Textile tools from Sitagroi, northern Greece

Elster, Ernestine S.; Andersson Strand, Eva; Nosch, Marie Louise Bech; Cutler, Joanne

Published in:
Tools, Textiles and Contexts: Investigating Textile Production in the Aegean and Eastern Mediterranean Bronze Age

Publication date:
2015

Document version
Publisher's PDF, also known as Version of record

Tools, Textiles and Contexts

We dedicate this book to Betchen Barber,
the pioneer of the study of Aegean Bronze Age textiles.

AN OFFPRINT FROM

ANCIENT TEXTILES SERIES VOL. 21

Tools, Textiles and Contexts

Investigating Textile Production in the Aegean and Eastern Mediterranean Bronze Age

Hardcover Edition: ISBN 978-1-84217-472-2
Digital Edition: ISBN 978-1-78297-051-4

edited by

Eva Andersson Strand and Marie-Louise Nosch

with the editorial and analytical assistance of Joanne Cutler

Oxford & Philadelphia
www.oxbowbooks.com

Published in the United Kingdom in 2015 by
OXBOW BOOKS
10 Hythe Bridge Street, Oxford OX1 2EW

and in the United States by
OXBOW BOOKS
908 Darby Road, Havertown, PA 19083

Hardcover Edition: ISBN 978-1-84217-472-2
Digital Edition: ISBN 978-1-78297-051-4

A CIP record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

Tools, textiles and contexts : textile production in the Aegean and Eastern Mediterranean Bronze Age / edited by Eva Andersson Strand and Marie-Louise Nosch.
pages cm. -- (Ancient textiles series; vol. 21)
Includes bibliographical references.
ISBN 978-1-84217-472-2 (hardback)
1. Bronze age--Middle East. 2. Textile fabrics, Prehistoric--Middle East. 3. Neolithic period--Middle East. 4. Bronze age--Aegean Islands (Greece and Turkey) 5. Neolithic period--Aegean Islands (Greece and Turkey) 6. Middle East--Antiquities. 7. Aegean Islands (Greece and Turkey)--Antiquities. I. Strand, Eva B. Andersson, editor. II. Nosch, Marie-Louise, editor.
GN778.32.N4T66 2015
939.4--dc23
2015027222

Printed in Malta by Melita Press Ltd

For a complete list of Oxbow titles, please contact:

UNITED KINGDOM
Oxbow Books
Telephone (01865) 241249, Fax (01865) 794449
Email: oxbow@oxbowbooks.com
www.oxbowbooks.com

UNITED STATES OF AMERICA
Oxbow Books
Telephone (800) 791-9354, Fax (610) 853-9146
Email: queries@casemateacademic.com
www.casemateacademic.com/oxbow

Oxbow Books is part of the Casemate Group

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)

Contents

Introduction vii

Chapter 1 Research history

1.1 An introduction to the investigation of archaeological textile tools 1
Lorenz Rahmstorf

1.2 An introduction to experimental archaeology and textile research 25
Linda Olofsson

Chapter 2 The basics of textile tools and textile technology – from fibre to fabric 39
Eva Andersson Strand

Chapter 3 Survey of archaeological textile remains from the Aegean and Eastern Mediterranean area 61
Irene Skals, Susan Möller-Wiering and Marie-Louise Nosch

Chapter 4 The TTTC experiments

4.1 Experimental testing of Bronze Age textile tools 75
Linda Olofsson, Eva Andersson Strand and Marie-Louise Nosch

4.2 External examination of spinning and weaving samples 101
Susan Möller-Wiering

4.3 Test of loom weights and 2/2 twill weaving 119
Linda Olofsson and Marie-Louise Nosch

4.4 Weaving with crescent shaped loom weights. An investigation of a special kind of loom weight 127
Agnete Wisti Lassen

4.5 From tools to textiles, concluding remarks 139
Eva Andersson Strand

Chapter 5 The TTTC database

5.1 Introduction to the CTR database 145
Eva Andersson Strand and Marie-Louise Nosch

5.2 Mathematical analysis of the spindle whorl and loom weight data in the CTR database 153
Richard Firth

Chapter 6 Textile tools in contexts

6.1 Textile tools and textile production – studies of selected Bronze Age sites: introduction....191
Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.2 Textile tools from Khania, Crete, Greece....197
Maria Bruun-Lundgren†, Eva Andersson Strand and Birgitta P. Hallager

6.3 Textile tools from Ayia Triada, Crete, Greece....207
Pietro Militello, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.4 Textile tools from Phaistos, Crete, Greece....215
Pietro Militello, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.5 Textile tools from Quartier Mu, Malia, Crete, Greece....229
Jean-Claude Poursat, Françoise Rougemont, Joanne Cutler, Eva Andersson Strand and Marie-Louise Nosch

6.6 Textile tools from Akrotiri, Thera, Greece....243
Iris Tzachili, Stella Spantidaki, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.7 Textile tools from Midea, mainland Greece....247
Katie Demakopoulou, Ioannis Fappas, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.8 Textile production at Mycenae, mainland Greece....253
Iphiyenia Tournavitou, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.9 Textile tools from Tiryns, mainland Greece....267
Lorenz Rahmstorf, Małgorzata Siennicka, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.10 Textile tools from Thebes, mainland Greece....279
Maria Emanuela Alberti, Vassilis Aravantinos, Ioannis Fappas, Athina Papadaki, Françoise Rougemont, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.11 Textile tools from Archontiko, northern Greece....293
Evi Papadopoulou, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.12 Textile tools from Sitagroi, northern Greece....299
Ernestine S. Elster, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

6.13 Textile tools from Troia, western Anatolia....309
Marta Guzowska, Ralf Becks, Eva Andersson Strand, Joanne Cutler and Marie-Louise Nosch

6.14 Textile tools from Apliki, Cyprus....329
Joanna S. Smith, Joanne Cutler, Eva Andersson Strand and Marie-Louise Nosch

6.15 Textile tools from Kition, Cyprus....337
Joanna S. Smith, Joanne Cutler, Eva Andersson Strand and Marie-Louise Nosch

6.16 Textile tools from Tel Kabri, Israel....347
Assaf Yasur-Landau, Nurith Goshen, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

Chapter 7 Summary of results and conclusions....351
Eva Andersson Strand and Marie-Louise Nosch

Appendices

Appendix A: Textile remains in the Eastern Mediterranean area: Neolithic and Chalcolithic....385

Appendix B: Textile remains in the Eastern Mediterranean area: Bronze Age....392

Acknowledgements....402

Chapter 6.12

Textile tools from Sitagroi, northern Greece

Ernestine S. Elster, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler

Sitagroi is a prehistoric settlement mound located on the Drama plain 25 km inland from the north Aegean Sea. Its 10.5 m of occupational debris appears as a gentle rise above the level of the plain (Renfrew *et al.* 1986, map 1.3). The mound (Fig. 6.12.1) was excavated from 1969 to 1970 under the joint direction of Colin Renfrew and the late Marija Gimbutas (UCLA) with the goal of exploring an Aegean region midway between Europe and the Near East, virtually *terra incognita* at that time. It is no longer unknown (Renfrew and Hardy 2003, 471, fig. 13.1; Treuil *et al.* 1992). The excavations yielded whorls, weights, anchors, hooks, spools, bone tools, and mat and cloth impressions (Renfrew *et al.* 1986; Elster 2003, 229–282; Elster and Renfrew 2003).

Twenty-nine calibrated radiocarbon dates from the site (Renfrew 1986b, 173, table 7.3) provided a framework for *c.* three millennia of occupation and also allowed for a re-evaluation of the then accepted Early Bronze Age chronology and archaeological cultures *vis-à-vis* the Aegean and the Balkans (Renfrew 1986a, 3–6). The millennia at Sitagroi were divided into five phases based on the calibrated radiocarbon determinations and a statistical analysis of changes in pottery from a sounding (5.0 × 5.0 m) in excavation Square "ZA" (see Fig. 6.12.1) which reached sterile earth at a depth of 10.5 m (Renfrew 1986b, 158, fig. 7.9; 165, 166, fig. 7.16).

Pottery comparanda (Keighley 1986, 363–369) for Sitagroi Phase I (5500–5200 BC) and Phase II (5200–4600 BC) refer to the shapes and many styles of the prehistoric Vinča culture of the former Republic of Yugoslavia, and from the Middle Neolithic Greek Thessalian painted wares, as well as prehistoric Bulgarian sites such as Slatino (Chohadziev 2007) and Kovaçevo (Demoule and Lichardus-Itten 1994). A fair degree of weaving skill is illustrated by a tabby weave textile impression on a clay sherd recovered in a clear Phase I context (Elster 2003, 246, fig. 6.31a). There is no hiatus in occupation between Phases I and II; both time periods are referred to as Middle Neolithic.

The Chalcolithic Phase III (4600–3500 BC), considered a flourishing period, is defined by flamboyantly shaped and decorated pottery painted in silvery graphite and/or in red paint on a black burnished surface, surely a prestigious commodity. This pottery is easily comparable to graphite painted pottery of the Gumelnitsa culture of Romania (Evans 1986, 406–410). Furthermore, Phase III yielded considerable evidence for specialised

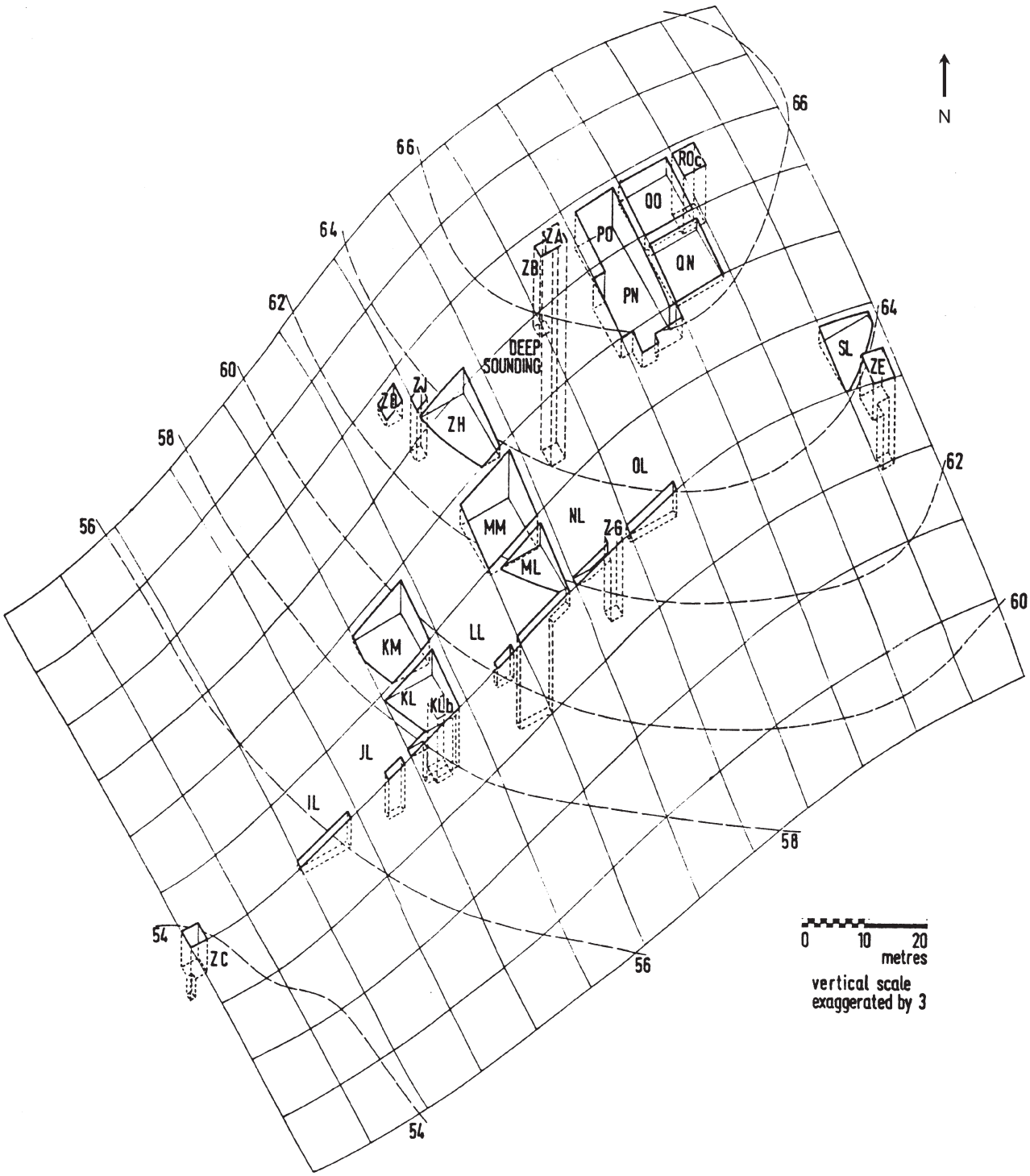

Fig. 6.12.1. An axonometric view of the excavation with squares delineated (drawing: Renfrew et al. *1986a, 18, fig. 2.2).*

crafters – potters, spinners, weavers – and their likely interaction with traders, middlemen, and travellers who introduced the various exotic raw materials utilized at Sitagroi (Elster 2007, 193–201). A particular Phase III stylistic innovation was the intentional addition of decorative incisions on the shallow faces of rather flat/discoid whorls (Fig. 6.12.2, d–g), discussed further below.

Three phases divide the millennia of the Early Bronze Age: Phase IV, 3500–3100 BC; Phase Va, 3100–2700 BC; and Phase

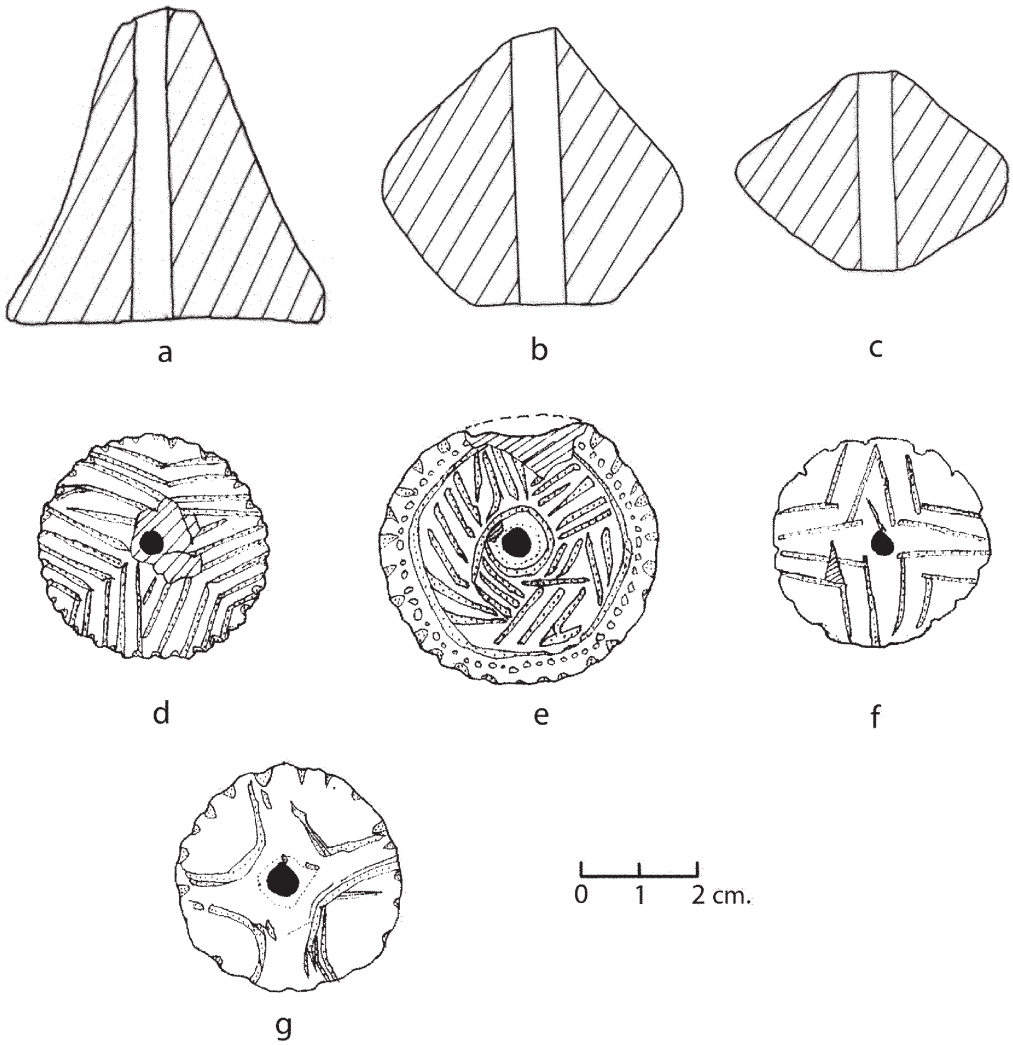

Fig. 6.12.2. Whorl forms: conical, a (Elster 2003, 232, fig. 6.3:a); biconical, b (Elster 2003, 232, fig. 6.2:a), c (Elster 2003, 232, fig. 6.1:a); Phase III incised whorls: shallow/ conical, d (Elster 2003, 235, fig. 6.6:d), e (Elster 2003, 237, fig. 6.11:a), f (Elster 2003, 235, fig. 6.6:a); flattened/ discoidal, g (Elster 2003, 235, fig. 6.7:b).

Vb, 2700–2200 BC. They reflect a variety of changes from the Chalcolithic in terms of subsistence base and material culture: pottery shapes and decoration, craft, elite, prestigious and/or imported goods including raw materials, and artefacts suggesting symbolic roles (Sherratt 1986).

A total of 579 textile tools from Sitagroi are recorded in the database, of which 542 are from secure Phase III–V contexts (Fig. 6.12.3).

Spindle whorls and spinning

The majority of the textile tools (363) are spindle whorls. Of these, 265 are Early Bronze Age in date. A further 98 whorls are from Chalcolithic Phase III contexts. Although the Bronze Age is the focus of this volume, the Chalcolithic whorls are included in the following discussion, since they provide a valuable comparison with the Phase IV and V whorls.

Conical whorls are the dominant type in Phases III and IV, whereas in Phase V biconical whorls are the most frequent shape (Fig. 6.12.4).

One hundred and sixty-one of the whorls had a recorded weight and thickness (Fig. 6.12.5). The weight of the spindle whorls varies from 8 g to 135 g and the diameter varies from 2.4 cm to 6.1 cm. This indicates that several types of yarn, from very thin to very thick, were produced at Sitagroi. There is no clear relation between spindle whorl type and weight; however, the conical whorls and "other types" display greater variation in diameter than the biconical spindle whorls.

The variation in whorl weight is considerably wider during Phase V, indicating the production of a greater range of different types of thread,

with an emphasis on thicker thread. However, it should be noted that spindle whorls with a recorded weight and thickness are less numerous during Phases III and IV (34 and 15 objects respectively) compared to Phase V (112 objects). Additionally, the diameter of the whorl in relation to the whorl's weight is in general larger in Phases III and IV than in Phase V (Fig. 6.12.6). This could of course be due to the change in shape of the whorls, but this change could also affect the outcome with regard to the spun yarn. The conical whorls are very suitable for spinning hard spun threads while the thread spun with the biconical spindle whorls with the same weight would be more loosely spun. The Sitagroi spinners were therefore producing a harder spun yarn in Phases III and IV than in Phase V. The change to more loosely spun thread could be due to a change in the type of fibres being spun. There is evidence for wool (or at least sheep) during all three phases (Bökönyi 1986, 69). The indications of flax and other plant fibres are rare, but are present (Elster 2003, 230). This indicates that the whorls from Sitagroi could have been used for spinning both wool and plant fibres. The analysis of the whorls demonstrates that the spinners at Sitagroi were already spinning different types of thread, from very thin to very thick, in the Chalcolithic period. The yarn spun with the heaviest whorls would have been very thick and would therefore have been used for coarser textiles (the heavier whorls could also have been used for plying).

The incised whorls

Incised whorls are especially associated with Chalcolithic Phase III (Elster 2003, 240, table 6.3). A total of 50 are recorded and 41 of these were recovered from Phase III contexts. These whorls were either flat/discoid or shallow conical (Elster 2003, 237, 238), shapes which provide a "face" for the incisions, more so than the biconical form (Fig. 6.12.2, d–g). An incised whorl reflects the investment of extra thought, effort and time, but is no more effective as a tool than an unadorned but burnished example. The incised and undecorated whorls were both produced and used concurrently along with a few pottery sherds recycled into whorls; some of the latter had painted designs of woven patterns (Elster 2003, 238, fig. 16.b). The incisions on the whorl face are not only decorative, but perhaps may convey a self-conscious and symbolic message of pride; pride in the tool which a skillful spinner employs to practise his/her craft. This suggests the importance of the craft in Phase III when trade/exchange was at its height, with textile production as one element in this system, based on the following evidence (Elster 2004, 81–91):

- The pattern of sheep husbandry changes from 50/50 young and adult to a majority of adult animals, which produce more wool (Bökönyi 1986, 80).
- Patterns depicting woven goods are painted in graphite on highly burnished, large vessels (Evans 1986, 417, figs. 12.4, 12.6:2) which require pyrotechnical skill in firing (Gardner 1979, 18–23) thus connecting two crafters: potters and weavers.
- Imported raw materials: (a) stone for polished edge tools – axes, adzes, chisels from sources 30–100 km away (Dixon 2003, 133); (b) *spondylus gaederopus* from the Aegean (25 km away) for bracelets and pendants (Nikolaidou 2003, 331); (c) honey-brown flint from northeast Bulgaria (*c.* 300 km away) for chipped stone tools.
- Copper objects, few in number (sources of copper are not yet clearly identified; Renfrew and Slater 2003, 301), also a small gold ring: exotica perhaps traded as ores and/or small artefacts.

The crafts of spinning and weaving are likely to have become an important link in the trading or exchange pattern of this village during Chalcolithic Phase III. Based on the artefacts, the data indicate that the spinners were able to skillfully produce different types of yarn and thus to vary the types of textiles produced. By the Early Bronze Age, new societal forces

Fig. 6.12.3. Textile tools from securely dated Phase III–V contexts, by type and date.

	Spindle whorl	Loom weight	Spool	Pointed bone tool	Hook	Anchor	Total
Phase III, Chalcolithic	98	4					**102**
Phase IV, EH I	67	17	2	30			**116**
Phase V, EH II	198	28	31	20	26	21	**324**
Total	**363**	**49**	**33**	**50**	**26**	**21**	**542**

	Phase III, Chalcolithic	Phase IV, EH I	Phase V, EH II	Total
Biconical	6	13	118	**137**
Concave conical	1	1		**2**
Conical	49	40	27	**116**
Convex		9		**9**
Convex?			6	**6**
Cylindrical			1	**1**
Discord	33		2	**35**
Other	8	4	34	**46**
Spherical	1		9	**10**
Not available			1	**1**
Total	**98**	**67**	**198**	**363**

Fig. 6.12.4. Spindle whorls, Phases III–V, by type and date.

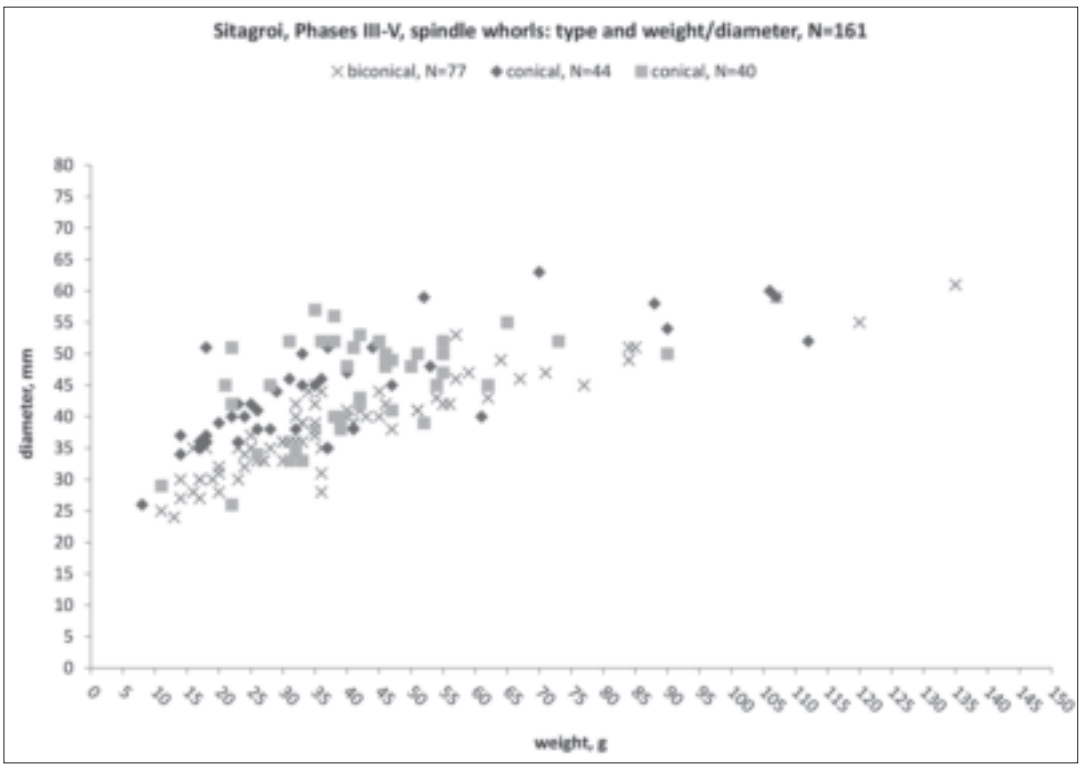

Fig. 6.12.5. Spindle whorls, Phases III–V: type and weight/diameter. Please note that some markers represent more than one spindle whorl.

were at play; the grape had been domesticated, drinking cups appear in the various Early Bronze Age levels and prestige goods changed (for example *spondylus* recovery diminished greatly). Spinning and weaving continued to be very important and necessary, but perhaps the emphasis on the products of these crafters was not the same as during the Chalcolithic when spinning tools were purposely decorated, suggesting significance beyond the simple utilitarian level.

Undecorated spindle whorls have been recovered from Neolithic to Early Bronze Age sites all over Greece and beyond and widely published: for example, from northern Greece (Hochstetter 1987; Aslanis 1985; Carington Smith 1977, 2000), Thessaly (Weisshaar 1989; Gimbutas *et al.* 1989), Bulgaria (Hiller and Nikolov 1997), and the former Republic of Yugoslavia (McPherron and Srejovic 1988; Tringham and Krstic 1990). But incised whorls are a particular find from sites in the Drama

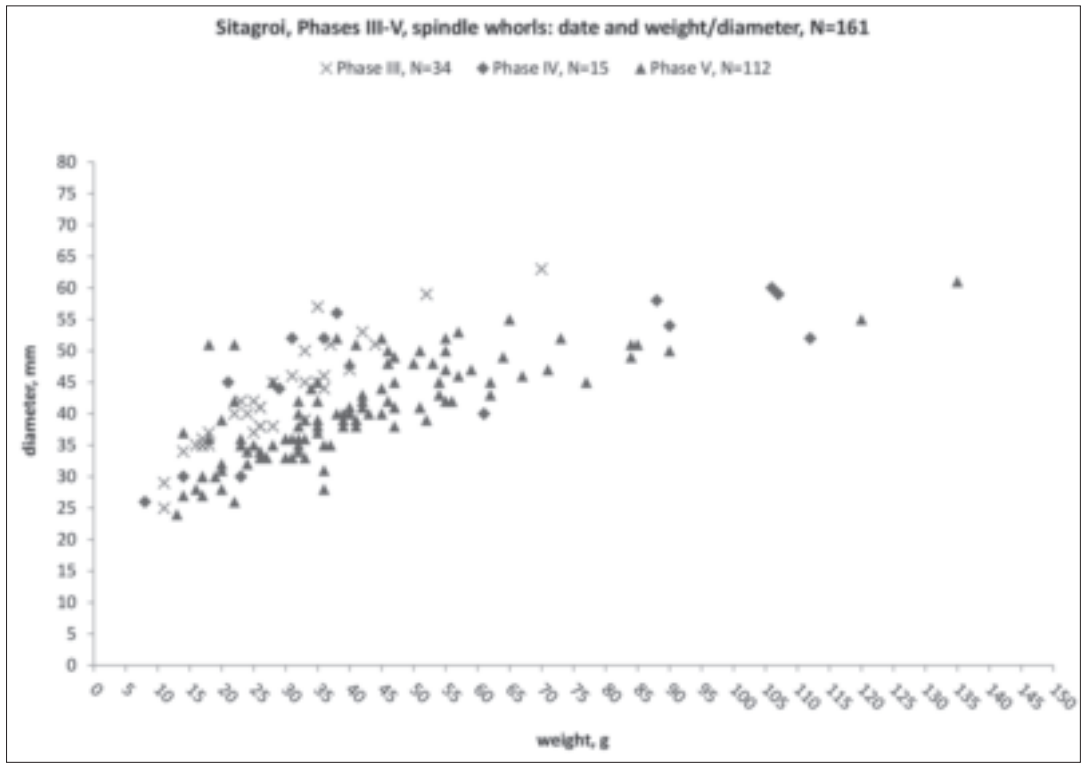

Fig. 6.12.6. Spindle whorls , Phases III–V: date and weight/ diameter. Please note that some markers represent more than one spindle whorl.

Plain such as Dikili Tash (Treuil *et al.* 1992, 124–130, plates 201 b–d, f; 202 a–f), Dhimitra (Grammenos 1997, 36:4) and Paradeisos (Hellström 1987, 88, fig. 48:21),[1] and also in southwest Bulgaria (*e.g.* Chohadzhiev 2006, 141, fig. 60:2; Chohadziev 2007). A study of the incisions suggests a coherent vocabulary or "symbolary" of radiating lines, forming sets of angles dividing the face into zones (Fig. 6.12.2, d, f), curving lines nested or dividing the face into registers (Fig. 6.12.2, g), circling frames around the yarn hole or the whorl edge (Fig. 6.12.2, e). However, whether decorated or not, the hundreds of Sitagroi whorls underscore a real investment of human energy in spinning different types of yarn and thread and producing woven products of utility and value. Along with other unidentified goods, the textiles were likely exchanged, traded, or gifted for some of the imports outlined above.

Loom weights and weaving

Of the 82 loom weights recorded in the database (49 loom weights and 33 spools), only four date to Chalcolithic Phase III (not discussed here). The Early Bronze Age Phase IV and V loom weights include a range of types (Fig. 6.12.7).

Weight and thickness measurements were only available for 28 of the loom weights. It is therefore not possible to provide a comprehensive interpretation of the overall textile production at Sitagroi during Phases IV and V, but it is possible to give an indication of what types of fabric may have been produced with the preserved tools.

Six of the Phase IV loom weights, all of them long cylinders in shape, had a recorded weight and thickness. They vary in weight from 600 g to 1170 g, with a thickness varying from 6.2–9.8 cm. All of these loom weights would be suitable for producing coarser fabrics with thick to very thick thread needing *c.* 40–60 g tension. With thick thread requiring *c.* 40 g tension, a tabby textile would have *c.* 5–6 warp threads per cm. With very thick, *c.* 60 g tension thread, the resulting textile would have *c.* 3–4 warp threads per cm. These fabrics could be balanced textiles, with approximately the same number of warp and weft threads per cm.

Nineteen of the Phase V loom weights, all of them spools, had a recorded weight and thickness. They vary in weight from 21 g to 68 g and in thickness from 2.1 cm to 3.9 cm (Fig. 6.12.8).

Such light spools cannot be considered functional as loom weights on a warp-weighted

loom. The spools weighing less than 50 g could only be used with thread needing less than *c.* 5 g tension, or with *c.* 5 g tension thread with fewer than 10 threads attached to them. Therefore, the spools are not particularly suitable as loom weights (see chapter 4.1). However, the analysis of the spools supports an earlier suggestion (Elster 2003, 239) that they would be very useful as weights for tablet weaving, where one adds two to four threads per tablet, or for other types of band weaving and braiding (Gleba 2008). They would also be very useful when setting up a warp on a loom (see chapter 4.1)

The pyramidal loom weights from Phase V vary considerably in size (Elster 2003, 241, fig. 6.18 and plates 6.11 and 6.12), suggesting that they could have been used to produce a variety of fabrics. The two examples recovered from the Bin Complex, with incomplete weights of 1510 g and 1285 g, would be suitable for the production of coarser textiles with very thick threads.

Anchors and hooks

It has previously been suggested (Elster 2003, 242–245) that the anchors and hooks recovered from the site may have functioned as loom weights. No weights for these objects are recorded in the database, but their thickness (hooks 0.8–2.1 cm and anchors 1.4–2.1 cm) indicates that, if they are not too light, it is possible that they may have functioned as loom weights. Their thickness also suggests that any fabrics woven with them are likely to have been quite dense.

Other textile tools

Thirty pointed bone tools from Phase IV and 20 from Phase V are recorded in the database. These could have been used as pin beaters – a multifunctional weaving tool, used to distribute the weft thread in the weave, for example. Some of these tools, made from rib bones, could have been used as weft beaters for band weaving. These types of tools are suitable for use in association with different types of looms, both the warp-weighted loom and the two-beam vertical loom.

The following discussion of textile tools in context (Elster 2003, 229–282) will focus on Square ROc, and tools from three building episodes of the Early Bronze Age (Renfrew 1986c, 184–203).

Contexts

Square ROc

The excavation of Square ROc provided a long EBA stratigraphy with the exposure of numerous contiguous Phase IV (ROc 73–49), Phase Va (ROc 49–33), early Phase Vb (ROc 30–13), and later Phase Vb (ROc 12–2) layers. Phase IV yielded several loom weights in a context which is described as "…part of a destruction deposit from a burned house…" (Renfrew 1986c, 205). It seems that these weights were part of a warp-weighted loom and were found in the context in which they fell as the house burned (Fig. 6.12.9). Although ROc yielded some discontinuous evidence of house walls (Renfrew 1986c, 203–204), its importance was in the continuous sequence of Early Bronze Age Phase IV through Vb living floors upon which almost two dozen textile tools were recovered (though not on every floor). Among other finds, hook and anchor fragments first appear in ROc during Phase Va.

The Early Bronze Age Building Episodes

The deep sounding "ZA" indicated that the mound (Fig. 6.12.1) was built up as a proverbial "layer cake" and the final Early Bronze Age structures were indeed exposed at the summit of the mound. Over the three seasons of excavation, a large exposure (20 × 20 m) was opened in Squares PO, PN, QO, and QN which revealed three successive building episodes in stratigraphic sequence: late Phase Vb: "Bin Complex", early Phase Vb "Long House", and Phase Va "Burnt House"; their orientations were similar and much of the Long House was directly under the Bin Complex. The Burnt House was on levels lower than the Long House, but not directly underneath.

Phase IV, EH I	Conical	**1**
	Cylindrical long	**11**
	Discord	**3**
	Other	**2**
	Spool	**2**
	Total	**19**
Phase V, EH II	Cylindrical long	**1**
	Discord	**2**
	Other	**2**
	Pyramidal	**21**
	Spool	**31**
	Torus	**2**
	Total	**59**

Fig. 6.12.7. Loom weights, Phases IV and V, by type.

Fig. 6.12.8. Spools, Phase V: weight/ thickness. Please note that some markers represent more than one loom weight.

The Burnt House

Excavation of the Burnt House revealed the complete plan and remaining contents of a house 5.0 × 3.5 m (Renfrew 1970, 131–134; 1986c, 190–203; Elster 1997, 19–35, pl. II–VIII) including seven spindle whorls (Elster 2003, 249, fig. 6.1.c and pl. 6.6.a). These are all biconical and weigh between 57 g and 84 g; they would therefore be optimal for spinning thick to very thick thread. Two whorls were broken and one of these (SF 4430) exhibited incisions angled across the shoulder which provided no extra utility and thus must be considered a purely decorative addition.

The Long House

Above the Burnt House, a series of postholes outlined an early Phase Vb structure *c.* 15 × 5 m. Textile tools recovered included 22 whorls, two fragmentary pyramidal weights, five spools, three anchor fragments, and five worked bone tools. The whorl shapes vary: 13 are biconical, four are flat/discoid, two are conical and three are spherical. One conical form weighs 74 g. The three spherical forms weigh 22 g, 32 g and 47 g. Eight other whorls with a complete/estimated weight weigh 31–41 g. The whorls would therefore be suitable for spinning a variety of thread types, ranging from medium to thick, but none of them would be optimal for producing thin thread. The weights of four of the five spools range between 12 g and 68 g; the fifth was not weighed.

No cloth or mat impressions were found, and there was a paucity of pottery. However, one remarkable shaft-holed stone axe was recovered: a "sceptre", its butt carved in the shape of and incised with the features of a lion or feline (Elster 2003, 191, pl. 5.42; Renfrew 1986c, 189, pl. XXV), perhaps representing the power held by the household or its chief (Gimbutas 1986, 264).

The Bin Complex

Above the Long House, excavators uncovered an area close to the surface of the mound outlined by post holes, with numerous large bins or pits sunk into the ground. It has been interpreted as a courtyard (Renfrew 1986c, 185, 187–188), exceedingly rich in all types of artefacts, including 70 spindle whorls, nine loom weights (of which two pyramidal shapes weigh 1285 g and 1510 g), nine spools (one fragmentary, the rest weighing 30–61 g) and 16 hook and anchor fragments. The weights of the whorls range widely: 14 g to 90 g, but the main cluster consists of whorls weighing between 25 and 45 g, with one-third of these being biconical in shape. The whorls would be suitable for the production of a range of thread types, varying from thin to very thick.

Fig. 6.12.9. Exposure of loom weights and a bowl from Square ROc, level 73, EBA IV (photo: Renfrew 1986c, 205, pl. XXXIV: 1).

Summary

The analysis of the spindle whorls suggests a production of many different types of yarn, from thin to very thick. During Phase V the results indicate a larger range of different types of thread, with an emphasis on thicker threads. It has also been noted that the majority of the Phase IV spindle whorls in general have a larger diameter in relation to the weight than the whorls from Phase V. This could indicate a change in fibre material, or just a change from the use of a hard spun to a more loosely spun yarn.

Only a limited analysis of the loom weights and weaving has been possible, and the results cannot therefore be considered as representative. The cylindrical weights from Phase IV indicate the production of coarser textiles, with thick thread needing *c.* 40–60 g tension. The size range of the pyramidal weights from Phase V suggests that a variety of textiles were being made, with a range of thread types. If the anchors and hooks present in Phase V were used as loom weights, their thickness additionally suggests the production of some relatively dense fabrics.

Mat and textile impressions from the site (Elster 2003, 246–247) suggest a well developed textile production at Sitagroi and the recorded tools support this. Unfortunately, there are no cloth impressions from Phase IV or V, but the elaborate mat techniques clearly indicate that the textile producers at Sitagroi had a good knowledge of fibres and textile techniques. The textile impression dated to Phase I (Elster 2003, 246, fig. 6.31a) demonstrates a long textile tradition at the site.

Note

1 But see also the large assemblage from Early Bronze Age Troy (Balfanz 1995, 117–144).

Bibliography

Aslanis, I. (1985) *Kastanas. Die Frühbronzezeitlichen Funde und Befunde.* Berlin. Wissenschaftsverlag Volker Spiess.

Balfanz, K. (1995) Bronzezeitliche Spinnwirtel aus Troja, *Studia Troica,* 5, 117–144.

Bökönyi, S. (1986) Faunal remains, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*, 61–132. Los Angeles. Institute of Archaeology, UCLA.

Carington Smith, J. (1977) Cloth and mat impressions, in Coleman, J. E. (ed.), *Keos I. Kephala, a Late Neolithic Settlement and Cemetery,* 114–125. Princeton. American School of Classical Studies.

Carington Smith, J. (2000) The spinning and weaving implements, in Ridley, C., Wardle, K. A. and Mould, C. A. (eds), *Servia I. Anglo-Hellenic Rescue Excavations 1971–73*. 207–263. London. British School at Athens.

Chohadzhiev, S. (2006) *Slatino Prehistoric Settlements*. 2nd edition. Veliko Tarnovo. Faber.

Chohadzhiev, S. (2007) *Neolithic and Chalcolithic Cultures in the Struma River Basin*. Veliko Tarnovo. Faber.

Demoule, J.-P. and Lichardus-Itten, M. (1994) Rapport préliminaire (campagnes 1986–1993), *Bulletin de correspondance hellénique*, 118 (2), 561–618.

Dixon, J. (2003) Lithic petrology, in Elster, E. S. and Renfrew, C. (eds), *Prehistoric Sitagroi: Excavations in Northeast Greece, 1968–1970. 2. The Final Report*, 133–147. Los Angeles. Institute of Archaeology, UCLA.

Elster, E. S. (1997) Construction and use of the Early Bronze Age Burnt House at Sitagroi: craft and technology, in Laffineur, R. and Betancourt, P. (eds), *TEXNH. Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age*, 19–35. Liège. Université de Liège.

Elster, E. S. (2003) Tools and the spinner, weaver and mat maker, in Elster, E. S. and Renfrew, C. (eds), *Prehistoric Sitagroi: Excavations in Northeast Greece, 1968–1970. 2. The Final Report*, 229–251, 258–282. Los Angeles. Institute of Archaeology, UCLA.

Elster, E. S. (2004) Figuring out social archaeology in Sitagroi, in Cherry, J. F., Scarre, C. and Shennan, S. (eds), *Explaining Social Change: Studies in Honour of Colin Renfrew*, 81–91. Cambridge. McDonald Institute for Archaeological Research, University of Cambridge.

Elster, E. S. (2007) Odysseus before Homer: trade, travel and adventure in Prehistoric Greece, in Morris, S. P. and Laffineur, R. (eds), *EPOS: Reconsidering Greek Epic and Aegean Bronze Age Archaeology*, 193–201. Liège. Université de Liège.

Elster, E. S. and Renfrew, C. (eds) (2003) *Prehistoric Sitagroi: Excavations in Northeast Greece, 1968–1970. 2. The Final Report*. Los Angeles. Institute of Archaeology, UCLA.

Evans, R. (1986) The pottery of Phase III, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*, 393–428. Los Angeles. Institute of Archaeology, UCLA.

Gardner, E. J. (1979) Graphic painted pottery, *Archaeology,* 32 (4), 18–23.

Gimbutas, M. (1986) Mythical imagery of the Sitagroi society, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*, 225–301. Los Angeles. Institute of Archaeology, UCLA.

Gimbutas, M., Shimabuku, D. M. and Winn, S. M. M. (1989) *Achilleion: a Neolithic Settlement in Thessaly, Greece, 6400–5600 BC*. Los Angeles. Institute of Archaeology, UCLA.

Gleba, M. (2008) *Textile Production in Pre-Roman Italy*. Ancient Textiles Series 4. Oxford. Oxbow Books.

Grammenos, D. V. (1997) *Neolithiki Makedonia*. Athens. Ekdosi tou Tameio Archaiologikon Poron kai Apallotrioseon.

Hellström, P. (1987) Small finds, in Hellström, P. (ed.), *Paradeisos. A Late Neolithic Settlement in Aegean Thrace*, 83–88. Stockholm. Medelhausmuseet.

Hiller, S. and Nikolov, V. (1997) *Karanovo. Die Ausgrabungen im Südsektor 1984–1992*. Horn/Wien. Berger.

Hochstetter, A. (1987) *Kastanas. Die Kleinfunde*. Berlin. Volker Spiess.

Keighley, J. M. (1986) The pottery of Phases I and II, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*, 345–390. Los Angeles. Institute of Archaeology, UCLA.

McPherron, A. and Srejovic, D. (1988) *Divostin and the Neolithic of Central Serbia*. Pittsburgh. Department of Anthropology, University of Pittsburgh.

Nikolaidou, M. (2003) Items of adornment, in Elster, E. and Renfrew, C. (eds), *Prehistoric Sitagroi: Excavations in Northeast Greece, 1968–1970. 2. The Final Report*, 331–360. Los Angeles. Institute of Archaeology, UCLA.

Renfrew, C. (1970) The Burnt House at Sitagroi, *Antiquity*, 44, 131–134.

Renfrew, C. (1986a) Northeast Greece: The archaeological problem, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Settlement in Northeast Greece. 1*, 3–13. Los Angeles. Institute of Archaeology, UCLA.

Renfrew, C. (1986b) The Sitagroi sequence, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*, 147–174. Los Angeles. Institute of Archaeology, UCLA.

Renfrew, C. (1986c) The excavated areas, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Settlement in Northeast Greece. 1*, 175–222. Los Angeles. Institute of Archaeology, UCLA.

Renfrew, C. and Hardy, D. (2003) Prehistoric sites in the Plain of Drama, in Elster, E. S. and Renfrew, C. (eds), *Prehistoric Sitagroi: Excavations in Northeast Greece, 1968–1970. 2. The Final Report*, 469–474. Los Angeles. Institute of Archaeology, UCLA.

Renfrew, C. and Slater, E. A. (2003) Metal artifacts and metallurgy, in Elster, E. S. and Renfrew, C. (eds), *Prehistoric Sitagroi: Excavations in Northeasr Greece, 1968–1970. 2. The Final Report*, 301–319. Los Angeles. Institute of Archaeology, UCLA.

Renfrew, C., Gimbutas, M. and Elster, E. S. (eds) (1986) *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*. Los Angeles. Institute of Archaeology, UCLA.

Sherratt, A. (1986) The pottery of Phases IV and V: the Early Bronze Age, in Renfrew, C., Gimbutas, M. and Elster, E. S. (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece. 1*, 429–476. Los Angeles. Institute of Archaeology, UCLA.

Treuil, R., Deshayes, J. and Blécon, J. (1992) *Dikili Tash: village préhistorique de Macédoine orientale, Fouilles de Jean Deshayes (1961–1975). 1*. Athens. École française d'Athènes.

Tringham, R. and Krstic, D. (1990) *Selevac: a Neolithic Village in Yugoslavia*. Los Angeles. Institute of Archaeology, UCLA.

Weisshaar, H.-J. (1989) *Die deutschen Ausgrabungen auf der Pevkakia-Magula in Thessalien. I. Das späte Neolithikum und das Chalcolithikum*. Bonn. Rudolf Habelt.