Jeannette H. Boertien
Ixiadal 4
2317 HL Leiden
The Netherlands
jhboertien@orange.nl

Jeannette H. Boertien

Travelling Looms: Textile Production Crossing Borders

Textile industry is older than pottery and perhaps even than agriculture and stock breeding, and it probably consumed far more hours of labor than pottery making and food production together (Barber 1991: 4).

Identification of weaving gives clues about the organisation of society, its agriculture, herding, textile production, and social relationships. Analysis of looms aids reconstruction of one of the most time consuming activities of the past: textile production.

Looms and Weft

Weaving differs from plaiting, basketry and matting in that mats and baskets are made of short stiff materials that have a framework of their own. Weaving is done with flexible string and thus requires a temporary frame or brace to hold the yarn and to provide a degree of tension while interlacing the flexible threads. The brace, or structure used to apply the tension required for the warp threads, is called a *loom*.

Looms vary considerably in their design and function. They can be divided into two main categories on the basis of the position of the warp-threads while weaving: horizontal looms and vertical looms.

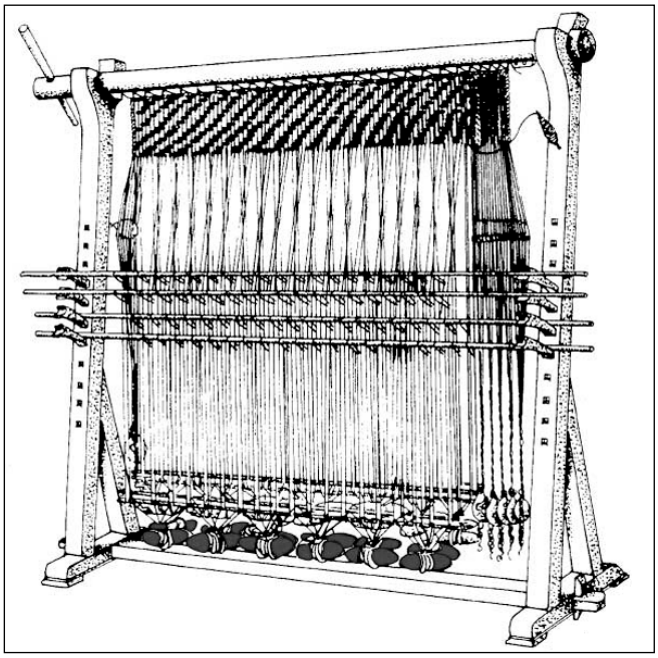
Horizontal looms are those in which the warp-threads and woven cloth are held in a horizontal position. The so-called ground loom is still in use in the Middle East (FIG. 1).

Vertical looms hold the warp threads and woven cloth in a vertical position. This category can be divided into two main groups: standing looms and hanging looms.

A standing loom is a solid wooden construction in which the warp threads are tensioned between two beams fixed between two uprights.

Hanging looms are more flexible constructions, of which the *warp-weighted loom* is best-known (FIG. 2). Two uprights hold an upper beam to which a pre-woven band or starting border is attached, upon which the warp threads are tensioned. The lower ends of the warp threads are not tied to

1. Lady weaving tent cloth on a ground loom in Bayḍā, Jordan, May 2000.



2. The warp-weighted loom.

a beam or rod, as in standing looms, but are tied to weights. These weights can be made of stone, ceramic or clay and are usually referred to as loom weights. The hanging warp is stretched by loom weights and thus forms a flexible construction. The weft of the warp-weighted loom is beaten upwards and the finished cloth is rolled on to the upper beam of the loom. In the first Century AD the Levantine warp-weighted loom was gradually replaced by the two-beam loom (Shamir 1996: 148; Barber 1991: 125).

Materials and Methods: Loom Weights as a Research Tool

The warp-weighted loom can be identified in the archaeological record because the loom weights survive and can therefore be recovered. Stone and ceramic loom weights are easy to recognise. In a burnt deposit, unfired clay loom weights can become inadvertently 'fired' and therefore survive. It is however difficult to recognise and excavate unfired loom weights. The two main problems are: Unfired loom weights 'melt' when they get wet; when excavating mudbrick deposits, the artefact closely resembles building material. But with an open mind and skilled hands it is possible to recover the unfired clay loom weights of warp-weighted looms, which can tell an interesting story of textile production (FIG. 3).

Stone loom weights are known from the Levant, but in this region were more typically made of clay. In the Bronze Age, loom weights were made of fired clay, whilst in the Iron Age they were made of unfired or poorly-fired local clay.

Discussion

From the work of Marta Hoffmann (1964), Margrethe Hald (1980) and Elisabeth Barber (1991) we know that the warp-weighted loom originated in central Europe during the Neolithic. It became common along the River Danube and then spread north through Europe into Scandinavia. In Scandinavia the warp-weighted loom was in use until about 1950 AD.

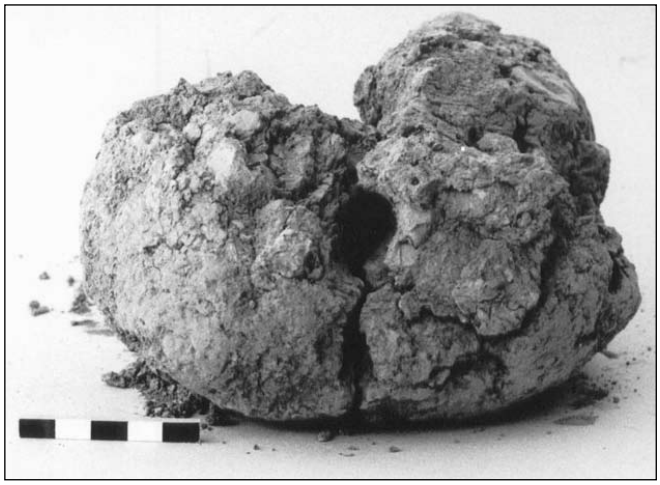
Intricate textiles made on warp-weighted looms are known from Early Neolithic Swiss lake villages such as Rubenhausen (Keller 1866: 323 and 333) and Early Bronze Age 'doughnut' -shaped loom weights have been reported from Czechoslovakia (Hoffmann 1974: 388; Barber 1991: 101, Fig. 3.22).

The warp-weighted loom also spread southwards from Switzerland, Hungary, Bulgaria and Romania, through the Aegean and Anatolia (Barber 1991: 95-98) and into the southern Levant where the warp-weighted loom was introduced during the Middle Bronze Age (Shamir 1996: 139; Barber 1991: 124), *contra* Friend (1998: 2-14) who states that it was already in use during Early Bronze Age III. [1]

3. Skilled hands excavating loom weights.

[1] Based on the loom weights of Tall Taanek Friend (1998: 13-14) states that the warp weighted loom arrived at Tall Taanek already in the Early Bronze Age. Because her statement is based on the find of only three loom weights from Early Bronze Age III loci of Tall Taannek this theory is disputable, as suggested by Friend indeed further research needs to be done, before the warp weighted loom can be situated in the Levantine Early Bronze Age.

4a. Donut shaped loom weights.



4b. Unfired loom weight damaged.

After the introduction of the warp-weighted loom in the Southern Levant, its use increased during the Iron Age. Perforated loom weights are known from different excavations dating from the Middle Bronze Age into the Roman period, including Tall Batash / Timna (Browning 1988; Kelm and Mazar 1995: 162-163), Jerusalem (Shamir 1996), Tall Taannek (Friend 1998), Tall as-Sa'īdiyya (Pritchard 1985: 36), Tall Dayr 'Allā (Boertien 2004) and Tall Jāwā (Daviau 2002: 191-200).

Until recently there was a tremendous gap in our knowledge of loom weights from Syria. The lack of published information on loom weights from Syria caused Elisabeth Barber to state that such weights did not exist there, in between Anatolia and Palestine (Barber 1991: 300 and 302). However, rather than a gap in the distribution of loom weights in Syria as argued by Barber, these artefacts had actually been excavated there but were only recently published (Cecchini 2000). Cecchini argues for a difference in form between loom weights from Syria and those from the Levant. In northern Syria reel- or bell-shaped loom weights have long been known from excavations, but those without holes have not always been recognised for what they are.

Unperforated loom weights were used in northern Syria and eastern and central-eastern Anatolia during the Late Bronze Age and in central Syria from the start of the Iron Age. The spread of the warp-weighted loom is thought to have resulted from the transfer of material culture from the Aegean to northern Syria via Cyprus and the Anatolian coast (Cecchini 2000: 217). An Aegean, or more precisely Cypriot origin for this kind of loom weight may certainly be taken into consideration in relation to Palestine (Cecchini 2000: 216). This statement is an interesting point that has to be studied in Levantine loom weight collections.

The general conclusion is however beyond doubt: the warp-weighted loom spread from Europe to northern Syria and the Levant via Greece, Cyprus and Anatolia.

Results

Loom weight types

The elongated and unperforated forms of loom weights from northern Syria and eastern and central-eastern Anatolia from the Late Bronze Age, and from central Syria from the start of the Iron Age, differ from the form of loom weights from the southern Levant (FIG. 5).

Iron Age I

Unperforated loom weights are made of unfired or poorly fired clay, are elongated cigar- or bell-shaped and are referred to in the literature as reels, spools or bobbins. They have been excavated at Kastanas in Macedonia[2], Maa Palaeokastro and Kition in Cyprus[3] and at various sites in Syria and Anatolia[4]. In

[2] Kastanas Layer 13, (ca. 1190 BC) A. Hochstetter. Kastanas Die Kleinfunde der Spätbronze und Eisenzeit. Berlin 1987: 90-91. pl 22.1-3; 36.17-18.

[3] V. Karageorghis & M. Demas. Excavations at Maa-Palaeokastro 1979-1986. Nicosia 1988: 222. V.Karageorghis. Excavations at Kition V, the Pre-Phoenician Levels, part II Nicosia, 1985: 133, 153, 166.

[4] Cecchini 2000: 217.

5. Map traveling looms.

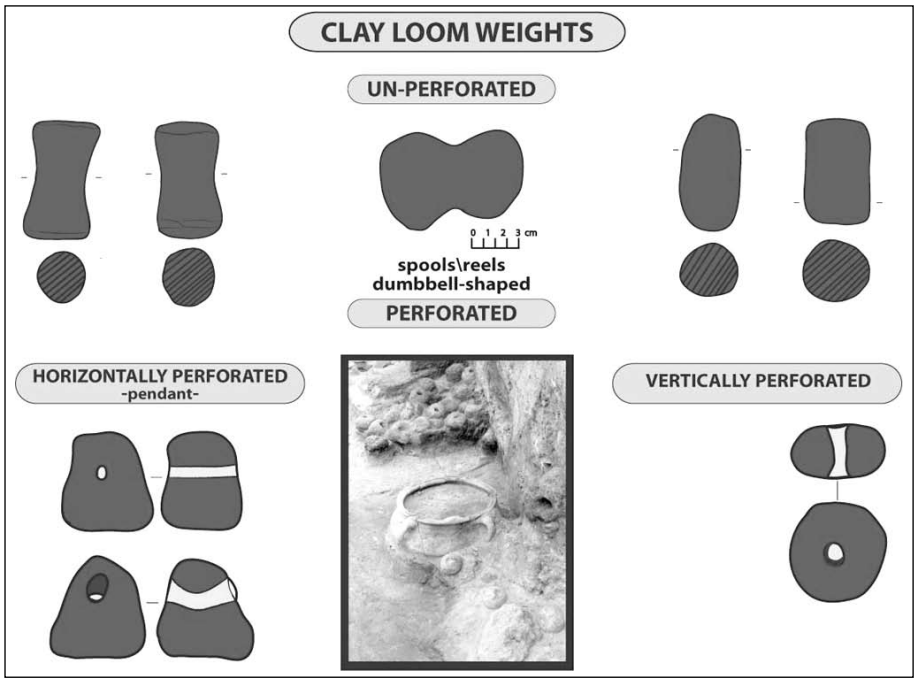
western Palestine unperforated loom weights have been reported from Iron Age I levels at Ashdod (Dothan and Porath 1993: 64, 68, Fig. 24: 3-5, Fig. 25: 8 and Pl. 39: 4), Ashkelon (Lass 1994; Stager 1995: 346), Tel Miqne-Ekron (Dothan and Gitin 1994; Shamir 1991; Stager 1995: 347, Pl. 6) and Megiddo (Loud 1948: Pl. 170: 26). They are referred to as a Philistine phenomenon: the so-called 'Philistine cylindrical type'. Loom weights of this 'Philistine cylindrical type' have recently been reported from Lehmann and Niemann's (2007) excavations of Iron Age I deposits at Qubūr al-Walayidah.

The name 'Philistine cylindrical type' raises questions because the loom weights from the Philistine site of Tel Quasile (Stratum XII) are perforated 'doughnut' -shaped or cylindrical loom weights (Shamir 1994; Mazar 1980: 42-44; Mazar 1985: 80, Photo 85). Unfired, unperforated loom weights with a cylindrical form demonstrate a strong connection with loom weights from the Mycenaean world (Lass 1994: 33). Unperforated loom weights are known from Mycenae and Tiryns (Schliemann 1886: 146), Kition (Karageorghis and Demas 1985: 113, 153, Pls 201 and 229), Pylos and Troy (Blegen 1958: 152, Fig. 256). In Syria unperforated loom weights of Iron Age I date have been excavated at Tall Afis and Tall Mastuma (Cecchini 2000: 217).

Unperforated loom weights dating to Iron Age I have not been reported from Jordan. It remains to be seen whether or not reels or cigar-shaped weights were used east of the River Jordan at that time. There is a possibility that these unperforated loom weights have not been recognised and are thus missing from excavation reports.

Iron Age II

Levantine loom weights of this period are mostly of the well-known perforated type, made of unfired local clay and 'doughnut' -shaped, or of the spheroid and flattened cylindrical types. In Syria unfired clay loom weights are found alongside fired exam-



6. Different types of loom weights.

ples, whilst in Jordan perforated loom weights during Iron Age II tend to be of the fired variety.

In Syria pierced spheroid loom weights replaced cylindrical loom weights between the end of the eighth and start of the seventh centuries BC. At Tall Afish in northern Syria reel-shaped loom weights continue to be used to a lesser degree alongside perforated loom weights. A similar process can be seen at Tall Ahmar, Tall Nebi Mend, Tall Masin (near Hama), Taba el-Akrad (Level I) and at the Neo-Hittite site of Malatya; Cecchini (2000: 219) speaks of a transitional phase.

Iron Age II loom weights have also been reported from other Syrian sites. For example, at Hama ('Pièce G' of Bâtiment V) fired reel-shaped loom weights have been recovered from a destruction level dated to 720BC (Cecchini 2000: 219, 223, Note 60). At Tall Mishrifeh / Qatna, 140 spool- or reel-shaped loom weights have been found in the *suq*, together with spatulas and spindle whorls (Garna and Besana 2006). At Tall Abu Danne, loom weights dated to between 855 and 750 / 700BC have been reported (see overview in Cechcini 2000: 223).

Also of interest are the Iron Age II finds from Tall Mastuma; Cecchini describes 25 storage jar rims, smoothed so as to have a cylindrical shape, that were found together with perforated pierced loom weights and 25 cylindrical objects (Cecchini 2000: 219 and 223).

Jordan

Surprisingly, research on loom weights from Iron Age II strata at Tall Dayr 'Allā in the Jordan Valley (Boertien 2004) has demonstrated their typological similarity with Iron Age II loom weights from Syria (Cecchini 2000). At Tall Dayr 'Allā, the loom weights are made of the local banded clay in a style that is similar to finds from Tall Afis in northern Syria.

Tall Dayr 'Allā (Phase IX)

In a room that was partially paved with cobblestones, a three-rowed loom stood next to a large cooking pot. This loom with its three rows of weights was used to produce a patterned textile. The 34 loom weights used on this loom were of different types (Boertien 2004: 320).

This group of loom weights yielded a remarkable unperforated spool or reel-shaped loom weight in association with the perforated weights (FIG. 7). It was made of the same banded clay as the other loom weights within the group, but its clay was tempered with grit and not well-mixed. The dimensions of this object are: height 8.5cm, diameter 6-7cm,

7. Unperforated spool/ reel shaped loom weight from Tall Dayr Allā.

Iron Age Tall Dayr 'Allā (Group XII , B / E9 locus 24).

Type	Number	Weight range in gr.
'Doughnut'-shaped	12	255 - 480
Conical	17	320 - 500
Beehive-shaped	4	460 - 500
Spool (unperforated weight)	1	430
Total	34	Average weight 347

weight 430gr. Within Group XII, three fragments made from the same type of clay were excavated. Although these could not unequivocally be identified as loom weight fragments, they could conceivably comprise three more spool-shaped weights. The form of the unperforated spool is comparable to spools from Syria (Cecchini 2000: 212).

The 'doughnut' -shaped loom weights in this group are of the type commonly found on sites throughout the southern Levant.

The conical and beehive-shaped loom weights are similar to Iron Age II loom weights from Tall Afis in northern Syria. The similarity in form between the horizontally perforated conical and conical-pyramidal weights from Syria and the horizontally perforated weights from Tall Dayr 'Allā in Jordan is striking. Both the perforated and the unperforated loom weights are made of local unfired clay. They are very brittle and would therefore have been unsuitable for sale or exchange.

The typological similarity between the perforated loom weights used in Syria and in Jordan is spectacular. The presence of an unperforated spool- / reel-shaped weight in a collection of loom weights from Jordan points to a hitherto unknown relationship between the Jordan Valley and Syria.

Spatulas

An increasing number of loom weights excavated from different Iron Age sites in Syria and the southern Levant are found in association with interesting small bone artefacts, namely *spatulas* or *laminas* (FIG. 8). Spatulas are flat, oblong objects averaging between 10 and 12cm in length, 1.5 and 2cm in width and 0.1 and 0.2cm in thickness. Spatulas typically have a single sharpened end, but occasionally both ends are sharpened (Cecchini 2000: 223). They are made of smoothed animal rib bones and the sharpened end typically shows signs of wear (Hollander 2003). Their function has long been debated (Tufnell 1953: 397; Crowfoot and Crowfoot 1957: 461-462; Friend 1998: 6-7; for an overview see Cecchini 2000: 223, Note 63). These authors suggest that spatulas were used as pattern sticks to separate certain threads when weaving a complicated pattern. More remarkable is the suggestion of G. and O. Van Beek (1990), who suggest that they were used as a type of ophthalmic instrument with which to clean the eye. Kertesz (1989: 364) proposed that spatulas with rounded ends were used to apply cosmetics and that those with pointed ends were used to puncture abscesses and clean wounds.

8. Spatulas/ laminas.

It is now clear that these thin, sharpened bone artefacts were associated with weaving. It has already been suggested that they could have been used to beat small areas of the weft (Vogelsang-Eastwood 1989). Friend (1998: 7) argued that spatulas were used as pattern-weaving tools on the basis of their similarity to traditional weaving tools. Hella Hollander (2003) has demonstrated from use-wear analysis that spatulas were used to insert patterns into the weft (Hollander 2003).

Spatulas have been excavated in places where the warp-weighted loom was used. Loom weights and spatulas have been found together at Samaria (Crowfoot and Crowfoot 1957: 461), Megiddo (Strata I to V) (Lamon and Shipton 1939: 39-62, Pls 95 and 96: 1-9), Jerusalem (Shamir 1996: 139; Franken and Steiner 1990: 17, 26 and 44), Tall Dayr 'Allā (Vogelsang-Eastwood 1989; Hollander 2003), Tall Taannek (Friend 1998: 7), Tall Jāwā (Daviau 2002: 191-200, 261, Figs 2.154: 1 and 2) and at Khirbat al-Mudayna.

In Syria, spatulas have been found in association with loom weights at Tall Afish (Cecchini 2000: 223), Tall Mishrifeh / Qatna (Garna and Besana 2006), Tall Abu Danne and Umm al-Marra (Doyen 1986).

In sum, spatulas and loom weights have been found together at a number of Iron Age Syro-Palestinian sites. The increased frequency of loom weights and appearance of spatulas are indicative of pattern weaving.

Conclusions

Cloth played a central role in ancient economies. Typically neither cloth nor wooden loom compo-

nents survive in the archaeological record, so any remaining artefacts used in the production of textiles, e.g. loom weights, are important.

Loom weights can be used as a research tool to indicate where looms may have stood or where the weights themselves were stored. Analysis of loom weights sheds light on one of the most time-consuming activities practiced by ancient societies: textile production.

"Given the centrality of cloth in ancient economies, identification of weaving could give us clues about how a society organized its agriculture, herding, textile production and social relationships" (Miller and Leaman 2007).

The Journey of the Warp-Weighted Loom

Until a few years ago, loom weights were generally understood to be rounded or conical weights of terracotta or stone with a hole from which they could be suspended. It is only recently that terracotta objects in the form of reels or spools have begun to be recognised as loom weights.

Recent finds from Syria provide a hitherto missing link in the spread of the warp-weighted loom (Cecchini 2000; Garna and Besana 2006). The conclusion is that the warp-weighted loom spread from Europe, via Greece, Cyprus and Anatolia, to Syria and the Levant.

The perforated loom weights from Tall Dayr ʻAllā in the Jordan Valley show northern influence (Boertien 2004). The recovery of a spool-formed weight at Tall Dayr ʻAllā raises the question of whether or not unfired or partially-fired clay loom weights without a perforation, i.e. the so-called reels or spools, were used at sites east of the River Jordan as they were used in Syria.

Have the unfired and unperforated loom weights been missed in the archaeological record, or were such weights never used on a large scale in this part of the Levant? To answer this question a comparison between loom weights from Syria and loom weights from different sites in Jordan has been carried out.

Increasing Frequency of Loom Weights

Loom weights from different sites in Jordan show a spectacular increase in frequency during Iron Age II. This phenomenon is repeated all over the southern Levant during the Iron Age. The increasing frequency of these 'soft', i.e. unfired, loom weights shows that the warp-weighted loom was used intensively during the Iron Age. This is typically attributed to two factors: (1) weaving on a flexible loom is thought to have been easier, thereby enabling production to be increased for export and (2) an increase in textile production could have been linked to Assyrian demands; indeed textiles are mentioned in Assyrian tribute lists relating to Palestine (Browning 1988: 154-158).

ANET 282 and ANET 283 mention locally-produced garments with multicoloured trimmings that were received by Tiglat Pileser III from the states of the southern Levant, including Damascus, Tyre, Israel and Gaza.

The fine and intricate textiles found in central Europe show that the warp-weighted loom was used to weave fine textiles with colored patterns. It's possible that the warp-weighted loom was used in the Levant precisely because it enabled the warp threads to be hung in two, three or more flexible rows, thereby facilitating the weaving of intricate patterns in the weft. This would in turn have resulted in the use of more loom weights. It should be noted that the technical potential of the warp-weighted loom has long been under-estimated.

The increasing number of loom weights used in the Levant during the Iron Ages, in combination with the appearance of bone spatulas/ laminas, demonstrates that the sophisticated pattern techniques that had been practiced in central Europe since the Neolithic, spread into the Levant during the Bronze and Iron Ages.

The warp-weighted loom is a western invention that spread all over Europe and, via Greece, Anatolia and Syria, into the southern Levant to form the basis of a vibrant Levantine textile tradition. The warp-weighted loom and its archaeological evidence — the loom weight — show that the traditional view of the origin of culture as *ex oriente lux* can also be seen the other way round, as *ex occidente lux*!

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