

## 6 What makes ‘Tibetan paper’ Tibetan?

### Understanding the materiality of Tibetan paper

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**Abstract** Paper, as a writing support, is an integral element of the materiality of Tibetan books together with the technologies of their production. Analysis of the material features of the paper used in Tibetan written artefacts can help us to unravel their provenance, which is often unknown. First, however, we need a relatively clear understanding of the characteristic features of paper produced within particular book cultures and geographical regions at particular periods of time. This chapter offers a starting point by discussing the general characteristics of paper that originated in Tibet. Drawing on macro- and microscopic studies, it highlights the wide variety of paper types that have been used as writing supports in Tibetan written artefacts, before examining in more detail the raw materials, papermaking technologies and processes, and writing surface preparations that might justify the descriptor ‘Tibetan’ and thus grant Tibetan identity to paper.

**Keywords** Tibet, material culture, written artefacts, paper, Tibetan books, paper production, paper analysis, provenance, papermaking plants

## Introduction

Tibetan books are carriers for a vast array of knowledge, from religious and philosophical treatises, ritual texts and biographies to scientific works. For followers of Buddhist and Bon traditions, books—especially those concerned with religious topics—are also considered as sacred objects of devotion and as ‘containers’ for sacred or efficacious text that are generative of karmic merit for those who read or produce them (Diemberger, Elliot and Clemente 2014: 7–12; Pakhoutova and Helman-Ważny 2012: 124–9).<sup>1</sup> Yet, while the study of Tibetan texts has been central to Tibetan Studies since its establishment as a discipline, it is only in recent decades that the Tibetan book has been studied as a written artefact in its own right, that is, as both a material and textual object. This is partly a reflection of broader developments in the academy, notably the development of preservation as a scholarly discipline, but also increasing interest in cultural production and Indigenous knowledge in communities living beyond the centers of state powers (Auslander 2012; Miller 1998, 2005; Soentgen 2024) and the application of biographical methodologies to the study of things as well as people (Kopytoff 1986).

Paper, as a writing support, is an integral element of the materiality of Tibetan books together with the technologies of their production. I have been studying Tibetan paper from different perspectives since 1997, including through ethnographic fieldwork in Tibet and the Himalayas (Helman-Ważny 2016a; Helman-Ważny and Ramble 2021a, 165–210), where I have documented paper production in multiple

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1 As a result, Tibetans do not always attach higher value to older copies of texts, as is often the case in European-based Enlightenment cultures (Helman-Ważny 2024a: 160, 166). Some scholars have argued that this lack of any automatic correlation between an object’s importance and its age shapes Tibetan attitudes to material culture, materiality and the preservation of cultural goods more generally (Luczanits 2013). Among non-Tibetans, Tibetan books were often treated as curiosities brought to Europe by travellers as gifts or memories and originally not intended to be read or studied. By the mid-nineteenth century, however, colonial officers and the first scholars of the culture and religions of Tibet were collecting texts to study them for historical and ethnographic reasons.

workshops in both Tibet and Nepal.<sup>2</sup> At the same time I have worked on the material characterization of paper in Tibetan written artefacts through the study of methods of paper preservation, mechanisms of paper deterioration, the use of paper in rituals and as a writing support, the anatomy and distribution of papermaking plants and the nano-structure of paper using Synchrotron facilities,<sup>3</sup> as well as through carrying out codicological studies of Tibetan book collections preserved in Asia, Europe and America (Helman-Wazny 2014; Helman-Wazny and Ramble 2021b). I have built my 'paper' curriculum via heritage studies including art, paper and book conservation, as well as fibre analysis and paper science. This reflects the different types of evidence upon which I base my research, which include material culture, interviews and written sources.

At some point I started asking myself what material features of paper would justify the naming of a piece of paper 'Tibetan'. This question became more and more pressing as I continued to research materials in books containing Tibetan text and started to grasp the great variety of different kinds of paper that had been used (Helman-Wazny 2016, 179–181). Understanding these differences opens up new possibilities for identifying the provenance of the many Tibetan books that have no attribution. Although paper is made up primarily of cellulose fibres, it is not as simple a material as most people think. A huge variety of paper types have been used for bookmaking over more than two thousand years of paper production. Different types of paper have required different manufacturing processes. Any evaluation of the qualities of paper requires an examination of the raw materials and technologies used, as well as the aesthetics and intended uses of the paper in any given historical period. The final product thus depends on local technological know-how, the availability of materials, the preferences of the patron or bookmaker and the form and function

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- 2 In Tibet, I have documented paper production in Nyemo and Lhasa; in Nepal, in Lekphat, Salijia, Ghandruk, Taman, Darbang-Phulbari, Lamsung, Karimila and Nangi in Myagdi, Baglung, Parbat and Kaski Districts, Jiri in Dolakha District, and other workshops in Kathmandu and southern Nepal.
  - 3 Synchrotron radiation source has become an increasingly important tool for all kinds of research in physics, chemistry, biomedicine, material science, human heritage, technology and, more recently, art, archaeometry and the conservation of heritage objects. On methodology and possible application in paper analysis see: Grzelec et al 2025.

of the book, along with various other locally specific considerations. This means that by analyzing the material features of paper we should be able to gain important insights into the provenance of the written artefact that has used it as a writing support. However, we must first have a relatively clear understanding of the characteristic features of paper produced within particular book cultures and geographical regions at particular periods of time.

This chapter discusses what material features might grant Tibetan identity to paper. The first part situates the discussion, showing why the materiality of paper is integral to, but also needs to be distinguished from, the materiality of Tibetan books—and why the identity of paper matters. To illustrate the different kinds of paper found in Tibetan books, I use some examples from my macro- and microscopic studies of different collections of Tibetan written artefacts. In the second part of the chapter, I focus more squarely on the question of what makes Tibetan paper ‘Tibetan’, starting with an outline of what we know about the historical origins of Tibetan paper and a critical discussion of oral and written accounts of the raw materials used to produce it. I then describe characteristic raw materials, technologies and processes, and writing surface preparations based on the available evidence. These discussions are brought together in the conclusion, where I highlight several features that would, I suggest, justify describing a piece of paper as ‘Tibetan’.

## Studying the Tibetan book as a material object

Despite the increasing attention to the materiality of Tibetan books, generally speaking there has been a lack of systematic work in this area. Publication of Cristina Scherrer-Schaub’s proposed methodology (1999) and typology (Scherrer-Schaub and Bonani 2002) for old Tibetan manuscripts probably represented a pivotal moment. Yet, surprisingly few studies have considered the materiality of Tibetan written artefacts since (Helman-Ważny 2019: 95–6). Among those that have, some explicitly focus on the material aspects of manuscripts (Dotson and Helman-Ważny 2016; Helman-Ważny 2014; Helman-Ważny and van Schaik 2013; Viehbeck 2021), while others address their materiality in the wider context of studies of Tibetan manuscript cultures (Almogi 2016) and printing (Diemberger, Ehrhard and Kornicki 2016). The recent publication of a two-volume edited collection of introductory essays on the material and aesthetic features and major categories of

Tibetan books (Kapstein 2024) represents another step towards the consolidation of Tibetan manuscript studies.

The relative paucity of systematic research on the materiality of Tibetan books has been paired with the rapid development of digital humanities in the field of Tibetan studies (Wallman 2024: 268–90). The ever-increasing availability of internet resources has resulted in a field of scholars who engage with books—indeed all texts—as virtual objects in digital or digitized microform formats. This virtual archiving of Tibetan books is crucial, but at the same time it has narrowed the focus of research on Tibetan written heritage and diminished the perceived value of written artefacts in their physical, material form. As a consequence, research on Tibetan manuscripts is now split, with the study of virtual texts separated from analyses of their physical forms, making the integrated meaning of their textuality and materiality much harder to retrieve.

Studying the materiality of Tibetan books—and Tibetan material culture more generally—requires an interdisciplinary approach that combines humanities-based methodologies with scientific material analysis (see also Lange and Hahn, this volume). This in turn requires precise definitions of concepts and the different elements of Tibetan book culture. Such an approach has been promoted over the last decade or so by the Cluster of Excellence 'Understanding Written Artefacts' (UWA) at the Centre for the Study of Manuscript Cultures (CSMC) at the University of Hamburg. UWA brings together scholars from thirty disciplines across the humanities and sciences with the aim of investigating the rich diversity of global manuscript cultures as material objects. One of the challenges in forging this kind of collaboration across disciplines, especially between the humanities and sciences, is that different terminologies are used depending on the discipline and the scholar's scientific background.<sup>4</sup> CSMC accordingly established a Theory and Terminology (TNT) working group.

CSMC defines a 'written artefact' as 'any artificial or natural object with visual signs applied by humans' (Bausi et al. 2023). Following this definition we may assume that a Tibetan written artefact can be defined as *any artificial or natural object written in Tibetan and/or created by Tibetans*. Although we usually do not know who produced a

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4 For example, terms like form, format, provenance, materiality, binding, preservation, conservation and restoration are understood differently depending on whether or not one takes a humanities or material science perspective.

given manuscript, we do know that many people are usually associated with its production, each playing one or more of various roles from papermaker, scribe and printmaker to patron (among others). Since the manuscript is a complex object we should look at it as such, considering all its components, associations and contexts. The definition of a manuscript developed in 2015 by the CSMC is: ‘an artefact planned and realised to provide surfaces on which visible signs are applied by hand; it is portable, self-contained, and unique’ (Lorusso et al. 2015: 1). Applying this definition as a framework for Tibetan book studies it is clear that we need to differentiate the elements composing the written artefact, namely: the ‘surface’, for example, paper, which varies depending on the raw materials of which it is made and its other components, as well as how it has been produced and prepared for writing; the ‘visible signs’, such as script, which is not necessarily the same as language; and the ‘hand’ that applied them, which has implications for the cultural associations of the artefact and its constituent elements and components.

Understanding the materiality of Tibetan paper is therefore an integral element in understanding the materiality of Tibetan written artefacts, but the identity of the two should not be conflated. The materiality of Tibetan books can be specified by the raw materials and combination of technologies (papermaking, ink production, book-binding, writing) used in the process of their production. The latter is conditional on a number of variables, such as the availability of materials and technological know-how in the site where the written artefact is created, which is to some extent also conditional upon the choice of materials. Together these create the unique resources available locally. While these circumscriptions clearly shape the physical appearance of books produced in particular places and times, it is much more difficult to understand the reasons behind the choice of particular raw materials or technologies. For example, the writing supports used in the production of Tibetan books have been determined primarily by their availability in particular regions, but also by conditions of patronage, aesthetic preferences and a given book’s status and functions. Materials are carefully chosen for their intrinsic qualities as well as their suitability for specific types of writing and engraving. Their selection is usually relatively local and dependent on social, cultural and economic habits, as well as climate and other factors such as the availability of certain natural resources coupled with the dynamics of local mining industries, laws regulating resource exploitation and trade networks. The use of particular technologies, in

contrast, is usually considered from a wider perspective, such as the global spread of papermaking, printing and less obvious book technologies such as bookbinding, ink-making and writing. We actually know very little of the historical ambit of specific technologies, what facilitated their adaptation and transfer, or the preconditions for the speed of such transfer.

Regional diversities in the production of Tibetan books in local workshops within the Tibetan and Himalayan region (and beyond) is sure to be a major avenue for future study, given the rapid development of provenance studies. As we gain more information about the materials used or available in different localities, this will provide us with reference points for identifying the provenance of particular books on the basis of the materials of which they are composed. This will take time, since we will need a large number of case studies to draw valid conclusions. Nevertheless, as this chapter will unfold, we are already able to make some observations about the general characteristics of paper that originated in Tibet, which can help us to unravel the provenance of Tibetan books. In order to do so, however, it is crucial to first distinguish between the identity of a book written in by Tibetan or created by Tibetans (a 'Tibetan book') and the identity of the paper of which it is made.

## The identity of paper

Often when scholars refer to a 'Tibetan paper' they are not implying that the paper itself was necessarily made in or originated in Tibet; they are instead referring to what is written *on* the paper, namely Tibetan script. Even if this distinction is understood, it is unfortunately often ignored in material analysis or museum collection studies as, in many cases, there is no provenance information. If the provenance of the manuscripts in a collection is known, it is often not possible to identify where exactly the paper itself was produced. It cannot be assumed that it was made in Tibet. Despite this, collections are still considered collectively as groups of objects and interpreted as Tibetan. This grouping together of all texts in Tibetan only because they are in the Tibetan language can be somewhat misleading when it comes to determining provenance. The process of writing with Tibetan script on a piece of paper does not alone grant 'Tibetan identity' to that paper. To take a hypothetical example: if a piece of paper made by a German papermill (which could justifiably be called 'German paper') were to

be written upon in English, that process of inscribing English letters onto a piece of German paper would not change its provenance from German to English.

Understanding this distinction between the identity of paper and the language written upon it is important in the field of provenance studies,<sup>5</sup> since material analyses—if interpreted accurately—can be successfully implemented to investigate the origins of manuscripts. Conversely, analyses conducted on the assumption that all paper inscribed with Tibetan characters is ‘Tibetan’ can lead to problematic conclusions. This is exemplified in a recent article by Yujia Luo, Irena Kralj Cigić, Quan Wei, Marjan Marinsëk and Matija Strlič. In their study of the durability of nineteenth and twentieth century Tibetan manuscripts, the authors define Tibetan paper as ‘all papers with Tibetan characters’ and note that it is characterized by its laminated structure (which is not typical in China) (Luo et al. 2023: 11784). They justify this definition by arguing that regardless of whether or not such papers were strictly produced in Tibet, they are part of Tibetan cultural heritage. The results of their fibre analysis suggest that the raw materials probably originated in China, even if the papers were produced for and used in Tibet. In other words, the authors carried out sophisticated material analyses of what is in fact typical Chinese paper, which was used as a support for manuscripts of unknown provenance written in Tibetan. They then compared these papers with other studies of Chinese paper. This leads them into a process of circular reasoning and the misleading conclusion that Tibetan paper of this period is similar to Chinese paper.<sup>6</sup> As this example shows, a great deal of confusion can

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5 In the literature two largely synonymous terms *provenience* and *provenance* are current, but while both refer to an artefact’s source or origin, the latter also encompasses its history and can be thought of as an artefact’s curriculum vitae (Price and Burton 2011: 213). As researchers, however, we tend to focus on specific moments of the object’s life and rarely enter into a thorough investigation of its past, especially when there is no provenance information in the text.

6 The authors further justify their definition of Tibetan paper with reference to the definition of ‘Islamic paper’ provided by Mahgoub et al. (2016). In that article, the authors were looking at the properties of paper used in Islamic countries at the turn of the twentieth century, where imported paper was finished by local craftsmen into what was a typical local product, although it technically did not originate in Islamic countries.

be created when the paper used as a writing or printing support for Tibetan-language books produced in different geographical locations is attributed to Tibet and named 'Tibetan'.

Thus, despite the apparently simple nature of the question 'What makes "Tibetan paper" Tibetan?', the answer is neither obvious nor unambiguous. Whether in the wake of pilgrimage or as a result of ethnic, national and/or territorial conflicts, Tibetan communities have often migrated. By the turn of the millenium, more than 120,000 Tibetans were living in exile across the globe, while there were about 5.4 million Tibetans in China (MacPherson, Bentz and Dawa Bhuti Ghoso 2008). In the aftermath of China's invasion of Tibet during the 1950s, Tibetan material culture, including written artefacts, spread all over the world and Tibetan communities in exile have successfully managed to keep their culture and language alive. Thus, a large number of Tibetan manuscripts and woodblocks are extant. They can be found in homes, offices, monasteries, caves, stupas and tombs in Tibetan cultural areas. Globally, there are tens of thousands of Tibetan texts of various types preserved in museums and libraries, including the Tibetan libraries located in Russia, Mongolia and China. In India new Tibetan books have been produced using local paper. This is not to mention the manuscripts and printed books produced in Nepal and Bhutan, where book making traditions are closely linked to Tibetan methods in terms of both the raw materials and technologies used in local papermaking. Books have been produced wherever Tibetan communities have lived, using local materials that have sometimes differed drastically from those found in Tibet. Thus, in both the past and the present Tibetan books have been produced according to traditional methods far beyond the geographical scope of Tibet.

Macro- and microscopic analyses that I have conducted on specific collections demonstrate the wide variety of paper types used in Tibetan books. From a practical point of view, my material analysis of paper is usually divided into stages. First, I study the papers in manuscripts *in situ* using codicological methods and basic equipment such as a digital Dino-Lite microscope (see Durkin-Meisterernst et al. 2015; Helman-Ważny 2016a). The aim is to document technological and visual features of paper in different lights and to sample paper for fibre analysis. Further analyses are conducted in the lab environment. The methodology is always adjusted to the specific research questions, which are connected to the type of written artefact and its function.

During my doctoral studies in the years 2002–7, I realized that many nineteenth-century Tibetan books held in the Mongolian and Tibetan

collection of the Asia and Pacific Museum in Warsaw were produced on Russian paper certified by the watermarks of Russian papermaking mills or on industrial paper that could have been produced elsewhere (Helman-Ważny 2009: 129, 141, 145–6; Strzechowska 2000). Many of the Tibetan books produced on the territory of the Russian Empire and early USSR are now preserved in the libraries of St. Petersburg and Ulan-Ude among many others (Zorin 2016). These books were also produced using Russian paper from the first half of the eighteenth century to the middle of the 1930s. Thereafter many of the manuscripts and xylograph books in these collections use machine-made paper, reflecting technological developments and industrialization that saw this type of paper starting to be used in early nineteenth-century Europe and then gradually in Asia. Despite this shift to using a contemporary material, a large number of these books remain in the traditional loose-leaf *pothi* format.

Paper of Chinese origin can be found in the Yongle and Wanli editions of the Tibetan Buddhist canon preserved in the University of Michigan Library in Ann Arbor, USA, the Jagiellonian Library in Cracow, Poland and the Harvard-Yenching Library in Cambridge, Massachusetts, USA. The paper used in these volumes is a very thin paper made of six or more sheets glued together and composed of paper mulberry fibres. The sheets were prepared with a dipping technique and by using a papermaking mould with a movable bamboo sieve (Helman-Ważny 2012/13; for general information on these technologies see Hunter 1978). This kind of sieve/mat is formed from finely cut strips of bamboo laced together with horsehair or natural fibre thread. These bamboo strips leave impressions on the paper known as ‘laid lines’; the thinner the bamboo, the more laid lines and the finer the pattern produced. The marks left by the thread used to join the bamboo strips are called ‘chain lines’. The chain lines are hardly visible in the paper used in the volumes in question due to the gluing of many layers of paper together, but still possible to discern. Most of the volumes contain laid paper characterized by twenty-four tiny but visible laid lines every three centimetres. The type of mould that would result in this kind of paper was not used in Tibet. This and the paper’s fibre composition confirm the Chinese origin of the paper; paper mulberry fibres, together with bamboo and straw, are typical Chinese paper components. In fact the consecutive editions of the Peking Kanjur (of which the Yongle and Wanli are two) are typically written on Chinese paper (Helman-Ważny 2014: 136–58), which is not that surprising given that they were produced in Beijing. Since the materials composing those

volumes are typically Chinese, we can hypothesize that they were produced by Chinese craftsmen (Mejor, Helman-Ważny and Kunga Chashab 2010).

Perhaps the best known early Tibetan written artefacts are the thousands of manuscripts written in the Tibetan language that have been discovered at Dunhuang, in present day Gansu province, China. These manuscripts have been dated to approximately the tenth century (Dalton, Davis and van Schaik 2007; van Schaik 2014; Uray 1988). The majority of them are executed on paper made of both recycled rag and fresh bark fibres, components that are also widely found in manuscripts written in Chinese and other languages of the Silk Road (Helman-Ważny 2014; Helman-Ważny and van Schaik 2013). This again shows that the types of raw materials used and the technologies applied differ significantly from what is often assumed to be the type of paper used in Tibetan books, namely paper made with *Daphne* fibres on a papermaking mould with a woven type of sieve. The rag paper of the Tibetan Dunhuang manuscripts is composed of ramie and hemp, while most of the bark paper is composed of paper mulberry or mulberry (*Broussonetia* or *Morus* spp.) fibres; *Daphne* fibres have been identified in only a few samples. Paper mulberry and mulberry are usually associated with Chinese types of paper and books featuring the Tibetan language that were produced in China or other areas where paper made from paper mulberry was used (Hunter 1978; McDaniel and Ransom 2016; Tsien 1985).

In the case of the paper used in the canonical volumes found in the Upper Mustang caves in Nepal the traditional Tibetan papermaking process was followed and traditional raw materials such as *Daphne* and *Stellera* were used by the local Tibetan communities (Helman-Ważny and Ramble 2021a, 2021b). As these plants are sparse, their use can be said neither to have been widespread nor common in that area and may correspond to local attempts at developing papermaking technology. The minor presence of other unidentified fibres suggests that some details remain to be studied.

I will return to a discussion of these traditional raw materials and what I mean by the 'Tibetan' papermaking process, as well as traditional methods of writing surface preparation that have been used to produce different kinds of Tibetan paper. However, considering the more recent globalization of 'Tibetan' paper, it is worth first outlining what has been noted of the origins of Tibetan paper in the historical record and the limitations of accounts of historical papermaking to be found in oral and written accounts.

## Accounts of Tibetan paper

### Historical origins of Tibetan paper

The historical origins of Tibetan papermaking are difficult to determine. Traditional Tibetan and Chinese historiography link paper to the arrival of the Chinese wife of Tibetan Emperor Songtsen Gampo (Konishi 2013: 187). The Tang Annals mention the date 648 CE in a report of Songtsen Gampo's request for paper, ink and other writing equipment from the Chinese emperor (Uebach 2008). Until the middle of the eighth century, however, most official Tibetan documents were written on wood. The entry for the years 744 and 745 in the Old Tibetan Annals records the transfer of official documents from wooden 'tallies' (*khram*) to paper (ibid.: 61). That entry also provides the first dated attestation of the word *shog* (paper) in Tibetan literature. Archaeological evidence suggests that paper was known in China from the second century BCE (Tsien 1985; Pan 2011) and was gradually carried throughout East and Central Asia, where Muslim Arabs encountered it in the eighth century CE (Bloom 2017). It thus appears that by the time writing arrived in Tibet in the seventh century the technology of papermaking was already known in East and Central Asia (Tsien 1973, 1985; see also van Schaik 2011).

Before the Tibetan imperial period (618–842 CE) vague knowledge of the Tibetan plateau circulated in Europe and other parts of the world (Kaschewsky 2001: 3–4).<sup>7</sup> People probably already had far better contact with neighbouring countries at this time than is generally supposed. The earliest accounts of relations between Tibet and its neighbouring regions, however, date from the early seventh century, with the earliest documented contact occurring during the Sui dynasty (581–618). Major relations with China framed the Tibetan imperial period (van Schaik and Galambos 2012), which was contemporaneous with the Tang dynasty (618–907). The trades route(s) that came to be known as the Silk Road(s) encouraged intellectual and religious exchange, as well as serving as conduits of

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7 Kaschewsky gives an overview of how Tibet was imagined in the West from ancient Greece to the eighteenth century.

commerce for not only silk but also many other commodities, among them paper.<sup>8</sup>

During the imperial period Tibet intermittently gained control over crucial parts of the Silk Road, and at times was able to dominate trade between China and the West. At that time, the production and circulation of manuscripts intensified along with the rise of Buddhism. At the end of the first millennium Tibetans started to produce their own paper made of *Daphne* plants, using technology developed earlier in China, as testified to by the oldest extant examples of Tibetan papers preserved in the Dunhuang collection of the British Library (Helman-Wazny and van Schaik 2013).<sup>9</sup> As already noted, only a few samples from the large collection of Tibetan-language manuscripts found at Dunhuang and other places in Central Asia have been confirmed through scientific material analysis as composed of *Daphne* fibres. Interestingly, these few samples originated from Miran and Mazar Tagh, which were Tibetan fortresses during the imperial period. This suggests that the first use of *Daphne* fibres can be assigned to Tibetans, justifying the use of the term 'Tibetan' for *Daphne* paper, even though *Daphne* was also used later for papermaking in Japan.

## Accounts of raw materials used in papermaking

The papermakers who I interviewed in Western Nepal and Tibet, as well as the secondary literature,<sup>10</sup> mention various raw materials used in papermaking. However, these are not always properly identified and confirmed by material analyses. As this section will discuss, much of the evidence that these sources present with regards to historical

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8 Of all the precious goods crossing this area, silk was perhaps the most remarkable for Europeans. Paper was not yet known in Europe, and it took a thousand years before it was appreciated and properly valued in that region (Bloom 2017; Hunter 1978). Instead, writers wrote on a variety of other materials such as cuneiform clay tablets, wax tablets, papyrus, parchment, pottery, animal hide and wood. To a certain extent, there was a progression over time from the use of papyrus to parchment and then paper, but most of the other aforementioned materials were still used for specific purposes (Bülow-Jacobsen 2012).

9 On the earliest examples of *Daphne* sp. plants identified in Tibetan manuscripts see Helman-Wazny and van Schaik 2013.

10 For an overview of secondary sources, see Trier 1972: 58–68.

papermaking is anecdotal, while local names of the plants used for papermaking vary from place to place and are not easily translatable into the Latin nomenclature used in the West. These difficulties must be taken into account when attempting to identify characteristic features of Tibetan paper.

Traditional papermaking knowledge was not preserved in writing until very recently (see, e.g., byams pa brtson 'grus 2010; Sherpa et al. 2008). Among papermakers, knowledge of raw materials and technologies is mostly passed orally from generation to generation. Those who I interviewed usually learned on the job from older practitioners, often their parents or grandparents. They were always much more eager to demonstrate their methods and skills, or to show their materials (usually stored in the workshop), than to talk about the process. Practicalities, effectiveness and income were much more important to them than theoretical knowledge. That being said, those with whom I talked were usually well informed about the materials and processes currently in use. However, it was impossible to judge the accuracy of their recall of knowledge learned in the past and not practiced themselves; they were often even unable to say how long ago this knowledge had been passed on to them. For example Jagat Thing, a papermaker from the workshop in Ghandruk, Kaski District in Nepal, reported that everybody in the region gathered only *lokta* (*Daphne* sp.), but he had heard about other plants used for papermaking in other places or abroad, such as banana, *alaichi* (cardamom), *babiyo* (sabai) and *khar* (grass). However, he was unable to say where they were used, and there is no available evidence to suggest that any of them can be associated with Tibet.

Written sources can have similar limitations. For example, the recent overview of Tibetan papermaking written down by Tibetan papermaker Jampa Tsundru from Lhasa (byams pa brtson 'grus 2010), though very informative, contains both material and anecdotal evidence. It is unclear which type of evidence is being referred to in its outline of materials and tools (ibid.: 54). There are also problems with the identification of certain plants used for paper manufacture in the anecdotal accounts of non-Tibetan travellers, explorers and missionaries who passed through Tibetan cultural regions in the eighteenth and nineteenth centuries. For example, Bentley Beetham, who was a member of the 1924 British Everest expedition in 1924, wrote that paper being produced in the Rong shar Valley at that time was made from the bark of the elder (*Sambucus* sp.) (Boesi 2016: 502–3). While there are two species belonging to this genus present in Tibet

(*S. adnata* and *S. javanica*), neither have ever been used for making paper (ibid.: 503).

As demonstrated by these examples from the accounts of both papermakers and observers, anecdotal evidence may limit our understanding of historical papermaking in Tibet. There are some, more recent, short reports on the papermaking process by travellers (usually white and of North American or European descent), although their depth of focus depends on the knowledge and familiarity with the topic of the reporter (see, e.g., Imaeda 1989; Koretsky 1986; Sander-mann 1968). In many cases travellers were only able to report on the general steps of the process but rarely do they offer the details that are the most informative for a study like this.

The papermakers who I interviewed always used local names of plants and tools and were hardly ever able to name foreign materials or technologies if they were used. This points to another difficulty in identifying the raw materials used in Tibetan papermaking through narrative accounts alone, namely that the plants are often mentioned in different contexts or by local names only. For example, *Stellera chamaejasme* is usually named *rechakpa* (*re lcag pa*) in Tibetan and is a well-known paper plant in many Tibetan cultural regions, including Amdo, Kham and Ü Tsang, as well as in the Nepalese high valleys of Dolpo and Mustang. Yet in each region a local vernacular name for *Stellera* is used. It is known as *gore chakré* (*mgo re lcag re*) in Lithang, *gonara* (*mgo na ra*) in Nepalese Dolpo, *gowo röldang* (*mgo bo rol gdangs*) in lower Mustang District (Nepal) and *rama racho* (*ra ma rwa co*) in the Xining area (Qinghai Province, PRC) (Boesi 2016: 504). To my knowledge *Stellera chamaejasme* is also known locally in Mustang as *sedri metok* (*se dri me tog*; lit. disagreeable smell of underarm sweat flower). This plant was very common around Muktinath, Jharkot, Khingar and in the vicinity of Lo Monthang. Furthermore Tibetans often refer to *Stellera chamaejasme* and other plants used locally for papermaking as *shokgu metok* (*shog gu me tog*; paper flower), *shogdum* (*shog ldum*; paper plant) and *shogshing* (*shog shing*; paper wood) (ibid.: 504).

These various local names of papermaking plants and other vegetal materials are not easily translatable into Latin nomenclature used in the West. Some modern Tibetan materia medica record the use of certain medicinal plants for papermaking and include their botanical identification: *rechakpa* corresponds to *Stellera chamaejasme*, *arnak* (*ar nag*) to both *Daphne aurantiaca* and *Wikstroemia canescens*, *arkya* (*ar skya*) to *Daphne aurantiaca* and *ngönbu* (*sngon bu*) to a few

Campanulaceae species (Boesi 2016: 516). While scientific analyses have shown that these are all plants that have been used in paper-making in Tibet, medical texts also mention a fifth plant, *duksé* (*dug srad*), which they identify as corresponding to *Oxytropis ochrocephala* and *Astragalus strictus* (ibid.: 516, 520). There is no evidence that these species have ever been used for manufacturing paper.

On the question of nomenclature, it is also worth noting that in Nepal lokta (*Daphne* sp.) paper is often mis-named ‘rice paper’, a generic term used by non-specialists to refer to paper from Asian countries. Unfortunately, this term has also been mistakenly used in Tibetan ritual contexts, having been adopted by some Tibetan lamas and their followers as synonymous with good quality paper, white as rice.

Caution is also required when interpreting the appearance of plants in both accounts of papermaking and in samples of paper. There are many discrepancies in the proportional use of plants in papermaking, so when a papermaker mentions several plants on an equal footing, this can be misleading. For example, some plants were only used as an auxiliary component such as a formation aid, for purely decorative purposes or for smell. Additionally, paper can contain impurities that were accidentally mixed with the pulp, beyond the control of the papermaker, such as singular cotton fibres that in most cases probably originated from the extensively used cotton sieve that was spread on papermaking moulds. Many admixtures of plant fibres were never truly intended for use as the main components of the paper.

Despite the various limitations that I have highlighted here, the interviews I conducted with papermakers showed that Tibetan papermakers developed methods that were conditioned by the unique qualities of the raw materials available locally. Taken together, the materials, technologies and papermakers’ skills resulted in paper products with distinctive properties and features adjusted to their specific purpose and intended use. It is to these materials and methods that I now turn.

## Deciphering Tibetan paper

### Raw materials

Considering all types of evidence, including the literature, interviews and my own experience of papermaking, it is possible to summarize that Tibetan paper was originally made mainly from the phloem of shrubs of the Thymelaeaceae family, specifically the *Daphne*,

*Wikstroemia*, *Edgeworthia* and *Stellera chamaejasme* species (Boesi and Helman-Ważny 2020). Thymelaeaceae is a family of dicotyledonous flowering plants with 898 species in 50 genera. The phloem contains very strong fibres with a large content of hemicelluloses, making the bark of many species of this family very suitable for the manufacture of high quality paper such as that used for bank notes and writing supports. The fibres are long and narrow, while supportive cells provide tensile strength without limiting flexibility. These characteristics render the bark a valuable material for papermaking. Moreover, most species are poisonous and some are important medicinally, which means that paper made from them can resist insect infestation longer than paper made from other plants and is therefore more durable and long lasting.

Besides the use of *Daphne* fibres, Tibetans usually claim that paper made from *Stellera* sp. is the 'original' Tibetan paper. This is probably because Tibetans associate this type of paper exclusively with 'the heart of their culture', since the plant grows at over four thousands meters above sea level and has not been mentioned anywhere else in the context of papermaking. When I asked Tibetan monks, scholars and craftsman the question 'What is so special about *Stellera* paper?', they usually pointed to the poisonous properties of the plant, and hence its strength and resistance to insects. We can assume that *Stellera* paper is unique to Tibet, or at least there is no available evidence that it was produced in places other than the Tibetan plateau; *Stellera* fibres have not been identified using scientific methods as the main component in any non-Tibetan manuscripts.<sup>11</sup> The oldest samples were identified in manuscripts from Central and Western Tibet that were respectively dated to the tenth and eleventh centuries (Helman-Ważny 2016a). It should, however, be noted that there is no evidence of these plants in the Tibetan manuscripts found in Dunhuang. After the fifteenth century, we more often find this plant being used in addition to *Daphne*, possibly to add some softness to the *Daphne* paper to make it more suitable for printing (Helman-Ważny 2016b). Used alone, the *Stellera* root fibres create a very specific soft type of paper, which was later considered by Tibetan papermakers to be of lower quality than bark

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11 Minor admixtures of *Stellera* fibres were identified in four of the Naxi manuscripts housed in the Weltmuseum in Vienna (inventory numbers 101502, 101505, 101511 and 117921). These manuscripts used paper primarily made of *Daphne* fibres, which suggests a typically Tibetan type of paper (see Helman-Ważny and Cai 2023: 409, 414).



**Figure 6.1** *Daphne* sp. used for making paper in Tibet and Nepal. Photograph by the author, 2015.

paper made of *Daphne*, *Wikstroemia* and *Edgeworthia*, since its fibres are not considered as strong.

From the perspective of manuscript studies, therefore, a significant number of the early manuscripts from Central and Western Tibet that have been subjected to microscopic analyses were written on *Stellera* paper or on paper where *Stellera* was a dominant component, the exception being the Dunhuang manuscripts which were written on rag or *Daphne* paper. Whilst it is difficult to establish the origins of Tibetan paper, the working hypothesis is that the usage of particular raw materials was strongly conditioned by geography. *Daphne* sp. grows up to 3,600 metres above sea level and *Stellera* sp. to 4,500 metres, but *Daphne* plants need much more moisture than *Stellera*, supporting the conclusion that these two species very rarely grow in the same habitat (Figure 6.1–6.3). However, the choice of materials has always been conditioned by more than one factor, sometimes many. This is what makes material analyses complex and can lead to problems in the interpretation of data. Despite the occasional ambiguities in data resulting from material analyses, however, we can develop protocols aimed at both interpreting each factor separately and then pulling these analyses together to draw our conclusions from as many perspectives as we can. The more information, data, and facts we are able to draw



**Figures 6.2 and 6.3**  
*Stellera chameejasme*  
plant and its root used  
for making paper in  
Dobe Shang, Ngamring,  
Central Tibet. Photo-  
graph by the author,  
2013.

together from both the paper used in a given object and that object's context, the better our chances of making a successful identification.

To return to the hypothetical factors determining the choice of *Daphne* or *Stellera* fibres, we need to consider their respective properties and how those might (or might not) have related to their use in paper production for particular uses, and related technological factors. To some extent it is possible to use a variety of fibres for the production of paper regardless of their individual properties and strength, since paper for manuscripts has to be processed before its use as a writing surface. This technological step allows for the adjustment of certain properties of the paper to suit the purpose to which the paper will be put, for example by gluing sheets of paper together or coating the surface with additional substances (processes to which I will return). Therefore, from a technological point of view, the only factor influencing the selection of fibres is the size of the manuscript. Small format manuscripts can be easily produced on pure *Stellera* paper, the fibres of which are soft and flabby with a wide lumen and narrow irregular fibre walls. But *Stellera* alone is not stable enough for large formats, since *Stellera* paper can easily bend or break. While it is sometimes made thicker by gluing several layers together, this is not enough to achieve the stability necessary for a large format, which is possible in *Daphne*, *Edgeworthia* and *Wikstroemia* based papers. In the case of liturgical texts, the addition of significant amount of more rigid *Daphne* fibres permits monks to turn folios easily with one hand, while leaving the other free to manipulate ritual objects and musical instruments during the course of a ceremony. However, there are advantages to using *Stellera* paper in such texts, namely that its softness improves the printability of such paper, and its poisonous qualities give it slightly better resistance against insects than *Daphne* paper.

## Papermaking processes and technologies

Besides raw materials, paper can be distinguished by technological features that directly originate from the papermaking process. In principle, there are several steps to papermaking:

- processing the raw material, which involves collecting, separating and cleaning the fibres;
- cooking the fibres;
- beating and refining the fibres;
- diluting to form a thin pulp suspended in a water solution;

- spreading the pulp to form a web of fibres on a screen;
- pressing the web to increase the density of the material;
- drying to remove the remaining moisture;
- and finishing, to provide a suitable surface for the intended end use.

Since these basic steps are shared by all papermaking traditions, general information about the papermaking process used by Tibetan papermakers is not helpful in identifying what makes paper Tibetan. However, parts of their process are specific to their practice.

While Tibetan papermaking technology has many similarities with the technology originally invented in China, it is clear that Tibetans established their own tradition of making paper suitable for writing, printing and other daily uses. The method seems to have evolved very little over the centuries. Each sheet of paper is dried on an individual papermaking mould called a 'floating mould', so named because it is placed on a water surface such as that of a lake, pond, river, puddle or, later, a wooden basin. The floating mould is made from a wooden frame with an attached woven textile that serves as a sieve; use of this technology results in a 'woven' type of paper (Figure 6.4). Since the



**Figure 6.4** A woven type of paper made with a floating mould constructed with a wooden frame and attached woven textile. Photograph by the author, 2016.

textile creates a finer mesh than the bamboo strips (or metal wires in European papermaking moulds) used in laid paper technology, woven paper is distinguishable by its different texture, since it does not have the chain lines or laid line pattern that are created by the imprint of bamboo or wires—that is, the lines and pattern that we saw, for example, in the Chinese paper used for the aforementioned Yongle and Wanli editions of the Tibetan canon. As shown in Figures 6.5 and 6.6, when using the floating mould technique, the papermaker stirs up a quantity of the pulp by moving the frame in the water until it entirely and equally covers the surface of the mould. Two people then tilt the frame until the water drains off to assure that a large even sheet is made (see also Helman-Ważny 2016a).

While we can say that this floating mould technology is Tibetan, this does not mean that it was necessarily the technology used by all Tibetan papermakers. It is important to note that macroscopic examinations of the paper in Tibetan books have more and more often identified the use (and adaptation) of a different technology, namely the ‘dipping mould’. With this kind of mould, the sieve is made from bamboo, reed or another kind of grass and is moveable, and results in the production of laid paper. Significant amounts of laid paper have been found in Tibetan books in the Dunhuang collection, as well as in the more recently studied Mustang and Dolpo manuscripts. Analysis of the fibres of this laid paper allows us to identify whether it is of Tibetan, Chinese or some other origin (Helman-Ważny 2016a: 191–2). However, it is worth mentioning that this technology was also adapted by Bhutanese craftsman for making *tshar-sho* paper for writing purposes. *Tshar-sho*, which is considered an ordinary type of traditional Bhutanese paper, is in fact aesthetically very similar to Tibetan paper and is also made with *Daphne* fibres.

In addition to the traces left from the technologies used to make it, Tibetan paper is also characterized by aesthetic features that result from processes specific to the practice of Tibetan papermakers. Firstly, Tibetan paper contains the remains of outer bark in the paper structure and is therefore not as white as Chinese and other East Asian papers, including the paper made in Japan from the same components. This is due to the relative simplicity of the Tibetan papermaking process and the fact that papermakers never sufficiently cleaned the bast strips before and after cooking (i.e., the outer bark was not entirely removed). Secondly, Tibetan paper is also usually thicker and of uneven thickness due to the traditional use of ash, rather than chemical agents, in the cooking process, which involves boiling the fibres



**Figures 6.5 and 6.6** The process of making paper in Nyemo, Central Tibet. Process of shaping the sheet of paper. Photograph by the author, 2013.

in an alkaline solution to soften them and to disintegrate the strips of bast into singular fibres. While these flaws relating to the papermaking process diminished the quality of the paper, they simultaneously serve as among the most typical aesthetic features of Tibetan paper.

## Writing surface preparation

Independent of the raw materials, technologies and processes that Tibetan papermakers used, they glued a few layers of paper together and sometimes finished the surface with additional substances, such as wheat or barley powder, to obtain a smooth surface that allowed for even hand lettering. This writing surface preparation involved pressing several layers of paper together using a paste made of boiled wheat flour and smoothing it with a stone (Figure 6.7); for some kinds of paper special ink, paint or dye would be applied to the surface before polishing (Helman-Ważny and Ramble 2021b). Each paper sheet was comprised of between two and eight layers depending on the paper type. Analysis of Tibetan bookbinding media shows that the sheets were attached with starch paste or, less often, with animal glue depending on the type of paper used and the availability of glue



**Figure 6.7** Monk in Triten Norbutse monastery, Kathmandu, polishing the surface of a book leaf in preparation for writing. Photograph by the author, 2017.

(Helman-Ważny 2014). Such preparation of traditional Tibetan paper no doubt contributed to Tibet's lettering style. The surface of the paper made of glued and then polished layers became practically unabsorbent and smooth. This encouraged the use of a wooden or bamboo pen for writing, implements that could not be used on one-layered Chinese-type absorbent paper for which the brush was the designated writing tool.

This process of gluing several layers of paper together characterizes Tibetan book leaves independently of the type of paper that was used. For example, the paper leaves found in Tibetan canonical volumes produced in China contain more than five layers of thin Chinese paper to achieve the thickness and stability of a large paper leaf. Those produced in Tibet usually contain two or at most three layers of paper, achieving the same thickness. This practice of gluing the paper sheets together into a book leaf of a certain thickness seems to be associated almost exclusively with Tibetan book culture. It likely originated during the early period of Tibetan book culture when Tibetans tried to make their books similar to their Indian precursors by adopting the loose leaf pothi format from the Indian palm-leaf books named *pustaka*.

Another kind of preparation that appears to be particular to Tibetan book culture was (and is) the colouring of paper to produce *tingshok* (*mthing shog*), a special kind of dark blue or black Tibetan paper that is used as a support for writing in gold. Its production often involved a range of specific products, such as paper (*shog bu*), brains (*glad pa*), yak hide glue (*phing*) and soot (*sre nag*). According to James Canary (2014), who has studied the technique of tingshok production among contemporary Tibetan craftsmen, the black mixture is prepared by kneading a paste of yak, sheep or goat brains with very fine black powdered soot and a small amount of cooked hide glue. This mixture is then painted on to the surface of the paper and left to dry, after which the surface is burnished (*dbur ba*) with a smooth piece of conch shell or a *zi* (*gzi*) stone. The specific ingredients combined with the burnishing process turn the matte surface into a shining support for writing in gold. While gold writing has been used in sacred texts and other types of manuscript in many places and cultures, to my knowledge the particular combination of materials and technologies used in the production of tingshok is rarely, if ever, found outside Tibetan book culture.

Some tingshok paper was produced using indigo dye, which was also used as a colorant in the decoration of other Tibetan written artefacts. Indigo, like gold, was a common substance treasured by all

literary cultures that were committed to embellishing their sacred books with the best possible materials (Balfour-Paul 1996, 2011). The discovery of indigo dye may have evolved independently in many civilizations where a suitable dye plant existed.<sup>12</sup> It may have reached Europe by way of Egypt originating in India. It is commonly used for dyeing paper blue in East and Central Asia. Interestingly it is often found in Tibetan books despite the fact that it was usually bought from India. In the Himalayas, the *Strobilanthes cusia* plant was used for producing indigo dye. This plant can be found most extensively in the Western and Central Himalayas, Southern China and Southern Japan (Zhang et al. 2021). As in the case of many other plants related to papermaking in this region, distribution of *Strobilanthes cusia* is conditioned by altitude and may be limited to specific valleys with a suitable climate. Even it may not be able to grow on the Tibetan plateau it must have been easily accessible and traded. This is probably why indigo is quite commonly found in Tibetan books, as both a textile dye and a component of pigments.

## Conclusions

Depending on the type of evidence used one may draw differing conclusions when trying to discern what ‘Tibetan’ paper is. Studies of Tibetan books as material objects clearly show that a variety of different paper types have been used for handwritten and printed Tibetan books across the vast geographical regions where Tibetan communities have lived. As explained above, this can create a great deal of confusion and even lead to misleading conclusions if the paper used as the writing support for such books was produced in different geographical locations but is still attributed as ‘Tibetan’. The process of writing on a piece of paper with Tibetan script does not immediately grant Tibetan

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12 Indigo is an organically derived pigment this is a unique shade of dark blue with a hint of purple, unlike most mineral pigments which have the earth colour palette of yellows, browns, greens and reds. Although indigo is typically known as a fabric dye, it is thought that it was first used as a pigment in inks and paints. Greeks and Romans used it in the last century BCE and first centuries CE for painting as well as for medicinal purposes. It was later banned from the European market to save the local woad markets (McCreery 2006; Enzel et al 2021, 83).

identity to that paper. The lack of clear terminology and systematic research on this topic does not help. However, on the basis of the above discussion I would like to propose that several features rooted in Tibetan culture would justify describing a piece of paper as 'Tibetan'.

The most important raw materials for papermaking in Tibet were the various plants of the Thymelaeaceae botanical family, especially *Daphne* and *Stellera* fibres. But while this is an important part of what makes Tibetan paper 'Tibetan', it is not conclusive. The same type of paper based on the same fibres was also produced in Bhutan and other Himalayan regions, and named accordingly as, for example, 'Bhutanese' paper. Furthermore, both *Daphne* and *Edgeworthia* plants were also used later in Japan (known as *gampi* and *mitsumata*). Despite use of the same raw materials, the final products that we can call 'Japanese' and 'Tibetan' paper clearly differ due to the different methods and technologies used for their production. Thus, it is not only the specific raw materials that make a piece of paper Tibetan, it is also the papermaking process and technologies that were used, as well as the preparation of the paper as a writing surface.

As we have seen, flaws related to the Tibetan papermaking process resulted in one of the most recognizable aesthetic features of Tibetan paper, namely the remains of outer bark in the paper structure, as well as its uneven thickness within the same sheet. In terms of technologies, I would not hesitate to describe the floating mould technology as Tibetan. However, like the use of *Daphne* fibres, this technology was employed in a geographical area extending well beyond Tibet. Preparation of the writing surface by gluing together sheets of paper into thicker book leaves is also an identifiable Tibetan practice. So too is colouring the paper with black ink or indigo to prepare a dark background for the execution of golden letters, which we find in tingshok manuscripts. Although manuscripts written in gold on coloured paper were produced all across Asia, this particular aesthetic can be called Tibetan. What is important is that the materials and techniques most often used in Tibetan books are distinguishable. The resulting aesthetic can be related to the function of Tibetan manuscripts, as well as the types and qualities of materials used in Tibet.

Last but not least, the ethnicity of the papermaker is the most obvious feature that justifies the use of the adjective 'Tibetan'. However, this is the most difficult thing to deduce from an examination of the paper in books alone. The ethnicity of a papermaker is not possible to determine by material analyses of books written on the paper they made. We can only know this if we buy paper directly from producers,

or if the paper contains ownership marks such as a papermaker's seal. In books, it is usually only the scribe or author who is mentioned, not the papermaker. The knowledge and skill of the latter remains obscured in the record.

In short, papermakers in Tibet developed methods for paper production that reflected the particular qualities of the raw materials and specific technologies they used. As a result, their paper products were unique. Among other uses, they served as writing supports for Tibetan written artefacts, with distinctive properties and features that are sometimes traceable to their place of origin. To summarise these features, I would say that the use of *Daphne* or *Stellera* fibres combined with the use of 'floating mould' technology, the presence of outer bark particles in the paper and the layered structure of book leaves would justify the use of the descriptor 'Tibetan paper'. Other combinations of features would require further discussion on a case by cases basis.

## Note on the author

Agnieszka Helman-Ważny (Ph.D. 2007) is Professor of Book Studies at the University of Warsaw and a researcher at the Division 4.5—Analysis of Artefacts and Cultural Assets at the Federal Institute for Materials Research and Testing in Berlin. She is also affiliated with the Cluster of Excellence 'Understanding Written Artefacts' at the Centre for the Study of Manuscript Cultures at the University of Hamburg. Her publications include monographs and articles on the history of books and paper in Central Asia and the Himalayas, material culture of Tibet, codicology of Silk Road manuscripts and history of Asian book collections, including *The Archaeology of Tibetan Books* (Brill, 2014) and *The Mustang Archives: Analysis of handwritten documents via the study of papermaking traditions in Nepal* (Brepols, 2021, co-authored with Charles Ramble). Her recent work, since 2019, explores the complex history of hand-made paper in Asia. While there is a good amount of information about paper-production techniques from mainland China, Japan and Korea, very little is known about papermaking in borderland areas of southwestern China and upper mainland South-east Asia (Thailand, Burma, Laos and Vietnam) where minority ethnic groups still keep their traditions of papermaking. Helman-Ważny's research contributes to our understanding of how these traditions developed and evolved, especially in light of specific local circumstances.

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