# Threads from the Depths

Investigating the Origin of Embroidered Textile Fragments from the Burgzand North 17 Shipwreck



MA Thesis
Conservation and Restoration of Cultural Heritage, Textiles


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| Date of Submission: | June 20th, 2025 |

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## Preface

This thesis is the result of my master's research conducted at the University of Amsterdam in the Conservation and Restoration of Cultural Heritage programme. The work focused on investigating a group of decorative textile fragments from the Palmwood Shipwreck. The project combines art-historical, material, and technical analysis to explore the possible origins of these fragments.

## Acknowledgments

I would like to express my deepest gratitude to my supervisor, Marjolein Homan Free, for her invaluable guidance, kindness, and insightful feedback throughout this project. I am especially thankful to Ana Albano Serrano and Maarten van Bommel, whose expertise and unwavering support played a vital role in shaping the direction of this research. My sincere thanks also go to the staff of Huis van Hilde, particularly Martin Veen, for their generous assistance and for facilitating access to the objects.

Special thanks are due to all the scholars and conservators who kindly shared their publications, time and knowledge. I am also deeply grateful to my beautiful classmates, friends, and family for their constant encouragement and support throughout this challenging yet rewarding journey.

*Domaradzka, UvA, 2025.*

## Abstract

This thesis investigates a selection of embroidered textile fragments recovered from the 17th-century Palmwood Shipwreck (BZN17), discovered off the coast of Texel in 2014. These fragments - remarkable for their preservation and material complexity - present a rare opportunity to explore early modern textile production, trade, and cultural exchange across the Mediterranean and Europe. Through a multidisciplinary approach combining technical analysis, visual comparison, and historical contextualisation, the research examines the materials, techniques, and motifs used in the fragments to assess their possible provenance. Scientific analyses, including microscopy, dye and metal thread characterisation, are paired with comparative studies of better-documented textiles from museum collections. By situating these objects within wider networks of aesthetic and material exchange, this study aims to contribute to the understanding of transcultural textile circulation in the early modern period and address broader challenges in the attribution of shipwreck finds with limited provenance.


Keywords: Palmwood Shipwreck, early modern embroidery, Mediterranean textiles, metal threads, maritime archaeology, textile provenance, cultural hybridity and exchange.

# Introduction

In the Wadden Sea, off the coast of Texel, lie the remains of numerous shipwrecks dating from the 16th to the 19th century. Preserved under layers of sand and sediment in what was once the Texel Roads, a central anchorage zone for ships navigating the North Sea, these wrecks form time capsules that offer unique insights into maritime trade. One such wreck, discovered in 2010 and further exposed in 2014, has drawn scholarly interest. Known as the Palmwood Shipwreck (or BZN17), this mid-17th-century vessel contained a wealth of materials, including wooden furniture, silverware, ceramics, and an extraordinary collection of textiles.[1]

The shipwreck likely belonged to a merchant travelling from the Mediterranean to the Dutch Republic around 1640.[2] Artefacts retrieved from the wreck may also suggest that the cargo consisted of personal belongings of individuals from the high social strata, possibly a wealthy family.[3] Among the most significant finds were silk dresses, finely knitted stockings, and, the focus of this thesis, many embroidered silk textile fragments.

Despite the textiles' exceptional preservation, their provenance remains unclear. The fragments exhibit motifs and technical characteristics associated with Ottoman textile traditions, yet the lack of contextual documentation and the fragmentary nature of the objects complicate efforts to determine their origin.[4] As such, the Palmwood Shipwreck provides an opportunity to explore questions of production, trade, and cultural exchange in the 17th century. This thesis addresses the central research question:

*Where do the selected textile fragments from the Palmwood shipwreck originate, and how can their materials, techniques, and stylistic characteristics inform their cultural and geographical provenance?*

The study focuses on a selected group of embroidered textile fragments, chosen for their visual complexity and relatively good, readable condition. The research investigates how their material and stylistic features may inform hypotheses about their cultural and geographic provenance. This research contributes to ongoing discussions in provenance studies, material culture, and maritime archaeology. It foregrounds the role of textiles in 17th-century global trade and considers the symbolic and political meanings of embroidered fabrics in the Mediterranean and beyond.

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[1] Janet Dickinson, "Drowned Books and Ghost Books. Making Sense of the Finds from a Seventeenth-Century Shipwreck off the Dutch Island of Texel," *The Seventeenth Century* 38, no. 1 (October 21, 2022): 49–85, https://doi.org/10.1080/0268117x.2022.2123847.

[2] Ana Serrano, Maarten Bommel van, and René Lugtigheid, "The Colours of a Lavish 17th-Century Finding off the Coast of Texel, North Holland" (University of Amsterdam, 2020).

[3] Lambert D. Westera, "The Silk Dress and the Shipwreck: A Seventeenth-Century Wreck near Texel," The Mariner's Mirror 111, no. 1 (January 2, 2025): 22–40, https://doi.org/10.1080/00253359.2025.2445922.

[4] Ana Serrano, Maarten Bommel van, and René Lugtigheid, "The Colours of a Lavish 17th-Century Finding off the Coast of Texel, North Holland" (University of Amsterdam, 2020).

# Chapter 1: Methodology

This chapter outlines the methodological framework adopted to investigate the origins of fourteen embroidered textile fragments recovered from the BZN17. The fragments were selected for their decorative and embroidered characteristics, which offer a strong potential for comparative technical and stylistic analysis. The methods employed aim to document material and stylistic data and contextualise these findings through comparison with textiles of secure provenance. The methodology aims to ensure that interpretation is grounded in verifiable observation and academic literature, while acknowledging the limitations of working with fragmentary, archaeological materials.

## 1.1 Research Question

The central research question is:

*Where do the selected textile fragments from the Palmwood shipwreck originate, and how can their materials, techniques, and stylistic characteristics inform their cultural and geographical provenance?*

This question will be addressed through the following sub-questions:

1. *What existing scholarship is available on the Palmwood shipwreck and 17th-century silk and embroidery production?* (Addressed in Chapter 2)
2. *What materials, techniques, and stylistic features characterise the BZN17 textile fragments studied in this thesis?* (Explored in Chapter 3)
3. *What were the main characteristics of the textile industry and trade networks in the early modern period?* (Discussed in Chapter 4)
4. *What insights can be gained about the BZN17 fragments through an object-based analysis supported by relevant literature?* (Analysed in Chapter 5)
5. *What does comparative analysis with museum-held objects reveal about the BZN17 fragments?* (Evaluated in Chapter 6)

## 1.2 Research Objectives

This study aims to identify the fragments' possible regional and cultural origins, focusing on material analysis, embroidery techniques, and decorative motifs. A secondary goal is to place these fragments within broader textile trade and cultural exchange of design contexts, recognising that high-end textiles are likely intended for trade-related marine circulation.

### 1.3. Research Strategy

The methodology follows four interrelated components:

1. Contextual research using academic literature and museum catalogues to understand regional techniques and trade
2. Object-based analysis microscopy, dye analysis, visual assessment and hand-sketching to document technical and visual features
3. Comparative research drawing on online museum databases and publications on textiles of similar date, material composition, and stylistic features

These methods were selected to ensure that conclusions are supported by multiple forms of evidence, thereby strengthening the reliability of the findings and avoiding dependence on a single research method.

### 1.4. Contextual Research

Contextual research was carried out to provide a historical, technical, and cultural framework for interpreting the BZN17 textile fragments. It was divided into two main strands of research:

1. Research and publications related to the BZN17 textiles
2. Broader literature on 17th-century textile production and cultural exchange

The first strand focused on existing documentation and analysis of the textile finds, including photographic documentation, condition assessment forms, and chemical analysis reports. These sources offered essential background on excavation conditions, fragment preservation, and prior technical findings. In addition, scholarly articles addressing the shipwreck's provenance and other cargo were examined to contextualise the textiles within the wreck's broader historical narrative.

The second strand addressed wider material, technical, and stylistic traditions across the Ottoman Empire, Safavid Iran, and Mediterranean Europe. Topics included silk production, embroidery techniques, metal thread usage, dye sources, floral motifs, and ornament systems. It also encompassed the socio-political functions of textiles within trade, diplomacy, and cross-cultural exchange.
Together, these two strands of contextual research established the technical and contextual foundation needed for comparative analysis in the later stages of the study.

### 1.5 Object-Based Analysis

The selected textile fragments were studied through previously available documentation and direct examination. Existing photographic records, condition assessment forms, and chemical analysis reports (including fibre and dye studies) provided essential preliminary data on materials and degradation.

In addition, two supervised depot visits were conducted on 12 February and 30 April 2025 at the Huis van Hilde, where the fragments are currently housed. A standardised

checklist was developed before the visits to ensure consistency in data collection (see Appendix III). This checklist focused on key material, technical, and stylistic features relevant to provenance research. Observations were recorded systematically under the following categories:

- Ground fabric and embroidery thread materials
- Weave structure
- Embroidery techniques and metal thread construction techniques
- Colour palette and potential dye analysis results
- Motif design and layout characteristics
- Structural features, including lining, selvedge, seams, and buttons
- Comparative observations across fragments
- Other observations, notes and comments

Photography was carried out in a standardised manner (following a spreadsheet with guiding questions, using a mobile phone camera and a Dino-Lite Digital Microscope, capturing full views and close-up details of materials, weave structures, embroidery execution, and motif composition. The collected data formed the basis for contextual research and comparative analysis with textiles of known provenance. Finally, as some fragments have not yet undergone scientific dye analysis, this was part of the thesis research. The aim was to identify dye sources present in the fragments and use the results to inform attribution.

### 1.6 Comparative Analysis

Comparative analysis assessed material and stylistic similarities between the BZN17 fragments and textiles with a more secure provenance. This phase focused on identifying comparable embroidery techniques, weave structures, metal threads, and decorative motifs and designs. The comparison drew on objects in major museum collections, focusing on silk textiles dated between the late 16th and early 17th centuries. Institutions consulted included:

- The Metropolitan Museum of Art (US)
- Victoria and Albert Museum (UK)
- Museum für Islamische Kunst (Germany)
- Textile Museum at The George Washington University (US)
- Benaki Museum (Greece)

Chapter 6 presents the comparative analysis through illustrative case studies, highlighting affinities and divergences between the BZN17 fragments and museum-held objects. While this builds on the object-based discussion in Chapter 6 and supports attribution efforts, significant limitations must be acknowledged. The chapter compares well-preserved museum textiles with fragmentary archaeological materials, which differ markedly in both condition and completeness. Museum collections are shaped by selection and survival bias,

whereas the BZN17 fragments reflect a unique archaeological snapshot. Had they reached their destination, they may not have survived due to subsequent use or repurposing.

### 1.7 Thesis Structure

This thesis is organised into eight chapters. The structure reflects the progression from methodology and research context to analysis, comparison, and conclusions.

- Introduction
  Introduces the Palmwood shipwreck and its textile finds.
- Chapter 1: Methodology
  Describes the research design and methodological framework.
- Chapter 2: Current Scientific Knowledge
  Provides an overview of the available and unavailable relevant literature.
- Chapter 3: Object Description
  Describes the fourteen embroidered fragments from the Shipwreck.
- Chapter 4: Context and Background Information
  Provides contextual information on 17th-century textile production in regions relevant to the scope of the thesis.
- Chapter 5: Object Analysis
  Presents fourteen selected textile fragments' technical, material, and visual analysis, supported by literature
- Chapter 6: Comparative Analysis
  Evaluates similarities and differences between the BZN17 fragments and comparative examples from museum collections.
- Conclusion
  It summarises the findings about the research questions, answers the research question, reflects on the study's limitations, and outlines recommendations for future research.

# Chapter 2: Current Scientific Knowledge

*What existing scholarship is available on the Palmwood shipwreck and 17th-century silk and embroidery production?*

This chapter provides an overview of the current state of scholarship relevant to the Palmwood shipwreck textiles. It outlines the key sources available and discusses gaps in the literature, thereby clarifying areas that remain understudied or insufficiently explored.

## 2.1 Available Literature

The available literature on the Palmwood shipwreck (BZN17) is limited but provides a valuable technical foundation for this research. Condition reports exist for all textile fragments, documenting their current state and deterioration patterns. In addition, chemical analyses have been conducted for all fragments except those classified within Group A, offering insight into fibre composition, dye content, and structural features. Articles on dyes by Ana Serrano and Maarten van Bommel have been essential for writing about the colourants used in the fragments. Further technical characterisation of the metal threads was conducted by Sandra Savelli, whose findings contributed to the material understanding of the embroidery. Janet Dickinson's publication on bookbindings found in the wreck has also offered contextual value.

When it comes to contextual literature, Ottoman textile scholarship is especially well developed, with Amanda Phillips's Everyday Luxuries and Sea Change providing key frameworks for understanding luxury textile production, trade, and consumption. These are complemented by İpek: The Crescent and the Rose, which offers a richly illustrated overview of Ottoman silk production and its artistic and historical significance. Additional contributions by Phillips, alongside studies by Walter B. Denny, and Turkish-language scholarship by Hülya Tezcan offered further insight into centres of production and economic infrastructure. For the Mediterranean and Italian context, works by Tatiana Markaki, Miki Iida, Melinda Watt and Anna Ballian have contributed essential contextual information and perspective. In the case of Safavid Iran, two publications have been particularly important: Narrative Threads, edited by Ashley Dimmig and Moya Carey, and Michael Franses's article on Safavid-style domestic embroideries. These studies, while fewer in number, provide rare technical and visual insight into the practices of early modern Iran.

Literature on dyes and metal threads forms a crucial component of this research. Dye analysis is supported by a substantial body of publications, including Analysis of Natural Dyes and Metal Threads Used in 16th–18th Century Persian Textiles, Dyes in Post-Byzantine and Ottoman Textiles, and The Red Road of the Iberian Expansion. Serrano's 2023 chapter "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries" provides a particularly valuable synthesis of historical, scientific, and economic perspectives, and has been instrumental in contextualising the dye data obtained

from the Palmwood fragments classified under Group A. Concerning metal threads, foundational studies by Marta Járó have offered a reliable basis for the identification, classification, and technical understanding of historical thread types.

Finally, the most extensive body of literature available concerns trade, cultural exchange and the global movement of luxury textiles. Works such as Interwoven Globe, The Empire of Fabrics, and Symbols of Power provide essential context for understanding the circulation, reception, and political significance of luxury textiles in early modern diplomacy, commerce, and court culture. These sources help situate the Palmwood fragments within broader global trajectories of textile exchange.

### 2.2 Gaps in Literature

One of the primary gaps in the current literature concerns the study of archaeological textile fragments recovered from a marine context. The Palmwood shipwreck represents a highly unusual case, and limited comparable material exists from similar underwater environments. As these fragments are archaeological rather than part of a museum collection with a somewhat documented provenance, their historical trajectory is effectively confined to the 17th century, when they were deposited, and the 21st century, when they were rediscovered. This discontinuity poses challenges for contextualisation.

Additionally, embroidery remains significantly underrepresented in textile scholarship. Most of the existing literature focuses on woven textiles and carpets, while embroidered objects are far less frequently examined in technical, stylistic, or regional terms. This scarcity complicates the study of the Palmwood embroideries.

In terms of geographical coverage, there is some imbalance between studies of Mediterranean production centres and those focusing on Iran and Western Asia. While the Ottoman Empire and Italy have received sustained scholarly attention, Safavid Iran and neighbouring regions appear less extensively studied, particularly in the context of embroidery. Furthermore, access to relevant Iranian sources is often limited due to political restrictions, language barriers, and the lack of digitised archives and publications, which further hinders comparative research.

Another limitation stems from the nature of early modern documentation. While estate inventories, account books, and other financial records from the 17th century are accessible and frequently cited in textile studies, these documents seldom contain information on the technical or material aspects of production. They typically list quantities, values, and broad object categories without specifying details such as stitch type or describing decorative motifs, factors that are essential for technical analysis and stylistic comparison.

# Chapter 3: Object Description

*What materials, techniques, and stylistic features characterise the BZN17 textile fragments studied in this thesis?*

This chapter overviews the fourteen embroidered textile fragments selected for this thesis. Previous scientific research has documented these fragments through visual examination, material analysis, and, in some cases, dye characterisation.

## 3.1 Grouping and Object Association

Technical and stylistic analysis suggests that the fourteen embroidered fragments examined in this study originate from four distinct textiles or coordinated sets of furnishings. The grouping is based on shared materials, embroidery techniques, dimensions, and design motifs.

Fragments 6305-030 to 6305-036 and 6333-35 and 6333-48 exhibit consistent material characteristics and decorative elements. These include silk satin grounds, silk and metal thread embroidery, and recurring ornamental motifs. The coherence across these features indicates that the fragments likely formed part of a single textile or a coordinated group of items, such as bed covers.

Fragments 6263-038 and 6305-056 derive from a single rectangular textile. The fragments physically align at their edges, suggesting they were joined initially, much like two puzzle pieces. Both pieces share similar dimensions, embroidery techniques, and lining patterns.

Fragments 6263-043 and 6263-044 are embroidered pillow covers of nearly identical construction and decoration. Fragment 6263-044 is in significantly better condition and is currently displayed at the Museum Kaap Skil. Due to accessibility limitations, only fragment 6263-043 was examined in situ. Both pillow covers are accompanied by pieces of silk lining, presumed to be part of their original backing.

Fragment 6263-087 is an independent textile, with no related fragments identified.

### 3.2 Object Descriptions per Group

### Group A: Fragments 6305-030 to 6305-036, 6333-35, and 6333-48

Table 3.1 Fragments 6305-030 to 6305-036, 6333-35, and 6333-48



*Fig 1. Fragment 6305-031, a fragment representative of the group, embroidered silk satin*



*Fig 2. Detail of the weave structure and corroded metal thread embroidery*



*Fig 3. DinoLite image of embroidery contours indicated with a couched down thicker thread*



*Fig 4. Detail of metal thread embroidery and remains of couched silk floss embroidery*

Based on shared materials, dimensions, and decorative motifs, these nine fragments are believed to originate from the same textile or set of coordinated furnishings. All are embroidered on a red silk satin ground using couched metal and silk threads. Among the group, fragment 6305-031 is the most visually complete, while fragment 6333-35 provides the most insight into the potential original function of the fragments.

All fragments feature various, often mirrored, floral motifs, and some include a mihrab-like arch motif (6305-030 through 032 and 035). The embroidery on all the fragments includes floral patterns, specific elements of which are embellished with metal threads.[5] Identification of the metals present has not yet been conducted. Horizontal selvedge (present in all but 6333-48) indicate an original loom width of roughly 60cm.

Silk and metal thread embroidery constitute the primary decorative techniques. As the reverse side indicates, the metal threads contain silk cores where typical goldwork attachment patterns and cross-shaped couching stitches are visible. However, using solid metal wires without a core remains possible in some areas, although corrosion obscures conclusive identification. The contours of motifs were defined using thicker silk threads couched in place (Fig. 3), while other sections, such as flower petals, were filled with silk floss secured through couching (Fig. 4). This is particularly evident on fragment 6333-35. Today, only remnants of the floss and numerous holes indicating former couching stitches remain (Fig. 4).

Fragments 6263-032 and 033 contain decorative Turk's head knot buttons, while fragment 6333-35 includes buttons and associated button loops. A separate lining fabric remains partially attached to several pieces. Fragments 6305-030, 6305-034, 6305-036, and 6333-35 are significantly folded inward, obscuring their embroidered surfaces. Fragment 6333-48, the smallest in the group, features a single embroidered flower, matching those on fragments 6263-030 and 031.[6]

This thesis research includes chemical analysis of dyes in this fragment group, employing ultra-high performance liquid chromatography and scanning electron microscopy with energy dispersive X-ray spectroscopy (see Appendix IV).

[5] Sjoukje Telleman, "Conditiebeschrijving 'Koelkastcollectie' – Project 'Wetdress,'" August 9, 2018, https://dev.cithosting.nl/pnhtexel/conditierapporten/Object%203_objectnummers%206305-030%20tm%206305-036.pdf.

[6] Sjoukje Telleman, "Conditiebeschrijving 'Koelkastcollectie' – Project 'Wetdress,'" August 9, 2018, https://dev.cithosting.nl/pnhtexel/conditierapporten/Object%203_objectnummers%206305-030%20tm%206305-036.pdf.

*Domaradzka, UvA, 2025.*

**Group B. Fragments 6263-038 and 6305-056**

Table 3.2 Fragments 6263-038 and 6305-056



*Fig 1. Fragment 6263-038, used as reference due to its condition and readability of design*

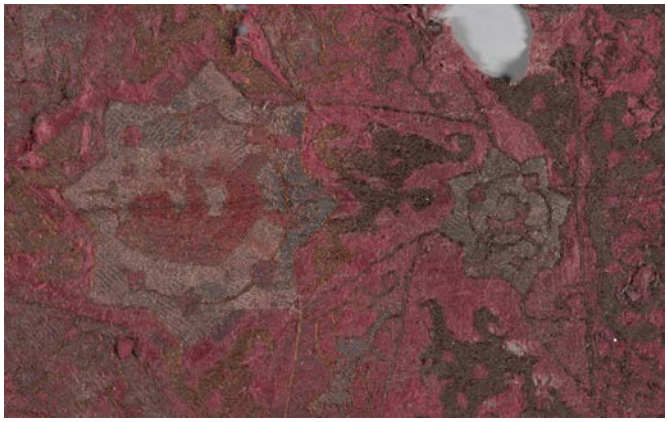


*Fig 2. Detail of embroidery motif, visible 8-pointed stars with animal contours and floral vines*



*Fig 3. Detail of embroidery technique*



*Fig 4. Detail of embroidery technique*

Fragment 6263-038 is composed of a crimson warp-faced silk satin ground embroidered with eight-pointed stars enclosing leaping deer and dragon-like creatures, surrounded by scrolling vines, framed by borders filled with pomegranate branches.[7] A patterned twill weave lining is

[7] Ana Serrano, Maarten Bommel van, and René Lugtigheid, "The Colores of a Lavish 17th-Century Finding off the Coast of Texel, North Holland" (University of Amsterdam, 2020): p. 5.

present on the reverse. Warp and weft are identifiable despite a lack of selvedge, suggesting a loom width exceeding 60 cm.

The embroidery features shades of silk yarn and gilt metal threads, consisting of metal strips wound around a silk core (filé). This combination produces a richly dimensional visual effect. In one technique, silk threads of a single shade are couched using threads of a contrasting colour, resulting in a chequerboard-like pattern (Fig. 3). In another similar technique, the metal threads are laid directly onto the ground fabric and manipulated into the desired shapes before being couched down in pairs, further enhancing the layered appearance of the decoration (Fig. 4).

The dye analysis revealed the presence of kermes and cochineal as the primary dyestuffs in many of the samples, often in combination with tannins.[8] While the specific type of cochineal - American, Armenian, or Polish - could not be conclusively identified, in the sample taken from a twill lining fabric, the ratio between carminic and kermesic acids suggests the use of the American variety.[9] Madder was also identified in some of the samples in combination with insect dyes. The tannins detected were likely derived from oak galls.[10] Aluminium was found in all yarns, indicating alum use as a mordant. XRF examination of the metallic embroidered areas revealed the presence of silver, copper and iron. The copper may point to a silver alloy being used. Additionally, the analysis also detected traces of gold, confirming the threads were originally gilded silver or gilded silver alloy.[11]

Fragment 6305-056 appears to have been constructed using the same materials, techniques and motifs, including similar patterning in the lining and absence of selvedge. Though not analysed independently, it is presumed to be materially and technically identical to 6263-038. When pieced together, the fragments fit with one another. They most likely formed a continuous section measuring at least 128 cm long.

[8] Ana Serrano and Ineke Joosten, "Chemical Analysis of BZN17 Textiles," ed. Maarten Bommel van (University of Amsterdam, April 3, 2017): p. 37-44, https://dev.cithosting.nl/pnhtexel/pdf/Research%20report%20BZN17-22082017.pdf.

[9] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 89-91.

[10] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 89-91.

[11] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 89-91.

*Domaradzka, UvA, 2025.*

**Group C: Fragments 6263-043 and 044**

Table 3.3 Fragments 6263-043 and 044



*Fig 1. Fragment 6263-044, cushion cover made of silk satin embroidered with silk and metal threads*



*Fig 2. Embroidery detail with palmette-like motif, couched silk floss and tarnished metal threads*



*Fig 3. DinoLite image of round gilded wires used to create the embroidery design*



*Fig 4. DinoLite image of silk floss couched using twisted threads to create texture in the design*

Fragments 6263-043 and 6263-044 are a coordinated set of two embroidered cushion covers. Both are constructed from a silk satin ground now faded to an orange-pink hue and exhibit nearly identical dimensions, compositions, and decorative schemes. Their symmetrical designs feature borders along the shorter edges framing a central field of flowers, saz leaves, and undulating vines.[12] Horizontal selvedge present in both objects indicate an original loom width of 56 centimetres.

[12] Ana Serrano, Maarten Bommel van, and René Lugtigheid, "The Colours of a Lavish 17th-Century Finding off the Coast of Texel, North Holland" (University of Amsterdam, 2020): p. 7.

The embroidery techniques include goldwork and silk threads. The metalwork appears to have been created by couching down round wires of gilt silver (Fig. 3). Although they seem solid metal, the presence of metal threads with silk cores in some areas is possible. Additionally, in areas that don't contain metal threads, such as flower petals, pink and orange silk floss was couched onto the ground fabric using twisted threads in the same colours (Fig. 4).

Dye analysis revealed a combination of colourants, including cochineal, kermes, redwood (brazilwood), and indigo. Cochineal was the dominant dye in the pink silk floss and twist yarns. The satin lining contained carminic and kermesic acids, potentially indicating the use of American cochineal. The presence of urolidin C confirmed redwood, making this the only textile among the BZN17 fragments with verified use of this dye source.[13] Indigotin was detected in the orange floss, likely derived from indigo rather than woad, used to produce a brown-orange hue when combined with other dyes. Ellagic and gallic acids identified in the warp and weft suggest using oak gall tannins to weight silk and improve dye adhesion. Aluminium was consistently detected across the fragments and was likely introduced in the form of an alum mordant.[14]

The metallic threads consist primarily of silver, with trace elements of gold, lead, and iron, as identified through XRF and EDX analyses. Some threads were gilded, while others may have been composed of silver alloys. A well-preserved section of fragment 6263-044 revealed only silver and gold peaks, with no sulphur detected, confirming that these threads may have been made of a gold-silver alloy rather than gilded silver.[15]

[13] Ana Serrano, Maarten Bommel van, and René Lugtigheid, "The Colours of a Lavish 17th-Century Finding off the Coast of Texel, North Holland" (University of Amsterdam, 2020): p 7.
[14] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 65-74.
[15] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 65-74.

*Domaradzka, UvA, 2025.*

**Group D: Fragment 6263-087**

Table 3.4 Fragment 6263-087

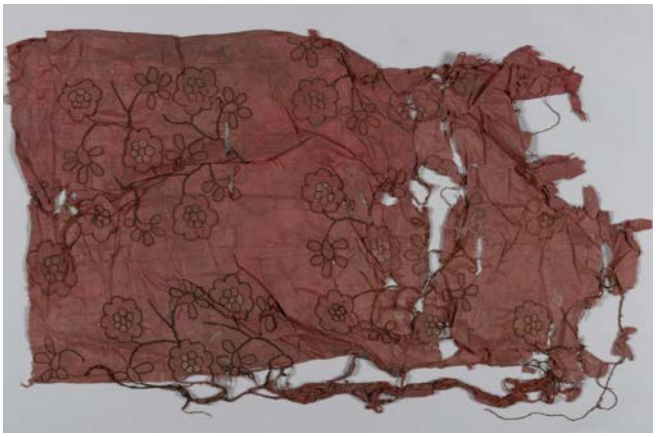


*Fig 1. Fragment 6263-087, plain woven taffeta silk with silk thread embroidery*



*Fig 2. Detail of embroidery, traces of silk floss and stitch holes indicating couching of the floss*



*Fig 3. DinoLite image of the silk contour thread*

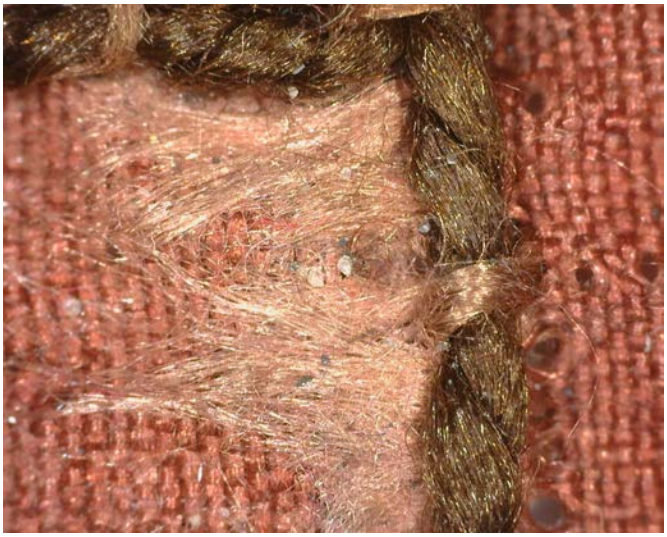


*Fig 4. DinoLite image of the remaining silk floss*

Fragment 6263-087 is a rectangular textile, constructed from plain woven silk taffeta, embroidered with simple floral motifs that are now primarily visible through contour stitching in dark threads. One edge features a selvedge, while the other is sewn.[16]

[16] Sjoukje Telleman and Marijke Bruyne de, "Conditiebeschrijving Textielvondst Texel, Project Wetdress, MdB/ST," March 22, 2016.

The embroidery techniques involve using darker twisted silk threads couched onto the ground fabric using a slightly different shade of thread (Fig. 3). These threads define the contours of the design. The interiors of the floral motifs were filled with silk floss, now preserved only in a few areas (Fig. 4). However, the original presence of the floss is indicated by the visible stitch holes remaining in the fabric.

Dye analysis identified both madder, which was used as a primary dye, and kermes, which was most likely applied as an additional ingredient to improve the final colour.[17] The embroidery floss exhibited lower dye concentrations. The detection of a small indigotin peak in the warp suggests the use of indigo or woad. This dye may have added a bluish tone to the red fabric. Aluminium was reported in all samples taken, indicating an alum mordant. Additionally, tannins were used on the embroidery cord dye.[18] Fragment 6263-087 does not contain metal thread embroidery.

[17] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 75-78.

[18] Ana Serrano, "Material Characterization of BZN17 Silk Fragments - Part II" (University of Amsterdam, October 2019), p. 75-78.

*Domaradzka, UvA, 2025.*

# Chapter 4: Historical Context

*What were the main characteristics of the textile industry and trade networks in the early modern period?*

Knowledge from early modern textile production and trade provides essential historical context for understanding the BZN17 fragments. This chapter outlines key regional practices, stylistic traditions, and material exchanges that shaped 17th-century silk textiles across the Mediterranean Europe, the Ottoman Empire, and Safavid Iran. Particular attention is given to production techniques, dye usage, embroidery, and transregional circulation through trade and diplomacy.

## 4.1 Regional Practices in Early Modern Textile Production

### 4.1.1 Techniques and Centres of Silk Weaving

#### Italian Peninsula and Eastern Mediterranean

In the 17th century, the Italian Peninsula stood at the forefront of luxury silk production in Europe, with cities such as Florence, Lucca, Venice, Bologna, and Genoa operating thousands of looms and exporting textiles across the Mediterranean.[19] Iida notes that Florentine production grew rapidly between the 16th and 17th centuries, outpacing many Ottoman production centres. These included satin, damask, brocade, and velvet, many of which were exported to the Ottoman Empire. Florentine silks were recorded in Istanbul's official price lists (narh registers) under names such as atlas, ormesin, and dârâyî, indicating their wide circulation and high demand.[20]

According to Okumura, Italian velvet weaving was technically advanced and deeply rooted in draw looms. Velvet production required specialised tools, including rods and knives for pile formation and cutting. Cities like Lucca and Venice excelled in producing multicoloured velvets embellished with metal threads.[21] A loom width of approximately 52-54 centimetres is characteristic of 17th-century Venetian silk textiles, as evidenced by multiple examples with these dimensions attributed to Venice.[22]

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[19] Stefano Comino and Alessandro Gasparetto, "Silk Mills in the Early Modern Italy," Advances in Historical Studies 09, no. 05 (2020): 284–94, https://doi.org/10.4236/ahs.2020.95022.

[20] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.

[21] Sumiyo Okumura, "Velvet and Patronage: The Origin and Historical Background of Ottoman and Italian Velvets," in *Textile Society of America* (Textile Society of America Symposium, University of Nebraska, 2016): 10-12, https://digitalcommons.unl.edu/tsaconf/1008.

[22] Melinda Watt, "Exploring Pattern in Woven Design: A Comparison of Two Seventeenth Century Italian Textiles," in *Textile Society of America*, 1998, https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1211&context=tsaconf.

Markaki's study of probate inventories in Venetian Crete shows how Florentine silks circulated in elite Mediterranean households. Textiles such as raso, velluto, and brocadello were frequently listed in the belongings of wealthy women in Candia (Heraklion), often identified by place of origin. These high-quality Italian imports were contrasted with more modest local textiles, which featured less costly dyes and lower thread counts. The inventories reveal that Italian silks were not only traded widely but also played a role in articulating social status and taste across the eastern Mediterranean.[23]

Finally, Ballian provides a complementary view from Chios, an island under Genoese and later Ottoman control. While Chios maintained a decentralised, household-based weaving tradition, it also produced imitations of Genoese, Venetian, and Lyonnais silks. Chian weavers were technically skilled and worked year-round, supplying regional markets and contributing expertise to imperial Ottoman silk factories. Though local products were considered of slightly lower quality than Florentine or Venetian cloths, Chios remained a key player in the Mediterranean silk economy.[24]

**Ottoman Empire**

In the 17th century, the Ottoman Empire maintained one of the most complex silk industries in the early modern world. Production was centralised in cities such as Bursa and Istanbul, though significant weaving also occurred in regions like Bilecik, Edirne, and parts of the Arab provinces.[25] Bursa was the primary transhipment for raw silk from Iran and its prominence as a centre of high-end weaving since the late 14th century.[26] However, efforts were made to expand domestic sericulture, notably in the Morea and around Bilecik, with mulberry cultivation promoted by imperial decree.[27]

The imperial workshops in Istanbul produced elite fabrics such as serâser (cloth of gold), kemhâ (brocade in lampas weave), çatma (voided velvet), and serenk (lampas without metallic brocade) for the court and diplomatic gifting. These fabrics were woven on draw looms by highly skilled artisans, many of whom were trained or transplanted from provincial

[23] Tatiana Markaki, "Objects and Their Stories in Early Modern Europe: Anezina's Tangible and Intangible Heritage (1647)," *European Journal of History and Culture* 1, no. 1 (2024): 153-82.
[24] Anna Ballian, "From Genoa to Constantinople: The Silk Industry of Chios," in *The Mercantile Effect: On Art and Exchange in the Islamicate World During the 17th and 18th Centuries* (Gingko Library Art Series, 2018): 87-101.
[25] Amanda Phillips, "The Localization of the Global: Ottoman Silk and Silk Weaving, 1600-1790," in *Threads of Global Desire: Silk in the Pre-Modern World* (Pasold Studies in Textile, Dress and Fashion History, 2018): 103-23.
[26] Nurhan Atasoy et al., *İpek, the Crescent & the Rose: Imperial Ottoman Silks and Velvets* (London: Azimuth Editions, 2001): 155-158.
[27] Nurhan Atasoy et al., *İpek, the Crescent & the Rose: Imperial Ottoman Silks and Velvets* (London: Azimuth Editions, 2001): 155-158.

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centres such as Bursa or Tokat.[28] While loom widths were not uniform, many Ottoman textiles, such as those used to produce kaftans, measured around 60 centimetres from selvedge to selvedge.[29]

Hülya Tezcan's study of velvet textiles from Topkapı Palace confirms material continuity in court production. Technical analysis of seven objects dating from the 16th to 18th centuries reveals the consistent use of silk warps, silver and silver-gilt threads, and insect-based dyes such as cochineal. These textiles exhibit stable structural formats and mirrored compositions, underscoring the lasting technical standards of imperial weaving even as political and economic contexts evolved.[30]

Beyond the structure of palace production, recent scholarship has highlighted the broader social and economic dimensions of Ottoman silk weaving. Phillips argues that understanding Ottoman textiles requires attention not only to aesthetics and materials, but also to the broader networks of production and consumption.[31] Building on this, Phillips draws on legal documents from Bilecik and Bursa that reveal how çatma cushion covers were not only luxury items but also functioned as financial instruments, serving as collateral in credit arrangements.[32]

Outside the major centres, regional production was also significant. In provinces such as Aleppo, Damascus, Cairo, and Edirne, textiles were produced for local consumption and export, often in small-scale workshops or domestic settings. These workshops typically operated outside the guild-based regulatory structures found in Istanbul or Bursa, resulting in a more flexible and less standardised mode of production.[33] While the fabrics were generally simpler, using fewer metallic elements and more modest weaves, they were essential in meeting regional demand and sustaining internal trade networks. Despite sometimes being

[28] Amanda Phillips, "The Localization of the Global: Ottoman Silk and Silk Weaving, 1600-1790," in *Threads of Global Desire: Silk in the Pre-Modern World* (Pasold Studies in Textile, Dress and Fashion History, 2018), 103–23.

[29] Amanda Phillips and Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 85-121.

[30] Hülya Tezcan, "Yerli Ve Yabanci Kaynaklarin Işiğinda 16. Yüzyildan 20. Yüzyila Türk Hali Dokumaciliği," *Arış* 1, no. 22 (June 1, 2023): 116–36, https://doi.org/https://doi.org/10.32704/akmbaris.2023.182.

[31] Amanda Phillips, "The Localization of the Global: Ottoman Silk and Silk Weaving, 1600-1790," in *Threads of Global Desire: Silk in the Pre-Modern World* (Pasold Studies in Textile, Dress and Fashion History, 2018), 103–23.

[32] Amanda Phillips, "The Localization of the Global: Ottoman Silk and Silk Weaving, 1600-1790," in *Threads of Global Desire: Silk in the Pre-Modern World* (Pasold Studies in Textile, Dress and Fashion History, 2018), 103–23.

[33] Emine Torgan Güzel, "Ottoman Palace Weavings between Different Periods: Material Characterization, Comparison and Suggestions for Conservation," *Heritage Science* 11, no. 1 (August 23, 2023): 2-3, https://doi.org/10.1186/s40494-023-01016-0.

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perceived as of lesser quality, these provincial textiles formed a vital component of the empire's broader textile economy.[34]

### Safavid Iran

Safavid Iran was a dominant force in raw silk production and textile innovation throughout the 17th century. The provinces of Gilan, Shirvan, and Mazandaran were major centres of sericulture, producing large quantities of raw silk exported to the Ottoman Empire and Europe. Shah Abbas I's economic reforms centralised and intensified control over the silk trade, transforming it into a major state revenue source. Raw silk was often transported overland from the northern provinces to various production centres for finishing or onward trade.

Major urban centres such as Isfahan, Yazd, and Kashan developed into important hubs for textile manufacturing, housing both court-sponsored and commercial ateliers. Workshops under royal patronage produced high-end fabrics, including velvets, brocades, and lampas weaves, for use in court, diplomacy, and commerce. The volume and technical sophistication of production reflect a complex organisation of labour, in which weavers executed compound weave structures, integrated metallic threads, and produced consistent, high-quality outputs.[35]

While Safavid textile historiography has traditionally centred on court-sponsored workshops and luxury fabrics, recent scholarship has highlighted the importance of non-courtly textile production in domestic and vernacular contexts. In contrast to the highly regulated, centralised silk weaving of Isfahan or Yazd, many embroidered textiles were produced in private households, often by women, for use in the home. These items included cradle covers, bed curtains, mirror cloths, and other furnishings, typically made from cotton or linen and embellished with silk thread.[36]

## 4.1.2 Metal Thread Embroidery and Its Regional Variations

Although the origins of metal thread usage date back to antiquity, the 17th century marked a notable expansion in the diversity of materials, manufacturing techniques, and application contexts. Metal thread use extended to furnishings, garments, and accessories within courtly and wealthy domestic settings.

Threads typically appeared in two main forms: cut strips of metal foil (often gold or silver) and drawn wires, which could be left round, flattened, or coiled into spiral threads. These were wound around fibrous cores of silk, linen, or cotton.[37] To reduce cost, alloys such

[34] Suraiya Faroqhi, "Textile Production in Rumeli and the Arab Provinces: Geographical Distribution and Internal Trade (1560-1650)," *The Journal of Ottoman Studies* 61, no. 83 (1980).
[35] Ashley Dimming, "Narrative Threads: Safavid Persian Textiles," *HALI* 1, no. 173 (2012): 66–71.
[36] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), 48–105.
[37] Anna Karatzani, "Metal Threads: The Historical Development," *Department of Works of Arts and Antiquities Conservation, Technological Educational Institution of Athens*, (2014): 1-14, https://primastoria.wordpress.com/wp-content/uploads/2015/09/historical-development-metal-threads.pdf.

as silver-gilt copper became widespread, offering the appearance of luxury while minimising the use of precious metals.[38]

Manufacturing techniques were increasingly codified and advanced, including the use of drawn wire technology, gilding methods such as fire-gilding and electroplating, and rolling techniques to produce flattened strips.[39] Despite regional variation, common technical vocabularies and structural formats attest to growing transregional exchange. In this sense, the metal thread textiles of the 17th century reflect an early form of globalisation in textile production.

**Italian Peninsula and Eastern Mediterranean**

In early modern Europe, metal thread embroidery was a central feature of ecclesiastical textiles, ceremonial dress, and aristocratic furnishings. Guild-regulated workshops in Florence and Venice developed increasingly refined thread types and standardised production methods.[40] Threads were classified into drawn wires, cut strips, and hybrid constructions.[41] The threads were produced using drawn wire or foil strips made from pure or alloyed metals. These strips were flattened using rolling mills or hammering, then wound around silk or linen cores. Advances in wire drawing, particularly the introduction of drawbenches and pulley systems, allowed for finer and more consistent threads.[42] Scientific studies confirm the presence of silver-gilt copper, fire-gilded silver, and plated alloys in both ecclesiastical and secular textiles.[43]

Italian embroidery integrated a wide range of metal thread types, including *or de Milan* (silver-gilt foil from Milan), drawn wires, and spun threads, often layered with silk, pearls, or

[38] Marta Járó, "Metal Threads in Historical Textiles," in *Molecular and Structural Archaeology: Cosmetic and Therapeutic Chemicals* (Dordrecht: Springer Netherlands, 2003), 163–78, https://doi.org/10.1007/978-94-010-0193-9_15.

[39] Márta Járó and Attila Tóth, "Scientific Identification of European Metal Thread Manufacturing Techniques of the 17–19th Centuries," *Endeavour* 15, no. 4 (January 1991): 175–84, https://doi.org/10.1016/0160-9327(91)90124-t.

[40] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.

[41] Anna Karatzani, "Metal Threads: The Historical Development," *Department of Works of Arts and Antiquities Conservation, Technological Educational Institution of Athens*, (2014): 1-14, https://primastoria.wordpress.com/wp-content/uploads/2015/09/historical-development-metal-threads.pdf.

[42] Marta Járó, "Metal Threads in Historical Textiles," in *Molecular and Structural Archaeology: Cosmetic and Therapeutic Chemicals* (Dordrecht: Springer Netherlands, 2003), 163–78, https://doi.org/10.1007/978-94-010-0193-9_15.

[43] Márta Járó and Attila Tóth, "Scientific Identification of European Metal Thread Manufacturing Techniques of the 17–19th Centuries," *Endeavour* 15, no. 4 (January 1991): 175–84, https://doi.org/10.1016/0160-9327(91)90124-t.

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coloured metal sequins.[44] This wide variety of thread structures, materials, and gilding techniques used in Europe, combined with increasingly complex trade networks, resulted in highly hybridised metal thread embroideries.[45]

## Ottoman Empire

In the Ottoman Empire, metal thread embroidery was a richly developed tradition employed in both courtly and domestic spheres. Threads such as sırma - metal strips (gold or silver) wrapped around silk or linen cores, formed the backbone of embroidery traditions. These were accompanied by tir-tir, tightly coiled spiral wires used extensively in garments and accessories.[46] The most common embroidery method was overcasting (couching), in which *sırma* was laid over a cotton base and stitched to the textile, creating slightly raised motifs. This technique conserved expensive materials and reduced abrasion on delicate silk grounds.[47] Studies by Járó and Tóth have confirmed the use of both fully gilt and single-side gilt threads, membrane threads, spiral wires, and alloyed substitutes in Ottoman embroidery. Techniques ranged from hammering and drawing wires to rolling and fire-gilding, showing a wide technical repertoire of manufacturing.[48]

Embroidery was widely applied to household objects such as cushion covers, bed linens, napkins, *bohça* (cloth bundles), and garments, including turbans and slippers. Some pieces were made in professional workshops; women made others in domestic settings. The Kaya Sultan style and Evliya Çelebi's account of over sixty gold-embroidery shops in 1630s Istanbul underscore the widespread reach of this practice.[49]

## Safavid Iran

In Safavid Iran, metal thread embroidery attained exceptional technical and artistic refinement, characterised by its integration of literary motifs and courtly symbolism. Unlike the abstract

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[44] Sandra Savelli, "Metal Threads in 17th Century Textiles: Art-Technological Research and Characterization of Burgzand North 17 Metal Threads" (Master Thesis, 2018), https://collectie.huisvanhilde.nl/pdf/Savelli_THESIS_20180716_final.pdf.

[45] Sandra Savelli, "Metal Threads in 17th Century Textiles: Art-Technological Research and Characterization of Burgzand North 17 Metal Threads" (Master Thesis, 2018), https://collectie.huisvanhilde.nl/pdf/Savelli_THESIS_20180716_final.pdf.

[46] Anna Karatzani, "Metal Threads: The Historical Development," *Department of Works of Arts and Antiquities Conservation, Technological Educational Institution of Athens*, (2014): 1-14, https://primastoria.wordpress.com/wp-content/uploads/2015/09/historical-development-metal-threads.pdf.

[47] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): 79-110.

[48] Marta Járó, "Metal Threads in Historical Textiles," in *Molecular and Structural Archaeology: Cosmetic and Therapeutic Chemicals* (Dordrecht: Springer Netherlands, 2003), 163–78, https://doi.org/10.1007/978-94-010-0193-9_15.

[49] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): p.89.

and repetitive motifs typical of Ottoman embroidery, Safavid examples often employed figural elements inspired by Persian epic literature. These narratives were created using gold and silver thread, transforming embroidery into a medium of visual storytelling.[50]

Threads were produced by wrapping fine strips of gilt silver or gold around silk or cotton cores, and in some cases, using gilded metal wires made by adhering gold leaf to silver or copper cores through soldering or thermal bonding. These were subsequently drawn into fine threads or hammered into flattened strips.[51] Embroidery techniques included couching, often combined with stem-stitching to allow for greater precision in figural detail.

Recent analytical studies confirm that Safavid metal threads share technical similarities with their Ottoman and European counterparts, particularly in the layering of metal coatings and the use of silk or cotton substrates. However, regional differences were observed in the specific alloy compositions and manufacturing methods. For example, gold threads from 17th-century Iranian textiles frequently displayed a higher copper content in the core metal than their Ottoman equivalents, resulting in slightly redder hues and more flexible threads.[52]

### 4.1.3 Dye Sources and Their Regional Variations

Textile dyeing in the 17th century was characterised by both regional specificity and growing global entanglement. As international trade networks expanded, natural dyes circulated between empires and across continents. Chemical analysis has identified American cochineal in many of the BZN17 textile fragments, positioning them within the transcontinental dye networks that characterised the early modern period. By the 17th century, its use had become firmly established across the Mediterranean and western Asia, facilitated by Iberian maritime expansion and commercial redistribution through Venice and other regional hubs.[53] Examining regional dye practices within this entangled context supports attribution efforts and deepens understanding of early modern textile production.

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[50] Ashley Dimming, "Narrative Threads: Safavid Persian Textiles," *HALI* 1, no. 173 (2012): 66–71.

[51] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015): 2-4, https://doi.org/10.1186/s40494-015-0037-2.

[52] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015): 2-4, https://doi.org/10.1186/s40494-015-0037-2.

[53] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345–66.

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### Italian Peninsula and Eastern Mediterranean

In 17th-century Italy, dyeing practices were deeply intertwined with colonial trade and established guild systems. American cochineal became the dominant red dye, widely adopted in centres such as Florence and Venice, displacing older insect dyes like kermes and Polish cochineal. This transition occurred rapidly following Spain's control of New World cochineal production, with documented imports into Italy and across the Mediterranean by the end of the 16th century.[54]

Indigo, increasingly imported via Portuguese and Dutch maritime routes, replaced traditional woad as the preferred blue dye due to its deeper colour and efficiency. Combined with weld or cochineal, it enabled the creation of greens, purples, and complex browns used in ecclesiastical vestments and luxury silk fabrics.[55]

In Venetian-controlled Crete and the broader Eastern Mediterranean, silk and wool textiles were often dyed with imported Italian dyestuffs. Wealthy Cretan households ordered garments dyed with cochineal, mirroring mainland fashion trends. These practices reflect not only Venetian mercantile influence but also the importance of maritime networks in transmitting dye materials and technical knowledge.[56]

### Ottoman Empire and Its Provinces

The Ottoman Empire employed a diverse and highly developed dyeing tradition that drew upon both local and imported sources. Red dyes included madder, which was cultivated widely in Anatolia and the Balkans, as well as various cochineal species, most notably Armenian and Polish cochineal. From the late 16th century, American cochineal began entering Ottoman markets via Spanish and Venetian intermediaries. By the mid-17th century, its use was firmly established in silk textiles due to its strong colourfastness.[57]

Tannins from oak gall, sumac, and pomegranate rind were used for both dyeing and mordanting. Indigo, imported from Persia and India, was the principal source of blue, gradually replacing local woad in high-status textiles. Green was commonly achieved through

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[54] Katarzyna Lech and Maciej Jarosz, "Identification of Polish Cochineal (Porphyrophora Polonica L.) in Historical Textiles by High-Performance Liquid Chromatography Coupled with Spectrophotometric and Tandem Mass Spectrometric Detection," *Analytical and Bioanalytical Chemistry* 408, no. 12 (March 2, 2016): 3349–58, https://doi.org/10.1007/s00216-016-9408-0.

[55] Chen, Victor J., Gregory D. Smith, Amanda Holden, and Sadie Arft. "Dye Analysis of a 17th-Century Mattens Workshop Tapestry Based on Raphael's Drawing, The Miraculous Draught of Fishes." *Heritage* 7, no. 3 (February 27, 2024): 1221–36. https://doi.org/10.3390/heritage7030059.

[56] Tatiana Markaki, "Objects and Their Stories in Early Modern Europe: Anezina's Tangible and Intangible Heritage (1647)," *European Journal of History and Culture* 1, no. 1 (2024): 153–182.

[57] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015): 2-4, https://doi.org/10.1186/s40494-015-0037-2.

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overdying indigo with yellow dyes, while black and brown were produced using tannin-iron complexes. In addition to oak galls, mordanting practices involved alum, tannins, and metallic salts to fix and modulate colours across silk and wool substrates.[58]

### Safavid Iran

In Safavid Iran, red hues were primarily achieved using cochineal, particularly Armenian and possibly Polish varieties, though chemical analysis has also confirmed the presence of American cochineal in Safavid velvets from the mid-17th century.[59] Cochineal was often combined with tannins or used with alum mordants to enhance saturation. Madder was used mostly in structural threads or lower-cost applications.

The most distinctive feature of Safavid dyeing was its widespread use of yellow larkspur, a flavonoid-rich plant cultivated in Central Asia and northern Iran. It was frequently combined with indigo to achieve vivid greens. Pink and orange shades were produced using safflower, while black tones were achieved through tannin-based systems. Mordanting practices involved combinations of alum and tannins, often applied selectively across the warp and weft to produce optical variation.[60]

## 4.1.4 Design Traditions and Motif Circulation in Early Modern Textiles

### Italian Peninsula and Eastern Mediterranean

Textile design in Italy, Chios, and other parts of the eastern Mediterranean reflected a hybrid ornamental vocabulary shaped by centuries of trade and exchange. Silks produced in Florence and Venice incorporated large-scale stylised blossoms - pomegranates, palmettes, and roses - arranged in vertical or diagonal repeat systems. These designs were often brocaded in metallic threads and structured using point-repeat formats well suited to draw loom production.[61]

In places like Chios and Crete, weaving and embroidery traditions absorbed both Ottoman and European stylistic influences. Floral motifs were rendered within framed medallions or architectural niches, sometimes combined with arcades or stylised urns. While

[58] Amanda Phillips and Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 85–121.
[59] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015): 2-18, https://doi.org/10.1186/s40494-015-0037-2.
[60] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015): 2-18, https://doi.org/10.1186/s40494-015-0037-2.
[61] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.

symmetrical layouts predominated, the decorative vocabulary was highly adaptive, responding to both religious function and fashion preferences.[62]

### Ottoman Empire

In the Ottoman Empire, textile ornament was strongly influenced by design practices formalised under imperial workshops. The emergence of the so-called "four-flower" style - centred around stylised carnations, tulips, roses, and hyacinths - reflected the preferences of the Istanbul court and rapidly became ever-present across silks, embroideries, and ceramics.[63] These motifs were often composed within mirrored arrangements, ogival lattices, or roundel-based formats suited to production on draw looms or for replication through embroidery.[64]

The visual system relied on clarity and balance. Design units were generally symmetrical and repeatable, often accompanied by structured borders and alternating orientations. Mirror symmetry and rhythmic alignment enabled these patterns to extend across long lengths of cloth without visual interruption. Even in contexts where the textiles were embroidered rather than woven, Ottoman artisans frequently adopted compositional strategies borrowed from weaving traditions.[65]

### Safavid Aesthetics and Pictorial Layouts

In Safavid Iran, textile design was shaped by a pictorial aesthetic that drew heavily from manuscript painting, miniature art, and Persian narrative traditions. Designs often included floral and vegetal ornamentation, arranged in continuous fields or staggered rows that masked repetition and created a flowing, painting-like effect. While symmetry was maintained, visual emphasis shifted toward variation over rigid repetition.[66]

Velvets and lampas-woven silks from court workshops frequently featured scrolling vines, irises, lotuses, and palmettes. These motifs were executed with a distinct sharpness and colour contrast, echoing the stylistic conventions of Persian manuscript painting, where forms were outlined in black for emphasis.[67] Figural silks often depicted scenes from literary classics such as Layla and Majnun or the Shahnama, simplified into repeatable vignettes.

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[62] Tatiana Markaki, "Objects and Their Stories in Early Modern Europe: Anezina's Tangible and Intangible Heritage (1647)," *European Journal of History and Culture* 1, no. 1 (2024): 153–82.

[63] Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 85–121.

[64] Amanda Phillips, "Ottoman Silk Furnishing Fabrics in the Doris Duke Foundation for Islamic Art: Fashion and Production, 1600-1750," *Shangri La Working Papers in Islamic Art*, (2012): 17-31.

[65] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): 79-110.

[66] Ashley Dimming, "Narrative Threads: Safavid Persian Textiles," *HALI* 1, no. 173 (2012): 94–99.

[67] Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 99-102.

*Domaradzka, UvA, 2025.*

Domestic and provincial embroideries emulated this courtly vocabulary but with localised variation. In regions such as Tabriz, Garadagh, and Dagestan, embroideries were often designed as horizontal rows of mounted figures, falconers, lions, or deer amid floral or arboreal settings, arranged in medallions or cartouches.[68] These repeating structures mirrored those found in woven silks but were simplified or stylised, showing a vernacular adaptation of Safavid visual culture.[69]

## 4.2 Circulation Through Trade, Gift Exchange, and Diplomacy

### 4.2.1 Trade Networks and Centres of Production

The textile trade in the early modern period operated through a vast network of production centres, transhipment ports, and consumption markets.

Istanbul and Bursa were central hubs for silk production and trade in the Ottoman Empire. Bursa remained the principal centre for Ottoman sericulture, its plains densely planted with mulberry trees to sustain silk worms, and its infrastructure supported by a complex system of caravanserais and market halls.[70] By the 17th century, Istanbul had become the empire's dominant textile market, with Evliya Çelebi recording hundreds of specialised merchants and artisans active in the city's commercial quarters.[71] Textile inventories and price registers from the period list fabrics from across the Ottoman provinces as well as imports from India, Iran, and Italy.[72]

Florence and Venice emerged as key European exporters to the Ottoman Empire. Narh lists (Ottoman price registers) from 1600, 1624, and 1640 record repeated imports of Florentine and Venetian silk into Istanbul and Bursa, often classified as light cloth (satin) or brocade.[73] Florentine silks have gained a powerful reputation. Their stylistic influence was so prominent that even products woven in other regions were sometimes described as being in the "Florentine style".[74]

Eastern Europe also participated actively in these networks. Polish, Hungarian, and Russian elites were major consumers of Ottoman silks, which were transported via long-

[68] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), 48–105.
[69] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), 48–105.
[70] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016), 21-32.
[71] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016), 21-138.
[72] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016), 21-138.
[73] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.
[74] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.

established caravan and river routes connecting Istanbul to Kraków, Lviv, and beyond. Turkish silks appear regularly in the inventories of Polish noble estates and churches and were worn as markers of wealth and status throughout the region.[75] Bursa silks were sometimes purchased directly at the Polish and Russian courts, while traders from Italian cities were intermediaries in moving goods into Eastern Europe.

While these routes were shaped by geography and politics, they also facilitated an intense material entanglement. Textiles from Iran, India, and Egypt coexisted alongside local and European products in Ottoman markets. Imported silks were adapted, reclassified, or remade for regional tastes, illustrating the permeability of boundaries between production centres. This dynamic of goods was not simply the result of mercantile exchange, but a process that redefined taste and cultural identity.[76]

### 4.2.2 Gifts, Status, and Diplomacy

In the Ottoman Empire, textiles played a fundamental role in courtly and diplomatic culture. As expressions of imperial authority, hierarchy, and wealth, they functioned not only as luxury commodities but also as instruments of political communication and ceremonial protocol.[77]

Central to this practice was the *hil'at* system, in which robes of honour were bestowed by the sultan or senior officials to reward service, demonstrate favour, or formalise diplomatic relations.[78] These garments, often woven from brocade, velvet, or cloth of gold, varied in material and quality according to the recipient's status. The act of bestowal was carefully staged within court rituals and processions, serving both symbolic and strategic purposes. Robes were conferred on a range of occasions, including religious holidays, military victories, and the reception of foreign envoys.[79]

The significance of the *hil'at* system extended beyond internal court dynamics. In 1541, the Habsburg ambassador Siegmund von Herberstein was presented with garments made of Turkish and Italian velvet, illustrating how textiles were mobilised to convey imperial prestige to European counterparts.[80] Similar exchanges occurred across Eurasia, where courts engaged in reciprocal gifting of high-value textiles to express alliance, hierarchy, or

[75] Nurhan Atasoy et al., *İpek, the Crescent & the Rose: Imperial Ottoman Silks and Velvets* (London: Azimuth Editions, 2001), 176-181.
[76] Amy Elizabeth Bogansky, *Interwoven Globe: The Worldwide Textile Trade, 1500-1800* (Metropolitan Museum of Art, 2013), 66-81.
[77] Emma Hinchliffe, "Textiles and Majesty in the Sixteenth and Seventeenth Centuries: A Global Perspective" (Master Thesis, University of Washington, 2014): 49-50.
[78] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.
[79] Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 87-93.
[80] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.

diplomatic intent.[81] When Sir Thomas Roe visited the Mughal court of Jahangir in 1615 as ambassador of King James I of England, he brought a coach covered in Chinese velvet. The gesture, though intended to impress, was interpreted by the emperor as a diplomatic misstep, as Persian velvet was regarded as superior, underscoring the importance of material literacy and regional hierarchies in early modern textile diplomacy.[82]

Within the Ottoman Empire, textiles also operated as indicators of social rank and distinction.[83] While literary sources such as Mustafa Âli emphasised the exclusivity of certain luxury items, such as Persian carpets or gold-threaded furnishings, probate inventories reveal that individuals of lower rank also acquired high-end textiles, using them to assert professional identity and social aspiration.[84] The symbolic value of such objects frequently exceeded their material function, reinforcing their role as visual markers of status across different strata of society.[85]

### 4.2.3 Shared Aesthetics and Visual Entanglement in the Mediterranean

The early modern period witnessed extensive visual and material exchange between textile-producing centres across the Mediterranean, Europe, and Asia.[86] Through diplomatic gifting, commercial trade, and artisanal migration, textile motifs and compositional formats circulated across regional and imperial boundaries, contributing to a shared ornamental vocabulary in luxury textile design.[87]

Ottoman, Safavid, and Italian silks from the 16th and 17th centuries frequently display convergences in design, including the widespread use of ogival lattices, stylised pomegranates, scrolling foliage, and serrated leaves.[88] Ottoman luxury textiles, often woven in deep red with gold accents, showed marked similarities to Safavid aesthetics, while also incorporating local

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[81] Amy Elizabeth Bogansky, *Interwoven Globe: The Worldwide Textile Trade, 1500-1800* (Metropolitan Museum of Art, 2013).

[82] Emma Hinchliffe, "Textiles and Majesty in the Sixteenth and Seventeenth Centuries: A Global Perspective" (Master Thesis, University of Washington, 2014): 25-26.

[83] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): 41-47.

[84] Amanda Phillips, "A Material Culture: Ottoman Velvets and Their Owners, 1600–1750," *Muqarnas Online* 31, no. 1 (October 19, 2014): 151–72, https://doi.org/10.1163/22118993-00311p07.

[85] rlag, 2016): 41-47.

[86] Beverly Lemire and Giorgio Riello, "East and West: Textiles and Fashion in Eurasia in the Early Modern Period" (London School of Economics, April 2006): 4-11, http://www.lse.ac.uk/collections/economicHistory/.

[87] Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 102-105.

[88] Hinchliffe, Emma. "Textiles and Majesty in the Sixteenth and Seventeenth Centuries: A Global Perspective." Master Thesis, University of Washington, (2014): 12-13, https://www.academia.edu/25250206/Textiles_and_majesty_in_the_sixteenth_and_seventeenth_centuries_a_global_perspective.

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and imported motifs.[89] Mamluk and Veneto-Saracenic ornament, particularly arabesque elements, further contributed to a visual repertoire shared across Islamic and European artistic traditions. The appearance of crowns, artichoke motifs, and mirrored floral compositions on "cloth of gold" textiles exemplify this transregional design system.[90]

The influence of Italian textile production, particularly in Florence and Venice, extended deep into Ottoman markets. Narh registers list Florentine silks among valued imports, while Chian weavers produced local adaptations drawing on both Italian and Iranian visual traditions.[91] In Venetian-controlled Crete, locally produced gowns and furnishings incorporated Italianate motifs, even when manufactured outside the peninsula.[92] Aesthetic borrowing was not confined to the Mediterranean; French observers noted that Chian silk producers "perfectly imitated" Persian, Indian, and Lyonnais fabrics, demonstrating both technical proficiency and stylistic fluidity.[93]

The mutual appreciation between Eastern and Western textile producers extended beyond surface design. For example, European efforts to replicate Persian velvets reflect not only an interest in their visual appeal but also a recognition of their technical sophistication and the cultural prestige associated with these imported textiles.[94]

[89] Hedda Reindl-Kiel, "The Empire of Fabrics: The Range of Fabrics in the Gift Traffic of the Ottomans," in *Inventories of Textiles – Textiles in Inventories: Studies on Late Medieval and Early Modern Material Culture* (V&R Unipress, 2017), 143–64.

[90] Anna Ballian, "From Genoa to Constantinople: The Silk Industry of Chios," in *The Mercantile Effect: On Art and Exchange in the Islamicate World During the 17th and 18th Centuries* (Gingko Library Art Series, 2018), 87–101.

[91] Miki Iida, "Florentine Textiles for the Ottoman Empire in the Seventeenth Century," *Senshu University* 21, no. 25 (May 2012): 179–96.

[92] Tatiana Markaki, "Objects and Their Stories in Early Modern Europe: Anezina's Tangible and Intangible Heritage (1647)," *European Journal of History and Culture* 1, no. 1 (2024): 153–82.

[93] Anna Ballian, "From Genoa to Constantinople: The Silk Industry of Chios," in *The Mercantile Effect: On Art and Exchange in the Islamicate World During the 17th and 18th Centuries* (Gingko Library Art Series, 2018), 87–101.

[94] Beverly Lemire and Giorgio Riello, "East and West: Textiles and Fashion in Eurasia in the Early Modern Period" (London School of Economics, April 2006): 11-15, http://www.lse.ac.uk/collections/economicHistory/.

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# Chapter 5: Object-Based Analysis

*What insights can be gained about the BZN17 fragments through an object-based analysis supported by relevant literature?*

Building on the contextual framework established in the previous chapter, this section presents a detailed object-based analysis of the embroidered textile fragments studied. This chapter assesses these fragments' potential provenance and production context by closely examining their materials, embroidery techniques, dyes, and decorative motifs.

In addition to identifying specific affinities with particular production centres, the chapter also explores evidence of hybridity and cultural exchange. The objects are not treated as fixed cultural units to which a specific point of origin can be assigned, but rather as entangled artefacts shaped by overlapping material traditions and historical circulations of textiles in the early modern era.

## 5.1 Object Analysis per Group

### Group A: Fragments 6305-030 to 6305-036, 6333-35, and 6333-48

Table 5.1 Fragments 6305-030 to 6305-036, 6333-35, and 6333-48



*Fig 1. Fragment 6305-031, representative of the group due to its relatively readable motifs*



*Fig 2. Carnation/rose-like flower on the left, and hyacinth/tulip-inspired bloom on the right*

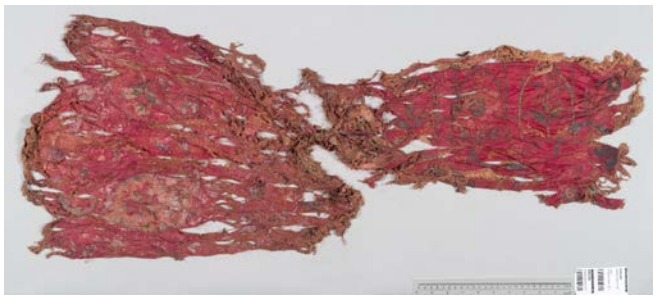


*Fig 3. Fragment 6305-030, composed of two separate loom widths; motifs on the right correspond to 031, motifs on the left to 036*



*Fig 4. Fragment 6305-035, loom width of 60cm; four buttons, the first button is 5cm away from the selvedge, others are separated by 10cm*



*Fig 5. Fragment 6305-034, reverse side of the carnation design, verso visible on 6333-35*



*Fig 6. Fragment 6333-35, stylised carnation and saz leaves, motif corresponding to 6305-034*



*Fig 7. DinoLite image, metal threads with silk cores, couched down with silk thread, 6333-35*



*Fig 8. Thicker silk thread used to mark contours of flower motif, 6333-35*

**Weave and Thread Counts**

Based on the measurements of the fragments where selvedge-to-selvedge sections were available (6305-034, 6305-036, 6333-35), a potential loom width of over 60 centimetres can be assumed. While loom widths varied, it is known that some Ottoman looms were about 60 centimetres in width.[95] As mentioned in chapter 4, Italian looms tended to be smaller, measuring between 50 and 55 centimetres from selvedge to selvedge.[96] To contrast this information, two objects of Safavid origin, discussed by Dimming, have loom widths of 84 centimetres and 88.5 centimetres.[97] While these numbers offer a significantly simplified grouping of loom widths by region, and realistically only confirm a large variety of widths available in the textile industries of the time, they serve as an imperfect guide for attribution.

The thread count of objects from this group is roughly 60 threads per centimeter$^2$. Higher thread counts like this one typically indicate a finer weave and suggest that the textile was produced in a skilled workshop, often for high-status use.[98] Phillips states that thread counts were reflected in the price of textiles; therefore, a common way to economise, among

[95] Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): p. 97.
[96] Melinda Watt, "Exploring Pattern in Woven Design: A Comparison of Two Seventeenth Century Italian Textiles," in *Textile Society of America*, (1998): p. 450, https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1211&context=tsaconf.
[97] Ashley Dimming, "Narrative Threads: Safavid Persian Textiles," *HALI* 1, no. 173 (2012): 66–71.
[98] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): 79-93.

other options such as cheaper dyes and less metal threads, was to lower thread density.[99] For example, a list of fixed prices for Constantinople handicrafts indicated that the number of warp threads per "loom width" for "double taffeta" (çifte tafta) had dropped from 1800 to 1200. This would mean that, assuming the loom measures 60 centimetres, the standard warp thread count decreased from 30 to 20 threads per centimetre. A study of two high-end 17th-century chasubles, attributed to Italy, discusses warp densities of roughly 60 and 64 threads per centimetre and weft densities of 20 and 22 threads per centimetre. These thread numbers would account for a thread count of 80 and 86 threads per centimeters², an even finer weave.[100]

## Embroidery Techniques

Silk and metal thread embroidery was a widespread luxury practice across Europe, the Ottoman Empire and Safavid Iran.[101] While couching was also a ubiquitous embroidery stitch across these regions, the particular technique visible on objects in this group may align more closely with Ottoman techniques. Phillips describes that overcasting (also known as couching) was one of the most widely used stitches in 17th-century Ottoman production, as it offered a way to minimise the waste of the expensive metal thread by keeping it on the surface.[102] Additionally, creating a raised effect by first rendering motifs in thicker thread and filling them in with a textured metal thread (Fig. 8), directly matches the techniques mentioned for an Ottoman metal-thread embroidered silk from the later 18th century.[103]

Silk floss, while undoubtedly used throughout centuries in various embroidery traditions, is, however, only mentioned in literature concerning Safavid embroideries.[104] This points to a lack of available literature on embroidery techniques, rather than the absence of silk floss in Ottoman or European embroideries. More insight into floss silk embroidery may emerge through the comparative analysis in Chapter 6.

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[99] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): p. 87.

[100] Melinda Watt, "Exploring Pattern in Woven Design: A Comparison of Two Seventeenth Century Italian Textiles," in *Textile Society of America*, (1998): 3-6, https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1211&context=tsaconf.

[101] Anna Karatzani, "Metal Threads: The Historical Development," *Department of Works of Arts and Antiquities Conservation, Technological Educational Institution of Athens*, (2014): p. 1, https://primastoria.wordpress.com/wp-content/uploads/2015/09/historical-development-metal-threads.pdf.

[102] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016), p. 89-93.

[103] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016), p. 89-93.

[104] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), 48–105.

**Dye Analysis Results**

Dye analysis of six samples taken from two fragments in this group (6305-031 and 6333-35) identified American cochineal (Dactylopius coccus) as the predominant dye source, with a smaller presence of kermes (Kermes vermilio). Full analytical results and the conditions under which the analysis was conducted are provided in Appendix IV. Overall, the findings are consistent with those observed in other embroideries from the BZN17 collection, where American cochineal appears frequently.[105]

While American cochineal was introduced to European markets in the early 16th century, its widespread adoption appears to have occurred more gradually than often assumed. After being accepted in Italy, the dye circulated through both maritime and overland routes, reaching the Levant, Egypt, and parts of the Ottoman Empire via ports such as Venice and Marseilles, and moving inland through Greece, Romania, Gdańsk, and Moscow.[106] Dye research on textiles from Ottoman Romania and mainland Greece confirms its early acceptance in these regions. Furthermore, chemical analyses have identified American cochineal in 16th-century Ottoman textiles from Turkey, indicating that Ottoman workshops would have had access to this globally significant new dyestuff.[107]

Recent scholarship has demonstrated that the introduction of American cochineal did not result in the complete displacement of older insect-based red dyes. Instead, cochineal often coexisted with earlier sources such as kermes, Polish cochineal, and lac dye, albeit in progressively smaller quantities. Before the arrival of cochineal, kermes was widely used across Europe and the Mediterranean, particularly in Byzantine and early Ottoman dyeing practices, where it was frequently combined with lac dye or madder to achieve a range of red hues on silk.[108] Even after cochineal became increasingly available in the 17th century, kermes continued to hold value in certain contexts. In Venice, for example, it remained integral to the production of the renowned Venetian scarlet, with kermes-dyed fabrics still being manufactured into the late 1600s.[109]

However, this continued use of kermes appears to have been geographically uneven. While kermes has been consistently detected in textiles of European provenance, its absence in

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[105] Ana Serrano, Maarten Bommel van, and Ineke Joosten, "Crimson, Black, Silver and Gold in a Lavish 17th-Century Finding off the Coast of Texel, North Holland" (University of Amsterdam, November 2019).
[106] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345-66.
[107] Ana Serrano, "The Red Road of the Iberian Expansion, Cochineal and the Global Dye Trade" (Doctoral Thesis, Universidade NOVA de Lisboa, 2016), 180.
[108] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345-66.
[109] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345-66.

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Ottoman materials from the same period is notable. Analytical studies of post-Byzantine textiles from Mount Athos (16th to early 20th century) and Ottoman textiles from the Topkapi Palace Museum (16th to 18th century) report that kermes was not identified in any of the samples examined.[110] This contrast suggests regional preferences or access differences in dyestuff use and highlights the complexity of interpreting dye evidence in the context of early modern textile production.

American cochineal is said to have reached Safavid Iran by the early 17th century and rapidly gained prominence in local dyeing practices. While a diplomatic gift of five barrels to Shah ‘Abbas I is recorded in 1614, analytical evidence from Safavid textiles suggests its adoption may have occurred earlier, likely via Ottoman intermediaries.[111] By the 1620s, cochineal was regularly sold in Isfahan by English, Portuguese, and Dutch merchants, having been sourced through established trade hubs such as Venice and Istanbul. By the 1630s, major Safavid textile centres such as Tabriz, Isfahan, Kerman, and Khorasan, which had traditionally used lac dye, were incorporating American cochineal into their dyeing practices.[112]

The identification of both American cochineal and kermes in the BZN17 samples appears to support Serrano’s argument that, in 17th-century textile production, American cochineal did not entirely replace locally available dyestuffs.[113] The co-existence of these two dye sources suggests a provenance from a region that was integrated into the global trade networks (allowing access to American cochineal) and maintained its traditional dyeing practices (continuing the use of locally or regionally available kermes). While the dye composition alone does not offer conclusive evidence of origin, it supports the likelihood of production in an eastern Mediterranean, Ottoman, or possibly Italian context. A Persian origin also seems possible; such an attribution could make the fragments early examples of textiles dyed with American cochineal in Iran.

### Stylistic Features: Mihrab and The Four-Flower Style

Although in poor condition, these nine fragments retain partially legible floral motifs. Fragments 6305-030 through 6305-033 and 6305-035 display a recognisable arch or niche-shaped composition that may be interpreted as a stylised mihrab. This type of motif is commonly understood as a visual reference to mosque architecture.[114] The niches frequently

[110] Ioannis Karapanagiotis and Recep Karadag, “Dyes in Post-Byzantine and Ottoman Textiles: A Comparative Hplc Study,” *Mediterranean Archaeology and Archaeometry* 15, no. 1 (February 3, 2015): 177–89.
[111] Ana Serrano, “The Red Road of the Iberian Expansion, Cochineal and the Global Dye Trade” (Doctoral Thesis, Universidade NOVA de Lisboa, 2016), p. 116.
[112] Ana Serrano, “The Red Road of the Iberian Expansion, Cochineal and the Global Dye Trade” (Doctoral Thesis, Universidade NOVA de Lisboa, 2016), p. 116.
[113] Ana Serrano, “Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries,” in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345-66.
[114] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016, p. 94-101.

*Domaradzka, UvA, 2025.*

incorporated decorative elements in or around them, such as floral motifs, vases, or cypress trees.[115] Within silk production traditions, this composition, referred to as the arcade format, was frequently employed and appears to have been a local specialisation of the island of Chios under Ottoman rule.[116]

Inside the mihrab-like arches, two types of flowers can be identified (Fig. 2). The one on the left is a rosette-style flower, interpreted as a stylised carnation or rose. Carnations also appear visible on fragment 6333-35 (Fig. 4). According to Phillips, carnations featured prominently among floral motifs in Ottoman decorative textiles. Although estate inventories rarely recorded specific designs, one exceptional case, the inventory of Fatima Hatun, lists several cushion covers described as "featuring carnations", indicating the design's recognisability and popularity.[117] Similarly, the rose, and in particular the rosebud (Fig. 2 and 4), is a familiar Ottoman motif, repeated in endless variations in the margins of manu-script folios and bindings, in leatherwork, metalwork, and textiles.[118] The flower on the right appears to be a stylised hyacinth or tulip (Fig. 2). Although the petals are now primarily visible through inked outlines on the fabric, they were likely formed using couched silk floss, as suggested by the visible stitch holes remaining in the textile. Both hyacinths and tulips were common in 17th and 18th-century Ottoman decorative arts, often arranged in rinceau or zigzag patterns.[119]

In her work, Phillips describes various Ottoman çatma cushions with these exact flower combinations of carnations, roses, hyacinths and tulips.[120] While this does not inform an origin for the fragments under study, it affirms their alignment with Ottoman or Ottoman-inspired stylistic traditions. These same floral elements form the foundation of what scholars, such as Necipoğlu, have identified as a distinct, non-Persian decorative mode that gained prominence in the Ottoman court arts during the mid-16th century. This style, later called the "four-flower style," is characterised by its recognisable yet simplified carnations, hyacinths, roses, and tulips. Emerging alongside the expansion of the luxury silk sector in the 1550s, the

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[115] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016, .p. 94-101.

[116] Walter B. Denny, "Saff and Sajjadah: Origins and Meanings," Oriental Carpet and Textile Studies 3, no. 2 (July 1986): 93–104, https://doi.org/10.1017/s0026318400059393.

[117] Amanda Phillips, Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800 (Kettler Verlag, 2016, p. 81-88.

[118]Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016, p. 51-52.

[119] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016, p. 62.

[120] Amanda Phillips, "Ottoman Silk Furnishing Fabrics in the Doris Duke Foundation for Islamic Art, 1600-1750," *Shangri La Working Papers in Islamic Art*, December 4, 2012, p. 20-26.

four-flower style appears across a wide range of media and continued to influence textile design for more than two centuries.[121]

The curved base leaves (Fig. 2 and 4) similarly appear to draw upon an even earlier stylistic system named the saz-style, a Persian term used to describe feathery leaves. It is said to have been popularised in the 16th century by the presence and training of Syrian, Persian, and Egyptian artists in Constantinople, whose use of pattern books and drawings originating from Timurid, Turkmen, and Jalayirid workshops likely contributed to the transmission of the saz-style elements into Ottoman design.[122]

**Attribution**

Based on the above findings, an attempt can be made to attribute this group of fragments. While there is insufficient information to pinpoint a specific place of origin, the available data allows for an informed assumption.

The loom width, thread count, and the ground fabric, silk satin, point to a high-end, quality production. Nevertheless, the embroidered fabric, meaning that it could have been purchased without any ornamentation and later embroidered, suggests a slightly less luxurious manufacturing than, for example, that of brocaded weaves.

The likely presence of American cochineal further confirms a production centre with trade networks that would allow the availability of this material. This can point to a less provincial, more urban environment. The co-existence of cochineal and kermes in the dyes indicates a region integrated into global trade routes while maintaining traditional dyeing practices, suggesting the broader eastern Mediterranean.

Furthermore, embroidery techniques align closely with documented Ottoman methods, particularly using couching for metal threads and creating raised effects. Similarly, the stylistic features, including the mihrab-like compositions and the distinct combination of carnations, roses, hyacinths, and tulips characteristic of the Ottoman "four-flower style," provide the most compelling evidence for an Ottoman or Ottoman-inspired origin. While elements like the saz-style leaves show broader artistic influences, their integration into the overall design further solidifies the connection to Ottoman decorative traditions.

Taken together, these findings suggest that this group of fragments likely originates from an Ottoman workshop or a region under significant Ottoman stylistic influence during the 17th century.

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[121] Phillips, Amanda, and Amanda Phillips. Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean. University of California Press, 2021, p. 98-99.

[122] Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): p. 97.

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**Group B: Fragments 6263-038 and 6305-056**

Table 5.2 Fragments 6263-038 and 6305-056



*Fig 1. Fragment 6263-038*



*Fig 2. Fragment 6305-056*



*Fig 3. Central star, animal-like shape in the centre, surrounded by curving vines, possibly a predator attacking prey*



*Fig 4. Animal shape, possibly a tiger or leopard, inside of a geometrical shape, curving vines*

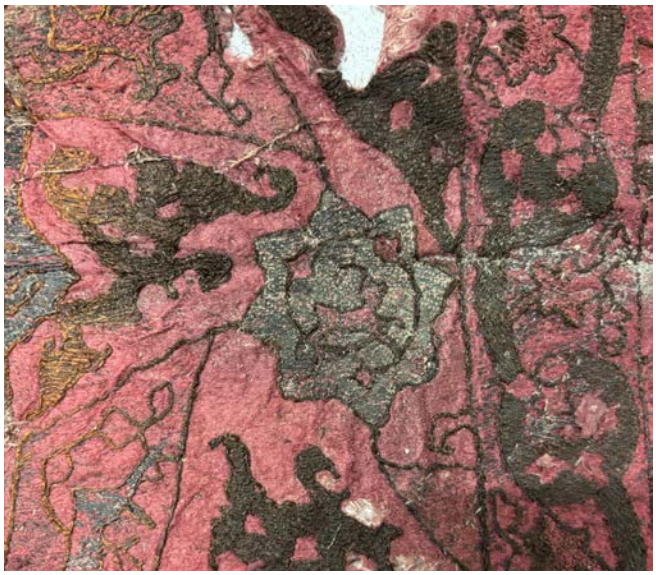


*Fig 5. Detail of embroidery motifs, 8-point star with a running deer surrounded by curving vines*



*Fig 6. Fragments 6263-038 and 6305-056 next to one another, imitating their likely original shape*

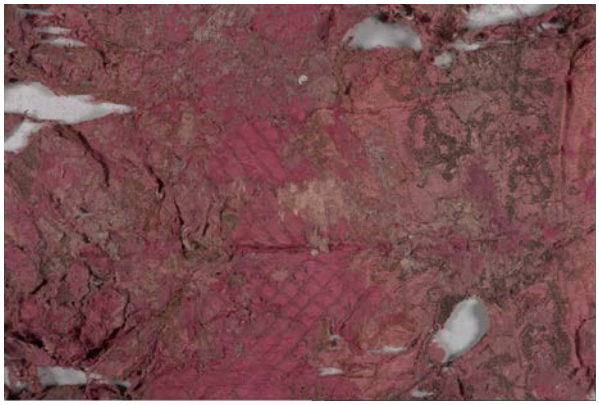


*Fig 7. Verso of 6263-038; patterned lining*

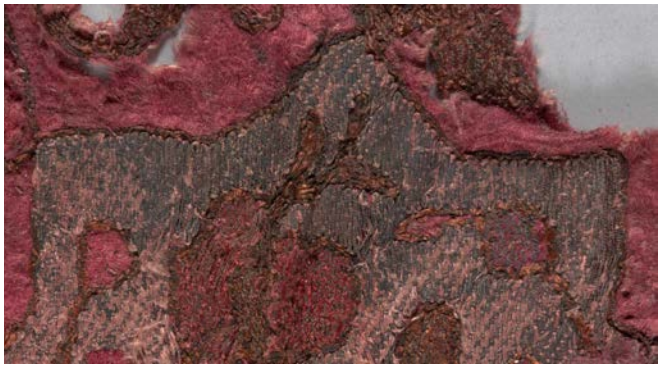


*Fig 8. Metal threads with silk core laid and couched down to create a star motif*



*Fig 9. DinoLite image, metal thread laid and couched down to create design contour*



*Fig 10. DinoLite image, metal threads with two colours of silk core threads, used to fill in a design*

**Weave and Structure**

Although the selvedge is missing, the orientation of the warp and weft threads can be identified. The absence of selvedge, combined with the visibly truncated or incomplete motifs along the edges, indicates that the fragment represents a partial width of the original textile. Given that the preserved portion measures approximately 60 centimetres across, it can be inferred that the original loom width must have exceeded this measurement. This may correspond to Ottoman looms, of which some had a width of around 60 centimetres.[123] Nevertheless, as the decorative design appears incomplete, a wider loom, such as Safavid ones described by Dimming, seems more likely.[124] While the ground weave is silk satin, similar to the fragments of Group A, this time the thread count appears to be lower, which would indicate a slightly cheaper fabric.[125] The thread count is approximately 50 threads per centimeter².

The fragment is characterised by its patterned lining (Fig. 7), which has been stitched through the ground fabric with a pink thread. These stitches are subtle yet traceable, indicating that it is, in fact, a lining, not a separate object which has attached itself due to the degradation. The pattern on the lining forms textured diagonal lines created by regular rows of stitches. The lining remains an interesting aspect of these fragments, and it is recommended that further

[123] Amanda Phillips and Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): p. 97.
[124] Ashley Dimming, "Narrative Threads: Safavid Persian Textiles," *HALI* 1, no. 173 (2012): 66–71.
[125] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): 79-110.

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study be done. Additionally, while it has not been confirmed by previous studies of the BZN17 collection, and therefore not included in this study, fragment 6305-055 appears to be part of the lining missing from objects in this group.

**Embroidery Techniques**

Like fragments from Group A, the silk and metal thread embroidery techniques correspond to 17th-century textile production practices in various regions. Scholarship on stitch types in regional embroidery practices is limited; however, Phillips highlights the importance of the couching stitch in Ottoman textiles.[126] Unfortunately for this research, the reverse side of the embroidery is not entirely accessible because of the attached lining. The visible stitches, however, differ from those seen on fragments from Groups A and C. As the metal thread on this object is laid on the ground fabric and later couched using another thread and not inserted onto a silk core and threaded through the ground, less stitching and no cross-like pattern can be seen at the back.

The metal thread technique observed in these fragments (Fig. 9 and 10) - comprising thin strips of gold or silver wound around a silk core, known as filé - also represents a basic form of metal thread used in European textiles since the late Roman period.[127] According to Karatzani, by the 16th and 17th centuries, this technique had gained widespread popularity due to its relative ease of handling.[128] Similarly to the fragment from Group A, the metal threads were once gilded. Additionally, while gilded threads were usually made of a silver alloy, larger amounts of copper present in them may point to a Safavid origin.[129] Nevertheless, these speculations are largely inconclusive as gilded metal threads were a common luxury element in textiles across the Mediterranean and neighbouring regions from ancient times through the early modern period. Comparative analysis in Chapter 6 may provide further insight into the specific technique visible on these fragments.

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[126] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016), p. 89-93

[127] Márta Járó and Attila Tóth, "Scientific Identification of European Metal Thread Manufacturing Techniques of the 17–19th Centuries," *Endeavour* 15, no. 4 (January 1991): 175–84, https://doi.org/10.1016/0160-9327(91)90124-t.

[128] Anna Karatzani, "Metal Threads: The Historical Development," *Department of Works of Arts and Antiquities Conservation, Technological Educational Institution of Athens*, (2014): 7-11, https://primastoria.wordpress.com/wp-content/uploads/2015/09/historical-development-metal-threads.pdf.

[129] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015): p.18, https://doi.org/10.1186/s40494-015-0037-2.

*Domaradzka, UvA, 2025.*

### Dye Analysis

The presence of a combination of cochineal, kermes and madder in these fragments broadly aligns with early modern European, Mediterranean, and even West Asian dyeing conventions.[130] More information can be found in the dye analysis discussion of Group A.

Assuming that the identified cochineal is of American origin, the fragments were likely produced in a region integrated into the global trade networks, which at the same time maintained more traditional dyeing practices, such as using kermes. Similarly to fragments in Group A, this challenges the assumption that American cochineal quickly replaced other insect dyes when brought to Europe. Instead, it appears to have coexisted with traditional red dyes, as confirmed by the BZN17 collection.[131]

According to Shibayama et al., by the end of the 16th century, American cochineal was being exported via Venice to Persia and Central Asia.[132] Providing further proof, recent studies have chemically identified American cochineal in numerous 16th and 17th-century silk textiles attributed to Iran, including in embroidery samples.[133]

### Stylistic Features: Safavid Embroidery

These fragments are distinctive for their incorporation of animal motifs, which contrast with the predominantly floral designs commonly found in both European and Ottoman textiles of the 16th and 17th centuries.[134] On the other hand, Safavid textiles frequently drew upon Persian stories and epics, embedding the characters and narratives into the fabric's design. Typical motifs included human figures, animals, mythical creatures, geometric and compartmental (tile-like) patterns, and botanical elements.[135] The fragments in this group show a strong alignment with these Safavid features.

The eight-pointed star has been identified as a foundational element in many embroidery compositions. Franses notes that this motif has been "deeply embedded in the

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[130] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345–66.

[131] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345–66.

[132] Nobuko Shibayama, Mark Wypyski, and Elisa Gagliardi-Mangilli, "Analysis of Natural Dyes and Metal Threads Used in 16th -18th Century Persian/Safavid and Indian/Mughal Velvets by HPLC-PDA and SEM-EDS to Investigate the System to Differentiate Velvets of These Two Cultures," *Heritage Science* 3, no. 1 (March 13, 2015), https://doi.org/10.1186/s40494-015-0037-2.

[133] Ana Serrano et al., "Investigation of Crimson-Dyed Fibres for a New Approach on the Characterization of Cochineal and Kermes Dyes in Historical Textiles," *Analytica Chimica Acta* 897 (October 2015): 116–27, https://doi.org/10.1016/j.aca.2015.09.046.

[134] Amanda Phillips and Amanda Phillips, *Sea Change: Ottoman Textiles between the Mediterranean and the Indian Ocean* (University of California Press, 2021): 85-121.

[135] Ashley Dimming, "Narrative Threads: Safavid Persian Textiles," *HALI* 1, no. 173 (2012): 66–71.

Iranian design language for more than three centuries," particularly through the use of patterned ceramic tiles, which often incorporated animals intertwined with curving stems.[136] This type of design is reflected in the present group. Running deer, typically spotted and embroidered to emphasise their patterned backs, are a recurring motif characteristic of the Safavid style; these can also be seen on the studied fragments (Fig. 5). Tigers, lions, and dragons also appear frequently, especially in dynamic scenes of attack.[137] Such a composition is likely represented in the central star motif on fragment 6263-038, although due to thread degradation, only a faint outline of an animal-like figure remains visible (Fig. 3).

Although Persian textiles from this period often appear less rigidly structured than their Ottoman counterparts, geometric elements remain fundamental to their design. In Safavid-style embroideries, as argued by Franses, borders play a significant role, frequently framing the central field with a range of decorative motifs that may echo elements found within the main composition. These borders often feature spiralling floral patterns, cartouches, and cusped edges, like those on object 6263-038 (Fig. 1).[138]

As Safavid embroidery evolved, decorative elements are said to have reduced in number by the late 16th century and became smaller and less complex in the early 17th century, with a notable shift towards floral shrub designs. Despite these stylistic changes emanating from court arts and trade, older figurative styles may have persisted, especially in more rural areas. According to Franses, embroideries containing motifs like those discussed above most likely served as wedding gifts and family heirlooms.[139]

**Attribution**

Based on the technical, material, and stylistic evidence outlined above, the fragments in this group may be attributed to a Safavid origin or a context heavily influenced by Safavid design traditions. The ground weave of silk satin and the loom width exceeding 60 centimetres can be used to support this claim. The materials suggest a high-end textile, though the thread count may indicate a slightly more economical or sophisticated production compared to the finer fabrics in Groups A or C.

Although American cochineal is commonly associated with European production centres due to its trade with Spanish merchants, research has identified its presence in textiles from all regions examined in this thesis. This further underscores the globalised nature of textile production in the early modern period and complicates attribution attempts.

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[136] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), p. 68-76.
[137] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), 48–105.
[138] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), p. 60-63.
[139] Michael Franses, "Safavid-Tyle Domestic Embroideries from Historical Azerbaijan, 1550–1800," in *Stars of the Caucasus: Silk Embroideries from Azerbaijan* (London: Hali Publications Ltd, 2017), 48–105.

The embroidery techniques, notably the use of filé metal thread and the presence of gilded elements, reflect widespread 17th-century textile manufacturing practices. While the higher copper content in the metal threads may point to a Safavid production centre, this remains speculative. Similarly, the use of the couching stitch cannot be attributed to a specific region due to its widespread popularity.

The assumption that these fragments are of a Safavid origin is primarily based on the characteristic embroidery motifs and layout. Standard Persian design features include eight-pointed stars, animals surrounded by curving vines, and geometric borders with cusped edges. Similarly, the embroidery layout appears almost identical to Persian and West-Asian examples shown in literature, further reinforcing the claim. As there is no evidence of these particular designs making their way into areas outside the Safavid Empire, an attribution based on decorative motifs appears well-founded.

**Group C: Fragments 6263-043 and 044**

Table 5.3 Fragment 6263-043 and 6263-044



*Fig 1. Fragment 6263-044, cushion cover made of silk satin embroidered with silk and metal threads*



*Fig 2. Recto of 6263-044; detail of the floral motifs, salvage visible at the top*



*Fig 3. Traces of a silk satin lining are visible in the verso of 6263-043*



*Fig 4. Detail of embroidery techniques, cross-shaped stitches used to attach metal threads*

Table 5.3 Fragment 6263-043 and 6263-044



*Fig 1. Fragment 6263-044, cushion cover made of silk satin embroidered with silk and metal threads*



*Fig 2. Recto of 6263-044; detail of the floral motifs, salvage visible at the top*



*Fig 5. DinoLite image: metal threads/wires used in embroidery motifs*



*Fig 6. DinoLite image; extremely fine weave structure, verso of 6263-043*

**Weave and Thread Counts**

The two covers are characterised by an exceptionally fine silk satin ground. As both fragments are preserved in their entirety, including original selvedge, their full width can be measured at approximately 56 centimetres. This is notably narrower than the widths observed in Groups A and B. While loom width alone cannot conclusively indicate provenance, it is worth noting that Ottoman looms typically produced textiles with widths of 60 centimetres or more.[140] A

[140] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): 79-93.

study of 17th-century Italian silks, for instance, reports textile widths of 52.7, 54, and 54.8 centimetres, suggesting a potential, though inconclusive, alignment.[141]

The high-quality appearance of the ground fabric is further supported by its dense weave, with an estimated 60 warp and 30 weft threads per centimetre, resulting in a total thread count of approximately 90 threads per centimeter². This compares closely to Italian chasubles of the same period, which have thread counts of 80 and 86 threads per centimeter² and are considered high-end liturgical textiles.[142]

Traces of a silk satin layer are visible on the verso of both fragments (Fig. 3). However, it remains uncertain whether this represents a deliberately applied lining intended to protect the embroidery or simply the reverse side of a folded cushion cover that has adhered to the decorated face over time.

## Embroidery Techniques

The embroidery techniques observed in this fragment closely align with those identified in Group A. Around the contours and stems of the floral motifs, standard couching stitches secure thicker silk threads laid flat on the surface. In areas beneath the metal threads, the stitching becomes denser and features distinctive cross-shaped attachments on the verso (Fig. 4). The precision and consistency of this technique reflect a high level of craftsmanship, suggesting a high-end textile.

Fragment 6263-044, which is significantly better preserved than 6263-043, features an exceptionally well-maintained section where the golden threads or wires remain visibly intact and retain their original lustre. For a more detailed discussion of comparable embroidery techniques, see the analysis in Group A.

## Dye Analysis

To some extent, the dye composition identified in this fragment resembles that of Groups A and B, particularly the combination of cochineal and kermes. The presence of cochineal, assumed to be of American origin, highlights the global trade networks active during the period, while the detection of kermes points to the use of regionally available dyestuffs common to Europe and the Mediterranean. As previously noted, the presence of kermes may suggest a more European origin for the textile; however, further research is required to substantiate this hypothesis.[143]

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[141] Melinda Watt, "Exploring Pattern in Woven Design: A Comparison of Two Seventeenth Century Italian Textiles," in *Textile Society of America*, (1998): 3-6, https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1211&context=tsaconf.

[142] Melinda Watt, "Exploring Pattern in Woven Design: A Comparison of Two Seventeenth Century Italian Textiles," in *Textile Society of America*, (1998): 3-6, https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1211&context=tsaconf.

[143] Ioannis Karapanagiotis and Recep Karadag, "Dyes in Post-Byzantine and Ottoman Textiles: A Comparative Hplc Study," *Mediterranean Archaeology and Archaeometry* 15, no. 1 (February 3, 2015): 177–89.

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This fragment is the only example among the studied group in which redwood (Brazilwood) was identified. Brazilwood was a commonly imported dye source in 17th-century Europe, originating primarily from South America.[144] While American cochineal was largely monopolised by the Spanish, Brazilwood was harvested across various territories under the control of different European powers, contributing to its broader availability. It was also considerably more affordable, reported to be approximately 35 times cheaper than cochineal in 1608.[145]

Known for its fugitive nature, Brazilwood dyes tend to fade from a vibrant red to a tan or brown shade over time, a phenomenon observable on the cushion fragment.[146] As Brazilwood appears in a wide range of textiles from both Europe, the Near East, and Asia, its presence in this fragment does not enable a precise attribution. Instead, it underscores the global material circulation that characterised the early modern period.

**Stylistic Features: "Çatma" Cushions & Hybridity**

At first glance, the cushion cover evokes Ottoman stylistic conventions. The characteristic framing borders composed of lappets containing stylised floral motifs correspond to widely used design strategies in 17th-century Ottoman textiles.[147] Such borders frequently framed a central decorative field and were a hallmark of çatma cushion covers produced in Bursa. These cushions functioned not only as domestic furnishings but also as indicators of social status and, at times, even as currency.[148]

However, notable discrepancies exist between the studied fragment and standard Ottoman production in both material and design. Traditional çatma covers were typically made of çatma brocaded velvet, while the present example is silk satin. Furthermore, while Ottoman cushion covers often featured regular and geometrically structured repeats, such as çintamani motifs, sunburst medallions, or ogival arrangements.[149] The central field of the studied piece appears not to follow these conventions. Although the motif repeats, it lacks the ordered geometry found in most Ottoman examples. Instead, the decoration comprises a more

[144] Ana Serrano, "The Red Road of the Iberian Expansion, Cochineal and the Global Dye Trade" (Doctoral Thesis, Universidade NOVA de Lisboa, 2016): 88-96.
[145] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023): p. 347.
[146] Ana Serrano, "The Red Road of the Iberian Expansion, Cochineal and the Global Dye Trade" (Doctoral Thesis, Universidade NOVA de Lisboa, 2016): 88-96.
[147] Amanda Phillips, "Ottoman Silk Furnishing Fabrics in the Doris Duke Foundation for Islamic Art: Fashion and Production, 1600-1750," *Shangri La Working Papers in Islamic Art*, December 4, (2012): 20-24.
[148] Amanda Phillips, "The Localization of the Global: Ottoman Silk and Silk Weaving, 1600-1790," in *Threads of Global Desire: Silk in the Pre-Modern World* (Pasold Studies in Textile, Dress and Fashion History, 2018), 103–23.
[149] Amanda Phillips, "Ottoman Silk Furnishing Fabrics in the Doris Duke Foundation for Islamic Art: Fashion and Production, 1600-1750," *Shangri La Working Papers in Islamic Art*, December 4, (2012): 20-24.

entangled floral composition, nevertheless featuring stylised elements such as saz leaves and floral blooms potentially representing roses, carnations, or lotus flowers (Fig. 2). These features suggest an interpretation of Ottoman style that departs from established courtly conventions, potentially indicating either an imitation or production in a centre operating outside the court-regulated workshops.

The hybridity in style may reflect the transregional exchange of textile aesthetics during the 17th century. Italian and other European textiles of the period frequently adopted and reinterpreted Ottoman, Safavid, and Mughal motifs, including floral types, directional alternation, and polychrome brocading. Likewise, silks produced on Chios, then under Ottoman control, often blended Ottoman decorative elements with European compositional structures, creating designs that were "Oriental" in appearance but divergent from canonical Ottoman styles.[150] The distinctive layout and mixed stylistic features of the present fragment may thus reflect such a hybrid production context. Further insights can be drawn through comparison with museum-held examples.

**Attribution**

Based on the technical and stylistic features of these fragments, a general Mediterranean origin can be speculated. This is assumed primarily based on the Ottoman-style design features, which nevertheless appear unconventional for the typical Bursa cushion style, as well as the loom width and dye composition. It can be speculated that the covers were made in Europe following a fashion for Ottoman-looking furnishings. It is equally possible that they were a product of the cultural hybridity of, for example, the island of Chios, being both a European and an Ottoman territory at different times in the 16th and 17th centuries and therefore reflecting both stylistic conventions. Chios emerges as a particularly plausible candidate, given its well-established silk industry and capacity to produce high-quality silk satins.

[150] Anna Ballian, "From Genoa to Constantinople: The Silk Industry of Chios," in *The Mercantile Effect: On Art and Exchange in the Islamicate World During the 17th and 18th Centuries* (Gingko Library Art Series, 2018): p. 87.

**Group D: Fragment 6263-087**

Table 5.4 Fragment 6263-087



*Fig 1. Fragment 6263-087, plain woven taffeta silk with silk thread embroidery*



*Fig 2. Detail of embroidery technique, traces of silk floss and stitch holes indicating couching*



*Fig 3. Verso of fragment 6263-087, two colours of couching stitches visible*



*Fig 4. Detail of the floral embroidery, visible stitch holes with no threads or floss remaining*



*Fig 5. DinoLite image; silk thread used to embroider the contours of the flower design*

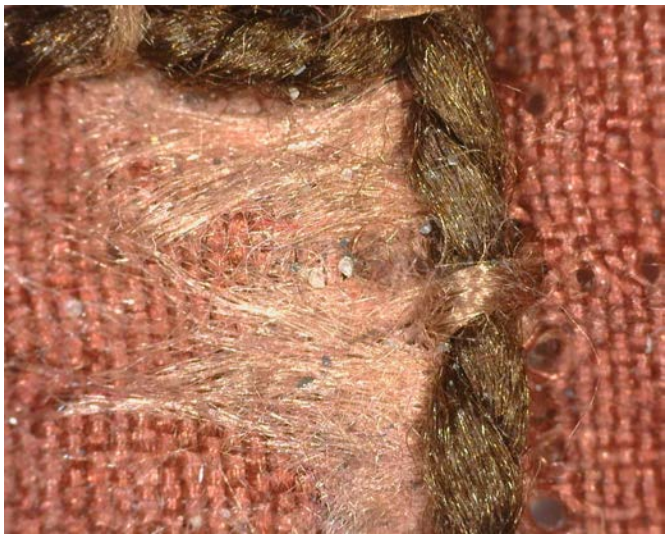


*Fig 6. DinoLite image; remains of the silk floss used to fill in the embroidered flowers*

**Weave and Thread Counts**

Fragment 6263-087 stands out as both distinct and difficult to classify within the studied embroideries. It is the only example executed on a plain-woven silk taffeta ground rather than the more commonly observed satin weave. Historical records indicate that taffeta was widely available and used in the Ottoman Empire. Phillips, for instance, refers to taffetas produced on the Ottoman Island of Chios,[151] while other archival sources document a 1603 order for 600 cubits of tafta cloth from Bursa intended for the Ottoman fleet.[152] These examples suggest that taffeta was a common and commercially significant fabric type in the early modern Ottoman textile economy. The thread counts of fragment 087 is approximately 40 threads per centimeter². Although no standard thread count for taffeta is cited in the consulted literature, this is noticeably lower than the counts observed in fragments from Groups A, B, and C. This may indicate that fragment 6263-087 represents a simpler and potentially more modest object in terms of material quality and intended use.

**Embroidery Techniques**

The embroidery technique observed on fragment 6263-087 is like those found in other studied fragments, combining couched silk floss with thicker twisted silk threads used to define the contours of motifs (Figs 5 and 6). These outline threads are secured using a differently

[151] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): p. 95.

[152] Nurhan Atasoy et al., *İpek, the Crescent & the Rose: Imperial Ottoman Silks and Velvets* (London: Azimuth Editions, 2001): p. 165.

coloured couching thread. Notably, the reverse of the fragment (Fig. 3) reveals the use of two distinct couching thread colours: a lighter one that blends into the ground fabric and a darker one that corresponds to the surface embroidery. This inconsistency may reflect a non-workshop production, possibly in a domestic context, where the thread was replaced mid-execution after being used up. A further distinction of this fragment is the complete absence of metal threads, making it the only example among the studied group without metallic embellishments, again suggesting a humbler origin or non-professional setting. In several areas, faint lines, either drawn in ink or imprinted by lost threads, indicate missing design elements (Fig. 4). Additional evidence is provided by visible stitch holes, which outline areas that were likely once embroidered with now-lost silk floss.

**Dye Analysis**

The dominant dye identified in fragment 6263-087 is madder, a widely used natural dye source in both Europe and the Ottoman Empire. Along with weld and indigo, madder was among the most employed dyestuffs in European textile production.[153] It has also been consistently found in post-Byzantine and Ottoman textiles, including examples from the monasteries of Mount Athos (Greece) and the Topkapi Palace Museum (Turkey). Despite cultural differences between these two collections, their comparable dye profiles suggest a shared or overlapping dyeing industry in the region.[154] Historically, madder was a more affordable alternative to insect-based red dyes such as kermes or cochineal, which were more costly due to limited availability, labour-intensive harvesting, and complex processing requirements.[155] In addition to madder, kermes was also detected in this fragment, consistent with the findings in fragments from other groups, further supporting the pattern of dyes used across the Palmwood collection.

**Stylistic Features: Simple Motifs and Ottoman Influences**

The fragment is decorated with simple floral motifs that appear more rudimentary and less refined than those observed in other groups. The stylised forms evoke a schematic, almost symbolic representation of flowers, with no identifiable species. However, the leaf-like elements protruding from the sides of the blooms bear a resemblance to motifs seen in Groups

[153] Victor J. Chen et al., "Dye Analysis of a 17th-Century Mattens Workshop Tapestry Based on Raphael's Drawing, The Miraculous Draught of Fishes," *Heritage* 7, no. 3 (February 27, 2024): 1221–36, https://doi.org/10.3390/heritage7030059.

[154] Ioannis Karapanagiotis and Recep Karadag, "Dyes in Post-Byzantine and Ottoman Textiles: A Comparative Hplc Study," *Mediterranean Archaeology and Archaeometry* 15, no. 1 (February 3, 2015): 177–89.

[155] Ana Serrano, "Cochineal and the Changing Patterns of Consumption of Red Dyes in Early Modern European Textile Industries," in *In-Between Textiles, 1400-1800: Weaving Subjectivities and Encounters* (Amsterdam: Amsterdam University Press B.V., 2023), 345–66.

*Domaradzka, UvA, 2025.*

A and C, as well as to foliate designs frequently found on Iznik ceramics.[156] Phillips has also noted the export of floral-patterned taffetas (*tafta*) from the Ottoman Empire.[157] Despite the apparent simplicity, the floral clusters are arranged in a symmetrical repeat, indicating a level of intentional spatial organisation. The fragment's visual impact is further diminished by the extensive loss of silk floss, which obscures the embroidery's original appearance. Unlike other fragments, this piece lacks metal threads, which further reduces the design's legibility in its current condition.

### Attribution

Fragment 6263-087 most likely belongs to a broader Mediterranean textile tradition shaped by Ottoman visual culture. Based on the material, specifically the use of plain-woven taffeta silk dyed with madder, the piece could plausibly originate from any of the regions discussed in the previous chapter, including areas within or adjacent to the Ottoman sphere. The absence of metallic threads, modest thread count, and simplified floral motifs distinguishes it from more opulent workshop productions. The embroidery technique, combined with the informal stitching and material choices, evokes domestic embroidery practices in which middle-class women purchased affordable base fabrics and embellished them independently.[158] While the symmetrical design suggests awareness of common Ottoman decorative conventions, the fragment's technical and stylistic characteristics indicate production in a non-courtly, possibly domestic or regional context, such as the Greek islands, areas where Ottoman and local textile practices intersected.

## 5.2 Limitations of Object-Based Analysis

This analysis is limited by the lack of technical scholarship on early modern embroidered textiles. Information on thread counts, loom widths, and stitch types is often missing or comes from only one source, making it difficult to compare and confirm findings. The poor condition of many BZN17 fragments also restricts what can be observed and analysed. In addition, there is little published research on archaeological textiles, which makes it harder to place these fragments in a broader historical and material context.

[156] Amanda Phillips, *Everyday Luxuries: Art and Objects in Ottoman Constantinople, 1600-1800* (Kettler Verlag, 2016): p. 51-52.
[157] Amanda Phillips, "The Localization of the Global: Ottoman Silk and Silk Weaving, 1600-1790," in *Threads of Global Desire: Silk in the Pre-Modern World* (Pasold Studies in Textile, Dress and Fashion History, 2018), 119-122.
[158] Tatiana Markaki, "Objects and Their Stories in Early Modern Europe: Anezina's Tangible and Intangible Heritage (1647)," *European Journal of History and Culture* 1, no. 1 (2024): 153–82.

# Chapter 6: Comparative Analysis

*What does comparative analysis with museum-held objects reveal about the BZN17 fragments?*

This chapter presents the comparative analysis conducted to contextualise the fourteen embroidered textile fragments recovered from the Palmwood shipwreck (BZN17). The comparative approach was informed by contextual and object-based research to identify stylistic and technical parallels with museum objects of known provenance.

## 6.1 Selection Criteria and Research Scope

Thirteen museum collections were selected for a comparative study based on the wide range and relevance of their textile holdings and the accessibility of images and descriptive data online. The collections consulted included institutions such as the Metropolitan Museum of Art, the Victoria and Albert Museum, and the Rijksmuseum Amsterdam.

The search was initially limited to textiles dated between 1550 and 1650 to reflect the presumed date range of the BZN17 shipwreck. However, this range was broadened to capture a wider stylistic and technical spectrum. This decision was informed by the observation that many objects bearing significant similarities in motifs, layout systems, and materials were either loosely dated or extended into the 19th century. Filtering parameters when searching through online collections focused on silk textiles with metallic threads, satin weave structures, and embroidered embellishment, with additional motif-specific keywords such as “star” or “floral” used where database functionality allowed.

In total, 67 comparative objects were selected as bearing a meaningful resemblance to the Palmwood fragments. Each object was catalogued in a comparative database and assessed for material, construction, and decorative language affinities. The table showing all catalogued objects can be found in Appendix V.

## 6.2 Qualitative Analysis

The results of the qualitative comparative analysis indicated a substantial prevalence of objects attributed to Turkey and Iran. Out of the 67 comparative textiles:

- 25 were attributed to Turkey (e.g. Bursa and Istanbul),
- 16 to Iran (e.g. Isfahan, Rasht, and Kashan),
- 10 to Italy,
- 6 to Greece,
- The remainder are of Spain, France, Pakistan, Syria, Hungary, and broader European origin or are simply classified as of unidentified origin.

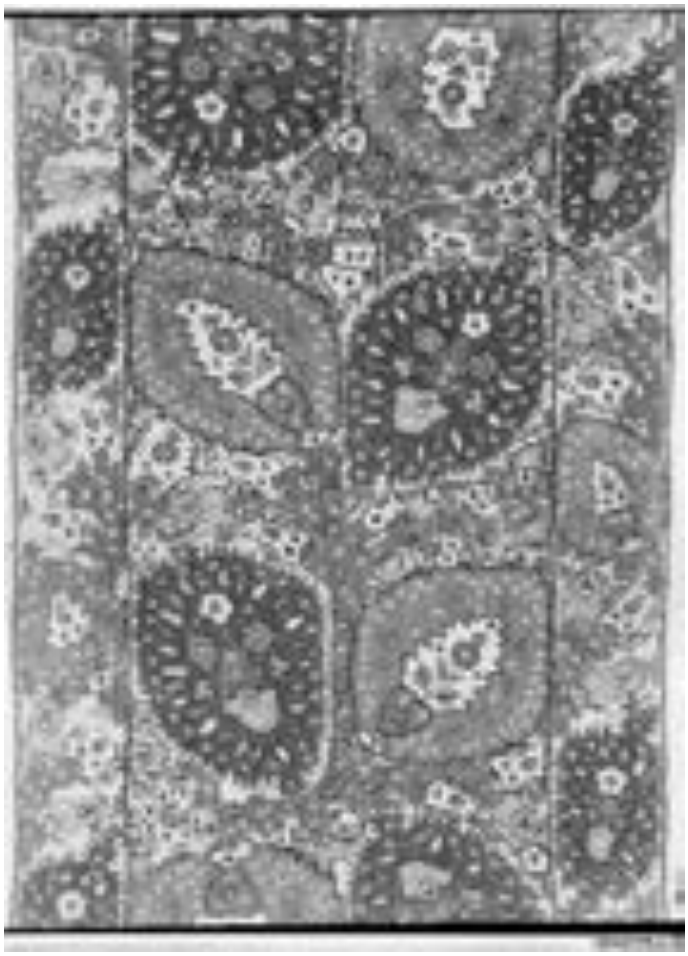
| Table 6.1 Attributed Locations and Museum Object Count | |
|---|---|
| **Location** | **Number of objects attributed** |
| Turkey (incl “Ottoman”) | 25 |
| Iran (incl “Persian”) | 16 |
| Italy | 10 |
| Greece | 6 |
| Spain | 2 |
| France | 1 |
| Pakistan (Lahore) | 1 |
| Syria (Aleppo) | 1 |
| Hungary | 1 |
| Europe | 1 |
| Unknown, marked with “?” | 3 |

### 6.3 Detail Object Comparison per Group

To move beyond the initial qualitative survey, three comparative examples were selected for each group of BZN17 fragments to enable a more focused and in-depth analysis. The chosen examples represent the closest visual and technical alignments with the BZN17 textiles, while also offering meaningful contextual and material information available through museum collections and online documentation. Each subsection presents these three comparisons alongside a short attribution based on the examples discussed. These attributions are not definitive but serve as guiding assessments that contribute to the broader conclusions offered later in the thesis.

**Group A: Fragments 6305-030 to 6305-036, 6333-35, and 6333-48**

**Table 6.2: Example 1 - Floral motifs**

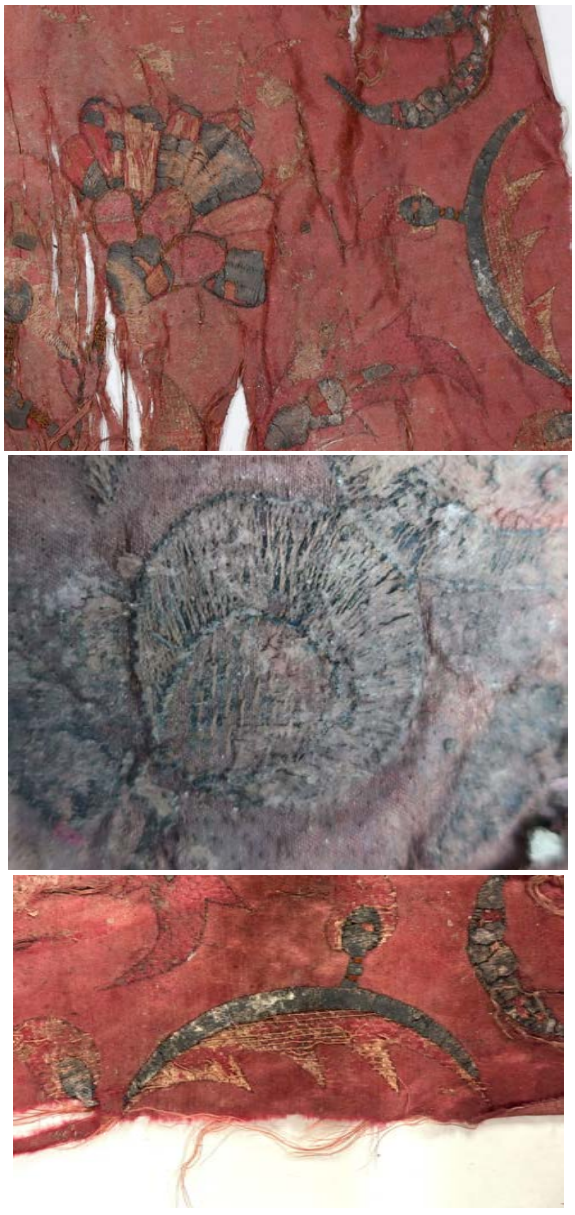
| | |
|---|---|
|  |  |
| *Cover, cotton (?), silk (?); plain weave, embroidered. Attributed to present-day Greece, Janina, 18th century. The Metropolitan Museum of Art, 79.1.12. https://www.metmuseum.org/art/collection/search/443017* | *Top: 6305-031, floral motifs. Bottom: 6333-35, leaf-shaped embroidery* |

**Comparison**

The floral design of the BZN17 fragments shares stylistic elements with the Met example, including the presence of stylised hyacinth-looking flowers and large leaf motifs. Despite the shared decorative vocabulary, the BZN17 fragments exhibit a finer execution and a more complex material composition, which includes metal threads. While both objects are

embroidered, the pieces from the Palmwood collection appear more refined and richer in texture and materials. Regarding dating, the Met example is attributed to the 18th century, placing it approximately a century later than the BZN17 fragments, dated to the first half of the 17th century.

**Table 6.3: Example 2 - Decorative motifs, materials and techniques**

| | |
|---|---|
|  |  |
| *Cover, silk; satin weave, embroidered. Turkey, 17th century. London, Victoria and Albert Museum, 830-* | *Top: 6333-35, floral carnation motif. Centre: Reverse side of the embroidery,* |

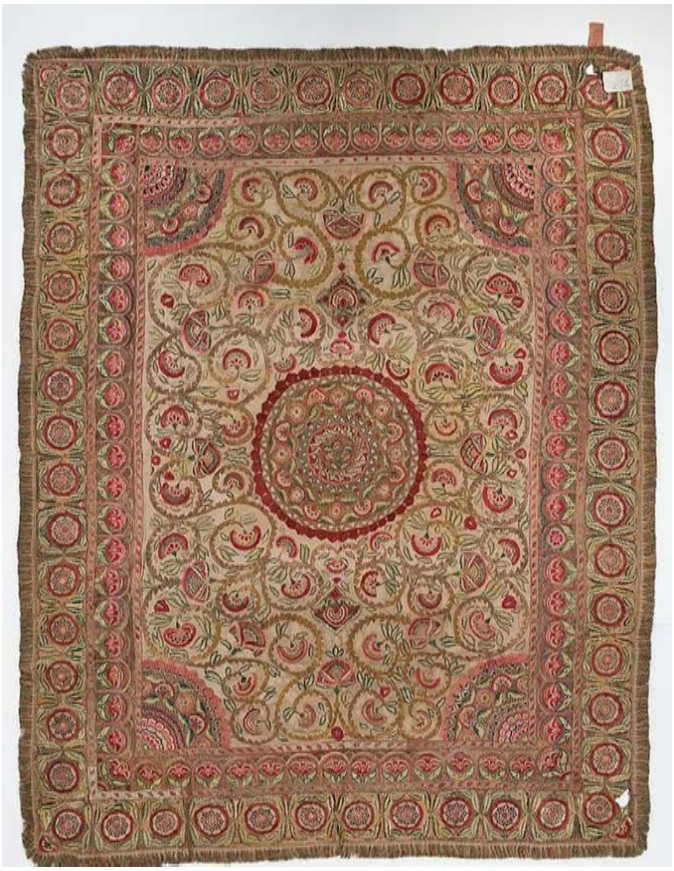
*Domaradzka, UvA, 2025.*

| **Table 6.3: Example 2 - Decorative motifs, materials and techniques** | |
|---|---|
| *1902.https://collections.vam.ac.uk/item/O52013/cover-unknown/* | *stitches used to attach metal threads. Bottom: Traces of silk floss embroidery, now only couching threads are visible* |

**Comparison**

The V&A example exhibits strong stylistic parallels with the BZN17 fragments, including the depiction of carnations and stylised saz-leaves, both characteristic motifs in Turkish design. The layout and ornamental vocabulary suggest similar aesthetic conventions. Technically, both objects are embroidered on a silk satin ground using silk and metal threads. By looking at the photograph, it can be said that silk floss embroidery was employed on the museum example. This aligns with what is present on, for example, fragment 6333-35, with only the couching stitches visible due to the deterioration and loss of floss. Chronologically, this museum object is attributed to the 17th century and likely dates from a similar timeframe as the Palmwood fragments, supporting the proposed attribution to the first half of the century.

**Table 6.4: Example 3 - Decorative motifs, materials and techniques**

| | |
|---|---|
|  |   |
| *Wedding blanket with embroidery, cotton, silk, and metallic threads. Turkey, 19th century. Bavarian National Museum, 2012/123.* [https://www.bayerisches-nationalmuseum.de/sammlung/00210973](https://www.bayerisches-nationalmuseum.de/sammlung/00210973) | *Top: 6333-35, floral carnation motif. Bottom: 6305-031, flowers in niches* |

**Comparison**

The BZN17 fragments share stylistic elements with the Bavarian National Museum piece, particularly in carnations and rosette-like blooms arranged in repeated arches or niches. Both pieces are embroidered using silk and metal threads. However, differences are evident in the choice of ground fabric: the BZN17 examples are executed on a silk satin base, while the museum blanket is worked on cotton. Furthermore, the museum object is attributed to the 19th century, placing it two centuries later than the BZN17 fragments, which is quite a significant difference.

*Domaradzka, UvA, 2025.*

**Attribution based on provided examples**

The combination of stylised carnations, saz leaves, repetitive floral motifs, silk satin ground, and metal thread embroidery is consistent with high-quality embroidered textiles produced under Ottoman influence during the 17th century. Strong stylistic and technical parallels can be drawn with examples attributed to the Ottoman Empire, particularly the embroidered cover held at the Victoria and Albert Museum. However, similar decorative conventions also appear in 18th- and 19th-century textiles from regions such as Chios or other Aegean islands, which were under Ottoman control during the 17th century. While an Ottoman provenance remains the most likely attribution, a production centre within present-day Greece under Ottoman rule cannot be excluded.

**Group B: Fragments 6263-038 and 6305-056**

**Table 6.5: Example 1 - Decorative motifs, materials**

| | |
|---|---|
|  | <br> |
| *Cover, silk on cotton. Attributed to Iran, 18th century. The Metropolitan Museum of Art, 08.164.5a.https://www.metmuseum.org/art/collection/search/445294* | *Top: Detail of the central motif, an 8-pointed star with an animal-like creature and curving vines*<br>*Bottom: Geometric shape with a leopard-like animal inside, curving vines and leaves* |

**Comparison**

This example is among the closest stylistic parallels to fragments 6263-038 and 6305-056 regarding overall composition and decorative language. The shared features include large and small eight-pointed stars, animal figures embedded within geometric frames, and dynamic curving vines integrated into the pattern. The presence of a dragon-like creature in the central star of the museum example offers a possible clue to the now-lost motif inside the central star in fragment 038. Technically, both objects are silk-based embroideries that employ geometric layout principles and decorative animal imagery; however, the BZN17 fragment appears to be of higher quality, featuring metal thread work and a silk ground, whereas the Met example is worked on cotton and lacks metal threads. Furthermore, the border designs differ

considerably. The museum object is attributed to the 18th century, making it a century later than the BZN17 fragments.

**Table 6.6: Example 2 - Decorative motifs and stylistic conventions**

| | |
|---|---|
|  |  |
| *Spiral vine carpet, cotton, wool. Pakistan, 16th/17th century. Berlin, Museum of Islamic Art, I. 6/74. https://recherche.smb.museum/detail/1521009/spiral rankenteppich* | *Detail of pomegranate vine border on fragment 6263-038* |

**Comparison**

The BZN17 fragment and the spiral vine carpet share similar stylistic conventions, particularly in their decorative borders. In both objects, these are composed of undulating vegetal bands supporting blooms and stylised leaves arranged in succession, evoking similar design logic and visual rhythm. However, the two objects differ fundamentally in materials and technique. The Berlin carpet is woven using cotton and wool, while the BZN17 fragment is embroidered

with silk and metal threads. Moreover, the intended function of the objects likely diverges: the museum piece is a complete carpet. At the same time, the Palmwood fragments remain unidentified but were most likely not produced as a carpet due to their metal thread embroidery. In terms of dating, both objects could be contemporaneous. The Berlin example is dated to the 16th-17th century, potentially overlapping with the BZN17 fragments from the first half of the 17th century.

**Table 6.7: Example 3 -Decorative motifs, materials and techniques**

| | |
|---|---|
|  |  |
| *Fragment of silk carpet, silk, cotton, gold and silver threads. Isfahan (Iran), ca. 1625 - ca. 1650. Rijksmuseum Amsterdam, BK-17275.* *https://www.rijksmuseum.nl/nl/collectie/object/Fragment-van-een-zijden-tapijt--89e8192c8e0cc5fbcb958f8256da255f?tab=data* | *Fragment 6263-038, detail of decorative motifs and metal thread embroidery* |

**Comparison**

Although the stylistic similarities between the BZN17 fragment and the Rijksmuseum example are limited, both include pomegranates and floral motifs, potentially stylised lilies. Technically, both objects share notable material characteristics, incorporating silk and metal threads (gold and silver) in their execution. The primary difference lies in technique: the BZN17 object is embroidered, while the Rijksmuseum fragment is woven. Chronologically, this carpet fragment dates from approximately 1625 to 1650, placing it firmly within the same timeframe as the studied fragments.

**Attribution**

Using eight-pointed stars, animal figures surrounded by scrolling vines, and geometric layouts closely align with design traditions found in Persian textiles, particularly those attributed to Safavid Iran. Comparative examples from the Metropolitan Museum and Rijksmuseum reinforce this attribution: the former displays a nearly identical layout and motif type. At the same time, the latter confirms the use of silk and metal threads in Safavid textiles. Despite differences in ground materials or weaving technique, the visual language and material quality of fragments 6263-038 and 6305-056 indicate a Safavid origin, likely from Iran, dating to ca. 1600-1650.

### Group C: Fragments 6263-043 and 6263-044

**Table 6.8: Example 1 - Layout and embroidery techniques**

| | |
|---|---|
|  |  |
| *Cushion cover, silk velvet, embroidered with metal wrapped thread. Attributed to Turkey, 18th century. The Metropolitan Museum of Art, 41.190.288. https://www.metmuseum.org/art/collection/search/450474* | *Fragment 6263-044, cushion cover embroidered with silk and metal threads on a silk satin ground* |

### Comparison

Both the BZN17 fragment and the Met cushion cover share similar formats, including decorative lappets and a central floral field. However, the layout differs significantly in execution. The museum object is more centrally composed, with a single, dominant floral motif framed by symmetrically placed elements. At the same time, the BZN17 fragment is based on a repeated floral unit, resulting in a more rhythmically fragmented or chaotic overall appearance. Technically, both covers are embroidered with metal-wrapped threads on a silk base, although the Met example is made of silk velvet, contrasting with the silk satin ground of the BZN17 piece. Regarding dating, the Met object is attributed to the 18th century, making it later than the studied fragment.

*Domaradzka, UvA, 2025.*

**Table 6.9: Example 2 - Layout and motifs**

| | |
|---|---|
|  |  |
| *Detail, cushion cover with vines and lotus blossoms. Silk and metal thread, lampas weave. Ottoman Chios, 1550s-1600s.Victoria and Albert Museum, 479A-1884.https://collections.vam.ac.uk/item/O319478/pair-of-cushion/* | *Top: Detail of decorative lappets with flowers inside of them, 6263-044*<br>*Bottom: Lotus-like flower, golden metal thread visible in the centre, 6263-044* |

**Comparison**

These cushion covers from Ottoman Chios exhibit notable stylistic parallels with the BZN17 fragments, particularly in the floral motifs of the central field. The large blossoms, resembling lotus flowers or palmettes, share visual characteristics with those found in fragment 6263-044. However, the compositions differ in structure. The museum repeats a single vine-based floral unit six times across the length, producing a harmonious and orderly layout. In contrast, the BZN17 fragment repeats its floral unit only twice across the width, resulting in a denser and more chaotic visual rhythm. Technically, both utilise silk and metal threads, though the V&A covers are woven in lampas, whereas the BZN17 fragments are embroidered on silk satin.

Chronologically, the V&A examples are dated to the late 16th or early 17th century, aligning closely with the attribution of the studied covers.

**Table 6.10: Example 3 - Goldwork embroidery techniques**

| | |
|---|---|
|  |  |
| *Red with gold-coloured vine ornament, silk, metal threads, embroidered. Italy, 16th century. Museum of Applied Arts, Vienna, 23.05.2025. https://sammlung.mak.at/de/collect/rot-mit-goldfarbenem-rankenornament_91266* | *Top: Detail of goldwork embroidery technique, golden wire visible, 6263-044 Bottom: Detail of goldwork embroidery technique, golden wire visible in the centre of the flower, 6263-044* |

**Comparison**

The arrangement of metal threads in fragment 6263-044 closely resembles the goldwork embroidery technique observed in the Italian example. In both cases, gold-coloured threads are applied in a raised manner to create textured floral ornamentation, resulting in a comparable

visual and material effect. Both textiles are embroidered on a silk satin ground and incorporate floral motifs, suggesting potential parallels in technique and style. However, the BZN17 fragment displays a more refined and complex composition in terms of aesthetic execution and technical detail. Notable differences remain in the style and form of the floral motifs. Chronologically, the Viennese example is dated to the 16th century, possibly placing it slightly earlier than the BZN17 fragments.

**Attribution**

Fragments 043 and 044 share notable features with early modern cushion covers attributed to Ottoman production, including decorative lappets, stylised floral motifs, and goldwork embroidery on a silk satin ground. The visual and technical comparisons with examples from Ottoman Chios and later Turkish pieces support a possible connection to Ottoman decorative traditions. However, the denser and less centralised layout of the BZN17 fragments introduces a degree of variation. The similarity in gold thread application to an Italian 16th-century embroidery also raises the possibility of technical influence or shared workshops across cultural boundaries. Given the high level of craftsmanship and stylistic overlap, these fragments may have originated in an Ottoman context or reflect an Ottoman-inspired design produced in a European setting.

### Group D: Fragment 087

**Table 6.11: Example 1 - Floral motifs, layout, design, materials and techniques**

| | |
|---|---|
|  |  |
| *Textile fragments with floral spray, linen, silk, plain woven, and embroidered. Near East, 10th-15th century. Ashmolean Museum, EA1993.311. https://jameelcentre.ashmolean.org/collection/7/10222/10231/18942* | *Top: Detail of floral pattern on fragment 6263-087*<br>*Bottom: Detail of the embroidered flowers, stitch holes and floss silk visible* |

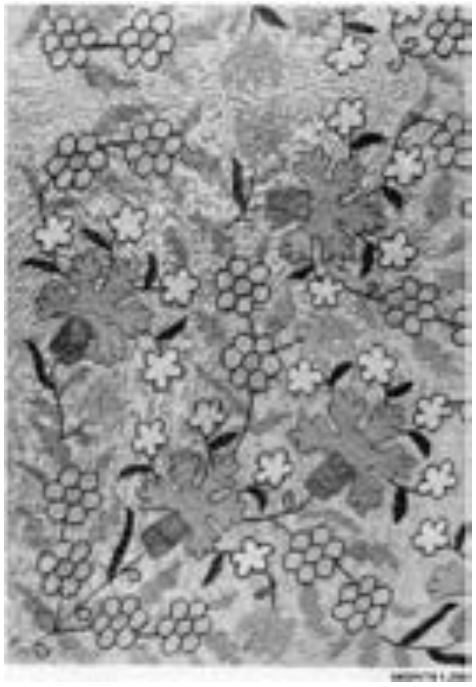
### Comparison

This fragment resembles BZN17 fragment 6263-087 in terms of floral motifs and compositional arrangement. The stylised blossoms and placement are closely comparable, including lateral leaf-like stems that are only partially preserved in the archaeological piece.

*Domaradzka, UvA, 2025.*

Both objects are embroidered using silk threads, and the technique appears similar based on surviving stitch holes and floss remnants. Technically, the main distinction lies in the ground fabric: the museum example is worked on linen, while the BZN17 fragment is embroidered on silk, suggesting a more valuable base material. Thread density is comparable, with the Ashmolean object measured at 42 threads per centimeter². Chronologically, the Ashmolean fragment dates significantly earlier, between the 10th and 15th centuries, but this may indicate the long-standing use of this floral design across centuries.

**Table 6.12: Example 2 - Floral motifs and materials**

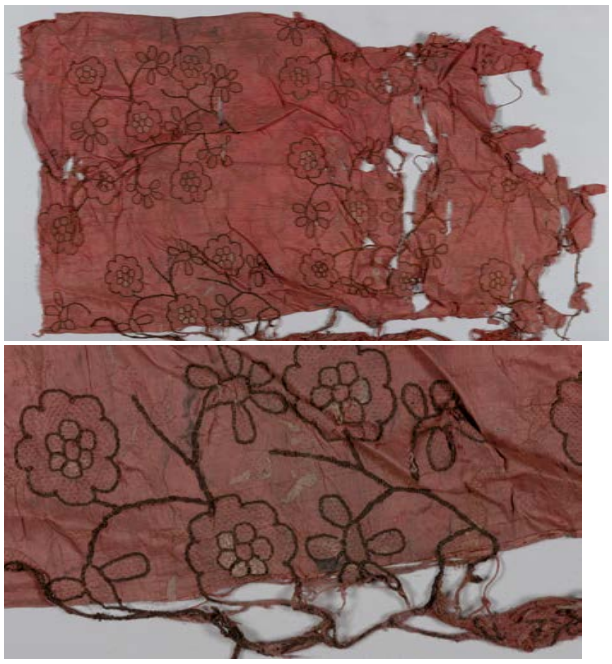
| | |
|---|---|
|  |  |
| *Textile fragment, linen, silk, plain weave, embroidered. Attributed to present-day Greece, 18th century. The Metropolitan Museum of Art, 79.1.296. https://www.metmuseum.org/art/collection/search/443089* | *Fragment 6263-087* |

**Comparison**

The floral motifs in this fragment share visual similarities with those found in 6263-087, particularly in their stylised form and arrangement. While the museum example features a more elaborate overall composition with additional floral varieties, the core decorative vocabulary overlaps. Both fragments are embroidered using silk thread, yet they differ in ground material: the museum example is worked on linen, whereas the BZN17 piece is

embroidered on silk. This suggests variations in quality, with the archaeological fragment likely representing a more luxurious version. Unfortunately, no detailed information regarding the embroidery technique used in the museum object is available, limiting a more precise technical comparison. Chronologically, the Met example is attributed to the 18th century, placing it at least a century later than the archaeological fragment.

**Table 6.13: Example 3 - Floral motifs, materials and techniques**

| | |
|---|---|
|  |  |
| *Fragment of a wrapping cloth with leaf shapes and flowers, silk, silver thread, embroidered. Ottoman, 18th century. Ashmolean Museum, EA2004.7. https://jameelcentre.ashmolean.org/collection/8/per_page/25/offset/50/sort_by/random/object/19640* | *Top: Fragment 6263-087*<br>*Bottom: Detail of the edge of fragment 6263-087, floral motif and remains of silk floss embroidery visible* |

**Comparison**

This museum fragment shares stylistic features with 6263-087, particularly in the use of floral motifs and the visual rhythm of the design. Both are embroidered on a silk ground using silk thread, suggesting similarities in material selection and basic technique. However, the museum object includes silver metal thread and is executed on a satin weave ground, making it technically and visually more high-end than the archaeological fragment. Despite these differences, the shared ornamental vocabulary points to overlapping stylistic influences.

Chronologically, the Ashmolean example dates to the 18th century, making it a century younger than the BZN17 piece.

**Attribution**

Fragment 6263-087 is characterised by stylised floral motifs embroidered in silk thread on a silk taffeta ground, with visual and technical features that recur in various textiles spanning several centuries and regions. Comparable examples from the Near East, Greece, and the Ottoman Empire display overlapping decorative vocabulary and material choices. However, they vary in quality, ground fabric, and the inclusion of metal threads. The similarity to an earlier Near Eastern embroidery dated to the 10th–15th century suggests that this simplified floral style may have been used for a long time. Later examples from Greece and the Ottoman world confirm the continuity of this motif into the 18th century. While a definitive attribution remains difficult due to the widespread nature of the design, a production context influenced by Ottoman or Eastern Mediterranean embroidery traditions is possible.

### 6.4 Comparative Analysis Results

As demonstrated in the section above, museum objects exhibited correspondences with the BZN17 fragments in visual characteristics and, at times, technical construction. Here are the general findings and results of the comparative analysis, which bring insight into both the origin of the studied fragments and the contents of museum collections.

1. In general, the most substantial similarities were observed regarding decorative motifs and compositional design, as these elements were more readily identifiable through images. While museum databases often provided basic information on materials, details regarding embroidery techniques were frequently absent, and the resolution of images was usually insufficient for closer technical examination.
2. While many of the closest comparative examples are dated later than the BZN17 fragments, this likely reflects the persistence and wide circulation of certain ornamental and technical conventions across the early modern period. The recurrence of similar motifs and layouts in 18th and 19th-century pieces should not be interpreted as evidence of later production for the BZN17 fragments, but rather as an indication of stylistic continuity within textile traditions.
3. The comparative examples from museum collections often show greater similarity to one another than to the Palmwood fragments. This highlights a potential bias in museum holdings, favouring textiles such as imperial garments that were deliberately collected and conserved. In contrast, the Palmwood fragments likely belonged to a textile category that was not intended for preservation. Their survival is a result of accidental archaeological circumstances rather than purposeful conservation. This may help explain the relative scarcity of comparable examples in museum collections today.

4. A review of museum collections reveals that textiles attributed to different regions often share overlapping stylistic and technical features, making clear distinctions difficult. Despite regional attributions assigned by institutions, many examples of Greek and Italian origin appear visually indistinguishable from those identified as Ottoman or Iranian. However, Persian textiles generally exhibit more distinctive motifs. Several Greek and Italian examples display hybrid characteristics, combining design elements associated with Ottoman fabrics with features typical of European decorative arts, such as Christian iconography.
5. No individual object examined provided an exact match to any of the BZN17 fragments, underscoring both the fragmentary condition and potentially unique nature of the textiles recovered from the Palmwood shipwreck. This highlights the limitations of comparative analysis regarding archaeological fragments and the need for caution when assigning definitive attributions.

### 6.5 Limitations of Comparative Analysis

This comparative analysis faced several limitations. Access to major collections with highly relevant holdings, such as those of the Topkapi Palace Museum in Istanbul and the National Museum of Iran, was not possible due to a lack of online access or web restrictions. In many cases, high-resolution images were unavailable, and essential technical data, such as stitch types, thread counts, or an image of the reverse side of the objects, was not provided. Some objects, particularly fragments that are not on display, had no photos available at all. In addition, the selection of comparative examples was based on visual similarities and available data, which introduces some researcher bias and does not reflect the full range of historical textiles that may be relevant.

# Conclusion

## Results and Reflection

This study investigated fourteen embroidered textile fragments recovered from the Palmwood Shipwreck (BZN17), aiming to assess their possible point of origin through material, technical, and stylistic analysis. Drawing on a combination of object-based examination, scientific analysis, contextual research, and comparative study, it was possible to propose tentative attributions for the fragments.

Group A fragments were attributed to the Ottoman Empire or a region under Ottoman stylistic influence, supported by the identification of the four-flower motif, mihrab-like layout, and construction and embroidery techniques documented in the Ottoman Empire. Group B was attributed to Safavid Iran, primarily due to its decorative motifs. Fragments from this group showed strong alignment with museum objects in their use of eight-pointed star motifs, animal imagery, and border compositions characteristic of Persian design. Group C, attributed to originating from a broadly Mediterranean production centre, displayed hybrid stylistic features and technical affinities with both Ottoman and European traditions. This could suggest manufacture in a transregional context such as Chios. Group D, the most modest in materials and technique, could not be attributed with certainty but likely emerged from a domestic or regional production context informed by Ottoman aesthetics.

While attribution remains speculative, the findings underscore the complexity of early modern textile production and exchange, particularly in the Mediterranean and West Asian regions. The wide availability and co-existence of red dyes such as American cochineal and kermes, together with overlapping material features and embroidery styles, reflect the globalised and entangled nature of the 17th-century textile trade. The study further highlights the persistence of visual conventions across centuries and empires, complicating efforts to assign origin based on motif or layout.

## Research Limitations

Several limitations shaped the scope and certainty of this study. The most fundamental challenge lies in the inherently fragmentary and decontextualised nature of the BZN17 textile collection. Despite their exceptional preservation, the embroidered fragments remain isolated from clear historical documentation, rendering attribution speculative. Their survival was the result of accidental archaeological circumstances rather than deliberate preservation, which complicates their contextual interpretation.

A further limitation stems from the limited availability of technical and art-historical literature, particularly concerning early modern embroidery. While the study sought to establish correlations between features such as loom width, thread count, and embroidery techniques and specific regional practices, there is no definitive evidence that these parameters were universally standardised or consistently applied. Regional variability, undocumented

production methods, and the absence of a standardised technical vocabulary make it difficult to link such specifications to a place of origin.

Comparative analysis was restricted by the uneven quality and availability of museum documentation. Many collections lack detailed technical descriptions, high-resolution imagery, or reverse-side photographs needed for embroidery technique analysis. Additionally, lack of access to major collections in Turkey and Iran, such as those of the Topkapı Palace Museum or the National Museum of Iran, further hindered comparative efforts. Finally, most available comparative examples stem from well-preserved, curated objects, often of courtly provenance, which does not reflect the full diversity of textiles in circulation during the 17th century. The contrast between these intact examples and the archaeological material causes further interpretive challenges.

Finally, the globalised nature of the early modern textile trade itself limits attributional certainty. By the 17th century, materials, motifs, and techniques appear to have become highly mobile, travelling across geographical and cultural boundaries. The resulting hybridity complicates attributions to specific production centres. Despite these constraints, the embroidered fragments from the Palmwood Shipwreck offer a rare window into the materiality of early modern textile culture. Their study contributes to understanding the complexity of provenance research in archaeological contexts.

**Future Research Recommendations**

Further research is strongly encouraged on both the embroidered fragments and the broader textile assemblage from the Palmwood Shipwreck. Despite their fragmentary condition and limited suitability for exhibition, these objects provide rare insight into the material, technical, and decorative realities of early modern textile production and circulation. Their documentation, study, and long-term preservation should be prioritised to ensure continued scholarly engagement with these unique finds.

Broader comparative research is also recommended. This includes targeted investigation of underrepresented or less-accessible collections, particularly in Turkey, Iran, and Eastern Europe, which remain crucial for establishing more robust regional frameworks. Improved access to high-resolution imagery, technical documentation, and reverse-side views of comparative objects would enhance the quality and precision of future studies. Where feasible, institutional collaboration and direct consultation with textile specialists in these regions would offer significant value.

Finally, addressing the full complexity of the Palmwood Shipwreck and its finds demands ongoing interdisciplinary engagement, uniting expertise in textile conservation, art history, and provenance studies.

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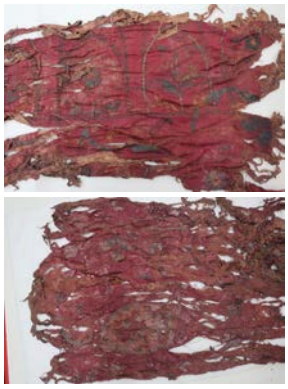
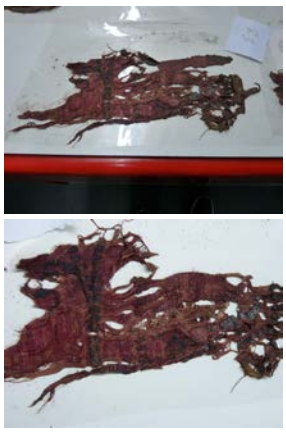
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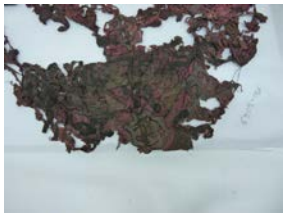
# Appendix I: BZN17 Embroidered Fragments

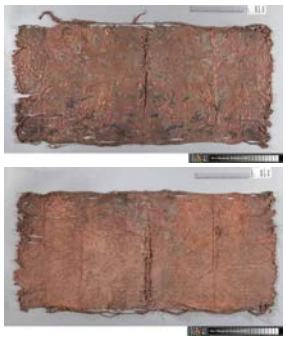
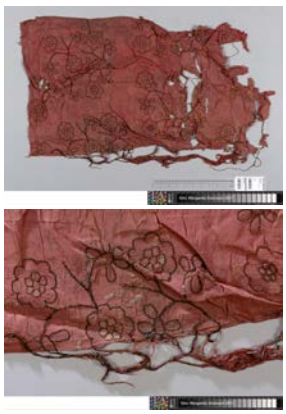
**Table I.1 BZN17 Embroidered Fragments**

| Inventory number | Image | Size (cm) | Materials & Techniques | Lining | Selvage | Dyes | Notes & Comments |
|---|---|---|---|---|---|---|---|
| 6305-030 |  | 95x37 | Silk satin, silk threads, metal threads | Yes | Yes | No analysis, presumably identical to related fragments. | Mihrab decorative arch motifs, flowers |
| 6305-031 |  | 61 x 39 | Silk satin, silk threads, metal threads | Yes | Yes | Analysis is part of this thesis research | Weird opening, sewn section in the middle |
| 6305-032 |  | - | Silk satin, silk threads, metal threads | - | Yes | No analysis, presumably identical to related fragments. | |

| Table I.1 BZN17 Embroidered Fragments | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6305-033 |  | - | Silk satin, silk threads, metal threads | - | Yes | No analysis, presumably identical to related fragments. | |
| 6305-034 |  | 59 x 26 | Silk satin, silk threads, metal threads | - | Yes | No analysis, presumably identical to related fragments. | Folded inwards, backside visible. Loom width: ~60cm |
| 6305-035 |  | | Silk satin, silk threads, metal threads, ball buttons (Turk's head knot) | - | Yes, selvedge | No analysis, presumably identical to related fragments. | 4 buttons |
| 6305-036 |  | | Silk satin, silk threads, metal threads | Yes | Yes | No analysis, presumably identical to related fragments. | Folded inwards, backside visible |

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| Table I.1 BZN17 Embroidered Fragments | | | | | | | |
|---|---|---|---|---|---|---|---|
| |  | | | | | | |
| 6333-35 |  | 65 x 55 x 1.5 | Silk satin, silk threads, metal threads | Yes | Yes, selvedge to selvedge | Analysis is part of this thesis research | 3 buttons, 2 loops, partially folded inwards |
| 6333-48 |  | 3 x 2.3 | Silk threads, metal threads | - | - | - | Embroidered decorative flower |
| 6263-038 | <br> | 60 x 82 | Silk satin, silk threads, metal threads | Yes, with a pattern | Not found | Cochineal and kermes | Contains one edge of the object, not a selvedge. The total length of the object would have been at least 128cm. Loom width: over 60cm |
| 6305-056 |  | 59 x 46 | | Yes, with a pattern | Not found | No analysis, presumably identical to 038. | Contains one edge of the object, not a selvedge |

| Table I.1 BZN17 Embroidered Fragments | | | | | | | |
|---|---|---|---|---|---|---|---|
| |  | | | | | | |
| 6263-043 |  | 56 x 124 | Silk satin, silk thread, metal threads | Yes | Yes, selvedge to selvedge | Redwood | Loom width: 56cm |
| 6263-044 |  | 56 x 124 | Silk satin, silk thread, metal threads, Gold is still visible in some areas | Yes | Yes, selvedge | Redwood | Loom width: 56cm |
| 6263-087 |  | 43.0 x 78.0 | Silk cloth (taffeta?), silk thread, ink marks underneath the embroidery | No | Yes, one edge | Madder | No metal threads, some silk floss decoration still visible. One selvedge edge and one sewn. |

# Appendix II: Sketches of Embroidery Motifs

**Table II.1 Sketches of Embroidery Motifs**



*Fig II.1.1 Fragment 6305-031*



*Fig II.1.2 Fragment 6263-038*



*Fig II.1.3 Fragment 6263-044*



*Fig II.1.4 Fragment 6263-087*

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# Appendix III: Guideline Form for In-Situ Examination

| Table III.1 Guideline Form for In-Situ Examination | |
|---|---|
| **Field** | **Notes** |
| **Fragment Number** | Add number. |
| **Materials** | Identify ground fabric (e.g., silk, wool, linen); Identify embroidery thread material (e.g., silk, metal-wrapped, type of metalwork); Note if metal threads are wrapped around silk, pure metal, or other |
| **Weave Structure** | Identify weave type (plain, satin, velvet, lampas, other); Note density and quality of weave (tight, loose, regular, irregular) |
| **Embroidery Technique** | Identify stitches used (couching, chain stitch, satin stitch, others); Note precision: fine and even vs rough and irregular |
| **Colours** | List main colours visible (primarily red for all fragments); Dye analysis results; Observe colour variations (different areas, across fragments); Note possible fading, staining, contamination |
| **Motifs & Layout** | Sketch or describe main motifs (florals, geometric, abstract, etc.); Identify presence of Ottoman/Safavid/European motifs; Observe symmetry/asymmetry; Borders, repeating patterns, isolated elements |
| **Structure** | Check for lining materials, layering of materials, folds; Check for salvage, seams, buttons, stitching lines, piecing |
| **Comparative Observations** | Compare similarities/differences between fragments |
| **Photographic Focus** | Photograph areas that could help support or challenge the origin hypothesis |

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| **Table III.1 Guideline Form for In-Situ Examination** | |
|---|---|
| **Field** | **Notes** |
| **Fragment Number** | Add number. |
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| **Weave Structure** | Identify weave type (plain, satin, velvet, lampas, other); Note density and quality of weave (tight, loose, regular, irregular) |
| **Embroidery Technique** | Identify stitches used (couching, chain stitch, satin stitch, others); Note precision: fine and even vs rough and irregular |
| **Conclusion** | Answer: "Does this fragment feel (e.g., Ottoman)? Why or why not?" |

# Appendix IV: Chemical Analysis Fragments 6305-031 and 6333-35

### Sample preparation

The samples were accurately weighted (circa 0.2 - 0.4mg). To extract the colourants from the textile samples presented here as a case study, a two-step extraction was performed according to the method of Serrano et al (2015):

> Step 1) Each sample was extracted and placed in a 1 mL vial and extracted with 50 µL of a solution of 100% DMSO. The sample was placed in a heating block at 80ºC for 10 minutes. Afterwards, the liquid extracted was transferred into an insert. A residue of the fibre remained in the original vial.
>
> Step 2) The fibre residue sample was further extracted with 50 µL of a solution of HCl: H2O: MeOH (2:1:1, v/v/v). The vial was placed in a heating block at 100ºC for 10 minutes.

After the extraction, the samples were evaporated to dryness under a gentle nitrogen flow. The dried extract was reconstituted with the previously obtained DMSO extract, mechanically agitated, and centrifuged for 10 minutes at 700 RPM with a tabletop centrifuge from VWR. The supernatant was then carefully transferred into a new insert for dye analyses.

### UHPLC-PDA

An ACQUITY ultra-high performance liquid chromatography (UHPLC) system H-class (Waters, Milford, MA, USA), consisting of a quaternary pump, autosampler, column oven, and a photodiode array detector (PDA), was used. The chromatographic separation was performed on a ZORBAX Eclipse Plus C13 2.1 x 150 mm, 1.8 µm column (Agilent Technologies).

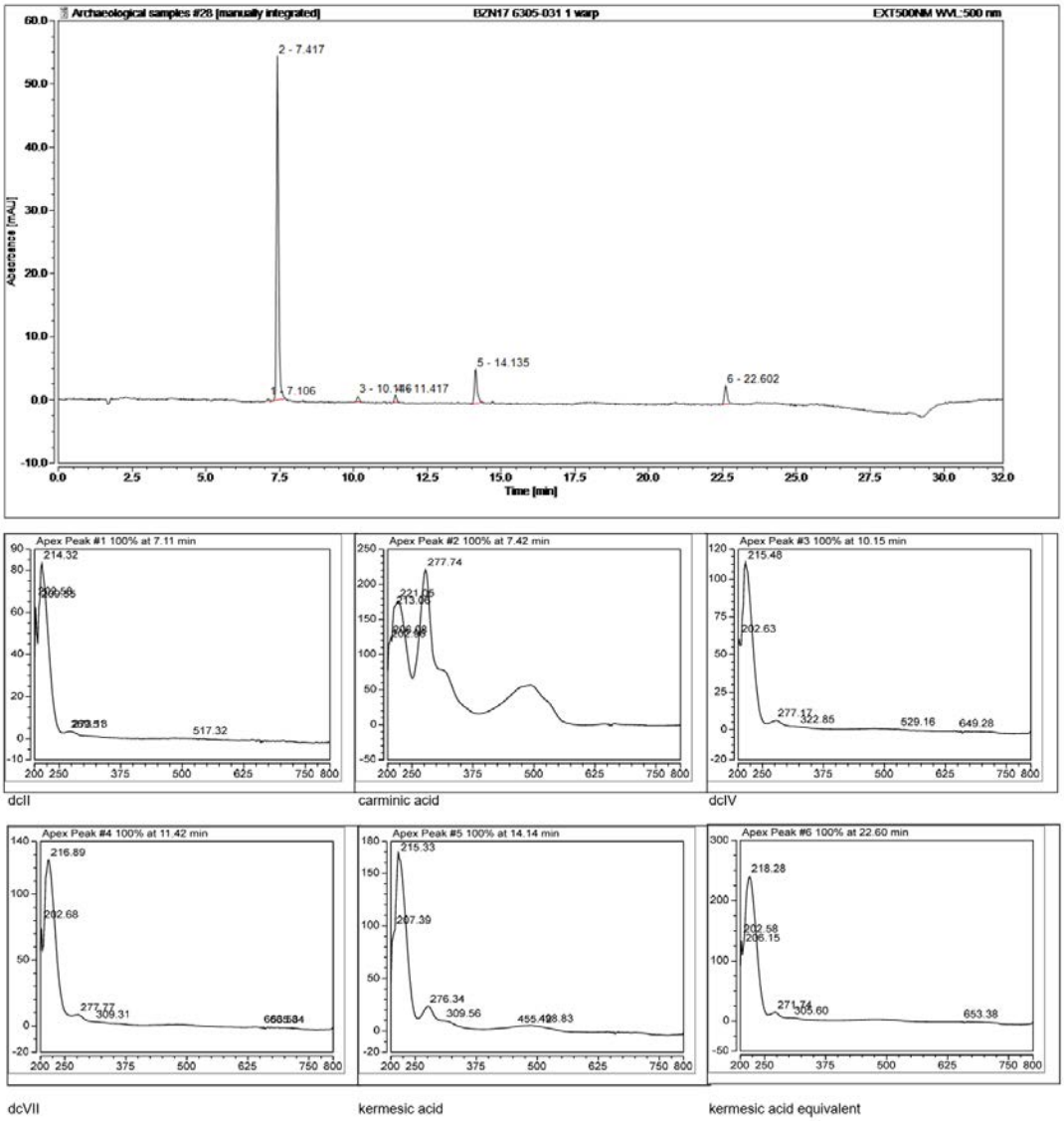
The column oven and autosampler temperatures were kept at 40 °C and 15 °C, respectively. The analysis was performed at a flow rate of 0.2 mL/min, using gradient elution. The aqueous phase (solvent A) was prepared with 94.9:2.5:2.5:0.1 (v/v/v/v) H2O: MeOH:ACN: formic acid mixture containing 0.5 mM ammonium formate. The organic phase (solvent B) was prepared with 5:47.45:47.45:0.1 (v/v/v/v) H2O: MeOH:ACN: formic acid mixture containing 0.5 mM ammonium formate (Astefanei et al., 2025). The elution programme used by Astefanei et al was adapted to have a total run of 32 min: 0 – 1.0 min, isocratic gradient of 95A:5B (v/v); 1.0-3.5 min, linear gradient to 80A:20B (v/v); isocratic gradient until 5 min; 5.0-17 min, linear gradient to 40A:60B (v/v); isocratic gradient until 19 min; 19-24 min, linear gradient to 5A:95B (v/v); isocratic gradient until 26 min; 26-27 min, linear gradient 95A:5B (v/v); isocratic gradient until 32 min.

### SEM-EDX

Analyses were carried out with a SEM-EDX Jeol IT700HR using 20 kV accelerating voltage, 10 mm working distance, and backscattered signal (BED-S) at low vacuum (30 Pa). EDX measurements were done with 30 30-second acquisition time.

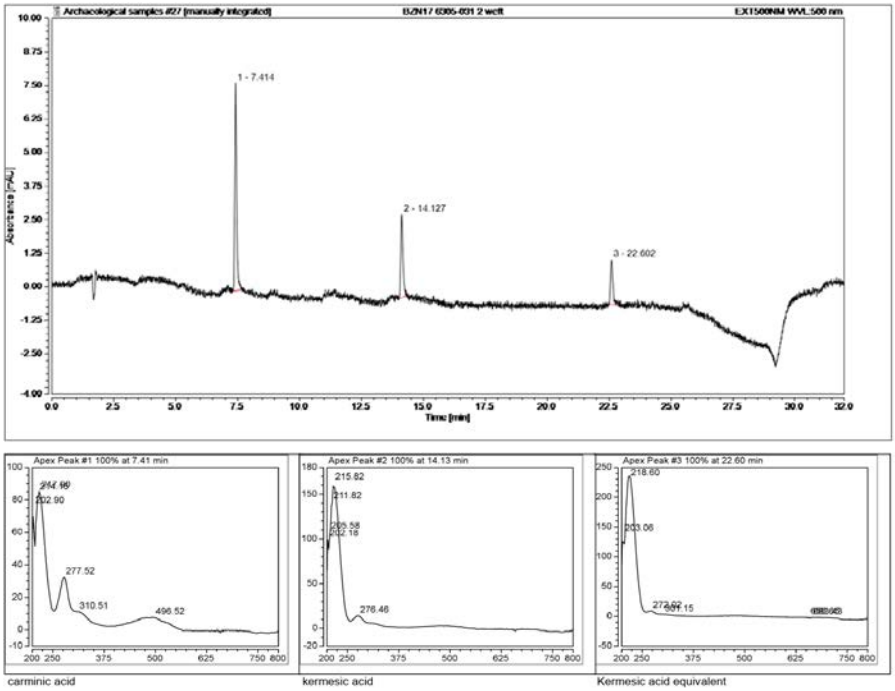
**Results**

**1. 6305-031 satin warp**

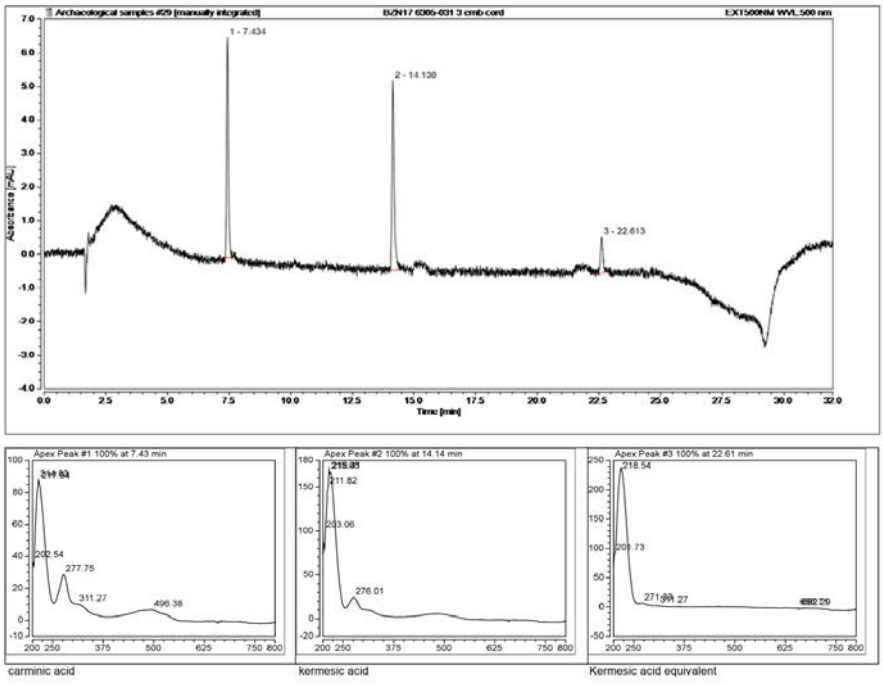



**2. 6305-031 weft**

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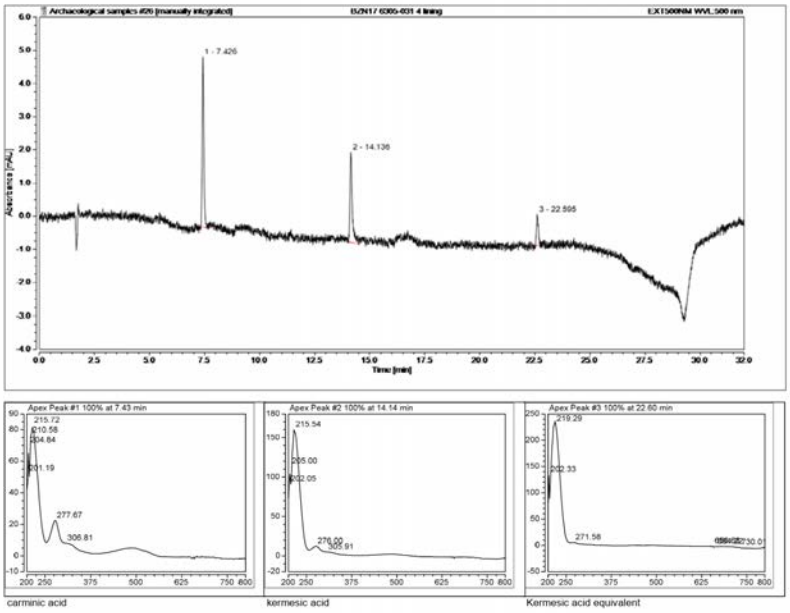



**3. 6305-031 embroidery cord**

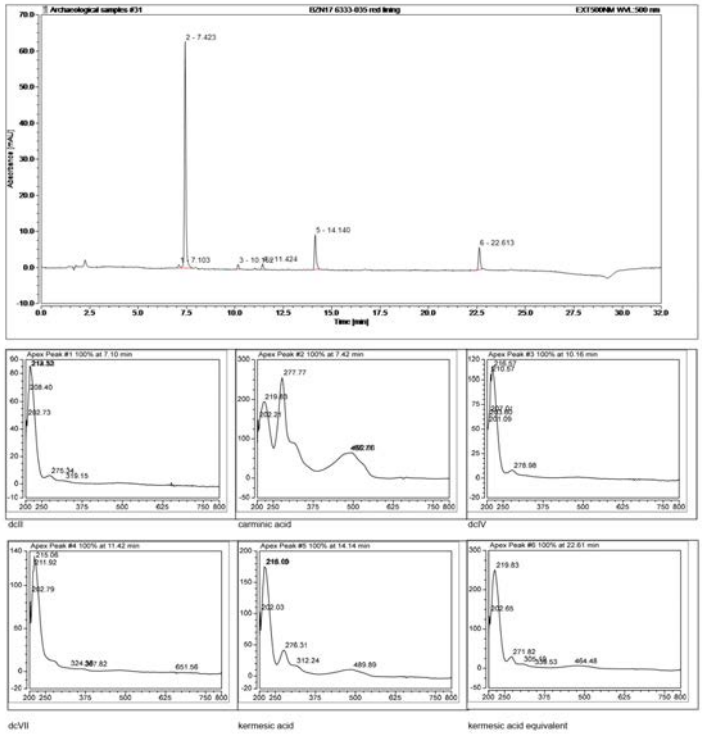



**4. 6305-031 lining**

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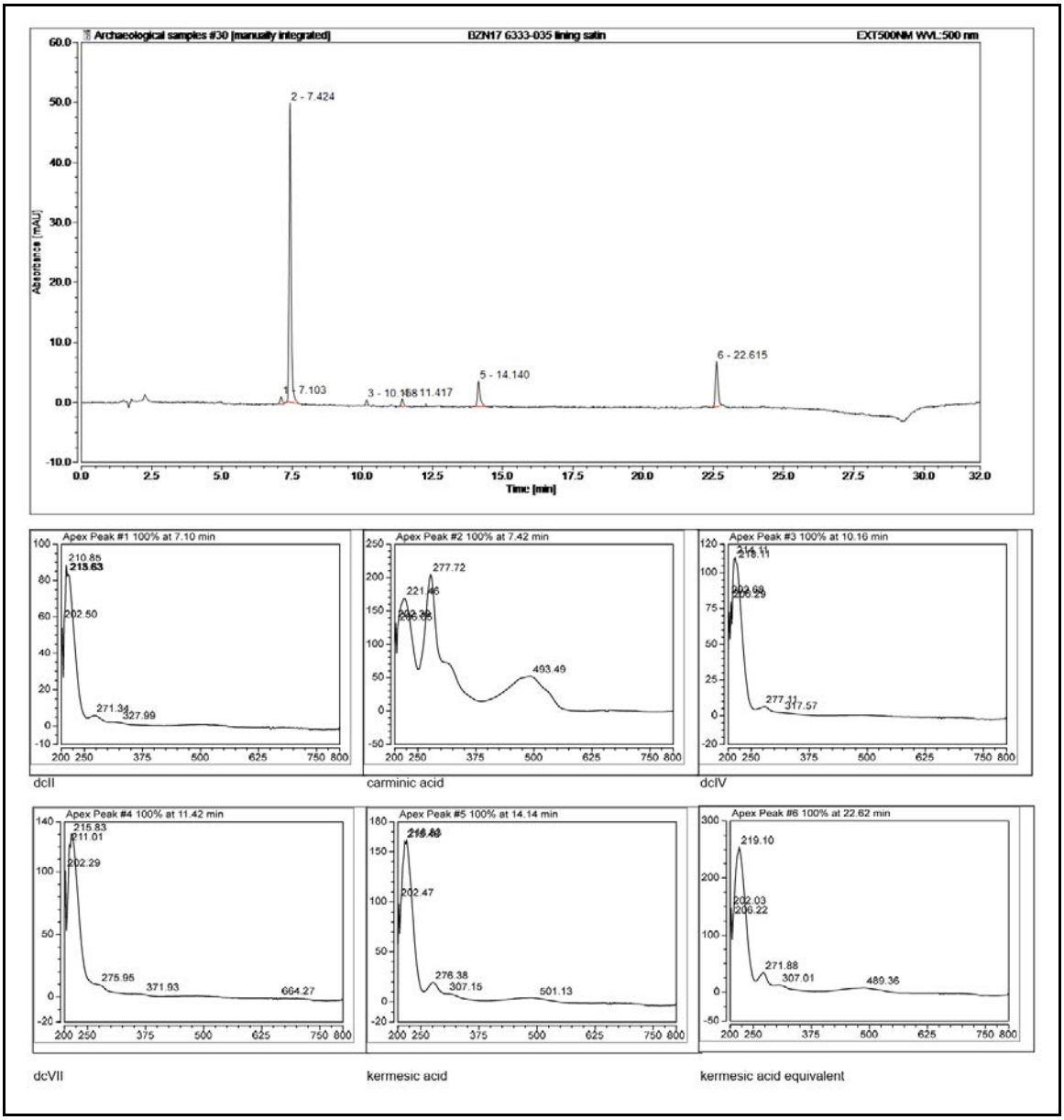



**5. 6333-35 red lining (warp)**



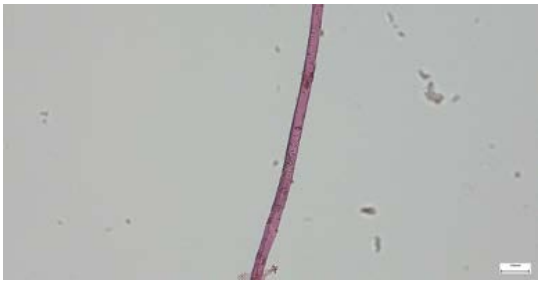

**6. 6333-35 satin lining**

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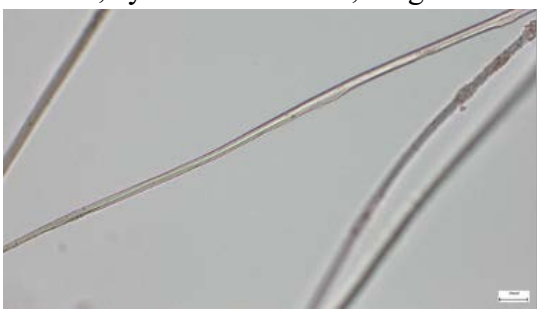
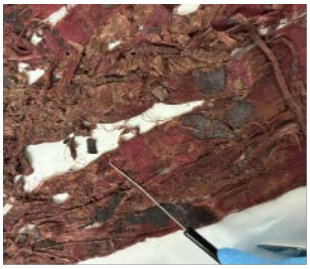

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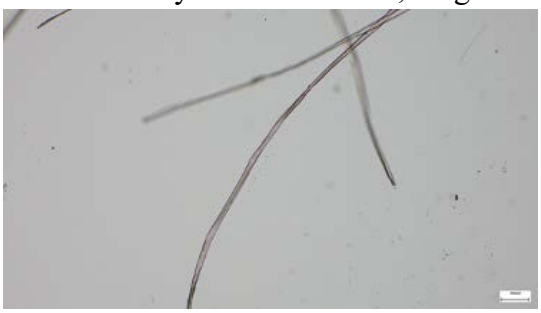

| Sampling | Dye analyses | Fibre/metal characterisation |
|---|---|---|
| 1. Satin warp  Hirox image:  | Sample weight: 0.3074 mg<br><br>Compounds detected: dcII, CA, dcIV, dcVII, KA<br><br>Dyestuff attribution: Cochineal and kermes<br><br>Date of analysis: 26/05/2025 | Transmitted light microscopy: silk-smooth, cylindrical surface, long  SEM-EDX: Silk fibres, moderately damaged (pitting, some fibres have collapsed), some crystal contamination. Small peaks of sodium, magnesium, silicon, calcium, aluminium (mordant?) and chlorine on the fibre surface; carbon, oxygen, sulphur and nitrogen from the fibres.<br>Date of analysis: 12/06/2025 |

| Sampling | Dye analyses | Fibre/metal characterisation |
|---|---|---|

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| | | |
|---|---|---|
| 2. Weft<br><br>Hirox image:<br> | Sample weight: 0.4662 mg<br><br>Compounds detected: CA, KA<br><br>Dyestuff attribution: Cochineal and kermes (?)<br><br>Date of analysis: 26/05/2025 | Transmitted light microscopy: silk- smooth, cylindrical surface, long<br><br>SEM-EDX: Silk fibres, lightly damaged (some pitting, transversal cracking, a few fibres have collapsed), some crystal contamination, but moderately clean. Small peaks of sodium, calcium, aluminium (mordant?) and chlorine on the fibre surface; carbon, oxygen, sulphur and nitrogen from the fibres.<br><br>Date of analysis: 12/06/2025 |
| 3. Embroidery cord<br><br>Hirox image:<br> | Sample weight: 0.3852 mg<br><br>Compounds detected: CA, KA<br><br>Dyestuff attribution: Cochineal and kermes (?)<br><br>Date of analysis: 26/05/2025 | Transmitted light microscopy: silk - smooth and cylindrical surface, long.<br><br>SEM-EDX: Silk fibres, minimally damaged (occasional pitting), heavy contamination of crystals and silver sulphide. Large residues of silver sulphide.<br>Small peaks of sodium, magnesium, calcium, aluminium (mordant?), and chlorine on the fibre surface; carbon, oxygen, sulphur and nitrogen from the fibres. Silicon, iron and silver on contaminants (silver sulphide). |

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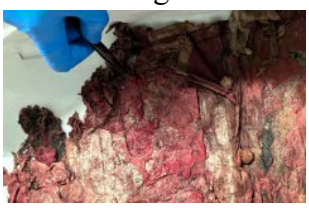
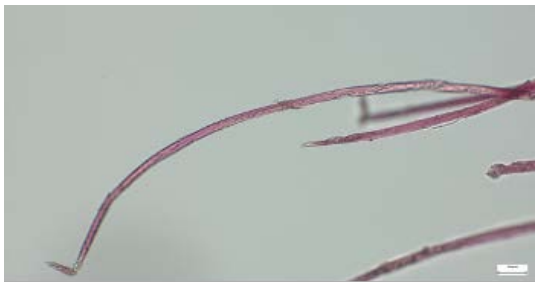
| | | |
|---|---|---|
| | | Date of analysis: 12/06/2025 |
| 4. Lining<br><br>Hirox image:<br> | Sample weight: 0.3453 mg<br><br>Compounds detected: CA, KA<br><br>Dyestuff attribution: Cochineal and kermes (?)<br><br>Date of analysis: 26/05/2025 | Transmitted light microscopy: silk - smooth and cylindrical surface, long<br><br>SEM-EDX: Silk fibres, minimally damaged (occasional pitting). Some crystals and silver sulphide contamination, but moderately clean. Small peaks of sodium, magnesium, calcium, aluminium (mordant?), on the fibres' surface; carbon, oxygen, sulphur and nitrogen from the fibres.<br><br>Date of analysis: 12/06/2025 |

| | | |
|---|---|---|
| 5. Metal embroidery<br><br>Hirox image:<br> | Not applicable | SEM-EDX: Silver sulphide with fragments of (very damaged, collapsed) silk fibres embedded into the surface of the corroded metal. Irregular, angled surface characteristic of corroded silver. Detection of silver, gold, sulphur and iron (pyrite?). Gold residue from a gilt layer.<br><br>Date of analysis: 12/06/2025 |

6333-035
1. Red lining
2. Red lining satin warp




| Sampling | Dye analyses | Fibre/metal characterisation |
|---|---|---|

| | | |
|---|---|---|
| 1. Red lining<br><br>Hirox image:<br> | Sample weight: 0.3844 mg<br><br>Compounds detected: dcII, CA, dcIV, dcVII, KA<br><br>Dyestuff attribution: Cochineal and kermes<br><br>Date of analysis: 26/05/2025 | Transmitted light microscopy: not performed<br><br>SEM-EDX: Silk fibres, very damaged and/or collapsed (very advanced degradation). Some crystals and silver sulphide contamination, but moderately clean.<br>Small peaks of sodium, calcium, aluminium (mordant?), and chlorine on the fibres' surface; carbon, oxygen, sulphur and nitrogen from the fibres. Iron was detected in some crystal contaminations.<br><br>Date of analysis: 12/06/2025 |
| 2. Red satin lining (warp)<br><br>Hirox image:<br> | Sample weight: 0.3896 mg<br><br>Compounds detected: dcII, CA, dcIV, dcVII, KA<br><br>Dyestuff attribution: Cochineal and kermes<br><br>Date of analysis: 26/05/2025 | Transmitted light microscopy: silk-smooth, cylindrical surface, occasional faint striations, long.<br><br>SEM-EDX: Silk fibres, lightly damaged (some pitting, transversal cracking, a few fibres have collapsed), some crystals and silver sulphide residue contamination. Small peaks of sodium, calcium, aluminium (mordant?) and chlorine (slightly higher peak) on the fibre surface; carbon, oxygen, sulphur and nitrogen from the fibres.<br><br>Date of analysis: 12/06/2025 |

# Appendix V: Comparative Analysis Data

**Table V.1 The Metropolitan Museum of Art, USA**

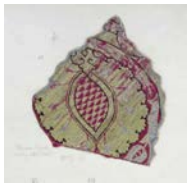
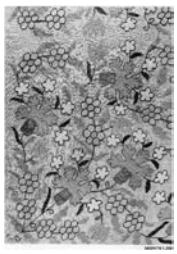
| Images | Title & Accession No. | Date | Origin | Materials & Techniques | Dimensions | Comparison Notes |
|---|---|---|---|---|---|---|
|  | Textile Fragment No. 79.1.285c https://www.metmuseum.org/art/collection/search/455294 | 18th century | Attributed to present-day Greece, Thessaloniki | Linen, silk, metal wrapped thread; plain weave, embroidered | H. 15 1/2 in. (39.4 cm) W. 20 in. (50.8 cm) | General resemblance, especially to fragment **6305-030** and related, and **6263-043/044** |
|  | Cover No. 08.164.5a https://www.metmuseum.org/art/collection/search/445294 | 18th century | Attributed to Iran | Silk on cotton | H. 31 1/2 in. (80 cm) W. 31 1/2in. (80 cm) | Similar motif as fragment **6263-038** |
|  | Panel No. 30.95.141 https://www.metmuseum.org/art/collection/search/448414 | 17th century | Attributed to Turkey, Bursa | Silk, metal-wrapped thread; cut and voided velvet | L. 53 3/8 in. (135.6 cm) W. 26 1/8 in. (66.4 cm) | Similar layout to fragment **6263-043/044** |
|  | Textile Fragment No. 2002.494.746 https://www.metmuseum.org/art/collection/search/454524 | early 17th century | Made in Turkey, Bursa | Silk, metal thread | H. 7 3/4 in. (19.7 cm) W. 8 in. (20.3 cm) | Similar motif to fragment **6305-030** |

**Table V.1 The Metropolitan Museum of Art, USA**

| | | | | | | |
|---|---|---|---|---|---|---|
|  | Textile Fragment No. 2002.494.750 https://www.metmuseum.org/art/collection/search/454528 | 17th century | Made in Iran | Silk | H. 16 1/8 in. (41 cm) W. 14 in. (35.6 cm) | Similar layout and motif as fragment **6263-038** |
|  | Textile Fragment No. 79.1.12 https://www.metmuseum.org/art/collection/search/443017 | 18th century | Attributed to present-day Greece, Janina | Cotton (?), silk (?); plain weave, embroidered | H. 39 in. (99.1 cm) W. 15 in. (38.1 cm) | Similar motif to fragment **6305-030** and related fragments |
|  | The Czartoryski Carpet No. 45.106 https://www.metmuseum.org/art/collection/search/450563 | 17th century | Made in Iran, probably Isfahan | Cotton (warp), silk (weft and pile), metal wrapped thread; asymmetrically knotted pile, brocaded | H. 191 1/2 in. (486.4 cm) W. 85 5/8 in. (217.5 cm) | Similar motifs and layout to fragment **6263-038** and other ones. |
|  | Cover No. 09.203.2 https://www.metmuseum.org/art/collection/search/445962 | First half of the 17th century | Attributed to Iran | Cotton, silk; plain weave, embroidered | L. 50 in. (127 cm) W. 46 in. (116.8 cm) | Similar layout and motif as fragment **6263-038** |
|  | Textile Fragment No. 79.1.296 https://www.metmuseum.org/art/collection/search/443089 | 18th century | Attributed to present-day Greece, Thessaloniki | Linen, silk; plain weave, embroidered | H. 28 1/2 in. (72.4 cm) W. 18 in. (45.7 cm) | Similar motifs to fragment **6263-087** |

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| Table V.1 The Metropolitan Museum of Art, USA | | | | | | |
|---|---|---|---|---|---|---|
|  | Cushion Cover (Yastik)<br>No. 41.190.288<br><br>https://www.metmuseum.org/art/collection/search/450474 | late 18th century | Attributed to Turkey | Silk velvet, embroidered with metal-wrapped thread | H. 42 in. (106.7 cm)<br>W. 24 1/2 in. (62.2 cm) | Similar materials and layout to fragment **6263-043/044** |

| Table V.2 Victoria and Albert Museum, UK | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | The Isfahan Cope<br>No. 477-1894, T.30-1926, T.211-1930<br>https://collections.vam.ac.uk/item/O93501/the-isfahan-cope-cope-unknown/ | early 17th century (made) | Iran, Isfahan | Silk, knotted | Length: 170cm<br>Width: 260cm<br>These dimensions refer to the board on which these three fragments are mounted. | Similar style of motifs to fragment **6263-038** |
|  | Cover<br>No. 1560-1902<br>https://collections.vam.ac.uk/item/O364656/cover-unknown/ | 17th century | Turkey | Brocaded silk satin | Length: 84cm<br>Width: 49cm | General resemblance. Specifically, **6263-043/044** and **6305-030-036.** |

| **Table V.2 Victoria and Albert Museum, UK** | | | | | | |
|---|---|---|---|---|---|---|
|  | Cover<br>No. 4645-1859<br>https://collections.vam.ac.uk/item/O56710/cover-unknown/ | 1600-1799 (made) | Turkey | Silk embroidered with silk and metal thread, quilted silk | Length: 31in<br>Width: 26in | General resemblance of motifs to **6263-043/044** |
|  | Cover<br>No. 830-1902<br><br>https://collections.vam.ac.uk/item/O52013/cover-unknown/ | 1600-1700 (made) | Turkey | Silk, embroidered with silk in atma stitch with couched single threads. | Length: 181cm<br>Width: 149cm | General resemblance! Especially to object **6305-030** and related. |
|  | Cover<br>No. 911-1892<br>https://collections.vam.ac.uk/item/O51834/cover-unknown/ | 1550-1699 | Turkey | Silk, embroidered with silk and metal thread in atma. | Length: 108cm<br>Width: 107cm | Some resemblance to fragment **6305-030** and related. |
|  | Cover<br>No. 1017-1898<br>https://collections.vam.ac.uk/item/O51979/cover-unknown/ | 1600-1799 | Turkey | Silk satin, embroidered with silk in atma stitch, split stitch and couched threads, with metal threads. | Length: 110cm<br>Width: 107.5cm | Similar to fragments **6263-087**, **6263-043/04** and **6305-030 - 035** |
|  | Cushion Cover<br>No. 104-1878<br><br>https://collections.vam.ac.uk/item/O319480/cushion-cover-unknown/ | 1625-1650 | Turkey, Bursa | Voided and brocaded silk. Satin foundation structure: ivory silk warp, single strand ivory cotton weft. Satin and | Length: 120cm<br>Width: 62.5cm<br>Length: 59.75cm (of pattern repeat)<br>Width: 16cm (of pattern | Similar to fragments **6263-043/044** |

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| **Table V.2 Victoria and Albert Museum, UK** | | | | | | |
|---|---|---|---|---|---|---|
| | | | | velvet warp order 3-1-2. | repeat) Selvedge: dimensions 2 cm. | |
|  | Cushion Cover No. 534-1884<br><br>https://collections.vam.ac.uk/item/O319477/cushion-cover-unknown/ | 1625-50 | Turkey | Silk brocade with metal wire. Weft cotton, 1 strand, ivory, warp: silk, slight S twist, ivory. Satin and velvet warp order 3-1-3. | Length: 130cm Width: 64cm Length: 27.5cm (repeat pattern) Width: 16.5cm (of repeat pattern) | Similar to fragments **6263-043/044** |

| **Table V.3 Islamische Kunst Museum, Germany** | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Aleppo Room No. I. 2862<br><br>https://recherche.smb.museum/detail/1528427/aleppo-zimmer | 1600 - 1603 | Syria, Aleppo | Not textiles, but a similar style | - | Similar style of motifs to fragment **6263-038** |

| **Table V.3 Islamische Kunst Museum, Germany** | | | | | | |
|---|---|---|---|---|---|---|
|  | Spiral Vine Carpet<br>No. I. 6/74<br><br>https://recherche.smb.museum/detail/1521009/spiralrankenteppich | 16th/17th century | Pakistan, Lahore | Cotton, wool | Length: 768 cm, Width: 298 cm, Weight: assembled approx. 140 kg incl. frame | A carpet with similar motifs to **6263-038,** many other carpets in the collection are similar. |
|  | Curtain/cover (furnishing textile)<br>No. I. 4927<br><br>https://recherche.smb.museum/detail/2037293/behang | 17th/18th century | Turkey | Silk, metallic thread, woven | Height: 316 cm Width: 321 cm | Similar to the BZN17 fragments in terms of materials and aesthetic features. |

| **Table V.4 George Washington Textile Museum, USA** | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Bed Sheet<br>No. 81.96 | 17th century-18th century | Greece, Epirus | Linen, silk, chain stitch, herringbone stitch, plain | 184.00 L x 109.00 W cm | Some resemblance to fragment **6305-030** and |

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| Table V.4 George Washington Textile Museum, USA | | | | | | |
|---|---|---|---|---|---|---|
| | https://collections-gwu.zetcom.net/en/collection/item/17682/ | | | weave | | related. |
|  | Cover<br>No. 3.31<br><br>https://collections-gwu.zetcom.net/en/collection/item/16887/ | 18th century | Northwestern Iran, Caucasus? | Cotton, silk, block printed, embroidery, plain weave | 64.77 L x 71.12 W cm | Similar style of motifs to fragment **6263-038** |
|  | Embroidered, appliqué, and patchwork cover<br>No. 1964.9.3<br><br>https://collections-gwu.zetcom.net/en/collection/item/15176/ | 19th century | Iran, Rasht | Wool, silk, appliqué; embroidery; plain weave, filled; chain stitch; couching; patchwork | - | Similar to all the BZN17 fragments in terms of materials and aesthetic features. |
|  | Horse Cover<br>No.1965.52.1<br><br>https://collections-gwu.zetcom.net/en/collection/item/20114/ | 19th century | Iran, Rasht | Wool; silk | Without fringes 160.00 L x 191.00 W cm | Similar to the BZN17 fragments in terms of colours, motifs and aesthetic features. |

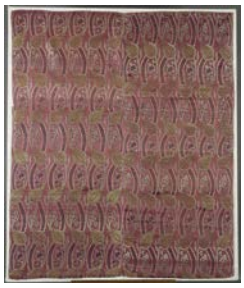
| **Table V.4 George Washington Textile Museum, USA** | | | | | | |
|---|---|---|---|---|---|---|
|  | Kilim, carpet?<br>No. R33.28.1<br><br>https://collections-gwu.zetcom.net/en/collection/item/12880/ | late 16th century-early 17th century | Iran, Kashan | Silk; metallic-wrapped silk | 229.24 H x 130.81 W cm | Similar style of motifs to fragment **6263-038** |
|  | Velvet Cover<br>No.1977.37.18<br><br>https://collections-gwu.zetcom.net/en/collection/item/3564/ | 19th century | Iran? Turkey? | Silk; metallic-wrapped silk; metal, silver, appliqué; embroidery; supplementary-warp pile | - | Similar to fragments **6263-087**, **6263-043/04** and **6305-030 - 035** |
|  | Greek panel from an embroidered cushion cover<br>No. T-1527<br>https://collections-gwu.zetcom.net/en/collection/item/48357/ | 18th century | Greece; Crete | linen; silk, embroidery | 35.60 H x 58.40 W cm | Similar layout to **6263-043/044** |
|  | Cover<br>No. 1999.18.1<br>https://collections-gwu.zetcom.net/en/collection/item/11702/ | late 18th century-early 19th century | Turkey | Silk, metallic wrapped thread, satin weave; embroidery, couching | - | Similar to fragments **6263-043/04** and **6305-030 - 035** |

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| Table V.5 Ashmolean Museum, Oxford, UK | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Velvet fragment No. EA1978.2613<br><br>https://www.ashmolean.org/collections-online#/item/ash-object-714723 | 17th - 18th century (1601 - 1800) | Turkey | Silk, metal-wrapped thread, cut and voided velvet, brocaded | 35 x 20cm approx. (height x width) | Similar style of motifs to fragment **6263-038** |
|  | Various Ottoman/Iznik pottery with floral motifs<br><br>E.g. https://www.ashmolean.org/collections-online#/item/ash-object-352814 | 17th century. Ottoman Period (1281 - 1924) | Turkey, Iznik | - | - | Various motifs like BZN17 fragments |

| **Table V.5 Ashmolean Museum, Oxford, UK** | | | | | | |
|---|---|---|---|---|---|---|
|  | Wall hanging with tulips. No. Accession no. EA2007.104<br><br>https://jameelcentre.ashmolean.org/collection/8/per_page/25/offset/250/sort_by/random/object/13017 | 2nd half of the 16th century - 1st half of the 17th century | Turkey | Cotton, silk, embroidered | 237 x 130 cm | Similar in motifs to fragments **6263-043/04** and **6305-030 - 035** |
|  | Fragment of a wrapping cloth with leaf shapes and flowers No. EA2004.7<br><br>https://jameelcentre.ashmolean.org/collection/8/per_page/25/offset/50/sort_by/random/object/19640 | Mid 18th century | Turkey | Silk, silver, embroidered | 54.5 x 52 cm | Similar to fragments **6263-087**, **6263-043/04** and **6305-030 - 035** |
|  | Textile fragment with floral spray No. EA1993.311 https://jameelcentre.ashmolean.org/collection/7/ | 10-15th century | Near East | Linen, embroidered with coloured silk; with remains of a rolled hem in silk | 21 x 25 cm max. (warp x weft) | Similar to fragment **6263-087** |

| Table V.5 Ashmolean Museum, Oxford, UK | | | | | | |
|---|---|---|---|---|---|---|
| | 10222/10231/18942 | | | | | |

| Table V.6 Louvre, France | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Tulip Panel<br>No. MAO 1206<br><br>https://collections.louvre.fr/ark:/53355/cl010319036 | 1560 / 1650 (2nd half of the 16th century; 1st half of the 17th century) | Turkey | Silk (lampas), brocaded decoration of gold and silver threads, silk lampas | Thickness: 3 cm; Height: 162 cm (Max); Width: 137 cm (Max); Weight: 7.4 kg | Various materials and motifs similar to BZN17 fragments |
|  | The front half of the kaftan<br>No. MAO 1205<br><br>https://collections.louvre.fr/ark:/53355/cl010319035 | 1550 / 1615 (2nd half of the 16th century; 1st quarter of the 17th century) | Turkey | Silk (lampas), brocaded decoration with gold and silver threads | - | Various materials and motifs similar to BZN17 fragments |

| **Table V.6 Louvre, France** | | | | | | |
|---|---|---|---|---|---|---|
|  | Carpet with animal fight decoration<br>No. GOB 1353<br><br>https://collections.louvre.fr/ark:/53355/cl010466281 | 1530 / 1540 (2nd quarter of the 16th century) | Tabriz (?) Kashan (?) | Silk, asymmetrical knot | Length: 5.45 m; Width: 2.8 m | Various materials and motifs similar to BZN17 fragments |

| **Table V.7 MAK Vienna, Austria** | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |

| **Table V.7 MAK Vienna, Austria** | | | | | | |
|---|---|---|---|---|---|---|
|  | Woven textile fragment/ embroidery<br>No. T 930<br><br>https://sammlung.mak.at/en/collect/seidensamt-mit-metallstickerei_90108 | End of the 16th century | Italy(?) | Silk, metal thread, velvet, embroidered | height: 53.2 cm<br>width: 17 cm | Similar materials and motifs to the BZN17 fragments. In particular, 043 and 044 |
|  | Fragment / Embroidery<br>Red with gold-coloured vine ornament<br>No. T1707<br><br>https://sammlung.mak.at/de/collect/rot-mit-goldfarbenem-rankenornament_91266 | 16th century | Italy | Silk, metal thread, satin, embroidered | height: 21.5 cm<br>width: 13 cm | Similar materials and motifs to the BZN17 fragments. 043 and 044 |

| Table V.7 MAK Vienna, Austria | | | | | | |
|---|---|---|---|---|---|---|
|  | Dalmatic<br>No. T1803<br><br>https://sammlung.mak.at/de/collect/rankenwerk-in-goldstickerei-auf-weissem-grund-und-oranment-in-silberstickerei-auf-rotem-grund_90789 | 1st half of the 17th century | ? | Silk, metal thread, interlining: linen, lining: cotton | height: 106 cm<br>width: 108 cm | Similar materials and motifs to the BZN17 fragments. 043 and 044 |
|  | Fragment/Embroidery<br>No. T 929<br>https://sammlung.mak.at/en/collect/roter-samtgrund-mit-silber-und-goldem-muster_90083 | 1475 - 1510 | Italy (?) | Silk, metal thread, velvet, embroidered | height: 14 cm<br>width: 22.5 cm | Similar materials and motifs to the BZN17 fragments |

| Table V.8 Museum of Applied Arts, Budapest, Hungary | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |

| **Table V.8 Museum of Applied Arts, Budapest, Hungary** | | | | | | |
|---|---|---|---|---|---|---|
|  | Chasuble<br>No. 7707<br><br>https://collections.imm.hu/gyujtemeny/chasuble/62678?f | 17th century<br> | Upper-Hungary<br> | silk fabric<br>Techniques: metal thread embroidery, silk thread embroidery | length: 60 cm<br>width: 66 cm<br>length: 120 cm<br>width: 73 cm | Similar materials and motifs to the BZN17 fragments. 043 and 044, and fragments 6305-030-036 and related. |
|  | Cushion cover (Yasti)<br>No. 7362<br>https://collections.imm.hu/gyujtemeny/cushion-cover-yastik-velvet-with-palmette-and-tulip-motifs/23890 | 17th century | Bursa, Turkey | silk velvet, interwoven with gold thread | length: 112 cm<br>width: 65 cm | Similar to fragments **6263-043/044** |
|  | Dress for a statue of the Virgin Mary<br>No. 13613.a-b<br>https://collections.imm.hu/gyujtemeny/dress-for | 17th century | Italy (presumably) | gold coloured metal yarn; silk damask, metal thread embroidery; metal thread raised embroidery | length: 72 cm<br>width: 100,5 cm<br>length: 33 cm<br>width: 34 cm | Similar materials and motifs to the BZN17 fragments. 043 and 044 |

| Table V.9 Smithsonian Institution, USA | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Fragment<br>No. 1971-50-43<br><br>https://www.si.edu/object/fragment:chndm_1971-50-43 | 16th century | Spain | Medium: silk, metal thread<br>Technique: appliqué and embroidery | - | General similarities with the Palmwood fragments. |
|  | Box<br>No. 1962-58-13<br><br>https://www.si.edu/object/box:chndm_1962-58-13 | Early mid 17th century | Italy or Spain | Medium: silk, metal<br>Technique: embroidered | H x W x D: 11 x 16 x 6 cm | General similarities with the Palmwood fragments. Similar to the toiletry set 6263-111. |
|  | Fragment<br>No. 1971-40-9<br><br>https://www.si.edu/object/fragment:chndm_1971-40-9 | 17th century | Europe | Medium: silk, metal-wrapped silk cord<br>Technique: embroidered | H x W: 17 x 50 cm | General similarities with the Palmwood fragments. Especially symmetrically repeating designs like in 043/044, 030-036, and 087 |

| **Table V.9 Smithsonian Institution, USA** | | | | | | |
|---|---|---|---|---|---|---|
|  | Chalice cover<br>No. 1963-92-1<br><br>https://www.si.edu/object/chalice-cover:chndm_1963-92-1 | 16th-early 17th century | Italy | Medium: silk, metal<br>Technique: embroidered | H x W x D (width across base diameter): 23 x 16 cm | General similarities with the Palmwood fragments. Similar to the toiletry set 6263-111. |
|  | Wall pocket<br>No.1950-121-52<br><br>https://www.si.edu/object/wall-pocket:chndm_1950-121-52 | 17th century | Italy | Medium: silk, metal<br>Technique: embroidered | H x W: 51.8 x 20 cm | General similarities with the Palmwood fragments. Similar to the toiletry set 6263-111. |
|  | Fragment<br>No. 1896-1-14<br><br>https://www.si.edu/object/fragment:chndm_1896-1-14 | 17th-18th century | France or Italy | Medium: silk, metallic thread<br>Technique: silk and metallic thread plain weave appliquéd on velvet with couched metallic threads, satin stitch embroidery | H x W: 30.5 x 25.3cm | General similarities with the Palmwood fragments. Especially symmetrically repeating designs like in **043/044, 030-036,** and **087** |

| **Table V.9 Smithsonian Institution, USA** | | | | | | |
|---|---|---|---|---|---|---|
|  | Cover No.1975-53-1<br><br>https://collection.cooperhewitt.org/objects/18488417/ | late 17th–early 18th century | ? | Silk, metal-wrapped thread on a silk core, plain couching stitches on 8-harness satin | H x W: 106.5 x 117.5 cm | Similar to objects **6263-043/044** |

| **Table V.10 Rijksmuseum Amsterdam, Netherlands** | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Yellow fragment No. BK-NM-3677 https://www.rijksmuseum.nl/en/collection/object/Fragment-geel-zijdeweefsel-met-veelkleurig-borduurwerk--12c82a72c3d021b35a04fd406a64d7bc?tab=data | C. 1500 | Persia | Silk, satin, embroidered | height 33.0 cm x width 34.0 cm | General similarities with the Palmwood fragments. |
|  | Red satin pouch No. BK-1960-174 | Ca.1550-1599. 1683 | Turkey (possibly) | Satin, silk, gold and silver thread, linen, cotton | height 20 cm x diameter 9 cm | General similarities with the Palmwood fragments. |

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| Table V.10 Rijksmuseum Amsterdam, Netherlands | | | | | | |
|---|---|---|---|---|---|---|
| | https://www.rijksmuseum.nl/en/collection/object/Buidel-van-rood-satijn-met-floraal-borduurwerk-in-goud-en-zilverdraad-met-bijgevoegd-briefje-met-betrekking-tot-de-vermeende-herkomst--54c4ab58da166e4bd25954189c498607?tab=data | | | | | Similar to the toiletry set 6263-111. |
|  | Wine-red velvet No. BK-1964-47<br><br>https://www.rijksmuseum.nl/nl/collectie/object/Kleed-van-wijnrood-fluweel-met-borduurwerk-van-gouddraad-en-zijde--f67e86d99cd10c9006429d393ebc6266?tab=data | Ca. 1600 | Italy | Silk, silver and gold metal threads. Italian embroidery of gold thread and silk at the top and bottom. Probably from a four-poster bed. | height 277 cm x width 124.5 cm | General similarities with the Palmwood fragments. Specially designs like in **043/044, 030-036,** and **087**. |

| **Table V.10 Rijksmuseum Amsterdam, Netherlands** | | | | | | |
|---|---|---|---|---|---|---|
|  | Fragment of a silk carpet<br>No. BK-17275<br>https://www.rijksmuseum.nl/nl/collectie/object/Fragment-van-een-zijden-tapijt--89e8192c8e0cc5fbcb958f8256da255f?tab=data | Ca. 1625-1650 | Isfahan, Persian | Fragment of a carpet, a so-called Polentapijt, of silk and brocaded gold and silver thread. Simple repeating lily pattern on an originally red background. | height 165 cm x width 107 cm | Similar motif to object **6263-038** |
|  | Bag<br>No. NG-1980-23<br>https://www.rijksmuseum.nl/nl/collectie/object/Tas-in-een-plat-rechthoekigmodel-van-rood-fluweel-waarop-borduursel | 1696 | Constantinople (possibly) | Velvet, chamois leather, gold thread, silver thread, linen and silk | whole: height 10.5 cm (open) x height 16.5 cm x width 19.3 cm | General similarities with the Palmwood fragments. Similar to the toiletry set 6263-111. |

| **Table V.11 Bavarian National Museum, Germany** | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |

| **Table V.11 Bavarian National Museum, Germany** | | | | | | |
|---|---|---|---|---|---|---|
|  | Wallet https://www.bayerisches-nationalmuseum.de/sammlung/00223922 | Around 1650/1680 | ? | Silk, embroidery: metal, silk | H. 10 cm, W. 18 cm | General similarities with the Palmwood fragments. Similar to the toiletry set 6263-111. |
|  | Blanket made of wine-red half-silk satin with a colourful embroidery pattern https://www.bayerisches-nationalmuseum.de/sammlung/00078569 | 19th century | Ottoman Empire | Upper fabric: semi-silk (red), satin; embroidery: silk, cotton, twill | W. 197.5 cm, L. 241.7 cm | General similarities with the Palmwood fragments. Specially designs like in **043/044, 030-036,** and **087**. |
|  | Wedding blanket https://www.bayerisches-nationalmuseum.de/sammlung/00210973 | 19th century | Turkey | Fabric: Cotton, embroidered; Embroidery: Silk, metallic thread | W. 225.2 cm, L. 288.8 cm | General similarities with designs like **043/044, 030-036.** |
|  | No. https://www.bayerisches-nationalmuseum.de/sammlung/00210670 | Mid 18th century | Italy (?) | Silk, plain weave | W. 7.9 cm, L. 20.6 cm | Similar to **6263-087** |

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| Table V.12 Benaki Museum, Greece | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |
|  | Silk cloth<br>No. ΓΕ 3896<br><br>https://www.benaki.org/index.php?option=com_collectionitems&view=collectionitem&id=117253&Itemid=540&lang=en | Mid 16th century | Turkey, possibly Istanbul | Silk, silver and gold thread | H. 1,33 m., W. 0,67 m. | General similarities with the Palmwood fragments. Specially designs like in **043/044, 030-036** |
|  | Star-shaped tile<br>No. ΓΕ 748<br>https://www.benaki.org/index.php?option=com_collectionitems&view=collectionitem&id=117157&Itemid=&lang=en | Late 13th century | Iran, Kashan | Not textile, but with similarities to the fragments | - | Similarities to the star motifs from fragment 6263-038. |

| Table V.13 Whitworth Collections Manchester, UK | | | | | | |
|---|---|---|---|---|---|---|
| **Images** | **Title & Accession No.** | **Date** | **Origin** | **Materials & Techniques** | **Dimensions** | **Comparison Notes** |

| **Table V.13 Whitworth Collections Manchester, UK** | | | | | | |
|---|---|---|---|---|---|---|
|  | Square cover<br>No. T.9226<br>https://whitworthcollections.manchester.ac.uk/collections/item/d6f545c6 | 1600-1699 (?) | Persian | Materials: silk; metallic thread<br>Technique: hand embroidery; | 736 mm (height)<br>736 mm (width) | General similarities with the Palmwood fragments. Specially designs like in **043/044, 030-036** and **087.** |
|  | Square (square)<br>No.<br>https://whitworthcollections.manchester.ac.uk/collections/item/7b52604f | ? | Persian | Technique: hand embroidery; | 635 mm (height)<br>635 mm (width) | General similarities with the Palmwood fragments. Specially designs like in **043/044, 030-036, 087** and even **6263-038**. |
|  | Portion of an altar frontal<br>No. T.8054.2<br>https://whitworthcollections.manchester.ac.uk/collections/item/19af50b8-1e87-3ee3-836d-5562f528970f/?s%3Dsilk% | 1500-1599 | Spanish | Materials: silk; linen; cord; fringe<br>Technique: embroidery; applied work; | 356 mm (height)<br>609 mm (width) | Similar to objects **6263-043/044** |