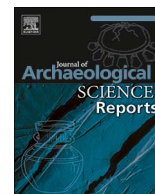




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Red Lustrous Wheelmade ware: Analysis of organic residues in Late Bronze Age trade and storage vessels from the eastern Mediterranean

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ABSTRACT

Transport and storage vessels in Red Lustrous Wheelmade ware (RLWm ware) were traded across a large area of the eastern Mediterranean for approximately 300 years (c. 1500–1200 BCE) during the Late Bronze Age (c. 1600–1000 BCE). The extreme consistency of the ceramic, in form, fabric, chemistry and mineralogy, points to a single production source for the ware, which, although no kiln sites have been identified, is generally accepted to have been on Cyprus. The aim of this study was to determine whether organic residues were present in this very fine, dense ware, and to characterise the contents of RLWm ware vessels from different sites, contexts and periods, and of different forms, to improve our understanding of the trade in this ceramic type. To that end, 101 RLWm ware sherds, together with three visible residues, were examined from sites in Turkey, Cyprus, Egypt and Syria. Residues were identified in more than half of the samples, indicating that organic material is absorbed into and preserved in this very fine fabric. Four commodities were identified: fat (probably plant oil), which in four residues was identified further as castor oil; beeswax; bitumen; and *Pinaceae* spp. resin. The commodities were found alone or, occasionally, one of the latter three was combined with the fat or oil. Fatty material was the only commodity present at all sites and its wide distribution may indicate that generally the vessels were used for a mixture or mixtures based on plant oils, in some cases containing castor oil. It was impossible to determine whether the beeswax, bitumen and resin formed part of this mixture or represented post-firing treatments of the ceramic to make it less porous. The identification of more than one type of residue indicates that RLWm ware vessels did not always contain the same commodity. No significant correlation could be detected between the vessel forms, and the dating of many of the sherds was not precise enough to reveal any variation through time. The type of residue present did vary depending on the geographical location of its final use. Beeswax was, with two exceptions, only present in samples from Turkey, while bitumen was found exclusively in samples from Cypriot sites. The occurrence of at least one example of every commodity in the samples from Cyprus is consistent with the theory that this ware was manufactured on Cyprus, and indicates that the vessels could also have been filled and exported from there. The variation in content of the vessels found in different geographical areas could highlight a special trading relationship between the Hittite heartland in Turkey and the Cypriot potters who produced the ware, and a possible trade in bitumen as a raw material between the north Syrian coastal area of Ugarit and Cyprus.

1. Introduction

This paper presents the results of organic residue analysis of one of the key storage and transport wares from the Late Bronze Age (LBA) (c. 1600–1000 BCE) of the eastern Mediterranean. It addresses questions about the contents of the vessels and provides insights into the trading relationships of Cyprus during the LBA.

Red Lustrous Wheelmade ware (RLWm ware) is a distinctive fabric in the eastern Mediterranean LBA ceramic assemblage. This very fine, dense fabric is well levigated, wheelmade and kiln fired at temperatures

between 900° and 1000 °C (Artzy, 2001, 2007; Eriksson, 2001; Knappett, 2000; Knappett et al., 2005; Nordström and Bourriau, 1993; Serpico and White, 2000c). The fabric generally contains very few, small inclusions and few voids, although there are occasional examples in coarser variants, which differ only in the size and number of inclusions and voids, and a few examples containing silt; both these types of examples are mainly found at Turkish sites. Chemically, RLWm ware from sites across the eastern Mediterranean is extremely consistent (Knappett, 2000; Knappett et al., 2005; Schubert and Kozal, 2007). The pottery was self-slipped and burnished on the exterior before firing to

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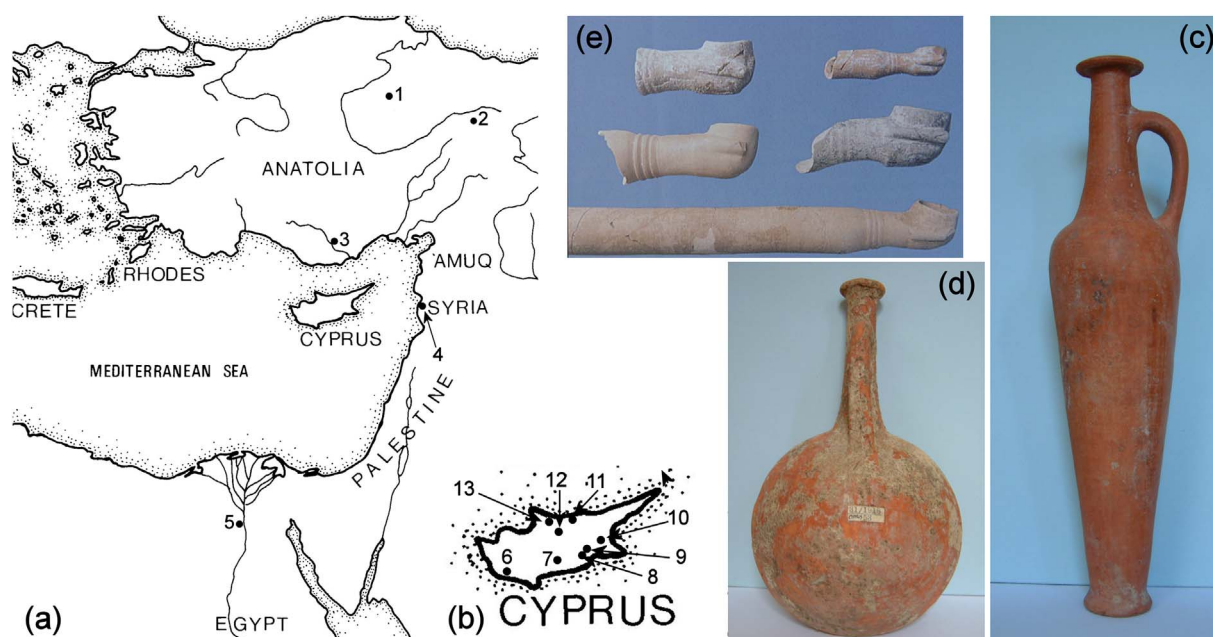


Fig. 1. (a) Map of the study sample sites in Turkey, Syria and Egypt: 1, Boğazköy, Turkey; 2, Kuşaklı, Turkey; 3, Kilise Tepe, Turkey; 4, Tel Tweini, Syria; 5, Memphis Saqqara, Egypt. (b) Enlargement to show the study sample sites on Cyprus: 6, Kouklia; 7, Kalavassos-Ayios Dimitrios; 8, Arpera; 9, Hala Sultan Tekke; 10, Enkomi; 11, Kazaphani; 12, Dhenia; 13, Myrtou-Pigadhes). (c) A spindle bottle from Cyprus, (d) a lentoid flask from Cyprus, (e) arm-shaped vessels from Kilise Tepe. Map after Eriksson (1993, 2, Fig. 1, used with permission); photographs (c) and (d) © Val Steele; photograph (e) © Kilise Tepe Archaeological Project, used with permission.

give it its characteristic lustre, which is still visible on well preserved pieces (Eriksson, 1993; Knappett et al., 2005).

Transport or storage vessels in this fabric were produced between the 16th and 12th centuries BC. They are found in LBA contexts across a huge area of the eastern Mediterranean, from Hittite sites in central Turkey, through Jordan, Syria, Lebanon and Israel into Egypt, and on Cyprus, with a few pieces found further west on Rhodes and Crete (Eriksson, 1993; Knappett et al., 2005; Kozal, 2003, 2007; Mielke, 2007; Todd, 2001). Recent excavations have identified RLWm ware at Hittite sites in Turkey from the late 16th century BC, indicating that the greatest geographical range occurred around 1400 BCE (Eriksson, 1993; Grave et al., 2014; Manuelli, 2009; Mielke, 2007). After c.1400 BCE, RLWm ware disappears from Egypt and declines in Jordan, Lebanon, Syria and Israel. The distribution has been linked to the changing balance of power between Egypt and the Hittite Empire during this period (Eriksson, 1993), although this interpretation has been questioned with the latest discoveries of much earlier occurrences in Turkey (Grave et al., 2014; Manuelli, 2009; Mielke, 2007) and the identification of contemporary or earlier local ceramics in similar shapes at Turkish sites such as Mersin/Yumuktepe (Manuelli, 2009), Boğazköy, Kuşaklı and Alaca Höyük (Mielke, 2007). The occurrence of the ware in relatively large amounts at LBA Hittite sites is particularly noteworthy, as RLWm ware is the only Cypriot ware imported by the Hittites in any quantity, and indeed the only foreign ware found on any significant scale at LBA Hittite sites. This possibly indicates a different kind of relationship between the area of production, probably northern Cyprus, and the Hittite Empire (Grave et al., 2014; Manuelli, 2009; Mielke, 2007).

RLWm ware is rare at most sites. Eriksson's (1993, 173ff) catalogue lists only 1173 securely provenanced examples. Even at the sites where it is considered abundant, it is often only present in very small amounts. For example, at Kalavassos on Cyprus, it forms only about 0.7% of the total LBA ceramic assemblage, less than imported Aegean (Mycenaean and a few Minoan) wares (1.8%) (South and Steel, 2007). At some sites it is extremely rare, for example at the site of Tell el-^cAjjul in Gaza the 1999–2000 excavations yielded only 14 pieces of RLWm ware among a Cypriot ware assemblage of 830 pieces in total (Fischer, 2009). Many examples come from tomb or temple contexts and consist of complete

or nearly complete vessels, which are not available for residue analysis. The rarity of the ware in general and the abundance of complete vessels among the extant examples have limited the amount of material available for analysis.

This rarity and the burial or cultic contexts of many of the samples have led to the conclusion that RLWm ware vessels were expensive, luxury items (Eriksson, 1993). However, despite the fine fabric and lustrous finish the ware is considered to be plain, functional and undecorated, especially when compared with the highly decorated wares being traded around the eastern Mediterranean from the Aegean. It therefore seems probable that the contents represented the valuable commodity rather than the vessels themselves (Donovan, 1993; Eriksson, 1993; Knappett et al., 2005; Mielke, 2007). The consistency of the fabric, in both chemistry and mineralogy, has led to the conclusion that it must have been manufactured in one area, possibly in one place, and maybe just one workshop. However, the location of this source of RLWm ware has remained a mystery since its first classification in the late 19th century: wherever it has been found it has been classed as imported (Eriksson, 1993; Knappett, 2000; Knappett et al., 2005; Nordström and Bourriau, 1993). Studies of the distribution of the ware and elemental and thin section analysis of the fabric have suggested northern Cyprus as a source, although no kiln sites have been found (Eriksson, 1993; Knappett, 2000; Knappett et al., 2005). Recent research has identified an area in south-western Cyprus as the source, although this was based on elemental analysis of the ware and the suggested area does not match the mineralogy of RLWm ware samples in thin section (Grave et al., 2014).

There are three main forms of RLWm ware vessels: spindle bottles; lentoid or pilgrim flasks; and arm-shaped vessels, in which a tapering cylinder forms the container, with an opening into a cup held in a more or less stylised representation of a right hand (Fig. 1) (Eriksson, 1993; Knappett, 2000; Mielke, 2007). The spindle bottle is the most common form, manufactured throughout the lifetime of the ware, and forms the majority of examples found in Egypt (Eriksson, 1993; Merrillees, 1968; Nordström and Bourriau, 1993). While the first two forms are ideally suited to transport or storage, the exact function of the arm-shaped vessels has never been established. They show no signs of burning within or outside the 'cups', so are not comparable with similarly

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