexandria or other Mediterranean ports through Fustat.

24.6 Conclusion

The more our knowledge of Quseir increases the more it appears as an established settlement supported by various activities, even if it is still difficult to affirm the existence of secondary activities or of services which are not bound up in one way or another with trading and fishing or which follow in the wake of a population engaged in these ways of making a living. If, under the Romans, Quseir was a port with an infrastructure, by the Ayyubid and Mamluk periods it is no more than an anchorage. In this, Quseir is not exceptional. The collection of paper documents of the Southampton Quseir collection neither overturns our knowledge of this period of activity nor does it bring substantial proof of its role as a point of embarkation for pilgrims to Mecca. The collection contributes, however, in establishing more firmly that from the late Ayyubid period, Quseir participated in the great trade which joined the Mediterranean to India, through Fustat and Yemen.

25 Overview: The Trade and Economy of Myos Hormos and Quseir al-Qadim

David Peacock and Lucy Blue

Introduction: The town and port

In this volume and the previous one (Peacock and Blue 2006), details were presented of the excavations and of the portable finds recovered. In this chapter we stand back and attempt an appreciation of what we now know of the nature of both the Roman and Islamic ports and their function. We will focus on trade and the economy, both local and long distance, endeavouring to place it in its social context. At the same time we propose to highlight gaps in our knowledge which only future research can fill.

In our first volume we reiterated the case for the port being founded by Ptolemy II Philadelphus in c. 275 BC at the same time as its sister port Berenike. However, in contrast to Berenike, the Ptolemaic occupation has remained elusive at Myos Hormos but may well be located along the fringes of the silted lagoon well below the current water table. Its investigation is a task for future excavators better equipped to examine such deposits. However, the harbour area (Trench 7A) produced Ptolemaic pottery and Ptolemaic coins. Several of these are of Cleopatra, but one very worn example, was possibly of Ptolemy VI Philometor, BC 180-146 (see Chapter 9, this volume). Sidebotham's Appendix 1 on the coins from the Chicago excavations includes an even earlier one attributed to Ptolemy III Euergetes I (246-221 BC). These might of course have been in circulation during the Augustan period, but equally they could be pointers to a 3rd century BC origin.

25.1 Topography

The topography of the site was discussed at some length in Peacock and Blue (2006, *passim*). The first point to note with regard to the earlier settlement is that we could find no evidence of the classical chess-board layout generally associated with Roman towns. Rather the fragments of streets we excavated suggested a somewhat ramshackle maze of narrow winding alleys, a view supported by building orientation across the site. Some of the later Islamic buildings rest on Roman foundations and have the same orientation, suggesting that something of the Roman town would have been visible after 1000 years of desertion. Thus, to some extent the Islamic street pattern would have been inherited from the Roman, although there seems to have been a shift in the principle occupation of the site from west to east in the later period. This was almost certainly a result of the silting of the lagoon, which would have necessitated moving the position of the harbour, always at the heart of the settlement. There is no evidence that either settlement was fortified beyond their naturally defensive location on a raised Pleistocene reef elevated some 8 m above the surrounding coastal zone. However, the Islamic name Quseir could indicate a fortress, little castle or palace of some sort, either contemporary or a relict Roman structure, although no trace has yet come to light. A natural place for this would be highest central point of the site, but only decayed mudbrick structures were found, from which it would be extravagant to postulate a fort.

25.2 The harbour, buildings and burial

Most of the buildings, Roman and Islamic, seem to be fairly rudimentary, but the presence of a few bits of exotic marble (see below and Chapter 11, this volume) might indicate that in the Roman period, a few of the buildings were of higher status, although equally these might be associated with goods of trade passing through the port.

The harbours were a far cry from the fine ports of the Mediterranean. The Augustan quay and the early Roman waterside, seem to be makeshift affairs composed of reused amphorae and devoid of any monumentality (see Chapter 4, this volume). The amphorae were clearly broken when used and some bore marine encrustations suggesting that they were recovered from the water – perhaps a merchant ship leaving the port wrecked on the treacherous coral at the harbour entrance. There are reports of amphorae and an anchor in over 40 m of water at the mouth of the bay, which might be indications of such a wreck. However, despite their rudimentary appearance the use of recycled amphorae in the construction of the Roman waterfront was in fact ideally suited to the environmental context of this harbour. Located along the edges of the silty lagoon, the amphorae provided perfect foundations for a jetty which in other contexts would have been constructed of stone, totally inappropriate here as they would have sunk into the silt and sand. The base of the jetty extended to the north parallel to the shore along the edge of the Pleistocene bedrock.

We found no trace of the Islamic harbour structures, and it is entirely possible that there were no installations to be found, the ships merely being beached on the edges of what would have been a typical Red Sea *mersa* or anchored in the sheltered, shallow waters. In both periods of settlement, the shores of the bay supported facilities for the storage of goods and the repair of ships. Set back from the shore but still in the low-lying lagoon area was an exceptionally long building, which may have been a *wikāla* or *caravanserai*, to accommodate traders and their merchandise. If the adjacent enclosure was for animals, these traders may have arrived and departed overland rather than by sea. Guo (2004) suggests that the Sheikh's house which lay on the bluff above this structure and was excavated by the American team, might have acted as a *dār al-wikāla* or *wikāla*. It now seems more probable that it was a *shūna* or grain warehouse and that the *wikāla* was the structure we excavated on the lagoon edge below, also associated with storage buildings (Trench 9; Peacock and Blue 2006, chapter 6.3). These buildings highlight the strong link between trade both by sea and land, the harbour acting as the interface to these activities.

Cemeteries seem to have been a feature of Red Sea ports and at 'Aydhab to the south, Murray (1926) was struck by the extent and number of graves (see also Peacock and Peacock 2008). We have yet to locate the Roman necropolis, but we excavated an Islamic one, dated to the late 15th century, on the eastern extremity of the site (see Chapter 19, this volume). Surface finds of broken glass bangles abound in this area and may suggest the remains of a mourning ritual perhaps persisting for many years after burial took place. This cemetery was unusual, perhaps one relating to a disaster such as a shipwreck, for it is sited by the sea and was marked by a structure, perhaps a mausoleum or monument of some type, and was essentially a mass grave. There was probably another necropolis behind the harbour in the silted lagoon, as test pits revealed human remains dating to the earlier 15th century, but this was not investigated in detail. This might have been the more usual burial ground or perhaps a precursor of the eastern one.

25.3 The population

The Roman population of Myos Hormos was probably complex, both in terms of ethnicity as well as trades and professions. There was certainly a military presence as Strabo (*Geog.* 17.1.45) tells us there was a naval station based at the port. Also it is here that Aelius Gallus disembarked his troops on their return from Arabia. We found no military structures or equipment, but ostraca finds suggest the presence of the army perhaps into the 2nd century AD, for the name *Longinus,* which was favoured by soldiers, is not uncommon. The papyrus reported above (Chapter 23, this volume) refers to *Lucius Longinus*, a *tessarius* based on the ship '*Hippocampus*'. Equally, while most ostraca are in Greek, a few are in Latin, which might imply a person from outside the Greek speaking east, possibly a soldier. Frequently there is mention of a *hippeus*, or cavalryman, clearly military, acting as an intermediary in private correspondence.

The population of any port is likely to be an ethnic mix, with merchants from afar. The presence of Indian and south Arabian pottery at Myos Hormos could imply foreign settlers, whether permanent or temporary. In some areas of the site the Indian pottery is sufficiently common to suggest an Indian quarter. However, it might be an object of trade and the suggestion that ships seldom made the full journey to India, but rather went as far as Aden and Qana where they met Indian traders, perhaps favours the trade rather than the trader hypothesis (Casson 1989, 65). For example, the presence of Indian teak and African blackwood from maritime contexts (see Chapter 17, this volume), demonstrates the presence of foreign ship building materials and not necessarily a foreign population. That said, it would be surprising if there were not Indian, Arabian and African traders, together with indigenous peoples involved with the Egyptian end of the route. The graffiti or ostraca in Palmyrene, Tamil, Cilician, Nabatean and Southern Arabian scripts (see Chapter 2, this volume) may be, at least in part, a reflection of an ethnic mix, although as stated, it is difficult to distinguish foreigners from foreign imports.

Jews were known to be active traders and their presence would be expected. This might be confirmed by the building excavated in Trench 2B, if correctly interpreted as a synagogue. The single glass weight (see Chapter 7, this volume) might also point to a Jewish presence, if it is correct that they were used for assaying coins and weights, a preserve of Jews. On the other hand, no Hebrew script was found, which would be improbable if many were present.

A further question is whether the port was seasonally or temporarily occupied, but it is not easy to give a definitive answer. According to the *Periplus*, ships would leave for India in about July so that they would have the advantage of sailing down the Red Sea on the prevailing north wind, thence passing through the Gulf of Aden on the south-west monsoon and across the Arabian Sea or Indian Ocean on the same wind, arriving in India late September or October. This would bring the ship into open sea just when the monsoon was at its height, so sturdy vessels would be needed. The return would be in November, after a quick turn-around, because then the contrary north-east monsoon would be at its optimum, permitting an easy return so that the round trip would take less than a year. However, particularly in the north, the winds in the Red

Sea would be against the return journey, making heavy going. No doubt this is why a landfall at Berenike was established perhaps in preference to Myos Hormos despite the longer desert transit. On the other hand Myos Hormos was at the closest point of the Red Sea to the Nile, and it was well placed for cross-sea trade, particularly with the Nabateans, so it was not without its value. Other factors such as the Mediterranean sailing season and the period of the Nile flood would also effect trade in and out of the port. It is likely therefore that occupation of the port was year round but that some seasons were busier than others. As to the scale of activity in the harbour, Strabo (2.5.12) states that 'Now one hundred and twenty ships sail from Myos Hormos to India', which assuming the average tonnage of a Roman vessel in the Mediterranean (Casson 1971), would equate to over 1,200 tons of cargo, we assume per season, departing from the harbour.

The sailing seasons suggest that the port was at its busiest in June/July and in December/January; during those periods there would be a fairly massive influx of sailors, merchants and dock hands. On the other hand the maritime evidence suggests that ships were repaired and cleaned at Myos Hormos (see Chapter 15, this volume), and this is likely to have taken place when trade was not the main pre-occupation. The port would have possessed one of the finest natural harbours on the Red Sea and ideally suited for ship maintenance, despite the need to import wood and other materials. The emerging picture is one of a small resident population, rising at key times to perhaps a thousand or more. If correct, these suggested figures would be in line with those of Islamic 'Aydhab (Peacock and Peacock 2008, 43).

Arab ships would have been a different matter, and it is often asserted that they were not a strong as the Roman ones by default of the nature of their sewn planked hulls, similar to those located in the cemetery (see Chapters 15 and 19, this volume). However, this is undoubtedly an over-simplification as sewn planks were strong enough to cross the Red Sea, for amongst others, Ibn Jubayr records that the *jilab*, sewn together without nails, was used for transporting pilgrims on the Hajj. A Geniza text contrasts light vessels (*jawniya*) with larger ships (*marakib*) that were used to convey merchants and goods (Margariti 2007). It is probable that the pattern of occupation and activity would have been much the same as in the Roman period, with the addition of pilgrims and journeys made in connection with the Hajj.

25.4 Food and water

The port could only function if it was well supplied with food and water for the resident population, merchants, sailors, and to restock ships. Herein lies a problem, because it is a desert location where the only immediate source of food is the sea, and water is a perennial problem. We believe that Myos Hormos was supplied with water from Bi'r an Nakhil, some 15 km distant in the desert. It may have been slightly brackish, but nevertheless potable and infinitely better than nothing. There is no evidence of this source being utilised in the Islamic period, and the source of water for Quseir al-Qadim remains an unanswered problem, and yet one that was critical to the effective function of the port.

Food could have come from one of four sources:

1. the local desert fauna or flora, which might have provided supplements but not a staple,
2. the sea, which would be a rich and important source,
3. the Nile Valley, and
4. overseas imports.

Of these there is little doubt that the most important would have been the sea (see Chapters 16 and 20, this volume). Finds of fishing gear show that both line and net fishing were practiced extensively in both the Roman and Islamic periods and in the Roman period there was clearly a surplus, because there is reason to believe that fish, dried, salted, or more rarely, fresh, were transported to feed the inland desert stations (Thomas 2010). It is clear that a wide variety of fish were sought, including the ubiquitous parrot fish, emperors, groupers, jacks, wrasse, surgeons and unicorn fish, triggerfish and seabream, with a marked predominance of parrot fish. Also present were turtles (which may be been sought primarily for their shell), clams (*Tridacna*), sharks, moray, snappers, silverbiddies, goatfish, mullet, puffers and porcupine fish. The last six were absent or very rare in Islamic deposits.

While the Red Sea was an obvious and important source of fish, occasionally Nile fish were consumed. These would have to be preserved in some way and were probably imported in the form of fish sauce (*tarikos*) (Van Neer *et al.* 2007). This fish diet was supplemented by mammals such as sheep and goat and domestic fowl. Bones of donkey, and cattle might also represent food remains in the Roman period. Desert animals are scarce and restricted to gazelle and birds, no doubt acquired on hunting trips.

The main source of vegetable foods was almost certainly the Nile Valley and hulled barley and hard wheat were present in almost all deposits (see Chapter 18, this volume). Also common were fava beans, dates, water melons and grapes, all of which are likely to emanate from the fertile parts of Egypt. On the other hand, sorghum, peach, apricot, and citrus fruits may have been imported from the east, unless already established in Egypt by Roman times. However, coconut, mango, rice and spices such as pepper or fenugreek were imported from India, while pistachio nuts came from Iran, pine nuts from the Mediterranean, and hazelnuts may have come from the Delta or even further afield.

In the Islamic period we have extensive written evidence for foodstuffs (Guo 2004). Grain, dominated by wheat, was the most important item, but there is mention of oil, baked foods, nuts, syrup, lemons, butter and vegetables such as chickpeas, carrots or onions. Grain, was probably an object of trade, but many of the other commodities are perishable and probably were intended for the resident population. The lack of mention of fish is interesting and may indicate that it was not an object of trade but rather, freely acquired by individuals.

Particularly striking is the dearth of Islamic documents referring to spices at Quseir, although pepper is mentioned in a few. This is puzzling as it is one of the commodities frequently seen archaeologically. Its acquisition may have been one of the main reasons for Roman interest in India. In Islamic times, the spice trade was in the hands of the Jewish Karimi merchants, who seem to have been masters of the Red Sea and Indian Ocean trade. The Sheikh who received most of the documents reported by Guo (2004) would have been a Muslim and not part of that group, which might account for the low profile of pepper.

The general impression is of a balanced and rich diet, although perhaps lacking in vitamin C as there seemed to be a dearth of green vegetables, at least in the archaeological record. This might be a reflection of what could be stored on a ship during a long voyage, rather than taste. The perennial problem was probably not food, but water.

25.5 The organisation of trade

There are two facets of trade at Myos Hormos: transport to and from the Nile; and the mercantile aspect of shipping. The first is a little clearer than the second.

One of the most important sources of Roman period evidence is the *Nicanor* Archive of ostraca from Coptos, dating between 6 BC and AD 68 or 69, which gives an insight into the working of what may be a fairly typical firm of traders (Fuks 1951). It seems to have been a family firm with *Nicanor* son of *Panes* as proprietor including his two brothers *Philostratos* and *Apollos*, as well as his sons *Miresis* and *Peteharpochrates* and a woman called *Isidora*, who may not have been one of the family. He had a number of associates, one of whom, *Parthenios*, did business at Myos Hormos and Berenike between AD 26 and 42. Other names which are mentioned in connection with Myos Hormos are *Tiberias Claudius Agathocles*, *Gaius Julius Bacchylus, Gaius Norbanus* and *Marcus Julius Alexander* (active between AD 37 and 43 or 44), but the list is not exclusive. They may have been well connected and served the state as well as acting in commerce (Sidebotham 1986, 85). It seems that they worked for both military and civilian markets.

Names connected with *Nicanor* appear among our finds, in particular we hear of *Miresis*, almost certainly *Nicanor's* son, as the name is rare. Another name to appear is *Peteasmephis* one of *Nicanor's* agents at Myos Hormos, and *Agathopus* an agent of *Publius Mamilius Chresimus*. His name appears in the *Nicanor* Archive, but he might be part of a different firm.

The firms thus begin to appear in the historical record and no doubt their function would have been to keep the port supplied with essential goods from the Nile Valley. Food would obviously be important, but it is probable that they also transported goods for export and took imports back to the Nile for onward transport to Alexandria and the Mediterranean. Business would have been brisk when ships arrived in December and January or when they were leaving in July. It is possible that the string of watch towers across the desert would have been manned at these times to warn of the presence of ships and the need for traders to make the trek. Strabo (*Geog*. 17.1.45) states that the journey took six or seven days and it is noteworthy that there are the appropriate number of *hydreumata* between the port and Coptos. Here the traders would find water, security and overnight accommodation.

Behind the whole operation lay the financial backers who would invest a huge sum of money in the hope of a handsome return. The 'Muziris' papyrus gives a clear insight into what was involved. It appears that a wealthy investor based in Alexandria would pay for the whole journey, subcontracting to shippers, desert transporters and Nile boatmen so that exotic goods could find their way to the warehouses of Alexandria (Rathbone 2000). 'In no year does India drain less than HS 50 million from our empire and send back goods which are sold among us for more than a hundred times more' (Pliny *NH* VI,101; cited by Rathbone 2000, 47). The trade was a risky one, but clearly highly lucrative. The Muziris papyrus gives an insight into some of the luxuries involved, which in this case included Gangetic nard and ivory carried in the ship *Hermapollon*. It is goods such as these and other luxuries that would pass through the port of Myos Hormos or Berenike.

It seems that a rather similar system operated in the Islamic period. Particularly important is the archive of documents excavated by the Americans in the Sheik's house and recently published by Guo (2004). The house seems to have been the *shūna* or warehouse of Sheik *Abu Mufarrij* who in the 13th century ran a business here with his son *Ibrahim*, and Sheik *Najib* as senior administrator. He seems to have been a general trader buying and selling the food items mentioned above, but he also dealt in textiles, livestock, bottles, stoneware cups, mirrors, soap cosmetics, pottery and perhaps sometimes slaves. In addition he seems to have been something of a general factotum: tax farmer, market inspector and social-services provider (including a postal address, funeral arrangements, medical care and magic practices). In contrast to *Nicanor*, he was probably not a haulage contractor, but mainly a shipping broker.

There is no direct mention of the Karimi merchants, but they were almost certainly present as spice was found frequently and in some quantity. The Karimi had a virtual monopoly of this and other aspects of long distance trade and Guo (2004, 97) is of the opinion that there was certainly a connection. Thus, Qalqashandi (1987), writing in the 14th century, gives what would appear to be a clear statement of Karimi involvement;

> Al-Quseir is on the northern side of ʻAidhab and some of the ships frequent it; it is near to Qus and ʻAidhab is far from Qus. The merchandise is carried from Quseir to Qus, then from Qus to the warehouse of al-Karim in Fustat.

We know that the Karimi had a base at ʻAydhab and it seems virtually certain that they would have operated at Quseir also. The scale and importance of their activities is summarised in the following paragraphs paraphrased from Ghazanfar's (2007) paper;

> The Karimi who first emerged in the 11th century soon attained wealth and influence in all important eastern markets and became quite prominent in financial activities as well as in politics. From the 12th century, the Karimis dominated commercial activities between East and West and Karimi funduqs emerged on the main trade routes from the Indian Ocean to the Mediterranean, in particular in Cairo, Alexandria, Qus in Egypt, in Aden, Taʻiz, Zabid, Ghalafiqua, Bir ar-Rubahiyya in Yemen, and in Mecca, Medina, and Jeddah in the Hijaz. The Suq al-Attarin or Al-Buhar (a merchandise market) was known to be the centre of all Karimi family business activities in Alexandria.
>
> If one estimated the average capital of a wholesale merchant at about 30,000 dinars prior to the Karimi activity in Egypt, the wealth of the Karimi entrepreneurs would amount to at least 100,000, or even 1 million dinars or more. From the biographical sources of the 14th century, one source describes a wealthy Karimi, named Nasir al-Din b. Musallam (d. 1374) "as the marvel of his time, as far as his wealth was concerned" The famous world traveller, Ibn Battuta (1304-1368), noted that the wealth of the Karimi merchants was comparable to that of the greatest middlemen of China.

Quseir al-Qadim occupied a very favourable situation at the shortest point of the Red Sea from the Nile, contrasting it with its rival ʻAydhab to the south. The situation is similar to that of the Roman period, although Qus took the place of Coptos, and Fustat of Alexandria. Qus clearly had a symbiotic relationship with Quseir, for it rather than Quseir, was the pivotal point of the eastern trade. Merchants would obtain their goods from the warehouses of Qus on the Nile rather than venturing to the inhospitable Red Sea. A Geniza document refers to a Cairene merchant going to Qus to acquire Indian and other Oriental specialities, but at the same time returning with a consignment of Upper Egyptian wheat, renowned for its quality (Goitein IV, 240). It is likely therefore that there were haulage specialists concentrating on the desert transport of goods, just as in Roman times.

For both periods of maritime trade, it seems that the pivotal point in the Red Sea trade was either Aden or later Qana in southern Yemen. It was there that oriental and Roman merchants met, neither making the full journey (Casson 1989, 65). Such a journey would be possible, but rarely undertaken and it may be that the Muziris papyrus records an exceptional rather than a commonplace journey. This seems to have been the case in the Islamic period also when traders met at Aden (Margariti 2007, 151-2; Qalqashandi 1987, 5). Ibn Jubayr (1952, 63) remarks that ships from India and Yemen used the port of ʻAydhab, showing these as two alternative destinations. The same may have applied to Quseir however, Ibn Jubayr travelled to ʻAydhab not Quseir, and thus did not mention the latter.

25.6 Ships and the objects of trade

In recent years there has been something of an explosion of interest in Red Sea trade, particularly in relation to maritime trade of the Roman era (Tomber 2008; Sidebotham 2011). Our work at Myos Hormos has been matched by a similar programme at Berenike (Sidebotham and Wendrich 2007); Adulis has been reinvestigated (Peacock and Blue 2007); Qana' (Sedov 2007) and Khor Rori (Avanzini 2002) further excavated; and more work done in India, not only at Arikamedu (Begley *et al.* 2004) but at more northerly sites, and also most importantly, the recent and ongoing work at Pattanam, Muziris (Shajan *et al.* 2004). As a result of this, the overall pattern is gradually becoming clearer and archaeological evidence is beginning to match the literary.

We still know all too little about the ships which plied the long distance route, across some of the roughest seas in the world. However, thanks to our finds we can begin to flesh out some details (see Chapter 15, this volume). Finds from Myos Hormos and others from Berenike, suggest that hulls were built in the time honoured 'shell first' tradition, characteristic of the Mediterranean. Similarly, the finds of sail fragments and rigging including a deadeye and numerous brail rings, suggest that they would be rigged in a similar manner to their Mediterranean counterparts. It seems that the hulls were sometimes sheathed in lead to prevent attack by marine organisms and to deter fouling. In short, there seems little doubt that Red Sea ships would have closely resembled their Mediterranean cousins despite the more rigorous journeys entailed. It is clear that these ships would need ballasting when carrying a light load, but on the outward journey amphorae of wine may have served this purpose. The ballast found at Myos Hormos seems to have been beach boulders mainly from Qana' with some from Aden. It seems that the north-bound cargo was relatively light and buoyant and in need of ballasting. South Arabia and Qana' in particular were in the major production area, and Qana' seems to have been a collection centre for regional produce (Peacock, Williams and James 2007). While it cannot be proven that ballast from Myos Hormos was the result of trade in light loads such as pepper or incense, this seems to be the most probable explanation.

At present we have less evidence for ships of the Islamic period, except for their mention in literary sources, our main find being the remnants of a sewn boat. These would certainly have been used for fishing, and most probably for crossing the Red Sea and for journeying further afield (see Chapter 15, this volume). It is uncertain whether Islamic ships would need ballasting or instead rely on the pay-load for balancing as is commonly thought. A small fragment of frankincense from Islamic deposits, suggests that the incense trade continued.

Rather more information is available about the objects and commodities traded than the ships, and these have now been brilliantly discussed by Tomber (2008). In the Roman period we have a number of valuable written sources of which the *Periplus* is the most detailed and important. This can be supplemented to a small extent by Pliny's *Natural History* and Claudius Ptolemy's *Geography.* The Tamil sources furnish a little supplementary evidence, usually embedded in poems. From these sources it seems that the Romans imported spices (principally pepper), nard, cassia, costus, ebony, teak, silk and cotton from India, ivory from Africa or India, and incense or perfumes from the Arabian Gulf. Other Indian exports include slaves, fine pottery and gemstones. The emphasis is on luxuries, but this could be because these were exotic and attracted the writers' attention. In return, the Romans exported fine wine, which seems to have included some of the best vintages of Italy and Laodicea but mostly Egyptian, as well as textiles, terra sigillata, glass, copper and gold.

In the Islamic period the objects of trade seem to have been a little different. The Cairo Geniza documents list the following as exports from the Red Sea ports: textiles, metal vessels, wheat, glass, silver, chemicals, medicines, paper and books, food such as cheese, sugar, raisins, olive oil and linseed oil, metals for the copper industry and household goods, a list now expanded in our own documents (Chapter 24, this volume). It seems that textiles may have been among the more important objects of trade. In return imports included spices, brass and bronze vessels, iron and steel, silk, shoes and leatherwork, Chinese porcelain, Yemeni stone pots, African ivory, pearls and beads, fruits such as coconuts, and timber (Meyer 1992, 102-3). While there is an element of luxury in these lists, the range seems much more utilitarian than that of the Roman period.

It is instructive to compare these accounts with the evidence of archaeology. This is not without its problems because it is often difficult to decide whether a commodity was intended for local consumption or whether it was en route to another destination. If finds occur in sufficient quantity it is reasonable to suggest that they might have been surplus to local requirements and that they were probably trade items passing through, some of which may have been broken or appropriated for local use. Rarer finds are open to either interpretation, but if there is a correspondence with written sources the rarer finds may be reasonably interpreted as the tip of an iceberg. Context may be another indication, as goods found in or near the harbour are more likely to have been trade goods than those found in domestic contexts. However, reuse of domestic rubbish as hardcore is always a possibility. In any case the harbour locations are generally damp and less favourable to organic preservation, here favoured by desiccation, so the record will be skewed in favour of durable materials. In view of these constraints, the archaeological evidence must be used cautiously and conservatively.

In the Roman period, amphorae are the dominant export and numerous examples were found, particularly in the Augustan wharf, which was constructed from them. The majority of these seem to be Italian Dressel 2-4, some of which certainly come from Campania and would have contained the renowned wine. These are characteristic of Augustan trade over a wide area, from Egypt to Arabia and India. In the wharf they are accompanied by a smaller number of local Egyptian amphorae, although these occur frequently on the site as a whole. These do not have such a wide distribution and instead may have been used on ships as water containers. A small percentage of amphorae are of Rhodian manufacture. The main problem with this assemblage is the apparent domination by Italian products, for the general documentary sources speak of the wines of Laodicea as well as Italy being exported. The former are mentioned by Strabo as an important source for Alexandria, they appear in the *Nicanor* Archive, and they are mentioned in the *Periplus* (Tomber 1998). However, they are difficult to recognise archaeologically as there does not seem to be a distinctive Laodicean amphora fabric. Fraser (1972) suggested that the wines were transported in amphorae made on Rhodes, while more recently Tomber (1998) has suggested that the Dressel 2-4 fabrics from the north-eastern corner of the Mediterranean were similar, and Reynolds (2005, 565) has gone one step further and suggests that they were actually made in Cilicia and transported to Laodicea for filling. Either way, the fabric would be close to the Late

Roman 1 fabric, and Tomber identified such vessels at Mons Claudianus. This fabric has not been recognised in the amphora used in the construction of the wharf, but is present elsewhere on the site. Furthermore, study of a collection of Dressel 2-4 from Adulis failed to reveal any fabrics of this type, and all the material seems to be Italian (Peacock and Blue 2007), although the *Periplus* clearly states that Laodicean wine was imported, with Laodicea mentioned in precedence to Italy. There is thus a problem in reconciling the archaeological and literary sources. Although both concur on the importance of wine as an object of trade.

Mediterranean pottery, together with wares from the Nile Valley, form an important part of the Roman period assemblage, but the widespread connections of the port are further attested by imports of vessels from India, South Arabia, Nabatea and Eritrea (Tomber 2000, 2004, 2007, 2008). In the Islamic period the pottery is more restricted, with vessels from the late Ayyubid and Mamluk realms. The source of glass has not been determined with any precision but it might emanate from the manufacturing centres of Egypt or Syria (see Chapter 7, this volume).

In the Roman period, decorative stones include polished fragments from Wadi Atalla and Wadi Semna and a block of conglomerate from Wadi Hammamat. These might indicate either exportation or perhaps the presence of exotic buildings on site (see Chapter 11, this volume). Fragments of pumice found on the site seem to be associated with Italian amphorae whence they may derive, but the few fragments of obsidian may be Eritrean in origin. Very little steatite was found in Roman contexts and this seems to be characteristic of the Islamic period. It may derive from quarries in the Eastern Desert, such as that reported by Harrell and Brown (2000, 2008) but it is likely that at least some come from the Arabian Peninsular as this was a major centre of production (Hallett 1990). Stone pots are common in the Islamic period and they were clearly highly valued as they were often repaired. No doubt they were resistant to thermal shock and would have imparted a good flavour to food cooked in them. The iron repair rivets in themsleves suggest that they were imported from a distant land and that an Egyptian source may be less significant, since locally available goods are unlikely to have been valued in this way. Querns were made of rocks such as sandstones but more often of lava, which seems to have a different origin to the ballast, and it is intriguing to note that the Cairo Geniza mentions importation from Syria. Whether this applies to the Red Sea remains to be seen.

Textiles seem to have similarly diverse origins (see Chapter 22, this volume). In the Roman period some may have been imported from India or even China. In the Islamic period the recurrence of elephants as a decorative theme suggests an Indian origin, but care is needed as the Prophet was born in the year of the elephant.

25.7 Concluding Remarks

Recent years have seen a substantial growth in our understanding of Red Sea-Indian Ocean maritime trade particualrly in the Roman era with continuted investigation of key ports sites such as Berenike and Adulis. This study clearly demonstrates the range of materials being traded and the scale of exchange, as well as identifies some of the people invovled with trade and the vessels on which they traded, and hints at the nature of maritime communities resident in this important port site during both the Roman and Islamic eras. However, only a relatively small area of the site has been investigated indicating that we still have much to learn about the nature of ancient maritime trade and seafaring in the Red Sea-Indian Ocean region. Particularly pressing is the need to locate Ptolemaic occupation, which may well be concentrated in the lagoon below the water table, making investigation a major undertaking.

Appendix 1 Ancient Coins from Quseir al-Qadim: The Oriental Institute, University of Chicago Excavations 1978, 1980 and 1982

Steven E. Sidebotham

Introduction

The 1978, 1980 and 1982 seasons of excavations at Quseir al-Qadim under taken by the Oriental Institute, University of Chicago, recorded 154 coins, possible coins/coin-shaped flans and a lead token.[1] In addition, one other find, which appeared to be a coin prior to cleaning, proved to be a modern French naval tunic button (catalogue No. 155). The general distribution appears in the Table A1.1.

Most of the coins were *aes* (bronze, brass, copper) and the majority of the identifiable specimens included small denomination Roman issues of *dichalka*, *obols* and *diobols*. Five to seven coins were billon (debased silver) *tetradrachms* minted in the period from Nero to the 3rd century AD. Excavations documented no silver or gold coins or hoards. A single *aes* issue of Ptolemy III Euergetes I (reigned 246-221 BC) (catalogue No. 1) was recovered. All of the identifiable or attributable Roman coins were provincial issues from the Alexandria mint produced prior to the Diocletianic reform initiated in 294 AD; there were no regular imperial coins issued by mints outside Egypt. Many of the excavation coins were unidentifiable/unattributable due to corrosion from the highly saline soil in which they had been found. The very worn condition of some of the others was, however, due to prolonged circulation. One indication of this was an *aes* (catalogue No. 14), which had a counter stamp across the obverse portrait placed after the coin had incurred excessive wear from long term use. The counter stamp indicated that although badly worn, the coin remained legal tender at a reduced face value. Four coins (catalogue Nos. 144-147) may not be Roman issues and three others (catalogue Nos. 148-150) are possibly Islamic. Three (catalogue Nos. 151-153) may not be coins.

It is not unusual to find a preponderance of small denomination coins in an excavation context. If lost, less time would have been spent attempting to recover them while someone who had lost larger denomination *aes*, billon, silver or gold specie would spend proportionally more time endeavoring to retrieve those coins. Thus, the excavation coins do not provide an accurate picture of the coinage in circulation at the port, which undoubtedly included larger denominations as well. Despite the ban on the importation of regular imperial issue coinage into Egypt (Johnson 1959, 425 and 428 n. 46; Weber 1932, 5; Duncan-Jones 1994, 90), which may have been an extension of a Ptolemaic policy prohibiting the circulation of foreign coins in Egypt (cf. *P. Cairo Zenon* 59021), finds of *denarii*, *sestertii,* other smaller denominations and *antoniniani* do occur at other Roman sites in Egypt such as Karanis (Haatvedt *et al.* 1964, 3-4, 106ff.) and elsewhere (Duncan-Jones 1994, 91-92). Those regular Roman imperial issues found in Egypt were either brought into the province inadvertently or were smuggled in, perhaps in the hope of a better rate of exchange than officials gave at Alexandria.

[1]The project directors, Drs. D.S. Whitcomb and J.H. Johnson of the Oriental Institute, University of Chicago invited and generously supported the author's participation on the project during the 1980 season. Unfortunately, they declined to provide photographs for this publication. For the 1978 season coins the author had to rely on the published report by Barghusen; he was unable to examine many of the coins himself.

Identification	Attributable	Unattributable (prob. Roman)	Total
Ptolemaic	1	-	1
Roman	25	122	142
Non-Roman/possible Islamic/ possible coins/flans	-	10	10
Lead token	-	1	1
Modern button	1	-	1
Total	**27**	**128**	**155**

Table A1.1. General distribution of coins from the 1978, 1980 and 1982 excavation seasons.

We know that special consignments of silver and gold bullion were exported to South Arabia and India in Rome's lucrative trade with those regions from the 1st century AD on and the *Periplus* (32) indicates that Roman entrepreneurs often used bullion or plate in the South Arabia trade. An ostracon (*O. Tait* no. 290) dated July 22, 62 AD refers to the shipment of silver bullion to Myos Hormos, most likely for use in this commerce. A papyrus dated 117 AD (*P. Giess.* 47 = Kornemann *et al.* 1910-1912, no. 47) deals with the price of silver bullion at Koptos, no doubt for use in Eastern trade.

Roman imperial *denarii* and *aurei* also appear in southern Arabia, India and, in late antiquity *solidi* have also been documented in these regions (Raschke 1978, 665ff.; Puskás 1987, 154; Turner 1989). The Indians seem to have been especially fond of *denarii* issued by Augustus (Gaius and Lucius Caesars reverse) and Tiberius (PONTIF MAXIM reverse). Payment in gold rather than silver may suggest that there was an expanded demand in Mediterranean markets for Indian products (Rodewald 1976, 49-52). Alternatively or concomitantly, the reduction in weight and fineness of the *denarius* in 63/64 AD may have caused a decline in its desirability and an increased demand for *aurei* (Mattingly 1962, 123) the fineness of which remained high; this would suggest that residents of the subcontinent viewed Roman silver specie as bullion rather than currency. The *Periplus* (49, 56) refers to the importation of Roman coins into India and at some Indian emporia Roman silver received an excellent rate of exchange for Indian silver coins (*Periplus* 49; cf. Sidebotham 2011, 247). Few Roman *aes* coins have been documented from India dating prior to the 4th century (Sewell 1904, 607ff.; Turner 1989, 19-20) and provincial Alexandrian issues are also rare in India, Sri Lanka and Arabia (Warmington 1928, 295; Raschke 1978, 600 and note 1467; West and Johnson 1944, 78 note 4).

There is some debate about the status of Roman silver and gold coins in this "international" commerce, whether used to "purchase" goods and services or as bullion in exchange (Sidebotham 2011, 244-245). Whatever their status, most of the coins must have arrived by sea from ports on the Red Sea coast of Egypt. That no examples of regular Roman imperial issues have been recorded in excavations at Myos Hormos, or at Berenike dating prior to the Diocletianic reform of the mid-290s AD, suggests several possibilities. The great value of silver and gold coins necessitated careful guarding resulting in no losses. Likely the silver and gold coinage destined for the Erythraean Sea trade had been carefully packed and placed under lock and key by officials in Alexandria, less likely at Koptos, and was not accessible until merchants reached their foreign destinations. Clearly, some Roman coins reached India via Palmyra. An inscription of 193 AD (*IGRR* 3.1050) documents how Palmyrene merchants sought older *aurei* for their trade with the East.

The ancient coins documented from Quseir al-Qadim span from Ptolemy III (catalogue No. 1) into the first to third quarter of the 3rd century AD (catalogue No. 26). The very worn condition of the Ptolemaic coin suggests that it had been in circulation for some time prior to its loss, which may have taken place during the Roman occupation of the settlement. On the other hand, recent excavations suggest that there was some Ptolemaic era-activity at the site (Tomber 2008, 60); the coin could have been lost at that time.

The bulk of the identifiable coins derives from the reigns of Claudius, Nero and the Flavians (41-96 AD), a period of intense commercial activity between the Roman world on the one hand and south Arabia and southern India on the other (according to Pliny the Elder, *Natural History* and the *Periplus*, if one accepts the generally held opinion of a mid 1st century AD date for its composition). A similar pattern has emerged from the excavations at Berenike where approximately 40-41% of all identifiable coins are also 1st century AD (mainly Julio-Claudian) in date (Sidebotham 2011, 244).

The latest identifiable coin from the 1978-1982 seasons is a surface find: a billon tetradrachm of Hadrian (catalogue no. 24). The weight (9.70 g.) and diameter (23 mm) of the unidentifiable 3rd century billon tetradrachm (Cat. No. 26) indicate that it was minted sometime between the period of Severus Alexander (222-235 AD) and Aurelian (270-275 AD). This specimen is worn and was originally heavier and slightly larger; the reverse type is very common for emperors of this period. Thus, association of the coin with a specific ruler cannot be made based upon reverse type alone. The obverse portrait seems to be that of a middle-aged or older man; the best candidates are Philip I (244-249 AD), Trajan Decius (249-251 AD) or Valerian (253-260 AD).

Another find worth noting is a lead token (catalogue No. 154). Numerous lead tokens have been documented from other Roman sites in Egypt. They are distinct in fabric and style from anything manufactured at Alexandria. They seem to have been produced in the Nile Valley at centers between Hermopolis Magna and Memphis as well as in the Fayum and at the western edge of the Nile Delta. There is, however, little indication of the use of lead tokens in Upper Egypt south of Koptos (Milne 1933, xliv-xlv). Perhaps this poorly preserved specimen falls into this category of lead tokens produced in Egypt in the Roman period.

One last item of interest is a French naval button made of copper or bronze, perhaps from a tunic or coat (Cat. No. 155). There is no doubt that it is of relatively recent manufacture. The anchor on the obverse is quite modern in appearance and the text on the reverse corroborates a modern date; the only clue as to the nationality of the button appears on the reverse where a rather lengthy raised text circles the central knob of the button. It is illegible except for the word "Paris," undoubtedly the place of its manufacture. Perhaps a French sailor stationed at Quseir during the Napoleonic occupation (Le Quesne 2007) lost this while visiting the site.

The catalogue adopts the following format:

1. identification of coin by ruler or period
2. denomination or metal
3. weight in grams, if available
4. die positions, if available
5. diameter in mm. if available
6. description of obverse
7. description of reverse
8. published parallels
9. Oriental Institute/University of Chicago registration number

The following abbreviations are used:

AE	*aes* (bronze, brass, copper)
g	grams
mm	millimeters
Obv.	obverse
Rv.	reverse
l.	left
r.	right
stg.	standing
fig.	figure
no(s).	number(s)
RN	Quseir al-Qadim registration number

Catalogue

1. Ptolemy III Euergetes (246-221 BC); AE; 9.63 g; ↑↑; 24 mm; Obv. head of Zeus Ammon r. with diadem and floral ornament; Rv. eagle stg. l. on thunder/lightning bolt, wings folded, *cornucopiae* in front, between legs ☧; ΠΤΟΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ; Kromann and Mørkholm 1977, nos. 178-180; Haatvedt *et al.* 1964, no. 10; 1982 RN 697, F8d-34.
2. Livia (9/10-12/13 AD); AE *diobol*; 3.84 g; 24 mm; Obv. head of Livia r., no legend/legend lost; Rv. obliterated/lost; Geißen 1974, nos. 34-35 (undated or years 39-42 = 9/10-12/13 AD); Dattari 1901, nos. 56-72, 104-107; Milne 1933, nos. 6, 15-16, 24a, 27-28, 32; Poole 1892, cf. nos. 28-33; Christiansen and Kromann 1974, nos. 37-40; Haatvedt *et al.* 1964, nos. 62-63; Vogt (vol. 1) 1924, cf. 14-20; Vogt (vol. 2) 1924, 2-4; 1980 RN 519a, E6b-38.
3. Claudius (41-54 AD); AE *diobol*; 24 mm; Obv. bust r., legend lost; Rv. 6(?) grain stalks bound together, to l. L; Geißen 1974, nos. 66-67 (year 2 = 41/42 AD); Dattari 1901, no. 142; Milne 1933, no. 73; Poole 1892, nos. 101 variant, 102 variant; Haatvedt *et al.,* 1964, nos. 73-74; Vogt (vol. 1) 1924, cf. 23-25; Vogt (vol. 2) 1924, 5; Barghusen, 1979 221; 1978 RN 447, F10a-11.
4. Claudius (41-54 AD); AE *diobol*; 27.5-28 mm; Obv. Obliterated/lost; Rv. Hippopotamus r. head lowered, faint legend beneath; Geißen 1974, nos. 70-71, 78-79, 84, 90 (years 2-4 = 41/42-43/44 AD, year 6 = 45/46 AD); Dattari 1901, nos. 162, 166, 167; Milne 1933, nos. 71-72, 90, 100, 112; Poole 1892, nos. 96, 98; Christiansen and Kromann 1974, no. 68; cf. Haatvedt *et al.* 1964, no. 71; Vogt (vol. 1), 1924, cf. pp. 23-25; Vogt (vol. 2) 1924, 5-6; 1978 RN 434b, C4c-8.
5. Claudius (41-54 AD); AE *diobol*; 6.10 g; 23.5 mm; Obv. laureate bust r. [ΤΙ ΚΛΑΥ Κ]Α[Ι] CΕΒ[ΑΣΓΕΡΜΑ] to r. LI or LIA; Rv. winged caduceus and ears of grain bound together [ΑΥΤΟΚΡΑ] across grain ears; Geißen 1974, nos. 91-92, 100 (years 10-11 = 49/50-50/51 AD); Dattari 1901, nos. 140-141; Milne 1933, nos. 114, 119; Poole 1892, nos. 99-100; Christiansen and Kromann 1974, no. 76; Haatvedt *et al.* 1964, nos. 81-83; Vogt (vol. 1) 1924, cf. 23-26; Vogt (vol. 2) 1924, 6-7; 1982 RN 702, F8d-31.
6. Claudius (41-54 AD); AE *diobol*; 4.25 g; ↑↖; 22 mm; Obv. bust r. (?), legend lost; Rv. bound wheat stalks with caduceus or r. hand l. clasping ears of grain and poppy heads, in field ΑΥΤΟΚΡΑ; Geißen 1974, nos. 91-92, 100 (years 10-11 = 49/50-50/51 AD); Dattari 1901, nos. 140-141, 150-151; Milne 1933, nos. 114, 116, 119; Poole 1892, nos. 99, 100, 103-105; Christiansen and Kromann 1974, no. 76; Haatvedt *et al.* 1964, nos. 81, 83, 84; Vogt (vol. 1) 1924, cf. 23, 26; Vogt (vol. 2), 1924, 6; Barghusen 1979, 224; 1978 RN 463, C4c-7.
7. Claudius (41-54 AD); AE *diobol*; 8.60 g; ↑↗; 25.5 mm; Obv. laureate bust r., legend faint [---] Σ, to r. LI or LIA; Rv. bust of Nilus r., crowned with papyrus, over r. shoulder *cornucopiae*, over l. shoulder infant Ploutos (?) or genius with l. arm raised, ΑΥΤΟΚΡΑ; Geißen 1974, nos. 98-99, 102 (years 10-11 = 49/50-50/51 AD); Dattari 1901, nos. 138-139; Milne 1933, nos. 113, 118; Poole 1892, nos. 81-83; Haatvedt *et al.,* 1964, nos. 80, 82; Vogt (vol. 1) 1924, cf. 23-26; Vogt (vol. 2) 1924, 6-7; 1980 RN 511, E7c-7.
8. Claudius (41-54 AD); AE *diobol*; 4.35 g; 21 mm; Obv. faint laureate bust r., legend lost; Rv. eagle stg. r. on thunder/lightning bolt, head turned l., [ΑΥΤΟΚΡΑ]; Geißen 1974, nos. 103, 105-107 (years 12-13 = 51/52-52/53 AD or no regnal year indicated); Dattari 1901, nos. 154-157 (years 11-15 = 50/51-53/54 AD); Milne 1933, nos. 123a, 128-130; Poole 1892, nos. 90-92 (year 3 = 42/43 AD and years 12-13 = 51/52-52/53 AD); Christiansen and Kromann 1974, nos. 81-83; Haatvedt *et al.* 1964, no. 87; Vogt (vol. 1) 1924, cf. 23-26; Vogt (vol. 2) 1924, 7; 1980 RN 533a,

surface.

9. Claudius (41-54 AD); AE *diobol*; 4.60 g; ↑↗; 25 mm; Obv. laureate(?) bust r., legend illegible; Rv. eagle stg. r. on thunder/lightning bolt(?), head turned l., [AYTOKPA]; same parallels as catalogue No. 8 [1980 RN 533a, surface]; 1980 RN 523, E6b-38.

10. Claudius or Nero (41-68 AD); AE *diobol*; 4.52 g; ↑↑; 25 mm; Obv. bare or laureate bust r., legend very faint and illegible; Rv. eagle stg. r. on thunder/lightning bolt, wings folded, head turned l.(?), in field to r. LA or LΔ or LIA AYTOKPA; if Claudius, same parallels as catalogue nos. 8 and 9 (1980 RN 533a, surface and 1980 RN 523, E6b-38), but different regnal years; if Nero, see Geißen 1974, no. 192 (but year 13 = 66-67 AD); Haatvedt *et al.* 1964, nos. 107, 109, 115 (years 11-13 = 64/65-66/67 AD); Vogt (vol. 1) 1924, cf. 26f., 32f.; Vogt (vol. 2) 1924, 11; 1980 RN 509, 37a-15.

11. Claudius or Nero (41-68 AD); AE *diobol*; 4.30 g; 22 mm; Obv. obliterated and lost; Rv. eagle stg. r. on thunder/lightning bolt, wings folded, head turned l.(?), in field LIΓ (year 13 = 52/53 AD if Claudius or 66/67 AD if Nero); if Claudius see Geißen 1974, no. 105; Dattari 1901, no. 156; Milne 1933, nos. 128-130; Poole 1892, no. 92; Christiansen and Kromann 1974, no. 83; Haatvedt *et al.,* 1964, no. 87; Vogt (vol. 1) 1924, cf. 23-26; Vogt (vol. 2) 1924, 7; if Nero see Geißen 1974, no. 192; Vogt (vol. 1) 1924, cf. 26 f., 32f.; Vogt (vol. 2) 1924, 11; cf. Barghusen 1979, 225-226; 1978 RN 92, G8d-1.

12. Agrippina the Younger (wife of Claudius and mother of Nero) (52/53 AD); AE *diobol*; 9.60 g; 25.5 mm; Obv. bust of Agrippina the Younger r. as Demeter, crowned with grain, legend lost; Rv. bust of Euthenia r., crowned with grain, carrying ears of grain, in field [EY]ΘHNI[A] and LIΓ (year 13 = 52/53 AD); Geißen 1974, nos. 110-112; Dattari 1901, no. 179; Milne 1933, no. 127; Poole 1892 no. 110; Christiansen and Kromann 1974, no. 89; Haatvedt *et al.* 1964, no. 89; Vogt (vol. 1) 1924, cf. 23-24, 26; Vogt (vol. 2) 1924, 8; 1982 RN 665, J10c-5.

13. Augustus, Livia (wife of Augustus) or Agrippina the Younger (wife of Claudius) (10/11 AD); AE *diobol*; 3.76 g; ↑↑; 26 mm; Obv. very faint bust r., no legend visible; Rv. bust of Euthenia r., in field E[YΘH]N[IA], no regnal year visible; if Augustus see Geißen 1974, no. 14 (no regnal year indicated); Dattari 1901, no. 5; Milne 1933 no. 23; Christiansen and Kromann 1974, no. 16; Haatvedt *et al.* 1964, no. 58; Vogt (vol. 1) 1924, cf. 17; Vogt (vol. 2) 1924, 1; if Livia see Geißen 1974, no. 41 (year 40 = 10/11 AD); Dattari 1901, nos. 58, 64 variants; Poole 1892, cf. no. 28; Christiansen and Kromann 1974, no. 38; Vogt (vol. 1) 1924, cf. 14, 17-18; Vogt (vol. 2) 1924, cf. 3; if Agrippina the Younger same parallels as catalogue No. 12 (1982 RN 665, J10c-5); Dattari 1901, nos. 178, 180; Milne 1933, nos. 124-125; 1980 RN 517a, E6b-49.

14. Julio-Claudian portrait; AE; 10.40 g; 25.5 mm; Obv. bare head r., legend (if any) lost, square counter stamp across face Γx or Γ>; Rv. lost, obliterated; 1980 RN 514, G8a-4.

15. Nero (63/64 AD); billon tetradrachm; 11.88 g; 27 mm; Obv. radiate bust r. NEPΩ KΛAY KAIΣ ΣEB ΓEP AY; Rv. draped bust of Poppaea, hair tied in queue ΠOΠΠAIA ΣEBAΣTH, in field to r. LI; Geißen 1974, no. 157 (year 10 = 63/64 AD); Dattari 1901, no. 196; Milne 1933, nos. 217-221; Poole 1892, nos. 122-123; Christiansen and Kromann 1974, nos. 112-113; Haatvedt *et al.,* 1964, no. 102; Curtis 1969, nos. 138-142; Sadek 1966, 139 no. 33 and 146 no. 23; Grose 1929, no. 9851; Vogt (vol. 1) 1924, cf. 26-31; Vogt (vol. 2) 1924, 10; 1982 RN 701, F8d-34.

16. Vespasian (70-71 AD); AE *diobol*; 5.34 g; ↑↑; 27.5 mm; laureate bust r, AYTOK KAIΣ [ΣEBA OYEΣΠAΣIANOY]; Rv. bust of Serapis r., wears *taenia* and *modius*, to r. LΓ; Geißen 1974, no. 290 (year 3 = 70/71 AD); Dattari 1901, no. 398; Milne 1933, no. 417; Poole 1892, no. 253; Christiansen and Kromann 1974, no. 173; Haatvedt *et al.* 1964, no. 142; Vogt (vol. 1) 1924, cf. 41-43; Vogt (vol. 2) 1924, 15; 1980 RN 557a, E6b-24.

17. Vespasian (69-79 AD); AE *diobol* (coin broken); 4.95 g; 23 mm; Obv. bust r. AYTOK KAIΣ Σ[EBAΣTOY OYEΣΠAΣIANOY]; Rv. lost/obliterated; 1980 RN 565, G8a-1.

18. Domitian (82/83-89/90 AD); AE *diobol*; 4.90 g; ↑↑; 24 mm; Obv. laureate bust r., legend faint and illegible; Rv. eagle stg. r. wings folded, legend faint, ETOYΣ, could be regnal year 2, 3, 5, 6, 8 or 9 (= 82/83, 83/84, 85/86, 86/87, 88/89 or 89/90 AD); for these years see Geißen 1974, nos. 331-333, 341, 359; Dattari 1901, nos. 583-589; Milne 1933, nos. 474-476, 480, 486; Poole 1892, nos. 319-321; Christiansen and Kromann 1974, no. 199; Haatvedt *et al.* 1964, no. 167; Vogt (vol. 1) 1924, cf. 45-64; Voft (vol. 2) 1924, 17-20; 1980 RN 513, F7a-3.

19. Domitian (82/83-88/89 AD); AE *diobol*; 3.90 g; ↑↑; 27-28 mm; Obv. laureate(?) bust r., legend faint and illegible; Rv. bust of Serapis r. wearing *taenia* and *modius*, ETOYΣ, could be regnal year 2, 3, 4, 5 or 8 (= 82/83, 83/84, 84/85, 85/86 or 88/89 AD); for these years see Geißen 1974, nos. 347, 362; Dattari 1901, nos. 526-529; Milne 1933, nos. 466, 471; Poole 1892, nos. 299-301; Christiansen and Kromann 1974, nos. 195, 200; Haatvedt *et al.* 1964, nos. 162, 165, 166; Vogt (vol. 1) 1924, 45-64; Vogt (vol. 2) 1924, 17-18; 1980 RN 516, E6c-1.

20. Domitian (82/83-94/95 AD); AE *obol*; 3.06 g; 19 mm; Obv. laureate bust r. legend lost; Rv. winged griffin seated r., l. forepaw on spoked wheel, could be regnal year 2, 3, 4, 5, 6, 7, 8, 9, 11, 12 or 14 (= 82/83, 83/84, 84/85, 85/86, 86/87, 87/88, 88/89, 89/90, 91/92, 92/93, 94/95 AD); for these years see Geißen 1974, nos. 328, 345, 361, 365, 385; Dattari 1901, nos. 602-612; Milne 1933, nos. 481, 489-491, 511, 522; Poole 1892, nos. 323-327; Christiansen and Kromann 1974, nos. 197, 206; Haatvedt *et al.* 1964, nos. 170, 175; Vogt (vol. 1) 1924, cf. 45-55; Vogt (vol. 2) 1924, 17-23; 1982 RN 700, F8d-18.
21. First to 2nd century AD; billon tetradrachm; 6.96 g; 23mm; Obv. radiate bust r(?), legend lost; Rv. fig. stg. l.(?), legend faint and illegible; 1980 RN 520a, E6b-44.
22. Galba (68-69 AD) or the Flavians (69-96 AD); billon tetradrachm; 7.20 g; ↑↗; 25 mm; Obv. radiate bust r., legend lost; Rv. bust r. (personification?), legend lost; 1980 RN 515, D6d-7.
23. Trajan (98-117 AD), Hadrian (117-138 AD) or Antoninus Pius (138-161 AD)(?); AE *dichalkon*; 1.30 g; 14 mm; Obv. laureate bust r.(?), legend, if any, lost; Rv. headdress of Isis flanked by wheat stalks(?), in field LIΔ (= regnal year 14); 1980 RN 524, E6b-24.
24. Hadrian (132/133 AD); billon tetradrachm; 12.70 g; ↑↖; 25 mm; Obv. laureate bust r. wears *paludamentum*, *cuirass* and *aegis* AYT KAI [TPAI AΔPIA CEB] or AYT KAI[C TPAIAN AΔPIANOC CEB], other variants; Rv. Nilus reclining l. holds *cornucopiae* in l. hand, reed or wheat stalk in r., crocodile beneath, in field to l. of Nilus LIZ (= regnal year 17); Geißen 1978, nos. 1063 or 1064; Dattari, 1901 nos. 1434 or 1435; Milne 1933, nos. 1351-1352 or 1354-1355; Poole, 1892, no. 648; Christiansen and Kromann 1974, no. 371; Haatvedt *et al.* 1964, no. 269; Curtis 1969, nos. 459-466; Vogt (vol. 1) 1924, cf. 104-105; Vogt (vol. 2) 1924, 54; 1980 RN 518, surface.
25. First to 2nd century AD; AE; 2.40 g; 15 mm; Obv. bust r.(?); Rv. canopic jar(?); 1980 RN 521, D6d-3.
26. Third century AD, possibly Philip I (244-249 AD), Trajan Decius (249-251 AD) or Valerian I (253-260 AD); billon tetradrachm; 9.70 g; ↑↖; 23 mm; Obv. radiate bust r., wears cuirass and aegis(?), legend very faint; Rv. eagle stg. l., wings folded, head turned r., holds wreath in beak(?), in field to r.(?) A; many emperors with this reverse type on 3rd century tetradrachms; if Philip I see Milne 1933, nos. 3519-3523 (year 1 = 244 AD); Poole 1892, no. 1992; Christiansen and Kromann 1974, no. 705 or 706; Haatvedt *et al.* 1964, no. 795; Curtis 1969, no. 1334; Vogt (vol. 1) 1924, cf. 195-196; Vogt (vol. 2) 1924, 141; if Trajan Decius see Dattari, 1901, nos. 5096-5097; Milne, 1933, nos. 3787 or 3812-3815 (year 1 = 249/250 AD); Poole 1892, nos. 2083-2085; Christiansen and Kromann 1974, no. 738; Haatvedt *et al.* 1964, no. 892; Curtis 1969, nos. 1418-1420; Vogt (vol. 1) 1924, cf. 198-200; Vogt (vol. 2) 1924, 148; if Valerian I see Dattari 1901, no. 5183 or 5187; Mile 1933, no. 3873 (year 1 = 253/254 AD); Poole 1892, no. 2142; Haadvedt *et al.* 1964, no. 929; Curtis 1969, no. 1499; Vogt (vol. 1) 1924, cf. 202-203; Vogt (vol. 2) 1924, 150; 1980 RN 510, F19a-2.
27. Unattributed; AE *diobol*(?); 7.55 g; 25 mm; Obv. bare or laureate bust r., legend, if any, faint and illegible; Rv. obliterated/lost; 1982 RN 688, G8a-27.
28. Unattributed; AE or billon; 10.06 g; 29.5 mm; Obv. bare or laureate bust r.(?), legend lost; Rv. obliterated; 1982 RN 704, surface.
29. Unattributed; AE *obol* or *diobol*; 3.40 g; 21 mm; Obv. laureate bust r., legend lost; Rv. obliterated; 1982 RN 664, G8a-4.
30. Unattributed; AE *obol* or *diobol*; 3.06 g; 21 mm; Obv. bust r., very worn; Rv. wheat stalks(?); 1982 RN 662, F8d-32.
31. Unattributed; AE; 3.58 g; 17 mm; illegible and completely worn; 1982 RN 663, F8d-30.
32. Unattributed; AE; 3.77 g; 21 mm; illegible and completely worn; 1982 RN 666, G8b-43.
33. Unattributed; AE; *diobol*(?); 6.66 g; 22 mm; illegible and completely worn; 1982 RN 672, G8a-15.
34. Unattributed; AE; *diobol*(?); 7.08 g; 23 mm; illegible and completely worn; 1982 RN 674, L8c-23.
35. Unattributed; AE; *diobol*(?); 4.68 g; 22 mm; illegible and completely worn; 1982 RN 684, G8a-8.
36. Unattributed; AE *obol* or *dichalkon*(?); 2.15 g; 15 mm; illegible and completely worn; 1982 RN 686, F8d-13.
37. Unattributed; AE *diobol*(?); 6.37 g; 25 mm; illegible and completely worn; 1982 RN 689, G8b-49.
38. Unattributed; AE *diobol*(?); 6.87 g; 24.5 mm; illegible and completely worn; 1982 RN 690, G8a-18.
39. Unattributed; AE *diobol*(?); 4.52 g; 25 mm; illegible and completely worn; 1982 RN 705, K9d-4.
40. Unattributed; AE *obol*(?); 4.38 g; 18.5 mm; illegible and completely worn; 1982 RN 706. D8s-2.
41. Unattributed; AE *diobol*(?); 4.85 g; 24.5 mm; illegible and completely worn; 1982 RN 707, surface.
42. Unattributed; AE *diobol*(?); 4.63 g; 23.5 mm;

illegible and completely worn; 1982 RN 708, G8b-32.

43. Unattributed; AE *diobol*(?); 6.97 g; 25 mm; illegible and completely worn; 1982 RN 709, F8d-32.
44. Unattributed; AE *diobol*(?); 3.71 g; 27 mm; illegible and completely worn; 1980 RN 520d, E6b-44.
45. Unattributed; AE; 2.23 g; 21 mm; illegible and completely worn; 1980 RN 520b, E6b-44.
46. Unattributed; AE; 5.07 g; 21 mm; Obv. bust r.(?); Rv. eagle stg.(?); 1980 RN 520c, E6b-44.
47. Unattributed; AE; 2.72 g; 22 mm.; illegible and completely worn; 1980 RN 533b, surface.
48. Unattributed; AE; 3.50 g; 22 mm; illegible and completely worn; 1980 RN 533c, surface.
49. Unattributed; AE; 7.12 g; 22 mm; illegible and completely worn; 1980 RN 533d, surface.
50. Unattributed; AE *diobol*(?); 7.40 g; 25 mm; illegible and completely worn; 1980 RN 557b, E6b-24.
51. Unattributed; AE *diobol*(?); 5.05 g; 23 mm; illegible and completely worn; 1980 RN 557c, E6b-24.
52. Unattributed; AE *diobol*(?); 2.67 g; 26 mm; illegible and completely worn; 1980 RN 517b, E6b-49.
53. Unattributed; AE *diobol*(?); 3.24 g; 23 mm; illegible and completely worn; 1980 522, E6d-5.
54. Unattributed; AE(?); 11.44 g; 25 mm; illegible and completely worn; 1980 RN 523, E6b-38.
55. Unattributed; AE; 2.54 g; 20 mm; illegible and completely worn; 1980 RN 525, E6b-30.
56. Unattributed; AE broken in four pieces and conserved as one; 6.37 g; 28 mm; illegible and completely worn; RN 526, E6b-29.
57. Unattributed; AE *diobol*(?); 3.71 g; 26 mm; illegible and completely worn; 1980 RN 527, E6b-48.
58. Unattributed; AE *diobol*(?); 4.07 g; 24 mm; illegible and completely worn; 1980 RN 528, E6b-43.
59. Unattributed; AE; 4.53 g; 27 mm; illegible and completely worn; 1980 RN 529, E6c-1.
60. Unattributed; AE; 1.25 g; 17 mm; illegible and completely worn; 1980 RN 530, G8a-4.
61. Unattributed; AE 0.62 g; 14 mm; illegible and completely worn; 1980 RN 531, E6a-2.
62. Unattributed; AE *diobol*(?); 3.58 g; 22 mm; illegible and completely worn; 1980 RN 532, E6c-3.
63. Unattributed; AE *diobol*(?); 4.68 g; 22 mm; illegible and completely worn; 1980 RN 534, E7a-10.
64. Unattributed; AE; 1.27 g; 23 mm; illegible and badly corroded; 1980 RN 535, E6b-24.
65. Unattributed; AE *diobol*(?); 3.58 g; 26 mm; illegible and completely worn; 1980 (1978 south baulk); RN 536, E6b.
66. Unattributed; AE or billon tetradrachm(?); 9.42 g; 27 mm; illegible and completely worn; 1980 RN 537, E6b-49.
67. Unattributed; AE *diobol*(?); 4.91 g; 25 mm; illegible and completely worn; 1980 RN 538, E6a-15.
68. Unattributed; AE; 2.44 g; 23.5 mm; illegible and completely worn; 1980 RN 539, D6d-2.
69. Unattributed; AE; 1.50 g; 19 mm (measurement and weight taken before cleaning); illegible; 1980 RN 540, E6b-48.
70. Unattributed; AE *diobol*(?); 4.45 g; 24 mm; illegible and completely worn; 1980 RN 541a, E6a-9.
71. Unattributed; AE; 2.65 g; 20 mm; illegible and completely worn; 1980 RN 542b, E6a-8.
72. Unattributed; AE; 2.75 g; 20 mm; illegible and completely worn; 1980 RN 543, G8a.
73. Unattributed; AE coin fragment; 2.14 g; 19 mm; illegible and completely worn; 1980 RN 544, D6d-2.
74. Unattributed; AE; 2.72 g; too fragmentary to measure; illegible and completely worn; 1980 RN 545, E6c-4.
75. Unattributed; AE *diobol*(?); 5.90 g; 23 mm; illegible and completely worn; 1980 RN 546, D6d-2.
76. Unattributed; AE in four fragments; 4.60 g; 26 mm; illegible and completely worn; 1980 RN 547a, E6d-2.
77. Unattributed; AE coin fragment; 3.42 g; 24 mm; illegible and completely worn; 1980 RN 547b, E6d-2.
78. Unattributed; AE; 1.70 g; 19 mm; illegible and completely worn; 1980 RN 548, E6a-1.
79. Unattributed; AE; 13.00 g; 27 mm; illegible and completely worn; 1980 RN 549, E6c-1.
80. Unattributed; AE; 3.37 g; 20 mm; illegible and completely worn; 1980 RN 550, E6a-9.
81. Unattributed; 8.97 g; 24 mm; illegible and completely worn; 1980 RN 552, E6b-33.
82. Unattributed; AE; 14.40 g; 27 mm; illegible and completely worn; 1980 RN 553, E6a-9.
83. Unattributed; AE; 6.58 g; 26 mm; illegible and completely worn; 1980 RN 554a, E6c-4.
84. Unattributed; AE broken in two pieces; 0.45 g; 14 mm; illegible and completely worn; 1980 RN 554b, E6c-4.
85. Unattributed; AE coin fragment; 4.26 g; 27 mm; Obv. lost; Rv. bust r.(?); 1980 RN 555a, E6b-14.
86. Unattributed; AE; 3.71 g; 23 mm; illegible and completely worn; 1980 RN 555b, E6b-14.
87. Unattributed; AE; 10.28 g; 26 mm; illegible and completely worn; 1980 RN 556a, E6b-38.
88. Unattributed; AE in four fragments; 10.04 g; too fragmentary to measure; illegible and completely worn; 1980 RN 556b, E6b-38.

89. Unattributed; AE; 0.81 g; 14 mm; illegible and completely worn; 1980 RN 558a, E7c-2.
90. Unattributed; AE; 9.93 g; 26 mm; illegible and completely worn; 1980 RN 558b, E7c-2.
91. Unattributed; AE; 3.31 g; 22 mm; illegible and completely worn; 1980 RN 559, E6b-24.
92. Unattributed; AE coin fragment; 1.00 g; too fragmentary to measure; illegible and completely worn; 1980 RN 560a, E6b-16.
93. Unattributed; AE coin fragment; 2.69 g; 21 mm; illegible and completely worn; 1980 RN 560b, E6b-16.
94. Unattributed; AE thick flan; 2.97 g; 16 mm; illegible and completely worn; 1980 RN 560c, E6b-16.
95. Unattributed; AE; 18.46 g; 32 mm; illegible and completely worn; 1980 RN 562, E7c-2.
96. Unattributed; AE three fragments; 3.59 g.; 25 mm; illegible and corroded; 1980 RN 563, E6b-29.
97. Unattributed; AE; 9.46 g; 27 mm; illegible and completely worn; 1980 RN 564, E6b-29.
98. Unattributed; AE; 5.94 g; 25 mm; illegible and completely worn; 1980 RN 566a, G12c-7.
99. Unattributed; AE; 8.36 g; 25 mm; illegible and completely worn; 1980 RN 566b, G12c-7.
100. Unattributed; AE in many fragments/powder; 1.75 g; too fragmentary to measure; illegible and completely worn; 1980 RN 567, E6b-31.
101. Unattributed; AE; 4.96 g; 22 mm; illegible and completely worn; 1980 RN 568, E6b-14.
102. Unattributed; AE in two fragments; 2.28 g; too fragmentary to measure; illegible and completely worn; 1980 RN 519b, E6b-38.
103. Unattributed; AE *diobol*(?); 3.15 g; 24 mm; Obv. lost; Rv. bust r., no legend visible; 1978 RN 450a, E7a-9.
104. Unattributed; AE *diobol*(?); 24 mm; illegible and completely worn; 1978 RN 450b, E7a-9.
105. Unattributed; AE *diobol*(?); 6.00 g; ↑↑; 24 mm; Obv. bust r., legend lost; Rv. eagle stg. r., head turned l.; cf. Barghusen, 1979, 225; 1978 RN 442, E6b-11.
106. Unattributed; AE; 13.58 g; 32 mm; Obv. bare or laureate bust l., legend lost; Rv. lost; cf. Barghusen, 1979, 226; 1978 RN 65, QRS-16.
107. Unattributed; AE *diobol*(?); 5.40 g; ↑↑; 22.5-23 mm; Obv. bust r., legend lost; Rv. bust r., L in field; cf. Barghusen, 1979, 224-225; 1978 RN 462, E6b-2.
108. Unattributed; AE; 23.5-24 mm; illegible and completely worn; illegible and completely worn; 1978 RN 445a, E7a-9.
109. Unattributed; AE; 22 mm; illegible and completely worn; 1978 RN 445b E7a-9.
110. Unattributed; AE *diobol*(?); 5.80 g; 23 mm; Obv. bare or laureate bust r., legend lost; Rv. obliterated; cf. Barghusen 1979, 222-223; 1978 RN 433a, C4c-2;
111. Unattributed; AE; 0.80 g; 17 mm; illegible and completely worn; cf. Barghusen 1979, 222-223; 1978 RN 433b, C4c-2.
112. Unattributed; AE *obol*(?) broken in two pieces; 1.65 g; 19 mm; illegible and completely worn; 1978 RN 466, E6b-5.
113. Unattributed; AE; 24 mm; illegible and completely worn; 1978 RN 449, E7a-4.
114. Unattributed; AE 25.5-26 mm; illegible and completely worn; 1978 RN 435, E7a-2.
115. Unattributed; AE *diobol*(?) broken in two pieces; 3.20 g; 25 mm; Obv. bust r., legend lost; Rv. obliterated; 1978 RN 443, E7a-10.
116. Unattributed; AE; 24 mm; illegible and completely worn; 1978 RN 438, F8d-9.
117. Unattributed; AE 20 mm; illegible and completely worn; 1978 RN 439, G12a-3.
118. Unattributed; AE, flat on one side, convex on the other; 4.10 g; 17.5-18 mm; illegible and completely worn; 1978 RN 444, F9c-14.
119. Unattributed; AE; 24 mm; illegible and completely worn; 1978 RN 434a, C4c-8.
120. Unattributed; AE; 29-30 mm; illegible and completely worn; 1978 RN 434c, C4c-8.
121. Unattributed; AE; 23 mm; illegible and completely worn; 1978 RN 434d, C4c-8.
122. Unattributed; AE; 24 mm; illegible and completely worn; 1978 RN 434e, C4c-8.
123. Unattributed; AE; 6.42 g; 21.5 mm; illegible and completely worn; RN S11a
124. Unattributed; AE; 8.22 g; 20 mm; illegible and completely worn; RN S11b.
125. Unattributed; AE; 7.88 g; 22 mm; illegible and completely worn; RN S11d.
126. Unattributed; AE; 10.40 g; 23 mm; illegible and completely worn; RN 09a (a).
127. Unattributed; AE; 7.90 g; 22 mm; illegible and completely worn; RN 09a (b).
128. Unattributed; AE; 24 mm; illegible and completely worn; 1978 RN 437, C4c-15.
129. Unattributed; AE; 21 mm; illegible and completely worn; 1978 RN 440, G12a-4.
130. Unattributed; AE; 23 mm; illegible and completely worn; 1978 RN 441a, E6b-9.
131. Unattributed; AE; 22 mm; illegible and completely worn; 1978 RN 441b, E6b-9.
132. Unattributed; AE; 23 mm; illegible and completely worn; 1978 RN 441c, E6b-9.
133. Unattributed; AE; 32 mm; illegible and completely worn; 1978 RN 452, E7a-8.
134. Unattributed; AE; 26 mm; illegible and completely worn; 1978 RN 453, E6b-1
135. Unattributed; AE; 26 mm; illegible and completely worn; 1978 RN 454a, E6b-8.
136. Unattributed; AE; 22 mm; illegible and completely worn; 1978 RN 454b, E6b-8.
137. Unattributed; AE; 20 mm; illegible and

completely worn; 1978 RN 455, C4c-11.

138. Unattributed; AE; 21 mm; illegible and completely worn; 1978 RN 456, C4c-12.
139. Unattributed; AE; 26 mm; illegible and completely worn; 1978 RN 457a, E6b-2.
140. Unattributed; AE; 26 mm; illegible and completely worn; 1978 RN 457b, E6b-2.
141. Unattributed; AE; 23 mm; illegible and completely worn; 1978 RN 461, S12a-6.
142. Unattributed; AE; 26 mm; illegible and completely worn; 1978 RN 464, E7a-4.
143. Unattributed; AE; 24 mm; illegible and completely worn; 1978 RN 465, E7a-2.
144. Unattributed; AE, may not be Roman; 19.5-20 mm; illegible and completely worn; 1978 RN 458, E6b-8.
145. Unattributed; AE, may not be Roman; 25 mm; illegible and completely worn; 1978 RN 448, L9d-3.
146. Unattributed; AE; may not be Roman; 15 mm; illegible and completely worn; 1978 RN 451, K11 surface.
147. Unattributed; AE, may not be Roman; 18 mm; illegible and completely worn; 1978 RN 460, F9c-14.
148. Unattributed; AE, probably not Roman and may be Islamic; 5.40 g; 23 mm; One side with faint decoration(?); other side lost; 1980 RN 512, E7c-1
149. Unattributed; AE; 4.35 g; 24.5 mm; illegible and completely worn, may be Islamic as from an Islamic era locus; 1982 RN 703, G8b-38.
150. Unattributed; AE; 19 mm; illegible and completely worn, may be Islamic as from an Islamic era locus; 1978 RN 436; F9c-20.
151. Unattributed; AE, but possibly not a coin; 1.15 g; 21 mm; illegible and completely worn; 1980 RN 541b, E6a-9.
152. Unattributed; AE, but possibly not a coin; 3.94 g; 26 mm; illegible and completely worn; 1980 RN551a, E6c-1.
153. Unattributed; AE, but possibly not a coin; 2.89 g; 24.5 mm; illegible and completely worn; 1980 RN 551b, E6c-1.
154. Unattributed; lead token; 4.19 g; 20 mm; illegible and completely worn; 1980 RN 542a, E6a-8.
155. French naval tunic button; AE; 3.58 g; 24 mm; Obv. modern anchor; Rv. knob, raised relief text with word "Paris" legible, rest of legend faint; 1978 RN 446, B4a-5.

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