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## BARREL-SHAPED VESSELS IN CONTEXT: A LONG-RANGE MODEL OF DAIRY PRODUCTION IN EASTERN AND CENTRAL MEDITERRANEAN DURING THE LATE FOURTH AND EARLY THIRD MILLENNIA BC

Massimo Cultraro

**ABSTRACT** – *The paper aims at investigating an unusual pottery category which occurs in the Late Chalcolithic of Southern Levant, as well as in Western Anatolia, Northern Aegean and Sicily between the early Fourth and middle Third Millennium BC. In the archaeological literature of eastern Mediterranean prehistory cylindrical barrel-shaped vessels are interpreted as “churns”, because they closely resemble skin-bottles used by modern pastoral nomads in rural Anatolia for converting milk into products such as butter or light cheese.*

*The archaeological investigations and the results of complementary chemical analyses to detect organic residues, involve some ethnographic evidence, in order to define use and function of such uncommon pottery assemblage, which represents one of the most important element of dairy production.*

**KEYWORDS** – Barrel-shaped vessels, Late Chalcolithic, Levant, EBA, Western Anatolia, Aegean, Ethnoarchaeology, Aeneolithic in Sicily, Organic Residues Analyses.

**RIASSUNTO** – Il lavoro prende in esame un’insolita categoria di vasi a forma di barilotto diffusi tra gli inizi del IV e il III millennio a.C. in diverse aree del Mediterraneo, dal Levante sino alla Sicilia. Nella corrente letteratura archeologica sul Mediterraneo orientale questi vasi sono interpretati come zangole, in base ai confronti etnografici proposti con contenitori simili in materiale organico ancora in uso presso gruppi pastorali della moderna Turchia per la produzione di latte o formaggio leggero.

Il riesame della documentazione archeologica dai principali contesti di rinvenimento e la presentazione di alcune analisi archeometriche sui residui organici suggerisce di riprendere le principali questioni legate a questa categoria vascolare, non ultima la possibile relazione con attività casearie.

**PAROLE CHIAVE** – *Vasi a barilotto, Tardo Calcolitico, Levante, antica età del Bronzo, Anatolia occidentale, Egeo, Eneolitico, Sicilia, etnoarcheologia, analisi di residui organici.*

### INTRODUCTION

In the archaeological literature of Eastern Mediterranean Prehistory, the barrel-shaped vessel is an asymmetrical and uncommon pottery form which occurs in different cultural and chronological contexts from Anatolia to Palestine (Huot 1982: 557-558; Seferiades 1985: 217-

218). Since the publication of two examples at el-Mughar, Gedera, in modern Israel (Kaplan 1954) (fig. 5, 1), this category is convincingly dated to the Chalcolithic Period and it has been proposed the interpretation as vessel used for churning butter, comparing its barrel-like asymmetrical form with the modern skin-bottle in which Arab women make

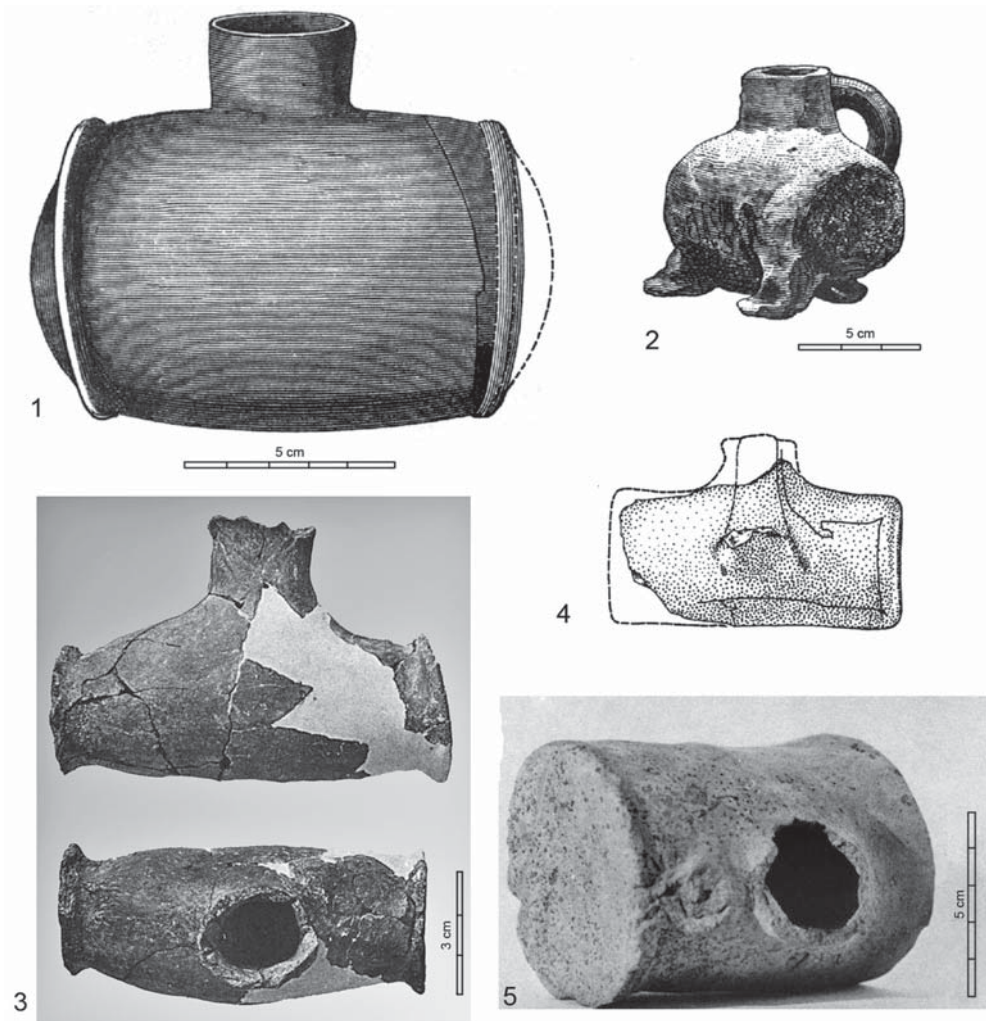


Fig. 1 – Barrel-shaped vessels from Western Anatolia: 1-3, from Troy; 4, from Kaklik Mevkii; 5, from Karataş (1, 3 after Schliemann 1880; 2, Blegen *et alii* 1950; 4, Efe *et alii* 1995; 5, Mellink 1965), 4, not to scale.

secondary products of milk (Kaplan 1965).

The evidence of barrel-shaped vessels in Central and Western Anatolia, since the first explorative fields at Troy by H. Schliemann, has increased the distribution map which comprises some of the main Northern Aegean islands, as Lesbos and Lemnos (figs. 1-3). In this regional

district examples of this kind have been conventionally named as “churn” in similarity with the Eastern Mediterranean evidence.

Furthermore, this pottery category occurs in the early Eneolithic Sicily (*prima età del Rame* in Italian terminology), where it has been correctly identified as one of the most relevant basic pottery

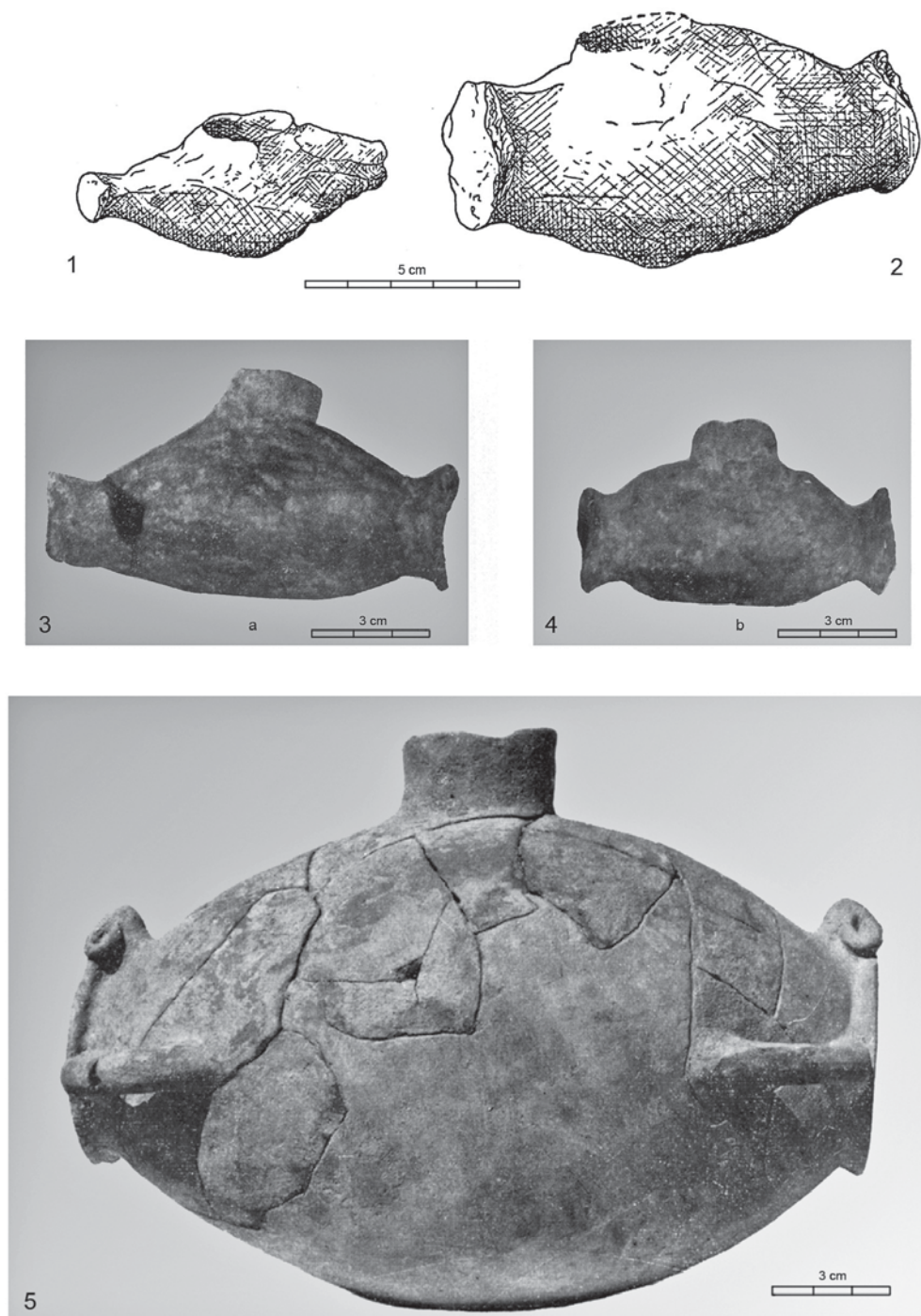


Fig. 2 – Barrel-shaped vessels from Northern Aegean: 1-2 from Thermi on Lesbos; 3-5 from Poliochni (1-2, after Lamb 1936; 3-5, Bernabò Brea 1964 and 1972).

shape to correlate the main cultures of North-Eastern Anatolia and Central Mediterranean during the Third Millennium BC (Cazzella *et alii* 2011: 159; Cazzella, Maniscalco 2012: 95).

Whether or not barrel-shaped vessels are considered to be related to dairy production, the Biblical term of “butter churn” (Kaplan 1965: 148-149; Perrot 1968: 432) continues to be improperly maintained until now, generating some confusion and uncertainty on the hypothetical function which seems to be hardly accepted at the light that the high percentage of barrel-shaped types from given archaeological contexts are miniature vessels. In this case it is difficult to interpret these pottery examples only in the way as specialized implements for butter production, because the uncomfortable small-scale of the overwhelming majority of examples found in Western Anatolia introduces the suspect that the miniature vessels in question were used for cultic purposes, as the so called “Churn Goddess” figurine from Gilat, Negev, confirms (Epstein 1982: 78, fig. 53; Amiran 1989) (fig. 7).

This paper aims at investigating the main aspects related to this intriguing pottery class which needs to be re-interpreted in different ways. Firstly, in the last decades the increased archaeological record, mainly in Western Anatolia, leads to focus on the nature of context where barrel-shaped vessels were found. Moreover, the reassessment of the archaeological record coming from the oldest excavations at Poliochni on Lemnos (Cultraro 2012), as well as at Troy (Easton 2002), suggests to attempt a new fresh survey on the barrel-shaped vessels, including a satisfactory interpretation of the function(s) and its symbolic dimension.

A second level of research involves the definition of correlations between the appearance of barrel-shaped vessels and patterns of dairying strategies, in particular among the Chalcolithic and Early Bronze Age coastal village societies of northwestern Anatolia. In this perspective it is of relevant interest to investigate other pottery categories associated with the barrel-shaped vessels, which can be related to milk production and its secondary products, such as the perforated cheese-strainers which, in the case of the Chalcolithic site of Yarikkaya in central Anatolia, chemical analyses confirm to be used in the production of cheese (Sauter *et alii* 2003). In general, molecular or stable isotope investigations of organic residues is the most fit way to validate the use of these specific pots for milk production (Craig 2002). Although there is a scarce application of the modern laboratory analyses on organic residues, some valuable studies undertaken in Western Anatolia, and the unpublished data from Poliochni on Lemnos (see further) provide evaluable indications of specialized pottery assemblage for dairy production.

Finally, specific investigations of faunal data from some sites may contribute to define the economic dimension of dairy production for domestic or village consumption among these human groups (Halstead 1996). Ethnoarchaeological researches (Seferiades 1985: 217-218; Takaoğlu 2006*a*) can also be an useful tool to give more information on the past patterns of dairying and shepherding, and the close similarities among the Bronze Age barrel-shaped pottery and goatskin churns used by modern transhumant pastoralists in Black Sea region,

as well as in Syrian-Palestinian area, leads to follow this interpretative way.

In order to provide a more correct interpretation of this pottery category and its plausible correlations with cheese production, it needs to investigate and to reconstruct the main archaeological contexts where barrel-shaped vessels were found.

#### WESTERN ANATOLIA AND NORTHERN AEGEAN

A large number of complete and fragmental clay churns occurs in different levels of the Early Bronze Age at Troy. Schliemann found some examples of this pottery category in the “Trojan stratum of Burnt City”, during the explorative campaign in 1873 (Schliemann 1874: 275-279, 1875: 341-342). A complete dark yellow barrel-shaped vessel with spout on one side was found in Area VI of Citadel, nearby the complex that he identified as “Priam’s Palace”, where the valuable “Treasure A” was collected (Schliemann 1874: 189-3462, 1884: 152) (fig. 1, 1). According to the reconstruction of the excavation area (Easton 2002: 292-293, fig. 192), the barrel-shaped vessel was found in a part of the early Bronze age settlement where some buildings of architecturally relevant significance were placed. However, the lack of further information in Schliemann’s daybooks doesn’t help us to reconstruct the archaeological context, but a dating to Troy II late or Troy III appears to be likely.

A second example comparable with the pot from Area VI was found in another part of Citadel (Schliemann 1875: 341, n. 283, 1880: 404, n. 4399), and

was erroneously restored as a beaker (Schmidt 1902: 134, n. 2558). Moreover, there is evidence of a third example found in the Citadel too, which has three small feet and a large flat handle (Schliemann 1880: 405, n. 440; Schmidt 1902: 75, n. 1748) (fig. 1, 2).

During the explorations by the university of Cincinnati, a miniature clay barrel-shaped vessel (h. 10 cm.) of unusual shape was recovered from Stratum E in a domestic context dated to Troy I middle (Blegen *et alii* 1950: 76, 179, fig. 231, n. 37.980, Form D28) (fig. 1, 3).

Comparing the vessels found in the Schliemann’s excavations and those from the Cincinnati University’s campaigns, the Trojan clay barrel-shaped containers show the same morphological features: a horizontal barrel-like biconical body swelling in the middle part and narrowing at each edge to a flat wall with pronounced ridge for ropes to be hung. Moreover, at the top of middle part is one tall narrow neck with slightly flaring rim and it notable that all Trojan examples are without decorative patterns.

In North-Central Anatolia, in the region of Afyon, the recent exploration of the settlement of Kaklik Mevkii, displays a barrel-shaped miniature vessel with a large vertical handle from the body to the cylindrical neck (Efe *et alii* 1995: 385, n. 87, fig. 25, pl. 30) (fig. 1, 4). The form is unusual in the local ceramic assemblage, and some features, such as the miniature scale and the cylindrical section of body, are comparable with the barrel-shaped vessels from Troad region.

The vessel from Kaklik Mevkii, which was found in a storage room close by the fortification walls, is important in terms of relative chronology, because the con-

text is dated to a transitional period to the Early Bronze Age and correlating with Troy I late and Beycesultan EB1 (Efe *et alii* 1995: 375-376).

A fragment of body belonging to this variety is reported from the Early Bronze Age settlement at Dermicihüyük, in the Eskisehir district; the cylindrical section, the flat edge and the miniature scale clearly resemble the miniature churn from Kaklik Mevkii mentioned above (Efe 1988: 161, K8.130, pl. 48.10).

Finally, a clay miniature churn was found in the house-floor of a large building at Karataş, in Southern Anatolia. The vase, dated to the Early Bronze Age II-III, has a barrel-shaped body, circular in section, and traces of a vertical handle (Mellink 1965: 250, pl. 64.32) (fig. 1, 5).

Moving to the islands of Northern Aegean, two examples comparable to the Trojan biconical churns have also reported in the oldest excavations in the Bronze Age settlement at Thermi, in the island of Lesbos (Lamb 1936: 121, 134, fig. 37, nn. 367 and 601). W. Lamb interpreted these miniature pots as “receptacles for oil” (Lamb 1936: 121). The first example (fig. 2, 1) was found in Area E5 related to Thermi IV period, where a recent study of the functional analysis of buildings has proposed to identify a storage place probably related to ritual purposes, as the large concentration of marble idols suggests (Kouka 2002: 168-169).

The second example from Thermi (fig. 2, 2) is reported from an unstratified deposit in Area Theta, dated to Thermi II-IV period, and where the huge assemblage of spindle whorls and other implements for textile manufacture qualifies this building as a domestic working area (Kouka 2002: 169).

Further information of the context and function of the barrel-shaped vessels in Bronze Age Northern Aegean are reported in the coastal settlement of Poliochni, in the island of Lemnos.

Two complete miniature examples of biconical barrel-shaped pots with pronounced ridges and narrow neck were found among the pottery assemblage in Room 518 dated to Red Period, correlating to Troy II early (Bernabò Brea 1964: 506, pl. 148*a-b*) (fig. 2, 3, 4). L. Bernabò Brea (1962: 642) has correctly identified both examples as a small scale reproduction of the barrel-shaped vases found by Schliemann at Troy, already mentioned. Morphologically the examples from Poliochni Red Period are very close to the category from Troy and Lesbos, because they basically show an asymmetrical cylindrical body and two ridges located at the edges.

The context where two barrel-shaped vessels were found needs to be reassessed. The Room 518 is a part of a large building comprising Room 510-511 and 513-514 (Bernabò Brea 1964: 469-478, fig. 275) (fig. 3). After a general reassessment of the archaeological record coming from excavations of 1931 and 1956 carried out by the author, this large building, which shows three different architectural phases belonging to the Red Period, can be interpreted as a structure for cultic purposes. The focus of ritual activity is the Room 510-511, a large room with stone benches, which in the final phase was divided in two separated spaces (Bernabò Brea 1964: 472, fig. 276).

The pottery assemblage includes miniature vases, smallest cups, large pedestalled bowls and small globular jugs (Bernabò Brea 1964, 487: pls. 136-138). This pottery assemblage, which is

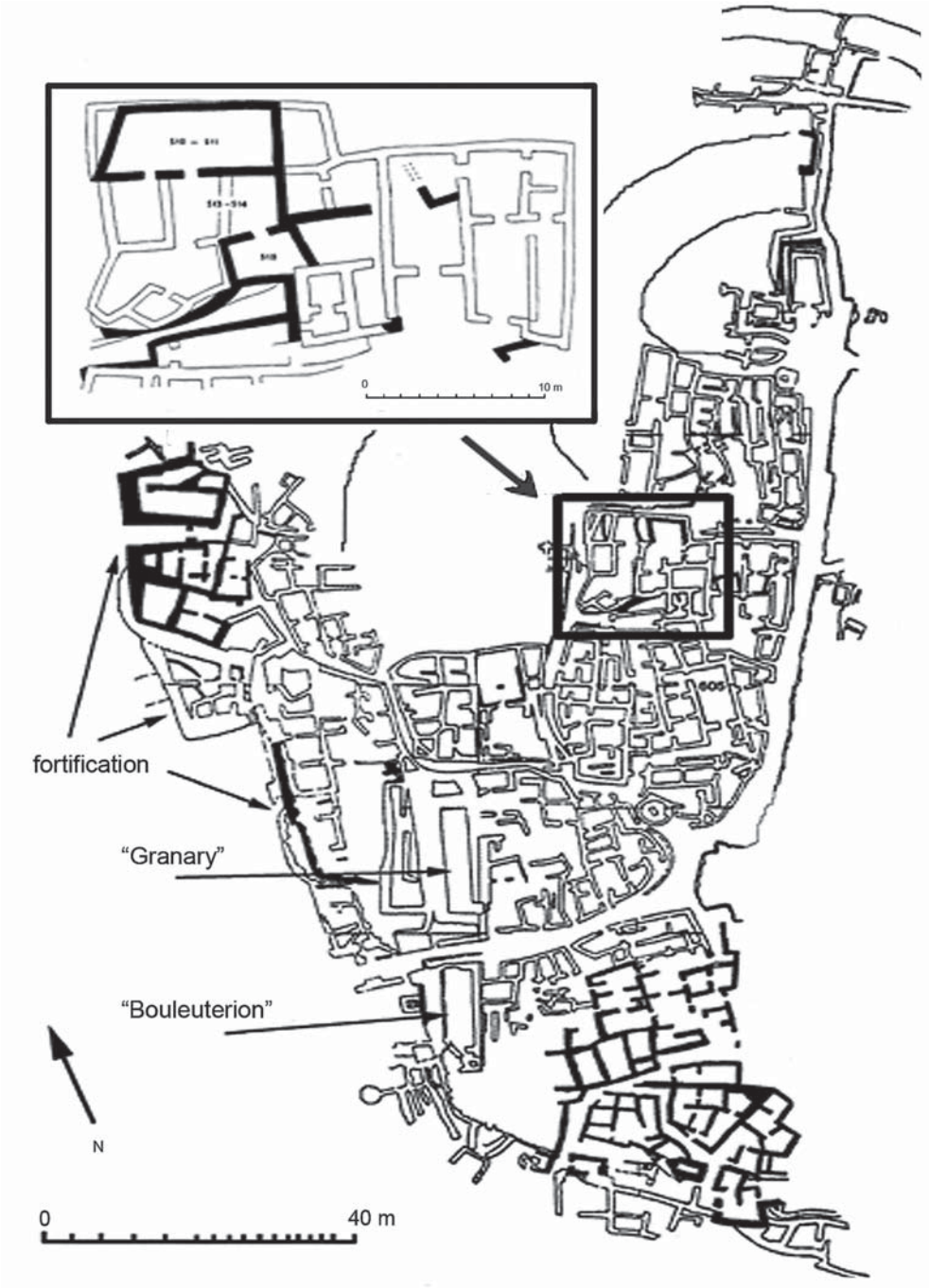


Fig. 3 – Plan of the Bronze Age settlement at Poliochni on Lemnos, with indication of the Building 513-518 of Red Period (adapted from Bernabò Brea 1964).

marked by red/black burnished ware and by well-made surface treatment, mostly encompasses vessels for serving and consuming liquids. Behind the entrance to Room 510-511 a large pit with plastered walls may be interpreted as a “bothros” for ritual offering, because it was exceptionally filled up with miniature vases, among them some jugs containing carbonized seeds (Bernabò Brea 1964: 481, 497, fig. 282). Close by the bothros was identified a large pit rich in finds: pottery includes cooking vessels and fine table ware, and associated to them an abundant faunal evidence mostly represented by young sheep and goats.

In the same area a singular sandstone baetyl (h. 45 cm), which was placed close to plastered pit, can be interpreted as an aniconic cult image for religious purposes (Cultraro, La Rosa 1997: 105, fig. 4). On the southern side of open-air space 513-514 the nearby Room 518, where the barrel-shaped vessels were reported, can be interpreted as the storeroom related to the domestic shrine.

In general, the architectural plan, the features as benches, plastered pit and stone baetyl, as well as the faunal deposits and the selected tableware, suggest a complex of ritual activities strictly related to a domestic shrine of relevant importance for the local community. In this context we should interpret the possible function and symbolic significance of two barrel-shaped vessels found in Room 518. The results of chemical analysis on organic residues carried out on the miniature vases from Room 518 further clarify this interpretation.

Even at Poliochni, a third fragmentary example of barrel-shaped vessel is reported by Bernabò Brea from a disturbed superficial layer in the south-western area

of settlement, but this latter has not been identified among the archaeological material stored in the Archaeological Museum at Myrina (Bernabò Brea 1964: 642, inv. 2830).

A large barrel-shaped vessel decorated with plastic reliefs terminating in ram's head was found in the eastern building block (“*Insula VI*”) of the settlement of Yellow Period (Bernabò Brea 1976: 276, pl. 230; Cultraro, La Rosa 1997: 91, fig. 4) (fig. 2, 5).

It should be stressed that the barrel-shaped vessels reported from Anatolia and Northern Aegean show basically the main morphological features, as the long horizontal, asymmetrical body with conical section, swelling in the centre and ending with pronounced edges. The only exception is a large barrel-shaped with three small feet and handle from Troy (fig. 1, 2), but, in my opinion, this latter vase can be related to a late phase of the Bronze Age sequence at Troy, maybe Troy III-IV, according to the similarities with the vase from Poliochni of Yellow Period mentioned above (Schliemann 1880: 452, n. 440; Schmidt 1902: 75, n. 1748).

Apart from two examples from Troy II-III and one from Poliochni of Yellow Period, the large part of barrel-shaped vessels in this area is represented by miniature pots. There is no doubt that these clay containers were used for storing modest quantity of liquid, which was perceived of relevant value.

#### A LOOK AT CRETE: AN ANATOLIAN INTRUSIVE FEATURE?

For the purposes of this diachronic comparison, it is noteworthy that barrel-

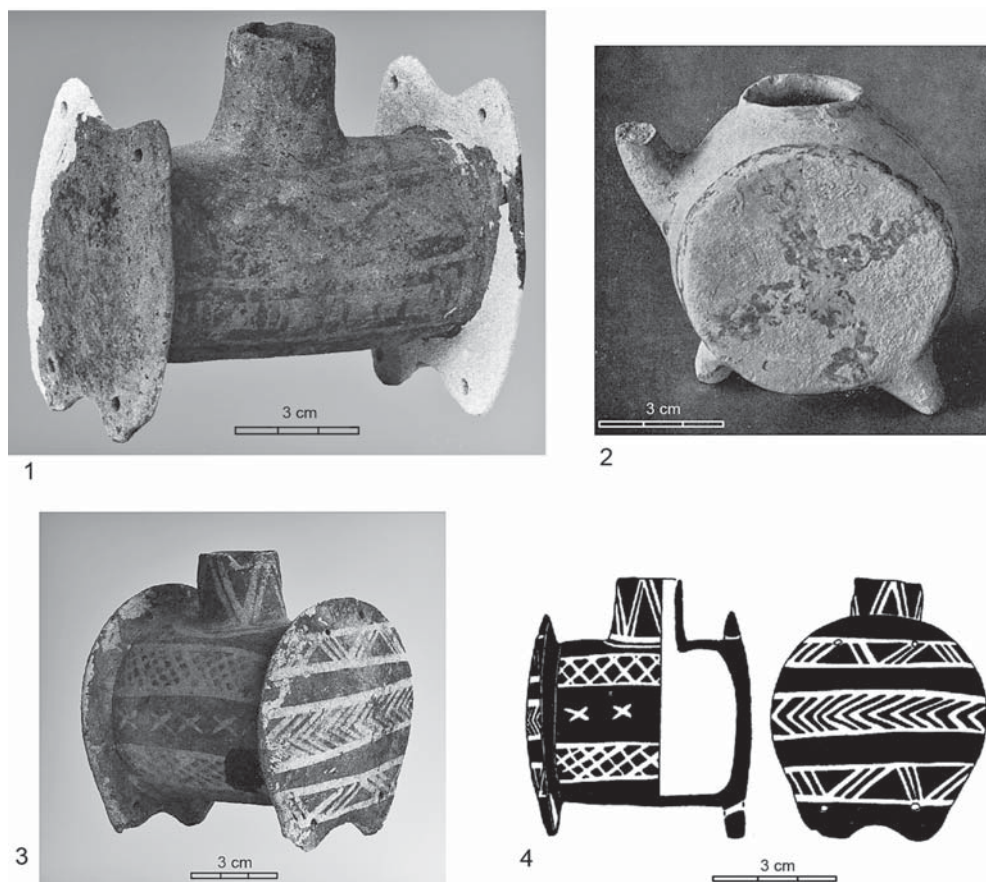


Fig. 4 – Barrel-shaped vessels from Early Minoan Crete: 1, 3-4, from Lebena; 2, from Koumasa (1, 3-4, after Alexiou-Warren 2004; 2, from Zervos 1956).

shaped vessels occur in other areas of Aegean Sea and the Early Minoan cemetery at Lebena, southern coastline of Crete, provides important data in this perspective. In Tholos Tomb II are reported two examples of barrel vases, which represent an uncommon pottery category among the ceramic repertoire of Crete during the Early Minoan I-IIB (Alexiou-Warren 2004: 62-63, fig. 18 pls 31*b*, 32*a*) (fig. 4, 1,3,4).

Both examples from Tholos II at Lebena, dated to Early Minoan I, show a cylindrical body with a central collar

neck; the main characteristic feature is the enlarged flat edges with two pairs of perforations, formed as ears corresponding to four small feet below. Moreover, the body and the edges are decorated by painted motifs in both cases: one is made in the Haghios Onouphrios Style with red or black ornaments, whereas the other vase has white designs on a red background (Lebena Style).

Despite the close similarities with the Anatolian examples, it should be stressed that these latter are without feet and undecorated. The cylindrical body and the

large dimension can be compared with the restored two churns from the Schliemann excavations at Troy already mentioned (fig. 1, 1), whereas the presence of three small feet is a peculiar feature of the churn/askos from the Citadel dated to Troy II late or Troy III (Schliemann 1880: 452, n. 440) (fig. 1, 2).

In the Tholos Tomb at Koumasa, in a context dated to the Early Minoan II, is reported a clay barrel vase (fig. 4, 2): it consists of a horizontal cylindrical body with a small neck at the top and its ends closed, a vertical handle and three small feet (Zervos 1956: 215, fig. 267). The vase, which was once dated to the Middle Minoan Period (Zervos 1956: 215), after the discovery of two examples from Lebena mentioned above, can be attributed to the Hagios Onouphrios pottery assemblage of Early Minoan I-IIB (Betancourt 2008: 53, fig. 5, 8).

The vase from Koumasa is very close to the Anatolian examples for the vertical handle and the three tiny feet, but the painted ornament is purely Minoan.

Whereas the vessels from Lebena and Koumasa are without close comparisons in the pottery repertoire of Early Minoan period at Crete, the origin of this form may be related to the Early Bronze Age Anatolian world. The Cretan examples seem to be an accurate clay imitation of churns which occur in Western Anatolia and in Northern Aegean. Many of the tableware assemblage of the Prepalatial period seems to imitate other materials, following a trend which is seen elsewhere in other part of the Aegean in this same period (Renfrew 1972: 335-337). In the pottery assemblage of Early Minoan I some shapes or decorative motifs appear to imitate organic materials: it has been suggested that some Early Mi-

noan I ovoid jug with cut-away spout can be derived from gourds (Hood 1971: 30; Betancourt 2008: 55, fig. 5.11), or that some painted decoration may deliberately imitate string net patterns (Hood 1971: 30; Betancourt 1985: 29-31), as the multiple-lines painted in both barrel-shaped vessels from Tholos Tomb II at Lebena. It is also notable that the dark pattern burnished pottery is the better candidate for imitating wood graining (Evans 1971: 59-60), whereas in the case of the Early Cycladic incised pottery has been convincingly demonstrated the probable origin in basketry (Rambach 2000: 45).

The barrel-shaped vessels at Lebena and Koumasa can be the clay imitation of a wooden churn, but the closest affinities with the examples of this category in Northern Aegean and Troad may reflect that the model was introduced in Crete from Anatolia. It has been suggested elsewhere that some Early Minoan I-IIB shapes imitate typologies and features of the pottery repertoire of Troy I, as the bell-shaped lids, the zoomorphic vases, the two-handled tankards or chalices with high base (Cultraro 2009: 233-235, figs. 11-13). As Betancourt has convincingly clarified (2009: 103), the Cretan potters since the Early Minoan I transformed what they received from abroad giving it a new appearance.

#### A PERSPECTIVE FROM EASTERN MEDITERRANEAN

Valuable studies have demonstrated that barrel-shaped horizontal vessels occur in some sites of Jordan Valley, as Teleilat Ghassul, which became the type site for eponymous Ghassulian aspect of

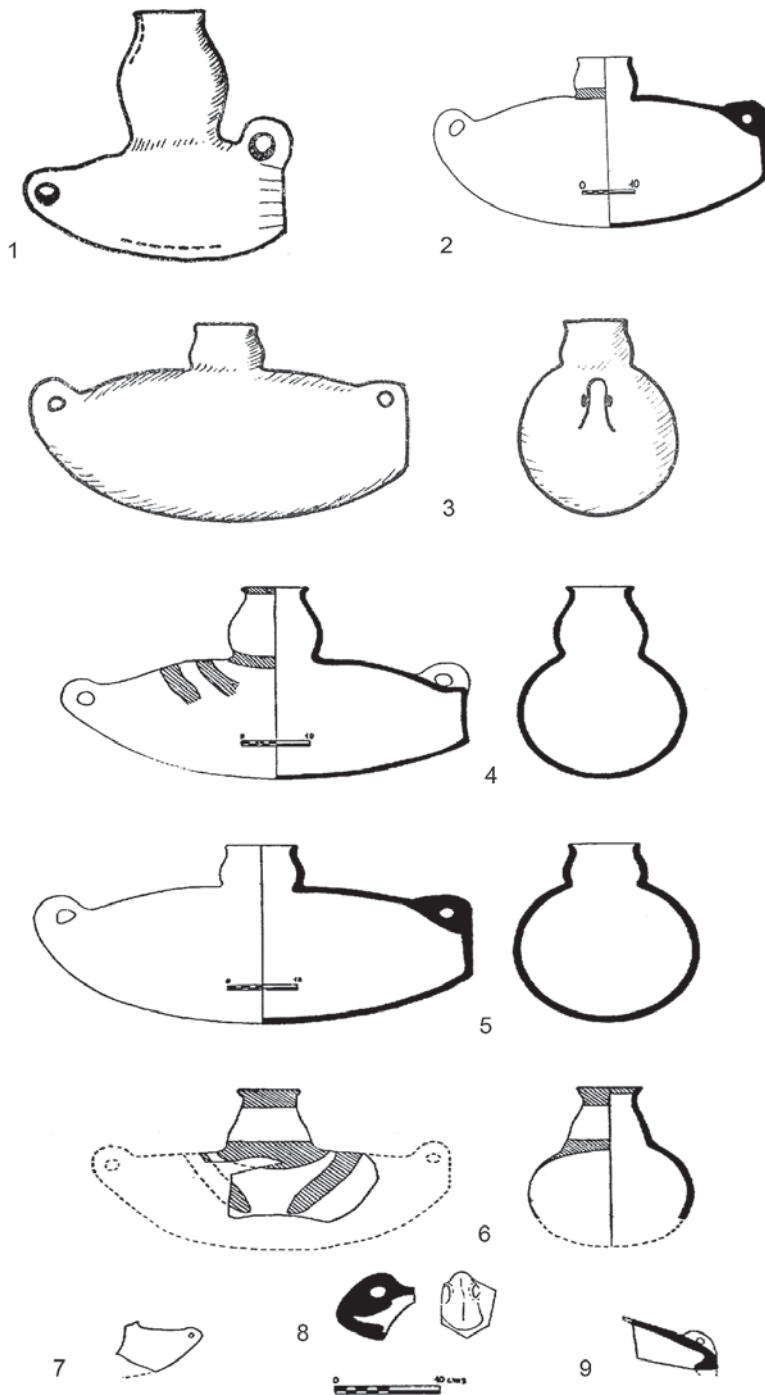


Fig. 5 – Barrel-shaped vessels from Late Chalcolithic and Early Bronze Age I Southern Levant (1-2, after Kaplan 1965; 3-9, after De Contenson 1956).

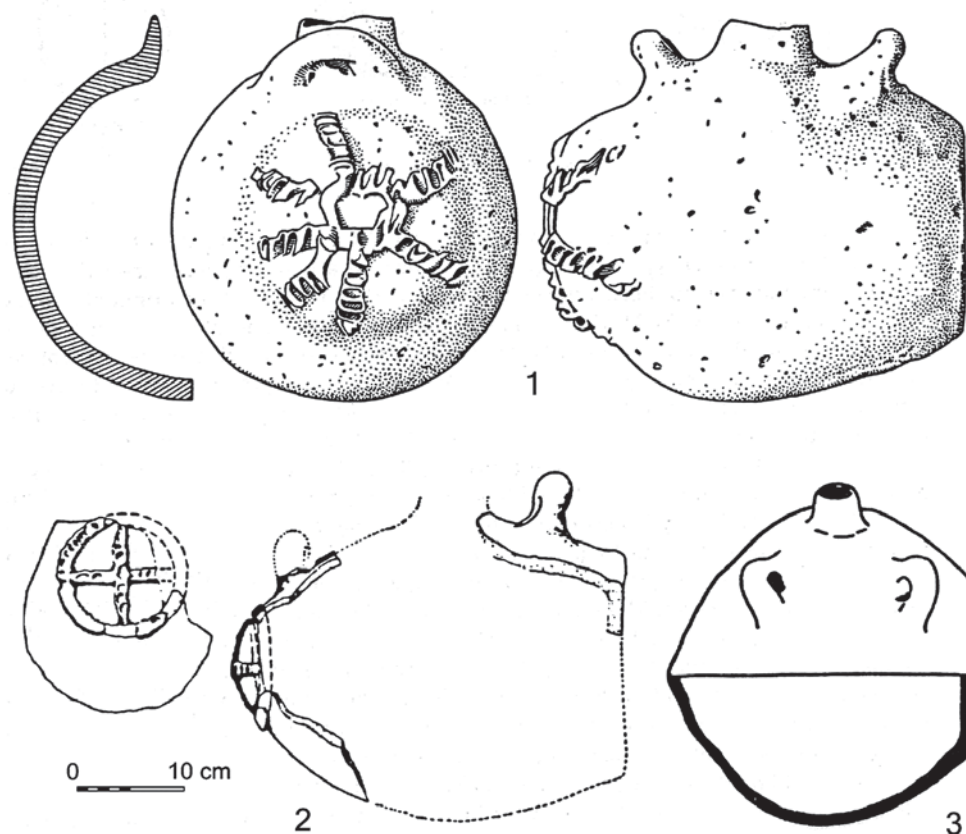


Fig. 6 – Barrel-shaped vessels: 1, from Minshat Abu Omar, Egypt; 2, from Azor; 3, from Jericho (after Kroeper 1989).

the Chalcolithic Period in this region (Mallon *et alii* 1934: 128; De Contenson 1956; Kaplan 1954; 1965) (fig. 5: 1, 2). Moreover, this category of pottery, conventionally named in French as “barattes” (Perrot 1968: 432), is reported from the Beersheba district, which produced important radiocarbon samples for the early dates of Chalcolithic Period in Southern Levant (Dessel, Joffe 2000: 39-40) (fig. 5, 3-9).

An example found at el-Mughar, Gedera, in a Ghassulian context, shows an asymmetrical body with two ear-handles

on the edges, and a second vertical vessel put in the middle part of jar (Kaplan 1965: 144, fig. 1) (fig. 5, 1). The interpretation by Kaplan (1965: 145) is formally right, because the example from el-Mughar is formed by two different vases, the main is the churn and the second is a secondary clay container vertically fixed, probably related to a specific but undeterminable function.

This variety with double vases or high neck occurs in the Beersheba sites, where the barrel-shaped vessel appears to be more standardized in the morphology of

body (Perrot 1957: 20, fig. 19.5, pl. II middle). The vessel shows a biconical section and a specific feature is the appearance of two loop-handled at the ends of the body (De Contenson 1956: fig. 7-9) (fig. 5, 2-6). Evidence from Beersheba region suggests that this category of pottery continues to be used during the Early Bronze Age I-II (Kaplan 1965: 145, footnote 5), and after such period these vessels seem to disappear among the local pottery repertoire (Schaub 1996).

The main assemblage of barrel-shaped vessels from Southern Levant includes many miniature examples, which occur in tombs too, as at Azor, Tel Aviv (Perrot 1961: fig. 39.3) or in probable domestic shrines, as at Horvat Beter, Beersheba region (Dothan 1959: fig. 10.3).

The possible relationship between the barrel churns and the religious sphere is illustrated by an anthropomorphic vase found in the temple at Gilat, Northern Negev, and dated to the Late Chalcolithic Period/Early Bronze Age I (Alon 1976 and 1977) (fig. 7). The female statuette represents a goddess, who is majestically seated on a stool, carrying a churn on her head, supported it with her right arm and holding another small vase under left arm (Alon 1976, pl. XXXVI). Moreover, the figure shows the emphasized sexual organs and she seems to appear as pregnant (Epstein 1982: 77, fig. 53). The posture, the gesture of carrying a vessel, the dimension and the stool lead to interpret the figure neither a worshipper or an offerings-bearer, but a divine image (Amiran 1989: 53).

The churn placed on the figure's head is an important attribute and it means that this pottery category, mostly in the



Fig. 7 – Clay female figurine known as Churn Goddess from the Late Chalcolithic temple at Gilat, Israel (after Epstein 1982).

miniature variety, could be used for cultic purposes.

Arguments over whether the figurine is the image of the Churn Goddess related to milk production (Epstein 1982: 78), or the churn was originally a water-container (Amiran 1989: 55), become more problematic, again pointing to the

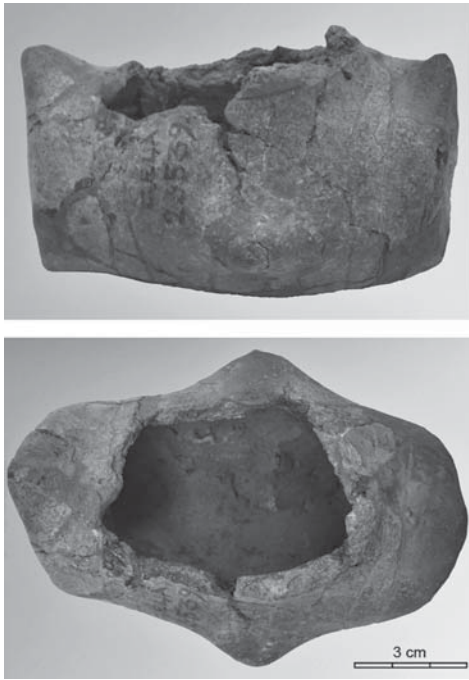


Fig. 8 – Archaeological Museum at Syracuse: barrel-shaped vessel from the Early Eneolithic Period cemetery at Piano Notaro (Gela), Sicily (inv. 23539) (author's photos).

scarce evidence of closed contexts in Southern Levant related to the phase in question.

In the specific context of Gilat, the churn is a container perceived and used as implement of a service set for cult activity. The symbolic and ceremonial value of the barrel-shaped in the Southern Levant during the Late Chalcolithic period is also stressed by another zoomorphic vase discovered in the temple at En-Gedi (Amiran 1989: 54-55, fig. 2). The vessel represents a cow or bull carrying a pair of barrel-shaped pots. It is notable the correlation between this kind of container and the ruminant animal related to the production of milk. As the Gilat female statuette, the zoomorphic vessel

from En-Gedi was found in a temple, and it could be used as implement for ritual purposes, perhaps as container for specific liquids.

The connection of the Gilat statuette as Rain-Goddess with the water world and its symbolism is a suggestive interpretation (Amiran 1989: 57), but need to be much more explained in terms of utilitarian function of this pottery class and of symbolic meanings.

Assuming that the miniature vases were used for cultic proposes, it is difficult to believe that barrel-shaped vessels were used exclusively as water-container, as Amiran proposed (1989: 55). In fact, the specific morphology of body and the pairs of small handles at edges indicate that the shape was not very convenient for transport over long distances.

Another vessel category can be likely identified as pots for carrying water. This is a large oval-body jar with a spout at top middle, which largely occurs in Levant during the Ghassul phase (Kroeper 1989: 416, fig. 8c) (fig. 5, 3). The shape has been compared with a barrel-shaped jar found at Azor, in a Late Chalcolithic context (Kroeper 1989: 416, fig. 8b) (fig. 6, 2). The body has a circular section and the central neck on the top is flanked by two upright handles, and one side is decorated with a rope ornament (Kroeper 1989: 416, fig. 8a). It is notable that this variety of globular or cylindrical goatskins has closest parallels with a pot found at Minshat Abu Omar, in the Eastern Delta in Egypt (fig. 6, 1). This vase, which is dated to Naqada IIc- Dynasty 1 (3200-2950 BC), is a unique find in Pre-Dynastic Egypt and it has been correctly related to a shape inspired by the contemporary Palestinian churns, as

other imports from the same area confirms (Kroeper 1989).

More in general, the evidence from Gilat and from other sites of the Late Chalcolithic sites in Southern Levant contributes to focus in three main aspects of the symbolic sphere related to the class of barrel-shaped vessel: the churn as container for milk; the miniature scale into religious context, and the connection with the female world.

#### LONG-RANGE CONNECTIONS: THE EVIDENCE FOR SICILY

In 1902 Paolo Orsi, exploring the cemetery of Archaic period on the hill of Piano Notaro, along the western area of ancient Gela, identified a part of a prehistoric necropolis consisting of some small chamber tombs (Orsi 1908). Further, the specific funerary architecture and the grey burnished ware with incised decorative motifs was named as San Cono-Piano Notaro pottery assemblage (Bernabò Brea 1958: 72-75).

The pottery assemblage from Piano Notaro has been known for long time through the preliminary publication by Orsi (1908) and an ongoing reassessment of the archaeological record, stored in the Archaeological Museum at Syracuse, is carried out by the author. The combination of information reported in Orsi's daybooks and the markers in each vase made by the Italian scholar, provides new data for identifying and reconstructing the location of burials and the related grave goods.

Piano Notaro was a modest cemetery which included no more than 10/15 tombs. These latter were characterized by a vertical shaft, dug into the bedrock,

and by a burial chamber of modest dimension, usually elliptical in shape.

Among the grave goods, Orsi reported an uncommon miniature barrel-shaped vessel (1908: 138, pl. IV.1) (fig. 8), which was interpreted as a lamp or a container comparable to similar perishable items used in modern rural Sicily. As Schliemann for the barrel-shaped vessels from Troy, mentioned above, the Italian scholar applied the method of ethnographical comparison for explain the function of this uncommon pottery category.

After a long silence in literature, the barrel-shaped vessel of Piano Notaro has been considered as a key element for reconstructing a pathway of long-range interaction between Sicily and Anatolia during the Eneolithic period, in a wider coherent systems of relations mainly provided from the affinities of some decorative patterns in the Sicilian prehistoric pottery and the Eastern Mediterranean (Cazzella 1974: 267).

The vase from Piano Notaro is a pale grey ware well-manufactured product, in miniature dimension (h. 6,2 cm, L. 10,8 cm), with asymmetrical cylindrical body and pronounced flat ends. It also shows a pair of ledge-handles is on the middle of body, and a decorative pattern of incised lines reproducing the rope system to be hung (McConnel 1997: 292, fig. 9).

The recent reassessment of the archaeological record from the Eneolithic cemetery at Piano Notaro gives further information on the context of the barrel vessel in question. It was part of three vases which constituted the grave goods probably of a single or two burials inside the same chamber tomb. It has been possible to identify the shallow bowl and the

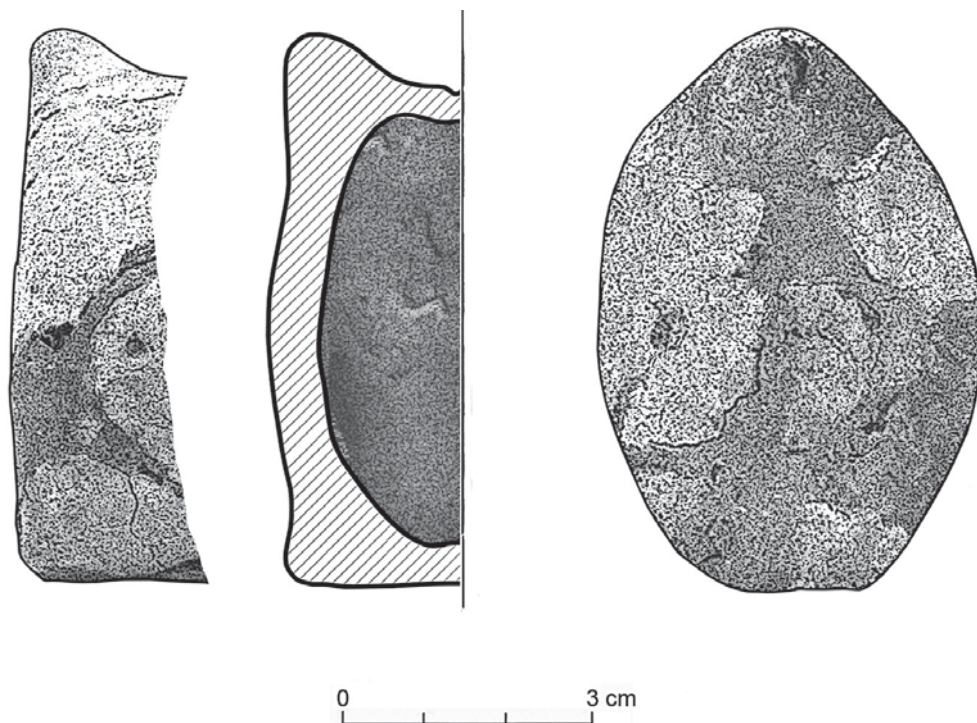


Fig. 9 – Archaeological Museum at Licata, Agrigento: part of a barrel-shaped vessel from Casalicchio-Agnone (unpublished material) (drawing by author).

small jar (Orsi 1908: pl. IV 3 and 6) as items, together with the barrel vessel, of the same burial. Unfortunately there are no available information about the number of inhumations placed in the tomb and the absence of the human remains is a serious hindrance to reconstructing the funerary practices.

However, a preliminary reconstruction of the cemetery leads to identify two different phases in the use and development of the funerary area. The barrel-shaped vase can be assigned to the Group II, which, in terms of the inner chronological sequence, is dated to the late phase of the development of the San Cono – Piano Notaro pottery assemblage.

A second example of barrel-shaped

vessel occurs in the site of Casalicchio Agnone, near Licata, along the south-eastern coastline, where regular excavations carried out by F. Gnesotto in 1978-80 have permitted to identify a settlement with a long chronological range from the Neolithic Period to the Early Bronze Age (Gnesotto 1982). Among the mass of unpublished material reported from the Gnesotto's soundings, it has been identified a small part of cylindrical body of a barrel-shaped vase (fig. 9). The sherd, belonging to a Grey Burnished fabric, comes from a trench where was identified levels with San Cono – Piano Notaro pottery.

It is notable that both examples of barrel-shaped vessels are related to the

first phase of the Eneolithic Period, whereas there is no evidence of the same pottery class in the following periods.

#### BARREL-SHAPED VESSELS IN CENTRAL EUROPE: EMERGENT PATTERNS?

That the barrel-shaped vessels can be a specialized pottery category well-documented in geographically and chronologically different contexts is convincingly shown by the evidence for central Europe.

Eloquent archaeological support for this view is offered by a large occurrence of barrel-shaped vessels in different part of Western Hungary and Carpathian Basin during the Baden culture (Banner 1956: 146, pls. 6.1; 21.23; 23.42; 29.13; Kalicz 1963: 36; Sherratt 1981: 281, fig. 10.15).

In the Baden culture, which now is dated to 3400-2600/3500-2900 BC (Kalicz 2004: 195), this pottery category has been interpreted as churns (the so-

called '*fischbuttenförmige*' vases in German terminology) and it also has correlated to the imitation of exogenous prototype imported from Western Anatolia or North-East Aegean (Banner 1956: 146; Kalicz 1963: 36-37) (fig. 10, 3-4). The map of distribution includes the basin of Danube in Low Austria (Pittioni 1954: 202, fig. 130; Mayer 1996: 54-56, pls. 11.1 and 21.2) and the South-East Bulgaria, where the this pottery category occurs in context dated in the later fourth and early third millennia BC (Merpert, Georgiev 1973: 245, fig. 23) (fig. 10, 4).

Recent advances in explorative fieldworks carried out in different areas of Western Germany and Austria have been useful to review what it has been shown at an empirical level about this pottery category in the last decades. There is a significant evidence for barrel-shaped vessels which occur in context dated to the Late Bronze Age and to the early phase of Urnfield Culture (Lochner 2012: 195-197, figs. 3.6 and 4). A re-

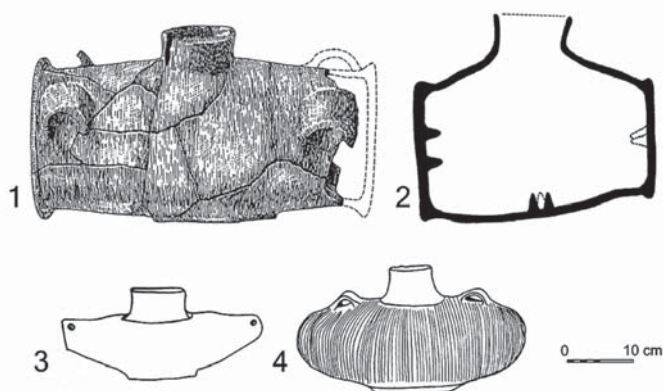


Fig. 10 – Barrel-shaped vessels in central Europe: 1, 2, examples of the Urnfield Culture (after Lochner 2012); 3, 4, from the Baden Period (after Kalicz 1963).

assessment of the archaeological record confirms that barrel-shaped vessels continue to be used until the beginning of the Hallstatt Culture (800-750 BC), according to the evidence for the stratified site at Thunau am Kamp (Lochner 1997: 28, fig.25.1; 2012: 196-197) (fig. 10, 1-2).

In the light of the above archaeological documentation, there is a wide gap between the oldest evidence related to the third millennium BC and those dated to the Late Bronze Age, but this interruption of production could be apparent as consequence of an uncompleted status of the archaeological record. Despite these considerations, however, some substantial differences can be recognized among two assemblages of barrel-shaped pots. The category related to the oldest examples dated to the Baden culture shows small-size vases (height around 8-15 cm.), whereas the vessels from Late Bronze Age contexts are largest and highest. Moreover, these latest examples show specific features, as a series of holes on lateral walls and, in some case, the application of plastic knobs in the inner body (Lochner 2012: 197, fig. 4, 2, 4) (fig. 10, 2).

The main question arises the origin of shape in central Europe, which some scholars suggest to connect to the barrel-shaped vessels of North Aegean, thanks to the closest formal affinities (Banner 1956: 146; Kalicz 1963: 36-37). Large-scale contacts between the Baden people from Western Hungary and the Anatolian communities of Troy II are typified through the circulation of non-Aegean metals in Northern Aegean and Western Anatolia (Kalicz 2004: 189-190), as well as the similarities of the pottery assemblage of Poliochni Blue Period and those

from Ezero and other sites of the early Baden culture (Bernabò Brea 1964: 694-699).

Starting with the documentation related to the Danube Basin, however, the origin of this clay vessel in Western Hungary could be fortuitous and independent by possible relationships between the communities of Western Anatolia and Carpathian area in the early phase of the Third millennium BC (Huot 1982: 558).

If we accept the model already proposed that cylindrical vases are correlated within the consumption of dairy products, in the case of the barrel-shaped vessels of Baden culture we could suppose that this pottery category is an imitation of the utilitarian and perishable goatskin milk bottles. Indeed, a probable local origin of the shape, even connected with the increase of the mixed farming economy, can be identified in the barrel-shaped ceramic containers which occur in the Early Neolithic Linear pottery culture and in the middle Neolithic Rössen culture in Central Europe dated to later 6<sup>th</sup> and early 5<sup>th</sup> millennia BC (Sprockhoff 1933: 249, pls. 20-21). Similar examples of barrel-shaped vessels also occur in context of the late Neolithic culture of Jordansmühler (4300-3900 BC.), in central Germany (Lochner 2012: 201).

These latest examples, which probably makes them the earliest such vessels in Mainland Europe, need to be further explained and to interpret in a wider perspective, focusing on the dairying strategies of transhumant shepherds and of milk processing, as well as the interrelations between technological changes in dairy economy and acquisition model from basketry or wooden vessels repertoire.

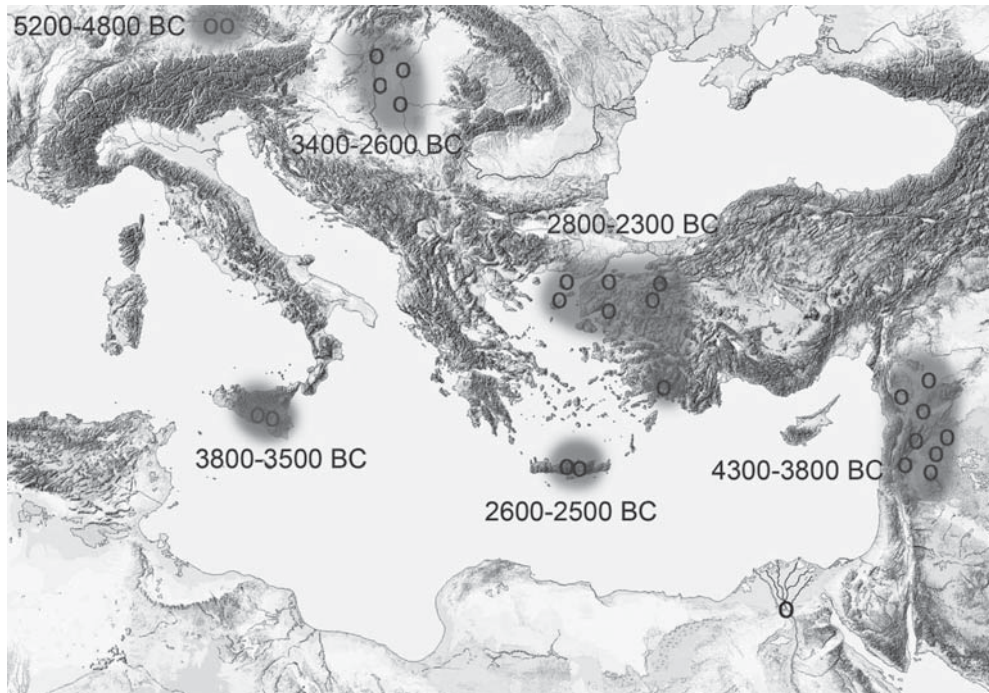


Fig. 11 – Distribution map of barrel-shaped vessels in the Mediterranean during the late fourth and third millennium BC.

#### CONTEXTUALIZING THE CHURNS: A QUESTION OF DATING AND TYPOLOGY

The pottery analysis leads to conclude that there are marked differences in form between the clay barrel-shaped vessels from Southern Levant and those from Western Anatolia and Crete, as well samples from Sicily too. At this point, the main question is to explain similarities and differences in a synchronic and diachronic way that encompasses, in an expanding geographical perspective, each region where this pottery category occurs (fig. 11).

The assemblage of barrel-shaped vessels reported from Beersheva-Ghassul sites represents chronologically the oldest evidence of this pottery class. Despite

some incongruous gap in radiocarbon chronology, several radiocarbon dates from the Late Chalcolithic sites in Jordan Valley would seem to indicate that Ghassul culture is now dated to the later 5<sup>th</sup> and early 4<sup>th</sup> millennia BC (Rowan, Golden 2009; Klimscha 2012).

In the transitional phase to early Bronze Age, which can be partially correlated with the early part of Egyptian Dynasty, occurs the barrel-shaped with two handles reported from the cemetery at Minshat Abu Omar, in the Eastern Delta of Egypt: the correlations with Naqada IIc-Dynasty 1 (3200-2950 BC) and Early Bronze Age 1 in Palestine is an important element in terms of dating the latest production of barrel-shaped vessels in Southern Levant.

As regards the Palestine area, the in-

ternal chronology of the Early Bronze Age I remains unclear and problematic due to the competing systems of terminology and dating of the main pottery assemblages. The radiocarbon dates provided from some sites in southern Coastal Plain and in Negev Highlands suggest to place the development of this period about 3300-3000 BC (Stager 1992: 35-41). It is worth noting that in the later phase of the Early Bronze Age period (3000-2900 BC), which is a phase of general reorganization of settlements and of new socioeconomic configurations (Joffe 1993: 50), there is no evidence of clay barrel-shaped vessels in Southern Levant (fig. 12). This pottery category disappears among the main material cultural assemblage in the traditional pastoral region of Beersheva, where it was largely produced since the Late Chalcolithic period. In other words, the absence of evidence coincides with the emerging of greater settlement planning and a higher level of craft specialization, with the results of higher levels of sedentism and community organization.

Turning to Western Anatolia, the miniature vessel from Squares C4-5 (stratum E) at Troy (Blegen *et alii* 1950: fig. 231, n. 37980) is assigned to Troy I middle, which, according to the new radiocarbon dates provided by the Heidelberg Radiocarbon Laboratory (Kromer *et alii* 2003: 48), covers the period between 2700-2500 BC (figs. 11, 12).

The other three examples from the Citadel, one of them was found close the Treasure A, as clarified above according to the reconstruction by Easton (2002: 292-293), are related to the levels of Troy II late and III-IV. Most of the radiocarbon dates indicate a calibrated age of

2200-2000 BC (Kromer *et alii* 2003: 48).

In the case of Poliochni, the pairs of miniature vases from Room 518 are dated to the Red Period which is correlated with Troy II early and Thermi IV (Manning 1995: 76). The synchronism between Thermi IV and Poliochni of Red Period is of relevant significance because the barrel-shaped vessels found in both sites show close analogy in form and surface treatment.

Following the radiocarbon correlations between different sites from Northern Aegean and the affinities in typology of the barrel vases, we can propose to classify the examples of this pottery category in two different main types. The first one includes vessels with barrel-shaped body and flattened longitudinally ending into pronounced ridges. From the upper side of the body is put a tall neck, oval in section, with out-turned rim. Moreover, the examples from Thermi IV and Poliochni of Red Period are of small scale. This first category is oldest and it can be dated, according to the radiocarbon dates from Troy, between 2800 and 2300 BC (fig. 12).

The second group comprises the examples from Troy III-IV and Poliochni of Yellow Period, mentioned above. The barrel vessel becomes larger than the examples of the first type, and the body is circular in section, with a handle from the body to the neck. The changes in form and dimension coincide with the difference in chronology, suggesting for this type an age about 2300-2100 BC.

A third type encompasses the examples from Dermicihüyük (Efe 1988: pl. 48.10) and Kaklik Mevkii, both assigned to EB1 late, with a calendar range of













	LEVANT	NW ANATOLIA	CRETE	SICILY	EUROPE
5200- 4500 BC					
4500 - 3800 BC					
3800 - 3500 BC					
3500 - 3000 BC					
3000 - 2800 BC					
2800 - 2500 BC					
2500 - 2300 BC					
2300- 2000 BC					
2000- 1300 BC					
1300 - 900 BC					

Fig. 12 – Comparative table of distribution of barrel-shaped vessels in the Mediterranean and Mainland Europe, and related absolute chronology.

2800-2650 BC (Manning 1995: 157). This latter type is different from the Trojan example due to the cylindrical body and the handle. It could be considered, then, a variety of the barrel-shaped churn with a specific map of diffusion mostly related to the North-Western Anatolia.

The cylindrical churn from Karataş, Southern Anatolia, is morphologically close to the examples of third type, but its dating is about 2400-2390 BC, ac-

ording to the radiocarbon dates and to the pottery assemblage from the house-floor which shows features of Troy II early ware (Mellink 1965: 250-251).

Similar morphological features (cylindrical section of body and vertical handle) occur in three examples from Crete, two from Tholos Tomb at Lebena and the third from the necropolis at Koumasa. The Cretan barrel-shaped vessels can be dated to the Early Minoan IIb, which is correlated to the Early

Bronze Age I-IIa (Troy IIa, Poliochni of Red Period, and Thermi IV) (Manning 1995: 63; 168-170) (fig. 12).

Accepting the reconstruction that the introduction of this pottery category in North-West Anatolia cannot be dated earlier than Troy I late (2800-2500 BC in calibrated dated), the group of barrel-shaped ware in the Baden culture context is chronologically isolated and it seems to be the oldest in central and eastern Europe. Moreover, the evidence for examples in the Neolithic context can be support the idea that the barrel-shaped containers, at least in central Europe, show a different origin.

If this reconstruction is right, one might read this evidence in a different perspective, suggesting the circulation and manipulation of a Baden culture model into the Troy I context rather than an Anatolian origin for the Carpathian examples, as some scholar proposed (Banner 1956: 146; Kalicz 1963: 36) (fig. 12).

Moving to Western Mediterranean, the two examples of barrel-shaped vessels found in Sicily are assigned to the early Eneolithic Period in local terminology (figs 8-9). For this horizon radiocarbon dates are few and, more in general, provide a date of 3600-3400 cal. BC for the first phase of the Sicilian Early Eneolithic Age (McConnell 1997: 293-294; Leighton 1999: 93). The examples, therefore, from Gela and Casalicchio Agnone seem to be earlier than 3000 cal. BC, thanks to the recent calibrated dates from Grotta Cavallo, Western Sicily (3950-3526; 3700-3360 cal. 2 sigma BC, Leighton 1999: 271) and the dating of Zebbug pottery assemblage in Maltese archipelago, which is strictly connected to San Cono-Piano

Notaro culture (Cazzella *et alii* 2011: 158-159).

If this reconstruction supported from calibrated dates will be further confirmed, it means that the variety of barrel-shaped vessels in Sicily are earlier than similar vases in Western Anatolia, whereas are partially contemporaneous with the clay biconical-shaped churns from Azor and from other sites in Southern Levant dated to the Palestine Early Bronze Age (fig. 12).

#### MILK AND CHURNS: A VIEW FROM THE MOLECULAR ARCHAEOLOGY

I turn lastly to some briefer comments on the more significant theme firstly treated in the case of Palestine archaeology, the issue that the barrel-shaped vessels were basically used for milk processing.

In the last decades valuable multi-disciplinary studies, supported by the results of conventional lipid analytical techniques such as gas chromatography (GC), have set matters on dairy production among the Bronze Age communities in Europe and Central Mediterranean (Dudd *et alii* 1999; Craig 2002, 2008; Craig *et alii* 2005). One of the most relevant research is the organic residues analysis successfully applied to the pottery from the Late Chalcolithic site of Yarikkaya, central Anatolia: trace amounts of fatty acids have been explained as milk fats obtained from ruminant animals, as sheep or cow (Sauter *et alii* 2008).

These results are of relevant significance in terms of dietary and dairy processes among the human communities of Anatolia during the Third Mil-

lennium BC, and it means that this methodology could doubtless be extended, with profit, to other periods and regions in the Aegean.

Some light is shed on this last issue by a few pieces of evidence from Poliochni. In this paper I show the preliminary results of some ongoing chemical investigations, carried out in the Laboratory of CNR-IBAM, Lecce (pers. comm.), according to the protocols of Diffuse-Reflectance Infrared Fourier-Transform Spectrometry (DRIFTS) and liquid and gas chromatography-mass spectrometry (LC-MS and GC-MS).

A specimen reported from Poliochni is of relevant interest. The sample POL 9 has been drawn from the body of a miniature barrel-shaped vase found in Room 518 (Bernabò Brea 1964: 506, pl. 148*a*) (fig. 2, 3). The mass spectra provide the absence of unsaturated fatty acids, indicating the presence of an animal fat rather than a vegetable oil. The organic product is basically rich in animal fat, but scarce traces of cerotic acid, which is a constituent of beeswax, suggest that the vase contained a mixture of animal fat and other organic substances.

However, this pattern needs a certain caution and further investigations, but the presence of milk fats and beeswax is the basic constituent of a mixed fermented beverage largely used in Western Europe during the Copper Age and identified by organic residues analysis (Craig and *alii* 2005). In the light of available archaeological documentation, unfortunately there is no certain connection between the consumption of fermented beverages and the increase of barrel-shaped vessels which occur in different areas of central Europe since the late

fourth millennium BC. The later examples from the Urfirnis culture context show specific technical features, as large holes and plastic knobs in the inner part of body, which could be compatible with the manipulation of milk for processing butter and yogurt (Lochner 2012: 197, fig. 4).

It is difficult to believe that the larger examples had been used for marinating fish or other food, as some has proposed (Toth 2009), focusing on the presence of the plastic knobs which appear in other category of kitchen pottery during the Urfirnis culture (the so-called ‘*zapfengefässe*’; Lochner 2012: 199, fig. 6) (fig. 10, 2). In absence of chemical analysis, the most likely reconstruction is that these barrel-shaped vessels were used in milk processing and production of alcoholic beverages, as historical and ethnological comparisons suggest (Lochner 2012: 202).

The widespread appearance in EBA Northern Aegean of several key drinking shapes, as tankards, bell-shaped cups and upright-necked jugs with cut-away spout (Renfrew 1972: 286-287, pl. 19; Cultraro 2012) is assumed to indicated processing of fermented beverages which might be connected with the introduction of exotic drinking customs attested in different parts of insular Aegean and Mainland Greece (Rutter 1993: 758-74).

If the simultaneous increase in drinking vessels may argue for imported fashions in the consumption of alcoholic liquids, with wine being a reasonable guess (Renfrew 1972: 289-290), the case of Poliochni implies a greater degree of familiarity with specific liquids based on milk and honey/mead, which might suit the barrel-shaped vessel too.

The identification of other diagnostic

compounds for dairy products in the Early Bronze Age at Poliochni is confirmed by the results of laboratory analysis on another sample from Poliochni of Blue Period late. The sample (POL 4) belongs to a coarse shallow pan with a row of multiples holes below the rim, conventionally named as “cheese pots”, which largely occur in Aegean and Western Anatolia sine late Neolithic period (Sampson 2002: figs. 56-62; Takaoğlu 2006*b*: 301, fig. 11; Cultraro 2013: 108). Two standard chemical tests have provided the presence of triacylglycerols and short chain fatty acids, suggesting the identification of milk in this sherd.

As has been argued elsewhere, pottery cheese strainers, which appear to be very common among the ceramic repertoire of Late Chalcolithic Kumtepe Ia and of some sites of the Late Neolithic of Western Anatolia (Gülpınar and Troy I), are interpreted as utilitarian implements related to milk processing (Takaoğlu 2006*b*: 301, fig. 11). Recent chemical analyses on potsherds belonging to this pottery category, reported from the Late Neolithic site of Limenaria, on the island of Thasos, have provided the presence of beeswax and lipids of fat animal origin (Decavallas 2007). These results reveal that the exploitation of beehive products was a part of the economic strategies and food preparation among the local communities in Northern Aegean since the late phase of Neolithic Period.

Documenting the presence of dairy production in Northern Aegean since the transitional phase between Late Chalcolithic/Late Neolithic and Early Bronze Age is an attempt of relevant importance, because it means that the exploitation of domesticated animals might have been crucial for local com-

munities (Sherrat 1981; Halstead 1998).

In this perspective is useful to investigate the faunal record found at Poliochni and also to examine it in a diachronic way. Since the levels of Poliochni Blue late Period there is a progressive increase of domesticated animals, such as cattle, sheep and goats (Cultraro 2013: 105). The appearance, among the faunal remains related to Poliochni of Green and Red Period, of bones of calves and new born sheep suggests that local farmers were slaughtering young animals to maintain milk production. This pattern can be compared with examples from different areas from Mainland Greece, where the high proportion of female specimens among sheep and goats is commonly interpreted as an indication of stock-raising for milk production (Halstead 1998).

Despite a certain criticism about the idea of a small-scale mobile pastoralism in the Early Bronze Age (Halstead 1996, 1998), which is a popular concept with Aegean prehistorians, milk extraction could be integrated into island economies either through deliberate interbreeding between small local community flocks, or through increasing the role of stock-breeding within mixed farming economies (Halstead 1996: 35).

If we correlate the evidence on faunal record and the results from analysis on organic residues in pottery, there are significant data for concluding that stock-raising for milking or dairying is a part of subsistence strategies by communities in Western Anatolia and Northern Aegean during the Early Bronze Age. Unfortunately, and despite rapid recent advances in our empirical knowledge of this critical period, any question about the function of these vessels continues to be writ-

ten about the ethnographical comparisons, but the preliminary results of chemical investigations suggest that barrel-shaped vessels were connected with drinking and pouring of milk-based liquids.

#### MODERN CHURNS AND PAST EXAMPLES

All such discussion on milk processing and patterns of animal exploitation, though, presupposes that this comparative methodology could doubtless be extended to other investigative fields.

It is notable that H. Schliemann was the first scholar at attempting a comparative way for interpreting the clay barrel-shaped vessels found at Troy: the German scholar (1880: 404), mentioning unpublished pottery reported from Cyprus in Archaic Period and stored in the exhibition of the British Museum, provided further information about some wooden barrel-bottles used by modern English workers for conserving beer or cider.

The paper by Takaoğlu (2006a), already mentioned, is based on an approach that is essentially comparative in nature: compiling a substantial database of example, the investigation of the modern dairying strategies contributes to create an original picture for interpreting some uncommon archaeological evidence, such the barrel-shaped vessels or the perforated pottery cheese strainers.

On this theme some useful progress has been made; without question, the comparison between the modern pottery butter churns used in rural Turkey and those surprisingly similar reported

from Bronze Age Anatolia, indicates that the ethnographic approach, if enlarged towards other areas and periods, remains an useful effort.

According to the ethnographic evidence of the modern Arab pastoral milk production (Kaplan 1965: 148-149, fig. 3), the uncommon barrel-shaped body has been explained as the reproduction of goatskin bottles for making butter (fig. 13b). Since the perishable container is made out of the natural goatskin, which has been carefully removed without any incision, the vessel shape is asymmetrical, with one end straight and the narrow ridges. The similarities between skin containers and clay churns are very strong and, according to Kaplan (1965: 145), the barrel-shaped form does not have any connection with wooden artefacts, but the asymmetrical body may be the result of an imitation of skin churns.

Similar comparison has been proposed for other areas too: for instance the multivaried comparative study by Takaoğlu (2006a) of Bronze Age churns and modern clay barrel-shaped vessels used by Turkish pastoralists. In this recent study, which compares ethnographic and archaeological evidence, the focus is on modern Anatolian clay churns (*Nebre* or *Nehrin* in Turkish): these pots usually have horizontal barrel-shaped body with a tall cylinder neck placed at the swollen center. Many are the similarities among the modern examples and the Anatolian Bronze Age category in the morphology, as well as in the function closely related to milk production. The reconstruction proposed by Takaoğlu is illuminating: the variety of *Nebre* churn is a clay reproduction of a goatskin implement (*Tuluk* in Turkish), which the

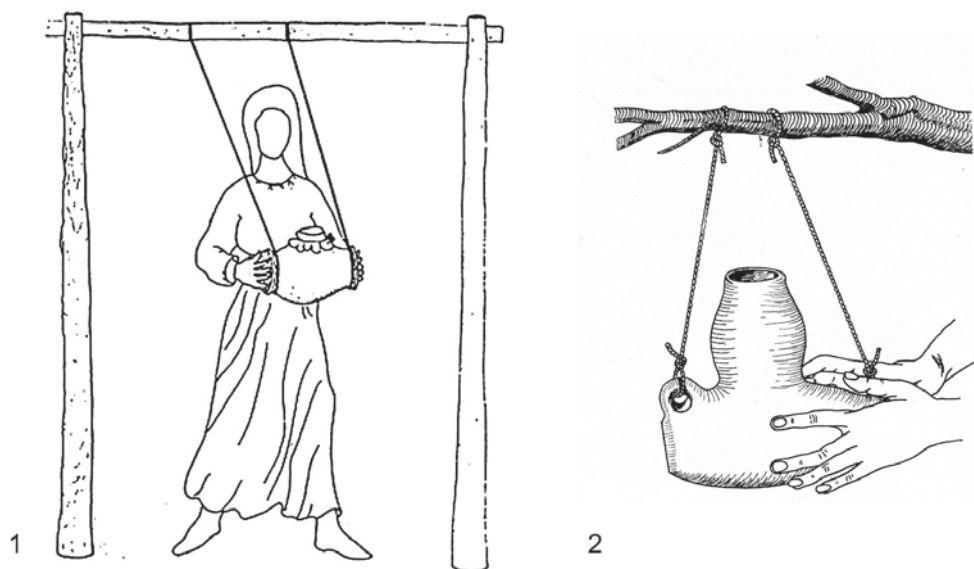


Fig. 13 – Churns and process of making butter (1, after Seferiades 1985; 2, after Kaplan 1954).

pastoralist of Anatolia use to convert milk into secondary products, such as butter or soft cheese (fig. 13a).

Moreover, among the transhumant shepherds who lived in the uplands of the eastern Black Sea region, there is a variety of wooden churn, which repeats the main morphological features of goatskin and clay barrel-shaped vessels, i.e. the asymmetrical and cylindrical body and the narrow mouth (Ertuğ 2004: 86, fig. 1). The wooden dash churn consists of a narrow tub carved from a single piece of log or made by wooden staves held by metal rings (Takaoğlu 2006a: 33).

For the purposes of this comparative analysis, it is noteworthy that barrel-shaped wooden artefacts for making butter, which are very similar to modern wooden churn used in Middle East and rural Anatolia, are well-documented in late Antiquity and Medieval Ireland

(Earwood 1997: 26, identified as type K3 “bog butter”). A cylinder wooden vessel from Mount Jubilee, Barony of Erris, Western Ireland, is very close to clay churn of Bronze Age Western Anatolia and the chemical analyses on fat carried out on wooden “bog butter” examples from Scotland and Britain confirm that vessels of this kind was used for making butter or cheese (Thornton *et alii* 1970).

Turning to the Mediterranean area, the ethnographic comparison, including the examples from Arab pastoral world (Kaplan 1965: pl. XXVI.b) confirms that the churn is designed to be suspended and swung from ropes until the milk becomes butter. The manufacturing process starts from filling the churn with milk and then the mouth of clay churn is stopped with a leather or garment stretched over the mouth. The pot is hung on a wooden tripod or ceiling post

and swung back and forth (Seferiades 1985: pl. XIV.5) (fig. 13*a*).

The same manufacturing process occurs in Levant: modern Arab shepherds in the Gaza district use clay churns, which show loop handles for ropes instead of ridges at the ends. In both cases, the clay churns has close morphological similarities and the appearance of loop handles distinguish the Palestinian examples, either in Chalcolithic Period or in modern age, from the horizontal barrel-shaped well-documented in ancient and modern Anatolia.

It is notable that there is correlation between archaeological record and ethnographic information in the case of Poliochni and other sites of Western Anatolia, where the barrel-shaped vessels occur associated to another category of pottery for milk processing, the performed coarse pots, as we have clarified above. Modern clay strainers comparable in form to those archaeological ones from Bronze Age Troad are easily to found in modern rural Turkish Thrace. In this latter context such perforated vessels are associated with milk processing, such as the straining of curds from whey in cheese production (Takaoglu 2006*a*: 29-30).

#### CONCLUDING COMMENTS

The evidence from Western Anatolia and Northern Aegean gives a basic explanatory paradigm for investigating, though the paths of the intriguing class of the barrel-shaped vessels, the growth of dairy strategies since the later fourth and early third millennia BC. In this paper it has been suggested that the study of this uncommon pottery category, which shows an expanding geographical

distribution, in absence of radiocarbon chronologies and also of detailed studies on models of ceramic production, may become a wild goose chase. The direct consequence of this methodological pathway is to mechanically accept the equation barrel vessel = churn for butter, and therefore to stress the need for identifying the place of origin and diffusion.

In the first case, it seems likely that this pottery category is strictly connected to the dairying strategies of transhumant shepherds and to milk processing. Despite the wide geographical distribution and some chronological differences, in all investigated cases the introduction of this specialized vessels occurs among those communities where there is evidence of a model of small-scale dairying within a mixed farming economy, as in the case of EBA Western Anatolia and Mainland Greece (Halstead 1996), and Southern Levant too (Joffe 1993: 50; Rowan, Golden 2009: 68-70). This explanatory path is further supported by the results of organic residues analysis reported from Poliochni and other sites of EBA Western Anatolia already mentioned. However, some difference in scale (i.e. the high number of miniature examples in Western Anatolia and Southern Levant) and in fabric invite to support the idea that barrel-shaped vessels, which appear together with the growth of pastoralism and the consumption of dairy products, can be used for precious fermented beverages based on a mixture of milk or honey/mead.

However, one might suggest that, in the light of the high degree of variability in shape and size, the barrel-shaped vessels could have different functions for preparing milk and its derived products, as butter or yogurt, as the evidence for

the examples of the Urnfield culture in central Europe confirms. As was pointed out in the study of the pottery assemblage from Thunau am Kamp (Lochner 2012), some technical features suggest to related the barrel-shaped pots with another specialized pottery category which was used in processing of secondary products.

Concerning the origin of this pottery category, it is important to resist the temptation to circular reasoning, exemplified by the dominance of the 'exotic' contribution in the transmission of that unusual pottery class. The growing body of archaeological material from Anatolia, Crete and Eastern Mediterranean, along with a large number of radiocarbon data, weakens the simple linear reconstruction that the barrel-shaped vessels firstly occurred in Southern Levant (Kaplan 1954; Kalicz 1963: 36). One problem is that the antecedent examples in the early Neolithic central Europe and the later diffusion in the Baden culture invite to reassess the explanatory model, traditionally invoked, of the transmission of an Anatolian specialized pottery in the Carpathian Basin (Banner 1956: 146; Kalicz 1963: 36). As the overall horizon related to the Baden culture can still only be roughly coordinated, taking the chronological picture with radiocarbon dates related to Western Anatolia and Troy, there is the suspect that the barrel-container shape was introduced in this latter region as external element directly from the Danube basin.

In the present context, it is probably a mistake to image a direct transmission from Southern Levant to other areas of central Mediterranean, namely Sicily or insular Aegean, of a Ghassulian model of pottery since the later fourth millennium

BC. There is no primacy of Ghassul model, despite it was basically a pastoral society, and the similarities of these barrel vases between culturally different and geographically distant regions can be explained in terms of skeuomorphic processes and imitation of different material. In fact, the barrel-shaped vessel can be considered as a clay translation of the basic goatskin bottles in which women, either of modern pastoral society or of Bronze Age communities, churn their butter.

The wide and independent appearance of this specialized shape in Western Asia and central Europe can be explained in terms of a 'secondary products revolution' involving different areas of Mediterranean through the Final Neolithic/EBA (Sherratt 1981), entailing the adoption of the ox-plough complex, a new exploitation of sheep for wool and the consumption of dairy products.

But taking the wider context of change in the central Mediterranean during the third millennium BC, some local factors might have determined the transmission of this shape in specific areas. If there are no doubt that examples of barrel-shaped containers in Crete are the local imitation of Anatolian model, the evidence from Sicily needs to be reconsidered in a wider perspective of long-range interconnections between Western Mediterranean and Aegean area. In fact, the churns from Piano Notaro cemetery are not isolated and independent elements within the local context of the early Eneolithic, because many other features, recognizable in the ceramic repertoire (spouted jugs; double-pots; cylindrical lids) and in the metallurgy, could be related to the EBA Western Anatolia and North Aegean (Cazzella *et alii* 2011:

158-160; Cazzella, Maniscalco 2012: 95-96).

To summarize, starting with the evidence from Sicily and from North-Western Anatolia, it should be readily apparent that the barrel-shaped vessels are hardly an adequate reason to postulate a model of moving people from Levant, who is the only responsible to introduce this pottery shape in central Mediterranean during the later fourth millennium BC.

Lastly, and most crucially, a final comment concerns the symbolic dimension of such vessels. The religious function of the complex building Room 510-518 can give further information on the social and ritual activities of offering and consumption of specific fermented beverages, which might suit the barrel-shaped vessel. To varying cultural and geographical are, the figurine statuette at Gilat (fig. 7), reproducing a goddess carrying a churn, is the symbolic and ideological interface of the miniature barrel vases found in Western Anatolia, where they used as containers of mixed fermented beverage.

The explosion of drinking sets (two-handled tankards and jugs), of small-scale, flat-base tableware, in the Red Period at Poliochni and in other contemporary sites of Northern Aegean (Thermi IV on Lesbos; Troy II), exemplifies a radical change in the ceramic assemblage, as well a transformation in the practice of

food and drink consumption (Cultraro 2013). In this dynamic context, the churns, which were created from goatskin bottles for transforming milk into butter, leave the former pastoral dimension moving to become essentially vessels for drinking in communal social practices or/and in cultic activities. To conclude, that adequate data on organic residues within vases are only now being collated, it means that study on the functional analysis of ancient pottery has only recently become realistic.

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\* *Consiglio Nazionale delle Ricerche, Istituto per i Beni Archeologici e Monumentali*  
Catania, Italy  
*massimo.cultraro@cnr.it*

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