

Note from the Making and Knowing Project:

This essay was written for “The Art Technological Source,” an 8-week graduate course at the University of Amsterdam offered by Dr. Marjolijn Bol in 2015 and 2016 to students enrolled in an MA program in either Technical Art History or Conservation and Restoration. Students worked on various recipes from BnF Ms. Fr. 640 on the following five topics: 1) tracing and painting on glass, 2) yellow dyes and their applications, 3) dragon’s blood, 4) painters’ varnishes, and 5) sieves.

This is an un-edited student paper that relies on an earlier state of the Making and Knowing Project’s transcription and translation of Ms. Fr. 640. For an updated version of the text, see:

Making and Knowing Project, Pamela H. Smith, Naomi Rosenkranz, Tianna Helena Uchacz, Tillmann Taape, Clément Godborge, Sophie Pitman, Jenny Boulboulle, Joel Klein, Donna Bilak, Marc Smith, and Terry Catapano, eds., *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640* (New York: Making and Knowing Project, 2020), <https://edition640.makingandknowing.org>. DOI: <https://doi.org/10.7916/78yt-2v41>.

Fine Raw Silk Sieves and Horse Hair Sieves

***How sieves of different materials could have been used
to obtain various textures in the sieved product***



Photo by author.

Lisanne van den Heuvel

Course: The Art Technological Source

Prof. Marjolijn Bol

March 22, 2016

Introduction

‘BnF Ms. Fr. 640’ is a late-sixteenth century manuscript that has been extensively researched and digitized as part of ‘The Making and Knowing Project’ at Columbia University.¹ In contribution to the research on this manuscript, I have been working together in a team with Kirsten Derks, Paulien Coopmans, Hanneke Kramer, Annelena de Groot and Lieke Boerstra, in a course called ‘The Art Technological Source’.² Along with many other recipes, the manuscript contains recipes for the weaving of a sieve made of silk, folio (fol.) 13: ‘Fine Raw Silk Sieves’, and of a sieve made of horse hair, fol. 44: ‘Horse Hair Sieves’. Firstly, we tried to interpret the sixteenth century recipes from fol. 13 and fol. 44 and subsequently we have been making reconstructions of the recipes.

During reconstructing the two types of sieves, I kept wondering why one would need two sieves of a different kind of material? While working with silk and horse hair, I experienced different possibilities of both materials. Therefore, my annotation investigates how the different properties of silk and horse hair may lead to a different application of the sieves and consequently a difference in the sieved product.

Firstly, different properties of silk and horse hair will be described. Furthermore, I will refer to parts in the recipes that may indicate properties of both the materials. Specifically, I will try to find out why the recipe of silk is referring to raw silk and the recipe with horse hair states that you should use black and white horsehair from the tail of the horse. Of course, there may be other variables that influence a choice for horse hair or silk to produce a sieve. One such variable

¹“The Making and Knowing Project,” Columbia University, accessed March 20, 2016, http://www.makingandknowing.org/?page_id=23.

² ‘The Art Technological Source’ is a course of the Master’s Programme ‘Technical Art History’ at the University of Amsterdam.

I will address, is the probable difference in price for acquisition of the materials in the sixteenth century.

I will also describe an early-eighteenth century source by Don Acisclo Antonio Palomino de Castro y Velasco (Palomino), who mentions a different use of the two kinds of sieves. Subsequently, I will briefly explain some of the choices we made during the reconstruction of the recipes. My experience with and observations of sieving flour with the three sieves that were produced by following the recipes will be described.

Finally, I will try to give an answer to the question how the different properties of silk and horse hair may lead to a different application of the sieves and consequently a difference in the sieved product.

1. Comparing properties of silk and horse hair

The beneficial properties of silk for sieving have unfortunately not been extensively mentioned in the BnF manuscript. However, fol. 13 states that: '[one should] choose yellow and natural raw silk because it is stronger and rejects flour as horse hair does.'³ Silk threads mainly consist of fibroin proteins and sericin proteins. Fibroin proteins make up the core of silk, and sericin proteins glue two particular fibroin filaments together. These proteins make silk strong and tough compared to other fibres.⁴ Fol. 13 emphasizes the use of raw, yellow natural silk as opposed to raw silk whitened by sulfur smoke. It is not completely clear why the author-practitioner advises this.⁵ A reason could be that, before the process of bleaching a process called *degumming* is executed. In this *degumming* process, the silk is boiled and some of the sticky sericin is removed,

³ See Appendix 2 for the complete recipe from fol. 13 BnF Ms. Fr. 640.

⁴ Mary Schoeser, *Silk* (New Haven: Yale University Press, 2007), 232-234.

⁵ The writer of BnF Ms. Fr. 640 is unknown. Therefore, the Columbia Project refers to him as author-practitioner. I will continue using this name in my annotation.

making the silk become less stiff.⁶ However, it could also have to do with the properties of sulfur, but it is still unclear how sulfur actually changes the properties of silk and how this differs from other bleaching methods. Almost 30 percent of the silk cocoon consists of a very long thread. The length of this silk thread varies between 2.7 to 3.6 kilometre and is only 28 to 36 μ m thin. It is possible to spin very fine long threads with these.⁷ The long fine tough thread is therefore suitable for the production of a very fine sieve. The other 70 percent of the cocoon, which can not be used for the production of one continuous thread of silk, contains smaller threads and is called *waste silk*. This waste silk can also be spun together resulting in a lower quality silk thread that is less strong and elastic.⁸ It is not clear if the author-practitioner advises the first type of good quality silk thread or the second type of lower quality. On the one hand, It would make sense if he meant to use the second quality thread of silk, since silk in those days was fairly expensive.⁹ On the other hand, the fact that silk was so expensive may also have attracted buyers who could afford a sieve made out of silk. Therefore, it may have been a product of conspicuous consumption.

In contrast to silk, literature about the properties of horse hair is scarce. Fol. 44 mentions that the horse hair used for the sieve is from the ‘horse’s tail’ and that it is ‘a black or white hair’. The fact that the author-practitioner explicitly mentions the tail of the horse hair and the colors that ought to be used, may indicate that this is relevant for the properties of the sieve. Although we have to keep in mind that the *Encyclopedie* was probably written two decades later than Bnf

⁶ Schoeser, *Silk*, 239.

⁷ Sheila Landi, *The textiles conservator’s manual* (Butterworth-Heinemann, 1998), 23.

⁸ Schoeser, *Silk*, 237.

⁹ In a book by Jo Kirby, Susie Nash and Joanna Canon: ‘Trade in Artists’ materials’ markets and commerce in Europe until 1700’, a table is demonstrated at page 402, that shows that raw imported silk in England in 1604 was one of the most expensive imported products. Even more expensive than for example pepper, which had to be imported from far foreign countries. A critical note must be shared that the situation of the silk importation in France may have been different from that in England.

Ms. Fr. 640, it may be interesting to look at the explanation of the French word for sieve, ‘*tamis*’, by Denis Diderot in 1781: ‘*The sieve* is a wooden circle, little or large, on which is placed a cloth of fabric, from silk or horsehair, or another clear fabric, dependent on how you are willing to use it.’¹⁰ In this explanation, Diderot explicitly mentions silk or horse hair or another clear fabric for the cloth of the sieve. Furthermore, instead of using the word ‘poil’ as in Bnf Ms. Fr. 640, Diderot makes use of the word ‘crin’. In *Dictionnaire Portatif de Commerce* by the brothers C. & A. Philibert dated 1761 ‘crin’ is described as: ‘Long hair that grows on the manes and the backside of the horse or mare and that is used as ornament. [...] The ‘crin’ of the backside is the most appreciated, being the strongest and the longest, it is used in the fabrication of a sort of clear cloth, that is called *Rapatelle*, that is used in the making of the *tamis* or sluice.’¹¹

Hereby one could conclude that *rapatelle* is the name for the fabric that is made from horse hair, that is used to make a sieve and that horse hair from the tail of the horse was the most valued hair of the horse. Furthermore, on the next page the *Dictionnaire* describes that ‘crin’ can also refer to hairs of other animals, for example from a cow. However, it is stated that those hairs were of inferior quality to the hairs of the horse. Furthermore, the Philiberts describe that you should not be persuaded into buying a mix of these hairs and at the end of this page they mention

¹⁰ Denis Diderot, *Encyclopedie ou dictionnaire raisonné des sciences des arts et des métiers*. Volume 23 part 2. (Genève, 1781), 698. The English Translation is by the author of this annotation, this is the French text by Diderot: ‘*Le tamis* est fait d’un cercle de bois mince & large a discretion, au milieu duquel est placé un tissu de toile, de soie, de crin, ou de quelque autre toile claire, suivant l’usage qu’on en veut faire.’

¹¹ C. Philibert & A. Philibert, *Dictionnaire portatif de commerce*. (Copenhague, 1761) 586. The English translation is by the author of this annotation, this is the text of the brothers Philibert: ‘Long poil qui croît au cou & à la queue des chevaux ou jumens & qui leur sert d’ornement.[...] Le Crin plat, c’est-à-dire, celui qui est encore tel qu’il a été tiré du cheval & de la jument; don’t celui de la queue est le plus estimé, étant le plus fort & le plus long, s’emploie à fabriquer une sorte de toile très claire, qu’on nomme *Rapatelle*, dont on se sert à faire des *tamis* ou *sas*.’

(my translation): ‘The white and black horsehairs are valued the most, because they are always from the horse or mare, without being mixed with other [animal’s] hairs.’¹²

An explanation for the author-practitioner’s description of black and white horse hair seems to be because one needs to prevent the before mentioned inferior mixtures with other animal’s hair when making a *rapatelle*. Unfortunately, neither sources describe why horse hair in particular is preferable over other animal’s hair.

Kerstin Fröberg, a spinner and weaver that experimented with weaving horse hair and who was doing research on this topic mentions that horse hair is a protein fibre. It is hard and stiff hair and this means it takes longer for this kind of hair to take up water.¹³ This could be an explanation in favor of the use of horse hair. When a hair is rigid you may be able to use pressure if needed to filter your material. Also the fact that it takes up water very slowly, would mean that this is easier to clean, which could come handy. I will come back to this point later, when I describe my experience sieving flour through a horse hair sieve.

2. Palomino’s description of the use of a horse hair sieve and a silk sieve in one recipe

In the BnF manuscript I found 39 recipes that mention the use of a sieve for different purposes. Although a few recipes state that you need a ‘fine’ sieve, a ‘double’ sieve or a sieve ‘apothecaries’ use, none of them specifically mention the use of a silk sieve and only one recipe mentions the use of a horse hair sieve. In fol.121 the author-practitioner has written down a note which says: ‘The sand the goldsmiths use to sand enamels and the white one which the glassworkers use and any type of fine sand which does not have much body, put it through a

¹² Philibert and Philibert, *Dictionnaire portatif de commerce*, 587. ‘Les crins noirs et blancs sont estimés les meilleurs parce qu’ils sont tout de cheval, ou du jument, sans mélange d’autres crins.’

¹³ “Horsehair as a textile,” Kerstin Fröberg, accessed March 12, 2016, <http://fiberarts.org/design/articles/horsehair.html>.

sieve made of *horsehair* because this matter must not be very thin. (..)’. Although this is a very clear indication that tells something about the use of a horse hair sieve, namely that you should use it if you want your sieved product to be quite coarse, it still does not confirm a different application of a horse hair sieve and a silk sieve.

Literature about this subject seems to be scarce, however there is one early-eighteenth century recipe that mentions the use of a horse hair sieve and a silk sieve together in one recipe. It is a recipe by the Spanish author Don Acisclo Antonio Palomino de Castro y Velasco in one of his books from his treatise.¹⁴ In his recipe about white pigment made of quick lime used for fresco paintings he mentions a sieve from horse hair and a sieve from silk.¹⁵ He describes how the slaked lime should be sieved through a close *horse hair sieve*: ‘(..) so the that the fine parts may pass through, and tapping it on the outside from time to time, that the thick part which remains in the sieve may subside.’ Later on in the recipe, when this lime strained through horse hair is precipitated, Palomino mentions you should sieve this lime again before using it on your pallet, but this time with a close silk sieve: ‘Straining it again through a *very close silk sieve*, for which purpose it must be diluted with much water, otherwise it will not pass through, and even then it will be necessary to stir it with a brush, and then to remove the refuse from the sieve from time to time. The lime being suffered to settle, there will be found in the bottom of the jar a white

¹⁴ Palomino was born 1663. He has written: ‘Museo pictorico y escala optica’, three large volumes in quarto of whom the two first books tell about instructions in painting and the third is a biography of Spanish painters. Palomino published the last volume of his work in 1724 and died in 1726. Mrs Merrifield translated the Spanish treatise to English in 1846 (first edition). However, I must say the edition I look at is the second edition from 1952 by Alec Tiranti, which is reprinted in 1966. This means that there may have been alterations in the text, due to different translators and interpretations.

¹⁵ See appendix 3 for the whole recipe of Palomino written down sentence by sentence.

coagulum, which is to be used for the palette, taking it out with a spoon which is to be kept for this purpose only.’¹⁶

What Palomino’s recipe clearly shows, is that the horse hair sieve is used for the coarse parts and later in the process a silk sieve is used to strain smaller particles.

3. Observations of sieving flour in our reconstructed sieves

While reconstructing the sieves with horse hair and silk we noticed their different properties. We had ordered white hair from the tail of a horse.¹⁷ Furthermore we ordered ‘tussah’ silk and ‘mulberry’ silk, because we did not really understand at the time what the recipe meant by ‘raw yellow natural silk’. Unfortunately, we still do not really understand what kind of silk we ordered, one sack stated ‘Tussah’ and on the other sack ‘Moerbeij’.¹⁸ The tussah silk had a more yellowish color and the mulberry silk a more white color. This could mean that the mulberry silk was bleached and the tussah silk was not bleached. Both contained short threads that had to be spun. We decided to use the mulberry silk because it was the easiest to spin. The tussah silk thread was very sticky and short and broke constantly. We found out that it is possible to spin very thin threads with the mulberry silk. Unfortunately, we were not able to spin thin threads evenly, due to the lack of experience and a spindle that was too heavy to make thin threads.

¹⁶ Mary Merrifield, *The art of fresco painting, as practiced by the old Italian and Spanish masters: With a preliminary inquiry into the nature of colours used in fresco painting, with observation and notes*. Facsimile, reprint from the first print from 1846. (London, 1966) 79-80.

¹⁷ We ordered white horse hair tail from this website:

<http://www.paardenextensions.nl/webshop/16798-losse-bossen-staarthaar>.

¹⁸ The difference between mulberry and tussah silk is that mulberry silk is always from a rups that has eaten mulberry leaves and tussah means that the silk is found in the wild and the larve has flown out of the cocon. So mulberry silk can contain long threads, as opposed to tussah silk, because the larve has eaten his way out of the cocoon and the thread has been broken. This information was provided by students of the master’s programme Conservation and Restoration of Textiles at the University of Amsterdam, at March 13, 2016.

The horse hairs on the other hand already had a certain length and width that could not be altered. So we could imagine that the silk weft can be finer than the weft we made with horse hair, because the small threads can be woven closer to each other. We ended up making 3 sieves: one from horse hair, one from the spun mulberry silk and one from a kind of silk crepe (see fig. 1). The silk we spun was not so thin and even and had been woven with a too open structure to be a ‘fine silk sieve’ as the BnF manuscript mentions. We concluded that a finer woven silk may resemble a ‘fine silk sieve’ better than the cloth we had spun. Crepe is a type of silk that is spun and woven in a very fine manner. So we choose to make one sieve out of the finer crepe that was available in the atelier where we worked (see fig. 2 for more information about this crepe).

Subsequently, we tried to sieve flour with the three kinds of sieves to see what the different sieved products looked like and how the sieves reacted to the flour. We choose to sieve flour, because in the recipe for silk states: ‘But for this effect, choose yellow and natural raw silk because it is stronger and rejects flour as horse hair does.’¹⁹ What we have to keep in mind here, is that the flour we use nowadays is probably different than the flour that was used in sixteenth century France. For noticing the different superficial properties between the sieves this does not matter that much at this point, but it can be of importance to be historically accurate for further research in the future.

The horse hair sieve sieved the flour the most coarsely, as we expected. After sieving, just a little flour remained on the sieve and it was easy to clean this sieve with water (see fig. 4).

The sieve with the self-spun mulberry silk had a very fine sieved product. This was probably due to the fact that the flour stuck to the silk and the space between the silk threads, became very small during sieving. Sieving also took a long time. Afterwards, this sieve was hard to clean with water (see fig. 5).

¹⁹ For this experiment, I bought flour from the supermarket Albert Heijn (see fig. 3).

Since we suspect that these hairs are bleached (although not likely with sulfur, since modern bleaching processing use different materials) this may indicate that the author-practitioner was right about not using the bleached silk, but raw yellow natural silk instead. The sieve with the crepe made a very fine sieved product, the flour did not stick and went easily through the holes (see fig. 6). Afterwards this sieve was easy to clean with water.

Conclusion

The different properties of raw natural yellow silk and bleached silk are not completely clear at this point. The sieve with the spun whitish mulberry silk turned out to be not so convenient for sieving flour. This could be because the silk we used may have been bleached, but we do not know this for sure. Also, it may not have been bleached with the sulfur the author-practitioner mentions not to use in BnF Ms. Fr. 640. The stickiness of the silk sieve could also be due to the fact that we did not make the threads in a proper way. For example, the threads we spun were thick and uneven, that could be a reason for the flour to stick to the sieve. In comparison, the sieve with silk crepe we used was a very fine cloth and had excellent sieving properties.

In the 'Dictionnaire' by the brothers Philibert it is stated that horse hair was more valued than other animals' hair. Although it is clear that horse hair is a strong and stiff material, it still remains unclear to what extent horse hair differs from other animals' hair. The use of black and white horse hair in the BNF recipe seems to refer to the fact that it could have been easier to distinguish them from other animals' hairs, rather than that there would be a difference in properties between the different colors of horse hair.

Both horse hair and silk contain strong protein fibers. However, while making the reconstructions we found that silk can be spun to make a very fine cloth. This may result in a

finer sieve than the sieve made out of horse hair, because horse hair more or less keeps the same width of thread compared to silk. If one looks at the process described by Palomino, it seems that horse hair was used to filter courser materials and silk was used to sieve finer material. This description of the application by Palomino matches our experiences with the use of the two sieves.

For further research, I would suggest to make reconstructions of the two recipes again. I would advice making a sieve with silk threads that are bleached by sulfur and compare this with a sieve made of good quality long threads of degummed mulberry silk. In this way you really know why sulfer-bleached silk was not recommended by the author-practitioner. Furthermore, I would advice comparing a horse hair sieve with a sieve made of cow hair. This may help to understand the different properties of both animal's hair and why the sieve of cow hair would have inferior properties in comparison to the sieve of horse hair.

Appendix 1. List of Images



Fig.1. Three sieves: left upper corner the sieve with crepe, left right corner sieve with spun mulberry silk and the sieve under in the middle is made with horse hair. Photo by Lisanne van den Heuvel.

Materiaal		Nummer	Staal
Zyle Crepe de		C.1.8	
voor			
Leverancier			
Whaleys			
Metage	Afname	Datum	
6 mtr.		10-01-2012	
✓	is op	7-11-2012	
+ 50 m.	nieuwe rol	22-04-2014	
- 10 m	opgeleid voor	20-05-2014	
- 10 m	lijmmiddel	10-06-2014	
- 10 m	(9.10 m.) verwerkt	11-11-2015	
- 1.5	lijmmiddel	7-12-2015	
- 2.5		6-1-2015	

Fig 2. Additional information about the crepe we used to make the sieve with. Photo by Kirsten Derks.



Figure 3. The flour used for the experiment. Photo by Lisanne van den Heuvel.



Figure 4. Flour sieved through horse hair sieve. Photo by Lisanne van den Heuvel.



Figure 5. Flour sieved through mulberry silk sieve. Photo by Lisanne van den Heuvel.

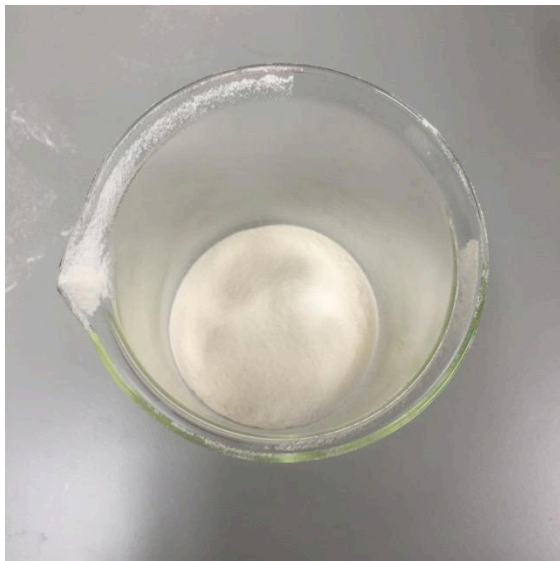


Figure 6. Flour sieved through crepe-sieve. Photo by Lisanne van den Heuvel.

Appendix 2. The recipes from fol. 13 and fol.44

Recipe 1 BNF MS Fr 640: po13r_4 + po13v_4: Fine Raw Silk Sieves

French transcription

<id>p013r_4</id>

<head>Tamis fins de <m>soye</m> creue</head>

<ab>On faict de l'estamine de <m>soye</m> crue au telier pour fayre de fins &<lb/>
subtils tamis. Et pour cet effect, il ne fault pas choisir la <m>soye</m> crue<lb/>
blanchie à la fumee du <m>soufre</m>, qui rend la <m>soye</m> chargee d'une<lb/>
vapeur glua{n}te, qui retiendrait la <m>farine</m> & enfin empescheroit qu'elle ne</ab>
</div>

<id>p013r_4</id>

passeroit pas si bien Mays choisis pour cet effect la <m>soye</m> crue<lb/>

jaulne & naturelle pource quelle est plus forte & rejete la<lb/>

<m>farine</m> comme le <m>poil de <al>cheval</al></m>

</ab>

</div>

English transcription

<id>p013r_4</id>

<head>Fine raw <m>silk</m> sieves</head>

<ab>Musline of raw <m>silk</m> is made on a weaver to make very fine and delicate sieves. And for that effect, you must not choose raw <m>silk</m> whitened by <m>sulphur</m> smoke which renders the <m>silk</m> full of a sticky steam that would hold the flour and hinder it from t</ab>
</div>

<id>p013r_4</id>

passing through so well. But for this effect, choose yellow and natural raw <m>silk</m> because it is stronger and rejects <m>flour</m> as <m><al>horse</al>hair</m> does.</ab></div>

Revised English transcription

Fine raw silk sieves

Musline of raw silk is made on a weaver to make very fine and delicate sieves. And for that effect, you must not choose raw silk whitened by sulphur smoke which renders the silk full of a sticky steam that would hold the flour and hinder from t passing through so well. But for this effect, choose yellow and natural raw silk because it is stronger and rejects flour as horse hair does.

Recipe 2 BNF MS FR 640: po44v_1: Horse hair sieves

French transcription

<id>p044v_1</id>

<head>Tamis de <m>poil de <al>cheval</al></m></head>

<ab>Ils se font à <pl>Coustance</pl> en <pl>Normandie</pl> de </m>poil</m> de la
 que^ue de <al>cheval,</al><lb/>
 qu'ilz nettoient avecq de la <m>lessive</m> à cause qu'ilz les trient avecq<lb/>
 la bouche & en separent les courts & rompus. Ils ne font<lb/>
 pas la lame plus longue que le tamis, & est ronde. Ils attachent<lb/>
 par les deulx extremités de la lames le <m>poil</m> ou blanc ou noir,<lb/>
 selon l'ouvrage qu'ils veulent faire. Et <corr>est</corr> faicte la trame<lb/>
 dessus & dessous comme pour faire quelque aultre tyssu. Et<lb/>
 passant entre deulx un petit baston plat large de ii ou trois doi<corr>gt</corr>s,<lb/>
 ilz passent après deulx <m>poils</m> à chasque frapem{ent} de marche et<lb/>
 tissent avecq trois marches. Il y a en tout le tamis xviic <m>poils.</m><lb/>
 Ils les vendent à douzaines & chascune xxx s{ols}. Ils les portent<lb/>
 jusques à <pl>Th{o}l{o}se</pl> pour les transporter après en <pl>Espagne</pl>, et<lb/>
 prenent en eschange de l'estamine de <m>soye</m>.</ab></div>

<div>

English transcription

<div>

<id>p044v_1</id>

<head><m><al>Horse</al>hair sieves</m></head>

<ab>They are made often in <pl>Normandy</pl> with <m><al>horse</al>tail hairy</m> that they clean
 with some washing <m>water</m> because they pick them out with their mouth and separate short and
 broken ones. They do not make the <m>thread</m> longer than the sieve and it is round. They attach the
 black or white <m>hair</m> at the two edges of the thread, according to the piece they want to make.
 And the thread is woven above and below like any other fabric. And passing a small flat stick of ii or
 three fingers wide between two, they pass between after two bits of hair at each step strike and weave
 with three steps. The entire sieve is made of xvii bits of <m>hair</m>. They sell them by dozens and each
 xxx sols. They bring them to <pl>Toulouse</pl> to send them then to <pl>Spain</pl> and there, they
 exchange it with <m>silk</m>.</ab></div>

<div>

Revised English transcription

Horse hair sieves

They are made often in Normandy with horse tail hairy that they clean with some washing water because
 they pick them out with their mouth and separate short and broken ones. They do not make the thread
 longer than the sieve and it is round. They attach the black or white hair at the two edges of the thread,
 according to the piece they want to make. And the thread is woven above and below like any other fabric.
 And passing a small flat stick of ii or three fingers wide between two, they pass between after two bits of
 hair at each step strike and weave with three steps. The entire sieve is made of xvii bits of hair. They sell
 them by dozens and each xxx sols. They bring them to Toulouse to send them then to Spain and there,
 they exchange it with silk.

Appendix 3. Recipe Palomino 'Of white pigments'

Pp. 79

First paragraph

- 'OF WHITE PIGMENTS.- We have now to speak of the white pigment which is used in fresco painting.
- This is made of the same lime as stucco, but without sand, for which purpose the whitest quick lime in lumps is chosen;
- this is slaked in a jar, (which in Castile is called bano),
- pouring water on it from time to time, until it has lost all its causticity, stirring it well until it is thoroughly soaked and covered with soft water.
- And this must be managed in the same way as stucco, taking off the pellicle on the surface every day,
- and being done, soft water should again be poured over the lime in great abundance,
- and it should be again well beaten up
- and so on every day for four months, if possible;
- and as the length of time occupied in preparing this pigment is great inconvenience, it will be proper for those who are accustomed to this kind of work, or even those who are not, to make it in large quantities;
- and after it has been well purified it may be kept either in pellets or in a large jar leaving it to dry.'

Second paragraph

- But before removing the water, the whole should be strained through a **close horse hair sieve**,
- resting the sieve on two sticks laid across the jar into which it is to be strained,
- and stirring about the thick liquid
- which is put into the sieve with a brush,
- that the fine parts may pass through, and tapping it on the outside from time to time,
- that the thick part which remains in the sieve may subside.
- And after it has been all strained in this manner, it will be like milk;
- it should then be left to settle,

- then the lime water should be poured off;
- preserving, however, enough for use, if you require it for any purpose,
- and pour it off gently, that it may not mix with the lime.

Third paragraph

- ‘But when it is required for use, the lime settled at the bottom of the jar should be taken out with a large wooden spoon,
- And then the tints for the buildings, and general other tints may be made of it in the same manner as the tints are made for painting in distemper’

Continue Pp 80.

- ‘only with this difference, that the white, instead of being gypsum, should be of lime.
- For crimson, Albin or Pabonazo must be employed, and use these tints properly, it is not necessary to take them out with a spoon, but the colour in the vase should be put into the vase which is to be held in the hands for this kind of painting is all done by means of water.’

Fourth paragraph

- ‘We have now to speak of the white paint for the palette, which may be a portion of the same lime, if it be mild,
- Straining it again through a **very close silk sieve**, for which purpose it must be diluted with much water, otherwise it will not pass through, and even then it will be necessary to stir it with a brush, and then to remove the refuse from the sieve from time to time.
- The lime being suffered to settle, there will be found in the bottom of the jar a white coagulum, which is to be used for the palette, taking it out with a spoon which is to be kept for this purpose only.’

Fifth paragraph

- ‘But if the Blanco de cal (lime white) is of that kind which has been kept in pellets, or dried in a jar, in the manner we have previously mentioned, it will be necessary to break it up, and to put water to it, and after it is well moistened, to grind it again on the stone with a muller.’

Bibliography

Columbia University, “The Making and Knowing Project.” Accessed March 20, 2016, http://www.makingandknowing.org/?page_id=23.

Diderot, Denis. *Encyclopedie ou dictionnaire raisonné des sciences des arts et des métiers*. Volume 23 part 2. Genève, 1781.

Fröberg, Kerstin. “Horsehair as a textile.” Accessed March 12, 2016, <http://fiberarts.org/design/articles/horsehair.html>.

Landi, Sheila. *The textiles conservator’s manual*. Butterworth-Heinemann, 1998.

Merrifield, Mary. *The art of fresco painting, as practiced by the old Italian and Spanish masters: With a preliminary inquiry into the nature of colours used in fresco painting, with observation and notes*. Facsimile, reprint from the first print from 1846. London, 1966.

Kirby, Jo, Susie Nash and Joanna Canon. *Trade in Artists’ materials’: Markets and commerce in Europe until 1700*. London: Archetype publications, 2010.

Philibert, C., and A. Philibert. *Dictionnaire portatif de commerce*. Copenhagen, 1761.

Schoeser, Mary. *Silk*. New Haven: Yale University Press, 2007.