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Middle Byzantine Silk in Context

Integrating the Textual and Material Evidence

Introduction

During the first millennium AD, silk became the most desirable fibre in the Mediterranean region. The material's westward spread through long-distance trade was a major factor in cultural and economic exchange among distant civilisations (Loewe 1971; Young 2001, 14-15; Hansen 2012, 235). While historians generally agree on the broad outlines of this process, the conventional understanding of silk as an exclusive material confined to the imperial court in the middle Byzantine period (AD 843–1204) is poorly integrated with the body of evidence and lacks explanatory value. The goal of my recently completed PhD project at the Centre for Byzantine, Ottoman and Modern Greek Studies at the University of Birmingham, UK was to redefine the current historical understanding of Byzantine silk by demonstrating its social importance, contribution to technology development and integration into the regional economy. The following provides a brief overview of the historical context associated with silk, research problems, methodologies and findings presented in my dissertation "Middle Byzantine Silk in Context: Integrating the Textual and Material Evidence".

Historical context

Byzantine writing conveys the importance of silk to the empire during the full extent of its history. Following the Arab conquest and territorial losses in the 7th and 8th centuries, silk was among the resources rationalised for imperial purposes. 10th-century sources such as the *Book of the Eparch* (Koder 1991, 20-41) and the *Book of Ceremonies* (Reiske 1829) demonstrate the ways that silk was employed by the Byzantine state in various ceremonial, diplomatic and economic roles.

In Byzantine sources, representational pattern weaves were prominent as a vehicle to project meaning, rank and status. Designs portrayed impressive symbols such as lions, griffins, mounted riders, peacocks and eagles (Reiske 1829, II.15.581-588). In addition to written sources, representational images in various media displayed luxury textiles as a means to project imperial status and power. Among the textiles depicted in illustrations, several portrayed figured patterns similar to those described in written works. For example, the portrait of Nikephoros III Botaneiates (1078-1081) and his courtiers displayed garments with a variety of woven repeating patterns as shown in Fig. 1.

Complementary to literary and representational evidence for figured silks, hundreds of textile fragments attributed to Sasanian, Byzantine and Islamic workshops are now held in museum collections and religious institutions. Fine silks were highly valued in medieval Europe and were used for liturgical and reliquary purposes (Muthesius 1982; 1997, 119-139). In the late 19th and early 20th centuries, non-scientific excavations in Egypt led to the large-scale transfer of remains to the antiquarian market (Fluck *et al*. 2000; Fluck 2005; 2008). Examples of catalogues showing silks recovered from church treasuries, shrines, tombs and cemeteries include works compiled by Schmedding 1978, Martiniani-Reber 1986, Stauffer 1991 and Desrosiers 2004.

In addition to their striking visual appearance, surviving figured silks are important to textile history because of the scale and complexity of their patterns. Known as weft-faced compound weave, the structure separates the warp into independent binding and

Fig. 1. Nikephoros Botaneiates and his courtiers, c. 1071-1081. Paris, Bibliothèque nationale de France, Ms Coilin 79, fol. 2r. (© Julia Galliker).

pattern units (CIETA 2006, 43). A fabric bound with twill is generally described as samite; a tabby binding is called taqueté (CIETA 2006, 43, 47). To reduce the labour required for selection of pattern sheds, workshops used drawlooms equipped with a figure harness for repetitive production of woven patterns. Although the origin and development of these looms is obscure, patterns tied up in a figure harness provided a means of recording and storing work for later reproduction.

Research problem

During the past century, a sizeable literature has developed to interpret surviving evidence in terms of art history, textual analysis and technical weave structure. The advantage of an art historical approach is that it can integrate evidence from a variety of media. While figural representations offer a rich body of material, fragments are too poorly situated temporally and geographically to support specific conclusions. Unlike some Islamic and Genizah compilations, a systematic survey of Byzantine texts for textiles has yet to be produced (Goitein 1967-1993; Serjeant 1972; Stillman 1972). The scattered and fragmentary nature of source evidence limits the applicability of conventional historical research methods. Difficult terminology and the cross-cultural character of textile interactions represent additional obstacles (Jacoby 2004).

During the past century, historical textiles have been gradually recognised as a source of technical production information. Researchers have devised various methods of analysis to study the relationship of cloth components to each other, and to consider the

Fig. 2a. Fantastic animals in roundels, Cooper Hewitt, 1902 1 222, macro scale (© Julia Galliker).

Fig. 2b. The same as Fig. 2a at 50 x magnification (© Julia Galliker).

techniques and equipment involved in the process of construction. While the CIETA method is now recognised as the standard analysis framework in the field, the literature is mainly confined to piece-specific analyses of the most intact and impressive surviving examples. The lack of comprehensive collection surveys has meant that available evidence has been considered selectively. While the fragility of surviving silks requires high conservation standards, the unintended consequence is that access is effectively limited to all but a few researchers. Crucially, the field lacks a resource that synthesises technical features and interprets evidence in a form accessible to non-specialist historians and textile researchers.

Despite the challenges, the quantity and variety of source material represents an opportunity for a fresh approach with the aid of information technologies. The research framework was defined in terms of three principles: comprehensive and balanced treatment of sources, use of methodologies appropriate to the nature of evidence and cross functional interpretation to integrate textual and material remains.

Methodology

Whilst ostensibly related, silk remains and textile mentions have very different characteristics requiring a common basis for analysis. A framework structured in terms of silk textile production stages provides a means to integrate the bodies of evidence. These include fibre and yarn preparation, textile construction, pattern reproduction and the end-use of finished cloth. Other relevant evidence includes quality characteristics and planning decisions. A specific strategy for data collection was defined to ensure comparable and reproducible data. A standardised approach established relative context for the purpose of comparative analysis.

Textile mention database

In written works, textile descriptions vary depending upon an author's interest, knowledge and purpose of recording. Most mentions contain only partial information, but include some specific details such as production place, materials, weave type, end use, design, quality and usage context. Amongst the available research methods, prosopography provides

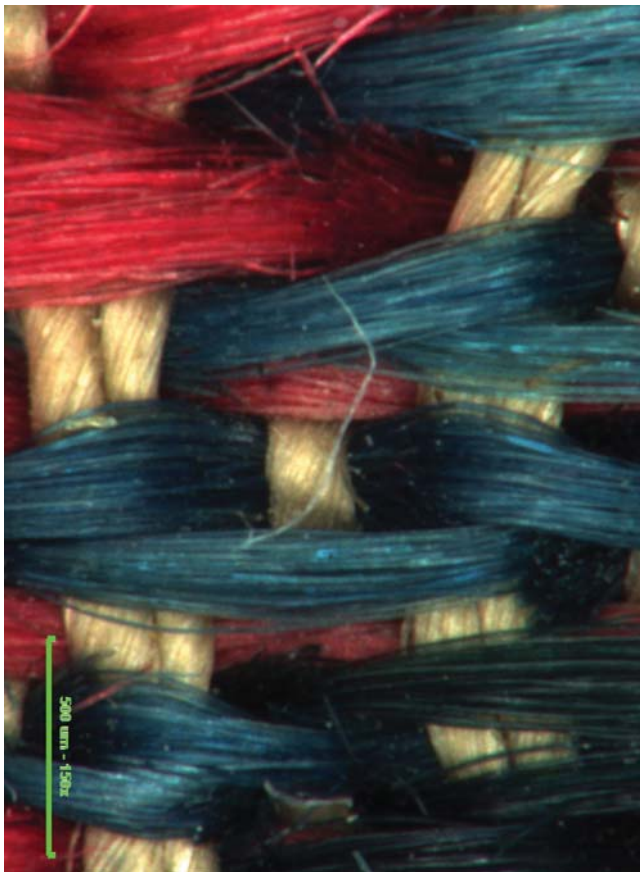

Fig. 2c. The same as Fig. 2a at 150 x magnification (© Julia Galliker).

a method of aggregating the fragmentary and scattered data associated with textiles into a consolidated resource (Short and Bradley 2005; Keats-Rohan 2007). The resulting textile mention database provided a structured approach to analysis with the advantage of relational design to organise and access information.

Computer vision analysis

Analysis of textile fragments requires a different set of tools to extract meaningful information in a way that can be analysed and compared with written evidence. The advantage of textiles is that they are composite structures created through a series of processes. Woven line by line, fabrics provide a sequential record of production. A consistent methodology is required to discern technical details from extant fragments and to define relationships among sets of distinguishing characteristics.

During the past decade, dramatic advances in imaging technologies have made digital photographs the medium of choice for recording technical textile attributes. However, the fine resolution of silk textiles requires specialised microscopy equipment to capture consistent, high-quality images at a scale appropriate for objective characterisation (Fig. 2a-c). My equipment setup for *in situ* recording of textile attributes is shown in Fig 3.

An additional technical problem is that much of the production data embedded in textiles exists at a level that is too diffuse to be captured reliably by conventional measurement methods. Information technologies can aid in developing low-level data into meaningful information according to scientific research standards. Within the field of computer engineering, computer vision refers to technologies associated with acquiring and using information from digital images (Nalwa 1993, 3-29). My research programme combined macro- and micro-scale digital imaging with the use of specialised computer vision software tools developed for this project.

Findings

The textile mention database methodology resulted in a corpus comprising over 800 descriptive mentions of textiles found in 27 Byzantine texts dating from the 6th to the 13th centuries, as shown below. Analysis of silk terminology indicates that references were mainly inferential with meaning conveyed through contextual clues such as colour, embellishment, superlative description and setting. Although *serika*, *blattia*, and *metaxa* were all names used for silk, each had a distinctive identity as is evident from usage patterns. In addition to reporting events associated with silk, Byzantine historians frequently used textile objects for symbolic representation or to give figurative meaning to their writing.

Analysis of textual information on a consolidated basis indicates that trade in silk fibre involved active cross-regional exchange and specialised roles for grading, buying and processing the material. References to various textile occupations and the names of particular fabrics provide details about production and consumption of luxury goods and cloth items in common use. Evidence associated with pattern details is particularly illuminating because elements of aesthetic perception and symbolic representation coincided closely with other forms of imperial media. The detailed examination of the sources provided a basis for the definition of the terms *diblattion* and *triblattion* and demonstrated coincidental imperial use of monochrome patterned 'damasks' according to ceremonial requirements. Interpretation of data for end-use draws on the concept of 'brand' to show how analysis of textile names, especially those with a geographic basis, can detect attitudes and preferences for particular types of fabrics.

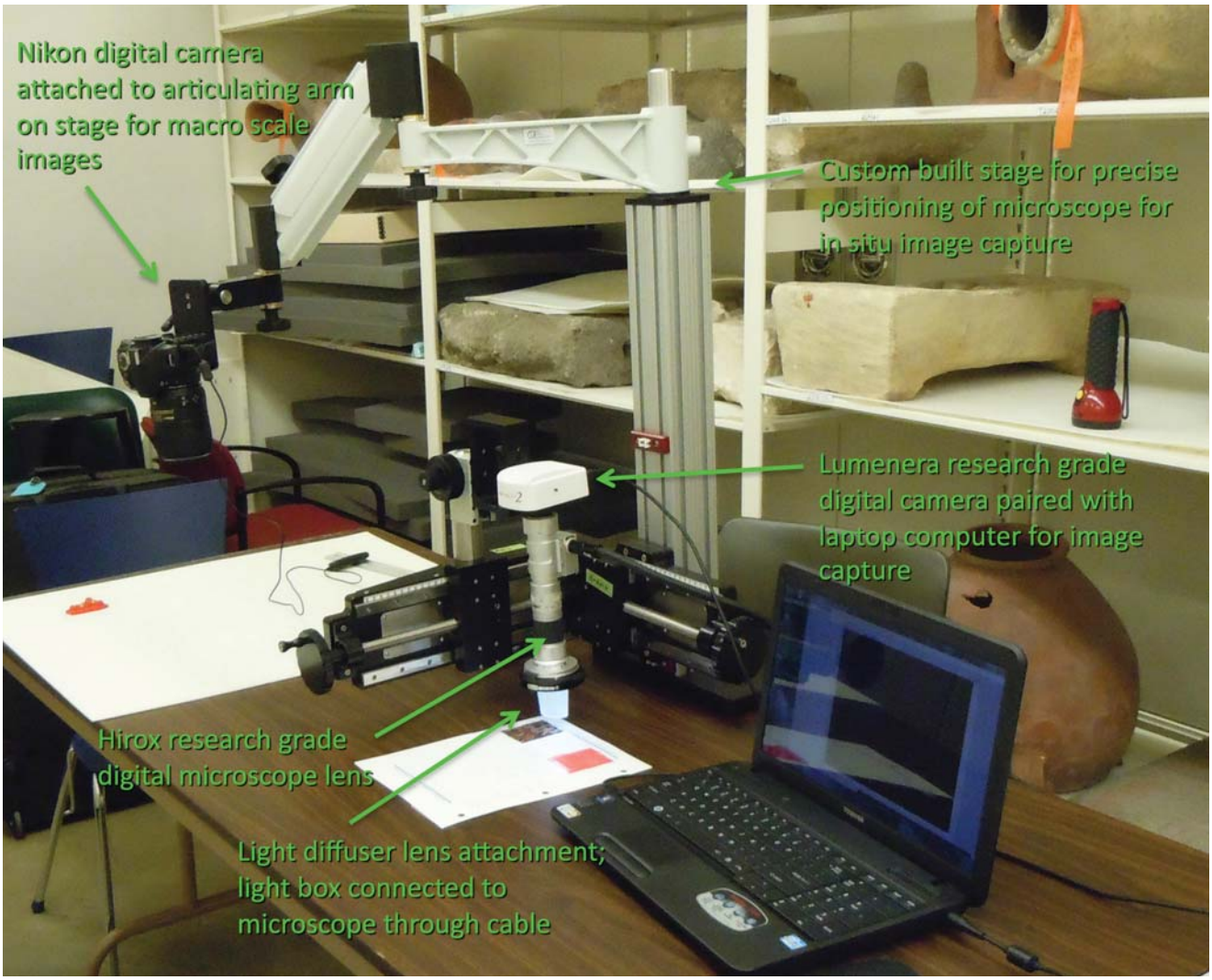

Fig 3. Annotated photograph of equipment set-up for in situ imaging of textile attributes (© Julia Galliker).

My imaging data is based on my analysis of 125 textile fragments from ten museum collections provisionally dated between AD 600 and 1300. As is typical for this class of artefacts, none of the fragments came from a known or dated context. According to my research protocol, I documented these textiles using a total of 10,635 images. Based on maximum width and height measurement, the total area of the textile fragments analysed is more than 780 m^2. Most pieces in the collection were woven exclusively in silk; gold is visible on just nine fragments, six of which were woven with the true lampas structure attributed to the 12th to 13th centuries (Schorta 1997). Technical analysis demonstrated that the weft-faced compound weave structure was the dominant method of patterning silks with 94 examples. Of these, 87 are attributed to Near Eastern and Mediterranean centres.

From a production point of view, surviving textiles contain information about the work environment and methods of production. Close analysis reveals characteristics associated with workplace organisation, processing steps, demonstrated skills, division of labour and work habits. Evidence indicates distinctive specialised roles for designer, weaver and assistant.

Amongst other attributes, errors provide a perspective on the working lives of weavers. The work was evidently exacting, especially the process of preparing the loom. The incidence of tie-up faults shows that minor and major errors were allowed to continue throughout a textile length. Some weavers faced equipment-related problems with uneven warp tension on their looms. The task of maintaining an

even warp distance and weft density was ongoing. The difficulty of coordinating work between a weaver and an assistant is also obvious.

The textile evidence shows that a body of conventions existed that provided a means of standardising work. The high degree of consistency of certain practices over hundreds of years in widely separated workshops is a surprising finding from this analysis. The uniformity of twist direction and angle suggest that technologies associated with silk were transmitted with the material and adopted by specialised producers at various locations throughout the region. While patterns varied among textiles, particular design conventions were applied to the majority of silks in the collection.

In terms of structure, 1/2 samite was overwhelmingly the dominant method of patterning silks. Pairing a twisted warp with an untwisted weft meant that each component had a specific function that was adopted by producers with variation only in instances when a particular effect was desired. Differences occurred in incidental decisions such as the choice of either twill direction or in colour insertion order. The highly repetitive nature of weaving lends itself to the formation of craft habits that were presumably shared by weavers within a given workshop.

Economic motivations are evident in surviving fragments. The widespread adoption of the work-saving method of returning weft insertion demonstrates an efficiency innovation that reduced the labour involved in weaving complex silks (Verhecken-Lammens 2007). The use of lesser-quality dyes in warps was a means of economising on materials while disguising visible warps. Substitution of lower-quality or spun silk points to either economy or fraud. Discontinuous use of colour provided the appearance of a more expensive polychrome silk without the associated costs.

Contrary to the prevailing view of silk as an imperial prerogative confined to elite use, this research shows that silk had a larger role in the material culture of middle Byzantine society and was important in cross-cultural economic and social exchange. The evidence suggests that the historical process involving silk was shaped by a continuing cycle of elite differentiation and imitative reproduction, which in turn contributed to the transmission of the material and production in the region. From a broader perspective, this work demonstrates the relevance of textile studies to the interpretation of economic and social history.

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