TEXTILES STUDIES: SOURCES AND METHODS

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ABSTRACT

The importance of textiles and textile production in ancient societies can hardly be overestimated. The sources for the study of ancient textile production are diverse, ranging from texts and iconography to archaeological material, including textiles themselves, as well as tools and installations used in their production. The article provides a review of the available materials and approaches to textile studies with particular emphasis on the Eastern Mediterranean and Near Eastern material.

RESUMO

A importância dos têxteis e da produção têxtil nas sociedades antigas dificilmente estará sobrestimada. As fontes para o estudo da produção têxtil antiga são diversas, desde os textos à iconografia, passando pelos materiais arqueológicos, que incluem os próprios têxteis, bem como pelas ferramentas e instalações utilizadas no seu fabrico. Este artigo oferece uma revista dos materiais e abordagens disponíveis para o estudo dos têxteis, com particular ênfase no material este-mediterrânico e próximo-oriental.

INTRODUCTION

Throughout Antiquity, textile manufacture was practiced on all levels of society and was one of the most labour-intensive of all occupations. As such, it was an industry of great cultural and social importance and should be factored into any balanced assessment of the ancient economy. Over the last few decades, textile studies have developed into an important new field of archaeology (Good 2001; Andersson *et al*.

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2010). The accumulation of data and the constant development of analytical techniques are permitting more precise fibre and dye identifications. The work on textile tools is allowing to assess the scale and specialisation of textile production on individual sites. This proliferation of technical studies is finally permitting a more synthetic approach to the history of textile technology. Numerous publications on the topic (Barber 1991; Breniquet 2008; Völling 2008) are demonstrating how much we can learn about the culture, society, technology and economy of the ancient world through textiles.[1]

Some of the earliest textile remains come from the Eastern Mediterranean and the Near East. Thus, charred twisted fibres interpreted as cord fragments dating to the Palaeolithic (19,300 BP) have been found at Ohalo II in Israel (Nadel *et al*. 1994). Textiles dating to the Middle PPNB have been found in the Levant at Jericho (Crowfoot 1960; 1965; 1982), Nahal Hemar (Bar-Yosef 1985; Schieck 1988) and Tel Halula (Alfaro 2002). Even more numerous are textile finds of the following periods: Çatal Höyük in Anatolia (Helbaek 1963; Burnham 1965; Ryder 1965; Vogelsang-Eastwood 1988), Jarmo in the Zagros Mountains (Adovasio 1977), El Kowm-2 in the oasis of Palmyra (Stordeur 1989) and Khirokitia on Cyprus (Stordeur 1989). These earliest textile remains are of primary importance for our understanding of the first textile materials and techniques. Furthermore, they may help us in reconstructing the pathways of domestication and secondary products revolution, since flax and sheep are both believed to have been first domesticated in the Fertile Crescent (Zohary and Hopf 2000: 125-132; Peters *et al*. 2005). Flax was cultivated for fibre as early as the PPNB, while the direct evidence for the use of wool fibre for textile production consists of the earliest textile remains made of sheep wool found at Shahr-i Shōkhta, Eastern Iran (Good 1999), and at Novosvobodnaya in the North Caucasus (Shishlina *et al*. 2003), both dated to the 4th millennium BC.

Textiles were used for a variety of purposes in past societies and textile production was an integral part of local and regional economies and local, regional and long-distance exchange (Bier 1995). The social significance of textile production was expressed in funerary ritual through

[1] Over the last 30 years, much of the archaeological textile research has been published in the *Archaeological Textiles Newsletter* (www.atnfriends.com) and Bulletin of *Centre International d'Études des Textiles Anciens*, as well as proceedings of the *North European Symposium for Archeological Textiles* (*NESAT* issues 1-10) and *Ancient Mediterranean Textiles and Dyes Symposium* (*Purpureae Vestes* issues 1-3).

the inclusion of textiles and textile implements among the burial goods, as well as in religious activities through the deposition of textile tools in votive deposits. The sources for the study of ancient textile production are diverse, ranging from texts and iconography to archaeological material, including textiles themselves, as well as tools and installations used in their production. The aim of this article is to provide a review of the available materials and approaches to textile studies. The bibliography is far from exhaustive and is intended as a starting point to anyone interested in the subject.

WRITTEN SOURCES

Eastern Mediterranean and Near Eastern textile industry has been largely investigated through written sources. An array of ancient written texts contains information on textile materials, technologies, uses and trade, which are among the most extensive in the ancient world. In the Near East and the Aegean area, textiles are frequently mentioned in administrative texts related to temple and palatial economies, providing detailed data on textile production organisation, or in legal documents, such as marriage contracts, dowry lists and inventories of household items. These sources provide us with terms for types of textiles, dyes, garments, quantities of raw materials needed for their production and quantities of finished products being traded.

Thus, the royal archives of Ebla, dated to the 3rd millennium BC, describe textiles produced, used and exchanged in Ebla itself, throughout Syria and in Mesopotamia, including for example monthly accounts of textile deliveries to the palace (Sollberger 1986; Biga 2010). From the end of the 3rd millennium BC, many thousands of the cuneiform tablets from the Ur III Dynasty preserve information on textile production, exchange and tribute in Sumer (Waetzoldt 1972; Pomponio 2010). Among the most detailed and best studied are the records of the Old Assyrian traders found in the Anatolian city of Kaneš, dated to the 19th-18th centuries BC (Veenhof 1972; Michel and Veenhof 2010). The traders imported to Anatolia vast quantities of woollen textiles woven in Assyria and the records found in Kaneš document the daily realities of the trade and associated legal transactions. The Akkadian texts found in Ugarit (Ras Shamra), dated to the 14th-12th centuries BC, mention textile prices, raw materials, costumes and other relevant information in a variety of contexts (Ribichini and Xella 1985; Vita 2010). Meanwhile, the Linear B tablet archives found on Crete

and on the Greek mainland provide us with extensive information about textile production in the Late Bronze Age Mycenaean kingdoms (Killen 2007; Del Freo *et al*. 2010). One of the striking aspects of the Mycenaean textile industry is its extreme specialisation. These archives present an extraordinary documentation of the centralised scale of textile industry during the Bronze Age in the Aegean and the Near East.

While extremely useful, written sources have to be treated with caution. One of the biggest limitations is the semantics of terminology (see Michel and Nosch 2010): the meaning of a particular word is oftentimes unknown or has changed through time, leading to translations such as "a garment or fabric" (Vita 2010: 334), or "a kind of red-brown" (Del Freo 2010: 348). Furthermore, in the rare instances when descriptions of production processes are preserved in written accounts, they are not always clear or sufficiently detailed: sometimes the authors themselves did not fully understand the technology or omitted information that seemed obvious to them but is lost to us. Another major problem is the fact that some periods and geographical areas are well documented while others left no written evidence. For these reasons, the use of ancient literary sources is most reliable when the information they provide is corroborated by other kinds of evidence. Archaeological material in particular can shed new light on issues previously investigated only through texts.

ICONOGRAPHY

After written evidence, iconographic material has been the most frequently cited source of information on ancient textiles. Ancient Near Eastern art encompasses one of the most interesting and informative collections of visual material in the ancient world. The proliferation of textiles on reliefs, paintings, statuary and other media has been noted by numerous scholars (Bier 1995). This vast corpus of representations of textiles has been used in studies of ancient dress (e.g. Canby 1971; Bittner 1985; Barber 1991).

Richly patterned cloth in royal or cultic contexts, for example those shown on Assyrian reliefs from Nineveh and paintings of Til Barsip (Albenda 2005), and Bronze Age Aegean frescoes (Barber 1991: 311-357) demonstrate not only the sophistication of textile technology reached by the various cultures of the Eastern Mediterranean and the Near East, but also the role of textiles as visible symbols of power and wealth. The study of patterns is also important for understanding religious and symbolic meaning

of textiles as they transmit information about specific people, places, or events.

In addition to garments represented on people, iconographic sources show a variety of utilitarian textiles, such as awnings, canopies, parasols, carpets and nets. Depictions of elaborate carpets, for example, are known from Assyria (Canby 1971; Albenda 1978). They have been compared to the carpet found in a 4th century BC Scythian burial in Pazyryk, Siberia (Stronach 1993).

While informative about many aspects of ancient cultures, representations of textiles, however, offer little information about the technical details of ancient Near Eastern textiles. Few actual images of the various stages of textile production or tools associated with it exist in ancient art. They are, however, of great importance to our understanding and reconstruction of this ancient technology. Thus, the earliest depiction of a woolly sheep, dated to c. 5000 BC comes from Tepe Sarab in Iraq (Ryder 1983: 52). One of the earliest depictions of a horizontal ground loom and weavers appears on a seal from Susa, dated before 3000 BC (Wild 2003a: 46). An aristocratic lady on a relief from Susa depicted with a spindle, dated c. 1000 BC, demonstrates the symbolic importance acquired by the textile craft in the Early Iron Age (Wild 2003b: 49). A detailed study of Mesopotamian iconography of textile production was recently published by Breniquet (2008; also see 2006; 2010).

The use of iconographic material, although not to be omitted, is nevertheless limited. Uneven geographical distribution of extant representations precludes meaningful comparisons between different regions, while artistic conventions and abbreviations inhibit our ability to read the surviving iconographic sources with confidence.

ARCHAEOLOGICAL EVIDENCE: TEXTILES

The most direct but paradoxically least explored type of evidence for ancient textile manufacturing activities consists of archaeological material, that is, textiles and tools used to produce them.

Like any organic material, textiles are subject to rapid decomposition in archaeological contexts and their preservation requires special conditions to prohibit their destruction by microorganisms (Wild 1988: 7-13; Gillis and Nosch 2007).

Thus, dry climates have preserved textiles by desiccation as for instance, in the case of the textiles recovered from the early Levantine sites

of Nahal Hemar (Schieck 1988) and Nahal Mishmar (Zindorf *et al*. 1971), as well as Roman-period desert cities of Dura Europos (Pfister and Bellinger 1945) and Palmyra (Pfister 1934; 1937; 1940; Schmidt Colinet *et al*. 2000; Stauffer 2000) in Syria and Masada in Israel (Sheffer and Granger-Taylor 1996).

Wet environments can also be favourable for preservation of organic materials. The alkaline conditions of the Alpine lakes and acidic environment in the Danish bogs have conserved textiles in Central and Northern Europe. The pH value of water or soil significantly influences conservation: vegetal fibres are not preserved in acidic environments, while animal fibres are for the most part destroyed by basic conditions. Thus, in Denmark, only woollens have been preserved (Hald 1980), while Swiss and Italian lakes have yielded predominantly fabrics made of plant fibres (Bazzanella *et al*. 2003).

Temperatures below 0°C preserve all organic material almost unaltered. A mummy known as the Iceman, the Man of Similaun or Ötzi, dated by radiocarbon to 3350-3100 BC, was discovered in the Alpine glacier of Italy (Spindler 1995). The Iceman's garments were also preserved in permafrost conditions, providing a first glimpse of the European Bronze Age costume practices. In Eurasia, the contents of Scythian tombs were frozen as well, preserving fabrics almost perfectly (Polosmak and Barkova 2005).

Salt has preserved mummies and fabrics in Iran (Aali 2005) and the Taklamakan Desert in northwest China (Barber 1999). Dry conditions and the presence of salt are particularly favourable for dye preservation while wet environments usually degrade colouring agents.

Textiles can also be preserved through exposure to fire, which leads to creation of charred samples. Plant fibres, in fact, are often more stable in charred or carbonized state than in the original shape. The Palaeolithic cord fragments from Ohalo II in Israel have survived in a charred state (Nadel *et al*. 1994), as did the textiles at Çatal Höyük in Anatolia (Helbaek 1963; Burnham 1965; Ryder 1965), at Akrotiri on Thera (Moulhérat and Spantidaki 2007; 2008), and at Chania on Crete (Moulhérat and Spantidaki 2009). Numerous charred textile fragments have also been excavated in the destruction levels of Hasanlu, Iran, dated c. 800 BC (de Schauensee 2011).

In the presence of metal objects, textiles may become pseudomorphs – mineralized formations in which metal corrosion products form casts around fibres retaining their external morphology and size almost unaltered

(Jakes and Sibley 1984; Janaway 1987; Chen et al. 1998). The formation of mineralised textiles depends on pH value, oxidation potential and moisture, as well as the composition of the fibre, and on the elemental composition of the soil and metal (Janaway 1987: 136-142; Gillard *et al*. 1994). Iron and bronze in particular favour formation of easily legible traces. Most of these corrosion-preserved textiles come from inhumation graves. Even when minute, these traces can provide a considerable amount of information about ancient textiles. A pseudomorph from Çayönü composed of bast fibre is dated *ca*. 7000 BC (Good 1998: 657). Mineralised textiles present on bronze peg figures from foundation deposits in Mesopotamia dating to the Ur III Dynasty, e.g. at Nippur, probably served to protect the pegs and were part of the foundation ritual (Garcia-Ventura 2008). The Late Bronze Age textiles found mineralised on bronze objects deposited in the anthropoid coffins discovered in tombs at Deir El-Balah in the Gaza Strip probably served as wrappings for the burial gifts (Dothan 1979: 68, Ills. 154, 156).

Textiles can also be preserved in the presence of calcium minerals, as in the case of the Middle Bronze Age remains from Qatna, Syria (James *et al*. 2009; Reifarth and Drewello 2011). Here, the dyes were also preserved, allowing the identification of shellfish purple.

Last but not least, textiles can also be preserved in the form of imprints. These are negatives of the original fabrics, created for example when fabric comes in contact with bitumen or with clay objects or surfaces before they are fired. Some of the earliest evidence for woven fabric, in fact, comes in the shape of such imprints, as in the case of examples from Jarmo dated *c*. 7000 (Adovasio 1977). At Tel Halula, balls of galena were found with textile imprints on the surface, indicating that textiles served as containers or wrapping (Molist *et al*. 2010). Impressions of fine textile on fragments of lime found at Dhuweila in eastern Jordan even permitted identification of the earliest cotton in the Near East (Betts *et al*. 1997).

Whatever the condition of preservation, textile recovery greatly depends on excavation methodology and conservation procedures (cf. Gillis and Nosch 2007). Thus, the micro-excavation approach, in which entire blocks of earth containing archaeological material are lifted and brought to the laboratory, where they are then carefully excavated by conservators using special equipment and under controlled conditions, has been especially successful in textile recovery and preservation. Their prompt consolidation, documentation and conservation, given the usually advanced state of degradation, are then essential. The exact conservation technique

depends on the environment, from which the piece was recovered, and the types of damage, whether mechanical, biological or chemical.

Archaeological textile remains can be subjected to a wide variety of established and new analytical techniques, which result in important discoveries regarding their materials, date and provenance, thereby providing data about their function, movement, meaning and role in ancient societies.

FIBRE ANALYSIS

Textile quality and appearance are dependent on the material of which the textile has been made, that is fibre. The biological source of fibres may be identified by microscopy in well-preserved textiles. However, much degraded samples require chemical tests, such as solubility measurements which can distinguish cellulose fibres from protein-based ones, although they will not help to identify a specific species. The new methods of amino acid composition (Good 2001) and DNA (Brandt et al. 2011) analyses are being developed for protein-based fibres. Hemp and flax differentiation of modern fibres is possible under a polarized light microscope through the difference in micro-fibrillar orientation, hemp being z-oriented and flax and nettle being s-oriented. Recent research has also produced a new means of differentiating between flax on the one hand, and hemp and nettle on the other, on the basis of the presence of calcium oxalate cluster crystals in nettle and hemp, but not in flax (Bergfjord and Holst 2010). In degraded textiles, alternative methods of differentiation have been further developed, using synchrotron radiation micro-beam diffraction and micro-fluorescence (Müller *et al*. 2006).

Fibre investigation, however, is more than just identification of material source. By studying fibre on a microscopic level we can come closer to understanding issues of selective breeding / cultivation, selection, and processing of fibres, and their wear. These issues are essential to the understanding of ancient agriculture, animal husbandry, domestication, and technology.

Analyses of wool fibre fineness are used to determine the fleece type of prehistoric sheep. Assessment of fibre quality is based on the diameter measurement of 100 fibres per thread and statistical analyses resulting in a distribution diagram. Wool contains three parts differing in structure and size: kemp, hair, and the wool itself. Michael Ryder (1969; 1983) established an evolutionary scheme for wool development based on fibre

diameter measurements. Early varieties of sheep had coats containing more hair and kemp than wool. Ryder demonstrated that, over the course of time, selective breeding has produced increasingly finer and more uniform wool. Wool fibre investigations of archaeological textiles may help in tracing these developments in the Eastern Mediterranean and the Near East (cf. Good 1999).

DYE ANALYSIS

Although archaeological textiles often survive as brown or colourless rags, it does not always follow that they looked this way when made. Addition of colour has been an integral part of textile making (Cardon 2007). Dye and mordant identification usually requires sophisticated chemical analyses. The most advanced method for natural organic dye analysis is currently high performance liquid chromatography (HPLC), which allows the identification of the chemical dye components. Since the sources for dyestuffs are numerous throughout the world, it is important to take into account the archaeobotanical data from the area where the dyed textile has been found. Dye analysis is a key to the understanding of dyeing technology, dye exchange, as well as aesthetics, value and meaning of colour.

Among ancient dyes, in a category of its own stands shellfish (also known as true, Royal or Tyrian) purple, extracted from a gland in several species of marine molluscs, such as *Hexaplex (Murex) trunculus*, *Bolinus (Murex) brandaris* and *Stramonita (Purpura) haemastoma*. Purple production is usually associated with the Phoenician cities of the Levant, especially Tyre and Sidon (Jensen 1963). Purple was worn by Near Eastern kings, from whom it was adopted by Alexander the Great and Hellenistic rulers, coming to signify royalty and power. A certain shade of bluish purple, *tekhelet*, had special significance in Hebrew Bible (Ziderman 2008).

Until recently, the earliest archaeological evidence of purple production was associated with Crete, where substantial quantities of shells have been found at Palaikastro, Kommos and Kouphonisi dated to the 1900-1800 BC (Stieglitz 1994). Recently, however, dye analysis identified shellfish purple in the textiles from the Middle Bronze Age royal burial in Qatna, Syria, making them the earliest shellfish purple-dyed textiles known to date (James *et al*. 2009).

RADIOCARBON ANALYSIS

When textiles are sufficiently well preserved they can be dated in relative terms on stylistic / typological grounds, although usually within very wide chronological brackets. More often, however, textiles are dated by context or association with other archaeological objects. Textiles, however, are particularly suitable for ^{14}C dating using Accelerator Mass Spectrometry since they have a short life and may even give more precise dates than other material (van der Plicht *et al*. 2004: 488). Thus, the ^{14}C method was used to date numerous late antique tunics from Egypt, which had been separated from their context and could not be dated by other means (Pritchard 2006:13-25; Schrenk 2004: 476-478).[2] Furthermore, even if the absolute dates are imprecise, they can make it possible to demonstrate the contemporary existence of what were thought previously to be chronologically differentiated styles.

ISOTOPIC TRACING

Identifying provenance of archaeological artefacts in absolute terms is often difficult if not impossible. This is especially true of archaeological textiles, which are made with widespread and long-lasting techniques and materials and often defy typological classification. Strontium (Sr) isotope ratios have recently been shown to be a unique indicator for wool fibre provenance, demonstrating for example that not all Early Iron Age textiles found in Danish bogs had local origin (Frei et al. 2009a; 2009b).

Strontium and oxygen isotope ratios can also be used to determine the origin of plants, as in the case of willow and tule used to manufacture prehistoric basketry and matting from archaeological sites in the western Great Basin of the USA which were shown to have been harvested from different sources, suggesting the use of both local and non-local raw materials (Benson *et al*. 2006).

MOLECULAR ANALYSIS

DNA analysis is a rapidly developing research field with great potential in archaeology. Techniques and methods are getting more refined, allowing extraction of minute amounts of DNA, such as present in hair shafts, which can then be replicated (Gilbert et al. 2004). A recent study has demonstrated that, while dependent on preservation conditions and presence

[2] An on-line database for ^{14}C-dated textiles has been launched recently (www.textile-dates.info).

of dyes and mordants, trace amounts of mitochondrial and nuclear DNA may be recovered from textiles made of sheep wool (Brandt *et al*. 2011). Technology from modern wool proteomics can further be used to analyse the proteome and changing properties of ancient wools (Plowman *et al.* 2000).

DNA of textile plant species is also currently being investigated, in particular with the aim to explore ancient flax genetics (Allaby *et al*. 2005). DNA analysis was used recently to identify flax and hemp in the ropes from Christmas Cave in the Dead Sea Area (Murphy *et al*. 2011).

ARCHAEOLOGICAL EVIDENCE: TEXTILE IMPLEMENTS

The study of implements in the investigation of textile production in ancient societies is an even more recent development than textile analysis. In fact, textile tools have rarely been given attention in archaeological literature beyond general observations or, at best, the publication of a tool catalogue. In the last few years, however, important studies have been carried out for Ebla in Syria (Peyronel 2004; 2007), Gordion in Anatolia (Burke 2007; 2010), and a variety of sites in Israel (Shamir 1994; 1997; 2008). Currently, a large-scale project on textile tools of Bronze Age Eastern Mediterranean is on the way (Andersson Strand and Nosch in press; see also Nosch and Laffineur in press).

Unlike the textiles themselves, textile implements are ubiquitous on Near Eastern archaeological sites and constitute the single most important and plentiful type of evidence for the assessment of the scale of production and the technology of the weaving industry in the ancient Near East. Spindle whorls appear already in the 6th millennium BC, indicating the use of suspended spindle for spinning yarn and can be used to hypothesise about the level of textile production (e.g. Sudo 2010). Likewise, the series of loom weights found in rows on the floor at Gordion suggest the presence of a vertical warp-weighted loom in Anatolia (Burke 2007).

As with any archaeological source, there are several problems associated with the study of textile tools. Implements made of organic materials are usually not preserved, and the function of some surviving tools is unknown or, at best, ambiguous. Thus, the horizontal loom used in Mesopotamia and other parts of the Near East leaves no archaeological traces. Any statistical analysis of the implements recovered at a given site is additionally compromised, since it is virtually impossible to ascertain what proportion of tools has survived in the archaeological record. Investigation

is further complicated by problematic contexts and the extent to which a site has been excavated. Nevertheless, the great number of implements associated with textile manufacture can be used to study the craft and its technological and economic aspects. Furthermore, many textile tools have been found in burial and votive contexts, providing another interpretative framework.

ETHNOGRAPHIC STUDIES AND EXPERIMENTAL ARCHAEOLOGY

Experimental archaeology and ethnographic investigation have been important complementary approaches to the study of ancient textile implements (Peacock 2001: 186). Tools found in archaeological contexts may be tested for their function and suitability by using replicas to reproduce particular types of textiles. Through ethnographic studies we often have knowledge about the tool function and different processes like fibre preparation, weaving techniques, and/or tools made of perishable material (Landreau 1980).

ARCHAEOLOGICAL EVIDENCE: RAW MATERIALS

The study of textiles and tools can be enriched by the investigation of plant and animal resources used in textile production. Archaeobotany and archaeozoology can provide important information about availability and exploitation of these resources.

Plants represent one of the most important and earliest raw materials in textile production, providing fibre, for example: flax (*Linum usitatissimum*), hemp (*Cannabis sativa*), or cotton (*Gossypium* sp.); dyestuffs, for example: woad (*Isatis tinctoria* L.), indigo (*Indigofera tinctoria* L.), weld (*Reseda luteola* L.), madder (*Rubia tinctorum* L.), safflower (*Carthamus tinctoria* L.), saffron (*Crocus sativus* L), and bedstraw (*Galium verum* L.); and washing agents such as soapwort (*Saponaria officinalis*). The plant remains most commonly retrievable archaeologically include seeds, pollen and/or phytoliths. The earliest evidence for cultivation of flax, for example, comes in the form of linseed from the 8th millennium BC Tell Aswad in Syria (Miller 1991: 142).

Archaeozoological evidence in the form of sheep bones permits analysis of slaughter patterns, which may indicate whether animals were kept for wool or meat. Predominance in the flock of adult animals, in particular castrated males, generally indicates wool production. The study of bone assemblages, landscape, and transhumance patterns can give valuable

information on the development of society's strategies in wool production and identify sites and regions with specialized production (Davis 1993; Helmer *et al*. 2007). It is particularly useful when combined with other sources of information, particularly texts (Halstead 2003).

Another archaeozoological material important for textile and dye studies consists of muricid shells found on Mediterranean sites, where large accumulations of them evince the production of one of the most celebrated dyes of antiquity, Royal or Tyrian purple (Alfaro and Karali 2008; Alfaro *et al*. 2004; Haubrichs 2005).

A more integrated study of archaeobotanical and archaeozoological assemblages, as well as geological and palaeoenvironmental data, can help in locating and mapping the areas of exploitation of textile resources in time and space, thereby advancing our knowledge of not only textile production but also of agriculture, animal husbandry and resource exploitation.

CONCLUSION

The study of ancient Near Eastern textiles has progressed much more slowly in comparison to the situation in Europe, but recent publications by Breniquet (2008) and Völling (2008) demonstrate how much information we can gain by exploring the various sources of information available to us to study ancient textile production. The comprehensive analysis of textiles is needed before one can speak more concretely of developmental trends in ancient technology. Further studies will permit us to trace the appearance of new techniques and their relationship to textile technology in the various periods and regions. An in depth analysis of the iconographic material is needed to correlate the patterns of the surviving textiles with those depicted in art. Research into ancient dyeing is still in its infancy, and one may hope that it will soon yield important results for textile studies. Here, paleoethnobotanic and geological studies are crucial to find the possible sources of ancient dyes. Furthermore, different classes of tools must be studied in their varied contexts. Thus, implements found in burials must be correlated with other burial good and votive contexts must be examined more carefully, while implement distribution studies are necessary for the settlements. Most importantly, physical parameters for various implements have to published and analysed. Finally, diachronic and synchronic comparison between the different regions of the Mediterranean and the Near East is needed. It is my hope that this short overview will draw the attention of excavators to this frequently overlooked class of archaeological material,

leading towards a better understanding of the ancient textile technology and broader issues connected to it.

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