

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 Godbarge, 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),
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The challenges of gilding on glass

**An analysis of adhering methods for gilding on glass,
based on BnF Ms. Fr. 640 fol. 39v and 41v**

Annotation by Corinna de Regt

Assignment for 'The Art Technological Source' class (UvA, 2016), taught by Marjolijn Bol

Transcription of Fol.39v: Trasser sur le verre quelque histoire

<title id="p039v_a3">Trasser sur le verre quelque<lb/>

histoire</title>

<ab id="p039v_b3a">Si tu veulx trasser sur le verre quelque histoire de taille<lb/>

doulce, tu le peulx faire en plusieurs sortes. Pose ta table<lb/>

de verre le plus tanvre que tu pourras sur l'histoire imprimée,<lb/>

& ayant bien nettoyé le verre avecq lessive & cendre, de sorte qu'il<lb/>

ne soict point gras, trasse sur les lignes qui te sont apparentes<lb/>

avecq du noir à huile ou du noir d'escaille, avecq le pinceau, si tu<lb/>

veulx paindre de couleurs en la façon que font les *vitriers*, qui<lb/>

lavent leur table de verre de noir d'escaille & puy esgratignent &<lb/>

descouvrent ce qu'ilz veulent coucher de couleur, laissant ce qui est<lb/>

nécessaire pour les ombres. Mays si tu veulx faire histoires<lb/>

dorées sur le verre avecq fonds de couleurs qui imitent la taille<lb/>

basse des *orfèvres*, dore avecq eau gommée ou suc d'ail ou laict de<lb/>

figuier toute ta planche de verre. Puy humecte entre deulx linges<lb/>

mouillés ton histoire imprimée, & l'estends sur le verre doré.<lb/>

Puy, avecq une espingle manchée au bout d'un petit baston, suys les<lb/>

lignes de ton histoire comme si tu la voulois poncer, & ainsy tu la<lb/>

trasseras naïfvement sur la doreure du verre. Et après tu descouvriras<lb/>

le fonds & ce qui doibt estre vuide avecq une aleine d'acier bien<lb/>

poinctue & resuivras nettement les traicts & accompliras ton ouvrage<lb/>

& feras tes visages & carnations d'argent moulu. Puys rempliras<lb/>
le fonds d'azur d'esmail ou de verdegris ou de fine laque platte<lb/>
destrempée avecq tourmentine clere meslée d'un peu de<lb/>
larne de mastic si tu veulx que les couleurs soient plus unies & ne<lb/>
s'espandent poinct. Après couche au dos du verre & sur les couleurs<lb/>
une foeille d'estain blanche. Et cela sec, tu pourras couvrir de couleur<lb/>
la foeille d'estain pour cacher ton secret. La foeille d'estain<lb/>
donne jour aulx couleurs. Ainsy tu pourras paindre sans estre</ab>

Translation of Fol.39v: Tracing a story on glass

<title id="p039v_a3">Tracing a story on glass</title>

<ab id="p039v_b3a">If you want to trace a story in intaglio on glass, you can do so in different ways. Place your glass pane, as thin as possible, over the printed image, and having cleaned the glass well with lye and ashes so that it is not greasy, trace over the lines visible to you with some oily black or skales black, using a brush, if you want to paint with colors in the manner of *glaziers*, who spread a wash of skales black all over their glasses and then scratch and uncover the areas where they want to apply colors, leaving whatever is necessary for shadows. But if you want to realize gilt stories on glass with a colored background, imitating the *taille-basse* of *goldsmiths*, gild the whole glass with gummy water or garlic juice or fig-tree milk. Then moisten your printed story with two humid linen cloths and lay it down on your gilt glass, then with a pin hafted to a small stick, follow your story lines as if you wished to pounce it, and thus you will

roughly draw it on the gilt glass. And next you will uncover the background and what needs to be cleared using a very sharp steel awl, and retrace precisely the lines and complete your work and make faces and skin colors in pounded silver. Then you will fill the background with enamel azure or verdigris or fine turpentine-soaked laque platte, mixed with a little mastic larme if you want the colors to be more unified and not to flow. Next, apply on the underside of the glass and over the colors a white tin sheet. And once dry, you can cover your tin sheet with color to hide your secret. The tin sheet gives light to the colors. Thus you will be able to paint without

Transcription of Fol. 41v: Couleurs et doreure sur le verre

<div>

<id>p041v_3</id>

<head>Couleurs et <m>doreure</m> sur le <m>verre</m></head>

<ab>Il ne fault pas donner l<m>eau gommee</m> si forte sur le<lb/>

<m>verre</m> pour la couche de ~~lor~~ que de l<m>argent</m> que de l<m>or</m>
pourceq{ue}<lb/>

une foeille d<m>argent</m> est deulx foys plus forte quune foeille<lb/>

d<m>or</m> L<m>argent</m> aussy est plus dur Et par ainsy ne sesgratigne<lb/>

pas si aysem{ent} Q Et si la <m>gomme</m> nestoit pour l<m>argent</m>
un peu<lb/>

forte il ne se refendrait pas si nettem{ent} Quand tu travailles<lb/>

~~Humid~~ lexalation de ton <m>halene</m> humecte la foeille couchee<lb/>

sur le <m>verre</m> & par ainsy il sera bon en travaillant de<lb/>
le chauffer quelque foys Il te fault bien estre curieulx<lb/>
de nettoyer ce que tu veulx estre vuide & servir de champ<lb/>
painct de couleurs Car sil nestoit bien net de la <m>graisse</m><lb/>
& viscosite de la <m>gomme</m> les & aultres choses les couleurs<lb/>
ni seroient pas si nettes Pour avancer besoignes tu<lb/>
peulx <m>poncer</m> Ou pour mieulx coucher de <m>gomme</m> & de foeille<lb/>
sur un <m>papier</m> coupe En ceste sorte il ne te fauldra<lb/>
que bien peu reparer Si tu y veulx faire couleur d<m>or</m><lb/>
sans <m>or</m> mesle du <m>safran</m> sec destrempe avecq un peu de<lb/>
<m>massicot</m>
</ab>
</div>

Translation of Fol. 41v: Colors and gilt on glass

<div>
<id>p041v_3</id>
<head>Colors and <m>gilt</m> on <m>glass</m></head>

<ab>You should not put as strong <m>gummed water</m> on <m>glass</m> for the
<m>silver</m> layer as for the <m>gold</m> layer because a <m>silver</m> leaf is
twice as strong as <m>gold</m> leaf. Also, <m>silver</m> is harder and therefore does
not scratch as easily. And if <m>gum</m> was not a little [too] strong for

<m>silver</m>, it would not crack so clearly. When you work, the exhalation of your <m>breath</m> humidifies the leaf lying on the <m>glass</m>, and therefore it would be good, when working, to heat it up a few times. You have to very thoroughly wash what you want to be empty and used as a surface painted with colors, because if it is not really clean of the <m>gum</m>'s <m>grease</m> and viscosity, and of other things, the colors will not be so clear on it. To advance your work you can smooth with a <m>pumice stone</m>, or [you can do this] to better lay down <m>gum</m> and leaf on a cut <m>paper</m>. This way, you will have to do very little repairs. If you want a <m>gold</m> color there without <m>gold</m>, mix soaked dried <m>saffron</m> with a little bit of <m>massicot</m>.

</ab>

</div>

Introduction

Verre églomisé artworks differ from paintings by their luminous appearance, accomplished through a special technique of reverse painting on glass. Conservators treating these artworks are confronted with diverse ageing issues such as cracking and delaminating paint layers, discoloration and the corrosion of foils.¹ Although the glass offers some degree of protection to the painted surface, the binding medium of most objects today is irreversibly aged and degraded. The color of resins has changed from originally light yellow to a deeper yellow or even dark brown hue.² Humidity has penetrated into arising defects.³ Very fine gold leaf, which was extensively used in the *verre églomisé* technique, has been peeled away.⁴ In order to understand how lamination of the gilded surface has occurred, it is relevant to gain insight into the manner in which this kind of decoration was originally applied. The type of adhesive used to adhere gold and silver leaf to the glass surface may have contributed to its decay. Other factors of influence may have been the thickness of the gold and silver leaf and the different techniques that were used for its application. The way in which the gold and silver decoration was adhered to *verre églomisé* objects will be the focus of this annotation

[[Annotation2016_CorinnaDeRegt_GildingOnGlass_fig1](#): example of *verre églomisé*].

The reconstruction of recipes from document BnF Ms. Fr. 640 triggered my interest in this topic and this document, as well as the results of my own experiments, have consequently served as an important source for this annotation.⁵ The author-practitioner of BnF Ms. 640

¹ Ursula Baumer et al., "Decorative reverse-painted glass objects from the fourteenth to twentieth centuries: An overview of the binding media," *Studies in Conservation*, no. 57: sup1 (2012): S9.

² Baumer, "An Overview," S16.

³ C. Neelmeijer and M. Mäder, "Reverse painting on glass as seen by the proton beam," *Nuclear Instruments and Methods in Physics Research Section B*, Vol. 226, Issue 1-2 (2004): 127.

⁴ Dillian Gordon, "A Sienese *verre églomisé* and its setting," *The Burlington Magazine* Vol. 123, No. 936 (1981): 148.

⁵ BnF Ms. Fr. 640 is a document written by an unknown author-practitioner in France in the late sixteenth century and contains recipes for different types of art. Judging from the fact that the margins of the instructions are filled with the author practitioner's comments on his experiments, the manuscript has most likely been a set of working notes. For more information see: "BnF Ms. Fr 640," The Making and Knowing Project, accessed

does not describe in great detail how one adheres gold and silver leaf to glass, but he mentions in fol. 39v the use of *eau gommée* (gummed water), *suc d'ail* (garlic juice) and *laict de figuier* (fig-tree milk). He also refers to different methods of applying paint and gilding, such as scratching and tracing.

It is my aim to contribute to conservator's understanding of the properties and condition of materials used in the *verre églomisé* objects they are treating. By investigating and putting to test the different options mentioned in the document for applying gold and silver to glass, I have made an attempt reconstruct these recipes in more detail. It has helped to clarify the different artistic techniques and could be valuable when studying the effect of these techniques on the gilded surface of *verre églomisé* objects. Other historical sources and literature on gilding and *verre églomisé* techniques have been consulted as well, for matters of comparison and for additional information. To narrow the topic down somewhat, I have decided to focus mainly on *verre églomisé* techniques from late medieval times and early Renaissance, to remain close to BnF Ms. Fr. 640, which was written in the late sixteenth century.⁶

Verre églomisé and gilding

The general term *églomisé* has been and continues to be used to describe all types of painting or gilding behind glass of any age.⁷ According to Davison, it covers reverse foil engraving, painting on the reverse side of the glass, *amelierung*, (verre) *églomisé*, mirror-painting and

March 21, 2016, http://www.makingandknowing.org/?page_id=23. For more background on my personal experiments, [consult my logbook](#).

⁶ A main source used in this annotation besides BnF Ms. Fr. 640 is Broecke's translation of Cennini's 'Il Libro Dell' Arte', who was an artist himself and wrote his document in the late fourteenth or early fifteenth century for anyone who wished to enter the profession of painting. Cennino intended his treatise as a workshop manual and therefore it is very clear and thorough. Lara Broecke, *Cennino Cennini's 'Il Libro dell'Arte': A New English Translation and Commentary and Italian Transcription* (London: Archetype Publications, 2015), 6.

⁷ Sandra Davison, *Conservation and Restoration of Glass*, 2nd ed. (Oxford: Butterworth Heineman, 2003), 58.

mezzotints.⁸ The term *verre églomisé* is chosen for this annotation to refer to reverse-painted glass objects. It derives from the name of Jean Baptiste Glomy, a picture framer who made frames for reverse glass paintings in eighteenth century Paris.⁹ Its origin is believed to be much older though, dating back to Roman times

([Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig2](#): Roman medallion). Gold glass medallions were detached from the objects they originally belonged to and installed in the walls of tombs.¹⁰ *Verre églomisé* seems to be inspired by the luminous surfaces of enamels.¹¹ Another word used often for the same technique is the German *Hinterglasmalerei*, gold leaf drawing or engraving behind glass.¹² In a Dutch historical document from 1777, the term *Zwarte Konst* is used, although it could refer only to mezzotint in particular.¹³

Verre églomisé involves painting on the reverse side of glass panels, or other transparent supports such as rock crystal, amber, mica or tortoise shell.¹⁴ The paint layers are applied in reverse order, starting with the uppermost layer.¹⁵ The finished painting is viewed through the glass, which produces a glossy, luminous effect with a lot of depth.¹⁶ The painting produced by *verre églomisé* can be applied on the reverse side of the glass in many different ways.

⁸ Davison, *Conservation and Restoration*, 53.

⁹ Neil Stratford, "Notes on enamel and other glass techniques in the second half of the thirteenth century," in *The Westminster Retable: History, Technique, Conservation*, ed. Paul Binsky and Ann Massing, 124-129. (Cambridge: The Hamilton Kerr Institute, Harvey Miller, 2009), 127.

¹⁰ O.M. Dalton, "The Gilded Glasses of the Catacombs," *Archaeological Journal*, Vol. 58, Issue 1 (1901): 227.

¹¹ Helen Howard, "Edmund Crouchback: technique of the tomb of a crusader," in *The Westminster Retable: History, Technique, Conservation*, ed. Paul Binsky and Ann Massing. (Cambridge: The Hamilton Kerr Institute, Harvey Miller, 2009): 328.

¹² Frieder Ryser. *Reverse paintings on glass: the Ryser Collection*, trans. and ed. Rudy Eswarin. (Corning: Corning Museum of Glass, 1992), 10.

¹³ *Nieuwen almanach der konst-schilders, vernissers, vergulders en marmelaers, voor het jaer Ons Heere Jesu Christi M.DCC.LXXVII* (Ghent: Phillipe Gimblet en gebroeders, 1777), 178, 207. For an extract see appendix 4.

¹⁴ Baumer, "An Overview," S9; Davison, *Conservation and Restoration*, 53.

¹⁵ To get an impression of this technique, watch: [Annotation2016_CorinnaDeRegt_GildingOnGlass_Vid1](#): Modern Verre Églomisé.

¹⁶ Baumer, "An Overview," S9.

Known techniques to have been applied are engraving through metallic foil, painting in color and transferring images from prints.¹⁷

Techniques

The manner in which the gold and silver leaf was applied – whether directly on the glass, or underneath or on top of a paint layer – is likely to have influenced its long-term stability. The thickness of the adhesive, the type of the glass used, the structure of the silver and gold and the tools used all determine the condition of the object.

Oil was the predominant binding medium for reverse painting on glass over the centuries.¹⁸

Other binders were used if the pigments required it, if the painter intended to achieve a different impression altogether, or if a different technique such as *Amelierung* was used.

Amelierung is known to have originated in Nuremberg in the sixteenth century and achieved its high point in the Swiss art of *hinterglasmalerei*, which flourished especially in the early seventeenth century.¹⁹ *Amelierung* involved resinous binding media to create layers of colorful translucent lacquer.²⁰ The technique was based on three steps: first, silver or gold leaf was adhered with a very thin adhesive layer onto the glass surface. A fine decoration was then engraved. Various materials were used as adhesives according to historic sources.²¹ The engraved metal foil was decorated with colorful translucent lacquers before another metal foil (silver, tin) was attached as backing material. The light passes through the translucent paint layers and is reflected by the metal foil to enhance the luminosity of the colors. Davison

¹⁷ Ryser, “Reverse Paintings,” 10.

¹⁸ Baumer, “An Overview,” S17.

¹⁹ Davison, *Conservation and Restoration*, 57.

²⁰ *Amelierung* can be traced back to 1532 in Nuremberg (c.f. Baumer, “An Overview,” S17).

²¹ F. Koreny, “Ein unbekanntes Meisterwerk altdeutscher Glaskunst: Hans Wertingers gläserne Hostienschale von 1498,” *RIHA Journal* 007 (2010): 1.

mentions that in *Amelierung*, images were painted on parchment and glued to the reverse painting on glass.²²

Mainly soft resins such as larch turpentine, mastic, but also pine resin and sandarac were identified in objects where the *Amelierung* technique was used. The resins were dissolved either in essential oils and/or alcohol. Due to the presence of polar components in resins they show good adhesive properties on glass²³.

In BnF Ms 640 fol. 39v, the author-practitioner mentions different *verre églomisé* techniques. He first explains how to “trace a story in intaglio on glass”, by either tracing lines with a brush in black, or by applying scales black all over the glass and then scratching away the areas where color needs to be applied. He then continues to explain the *verre églomisé* technique which incorporates gilding. For this purpose, the whole glass was covered with adhesive first, and it was gilded. Then, a “printed story” was laid down on the gilded surface and with a pin the silhouette was traced, so it could be cleared with a steel awl. Faces were made with “pounded silver” and the background painted in different colors. Finally, a white tin sheet was applied to “hide your secret”, which was then colored. This latter, three-phase technique of (1) gilding the glass surface, (2) applying paints and (3) backing the artwork with a sheet of tin foil seems to be comparable to the *Amelierung* technique.

Verre églomisé was not only used for paintings, but for various kinds of decorative objects such as bowls, amulets, bottles and house altars.²⁴ The effect of brilliant colors was not only achieved by the glass, but also by using a resinous binder and translucent pigments such as dragon’s blood. The higher refractive index of the resins compared to oil is better suited for creating translucent colors with higher color saturation.²⁵ In addition, red colored resins such

²² Davison, *Conservation and Restoration*, 57.

²³ Baumer, “An Overview,” S10

²⁴ Baumer, “An Overview,” S9.

²⁵ Baumer, “An Overview,” S16.

as dragon's blood and gum benzoin can be dissolved with the resins but are insoluble in oil, in which they form an undesirably opaque pigment.²⁶

The art of *verre églomisé*

It is not known whether *verre églomisé* was practiced by one particular group of craftsmen at all times, or whether it was practiced by people with different professions in different time periods. The investigation of a reliquary tabernacle made by a Sienese painter showed that the tempera and *églomisé* work were sometimes done by the same hand²⁷. The Walters reliquary, on the other hand, was decorated by two different artists. It therefore seems unlikely that the maker of the *verre églomisé* panels was closely associated with the tempera artist.²⁸ Although *verre églomisé* in most cases involves gilding, there are no indications that it would have been practiced by goldsmiths. As the author-practitioner of BnF Ms. Fr. 640 indicates, gilding was applied “imitating the *taille-basse* of *goldsmiths*” (fol 39v), which seems to confirm that it was indeed not the goldsmith that made these works of art. In the same way, he mentions “if you want to paint with colors in the manner of *glaziers*”, suggesting that it was not an exclusive practice of glass-cutters either. *Verre églomisé* painters seem to have been inspired to develop their own methods for imitating the kind work normally produced by goldsmiths.²⁹ Regarding the types of tools used to make *verre églomisé*, Cennino Cennini in the fifteenth century described in his *Il Libro dell'Arte* how one should apply the gold with a cotton cloth: “...on the paper shovel and lay it carefully on top of the glass where you have wetted and, with a little completely clean cotton, start patting it down carefully so that the white does not

²⁶ Baumer, “An Overview,” S16.

²⁷ Swarzenski, “The localization of medieval *verre églomisé* in the Walters collection,” 55.

²⁸ Georg Swarzenski, “The localization of medieval *verre églomisé* in the Walters collection,” *The Journal of the Walters Art Gallery* iii, (1940): 56.

²⁹ C. Griffith Mann, “Relics, reliquaries, and the limitations of trecento painting: Naddo Ceccarelli's Reliquary Tabernacle in the Walters Art Museum,” *Word & Image*, 22:3 (2006): 257.

get transferred onto the surface of the gold.”³⁰ The author-practitioner of BnF Ms. Fr. 640 does not mention what tools can be used to transfer the gold to the wetted glass surface, but he describes some techniques that can be employed. To smooth the gold leaf, one can use a pumice stone (fol. 41v). Another option he mentions is to “...lay down gum and leaf on a cut paper. This way you have to do very little repairs.” (fol. 41v). Although unclear, the latter method might refer to a stamping technique, where the gold is coated with adhesive before it is applied onto the glass.

The author-practitioner of BnF Ms. Fr. 640 mentions that “When you work, the exhalation of your breath humidifies the leaf lying on the glass, and therefore it would be good, when working, to heat it up a few times.” (fol. 41v). Heating the gold is also mentioned by Jacques Alexandre de Chalmot.³¹ This could mean that the gold leaf may become detached from the surface due to moisture, which would hinder the production of the artwork. Heating the glass plate would make the water evaporate and solve the problem. How that would have been done, could be the topic of another reconstruction.

Adhesives for gilding

Binding media analyses of *Verre églomisé* are very rare, because of the limited number of such objects left to us and their often underestimated importance.³² The production and high quality of was much greater than is generally recognized.³³ Baumer et al. investigated the

³⁰ Broecke, *‘Il Libro dell’Arte’*, 227.

³¹ Jacques Alexandre Chalmot and M. Noel Chomel, *Huishoudelijk woordenboek, vervattende veele middelen om zijn goed te vermeederen en zijne gezondheid te behouden: met verscheidene wisse en beproefde middelen voor een groot getal van ziekten, en schoone geheimen, om tot een hoogen en gelukkigen ouderdom te geraken*. Vol. 2, 2nd ed. (Leiden: Joh. Le Mair, 1769), 687-688, 887. For extracts consult appendix 2.

³² Baumer, “An Overview,” S9.

³³ In the eighteenth and nineteenth century *verre églomisé* was practiced at the level of folk art. Despite the enormous output, *verre églomisé* is not seen as relevant in art history. Artworks in museum collections are not prominently displayed and mostly kept in storage. Also, very few museum catalogues have been published. Davison, *Conservation and Restoration*, 53.

binding media in the paint of 25 *verre églomisé* objects produced in different countries between the fourteenth and early twentieth century. The result of applying chromatography (GC), gas chromatography mass spectrometry (GC-MS) and amino acid analysis (AAA) was the conclusion that drying oils and resins predominated, but gums and proteins were identified as well.³⁴ Because little is known of the composition of the different layers involved in the technique, I have chosen to highlight the subject of adhesives used for gilding.

As a support for painting, glass does not provide an ideal surface: it is smooth, non-porous, even and polar.³⁵ When gold or silver has been applied on top of the paint layer, it will be consequently be affected by this unstable situation. Cennini mentions the importance of a clear, colorless glass and the author-practitioner of BnF Ms. Fr. 640 mentions that the pane should be as thin as possible (fol. 39v).³⁶ The glass is cleaned to degrease the surface.³⁷

Cennini states the glass should be cleaned with strong lye and pieces of charcoal, after it is rinsed with water and dried.³⁸ The author-practitioner of BnF Ms. Fr. 640 mentions cleaning with lye and ashes (fol. 39v).

Gold leaf is too weak to support its own mass and therefore adhesive has to be used to attach it to a substrate.³⁹ As mentioned earlier, the author-practitioner of Fr. 640 mentions three different adhesives to bind gold or silver to the glass surface: “eau gommée” (fol. 39v) or “la gomme” (fol. 41v), garlic juice and fig-tree milk. Although it may seem self-evident that Arabic gum dissolved in water would have been used for *each gommée*, since it is well-known, it is by no means apparent that this was always the case. Willem van der Vuurst

³⁴ Baumer, “An Overview,” S10.

³⁵ Baumer, “An Overview,” S9.

³⁶ Broecke, *‘Il Libro dell’Arte’*, 227.

³⁷ Rubbing with charcoal, such as mentioned by Cennino Cennini, degreases the glass. See: Broecke, *‘Il Libro dell’Arte’*, 227.

³⁸ Broecke, *‘Il Libro dell’Arte’*, 227.

³⁹ Andrew Oddy, “Gilding through the Ages: an outline history of the process in the Old World,” *Gold Bulletin and Gold Patent Digest*, 14 (1981): 76.

in the early nineteenth century distinguished three different kinds of gum: Senegalese, Arabic and Berbers, which each had different color and consistency.⁴⁰ Cennini on the other hand does not mention gum water to prepare an adhesive for gilding on glass, but instead claims that one should: "...get the white of a fresh egg, beat it with a completely clean whisk as you do that for gilding, so that it is thoroughly beaten, and let it settle for a night. Then get a vair brush and wet the glass on its reverse with this white, using the brush."⁴¹ Egg white was recommended for gilding on glass already in Lucca Manuscript, 800 AD. Since that time, it has been mentioned in numerous historical treatises.⁴²

The use of the 'milk' of trees such as the fig-tree to obtain a gum-like adhesive seems not to be uncommon. Van der Vuurst mentions gum of plum trees and cherry trees and so does Jacques Alexandre de Chamot.⁴³ Lambertus Simis does not mention what kind of adhesive is used, but states that one should use ones breath, after drinking brandy wine. This would speeden up the drying process.⁴⁴ In a document from 1747, J.B. Pictorius mentions the use of *verfkryt* [chalk paint], *menie* [lead oxide] and *lynzaad-Oly* [linseed oil] for applying gold to glass, before burnishing it.⁴⁵

When Alexandre de Chamot describes the option of using "gom ammoniak" soaked in vinegar, he mentions that the layer of gum should be left to dry until it sticks only a little still.

⁴⁰ Willem van der Vuurst, *Natuurlijke en oordeelkundige beschrijving der verfwaren: met onderscheidene bijvoegsels en aanmerkingen verrijkt, gedurende een aantal van jaren, met veel moeite en zorg, door eigen onderzoek en ondervinding* (Amsterdam: Wed. H. Gartman, 1819), 66-73. For extracts consult appendix 1.

⁴¹ Broecke, *'Il Libro dell'Arte'*, 227.

By 'vair brush' a brush made of the fur of the Russian and Scandinavian squirrel is meant (Broecke: 32).

⁴² Eva Rydlová et al., "Two Stangengläser from the collection of the Museum of Decorative Arts in Prague: Decorative techniques, material analyses, and conservation," *Studies in Conservation*, 60:3 (2015): 189. Also see: Chalmot and Chomel, *Huishoudelijk Woordenboek*, 687-688, 887. For extracts see appendix 2.

⁴³ Vuurst, *Beschrijving*, 66-73; Chalmot and Chomel, *Huishoudelijk Woordenboek*, 687-688, 887. For extracts consult appendices 1 and 2.

⁴⁴ Lambertus Simis, *Grondig onderwijs in de schilder- en verwkunst* (Amsterdam: Erven H. Gartman, 1835), 72. For extracts see appendix 3.

⁴⁵ Since this is likely to produce a white pigment though, one should wonder if this technique was used for verre églomisé in particular. J.B. Pictorius, *Den geheimen illumineer-kunst* (Leiden: J. van der Deyster, 1747), 46. For extracts consult appendix 5.

⁴⁶ The author-practitioner of BnF Ms. Fr. 640 states that one should make a distinction between gold and silver leaf when applying an adhesive layer of gummed water: “You should not put as strong gummed water on glass for the silver layer as for the gold layer because a silver leaf is twice as strong as gold leaf.” (fol. 41v). This would suggest that one should apply a less strong adhesive for silver, since the silver leaf is sturdier and less likely to crack. Because of the softer nature of gold, a stronger adhesive may be necessary to prevent it from tearing. On the other hand, one would expect a thin gold leaf to require less adhesive strength than heavier, stronger silver leaf to adequately adhere to the glass surface. The author-practitioner continues: “Also, silver is harder and does not scratch as easily.” (fol. 41v). For the *verre églomisé* technique where scraping away those parts of the gilded surface that will be painted on is required, it would be an advantage if the silver leaf is adhered with a strong adhesive. On the other hand, it might be rather difficult to remove the silver at all if the gummed water is too strong. The author-practitioner concludes his passage stating: “And if gum was not a little [too] strong for silver, it would not crack so clearly.” It is unclear if ‘cracking’ is used to refer to the undesired tearing of gold or silver by the force of the (too strong) adhesive, or to the scraping away of the gold or silver leaf that is aimed for as part of the technique. To gain a better understanding of what the author-practitioner means to say, I have decided to investigate the effects of stronger and weaker layer of adhesive on silver and gold leaf.

⁴⁶ “...nog een weinig kleevend is; als dan legt er *blad-goud* op dat men met katoen neerdrukt...”/ “...is still a little bit sticky, if that is the case then put gold leaf on it by pressing it down with cotton...”. Chalmot and Chomel, *Huishoudelijk Woordenboek*, 687-688, 887. For extracts consult appendix 2.

Reconstruction

Cennini states that as soon as the glass is evenly wetted with a layer of egg white adhesive, one should “take a piece of the gold, which should be really strong (that is, matt)”.⁴⁷ For another recipe where gold is needed for burnishing and for mordants, Cennini mentions that “...one should not draw other than a hundred pieces of it from a ducat...” and “...when you want to know about the gold, have a look when you buy it. Take it from a person who is a good goldbeater and have a look at the gold, and if you see that it is marbled and dull like a kid parchment then take it to be good.”⁴⁸ One can assume that the thickness of gold and silver leaf has varied over time and that artists may have asked for custom-made leaves. Varying karat weights and thickness will have influenced the type and amount of adhesion used for applying gold to glass. In my experiments, modern 22.5 karat gold leaf has been used, which is not historically accurate but the closest material I could find. The silver leaf was noticeably thicker and heavier, which at least offered the possibility of performing experiments which depended on comparison of differences between silver and gold adhesion. For the experiment, two glass plates were divided into rectangular spaces, ranging from a-z and from aa-ff

[[Annotation2016_CorinnaDeRegt_GildingOnGlass_fig3](#): glass test plates before gilding].

Earlier, the plates had been cleaned with ashes and sodium hydroxide. Different types of paint (blue: enamel azure, green: verdigris, red: turpentine soaked laque platte) were applied to the glass surface with a brush, which would later be covered by silver and gold leaf. Some spaces were left blank, so direct adhesion of silver and gold leaf to the glass could be tested as well. After applying the paint, the glass plate was left to dry for almost 24 hours. When dry, a thin and a thick layer of two different prepared bottles of unpurified Arabic gum were applied to

⁴⁷ According to Broecke, the translation of the Italian appannato is ‘frosted, steamed up’, but should be interpreted as ‘matt’ in this context (Broecke, *‘Il Libro dell’Arte’*, 174.).

⁴⁸ Broecke, *‘Il Libro dell’Arte’*, 174.

some of the square spaces [[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig4](#): Arabic gum] [[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig5](#): glass plate 1 gilded] [[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig6](#): glass plate 1 gilded - reverse]. The content of the bottles was the same, except one contained a more runny substance (with higher water content) than the other. The different Arabic gum solutions have been applied to study the difference between a ‘weak’ and a ‘strong’ gum, as described by the author-practitioner of BnF Ms. Fr. 640. It is unknown if ‘strong’ referred to the water/gum ratio, or the thickness of the applied layer, which should be kept in mind when considering the accuracy of the experiment. The other adhesive used in this experiment is garlic juice. The third adhesive mentioned by the author-practitioner of BnF Ms. Fr.640, fig-tree milk, was impossible to acquire within a short time period and therefore unfortunately has not been tested. After the application of the different adhesives, silver and gold leaf were applied with modern gilding brushes. Since I am unpracticed in gilding and mastering the craft takes considerable time, it should be kept in mind that the results of the experiments maybe be influenced by discrepancies or erroneous application. After gilding with gold and silver, the glass plates were left untouched for a week. Then, the adhesion of the gold and silver leaf on the different spaces was compared. A few remarkable results deserve attention: First, it is clearly noticeable that the garlic juice produces a well visible, aesthetically displeasing dark layer which distorts the luminous effect of the glass and causes the glass to look ‘dirty’ [[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig7](#): glass plate 2 gilded] [[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig8](#): glass plate 2 gilded – reverse]. The spaces that were not covered with paint however (q,r,s,t), do not show this undesirable effect as much. The components of the paint seem to react with the garlic juice, or to discolor it. It is therefore unlikely to assume that garlic juice was used as an adhesive when silver or gold leaf

was applied behind a paint layer. It could have been used in those places where only silver or gold was used however.

Unfortunately, the differences observed between the spaces where the ‘weak’ and the ‘strong’ adhesive has been applied, are too minimal to draw sound conclusions. The advantage of applying a thin layer is that there is less chance that the adhesive will be visible through the glass. Tearing and cracking related to the adhesive layer has not occurred in any of the spaces because. Gold was more difficult to apply than silver, mainly because of the thinner leaf. Paint seems to complicate the application of silver and gold leaf in all cases. Enamel azure (blue) provided the least problems and verdigris (green) the most.

In literature on modern *verre églomisé*, one occasionally encounters the use of gelatin as an adhesive.⁴⁹ Therefore, a separate test plate following the same procedure was made at a later moment with gelatin to test this adhesive’s properties as well

[[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig9](#): glass plate with gelatin]

[[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig10](#): glass plate with gelatin - reverse]

⁵⁰. A clear difference can be observed between the application of gelatin and the earlier discussed adhesives. Gelatin helps to smooth out the surface of the silver and gold leaf and produces a very even, aesthetically pleasing result. However, because of the stretching effect the adhesive has on the silver and gold, cracks easily occur. Cracking grew worse after a couple of weeks [[Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig11](#): glass plate with gelatin – cracking].

⁴⁹ Anthony Thorn, *Techniques of the Gilders: Being a Survey of the Many Methods of Gilding Past and Present* (Regina: University of Regina Archives & Special Collections, 2009), 4, accessed March 23, 2016, http://www.uregina.ca/library/assets/docs/pdf/finding_aids/techniques_gilders_anthony_thorn.pdf.

⁵⁰ After the experiment I consulted more (historical) literature, but could not find any references anymore to the use of gelatin. Therefore I have come to suspect that gelatin was not used during Renaissance yet. Examples found on the internet seem to all concern gold letter art, folk art or instruction for modern practitioners of *verre églomisé*.

Conclusion

From the consulted literary sources and the performed experiments, some careful conclusions can be drawn about the use of adhesives for binding gold and silver leaf to glass as part of the *verre églomisé* technique.⁵¹ It has become clear from the experiments that in order to prevent undesired optical effects, a very thin layer of adhesive must have been used by the artist. If paint is applied to the glass first, care must be taken to let it dry completely before adding an adhesive layer for gilding. The adhesive must not react with the components of the paints used. In the case of direct gilding on glass without an intermediate paint layer, fewer obstacles seem to have been present. This leads to the assumption that it must have been preferable to apply the gold first and to scratch away the areas to be colored with paint, which is a technique that is also described by the author-practitioner of BnF Ms. Fr. 640. The tin foil covering at the back of the pane provided a metal effect quite similar to that of gilding with gold or silver.

What exactly the author-practitioner meant when differentiating between applying a thin or a thick layer of adhesive depending on whether one uses gold or silver is still unclear, because the experiment did not show any obvious differences between the two options. In case of the gelatin, the more the adhesive dried out, the more the gilded layers suffered cracking. For future research, it would be interesting to investigate if different ratios of gelatin and water could help prevent this problem. This could be relative information to conservators dealing with cracked and flaked *verre églomisé*. Another, bigger type of experiment could involve a test of all known adhesives used for *verre églomisé* (including the reference to egg white, which I encountered too late to involve in my own experiment and the hard to come by

⁵¹ One should keep in mind however, that almost every aspect of the performed reconstruction requires further investigation. The outcome of the experiment is influenced by the type of glass used, the ingredients of the paints and adhesives and the manner of application.

fig-tree milk) in relation to gold and silver leaf of varying sizes. Other topics that could be looked into are the heating of the gilded layer such as mentioned by the author-practitioner (fol. 41v) and the effect of burnishing.

Since there are many different techniques and materials used for *verre églomisé*, each artwork requires an individual approach to treatment.⁵² Technical research of samples of old adhesives or reconstructed adhesives are essential for identifying complex mixtures. This information can be related to historical recipes and documents.

For conservators dealing with *verre églomisé* objects, it is important to choose restoration materials that correspond with the properties that must have been desired by the original artists as well: they should have adequate refractive indices, good adhesion properties, transparency and show stability of color.

⁵² Baumer, “An Overview,” S10.

List of illustrations and video material

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig1: 'Example of verre églomisé object'.

Name of object: Panel.

Museum number: C.22-1923.

Photographer: unlisted.

Copyright: Victoria and Albert Museum, London.

Source: <http://collections.vam.ac.uk/item/O3530/the-deposition-panel/> (accessed on March 23, 2016).

Description: This panel was made in Italy in the sixteenth century and gives an impression of what verre églomisé looks like, which will help when trying to picture the materials and techniques that are discussed in this annotation.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig2: 'Roman medallion'.

Name of object: Medallion.

Museum number: 1052-1868.

Photographer: unlisted.

Copyright: Victoria and Albert Museum, London.

Source: <http://collections.vam.ac.uk/item/O119621/medallion-unknown/> (accessed on March 23, 2016).

Description: This Roman medaillon dates from ca. 200-400 AD. It was made by applying gold-leaf to glass, which was scratched with a needle point to create a portrait. Finally, a second layer of glass was pressed on top of the image, creating a 'sandwich' of glass. Portrait medallions were sometimes made as jewelry, but most were set in the base of bowls used for special ceremonies. Later they were re-used as grave markers.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig3: 'glass test plates before gilding'.

Photo: De Regt, 18-02-2016.

Description: For the experiment, different paints were applied to the glass surface. This photo shows how some spaces were left unpainted, for direct application of gold and silver on glass.

During the next step, the following layers were applied:

Plate 1: Arabic gum

- a. Thin layer gummy water + gold leaf
- b. Thin layer gummy water + silver leaf
- c. Thick layer gummy water + gold leaf
- d. Thick layer gummy water + silver leaf
- e. Enamel azure + thin layer gummy water + gold leaf
- f. Enamel azure + thin layer gummy water + silver leaf
- g. Enamel azure + thick layer gummy water + gold leaf
- h. Enamel azure + thick layer gummy water + silver leaf
- i. Verdigris + thin layer gummy water + gold leaf
- j. Verdigris + thin layer gummy water + silver leaf
- k. Verdigris + thick layer gummy water + gold leaf
- l. Verdigris + thick layer gummy water + silver leaf
- m. Turpentine soaked laque platte + thin layer gummy water + gold leaf
- n. Turpentine soaked laque platte + thin layer gummy water + silver leaf
- o. Turpentine soaked laque platte + thick layer gummy water + gold leaf
- p. Turpentine soaked laque platte + think layer gummy water + silver leaf

Plate 2: Garlic juice

- q. Thin layer garlic juice + gold leaf
- r. Thin layer garlic juice + silver leaf
- s. Thick layer garlic juice + gold leaf
- t. Thick layer garlic juice + silver leaf
- u. Enamel azure + thin layer garlic juice + gold leaf
- v. Enamel azure + thin layer garlic juice + silver leaf
- w. Enamel azure + thick layer garlic juice + gold leaf
- x. Enamel azure + thick layer garlic juice + silver leaf
- y. Verdigris + thin layer garlic juice + gold leaf
- z. Verdigris + thin layer garlic juice + silver leaf
- aa. Verdigris + thick layer garlic juice + gold leaf
- bb. Verdigris + thick layer garlic juice + silver leaf
- cc. Turpentine soaked laque platte + thin layer garlic juice + gold leaf
- dd. Turpentine soaked laque platte + thin layer garlic juice + silver leaf
- ee. Turpentine soaked laque platte + thick layer garlic juice + gold leaf
- ff. Turpentine soaked laque platte + think layer garlic juice + silver leaf

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig4: 'Arabic gum'.

Photo: De Regt, 18-02-2016.

Description: Unpurified Arabic gum was used for this experiment, which was prepared as a viscous, but smoothly applicable substance. Two different bottles were prepared, with

different water/gum ratios, in order to test the effect of a weaker/stronger adhesive on gold and silver leaf adhesion on glass.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig5: 'glass plate 1 gilded'.

Photo: De Regt, 25-02-2016.

Description: On this glass plate, 'weak' and 'strong' Arabic gum was applied, before it was covered with silver and gold leaf.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig6: 'glass plate 1 gilded – reverse'.

Photos: De Regt, 25-02-2016.

Description: Reverse side of the glass plate covered with Arabic gum and silver and gold leaf.

This is the side of the glass that would be visible in case of the *verre églomisé* technique.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig7: 'glass plate 2 gilded'.

Photo: De Regt, 25-02-2016.

Description: On this glass plate, thin and thick layers of garlic juice were applied, before it was covered by silver and gold leaf.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig8: 'glass plate 2 gilded – reverse'.

Photo: De Regt, 25-02-2016.

Description: Reverse side of the glass plate covered with garlic juice and silver and gold leaf.

This is the side of the glass that would be visible in case of the *verre églomisé* technique.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig9: 'glass plate with gelatin'.

Photo: De Regt, 25-02-2016.

Description: On this glass plate, an even layer of gelatin dissolved in water was applied. It was then covered with silver leaf and gold leaf, which smoothened out relatively easily.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig10: 'glass plate with gelatin – reversed'.

Photo: De Regt, 25-02-2016.

Description: Reverse side of the glass plate covered by gelatin and silver and gold leaf. This is the side of the glass that would be visible in case of the *verre églomisé* technique. One can see the gold is more fragile than the silver.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Fig11: 'glass plate with gelatin – cracking'.

Photo: De Regt, 14-03-2016.

Description: This photo shows cracking of the silver leaf due to stress caused by the drying adhesive.

Annotation2016_CorinnaDeRegt_GildingOnGlass_Vid1: 'Modern Verre Églomisé'.

Name of the video: Verre Églomisé by Yanny Petters.

Creator of the video: Yanny Petters

Copyright: Yanny Petters

Link to original video: https://youtu.be/_Q1oUI-aH24

This video shows a modern interpretation of verre églomisé, which gives an impression of the material and techniques involved.

Bibliography: Primary Sources

Chalmot, Jacques Alexandre de, and M. Noel Chomel. *Huishoudelijk woordenboek, vervattende veele middelen om zijn goed te vermeerderen en zijne gezondheid te behouden: met verscheidene wisse en beproefde middelen voor een groot getal van ziekten, en schoone geheimen, om tot een hoogen en gelukkigen ouderdom te geraken*. Vol. 2, 2nd ed. Leiden: Joh. Le Mair, 1769.

Nieuwen almanach der konst-schilders, vernissers, vergulders en marmelaers, voor het jaer Ons Heere Jesu Christi M.DCC.LXXVII. Ghent: Phillipe Gimblet en gebroeders, 1777.

Pictorius, J. B., *Den geheimen illumineer-kunst*. Leiden: J. van der Deyster, 1747.

Simis, Lambertus. *Grondig onderwijs in de schilder- en verwkunst*. Amsterdam: Erven H. Gartman, 1835.

Vuurst, Willem van der. *Natuurlijke en oordeelkundige beschrijving der verfwaren: met onderscheidene bijvoegsels en aanmerkingen verrijkt, gedurende een aantal van jaren, met veel moeite en zorg, door eigen onderzoek en ondervinding*. Amsterdam: Wed. H. Gartman, 1819.

Bibliography: Secondary Sources

Baumer, Ursula, Fiedler, Irene, Bretz, Simone, Ranz, Hans-Jörg and Dietemann, Patrick. "Decorative reverse-painted glass objects from the fourteenth to twentieth centuries: An overview of the binding media." *Studies in Conservation*, no. 57: sup1 (2012), S9-S18.

Broecke, Lara. *Cennino Cennini's 'Il Libro dell'Arte': A New English Translation and Commentary and Italian Transcription*. London: Archetype Publications, 2015.

Dalton, O.M. "The Gilded Glasses of the Catacombs." *Archaeological Journal*, Vol. 58, Issue 1 (1901), 225-253.

Davison, Sandra. *Conservation and Restoration of Glass*. 2nd ed. Oxford: Butterworth Heineman, 2003.

Ryser, Frieder. *Reverse paintings on glass: the Ryser Collection*. Translated and edited by Rudy Eswarin. Corning: Corning Museum of Glass, 1992.

Gordon, Dillian. "A Sienese verre eglomisé and its setting." *The Burlington Magazine*, Vol. 123, No. 936 (Mar., 1981), 148-153.

Griffith Mann, C. "Relics, reliquaries, and the limitations of trecento painting: Naddo Ceccarelli's Reliquary Tabernacle in the Walters Art Museum." *Word & Image*, 22:3 (2006): 251-259.

Howard, Helen. "Edmund Crouchback: technique of the tomb of a crusader." In *The Westminster Retable: History, Technique, Conservation*, edited by Paul Binsky and Ann Massing, 319-340. Cambridge: The Hamilton Kerr Institute, Harvey Miller, 2009.

Koreny, F. "Ein unbekanntes Meisterwerk altdeutscher Glaskunst: Hans Wertingers gläserne Hostienschale von 1498." *RIHA Journal* 007 (2010): 1-27.

Neelmeijer, C. and Mäder, M. "Reverse painting on glass as seen by the proton beam." *Nuclear Instruments and Methods in Physics Research Section B*, Vol. 226, Issue 1-2 (2004), 126-135.

Oddy, Andrew. "Gilding through the Ages: an outline history of the process in the Old World." *Gold Bulletin and Gold Patent Digest*, 14 (1981): 75-79.

Rydlová, Eva, Kopecká, Ivana, Kunicki-Goldfinger, Jerzy J. "Two Stangengläser from the collection of the Museum of Decorative Arts in Prague: Decorative techniques, material analyses, and conservation". *Studies in Conservation*, 60:3 (2015): 185-193.

Stratford, Neil. "Notes on enamel and other glass techniques in the second half of the thirteenth century." In *The Westminster Retable: History, Technique, Conservation*, edited by Paul Binsky and Ann Massing, 124-129. Cambridge: The Hamilton Kerr Institute, Harvey Miller, 2009.

Swarzenski, Georg. "The localization of medieval verre églomisé in the Walters collection." *The Journal of the Walters Art Gallery* iii, (1940): 55-68.

The Making and Knowing Project. "BnF Ms. Fr 640." Accessed March 21, 2016.
http://www.makingandknowing.org/?page_id=23.

Thorn, Anthony. *Techniques of the Gilders: Being a Survey of the Many Methods of Gilding Past and Present*. Regina: University of Regina Archives & Special Collections, 2009.

Accessed March 23, 2016.

www.uregina.ca/library/assets/docs/pdf/finding_aids/techniques_gilders_anthony_thorn.pdf

Appendix 1: Extracts from Willem van der Vuurst

“Deze naam [gom] is van eene verbazende uitgestrektheid, want bijna alle gewassen die op de aarde groeijen, zoo bomen, struiken, ja, sommige planten leveren, door de werkingen en gistingen hunner vochten, gommen op.”⁵³

“...de Senegalsche, Arabische en Barbarijsche gom; die van den pruim- en kersenboom; de dragant-gom; de elemni-gom, de mirre gom, de bensoin gom, de copaal gom en de Elastique gom zijn sappen, die door de natuur zelve worden voortgebracht...”⁵⁴

“De gommen, welke tot de verfwaren behooren, zijn de drie volgende soorten, namelijk: de Senegalsche, Arabische en Barbarijsche; de eerste en de laatstgenoemde hebben Afrika tot hun vaderland, de tweede hoort in Azië, en wel in Arabië thuis.”⁵⁵

“De algemeene eigenschap dezer drie genoemde gomsappen bestaat hierin: dat dezelfde met eenig andere stoffen onvermengd blijven en zonder smaak of reuk zijn moet; dat zij zich schielijk in het smelten ontbindt; gesmolten zijnde, een lijmachtige stoffe oplevert...”⁵⁶

About Senegalese gum:

“Hare *qualiteit* is ongemeen wit, zacht en broos van aard, ja, men kan sommige stukjes tussen de vingers tot poeder wrijven.”⁵⁷

⁵³ Vuurst, *Beschrijving*, 66.

⁵⁴ Vuurst, *Beschrijving*, 66.

⁵⁵ Vuurst, *Beschrijving*, 66.

⁵⁶ Vuurst, *Beschrijving*, 67.

⁵⁷ Vuurst, *Beschrijving*, 68.

“In vroegere tijden zifte men deze soort van gom ook hier; en men telde toen de volgende soorten, als: gom in soorten, deze naam droeg de ongezifte in het algemeen, grove gezifte, fijn gezifte, en het gruis en zand; het laatste werd voor geringe prijzen verkocht.”⁵⁸

About Arabic gum:

De tweede soort is afkomstig uit de Levant en heeft de volgende eigenschappen: “...welke doorgaans meerder hardigheid bezit om klein te maken, en nogtans tot dezelfde gebruiken dient als de eerste...”⁵⁹

“Wanneer dezelve somtijds wat minder wit valt en wat meer naar het roode helt, bestempelt men haar met den naam van Turksch-Arabische gom...”⁶⁰

“Deze soort van Arabische gom is dikwijls vermengd met roode en doorschijnende stukken, en voornamelijk met dezulke, welke naar het bruine hellen en veel overeenkomst met de Senegalsche, met mirre of andere welriekende gom hebben, die in het gebruik nadeelig zijn.”

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About the Berber gum:

“De Barbarijsche gom werd vanuit Marokko aangeleverd. Dit wordt als de minste van de drie beschouwd, want: “...zij valt doorgaans klein van stuk, wankleurig van aard, poeijerig, onzuiver en harsachtig.”⁶²

⁵⁸ Vuurst, *Beschrijving*, 71.

⁵⁹ Vuurst, *Beschrijving*, 69.

⁶⁰ Vuurst, *Beschrijving*, 69.

⁶¹ Vuurst, *Beschrijving*, 69.

⁶² Vuurst, *Beschrijving*, 70.

About cherry tree and plum tree gum:

“De gom van den pruim- en kersenboom kan men wezenlijk onder de gomsoorten rekenen, alzoo het eene uitpersing of uitdringing der sappen van den pruim- en kersenboom is, die door de hitte der lucht en zon opgedroogt en hard wordt. Zij is van niet den minsten dienst, heeft deugd noch kracht, wil in het geheel niet smelten, en dien alleenlijk om de boven beschrevene gom te vervalschen; vooral geeft de gom van den pruimboom, die met de Senegalsche, zoo in gedaante als kleur, veel gelijkenis heeft, gelegenheid, om deze vervalschingen te doen.”⁶³

Appendix 2: Extracts from Jacques Alexandre de Chalmot & M. Noel Chomel

“Andere doordringende vergulding

Neemt *Arabische gom* en een weinig *borax*, laat het in genoegzaam zuiver water bij een vuur smelten, en vervolgens een nacht overstaan; hier mede bestrijkt het glas, of maakt er met een schoone penceel of veer zodanige figuren of letters op, als gij begeert, legt dan t *bladgoud* op en laat het droogen; zet het glas daarna in een oven, en laat het wel heet worden; zo zal het goud er nooit afgaan.”⁶⁴

“Andere vergulding zonder vuur

Neemt het wit van een eij, klopt het zo lang met een stomp roedje in een schotel, tot dat het geheel schuim is, en laat het dan wat staan, zo zal het een klaar lijmerig vogt worden; doet daar een weinig *saffraan* bij, en schildert of schrijft met dit mengzel zodanige figuren op het glas, als gij begeert, en als het bijna droog en nog maar wat kleevoerig is, legt er stukjes *bladgoud* op, en laat het droogen; als het dan wel droog is, wrijft het met katoen af, zo zal het

⁶³ Vuurst, *Beschrijving*, 72-73

⁶⁴ Chalmot and Chomel, *Huishoudelijk Woordenboek*, 887.

overvloedige goud, op de plaats daar geen eijwit gekoomen is, weg gaan en het overige zeer vast zitten, zelfs zo dat het door geen heet water afgaat; dat men vervolgens ook met een wolfstand kan polijsten en fraai blinkend maaken. Op dezelfde wijze kan men het glas ook *verzilveren* met *blad-zilver*.⁶⁵

“Andere manier

Neemt *menie*, *ceruis* en *geele ooker*, van elks even veel, wrijft deeze dingen met gemeene goede *verniss lijn-olie* wel fijn, en tot eene bekwaame dikte, en dit mengzel op dezelfde wijze als het eij-wit hier boven. Tot het *verzilveren* kan men alleen *ceruis* neemen, en die met *verniss* bereiden. Merkt. Dat men het glas vooraf eerst met wel *krijt* of fijn gepoederde *leevendige kalk* moet, anders zou het goud zomtjids ook op plaatzen vast kleeven, daar het niet wel schoon is.⁶⁶

“Nog andere goede manier

Neemt *gom ammoniak*, weekt hem een nagt in sterke *azijn*, zo zal hij zig tot een heel wit poeder ontbinden; giet dan den *azijn* af en wrijft dit gom-poeder op wrijfsteen, met een weinig *arabische gom* of zuivere *gom van kerse boomen* wel zaamen, daar een weinig *zuiver water* bij doende, tot een bekwaame dikte; met dit mengzel schildert of schrijft op het glas het geene dat begeert, en laat het droogen tot zo ver dat het nog een weinig kleevend is; als dan legt er *blad-goud* op dat men met katoen neerdrukt, gelijk men bij alle met bladgoud doen moet om het overal te vatten en wel effen worden; laat het glas dan een overstaan te droogen en dan het overvloedige goud, door wrijving met katoen, weggenoomen zijnde, laat het op een zagt vuur of in een maatic warme oven droogen, en dan weer langzaamerhand koud worden; dit

⁶⁵ Chalmot and Chomel, *Huishoudelijk Woordenboek*, 687-688.

⁶⁶ Chalmot and Chomel, *Huishoudelijk Woordenboek*, 688.

verguldzel zal heel schoon zijn, en door generlei vogt veranderen. Op deeze wijze kan men ook *gladde steenen, ijvoor* en alle soorten van *metaalen* vergulden.”⁶⁷

Appendix 3: Extracts from Lambertus Simis

Lambertus Simis mentions that the application of gold leaf by artists to make figures should be done in the same way as when applying gold letters on glass. He describes this procedure as:

“Vervolgens vergulden willende, maakt men met een zacht lederen lapje, of met eene spons, de letters zeer voorzigtig schoon, zonder de kanten te beschadigen: daarna snijdt men het goud op een verguld-kussen aan strooken, welke breeder zijn dan de letters; of zij die niet gewoon zijn van het kussen te vergulden, snijden de strookjes in de pers; evenwel is, in dit geval, het vergulden van het kussen veel beter en gereeder, om dat men het goud gelijk en minder beschadigd kan opbrengen. Vervolgens neemt men beste brandewijn in den mond, spoelende dezelve daar mede om, waarna men, den mond van den brandewijn ontledigd hebbende, op het glas sterk ademt, zoo dat de letters eenigzins daarvan beslagen worden, leggende er voorts zoo spoedig mogelijk het goud op; vervolgens beademt men weder een ander gedeelte, tot dat het geheele werk verguld is. Dat men brandewijn moet nemen, in plaats van den gewoonen vochtigen adem, is, om dat de geest van den brandewijn het goud minder benadeelt, en om dat het ook spoediger droogt. Men laat het goud dat te ver gekomen is, zoo berusten, zonder het af te stoffen of uit te wisschen; alleenlijk kan men, als het noodig is, hetzelfde, aanstonds na het verleggen, met een weinig zacht catoen op drukken, echter zonder wrijving.”⁶⁸

⁶⁷ Chalmot and Chomel, *Huishoudelijk Woordenboek*, 688.

⁶⁸ Simis, *Grondig*, 72.

Appendix 4: Extracts from an anonymous author

The anonymous author of this document writes:

“Ik en zal hier niet spreken van de Schilderinge op de Print achter glas, die men Zwarte Konst noemt, dit zult gy in een bezonder Heofdstuk volkomentlyk uytgeleyd vinden.”⁶⁹

“...ik hebbe u gezeyd, dat ik ter oorzaeke van de Verwe veranderde het order in de andere maniere van schilderen gevolgt, leggende eerst voor al op order van terugkeeringe, die, de welke de verhoogzelen maeken, en ten laetsten de gene die dienen voor den grond en ontwerpen; om dat gy wel vat, dat men het glas omkeerende, onder het welk de Schilderinge zig alsdan bevind, de Voorworpzelen dwers door ziet, en vervolgens en ziet men niet meer de ongeregeldtheyd der uytdeynzinge van de Verwen, aengezien men de verhoogzelen en uytspongen geplaetst ziet op den grond en op de ontwerpzelen.”⁷⁰

Appendix 5: Extracts from J.B. Pictorius

“N. 73. Gout op Glas te leggen

Vryf Kryt en Menie even veel swaarte, met Lynzaad-Oly ondereen, legt het op, en als het byna droog is, bruineer het.”⁷¹

⁶⁹ *Nieuwen*, 178

⁷⁰ *Nieuwen*, 207.

⁷¹ Pictorius, *Geheimen*, 46.