
Ancient anchors from Malta and Gozo

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In 2011, the national archaeological collection managed by Heritage Malta included 24 lead anchor stocks. They are the remains of ancient wooden anchors used on boats that sheltered in the harbours and bays of the Maltese Islands. This paper includes a gazetteer documenting these stocks with the aim of highlighting their value to maritime archaeology and to create a tool that will facilitate further study.

Anchors form part of the basic equipment of seagoing vessels. Although they are used to 'attach' a vessel to the seabed, an anchored boat is not stationary as it moves with the wind and currents. Anchors can also be deployed whilst underway to increase stability and manoeuvrability in bad weather. Furthermore, their use as votive offerings (Frost 2001) and inscriptions of names of deities on stocks highlight their importance to ancient seafarers.

One cannot be sure how many anchors ships carried. Numbers found differ from site to site. For example, the second millennium BC Ulu Burun shipwreck was carrying 24 stone anchors but it is not certain how many were carried as cargo (Pulak 1998). The seventh century AD Yassi Ada shipwreck carried 11 anchors, indicating the necessity of carrying spares on board (Bass and van Doorninck 1982). Greek and Roman period ships may have carried between five and ten anchors (Beltrame 2002, 18).

From an archaeological perspective the value of lead anchor stocks has been underestimated. Many were found by sports divers and given to local heritage authorities without much contextual detail. These solitary objects do however have a story to tell. An ancient stock on the seabed accounts for the presence of one ship in the area. Its indicative value for maritime activity equals that of a cargo of amphorae on the seabed. Therefore the study of entire collections

and the placing of these in a broader context will help further our knowledge of the maritime activity within an area.

When undertaking such a study it is important to keep the following in mind:

- 1) There is a correlation between the popularity of dive sites and the discovery of anchor stocks.
- 2) Although many stocks were given to heritage authorities others were kept or melted down to produce diving weights. This distorts the picture of quantification and distribution.
- 3) Sedimentation in many Maltese bays has buried archaeological layers. Mattes of the seagrass *Posidonia oceanica*, that further conceal objects of archaeological interest, are also widespread.
- 4) The discovery of anchor stocks was not always well documented. Linking the stocks in the collection to reported discoveries depends on the interpretation of images and recorded dimensions when available. If this cannot be done they are referred to here as unprovenanced.

This paper covers anchors recovered and recorded by Heritage Malta up until December 2011.

Typology

The lead stocks and collars discussed below were components of one type of ancient wooden anchor. Others include wooden anchors with stone stocks and anchors that had wooden stocks filled with lead (Kapitän 1984, 36; Haldane 1984, 3), none of which have been found in Maltese waters and they are therefore outside the scope of this paper.

The use of lead stocks on wooden anchors is considered to be a Roman practice (Haldane 1990, 22). A lead stock found off the Portuguese coast provides the earliest date for this type of anchor. C¹⁴ analysis dates the wooden core to between the fifth and fourth century BC (Purpura 2003). The subsequent proliferation of lead stocks in the Mediterranean has been linked to the Romans gaining control of Spanish silver mines by the third century BC and the development of increasingly efficient mining techniques which produced lead as a by-product (Haldane 1990, 22). Lead stocks were used throughout the Roman period and the last securely dated one is from the third century AD (Haldane 1984, 13; Purpura 2003).

During this time lead stocks did not undergo major changes that could provide an accurate dating

tool. Given this and the fact that their use spanned hundreds of years, they are usually dated according to their archaeological context. Unfortunately, a number of the stocks held by Heritage Malta do not have any secure provenance and therefore, no context. Others, such as those found at Ghallis, Delimara and Swali (Fig. 2) are the only objects recorded from these areas and cannot be cross-dated with other finds. In effect, they have a geographical context but not an archaeological one. Those from Salina, St. Paul's Bay, Qawra, Ramla, Xlendi and Comino come from areas where other objects of varying dates were discovered, again making it difficult to cross-date them.

However, some aspects of lead stocks can be used to indicate a relative position in their evolution (Kapitän 1996, 577). There are currently two main typologies that are used to differentiate lead stocks, one proposed by Kapitän and another by Haldane, as illustrated in figure 1.

Kapitän distinguishes four types of stocks used on wooden anchors (Fig. 1): stone, wooden ones with a lead core, lead stocks and wooden stocks with a lead coating (Kapitän 1984, 36-38). The latter two, his types 3 and 4 are the subjects of this discussion. Within type 3 i.e. lead stocks, Kapitän recognises four sub-types (Kapitän 1984, 38). Type 3a are lead imitations of

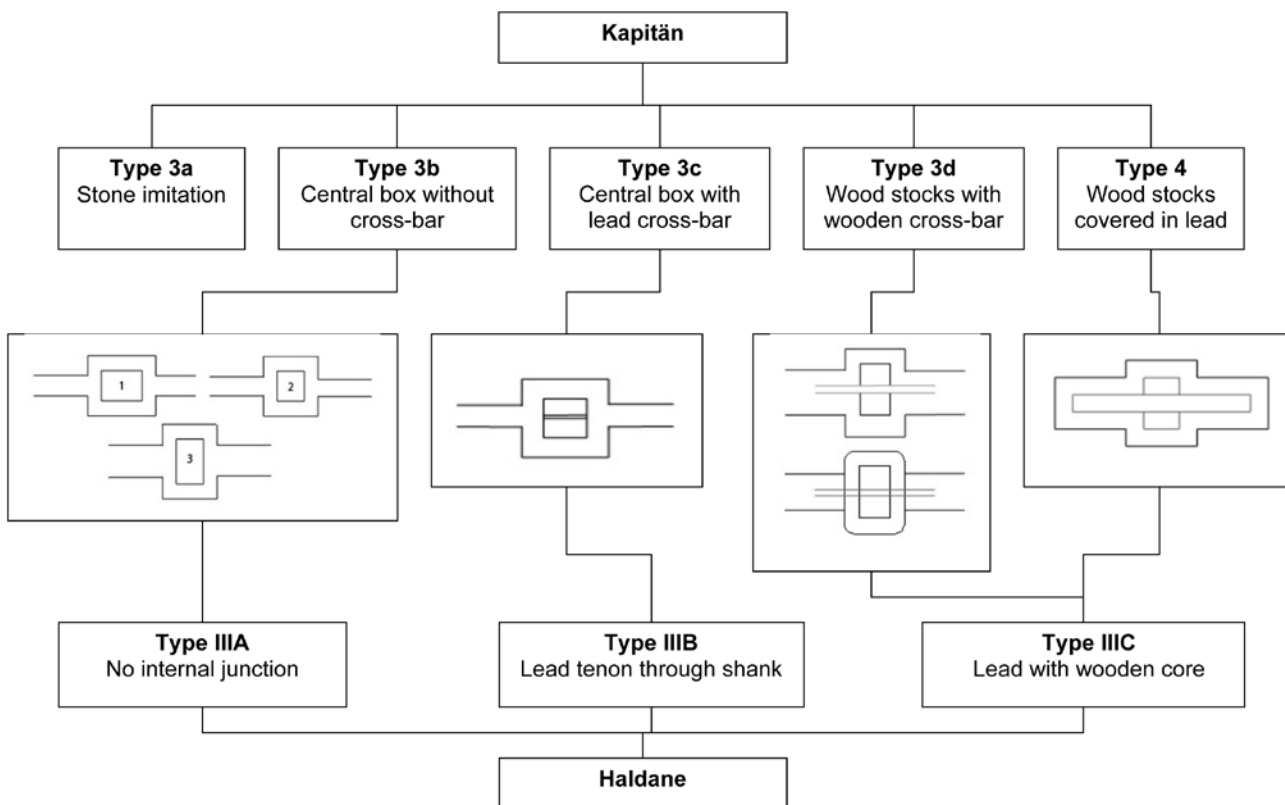


Figure 1. Comparison of the two main typologies of lead stocks by Kapitän and Haldane.

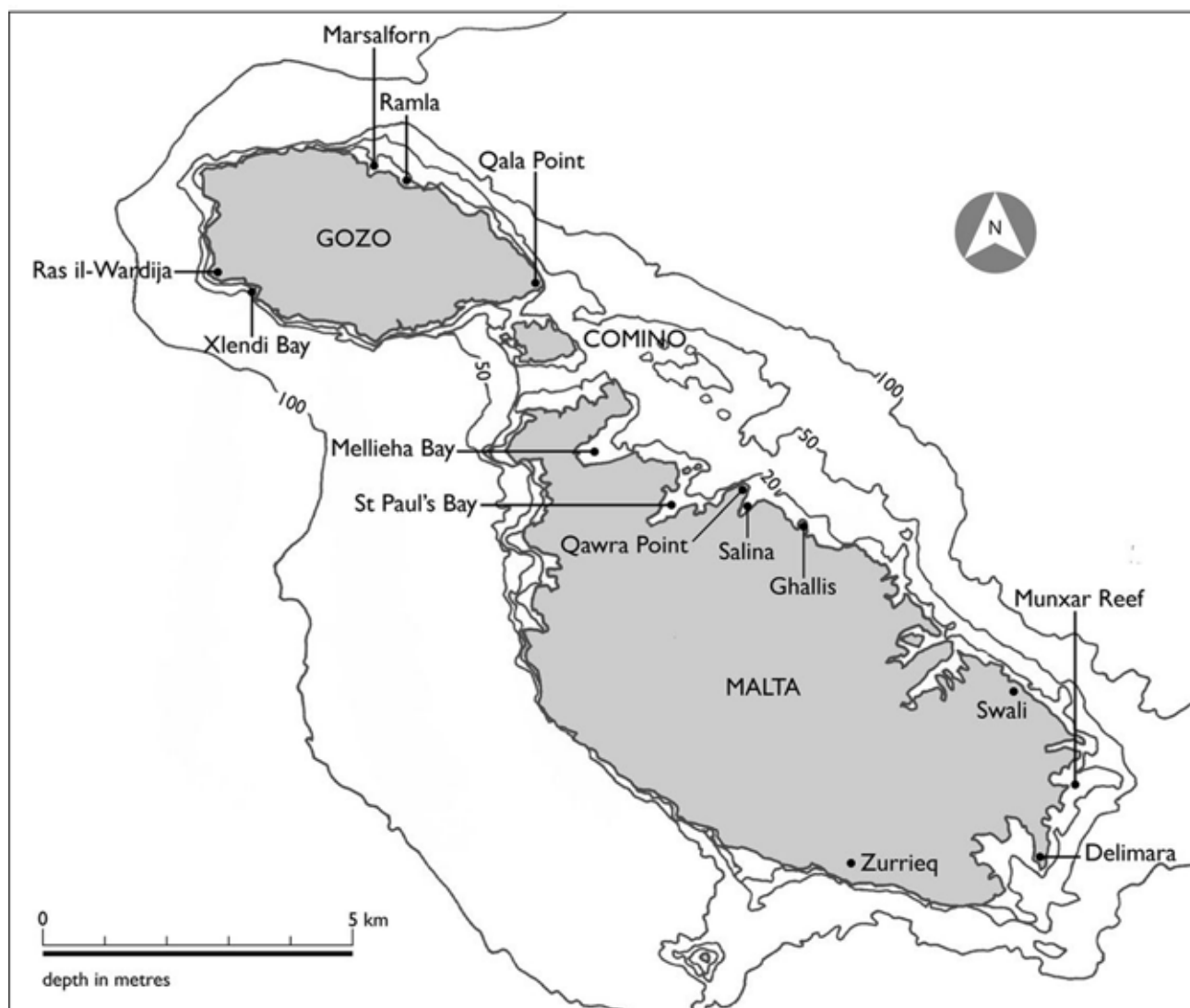


Figure 2. Location of principal sites mentioned in the text (drawn by Renata Zerafa and Maxine Anastasi).

stone stocks. Type 3b includes lead stocks that do not have a cross-bar in the central box and are therefore not integrally linked to the anchor's shank. He further suggests that the orientation of the central box relative to the rest of the stock changed over time (Fig. 1) and that the final orientation was the most suitable for efficiently lifting the anchor off the seabed.

Type 3c are stocks that have a lead cross-bar in the central box (Kapitän 1984, 38). The cross-bar is an integral part of the stock showing that this type was cast onto the wooden shank during manufacture. Type 3d stocks had wooden cross-bars to attach the stock and the shank instead of lead ones (Kapitän 1984, 38). They are identified by the holes in the side of the central box that extend into the arms depending on the length of the original wooden tenon. These stocks were also cast onto the wooden shank and not attached later.

The outside of the central boxes of type 3d stocks can be rectangular or rounded. Rounded edges may have been a technological development on the rectangular ones (Kapitän 1984, 38). Type 4 are wooden stocks with a lead coating. Kapitän considered these to be technologically advanced as the large wooden element offered more resistance to the physical stresses anchors were subjected to (Kapitän 1984, 38).

The second typology is Haldane's. His type IIIA is solid lead with no inherent attachment to the wooden shank (Haldane 1984, 3), comparable to Kapitän's type 3b. Haldane type IIIB are solid lead stocks with a lead tenon (Haldane 1984, 3), equivalent to Kapitän's type 3c. Finally, Haldane type IIIC stocks are lead stocks with a wooden core (Haldane 1984, 3). Haldane does not distinguish between stocks with a significant wooden element or stocks that only have

a wooden attachment bar. Therefore, this type IIIC includes stocks of Kapitän's type 3d and 4.

Lead stocks were made by pouring molten lead into a mould of sand and/or clay or even cut into the ground (Haldane 1984, 27; Gargiullo and Okely 1993, 79). Any markings, such as letters, astragals or images were made by pressing the marker into the side of the mould (Haldane 1984, 27, 28). The shaft with either a hole to allow a lead cross bar to form or with a wooden attachment already running through it was lowered into the mould and the stock cast around it (Haldane 1984, 27). Pieces of stone, pottery or other material would have been placed under the wooden arms of Kapitän type 4 and Haldane type IIIC stocks to keep them level (Haldane 1984, 29).

Gazetteer

Below is a description of the lead anchor stocks managed by Heritage Malta. They are described according to Kapitän's typology, which is more detailed. This does not necessarily correspond to their chronological order that is still unknown due to lack of information about their archaeological contexts.

Two stocks were used in reconstructions of ancient wooden anchors. One is in the Maritime Museum and the other is in the Gozo Museum of Archaeology. The first uses a stock discovered off Delimara in 1966 (DEL 1967/M/1, Cauchi 1967, 7). It is small with a total length of 1.02 m. The second uses a 1.13 m long stock (XLN/M/32546) and collar found at Xlendi in 1961 (Zammit 1961, 7). Both are currently part of reconstructed display anchors so it was not possible to determine their type.

Kapitän 3c: stocks with a central cross-bar

KEM 1996/M/1

This stock is 1.6 m long and has a rectangular central box that is 17 cm long and 12 cm wide. One of the arms is bent. It is labelled as found on the seabed in Comino in 1996 and is now kept at the National Museum of Archaeology.

GLS 1963/M/1

This stock, currently on display at the Maritime Museum, was recovered off Għallis in 1963 (Zerfa 1963, 7). It is 1.78 m long and one of the arms is bent. The central box is 22 cm long and 15 cm wide (Fig. 3d).

SAL 1962/M/1

This stock discovered in Salina Bay in 1961 (Zammit 1962, plate 6) is 1.88 m long with one bent arm. The box is 20 cm long and 15 cm wide. An interesting feature is that deterioration of an arm shows that at least one part is hollow with a central longitudinal partition. This indicates it was not cast of solid lead, or even around a single wooden core (Fig. 3e). It is on display at the Maritime Museum.

SAL 2004/M/1

This large stock measures 2.25 m in length with a central box that is 37 cm long and 29 cm wide. It was found off Salina Bay in 2004 and can now be seen at the Maritime Museum. It has the words ISIS cast onto one arm and SARAPIS on the other.

UNP/M/504

This stock may be one of two discovered in Mellieħa Bay in 1965 (Mallia 1965, 5). It is on display at the Maritime Museum and is 1.25 m long and has a rectangular box that is 16 cm long and 11 cm wide. Four astragals or letters are cast onto one of the arms but are difficult to decipher under marine growth (Fig. 4a).

UNP/M/506

It is not known where this stock was found but its dimensions indicate that it may be the one found off Delimara in 1965 (Mallia 1965, 5). Currently on display in the Maritime Museum, it is 1.29 m long and has a central box 20 cm in length 12 cm in width (Fig. 4c).

UNP/M/ 507

This is a small stock with a total length of 1.03 m and a central box 11 cm in length and 8 cm in width. It is on display in the Maritime Museum and may be the stock discovered in Ramla bay in 1962 (Zammit 1962, 7) (Fig. 4d).

UNP/M/7/1

This lead stock is potentially one of the artefacts found on the Munxar reef and obtained by the Maritime Museum under a temporary amnesty to private individuals in the 1990s. It is 1.64 m long and the central box is 18 cm long and 11 cm wide (Fig. 4g).

UNP/M/505

This stock is still unprovenanced but can be seen at the Maritime Museum. One of the arms is bent and

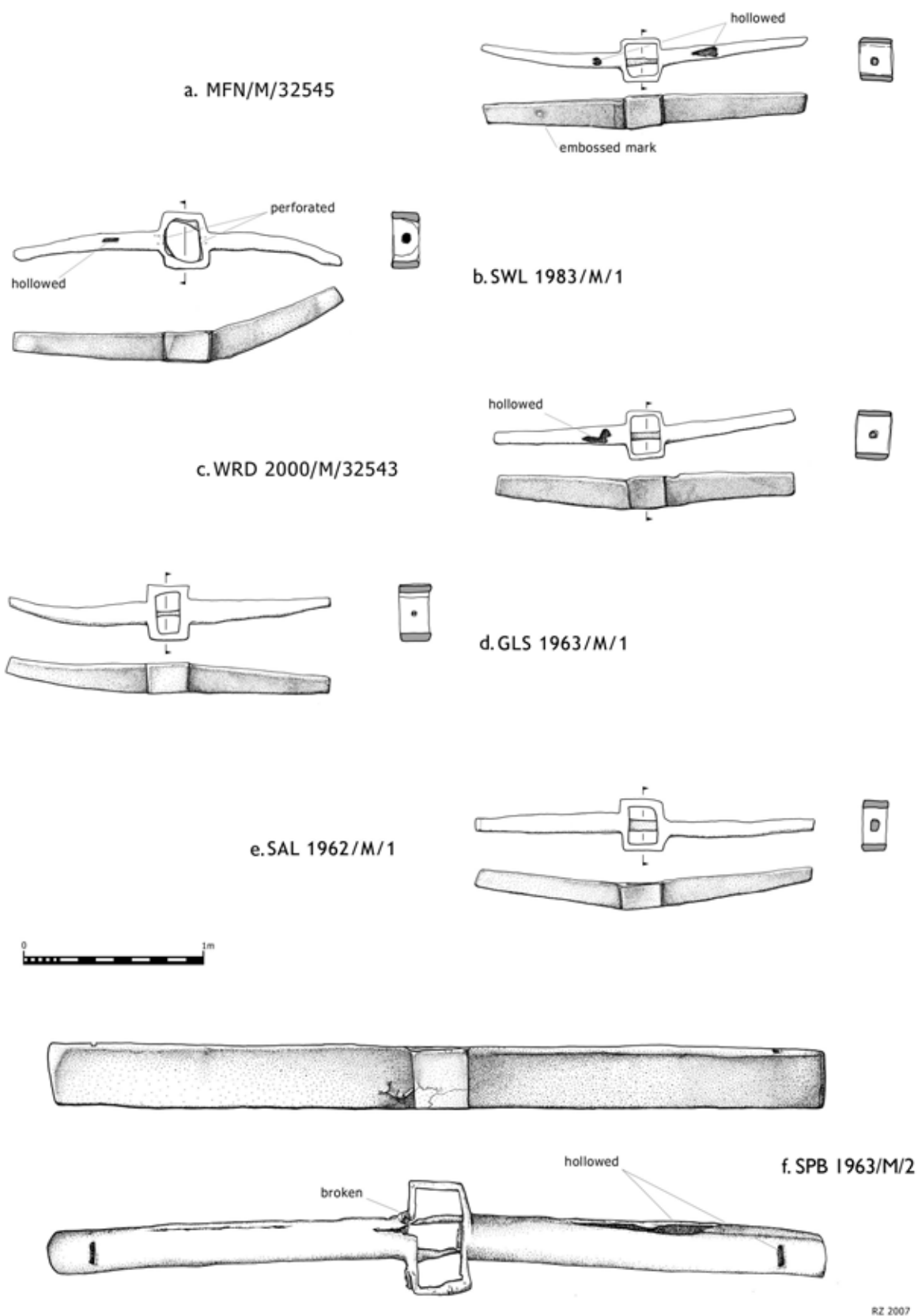


Figure 3. A selection of lead anchor stocks (drawn by Renata Zerafa).

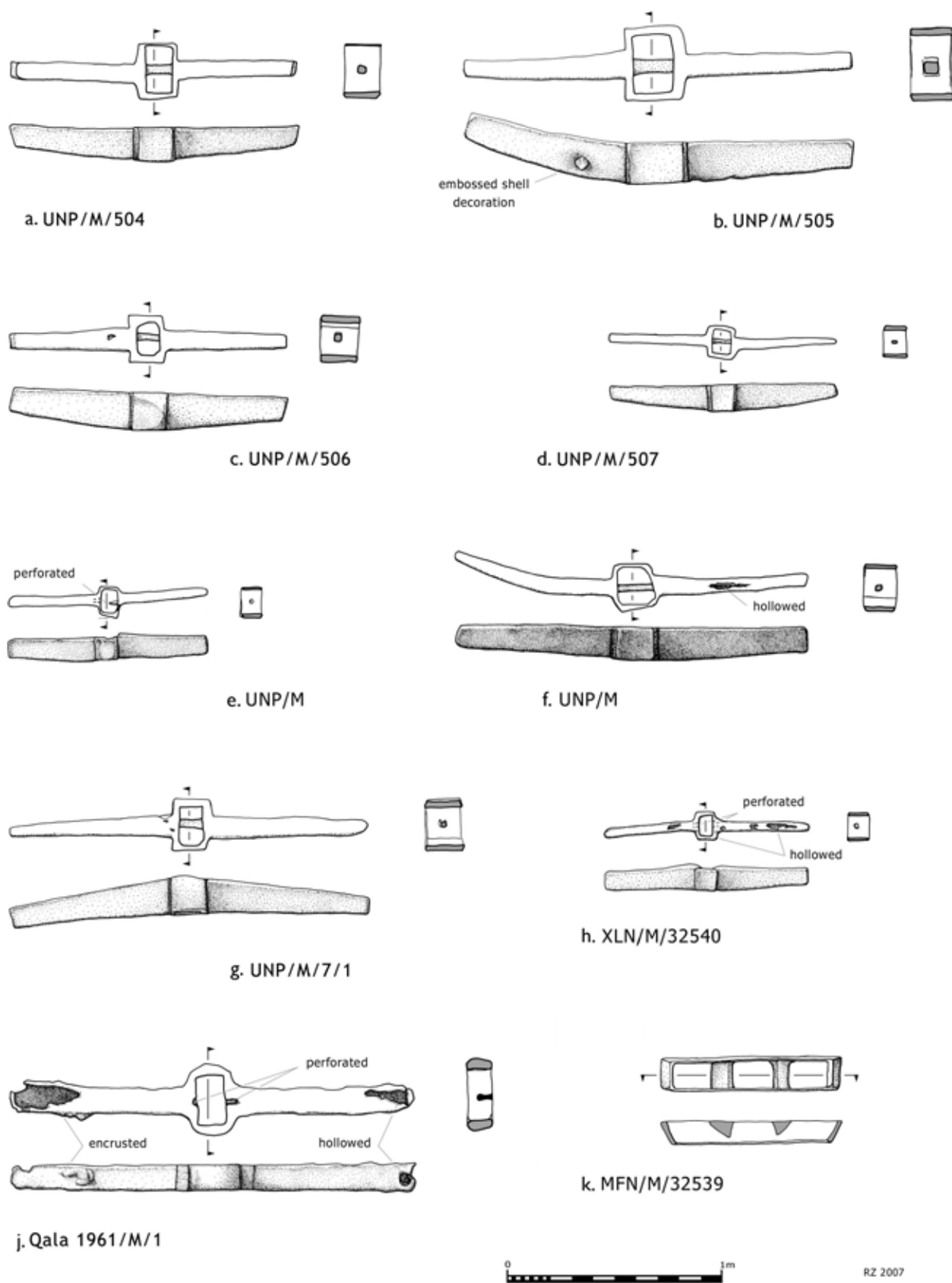


Figure 4. A selection of lead anchor stocks (drawn by Renata Zerafa).

has a shell cast on one side and four letters or astragals on the other. Another shell was cast on to the second arm. It is 1.77 m in length with a large central box that is 27 cm long and 19 cm wide (Fig. 4b).

UNP/M/ 508

This stock is held in the reserve collection of the National Museum of Archaeology. It is 1.85 m long with a central box that measures 22 cm in length and 18 cm in width. Both arms are bent and one has four astragals. An unusual feature is a hollow groove running down the centre of the cross bar.

MFN/M/32545

This stock, on display in the Gozo Museum of Archaeology, was found in Marsalforn in 1961 (Zammit 1961, 7) and is 1.81 m long with a central box 23 cm wide and 20 cm long. One of the arms is slightly bent (Fig. 3a).

WRD 2000/M/32543

This stock, discovered off Ras il-Wardija in 2000, is now on display at the Gozo Museum of Archaeology. It is 1.67 m long and has one bent arm. The central box is 21 cm wide and 15 cm long (Fig. 3c).

XLN/M/32542

This stock measuring 1.18 m in length is the largest of three found in Xlendi Bay (Zammit 1961, 7). The central box is 8 cm wide and 13 cm long. It was originally reported to have four letters cast on its side (Zammit 1961, 7). However, there are traces of five features on one side and four on the other of the central attachment. These features do not appear to be letters but may be astragal bones from a *iactus Veneris*, or a lucky throw in the Roman game of *Tali* (Radić Rossi 2005, 34).

UNP/M

This lead stock measures 1.64 m in length. It has one bent arm and a central box that is 19.5 cm wide and 13.5 cm long. Its provenance is still unknown but it is on display in the Gozo Museum of Archaeology (Fig. 4f).

Kapitän 3d: lead stocks with a wooden cross-bar

SWL 1983/M/1

This stock was found off Swali in 1983 (Zerafa 1983, 1) and is on display at the Maritime Museum. It is 1.81 m in length and both arms are bent. The central box is quite large and measures 23 cm in length and 19 cm

in width with hollows on either side for the wooden lynchpin (Fig. 3b).

UNP/M/NMA 7/2

This stock, currently on display in the Maritime Museum, is possibly another from the Munxar reef. It is 1.18 m long and has a central box that is 13 cm long and 9 cm wide and rounded on the outside. A longitudinal partition in the arms shows that they are at least partly hollow.

UNP/M/502

This stock is currently part of the reserve collection of the Maritime Museum. It was approximately 1.5 m long but is now broken into two pieces. A small lead bar is kept with the stock but it is unclear if or how it formed part of it.

XLN/M/32540

This stock, on display in the Gozo Museum of Archaeology, is another from Xlendi (Zammit 1961, 7). It is 94 cm long with a central box that is 6.8 cm wide and 10.5 cm long. Holes in the sides of the box show that the wooden tenon extended 20 cm into each arm (Fig. 4h).

UNP/M

With a total length of 91 cm and a central box that is 8 cm in width and 11 cm in length, this stock is one of the smaller examples. It has a piece of partially decayed lead on one side of the box just in front of the cavity left by the wooden lynchpin. The lead would have seeped into any space left between the shaft and the tenon during casting. It can be seen in the Gozo Museum of Archaeology (Fig. 4e).

Kapitän 4: Lead stocks with a wooden core

QWR 1967/M/1

This small stock is now in two pieces. Its complete length is 62 cm, the central box is rectangular and is 9 cm long and 5 cm wide. It was retrieved off the coast of Qawra in 1967 (Cauchi 1967, 8) and is held in the reserve collection of the National Museum of Archaeology.

QALA 1961/M/1

This stock, currently on display at the Maritime Museum, was discovered off Qala in 1961 (Zammit 1961, 7; John Ripard *pers. comm.*) Deterioration of the lead has revealed hollow flukes demonstrating

that the anchor was cast around a wooden core that no longer survives. A raised patch on one of the arms may be a shell that was cast on to the lead. The stock is 1.83 m long. The central box is 23 cm long and 13 cm wide and is rectangular on the inside with rounded outer edges (Fig. 4j).

SPB 1963/M/2

This is an exceptionally large example. Measuring 4.28 m in length, it is the largest lead stock found anywhere in the world with an estimated weight of over one ton (Purpura 2003). It is hollow and transversal crossbars run the length of both arms. This indicates that it was made by casting lead around a wooden core, which would have been perforated to allow molten lead to seep through. These would cool to form strengthening and reinforcing lead bars through the wooden core along the length of both arms. The central box is 26 cm long and 59 cm wide. The cross bar is also hollow, suggesting that it too was made of lead cast on wood. This enormous stock was found off St. Paul's Bay in 1962 and raised in 1963 (Zammit 1963, 7, fig. 6) (fig. 3f) and it is now on display at the Maritime Museum.

Collars

In addition to the stocks some lead collars that were used to reinforce the attachment of the wooden arms to the central shaft have been discovered. All have three compartments indicative of two-armed anchors.

SPB 1963/M/1

This collar was found in 1963 at St Paul's Bay in the vicinity of the large anchor stock (SPB 1963/M/2) (Zammit 1963, 7). It is 84 cm long and a maximum of 18 cm wide and is currently on display at the Maritime Museum.

MFN/M/32539

This collar measures 83 cm in length and 8.8 cm in width. It was originally thought to have come from Marsalforn but may be the collar that was found with the stock at Ramla Bay in 1962 (George Azzopardi *pers. comm.*; *Times of Malta* 11th October 1962, 9) (Fig. 4k). It can be seen in the Gozo Museum of Archaeology.

UNP/M/ 503

This is a very small example, with a total length of 29 cm. Its provenance is uncertain but it may have been found in Zurrieq (Manuel Magro-Conti *pers.*

comm.). It is in the reserve collection at the Maritime Museum.

Discussion

The above shows that the majority of known stocks are the Kapitän 3c or Haldane IIIB type. Furthermore, elements that Kapitän describes within the remit of one subtype are also found in others. For example, the rounded outer edges of Qala 1961/M/1 that he describes in his type 3d but which also appear in a type 4 stock.

An interesting feature of a stock with a lead cross-bar (SAL 1962/M/1) is that it also appears to have a significant wooden element. Deterioration of the lead has shown that it is at least partly hollow on the inside and has longitudinal partitions inside the arms. This could be the result of using organic material as filler for economical purposes (Haldane 1984, 29; Purpura 2003). Deterioration was evident in one longitudinal half of the arms and it is unknown if the other half is solid lead or is also hollow. Further investigation using non-destructive imaging techniques may yield interesting clues about lead stock manufacture.

In light of the above, a discussion about the weight of these stocks will be speculative to some degree. However, the MFN/M/32545 and Ghallis 1963/M/1 stocks were thought to weigh approximately 500 lbs (227 kg) on recovery (Zammit 1961, 7; Zerafa 1963, 7). They are large examples and are representative of the upper limits of the ones described here. Others including KEM 1996/M/1, UNP/M/NMA/7/1, UNP/M/505, UNP/M/508, WRD 2000/M/32543, UNP/M and SWL/1983/M/1 are of a comparable size while SAL1962/M/1 and SAL 2004/M/1 are slightly larger. A smaller stock, XLN/M/32546, was estimated to weigh approximately 150 lbs (68 kg) (Zammit 1961, 7). Similar sized ones include XLN/M/32542, XLN/M/32540, UNP/M/504, UNP/M/506, UNP/M/NMA/7/2 and UNP/M.

Distribution

The Maltese islands are indented with bays and harbours which offer protection from the prevailing northwesterly winds although in the winter some are exposed to northeasterly storms. However, a few areas

such as Marsa, Burmarrad, French creek and Mistra do offer all-weather protection and would have been ideal for vessels wintering at the islands.

A distribution map of the anchor stocks (Fig. 2) shows that the majority were found in sheltered bays that may have been regularly used as anchorages. Others from Munxar reef, Delimara Point and Ras il-Wardija, were found just outside such spots. The lack of stocks from other bays should not be taken to imply a lack of maritime activity in these areas since all the stocks described here were chance finds not the results of systematic research. For example, well-sheltered harbours like Marsa and Grand harbour are still heavily used making research there difficult. Heavy sedimentation that has affected the islands' deep submerged valleys has also concealed archaeological material.

An interesting point is the location of the enormous stock found in St. Paul's Bay. Such large stocks are impractical to handle on board a vessel and instead may have been mooring points for marine installations (Purpura 2003). It would be interesting to investigate if any traces of such installations still exist in the area.

Conclusion

It has been suggested that a low incidence of ancient shipwrecks in Maltese waters reflects a low degree of maritime activity (Atauz 2008). The archaeological value of an anchor stock refutes this and not all visiting vessels would have lost an anchor. Neither have all anchors recovered by private individuals been reported to the authorities. It is possible to conclude that the pieces in the national collection are representative of a steady maritime flow in antiquity. Their distribution points to the use of these maritime spaces by ancient seafarers who called into Malta to trade, for shelter from adverse weather or simply to wait for the ideal wind to continue their journey.

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