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## Global and Gendered Perspectives on the Production of a Parisian Alms Purse, c. 1340<sup>1</sup>

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**ABSTRACT** Drawing on recent technical analyses of an exquisite embroidered French alms purse that now resides at the Musée des Tissus et Musée des Arts Décoratifs in Lyon, this article argues that the purse, which was probably embroidered in Paris in the early 1340s, represents the culmination of the efforts of dozens of men and women on three different continents. Some of the women who worked in the fields where the flax was grown were simple day laborers, but many of the other men and women—both rural peasants and urban artisans—possessed specific technical knowledge and manual skills that could take years to perfect. Indeed, it took a global village of many talented individuals to create a fourteenth-century luxury alms purse from Paris. The article also explores the ecological impact of the extraction and processing of some of the raw materials that were employed in the purse.

**KEYWORDS:** silk, linen, flax, gold, cochineal, alum

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Sometime around 1340, a French painter, most likely one who resided in Paris, collaborated with an embroiderer in order to create a stunningly beautiful alms purse out of red velvet, fine linen cloth, gilded silver thread, and silk threads of various colors. On one panel, which apparently occupied the bottom half of the purse, a falconer wears a falconer's glove and clutches a falconer's jesses, which once led to a raptor that was perched above the glove, albeit that raptor is now visible only in its absence (Figure 1).<sup>2</sup> The

1. I am extremely grateful to Sophie Desrosiers, Maîtresse des conférences at the École des Hautes Études en Sciences Sociales, and to Marie-Hélène Guelton, Chargée des analyses textiles at the Musée des Tissus et Musée des Arts Décoratifs in Lyon, for spending two half-days with me conducting technical analyses of the embroideries, and for following up with additional analyses on their own. Marie-Hélène was also extremely gracious in facilitating communications with Mohammed Dallel, who conducted the chemical analyses of the red dyes in the velvet. I am grateful as well to the rest of the staff at the Musée des Tissus et Musée des Arts Décoratifs for accommodating our analysis and for providing photographs of the two embroideries, and to Christine Descatoire, Conservatrice en Chef du Patrimoine Cluny-Musée Nationale du Moyen Âge, for sharing her insights with me on this purse and on others that now reside in the Cluny Museum. Many thanks to Mohammed Dallel, Conservation Scientist and Research Engineer at the Laboratoire de Recherche des Monuments Historiques, for completing the analysis of the red dyes at a time when his laboratory was swamped with extra work in the wake of the tragic fire at Notre Dame Cathedral in Paris. I also owe a debt of gratitude to Butch Ware, who alerted me to some of the best scholarly literature on gold mining in medieval West Africa, and to Sarah Guérin for alerting me to the importance of central African alum deposits. Finally, for their thoughtful readings and helpful suggestions, I thank the two anonymous readers for the *Journal of Medieval Worlds*.

2. As pointed out by Marie Schoefer, whose 1985 restoration notes are preserved at the Musée des Tissus et Musée des Arts Décoratifs in Lyon, the elevation of the velvet pile just above the left hand of the falconer



FIGURE 1. Purse, northern France, c. 1340, lower panel. Stitching patterns on the reverse side of the panel indicate that the arms of the two lovers have been heavily restored. The dark red patch above the falconer's gloved left hand marks the spot where an embroidered piece of blue linen or hemp once represented a raptor. Lyon, Musée des Tissus et Musée des Arts Décoratifs, MT 30020.2. © Lyon, Musée des Tissus – Sylvain Pretto.

falconer in this panel stretches his/her arms around both sides of a lover while reaching up to crown the lover with a green chaplet. Depicted in a second panel, which originally had a rounded top, an indication that this panel occupied the top half of the original purse, an individual of uncertain gender—most likely the crowned lover from the first panel—wears the green chaplet (Figure 2). Above his or her left arm, which is now protected with a falconer's glove, the lover holds two birds to his/her chest; one of the birds mounts the other, and at least one of them is attached to the falconer's jesses. In the right

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suggests a missing appliqué/embroidery, which would have protected the pile from wearing away. That elevated pile appears as a patch of darker red in the image in figure 1. There are also traces, in that same spot, of the same blue textile that was used for the birds in figure 2.





FIGURE 2. Purse, northern France, c. 1340, upper panel. The two birds that are perched above the man or woman's left hand have been heavily restored with a brown textile that both protects and conceals the original blue textile that supported the embroidery for the birds, however some of the blue is still visible on the edges of the tail of the upper bird (see also Figure 9) The semi-circular seam that frames the upper half of the figure indicates that this panel constituted the upper level of the original purse. Lyon, Musée des Tissus et Musée des Arts Décoratifs, MT 30020.1. © Lyon, Musée des Tissus – Sylvain Pretto.

hand of this lover we can detect a dismembered bird's leg—which may have belonged to the lower of the two birds on the left arm. Although it is not evident to us today, these two birds (a raptor and its meal) were originally portrayed with a ground of blue linen that had been embroidered with brown and white stitches on the side of the heads, along the underbellies, on the legs, and on the tips of the tail; the original coloring suggests that the birds were sparrow hawks.<sup>3</sup> Both the falconer and the object of his/her desire

3. Archival photograph in the collection of the Musée des Tissus et Musée des Arts Décoratifs in Lyon, depicting the top panel of the alms purse, MT 30020.1, before restoration work began in 1985. As part of the restoration process, the birds were covered with a brown textile. I thank Marie-Hélène Guelton for providing me with a scan of the pre-restoration photograph.

are dressed in gold; both have capes that are lined with green and yellow silk; both have wavy gold hair.

The stylistic characteristics of the facial modeling and of the clothing of the lovers indicate that the final production of the purse took place in Northern France in the second quarter of the fourteenth century.<sup>4</sup> The subject matter of the embroideries also points to Northern French origins: the two panels, I want to suggest, allude to a sequence in Chrétien de Troyes's *Erec and Enide*. Erec, having defeated an unpleasant knight at the "Tournament of the Sparrow Hawk," offers the prize of the tournament—the sparrow hawk itself—to Enide and "crowns" her (metaphorically, at least) as the most beautiful woman at the tournament; this appears to be what the artist intended to represent in the lower panel (Figure 1). Slightly later in the poem Erec sees that Enide is happily feeding a dismembered bird to her sparrow hawk. That scene corresponds with what we see in the upper panel of the purse (Figure 2).<sup>5</sup>

Our attention is immediately drawn to the artistry that went into the confection of this masterpiece, but who was the artist? Was it the painter—most likely a book illuminator—who outlined the figures onto the linen? Was it an entrepreneur-embroiderer, most likely male, who purchased all of the materials for the purse and then supervised the work of the actual embroiderer? Or was it the woman, or women, who executed the fine embroidery stitches? None of these proposed responses provides a full answer to the question. Rather, it took a global village to create this purse; numerous women and men with highly developed skills contributed to its production.

Sources concerning the production and consumption of consumer goods point to Paris as the most likely location of the outlining and embroidering. Indeed, this purse is one of thousands of luxury silk purses that were made in Paris in the thirteenth and fourteenth centuries.<sup>6</sup> Like this one, moreover, a significant number of the embroidered purses that were made in fourteenth-century Paris were embroidered on velvet: at her royal coronation in January 1317, for instance, queen Jeanne of Burgundy gave away 24 embroidered silk purses, all of them purchased in Paris. Six of those purses were embroidered on velvet.<sup>7</sup>

4. On the clothing: Odile Blanc, "Fragment à scène courtoise," *Musée des Tissus de Lyon: Guide des collections* (Lyon: Editions Lyonnaises d'Art et d'Histoire, 2001), 130. A comparable example of facial modeling from Paris around this time would be the work of Jean Pucelle. See, for example, the high density digital image of one of the folios of *The Hours of Jeanne d'Evreux*, which can be viewed on Wikimedia Commons: [https://upload.wikimedia.org/wikipedia/commons/6/63/8\\_Jean\\_Pucelle%2C\\_Hours\\_of\\_Jeanne\\_d%27Evreux.\\_1325-28%2C\\_Metropolitan\\_Museum%2C\\_New-York.jpg](https://upload.wikimedia.org/wikipedia/commons/6/63/8_Jean_Pucelle%2C_Hours_of_Jeanne_d%27Evreux._1325-28%2C_Metropolitan_Museum%2C_New-York.jpg); accessed May 22, 2019.

5. Kristian von Troyes *Erec et Enide: Neue verbesserte Textausgabe mit Einleitung und Glossar*, ed. Wendelin Chrétien Foerster (Halle: Niemeyer, 1896), lines 639-997, 1306-12, pp. 17-26, 34. The lines describing Enide feeding the sparrow hawk occur in only four of the seven extant complete manuscripts of *Erec et Enide*: Roger Middleton, "Coloured Capitals in the Manuscripts of *Erec et Enide*," in *Les manuscrits de Chrétien de Troyes/The Manuscripts of Chrétien de Troyes*, ed. Keith Busby, Terry Nixon, Alison Stones, Lori J. Walters (Amsterdam: Brill, 1993), 1:150, 166.

6. On various aristocratic purchases of luxury purses in Paris, see: Arras, Archives Pas-de-Calais, Centre Mahaut d'Artois, Series A (henceforth PdC A) 19, PdC A 209, PdC A 263, fol. 18; PdC A 270, fol. 25v; PdC A 316, fol. 20r; PdC A 329; Ghent, Rijksarchief, Gaillard 52; *De Rekeningen der graven en gravinnen uit het Henegouwsche huis*, ed. J. Smit (Amsterdam and Utrecht: J. Müller, 1924-39), 1:515. See also the reference to over 200 gold and silk purses from Paris that were seized by authorities in Aix-en-Provence in 1343: J. Billioud, "Le roi des merciers du comte de Provence aux XIVe et XVe siècles," *Bulletin philologique et historique du Comité des travaux historiques et scientifiques* (1922-23): 58-59.

7. L. Douët-d'Arcq, ed., *Comptes de l'argenterie des rois de France* (Paris: Librairie Renouard, H. Loomis successeur, 1874), 66.



In fact, the weaving of velvet and the confection of luxury purses were so closely associated with each other in Paris that they were joined together by a single guild of weavers described as makers of "silk cloth, velvet, and woven purses."<sup>8</sup>

Given what we know about named manuscript painters in fourteenth-century Paris, such as Mahiet and Jean Pucelle, we might assume that the artist who outlined the design for this purse was male. However, that was not necessarily the case. Husbands and wives sometimes worked together as illuminators, and women who were illuminators were less likely to show up in the written record than were men.<sup>9</sup> It is even possible that women were more highly represented among embroidery illuminators than they were among book illuminators: a list of members of the Parisian embroiderers' guild from 1316 included the names of two women who were identified as illuminators, but without any indication that they had ever been married. One male illuminator is mentioned as well, but only because his widow was a member of the guild.<sup>10</sup>

Similarly, while account book evidence concerning master embroiderers points to a predominance of men, women nevertheless played an important role both in carrying out the actual work of embroidery and in serving as independent artisan-entrepreneurs in the making of luxury purses.<sup>11</sup> Indeed, if we consider all of the labor and all of the skills that went into the confection of this purse, we have to acknowledge that dozens of women probably contributed to its production. I have already discussed some of those women in my book on the silk industries of medieval Paris. The specifics of this purse compel me to examine, here, not only Parisian silk workers, but also Paris' luxury embroiderers and the various Parisian artisans and entrepreneurs who produced linen textiles.

Paris was a center of production not only of fine embroidery but also of most of the final products that went into the making of this purse: velvet, silk thread, simple tabby-woven silk cloth, linen cloth, and metallic thread. Since Paris was also a major center for the importation of luxury textiles and metallic thread, we cannot be absolutely certain that all of the products that went into the making of the purse were actually produced in Paris. Nevertheless, in the first part of this paper I discuss the various stages of Parisian production that may well have contributed to the production of each of the materials that contributed to the making of this purse—and that certainly contributed to the production of other purses like it. The discussion highlights the gendered division of labor in Paris. Wherever the evidence allows, I also outline the urban geography of the Parisian artisans and entrepreneurs who might have contributed to the production of this purse—as well as many others like it. Much as was the case with the production of silk cloth, women artisans in Paris predominated in the production of luxury embroideries as well as in the

8. René de Lespinasse and François Bonnardot, ed., *Les métiers et corporations de la ville de Paris, XIIIe siècle: Le livre des métiers d'Étienne Boileau* (Paris: Imprimerie nationale, 1879), 76.

9. Richard and Mary Rouse, "A 'Rose' by Any Other Name: Richard and Jeanne de Montbaston as Illuminators of Vernacular Texts," in *Manuscripts and their Makers: Commercial Book Producers in Medieval Paris, 1200-1500* (Turnhout: Harvey Miller, 2000), 1:235-60. See also Therese Martin, introduction, *Reassessing the Roles of Women as 'Makers' of Medieval Art* (Leiden, Boston: Brill, 2015), 1:20.

10. Georges Bernard Depping, *Règlements sur les arts et métiers de Paris rédigés au XIIIe siècle, et connus sous le nom du Livre des métiers d'Étienne Boileau* (Paris: Crapelet, 1837), 380 n1.

11. See below, pp. 24, 26.



FIGURE 3. Map of Europe, Africa, Arabia, and Western Asia showing the geographical origins of various raw materials that contributed to the making of the 1340s purse. Map created by Ebers Garcia.

production of fine linen textiles. Women's role as entrepreneurs differed, however, depending on the material and the process: they dominated as merchants of fine linen textiles and they played a strong role in the marketing of silk textiles. They hardly ever showed up as merchant-organizers of large-scale embroidery projects, but, as already suggested, there were a number of independent artisan-entrepreneurs, many of them female, who specialized in the making of luxury purses.

The second half of the paper broadens the analysis of the production chain to look at the global supply networks that brought to Paris the raw materials that went into the production of this purse and others like it. Those networks drew Paris into a global economy, one that extended thousands of miles and included three continents—Europe, Africa, and Asia (Figure 3). Unlike earlier discussions of this global economy, the discussion here focuses not on trade but on the skilled labor and technical knowledge that contributed to the production and extraction of raw materials. The cultivation, collecting, harvesting, and preparation of at least four raw materials that contributed to the confection of this purse—gold, silk, flax, and the scale insects that were harvested to make red dye for the velvet—relied upon the technical proficiency, accumulated wisdom, and physical contributions of rural workers who were both male and female; those workers resided on three different continents.

Coincidentally, moreover, the harvesting or collecting of three of the rural products that ended up in this purse and in other textile products like it (silk, flax, and the scale insects for red dye) entailed killing a plant or animal before it had a chance to reproduce. The role of ruptured lives and reproductive cycles in the conversion of these living things into commodities serves to remind us that both in the Middle Ages and today the social life of things creates relationships not only among humans, but also between humans and the natural world. And indeed, as will be elaborated below, the conversion into commodities of several of the natural products that contributed to the confection of this purse had profound environmental impacts.

## 1. THE PARISIAN CONTRIBUTION

The embroidery for this purse began with the work of an illuminator, who outlined the figures of the two lovers onto a piece of fine white linen and outlined the figures of the raptors onto a piece of blue linen or hemp.<sup>12</sup> A highly skilled embroiderer reinforced the drawn outlines of the lovers with brown and pink chain stitches. She then filled in the details of the figures, giving shape to the lovers' faces with white and brown split-stitch silk embroidery, attaching gilded silver thread to depict the lovers' clothing and hair, and adding brown and white markings to the figures of the birds. The white split stitches on the faces of the lovers created curved highlights on the foreheads and cheeks, and around the eyes. The embroiderer also employed layers of white and brown linen or hemp underneath the embroidery stitches in order to give both depth and height to various parts of the figures—most especially the corneas of the eyes, the arms, and the ridge of the nose (Figure 4).<sup>13</sup> Once the embroiderer had finished embroidering the main figures, she carefully cut them out and attached them to a piece of red silk velvet, which had been backed, for strength, with a piece of linen or hemp (Figure 5).<sup>14</sup>

Working directly onto the backed velvet, but with a very thin layer of white tabby-woven cendal silk on top of the velvet, the embroiderer then added the final background details to the embroidery: green and yellow split stitches filled in the linings of the lovers' capes, and gilded silver thread, attached with surface couching stitches, depicted background foliage and architectural ornamentation.<sup>15</sup> The use of the fine piece of cendal silk, rather than a heavier piece of

12. While it is impossible to determine from visual examination whether the embroiderer used linen or hemp cloth for the ground of the embroidery, Parisian account book evidence points to the use of linen as the ground for fine embroideries that were later attached to velvet textiles, and I am thus assuming that the white textile underlying the embroidered figures of the two lovers was indeed linen: L. Douët-d'Arcq, *Comptes de l'argenterie des rois de France* (Paris: Jules Renouard, 1851), 59-60.

13. The use of an underlying layer of brown cloth in the cornea of the eyes, rather than brown embroidery stitches, gives added depth to the eyes. I thank Marie-Hélène Guelton for discovering the brown layer of linen/hemp that shows up in the cornea of the eyes and for discovering the linen/hemp that appears to be folded under the ridges of the nose.

14. I thank Marie-Hélène Guelton for conducting a thorough technical examination, in November 2018, of the reverse side of the two panels, and for sending her photographs to me.

15. I thank Sophie Desrosiers and Marie-Hélène Guelton for discovering the use of the tabby-woven silk cendal ground for the cape lining, foliage, and architectural ornamentation. Because the embroidery stitches on these sections penetrated both the velvet and its linen backing, it is possible that these were later additions to the original embroidery, but my own





FIGURE 4. Detail of Figure 2, showing the fine white linen ground of the lover's face, and white split stitch silk embroidery highlighting the cheek, nose and forehead and spiraling into the eyes, for which the ground is formed from a piece of brown linen textile. Also visible are the pink and brown split stitches outlining the face and neck, a few of the brown couching stitches that attach the embroidered linen to the red velvet ground, and the ends of the linen where it was cut, just outside the brown outline stitches. Lyon, Musée des Tissus et Musée des Arts Décoratifs, MT 30020.1. © Lyon, Musée des Tissus – Sylvain Pretto.

linen, enhanced the three-dimensionality of the embroidered image by placing the background features on a lower plane from that of the lovers and raptors (Figure 7).

Our discussion of the Parisian contribution to the production of the purse begins with the skilled artisans who contributed to the confection of silk cloth and silk embroidery thread. It then shifts to the production of linen cloth in Paris, and from there it moves to the production of metallic thread and the final embroidery process. Women constituted the majority of artisans who contributed to the production of silk, linen, and embroideries, and they had a strong showing in the production of metallic thread. They also

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reading is that the original embroiderer intentionally employed the silk cendal, working through it and the velvet and its backing in order to enhance the three-dimensional effect of the embroidery.





FIGURE 5. Reverse side of Figure 2. Most of the visible brown stitching constitutes the backside of the stitches that secured the already embroidered figure to the velvet and its linen backing. Also visible, toward the center of the torso of the figure, are a mass of green stitches that were created at the time of the restoration, when a layer of brown textile was applied over the figures of the two birds. Lyon, Musée des Tissus et Musée des Arts Décoratifs, MT 30020.1. © Lyon, Musée des Tissus – Sylvain Pretto.

constituted a majority of linen merchants and had a strong showing as merchants of silk products and of small scale mercery goods, including luxury purses.

International merchants from Northern Italy were the primary importers of raw silk fiber into Paris. These merchants, who were all male, almost never established permanent residency in France, but some of them remained in Paris, without their wives and children, for decades at a time. They were concentrated in predominantly male households along and below the Rue des Lombards, which was centrally located on the right bank of Paris, in close proximity to the shops of Paris' silk mercers, who were in charge of silk production (Figure 6).<sup>16</sup>

16. Sharon Farmer, *The Silk Industries of Medieval Paris* (Philadelphia: University of Pennsylvania Press, 2016), 45-48, 145-47.

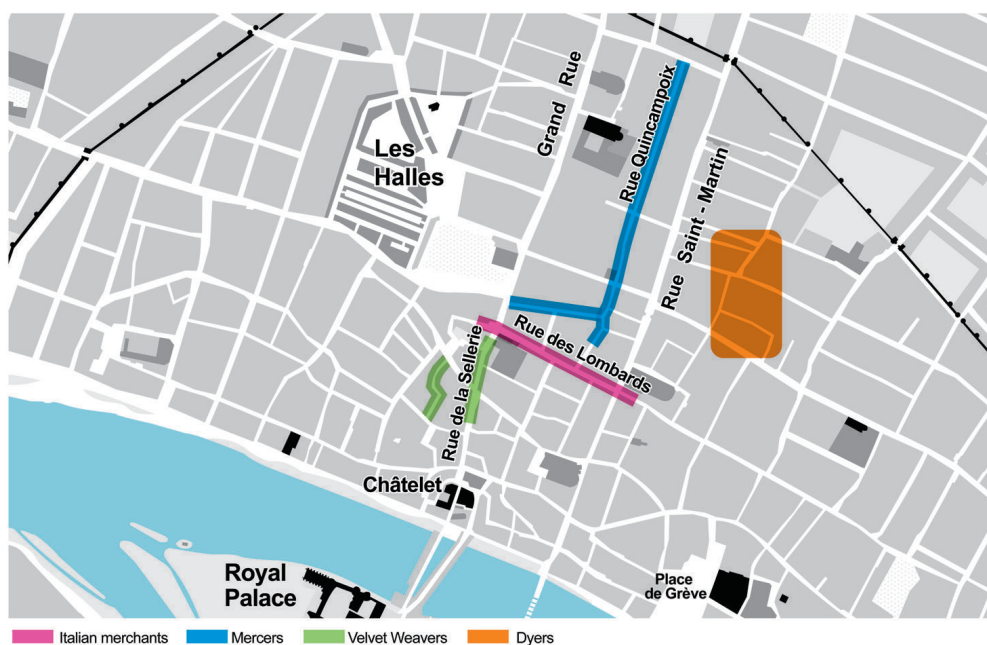


FIGURE 6. Map of early fourteenth-century Paris showing the rue des Lombards (highlighted in pink) on the right bank. Italian merchants were concentrated on, and just south of, that street. The principal streets for Paris' mercers (highlighted in blue) extended northeast from the rue des Lombards. The two streets with velvet weavers (highlighted in green) were just south of the rue des Lombards. The silk dyers' neighborhood (highlighted in orange) was to the east of the principal mercers' neighborhood. Map adapted by Ebers Garcia from <http://alpage.humanum.fr/documents/ressources/cartes/CarreParis1300-1330.svg>.

Silk fiber comes from the cocoons of the larva of the *bombyx mori*, a domesticated moth that is unable to fly and totally dependent on human intervention for its survival. Each cocoon is formed from a single strand, or bave, which can be up to a kilometer in length.<sup>17</sup> Italian merchants sometimes brought whole silk cocoons, containing dead silkworms, to Paris.<sup>18</sup> However, raw silk fibers usually arrived in medieval Paris (just as they usually arrive in centers of silk throwing today) having already been reeled off of the cocoons and formed into skeins that were then shipped in bundles known as fardels.<sup>19</sup>

17. "Silkworm Moth," Encyclopaedia Britannica," <https://www.britannica.com/animal/silkworm-moth>, accessed November 30, 2018.

18. In 1362, a Lucchese merchant in Paris had in stock both reeled raw silk and silk cocoons. There is no evidence, however, that Parisian throwsters were equipped to work with silk cocoons, and, indeed, reeled silk was the predominant form of imported raw silk for every medieval European silk industry: Léon Miro, ed., "Inventaire mobilier chez un marchand lucquois à Paris en 1362," "Études lucquoises 4: Les Cename," *Bibliothèque de l'École des chartes* 91 (1930): 164, 166. On the necessity, before the nineteenth century, of reeling raw silk before shipping it, in order to prevent it from spoiling: Claudio Zanier, "The Migration of the Silk Cycle from China: A Comprehensive View," unpublished article scheduled to appear in *Seritechnich* (Max Planck Research Library for the History and Development of Knowledge, edition open access). On the continued practice, into the twenty-first century, of shipping reeled raw silk, see: Farmer, *Silk Industries*, 289 n8.

19. Farmer, *Silk Industries*, 42, 45, 48. For a reference to "fardels" of mercery materials in Paris, see: Lespinasse and Bonnardot, ed., *Les métiers et corporations*, 247.



Paris' silk mercers, who were concentrated around the rue Troussevache and along the rue Quincampoix, purchased the skeins of raw silk from the Italian merchants and then lent those skeins out to silk throwsters. The majority of mercers were male, and some of those male mercers rose to the top of the city's merchant elite, attaining positions on Paris' board of aldermen. Nevertheless, women constituted over thirteen percent of the total number of mercers, and they were even more strongly represented among the wealthier mercers. Indeed, between the late thirteenth and the late fourteenth centuries, a number of wealthy women mercers emerged as the chief suppliers of silk textiles to royal and aristocratic households, reaching the very pinnacles of their profession.<sup>20</sup>

In Paris, the first stage of the production process took place in the workshops of silk throwsters, all of whom were women. There is no unambiguous evidence concerning the implements that these women used in that production process. All that we can say for sure is that Paris did not yet have any of the highly mechanized silk throwing machines that were already in use in Italy.<sup>21</sup>

Silk differs from both wool and linen because the fibers are continuous. Thus, the production of usable yarns involves a simple reeling together of several continuous raw silk strands, rather than "spinning" discontinuous fibers in order to shape them into a continuous yarn. Nevertheless, whenever silk production is introduced to an area that already produces textiles from other fibers, throwsters tend to adapt local spinning practices that are already in place. Thus, since the spinners for the Parisian wool industry employed both drop spindles and spinning wheels, we can assume that the silk throwsters of Paris used one or both of these implements.<sup>22</sup> Whatever implements they used, the throwsters, through their ability to create four distinct kinds of yarn, created the foundation for the entire architecture of the purse. Noticeably absent from this purse, however, is a kind of yarn that was frequently employed in England, in the making of the famed embroideries known as *opus anglicanum*: yarn known as floss, which was made from broken silk fibers.<sup>23</sup>

The majority of Paris' throwsters were scattered across the right bank, and since the mercer zone ran right up the center of the right bank, the throwsters were relatively close to the men and women who supplied them with their fiber.<sup>24</sup> In order to produce yarns that were strong enough to be woven, silk throwsters reeled together or lightly twisted several raw silk strands. The degree and direction of the twist depended on the type of textile or yarn the fibers were going to form. In the case of a light-weight tabby-woven silk that was known as "cendal"—which was used to back the green and

20. On mercer locations: Farmer, *Silk Industries*, 76-81; on women mercers: 128-29.

21. On throwsters being women: Farmer, *Silk Industries*, 111, 112; on their implements: 48, 51-52. On the mechanized throwing machines of Italy: Richard Leslie Hills, "From Cocoon to Cloth: The Technology of Silk Production," in *La seta in Europa, sec. XIII-XX: Atti della Ventiquattresima Settimana di Studi, 4-9 maggio 1992*, ed. Simonetta Cavaciocchi (Florence: Le Monnier, 1993), 70.

22. On silk throwsters adapting from the methods used with other fibers: oral communication from Sophie Desrosiers.

23. Lisa Monnas, "The Making of Medieval Embroidery," in *English Medieval Embroidery: Opus Anglicanum*, ed. Clare Brown, Glyn Davies, and M.A. Michael (New Haven: Yale University Press, 2016), 10.

24. Farmer, *Silk Industries*, 122.



FIGURE 7. Magnified photograph of the support textile for a background architectural ornament in Figure 2. The white silk yarns that run horizontally across the photo formed the weft of a piece of silk “cendal.” Those weft yarns have no discernable twist. Silk cloth with yarns containing no discernable twist was often cooked (and then dyed, if necessary) after the cloth had been woven. Photo: Marie-Hélène Guelton.

yellow embroidery for the cape linings on this purse as well as some of the foliate and architectural background—no discernable twist was given to the silk yarns of the weft (Figure 7).<sup>25</sup> In the case of the embroidery yarns on this purse, the yarns were twisted once, in a Z twist; the same was true of the yarns that formed the warp on the tabby-woven silk cendal. Those yarns that served as the core for the metallic yarns were twisted once, in an S twist (Figure 15). Those yarns that formed the pile for the velvet were twisted once, in one direction, and then two of them were re-twisted together, in the opposite direction, to form a two-ply yarn (Figure 8).

25. On the fundamental difference between silk textiles with no-twist yarns, or with yarns with virtually no twist, and those consisting only of twisted yarns, see Sophie Desrosiers, “Au plus près de la matière, entre Orient et Occident. Les différentes filières de transformation de la soie du *Bombyx mori*,” Archives-ouvertes HAL-01213712, submitted 8 October 2015. On the textile known as “cendal” see: Desrosiers, “Sendal-cendal-zendado: A Category of Silk Cloth in the Development of the Silk Industry in Italy, Twelfth to Fifteenth Centuries,” in *Crusading and Trading Between West and East: Studies in Honour of David Jacoby*, ed. Sophia Menache, Benjamin Z. Kedar, and Michel Balard (London: Routledge, 2019), 340–50. The Parisian gild of makers of “aumônières sarrazinoises” had a statute forbidding the use of untwisted silk. Presumably, that statute concerned the weaving of the purses themselves, because untwisted yarn was not strong enough to sustain the structure of the purses: Depping, *Réglements*, 385.

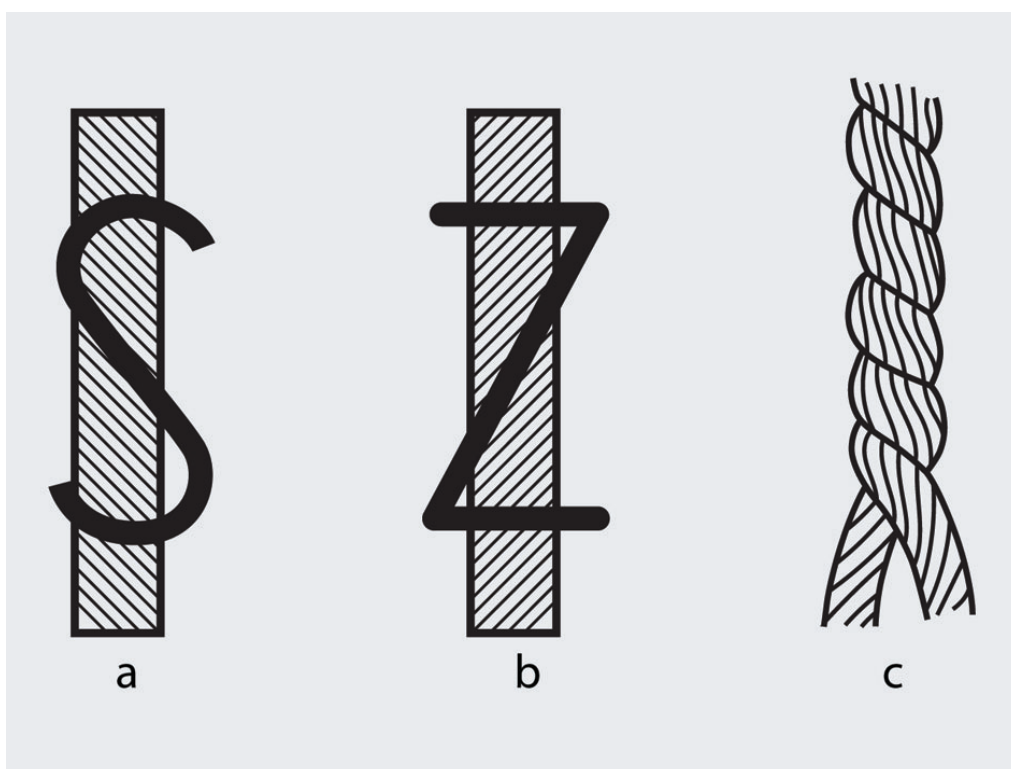


FIGURE 8. S- and Z-twist single twisted yarns (a. and b.) and re-twisted, 2-ply, yarn (c.). Adapted by Ebers Garcia from Sophie Desrosiers, *Soieries et autres textiles*, 476. With the exception of the yarns that served as the core of the metallic threads, which were spun with an S twist, most of the silk yarns on the Lyon purse were spun with a Z twist. The silk yarns that were used to make the pile of the velvet were 2-ply.

Unlike most working women in medieval towns, the throwsters of Paris had their own guilds, their own workshops, and their own apprentices. 93 of them were wealthy enough to be taxed in the late thirteenth century. Evidence suggests, moreover, that over half of the women who were identified in the tax assessments with the professional title “*ouvrière de soie*”—approximately 65 women—were also throwsters. We also know that lower-level women artisans were severely underrepresented in the tax assessments—by a factor of around 83 percent. The evidence from the tax assessments thus suggests that there were more than 900 silk throwsters in Paris around the year 1300.<sup>26</sup>

After the raw fiber was twisted or reeled into yarns, those yarns that had been twisted were sent to the silk dyers, who resided just east of the rue Quincampoix (Figure 6). Most, but not all, of those dyers were men.<sup>27</sup> With those yarns that had received some twist, the dyers usually cooked the yarns before dyeing them, in order to remove the “*sericin*”—the gummy substance that the silk worms had secreted in order to harden the cocoons and

26. Farmer, *Silk Industries*, 49, 108, 312 n4. On the guilds and apprentices of the throwsters: Farmer, 126-27.

27. Farmer, *Silk Industries*, 55, 108; 85, fig. 19.



hold them together.<sup>28</sup> By contrast, silk cloth containing yarns that had not been twisted were often “cooked” (and then dyed, if necessary) after the cloth had been woven; this may well have been the case with the light-weight tabby-woven silk cendal that was used as a support textile on this purse. The cooking process removed approximately 25 percent of the weight of the fiber or cloth, so silk cendals that were cooked after weaving were extremely light in weight and texture.<sup>29</sup>

Once the silk fiber had been “cooked” it was ready to be dyed. A Parisian statute from the mercer’s guild, recorded in 1326, specified that silk items that were dyed red in the city had to be dyed with *grainne*, a term that usually referred to the red dye that was made with the dried bodies of the scale insect *kermes vermilio*. Kermes was most well-known for its use in making “scarlet” woolens.<sup>30</sup> However, just around this time silk dyers were developing a preference for red dyes that were derived from a different set of red scale insects, and by the fifteenth century Italian dyers’ manuals declared that the most prestigious red dye for use with silk was derived not from *kermes vermilio*, but from the scale insects that belonged to the genus *Pophyrophora*. In Italian sources these were usually referred to as *cremexe* or *chermisi*; the common modern term is old world cochineal. In the fourteenth through the sixteenth centuries, the most frequently used cochineal dyes were Polish cochineal (*P. polonica*) and Armenian cochineal (*P. hamelii*).<sup>31</sup> Chemical analysis of the red fibers on this purse indicates that the dye that was used for the pile of the velvet was indeed a cochineal dye. The dye that was used for the ground weave of the velvet, by contrast, was madder, a much cheaper dye that was derived from a cultivated plant, *Rubia tinctorum*.<sup>32</sup> The weaver of the velvet for this purse reduced the cost of production by employing expensive cochineal-dyed yarns only for the velvet pile.

Dyeing with Polish and Armenian cochineal was an expensive and complicated process. Italian manuals indicate that dyers should be extremely generous in their use of the dyes, employing six pounds of dried Polish cochineal, or twelve pounds of Armenian cochineal, for every pound of silk fiber that was to be dyed. The skeins of yarn, moreover, had to rotate through two separate dye baths, spending a total of 80 to 100 minutes in the boiling solutions, and after each dye bath they had to be plunged into cold water so that the insects’ fats would not congeal on the fiber. The skeins were then soaked in an alum solution.<sup>33</sup>

As is evident in Figure 4, the purse under discussion was also decorated with pink and brown embroidery thread; and as is evident in Figure 1, green and yellow threads were used for the lining of the lovers’ capes. Blue linen or hemp was also used as the appliqué support for the raptors in Figures 1 and 2, but much of that blue textile is now either

28. Dominique Cardon describes two different cooking processes: one that was to be used for silk that was to be dyed in light colors and one that was to be used for silk that was to be dyed in dark colors, but it is not clear that this distinction was made in the fourteenth century: *Natural Dyes*, 11.

29. Desrosiers, “Au plus près de la matière,” 5-6.

30. Gustave Fagniez, *Documents relatifs à l’histoire de l’industrie et du commerce en France* (Paris: Alphonse Picard et fils, 1898), 2:64; Cardon, *Natural Dyes*, 609-14.

31. Cardon, *Natural Dyes*, 635-36, 641-43.

32. I thank Mohammed Dallel for conducting the analysis of these dyes.

33. Cardon, *Natural Dyes*, 643.



FIGURE 9. Magnified photograph of part of the embroidery shown in Figure 2, focusing on one edge of the blue linen or hemp that originally supported the embroidery for the two birds. The upper right quadrant of this image is dominated by a brown textile, added at the time of restoration in 1985, which now conceals most of the blue textile; thus, the birds now appear to be brown rather than blue. Photo: Sophie Desrosiers.

absent from the panel depicted in Figure 1, or hidden by restoration work on the panel depicted in Figure 2 (Figure 9).

For most of these hues Parisian dyers could choose from a number of possible dyes.<sup>34</sup> In the case of blue, however, woad, which came from the leaves of a plant that was grown in many parts of Europe, was the dominant choice.<sup>35</sup> There were three stages in the preparation of woad. Both the second and third stages involved fermentation processes that created noxious gases. The odor of those gases was so powerful and unpleasant that in the sixteenth century Queen Elizabeth I of England ordered that no woad preparation was to take place within an eight mile radius of any of her residences; some medieval towns, moreover, passed statutes forbidding dyers to empty their woad vats during the day or to dump their woad vats into particular rivers, due to the threat to fish populations.<sup>36</sup>

34. For the range of yellow dye possibilities: Cardon, *Natural Dyes*, 167-195, 301-307. Because of the damage that it would have caused to this purse, it was not possible to run chemical tests on any of the fibers other than the reds of the velvet.

35. Cardon, *Natural Dyes*, 360.

36. Cardon, *Natural Dyes*, 345-6, 369; Rawcliffe, *Urban Bodies*, 204.

Unlike wool dyers, silk dyers tended to work with a full spectrum of colors, which means that they had to be familiar with the full range of recipes for dyeing with each kind of dye. Because distinct vats were required for the cooking process and for each of the colors, setting up a dyer's workshop required a considerable amount of capital investment. This helps to explain why the Parisian tax assessments list far more men in the dyeing craft than women: only heads of household showed up in the tax assessments, and if a man was present he was almost always considered the head of household. Unlike male heads of household, women who were listed as heads of household were usually single or widowed, which meant that they had less capital than male heads of household, who were often married. In Paris, however, one of the six silk dyers who showed up in the tax assessments was a woman.<sup>37</sup>

After being dyed, the red silk yarns that were destined to be woven into the velvet for our purse were sent to a velvet weaver. Only three velvet weavers show up in the Paris tax assessments—on the rue de la Harengerie and the rue de la Sellerie (Figure 6). Both streets were in a neighborhood that included a significant number of saddle makers—which makes sense, because luxury saddles were often decorated with embroidered velvet.<sup>38</sup> There may have been other velvet weavers as well, since many of Paris' tax payers were identified by name but not by craft.

In Paris as elsewhere, all of the weavers of complex silk cloth—including velvet—who showed up in the tax assessments were men.<sup>39</sup> As is the case with the dyers, this can be explained in part by the necessary capital investment: the loom that was required for a complex weave was more expensive to construct than was a simple loom for, say, silk head coverings, tabby-woven light-weight silk cloth, or linen cloth; and velvet was, indeed, a complex weave. Nevertheless, the guild statutes for the weavers of complex silks allowed widows to take over their husbands' workshops, so it is possible that, as was the case with dyeing, some women did become velvet weavers.<sup>40</sup> Moreover, many simple silks, such as the light-weight tabby-woven silk on this purse, were woven by women.<sup>41</sup> Thus, while the red velvet silk on the purse was probably woven by a man, the white cendal silk may have been woven by a woman.

While the production process for tabby-woven silk and linen requires a loom with only one warp beam, the production process for velvet requires a loom with two rotating beams for the warp threads: one to supply the ground warp threads, and one to supply the pile threads, which have to be released at a more rapid rate than the ground warp threads because the pile threads are woven over a set of fine metal rods, which form loops that are then cut to make the pile (Figure 10).<sup>42</sup>

37. Farmer, *Silk Industries*, 55, 112-13.

38. Farmer, *Silk Industries*, 71, 241-42.

39. Farmer, *Silk Industries*, 113.

40. Farmer, *Silk Industries*, 116, 131.

41. Farmer, *Silk Industries*, 112-13, 243-45; Jordan Goodman, "Cloth, Gender, and Industrial Organization: Towards an Anthropology of Silk Workers in Early Modern Europe," in *La seta in Italia dal medioevo al seicento: Dal baco al drappo*, ed. Luca Molà, Reinhold C. Mueller, and Claudio Zanier (Venice: Marsilio, 2000), 229-45.

42. Desrosiers, "Sur l'origine d'un tissu qui a participé à la fortune de Venise: Le velours de soie," in Molà et al., ed., *La seta in Italia*, 40-41. The statutes for the Parisian guild of makers of "draps de soie" and velvet mentioned looms with two warp beams: weavers were not allowed to mix "soie canete" (presumably yarn formed from silk waste) with good silk, unless the loom had two warp beams: Lespinasse and Bonnardot, ed., *Livre des métiers*, 77.



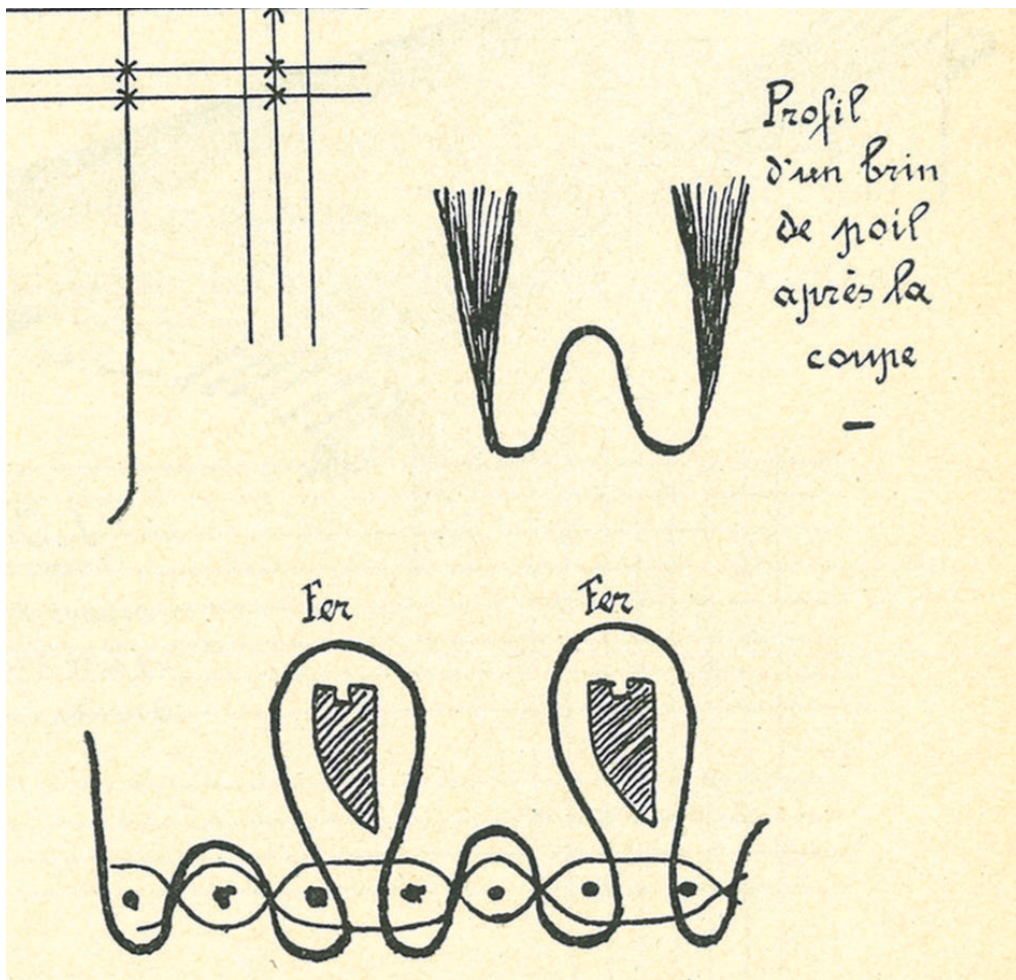


FIGURE 10. Cross sectional drawing showing, on the one hand, the path of the ground warp yarns in a piece of velvet, represented here by the two lighter undulating lines that go over and under the horizontal row of dots at the bottom of the image. The pile yarn, by contrast, represented here by a darker undulating line, travels under the weft yarns and then makes large loops over the grooved metal rods (marked here as “fer”). In the top right of the drawing is a cross sectional representation of the pile after it has been cut. G. Gilonne, ed, *Dictionnaire pratique des tissus*, 235.

In addition to red silk velvet and tabby-woven white silk cendal, the embroiderer of this purse employed several qualities and colors of linen (and possibly hemp) cloth. English royal accounts indicate that Paris at this time produced the most highly prized table linens in all of Europe, and that it came in second to Reims in producing the best linen cloth.<sup>43</sup> So, while it is possible that the linen cloth on this purse was produced in Reims, or somewhere else, it is also likely that it was made in Paris. And the linen on the front face of this purse was indeed fine: the warp and weft of the linen that was used for the underlying structure of the falconer’s and lover’s faces averaged 20 threads per centimeter; that which

43. Farmer, “*Biffes, Tiretaines, and Aumonieres: the Role of Paris in the International Textile Markets of the Thirteenth and Fourteenth Centuries*,” *Medieval Clothing and Textiles* 2(2006): 79-80.

was used underneath the gold thread on the sleeves averaged 32 threads per centimeter. The linen that was used to back the velvet, by contrast, had an average thread count of only 13½ threads per centimeter.<sup>44</sup>

It is unclear who the merchants were who brought linen fiber into Paris, but we do know that the statutes for the linen spinners attempted to ensure the high quality of linen that was spun in Paris by forbidding the purchase of fiber from certain places of origin, such as Spain and Noyon, and by insisting that all linen fiber that was spun in Paris had to be hackled—or combed—in Paris as well.<sup>45</sup> Regulating the location of the hackling process—which was always done by women—helped to assure that the final yarn would be of the highest quality. After it was hackled, the linen fiber passed into the hands of linen spinners, who had to keep the fiber moist in order to compensate for its lack of elasticity.<sup>46</sup>

One of the unusual characteristics of Paris' linen spinners—in contrast to both wool and silk spinners—was that their numbers included a significant proportion of men: according to the Parisian tax assessments, slightly over a third of the linen spinners were male.<sup>47</sup> Linen fiber strongly resembled hemp fiber, and illuminated hunting manuscripts suggest that men spun hemp in preparation for making hunting nets. It thus appears that men's involvement in linen spinning had a lot to do with their involvement in the making of hunting nets and in the spinning of hemp (Figure 11).

Once it was spun, the linen fiber passed into the hands of Paris' linen weavers, whose guild statutes insisted that every piece of linen that was woven in the French capital had to conform to standardized measurements.<sup>48</sup> The enforcement of standardized measurements may sound like a minor issue, but well into the fifteenth century merchants in England struggled with the linen-producing towns of Flanders in an attempt to get them to adapt standardized measurements.<sup>49</sup>

As was the case with linen spinners, the tax assessments point to the strong representation of both sexes among its linen weavers: approximately 60 percent of the linen weavers were men and 40 percent were women.<sup>50</sup> This too differentiated linen from wool and

44. By comparison, the thirteenth-century linen shirt that is believed to have belonged to King Louis IX of France had a thread count of 25 and 28 yarns per centimeter (warp and weft); the linen undershirt that belonged to his sister had a thread count of 21-27 threads per centimeter: Sophie Desrosiers, "Dessous royaux du XIIIe siècle," *Histoire et images médiévales* 6 (August-September, 2006): 73, 75.

45. Depping, *Règlements*, 145-46; Gustave Fagniez, *Études sur l'industrie et la classe industrielle à Paris au XIIIe et XIVe siècle* (Paris: F. Vieweg, 1877), 216.

46. Carol Kroff, *The Whole Craft of Spinning from the Raw Material to the Finished Yarn* (New York: Dover Publications, 1981), 36-37; Anne Sutton, "Some Aspects of the Linen Trade c. 1130s to 1500 and the Part Played by the Mercers of London," *Textile History* 30:2 (Autumn, 1999): 157.

47. In the computerized database of the seven Parisian tax assessments from 1292-1313, which is managed by Caroline Bourlet of the Institut de Recherche et d'Histoire des Textes in Paris, I have found 10 men and 17 women who were identified by either profession or surname as "filandrier/e or fileresse de lin." Some of the taxpayers appeared in more than one tax assessment, but I have counted each individual only once. Perhaps for that reason my numbers differ slightly from those of Janice Archer: "Working Women in Thirteenth Century Paris" (PhD Dissertation, University of Arizona, 1995), 172.

48. Depping, *Règlements*, 388; see also Fagniez, *Études*, 229.

49. Marc Boone, "Les toiles de lin des Pays-Bas bourguignons sur le marché anglais (fin xiv<sup>e</sup>-xvi<sup>e</sup> siècles)," *Publications du Centre Européen d'Etudes Bourguignonnes* 35 (1995): 72-73.

50. Among those who were identified in the seven tax assessments by profession or surname as "telier" or "tisserand/e de toile," 39 were men and 26 were women.





FIGURE 11. Men making hunting nets and spinning hemp yarn for that purpose. Gaston Phebus, *Livre de la chasse*, BNF ms. fr. 616 (early fifteenth century), fol. 53v. Photo courtesy of the Bibliothèque Nationale de France.

silk: in the wool industry, women constituted only four percent of the weavers; in the silk industry, only around a third of the weavers were women, and those women, as I already indicated, wove on simple looms, making silk veils and simple tabby-woven silk, rather than velvets or brocades.<sup>51</sup>

Once it was woven, most linen cloth was then bleached: it was scoured and boiled in a lye bath and then spread out in grassy fields, where it was left for up to sixteen weeks in order to be bleached by the sun.<sup>52</sup> By the late Middle Ages—and well into the modern period as well—this bleaching process could entail the use of acres and acres of open fields

51. Farmer, *Silk Industries*, 112; Archer, *Working Women*, 315.

52. John Munro, "Linen," *Dictionary of the Middle Ages*, ed. Joseph Strayer (New York: Charles Scribner's Sons, 1982-), 7:585. In the Low Countries, beguinages often used their meadows for bleaching linens: Walter Simons, *Cities of Ladies: Beguine Communities in the Medieval Low Countries, 1200-1565* (Philadelphia: University of Pennsylvania Press, 2001), 85, 196 n163.





FIGURE 12. Sixteenth-century painting of St. Gall, Switzerland, showing grass bleaching of linen in the fields surrounding the town. Inv. Nr. G 2878 Historisches und Völkerkundemuseum St. Gallen. Photo courtesy of Historisches und Völkerkundemuseum St. Gallen.



FIGURE 13. Nineteenth-century postcard from Ireland depicting grass bleaching of linen. Photo courtesy of the Linen Hall Library.

(Figures 12 and 13). The modern photographic and artistic archive suggests that the task of spreading linen over open fields was carried out by both men and women.<sup>53</sup>

In Paris, as was apparently the case elsewhere as well, the final marketing of linen cloth was usually handled by women (Figure 14). In the Parisian tax assessments, 42 percent of those who were identified as merchants of linen cloth were men, and 58 percent were

53. Records from 1377 mention bleaching fields in the suburbs of Ghent: David Nicholas, *Metamorphosis of a Medieval City: Ghent in the Age of the Artevelde, 1302-1390* (Leiden: Brill, 1987), 321 n129.





FIGURE 14. Woman selling linen cloth and clothing. Fifteenth-century German manuscript of the *Tacuinum sanitatis*, BNF ms. lat. 9333, fol. 103v. Photo courtesy of the Bibliothèque Nationale de France.

women. Royal and aristocratic account books indicate, moreover, that women predominated at the very top of the profession.<sup>54</sup>

54. Tax payer statistics are based on data from the computerized data base of the seven Parisian tax assessments of 1292-1313 concerning those who were identified as *linier/e* or *lingier/e*. The royal account books that were edited by Douët-d'Arcq mention five men and three women who sold linen to the royal household, but within that group one man (Guillaume Gallande) and two women (Guillemete de la Pomme and Jehanne de Brie) predominated: *Comptes de l'argenterie*,

In addition to acquiring red velvet cloth, tabby-woven silk cloth, silk yarns of various colors, and linen cloth, our embroiderer also had to purchase gilt thread. Metallic thread was marketed by gold beaters, who pounded gold and silver (often from coins) into foil sheets. One method of making gilded silver foil was to pound a sheet of gold foil onto a sheet of silver foil until they melded together. The sheets were then cut into strips, which were then sent to “gold spinners,” who used steel drop spindles to cause the flat metallic strips to wind around a core of silk thread (Figure 15). Most gold beaters in Paris were men, but there were a few prominent women in that group as well. All gold spinners in Paris were women.<sup>55</sup>

Once the embroiderer had all of the necessary materials—red velvet cloth, tabby-woven silk cloth, linen cloth, silk yarns, and metallic thread—he or she sent the fine white linen cloth and the blue linen or hemp cloth that would serve as the ground for the embroidered lovers and raptors to an artist who traced the outlines for the design; as I already indicated, the gild list for the Parisian embroiderers suggests that that artist may well have been a woman. The embroiderer then outlined the design with split stitches of brown silk thread, added detail and texture to the faces with brown and white split stitches, and filled in the clothing and hair of the lovers by laying down gilded silver threads and anchoring those threads with surface couching stitches (Figure 16). This method of attaching the metallic thread differed from that of English embroiderers of the “*opus anglicanum*”: in *opus anglicanum* the metallic threads were usually anchored with underside couching stitches (Figure 17). The basic movement of the needle is nearly identical with surface and underside couching. In both cases, the embroiderer brings the anchoring yarn up from the underside of the piece, passes that yarn over the metallic thread, then passes the anchoring yarn back down on the opposite side of the metallic thread. With underside couching, however, the embroiderer has to be sure that on the downward stroke the needle passes through exactly the same hole that was created with the upward stroke. The embroiderer then finishes the underside couching stitch by yanking the anchoring yarn, thereby forcing the metallic thread to “pop” through the support fabric (Figure 17). With underside couching, the anchoring yarn does not show up on the front of the embroidery; with surface couching, the anchoring yarn does show up, and the embroiderer can use different colored couching threads to create different effects.

As is evident in Figures 1 and 2, the embroiderer of our purse carefully laid out the gilded silver thread in such a way that parallel lines created the illusion of a dominant grain running down the fabric that constituted the garments of the two lovers. And as is evident in Figure 4, the embroiderer also curved some of the metallic threads around, in order to create the impression of wavy hair.

36, 93-95, 112, 143, 186; *Nouveau recueil*, 35, 150-155, 241, 260. In the late thirteenth and early fourteenth century, two women, Jehanne la Fouacière and Erembourc of Moustereul, dominated the Parisian luxury linen trade for c. 50 years: Sharon Farmer, “Merchant Women and the Administrative Glass Ceiling in Thirteenth-Century Paris,” in *Women and Wealth in Late Medieval Europe*, ed. Theresa Earenfight (New York: Palgrave MacMillan, 2010), 95-96.

55. Farmer, *Silk Industries*, 57-58, 111-114. On the use of gold coins and the pounding together of the two metals: Marian Campbell, “Gold, Silver and Precious Stones,” in John Blair and Nigel Ramsay, eds., *English Medieval Industries* (London: The Hambledon Press, 1991), 108, 131, 133. On gold thread in *Opus Anglicanum*: Monnas, “The Making,” 10-12.





FIGURE 15. Magnified photograph of the surface-couched, vertically oriented, gilded silver thread used to fill in the upper torso of the figure to the left in Figure 1. Clearly visible is the fact that the metal is in flat strips, it has been wrapped around a core of yellow silk yarn, and both the silk yarn core and the metal strips have been twisted with an S-twist. In several places the metal has worn away and all that remains is the silk core of the original metallic thread. Also visible are several horizontal surface couching stitches, which appear to have been made with the same yarn that was used for the core of the metallic threads. Each couching stitch serves to anchor two of the metallic threads. Photo: Sophie Desrosiers.

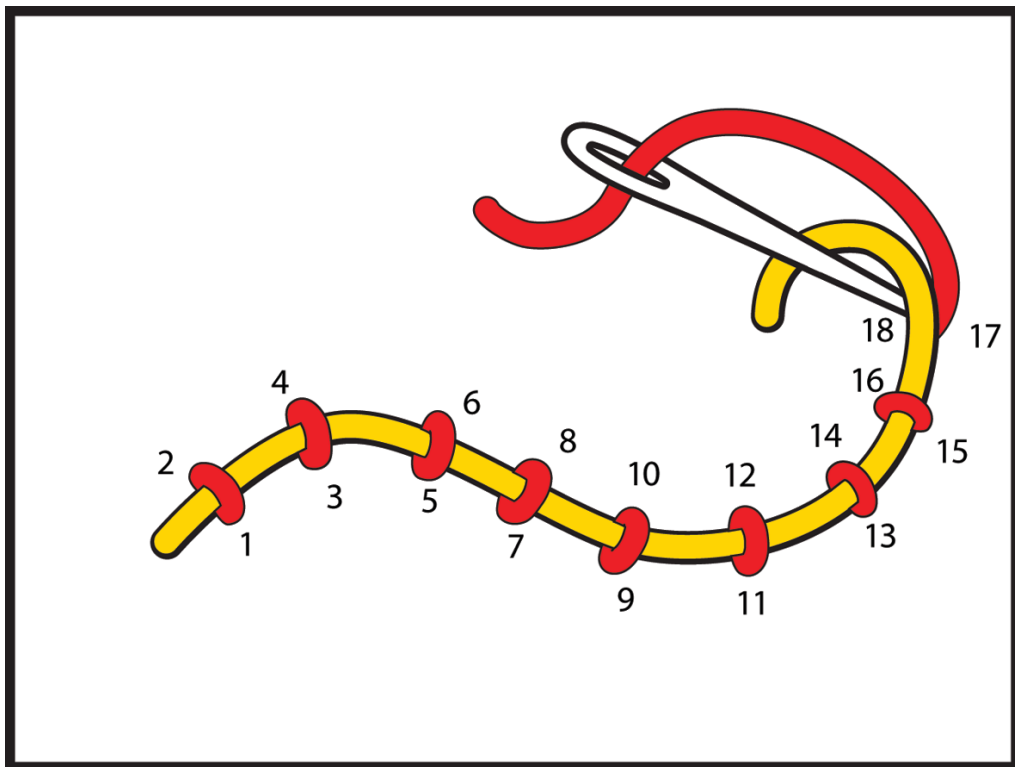


FIGURE 16. Surface couching. Adapted by Ebers Garcia from Kreinik Thread Blog (<http://kreinikthread.blogspot.com/2012/05/need-another-pair-of-hands.html>; accessed April 17, 2019).

The statutes for the Parisian embroiderers, which were compiled around 1300, included the names of 79 women and 15 men. It is clear, then, that women predominated in the physical labor of making fine embroideries.<sup>56</sup> A list of members of the guild of makers of a particular type of alms purses—“aumônières sarrazinoises”—included the names of 124 women and no men.<sup>57</sup> Unfortunately, however, we do not know if these guild members were purse weavers, embroiderers, or both.

Royal and aristocratic account books tell a different story from that of the guild lists: they indicate that the entrepreneurial merchant-embroiderers who organized the production of fine embroideries (especially large commissions, such as bedroom sets) were nearly always men. Sometimes, however, after listing a single very substantial payment to one of these male entrepreneurs (whose responsibilities included purchasing all of the raw materials), the accounts list the daily wages of a cluster of women who actually did the embroidering.<sup>58</sup> The pattern among

56. Depping, *Réglements*, 379-80.

57. Depping, *Réglements*, 383-84.

58. In the royal accounts published by L. Douët-d'Arcq, the nine embroiderers who are mentioned include eight men and one woman: L. Douët-d'Arcq, *Comptes de l'argenterie*, 27, 29-31, 33; Douët d'Arcq, *Nouvelle recueil de comptes de l'argenterie des rois de France* (Paris: Librairie Renouard, H. Loones successeur, 1874), 15-16, 49-50, 59-60, 132-33, 176, 180, 187, 192, 194, 196, 199. In 1303, the Concièrge of the Parisian residence of the deceased Count of Artois paid a man, “Henri le Brodeur,” for expenses related to the purchases for a large embroidery project for the count’s chapel in Paris. Immediately after listing the expenses for raw materials for this project, the account mentions the expenses for the daily wages of seven women workers (“ouvrières”) who appear to have been embroiderers who worked on the chapel project (one of the women is identified as a “broderesse”). These seven women contributed a total of 298 days of labor: Arras, PdC A 187.



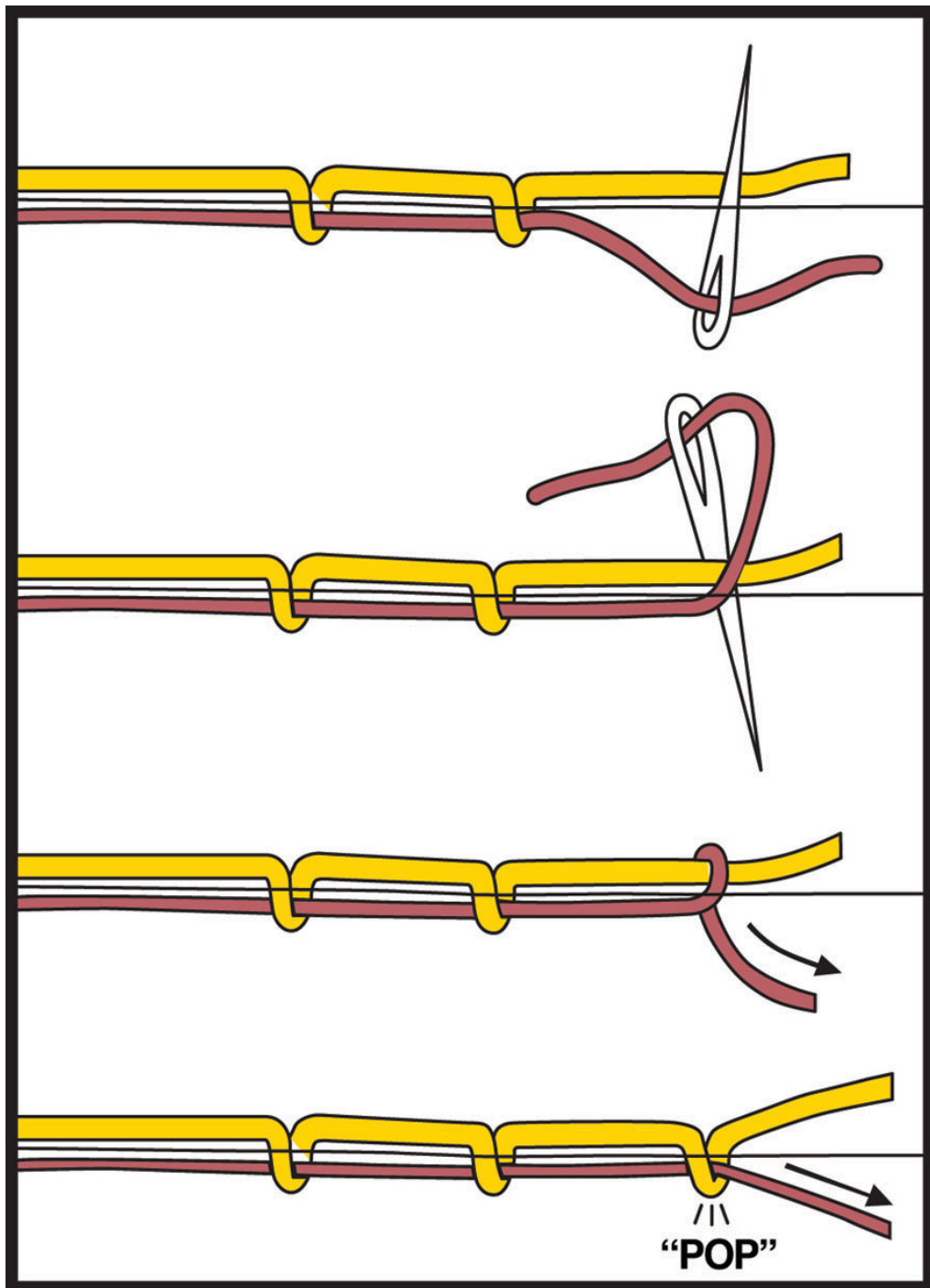


FIGURE 17. Underside couching. Adapted by Ebers Garcia from Sidney Eileen 2015 Underside couching (<http://sidneyeileen.com/artisan-works/embroidery-articles-and-tutorials/basics-of-opus-anglicanum-embroidery/#.XLdioqZ7koo>, accessed April 17, 2019).

the artisan/entrepreneurs who made and sold luxury purses is different from that of large scale embroiderers: aristocratic account books indicate that a number of women purse makers sold their wares directly to the ultimate elite consumers. Again, however, we do not know if these “purse makers” were weavers, embroiderers, or both.<sup>59</sup>

Over all, women, very likely women from Paris, played a major role in the production of the final products that went into the confection of this purse: they spun the silk and metallic threads, hackled the linen, and engaged in the actual labor of embroidering. It is also highly probable that a woman wove the light-weight tabby-woven silk, that another spun the linen fiber, and that another wove the linen fabric. Men probably did the dyeing and weaving of the silk velvet and the beating of the sheets of gilded silver, but we know that there were at least some women dyers and gold beaters. At the top of the production and merchandising hierarchies, male mercers dominated all levels of the silk making process, but there were significant numbers of women mercers as well. Men also dominated as entrepreneurs of large-scale embroidery projects, but women artisans worked as independent artisan merchants in the confection of luxury purses. The marketing of fine linen cloth was almost always in the hands of women.

## II. THE GLOBAL SUPPLY CHAIN

We turn, now, to the global supply networks for the gold, alum, silk fiber, cochineal dye, and flax that contributed to the making of this purse—with attention, in four cases, to the strong presence of rural women in the harvesting and conversion of raw materials into commodities.

In the 1340s two major loci of gold mining supplied the gold that arrived at the workshops of western European goldsmiths and gold beaters. The first was the nexus of West African gold deposits associated with the Mali empire. Their king at this time, Mansa Musa, is believed to have been the richest man in the world because he benefitted, through tribute payments, from the output of the gold deposits of the Bambuk and Bure regions that bordered his empire (Figure 18). Since, however, European gold beaters and goldsmiths frequently melted down or beat into foil objects and coins that had been produced at an earlier date, a significant amount of the African gold that ended up in fourteenth-century Paris probably left West Africa between the eighth and thirteenth centuries, during the eras of the Takrur and Ghana empires.<sup>60</sup>

West African mining and prospecting traditions varied from one place to another, but, as is sometimes the case today, much of it was done by men and women of farming-prospecting villages. During the wet season, both men and women farmed; during the dry season, they took their agricultural implements to the dry riverbeds, dug pits in the alluvial sediment, and then panned the material in order to separate gold particles from the rest of the sediment. They also prospected on dry terrain. In the Bambuk/Falumé region, men often excavated while women washed the sediments containing the gold.<sup>61</sup>

59. Farmer, *Silk Industries*, 126.

60. Campbell, “Gold, Silver and Precious Stones,” 108, 111.

61. Philip D. Curtin, “The Lure of Bambuk Gold,” *The Journal of African History* 14/4(1973): 630; Cameron Gokee, *Assembling the Village in Medieval Bambuk: An Archaeology of Interaction at Dijouboye, Senegal* (Sheffield, U.K.: Equinox Publishing, Ltd., 2016), 77-78.

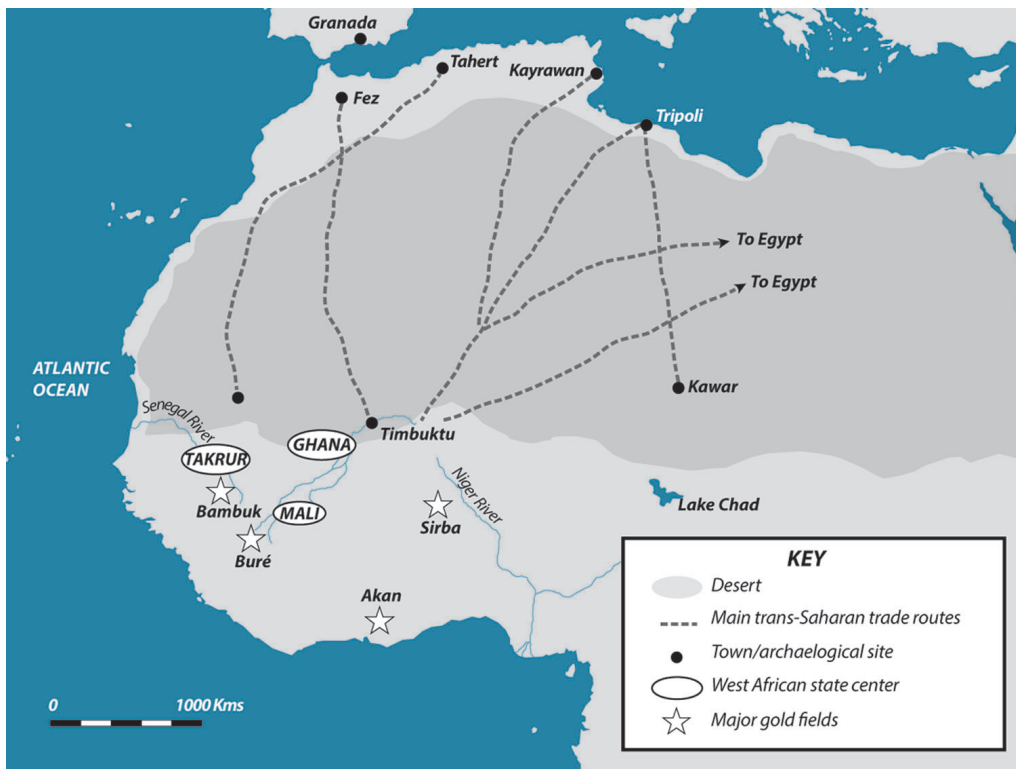


FIGURE 18. The Mali, Ghana, and Takrur Empires and neighboring gold deposits. Adapted by Ebers Garcia from Sam Nixon, “Trans-Saharan Gold Trade in Pre-Modern Times: Available Evidence and Research Agendas” in *Trade in the Ancient Sahara and Beyond*, ed. D. J. Mattingly, V. Leitch, C. N Duckworth, A. Cuénod, M. Sterry, F. Cole, 158.

Such prospecting required intricate knowledge of plants and trees that tend to grow on mineral deposits and of the kinds of rock formations that tend to contain gold deposits.<sup>62</sup> Successful prospecting also required acute understanding of the powerful spirits that controlled the gold and the sacrifices that those spirits required in order to reveal that gold to those who sought it.<sup>63</sup> Such powers could not be coerced by those who held state power. When an Egyptian official asked him why he did not simply conquer the regions from which he received his gold in the form of tribute, Mansa Musa replied, in the fourteenth century, “If we conquer them and take it, it does not put forth anything . . . but when it returns to them, it puts forth as usual.”<sup>64</sup>

According to Ian Blanchard, it was the introduction of the mercurial amalgamation process to sub-Saharan Africa that caused a great upsurge, in the twelfth century, of the

62. Marie Perimbam, “The Political Organization of Traditional Gold Mining: The Western Loby, c. 1850-1910,” *The Journal of African History* 29(1988): 444.

63. Robin D’Avignon, *Subterranean Histories: Making Artisanal Miners on the West African Sabel* (PhD dissertation: University of Michigan, 2016), 57-105.

64. Ibn al-Dawadari, “The Treasures of Pearls and the Assemblage of Choice Objects,” in *Corpus of Early Arabic Texts for West African History*, ed. N. Levtzion and J.F.P. Hopkins (Cambridge: Cambridge University Press, 1981), 250.



FIGURE 19. Map showing location of Kremnica. Map created by Ebers Garcia.

arrival of pure African gold to the Mediterranean region.<sup>65</sup> Nevertheless, the extraction methods themselves were pre-industrial; for that reason, medieval gold mining in West Africa caused little damage to the environment and left very few permanent scars on the landscape.<sup>66</sup>

Already in the eighth century, the gold of West Africa began to reach North Africa via trans-Saharan trade routes; in North Africa, it was minted as gold dirhems, which quickly worked their way into Iberia and Southern Italy, where Christian rulers began to mint gold coins in the eleventh century. By the mid-thirteenth century, a significant amount of this gold had worked its way into the Genoese and Florentine economies—enough, in fact, to enable those two polities to begin minting their own gold coins, which then began to show up in the fairs of Champagne, and, most likely, into the workshops of Parisian goldsmiths and gold beaters.

By the 1330s or 40s, when our purse was made, the gold of West Africa, which had been making its way into Christian Europe since the tenth century, if not before, had come to be rivaled by a significant increase in gold production in Kremnica, Slovakia (Figure 19). Small quantities of gold had been mined in Kremnica since the early thirteenth century,

65. Ian Blanchard, "African Gold and European Species Markets, ca. 1300-1800," *Relazioni economiche tra Europa e mondo islamico, secc. XIII-XVIII: atti della trentottesima settimana di studi*, Istituto internazionale di storia economica F. Datini (Prato: Le Monnier, 2007), 467-68.

66. Gokee, *Assembling the Village*, 110.



but the output was now sufficient for the King of Hungary, Charles Robert of Anjou, to begin minting gold coins in 1328.<sup>67</sup> Over the course of the rest of the fourteenth century, sub-Saharan West Africa and Hungary/Transylvania each supplied Europe and the Mediterranean regions with about four or five tons of gold per year.<sup>68</sup>

While mining for significant amounts of gold was relatively new in Kremnica, there was already a long tradition of mining for silver there—and the two ores were mined in the same manner. Some of the gold was mined with open pits, which would not have been all that different from the pits of West Africa, except that the miners were not also farmers, and since many of them were immigrants from Germany they probably had less respect for the local landscape than did the farmer-prospectors of West Africa.

There is also archeological evidence indicating that deep mining shafts were dug in the silver mines of Kremnica as early as the eleventh century, and the German miners who immigrated to Kremnica brought with them the technology of water pumping as well; these techniques—which released arsenic, among other contaminants, into the environment—would have then been applied to both silver and gold mining.<sup>69</sup> Needless to say, the environmental impact of shaft mining is more profound than that of the small artisanal pits of West Africa. In this environment of immigrant miners and shaft mining, the miners were predominantly male.<sup>70</sup>

Alum, the metal that would have been used as a mordant with the red cochineal dye, as well as with other dyes that were employed on this purse, was another mined metal that contributed to the production of this purse. In fact, due to its central role in the most important industry in medieval Europe—the wool textile industry—alum was one of the most important metals in circulation in the pre-modern world.

As was the case with gold, sub-Saharan Africa was a major source of medieval alum and, indeed, before 1264, the alum of the sub-Saharan oasis of Kavar was considered the best that could be had. After 1264, however, when the Byzantine emperor gave control of the Phocaea alum mine to the Genoese, Phocaea, on the western coast of Asia Minor, became the dominant source of alum for western European textile industries, and it remained so until 1453, when the Ottoman Turks took control of Phocaea.<sup>71</sup>

67. Peter Spufford, “European Silver and African Gold,” in *Money and Its Use in Medieval Europe* (Cambridge, UK: Cambridge University Press, 1988), 267–68.

68. Blanchard, “African Gold,” 480, 484.

69. Helmut Schröcke, “Mining and German Settlement in Slovakia: An Historical Survey,” *GeoJournal* 32/2 (February, 1994): 133; Susan Murcott, *Arsenic Contamination in the World: An International Sourcebook* (London: IWA Publishing, 2012), 209.

70. On the male gender of immigrant German miners: Piotr Górecki, “The Duke as Entrepreneur: The Piast Ruler and the Economy of Medieval Poland,” *“The Making of Europe”: Essays in Honour of Robert Bartlett*, ed. John Hudson and Sally Crumplin (Leiden: Brill, 2016), 113–14.

71. Sarah Guerin, “*Avorio d’ogni ragione*: the Supply of Elephant Ivory to Northern Europe in the Gothic Era,” *Journal of Medieval History* 36(2010): 168, n 82 and 83, citing al-Idrisi (twelfth century) and a 1270 statute from St.-Omer forbidding the use of any alum except those of Castile, Banjart, and Béjaia. The Florentine author of a fourteenth-century merchants’ manual, Francesco Pegolotti, clarifies that alum from Castile was really from the Barbary coast—and we now know that alum from the Barbary coast was really from Kavar oasis: Francesco Balducci Pegolotti, *La pratica della mercatura*, ed. Allan Evans (Cambridge, MA.: Medieval Academy of America Publications, 1936), 370. On the dominance of the alum of Phocaea after 1264: Dierk Lange, “L’alum de Kavar: une exportation

The alum of Phocaea was locked into alunite stones and the process of rendering those stones useful for the textile industry was complex. After they were quarried, the stones were placed in a furnace and heated to over 900 degrees Fahrenheit for around 18 hours. They were then placed in large, flat, “weathering” containers and regularly sprinkled with water for around four months, until they broke up into a paste. Once the paste was ready, it was boiled for about 14 hours, and the water was then poured into a lead-lined tank, where it remained for around 14 days. At the end of that period the alum had hardened onto the walls and bottom of the tank. The alum was then washed again with water, which was allowed to drip out and dry into alum crystals.<sup>72</sup>

The process of extracting alum potash from alunite stone had a huge environmental impact because of the fuel that was necessary for the process: the Phocaea mines, which produced slightly over 800 tons of alum each year, consumed approximately 4000 tons of wood per year.<sup>73</sup> It seems likely, moreover, that most of the workers at Phocaea were men.

Unlike mining, sericulture involves, in nearly every culture, a predominance of female labor. In areas as diverse as ancient China, medieval Italy, early modern France, and modern Japan and India, peasant women hatch, feed, and nurse silkworms through four different moltings, until the larva finally form their cocoons, about 33 days after they hatch.

As Claudio Zanier has argued, and as Figure 20 suggests, the labor that was required for raising silkworms was perceived as a “maternal” endeavor. The late sixteenth-century engraving reproduced in Figure 20 shows two young women placing small linen sachets containing approximately one to two ounces of silkworm eggs next to their breasts. In sixteenth-century Italy and France this was considered the best method of incubation; it was also a widely employed method in early modern Asia Minor and in nineteenth-century Greece and Gilan province in Iran.<sup>74</sup> As one early modern French author of a “how to” treatise put it: “Some people incubate the silkworm eggs in the sunlight or with some other source of heat, but those eggs that are kept next to the breasts of young women are the most likely to survive and have the greatest vigor.”<sup>75</sup> The women who hatched the eggs in this way were well aware of the problem of suffocation, so they wore porous clothing and made sure that the sachets containing the eggs were porous as well.<sup>76</sup>

africaine vers l'Europe,” in *Ancient Kingdoms of West Africa*, 36. On the quality of alum from Phocaea: Pegolotti, *Pratica*, 369.

72. Pegolotti, *Pratica*, 367-68; trans. Charles Singer, *The Earliest Chemical Industry: An Essay in the Historical Relations of Economics and Technology Illustrated from the Alum Trade* (London: Folio Society, 1948), 93-94.

73. Cardon, *Natural Dyes*, 24-25.

74. Claudio Zanier, “La fabrication de la soie: un domaine réservé aux femmes,” *Travail, genre et société* 18 (Nov., 2007): 121. See also: Françoise Clavairolle, *Le magnan et l'arbre d'or: regards anthropologiques sur la dynamique des saviors et de la production, Cévennes, 1800-1960* (Paris: Fondation Maison des Sciences de l'Homme, 2003), 128; Judith C. Brown, “A Woman's Place is in the Home: Women's Work in Renaissance Tuscany,” in *Rewriting the Renaissance: The Discourses of Sexual Difference in Early Modern Europe*, ed. Margaret Ferguson, Maureen Quilligan and Nancy Vickers (Chicago: University of Chicago Press, 1986), 22; Samuel Purchas, *Hakluytus Posthumus, or Purchas his Pilgrimes*, vol. 8 (Cambridge: Cambridge University Press, 2014), 257; George M. Curzon, *Persia and the Persian Question*, vol. 1 (London: Longmans, Green, and Co., 1892), 369; Albert Gaudry, *Recherches scientifiques en orient entreprises par les ordres du gouvernement pendant les années 1853-4* (Paris: Imprimerie impériale, 1855), 1:314-15.

75. Clavairolle, *Le magnan et l'arbre d'or*, 128, citing Béroald Verville, *L'histoire des vers qui filent la soie* (Tours: Michel Siffleau, 1600).

76. Clavairolle, *Le magnan et l'arbre d'or*, 126-27.



FIGURE 20. Jan van der Straet, called Stradanus (Bruges, 1523; Florence, 1605) (designer); Karel van Mallery (engraver); Jean-Baptiste Colbert, Philippe Galle (Haarlem, 1537; Antwerp, 1612), (printers), *Vermis Sericus*, plate 3. On the left, an older woman attends to some silkworms, in the center, three women sprinkle silkworm eggs with wine, and on the right two young women place sachets filled with silkworm eggs next to their breasts. The caption on the right reads, “Papillulis solent fouere virgines” - “Virgins are accustomed to warming the little worms.” Lyon, Musée des Tissus et Musée des Arts Décoratifs, MT 4451. © Musée des Tissus – Pierre Verrier.

Human intervention in incubating the eggs is necessary because young silkworms prefer young leaves from the white mulberry tree, and, of course, the timing of the appearance of the leaf buds depends on the prevailing winter and spring weather patterns. Silkworms have been so thoroughly domesticated that they are incapable of surviving in the wild, so there is no naturally induced coordination of the hatching of the larva with the appearance of the mulberry leaves. The women who tend to the eggs and larva need to assure that coordination by warming the eggs at precisely the right time in the spring.

In ancient China, medieval Italy, early modern and modern France, and modern India and Japan, among other places, women had, or have, charge of tending to the voracious appetites and delicate health of the larva throughout the 33 days between hatching and formation of the cocoons.<sup>77</sup> This was an all-encompassing job: one ounce of silkworm eggs

77. Francesca Bray, *Technology and Gender: Fabrics of Power in Late Imperial China* (Berkeley: University of California Press, 1997); Clavairolle, *Le magnan et l'arbre d'or*, 246-58; Brown, “A Woman’s Place is in the Home,” 220;

produces 40,000 larva, which will, over the course of a month, eat 1500 pounds of mulberry leaves.<sup>78</sup> During that time, the caretakers of the worms need to attend to not only the voracious appetites of the silkworms, but also their delicate hygienic needs. Thus, the silkworms are kept on trays that are not too crowded, and periodically their soiled trays are traded out for clean ones and they are divided up onto more trays, in order to give them enough breathing room as they grow. One method (but not the only one) involves placing a net over the top of a tray that is filled with worms, placing new mulberry leaves on top of the net, and allowing the worms to climb up to the new leaves. Once they have all climbed up, the net can be placed on a new, clean tray.<sup>79</sup> After about 33 days, the worms are placed on, or near, bundles of straw or twigs, where they climb up to spin their cocoons. The original ounce of eggs, whose hatched worms ate approximately 1500 pounds of leaves, will produce between 12 and 18 pounds of usable silk fiber.<sup>80</sup>

In early modern and modern France, entire families were involved in the final stages of the life cycle of the silkworm: while the silk women spent most of their time tending to the hungry, delicate, hygiene-sensitive worms, their husbands and children engaged in the auxiliary work of cutting and delivering mulberry leaves to the room where the worms were fed, kept clean and warm, and sheltered from unpleasant noises, smells, and smoke. Older children also helped care for the worms.<sup>81</sup>

In Gilan province in Iran, which provided early fourteenth-century Europe (including Paris) with its most prestigious raw silk,<sup>82</sup> men today tend to the feeding of the silkworms once they have been transferred from a warm room in the silk family's residence to a special silkworm nursery, known as a *tilimbar*. This takes place after the second molting, about 10 days into the 33-day life cycle of the larva. Nevertheless, as has been the case nearly everywhere else that silkworms have been cultivated, women in Gilan province have long had charge of first hatching the eggs and then feeding the youngest larva during the first ten days of their lives. Moreover, the women of Gilan again take over production once the cocoons have been formed.<sup>83</sup>

One possible explanation for the unusual gendered arrangements for silkworm cultivation in Gilan—the fact that men, rather than women, feed the larva during the last two thirds of their life cycle—is that silk production in that region occurs in precisely the same geographical areas where rice production occurs, and women contribute the predominance of labor to rice production. Indeed, two of the specific forms of rice-producing labor that are carried out

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M. L. Narasaiah, *Problems and Prospects of Sericulture* (New Delhi: Discovery Publishing House, 2003), 8; Sidney Lewis Gulick, *Working Women in Japan* (New York: Missionary Education Movement of the United States and Canada, 1915), 32-35.

78. Hills, "From Cocoon to Cloth: The Technology of Silk Production," *La seta in Europa*, 61.

79. Hills, "From Cocoon to Cloth," 61.

80. Henri Jones, *Transactions from the Year 1700 to the Year 1720*, vol. V (London: Printed for W. Innys, R. Ware, et al., 1749), 20.

81. Clavaïrolle, *Le magnan et l'arbre d'or*, 155, 253, plate no. 3.

82. Farmer, *Silk Industries*, 38-39, 42, 46-47.

83. Christian Bromberger, "Gilan Province xvii – Gender Relations," *Encyclopaedia Iranica* (June 30, 2011), <http://www.iranicaonline.org/articles/gilan-xvii-gender-relations>; Bromberger, "Changements techniques et transformation des rapports sociaux: la sericulture au Gilan dans la seconde moitié du XIXe siècle," in *Entre l'Iran et l'Occident. Adaptation et assimilation des idées et techniques occidentales en Iran*, ed. Y. Richard (Paris: CNRS, 1989), 76; Curzon, *Persia*, 369-70; Alexandre Chodzko, "Perse: industrie séricole," *Revue de l'Orient: Bulletin de la Société Orientale* 1 (1843): 330.



by women—transplanting and weeding—occur during May and June, the very months when silkworms are growing; these are quiet months for the men who engage in rice production, so it is the men who are free to assume responsibility for the voracious silkworms.<sup>84</sup> Another explanation for the gendered arrangements in Gilan province has to do with the architecture of the *tilimbar*, which is raised off of the ground, on stilts, in order to create a relatively cool, well ventilated environment, one that compensates for the hot, humid climate of Gilan province. Accessing the worms requires climbing around the elevated rafters of the *tilimbar*, an activity that is apparently considered inappropriate for women.<sup>85</sup>

In premodern periods, soon after the worms formed their cocoons the peasants who had raised them since birth also took charge of suffocating them, in order to prevent the mature moths from working their way out of the cocoons, thereby turning the continuous filaments that formed the cocoons into broken fragments. In Gilan province, as elsewhere, one of the most common means of killing the silkworm was to do so while simultaneously reeling off the fiber. Women placed the cocoons in hot water, located the filament ends of several cocoons, then reeled together those filaments, thereby producing a strand of raw silk that was sturdy enough to be formed into a skein and shipped. Doing so required assuring that the strand had a consistent number of filaments throughout its length. Thus, whenever a filament broke off, the reeler needed to work in another.<sup>86</sup>

So, when we look at this purse, we have to imagine that its silk was raised in peasant communities where women, who had intimate knowledge of the needs of these larva, nurtured the silkworms—either in their earliest stages of life (as was the case in Gilan province), or throughout their entire lives, as has been the case nearly everywhere else. These women had to know whether or not the first leafing of their mulberry trees was a trustworthy beginning of spring, or whether they should wait to incubate the eggs because of the likelihood that a late frost could kill off the mulberry leaves soon after they appeared. They also had to know when their silkworms needed more space and cleaner surroundings, and they needed to have the skill to produce strands of raw silk that were consistent in quality and thickness from one end to the other.

In thinking about sericulture, we also ought to ask how its introduction and expansion in a given territory changed the relationship between peasants and the land. We know, for instance, that in the first half of the nineteenth century, as the international market for the silk of Gilan province grew, peasants and landowners cleared forests in order to make room for mulberry trees.<sup>87</sup> Similarly, in early modern France, as the king began to offer more and more incentives to induce peasants to engage in sericulture, peasants and landowners in the Cévennes region just north of Montpellier began to replace chestnut and walnut trees with white mulberry trees. This had a profound impact on peasant diets, since in that

84. Bromberger, “Gilan Province xvii – Gender Relations.”

85. I thank Claudio Zanier for this observation. For a photograph of a typical *tilimbar*, see: Bromberger, “Gilan Province xvii – Gender Relations,” plate 3.

86. Curzon, *Persia*, 370; M. Bazin and C. Bromberger, “ABRĪŠAM, silk, ii, Trade and Production of Silk and its Use in Crafts,” *Encyclopaedia Iranica*, <http://www.iranicaonline.org/articles/abrisam-silk-index#pt2>; Farmer, *Silk Industries*, 42.

87. Bromberger and Bazin, “ABRĪŠAM, Silk, ii.”

region, which was mountainous and inappropriate for the farming of wheat, chestnuts had constituted the “bread” of peasant diets.<sup>88</sup>

We know that in the late fourteenth and fifteenth centuries, after the fall of the Mongol empire left Europeans scrambling to replace silk fiber from Central Asia and the Far East, sericulture spread through parts of Tuscany and that it expanded in sections of Iberia. As far as I know, however, no medieval historian has yet asked what crops or trees the newly planted mulberry trees ended up replacing.

As already mentioned, chemical analysis indicates that the pile on the red velvet on our purse was dyed with a cochineal dye from the genus *Porphyrophora*. The most likely sources were Polish cochineal, Armenian cochineal, or a combination of the two.<sup>89</sup> Polish cochineal (*P. polonica*) is a scale insect that thrives on the roots of a variety of wild plants, most especially the perennial knawel. Its known historical habitat ranges from the Ile-de-France to the Russian far east. However, from the fourteenth through the sixteenth century the most prominent harvesting centers were in parts of Germany, Poland, Lithuania, Belarus, and Ukraine. Observers from twentieth-century Romania indicated that peasant women dominated in this harvest, and since its harvest was an activity that complemented agricultural work, it is reasonable to assume that this was the case in the medieval period as well.<sup>90</sup>

According to one seventeenth-century description of the harvesting process in Ukraine, *P. polonica* was harvested in the month of June, when the second instars of the insects were still attached, as cysts, to the roots of the host plant. Peasant harvesters would grasp the host plant with one hand, dig up the plant’s roots with a trowel that they held in the other hand, employ the trowel to scrape the insects from the roots, and then replace the plant in the ground. They then cleaned the insects, killed them with cold water or vinegar, and dried them in the sun or on top of an oven, taking care not to dry them out too much, lest any of the dye be lost. In its dried form, a gram of this dye contained approximately 350 female insects or approximately 1500 male insects.<sup>91</sup>

Armenian cochineal (*P. hamelii*) thrived on the roots of two kinds of grasses and was especially abundant on the plain of the Araks river between Turkey and Armenia, in the Caucasus and Caspian regions, and in western Siberia. The female insects were harvested during the month of September, when huge numbers of them would crawl to the hardened mud surface of the grasslands and remain immobile, between the hours of five and ten in the morning, waiting for the arrival of their mates. These insects were considerably larger than *P. polonica*: the dried bodies of 40 females weighed approximately one gram. Because of the difference in size, Italian dyers’ manuals referred to Armenian cochineal as “*cremexin grosso*” and to Polish cochineal as “*cremexin menudo*.”<sup>92</sup>

We turn now to the last of the global products that contributed to the confection of our purse: flax, the plant that is cultivated in order to produce both linen and linseed oil. Although flax was grown in the marshy suburbs of Paris, we can be relatively certain that

88. Clavairolle, *Le magnan et l'arbre d'or*, 31-40, 44-46, 68-82.

89. Cardon, *Natural Dyes*, 643.

90. Cardon, *Natural Dyes*, 638-40.

91. Cardon, *Natural Dyes*, 637, 638, 640.

92. Cardon, *Natural Dyes*, 642, 647-49.

around the year 1340 most of the flax that fed the highly productive Parisian linen industry was coming from the region of Northern France, Hainaut, and Flanders. This region had adopted agricultural techniques that were unmatched by any other region of western Europe in terms of both overall productivity and the ability to grow multiple commercial crops in addition to the usual cereal grains. It was because of these new practices that the peasants of this region were able to grow flax, not only in the enclosed vegetable gardens next to their homes, but also in the open fields where they also grew wheat and oats. This was extremely significant, because flax is a crop that rapidly depletes the nutritional value of the soil. Nevertheless, by 1400, 32 percent of rents for the region around Ghent were for flax, and by 1500 that percentage had climbed to 58 percent.<sup>93</sup>

The statistical evidence for the success of this "Flemish" or Northern French agricultural system, which is already evident in thirteenth-century accounts from the regions around Douai and the county of Artois, are phenomenal: returns of up to 31 hectoliters of wheat per hectare, as opposed to less than twelve hectoliters per hectare elsewhere; returns of 14:1 for every seed that was planted, as opposed to 6:1 elsewhere; and the ability to plant all of the arable, instead of needing to leave a third of it lying fallow. Historian Alain Derville has described this mini-agricultural revolution as "nothing other than the extension of the cultivation methods of peasant garden plots into the open fields."<sup>94</sup> Basically, at a very early date peasants in this region came to realize that the meticulous gardening techniques that they had developed in the enclosed vegetable gardens next to their houses could also be employed in the open fields. They thus began to plant their fields with nitrogen-fixing plants, such as vetches and beans; they invented new ways of collecting manure and urine, such as placing straw mats in their barns; and they began to contract with municipal governments in order to buy the waste from urban outhouses.<sup>95</sup>

Peasants in the north also benefitted from the local geography, much of which was dominated by polders—low lying strips of reclaimed land that were separated by drainage canals. When such land was successfully drained it could consistently produce the kinds of vegetable plants that were usually cultivated in the well-watered gardens next to peasant residences. Such is the case today with the commercialized vegetable plots on the polders of the Audomarois marsh just north of St.-Omer.

The northern agricultural revolution also benefitted from patterns of rural to urban migration that were bringing men and women from rural holdings to urban centers in

93. Marie-Jeanne Tits-Dieuaide, "L'évolution des techniques agricoles en Flandre et en Brabant: XIVe-XVIe siècle," *Annales. Économies, sociétés, civilisations* 36/3 (1981): 366. In the fifteenth century, flax from the eastern Baltic also gained a foothold in the western European linen industry, but that was not the case in the fourteenth century: Heidi Sherman, "The Flax and Linen of Medieval Novgorod," *Textiles and the Medieval Economy: Production, Trade, Consumption*, ed. Angela Ling Huang, Carsten Jahnke (Oxford, UK: Oxbow Books, 2015), 109.

94. Alain Derville, *L'agriculture du nord au Moyen Âge: Artois, Cambresis, Flandre Wallonne* (Paris: Presses Universitaires du Septentrion, 1999), 52-53, 61, 180; Tits-Dieuaide, "L'évolution," 363-64, 370; P. Lindemans, *Geschiedenis van de landbouw in België* (Antwerp: De Sikkels, 1952), II: 214, 218-20; Erik Thoen, "Technique agricole, cultures nouvelles et économie rurale en Flandre au bas Moyen Âge," in *Plantes et cultures nouvelles en Europe occidentale au Moyen Âge* (Auch: Centre culturel de l'abbaye de Flaran, 1992), 51-67.

95. Tits-Dieuaide, "L'évolution," 367-70; Derville, *L'agriculture du nord*, 52-57. In the nineteenth century, English agronomers continued to admire the Northern French methods of collecting urine for crops: E. Sebastian Delamer, *Flax and Hemp: Their Culture and Manipulation* (London: G. Routledge & Co., 1854), 88.

search of work. The result was a surfeit of women in urban centers, and a significant number of those women ended up working not as household servants but as casual agricultural laborers. Again, and again, thirteenth- and fourteenth-century account books from this region mention the hiring of groups of women to weed, plant seeds, harvest, make hay, and drive carts.<sup>96</sup> It is likely that many of them helped harvest flax plants as well. That is the impression to be gained from an eleventh-century literary text, the “Conflict Between a Sheep and a Flax Plant,” in which the flax plant is reminded that it has been violently pulled out of the soil by a woman. And indeed, women’s dominance as harvesters of flax continued, in this part of the world, until at least the mid-nineteenth century, when English agronomists took note of that fact.<sup>97</sup>

In order to harvest the flax plants, the harvesters pulled the plant out of the soil, roots and all. They had to do this just before the seeds had reached full maturity: if the plants were uprooted too early, the internal fibers would not have reached their full strength; conversely, if the seeds were allowed to reach full maturity, the fibers would become too woody and would not be capable of being turned into yarn.<sup>98</sup>

In addition to playing a major role in tending and harvesting the flax, the women of this region played a major role in the complex process of turning flax stalks into usable textile fibers. It is unclear whether or not they played a role in retting, the first stage of the process (Figure 21). After the uprooted stalks had been tied into bundles and dried in the sun, the bundles were placed under water (either stagnant or slowly running) and weighed down with boards and stones. The stalks were left like that for a period ranging from five days to several weeks, during which time a fermentation process dissolved the resins that held the bast fibers together, and the water worked to soften the outer bark and inner wooden core, so that they would begin to fall away from the usable bast fibers. A great deal of skill was required in order to know precisely when to remove the bundles from the water—indeed, an error of even a few hours could result in ruined fibers. The task also required an ability to put up with the noxious odors that were created by the fermentation. Indeed, because

96. *Cartulaire de l'hôpital Saint-Jean-en-l'Estrée d'Arras*, ed. Jules-Marie Richard (Paris: H. Champion, 1888), 133; PdC A 163/3; Lille, Archives du Nord, B 13597, fol. 87v; Archives Hospitalières de Lille (henceforth AHL; this series is housed at the Archives du Nord in Lille), VI E 7 (account of the Hospital of St. Sauveur, dated, 1342 – hired women dominate at the August harvest). At the Hospital of St. Sauveur hired women also dominated at the August harvest in 1349–50 and 1364: AHL VI E 7, role 16; AHL VI E 9, role 2. In 1341–2 women predominated as hired diggers of beans and vetches: AHL VI E 7. In 1334–35, at the estate of Renaut-Folie, men did all of the mowing but for hay-making (fenaison) managers paid for 650 work days of women’s work (at 4d–7d/day) and for 110 work days of men’s work (at 6–10d/day): Gérard Sivery, *Structures agraires et vie rurale dans le Hainaut à la fin du Moyen Âge* (Lille: Presses Universitaires de Lille, 1977–80), 2:394. See also: Derville, *L'agriculture du nord*, 183, 184, 187; Bernard Delmaire, ed., *Compte general du receveur d'Artois* (Brussels: Palais des Académie, 1977), 25. On urban women as a source of agricultural labor, see Jacques Rossiaud’s translation and transcription of a fifteenth-century court case concerning a woman who gave up her job in service in order to work as a casual laborer weeding agricultural crops: *Medieval Prostitution*, trans. Lydia C. Cochrane (Oxford: Basil Blackwell, 1988), 180. For a discussion of similar gendered patterns among salaried rural laborers in England, Normandy, and Languedoc, see: Jane Whittle, “Rural Economies,” in *The Oxford Handbook of Women and Gender in Medieval Europe*, ed. Judith M. Bennett and Ruth Mazo Karras (Oxford, UK: Oxford University Press, 2013), 321.

97. Delamer, *Flax and Hemp*, 46, 82 (on women’s role), and 5, 26, 35, 48, 79, and 85 (on the importance of the flax from this region). On the dialogue between the sheep and the flax plant: “Hermann Contracti Conflictus Ovis et Lini,” *Zeitschrift für deutsches Alterthum* 11 (1859): 215–38.

98. Delamer, *Flax and Hemp*, 46–50.





FIGURE 21. Fifteenth-century manuscript illumination showing an individual retting flax (left) and a woman breaking flax (right). Pliny the Elder, *Historia naturalis*, Victoria & Albert Museum, L 1504-1896. ©Victoria & Albert Museum, London.

of the stench, towns and rulers passed statutes prohibiting the soaking of hemp and flax within town boundaries or near residences, and there were also some regulations and court cases restricting the release of retting water into streams where fish resided.<sup>99</sup>

99. Delamer, *Flax and Hemp*, 51-60; Munro, "Linen," 585; Perrine Mane, *Le travail à la campagne au Moyen Âge: Étude iconographique*, (Paris: A & J Picard, 2006), 247; Emperor Frederick II, *Constitutionum regni siciliarum*, liber III, titulus xlviii, ed. Dominico Alfeno Vario (Naples: A. Cervoni, 1773), 406; Richard C. Hoffmann, *An Environmental History of Medieval Europe* (Cambridge, U.K.: Cambridge University Press, 2014), 264; Philippe Plouchard, "La Scarpe et les gens de rivière aux XIVe et XVe siècles," *Revue du Nord* 79/322 (Oct.-Dec. 1997): 851. Since World War I, dew retting has replaced water retting, thereby reducing the negative environmental impact of processing linen. For descriptions of the two processes see: [www.wildfibres.co.uk/html/retting\\_flax](http://www.wildfibres.co.uk/html/retting_flax). On twentieth-century improvements in the retting process see: Z. Jankauskiene, A. Lugauskas, J. Repeckiene, "New Methods for the Improvement of Flax Dew Retting," *Journal of Natural Fibers* 3/4 (2007). On chemical, enzymatic, and steam explosion retting see: John A. Foulk, Danny E. Akin, Roy B. Dodd, "Processing Techniques for Improving Enzyme-Retting of Flax," *Industrial Crops and Products* 13/3 (May, 2001): 239-48.





FIGURE 22. Men bruising flax (center) and a woman (behind the men, to the left) scutching flax. Da Costa Hours (c. 1515), Pierpont Morgan Library, Ms. M 399, fol. 12v. Purchased by J. Pierpont Morgan (1837-1913), 1910. Photographic credit: The Morgan Library & Museum, New York.

After the retting process, the bundles were dried again, then the stalks were bruised with mallets, broken with a machine called a “break,” and finally scutched with a scutching knife. As the late medieval images from Flanders in Figures 21 and 22 suggest, women predominated in the tasks of breaking and scutching. Men, by contrast, usually did the bruising. After going through these stages, the fiber was finally ready to be hackled—or combed. As I mentioned earlier, Parisian statutes required that this stage take place in the city itself.

On three different continents, dozens of men and women contributed to the making of the fourteenth-century “French” alms purse that now resides at the Musée des Tissus in Lyon. Some of the women who worked in the fields where the flax was grown were simple day laborers, but many of the other men and women, both rural peasants and urban artisans, possessed specific technical knowledge and manual skills that could take years to perfect. The work of the highly talented Parisian illuminator and the highly talented Parisian embroiderer constituted only the final stages of a long and complex chain of male and female skilled labor.

Along with the other luxury textile products of Paris, this purse also had a significant impact on the environment and on the balance of agricultural production. The deep shaft mining of silver and gold in Kremnica and the processing of flax and woad released harmful toxins into local soils and rivers. Processing alum in Phocaea and heating dye vats in Paris consumed significant amounts of fuel. Planting flax and mulberry trees and bleaching linen cloth consumed acres and acres of agricultural or forest land. The harvesting of the cochineal insects, by contrast, probably contributed to the health of the host plants. ■

