Karina Grömer

The Art of Prehistoric Textile Making

nhm natural history museum vienna

THE DEVELOPMENT OF CRAFT TRADITIONS AND CLOTHING IN CENTRAL EUROPE

The Art of Prehistoric Textile Making

The development of craft traditions and clothing in Central Europe

Karina Grömer

with contributions of
Regina Hofmann-de Keijzer (Dyeing)
and
Helga Rösel-Mautendorfer (Sewing and tailoring)

Veröffentlichungen der Prähistorischen Abteilung (VPA) 5
Natural History Museum Vienna, 2016

FWF
Der Wissenschaftsfonds.

natural history
museum vienna
nhm

IMPRINT

Karina Grömer
Natural History Museum Vienna
Prähistorische Abteilung
Burgring 7, 1010 Vienna, Austria
e-mail: karina.groemer@nhm-wien.ac.at

Regina Hofmann-de Keijzer
Universität of Applied Arts Vienna
Department Archaeometry
Salzgries 14/1, 1013 Vienna, Austria
e-mail: regina.hofmann@uni-ak.ac.at

Helga Rösel-Mautendorfer
Independent researcher, Altlengbach, Austria
e-mail: helgo@roesel.at

Publisher:

Editor:
Andreas Kroh
Natural History Museum Vienna
Burgring 7, 1010 Vienna, Austria
Tel.: +43 (1) 521 77 / 576
Fax: +43 (1) 521 77 / 459
e-mail: andreas.kroh@nhm-wien.ac.at

Translation: Katharina Rebay-Salisbury and Roderick Salisbury

Proof reading: Susanna Harris, Katrin Kania, Andreas Kroh and John-Peter Wild

Cover: Andreas Kroh, Alice Schumacher

Layout: Gerhard Withalm, Baden

Printed by Ueberreuter Print & Packaging GmbH, Korneuburg

ISSN 2077-3943
ISBN 978-3-902421-94-4

Research partially results from: Austrian Science Fund (FWF): L 431-G02 (2008-2012)
Published with support from the Austrian Science Fund (FWF): PUB 127-G19

Der Wissenschaftsfonds.

The Prehistoric Art of Textile Making

The development of craft traditions and clothing in Central Europe

Preface

The book „The Prehistoric Art of Textile Making – The development of craft traditions and clothing in Central Europe“ is aimed at historians, archaeologists and anyone interested in the history of costumes and crafts. It was written from the perspective of a prehistoric archaeologist to illuminate Central European history before written records. To facilitate access for the broad, scientifically interested public, basic concepts and methods of prehistoric archaeology are briefly explained if they are relevant to understanding the content of this book. A subject-specific glossary of archaeological and textile technological terms is included as well.

Textile crafts, especially spinning and weaving, were interpreted metaphorically in Classical Antiquity. The Fates (parcae in Ancient Rome, moirai in Ancient Greece), three wise women, span and cut off the thread of life. Symbolically, they controlled the life of every mortal from birth to death. This appreciation of textile crafts expressed in linguistic and mythological symbolism is no longer apparent in the modern world of mass production and global economy. Interestingly, however, textile crafts and above all weaving have contributed significantly to the general development of technology. Looms, invented in the Neolithic period, were the first machines in human history as they mechanized production processes. Automation by punch cards and binary code – crucial for the development of modern computing – were first applied in weaving. Joseph-Marie Jaquard* (1752 to 1834) built punch cards into an Austrian model loom which contained information about the pattern to be woven. These were scanned by needles, whereby a hole meant the thread was to be lifted and no hole meant the thread was to be lowered. Through the punch cards – data storage in modern terms – the Jacquard loom was the first machine that could be programmed as needed to achieve patterns of any complexity.

The roots of our history – and thus the history of textile crafts – lie in the darkness of prehistory far before the Romans. Essential textile techniques that still accompany us as textile customers today were already developed in the Stone and Bronze Ages.

Through the combination of different, sometimes inconspicuous sources and the application of modern scientific methods, prehistoric archaeology succeeds in painting a vivid picture of the development of textile crafts over time.

At the beginning the book describes the individual steps of textile production and their tangible archaeological traces, addressing complex issues of craft sociology – the craftspeople behind the textiles as well as the places of production. It further evaluates whether crafts were conducted in the framework of domestic production or if organized forms of production such as specialization and mass production already occurred in Central Europe in pre-Roman times. The book concludes with a chapter about the history of clothing before the Romans. Clothing is a characteristic feature of any culture. By combining insights from image sources, burial finds and textile remains, an attempt is made to investigate the phenomenon of clothing from the Stone to the Iron Age. This time span is very long indeed – it is therefore impossible to draw a complete picture of all developments of clothing in prehistory. Individual garment shapes, however, can already be reconstructed for this early period. Many aspects of prehistoric clothing can be accessed by archaeological remains and further interpretations about the social function of clothing are possible.

The German version of this book (Prähistorische Textilkunst in Mitteleuropa – Geschichte des Handwerks vor den Römern, 2010) was written in the context of a research project based at the Natural History Museum in Vienna; its focus is therefore Austria and its neighbouring countries. The research project was part of the international textile research framework "DressID – Clothing and Identities. New Perspectives on Textiles in the Roman Empire", funded by the EU Culture Programme and conducted under the direction of the Curt-Engelhorn-Foundation of the Reiss-Engelhorn-Museums Mannheim between 2007 and 2012. Research on the prehistoric dying techniques was carried out within the FWF-Project Dyeing techniques of the prehistoric textiles from the salt mine of Hallstatt – analysis, experiments and inspiration for contemporary application. (FWF-Project L 431-G02; 2008-2012).

decomposition[4]. Different preservation conditions (oak coffins, wetland settlements, organics corroded onto metals, salt mines and glaciers) also represent various circumstances of deposition. Not only is the number of preserved textiles from Central European prehistory small, but it also represents a highly selective range of different contexts. Several of these special contexts of preservation are discussed below.

2.1 Preservation by metal corrosion products

During the Bronze and Iron Ages, numerous metal objects placed in graves as equipment for the afterlife provide an opportunity for textiles to be preserved. If textiles were deposited together with bronze and iron objects (for example as components of clothing in graves), metal corrosion at the contact points of the copper or ferrous metals and the adjacent textiles may lead to the emergence of a durable combination of materials (Fig. 9).

Under wet conditions the soluble metal salts penetrate the textile material and replace organic matter. During the duration of deposition in the soil a chemical combination of materials takes place, wherein the textile component becomes degraded. This process, referred to as mineralization, can lead to a complete

Fig. 9. Textiles attached on a bronze arm ring from the Roman cemetery of Mautern-Burggartengasse, Austria.

[4] *Cf.* Farke 1986. – Gillis and Nosch 2007. – Wild 1988, 7–12.

replacement of the organic material[5]. When textiles are in contact with iron artefacts when they rust, the sulphides leaching out of the metal gradually invade the adjacent patches of textile, replacing the fibres or causing a negative imprint to be formed around them.

The transition from the conservation of organic materials by metal salts to complete mineralization of the fabrics until only imprints remain is a fluid process. From the finds of Hochdorf, Johanna Banck-Burgess[6] was able to reconstruct the decomposition processes that lead to a change in the appearance of textiles. Thus, the fibre substance can degrade, the yarn thickness thins out and the surfaces may turn 'soapy', so that the textile structure is barely noticeable. In some cases when the fabrics have been completely replaced by the metal oxides, the weave structure and even the fibres are still recoverable as an imprint. The metal oxides can cause an increase of volume of the threads; through the growth of the fibre structure the textile may also appear densely compressed and unnaturally compact.

Textiles preserved in graves by metal corrosion are usually more than unsightly, because typically the original colouring is lost in this process. Furthermore, the remains are very fragmented, often limited to only of a few square millimetres and can therefore all too easily be overlooked during the excavation and restoration of the finds. Despite these limitations, textile residues obtained by metal corrosion are an important source for research, because of their clearly defined position in regard to the body of a buried person[7].

2.2 Preservation by salt

In the prehistoric sites of the Austrian salt mines[8] of Hallstatt and Dürrnberg near Hallein, preservation conditions unique in the whole of prehistoric Europe prevail. Salts may contribute to the preservation of fibres because they are toxic to microorganisms

5 *Cf.* Chen *et al.* 1998. – Mitschke 2001, 29. – Wild 1988, 8–11.
6 Banck-Burgess 1999, 93, pl. 1 and 2.
7 *E.g.* Bender Jørgensen 1992. – Rast-Eicher 2008.
8 Hallstatt: Grömer *et al.* 2013. – Dürrnberg: Stöllner 2005.

Fig. 10. '*Heidengebirge*' (layers containing objects from ancient mining activities) with textiles from the salt mine in Hallstatt, Austria, Early Iron Age.

such as bacteria. In a salty environment, single-celled bacteria dry out and die[9]. This prevents the decomposition process of organic materials due to bacterial activity.

The high pressure of the mountain closes the man-made cavities in the amorphous, soft geological material after the shortest possible time, so that the prehistoric remains, the so-called 'heathen's rock' (*Heidengebirge*) becomes hermetically sealed (Fig. 10). Through this air-tight embedding in the salt rock, no oxidative degradation processes can take place and microbiological degradation is strongly reduced. The high humidity in the mountain prevents the drying out of fibres[10]. The natural degradation processes are slowed by the constant and low temperatures in the salt mines. The textiles are therefore preserved so well in their organic matter that they are still elastic and supple when recovered. Salt preserves any organic material, both of plant and animal origin, without limitation. In contrast to lakeside settlements, bogs or oak coffins, sites with salt preservation thus do not show biases in regard to raw material origin.

9 Gengler 2005. – Van der Sanden 1996, 12.
10 See Gengler 2005, 28: chapter 3.1.3.5, 37: chapter 3.3.1.

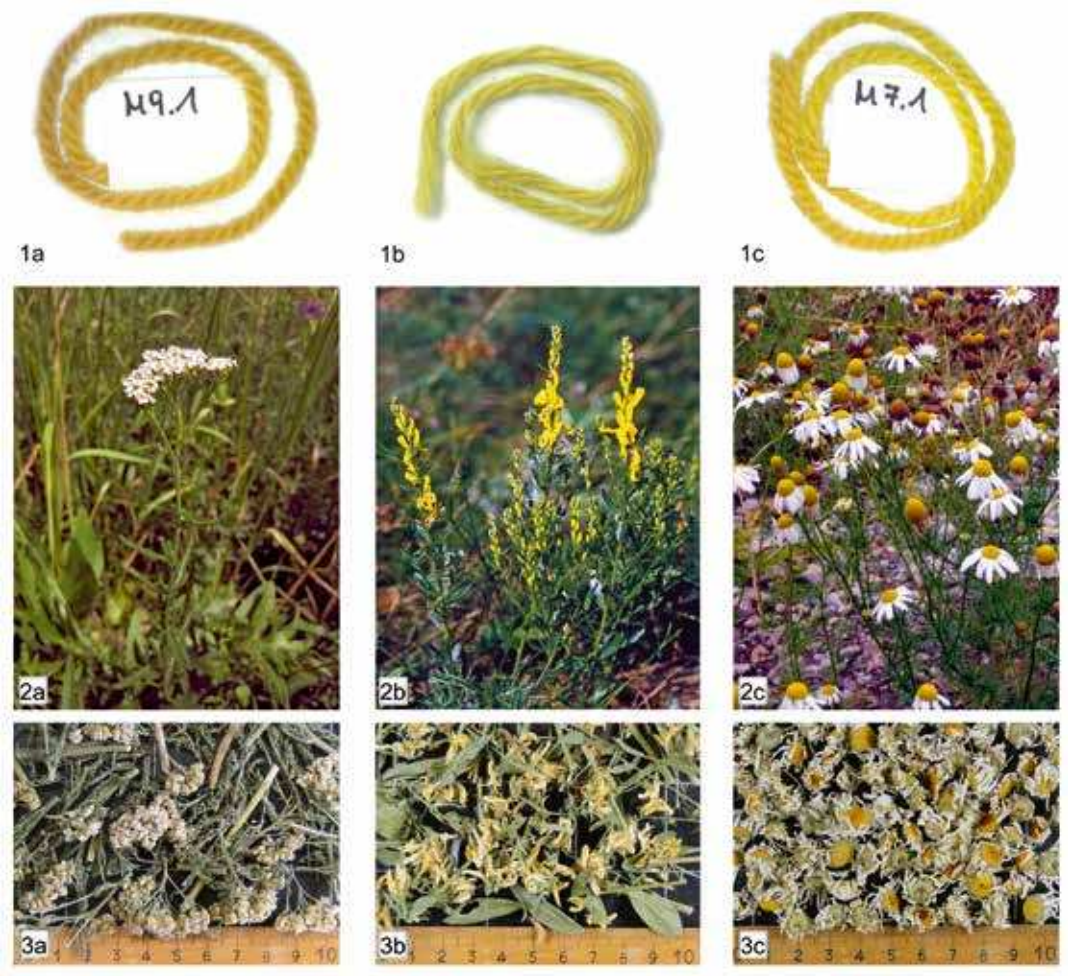

Fig. 86. Experimental dyeing with dye plants for yellow, performed by Anna Hartl, BOKU Vienna. a Yarrow, *Achillea millefolium*. b Dyer's broom, *Genista tinctoria*. c Scentless chamomile, *Tripleurospermum inodorum*, 1 wool dyed with plants, 2 flowering plants, 3 plant parts collected for dyeing.

to another plant that has been used alone or together with weld. In addition to weld, other plants can be sources for 'luteolin-type'-dyeings, for example saw-wort (*Serratula tinctoria*, Asteraceae) and dyer's broom (*Genista tinctoria*, Fabaceae, Fig. 86.b)[311]. Dyer's broom can only be identified as source for textile dyeing if genistein, a typical minor compound, is detected next to luteolin and apigenin, but in prehistoric textiles, it can

[311] Cardon 2007, 171, 178, 180. – Hofenk de Graaff 2004, 215.

Fig. 87. The detection of the red dye purpurin in this Bronze Age textile from Hallstatt (HallTex 205) indicates that rhizomes of Rubiaceae species, presumably bedstraw species (*Asperula* spp. *Galium* spp.), were used for dyeing.

be missing due to degradation. HPLC analysis of wool experimentally dyed with yarrow (*Achillea millefolium*, Asteraceae, see Fig. 86.a) and dandelion (*Taraxacum officinale*, Asteraceae) showed luteolin and apigenin, sometimes in the same ratio as in weld-dyeings[312]. Source for the 'apigenin-type' dyeings could be the scentless chamomile (*Tripleurospermum inodorum*, Asteraceae, see Fig. 86.c) which yield dyeings with the apigenin-equivalent detected as the main dye in Hallstatt textiles[313].

The yellow flavonol quercetin is detected in fragments from Iron Age Denmark and Norway[314]. The detection of quercetin

312 Hofmann-de Keijzer *et al.* 2013, 153.

313 Hartl 2012. – Hofmann-de Keijzer *et al.* 2013, 153.

314 Vanden Berghe, Gleba and Mannering 2009, 1916–1917. – The detection of quercetin in some Iron Age Hallstatt textiles mentioned in earlier publications cannot be upheld in the light of recent interpretations, see Hofmann-de Keijzer *et al.* 2013, 153.

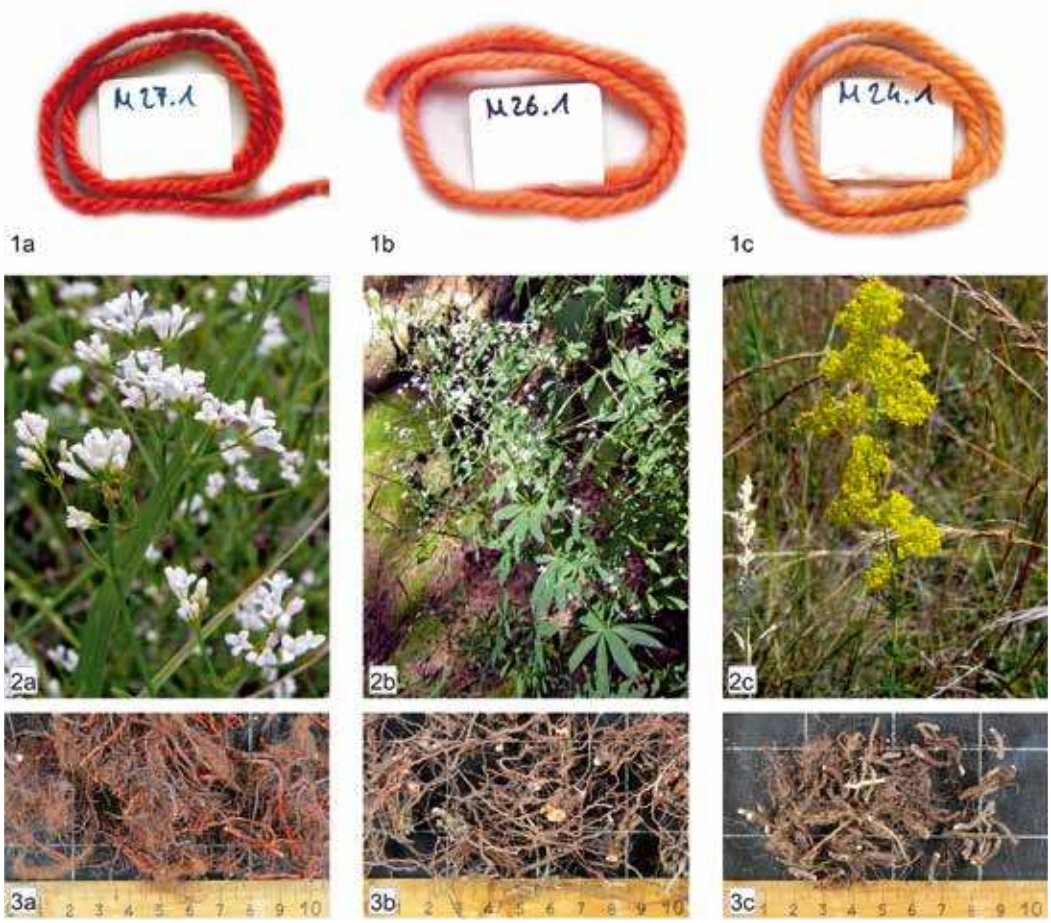

Fig. 88. Experimental dyeing with dye plants for red, performed by Anna Hartl, BOKU Vienna. a Dyer's woodruff, *Asperula tinctoria*; b Wood Bedstraw, *Galium sylvaticum*, c Lady's Bedstraw, *Galium verum*, 1 wool dyed with rhizomes, 2 flowering plants, 3 rhizomes collected for dyeing.

without any minor compound is of no use when the aim is to identify the dye plant, since quercetin occurs in 60% of all plants[315]. The detection of the yellow flavonol rhamnetin in textiles from Danish peat bogs and of a rhamnetin-equivalent in Iron Age textiles from Hallstatt points to the use of buckthorn species (*Rhamnus* sp., Rhamnaceae) in the Iron Age[316].

[315] Whiting 1981.

[316] Hofmann-de Keijzer *et al.* 2013, 154. – Vanden Berghe, Gleba and Mannering 2009, 1916.

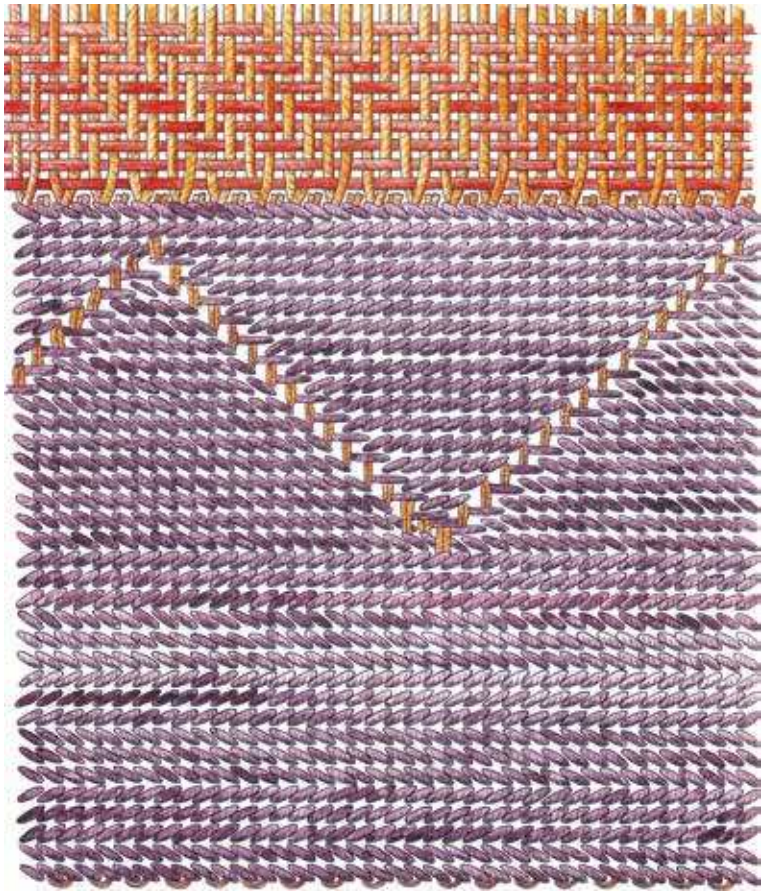

Fig. 101. Structure pattern from Cloak 2 from Verucchio in Italy, Early Iron Age.

Patterned tablet weaves

Tablet weaving is a traditional handcraft to make patterned bands. Great creativity is inherent in the craft, which manifests itself in the many possibilities of the pattern design. Essential for the design motif are the choice of colours for the warp, but also the way the tablets are placed and the direction of rotation during weaving. The creative use of this technology allows the design of various decorative motifs. Simple tablet woven patterns are, for instance, stripes. They arise when for each tablet a different colour of the warp threads is used. By continuous rotation of the tablets, a structure of different coloured 'strings' arises arranged next to each other. This simple principle of decoration first appears at the end of the Middle Bronze Age in Europe, as a new find from Hallstatt testifies[376] (Fig. 53). Striped design is further found in early Iron Age bands from Hallstatt as well as from the '*Prachtmäntel*' of the Nordic Iron Age[377].

Structural patterning is also a possible decorative principle inherent in tablet weaving. Cloak 2 from Verucchio in Italy has a wide tablet woven border with a triangular pattern, formed by changing the turning direction of the tablets. In addition, it has stripes formed by tablets turned in opposite directions (Fig. 101)[378].

[376] Grömer 2013, 87.

[377] Schlabow 1976, *e.g.* fig. 119, Thorsberg. – Möller-Wiering and Subbert 2012, fig. 6.7.

[378] Ræder Knudsen 2012, fig. 11.2–11.5. – von Eles 2002, tav. XXI/1, XXII.

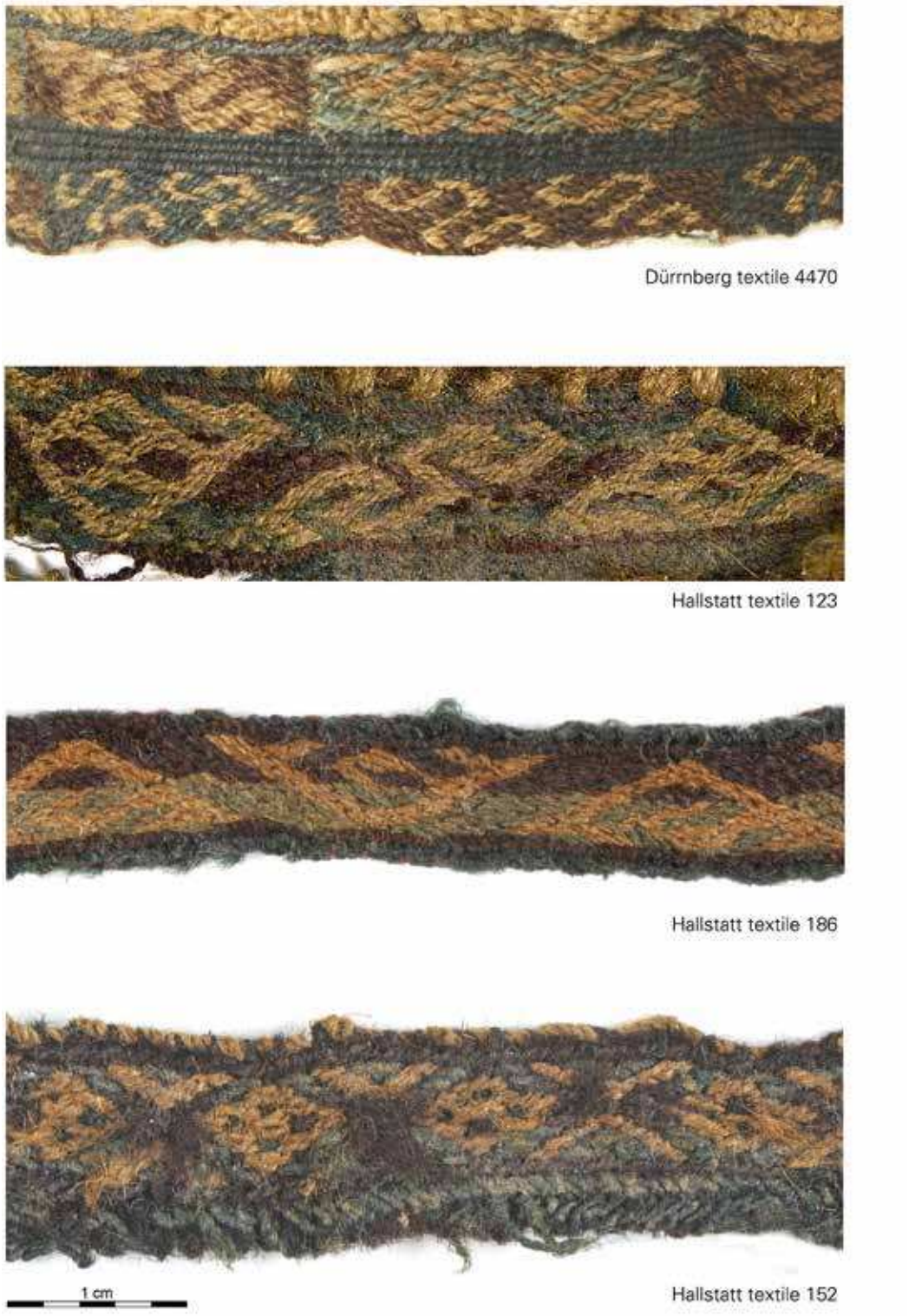

Fig. 102. Complex tablet weaves from Hallstatt and Dürrnberg, Iron Age.

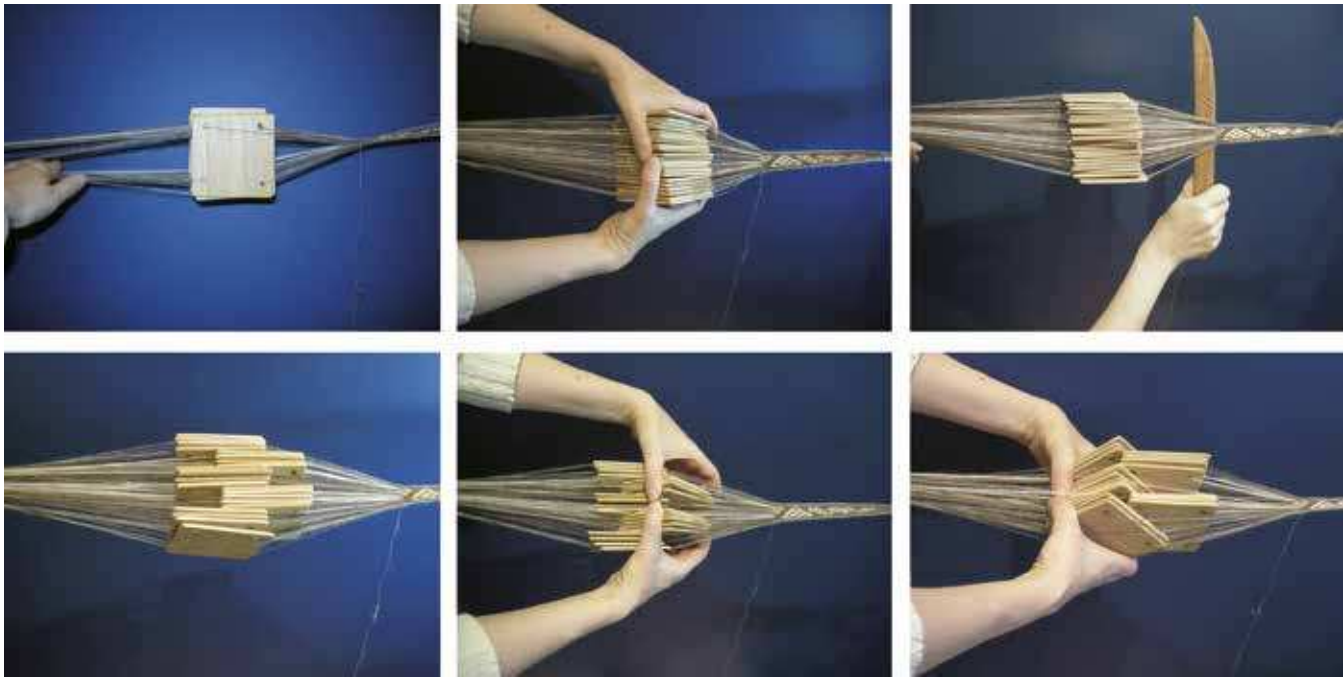

Fig. 103. Tablet weaving: producing complex patterns by turning individual tablets back and forth.

Similarly, there are colour patterns that have been woven in a complex manner. From the Iron Age onwards, the production of complex motifs in tablet weaving technique was mastered[379]. Prominent examples[380] can be found in the Hallstatt period elite grave from Hochdorf and in the salt mines of Hallstatt or Dürrnberg. In most of the tablet weaves from other sites, including the patterned one from Apremont in France, the original colour has unfortunately not survived. Only the binding structure can be reconstructed from these pieces. The recognisable changes in the rotation patterns were most likely not only structural patterns with uni-coloured yarns, but included coloured warp threads to form a colourful pattern lost to us today.

The motifs of patterned tablet weaves from the Iron Age salt mines in Hallstatt[381] (Fig. 102) include meanders, filled triangles and diamonds, which are repeated in sections. The patterns come

379 Pattern techniques from prehistoric Central Europe with catalogue: Grömer and Stöllner 2011.

380 Hochdorf and Apremont: Banck-Burgess 1999, 70, fig. 40–41. – Ræder Knudsen 1999. – Hallstatt: Grömer 2013, 87. – Dürrnberg: Grömer and Stöllner 2011, 109–111. – Ræder Knudsen and Grömer 2012.

381 For detailed descriptions of the reconstructions of the tablet weaves see Grömer 2005a.

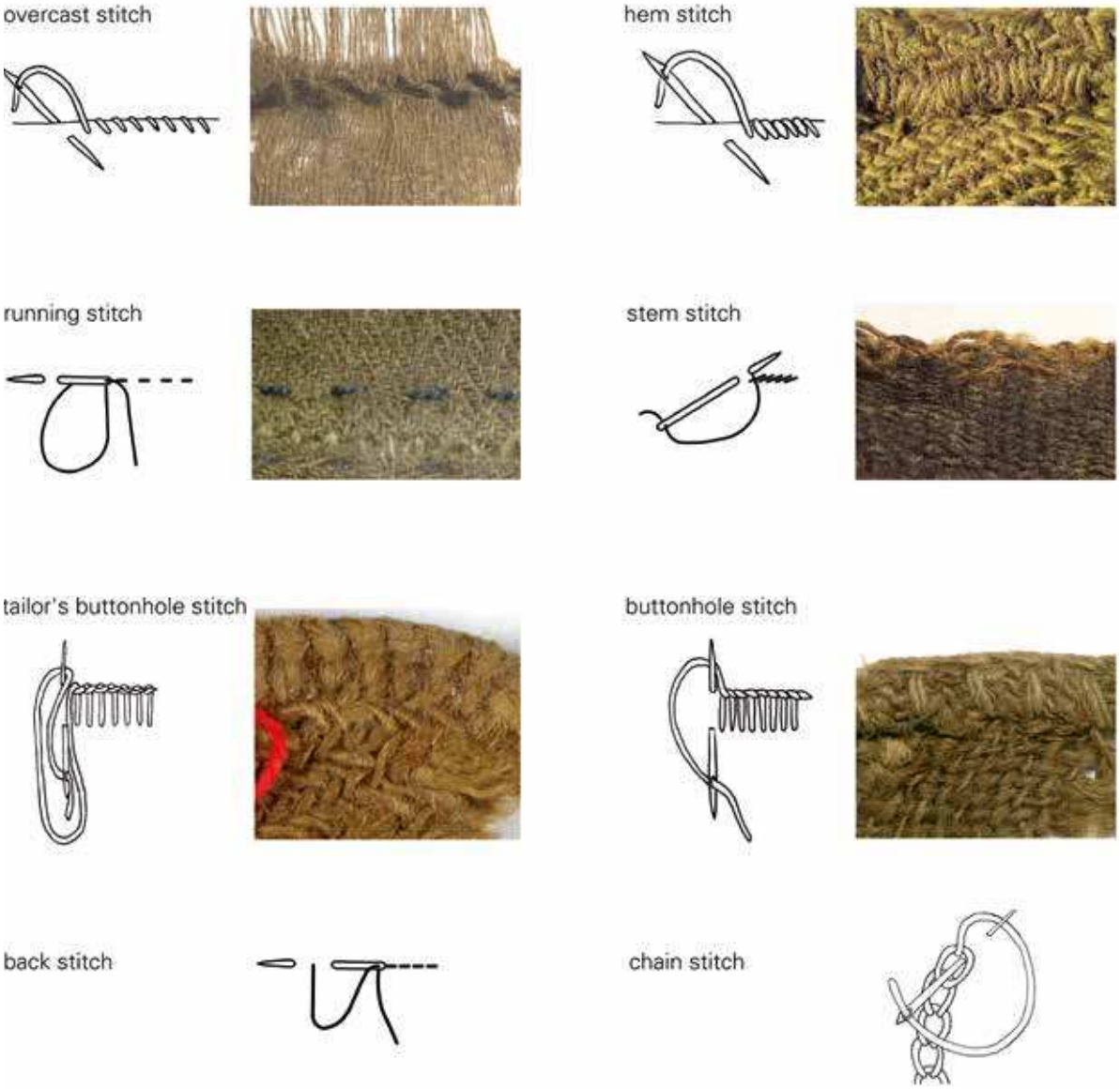

Fig. 129. Different types of stitches used in prehistory, with examples from the salt mines in Hallstatt, Bronze and Iron Age.

stitch type is used as a decorative stitch in the Early Iron Age. A textile find from Hallstatt shows a row of running stitches in a contrasting colour to the fabric as an ornament worked parallel to the actual seam (Fig. 129).[476] An extraordinary find in terms of the sewing technique is the embroidered La Tène

[476] Hundt 1960, 139–142. – Grömer and Rösel-Mautendorfer 2013, 354–356.

8.4 Examples of prehistoric dressmaking patterns

Information on dressmaking patterns and cutting techniques in prehistoric times can be inferred from a few preserved garments. Some of them exhibit considerable skill and refinement.

The Copper Age Iceman from the Tyrolean Alps[514] (see pages 341–347) had garments with interesting sewing details, but also interesting cutting and design details. All items of his clothing, including the leggings and the fur cap, were sewn together with overcast stitches.

The upper body wear, a kind of jacket, was composed of rectangular pieces of goatskin. The assembling of the clothing using strips of different coloured materials is visually striking. The selection of animal skin strips of colours ranging from bright to dark makes this jacket a very decorative piece of clothing. To what degree sewing the jacket from narrow pieces of fur might have been an advantage for fitting the garment to the body can no longer be evaluated today. An indication that the joining of strips had an impact on the fit can be observed on the Iceman's loincloth, which is approximately 1 m long. It is put together of tailored, slightly fitted, cut goat leather strips, again assembled with overcast stitches. With this sewing technique, the loincloth fits better to the body shape than if cut from a whole piece.

Sensational discoveries from the Nordic Early Bronze Age (15th–13th centuries BC) come from Muldbjerg, Trindhøj, Borum Eshøj, Skrydstrup and Egtved in Jutland/Denmark. Complete clothing was found in oak coffins from these sites.[515] Both men's and women's garments often have multiple seams. While the men's wrap around garments are mostly composed of multiple pieces that had been cut, the centrepiece of the women's blouses are made from a single piece of fabric (Fig. 191). Sewing and cutting techniques of these pieces of upper body wear is very interesting. The shape stands out from the wrapped and belted garments, such as the men's coats from Trindhøj and Muldbjerg

514 Egg and Goedecker-Ciolek 2009, 73–88. – Spindler 1995.

515 Hald 1950; 1980, 67–69 (men's coats), 67–69, 95–97 (women's skirts), 92 (blouse). – Mannering, Gleba and Bloch Hansen 2012, 96–102. – Nienholdt 1961, 1.

Fig. 133.
Reconstruction of the Thorsberg trousers by Katrin Kania. Although astonishingly tight, the trousers allow full mobility for the wearer.

or the women's skirts from Borum Eshøj or Skrydstrup. Analysis showed that the Bronze Age blouses from Borum Eshøj and Skrydstrup were tailored specifically to ensure a certain fit. The approximately rectangular material of the female blouse was cut crosswise from both sides in the lower third, then folded towards the middle and sewn together. The remaining material was folded down and sewn together with the lower fabric tube. Some of these blouses have been extended with additional fabric strips. The top fold was cut in horizontally for the neck opening (Fig. 191). The seams were worked with overcast stitches, wherein the fabric layers were overlaid without neatening and stitched together. Due to the structure of the fabric the seams were durable and functional. This kind of processing may indicate that this type of clothing was originally made of leather, fur or felt. In contrast to textiles, these materials do not fray and therefore do not need to be neat-

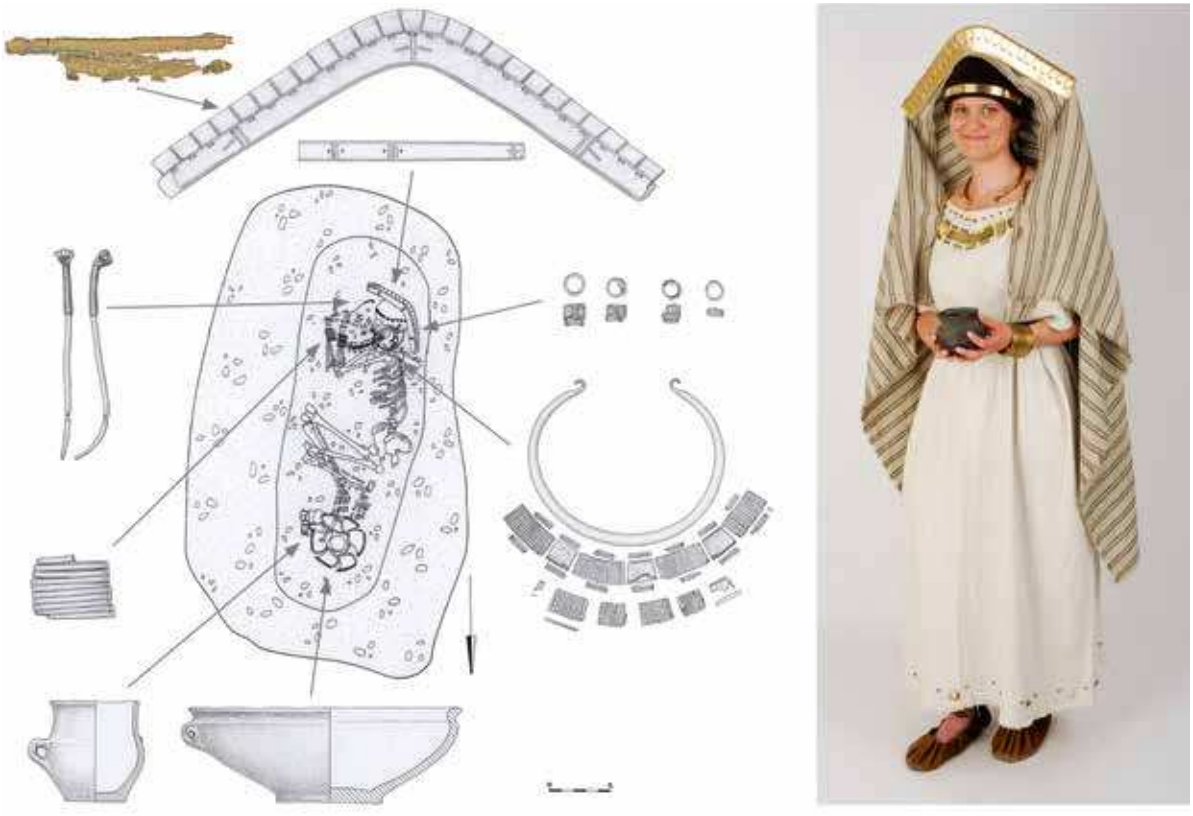

Fig. 199. Franzhausen, Austria: Early Bronze Age Grave 110 with bronze objects and reconstruction. Model: Susanne Mayrhofer.

probably belonged to a veil or other textile head cover attached to the headgear.

Middle Bronze Age

An in-depth analysis of jewellery and metal dress accessories from the Middle Bronze Age Tumulus Culture in Central Europe, that is found across Hungary, Bohemia, Austria and Southern Germany[779], observed a trans-regional pattern of costume, in which women are regularly equipped with two large pins in the shoulder/chest area (Fig. 201); it is rare that only one pin is encountered in women's graves. The question is whether different numbers of pins reflect a different style of clothing (different cut, different silhouette) or whether a similar garment was simply put together in another way.

[779] Sørensen 1997. – Wels-Weyrauch 1978, 1994. – Wiegel 1994, 165–218.

Fig. 200. Franzhausen, Austria: Excavation context of Grave 110 with elaborate headdress.

Some wealthy Middle Bronze Age female burials include massive sheet bronze spirals (*Beinberge*) that covered half the lower legs. Bronze rings worn on both upper and lower arms are also often found in the graves. The small, perforated decorative trim pieces (*tutuli*) are exclusively found in the pelvic area of female burials. The leather scraps sometimes found on their back indicate they were attached to some carrier material. There are also wide sheet bronze belts. Rich jewellery on neck and chest in female graves may sometimes appear outstanding (wheel pen-

dants or spiked disks Fig. 202, heart shaped pendants Fig. 208), for example the massive spiked disks found in a grave in Winklarn, Lower Austria[780].

In isolated cases, a special headdress can be reconstructed from the metal constituents of Middle Bronze Age burials. Sometimes small fabric remnants are found which indicate a veil that was fastened with small bronze pins; at times a bonnet or cap is assumed. A representative headdress was, for example, found in one of the largest Middle Bronze Age necropoles of Central Europe, Pitten in Lower Austria[781]. For the women, most richly adorned with bronze items and buried within this necropolis, a prominent position in society can probably be assumed. Two graves of 30 to 35-year-old women are at the top of the social pyramid, each carrying a magnificent diadem with neck plate. The ornamentation on these outstanding objects with bow and spiral decoration is an allusion to ancient Mycenaean art, which was formative for the European craft style of the middle 2nd millennium BC.

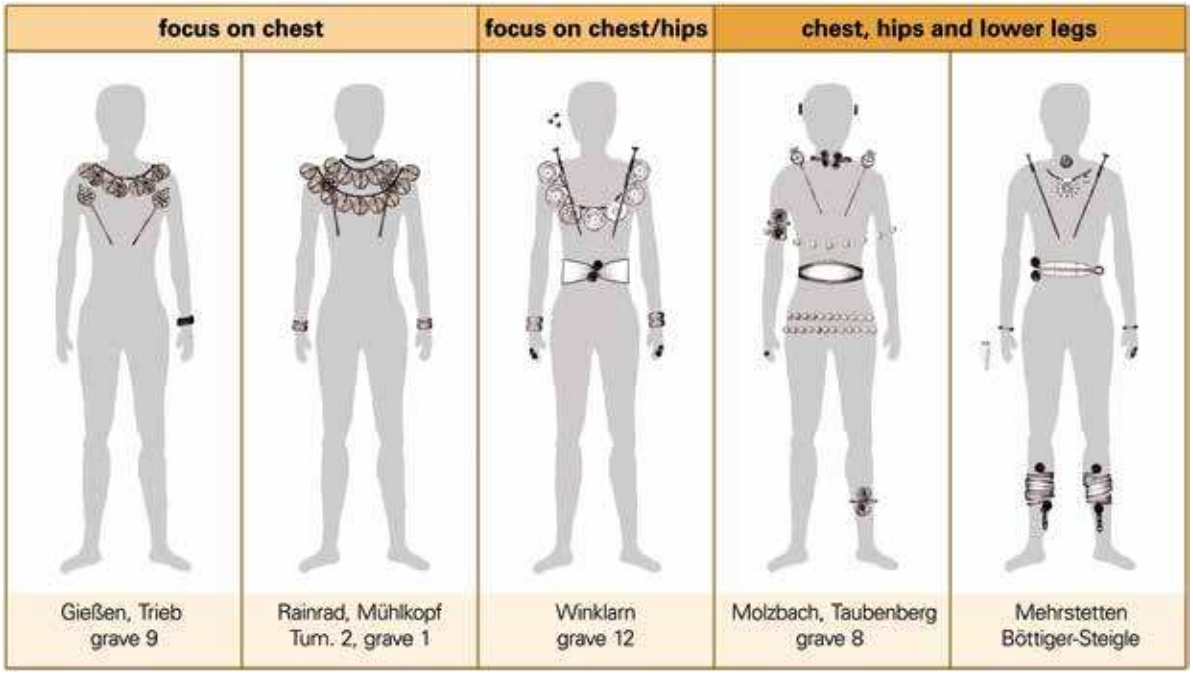

Fig. 201. Middle Bronze Age dress fittings and jewellery from woman's graves in Southern Germany and Austria.

[780] Grömer, Rösel-Mautendorfer and Bender Jørgensen 2013, 222–224.

[781] Urban 2000, 180–184, with figures.

for ornaments; for they not only wear golden ornaments – both chains round their necks and bracelets round their arms and wrists – but their dignitaries wear garments that are dyed in colours and sprinkled with gold.'

This small selection of ancient texts show a clear picture: they describe, for the most part, elements of clothing that emphasise the 'otherness' of northern barbarians in contrast to the civilized (= Roman) world. The most prominent garments for which the name is thus known are the trousers called '*bracae*' and the cloak held by a fibula called a '*sagum*'. Both were later incorporated into the attire of Romans, especially in the military, as the expansion of the Roman Empire to the north demanded suitable clothing for the local climate[863].

5.5 Iron Age head coverings and shoes

Head coverings

Anthropomorphic figures on pottery do not add a lot to our knowledge about head coverings, because they are very schematic. Especially differentiated is the headgear as shown on the works of situla art[864] (Fig. 221 and 230), if people are not shown bare-headed and/or bald. Women are usually depicted with veils of different lengths. Warriors – men armed with swords and shields wear helmets of types known from contemporary finds in the same area. *E.g.* it is possible to compare helmets from Magdalenska Gora or Brezje in Slovenia (type '*Doppelkammhelm*' and Negau, 6th century BC) with depictions on the belt sheet from Vače[865]. Non-armed persons usually have hats of various kinds. The situla from Kuffarn shows a flat, wide-brimmed hat for a socially high-ranking person. The majority of the men on the situla art, however, are depicted with a hemispheric cap or a beret. Phrygian caps, soft conical caps with the top pulled forward, are also common in the eastern Alpine region.

[863] For men's clothing, see Croom 2002, 31–59; – Speidel 2012.

[864] Lucke and Frey 1962. – Turk 2005.

[865] Kern *et al.* 2009b, 13 and 21.

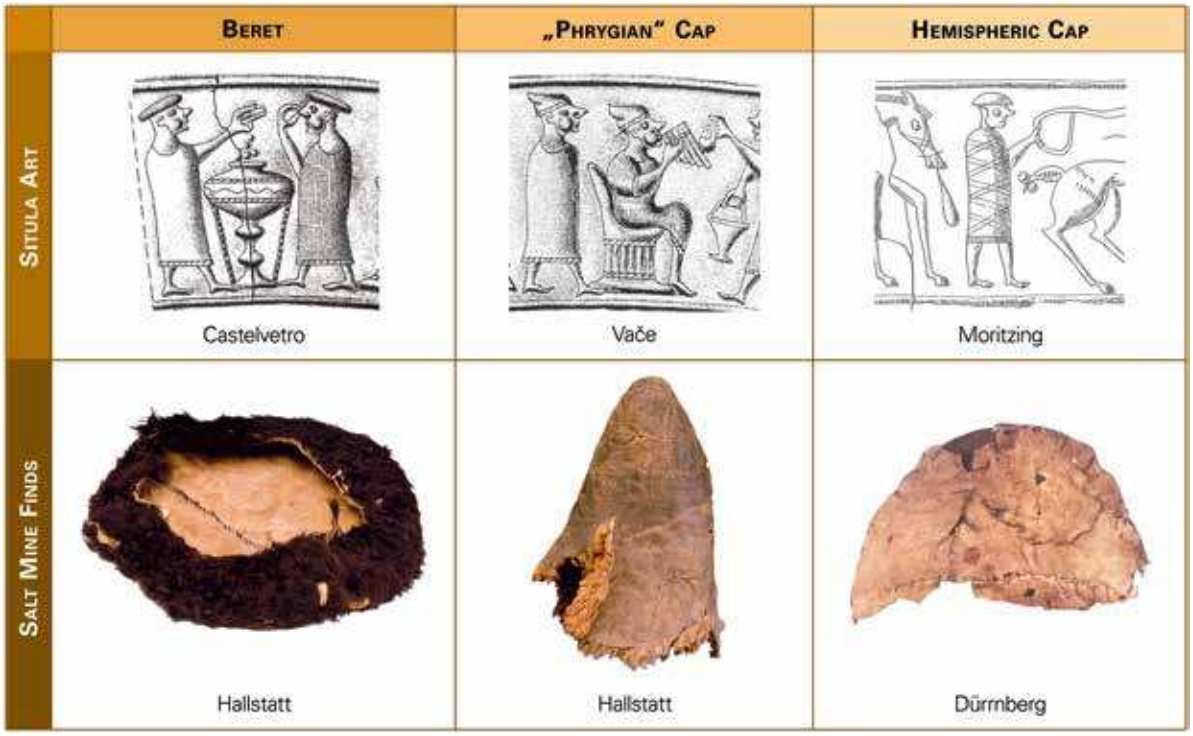

Fig. 230. Headgear from the Iron Age salt mines of Hallstatt and Dürrnberg in comparison with depictions on situlae, Iron Age.

It is very interesting that we have contemporary finds from the salt mines in Austria (Fig. 230), especially of the headgear, which are all made of leather or fur[866]. So far, the flat cap, the beret and the Phrygian cap have been found in Hallstatt, the hemispherical (globular) cap in Dürrnberg. The Phrygian cap made of fur was worn with the hair side inwards. The beret-like caps were made of sheepskin, by gathering a circular piece with a leather strap. In this case, the hair side was worn towards the outside. All of those items belonged to the workwear of the miners from the salt mines as functional and protective head coverings. As we can compare them with the contemporary depictions, they were worn by men. There is one example among the berets found in Hallstatt that belonged to a small child – as can be seen in the size of the item[867]. Scarce depictions of children (situla of Kuffarn) also point to the beret type of head gear for them.

Grave finds of headgear of high-ranked male persons are known in the princely tombs of the late Hallstatt and early La

[866] Popa 2009, 105. – Stöllner 2002, colour pl. 10.

[867] Pany-Kucera *et al.* 2010, fig. 8.

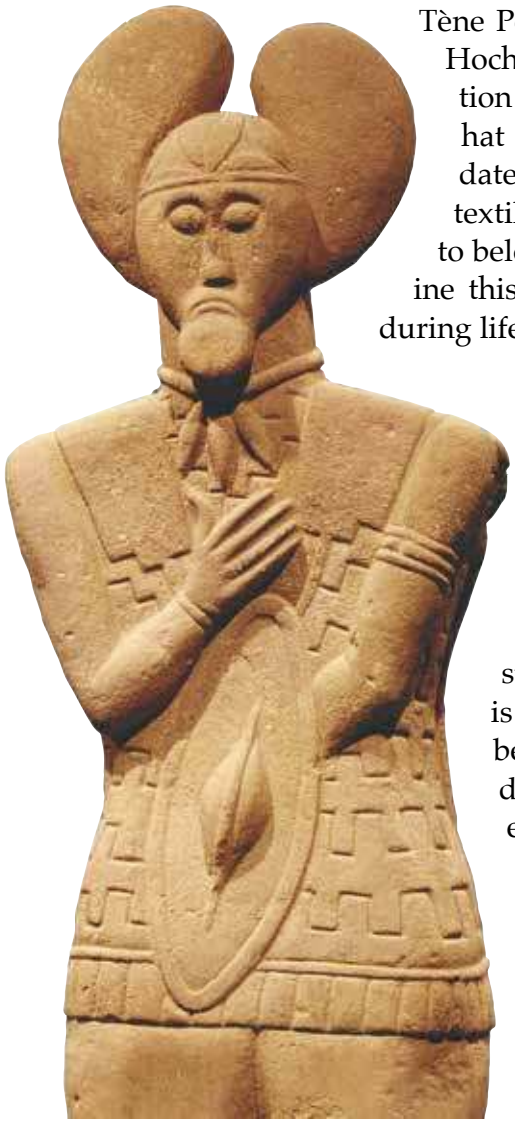

Fig. 231. Glauberg, Germany, statue with leaf-shaped crown, *c.* 400 BC.

Tène Period in Southern Germany[868]. From Eberdingen-Hochdorf a pointed birch hat was found. More attention has to be drawn to the big leaf-shaped crown or hat (Fig. 231) depicted on the statue from Glauberg, dated around 400 BC. Metal wires, wood, leather and textile remains found in grave 1 could be reconstructed to belong to such a leaf-shaped crown. So we can imagine this depiction to have had a real counterpart worn during lifetime as well.

Hallstatt period inhumation graves contain a lot of bodily adornment. Typical metal objects around the head of female individuals are bronze rings and bronze pins[869], *e.g.* at Hallstatt or Gießübel, Tum. 18, grave 6. The position of the bronze pins suggests their use as hair-pins, or as part of some otherwise perishable head-gear such as a veil or bonnet. Grave 464 from Hallstatt is remarkable because there are hundreds of amber beads around the head (Fig. 232), which may have decorated a bonnet. The Early La Tène period cemetery of Dürrnberg is representative concerning inhumation graves in this region. Metal objects as remains of headgear are very scarce, sometimes in women's graves pins and bronze rings appear (Fig. 227). In one case a very rich adorned woman wore a bronze ring around her head, together with a torques around her neck, beads of a necklace, fibulae and rings around her arms and ankles[870].

Like other elements of dress – the most famous being the use of paired fibulae on the shoulders and belts with metal fittings – the use of different hats, caps, veils and bonnets were developed

[868] Glauberg: Bagley 2014, 415, Kat. Nr. 118. – Bartel 2002, 163–167. – Frölich 2006. – Hochdorf: Biel 1985.

[869] Gießübel: Banck-Burgess 2012b, 41. – Hallstatt: Grömer and Kania 2006; – Kromer 1959.

[870] Moosleitner *et al.* 1974, pl. 189.

F Summary

The roots of our history, as well as the history of the textile craft, reach back to the 'dark ages', the millennia before the Ancient Civilisations and before writing. Textiles, textile production and clothing were essentials of living in prehistory, locked into the system of society at every level – social, economic and even religious.

The cultural and historical importance of textile technology, especially of spinning and weaving, can hardly be overstated. Textile crafts not only produced essential goods for everyday use, most notably clothing, but also utilitarian objects as well as representative and luxury items.

This book is dedicated to historians, costume designers, archaeologists and anyone interested in handcraft and artisanship. The temporal and geographical scope of this investigation is the prehistory of Central Europe, the period before the introduction of writing, which coincides with the Roman occupation in Central Europe. Austrian finds and sites as well as those of neighbouring countries are the primary focus.

The essential textile craft techniques that we still largely employ today date back to inventions in the Stone and Bronze Ages. A major concern of this book is to draw a differentiated picture of prehistoric textile crafts. The numerous individual production steps – not just spinning and weaving – are presented here in their entirety. The historical depth is illustrated by a variety of archaeological sources – from tools and textile finds to written sources of the Late Iron Age. From the first early agricultural societies of the Neolithic period, people developed many ingenious weaving and sewing techniques, as well as types of bindings and patterns that accompany us for the most part until today. From the Bronze Age in the 2nd millennium BC, a 'wave of innovation' can be noted in which the first twill weaves, dyes, colour patterns and spin patterns emerge.

The refinement of textile technologies achieved a first climax in the Hallstatt period, visible in the finer and more diverse wool fabrics of the Iron Age in comparison to the Bronze Age. The Hallstatt fabrics are of high quality, and very decoratively designed by weave structures, colours, patterns and elaborately made borders. This development was perhaps fostered by the emergence of differentiated social structures at the beginning of the Iron Age. The title of the book – 'The Art of Prehistoric Textile Making' – reflects the diversity of decorative techniques of textiles, since it challenges the common perception of primitive simplicity in prehistoric textile technologies.

The weave types constitute an essential design element. By their textured appearance, complex twill variants stand out against simpler plain weaves from the Bronze Age and earlier periods. Using different colours for warp and weft, the patterned effect of twill weaves is even more remarkable with its typical ridges.

In the prehistory of Central Europe, most patterns were designed to emerge during weaving. The design of the pattern goes hand in hand with their production technology. The system of warp and weft threads emphasises the vertical and horizontal directions. Stripes and checks of various kinds arise organically by using different colours for the warp threads and repeating colourful weft threads. Spin patterns are also created during the weaving process, which were very popular in the Central European Iron Age.

Creating curvy, non-linear shapes required resorting to other techniques. To achieve those, various pattern-forming entries in the weft as well as floating elements on a base fabric could be applied. The incorporation of different elements provided a wide sphere of activity for creative prehistoric people. Embroidery, sewing technology's little sister, has so far only rarely been detected in Central Europe, and yet it can be traced through the ages from the Bronze Age onwards. Tablet weaving is a special weaving technique utilising four-holed tablets that allow complicated and figurative designs. Tablet weaving had its heyday in the Central European Iron Age, and provided a rich field for creative work in pattern design: there is almost no limit for this technique, as archaeological and historical textile finds impressively testify.

In this book, every effort is made to correct the common misconceptions of prehistoric textile crafts being primitive. Questions of the organisation of production, labour division and the people involved in textile production are considered. Textiles and textile tools can give us a first indication of the level of production – starting from the level of household production in the Stone and Bronze Ages and culminating in more industrial level workshop production in Roman times. The evidence for Central Europe, albeit scanty, suggests that most textiles were produced in the domestic sphere during the Neolithic, but that specialist

weavers and mass production emerge during the Iron Age. It is also a delightful challenge, to create a hypothesis about 'the people behind', about textile producers and consumers. We can find traces in every settlement of where they lived and worked. Spindle whorls, loom-weights and needles in graves may indicate that their owners were textile workers, but also may demonstrate their special status.

Textiles were not only produced for clothing. Like today, they fulfilled a number of different functions in everyday life. We have presented evidence of wall hangings, pillows and mattresses dating back to prehistoric times. Textiles were used as transport bags in salt mines and as padding for scabbards. Even after wear and tear, the 'resource textile' – produced with so much time and effort – was handled thoughtfully. More than once, veritable 'recycling' has been observed. Discarded materials were used as makeshift binding material, as packaging material and even for dressing wounds.

The book concludes with a comprehensive chapter about clothing in prehistory. Different archaeological sources such as textile objects, rare finds of complete garments, jewellery in graves and iconographic evidence were compiled; Greek and Roman written sources enlighten some aspects of textile art at the end of prehistory. Neolithic depictions of clothed people on figurines, stelae and carvings show some representations of clothing which can be technically interpreted. But were the loincloths and aprons shown on the (cult) statuettes of the Early and Middle Neolithic reserved for ritual purposes, or were they also used in everyday life? Whether the garment of the Neolithic period may be reduced to a simple belted dress silhouette is questionable. An upper garment, open at the front, is definitely part of the repertoire; it is a basic type that is also known from the clothes of the Iceman. The way the garment was built can clearly be traced to working leather. Various hats and forms of shoes made of plant materials as well as all the equipment of the Iceman with his leggings, loincloth, bearskin hat and multi-component shoes show us the diversity of clothing in the Neolithic period. A certain optimisation and tweaking of the clothes for particular purposes may already be seen at this time.

In the Bronze Age, the lack of human representations in Central Europe drastically affects our knowledge about the forms of clothing. From Northern Europe, however, complete garments are known: women wear a combination of blouse and skirt or string skirt; men a loincloth or wrap-around and an oval cloak. The Central European dress elements recovered from graves, such as pins and metal trimmings, do not exist in this form in Northern Europe. We thus do not know with certainty which kinds of clothing they belonged to and how the garments were designed.

The Iron Age, however, delights us with numerous sources. Both the archaeological finds, the finds from graves, as well as pictorial representations in Central Europe indicate a variety of different garments. All this is complemented by original finds of garments from the centuries around the beginning of Common Era from Northern Europe: tunics, rectangular cloaks, skirts and dresses. For the first time in the history of Europe, trousers emerged – a form of garment that, like the shirt-like tunic, remained essential to the development of European fashion ever since[944]. Particularly interesting are the written sources by ancient authors, to whom we owe descriptions and even the names of various pieces of clothing for the first time in Central European clothing history: *bracae* for trousers and *sagum* for the rectangular cloak held together by fibulae.

Iron Age women's clothing in Central Europe certainly consisted of shirt-like (sewn) dresses, veils and cloaks; combinations of skirts and tops are also possible. The *peplos* with flap, however, is not attested in pre-Roman times. The location of paired fibulae at the shoulders, which are frequently seen as evidence of the *peplos*, can also be interpreted in various other ways. The multiple colours of Iron Age garments are noteworthy, as demonstrated both in the written sources and by the Central European textile finds – especially those from the Austrian salt mines. Various forms of headgear and footwear complete our picture of Iron Age clothing. Not all questions have been answered and we are far from being able to paint a full picture of the clothing for the whole population of each prehistoric period. First indica-

944 *Cf.* Bönsch 2001.

tions of individual garment shapes, footwear and headgear are, however, already possible. In the spirit of the research project '*DressID – Clothing and Identities. New Perspectives on Textiles in the Roman Empire* (2007–2012)', the book is further concerned with illuminating the importance of clothing and jewellery in the prehistoric period. Clothing not only protects against wet, heat and cold; the psychological effects of clothing as well as the social meaning, as an important medium to communicate identity and as indicator of power and status, cannot be underestimated. Like today, clothing was an important non-verbal means of communication, expressing details about its wearer such their social status, age, gender and group membership.

Today, as then, clothes had a role in identity creation for the individual and for the group. Textiles and the skill of craftsmanship with which they were created contribute much to this visual effect. This monograph interweaves the topics of prehistoric textile art, the history of the textile craft and the history of clothing.