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Picking up the threads: Reconstruction of the 1600-year-old tapestry from Poprad-Matejovce based on new analyses of colours, fibres, and motives

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Abstract

The unique grave from Poprad-Matejovce, excavated in 2006 and dated to the late 4th century AD, is already well known to the NESAT audience. Preliminary results from the laboratory research of the in situ blocks with organic material lifted from this grave were first presented in Esslingen in 2011. The recovered textiles were then shown on a poster in Hallstatt, in 2014, and at the Liberec conference in 2017, a talk was given about the multicoloured tapestry. The international and multidisciplinary project researching the Poprad grave for 16 years now has been the source for many wonderful and new discoveries. Finally, the project is in its last stage, preparing the results in a manuscript and in a permanent exhibition. The aim of this chapter is to pick up the threads of the previous work and to show the slit tapestry in a completely new light, based on recent findings. This is demonstrated by presenting the new methodology of reconstruction of the tapestry fragments via technological features as well as via final colour information, including new additional dye and fibre analyses. The intent is to answer essential questions to create a greater picture, namely: how the tapestry was produced, what its motifs tell us, and the purpose for which it was used. A reconstruction of the design of this fabric will be shown for the first time in this chapter.

Keywords: Tapestry, Late Roman Period, Germanic chamber grave, madder, kermes, motives, reconstruction

4.1. Introduction

The aim of this paper is to draw conclusions about the Poprad tapestry, based on colour and dye analyses, decoration on the fragments, as well as their position in the grave. We are summarising the knowledge about the coloured motif, its composition, origins, and the possible function of the tapestry.¹

The unique chamber grave from Poprad-Matejovce is dated to the Late Roman/Early Migration Period (i.e. late 370s AD²) and was found in 2005 in northern Slovakia (Pieta and Roth 2007; Belanová and Pieta 2007). The main institutions involved in the research are the Institute of Archaeology of the Slovak Academy of Science in Nitra, the Schleswig-Holstein State Museums Foundation's Museum of

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² The scientific dating of the grave was carried out by Peter Barta (Department of Archaeology, Comenius University in Bratislava) and John Meadows (ZBSA and Leibniz-Labor für Altersbestimmung und Isotopenforschung of the Christian-Albrechts Universität in Kiel).

Archaeology, and Centre for Baltic and Scandinavian Archaeology, Schloß Gottorf in Schleswig, and the Podtatranské Museum in Poprad. A rescue field excavation took place in 2006. Since then, the GIS documentation, laboratory excavation, conservation and restoration of all finds, analyses, evaluation, and interpretations were carried out by an international and multidisciplinary team under German-Slovak supervision (Lau 2017: footnote 1; see also Lau 2021; Štolcová 2016).

The princely grave from Poprad was located in a five-metres deep pit. It consisted of a large log-built chamber with its own roof, and a sarcophagus-like inner chamber with its own gabled roof. Both chambers were built from European larch wood³ and were very well preserved (Lau and Pieta 2014; Pieta 2009). The architecture of the inner chamber refers to the so-called *domus aeterna* in Roman funerary contexts (Lau and Carnap-Bornheim 2021: 328). A young man, about 20 years old, belonging to a local Germanic elite was buried here.⁴ Thanks to the forced entry in the grave, which must have happened a few years after the burial causing the flooding of mud and water, its organic content was well preserved due to a waterlogged environment (Lau and Pieta 2017). Finds not taken by ancient robbers include a lathe-turned wooden bed and table (Lau 2017), a wooden stool, and a wooden transport construction (a bier). Furthermore, there were a few small metal and amber finds, food remains (pig bones and nuts), vessels from metal, wood, and ceramic, a wooden gaming board with glass gaming pieces, the remains of a wooden candlestick, tools including wooden shovels, an axe and a hoe, a large collection of leather finds including a bow case, and various textile remains, including tapestry fragments and some golden threads (Štolcová and Lau 2013; Štolcová et al. 2014).

4.2. Tapestry textiles from Poprad

In situ blocks with fragile organic materials, like textiles, leather, and wood were excavated under laboratory conditions (Štolcová et al. 2009; Štolcová and Zink 2013; Štolcová et al. 2014). At this time, a number of textiles were also documented in a very decayed state, for example tabby and twill fabrics, tablet-woven pieces, a sprang fragment, various threads, remnants of gold foils and gold threads, along with a multicoloured tapestry (Figure 1) which was described in detail during the NESAT XIII conference in Liberec (Štolcová et al. 2017).

When preparing the overall interpretation and final reconstruction of tapestry for public dissemination, we realized that more analysis was needed, especially on colours.

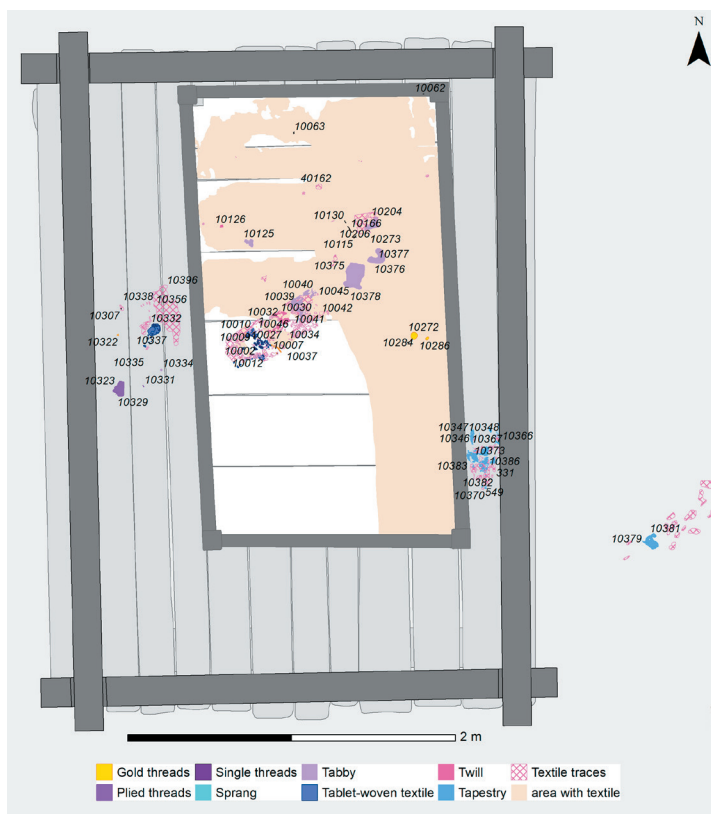


Figure 1. Plan of the grave with the distribution of all textile types. Tapestry was found in six blocks, of which four were excavated in the laboratory and two have been left for the future research. (GIS: K. Göbel; Design: T. Štolcová)

³ Archaeobotanical analysis of the wood was carried out by Mária Hajnalová (Department of Archaeology, Constantine the Philosopher University in Nitra) and Jana Mihályiová (Institute of Archaeology of the Slovak Academy of Science in Nitra).

⁴ Anthropological analyses were carried out by Július Jakab and recently updated by Zuzana Hukeľová (both Institute of Archaeology of the Slovak Academy of Science in Nitra).

Altogether, about 150 fragments of tapestry textiles were located exclusively outside the inner chamber, id est thrown away during the robbery process (Štolcová et al. 2017: 64, Fig. 3).

The tapestry fragments are consistent with each other; they are made of sheep's wool and woven in a weft-faced tabby (slit-tapestry) with z-spun threads in both systems. The weave count is around 8–10 warp threads and 12–23 weft threads per centimetre, while the thread thickness is 0.4–0.8 mm in the warp and 0.3–0.8 mm in the weft. The cover factor (0.79–1.07) can be described as medium dense to dense (c.f. Hammarlund 2005: 116), which indicates that the tapestry is generally of a very fine quality (Štolcová et al. 2017: 66). Among other features, the tapestry included evidence for stitching the slits and sewing the seams (Figure 2). During the analyses, small reconstruction projects helped us to understand the technology behind these processes. This was also the case for a border in fragment PM 10366 (Štolcová et al. 2014: 57, Fig. 6e; Štolcová et al. 2017: 64). Both ends of the border were torn off. The border measures about 16 cm in length and 0.4 cm in width. The weave count is around 9–10 threads per centimetre with z-spun threads in both systems, while the thread thickness is 0.61 mm in the warp and 0.59 mm in the weft. The weft yarn of the border served as a warp for the ground weave of the tapestry (Figure 3A). Twined borders are a typical feature for a tapestry woven cloth on a two-beam loom (Ciszuk and Hammarlund 2008: 126). We assume that the warp with the border for weaving the tapestry was done on a warping frame (Hald 1980: Fig. 165), and therefore rule out the use of twining techniques to make this border. The result of our reconstruction was a finger-woven starting border with two warp loops (Figure 3B). However, we consider the use of this technique with low technological compatibility in combination with a warping frame to be inefficient, and the border was most likely made by weaving on two tablets.

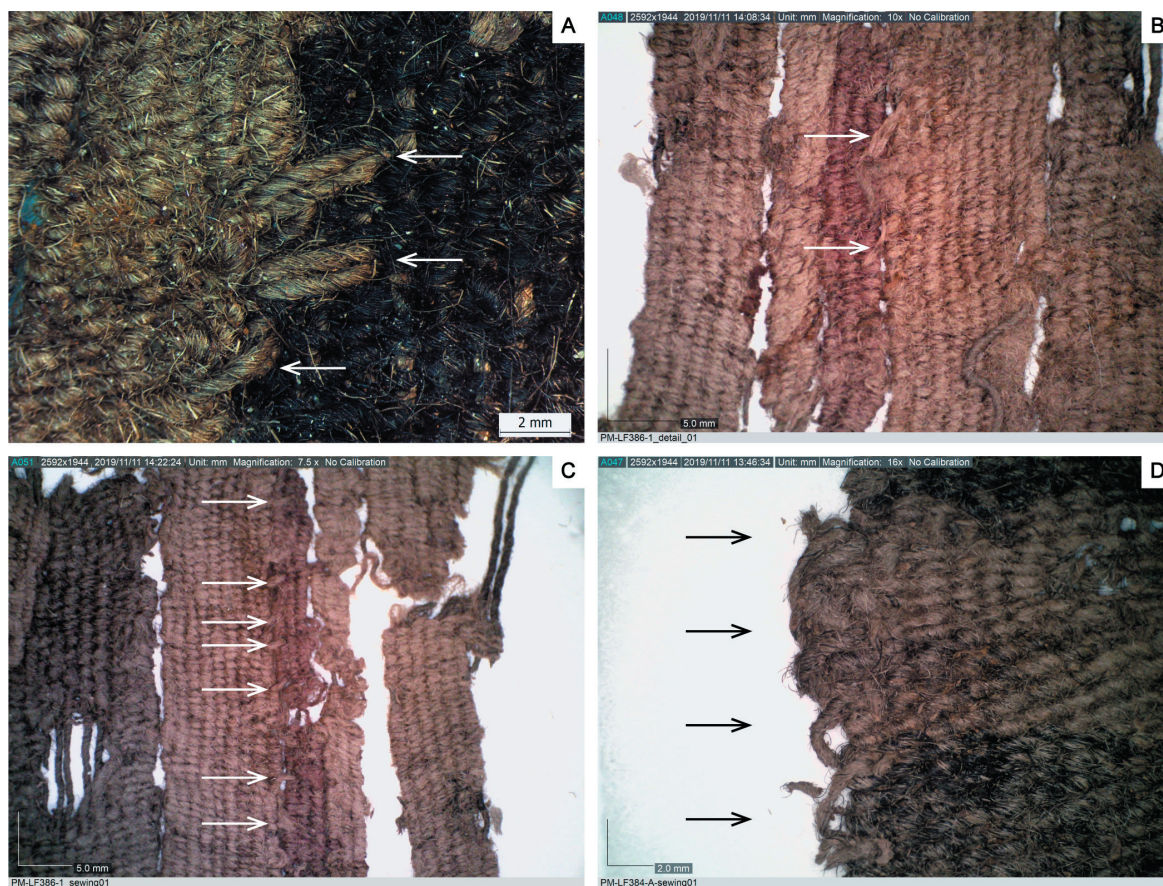


Figure 2. Details of sewing and stitching up the slits in tapestry from Poprad. a) PM10346, b and c) PM10386 and d) PM10384. (Photographs: T. Štolcová)

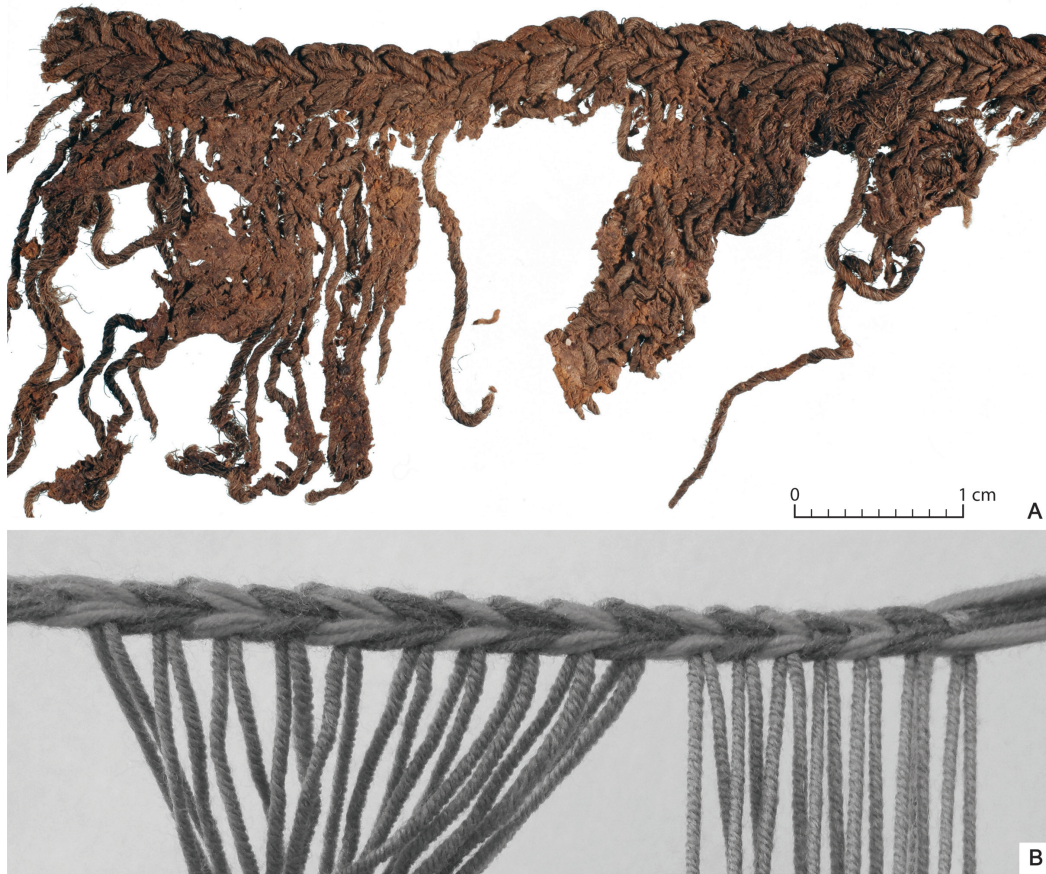


Figure 3. Starting border PM 10366. A: An original piece from Poprad. B: Reconstruction of the border made by finger weaving. (Photographs: T. Štolcová)

4.3. Colour and fibre analyses

4.3.1. Analyses in 2014 and 2016

Previous dye analyses of the slit tapestry fragments PM10346 and PM10379 and of the border fragment PM10366 presented at NESAT XIII in 2017 already indicated that the slit tapestry has a polychrome pattern, with large beige/brown volute motifs on a black dyed background, and highlights in at least two shades of red. Moreover – rather unexpectedly – no dyes were observed in the different threads used for the V-shaped decoration in the central part (Štolcová et al. 2017: Fig. 5).

4.3.2. Analyses in 2019 and 2020

Sixteen more samples were investigated more recently, either to refine or to confirm the previous dye results (Figures 4, 5, and 6, Table 1). They were selected not only from the main textile PM10346, but also from the nearby fragments PM10382-1A, PM10384-A, and PM10386-1 from other blocks. These textile fragments show different patterning, but they have similar fibre quality, thread count, and colours.

New analyses of the brown samples (SP 348, SP 351, SP 350, and SP 349), indicated that the area to the left of the red vertical stripe and the vertical border on the right side of the largest tapestry fragment PM10346 were undyed (Figure 4). This is also the case for the central area below the black weaving with the brown volute motifs, and for the half-moon patterns. The re-examination of the different threads (samples SP 352, SP 353, and SP 354) of the V-shaped area in the centre confirmed

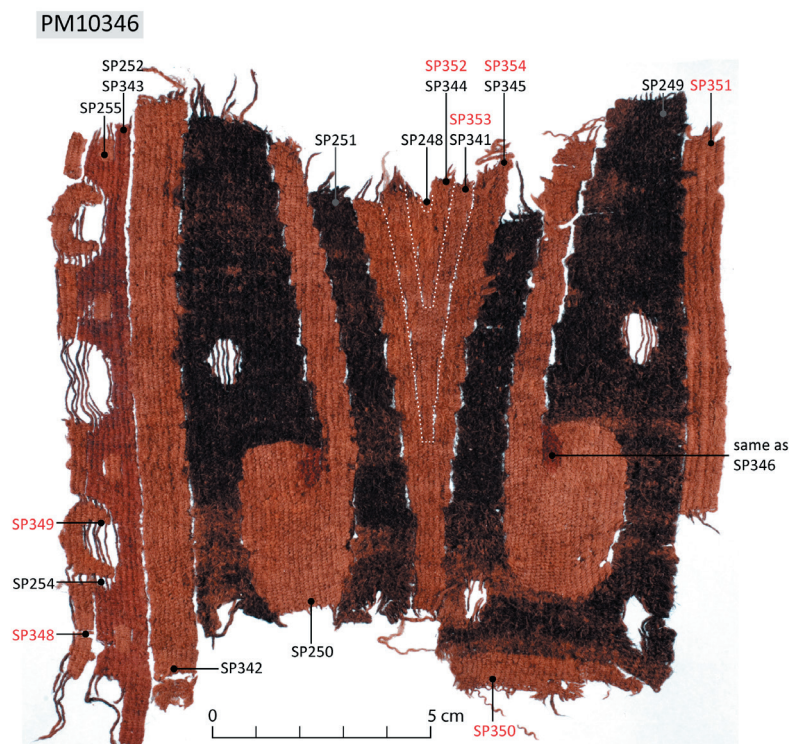


Figure 4. New samples (in red) taken in 2019 from the main tapestry fragment PM10346. (Image: T. Štolcová)

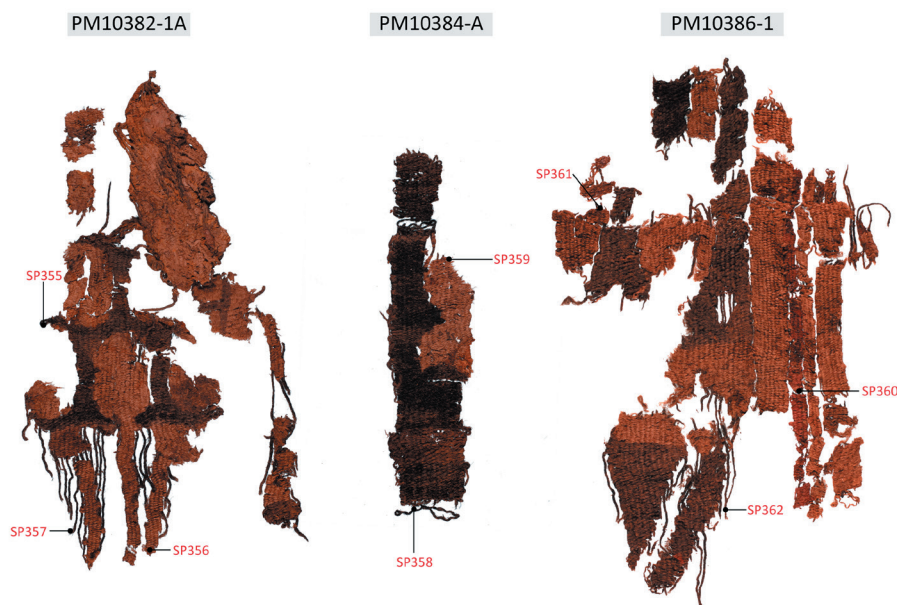


Figure 5. Samples taken in 2019 from fragments PM10382-1A, PM10384-A and PM10386-1. (Image: T. Štolcová)

the absence of dyes. Slightly varying beige/brown shades of these threads were obtained by using different ratios of unpigmented and pigmented fibres during yarn production.

A comparison with the samples selected from other fragments gave the following information. The black weft (SP 355 and SP 358) and warp (SP 357 and SP 362) were dyed black with tannin, while no dyes were found in the brown wefts (SP 356, SP 359, and SP 361). It must be noted that no SEM-EDX analysis was executed to further confirm the presence of iron salts in the black samples, as the similarity with the black threads from the largest fragment PM10346 is clear.

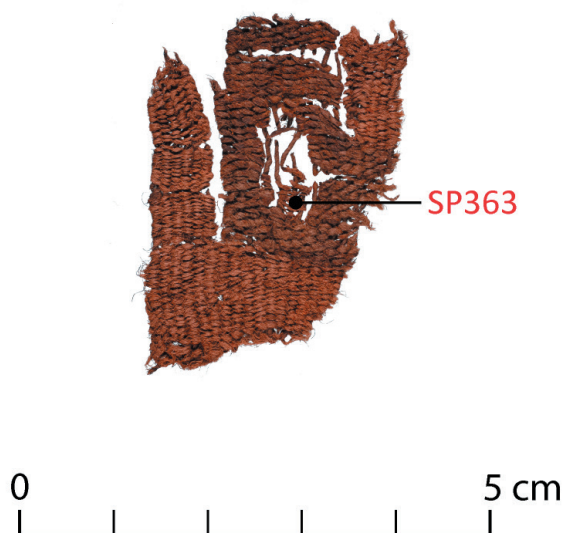


Figure. 6. Sample SP 363 taken in 2019 from tapestry fragment PM10404. (Image: T. Štolcová)

A second madder dyed vertical stripe was identified based on the analysis of sample SP 360 from fragment PM10386-1 (Figure 5) which was found very close to the large fragment. The presence of this red stripe might be an indication that the fragments originally belonged together. No SEM-EDX analysis was executed here to investigate the presence of an iron mordant either.

The recent analyses could also provide more conclusive information about the mysterious missing threads with repeated patterns of oval openings. An almost complete absence of this thread in the previously studied fragment PM10346 prevented any possible dye analysis (Štolcová et al. 2017: 64). However, a small remaining thread was found more recently in a similar motif with missing threads in fragment PM10404 (Figure 6). This weft thread is thinner than the threads used in the fabric surrounding this motif. Furthermore, it is very flattened and tremendously fragile. Backscattered electron imaging of the fibres allowed the fibre type to be determined as animal hair fibres based on the detection of a scale structure on the fibre surface (Figure 7). The presence of sulphur in the EDX element spectra was also detected, hence confirming previous investigation of a similar remnant of the fabric PM10346 (Štolcová et al. 2017: Table 2). Kermes and ellagic acid were identified in the HPLC-DAD analysis of this sample (Table 1). It can be concluded that this weft thread was dyed red with dyes from the kermes scale insect (*Kermes vermilio* Planchon), using tannins as the mordant (Figure 8).

Dyeing wool or silk with kermes has been known since prehistoric times (Cardon 2007). The main dyestuff, kermesic acid, is a mordant dye, thus dyes in a similar way on mordanted wool or silk

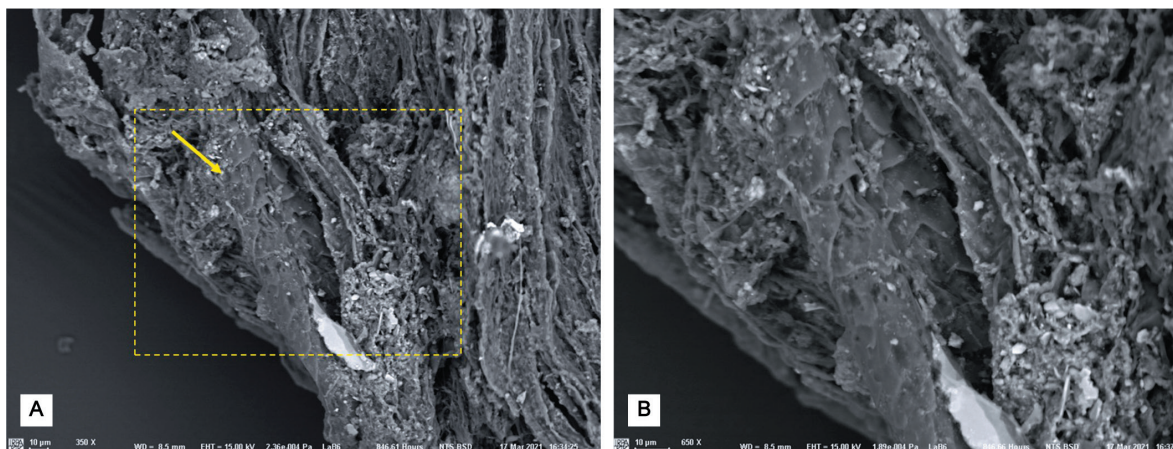


Figure 7. Backscattered electron images with visible scale structure of the almost completely disappeared weft thread from sample SP 363. A: Magnifications x350. B: magnification x650. (Images: I. Vanden Berghe and A. Coudray)

Table 1. Dyes and mordants in the new samples of slit tapestry weave fragments (I. Vanden Berghe).

Sample code	Textile fragment	Sample description	HPLC-DAD: detected components (trace compounds between brackets)	SEM-EDX marker elements	Dyes (and mordants)
SP348	PMI0346	Brown weft, taken next to purple stripe	(alizarin, purpurin)	Not analysed	No evidence of dyeing *trace of madder likely from contamination of purple strip
SP349	PMI0346	Brown weft from the half-moon	(100 alizarin)	Not analysed	No evidence of dyeing *trace of madder likely from contamination of purple strip
SP350	PMI0346	Brown weft from the area below the black weaving	–	Not analysed	No evidence of dyeing
SP351	PMI0346	Brown weft from the right side border	–	Not analysed	No evidence of dyeing
SP352	PMI0346	Brown weft, interior stripe v-shape	–	Not analysed	No evidence of dyeing
SP353	PMI0346	Brown weft, middle stripe v-shape	–	Not analysed	No evidence of dyeing
SP354	PMI0346	Brown weft, exterior stripe v-shape	–	Not analysed	No evidence of dyeing
SP355	PMI0382-IA	Black weft	100 ellagic acid	Not analysed	Tannin
SP356	PMI0382-IA	Brown weft	–	Not analysed	No evidence of dyeing
SP357	PMI0382-IA	Black warp	100 ellagic acid	Not analysed	Tannin
SP358	PMI0384-A	Black warp	100 ellagic acid	Not analysed	Tannin
SP359	PMI0384-A	Brown weft	–	Not analysed	No evidence of dyeing
SP360	PMI0386-I	Purplish red weft	alizarin, purpurin, nordamnacanthal + (munjistin, anthrapurpurin, alizarinprimveroside and xanthopurpurin)	Not analysed	Madder
SP361	PMI0386-I	Brown/purple? weft	(ellagic acid)	Not analysed	No evidence of dyeing *trace of tannin likely from contamination of black yarns nearby
SP362	PMI0386-I	Black warp	100 ellagic acid	Not analysed	Tannin
SP363	PMI0404	Degraded (missing) threads	kermesic acid, ellagic acid	S, Al, Fe	Kermes and tannin and metal salts (iron, aluminium, sulphur)

as other anthraquinone dyes such as dye compounds from madder. Tannins were used as an organic mordant and the SEM-EDX analysis additionally indicates the presence of iron in the fibre, but to a greater extent in particles on the fibres' surfaces.

However, there is no direct clue to the cause for the complete degradation of only these fibres. Presumably, these fibres were used or reused from a different origin – and different treatment – than the other fibres on this fabric. The recent analyses show that, in addition to the motifs dyed with madder, the polychrome tapestry fabric contains other important highlights that were made – consciously or unconsciously – with the most expensive and prized red dye ever developed.

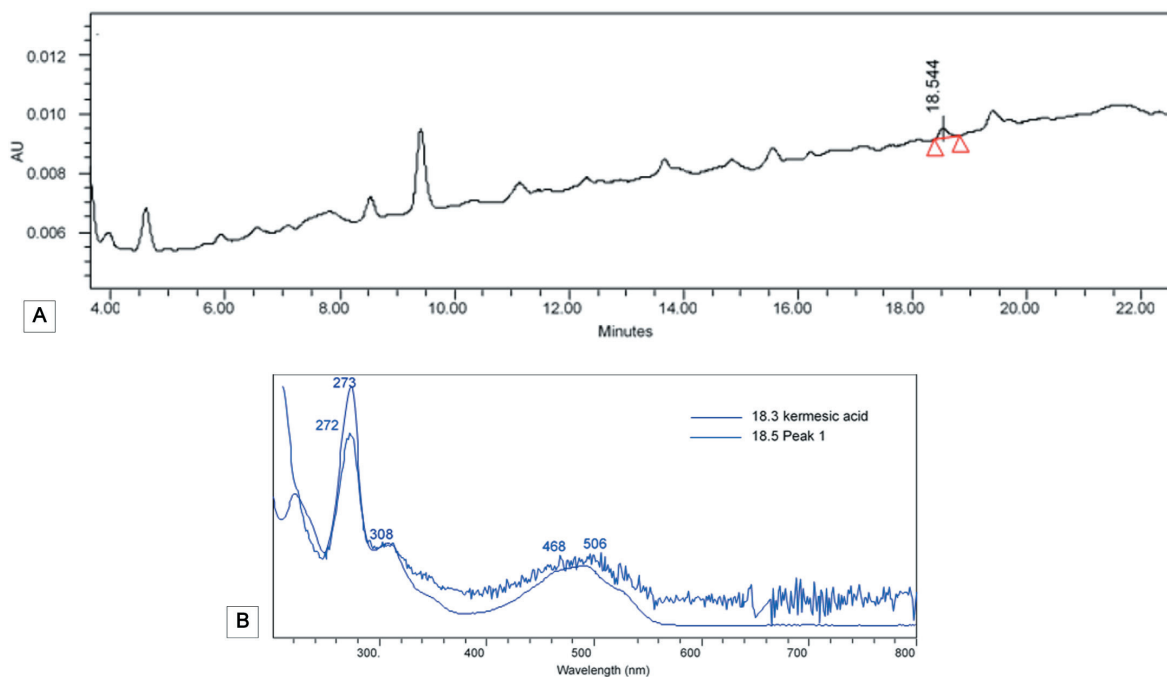


Figure 8. Sample SP 363. A: DAD chromatogram (at 270 nm) with indication of kermesic acid peak. B: UV-vis absorbance spectra of kermesic acid in the analysis compared to the reference spectrum. (Images: I. Vanden Berghe)

4.4. Analysis of the motives of tapestry

Following the results of the above described dye analyses, the next step was to analyse the formal aspect of the decoration of the Poprad slit tapestry. In addition to the final conclusions about the original colouring of the tapestry, the analyses were also carried out to draw conclusions about the origin of its decoration and, consequently, about the function of the original fabric.

4.4.1. Sorting out the fragments

The first analysis of the fragments showed that they contain elements from at least two distinct motifs. The fragments were therefore subsequently divided into three groups, based on the similarities of these elements (Figure 9).

The first group is the most representative. It contains the largest fragment PM10346 preserved with a motif composed of a central triangle and two volutes. The motif is placed in the area complemented by dots. We call it the main motif. However, it is not clear if it was also the main motif in the decoration of the fabric as a whole. On the edge of the fragment outside the main motif, elements in the form of a half-moon and a square alternate. In addition to the largest fragment, the first group contains other pieces with elements or parts of elements present on the largest fragment. The second group contains a honey-comb motif PM10382-1A, which was only found on a few fragments. The third group does not show any clear motif; thus, it consists of various fragments, which could not be categorised in the two previous groups.

4.4.2. Reconstruction of the composition of the main motif

Due to the high degree of fragmentation of the decoration of the preserved tapestry, it was only possible to deal with the reconstruction of the main motif (PM10346). This was the only case where we could identify not only the elements which composed the motif, but also the relationship of the

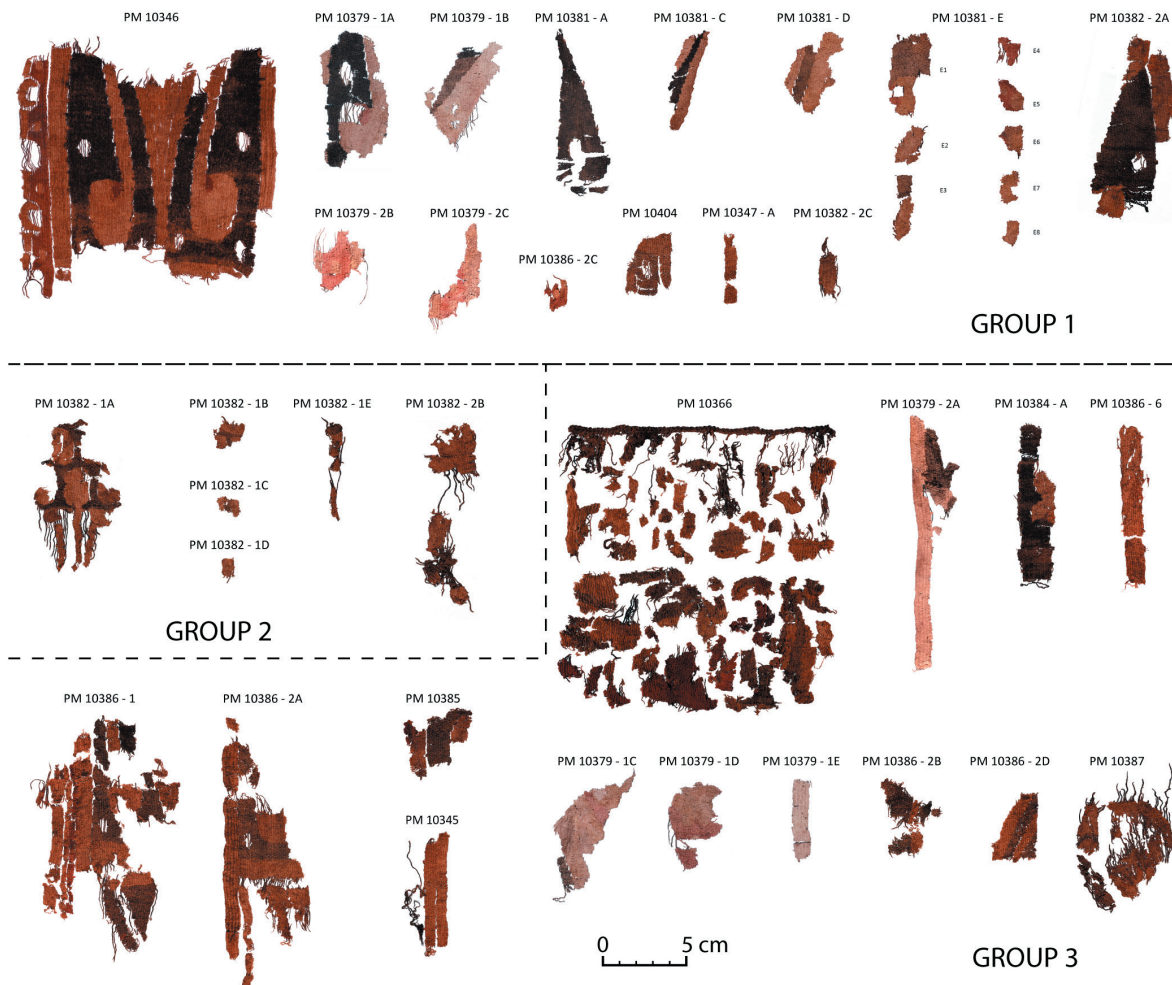


Figure 9. A representative selection of tapestry fragments from Poprad divided into three groups according to motif. (Image: T. Štolcová)

elements in its composition. Therefore, we focused on the first group of fragments. First, we tried to find out how many repetitions of this motif could be reconstructed from the preserved elements – even partially. The fastest and most effective way turned out to be good old-fashioned working with foils, over which we drew or printed out the fragments in 1:1 scale and overlapped them. We discovered that fragments from the first group come from two more recurrences of the main motif. At this stage of the reconstruction, we also found that there were also two fragments that differed in detail from the main motif in the first group. For example, the half-moons were missing in some of the fragments.

4.4.3 Parallels of the main motif

The starting point for the search for parallels to the main motif, and thus its possible origin, were its unequivocal elements. The first was the volute, as it was also present in other artefacts in the grave: a triangle-shaped open work leather appliqué, and a pattern of a gold embroidery with a volute as the basic element (Figure 10).

It seems very likely that the tapestry decoration, the openwork leather appliqué, and the gold embroidery formed a homogeneous group in terms of decorative elements and the style of decoration. In other tapestries around the world, we have found the volute, but not in a composition that corresponds with the motif from the largest piece. Separate volutes did not provide any more clues

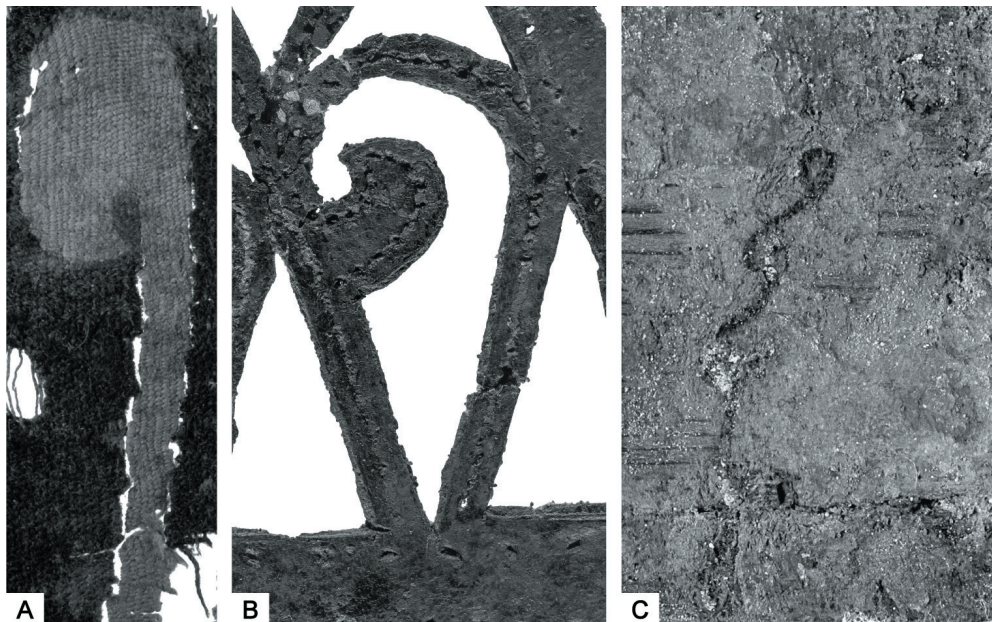


Figure 10. Volute from the main motif in tapestry PM10346, detail of an open work leather appliqué PM10072, and the so-called running dog consisting of volutes made of golden threads PM10038, most probably from an embroidery. (Photographs: T. Štolcová)

and other individual motifs such as dots, squares, and half-moons were rather complementary in the composition of the decoration of the largest fragment and therefore too non-specific. We further worked only with the whole main motif.

The search for parallels to the composition consisting of two volutes facing away from each other with a triangular element between them led us to the decoration of volute capitals of Ancient Greek columns (Figure 11). Among distinctive motifs of Ionic capitals, there are two volutes placed on the sides of a palmette, enriched by egg-and-dart elements (Kočišová 2020). The discovery of the connection of the main motif with the decoration of the Ionic capitals of classical Greece was the impetus for the correction of the orientation of the motif and fabric as a whole (c.f. Štolcová et al. 2017: Fig. 5).

Consequently, we focused on the search for the form of the motif in the decoration of column capitals, which would be as close as possible to the form of the main motif from the tapestry as for the elements. When searching for more volute motives in prehistory, we found the motif on a



Figure 11. A: Drawing of the main motif from the largest tapestry fragment by Kelvin Wilson. B: Ionic capital with volutes, palmettes and egg-and-dart elements (source: <https://www.flickr.com/photos/cogdog/4913892997/>). C: The largest fragment with the main motive turned. (Images: T. Štolcová)

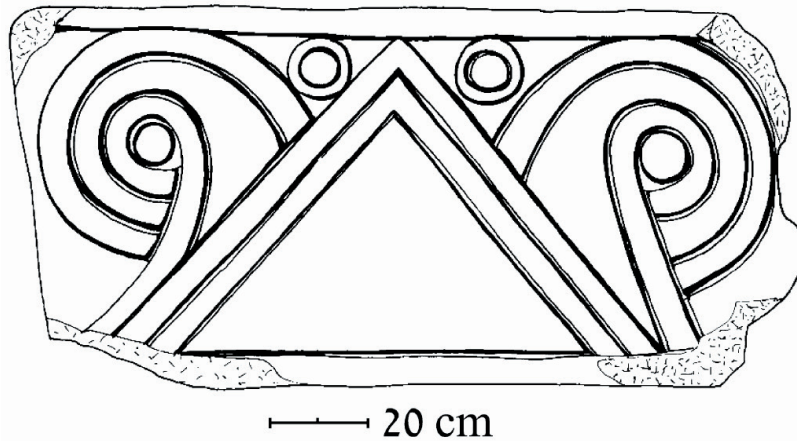


Figure 12. Volute capital from el-Mudeib' in Moab, Jordan. (Drawn by authors after Lipschits 2011: Fig. 4)

volute capital interpreted as a central triangle with two volute spirals at both sides and concentric circles, which is characteristic for the Proto-Ionic or Proto-Aeolic order (Figure 12). Such finds were discovered in archaeological excavations mostly from Israel and Jordan, dated from the 9th to 7th century BC (Lipschits 2011).

4.4.4. Reconstruction of the main motif

Based on the colour and dye analyses, we made the reconstruction of the original colouring of the decorative elements of the largest fragment, of which the main motif is a central part (Figure 13). Due to the form of the Proto-Ionic volute capitals, and considering other fragments of the tapestry from group 1 containing elements of the main motif, we have also created a hypothetical reconstruction of the largest tapestry fragment's entire motif. Given the observation that the tapestry used red dye kermes as a fill for the dots around the main motif, we are inclined to assume that it was also present in the centre of the triangle, where remnants of the red dye were found.



Figure 13: The largest tapestry fragment PM10346. Original piece and a reconstruction of the original colours and main motif based on the analysis by TŠ and JZ, which included fragments from the group 1 and colour and fibre analysis by IVB. (Images: T. Štolcová)

4.4.5. Function of the tapestry

Due to the high degree of fragmentation of the tapestry and its post-robbery position, there are no clues to rely on when identifying the function. It can therefore only be considered based on parallels from other grave finds of technologically and materially related textiles.

In Kerch, Ukraine, several woollen weft-faced tabbies dated to the 1st century AD were found, described as tapestries with stripes, geometric and floral motives of various colours (Gleba and Krupa 2012: Table 20.2). The man buried in Grave 35 in St. Maximin in Trier, which dated to the 4th century AD, probably wore an undergarment decorated with clavus-bands, roundels, and broad stripes made of woollen tapestry (Möller-Wiering and Subbert 2012: 173). We know of younger tapestries as well, for example a Coptic piece with s-spun threads and thread count of 7/46 attached to a helmet from a Frankish boy's grave in Cologne Cathedral, dated to the early 6th century AD. According to Lise Bender Jørgensen, the processing of s-spun threads references an eastern Mediterranean provenance, which is why she associated the fabric with the so-called Coptic textiles of late antiquity or early Islam (Bender Jørgensen 1988: Fig. 1, 127). Another interesting find comes from the Merovingian Grave 58 in Trossingen, dated to the year AD 580 (cf. Niepold in this volume). Tapestry textile, with the same technical features as in Poprad, was found on the upper part of the deceased, and was initially interpreted as a part of an upper garment (Peek and Nowak-Böck 2016: 381–383). However, recent analysis of textiles from this grave shows that this piece of tapestry was more likely a decorative element on the upper part of the body wrapped in another textile, and thus it was not any part of a garment.⁵

Due to the ancient robbery and forced disassociation of all artefacts, in addition to the fragmentary state of the Poprad tapestry, it is difficult to define its original function. Based on the above mentioned finds, and the so-called Coptic tapestry which is represented by the finds from the late antiquity and early Islam, this item was likely produced in the manufacture centres of the eastern Mediterranean from the 3rd to the 8th centuries AD (Schrenk 2004: 16). In this area, many of these tapestry textiles can be interpreted as parts of clothing – burial shrouds, tunics, mantles and shawls, or parts of furnishings (Rutschowskaya 1990: 46–62).

Therefore, the Poprad tapestry could be interpreted as a blanket in the grave to cover the body of the deceased, a piece of garment, or a decorative part of the clothing. Grave furnishings cannot be ruled out either. Moreover, ritual wrapping of grave goods was very common in rich Germanic graves, so this could also have been the case (Elschek et al. 2021: 121).

4.5. Conclusions

Not only the designs, but most possibly the technique itself used in this piece arrived from the Mediterranean to the area north of the Middle Danube region. Unfortunately, the state of present research on Germanic textiles does not allow us to recognise whether the tapestry from Poprad could have also been a new local textile technology reflecting Roman influences. This was the case for the wooden sarcophagus and other artefacts from the grave, which were clearly designed according to Roman burial customs (Lau and Pieta 2014).

However, the recent identification of dyer's kermes, the most expensive and highly valued red dye ever used, indicates extra highlights of bright red colour in the polychrome slit-tapestry weave of Poprad, and also reveals new and important information about the provenance of this textile. Dyer's kermes, the insect living only on the kermes oak, has been part of the cultural heritage of people of the eastern and western shores of the Mediterranean and the Near East since prehistoric times (c.f. map in Cardon 2007: 607, Fig. 1). It was mentioned in the Bible, and also by various Greek and

⁵ We would like to thank for this information to Tracy Niepold, with whom we discussed Poprad and Trossingen finds personally on the 6th of October 2021.

Latin authors. On the other hand, it was also a valuable and easily transportable product that was traded along Silk Road (Cardon 2007: 616–617). An important document on Diocletian's tariffs, published around AD 300, shows that for the Romans kermes was the second most expensive dye after real purple. It was used alone or in combination with real purple (Brunello 1973: 106–107). Archaeological evidence for the use of kermes was previously found in much older textiles in western Europe (Cardon 2007: 617; Rast-Eicher and Vanden Berghe 2015) and in textiles from Palmyra, AD 100–300 (Schmidt-Colinet et al. 2001). Kermes was also rarely detected in textiles from Roman fortress excavations in eastern Egypt (Cardon et al. 2004) despite the complete lack of kermes in other studies of Egyptian textiles from Roman and Coptic periods (Wouters 2009; Vanden Berghe 2011). Its detection here in the Poprad tapestry gives evidence for direct contacts with this ancient world. Based on the presence of proto-ionic motifs and the use of kermes, it is more probable that the whole fabric was imported to the territory North of the Danube, not as raw materials in the form of threads or just a dye itself.

The odyssey of the analysis of Poprad tapestry is almost at its end. Since 2018, a four-volume monograph is being prepared, of which the first volume has just been published (Lau et al. 2022). Since 2019, work is underway on a permanent exhibition in the Podtatranské Museum in Poprad, where the opening of the “Prince of Poprad and his grave” is planned for early 2023 (Pieta and Štolcová 2021). Other tapestry textiles will also be presented here to the public. For this purpose, a replica of the main motif with original colours based on our analyses was made in 2022 in the Moravian Gobelin Manufacture in Valašské Meziříčí, Czech Republic (Figure 14).



Figure 14. Replica of the largest tapestry fragment from Poprad made in the Moravian Gobelin Manufacture in Valašské Meziříčí. (Photograph: T. Štolcová)

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Juraj Zajonc is an ethnologist and works as a senior researcher at the Institute of Ethnology and Social Anthropology of the Slovak Academy of Sciences in Bratislava. The main topic of his research work is the technology of manual textile production, especially in the rural environment since the end of the 18th century. He is the author of the book *Premeny vlákna (Metamorphoses of The Textile Thread, 2012)* on the topic of hand processing of textile raw materials into felt and thread in Slovakia. He collaborates with archaeologists, art historians and restorers in identifying techniques of hand textile production.

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