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Loom weights in Archaic South Italy and Sicily: Five case studies

Abstract*

Textiles are perishables in the archaeological record unless specific environmental conditions are met. Fortunately, the textile tools used in their manufacture can provide a wealth of information and via experimental archaeology make visible to an extent what has been lost. The article presents and discusses the results obtained in a research project focused on textile tool technologies and identities in the context of settler and indigenous peoples, at select archaeological sites in South Italy and Sicily in the Archaic and Early Classical periods, with an emphasis on loom weights. Despite a common functional tool technology, the examined loom weights reveal an intriguing inter-site specificity, which, it is argued, is the result of hybrid expressions embedded in local traditions. Experimental archaeology testing is applied in the interpretation of the functional qualities of this common artefact.

Keywords: Loom weights, South Italy, Sicily, textile tools, experimental archaeology

Introduction

Just like today, textiles in ancient times were of great importance not only for dressing the body and for furnishings, but also for the manufacture of sailcloth, and devices for carriage and storage. Not least, textiles were considered valuable commodities in gift exchange. Experimental and experiential archaeology testing undertaken in recent years by researchers and crafts people at the Danish National Research Foundation's Centre for Textile Research (CTR) at the University of Copenhagen in collaboration with Sagnlandet Lejre (Land of Legends) Centre for Historical-Archaeological Research and Communication, a pioneering institution in Denmark for

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experimental archaeology,[1] have made it possible, to deduce, within a range, the types of fabrics produced at any given archaeological site by studying the recovered textile tools.[2] Thus it is fundamental to the understanding of ancient textile manufacture to analyse the related implements found in archaeological contexts.

The article presents and discusses the research undertaken by the author on a particular type of textile implement, the loom weight, based on the material unearthed at the sites of Cavallino and San Vito dei Normanni in the Apulian region of South Italy and Monte Iato, Segesta (Scarico di Grotta Vanella) and Mozia[3] in Western Sicily. The context and time period are those of settler and indigenous peoples in the Archaic and Early Classical periods (7th to 5th centuries BC). The sites were chosen for the purposes of a comparative analysis of loom weights with a primary focus on the Archaic period within two distinct geographical areas, Apulia and Sicily, against the background of the dynamics of a settler and indigenous context. The different types of settlement at Cavallino and San Vito dei Normanni, Monte Iato and Mozia in Sicily and, a secondary context, a refuse deposit at Segesta (Grotta Vanella) with a possible sacred origin for the material,[4] offered the prospect of a varied analysis. The loom weights from the site of Mozia, slightly later in date, provided the interesting possibility to include a third component in the form of a Phoenician cultural framework, in the study of indigenous peoples and Greek settler milieus in Apulia and Sicily respectively.

The present study has altogether involved the individual examination of more than 1,000 loom weights. The distribution in terms of numbers of loom weights with respect to the selected archaeological sites, is as follows:

Cavallino, 176
San Vito dei Normanni, 39
Segesta (Scarico di Grotta Vanella), 608
Monte Iato, 65
Mozia, 209

As will be elucidated in the case studies presented below, the loom weights reveal remarkable site specific characteristics. Although the general parametrical traits such as general loom weight shape and weight show inter-site similarities, the loom weight assemblages at each individual site, nevertheless, project a specific individual "essence". This manifestation while both elusive and intangible in empirical terms is, nevertheless, distinctly perceptible.

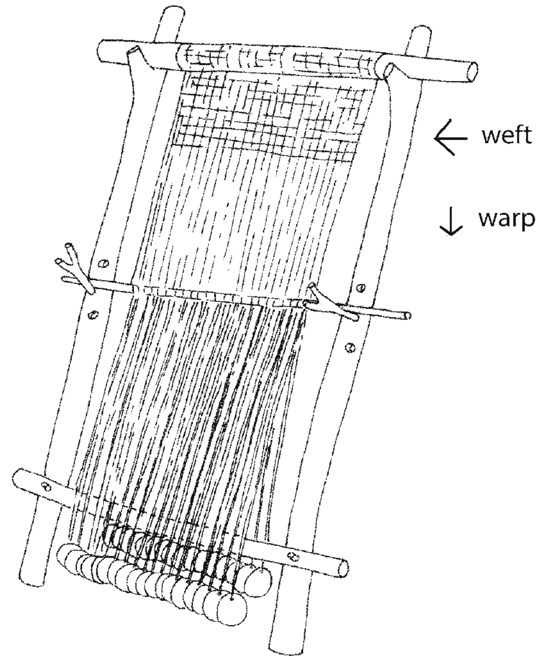

Fig. 1. Drawing of a warp-weighted loom showing a tabby weave using discoid shaped loom weights. Drawing by Annika Jeppson. Courtesy Eva Andersson Strand © CTR.

Prior to presenting the loom weight case studies, it is useful to describe the function of a loom weight. Loom weights were used on the warp-weighted loom, in order to provide warp threads with the necessary tension required for optimal weaving. The weights were most often made of fired or unfired clay, although other materials such as stone were also used. Different shapes of loom weights are also attested and shape seems to be connected both to region/culture and time period.[5] Thus, for example, discoid shaped loom weights are more common in Hellenistic times in South Italy,[6] while the truncated pyramidal was the preferred shape in the Archaic and Classical periods.

A warp-weighted loom could be of a very simple construction and thus be easily stowed away when not in use. The basic elements of this type of loom are an upper cross-bar or head beam, side beams also called uprights, one or more heddle rod/s, support/s for the heddle rod/s, and a shed rod (*Fig. 1*).

[1] http://www.sagnlandet.dk; http://ctr.hum.ku.dk.
[2] Andersson Strand *et al.* 2008; Mårtensson *et al.* 2005–2006; Mårtensson *et al.* 2009; Andersson & Nosch 2003; Andersson Strand *et al.* 2010; Andersson Strand 2011; 2012; Andersson Strand *et al.*, in press.
[3] As no consensus exists as to the English spelling and the variants of Motya, Mothia, and Mozya occur, the Italian spelling Mozia is preferred throughout the present paper.
[4] de Cesare 2009; de la Genière 1976–1977.
[5] Gleba 2008, 127–134.
[6] Meo 2011.

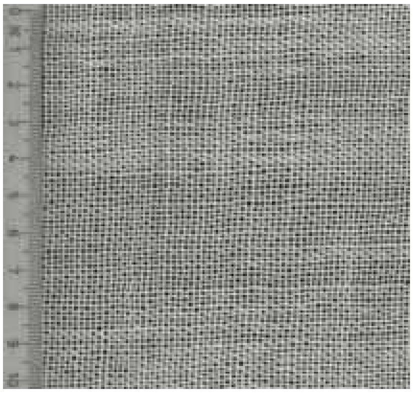

Fig. 2. Example of a balanced open tabby weave with an average of 6.1 warp threads and 7.4 weft threads per cm (linen). Courtesy Eva Andersson Strand © CTR.

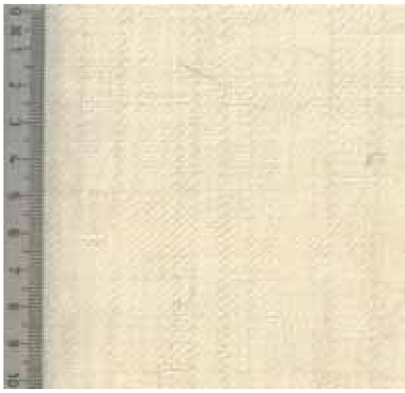

Fig. 3. Example of a 2/2 twill weave with 14.6 warp threads and 14.6 weft threads per cm. Courtesy Eva Andersson Strand © CTR.

Fig. 4. Example of a weft-faced weave with an average of 5.8 warp and 14.8 weft threads per cm. Courtesy Eva Andersson Strand © CTR.

The loom, when set up and leaning against a wall, creates a natural shed (opening) through which, for a simple tabby weave,[7] the shuttle carrying the weft threads is drawn. For a tabby (*Fig. 2*) one heddle rod is used. More complicated weaves such as various types of twill (*Fig. 3*) require more heddle rods, which will create more sheds, but the construction of the loom still remains very simple. If weft threads exceed warp threads, the weave is considered weft-faced (*Fig. 4*). Conversely, when warp threads dominate the weave, the fabric is termed warp-faced. Remains of ancient textiles show that, besides tabby weave, the technology existed to produce more complicated twill weaves. Finds of ancient looms are extremely rare since they were wooden structures. The few remains in the archaeological record mostly consist of imprints of carbonized wood. In Sicily, ligneous remains of a loom dated to the last quarter of the 4th century BC found together with about 70 loom weights in Ambiente D was recovered at the site of Entella.[8] The site of Mozia yielded carbonized remains of a loom in use at the time of the destruction in 397 BC.[9] These unique cases offer interesting prospects for correlating any loom measurements with the recovered loom weights.

A weave consists of the interlacing of a vertical so-called warp thread and a horizontal thread, named the weft. The setting up of a weave on a warp-weighted loom in antiquity[10] most likely involved a starting border produced by tablet weaving.[11] The weft threads of the starting border, which in turn is attached to the head beam of the loom, thus become the warp threads and these are held in place and given the necessary tension by the attached loom weights. The weight of a loom weight is thus vital to the thread used in the weave and, consequently, also to the manufactured textile. Hence, calculations performed on loom weights, in which the two most important parameters are weight and thickness,[12] generate estimates of ranges of fabric that could have been manufactured with any given loom weight, as the case studies below will demonstrate. An expert weaver would know how much tension a thread required and could thus calculate if a heavy or light loom weight were needed to keep the warp threads optimally suspended.[13] The weft was beaten upwards and the weaver/s most probably stood in front of the loom.[14] It is less likely that they sat down while weaving because standing would facilitate the process in giving added strength to beat the weft upwards. The high chairs with weavers depicted in the 8th century BC Bologna *tintinnabulum* and the Verucchio throne loom scenes[15] probably refer to the tablet weaving of borders.[16]

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7 Tabby weave refers to a plain-woven fabric (Webster-Merriam s.v.). The weft and warp threads are interlaced, positioned above and below each other in a distinct manner. When equal number of threads are used for warp and weft the tabby weave is referred to as balanced (Gleba 2008, 39). Twill weave is more intricate (Webster Merriam s.v.: cloth that is made in a way that produces a pattern of diagonal lines). Twill weave uses a staggered pattern (Gleba 2008, 39).

8 Parra 1995, 18–19.

9 Nigro & Spagnoli 2007, 45.

10 Also attested in Icelandic, Norwegian and Sami communities in modern times. See Hoffman 1964, 63, 68, 114.

11 Ræder Knudsen 2012, 254–263.

12 Mårtensson *et al*. 2009, 374.

13 Hoffman 1964; Mårtensson *et al*. 2009, 382.

14 Hoffman 1964, 5.

15 Ciszuk & Hammarlund 2008, 123.

16 Ciszuk & Hammarlund 2008, 123 with ref. to Ræder-Knudsen 2002. See also Ræder Knudsen 2012, esp. 261, figs. 11, 12.

Archaeological finds of loom weights demonstrate the use of the warp-weighted loom in very early chronological periods. An Early Neolithic context (*c.* 5000 BC) is Tiszanejò, Hungary,[17] and for the Early Bronze Age (mid-3rd millennium BC) Troy constitutes an example.[18] Early representations of the warp-weighted loom include a possible attestation in the form of a Linear A ideogram on a clay sealing (HT20.4; LM IA period, *c.* 1600 BC), from the site of Hagia Triada in Crete.[19] In Italy rock carvings dated to the Bronze Age in Val Camonica, in the province of Brescia, depict several warp-weighted looms.[20] An urn recovered at Sopron, Hungary,[21] depicting weavers and a loom constitutes an example of an early 1st millennium representation from Central Europe. Iconographic sources can, moreoever, provide information to further the understanding and reconstruction of ancient looms. A warp-weighted loom is depicted on a Cypro-Geometric II (850–750 BC) dish,[22] and a Greek aryballos dated to 600 BC.[23] A painted Attic lekythos[24] shows a loom that has generated much discussion insofar as it portrays a single row of loom weights attached to the warp. There is no consensus as to whether the image portrays a heddle rod.[25] It may well be that one of the women represented holds a weft beater while the other inserts the shuttle with the weft thread,[26] in which case the fabric would have been a simple tabby weave. A Kabeiric skyphos (late 5th century BC),[27] depicting Kirke provides more adequate images of looms and shows double rows of loom weights, a shuttle as well as heddle and shed bars. The famous image of Telemachos and Penelope in front of her warp-weighted loom, on an Attic red-figured skyphos (*c.* 440 BC),[28] provides an elaborate rendering of a loom.[29] The loom weights are pyramidal in shape, as they are on the lekythos, while loom weights depicted on the Boeotian skyphos are portrayed with a rounded shape. It may be that the vase actually depicts such loom weights but the schematic rendering of details does not show more than a general pyramidal shape for the weights concerned. The case studies will highlight that, for the sites in the present study, the overall preferred shape of loom weight in the Archaic period in South Italy and Sicily is the truncated pyramidal for use on a warp-weighted loom. It is possible that the dimension of looms varied.[30]

Other types of looms such as the vertical two-beam loom gradually gained predominance and made the warp-weighted loom obsolete.[31] In Egypt the horizontal ground loom seems early on to have been the preferred loom type,[32] as a dish from the site of Badari dated to the early 4th millennium BC depicts this type of loom.[33] In Northern Europe, however, weaving with a warp-weighted loom continued in some regions well into the 20th century AD.[34] Ethnological studies carried out in Scandinavia by Marta Hoffman in the mid 1950s have clarified to posterity how the warp-weighted loom was used. The looms she documented used stones and not fired clay weights to weight the warp thread.[35] Her documentation has been an invaluable aid for archaeologists in understanding the technological intricacies behind ancient textiles.[36]

Investigating loom weights

The *chaîne opératoire* approach in the study of ancient technology is much applied in the reconstruction of technological processes and how a specific tool functioned, the focus being on observing the sequence of stages of manufacture of an artefact.[37] Such an approach to ancient technology provides information on the detailed specifics of material components, tool usage, use wear and technological change while the concept of life biography highlights an object through the spectrum of

17 Barber 1991, 93–94 and ref.
18 Hoffman 1964, 311 with ref. to *Troy* 1, Blegen *et al.* 1950, 60.
19 Barber 1991, 92. Linear A sign/ideogram is actually a variant of sign AB 54 which is conventionally attributed as depicting a type of textile.
20 Médard 2010, 17.
21 Barber 1991, 56, 92, 295. It is interesting to note that the individuals portrayed seem to be wearing the same type of patterned cloth as that depicted as a border on the vase. Two types of patterns appear to be depicted: one with triangular checkered lozenges and the other with small concentric circles.
22 Aspris 1996.
23 Hoffman 1964, 298. In the museum of Corinth.
24 By the Amasis painter 540 BC, Metropolitan Museum of Art, New York.
25 Hoffman 1964, 307.
26 Phipps 2011, 49.
27 Boeotian. British Museum, London.
28 Museo Nazionale Etrusco, Chiusi, Italy.
29 Buitron-Oliver & Cohen 1995, 44.
30 See Quercia & Foxhall 2014, 98 with reference to proto-historic looms as being smaller.
31 Lipkin (2012a, 67) states that for Latium, Etruria, the Falscan and Sabine regions the two-beam loom was introduced in the Imperial period. In the rest of Italy the warp-weighted loom was predominant until Late Antiquity.
32 Barber 1991, 81–83.
33 Barber 1991, 83.
34 Hoffman 1964, 63, 68, 114. The Sami communities in Finnmark and Troms in Norway, and the Skolt Sami in Finland, used the warp-weighted loom as recently as the late 19th century–early 20th century AD; in some places as late as the 1950s. In Iceland and the Faroe Islands too, the tradition continued into the 19th century AD. See also Geijer 1972 (2006), 44.
35 Hoffman 1964.
36 For a discussion on different types of looms in the ancient world, see also Crowfoot 1936–1937.
37 First introduced by anthropologist André Leroi-Gourhan 1964–1965.

its creation until it ends up in the hands of an archaeologist, and ultimately perhaps is stored in a museum environment.[38]

Social agency theory has assumed a prominent place in the study of material culture in archaeological contexts,[39] where "agency has become a buzzword",[40] shifting focus from a tradition of cultural historical interpretations that gave pride of place to typologies of form, function and decorative elements/iconography with which to construe a past society, to a desire to comprehend the interaction of humans and the surrounding material culture through the social agency inherent in both.[41] The notion that "things" could have agency and act upon humans gathered momentum.[42] Things are looked upon as taking an active part in social relations and transforming them.[43]

Perception, a key concept in Maurice Merleau-Ponty's philosophy in turn depends on factors of embodied experience of the world around us.[44] Moreover, the perspective of the researcher as a participant, rather than an objective observer,[45] becomes an important aspect. There is a sentient experience of the social and cultural world which artefacts inhabit. They reflect a specific cultural environment where culture in this respect should be seen as "orientations" formed by individuals' active choices rather than something passive.[46]

Edmund Husserl's phenomenological *leitmotiv* was "back to the things themselves" signifying the hermeneutic understanding that things are experienced and that existential importance lies in this understanding.[47] Recent debate has focused on the fact that "Things transform our life and are themselves to some extent at least, transformed by this mutual engagement".[48] In other words, objects intervene and transmute. These reflections on material culture have all had impact for the approach to the material in the present study. Moreover, experiential and experimental archaeology is applied as an analytical tool in exploring the technological ramifications of the loom weights and how these influence a finished textile product.[49]

Case studies

The general historical setting for the case studies is that of societies composed of a mixture of inhabitants. The 8th and 7th centuries BC saw a determined flow of colonizing contingents to Sicily and South Italy, mostly Greek but in Sicily also Phoenician. The meeting of indigenous peoples and settlers gave rise to new social dynamics mirrored in the material culture such as hybrid forms, although the exact nature of these forms is not always crystal clear.[50] Semiotic values of specific decorative motifs for instance, may have changed meaning and effect with possible simultaneous changes in technological choices. The model of hybridity looks away from " ... the unproductive polarity inherent in Greek and barbarian/native in favour of a productive and mutual acculturation that produces new and vigorous forms".[51] With respect to the present case studies, one can, for instance, query whether the loom weights recovered in Sicily in the final assessment are Greek, Phoenician, indigenous Elymian or Sicanian, or indeed whether they are hybrids, in the post-colonial sense of the term, as a result of several stylistic universes coming together. The dynamics that arise from the encounter between diverse entities create new relationships and networks in which things as well as humans share a part.[52] When assessing the craftsmanship involved in making loom weights, calculating the kinds of textiles they could have generated, or considering whether they had additional uses, such as votive, as well as applying archaeometric analyses to the clay, it is important to bear in mind that the loom weights are social actors of a kind. "Things" such as tools, can be seen as manifestations of extended personhood

38 Hoskins 1998 and 2006. See Kopytoff 1986 for the concept of biographies of things.
39 See the bibliography in Urban & Schortman 2012. See also Dobres & Robb 2005a; 2005b; Dornan 2002, 319–320; Knappett & Malafouris 2008. Moreover for a discussion on human agency and cultural identities see Pauketat & Alt 2005.
40 Dobres 2010, 109. See also Dobres 2010, 34, 110; Dobres & Hoffman 1994, 214; Dobres 1995, 42; Joyce & Lopiparo 2005, 369–370.
41 See for instance Shanks & Tilley 1992; Skibo & Schiffer 2008; Watson 2008, Olsen *et al*. 2012.
42 Discussions in Wylie 2002 and more recently, Urban & Schortman 2012. Fundamental has been Alfred Gell's (1998) agency perspective which catered to the field of art history but has had a prevailing influence also in related fields. Bruno Latour's Actor-Network Theory (ANT) (2005) saw the animate and inanimate as actors in a world composed of a never-ceasing network. See also the edited volume Henare, Holbraad & Wastell 2007, *Thinking through things*; also Lesure 2005.
43 Hodder 2012 is essential to any discussion on the concept of "things" as is Olsen 2010 and Olsen *et al*. 2012.
44 Merleau-Ponty 1962 (2005), 110–112; 1989.
45 Frykman & Gilje 2003.
46 Frykman 2012, 20 with reference to Ahmed 2006.
47 Gallagher & Zahavi 2012², 6.
48 Olsen 2010, 147. Frykman 2012 addresses phenomenology in Ethnology studies.
49 Hopkins 2013; Mårtensson *et al*. 2005-2006.
50 See Hall 2003 and 1997; Antonaccio 2007, 216–217; Hodos 1999; Hales & Hodos 2010, 81 who consider material culture objects as interaction. See also the edited volume Riva *et al*. 2010. For more recent discussions on the concepts of hybridity see the edited volume of van Pelt 2013, especially the contribution by Antonaccio, 237–251.
51 Antonaccio 2010, 36.
52 See discussion in Antonaccio 2013, 249 and reference to Knappett 2011.

of the human actors manufacturing and using them.[53] The case studies serve to underpin that these artefacts transcend an intrinsic agency as identity markers both pertaining to individual identity but also reflecting the mechanisms of a wider identity within a collective.[54]

The sites were selected for study based on a chronological focus on the Archaic–Early Classical periods in the defined geographical areas. Incorporating material from Mozia, a Phoenician emporion in Western Sicily, of slightly later date, offers an interesting comparative perspective with regard to settler/indigenous dynamics. The specific criteria for the choice of loom weights on which to calculate the loom set-ups are given for each site. Tables demonstrating calculations for the potential loom weight set-ups for specific loom weights are restricted here to fewer than five for each site.[55] The methodology used in the present study involving the transposition of loom weight morphological parameters into calculations of potential fabric quality is based on the research undertaken by the Danish National Research Foundation's Centre for Textile Research (CTR) at the University of Copenhagen and at Sagnlandet (Land of Legends) Centre for Historical-Archaeological Research and Communication, Lejre, Denmark.[56] Experiments undertaken by craftspeople together with archaeologists used replicas of loom weights found in archaeological contexts to carry out weaving tests on the warp-weighted loom.[57] The experimental loom set-ups involved the basic tabby weave but the calculations on the ratio of loom weight and yarn tension can be used equally to estimate twill weave. The potential loom set-up calculations undertaken on select loom weights for each site further below are based on this methodology.

The weight of a loom weight is fundamental to thread tension in the sense of how many threads can be attached to a given loom weight. The optimal range of warp threads to be attached to each single loom weight is between 10 and 30, with possibly 20–25 being the ideal maximum number.[58] Recent experiments with replicas of spindle whorls and loom weights found in archaeological contexts, have, however, shown that thread diameter can fluctuate in the same thread. Moreover, wool thread diameter may increase slightly when woven on a loom, which makes the diameter of a thread an ambiguous parameter in visualizing any finished textile.[59] Since a large range, dependent on the fibre type and spinning technique, is always implicated, the exact thread diameter is a less reliable basis in estimating the specific tension a thread requires. It is rather the weight of the thread that defines the number of threads that can be attached to a given loom weight.[60] The spinning tests, involving both wool and linen yarn, established that a difference in weight of more than 13% but less than 26% would still need the same tension.[61] When adhering to this methodology one must always when estimating fabric quality from extant loom weights, reflect on and take into consideration a range, since a given loom weight could be used with threads that need different tensions.[62] Nevertheless, in general, a thick thread requires more tension in comparison with a thin thread.[63] While the assessment of what is considered to be very fine, fine, medium or coarse textile quality may fluctuate depending on context, in this study, as laid out in the chart below,[64] thread that requires very little tension, needing, for instance, only 5 or 10 g tension is considered to be of a very fine quality.[65] In the present paper following CTR methodology[66] the parameters for fine to thick thread and correspond-

53 For example, Malafouris (2008, 1998) refers to a Mycenaean gold signet ring and sword as examples of material engagement between humans and things (p. 1999).

54 Identity is a fluid term as it embraces many facets. We can speak of gender, ethnic, social as well as cultural identity. Hodos (2010, 3) sees identity in the past as "… the way individuals thought about themselves and the way they communicated that to others through actions and material belongings whether through active choice or more passive reflection" and defines identity as "… the collective aspect of the set of characteristics by which something or someone is recognizable or known".

55 Select loom weights were chosen according to upper, medium and lower weight ranges for the sites in question. CTR methodology is also applied in Meo 2011 and 2014 for the loom weight material at the site of Metaponto, and Lipkin (2012a) presents experiments undertaken at the University of Oulu.

56 See Andersson Strand & Nosch (nd); Mårtensson *et al.* 2009; Andersson Strand 2012, Andersson Strand *et al.* in press; Mårtensson *et al.* 2005–2006.

57 It can be noted that the yarn used in the weaving experiments were machine spun wool thread but in some cases also handspun (Andersson Strand *et al.* 2008.) It must be remembered that the wool quality of modern day sheep and ancient sheep breeds differ. Moreover the fibre type, being animal or vegetable will also influence the end results. Flax yarn is less elastic than wool and thus needs comparatively heavier weights (Andersson 2003, 28).

58 Eva Andersson Strand pers. comm. 14 December 2013 with reference to experiments undertaken at the Sagnlandet (Land of Legends) Centre for Historical-Archaelogical Research and Communication. See also Mårtensson *et al*. 2009, 392. For the numerical references see Andersson Strand 2012, 211; Andersson Strand *et al*., in press. For the latter reference I thank Eva Andersson Strand for providing me with the manuscript ahead of publication.

59 Andersson Strand 2012, 208.

60 Andersson Strand 2012, 210–212.

61 Andersson Strand *et al*., in press.

62 Andersson Strand *et al*., in press.

63 Andersson Strand *et al*., in press.

64 Following Andersson Strand *et al*., in press.

65 It must be kept in mind that a thread diameter may change slightly with respect to it being moved from the spun state to being woven (Andersson Strand 2012, 212 and pers. comm.).

66 Andersson Strand *et al*., in press. See also the Tools and Texts – Texts and Contexts research programme at the CTR: http://ctr.hum.ku.dk/tools/. Lipkin (Lipkin 2012a, 51) discusses fabric quality also with regard to tension per cm in a textile giving 48–88g/cm as very fine quality,

ing tension are set out in the list below. Finished fabric differs also depending on if it is dense with many threads per cm in the warp system or more open with a lesser number of threads per cm.[67]

Thread/quality	**Thread tension**
Very thin	≤10 g
Thin	15–20 g
Medium	25–30 g
Thick	40 ≥ g

CAVALLINO, APULIA

The archaeological site of Cavallino is situated near the city of Lecce in the Salento region of Apulia. To date, the earliest finds at this settlement site belong to the Late Bronze Age. Subsequently abandoned, the site was re-inhabited in the 8th century BC when the indigenous Iapygian/Messapian population gradually constructed a large urban centre.[68] They occupied the site until the first third of the 5th century BC when a violent destruction occurred. A few tombs dating to the 4th and 3rd centuries BC recovered in the rubble of the Archaic houses testify to a limited habitation after this major destruction.[69] Many pottery finds attest to contact with the Hellenic world, well before exchange with the Greek colony of Taranto,[70] and the faunal remains show a flourishing, mixed agricultural and pastoral economy, based in part on cattle raising.[71] Finds from the Iron Age levels point to Illyrian influx and a presumed substantial Illyrian ethnic genetic make-up of the population.[72] The site almost exclusively dates to the Archaic period, the general chronological time frame being the 7th to early 5th century BC. The archaeological evidence demonstrates that the Messapians were in contact with Greek people; Greek influx is observable in the pottery uncovered at the site,[73] but it remains limited. At around 500 BC at most 10% of the total amount of pottery is Greek and the site thus constitutes an excellent example of an indigenous urban centre of the Archaic period.[74]

Proper excavations at the site began in the 1960s and continued sporadically into the 1970s.[75] The area of the site spans approximately 69 hectares and comprises several different domestic complexes designated as "Fondi".[76] The majority of the material in the present study was recovered in the excavations undertaken in the 1960s by Giovanna delli Ponti.[77] Stratigraphic information on the exact find-spots have been derived both from the documentation available in the *Salento Arcaico and Cavallino* publications,[78] and information given through personal communication with the current excavator Corrado Notario who kindly provided general time frames based on stratigraphic annotations on the sacks in which the material was stored. Most of the material under study refers to a generic 6th century date and/or late 7th century BC. Recent excavations conducted within the summer field school programme reveal three phases of construction.[79]

The Archaic layer at Cavallino is reached just 10–20 cm below the surface.[80] Loom weights were found in almost all of the settlement quarters.[81] The sector Fondo Casino is made up of several house structures called G1-6.[82] In room B of the main house G1, a concentration of loom weights were unearthed suggesting that this room once contained a loom.[83] Apart from a few finds unearthed during the 2012 and 2013 summer excavations, the loom weights from Fondo Casino that were made available to me were recovered in the excavations in the 1960s. The sector Fondo Fico provided the highest number of loom weights in this material (154 loom weights out of a total of 176). The general time frame extends from the mid to the end of the 6th century and the beginning of the 5th century BC. The preferred loom weight shape is the truncated pyramidal (*Fig. 8*) followed by the pyramidal with only a few samples of conical loom weights.

Of the artefacts related to textile production examined, only a few (nine in all) belong to the early Iron Age layers of the part of the site designated as Fondo Pelli, where traces of post holes pertaining to hut structures were found in the

90–130 g/cm as fine, 134–200 g/cm as fine or coarse and 234–268 g/cm or higher coarse fabrics.

67 Andersson Strand *et al.* in press.

68 Notario 2005. From the 5th century BC onwards the term Messapians is used exclusively for the indigenous people living in the Salento area of Apulia (Nenci 1979, 19–20).

69 D'Andria 2005, 42–43.

70 D'Andria 1977, 531–532.

71 Nenci 1979, 114; Pancrazzi 1979a, 119; Pancrazzi 1979b, 285.

72 Pancrazzi 1979b, 286–287. However, see also Mallegni 1979, 313, stating that it is not possible, from the examined osteological material, to anthropologically determine the population.

73 D'Andria 1977, 526.

74 Morel 1979, 52–53.

75 D'Andria 1977, 525–578. See also Morel 1979, 41–55. The excavations were conducted jointly by the Università del Salento, Lecce, the Scuola Normale Superiore di Pisa and the École Française de Rome. In recent years the Università del Salento at Lecce has conducted excavations within its summer field school programme in the month of July.

76 The material here presented was recovered from the specific areas Fondo Casino, Fondo Fico, Fondo Pelli, as well as the area denominated Cerchio Interno.

77 Corrado Notario pers. comm., July 2012.

78 D'Andria 1979; Morel 1979; Pancrazzi 1979, 190.

79 Corrado Notario pers. comm., July 2012.

80 Pancrazzi 1979, 117.

81 Pancrazzi 1979, 188.

82 Notario 2005, 50–51.

83 Corrado Notario pers. comm., July 2012. This particular batch of loom weights was not available for me to examine since they were stored away after an exhibition in the archaeological museum in Lecce.

rock.[84] The material relating to textile implements recovered in these layers is scant; a few spindle whorls and cylinder-shaped implements, which are of a particular type of spool known by the conventional Italian designation *rocchetto*, were recovered. These *rocchetti*, with flat ends and oblique perforation in which the suspension hole runs from one flat end to the upper part of the body of the cylinder, differ from other more common perforated and unperforated spools with varied shapes which are more widespread in archaeological contexts in Italy.[85] Spools may have been used to keep the warp taut in tablet weaving, as experiments have shown, or when warping a starting border.[86] The nine examples from Cavallino show a range of 18–55 g in weight, 20–78 mm in length and 16–22 mm in thickness (*Fig. 16*). There is no consensus as to how this particular artefact with its singular oblique perforation was used.[87] Experimental testing undertaken by the present author on replicas of this implement shows that the oblique perforation on one end of the short side of these cylinders would constitute an ingenious way of arresting the thread when the needed length has been unwound (*Figs. 5–7*).[88] A novel suggestion, thus, is that this tool would have functioned well in warp twining, where the warp is the active party and where the paired warp threads trade places after each placed weft thread or straw.[89] The thread, conveniently kept on the cylinders, would facilitate the work process and the specific oblique perforation aids in the process. These implements would, thus, function as a specific type of small weights. This accords well with suggestions elsewhere that these implements

Fig. 5 (above). Cylinder-shaped implement/spool from Cavallino Photo © author.

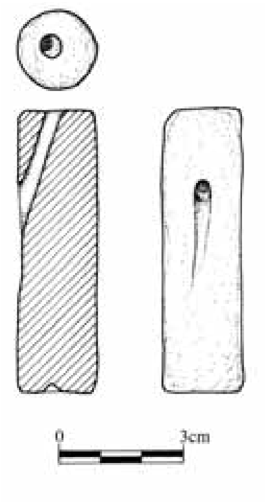

Fig. 6 (right). Drawing of a cylinder-shaped implement/spool from San Vito dei Normanni by Fabiola Malinconico, Laboratorio di Archeologia Classica del Dipartimento di Beni Culturali, Università del Salento, Lecce.

performed as small weights.[90] Hypothetically, if such a technique were in use it would point to a production in this period of, for instance, mats, as even a relatively thin thread used in the twining process may not impede the use of coarser fibres in the weft. As shown in Staermose-Nielsen bundles of straw or other rigid material was used as weft.[91] However, it must be kept in mind that, to date, no textile evidence suggesting that such a technique was used in the time period concerned, has been recovered. However, given the demanding environmental prerequisites for textile preservation in archaeological contexts, the possibility of such a type of textile production should not be completely ruled out. Other uses for these particular objects, other than textile production, have also been proposed but seem less likely.[92] Similar cylinders have been found locally at nearby Muro Leccese,[93] and at other South Italian sites, among others, at Satyrion and in pre-Hellenic Calabrian necropoli.[94] Although they seem to be more diffused in South Italy they occur also at Etruscan sites and in the Picenum.[95] To date, I have not seen this type of implement in the contemporaneous Sicilian sites under study.

84 See Polito 2005 for the material from Fondo Pelli.

85 Gleba 2008, 143; 145, fig. 100.

86 November 2013 (CTR textile course). See also Gleba 2008, 140, fig. 98 with reference to Ræder Knudsen 2002; 2012 and Lipkin 2012a, 61–62; 2012b, 9; 2014, 47 shows a drawing in which the preparation of warp using tablet weave is demonstrated. The drawing on page 8 shows the use of spools as small weights in the weaving of a decorative border. It is not stated if the spools have an oblique perforation which is the spool type discussed in the present paper. Both techniques, although using the same general principle of weighting the warp threads as demonstrated in the drawings, differ from the technique of warp twining which in the present paper is the suggested function of the spools with this particular oblique perforation.

87 Gleba 2008, 145, fig. 100, n. 1.

88 I thank Ulrikka Mokkdad for her expertise and kind assistance in the experiments on the function of the particular oblique perforation. I thank Anna Waern-Sperber for sharing her weaving expertise in discussions on this particular implement.

89 See Staermose Nielsen 1999, 52–53 and fig. 29A for the technique. In this particular case of warp twining children are depicted using implements that look very much akin to the basic shape of the *rocchetti* and where the warp twining involves a small rudimentary loom-like structure on which these implements hold the thread which is fastened to them. The children are twining a mat known from imprints detected in a clay floor at Lusehøj, a burial mound dated to the Bronze Age.

90 Gleba 2008, 140–141 discusses spools used as weights. See also Lipkin 2012a.

91 Staermose-Nielsen 1999, 50.

92 Such as that of kiln testers. See Gleba 2008, 40 for a discussion with further references.

93 Giardino & Meo 2013, 202–203.

94 Pancrazzi 1979, 189, with references.

95 Gleba 2008, 143.

Fig. 7. Replicas made by the author of cylinder-shaped implements/spools as depicted in Figs. 5 *and 6. Photo © author.*

Several decorative schemes came to light in the loom weight material. Decoration can serve several purposes. First and foremost aesthetic needs come to mind, but perhaps decorative elements also express functional needs. Perhaps a loom weight potter used decoration as a means of distinguishing between different loom weight batches intended for different households, or specific decoration mirrored actual textile designs intended in the weaves.[96] When one or more loom weights in a set show, for example, an incised cross or stamp, these may have functioned as markers for a given point in a weave where, for instance, the point at which a so-called float was to be inserted, thus facilitating the work for a weaver when weaving a more complex weave. It has been suggested that impressions from ornaments such as rings or brooches on loom weights reflect the personal attachment of the owner to the tool and that this is bedded in Greek tradition.[97]

There are several types of loom weight decoration at Cavallino, all of which were impressed or incised onto the clay before firing. The *puntinato* type of decoration consists of minute incisions made on the surface with a comb-like tool (*Fig. 9*).[98] The impressions are not rounded but are composed of rather small horizontal lines resembling dots, thus providing the name for this type of decorative pattern. The *puntinato* decoration occurs mostly in bands around all four faces of the loom weights. Other loom weights, however, are decorated with circles placed in a vertical line or scattered, usually restricted to the faces without suspension hole. Incised crosses (*Fig. 10*) are a common decorative element and often occur on the top end faces or on the lateral faces without perforation, as is the case also for the loom weights decorated with impressions of fibulae (*Fig.11*) and in some cases also for those with

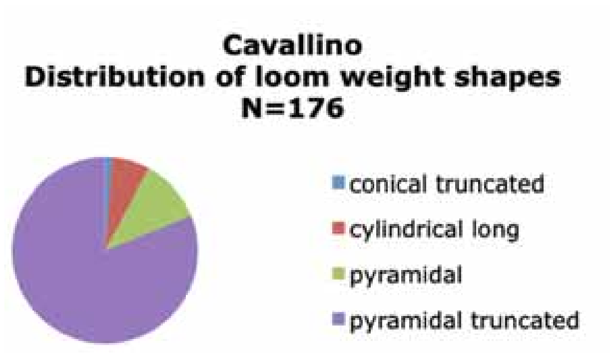

Fig. 8. Cavallino. Pie chart showing the distribution of loom weight types.

[96] On marks and decorative elements on loom weights see Rutschmann 1985; Ferrandini Troisi 1986; Quercia & Foxhall 2012; 2014 for a discussion.
[97] Quercia & Foxhall 2014, 99.
[98] The minute dots (*punti* in Italian) were probably incised with a very small type of pointed stylus or comb with the points measuring less than 1–2 mm.

Fig. 9. Cavallino. Loom weights with puntinato *decoration. Photo © author.*

Fig. 10. Cavallino. A loom weight with an incised cross. Photo © author.

Fig. 11. Cavallino. Loom weights with impressions of fibulae. Photo © author.

Fig. 12. Cavallino. Two loom weights probably made with a mould. Photo © author.

impressed rosettes. The fibula decoration has an interesting parallel, roughly contemporary in Sicily at Selinous.[99]

The clay paste used in the loom weights is of a very fine friable and powdery consistency. It is highly likely that in most cases a mould was used for the firing, since many loom weights are perfectly even in shape (*Fig. 12*), except for the cylindrical spools mentioned, which were most likely fashioned by hand. Hand-modelled loom weights tend to be much more irregular around the edges (see section on Mozia below). Most loom weights show use wear on the lower corners and side edges and others have clear signs of wear around the perforation.

The distribution of weight and thickness of complete loom weights demonstrated in the graph (*Fig. 13*), shows that the majority of loom weights fall within the range of 80–180 g in weight and 35–45 mm in thickness, with an outlier at 336 g and 57 mm thickness. These loom weights suggest a possible production at the site of finer quality fabrics.[100]

[99] Quercia & Foxhall 2014, 95, fig. 6. No measurements are given for the loom weight in question. It would be interesting to compare the morphological parameters to see if there are similarities with regard to potential fabric qualities.

[100] For a general discussion on loom weights in relation to the production of different fabric qualities see Mårtensson *et al*. 2009; Andersson Strand *et al*., in press. See also the discussion in Lipkin 2012a, 51 that the tension per cm is also indicative for fabric quality.

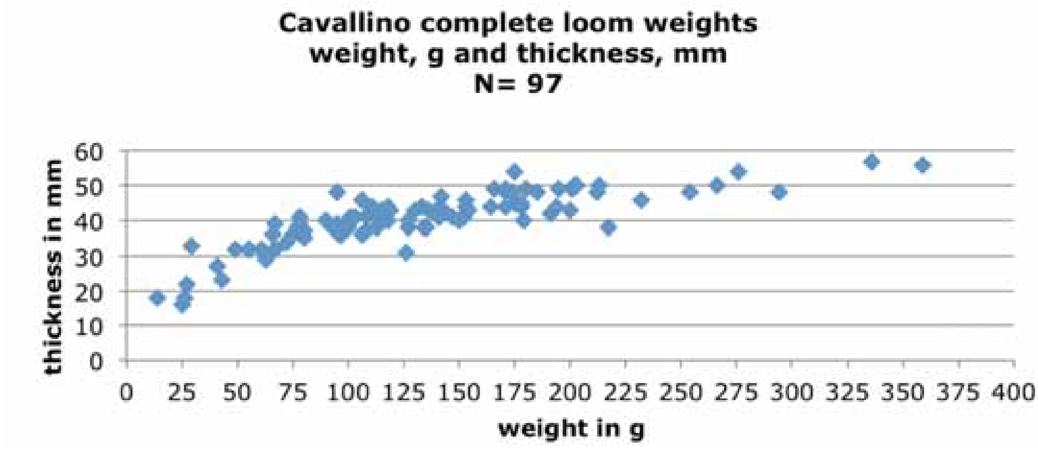

Fig. 13. Cavallino. Distribution of weight and thickness.

Several sets of loom weights may be distinguished in the material. For the potential loom set-ups weights were selected both according to distinguishable sets with decoration and/or to weight classes. The loom weights for the potential loom set-ups were calculated for loom weights chosen from two sets of decorated loom weights, the *puntinato* set (*Table 1*) and the set decorated with impressions of fibulae (*Table 2*). The *puntinato* set consists of ten similar loom weights weighing between 101 to 109 g with a thickness of 41–42 mm (two of the loom weights are broken and the weight and thickness have been calculated based on the remaining fragments). The third set-up (*Table 3*) regards a heavier loom weight weighing 336 g and thickness 57 mm. The set-ups follow the guidelines given in the Technical Reports of the Centre for Textile Research.[101]

The calculations for the potential loom set-ups (*Tables 1–3*) suggest that the loom weights at Cavallino were used to produce a range of fabric of a finer quality. Experiments undertaken by craftspeople with replicas of loom weights recovered in archaeological contexts have suggested that thread diameter is a decisive factor in determining warp tension. Thus a thread requiring 10 g warp tension per thread would have a diameter of ≤0.3 mm while a thread requiring 40 g warp tension would have a diameter of 0.8–1.0 mm.[102] Recent publications point to the fact that since variation of thread diameter occurs in one and the same thread, the tension required by a thread is a better parameter in determining thread quality.[103] Only two loom weights of those examined at Cavallino are heavier than 300 g. This suggests finer quality fabric production. Moreover, the set-ups show a low thread count for the warp threads, suggesting that weft-faced fabrics (*Fig. 4*) were the preferred type of fabric for the first two set-ups while the third could refer to a balanced fine fabric of 5–6 threads per cm. This potential manufacture of weft-faced fabric concurs with finds of mineralized textiles examined at the museum in Melfi, Basilicata, belonging to the same chronological horizon and which show a dominance of weft-faced tabbies, although evidence of twill fabric is also attested.[104] All calculations on potential loom set-ups have been made on the basic tabby weave. To calculate twill fabric one can multiply the rows of loom weights, thus for 2/1 twill calculations are made on three rows and for 2/2 twill on four. Accordingly, this influences a textile's tension per cm. With regard to the loom weight calculations, it may as a rule be concluded that if a loom weight is unsuitable for the weaving of tabby, it is so for twill as well, since the optimal number of threads that can be attached to a loom weight remains the same.

The motifs on decorated loom weights, such as impressions of fibulae, *puntinato* decoration, crosses and circles, attest to the investment allocated to these tools. The decorative schemes seem to have been carefully applied giving us a glimpse of the aesthetic preferences of the Messapian community at the time. We can only speculate if the circular impres-

[101] Technical reports CTR general introduction by Andersson Strand & Nosch (nd); Mårtensson *et al*. 2009.
[102] See Mårtensson *et al*. 2009, 378 for a comprehensive layout of the different parameters and methodology involved. See also the Tools and Texts – Texts and Contexts research programme at the CTR: http://ctr.hum.ku.dk/tools/.
[103] Andersson Strand *et al*., in press.
[104] The present author with Margareta Gleba, Christian Heitz, and Francesco Meo will co-publish the mineralized textile finds from the site of Ripacandida.

Table 1. Cavallino. Calculations for potential loom set-ups for a loom weight of the puntinato *set (CVFF65/30).*

Loom weight CVFF65/30, weight 109 g, thickness 42 mm			
	A	*B*	*C*
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per loom weight	11	5	3
Number of warp threads per 2 loom weights (one in front and one in back)	22	10	6
Warp threads per cm	5	2	1
Evaluation of suitability	Choice	Unlikely	Unlikely

Table 2. Cavallino. Calculations of potential loom set-ups for one of the loom weights from the set decorated with impressed fibula (CVFF65/98).

Loom weight CVFF65/98, weight 185 g, thickness 48 mm				
	A	*B*	*C*	*D*
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension	40 g warp tension
Number of warp threads per loom weight	18–19	9	6	5
Number of warp threads per 2 loom weights (one in front and one in back)	36–38	18	12	10
Warp threads per cm	7–8	3–4	2–3	2
Evaluation of suitability	Choice	Possible	Unlikely	Unlikely

Table 3. Cavallino. Calculations of potential loom set-ups with loom weight CVFF65/9.

Loom weight CVFF65/9, weight 336 g, thickness 57 mm				
	A	*B*	*C*	*D*
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension	40 g warp tension
Number of warp threads per loom weight	33–34	16–17	11	8
Number of warp threads per 2 loom weights (one in front and one in back)	66–68	32–34	22	16
Warp threads per cm	11–12	5–6	3–4	2–3
Evaluation of suitability	Possible	Choice	Choice	Unlikely

sions mirror a textile patterning in a weave or if they express mere personal preferences. The elegant and careful application of the motifs, of which the *puntinato* decoration is an example, in my view, suggests more aesthetic choice than a utilitarian purpose for the decoration although neither may be mutually exclusive. The calculations of the potential loom set-ups point to a sophisticated textile production, which we can again, speculatively, suggest mirrors the consideration given to the careful fashioning of these tools used in their manufacture. Impressions on loom weights with personal ornaments such as fibulae have been taken as an expression of a primarily Greek origin.[105] If so, the set with the impressed fibulae may testify to Greek influence in the textile technological sphere at this indigenous site which, however, shows only a limited percentage of Greek pottery. Thus it is attractive to view the loom weight material as being a reflection of mixed cultural expressions.

SAN VITO DEI NORMANNI, APULIA

Excavations have been carried out in recent years at the hill site of Castello d'Alceste at San Vito dei Normanni in the province of Brindisi by the Cultural Heritage Department of the University del Salento, Lecce under the leadership of Grazia Semeraro. An Iron Age hut village dated to the 8th century BC was unearthed beneath the Archaic settlement which dates to the 6th century BC.[106] The Archaic settlement of this indigenous site, abandoned in the beginning of the 5th century BC,[107] covers an area of about three hectares surrounded by walls measuring three metres thick and which were possibly at least four metres high.[108] During excavations a large building, the "Grande Edificio" constructed in the mid 6th century BC and destroyed around 475 BC, covering an area of 700 m^2, was uncovered.[109] This large structure had an open courtyard and a series of rooms[110] which yielded notable finds of imported Greek pottery as well as pottery from Greek foundation cities in South Italy, Taranto and Metapontum.[111] The "palatial" character of the "Grande Edificio" points to the site's social stratification with evidence of dominant nuclei.

To date, 39 loom weights (*Fig. 14*) have been discovered in various rooms of the building. Some were unearthed in the destruction layers belonging to the latest Archaic phase. Oth-

105 Quercia & Foxhall 2014.
106 Semeraro 2009, 496; Cocchiaro 1996, 58–59; Semeraro 1998, 60–61. The site has been made into an experimental archaeological park and includes a didactic reconstruction of an Iron Age hut (Semeraro & Monastero 2009). See also http://www.castellodialceste.it.
107 http://www.castellodialceste.it.
108 Semeraro & Monastero 2009, 19; Semeraro 2009, 496.
109 Semeraro & Monastero 2009, 23; Semeraro 2009, 496.
110 Semeraro & Monastero 2009, 23.
111 Semeraro & Monastero 2009, 25.

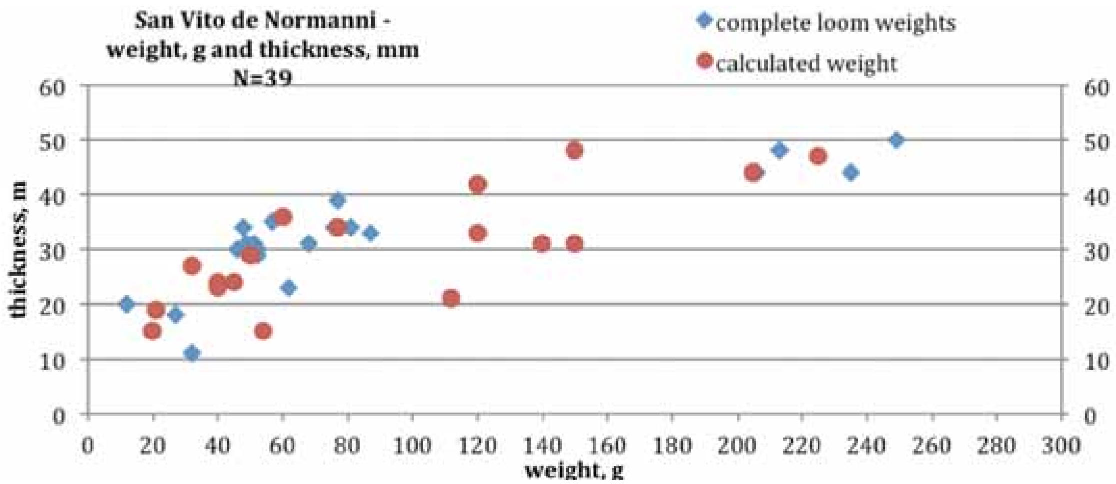

Fig. 14. San Vito dei Normanni. Distribution of weight and thickness for complete loom weights and for loom weights with small fragments missing with calculated weight.

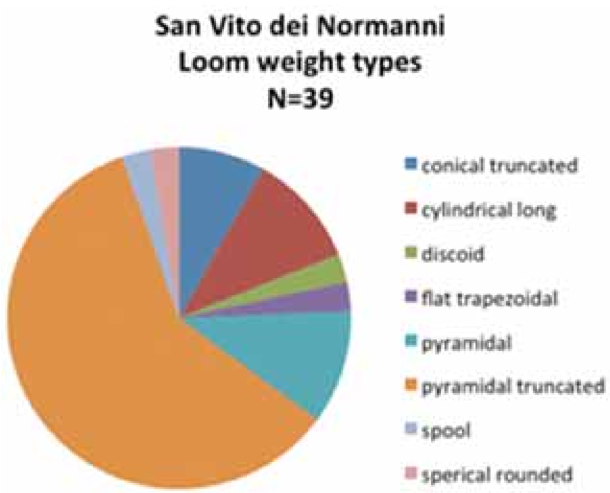

Fig. 15. San Vito dei Normanni. Distribution of loom weight shapes at San Vito dei Normanni.

ers were recovered from the topsoil layer with intermittent modern agricultural intrusion, together with finds of Archaic pottery sherds. The weight and thickness distribution shows a concentration of loom weights weighing 20–85 g (*Fig. 14*). The dominant loom weight shape category is the truncated pyramidal but finds of discoid and truncated conical and flat trapezoidal shapes were also recovered (*Fig. 15*). Four cylinder-shaped implements with oblique perforations belong to the late Iron Age–Early Archaic period. They are analogous to the *rocchetti* found at the site of Cavallino and reference is made to the discussion presented above. Most examples at San Vito dei Normanni weigh 20–34 g and are between 23–68 mm in length and 15–27 mm thick (*Fig. 16*). They show use wear around the suspension hole.

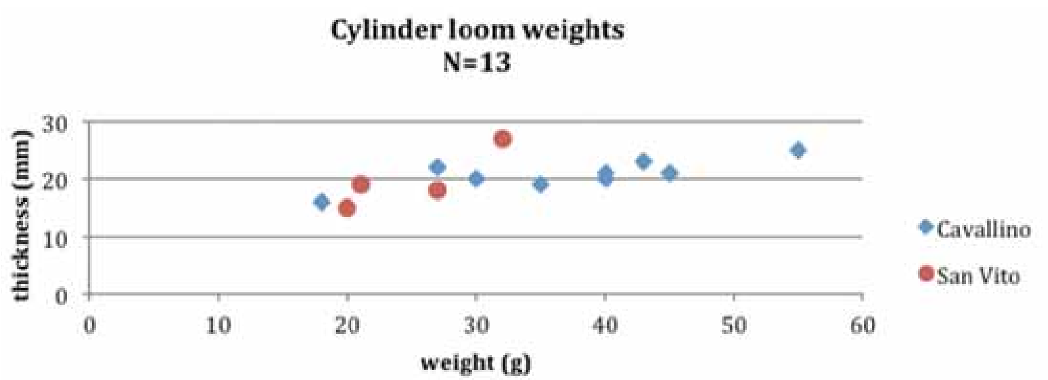

Fig. 16. Comparison between the weight and thickness of the cylinder–shaped implements/spools at Cavallino and at San Vito dei Normanni.

Table 4. San Vito dei Normanni. Calculations of potential loom set-ups with loom weight SV08/573/1.

Loom weight SV05/262/2, weight 249 g, thickness 50 mm			
	A	***B***	***C***
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per loom weight	25	12–13	8
Number of warp threads per 2 loom weights (one in front and one in back)	50	24–25	16
Warp threads per cm	10	5	3
Evaluation of suitability	Choice	Choice	Unlikely

Table 5. San Vito dei Normanni. Calculations of potential loom set-ups with loom weight SV08/573/1.

Loom weight SV08/573/1, weight 176 g, thickness 34 mm			
	A	***B***	***C***
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per loom weight	17–18	8–9	5–6
Number of warp threads per 2 loom weights (one in front and one in back)	35	16–18	10–12
Warp threads per cm	10	5	3
Evaluation of suitability	Choice	Possible	Unlikely

The calculations for potential loom set-ups (*Tables 4* and *5*) for two select loom weights recovered in the "Grande Edificio" suggest the manufacture of a range of finer and coarse quality fabric. These samples include a loom weight SV05/262/2 weighing 249 g with a thickness of 50 mm and SV08/573/ weighing 176 g and 34 mm thick; both have a truncated pyramidal shape. The set-ups show that these loom weights would have functioned well with a thin, even very thin, thread needing 10–20 g of tension respectively. Calculations indicate a production of finer quality fabric perhaps destined for clothing. It cannot be excluded that the loom weights were also utilized to produce coarser type of fabric but for a manufacture of textiles intended for sacks or heavier type of household furnishings, heavier loom weights would be expected. The low warp thread count for a tabby weave, 5 threads per cm, suggests a production of weft-faced fabric (*Fig. 4*). In the case of loom weight SV05/262/2, the set-up with a thread needing 10 g warp tension the result is 10 threads per cm[112] which suggests that this loom weight would have been well-suited for the production of balanced tabbies (*Fig. 2*). The loom weights are simple and pared down in their fabrication and most probably hand-fashioned. They appear to stem from a plain standard production of loom weights. The clay paste is medium coarse and the loom weights lack decorative features.[113]

MONTE IATO, SICILY

The site of Monte Iato is located on a promontory 852 m above sea level, in the hinterland of the Palermo province in Sicily. Its documented history spans 2,000 years, from the Early Iron Age in the beginning of the 1st millennium BC until its sack by Frederick II in AD 1246.[114] At one time the urban area extended over 40 hectares. The site is mentioned in the ancient sources as Iaitas in Greek and Ietas in Latin.[115] Traces of huts constitute the earliest evidence of settlement at the site. The indigenous population, conventionally named Sicano-Elymian, after Thucydides (4.2), eventually came into close contact with Greeks, evidenced by the numerous imported Greek and locally made but Greek influenced pottery unearthed at the site. The recovered artefacts are the expression of a Greek and indigenous mix of inhabitants and the site is thus an eminent expression of a hybrid culture.[116] The loom weights studied were all unearthed in a structure, the so-called Late Archaic House, erected about 500 BC.[117] It is situated in close proximity to a cult building, dedicated later to the worship of Aphrodite,[118] suggesting that the Late Archaic House was linked to the sanctuary and perhaps used for banqueting in connection with ceremonial activities.[119] Exact find-spots for the loom weights' distribution in the house will be given in the full publication of the Late Archaic House, thus the present article will highlight only select information.

112 See http://www.castellodialceste.it.

113 Close inspection reveals that one loom weight has possible traces of a cross.

114 Excavations have been undertaken for many years by the University of Zürich under the direction of Hans-Peter Isler and continue now with the University of Innsbruck's excavations of the Late Archaic House under the leadership of Erich Kistler. I thank Prof. Kistler for generously entrusting me with the publication of the loom weight material recovered in the Late Archaic House in the forthcoming volume, edited by Erich Kistler.

115 Isler & Spatafora 2004, 5.

116 For discussions on identity and cultural expressions, see Hall 2003, Hodos 2006, and Antonaccio 2010.

117 http://www.uibk.ac.at/projects/monte-iato/fwf/i/.

118 http://www.uibk.ac.at/projects/monte-iato/fwf/i/.

119 http://www.uibk.ac.at/projects/monte-iato/fwf/i/. Also Kistler 2013.

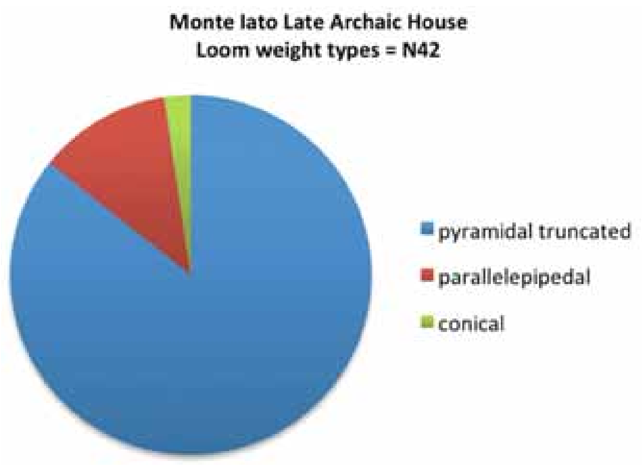

Fig. 17. Monte Iato. Loom weight types recovered at Monte Iato. Secure contexts.

The total number of the recovered and registered loom weights for the Late Archaic House is 65, of which 42 are loom weights with secure contexts pertaining to the Archaic layers (*Fig. 17*). The remainder were found in mixed contexts resulting from later Hellenistic intrusions. *Figures 18* and *19* give the loom weight types and the weight/thickness distribution for the loom weights recovered in the Late Archaic House from both secure and mixed contexts. *Figure 20* shows the weight and thickness distribution of the 42 loom weights recovered from secure contexts. The chart demonstrates that the truncated pyramidal shape is virtually dominant in the secure Archaic layers.

Tables 6, *7* and *8* show calculations of potential loom set-ups based on the weight in grams and thickness in mm of three selected loom weights.[120] The calculations of potential loom set-ups suggest a production of fine quality fabrics.

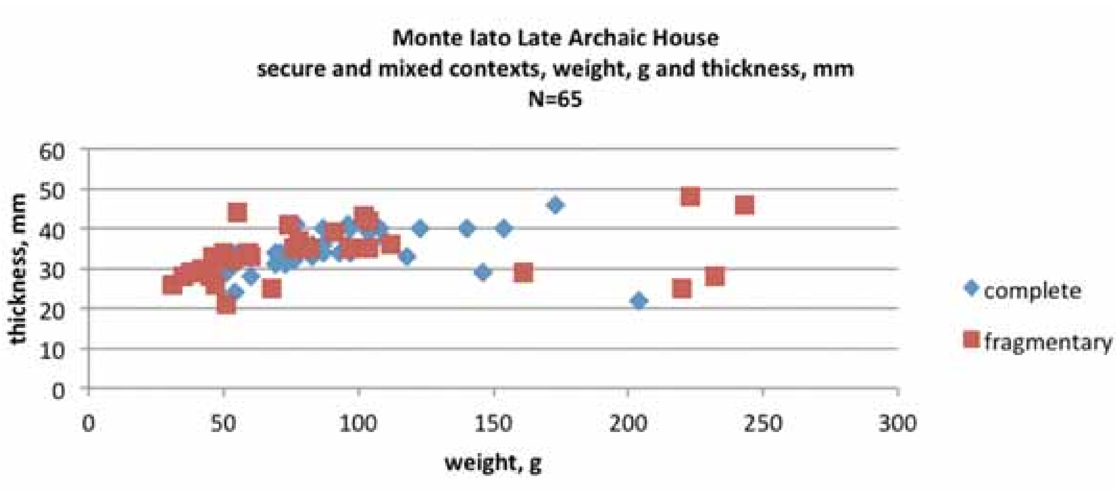

Fig. 18. Monte Iato. Distribution of weight and thickness. Secure and mixed contexts.

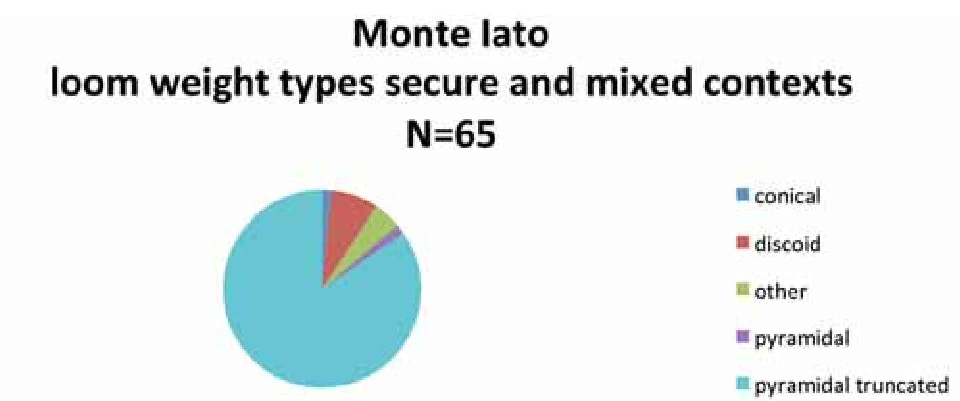

Fig. 19. Monte Iato. Loom weight types. Secure and mixed contexts.

120 The set-ups follow the method for calculations given in the textile tool reports at the CTR. See http://ctr.hum.ku.dk/tools/Technical_report_3__experimental_archaeology.pdf

Table 6. Monte Iato. Calculations of potential loom set-ups with loom weight I-W 2039.

Loom weight I-W2039, weight 204 g, thickness 46 mm				
	A	***B***	***C***	***D***
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension	40 g warp tension
Number of warp threads per loom weight	20	10	7	5
Number of warp threads per 2 loom weights (one in front and one in back)	40–41	20	14	10
Warp threads per cm	8–9	4	3	2
Evaluation of suitability	Choice	Possible	Unlikely	Unlikely

Table 7. Monte Iato. Calculations of potential loom set-ups with loom weight I-W 1549.

Loom weight I-W 1549, weight 39 g, thickness 40 mm			
	A	***B***	***C***
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	4	2	1
Number of warp threads per 2 LW's (one in front and one in back)	8	4	2
Warp threads per cm	2	1	–
Evaluation of suitability	Unlikely	Unlikely	–

Table 8. Monte Iato. Calculations of potential loom set-ups with loom weight I-W 1894.

Loom weight I-W 1894, calculated weight 104 g, thickness 40 mm				
	A	***B***	***C***	***D***
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	20–21	10	5	3
Number of warp threads per 2 LW's (one in front and one in back)	40–41	20	10	6
Warp threads per cm	10	5	2–3	1
Evaluation of suitability	Choice	Choice	Unlikely	Unlikely

However, the set-up (*Table 7*, I-W 1549) with a light loom weight weighing only 39 g and with a thickness of 40 mm suggests it is not suited for use on the warp-weighted loom. Experiments undertaken with replicas show that these lighter loom weights could potentially have worked well in the tablet weaving technique.[121] Tablet weave is found on the Verucchio mantles and possibly also in recent textile finds from the South Italian site of Ripacandida in the Basilicata region which suggests that the technique may have been known further south in Sicily, although no tablets have, to my knowledge, been uncovered in archaeological contexts to support this.[122] Presumably this is so because the tablets used in the technique were often made of perishable material and therefore need not imply that such a technique was not used.[123]

Two loom weights, one of which is fragmentary, show identical shape and burn marks making it likely that they were destroyed close to one another other and thus they perhaps belonged to a set, the remainder of which is lost. Moreover, the calculated weight for the fragmentary loom weight equals that of the intact loom weight, which suggests that these two particular weights were once part of a larger set. No other sets of loom weights can be detected in the material from a secure context. Uncovered in a mixed context belonging to later Hellenistic disturbance are four parallelepipedal weights of virtually identical weight, length, height, and width, which points to a set of loom weights.

Among the loom weights recovered in the Late Archaic House at Monte Iato, close examination detected a finger imprint on one loom weight (I-W1351), most probably a thumb, judging from the angle of placement when kept in the hand. This loom weight was handfashioned as was most probably the majority of the loom weights recovered in the house. The loom weights come across as very basic and only a few have decorative details such as an incised or grooved cross or a stamped decoration (*Fig. 21*). Use wear at the lower corners and around the perforation is detectable on virtually all of the loom weights. The proximity of the Late Archaic House to a cult building may be an indication that the recovered loom weights were ultimately dedications or should be viewed as part of ceremonial refuse assemblages since the Late Archaic House has been interpreted as a banquet and ceremonial building in which ritualized feasting took place.[124]

121 Tablet weave is a technique mostly using square tablets of leather, wood or bone perforated in the corners, in which thread is drawn through the perforations. Sheds are created by turning the tablets which forms different patterns (Gleba 2008, 138).

122 For Verucchio see Ræder Knudsen 2002; 2012. For Ripancandida see above and note 104.

123 Gleba 2008, 139.

124 See http://www.uibk.ac.at/projects/monte-iato/fwf/i/.

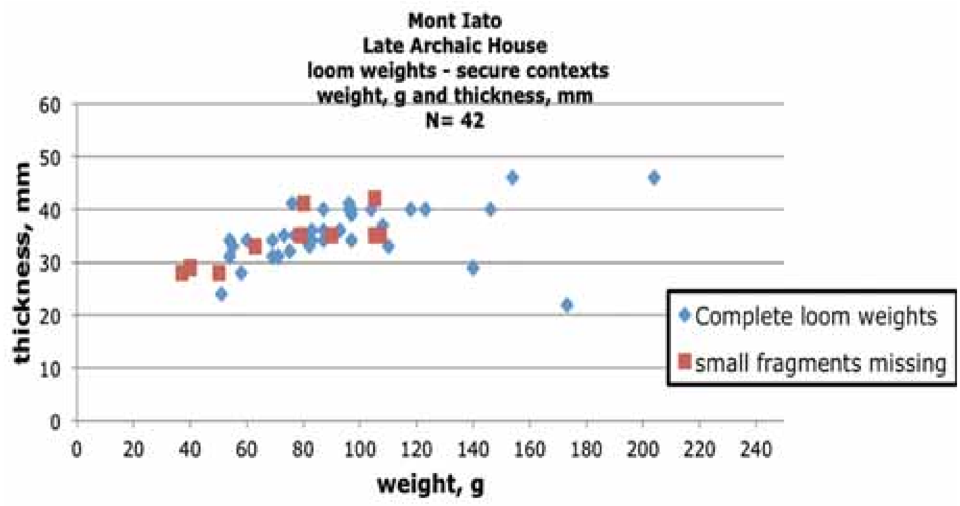

Fig. 20. Monte Iato. Distribution of weight and thickness. Secure contexts.

Fig. 21. Monte Iato loom weights, in the foreground some examples with an incised cross.

SEGESTA (SCARICO DI GROTTA VANELLA) SICILY[125]

The find-spot for the so-called Scarico di Grotta Vanella at the archaeological site of Segesta is located on the north-eastern slopes of the Monte Barbaro. The "scarico", or refuse deposit, was discovered in the 1950s and excavations at the site by Juliette de La Genière and Vincenzo Tusa began in 1957 and continued sporadically during the 1960s and 70s.[126] Four trenches up to 12 m deep were dug at the spot and an enormous amount of material was recovered, including indigenous pottery, Greek import ware, imitation Greek local ware, bronzes, terracotta figurines, lamps, musical instruments, ivory, and amber.[127] Moreover, more than 1,000 loom weights were unearthed during these campaigns.[128] A comprehensive study of the material recovered in the deposit has never been fully published but a publication is now under way.[129]

[125] Authorization from the Parco Archeologico di Segesta prot. no. 212 dated 15 April 2014 to use my own photographs and graphics in the present article.

[126] De La Genière 1997; de Cesare & Serra 2012, 261; de La Genière 1988; 1976–1977.

[127] de Cesare 2009; de Cesare & Serra 2012; de Cesare 2014; in press.

[128] de Cesare 2009, 639–656; de La Genière 1997.

[129] Under the direction of Monica de Cesare, Dipartimento di Culture e Società, at the University of Palermo.

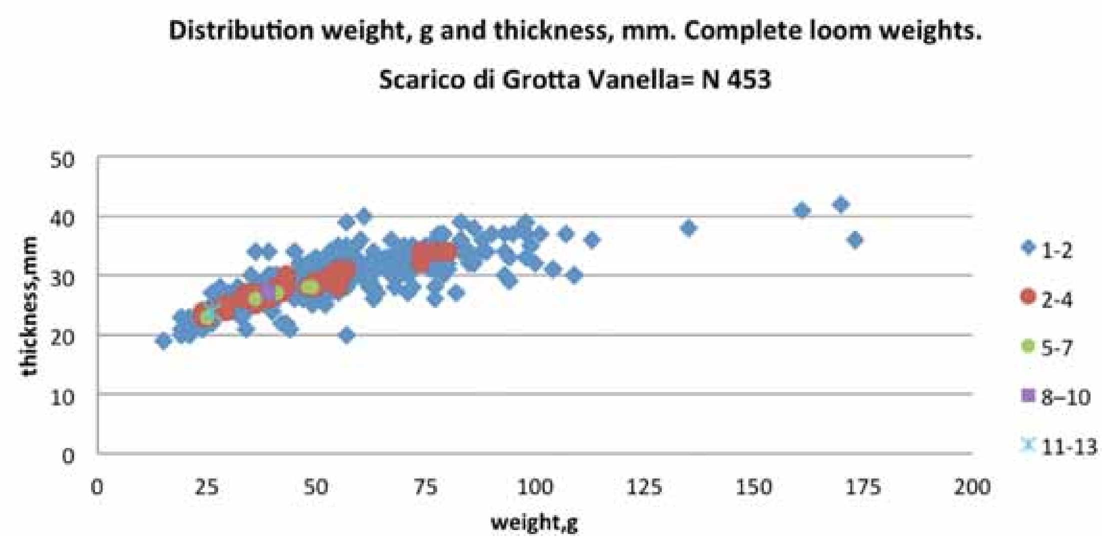

Fig. 22. Segesta. Distribution of weight and thickness of loom weights recovered in the Grotta Vanella deposit.

The material of the deposit is likely to originate from the summit of Monte Barbaro, the so-called North Acropolis of Segesta, in an area where the medieval castle stands today. The deposit is situated directly in the fall line from the location of the castle, making this particular spot a likely candidate for a primary context. Although soundings on the summit by de La Genière in 1978–1979 did not reveal any Archaic structural remains in that specific area, pottery similar to that found in the deposit was present.[130] However, the nature of the deposit which also includes finds of graffiti on black glazed pottery sherds, in Greek letters but in the indigenous Elymian language,[131] prompted de La Genière to tentatively propose a sanctuary located on the promontory as the origin for the material recovered, although no traces of any wall structures support the suggestion.[132] However an open-air cult place would scarcely have left any traces of a structural edifice.[133] The material from the deposit may, however, ultimately derive from a settlement context.

Segesta in the Archaic period was an indigenous centre, inhabited by peoples called the Elymians by Thucydides (6.2.3).[134] The make-up of the material culture also shows, however, evidence of a strong Greek influx. The structure of the partially excavated Archaic sanctuary of Contrada Mango, for instance, points to Greek architectural design.[135] These facts suggest an evolved Hellenized and/or hybrid community. Segesta, located in the hinterland of Selinunt, became an important centre. De La Genière envisaged Greek residents, merchants and/or intermediaries generating Hellenization.[136] According to the ancient sources, Segesta in the 5th century BC came under the influence of Carthage (Diodoros Siculus 13.43). The archaeological material, however, shows that the site on the whole lacks Phoenician influence and Greek influx is definitely more prominent.[137] De La Genière states "Sur près de 20,000 tessons de céramique provénant de Grotta Vanella triés à Ségeste, je ne peux citer que trois fragments appartenant sûrement à des vases phéniciens".[138] Thus far, only few architectural traces of any Archaic settlement on the Monte Barbaro have been recovered,[139] but the finds unearthed in the Grotta Vanella deposit such as musical instruments, terracotta statuettes, fine table ware, objects in ivory, and amber suggest that an affluent community existed there at the time.

The material in the deposit spans roughly two centuries, from the last third of the 7th century BC to the last decades

130 de La Genière 1988, 313; 1976–1977.
131 See Agostiniani 1977; 1983; 1999; 1988–1989.
132 de La Genière 1976–1977, 686–687.
133 See Öhlinger 2014 for ritual and religion in Archaic Sicily. I thank Dr Öhlinger for kindly providing me with a copy of her Ph.D. thesis.
134 Thucydides (6.2.3) tells about the major entities of indigenous populations in Sicily: Sicanians, Elymians, and Sicels; de La Genière 1978, 34–35.
135 Tusa 1961; Mertens 1984.
136 de La Genière 1978, 43.
137 de La Genière 1978, 38.
138 de La Genière 1978, 38.
139 de La Genière 1988; de Cesare 2009, 641.

of the 5th century BC,[140] with a significant amount datable to 500–480 BC.[141] Recent reappraisal of the pottery shifts the latest phase of the deposit into the 4th century BC.[142] Unfortunately, proper stratigraphical layers were not detected and the deposit yielded material dumped on different occasions. The exception is a sounding carried out in 1977 that, according to de La Genière, distinguished an earliest layer dating to the last decades of the 7th century BC.[143]

To date, 608 loom weights from the deposit have been measured and weighed, of which 453 are intact.[144] *Fig. 22* highlights the weight and thickness distribution of the examined complete loom weights. Compared to the distribution at, for instance, Cavallino (see above) there is a marked difference as the weight range for the Grotta Vanella loom weights is, with few exceptions, between 18 and 115 g. Many loom weights weigh as little as 20 g and have a thickness of 25 mm. Calculations of the potential loom set-ups demonstrate that these very light loom weights would not have been optimal for weaving on a warp-weighted loom. Experimental archaeology using replicas of some of these loom weights made by the present author shows that they could in technical terms hypothetically have worked well in tablet weaving, the resulting weave being a very thin fine band.[145] Similar tablet woven bands recovered from the Viking period in Scandinavia[146] come foremost to mind as a comparison. Nevertheless, such a suggestion remains purely speculative as, to my knowledge, no tablet woven textiles, nor tablets have been recovered in the archaeological record in Sicily.

An attractive possibility is a votive context for the loom weights, in particular with regard to the lighter/smaller weights. These are suggestive of miniature votives, hypothetically supporting de La Genière's and de Cesare's tentative suggestions of a votive origin for the Grotta Vanella deposit.[147] De La Genière proposed that a female deity was worshipped in a cult place on the summit, and made a cautious link between this deity and Aphrodite, venerated both at Monte Iato and at Erice.[148] Use wear is detectable on many of the weights but this need not necessarily contradict a final end use as a votive

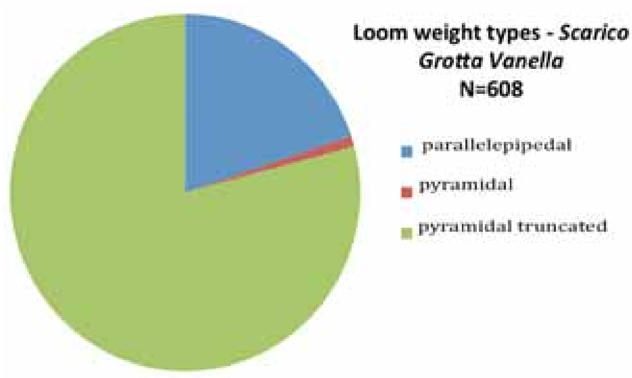

Fig. 23. Segesta Grotta Vanella. Loom weight types.

deposition. An intriguing find of an inscription on a loom weight in the batch of the examined loom weights, would tentatively point to a votive context.[149] This inscription is an important new contribution to the extant corpus of Elymian inscriptions.

The majority of the loom weights are of the basic truncated pyramidal type (*Fig. 23*) but almost parallelepipedal, being slightly tapered towards the top (*Figs. 24–25*).[150] The lower base dimensions are slightly larger than those of the top face. Loom weights with this shape have in other studies been referred to as "Elymi" tapered[151] or as parallelepipedal and/or cubic.[152] The massive loom weight material from the deposit includes "true" parallelepipedal loom weights but the majority are "pseudo parallelepipedal", so to speak, and it is incorrect to consider them all under an umbrella term of parallelepipedal. Since they belong to the basic truncated pyramidal shape this has been retained as a designation. In the Grotta Vanella loom weight material there are very few loom weights pertaining to other shape categories such as truncated conical, conical or the purely pyramidal.

More than half of the loom weights examined so far, have a painted St Andrew's cross on one or both sides of the non-perforated faces and/or on the top face (*Fig. 26*). A few have

140 de Cesare 2009, 640.
141 de La Genière 1988; 1976–1977, 682; de Cesare 2009, 640.
142 de Cesare & Serra 2012, 267.
143 de La Genière 1976–1977, 1030.
144 The loom weight material discussed below will be presented in its entirety in the forthcoming comprehensive publication of all the finds from the deposit, thus only selected points of interest are highlighted here.
145 I thank Eva Andersson Strand at CTR for suggesting this possibility and kindly showing me the technique. For the technique of tablet weaving see Barber 1991, 118–121.
146 Andersson 2003.
147 de Cesare & Serra 2012, 266; de Cesare in press; de La Genière 1988, 314.
148 de La Genière 1976–1977, 685.
149 The loom weight and inscription, co-published by the present author with Luciano Agostiniani and Monica de Cesare, is in press (Agostiniani *et al.*, in press). For Elymian inscriptions see Agostiniani 1977; 1988–1989; 1999; 2006.
150 Loom weights with this shape have been referred to as Elymi (see Balco & Kolb 2009, 178) with reference to Thucydides' distribution of indigenous peoples in Sicily. Since the indigenous populations of Sicily are fluid as regards material culture I prefer to avoid using an ethnic connotation. My working term to describe these loom weights has been praliné-shaped due to the shape's resemblance to a type of confectionery.
151 Balco & Kolb 2009, 178.
152 Quercia & Foxhall 2014, 97.

Fig. 24. Segesta, Grotta Vanella. Truncated pyramidal almost parallelepipedal shaped loom weights. Photo © author.

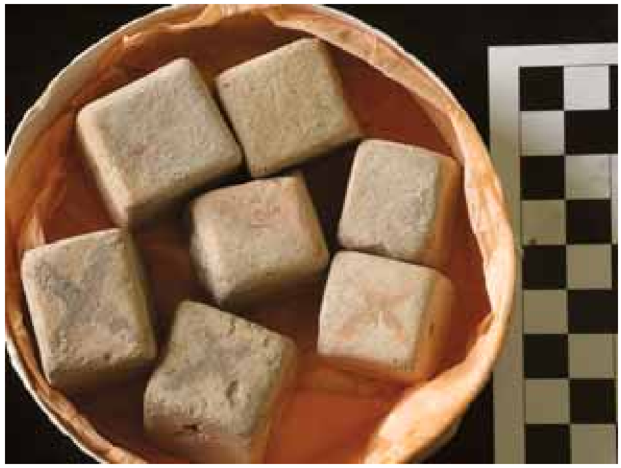

Fig. 25. Segesta, Grotta Vanella. Truncated pyramidal shaped almost parallelepipedal loom weights. Photo © author.

a painted cross on the bottom surface and yet others are incised with crosses. Some loom weights have a star painted on the top face and crosses on one or both lateral faces without suspension hole. It is difficult to assess the reason behind this decoration. For instance, it may be that the decoration had a functional meaning, rather than being the result of aesthetic choice.[153]

The loom weight material as a whole is quite uniform in shape and decoration. No impressed decoration occurs, to date, in the studied material from Grotta Vanella.[154] Examples of loom weights with the distinctive St Andrew's cross decorative element are found at many sites on the island, albeit in lesser numbers, and are on display in the local museums of, for example, Entella, Monte Iato, Erice, and Mozia.[155] An archaeometric analysis of the loom weights under study is in course.[156] Hopefully, the result will reveal and elaborate any connections.

Fig. 26. Segesta, Grotta Vanella. Loom weight decorated with a painted Saint Andrew's cross. Photo © author.

The calculations of potential loom set-ups (*Tables 9–12*) reflect the possible range of fabric qualities. These demonstrate the probable manufacture of a range of very fine quality fabrics. The weight of the loom weights suggests that a thread requiring 5–10 g tension was employed. The low thread tension per cm in loom set-ups 1 (SG 10990/137) and 2 (SG 10990/228) could point to weft-faced fabrics (*Fig. 4*) or

153 Aspris 1996. One can note that iconographically, a similar St Andrew's cross occurs as a decorative element in a cultural context outside Italy in connection with a textile theme on a Cypro-Geometric II plate (850–750 BC), which portrays a loom with a kind of band depicted above, composed of three rectangular elements in which an identical type of cross is placed. The connection to loom weight decoration, while certainly intriguing, may only be coincidental.

154 Quercia & Foxhall 2012 and 2014, 99 mention such decoration for Segesta occurring from the 5th to the first half of the 3rd century BC.

155 See also the occurrence at Monte Maranfusa (De Simone 2003).

156 Giuseppe Montana of the University of Palermo is currently conducting archaeometric tests on selected loom weights from Segesta and Monte Iato.

Table 9. Segesta. Calculations of potential loom set-ups with loom weight SG 10990/137.

Loom weight SG 10990/137, calculated weight 50 g, thickness 30 mm				
	A	*B*	*C*	*D*
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	10	5	2.5	1–2
Number of warp threads per 2 LW's (one in front and one in back)	20	10	5	2–4
Warp threads per cm	6	3	1–2	1
Evaluation of suitability	Choice	Unlikely	Unlikely	Unlikely

Table 10. Segesta. Calculations of potential loom set-ups with loom weight 10990/228.

Loom weight SG 10990/228, calculated weight 70 g, thickness 35 mm				
	A	*B*	*C*	*D*
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	14	7	3–4	2
Number of warp threads per 2 LW's (one in front and one in back)	28	14	6–8	4
Warp threads per cm	8	4	2	1
Evaluation of suitability	Choice	Possible	Unlikely	Unlikely

Table 11. Segesta. Calculations of potential loom set-ups with loom weight SG 9914/41.

Loom weight SG 9914/41, calculated weight 161 g, thickness 41 mm			
	A	*B*	*C*
Warp threads requiring	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	16	8	5
Number of warp threads per 2 LW's (one in front and one in back)	32	16	10
Warp threads per cm	7–8	3–4	2
Evaluation of suitability	Choice	Possible	Unlikely

Table 12. Segesta. Calculations of potential loom set-ups with loom weight SG 10991/38.

Loom weight SG 10991/38, calculated weight 19 g, thickness 21 mm			
	A	*B*	*C*
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension
Number of warp threads per LW	3–4	1–2	–
Number of warp threads per 2 LW's (one in front and one in back)	7–8	2–4	–
Warp threads per cm	3–4	2	–
Evaluation of suitability	Unlikely	Unlikely	–

perhaps to twill (*Fig. 3*).[157] The third loom set-up would suggest a more balanced tabby for a yarn requiring 10 g tension and points to weft-faced fabric. The last set-up is not suited to weaving on the warp-weighted loom. A suggestion is that the light loom weights such as SG 10991/38 in *Table 12* were used in tablet weaving. To date, of the examined 453 complete loom weights from Segesta (Grotta Vanella), few are ideal for weaving other than fine fabrics. Fewer than a dozen complete loom weights weigh more than 100 g. The Grotta Vanella loom weights show a contained range of weight distribution. This could corroborate, albeit tentatively, a further suggestion that the loom weights were intended for a specific end use other than weaving, such as votive.[158]

Many loom weights are carefully fashioned probably with the help of a mould. The clay is homogeneous and well fired. If indeed there was a sanctuary on the summit of Monte Barbaro, the many loom weights recovered in the deposit with this type of decoration may suggest a ritual use for these particular loom weights. Use wear is noticeable on virtually all samples, except for the smallest-sized loom weights, which being so light would not be necessarily display any signs of abrasion. Without concrete evidence of a sanctuary as a primary context, their use for weaving cloth for, or directly in, a sanctuary, or as a votive subsequent to weaving within a domestic context remains hypothetical.

[157] Calculations on tension per cm suggest twill. For fabric quality ranges see Lipkin 2012a, 51 and note 64 above.
[158] See Landenius Enegren forthcoming b.

MOZIA

The island of Mozia is located in the Stagnone lagoon off the west coast of Sicily in the vicinity of the city of Marsala. At the end of the 8th century BC, Phoenicians established emporia along the western shores of Sicily at Erice, Palermo, Solunto, Lilibeo, and at Mozia. Although recent excavations point to prehistoric habitation on the island,[159] the earliest levels at Mozia date to the advent of the Phoenicians and the site shows continuous habitation until the destruction at the hands of Dionysius of Syracuse in 397 BC. However, recovered dye installations and ovens for pottery production at the site point to a continuing, if partial, occupation on the island after this date. Different periods are distinguishable in the stratigraphy. Although evidence exists for Bronze Age habitation on the island,[160] the major architectural units excavated on the island date to the 7th to late 4th centuries BC.

The English wine merchant Joseph Whitaker acquired the island of Mozia in the early 1900s, and initiated the first excavations on the island.[161] Subsequent excavations at Mozia were undertaken by Benedikt Isserlin of the University of Leeds, and the Soprintendenza of Trapani, initially in the 1960s under the direction of Vincenzo Tusa and later under Maria-Luisa Famà. The University of Rome "La Sapienza" has conducted excavations on the island under the direction of Antonia Ciasca which continued and are still ongoing under the direction of Lorenzo Nigro.[162] Several domestic areas have been uncovered.[163] The loom weight material presented in the present article refers to the domestic area designated "Zona A" excavated by Maria-Luisa Famà, current director of the Archaeological Museum in Marsala (Museo Archeologico Regionale "Lilibeo" di Marsala).[164]

With respect to ancient textile technology Mozia is highly interesting, since loom weights have been found *in situ* in distinct sets stored in amphorae (*Fig. 27*).[165] In all, more than 200 loom weights from "Zona A" were examined in the present study.[166] It is attractive to see two different sets, 32 loom weights recovered in Amphora 1 (*Fig. 28*),[167] and 23 loom weights recovered in Amphora 2 (*Fig. 29*),[168] as referring to the actual number of loom weights used in a given weave. Moreover, in Zona D the remains of a carbonized loom were uncovered.[169]

Fig. 27. Mozia. The set of loom weights as found in Amphora 1 and exhibited in the Whitaker Museum. Photo © author with the kind permission of the Whitaker Museum..

The domestic quarters in the "Zona A", the rectangular shaped *Isolato* I, span about 1600 m^2.[170] Construction phases of the buildings correspond to several chronological periods, ranging from the end of the 8th century to the end of the 3rd century BC (I–V) with a final phase (VI) referring to modern intervention.[171] With regard to the recovered loom weight material from Buildings A and B of the *Isolato* I, these refer to three periods. Most of the loom weights date to the third chronological period (III A), from the beginning to mid-5th century BC.

159 Giglio 2008, 13.
160 Famà & Toti 2000, 452.
161 Joseph Whitaker founded the museum which was further extended by his daughter Delia in the 1960s. The Whitaker Foundation was set up in 1971(pers. comm. M.-L. Famà 14.5.2015).
162 See the *Missione Archeologica a Mozia's* website with references to publications on Mozia, http://www.lasapienzamozia.it/mozia/.
163 These have been published in Famà 2002. See http://www.lasapienzamozia.it/mozia/ for the ongoing excavations of the University of Rome "La Sapienza" excavations.
164 See Famà 2002 for a comprehensive publication.
165 Loom weights pertaining to "Zona A" were published by Giuseppe Rossoni 2002.
166 Some of these have been published in Rossoni 2002, and in Rossoni & Vecchio 2000.
167 Recovered in room 41, Rossoni 2002, 317 and plans in Famà 2002, 37–39.
168 Recovered in room 39, Rossoni 2002, 317 and Famà 2002, 37–39.
169 Nigro & Spagnoli 2007, 46, fig. 2.41.
170 Famà 2002, 37.
171 Famà 2002, 41.

Fig. 28. Mozia. The set of 32 loom weights recovered in Amphora 1. Photo © author.

Fig. 29. Mozia. The set of 23 (counting separately the two that are fused together) loom weights recovered in Amphora 2. Photo © author.

The part of the quarters designated IV includes, among others, the rooms 39 and 41, in which the two amphorae containing loom weights were unearthed; Amphora 1 in room 39 and Amphora 2 in room 41. The loom weights found in these two amphorae were hand-modelled and very often reveal thumb or other finger imprints. No archaeometric analyses have been undertaken on the loom weights but visual inspection discloses that the most prevalent clay used is a local variety with a greenish hue.[172] The main shape of the recovered Amphora 1 and 2 loom weights is the truncated pyramidal with variants.[173]

Moreover, in room 12, in the part of "Zona A" designated as Building B,[174] 44 parallelepipedal loom weights with stamped decoration composed of a rosette-like impression were recovered (*Fig. 30*). The impression closely resembles an imprint of the stamen and pistils of a poppy flower.[175] It is attractive to assume that these loom weights belong to one and the same set, impressed with the same stamp, given their identical decorative motif. Moreover, the weight and thickness distribution of the loom weights would underpin such a premise (*Fig. 31*).

Fig. 30. Mozia. Parallelepipedal loom weights with stamped decoration. Photo © author.

Calculations for potential loom set-ups are given in *Tables 13–15*, involving the chosen loom weights from "Zona A" recovered in Amphorae 1 and 2 and the set of loom weights decorated with a rosette motif, as these seemingly refer to entire sets of loom weights. The latter set has a distribution of weight between 30 and 45 g and thickness between 20 and

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172 I am especially grateful to Dr Pamela Toti at the Whitaker Museum at Mozia for discussing the local clay consistency with me.

173 Rossoni 2002, 319 uses a typology for the loom weights recovered in "Zona A" which are referred to as A, B or C each designated with numbers pertaining to a particular shape. While typology is useful as a tool in classification within a publication, my interest in the loom weights is not typological but functional thus the classification has not been given in the present study.

174 Famà 2002, 37–39.

175 In Rossoni 2002, 315–317, these are designated as loom weights decorated with a star. I thank Dr Pamela Toti for discussing in-depth this decorative detail with me and for pointing out the resemblance. It can be noted that poppies, moreover, grow abundantly on the island.

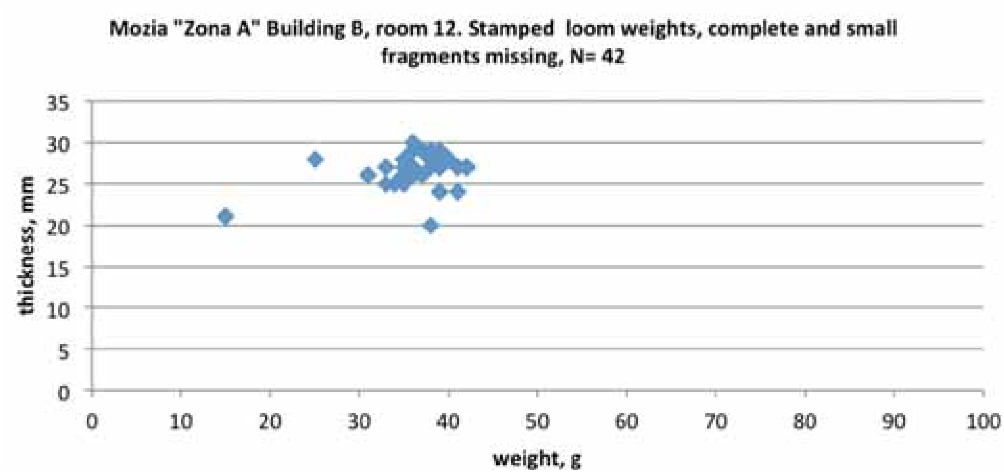

Fig. 31. Mozia. Distribution of weight and thickness for the rosette/star/poppy stamped loom weights.

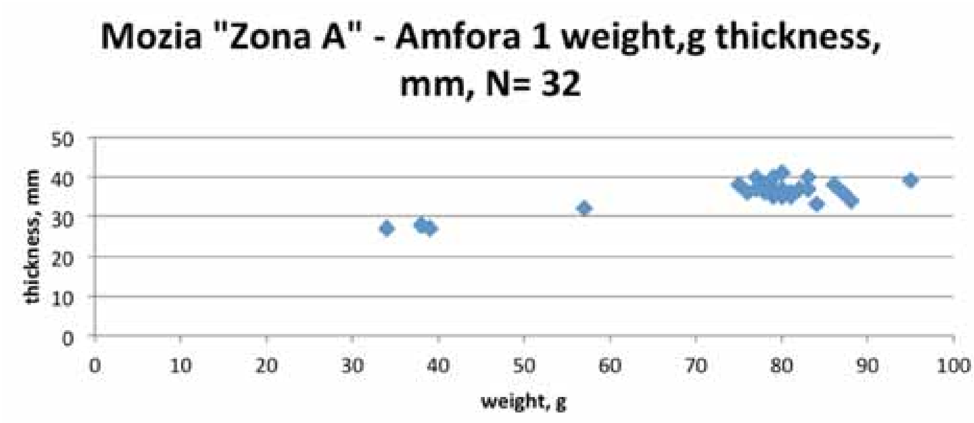

Fig. 32. Mozia. Distribution of weight and thickness for the loom weights recovered in Amphora 1.

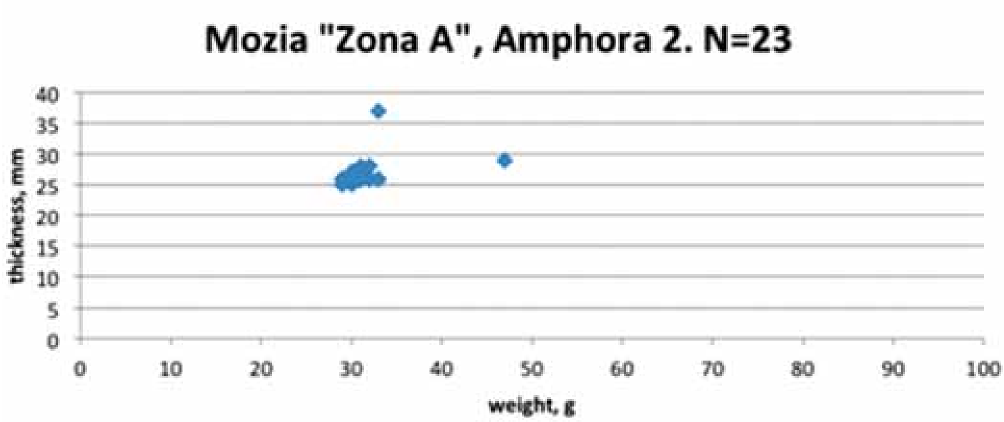

Fig. 33. Mozia. Distribution of weight and thickness for the loom weights recovered in Amphora 2.

30 mm (*Fig. 31*). The potential loom set-ups (*Table 15*) demonstrate that they are not likely to have been used for weaving on the warp-weighted loom as the calculations show that the number of threads needing 5 g tension would only be 7 per loom weight.[176] These loom weights seem more suited to tablet weaving.

With regard to the weight and thickness distribution of the loom weights from Amphora 1 (*Fig. 32*), there is a cluster of 29 loom weights with virtually the same parameters ranging roughly from a weight of 80 g and a thickness of 35–40 mm. The distribution of weight and thickness for the loom weights from Amphora 1 suggest that these were suitable for producing very fine fabric. The almost translucent dress depicted on the so-called Charioteer or Youth of Mozia[177] comes to mind in terms of fabric quality. The thread count per cm with fine thread requiring 5 g of tension, suggests that these light loom weights were perhaps used to weave twills (*Fig. 3*) rather than weft-faced fabrics (*Fig. 4*) or balanced tabbies (*Fig. 2*).[178]

The weight and thickness distribution for Amphora 2 is shown in *Fig. 33*. There is a cluster of loom weights with approximately 25 mm thickness and 35 g weight. The loom weights, thus, found in Amphora 2 are not readily suitable for weaving since they would be too light with calculations showing only 6 threads per loom weight rather than the optimal 10–25 (30) (*Table 14*). Hence, a suggestion that these loom weights were used in tablet weaving to keep the threads taut seems more likely. As regards these and the weights with the rosette decoration, one may speculate whether they would have functioned with very small looms with a lesser number of threads per loom weight.[179]

The loom weights at Mozia are hand-fashioned and finger imprints are readily detectable on many of them. Through the haptic quality of these finger imprints the user/maker behind a particular tool is made particularly vivid. Moreover, the loom weights impressed with a rosette may in this case point to ownership as they were only found on loom weights recovered in Building B.[180]

Table 13. Mozia. Calculations of potential loom set-ups with loom weight Amf 1:3.

Loom weight Amf 1:3, weight 80 g, thickness 36 mm				
	A	***B***	***C***	***D***
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	16	8	4	2–3
Number of warp threads per 2 LW's (one in front and one in back)	32	16	8	4–6
Warp threads per cm	8–9	4	2	1
Evaluation of suitability	Choice	Possible	Unlikely	Unlikely

Table 14. Mozia. Calculations of potential loom set-ups with loom weight Amf 2:9.

Loom weight Amf 2:9, weight 30 g, thickness 26 mm				
	A	***B***	***C***	***D***
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	6	3	1.5	1
Number of warp threads per 2 LW's (one in front and one in back)	12	6	3	2
Warp threads per cm	4–5	2	1	–
Evaluation of suitability	Unlikely	Unlikely	Unlikely	Unlikely

Table 15. Mozia. Calculations of potential loom set-ups with loom weight MOZ 92 AX181: 30.

Loom weight MOZ 92 AX181:30, weight 36 g, thickness 26 mm				
	A	***B***	***C***	***D***
Warp threads requiring	5 g warp tension	10 g warp tension	20 g warp tension	30 g warp tension
Number of warp threads per LW	7	3–4	1–2	1
Number of warp threads per 2 LW's (one in front and one in back)	14	7	3–4	2
Warp threads per cm	5	2–3	1	–
Evaluation of suitability	Unlikely	Unlikely	Unlikely	–

[176] Andersson Strand *et al.* in press. See also Lipkin 2012a, 51 and the discussion above. Although the optimal range is 10–30 threads per loom weight, it cannot be excluded that weavers at times attached a lesser or larger number of threads outside this range.
[177] For this sculpture see Volpi & Toti 2007, 115.
[178] Reference is made to Lipkin 2012a, 51 and discussion above.
[179] Quercia & Foxhall 2014, 98 propose that the proto-historic looms were smaller.
[180] Rossoni 2002, 319–320.

Concluding analysis

The loom weight assemblages examined in the present study from two Apulian and three Sicilian sites involve more than 1,000 individually examined pieces. The setting for the material is that of early 1st millennium BC when South Italy and Sicily saw an increasing influx from Greek settler contingents and, as regards Sicily, also Phoenician settlers. The assemblages show conformity in loom weight shape category which demonstrate that overall the preferred shape is the truncated pyramidal, a shape widespread in the Mediterranean in the 1st millennium and common at many sites in Greece.[181] Regarding the loom weights recovered at Grotta Vanella at Segesta a variant, almost parallelepipedal in shape, dominates. In the material examined, shapes such as conical and discoid loom weights are attested in select pieces at Monte Iato, Cavallino and at San Vito dei Normanni. It has been argued in other studies that loom weight shapes testify to specific ethnic influence, for example, pyramidal belonging to a Greek tradition and block-shaped to a Phoenician/Punic one.[182] However, the present study shows that loom weight shapes at the local level can be fluid across sites making such categoric distinctions problematic to sustain. Thus, the loom weights examined in the present study at the Phoenician site of Mozia included both truncated pyramidal and parallelepipedal shapes. In my view, the ethnic influence on the shape of the loom weights is not susceptible of such easy delineation. The present research based on examination of more than 1,000 loom weights does not support any strict demarcation founded on a direct correlation of shape and ethnicity. The single loom weight recovered at Segesta, with an inscription written in a local variant of the Greek alphabet in an indigenous language, bears testimony to a connection not only with weaving and writing but is also an indication of cultural hybridity.[183] The onomastic repertory reflects the diversity of linguistic expression in a multi-faceted society in Sicily.[184] The inscribed weights recovered from Terravecchia di Cuti on which indigenous names occur are but one example.[185]

Given the skewed distribution in terms of numbers of studied loom weights for individual sites,[186] it is rather more interesting to note that the loom weights display a strong site-specificity. This concurs with other research which suggests specific standardization of height and weight parameters pertaining to urban centres.[187]

The findings suggest that choice in shape and decorative elements of the loom weights is more likely to be determined by local circumstances specific to the site in question. This is not to deny the existence of any specific ethnic influence. However, in my view, the loom weight material is most probably the result of local dynamics and taste preferences in which several stylistic universes, settler and indigenous, have played a part.[188]

Functionally the loom weights respond to morphological prerequisites as they perform the task of supplying warp-threads with a required optimal tension. At the same time, they have a distinct intrinsic nature and project an identity of their own. The loom weights speak to us as artefacts with phenomenological characteristics thus transcending the purely functional and as such they reveal to be definite identity markers as they can be considered as social actors of a kind.[189]

In exploring these local expressions at hand, the haptic qualities of a loom weight provide sensory information. Thumb imprints, the handmodelling of loom weights, the paste qualities of the clay, the careful or not so careful fashioning of the weights, use wear and the decorative elements, highlight the "life world" of these artefacts. A loom weight from Mozia—simple, hand-modelled with no decoration—reflects a taste which is very different from the one expressed in a carefully mould-made, elegantly decorated and perfectly shaped loom weight from Cavallino. Given the easy access to clay and suitable temper, it is not unlikely that weavers themselves, at times, fashioned the loom weights to suit their needs.[190] If such was the case the fact that some sets diverge only by one or two grams indicate great expertise in fashioning these objects.

181 See Gleba 2008, 134 for a discussion and ref.
182 Balco & Kolb 2009. Reference is made to 154 loom weights and to other studies.
183 The loom weight will be published by the present author, L. Agostiniani and M. de Cesare (Agostiniani *et al*., in press).
184 See Tribulato and others in the edited volume Tribulato 2012.
185 Gleba 2009, 75.
186 Monte Iato, for instance, yielded a mere 69 loom weights and Segesta more than 600.
187 Balco & Kolb 2009, 179.
188 I thank Christian Mühlenbock for kindly showing me the loom weight material he is publishing from Monte Polizzo. Being very different from the material in my study it reinforced this view. See Dietler & Herbich 1998 for a discussion on the concept of Habitus and relationships between ethnic groups and material culture; van Dommelen 2005 discusses terminology and meaning with regard to colonial interaction.
189 See also Landenius Enegren forthcoming a.
190 The present author has manufactured replicas of some of the loom weights under study firing them in an open hearth. The result shows great similarity to the originals, demonstrating the relative ease with which loom weights could be manufactured. The clay source and temper, different from the original (in my case dried grated horse manure was used as temper in the manufacture of some loom weights in order to arrive at the very light weight of the originals), explains the slight differences observed. I thank potter Inger Hildebrandt of the Land of Legends Centre for Historical-Archaeological Research and Communication for her help, kind advice, and informative discussions on the use of diverse temper in ceramics, firing characteristics, and sharing her expertise in making replicas of pottery found in archaeological contexts. See also the discussion in Lipkin 2012a, 65–67 on clay properties, on kilns, and the fabrication of loom weights in general.

Decorative motifs on some loom weights, besides expressing aesthetic needs, could have worked as functional signs. Such a sign, perhaps, could have been an efficient way to indicate to the weaver when an extra weft thread, a float, such as in a patterned weave, for instance, should be inserted at the place where a particular loom weight with the specific sign hangs on the loom.[191] The set of 32 loom weights recovered in Amphora 1 at Mozia (*Fig. 28*), in which a single loom weight has an incised cross on the upper face, could perhaps support such a conjecture. It should be noted that the clay paste used for the loom weight in question differs from the remainder of the set. This fact is interesting, as a similarity exists, albeit in an earlier chronological context, with loom weight assemblages in closed contexts recovered at Malia in Crete. In several defined sets composed of between 32 and 38 weights, only one loom weight shows a specific mark. Moreover, the loom weight in question is made of a different clay paste compared to the remainder of the sets. The author compares the occurrence of marks on loom weights to that of potter's marks and further hypothesizes that the marks may refer to a specific quantity of wool for the manufacture of a perhaps specific textile.[192] In my view, however, it reinforces the suggestion, also proposed by others,[193] regarding loom weight decorative elements, that particular marked loom weights with, for example, a grooved cross embody an extra functional dimension, perhaps as technical markers in the sense of indicators.

The application of experimental archaeology in this study, moreover, has been a useful tool in the investigation of complementary textile techniques such as warp twining and tablet weaving. Experiments carried out on replicas (*Fig. 7*) of the cylindrical implements recovered at Cavallino and San Vito dei Normanni suggest that these would have functioned optimally in warp-twining techniques suitable for the production of mats or similar fabrics, rather than a range of finer cloth qualities. Without actual finds of any such products it remains a hypothesis. Tests with replicas of the miniaturistic truncated pyramidal loom weights at Segesta demonstrate their potential suitability for tablet weaving,[194] However, pending the discovery of other evidence pointing to the existence of tablet weaving in Sicily at this time, this suggestion too is purely hypothetical.[195] A votive or sacral or domestic end use for the

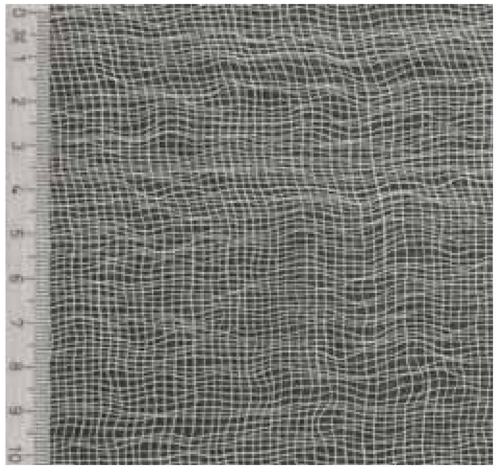

Fig. 34. A fabric with very fine thread requiring 10 g warp tension and with approximately 5 warp threads and 8 weft threads per cm. Courtesy Eva Andersson Strand © CTR.

loom weights is equally possible. The material thus becomes an element in the debated issue of whether textile production was a general manifestation in sanctuaries. Thus far there are limited attestations of textile production in direct on site connection with a sanctuary.[196] The material from Grotta Vanella could potentially represent another example. The sheer volume of loom weights recovered in the deposit could perhaps be an indication of large-scale textile production connected to a sanctuary.[197]

The potential loom set-ups illustrate that overall there is very little evidence of heavier loom weights adequate for making heavier fabrics.[198] They rather point to a production of fine fabrics and to very fine, probably weft-faced, tabbies, as well as twills, as the preferred cloth of manufacture. *Fig. 34* gives an example of a weave with five warp threads per cm and thread quality requiring 10 g tension. The lack of textile tools for producing heavier qualities of fabric is surprising given the documentation for many archaeological sites of wide ranges of loom weight classes and thicknesses which would point to a cloth production of both fine and very coarse textiles.[199] This in turn raises the question whether perhaps other loom

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191 As, for instance, in an inlay weave. See Wagner-Hasel 2002, 23 with reference to Barber 1991.

192 Poursat 2001, 28–29. I thank Françoise Rougemont for drawing my attention to these sets.

193 Rossoni 2002.

194 For instance SG 10018/34 with a weight of 15 g and a thickness of 19 mm.

195 The tablet woven bands with this diameter recovered at Viking Age Birka (Geijer 1972 [2006], 84–85; pl. 92f. and Andersson 2003, 152) constitute an example of a possible analogy.

196 The Heraion at Foce del Sele, see Meo forthcoming. The international workshop *Textiles and cult in the Mediterranean area in the 1st millennium BC* at the CTR at the University of Copenhagen in November 2013 highlighted this issue.

197 Landenius Enegren, forthcoming b. See Gleba 2009 for a discussion on textile tools/production in sanctuary contexts and Meyers 2014, 247–274.

198 The loom set-ups show that certain loom weights at San Vito dei Normanni and at Cavallino could be used to manufacture a range of fine and less fine quality cloth.

199 http://ctr.hum.ku.dk/tools/.

types and weaving techniques were in use at the time at these sites for the production of fabric needed for sacks, furnishings and sailcloth. Sailcloth was probably manufactured mainly from plant-based fibres.[200] Although thread made from flax and hemp may have been imported to Sicily due to the fact that they were difficult to grow locally,[201] other plant fibres must not be disregarded as candidates for particular textile manufacture. Ethnology can here provide some information. Thread from Spanish broom (*Spartium junceum*) is, for example, still woven within rural Calabria.[202] It is not unlikely that the processing method was known already in ancient times and that fibres from such a plant was thus used in the weaving of sturdier types of cloth.[203]

A final observation based on the above analysis of loom weights from two sites in Apulia and three in Sicily is that loom weights despite common characteristics as to physical shape and dimensions also contain design characteristics which seem to have specific connotations with regard to local cultural context and individual preferences.

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200 See Möller-Wiering 2007 for a discussion of sailcloth and different fibres. Wool was used for sailcloth in northern Europe.

201 As evoked in Marden 1867 (2013), 258 with reference to the pseudo Platonists. The reference intended is probably the following letter 13 (363a) Plato, *Epistulae* [Dub.]: Κρατίνῳ τῷ Τιμοθέου μὲν ἀδελφῷ, ἐμῷ δ᾽ ἑταίρῳ, θώρακα δωρησώμεθα ὁπλιτικὸν τῶν μαλακῶν τῶν πεζῶν, καὶ ταῖς Κέβητος θυγατράσι χιτώνια τρία ἑπταπήχη, μὴ τῶν πολυτελῶν τῶν Ἀμοργίνων, ἀλλὰ τῶν Σικελικῶν τῶν λινῶν. ἐπιεικῶς δὲ γιγνώσκεις τοὔνομα Κέβητος· γεγραμμένος γάρ ἐστιν ἐν τοῖς Σωκρατείοις λόγοις μετὰ Σιμμίου Σωκράτει διαλεγόμενος ἐν τῷ περὶ ψυχῆς λόγῳ, ἀνὴρ πᾶσιν ἡμῖν οἰκεῖός τε καὶ εὔνους. "To Cratinus the brother of Timotheus, and my own companion, let us present a hoplite's corslet, one of the soft kind for foot-soldiers; and to the daughters of Cebes three tunics of seven cubits, not made of the costly Amorgos stuff but of the Sicilian linen. The name of Cebes you probably know; for he is mentioned in writing in the Socratic discourses as conversing with Socrates, in company with Simmias, in the discourse concerning the Soul, he being an intimate and kindly friend of us all." I thank Peder Flemestad for his kind assistance in this matter.

202 During my fieldwork in South Italy, one of my informant weavers in Calabria told me (1 October 2013) that she still weaves with thread from the plant-derived fibre Spanish broom, a plant native to the Mediterranean area. Another informant, a weaver in Sicily, now in her eighties, explained (3 October 2014) that in her youth she used to weave with fibres from mallow. They explained that the two plants are processed in a similar way to flax for the working into fibres, subsequently spun into thread. An article with a focus on *Sparteum junceum* and other plant fibres is in preparation by the present author and Peder Flemestad.

203 An article in *Corriere del Mezzogiorno* on 3 June 2010 mentions cloth recovered at Pompeii as being made of broom.

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