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Karina Grömer with contributions by R. Hofmann-de Keijzer and H.R. Mautendorfer, *The Art of Prehistoric Textile Making. The Development of Craft Traditions and Clothing in Central Europe*. pp. 533. Vienna: Naturhistorisches Museum, 2016. ISBN-10 3902421940; ISBN-13 978-3902421944. €59.00.

The study of ancient textiles has made spectacular progress in recent years, with a large number of articles and conference proceedings already forming a fairly solid information base. In contrast, there are few monographs dealing exclusively with prehistoric textiles. The result of this state of the art is that the knowledge on this multifaceted topic is quite fragmented, complicating the introduction and understanding of the basic technological elements, without avoiding significant gaps. For this reason alone, the monograph discussed, dedicated exclusively to textile research, is a very important step towards a presentation of concise and well-documented information. This book is the third monograph by the main author preceded by one also devoted to prehistoric textile crafts. It is an expanded English version of an earlier publication written in German. The book is aimed both at the professional who wants to get informed about the latest developments in the field of prehistoric textiles and their technologies, and at the general public, which wants to learn more about this subject and the most important discoveries.

The book covers the period between the Stone Age and the Iron Age, and the main region treated is Central Europe, with most references to studies, activities, and finds in Austria, where the author has conducted research for many years. The other regions and the later historical periods are treated mainly in those cases in which the data are of particular importance to the overall consideration and evaluation of the subject matter. Comparatively, little is said about the manufacture and use of fabrics in early prehistory and in Bronze Age societies of the Aegean, some of which are contemporaneous with the periods covered in this book.

The introduction in Part A1 provides a general overview of the European prehistoric periods (pp.4-20). The main characteristics of each era, its duration, and the geographic distribution of the various cultures studied are given. As an introduction for a broader audience, a general summary of the most important archaeological evidence from Central Europe is given. The chronological framework is presented with an informative diagram of the synchronizations between the cultures of Central Europe and those of the Mediterranean and Scandinavia.

A particular and very important parameter in textile archaeology is the preservation conditions of textiles, which depend directly on the climatic conditions in the archaeological environment, which vary greatly from area to area and from site to site. This situation leads to an imbalance in the available information, as there are areas with abundant actual finds and others, for which we rely only on indirect evidence such as for e.g. the tool kit and, less frequently, iconography. For this reason, a special chapter (pp. 20-32) discusses the conditions for the preservation of ancient fabrics: direct contact with metals, liquid or salty environments, the location in mines, bogs or oak coffins. Some typical examples of well-preserved fabrics and garments are presented, such as the garments of the Iceman, also known as Ötzi. Through these examples, which produced numerous and impeccably preserved textile finds, it will be shown how important information can be given in terms of materials, technology and clothing, and consequently in terms of society and the economy of textiles, if they can be preserved and restored. In addition to theoretical knowledge of preservation conditions, this chapter is very useful for future research, as it helps to call for more attention to those environments in which textile finds can be expected due to exceptional conditions. One advantage of this chapter is that the conservation conditions and procedures are explained in simple terms, without using

highly specific scientific terminology, that can be understood by the general public.

The following Part B (pp. 36-239) describes the stages and processes of textile production in prehistoric times based on archaeological evidence. The chapters of this part aim to describe in detail the operational chain from the formation of textile fibres to the production of fabrics and garments. The successive stages of processing correspond to the division into different areas of textile research, i.e. the study of textile raw textile materials, the study of the production of textile fibres, the various weaving and decoration techniques, and finally the study of costume.

A special chapter on raw materials (pp. 37-72) discusses all the known fibres of plant, animal, or mineral origin that were used in prehistoric times. The information on what type of fibres were used in each prehistoric period is very important, because it is derived directly from the available archaeological data. This presentation is necessarily limited because there is no complete picture of the textile materials used in prehistory. The chapter dealing with the basic fibre types is accompanied by several drawings and photographs. Magnified scanning electron microscopy images (SEM) show the differences in fibre structure and provide criteria for their identification. Representative examples of archaeological textiles from Central and Northern Europe are cited for each period and type of raw material. The steps prior to weaving the various fibres are described in detail in a separate chapter (pp. 62-74). It is made clear that both the qualities of the raw materials and the methods of cloth production may have differed considerably, which is why much of the evidence is collected with caveats and is often guided and supplemented by ethnography. It is also made clear that different fibres required different treatments to produce certain qualities of textiles.

Tools used in the production of textile fibres are also discussed in Section B (pp. 72-91). Sometimes these are implements found ready in nature and are suitable for specific tasks, such as blackthorn spikes used to untangle or smooth fibres. Others are specially designed and manufactured tools, such as wooden boards for chopping flax or wool. This part of the presentation is also supported by recent ethnographic data that adds to the vague picture of the early stages of cloth processing. Textile tools found in excavated contexts, and iconography, sometimes attest to the exact type of processing.[1]

In particular, some tools, such as the hacking boards from the Halstatt and La Tene areas (p. 72), show the type of processing that took place. For others, however, only assumptions can be made, while some versatile tools such as combs may have been used at various stages of textile production. Special attention and ample space are given to some crucial and multifaceted stages of textile production. One of them is yarn production (pp. 74-91). We know that this process is done either by twisting with spindles or by splicing into yarns, since both of these techniques have been attested in archaeological environments. Regarding spinning, reference is also made to the social dimension of this activity, since it was a task to which the artisans of each community devoted plenty of time, and which often resulting in a web of metaphors and intelligible symbolisms in society.

After describing the basic principles and the techniques of spinning, the evolution of the spinning technology is described, as the various practices are linked to the regional traditions of different cultures. Equipment can often be an indisputable criterion for classification and dating. Reference is also made to later mechanised versions of spinning such as the treadle wheel (p. 77). Great importance is attached to the various types of drop spindles, which were widely used in prehistory, but are also attested in the figurative representations of the Classical period. The finds of intact prehistoric spindles, where the thread is also preserved, are extremely rare and come mainly from circumalpine lake settlements (p. 81).[2]

Spindle whorls that were made of fired clay, bone, or stone are usually well preserved and widely used. Special mention is made of the earlier spinning tools from the Linear Pottery Culture, which were simply perforated pottery sherds and probably provided the idea for the later discoid shape of the Neolithic (p. 83). Interestingly, a similar evolution is observed in Aegean spinning tools.[3]

The shapes of the later spindle whorls vary according to local traditions, which led to different trends in shape and decoration. The weight of the spindle whorls plays an important role in the quality of the yarn, as shown by several experimental studies carried out by the author and other researchers. The temporary storage of the finished yarn was facilitated by clay bobbins, which have been attested since the Neolithic era.

[1] On Aegean textile tools, see Andersson Strand and Nosch (eds.) 2015.

[2] Banck-Burgess 2020.

[3] Barber 1991: 54; Carrington-Smith 1975: 119; Tzahili 1997: 108; Sarri 2020: 98-99.

The contents of the volume proceeds with a description of the various weaving processes, which is the most complex part of textile production (pp. 91-139). At the beginning, various techniques for making bands with auxiliary tools are discussed. Two of these are the rigid heddle, which dates back to Roman times, and the heddle rod, which is perhaps the earliest tool for automating weaving, from which the next types of loom automation evolved. A special technique is tablet weaving for making tight bands with intricate patterns (p. 101). The relevant chapter gives details about the technique and its possibilities, accompanied by photographs and drawings, while a potential restoration of the spools as textile weights for this type of weaving is suggested.

An important field of prehistoric textile production is the weaving with the warp-weighted loom, which was invented and existed for a very long time in prehistory, but also in Greco-Roman antiquity (pp. 107-138). The weight components of this loom made of solid materials are often found in excavations, but its use is also well documented in ancient iconography. The loom weights served to give tension to the warp threads while providing a convenient opening for the weft to pass through. Their forms vary greatly according to local traditions and the period used, and they are in some cases marked with symbols (Figs. 59-60). Based on their shape and weight, and in combination with appropriate experimental approaches, calculations can be made about the type and quality of yarn and fabric (pp. 112-114). In addition to loomweights, there were several other tools, such as combs and weaving swords made of wood or bone, that accompanied this type of loom. Typical examples of all these tools, found in known excavations in Central Europe, are discussed, and an overview is given of their style, function, and distribution. The chapter also includes some of the fabrics made with this type of loom, such as the starting borders (pp. 120-122), which ensure the stability and regularity of the warp threads and sometimes decorate the fabric edges. Also discussed in this context, are some more creative innovations for making perfect hems and adding decorative elements such as fringes. Other types of looms, such as the two-beam loom, are briefly discussed because they do not appear in the prehistoric records of Europe due to their perishable material.

A characteristic and commendable element of this part of the book, is that the numerous examples given do not follow the usual chronological or cultural categorization, but rather a technological relevance, that allows a deeper comparative understanding of the production processes. Most of the reference examples come from the Hallstatt period, especially the obviously numerous finds from the very important site of Hallstatt itself, which the author has dealt with and dedicated herself to in a large number of publications.

In a separate chapter of Part B by R. Hofmann-de Keijer (pp. 140-163), natural dyes and dyeing processes are discussed in detail. The comprehensive description of their colour values and their combinations with various mordants gives a general overview of how the raw materials were obtained and processed. The chapter focuses on the scientific investigations, that are suitable to prove the use of certain dyes, thus emphasising the potential of analytical methods in textile research. To this end, a number of cases are listed from various sites in Europe in which dyes have been successfully detected.

Patterned textiles, designs, and decorative techniques are also discussed in Chapter B6 (pp. 169-208). These include woven patterns, embroidery, appliqué, painting, and the incorporation of organic and metallic elements. All of these decorative techniques are well documented by referencing specific archaeological examples from Central Europe and provide rich photographic records.

The finishing and sewing of textiles into garments form the final chapter of the technical section (pp.208-239). Because of the sparsity of actual finds, the examples are relatively few, but very important for reconstructing prehistoric garments, the techniques used, and also the fashion and style in prehistoric cultures. Very detailed information about attested types of stitches for sewing, decorating and repairing and the corresponding tools are given by H. Rösel-Mautendorfer in chapter B8.

The third part of the book is devoted to a sociological approach to textile production as far as it concerns the roles of producers, consumers, and the distribution of labour in the domestic sphere or in a specialised craft environment (p. 243). Each prehistoric period shows different relationships within the existing social groups and a different shift from domestic to mass production of textiles. The discussion of these issues draws on well-known examples, that show that textile production in the Stone Age and early Bronze Age textile production was an exclusively domestic craft. In the mature Bronze Age, however, the economy developed rapidly, and society became more stratified, while textile products produced by specialised craftsmen probably became commodities.

Section D (pp. 294-318), lists and explains various uses of fabrics that have been demonstrated in archaeological contexts. They mainly include objects for use in the domestic environment, such as mats, curtains, and furniture elements, or work utensils such as carrying bags. There are also indications of their use in the funerary environment, where they were used as shrouds, or to wrap burnt bones and offerings, but also as a decoration of the burial chambers in the Iron Age, as in the famous case of the princely tomb of Hochdorf. Since these objects are mainly from the late Iron Age in Central Europe, which is contemporaneous with the historical epoch of Greece, written sources from the Classical and Roman periods are also used. The role of sustainability in prehistoric societies is demonstrated by the recycling of clothing. Many preserved garments show attempts to repair clothes.

Section E (pp. 319-445), after an introduction to the available sources, presents the best-known examples of prehistoric garments, accessories, and jewellery in Central Europe by period and region. In contrast to Section A, which was devoted to a diachronic consideration of production technologies, the emphasis is here is on archaeological contexts, aiming to outline the peculiarities of the development and use of clothing in different prehistoric cultures.

Experimental comparisons are made in several chapters of the book, and are used to demonstrate ancient textile techniques and to test the function of some enigmatic implements, such as e.g. the crescent-shaped loom weights, in order to test their hypothetical use and suggest specific restorations. Some of the experiments were deliberately initiated for the needs of the book, while others had taken place during the past activities of the author and her collaborators.

The book is written in simple language and omits many highly specialised terms, when they were not necessary, and in such cases, they are clearly and simply explained. The accompanying visual material helps to ensure that the book is understood by the general public. However, as with all technological studies, the specific terminology necessary for a deeper understanding of the specific objectives, could not be omitted. Thus, the two glossaries listed in the appendix (pp. 456-460), one with archaeological and one with technological textile terminology, seem very helpful.

In summary, one may say that the book treats Central European prehistory through the prism of textile production. It is the result of many years of work by a highly skilled and prolific author with a specialisation in textile archaeology. The book is useful both for the specialist seeking information on specific textile finds and comparative material, and for those seeking an accurate introduction to the prehistoric textiles of Europe. The rich bibliography that has been compiled, is suitable to lead the interested reader to further research and documentation. The texts are accompanied by a large number of beautiful colour illustrations, photographs and high-quality graphics describing all the processes of yarn and weaving techniques and presenting the most significant finds. The book is printed on high quality glossy paper, which gives the publication a good aesthetic and the value of an attractive book.

The focus on the textiles of the Central European prehistory is a comprehensive presentation of the most important relevant finds. Nevertheless, the publication falls far short of the data for southern Europe, especially for the prehistoric Aegean, which is mainly due to the lack of specialised publications. It would be desirable if there were a similar work dealing with or including the archaeology of Aegean textiles, but also if there were more reports on textile finds in prehistoric Greece leading to this high level of knowledge acquisition. The actual textile finds in the area of the prehistoric Aegean area are still comparatively few, and the road to a better understanding of their technology is long, but publications like the discussed here clearly point to the prospects in this field.

KALLIOPE SARRI
INDEPENDENT SCHOLAR
kalliope.sarri@gmail.com

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