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# Archaeometric identification of Maltese imports in prehistoric Sicily: Żebbuġ phase pottery from Licata-Caduta (Agrigento)

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*During the study of a pottery assemblage collected at the Sicilian site of Licata-Caduta (Agrigento), continuously occupied between the Neolithic and Early Bronze Age, some ceramics presented typologies, fabrics and surface treatments alien to Sicilian repertoires and closer to Maltese productions. Sampled for petrographic (OM) and chemical (XRF) analyses one artefact turned out to be produced in Malta and imported into Sicily. The search for its chronological and cultural placement has led to the discovery of the first certified Żebbuġ phase import in Sicily.*

## Introduction

In the context of the interconnections between Mediterranean prehistoric civilizations, the Sicily-Malta interaction has been a leitmotif deriving from the geographic proximity of the two insular contexts and by a substantial cultural homogeneity over the centuries. The evidence on which the academic debate is centered is often represented by Maltese ceramics found in Sicily and vice versa, apparently pointing to a 'mobility of goods' rather than a 'mobility of humans' as the principal phenomenon of this interaction (Tanasi 2014a). The absence of archaeometric

characterizations of pottery and the impossibility of distinguishing imports from local imitations, keeps misleading scholars, conditioning the outlook on this issue (Biehl and Rassamakin 2008).

While significant advances have recently been made for the Middle Bronze Age, (Barone *et al.* forthcoming), for the previous periods such as the Neolithic and Copper Ages, when Sicilian and Maltese cultures had substantial elements in common (Trump 2004, 231-42), the gist of the interconnection has never been clarified. New data can now be offered through evidence from a previously unknown site in western Sicily.

The coastal site of Caduta is located 5 km west of the town of Licata (Agrigento), at an altitude of 40 m above sea level (Amato 2012, 327) (Fig. 1). In the 1970s a local archaeological association carried out a ground survey on a terrace, partly damaged by excavations of a modern quarry. The cultural material gathered pointed to a long-term occupation ranging between the Neolithic and Greek Archaic periods. The importance of the site during prehistory, confirmed by the large quantity of lithic implements and heterogeneous pottery related to the Neolithic, Copper and Early Bronze Ages, is also underlined by the presence of two nearby necropoleis. One of these, with shaft graves, has been almost totally obliterated by the quarry



**Figure 1.** Aerial map of southern coast of Sicily with indication of the site of Licata-Caduta. (source Google maps).

whereas the other necropolis characterised by chamber tombs has unfortunately been completely looted (Gulli 2012, 217-18).

Thanks to a permit granted by the cultural heritage Superintendence of Agrigento, in summer 2012 the reappraisal of the prehistoric artefacts from Caduta kept at the archaeological museum of Licata was started.

### Materials and methods

At first glance, the pottery presented fabric and typological features which were not immediately classifiable and were rather uncommon for the standard Sicilian repertoires. Particularly puzzling were two pieces, the portion of an ovoid jar (L101) (Fig. 2) and a handled cup (L1) (Figs 3-4), which shared the same autoptically recognizable fabric and showed the same surface treatment, but which lacked

the volcanic grits quite ubiquitous in all the other sherds.

### L101

H[height]. 16.5; w[width]. 18.8; handle  $\varnothing$  [diameter] 1.7; th[ickness]. 1.1 cm

Body portion of an ovoid jar, comprising three pieces, with a massive and wide vertical loop saddled handle; cut-out decoration: vertical groove passing through the handle in correspondence with the saddle, horizontal series of very rough oval and triangular nicks in line with the upper attachment of the handle. Thick burnished slip on the outer surface ranging from yellowish brown to purplish colour. The handle, applied subsequently but before firing, was attached matching its finial pegs with corresponding globular embossed sockets on the wall. On piece A, the handle was misplaced and one of the sockets is



Figure 2. Jar L101 from Licata-Caduta (photograph authors). Scale bar 5 cm.



Figure 3. Handled cup L1 from Licata-Caduta (photograph authors). Scale bar 5 cm.

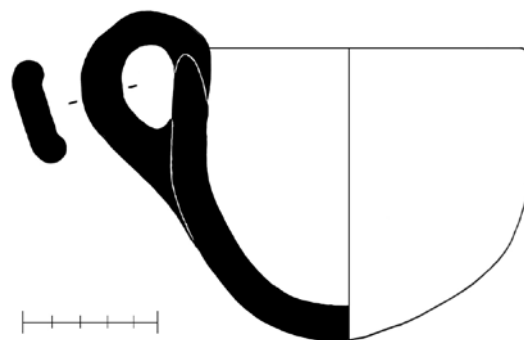


Figure 4. Handled cup L1 from Licata-Caduta (drawing by Carlo Veca). Scale bar 5 cm.

still visible; on piece B, the handle being missing, the socket is clearly distinguishable.

Medium-coarse fabric, over-fired with abundance of chamotte.

## L1

H. 10; mouth  $\varnothing$  12.5; handle th. 1.4; wall th. 0.9 cm

Handled cup with hemispheric body, round base, straight thinned rim and vertical surmounting round handle. Thick burnished slip inside and out surface ranging from yellowish brown to red. Intact, restored with a gap on a side of the body.

Medium-coarse fabric with abundance of chamotte.

Since the objects came from an uncertain context, the only way to establish the chronology and to interpret them has been by searching for comparisons. But while the handled cup L1 presented a rather common shape, ubiquitous in many prehistoric Sicilian *facies*, piece L101, sharing the same uncommon fabric of L1, appeared to be a novelty.

## Methodology

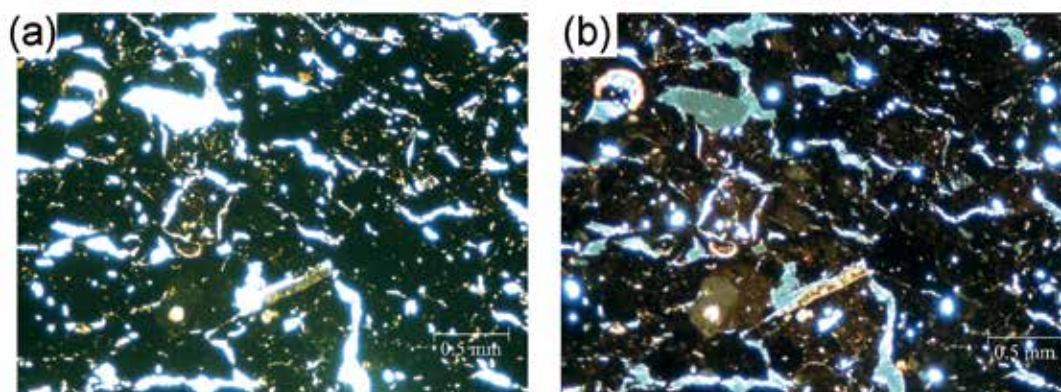
As all the prehistoric ceramics collected at Caduta presented unexpected features, it was decided to sample 22 specimens for archaeometric analyses, representing autoptically recognizable main fabrics, including specimen L101 but not L1. This approach aimed to reverse the traditional research pipeline based first on the typological definition and classification through comparisons and then eventually on the archaeometric characterization of the fabrics and provenance definition. This approach is in accordance

with the new trend in pottery studies in which a more prominent position is given to chemical and petrographic analyses in order to compensate for the limits of a study based on simple direct observation (Maniatis 2009).

Detailed petrographic (OM) and chemical (XRF) analyses were carried out on sample L101 in order to characterize fabric and mineralogical features and chemical composition respectively. A petrographic description on thin sections was made following the scheme proposed by Whitbread (Whitbread 1995), which facilitates a detailed characterization of pottery in terms of texture, groundmass and inclusions. Chemical analyses of major and trace elements were performed by X-ray fluorescence (XRF) spectrometry (PHILIPS PW 2404/00) on powder-pressed pellets; total loss on ignition (LOI) was gravimetrically estimated after overnight heating at 950°C.

## Results

The sample L101 is characterized by medium-coarse grain size and abundant fossil groundmass. In detail (Fig. 5), the microstructure shows channels and planar voids with remains of carbonaceous material suggesting the use of straw as temper. Less abundant are vugs and slightly preferential oriented vesicles. The fossil-rich groundmass is heterogeneous and is characterized by low optical activity and brownish-black colour. The inclusions have an open space distribution and a bimodal grain size: the coarser inclusions are represented by chamotte with prevalently sub-angular shape and millimetric dimensions, while the finer ones are mainly quartz grains. Overall, the sample shows a fabric characterized by fossil-rich groundmass and chamotte inclusions. Furthermore,



**Figure 5.** Microphotographs of sample L101 in parallel (a) and crossed (b) nicols.

Samples	SiO <sub>2</sub>	TiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	MnO	MgO	CaO	Na <sub>2</sub> O	K <sub>2</sub> O	P <sub>2</sub> O <sub>5</sub>	Sr	v	Cr	Co	Ni	Zn	Rb	y	Zr	Nb	Ba	La	Ce
L/O/	54.97	0.82	14.18	5.40	0.09	2.52	10.34	0.78	3.36	0.15	856	103	70	2	37	68	39	6	49	14	1724	38	46
<b>Maltese pottery</b>	50.80	0.86	15.08	4.69	0.03	2.45	22.17	0.78	2.70	0.43	334	100	105	5	51	82	54	14	89	3	241	38	73
<b>Maltese clays</b>	36.72	0.54	11.84	2.76	0.01	3.36	41.60	0.72	2.07	0.37	735	73	72	5	37	69	56	16	94	9	92	33	42
<b>Licata clays</b>	57.5	0.71	13.88	4.771	0.06	2.53	17.2	1.04	2.1	0.19	520	95	78	9	34	63	72	23	173	13	230	31	64

**Table 1.** Chemical composition of the sample L101 and reference data (average chemical data on 66 samples of Licata clays, 27 samples of Maltese pottery and two samples of Maltese clays). Concentration of major and trace elements are reported in wt% and ppm respectively.

information about micromass optical activity allows the estimation of a medium-high firing temperature (about 800° C).

In an attempt to identify the provenance of L101 sample, XRF chemical analysis was also carried out. The obtained data were compared with unpublished raw data about a selection of 66 clays collected in the territory of Licata (*pers. comm.* G. Barone and P. Mazzoleni), with 27 Maltese Middle Bronze Age ceramic samples coming from the settlement of Borg in-Nadur and two samples of Maltese clay of Blue Clay Formation type from Ġnejna Bay (Barone *et al.* forthcoming).

Based on the average chemical data deriving from these three groups and comparing them with those resulting from sample L101, the following comparative table was obtained (Table 1).

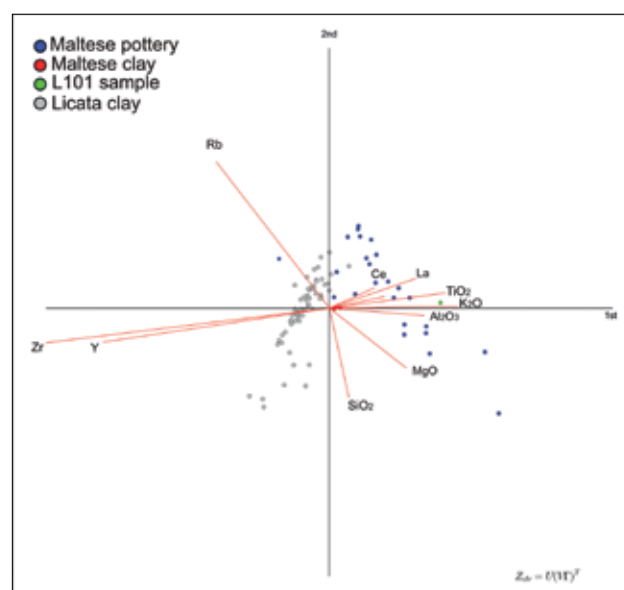
In particular, chemical data obtained by XRF measurements were processed by a well-known statistical method, previously successfully applied on pottery (Aitchison *et al.*, 2002; Buxeda i Garrigós, 1999; Barone *et al.*, 2005; Barone *et al.*, 2011; Barone *et al.*, 2012), based on a statistical approach introduced by Aitchison (Aitchison 1986). The following biplot (Fig. 6) represents the studied samples plotted in the first two principal components plan. It is noteworthy that sample L101 is plotted with Maltese Middle Bronze Age pottery and Maltese clays and not with the Licata clays.

A previous multivariate discriminant analysis performed on chemical data of trace elements of numerous groups of Sicilian and Maltese pottery specimens has demonstrated that, at least in the Middle Bronze Age, the pottery production of Sicily and Malta can be clearly distinguished and separated on geochemical basis (Barone *et al.* forthcoming). For this reason, the discriminant function (D.F.) has been calculated and compared with the values obtained for Sicilian and Maltese pottery production

respectively. The obtained result (D.F.=0.21) suggests a Maltese provenance for the sample L101. Furthermore, petrographic analysis, providing a detailed characterization of texture, structure and composition of sample L101, pointed to features similar to Maltese Middle Bronze Age samples from Borg in-Nadur (Barone *et al.* forthcoming).

Finally, comparing the petrographic and chemical data resulting from L101 with those deriving from the other 21 samples from Licata-Caduta, L101 appears as unique and not at all comparable with them, reinforcing the assumption that it is the only Maltese import in the group of specimens sampled.

The definition on an archaeometric basis of the Maltese provenance of the ovoid jar L101 opened up a new research perspective, explaining the reason for the apparent lack of comparisons in Sicily. Although the handled cup L1 has not been analyzed, because the sample taken turned out to be insufficient, the



**Figure 6.** Biplot of the two principal components.



identical surface treatment, with the same thick slip ranging from yellowish brown to red and purple, could indicate a certain connection between the two vessels, if not the same provenance.

Due to the extreme conservatism of Maltese prehistoric pottery production in terms of technology and manufacture (Barone *et al.* forthcoming; Tanasi forthcoming), the chemical and petrographic identity of L101 with the Borġ in-Nadur pottery sampled from Borġ in-Nadur cannot be considered as a chronological clue. Furthermore, the shape, typology and surface treatment of L101 are alien to the Borġ in-Nadur repertoire.

As a result of the familiarity of one of the present authors with Maltese prehistory (Tanasi and Vella 2011; Tanasi and Vella forthcoming), and through a scrutiny of the literature on Maltese prehistoric pottery between the Neolithic and Early Bronze Ages, it became clear that the most significant analogies come from the Żebbuġ phase (4100-3700 BC).

This phase marks the end of the Neolithic and the beginning of the early Temple Period. The pottery is handmade using a soft fabric, fired at a relatively low temperature and showing smoothed surfaces and fairly light colours (Trump 1966, 31). Two main fabrics have been distinguished, a yellowish fine ware with thin walls, pale and well fired, usually yellow in colour, and a higher quality, harder well-burnished pale or milky grey ware (Malone *et al.* 2009, 195). With regards to decoration, both painting and incision occur. In particular the incised decoration with its intricate linear and geometric patterns, even

symbolically used for representing anthropomorphic figures, can be considered the most distinctive trait of this class. The main issue of Żebbuġ phase pottery is the absence of a rigidly standardized repertoire, the formal guide types of which are represented in the classification of Evans (1953, 50). That repertoire, which was mainly characterized by several varieties of two main shapes, the jar and the handled cup, has recently been supplemented by data from the excavation at Brochtorff Circle, where scholars distinguished between 'storeyed' and 'devolved' shapes associated with an earlier and later date (Malone *et al.* 1995; 2009, 194-200).

According to Evans, some characteristic shapes appear foreign to the local ceramic repertoire, showing clear parallels with ceramic traditions documented in the central Mediterranean and Sicily (Evans 1953, 49-50, 78). In Sicily, the pottery class showing overall features similar to Żebbuġ pottery is San Cono – Piano Notaro (Bonanno 2008, 30), traditionally the first phase of the local Copper Age, recently dated using the radiocarbon technique to the transition between 5<sup>th</sup> and 4<sup>th</sup> millennium BC (Gulli and Terrasi 2013). The profile of the ovoid jar L101 directly recalls the main shape of the Żebbuġ phase pottery repertoire, the so-called deep jar, classified by Evans as shape 17 (1953, 49-50, fig. 7). Since the example from Caduta is fragmentary, it is not possible to ascertain whether it belongs to the storeyed or devolved group. A particularly striking comparison is represented by the jar U/P.21, from an unknown Maltese site, located at the National Museum of Archaeology, Malta (Evans

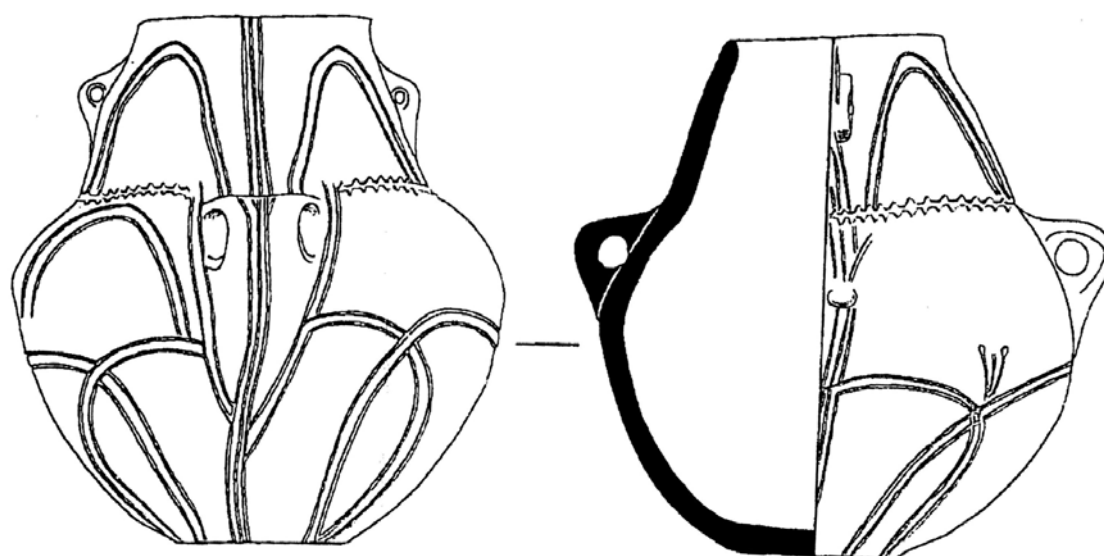


Figure 7. Jar of the Żebbuġ phase from the National Museum of Archaeology of Valletta (Trump 1971).

1971, 206, fig. 29.10) (Fig. 7). This example displays the same type of massive strap handle marked by a deep saddle intercepted in this case by a row of three incised vertical lines. It also shows a double horizontal series of triangular nicks, more neat and regular, in line with the upper attachment of the handle.

Besides this typological comparison, the jar from Caduta does not show any sign of the complex incised patterns so typical of the Żebbuġ phase pottery and it does not have the typical surface colour, that is generally more yellowish and brownish than reddish. Furthermore, the Żebbuġ pottery has thinner walls and more refined and smoothed surfaces.

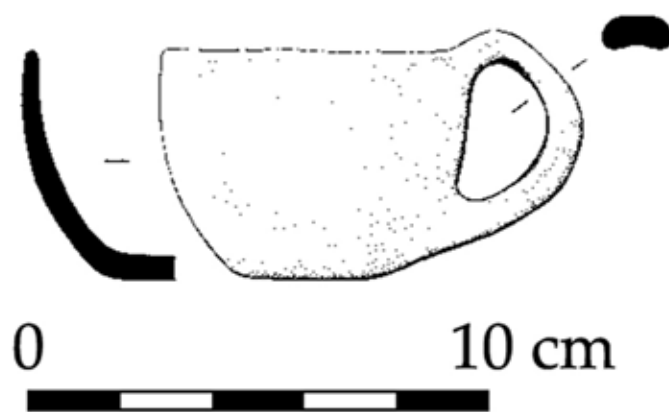
However, during the excavations carried out at Skorba, Trump identified a further class of Żebbuġ phase pottery that he named *Pellegrin ware*, from the name of the site of Qala il-Pellegrin (overlooking Ġnejna Bay) where it was identified for the first time (Trump 1966, 36). He described it as a coarse, over-fired, bright red ware occasionally of purplish colour, never decorated and mainly represented, in terms of shapes, by the ovoid or slightly S-profile jar. About its date, Trump hypothesized that *Pellegrin ware* appeared in a final stage of the Żebbuġ phase and that it continued in the course of the subsequent Mġarr and Ġgantija phases.

Within this framework, the jar from Caduta seems to show precisely the same features as this ware, with special reference to its first stage of development related to a late Żebbuġ phase. This assumption is further reinforced by the evidence of the handled cup L1, having exactly the same autoptically recognizable fabric and surface treatment as the jar L101. In fact, it directly recalls the typology and profile of a devolved handled cup from Brochtorff Circle (Fig. 8), dated by the excavators to the very end of the Żebbuġ phase. Both have in common a peculiarly shaped strap handle with curved rounded side edges.

Although archaeometric data are not available for cup L1, the similarity with sample L101 may suggest the same Maltese provenance, however further investigation is required to confirm whether this is the case.

## Discussion

The identification for the first time of Żebbuġ phase pottery imports in Sicily represents a significant



**Figure 8.** Handled cup of the Żebbuġ phase from the Brochtorff Circle (Malone *et al.* 2009).

advance in research about cultural connections between Sicily and Malta in the earlier phases of prehistory. Besides the well-known contiguity between the Sicilian and Maltese Neolithic and Copper Age pottery styles, such as Stentinello/Għar Dalam, Diana/Red Skorba, Żebbuġ/San Cono-Piano Notaro, the other trait that characterizes the connection has been the transfer of raw materials from Sicily to Malta, such as obsidian, flint, basalt, alabaster, sulphur and possibly ochre (Tanasi and Vella 2014b). Without the proper support of archaeometry, it is more problematic to take into consideration the many Sicilian pottery imports reported in Malta, such as the three sherds of the Middle Neolithic style of Trefontane-Palikè from Skorba and Santa Verna (Trump 1966, 45), the examples of Diana and Serra D'Alto from Skorba (Trump 2002, 39; 2004, 246), the Piano Quartara, Serrafferlicchio and S. Ippolito pieces from the Brochtorff Circle (Trump 2002, 212; Malone *et al.* 2009), and the sherds of Malpasso-S. Ippolito style from Għar Mirdum (Tanasi 2014b).

In any case, the evidence of Licata-Caduta has now provided reverse feedback, represented by the jar L101. Even more significant is the fact that the vessel is a container, possibly introduced into Sicily for its content or used as customary storage by Maltese immigrants who may have taken it with them to Sicily.

Obviously 'one swallow does not make a summer', but it certainly helps us to understand how complicated the cultural interweaving must have been, how risky it is to rely on absolute assumptions of the sort 'Sicily just exported and Malta just imported', and in particular it serves to emphasize the growing relevance of archaeometry in the study of pottery.

## Conclusion

In conclusion, the new data coming from Licata-Caduta encourages the search for a proper archaeological exploration of this site and the completion of the overall study of all the prehistoric ceramics already gathered there, with the greatest possible enlargement of the sampling for petrographic and chemical analyses. Finally, it is worth recalling that Licata-Caduta is located on the same coast and less than 30 kilometers east of Cannatello (Agrigento), the only other site of central western Sicily in which Maltese pottery imports, confirmed by archaeometric tests, were reported (Barone *et al.* 2014). Although the materials from Cannatello date to the Middle-Late Bronze Age and not to the Copper Age, this could be an indication that the stretch of the Sicilian southern coast between Cannatello and Licata remained for centuries the only 'western hub' for the arrival of Maltese goods and perhaps people in Sicily, probably aided by favourable prevailing winds (Tanasi & Vella 2014, fig. 1)

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