

bradscholars

Organic residue analysis of Red Lustrous Wheelmade Ware vessels traded across the eastern Mediterranean during the Late Bronze Age

Item Type	Thesis
Authors	Steele, Valerie J.
Rights	<p>
The University of Bradford theses are licenced under a Creative Commons Licence.</p>
Download date	2026-03-10 22:23:31
Link to Item	http://hdl.handle.net/10454/5519

2. Red Lustrous Wheelmade Ware – the background

Red Lustrous Wheel-made ware (RLWm) is a very distinctive transport or storage ware in the Late Bronze Age (LBA) pottery repertoire of the eastern Mediterranean. Its rarity combined with its wide distribution is unique among LBA ceramics (Eriksson, 1993, 5; Knappett, 2000). The ware was predominantly in use in tombs and temples and rarely in domestic contexts, for about three hundred years, from c1500 BC to c1200 BC (Eriksson, 1993, 93, p147; Knappett *et al.*, 2005), although it is possible that the lack of RLWm ware from domestic contexts is due to the bias of excavators, particularly in the past, towards tomb sites. Wherever it has been excavated it has been classed as “foreign” or “exotic” (Eriksson, 1993, 5; Nordstrom & Bourriau, 1993, 184). No production centre has ever been found and where RLWm ware vessels were made and what they were used for remain the two most significant questions to be answered in the study of the ware (Eriksson, 1993, 1; Knappett, 2000; Knappett, 2002; Knappett *et al.*, 2005).

2.1 Research up to 1993

Writing in her 1993 monograph on RLWm ware Kathryn Eriksson states that, “Questions surrounding its place of origin and manufacture have been a controversial issue for scholars for nearly a century.” (Eriksson, 1993, 5). In the 1890s archaeologists investigating New Kingdom cemeteries in Egypt started to excavate examples of RLWm ware spindle bottles (see below, p22-25) from tombs. A few examples had also been recorded from Cyprus, Palestine,

Lebanon, Syria and Crete and spindle bottles started to be recorded as a distinct group. Because the majority of examples available at this time came from Egypt, some archaeologists believed the ware was made there. Egyptologists quickly dismissed this theory, recognising the ware as foreign and noting its association with Cypriot fabrics such as Base-Ring (BR) ware. Cypriot archaeologists also believed RLWm ware to be foreign, mostly because of its rarity on Cyprus (Eriksson, 1993, 6).

The position of the RLWm ware spindle bottle as an imported ware across many regions of the eastern Mediterranean made it interesting as an indicator of communication and trade between different areas. The dates of its occurrence and its source were of particular importance in this context. For example many spindle bottles were found in New Kingdom tombs dated to the reign of Thutmose III. This led Petrie to maintain that the presence of these vessels in a tomb indicated a date during Thutmose's reign (Petrie, 1907, 26). However this interest in the date and origin of RLWm ware was shared by only a very few archaeologists and in general little attention was given to it (Eriksson, 1993, 6).

The ware was not described systematically until 1914 when Myres identified two forms; the spindle-shaped bottle and the lentoid flask (see below, p22-25). Because of the distinctive red fabric and finish he named it Wheelmade Red Ware. Myres also established chronological ranges for the ware in Egypt from c.1600-1350BC and on Cyprus from c.1400-1200BC (Myres, 1914, 41). Debate continued about its place of manufacture with Syria/Lebanon being the most

widely accepted source and Cyprus being ruled out completely by most archaeologists (Eriksson, 1993, 6-7).

In 1926, a major advance in the study of RLWm ware was made in Gjerstad's thesis, "Studies on Prehistoric Cyprus". He classified the pottery as Red Lustrous III, including four forms within this classification: the spindle bottle, two types of lentoid flask and the arm-shaped vessel (see below, p22-25) (Gjerstad, 1926, 201). He did not consider the arm-shaped vessels to be wheel-made but accepted them as part of the ware on the basis of fabric and finish. Gjerstad based his chronology of the ware on evidence from Askalon in Palestine and gave it a date range of Late Cypriot (LC) I – III (for notes on dating see Appendix 1) (Gjerstad, 1926, 277). He tentatively classified RLWm ware as Syrian, also suggesting Cilicia in southern Turkey and "some not yet fully explored region" as possible sources (Gjerstad, 1926, 323-324).

During the period up to the Second World War more examples of RLWm ware were excavated in Syria and Turkey and particularly on Cyprus. The new finds in Turkey extended the distribution of the ware northwards and seemed to support a north Syrian origin for the pottery. For the first time Cyprus was also seriously considered as a source for the ware (Eriksson, 1993, 7).

In 1940, Sjöqvist renamed the ware "Red Lustrous Wheel-made Ware" and identified several new forms including two forms of spindle bottle and two types of lentoid flask (Sjöqvist, 1940, 51-54). Sjöqvist did not consider Cyprus as a possible place of manufacture for RLWm ware as he felt the shapes were too

advanced to have been produced by Cypriot potters during the LBA (Sjöqvist, 1940, 88). When tests for firing temperatures showed that the ware had been fired at 900°C, higher than any other Cypriot pottery from the LBA, this confirmed his opinion that the ware could not have been manufactured in Cyprus (Eriksson, 1993, 9).

North Syria was generally considered by most archaeologists to be the most likely source of the pottery. For example the number of arm-shaped vessels excavated from Boğazköy (Hattuşa) in central Turkey, the capital of the Hittite Empire during the LBA, led Bittel to carry out a study on RLWm ware arm-shaped vessels (Bittel, 1957, 33-42). He discovered that the long arm-shaped vessels were found in contexts dating to the 14th and 13th centuries BC while the short version was found in 15th century contexts. In north Syria and Cyprus the arm-shaped RLWm ware vessels came from late 15th to 14th century contexts. Despite the quantity found in Boğazköy, these vessels were not a local ware and the same vessels found on Cyprus were also considered to be foreign there. The origin of these vessels had to be an area in contact with both the Hittite Empire and Cyprus and Bittel proposed northern Syria, despite the small quantity of RLWm ware found there, or possibly Cilicia (Bittel, 1957, 33-42).

During the 1960s Merrillees proposed that the ware might have been made in two centres, Cyprus and Syria, although he felt that the evidence was too ambiguous to provide a definite answer (Merrillees, 1963), and he included RLWm ware in his study of Cypriot Bronze Age pottery in Egypt (Merrillees,

1968). During the latter study he discovered that the overwhelming majority of RLWm ware vessels found in Egypt were spindle bottles and noted that all but two of these were excavated from middle class/professional tombs of both men and women (Merrillees, 1968, 171). He gave a date range for the occurrence of the ware in Egypt from first sporadic appearances at the end of the Second Intermediate Period to a peak during the 18th Dynasty, in particular under Thutmosis III, disappearing by the reign of Thutmosis IV. In his chronological framework this related to the period LCIA to LCIIA on Cyprus (see Appendix 1).

Despite including RLWm ware in a book on Cypriot pottery, and concluding that the spindle bottle was modelled on BR ware bottles, Merrillees (1968, 171) felt that the origins of the ware were in Syria. He based this conclusion partly on the depictions of similarly shaped, red vessels in Egyptian tomb paintings from the reigns of Hatshepsut to Thutmosis III. These paintings always depict red spindle bottle type vessels in contexts showing Syrian or mixed Syrian/Aegean figures and he concluded that this indicated a Syrian origin (Merrillees, 1968, 171, 173). This conclusion fails to take into account his own assertion of the central role of Ras Shamra (Ugarit) on the north Syrian coast as an important link in trade between Cyprus and Egypt (Merrillees, 1968, ix). Merrillees also records the work that had been done on identifying the contents of RLWm ware spindle bottles. He notes the narrow necks and concludes that the contents must have been liquid and were probably always the same. He reports that tests done on the few visible residues left in spindle bottles from Egypt indicated that the contents were some kind of fat although he mentions a resinous deposit in a bottle from Ras Shamra (Merrillees, 1968, 122-123, 143, 170-171).

In 1969 Åström produced another short study of the ware in which he re-examined its distribution (Åström, 1969). By this time large amounts of RLWm ware had been excavated in Cyprus and Åström had identified more forms – bowls, jars, jugs and one tankard – which had only been observed there. He also noted the similarity of some of the pot-marks often present on RLWm ware vessels to signs in the Cypro-Minoan script. These discoveries led him to conclude that the ware could have been manufactured on Cyprus (Åström, 1969). At the same time he concluded that the inspiration for the ware was not Cypriot but a combination of Hittite, Syrian and Egyptian fabrics and shapes. He dated the occurrence of the ware on Cyprus to LCIB to LCIIC. He also recorded the results of attempts to analyse the contents of several spindle bottles using wet chemistry methods in which substances as diverse as sugars, bitumen, greasy or oily liquids and “a clayey substance” were identified. He reported that the brown residue in one spindle bottle was identified by three separate analysts as asphalt/bitumen, a reducing sugar and honey (Åström, 1969).

One of the earliest studies of the chemistry of RLWm ware fabric was done by Courtois (1971). She concluded that the fabric could not be Cypriot and speculated that it probably came from the area of Syria/Palestine or Syria/Turkey (Courtois, 1971, 176-177).

From this time until the early 1990s north Syria continued to be the area favoured by most archaeologists as the source of RLWm ware. This was despite the limited quantities and forms discovered in Syria. Most researchers

still considered the ware too advanced to have been manufactured on Cyprus. Connections were made with red polished wares from Egypt and Turkey although there are no possible shapes in these wares which could have been prototypes for RLWm ware forms (Eriksson, 1993, 12). The presence of arm-shaped vessels on Cyprus as well as in Turkey and Syria led to the conclusion that common religious rites were practised in all these areas and that this was evidence for the presence of merchants or artisans from the mainland on the island (Eriksson, 1993, 12-13). Further studies of the ware by Courtois and Courtois (1978, 258-259, cited Eriksson, 1993, 13) and of arm-shaped vessels in particular (Courtois 1979, 85-95, cited Eriksson, 1993, 13-14) led to the suggestion of upper Cilicia in Turkey as a manufacturing centre. The presence of arm-shaped vessels as indicators of a common religious ritual in Cyprus, Turkey and north Syria was also re-emphasised (Courtois 1979, 85-95, cited Eriksson, 1993, 13-14). This suggested commonality of ritual was taken to imply the existence of Hittite control or influence across these areas during the 14th – 13th centuries BC, the Hittites being the dominant power in the region at this time. It would at least indicate communication between these areas (Eriksson, 1993, 14).

The view that Syria was the source of RLWm ware continued to dominate the literature although the problems in actually locating this source were often mentioned by archaeologists (Eriksson, 1993, 14). Because of the high quality of the ware and its lustrous finish the contents of RLWm ware vessels were generally overlooked as an explanation for their wide distribution. On the basis that spindle bottles found in Egypt came from Syria, Bourriau speculated that

they may have contained aromatic resins (Bourriau, 1982, 130, cited Eriksson, 1993, 14). Resins were imported by the Egyptians in large quantities for use in perfumes and ointments and in the mummification process, and Syria was one area which supplied resins to Egypt to meet this demand (Bourriau, 1982, 130, cited Eriksson, 1993, 14).

During the 1980s large quantities of RLWm ware spindle bottles and arm-shaped vessels were excavated from both domestic and religious contexts at the site of Boğazköy. Müller-Karpe (1988) considered that the ware was not local to central Turkey and that it had been imported from Cilicia or north Syria. He felt that spindle bottles were imported as containers for an oil, resin or perfume not available in the Hittite capital and noted that the shape of the necks of these bottles was suitable for pouring small quantities of oil (Müller-Karpe, 1988, 48, cited Eriksson, 1993, 15-16).

Even on Cyprus RLWm ware continued to be considered as a foreign import and the origins of this distinctive pottery remained elusive. This was, and still is, partly due to its relative rarity compared with both local and imported wares wherever it is found (Eriksson, 1993, 17).

2.2 Research since 1993

Kathryn Eriksson's work on RLWm ware was published in 1993 and marked a turning point in the study of the ware. She studied the typology, chronology and distribution of the ware in detail and produced a catalogue of all pieces available at the time of her study including some copies of RLWm ware in local fabrics from Cyprus, 'Amuq, Turkey (always referred to as Anatolia by Eriksson), Egypt, Palestine and Syria.

She argued that RLWm ware had been found on Cyprus throughout the lifetime of the ware from LCIA:2 to LCIIIA:1 (see Appendix 1) (Eriksson, 1993, 4, 31, 140). Her catalogue also showed that all forms of RLWm ware vessels are represented in the Cypriot record, with the possible exception of one piece shaped like a BR ware juglet which was found in Palestine (Eriksson, 1993, 57, 138, 149). At the point when she compiled her catalogue 53.5% of all the vessels discovered had been excavated from Cypriot sites (Eriksson, 1993, 57, 138, 149) (see Appendix 2 for problems in quantification of pottery). By comparison only about 7% of the extant examples came from Syria and were mostly from coastal sites (Eriksson, 1993, 138 149). Only four of the eight forms are represented in the Syrian material and the majority of these are spindle bottles. She commented that this is "...a curious situation had it been manufactured there" (Eriksson, 1993, 149).

Shortly after the first appearance of RLWm ware in Cyprus the ware also begins to appear in Egypt, Palestine and Syria. Eriksson did not agree with Merrillees'

dating of the first occurrences in Egypt to the end of the Second Intermediate Period, but placed these occurrences in the 18th Dynasty (Eriksson, 1993, 97). In her opinion the majority of examples date from the reigns of Amenhotep I to Thutmosis III and very little RLWm ware is found in Egypt after this date. She noted that in Palestine, Syria and Lebanon RLWm ware first appears about the same time as in Egypt, but continues to be found on sites contemporary with 19th Dynasty after the ware has disappeared from Egypt (Eriksson, 1993, 97-98, 117-118, 149-151). From about 1400BC onwards, roughly contemporary with Šuppiluliuma I of the Hittite Empire and Amenhotep III and Akhenaten in Egypt, the main distribution of RLWm ware is further north into Turkey (Eriksson, 1993, 129, 149-151). Eriksson linked this change in distribution with changes in the balance of power between the Hittites and Egypt (Eriksson, 1993, 149-153).

She further observed that in Egypt RLWm ware vessels were almost exclusively spindle bottles while in Turkey both arm-shaped vessels and spindle bottles are present (Eriksson, 1993, 129). She also noted that in Syria/Palestine RLWm ware is limited to coastal sites or sites on main trade routes and suggests that this indicates sea-going transport to these areas (Eriksson, 1993, 105-106, 117-118).

Eriksson also made a study of the pot-marks present on more than a quarter of the vessels in the catalogue, many of which are similar to characters in the Cypro-Minoan script. This is seen as a supporting argument for the manufacture of RLWm ware vessels in Cyprus (Eriksson, 1993, 145-147). She also addressed the problem of pottery technology on Cyprus during the LBA.

BR ware, although hand-made, required a high degree of skill to manufacture and might be favourably compared with RLWm ware. In addition there are other parallels on Cyprus from both Middle Bronze Age (MBA) contexts (Red on Black and Red on Red wares) and later Iron Age sites (Black on Red ware). In fact Cyprus had a tradition of red polished wares going back to the Neolithic and RLWm ware could be considered as part of this tradition (Eriksson, 1993, 1-3).

Based on these considerations, Eriksson concluded that RLWm ware had been manufactured exclusively on Cyprus throughout the lifetime of the ware (Eriksson, 1993, 149).

Eriksson also looked at the contents and function of RLWm ware vessels. As the ware is rare by comparison with other contemporary fabrics it was probably only produced in small quantities at any one time and its frequent appearance in graves suggests it was a valuable item. Despite the attractive appearance of RLWm ware, and its distinctive shapes, she felt that the main value of the vessels was probably in their contents (Eriksson, 1993, 143). She also considered that the contents of the different shapes would probably always have been the same, i.e. spindle bottles would always have held the same commodity (Eriksson, 1993, 143). She reported Åström's and Merrillies' earlier observations on the contents of spindle bottles (see p11, 12). She also recorded one analysis using gas chromatography – mass spectrometry (GC-MS) which identified palmitic and stearic acids as the main components of the contents of a spindle bottle but this reference cannot be verified (Cariveau *et al.*, 1986, cited Eriksson, 1993, 143).

Although it is impossible to know exactly what the function of RLWm ware vessels was, Eriksson concluded that its occurrence mostly in graves and ritual contexts implies some 'special' function (Eriksson, 1993, 144). Certainly its use in burials implies a high value was placed on the vessels and/or their contents. Vessels are found in female, male and child burials although she noted a preference for placing the vessels near the head of the body and suggested a possible association with oil used for anointing the head (Eriksson, 1993, 144-145).

Research into RLWm ware continues to produce new discoveries. Since 1993 large amounts of RLWm ware have been excavated in Turkey and on Cyprus (see eg. Baker *et al.*, 1995; South, 1995; Knappett, 2002; South & Steel, 2007). The dating of sites in Turkey is being re-examined, producing a different picture of the distribution and date of RLWm ware in this area (Mielke, 2007). Examination of the distribution of RLWm ware is also raising new questions about its source and how it reflects the trading and political relationships across the LBA eastern Mediterranean (Todd, 2001; Kozal, 2003). New studies of the fabric and contents of RLWm ware vessels are also in progress (McGovern, 1997; Knappett, 2000; Knappett, 2002; Steele, 2004; Knappett *et al.*, 2005). The current results of this research are outlined below in the description of the pottery itself.

2.3 The pottery

2.3.i Distribution

RLWm ware is found on LBA sites across a large area of the eastern Mediterranean (fig. 2.1). Examples are catalogued from Nubia in the south to central Turkey in the north and from Syria in the east to Crete in the west. Traditionally it has been stated that this distribution changes over the course of the ware's three hundred year history (see above, p16). Up to about 1400 BC it is found in Cyprus and to the south and east, in Egypt, Syria and Palestine, and in these contexts it is often associated with Cypriot pottery such as BR ware and White Slip ware (Merrillees, 1968, catalogue; Kozal, 2003) (fig. 2.2a). After 1400 BC, with the rise of the Hittite Empire, RLWm ware is found in Cyprus and northwards into Turkey, with small amounts still appearing in Syria and Palestine (Eriksson, 1993, 133-134, 139-144) (fig. 2.2b).

Up to 1993, when Eriksson published her monograph on RLWm ware, over 50% of finds of RLWm ware had been made in Cyprus (Eriksson, 1993, 138, 139-144). In recent years the traditional theories about the distribution of RLWm ware and how this distribution changes over time have been called into question by new archaeological discoveries. One example was Seeher's excavation of the fill of large, artificial ponds in the Temple Area of the Upper City at Hattuša (now Boğazköy), Turkey, during 2000 – 2001 (Seeher, 2001; Seeher, 2002b).

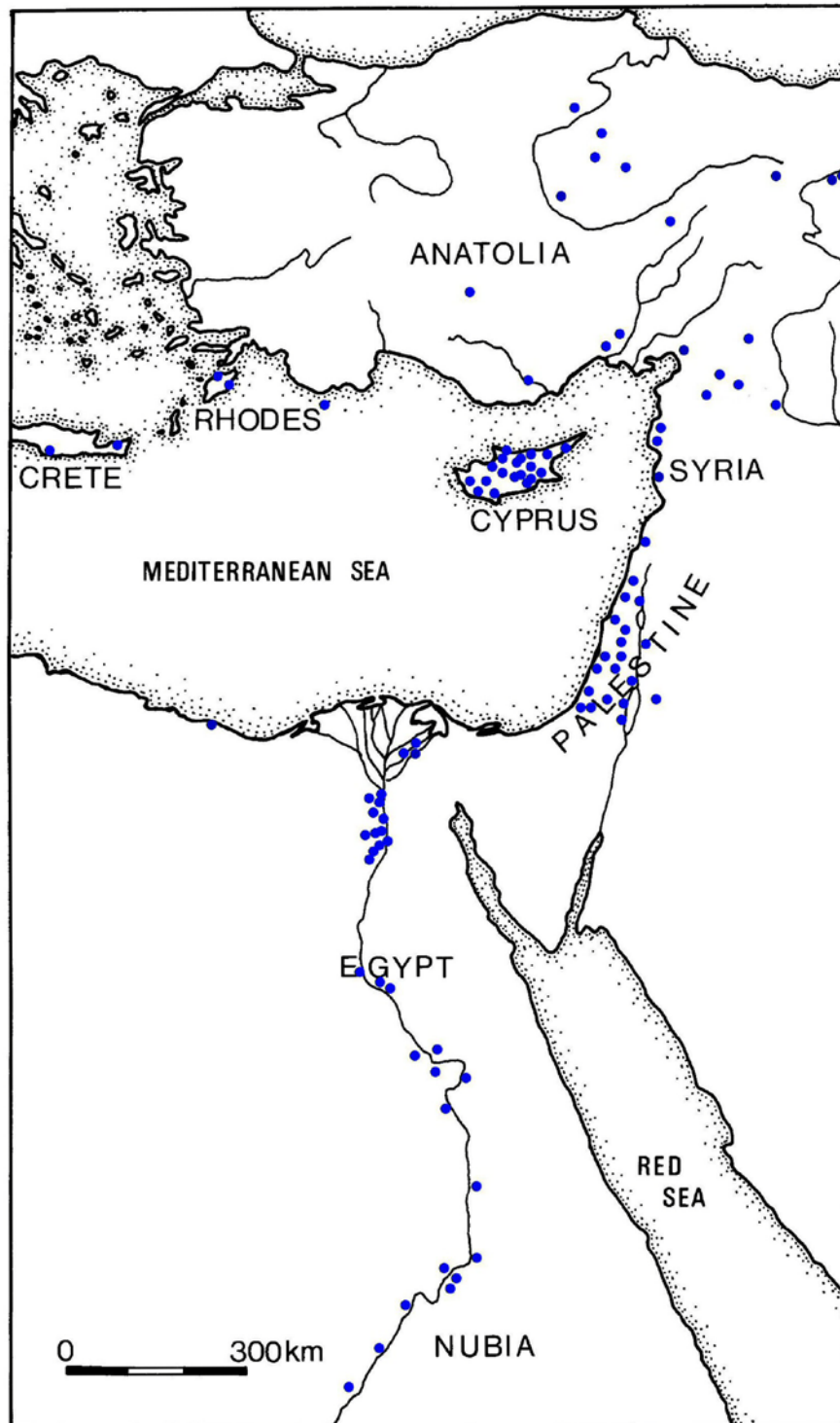


Figure 2.1: A map showing the find sites for RLWm ware across the eastern Mediterranean. Adapted from Eriksson (1991) figures 10.1 and 10.2 and Eriksson (1993) figure 1.

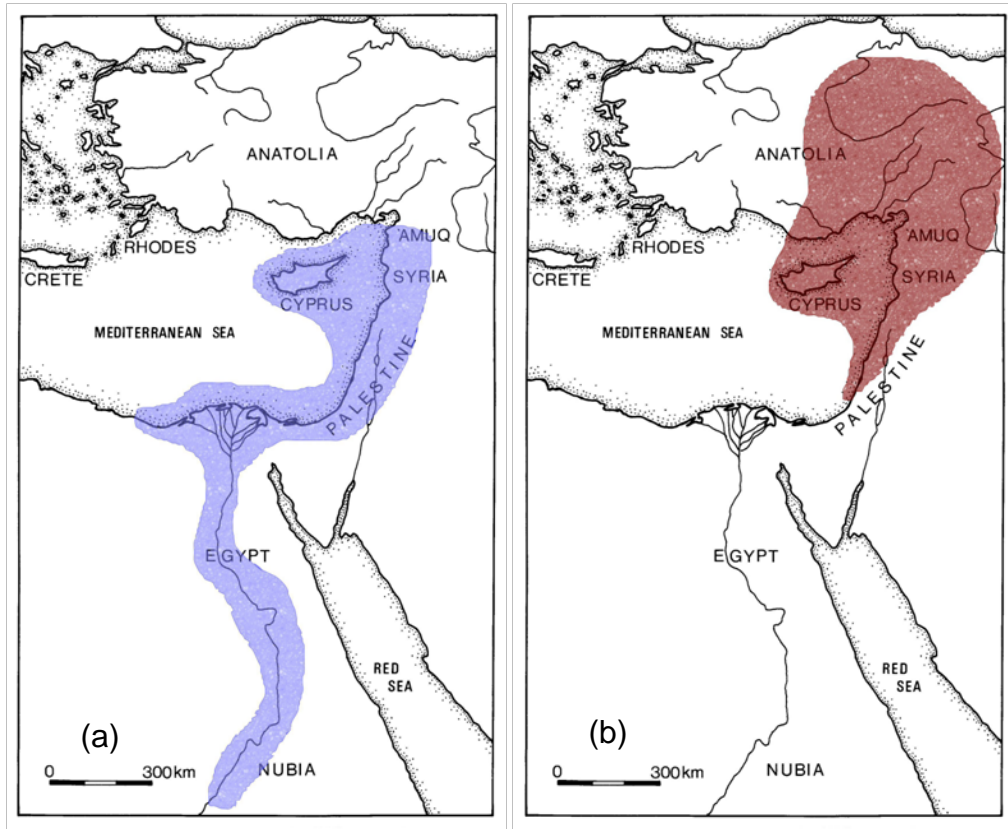


Figure 2.2: Maps showing the distribution of RLWm ware (a) up to 1400BC and (b) after 1400BC. Adapted from Eriksson (1993) figure 1.

This excavation produced thousands of RLWm ware sherds, similar to the total amount previously found in Cyprus (Knappett, 2002) (see Appendix 2 for brief discussion on the quantification of pottery from sherds). Excavations at Kilise Tepe in the Göksu Valley in southern Turkey have also uncovered RLWm ware – here found in domestic contexts rather than the more usual tomb or temple settings (Baker *et al.*, 1995; Knappett, 2000). In addition recent excavations at Kalavassos in southern Cyprus have produced 46 complete or nearly complete vessels (spindle bottles, pilgrim flasks and arm-shaped vessels) and 679 sherds, mostly from high status tombs in association with other imported and luxury goods (South & Steel, 2007).

Recent studies of the distribution of RLWm ware and other wares across the region have produced more questions than answers. RLWm ware occurs in the Levant, Cyprus and Egypt and in Hittite contexts in central Turkey. In all but Hittite contexts RLWm ware is found alongside Mycenaean pottery and Cypriot wares like BR ware and White Slip (WS) ware. RLWm ware is not present in the Aegean and western Turkey (with a handful of exceptions: two spindle bottles from Crete and one from Rhodes, along with two possible fragments from Troy), or Cilicia in southern Turkey (Todd, 2001; Kozal, 2007). Cypriot pottery is also absent in the Aegean (Kozal, 2003; 2007) despite the flourishing trade in Mycenaean pottery imports to Cyprus, particularly during the LCI period (Karageorghis, 2002, 27ff). In western Turkey and Cilicia small amounts of Cypriot wares and some Aegean pottery have been found (Todd, 2001; Kozal, 2003; 2007). Uniquely in Hittite central Turkey and in the Göksu Valley, the main trade route from the coast to the Hittite heartland, RLWm ware occurs alone – Mycenaean and Cypriot pottery is virtually unknown on Hittite sites (Todd, 2001; Kozal, 2003; 2007). In fact this is the only foreign ware that appears in Hittite Turkey on a large scale: other imported goods are also relatively rare (Mielke, 2007).

Recent discoveries have also altered archaeologists' views of the way the distribution of RLWm ware changes over time. Traditionally RLWm ware appears in central Turkey much later than its first appearance in Egypt and the Levant (p16). New excavations, as at Kuşaklı, and recent re-assessments of the dating of older sites such as Boğazköy has produced a possible first

appearance of RLWm ware roughly 100 years earlier than previously thought about 1500BC (Mielke, 2007).

2.3.ii Form

RLWm ware was produced in a range of shapes including jugs, jars, bowls, tankards, spindle bottles, pilgrim flasks and arm-shaped vessels (Eriksson, 1993, 21-29, 138; Nordstrom & Bourriau, 1993, 184; Knappett, 2000; Knappett, 2002; Mielke, 2007). However most of these forms are extremely rare and the majority of vessels take one of three shapes; spindle bottles, pilgrim flasks or arm-shaped vessels. The spindle bottle (fig. 2.3a) is considered to be the definitive shape for RLWm ware, forming nearly half the examples in Eriksson's 1993 catalogue (Eriksson, 1993, 23, 138; Nordstrom & Bourriau, 1993). It was also the only shape produced throughout the lifetime of the ware (Eriksson, 1993, 140), appearing towards the end of LCIA:2 or more likely during LCIB (Eriksson, 1993, 23-25, 31ff, 139ff; Eriksson, 2007) and disappearing before the beginning of LCIIIB, probably during LCIIIA:1 (Eriksson, 1993, 57, 143). The spindle bottle is the main shape found in Egypt (Merrillees, 1968, catalogue, 4-144; Eriksson, 1993, 138; Nordstrom & Bourriau, 1993, 184). The bottles stand between 20 and 80 cm in height and Eriksson (1993, 23) identifies five types with the most significant variation being in the diameter of the body.

Pilgrim flasks were a later addition to the repertoire of forms, appearing about during LCIIA:1 (Eriksson, 1993, 24-25, 142). These flasks (also known as lentoid flasks) stand 19 to 38 cm tall and Eriksson records six types. The most

common has a long neck and single handle, like the example in figure 2.3b, while others had string holes on the shoulders, with or without handles, and vary in neck length. Eight examples with fenestrated stands were documented by Eriksson (1993, 24-26) although many more, in both RLWm ware and local fabrics, have since been excavated at Kilise Tepe in Turkey (Knappett *et al.*, 2005).

Arm-shaped vessels are perhaps the most unusual form in the RLWm ware repertoire. They were introduced later in the lifetime of the ware sometime during LCIIA (Eriksson, 1993, 27, 129, 140). However recent discoveries of much earlier examples from Turkey (p22-23) imply that this form was produced earlier than the start of LCIIA (Mielke, 2007). The vessels are constructed from a wheel-made tube, closed at one end, forming the 'arm' which opens into a right hand holding a cup (fig. 2.3c). Traditionally two types have been identified: a short version about 28.5 cm long, of which only one complete example exists, and a longer version up to 84.5cm in length. However there is also a variation in the shape of the bases and recent work suggests that differences in the style of the 'hand and bowl' part of the vessel may be significant (Eriksson, 1993, 27; Mielke, 2007). It is not clear what the function of these arm-shaped vessels was. An exotic type of packaging, tools for the ritual pouring of libations, hence the alternative name of libation arms, and instruments for anointing have all been suggested (Eriksson, 1993, 27; Mielke, 2007). There is no evidence for burning in any of the samples so far excavated which excludes the suggestion that they were related to the censer arms found in Egypt (Eriksson, 1993, 27).



Figure 2.3: The three main forms of RLWm ware – (a) spindle bottle, (b) pilgrim or lentoid flask, (c) arm-shaped vessel. The spindle bottle (accession no. 31.1918.50) and pilgrim flask (accession no. 31/1918.53) are in the collection of the Royal Albert Memorial Museum, Exeter and were photographed with permission. Nothing is known about their provenance except that they are Cypriot and were part of the collection of Claude Delavel Cobham, Assistant Commissioner and then Commissioner of the District of Larnaca, Cyprus (1878-1908) (Cadbury, pers.comm.). During his time on Cyprus he was involved with the early excavations in the Larnaca area (Åström *et al.*, 1976). The Cobham collection was donated to the museum in 1918 by his nephew, Brigadier General Cobham (Cadbury, pers.comm.). (c) is after Knappett (2000).

The three main forms of RLWm ware are not exclusive to this particular ware and have parallels in other wares. Arm-shaped vessels were made in local fabrics in Turkey and the shape may have originated there (Baker *et al.*, 1995; Mielke, 2007). The pilgrim flask derives from Turkish prototypes (Eriksson, 1993, 25) and was widespread in many wares across the eastern Mediterranean during this period. The origin of the spindle bottle is obscure. Suggestions that it was modelled on the BR ware I bottle, type III (Merrillees, 1968, 169) have been largely discounted (Eriksson, 1993, 23). The shape occurs in many other wares, some vessels being very obvious imitations of RLWm ware. Some of these vessels were clearly made by local potters for use in their local areas, for example the Nile silt imitations which are found only in Egypt (Eriksson, 1993, 157).

2.3.iii Fabric

The fabric of RLWm ware vessels is very distinctive and it is this fine, red fabric which defines the ware. Eriksson (1993, 19) describes the fabric as consisting of “...a very fine clay from which all but the finest white, red and black grits have been removed.” The density and homogeneity of the fabric is one of its distinguishing features (Nordstrom & Bourriau, 1993, 184). The clay is very well levigated and generally contains very few inclusions or voids (Åström, 1969; Knappett, 2000; Artzy, 2001; Knappett *et al.*, 2005, Artzy, 2007).

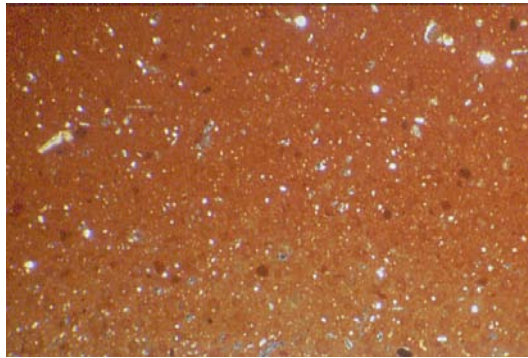


Figure 2.4: Thin section of a fine RLWm ware sherd from Saqqara, Egypt under crossed polars. Field of view is 5.4mm. After Knappett, 2000, figure 6d

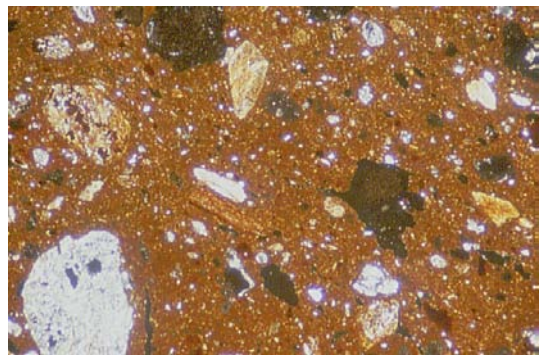


Figure 2.5: Thin section of a coarse RLWm ware sherd from Kilise Tepe under crossed polars; field width 5.4mm. After Knappett, 2000, figure 4d

Petrographically the fabric is remarkably consistent both from site to site and over time. The main variation in the fabric is between the classic fine fabric (fig. 2.4) and a coarser form (fig. 2.5) recently identified by Carl Knappett using thin section analysis (Knappett, 2000; Knappett, *et al.*, 2005). The finest examples are a vivid pink-red with almost no diagnostic inclusions, even in the fine fraction ($\leq 0.2\text{mm}$). Very small ($\leq 0.06\text{mm}$) mica laths are sometimes present with small amounts of quartz and micrite, mostly less than 0.1mm , and textural features are also present. There is a continuous gradation from this fine fabric to the coarse form, the main difference between 'fine' and 'coarse' being the number and size of the inclusions. For example the semi-fine fabrics are very similar to the fine with more quartz, textural features and micrite (some of which may be shell fragments) in the coarse fraction ($0.2 - 2.8\text{mm}$). The coarse fabrics are again very similar except that some metamorphic rock fragments (schist and phyllite) appear in the coarse fraction (Knappett, 2000; Knappett *et*

al., 2005). One other variation has been noted in a few sherds from Boğazköy in central Turkey. This is siltier in the fine fraction and the coarse fraction contains rare fragments of quartz sandstone, plagioclase, chert, amphibole, feldspar and serpentinite as well as the usual quartz, micrite, schist and phyllite (Knappett *et al.*, 2005).

Chemically the fabric of RLWm ware is also very consistent. Neutron Activation Analysis (NAA) of 94 (81 RLWm ware, 12 local, 1 copy) samples from seven sites in Turkey, Cyprus and Egypt showed a remarkable consistency in the chemistry of this fabric (Knappett *et al.* 2005). The fine and coarse groups form a very tight cluster, confirming that these are part of the same fabric group. The silty examples from Boğazköy are different in composition to the classic RLWm ware from the site having elevated levels of chromium and lower concentrations of calcium. However they are much more similar both to each other and to classic RLWm ware than they are to the local fabrics examined in the same study (Knappett *et al.*, 2005). One sherd from Kazaphani in northern Cyprus, described as a copy of RLWm ware, was also distinguished by NAA (Knappett *et al.*, 2005). Other studies using NAA have found more variation in the elemental composition of the fabric, although still confirming clear relationships between the samples studied (Artzy, 2001; Artzy, 2007).

2.3.iv Technology

The basic shapes of RLWm ware vessels are usually formed on a wheel (Eriksson, 1993, 19). The marks made by a potter when forming a vessel on a wheel can easily be identified on the interior surfaces of many examples such as that shown in figure 2.6 (Rye, 1981, 74-80; Rice, 1987, 132; Arnold, 1993a).

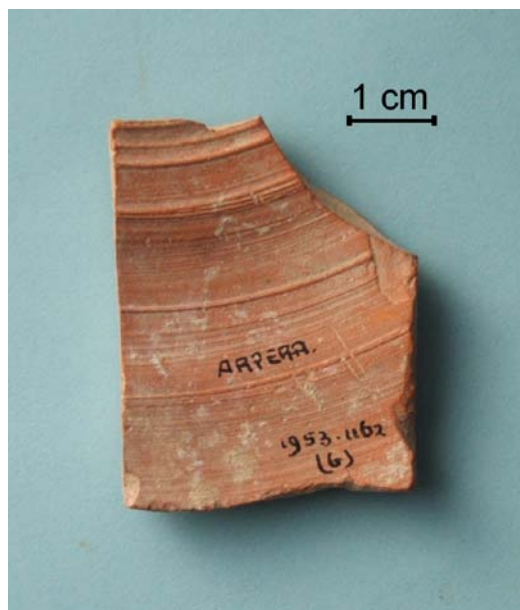


Figure 2.6: The interior surface of sherd 6 from Arpera, Cyprus, showing marks created by the wheel-throwing process. Sample from the Ashmolean Museum, Oxford.

Spindle bottles were formed in one piece and the handle or handles added. The construction of pilgrim flasks and arm-shaped vessels was a more complex procedure. Pilgrim flasks were constructed from a wheel-made lentoid body, constructed as one piece, a wheel-made neck and hand-moulded handles (Eriksson, 1988; Eriksson, 1993, 19). A possible process for this is shown in

figure 2.7 which shows the reconstruction of a lentoid flask by a modern potter, as described in the report on the Lachish excavations (Magrill & Middleton, 2004). The reconstruction also shows how the distinctive pattern of curved marks on the interior of the two halves of a pilgrim flask is formed.

The 'arm' part of an arm-shaped vessel was also wheel-made. A modelled right hand holding a cup was then added to the 'wrist' to create this distinctive vessel (Eriksson, 1993, 19, 19; Mielke, 2007).

Once assembled the vessels were coated in a self-slip, a watery solution of the body clay (Eriksson, 1993, 19). This process can be as simple as the potter dipping his/her hands in water and smoothing over the surface of the finished pot, or may involve dipping the vessel in the slip or pouring or wiping the slip over the surface (Rye, 1981, 41; Rice, 1987, 151; Arnold, 1993b). All these processes leave slightly different but distinctive features in the finished fabric but slips are not always easy to see and self-slips are particularly difficult to detect (Rye, 1981, 54). Thin section analysis is often needed to determine whether a slip has been applied and further treatment of the surface before firing makes a slip even harder to distinguish (Rye, 1981, 54; Arnold, 1993b).

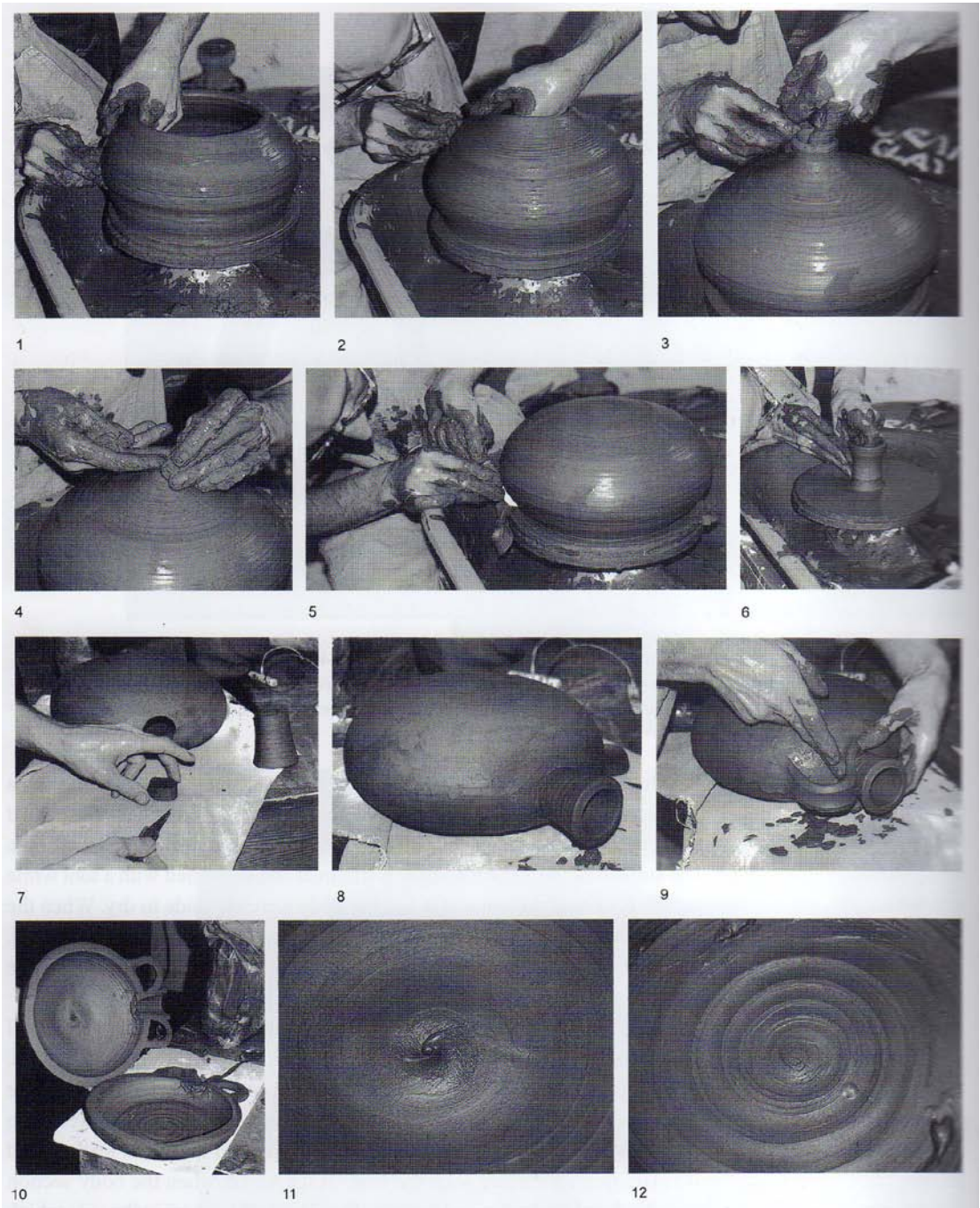


Figure 2.7: The stages in the reconstruction of a lentoid flask by a modern potter. After (Magrill & Middleton, 2004), figure 36.26.

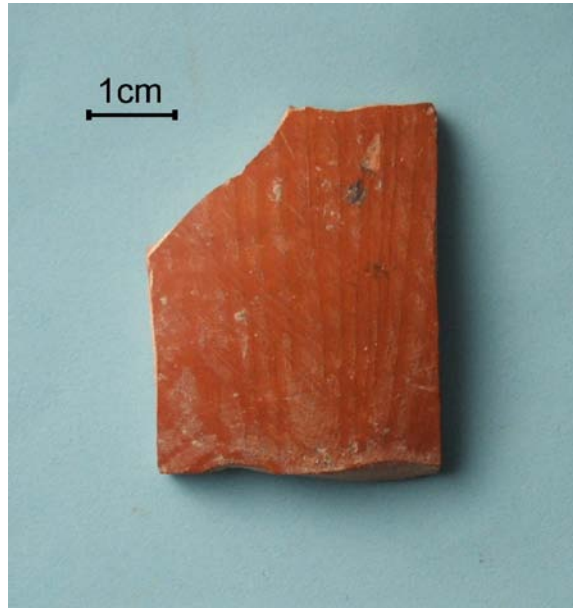


Figure 2.8: Burnishing marks on the exterior of sherd 6 from Arpera, Cyprus. Sample from the Ashmolean Museum, Oxford

One of the distinguishing features of RLWm ware is its lustrous appearance which was produced by burnishing the outside surface of the leather-hard vessel (Eriksson, 1993; Knappett *et al.*, 2005). Burnishing was usually done with hard, round object such as a pebble, horn or bone, often used directionally in long strokes producing a characteristic pattern of shiny and matt lines visible in the example in figure 2.8 (Rye, 1981, 90; Rice, 1987, 138; Arnold, 1993b; Bourriau *et al.*, 2000; Knappett *et al.*, 2005). RLWm ware vessels were burnished differently depending on the shape; with spindle bottles usually burnished vertically, arm-shaped vessels along the length of the ‘arm’ and pilgrim flasks in a radial pattern (Eriksson, 1993, 19). Burnishing not only produces a very distinctive surface finish but also compacts the outer layer of the clay, making it less porous (Arnold, 1993b; Eriksson, 1993, 19; Bourriau *et al.*, 2000).

Examining the fabric reveals that RLWm ware was fired at 900° - 1000°C and in most examples the firing produced an even colour throughout the fabric (Eriksson, 1993, 21). Only an occasional sample with a grey core is found – in fact in the 105 sherds so far included in this study, none has been observed. Some samples do show variations in colour between the surface and core of the sherd, but these are usually subtle. The uniform, red colour achieved by the LBA producers of this ware is another of its distinguishing characteristics (Eriksson, 1993, 21). The high firing temperature and uniform results suggest that RLWm ware was kiln fired (Eriksson, 1993, 21). Slight variations in colour, hardness and degree of firing between vessels can be accounted for by variations in the exact atmosphere in the kiln, the temperature variations across the kiln and changes in the cooling process (Rye, 1981, 100, 119; Nicholson, 1993). The clear, red, uniform colour suggests that the oxidising conditions prevailed during firing (Rye, 1981, 115; Rice, 1987, 345; Nicholson, 1993; Bourriau *et al.*, 2000).

2.3.v Pot marks

Over a quarter of the vessels in Eriksson's catalogue exhibit 'pot marks'. These marks, incised in the clay before firing, are often simple circles, lines or crosses – shapes which do appear in both the Cypro-Minoan and Linear B scripts. Some marks are more complex and a few appear as multiple marks, many of which have clear parallels in the Cypro-Minoan script. They are usually present on the bases or lower handles of spindle bottles or at the base of the handle on pilgrim flasks (fig. 2.9). They have often been considered as potters' marks

because they were incised before firing. However they are not very consistent with many different marks appearing on the same type of vessel (Eriksson, 1993, 145-146). It is also possible that the marks related to the contents of the vessels particularly if these were produced in the same locality (Eriksson, 1993, 147).



Figure 2.9: Pot marks on the base of a spindle bottle from Arpera, Cyprus (sherd 1), and the handle of a pilgrim flask from Dhenia, Cyprus (sherd 1). Both pieces from the Ashmolean Museum, Oxford.

2.3.vi Contents and function

In the study of RLWm ware the contents of the vessels have largely been ignored. The pottery, although it is high quality, burnished, bright red ware in distinctive shapes, is rather plain when compared with, for example, the highly decorated Minoan and Mycenaean wares widely available during the LBA. At the same time its wide distribution but relative rarity suggests that it was a highly valued item (Donovan, 1993). This has led to the conclusion that the vessels were widely traded because they contained a valuable commodity

(Eriksson, 1993, 143) and the vast preponderance of closed shapes with long narrow necks or narrow openings would suggest the contents were liquid (Merrillees, 1968, 170-171; Steele, 2004, 63; Knappett *et al.*, 2005; Steele *et al.*, 2007).

Various theories have been put forward about the contents of these vessels with very little research to substantiate the ideas. Merrillees (1968, 170-171) and Eriksson (1993, 143-144) both assume that the contents of spindle bottles were always the same. Wet chemistry analyses of visible residues in the 1960s and 1970s had proved inconclusive and only two analyses using modern methods of analytical chemistry have been recorded. Eriksson cites the identification of fatty acids in a spindle bottle using GC-MS (see above, p17-18). A further study on the contents of a spindle bottle from Egypt was carried out by McGovern using Fourier-transform infra-red spectroscopy (FT-IR). He concluded that the contents were a resin (McGovern, 1997). However, as the spectrum of the sample also appears very similar to that for fatty acids, the chosen analytical technique was not very selective (Pouchert & Aldrich Chemical Company, 1985, 485).

A pilot study to discover whether absorbed residues were preserved in RLWm ware sherds was carried out in 2003. GC-MS analysis of sherds from two sites, Boğazköy in Turkey and Kazaphani in northern Cyprus, showed that lipid residues survived in six out of the nine sherds sampled and identified bitumen and beeswax (Steele, 2004, 14). A study carried out in 2004 examined a further 31 sherds, including one in a local fabric, and one visible residue from

five sites (Kouklia and Kazaphani on Cyprus, Boğazköy and Kilise Tepe in Turkey and Saqqara in Egypt) (Steele, 2004; Steele *et al.*, 2007). Over half of these sherds contained lipids and beeswax, bitumen and fatty acids were identified (Steele, 2004, 82-85; Steele *et al.*, 2007).

Beeswax was identified only in sherds from Boğazköy, including the example of a local fabric, with the majority of the residues extracted from the interior surfaces. It seems unlikely that a substance as solid as beeswax would have been stored in RLWm ware vessels due to their long narrow necks and small openings. These vessels also show no sign of being used to process material, by heating for example, and are primarily storage, transport or ritual vessels. This leaves two possible explanations for the presence of beeswax. The first is that it was a surface treatment applied to the interior of a hot vessel soon after firing – a method still used by potters in some parts of the world today (Rice, 1987, 163-164; Charters *et al.*, 1995; Bourriau *et al.*, 2000). The second is that the wax formed part of a mixture that was much more fluid than beeswax alone (Steele, 2004, 56-64; Steele *et al.*, 2007).

Only two sherds, both identified as body sherds from pilgrim flasks, from Kazaphani in northern Cyprus, yielded bitumen, which was not visible on the sherd surface. One sherd (Kazaphani 2) yielded more residue from the interior surface than the exterior, in the other (Kazaphani 3) the reverse was true. It would be unlikely that bitumen would be stored in pilgrim flasks, which have extremely narrow necks. The most probable uses would seem to be as a waterproofing agent or as decoration (unlikely where the residue is on the inside

of the vessel). Cyprus has no sources of bitumen, so this occurrence must represent an imported material. Bulk stable isotope analysis of carbon and hydrogen showed a tentative link with the area around Ras Shamra in northern Syria (Steele, 2004, 47-49).

Fatty acids were present in at least one sherd from all sites except Kazaphani, 19 in total, and the visible residue consisted entirely of fatty acids (Steele, 2004, 74-79, 82-85). Most of these residues were on the interior surfaces of the sherds, indicating that they represented the contents of the vessel. The presence of plant sterols in two sherds (Steele, 2004, 68-70), and unsaturated fatty acids in three sherds (Steele, 2004, 53-55, 67-70) may indicate that the residues represent a vegetable oil rather than an animal fat. Large amounts of hydroxy fatty acids present in the visible residue may also indicate the presence of polymerised plant oil. Bulk stable isotope analysis of this residue gave a mean $\delta^{13}\text{C}$ value of $-26.2\text{‰} \pm 0.3\text{‰}$. This is in the centre of the range of values for C_3 plants (approximately -23‰ to -30‰) but is also within the range of $\delta^{13}\text{C}$ values for ruminant animal fats (approximately -23.5‰ to -33‰) (Steele, 2004, 79). Many of the sherds from Boğazköy contained fatty acids in addition to beeswax. The study was unable to determine whether these fatty acids represent degradation products of the beeswax, the contents of the vessels or the reuse of attractive containers (Steele, 2004, 63-64).

In the above study no variation in residues could be observed between the different forms of vessel or with the coarseness of the fabric or the context of the find. The main differences were between geographical areas, with bitumen

only appearing in sherds recovered from Cyprus and beeswax in sherds from Turkey, while fats/oils were present in sherds from a range of sites (Steele, 2004; Knappett *et al.*, 2005). Although the sample was not large enough for this conclusion to have statistical significance, it may indicate that the contents or treatment of the vessels was determined by its destination rather than its shape or final use.

From their relative rarity, their wide distribution and their presence in tombs, temple contexts and the occasional palace, it is clear that RLWm ware vessels were valuable items, either in themselves or for their contents. Many suggestions have been made about the function of RLWm ware from spindle bottles being distinctive containers for perfumed oils (Eriksson, 1993, 143-144; Steele, 2004, 169) to arm-shaped vessels for dripping offerings of precious honey onto altars in Hittite temples (Bietak, conference discussion), most of which cannot be substantiated. What is clear is that spindle bottles and pilgrim flasks were used for the transport and storage of one or more valuable commodities, some of which were oil or fat based.

Arm-shaped vessels are not particularly suitable for transporting liquids as they would not be easy to seal (Mielke, 2007). The use of the hand holding a cup as part of these vessels does suggest a more 'ritual' or symbolic use and this has led to the assumption that they were used in rituals (see above p24). There is no evidence of burning in the cup/hand of any of the arm-shaped vessels recovered so far, ruling out their use as censer arms. However, Mielke (2007) has recently made several interesting observations from his work on Turkish

sites. Firstly there is no evidence, documentary or pictorial, for the use of such a vessel in any Hittite context. Secondly, arm-shaped vessels are also found on Cyprus and their use in both areas would imply the sharing of a similar ritual. If RLWm ware was made on Cyprus and exported, the implication would be even stronger that a Cypriot ritual was being practiced in the Hittite heartland. While the Hittites did import the worship of many gods from the peoples they conquered, there is absolutely no evidence of this kind of connection with Cyprus (assuming that Cyprus is the *Alašiya* mentioned in Hittite texts). Mielke makes the suggestion that they were used as vessels for anointing people or statues. This could explain their frequent presence in temple contexts without resorting to their use as part of a ritual and would explain the lack of evidence for their use as part of temple worship. It could also account for their appearance in domestic contexts (Mielke, 2007).

Whatever their use it is clear that RLWm ware vessels formed a part of the wide-ranging exchange of goods which is seen both in the archaeological and textual record of the time. The context and background to this exchange is discussed in chapter 3.