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Investigating Textile Production in the Aegean
and Eastern Mediterranean Bronze Age

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edited by

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Front cover: clockwise: MM II Quartier Mu, Malia, Crete, map (after Poursat 1996, pl. 81), spindle whorls from Phaistos, Crete (courtesy of P. Militello), Khania, Crete, Late Bronze Age ribbon, reconstructed loom weights in TTTC experiments.

Back cover: Splicing (drawing: Annika Jeppsson)

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CHAPTER 6.10

Textile tools from Thebes, mainland Greece

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Athina Papadaki, Françoise Rougemont, Eva Andersson Strand,
Marie-Louise Nosch and Joanne Cutler*

The site of Thebes is located in Boeotia, central Greece, and has been a centre of primary importance throughout its history, from the Early Bronze Age to the present day. Parts of the Bronze Age settlement, which lies under the modern town, have been brought to light through a series of rescue excavations by the IXth Ephorate of Prehistoric and Classical Antiquities (Archaeological Museum of Thebes). The excavated plots can only provide a partial picture of the nature of the Bronze Age occupation, however. During Mycenaean times, Thebes was a first-order centre, the seat of a palatial administration. The whole upper town was variously involved in storing, craft and recording activities, and its excavated sectors seem to have been linked with the palace to varying degrees. The most well-known and impressive Mycenaean complexes are located roughly in the centre of the town: the so-called “House of Kadmos”, the “Treasury” and the “Room of the Pithoi” (Fig. 6.10.1).

An international project was initiated in 2006, with the aim of reconstructing the organisation of the textile production at Thebes, combining both textual and archaeological evidence. Textile tools from various Theban plots were recorded, and their contexts studied in order to provide a chronological framework and some

insights into the function of the excavated buildings.

A total of 236 textile tools from Bronze Age Thebes are included in the TTTC database. Two hundred of these are from securely dated contexts, with 30 objects dating to the Early Bronze Age and 170 dating to the Late Bronze Age, *i.e.* Mycenaean, Thebes (Fig. 6.10.2). All of the Late Bronze Age tools were recovered from LH III contexts, with the majority (95) dating to LH III B2 Late. Since there are so few textile tools from Early Bronze Age contexts, the discussion below focuses on the Late Bronze Age material.

Mycenaean Thebes: the included contexts

The evidence presented here comes from the Mycenaean levels of various excavated plots, each plot designated by the name of its owner, followed by the year of excavation. The plots considered here are: Christodoulou and Stamati (1983–1984), Kofini (2005), Loukou (1980), Pavloyiannopoulou (1963–1964 and 1994–1995) and Soteriou-Dougekou (1970–1971). In addition, the evidence from the excavations under Pelopidou Street (1993–1995) is also presented. The excavations are

Fig. 6.10.1. Thebes (Boeotia). Excavated plots in the grid of the modern town.

- 1) "House of Kadmos"
 - 2) "Treasury" and "Room of Pitheoi"
 - 3) "Wool workshop" (Soteriou-Dougekou plot)
 - 4) "Armoury" (Pavloyiannopoulou plot)
 - 5) Pelopidou street
 - 6) "Ivory Workshop" (Loukou plot)
 - 7) Christodoulou, Stamati and Liaga plots
 - 8) Kofini plot
- (plan: courtesy of the Museum of Thebes).



located in various parts of the Mycenaean town, spreading from the centre to the southeast gates, and comprise a series of functionally different contexts (Fig. 6.10.1). Most of them are known through preliminary or partial publications or are still under study.¹

In these structures, the large majority of the pottery assemblage consists of coarse,

medium-coarse and plain fine wares: storage, cooking, pouring and drinking vessels. This pattern of shapes fits very well with other evidence for the apparently utilitarian function of the associated areas. It seems that these architectural units were all dedicated to working (or domestic) activities, with tools of various kinds, including textile tools, and one or more

	Spindle whorl	Conulus	Kylix stem whorl	Pierced sherd	Pierced disc	Loom weight	Spool	Pointed tool	Needle	Total
EH I–III	4					1				5
EH II Late	13	1		2		5		1	3	25
LH IIIA2	1			2			1	3		7
LH IIIA–B	6									6
LH IIIB							1	2		3
LH IIIB2	3	4		1		1	2	1		12
LH IIIB2 Late	47	17	1	11	1	4	6	6	2	95
LH IIIB2–C	2									2
LH IIIC Early	5	7						1	1	14
LH IIIC Middle	11	15					1	3	1	31
Total	92	44	1	16	1	11	11	17	7	200

Fig. 6.10.2. Textile tools from securely dated contexts, by type and date.

bath-tubs positioned on the floor. Some of these units also yielded traces of administrative (Linear B tablets, inscribed and uninscribed nodules, seals and sealings) and/or craft activity, especially ivory working, and were possibly used as storage area for cereals, craft products (bronzes, ivories, pottery) or raw material (wool).

The Christodoulou and Stamati plots (1983–1984) (Fig. 6.10.1, n. 7) are situated in the southeastern part of the Kadmeia (between Oidipodos and Oikononou streets): they are part of the same archaeological complex as the Liaga plot (1981–1983), where many inscribed and a few uninscribed nodules were found. They are also close to the ancient town border and fortification line, in an area where the Homoloides Gate was traditionally thought to have been located. Two main destruction phases have been reported: the first in LH IIIB1 and the second in LH IIIB2.² Only the evidence from Christodoulou and Stamati is considered here (Aravantinos 1988). The buildings seem to have been used as storage and work structures rather than as habitation quarters: there are many large- and medium-sized containers as well as indicators of craft activities, including evidence for textile processing. The Christodoulou plot also yielded a seal and a sealing.³ Various assemblages of textile tools were found in the buildings, including spindle whorls, spool shaped loom weights, and some bone implements (such as a needle).

The Kofini plot (2005) is situated between Pelopidou and Dirkis Streets, in the southeast part of the Kadmeia, not far from the Elektrai gate (Fig. 6.10.1, n. 8). The bulk of the material is dated to LH IIIB2 and the area appears to

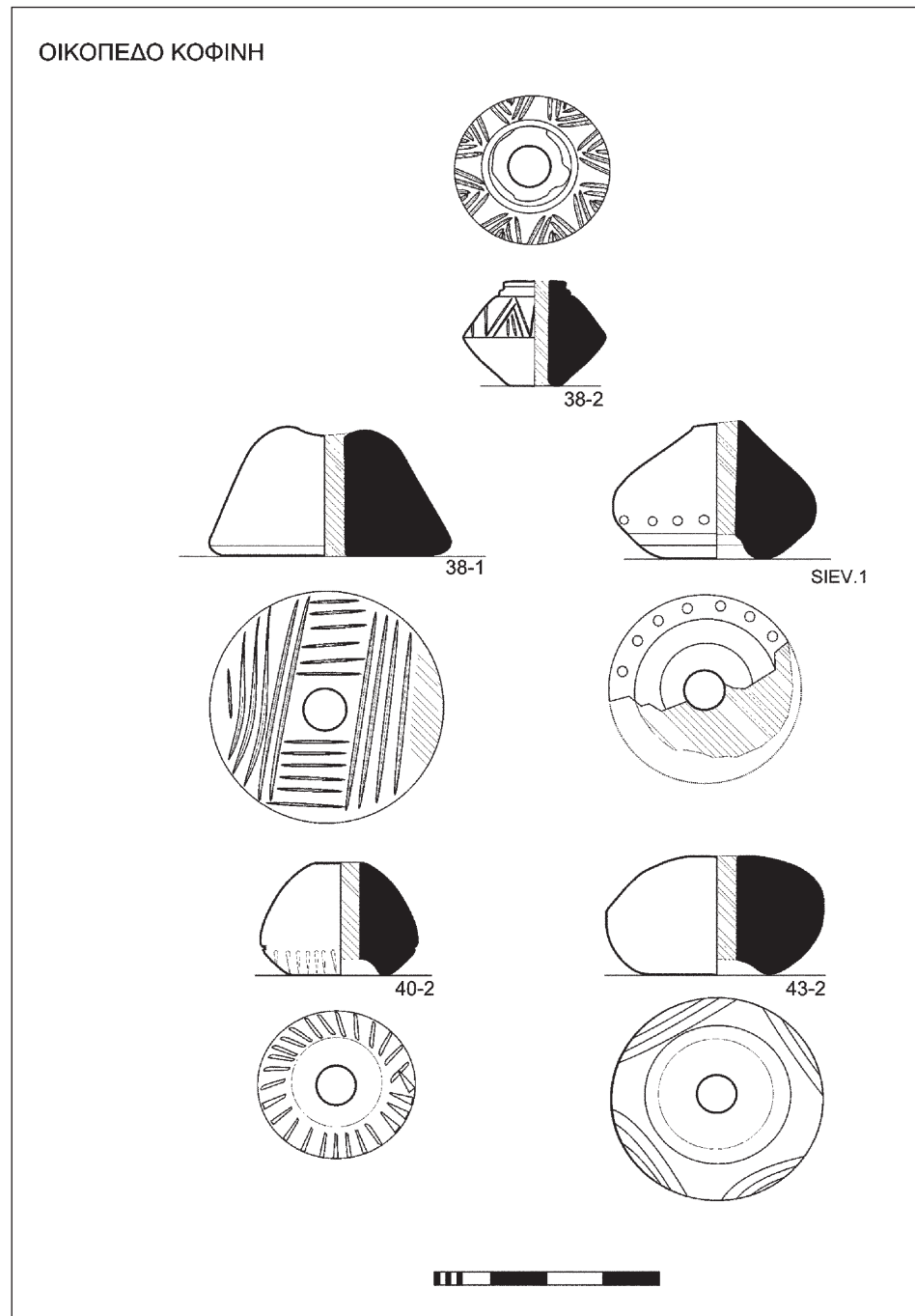


have had a utilitarian function.⁴ The textile tools mainly consist of spindle whorls (Figs. 6.10.3 and 6.10.4).

In the central area of the Kadmeia, in its southeastern part, between Pelopidou and Zeggini streets, a large Mycenaean complex has come to light through various excavations of different neighbouring plots (Fig. 6.10.1, n. 4, 5 and 6). The buildings that have been uncovered are very probably parts of the same urban unit, but, because of the physical limits of the rescue excavations, their relationships are still not fully understood. The main excavated areas are: the Pavloyannopoulou plot (or “Armoury”, 1963–1964 and 1994–1995), the Loukou plot (or “Ivory Workshop”, 1980) and Pelopidou street itself, which divides the two plots, where rich Linear B archives were uncovered (1993–1995). The “Armoury”

Fig. 6.10.3. Kofini plot: stone tools and textile tools (photo: courtesy of the Museum of Thebes).

Fig. 6.10.4. Kofini plot: spindle whorls (drawing: courtesy of the Museum of Thebes).



(LH IIIB1 or IIIB2 according to different scholars) was given its name because horse equipment and parts of bronze cuirasses as well as substantial quantities of bronze weapons were recorded in the course of the excavations, along with a deposit of Linear B tablets (TH Ug) and two lead balance weights. However, many ivory items were also found, thus connecting this context with the evidence from the Loukou plot (LH IIIB1 or LH IIIB2),

where evidence of ivory working was securely identified (for spindle whorls from the Loukou plot see Figs. 6.10.5 and 6.10.6).⁵ A large number of textile tools were recovered from the Pavloyannopoulou plot, including spindle whorls, loom weights and bone needles (Figs. 6.10.7 to 6.10.17). It should be noted that one of the two balance weights from the plot has a mass roughly similar to the Mycenaean unit for weighing and counting wool: that is, *c.* 3 kg.



Fig. 6.10.5. (left) Loukou plot: steatite convex-conical spindle whorl, view 1 (photo: courtesy of the Museum of Thebes).

Fig. 6.10.6. (right) Loukou plot: steatite convex-conical spindle whorl, view 2 (photo: courtesy of the Museum of Thebes).



Fig. 6.10.7. (left) Pavlyiannopoulou plot: bone needles (photo: courtesy of the Museum of Thebes).

Fig. 6.10.8. (right) Pavlyiannopoulou plot: incised spindle whorl (photo: courtesy of the Museum of Thebes).



Fig. 6.10.9. (left) Pavlyiannopoulou plot: clay spool shaped loom weight (photo: courtesy of the Museum of Thebes).

Fig. 6.10.10. (right) Pavlyiannopoulou plot: clay spool shaped loom weight (photo: courtesy of the Museum of Thebes).



Fig. 6.10.11. (left) Pavlyiannopoulou plot: steatite biconical spindle whorl, view 1 (photo: courtesy of the Museum of Thebes).

Fig. 6.10.12. (right) Pavlyiannopoulou plot: steatite biconical spindle whorl, view 2 (photo: courtesy of the Museum of Thebes).

Fig. 6.10.13. (left)
Pavlyoiannopoulou plot:
steatite biconical spindle
whorl, view 3 (photo:
courtesy of the Museum
of Thebes).



Fig. 6.10.14. (right)
Pavlyoiannopoulou plot:
stone conical spindle
whorl, view 1 (photo:
courtesy of the Museum
of Thebes).



Fig. 6.10.15. (left)
Pavlyoiannopoulou plot:
stone conical spindle
whorl, view 2 (photo:
courtesy of the Museum
of Thebes).

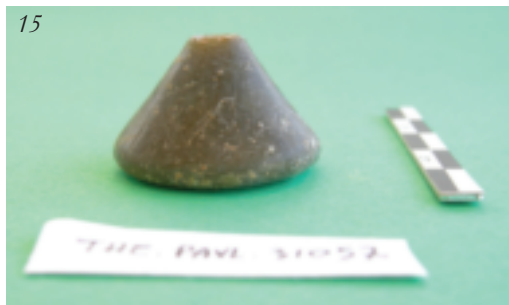


Fig. 6.10.16. (left)
Pavlyoiannopoulou plot:
stone incised spindle
whorl, view 1 (photo:
courtesy of the Museum
of Thebes).



Fig. 6.10.17. (right)
Pavlyoiannopoulou plot:
stone incised spindle
whorl, view 2 (photo:
courtesy of the Museum
of Thebes).



Fig. 6.10.18. (left)
Pelopidou street: steatite
conical spindle whorl,
view 1 (photo: courtesy of
the Museum of Thebes).

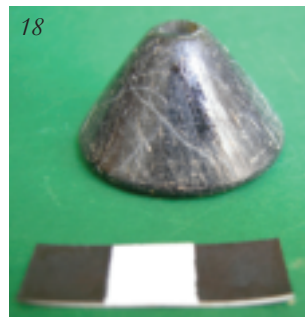


Fig. 6.10.19. (left)
Pelopidou street: steatite
conical spindle whorl,
view 2 (photo: courtesy
of the Museum of
Thebes).

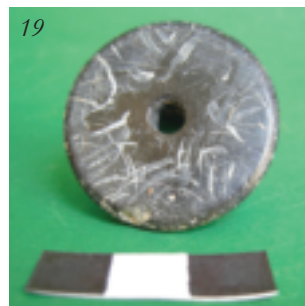
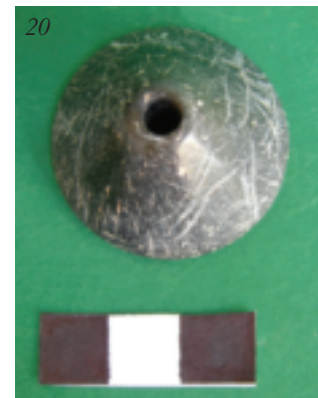


Fig. 6.10.20. (right)
Pelopidou street: steatite
conical spindle whorl,
view 3 (photo: courtesy of
the Museum of Thebes).



The buildings excavated under Pelopidou street date to three main phases: LH IIIB2, LH IIIC Early and LH IIIC Middle. Layers dating to LH IIIB2 yielded a substantial deposit of Linear B tablets *etc.*, evidence of large scale storage and some textile tools.⁶ The most extensive evidence for textile activity (most

notably a quantity of spindle whorls) comes from the LH IIIC Early and Middle layers, which have a more domestic character (Figs. 6.10.18 to 6.10.21).

The Soteriou-Dougekou plot (1970–1971) is situated in the central part of the Kadmeia, adjacent to the central square



Fig. 6.10.21. Pelopidou street: clay spindle whorls (photo: courtesy of the Museum of Thebes).



Fig. 6.10.22. Soteriou-Dougekou plot: stirrup jar (photo: courtesy of the Museum of Thebes).

Fig. 6.10.23. Soteriou-Dougekou plot: stirrup jar (photo: courtesy of the Museum of Thebes).



of the modern city (Fig. 6.10.1, n. 3).⁷ The building uncovered (LH IIIB2) yielded possible washing installations, a clay bath-tub, some small stirrup jars still *in situ* on the floor (Figs. 6.10.22 and 6.10.23) and a number of Linear B tablets recording quantities of wool (TH Of, Figs. 6.10.24 and 6.10.25). A multiple sealing was also found (Fig. 6.10.26). The recovered pottery assemblage included plain drinking ware and many storage vases, with heavy traces of burning (which seems to strengthen the hypothesis that oil was stored there). The unit has been interpreted as a location for processing and storing wool or as a clearing house (Chadwick and Spyropoulos 1975; Shelmerdine 1997). The presence of the small stirrup jars *in situ* on the floor, near the possible washing installations, could suggest that the processing of wool included also its treatment with (perfumed?) oil, a practice that is well known from the Linear B tablets of Knossos and from ancient tradition (Foster 1977; Shelmerdine 1995; Fappas 2010, 255–256). Textile tools include many small spindle whorls.

Spindle whorls and spinning

Among the Late Bronze Age textile tools are 75 spindle whorls, 43 conuli, a kylix stem whorl and a pierced bone disc, as well as 14 pierced sherds. Many of the pierced sherds are irregular in shape, and have drilled, hourglass shaped holes; because of this, the spindle would have rotated unevenly if they were used as spindle whorls. They would not, therefore, have been optimal for use as whorls.

Forty-one of the conuli and 51 of the spindle whorls are made of stone, the remainder are made of fired clay (Fig. 6.10.27). A variety of shapes are present among both the conuli and the spindle whorls, but the majority are conical/conical concave in form.

Excluding the pierced sherds, 106 whorls (including the conuli, kylix stem and pierced disc) had a recordable weight and diameter (Fig. 6.10.28). The objects classified as conuli all weigh 10 g or less, but there are a number of spindle whorls that also weigh 10 g or less, so there is a degree of overlap between the two categories.

Fig. 6.10.24. Soteriou-Dougekou plot: Linear B tablet TH Of 25 (photo: courtesy of the Museum of Thebes).



Fig. 6.10.25. Soteriou-Dougekou plot: Linear B tablet TH Of 36 (photo: courtesy of the Museum of Thebes).



Fig. 6.10.26. Soteriou-Dougekou plot: multiple sealing (photo: courtesy of the Museum of Thebes).

Sixty-six of the whorls are from LH III B2 Late contexts: 19 from the Kofini plot; nine from the Stamati plot; 22 from the Pavloyiannopoulou plot, 12 from the Soteriou-Dougekou plot and four from the Loukou plot. Of these, 60 had a recordable weight and diameter (Fig. 6.10.29). Excluding the Loukou plot, where only two of the four whorls had a preserved weight (6 g and 7 g) and diameter, the weight/diameter of the whorls from the various plots cover a range, indicating that a range of different thread types were being spun in each of these locations. The whorls from the Kofini, Stamati and Pavloyiannopoulou plots would have been suitable for spinning threads varying from very thin to thick. However, in the case of the Soteriou-Dougekou excavation, the weight/diameter range of the whorls is much narrower (but still covering a range); all of the whorls from this area weigh 13 g or less and would have been suitable for spinning very thin

threads. This would suggest that a narrower range of yarn types was being spun in this location, perhaps associated with a more focused production of particular thread types. The building also yielded other indicators of possible textile specialisation, as discussed above.

Fig. 6.10.27. Spindle whorls and conuli, LH III: type and material.

Conuli	Fired Clay	Stone	Total
Biconical		1	1
Concave conical		23	23
Conical	2	16	18
Convex			0
Discord		1	1
Spherical			0
Total	2	41	43
Spindle whorls	Fired Clay	Stone	Total
Biconical	9	10	19
Concave conical	1	9	10
Conical	13	30	43
Convex		1	1
Discord		1	1
Spherical	1		1
Total	24	51	75
Overall total	26	92	118

Thirty-eight whorls, all from the Pelopidou plot, were recovered from LH IIIC contexts (LH IIIC Early and LH IIIC Middle). Thirty-three of these had a recordable weight and diameter (Fig. 6.10.30). The LH IIIC whorls have a weight/diameter range similar to the LH IIIB2 Late whorls and indicate that a range of thread types, from very thin to thick, were being spun in the Pelopidou plot during this period. However, 24 of the whorls weigh 11 g or less, suggesting a greater focus on spinning very thin thread.

Loom weights and weaving

Of the 16 loom weights from securely dated Late Bronze Age contexts, 11 are spool shaped, two are discoid and three are torus shaped (Fig. 6.10.31). Seven of the spools are made of unfired clay, while one of the torus weights is made of stone; the remaining loom weights are made of fired clay.

Four of the spools were recovered from LH IIIB2 Late contexts in the Stamati plot and a further four are from the Pelopidou plot (one in a LH IIIA2 context, two in LH IIIB2 contexts and one in a LH IIIC Middle deposit). Six loom weights were found in LH IIIB2 Late contexts in the Pavloyiannopoulou plot (two spool shaped, one discoid and three torus shaped), while the remaining two weights (one spool and

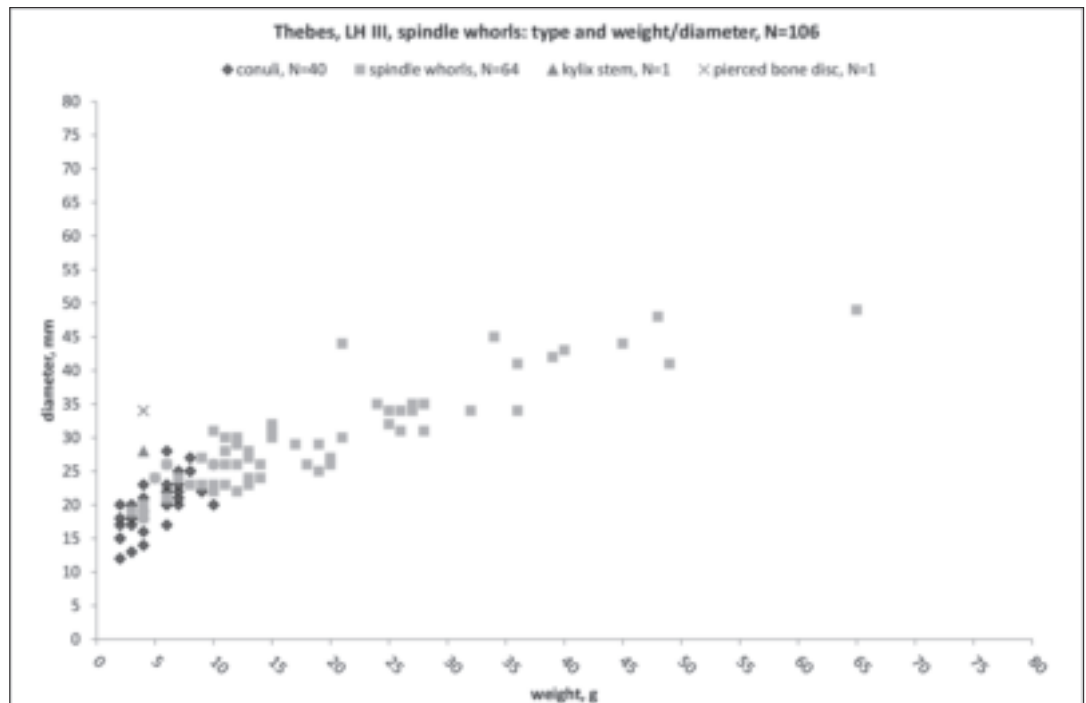


Fig. 6.10.28. Spindle whorls, LH III: type and weight/diameter. Please note that some markers represent more than one spindle whorl.

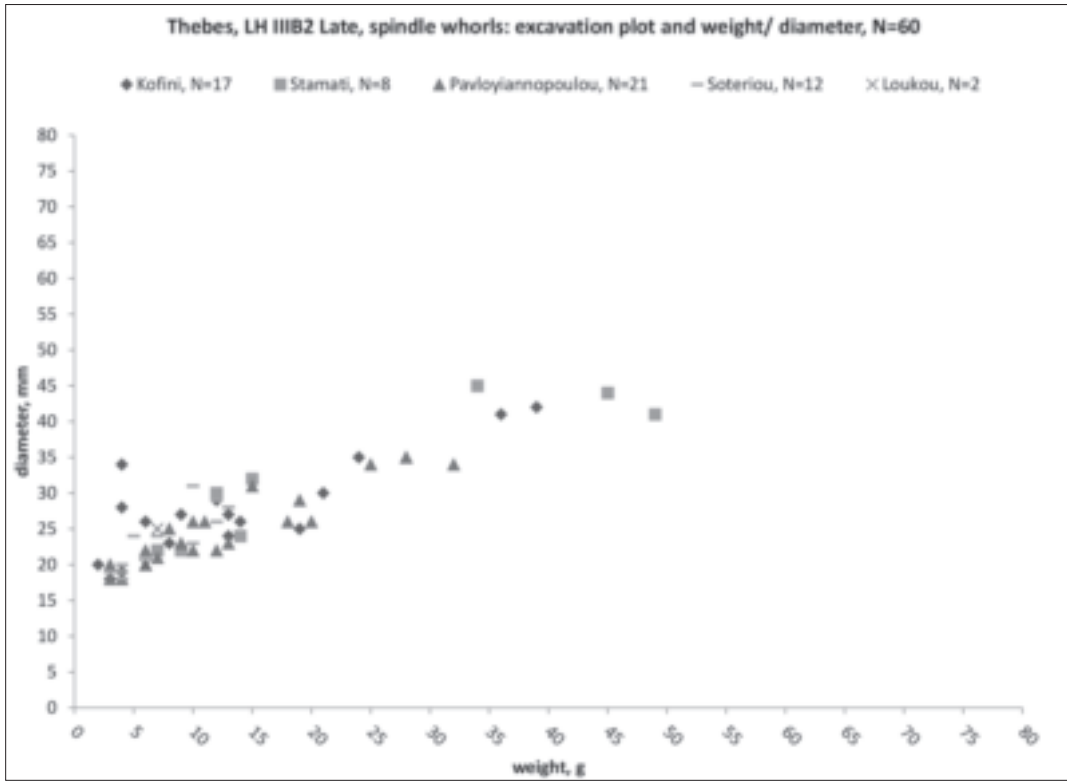


Fig. 6.10.29. Spindle whorls, LH IIIB Late: excavation plot and weight/diameter.

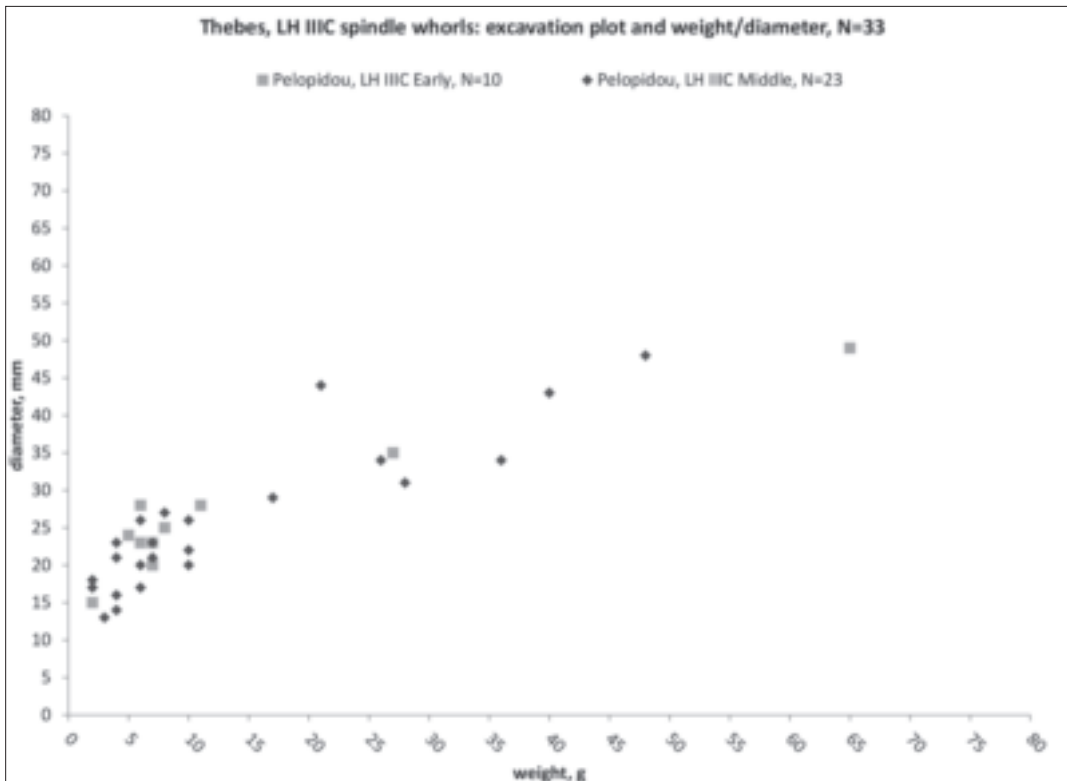


Fig. 6.10.30. Spindle whorls, LH IIIC: excavation plot and weight/diameter.

one discoid) were recovered from an LH IIIB and an LH IIIB2 context respectively in the Christodoulou plot.

Thirteen of the loom weights from securely dated Late Bronze Age contexts had a recordable weight and thickness (nine spools, two discoid and two torus shaped). Although there are only very limited numbers of each type, it can be noted that while the discoid and torus weights lie within the overall weight range of the spool weights, they are thinner than the spools (Fig. 6.10.32). The spools weighing less than 50 g (if they were used as loom weights) would only be suitable for use with extremely fine thread requiring less than *c.* 5 g tension each, or for use with threads requiring *c.* 5 g tension, but with less than 10 threads fastened to the spool. The thinner, discoid weights would be suitable for weaving fabrics with a higher number of warp threads per centimetre. The spools would have been

better suited for producing fabrics with fewer warp threads per centimetre that may have been either open or weft faced.

All of the loom weights with a recordable weight and thickness weigh less than 200 g; therefore, none of them would be ideally suited for use with threads requiring a tension of 20 g or more (although it should be noted that there is one incomplete torus weight weighing 421 g in an LH IIIB2 context from the Pavloyiannopoulou plot, which would have been suitable for use with much thicker thread). Ten of the loom weights weigh 100 g or less and would be best suited for use with very thin thread, requiring up to *c.* 10 g tension.

Fig. 6.10.31. Loom weights from securely dated Late Bronze Age contexts, by type and date.

	Discoid	Spool	Torus	Total
LH IIIA2		1		1
LH IIIB		1		1
LH IIIB2	1	2		3
LH IIIB2 Late	1	6	3	10
LH IIIC Middle		1		1
Total	2	11	3	16

Summary

The range of whorl weights indicates that a large range of yarn types, from very thin to thick, was being spun at the site in the LH III period, although the large number of whorls weighing less than 15 g suggests that there was a greater focus on spinning thinner thread. This is true both for LH IIIB2 contexts, *i.e.* during the last phase of the Palatial period (see especially the evidence from the specialised Soteriou-Dougekou plot), and LH IIIC phases, *i.e.* during the Postpalatial period (see especially the Pelopidou domestic contexts).



Fig. 6.10.32. Loom weights, LH III: type and weight/thickness.

Nearly all of the loom weights from LH III Thebes are best suited for use with thin thread types, with most of them being optimal for use with thread requiring up to *c.* 10 g tension; a few would be more suitable for use with thread requiring *c.* 15–20 g tension. The number of whorls weighing *c.* 15 g or less would correspond well with the production of this range of thread types. However, it is interesting to note that there are a number of heavier spindle whorls that would be more suitable for spinning thicker threads, which would need correspondingly higher tension. This is true both in the case of the general weight ranges, and in the case of loom weights and spindle whorls dating to the same period from the individual excavation areas. Loom weights suitable for weaving a fabric with these thicker threads are not present among the textile tools from the site (although the incomplete torus weight weighing 421 g in an LH IIIB2 context in the Pavloyiannopoulou area should be noted). It is possible that this is the result of recovery factors, or that another type of loom was being used to weave the heavier fabrics.

Notes

- 1 For a further discussion of the evidence and on the organisation of textile and other craft activity and administration in Late Mycenaean Thebes, and full bibliography, see Alberti *et al.* 2012.
- 2 See Aravantinos 1983 (Christodoulou and Stamati plots) and Piteros *et al.* 1990 (Liaga plot) with references. The material from the Christodoulou (1983) and Stamati (1983–1984) plots is presently under study by Françoise Rougemont and Maria Emanuela Alberti respectively.
- 3 Seal: CMS V I B, n° 352, n° inv. 12933; sealing: CMS V suppl. 1B, n°353, n° inv. 12933. On sealing practices in Thebes see Aravantinos 1987, 1990 and Piteros *et al.* 1990.
- 4 See Aravantinos 2005. The material is presently under study by Maria Emanuela Alberti.
- 5 For the archaeological contexts from Pavloyiannopoulou, Loukou and Pelopidou see Sampson 1985; Aravantinos 1993, 1994, 1995 and 2000 with references. TH Ug: see Aravantinos *et al.* 2002 and Aravantinos 2006. Balance weights: Aravantinos and Alberti 2006.
- 6 The archives have been published in Aravantinos *et al.* 2001, the pottery in Aravantinos *et al.* 2006 and Andrikou 2006. The Pelopidou textile tools were examined by M. E. Alberti and A. Papadaki.

- 7 The excavation and the Linear B tablets were published respectively by Th. Spyropoulos and John Chadwick (Chadwick and Spyropoulos 1975). More recently, on the TH Of texts, see Del Frio and Rougemont 2012. Textile tools and archaeological context were reviewed by I. Fappas.

Bibliography

- Alberti, M. E., Aravantinos, V. L., Del Frio, M., Fappas, I., Papadaki, A., and Rougemont, F. (2012), Textile production in Mycenaean Thebes. A first overview, in Nosch, M.-L., and Laffineur, R. (eds), *KOSMOS. Jewellery, Adornment and Textiles in the Aegean Bronze Age*, 87–105. Liège. Peeters.
- Andrikou, E. (2006) The Late Helladic III pottery, in Aravantinos, V., Godart, L., Sacconi, A. and Vroom, J., *Fouilles de la Cadmée*, 11–180. Pisa. Istituti editoriali e poligrafici internazionali.
- Aravantinos, V. (1983) Θήβα. Οδός Οιδίποδος και πάροδος Π. Οικονόμου (οικόπεδο Ε. και Μ. Χριστοδούλου), *Αρχαιολογικόν Δελτίον* 38 (1983), Β 1, 129–131.
- Aravantinos, V. (1987) The Mycenaean inscribed sealings from Thebes: preliminary notes, in Ilievski, P. H. and Crepajac, L. (eds), *Tractata Mycenaea*, 13–27. Skopje. Macedonian Academy of Sciences and Arts.
- Aravantinos, V. (1988), Η μυκηναϊκή οχύρωση της Καδμείας. Προκαταρκτική ανακοίνωση, in *Α' Συνέδριο Βοιωτικών Μελετών, Α'*, 113–136. Αθήνα. Επετηρίς της Εταιρείας Βοιωτικών Μελετών.
- Aravantinos, V. (1990) The Mycenaean inscribed sealings from Thebes: problems of content and function, in Palaima, T. G. (ed.), *Aegean Seals, Sealings and Administration*, 149–176. Liège. Université de Liège.
- Aravantinos, V. (1993) Οδός Πελοπίδου 28 (αρχείο πινακίδων Γραμμικής Β), *Αρχαιολογικόν Δελτίον* 48, Β 1, 170–173.
- Aravantinos, V. (1994) Οδός Πελοπίδου 28 (αρχείο πινακίδων Γραμμικής Β) και “Οπλοθήκη” (οικόπεδο Παυλογιαννόπουλου. Οδός Πελοπίδου 28), *Αρχαιολογικόν Δελτίον* 49, Β 1, 271–276.
- Aravantinos, V. (1995) Οδός Πελοπίδου και Οδός Πελοπίδου 28, *Αρχαιολογικόν Δελτίον* 50, Β 1, 275–281.
- Aravantinos, V. (2000) Νέα μυκηναϊκά ελεφαντουργήματα από τη Καδμεία (Θήβα), in *Γ' Συνέδριο Βοιωτικών Μελετών, Θήβα, 4–8 Σεπτεμβρίου 1996* (Επετηρίς της Εταιρείας Βοιωτικών Μελετών), Αθήνα 2000, Γ', α', 31–120.
- Aravantinos, V. (2005), Οδός Δίρκης 10 (Ο.Τ. 314, οικόπεδο Κ. Κοφίνη – Γ. Σκουρτανιώτη – Δ. Γερακόπουλου), *Αρχαιολογικόν Δελτίον* 60, 400–401.
- Aravantinos, V. (2006) La tavoletta frammentaria TH Ug 43. Un interessante caso di conflitto tra dati di scavo e dati epigrafici, in B. Adembri (ed.), *AEIMNHΣΤΟΣ. Miscellanea di Studi per Mauro Cristofani*, 25–31. Florence. Centro Di.
- Aravantinos, V. and Alberti, M. E. (2006) The balance weights from the Kadmeia, Thebes, in Alberti, M. E., Ascalone, E. and Peyronel, L. (eds), *Weights in Context. Bronze Age Weighing Systems of Eastern Mediterranean. Chronology, Typology, Material and Archaeological Context*, 293–314. Rome. Istituto Italiano di Numismatica.

- Aravantinos, V., Godart, L. and Sacconi, A. (2001) *Thèbes. Fouilles de la Cadmée I. Les tablettes en Linéaire B de la odos Pelopidou: édition et commentaire*. Pisa/Rome. Istituti editoriali e poligrafici internazionali.
- Aravantinos, V., Godart, L. and Sacconi, A. (2002) *Thèbes. Fouilles de la Cadmée III. Corpus des documents d'archives en Linéaire B de Thèbes (1–433)*. Pisa/Rome. Istituti editoriali e poligrafici internazionali.
- Aravantinos, V., Godart, L., Sacconi, A. and Vroom, J. (2006) *Thèbes. Fouilles de la Cadmée II.2. Les tablettes en Linéaire B de la Odos Pelopidou: Le contexte archéologique; La céramique de la Odos Pelopidou et la chronologie du Linéaire B*. Pisa/Rome. Istituti editoriali e poligrafici internazionali.
- Chadwick, J. and Spyropoulos, T. (1975) *The Thebes Tablets II*. Salamanca. Universidad de Salamanca.
- Del Freo, M. and Rougemont, F. (2012) Observations sur la série Of de Thèbes, *Studi Micenei ed Egeo-Anatolici*, 54, 263–280.
- Fappas, I. (2010), Έλαιον ενώδες, τεθωμενον: Τα αρωματικά έλαια και οι πρακτικές χρήσης τους στη Μυκηναϊκή Ελλάδα και την αρχαία Εγγύς Ανατολή (14ος–13ος αι. π.Χ.) (*Well-scented, perfume oil: Perfumed oils and practices of use in Mycenaean Greece and the ancient Near East (14th–13th cent. BC)*). Chania. Ιστορική, Λαογραφική και Αρχαιολογική Εταιρεία Κρήτης.
- Foster, E. (1977) An administrative department at Knossos concerned with perfumery and offerings, *Minos* XVI.1–2, 19–51.
- Piteros, C., Olivier, J. P. and Melena, J. L. (1990) Les inscriptions en Linéaire B des nodules de Thèbes (1982): la fouille, les documents, les possibilités d'interprétation, *Bulletin de correspondance hellénique*, 114, 103–184.
- Sampson, A. (1985) La destruction d'un atelier palatial mycénien à Thebes, *Bulletin de correspondance hellénique*, 109, 21–29.
- Shelmerdine, C. (1995) Shining and fragrant cloth in Homeric epic, in Carter, J. P. and Morris, S. P. (eds), *The Ages of Homer. A Tribute to Emily Townsend Vermeule*, 99–107. Austin. University of Texas Press.
- Shelmerdine, C. (1997) Workshops and record keeping in the Mycenaean world, in Laffineur, R. and Betancourt, P. (eds), *TEXNH. Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age*, 388–396. Liège. Université de Liège.