

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:

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Spike lavender and lavender spikes

The essence of spike lavender in the varnish recipes of BnF Ms. Fr. 640

Sepha Wouda



Distillation of herbs and flowers in the 16th century on cover of Eucharius Röblin, *Kreuterbüch. Von natürlichem Nutz und gründlichem Gebrauch der Kreutter, Bäum, Gesteud, unnd Früchten fürnemlich Teutscher Lande etc.* (Franckfurt am Meyn: Egenolffen, 1550).

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Craft and Science in a Sixteenth-Century Artist's Manuscript:
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Contents

General introduction	2
Transcription and translation	3
Annotation	
Introduction	4
What is <i>l'huile d'aspic</i> ?	4
The occurrence of spike lavender before BnF Ms. Fr 640	5
The production of spike lavender oil	6
The use of spike lavender oil in painting	8
Spike lavender oil within the manuscript	10
The reconstruction	11
Conclusion	13
References	14

Appendices

- Appendix 1: Images
- Appendix 2: The use of spike lavender oil in BnF Ms. Fr. 640
- Appendix 3: The properties of spike lavender oil in BnF Ms. Fr. 640

General introduction

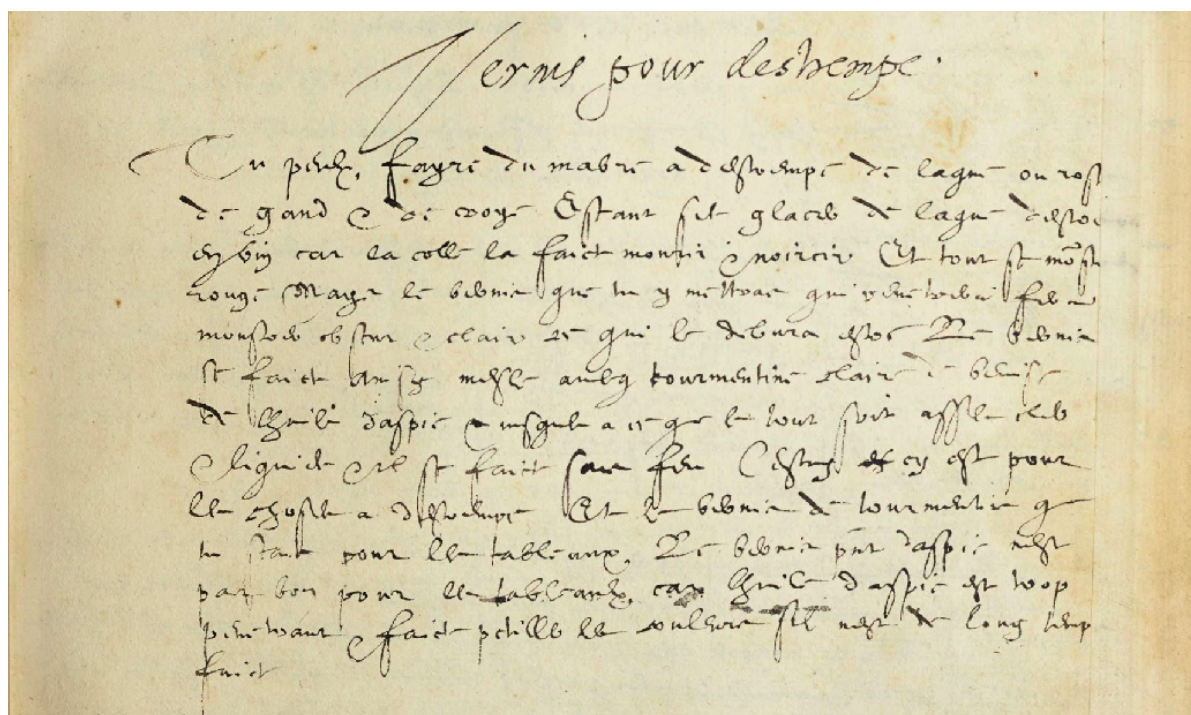
This annotation is written within the scope of The Making and Knowing Project: Craft and Science in a Sixteenth-Century Artist's Manuscript: An Open-Access Digital Edition and Translation of BnF Ms. Fr. 640 directed by Prof. dr. Pamela Smith of Columbia University New York. The BnF Ms. Fr. 640 is an anonymous French manuscript from the *Bibliothèque nationale de France* in Paris and was probably written at the end of the sixteenth century. It most likely originates from the region of Toulouse, in the south of France.¹ The manuscript contains a great collection of handwritten recipes and techniques, which range from making sieves and preparing varnishes to coloring wood and molding snakes.

In the context of the course The Art Technological Source, directed by dr. Marjolijn Bol, a selection of recipes from the manuscript have been researched and reconstructed by small groups of students in order to contribute to the project. Our group studied the recipe for making varnish for tempera on folio 56r of the manuscript. As the recipe inspired us to not only reconstruct the varnish but also the tempera marble on which it would be applied, the group was split in two. This annotation is part of the historical reconstruction of the varnish, which was carried out by Rosa Boute, Samuel Johansson and Sepha Wouda.

Challenging aspects of the experiments were how to find historically accurate ingredients and how to determine ratios and techniques, which are not described in the recipe. In order to find clues, the other recipes in Ms. Fr. 640 as well as earlier and contemporaneous recipes were studied extensively. The experiments that have been done during the reconstruction week are recorded in a separate logbook with field notes.² Afterwards every student formulated a research question in order to write an annotation for the recipe. The goal of the annotations was to generate answers to the questions and difficulties that arose during the reconstruction of the recipe.

¹ Many recipes in the manuscript mention (the region of) Toulouse, as stated in 'Clues to author and text' > 'Place of work' on Google Drive.

² See: [Logbook 'Varnish for tempera' \(fol.56r\)](#)



Transcription:

<title id="p056r_a2">**Vernis pour destrempe**</title>

<ab id="p056r_b2"> Tu peulx fayre du **mabre** a destrempe de **laque** ou **rose**<lb/>
de gand & de **croye** Estant sec glacer de **laque** destre[mpee]<lb/>
en **vin** car la **colle** la faict mourir & noircir Et tout se mo{n}st[rera apres]<lb/>
rouge Mays le **verniss** que tu y mettras qui penetrera fera<lb/>
monstres obscur & clair ce qui le debvra estre Le **verniss**<lb/>
se faict ainsy mesle avecq **tourmentine claire de venise**<lb/>
de **lhuile daspic** & jusques a ce que le tout soit asses cler<lb/>
& liquide & il se faict sans feu Cestuy es cy est pour<lb/>
les choses a destrempe Et le **verniss de tourmentine** que<lb/>
tu scais pour les tableaux Le **verniss pur daspic** nest<lb/>
pas bon pour les tableaux car **lhuile daspic** est trop<lb/>
penetrante & faict petiller les couleurs sil nest de long temps<lb/>
faict</ab>

English translation:

<title id="p056r_a2">**Varnish** for tempera</title>

<ab id="p056r_b2">You can make **tempera marble** with **lacquer** or **rose of Ghent** and **chalk**. Once dry, glaze it with **lacquer** mixed with **wine**, for **glue** will dull and blacken it. And the whole will firstly appear red, but the **varnish** you will apply, which will penetrate it, will make dark and light parts appear as they should. The **varnish** is made like this: mix with clear **Venice turpentine** some **aspic oil** until it becomes clear and liquid, and this is done without fire. This is for things done in tempera, and the **turpentine varnish** that you know is for panel paintings. Pure **lavender spike varnish** is not good for panel paintings because **lavender spike oil** is too penetrating and makes colours shine unless it has been made long beforehand.</ab>

Introduction

This annotation focuses on one of the ingredients of the varnish recipe on folio 56r related to which the following research question will be addressed:

What is the essence of spike lavender in the varnish recipes of BnF Ms. Fr. 640?

Since *l'huile d'aspic* is often used throughout the manuscript, it is important to acquire more knowledge about this ingredient and its properties, not only for the reconstruction of varnish for tempera marble but for other recipes as well. In addition, there has been confusion over the name and appearance of the plant from which the oil was produced that needs to be clarified.

As there are different species of lavender and different types of lavender oil the first step is to define what the ingredient *l'huile d'aspic* exactly is and how it must be translated in English. Then the use of the oil in the ages prior to the manuscript will be discussed, followed by a description of the production and its use in painting. In the next paragraph the use and properties of *l'huile d'aspic* within the manuscript will be addressed. Finally a part of the reconstruction will be discussed followed by the results of the research and a suggestion for the translation of *l'huile d'aspic*, which will be explained in the conclusion.

What is *l'huile d'aspic*?

In many recipes for varnishes, the author-practitioner of BnF MS. Fr. 640 uses the ingredient *l'huile d'aspic*. In the extensive work *The Genus Lavandula*, Tim Upson and Susyn Andrews state that the oil produced from the species *Lavandula latifolia* [fig.1], meaning broad-leaved lavender, is known as oil of spike, oil of aspic, *Oleum Spicae* or *essence d'aspic*. Spike lavender oil is a colorless to pale yellow volatile oil with a strong camphorous and penetrating odour. In the past, this essential oil was used in the pharmaceutical and perfumery industry but nowadays it is only produced in small amounts. Upson also mentions its former use as a diluent in the manufacture of varnishes and lacquers.³

The spike lavender plant is a woody, dome-shaped shrub with long, slender flower spikes. It seems likely that *L. latifolia* was already known by Pliny the Elder in 76 AD under the name

³ Tim Upson and Susyn Andrews, *The Genus Lavandula* (Richmond: Kew, 2004), 79, 171.

Pseudonardus. Spike lavender is commonly found in southwest and south-central Europe in France, Spain and Italy on shallow calcareous soils [fig.2].⁴

Confusion in the naming of lavenders has occurred due to the different ancient names for lavender. The name *Lavandula spica* has variously been applied to both *L. augustifolia* and *L. latifolia*, as stated by Upson, who advised to not use the name *L. spica* in any sense.⁵ To add to the confusion, spike and *spica* also refer to the inflorescence of flower stalks in general. So both lavender and spike lavender have spikes. The many different names in different languages have in common that they all refer to the Latin word *spica*, meaning head or ear of crops.⁶ So in order to make the distinction between ‘normal’ lavender oil and spike lavender oil, the name should contain a form of *spica*.

From a chemical point of view, spike lavender oil is a mixture of both hydrocarbon and oxygenated monoterpenoids and some sesquiterpenoids. According to Mills and White, it has been known since the beginning of the 16th century.⁷

The occurrence of spike lavender before BnF Ms. Fr 640

According to Upson, lavender was first described in the twelfth century treatise *Physica* of the abbess, musician and herbalist Hildegard von Bingen (1098-1179).⁸ The first book of *Physica*, which was written in Latin, discussed the scientific and medical properties of various plants, among which lavender and spike lavender.

Spike lavender (*spica*) is hot and dry, and its heat is healthy. Whoever cooks this lavender in wine or, if he has no wine, honey and water, and frequently drinks it when it is warm, will lessen the pain in his liver and lungs, and the stuffiness in his chest. It also makes his thinking and disposition pure.⁹

⁴ Upson and Andrews, *Genus Lavandula*, 166-171.

⁵ Upson and Andrews, *Genus Lavandula*, 119.

⁶ English: aspic oil, spike lavender oil, spike oil, oil of spike. French: huile d’aspic, essence d’aspic. Italian: olio di spigo, oglio d’aspigo (oglio di spico, oglio di spiga: Paduan Manuscript). German: Spicköl, Oleum Spick. Dutch: spijk olie. Latin: *Oleum Spicae*, *Oleum de Spica*.

⁷ John Mills and Raymond White, *The Organic Chemistry of Museum Objects* (Oxford: Butterworth-Heinemann, 1999), 97.

⁸ Upson and Andrews, *Genus Lavandula*, 1.

⁹ Hildegard von Bingen, *Physica*, trans. Priscilla Throop (Rochester: Healing Arts Press, 1998), 22.

The appearance and properties of spike lavender are often mentioned in herbal treatises that appeared in the course of the 16th century. Hieronymus Bock (1498-1554), a German botanist and physician, described *Lafander* and *Spica* in his *Kreüterbuch*, first published in 1539 [fig.3]. Bock mentions similarities between the species but emphasizes the differences in appearance and action. Spike is in everything, including its smell, stronger, broader, longer and higher than lavender. Both have healing properties because of their warming and pungent quality but spike more than lavender.¹⁰ However, confusion about the appearance of the two lavender species apparently remained, as shown by an illustration from another herbal that was published in 1550 [fig.4].

Bock's treatise was revolutionary because it provided detailed descriptions and illustrations, which derived from nature. In the 1577 edition a chapter about distillation was added. This clearly indicates that the practise of distillation was expanding during the 16th century.

The production of spike lavender oil

Until the late 15th century, the distillation of essential oils appears to have been minimal in Europe. The art of distillation was greatly advanced by the treatise *Liber de arte distillandi de simplicibus* of the Strasbourg physician Hieronymus Brunschwig (ca.1450-ca.1512), which was published in the year 1500 [fig.5]. The book received general recognition and numerous other treatises on the distillation of medicinal waters appeared in the course of the 16th century.¹¹

¹⁰ Hieronymus Bock, *Kreüterbuch. Darinn Underscheidt, Namen etc.* (Straßburg: Rihel 1551), 85-86. "Lafander unnd Spica, wie wol die zwen standen einander fast änlich seindt, mit wurzeln, holz, blettern, stengelen, blümen, und samen. So ist doch der Spica in gemelten dingen, dem Lafander überlegen. Das aber die zwen stauden nit einer art sein, kan ein jeder am geruch wol fülen. Dann Spica reücht fast anderst, unnd vil stercker, dann Lafander. Die Stengel seind an ihn beyde vierecker, ein wenig hol. Die bletter ganz Eschfarb grün, breiter und lenger dann der Rosmarein hat. Die blümen diser stauden wachsen am obersten des stengels, wie ein Spica (...) Von der kreüter underscheid. Was nun der Spica mit blettern, blümen, ähern, stengel, geruch, breiter, lenger, höher, dicker, und stercker ist, das ist der Lafander schmärer, kürtzer, niderer, dünner, milter, und lieblicher, und on zweiffel nützer (...) Von der Kraft und würckung. Spica und Lafander seindt bede hitziger qualitet, doch Spica mehr dann der Lafander, Beder eigenschafft ist erwermen, zertheilen, und außzuführen (...) Spica Nardi blümen möchten zů vorgesatzten krankheiten, umb irer warmen und scharpffen qualitet willen, auch also genützt und gebraucht werden, aber von mir, bis anher unuersücht bliben."

¹¹ Mills and White, *Organic Chemistry*, 97.

Brunschwig mainly describes the methods of preparation of the ‘burnt waters’, the directions for their use and an explanation of their action. He describes the virtues of common lavender water but also mentions the distillation of *oleum de spica*, made of the flowers of *spicula*, which grow in the Provence and can best be distilled in the month of June.¹²

Walther Hermann Ryff (ca.1500-1548) who was a surgeon in Strasbourg also states in his *Reformierte Deütsche Apothek* (1573) that spike lavender grows abundantly in the Provence near Narbona where they make a precious oil of it by means of a special distillation. *Oleum Spick* can be found in all apothecaries but “the common man calls it *Sanct Marien Madalenen öl*.”¹³ This is probably the first reference in German literature to the essential oil industry, which existed in France as early as the 16th century.¹⁴

By that time however, the distillation of oils from herbs and flowers was already known by many and took place in the larger households where the essential oils were used for medicinal and culinary purposes.¹⁵ In his *Le Vite*, Giorgio Vasari describes a story about Leonardo da Vinci (1452-1519) who apparently distilled oils and herbs to make varnish: “It is said that, on being commissioned by the Pope to do a work, he straightaway began to distil oil and herbs to make the varnish, which induced Pope Leo X to say: ‘This man will never do anything, for he begins to think of the end before the beginning!’”¹⁶

¹² Hieronymus Brunschwig, *Liber de arte distillandi, de simplicibus (Kleines Distillierbuch)* (Strassbourg: Grüninger, 1500), vol.1, fol.72. “Lavender wasser, das krut von den latinischen lavendula und in tütscher zungen lavender genant, ist ein krut gemeinglich yederman bekant, doch so ist syn zweigestalt, das ein von den latinischen spicula und von den tütschen spic genant, des vyl wachsen ist in dem land provinz. Zü dyser zyt ouch in tütscher nation glich dem gemeinen lavender, von des blümen ein öl würt gemachet mit putrisieren und dystillieren genant oleum de spica von dem ich hie nit schriben bin, sunder allein von dem gemeinen lavender. Das beste teil und zyt syner dystillierung ist krut und blümen under einander gehact unnd gebrant im brach monat.”

¹³ Gualtherum H. Ryff, *Reformierte Deütsche Apoteck*, (Straßburg: Rihel: 1573), fol.188-191.

“(…) aber in der Provinz inn Franckreich umb Narbona, da man solliches gewächß hauffecht unnd überflüssig hat, würt es durch ein sonderliche distillierung bereitet, wie man dann solliches öl auch von anderen nutzlichen unnd wolriechenden kreütteren, blümen, früchten, wurzeln abziehen mag. Diß öl findet man inn allen Apotecken, darinn würt es Oleum Spick genennet, der gemein Mann nennet es Sanct Marien Madalenen öl, Marsilier öl (…)” (fol. 191)

¹⁴ Eduard Gildemeister, *The volatile oils*, (New York: Wiley, 1913), 48.

¹⁵ Donald C. Fels, *Lost secrets of Flemish painting . Including the First Complete English Translation of the De Mayerne Manuscript*, B. M. Sloane 2052, (Hillsville: Alchemist, 2004), 40.

¹⁶ Giorgio Vasari, *The lives of the Painters, Sculptors and Architects*, volume 2, trans. A.B. Hinds, ed. William Gaunt (London: Dent, 1963), 166.

Full-scale cultivation of lavender only began in the 1920s in the south of France, as stated by Upson. Before that time, all oil of spike derived from wild plants. In the course of the 19th century, the collecting of wild lavender in the mountains became more organised and even distilling the oil was done in situ. The first modern distilleries were built around 1914 in Sault and Barrême. However, spike lavender oil being of a lesser quality than lavender oil and lavandin oil (a hybrid between lavender and spike lavender) was only cultivated on a small scale.¹⁷ This is confirmed by an article from 1907 in the *Bataviaans Nieuwsblad*, the leading and daily newspaper in the Dutch East Indies, which describes the flower fields and distillation industry in Grasse in the south of France. From the article it is clear that at that time, lavenders were still collected in the mountains. The amount of lavender that was picked was about three times as much as the amount of spike. The essential oils were produced by means of steam distillation and collected in high containers.¹⁸

In contrast, Jill Dunkerton and others state that lavender was already cultivated and distilled on a large scale during the 14th century. Eleven stills appear to have been located around Dijon in France. The oils were produced for medical purposes and perfumes but according to the authors spike oil might already have been used in painting at that time.¹⁹

¹⁷ Upson and Andrews, *Genus Lavandula*, 35,78-79,168.

¹⁸ “Odeurfabricatie”, *Bataviaasch Nieuwsblad*, ed. D.A. Hooyen, No. 40, (Batavia: Kolff, 19 January 1907), 17-18. “De industrie voor het uittrekken van de zuivere bestanddelen der bloemen is geconcentreerd te Grasse, een klein stadje bij Canea (...) Zoo uitgestrekt zijn daar de bloemenvelden, dat de odeurfabrikanten over heel de wereld van hieruit voorzien worden. Grasse beheerscht de wereld van een bloemen-standpunt! Gedurende het heele jaar zijn de Grassers dan ook in hun bloemenvelden bezig. In Maart en april bloeien de viooltjes (...) In augustus en September worden de tuberozen geplukt 175.000 pond. Dan 1.320.000 pond jasmijnen, 65.000 pond spijk en 176.000 lavendel, waarvoor de Grassers de hoge Alpen op moeten, waar zij de bloemen verzamelen en tevens uitzoeken.” (italics added) “De menschen in de distilleerderijen zijn even druk bezig als de plukkers; wanneer de bloemen binnen zijn, halen zij er de fijne oliesoorten uit (...) De wijze waarop de Grassers de fijne odeurs uit de bloemen trekken, getuigt wel voor hun bekwaamheid op dit gebied; zij weten het hoogste in deze industrie te bereiken. Rosemarijnen, thymys, lavendel, geraniums, rozen en oranjebloemen worden gedistilleerd in stoomdistilleerkolven met een inhoud van 300 tot 60.000 liter. De stoom en de geëxtraheerde olie worden in vloeibaren toestand samengebracht in condensoren, waaruit de olie verder wegloopt. Het gedistilleerde bloemenwater wordt samengebracht in hooge reservoirs, want dat is natuurlijk verzadigd met de kostbare essence.”

¹⁹ Jill Dunkerton et al., “Methods and materials of Northern European painting in the National Gallery, 1400-1550,” *National Gallery Technical Bulletin*, vol. 18 (London: National Gallery Publications,1997), 41.

On balance, there are various opinions about when large-scale distillation of essential oils in Europe developed but it clearly boomed during the 16th century, as already noted in the previous paragraph. Therefore, the occurrence of spike lavender oil in BnF Ms. Fr. 640 is quite comprehensible.

The use of spike lavender oil in painting

Sources until the 15th century describe varnishes composed of resins and drying oils, usually linseed oil. In the beginning of the 16th century, varnishes composed of resin with the addition of an essential oil begin to appear. The essential oils commonly used in painting were naphtha, oil of turpentine and oil of spike. These spirit-based varnishes dry quicker. However, it is often not stated whether the varnishes were to be used on paintings or for other purposes.²⁰

Sir Charles Lock Eastlake is of the opinion that Leonardo distilled essential oils himself, which he added to his paints in order to avoid the formation of a yellow film on the surface of his work. His colors, ground in linseed oil and diluted with essential oil, would dry partly by evaporation. Eastlake argues that Leonardo might have been the first who used essential oils in painting as Vasari stated that the artist “undertook extraordinary experiments in seeking for oils to paint with, and varnishes to preserve the finished pictures”. According to Eastlake, this could not have been the commonly used oil varnishes but most likely an essential oil varnish. And as Leo X saw Leonardo distilling herbs to make a varnish, these could be no other than lavender, from which spike oil was distilled because no other essential oils but petroleum and oil of turpentine were used by the Italian painters in that period. Spike oil was also used as a secret ingredient to avoid the yellowing of linseed oil, especially in light colors.²¹

Written references to the use of essential oil or spirit-based varnishes in painting only start to appear in treatises and manuals from the 16th century onward. In his *De veri precetti della pittura* (1587), Armenini states that a varnish of *oglio d’abezzo* (turpentine resin) and *oglio di sasso* (petroleum) was commonly used throughout Lombardy. He also mentions that

²⁰ Jill Dunkerton, Jo Kirby, Raymond White, “Varnish and early Italian tempera paintings.” *Cleaning, Retouching and Coatings, Preprints IIC Congress* (Brussels, 1990), 66-67.

²¹ Sir Charles Lock Eastlake, *Methods and materials of painting of the great schools and masters*, vol. 2 (New York: Dover, 1960), 99-109.

Correggio and Parmigianino used this type of varnish in their works in the beginning of the 16th century.²² A recipe for a varnish made of *sandracca* (sandarac) and *olio di spigo* (spike oil), which is boiled and applied warm on the painting is described in Raffaello Borghini's *Il Riposo* of 1584.²³

By the 17th century, spike lavender oil was often used as a volatile diluent for paints and varnishes.²⁴ For example, ten varnish recipes with spike oil are recorded by Théodore Turquet de Mayerne in *Pictoria Sculptoria et quae subalternarum atrium* (1620-1646). Pierre Le Brun noted one recipe in *Recueil des essais des merveilles de la peinture* (1635) and the *Paduan Manuscript* (17th century) describes three varnishes with spike lavender.²⁵ Moreover, the French apothecary Pierre Pomet (1658-1699) wrote in his *Histoire générale des drogues*, which was first published in 1684, that oil of spike is used by painters, farriers and also as a medicine. He describes six types of varnish among which *Le vernis siccatif*, a drying varnish prepared of aspic oil, fine turpentine and sandarac.²⁶

In summary, recipes for the preparation of spirit varnishes were first mentioned in late 16th century Italian sources such as Armenini's and Borghini's treatises. Before the 16th century, no such varnishes are described. BnF Ms. Fr. 640 is in this sense a unique document, as it contains French recipes with spike lavender oil from the 16th century. This might also indicate that the recipes are original and not dating from a much earlier period.

²² Giovanni Battista Armenini, *De' veri precetti della pittura* (Ravenna: Francesco Tebaldini, 1587), 128-129. "(...) alcuni dunque pigliavano del oglio d'abezzo chiaro, e lo facevano disfare in un pignattino à lento fuoco, e disfatto bene, li ponevano tanto altro oglio di sasso (...) e questa vernice è tenuta la piu sutile, e più lustra d'ogni altra che si faccia; io ho veduto usarla così per tutta Lombardia da i piu valenti, e mi fu detto che così era quella adoprata dal Correggio, e dal Parmegiano nelle sue opere (...)" See also: Giovanni Battista Armenini, *On the true precepts of the art of painting*, trans. and ed. Edward J. Olszewski (New York: Burt Franklin & Co, 1977), 195.

²³ Raffaello Borghini, *Il riposo di Raffaello Borghini* (Firenze, 1584) 221. "La vernice, che secca all'ombra altresì in due modi si può fare. Prendasi per lo primo un oncia d'olio di spigo, e un oncia di Sandracca in polvere, ò vero vernice grossa, e mescolate queste cose insieme si facciano bollire in pentolino vetriato nuovo; e chi volesse la vernice di più lustro vi metta piu Sandracca, e mentre bolle si mescoli benissimo, & essendo ben disfatta si levi dal fuoco, e come è tiepida cō diligenza si metta in opera, che questa è vernice molto gentile, & odorifera."

²⁴ Dunkerton et al., "Methods and materials," 41.

²⁵ VERNIX, online database of varnish recipes found in ancient textual sources, Cité de la Musique, Paris. <http://vernix.citedelamusique.fr/vernix/infodoc/page-daccueil-infodoc.aspx>

²⁶ Pierre Pomet, *Histoire générale des drogues traitant des plantes, etc.* (Paris, 1694), 184-185, 290.

The use and properties of spike lavender oil within the manuscript

Oil of spike is widely used within the recipes throughout the manuscript, especially as an ingredient in varnishes (see appendix 2). However, the recipes are not always described as being specifically for picture varnishes. The author-practitioner systematically used the term *lhuile daspic* or *le vernis (dhuile) daspic*.

The manuscript gives a lot of information about the properties of spike lavender oil in the various recipes (see appendix 3). The author-practitioner described the following properties:

Spike lavender oil is less thick than nut oil, is clear like water, should not be fatty, is penetrating, evaporates when heated, dissolves Venice turpentine without fire, dissolves sandarac,²⁷ is a fast cleaning agent for brushes and seals unpainted horn. Oil of spike is not good for all colors and lakes since it is too penetrating. Aspic oil “will break up colors that do not have body”, which probably means that the oil is not suitable to be used as a pigment medium but only as a diluent for paints (colors that do have body). In many recipes it is used as a solvent for terpene resins and oils.

Spike lavender varnish is penetrating, has good drying properties independent of temperature, dries quicker than turpentine varnish, gives gloss without polishing, is clear and not very white. Spike lavender varnish is not good for colors and not suitable for verdigris.

According to Mary P. Merrifield, Italian painters of the sixteenth century mixed a little oil of spike with their colors (in a nut or linseed oil medium) to keep them firmer. The oil would evaporate soon and make the colors flow and work more easily. Essential oils are also powerful solvents and may disturb paint that is not thoroughly dry. In addition, oil of spike is used to clean pictures although care has to be taken to not remove glazings as well as the dirty varnish.²⁸ These applications and properties are comparable to the ones mentioned in the manuscript.

In summary, spike lavender oil is mainly used as a solvent for resins in the preparation of varnishes and as a diluent for paint or varnish in order to increase its fluidity.

²⁷ Fels, *Lost secrets of Flemish painting*, 194, (Ms p.53): De Mayerne's states that sandarac cannot be dissolved in turpentine oil but only in pure spike oil.

²⁸ Mary P. Merrifield, *Medieval and Renaissance Treatises on the arts of Painting* (New York: Dover, 1999), 232, 248.

The reconstruction

According to the recipe, the varnish for tempera marble had to be prepared of Venice turpentine and spike lavender oil. No other instructions for the preparation are described in the recipe but to mix these ingredients without fire.

Two types of Venice turpentine were tested during the experiment: Venetiaanse terpentijn of Verfmolen De Kat, which contains colophony and Lärchenterpentin of Kremer pigmente, which has no colophony added and might therefore be a more pure product. Due to the extra colophony, the first mentioned resin had a darker color. Also two types of oil were tested: oil of spike lavender of Lefranc & Bourgeois and lavender oil of Kremer [fig.6].

The reconstruction consisted of 10 experiments (#2-11) to define the best type of Venice turpentine, the ratio of both ingredients and the application technique of the varnish.²⁹ Two final experiments (#12-13) followed to test the chosen varnishes on the panels with tempera marble that were prepared by the other group. The goal of experiment #1 was to test the quality of the lavender oils according to a test described in the manuscript.

(fol. 71v_1) Heed well that the aspic oil is quite clear and not at all fatty, otherwise your varnish will not be worth anything. You can test it by soaking some paper in it and heating it. If the oil, which will evaporate, leaves the paper clean, without a yellow mark, it is good, if not, it is fatty

(fol. 67r_1) All oils, which are absorbed in paper and when warmed evaporate in the fire and leave a clear paper just like turpentine and aspic oil, are good for varnishing

The fact that the author-practitioner included such a test is probably due to the existence of other lavender oils and adulterated oils.³⁰ The recipe describes how to test the quality of lavender oil and says that it should evaporate without leaving a yellow or fatty stain. The Kremer lavender oil initially left a stain that seemed to be fatty but not yellow, which disappeared after one and a half hour. [fig.7]. The L&B spike oil evaporated much faster without leaving a stain, just as the

²⁹ See: [Logbook 'Varnish for tempera' \(fol.56r\)](#)

³⁰ Pomiet states that spike oil is frequently adulterated with oil of turpentine and given an amber color with a little petroleum. However, “the deceit is easy to discover as real oil of spike has to be clear with an aromatic scent and it is the only oil which is able to dissolve sandarac.” (my translation) Pomiet, *Histoire des drogues*, 184-185.

author-practitioner described in the manuscript. Therefore this oil was chosen for preparing the varnish. While writing this annotation, it became clear that we had made the right choice, as lavender oil is a totally different product with different properties than spike lavender oil.

During the reconstruction the spike lavender oil revealed its properties and its true character. Firstly, it had a flowery but very pungent smell, which might be the camphorous tones mentioned in literature. Secondly, it dissolved the Venice turpentine readily even without heat, which means it is a strong solvent and thinner for terpene resins [fig.8-9]. Its penetrating powers became also apparent during the application of the prepared varnish on the different test panels. Especially the bare wood and the tempera marble without glue were easily penetrated. Lastly, the spike lavender varnish had a strong darkening effect on the tempera marble [fig.10-11], as mentioned in literature by J.A. van de Graaf.³¹

In the Paduan manuscript a recipe of Venice turpentine and oil of spike can be found, which have to be melt together over a slow fire. The varnish has to be used hot and it is mentioned that wood needs a glue ground and colors should be distempered with gum water to avoid penetration of the varnish.³² This is very consistent with our experiences during the reconstruction.³³

Conclusion

Research into spike lavender oil revealed its long history of different applications and its frequent use in painting from the 16th century onward. The need for thinner varnishes with better

³¹ Johannes Alexander van de Graaf, *Het Mayerne Manuscript als Bron voor de schildertechniek van de Barok*, Proefschrift, (Mijdrecht: Verweij, 1958), 73. “Lavendelolie wordt door distillatie van de lavendelplant verkregen (...) Zij veroorzaakt een vervloeiende penseelstreek en sterk nadonkeren.” Note that De Graaf erroneously uses the name lavender oil (*lavendelolie*) instead of spike lavender oil.

³² Mrs. Mary P. Merrifield, *Medieval and Renaissance Treatises on the arts of Painting* (New York: Dover, 1999), 670.

³³ During the reconstruction, the recipe for tempera marble had to be adjusted and a glue isolation layer was applied. Experiment 12 showed that the test panels with glue bound paint absorbed the varnish, resulting in a dark appearance. This could have been caused by the lack of a size layer, which enabled the wood and the chalk to absorb (too) much of the varnish. In the first place it was decided not to apply a size layer, because it is not mentioned in the manuscript. However, it could have been implied knowledge, and hence it was decided to do additional experiments with a size layer, primarily to check whether this would yield better results (see logbook).

drying properties that could be prepared and applied without heat probably led to the addition of essential oils to resins instead of drying oils. Oil of spike was also frequently used as a diluent for paints. However, the manuscript gives evidence that in the 16th century, spirit varnishes have indeed been used as surface coatings and not only as admixtures to fatty oils and paint media. The amount of varnish recipes within BnF Ms. Fr. 640 in which spike lavender oil is used is remarkable and might be related to the availability of this type of oil in France. The fact that the author-practitioner consistently uses the terms '*lhuile daspic*' and '*le vernis (dhuile) daspic*' might be an inspiration to also be consistent in the English translation.³⁴ Therefore I would suggest to use '*spike lavender oil*' or '*aspic oil*' and thus '*varnish of spike lavender oil/ spike lavender (oil) varnish*' or '*varnish of aspic oil/ aspic oil varnish*' in the English translation of the manuscript.

An important issue to be aware of is that oil of spike nowadays might be substantially different from the product used in the 16th century because *Lavandula latifolia* probably has changed over time as well as the distillation process. Moreover, the essential oil production in the past lacked standardization, which probably also influenced the solvent power.³⁵ Therefore, the spike lavender oil we used might have had a greater solvent power than the oils from the past. This probably explains why the varnish penetrated and darkened the tempera marble much more than expected. Accordingly, further research needs to be done into the appearance of tempera marble in the 16th century and into the composition of a matching spike lavender varnish.

As recipes for the preparation of spirit varnishes only started to appear in late 16th century Italian sources, further research might also be valuable on the relation between these recipes and the French ones in BnF Ms. Fr. 640. This might give insight in their origin and in the way certain recipes have to be interpreted.

A valuable aspect of this reconstruction project was to experience the difficulties of interpreting historical sources and the laborious technique of making artists' materials. This gave a new dimension to the theory about varnishes for paintings, which will contribute to a better understanding of historical materials and applications.

³⁴ See appendices 2 and 3 for the different English translations in the manuscript.

³⁵ Fels, *Lost secrets of Flemish painting*, 40.

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Appendix 1:



fig.1 *Lavandula latifolia*: Spike lavender.

Source: Tim Upson and Susyn Andrews, *The Genus Lavandula* (Richmond: Kew, 2004), 167.

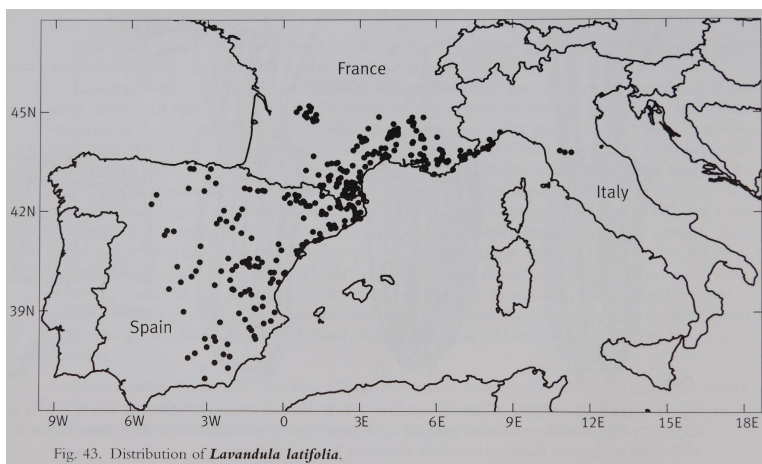


fig.2 Spike lavender is commonly found in south-west and south-central Europe in France, Spain and Italy.

Source: Tim Upson and Susyn Andrews, *The Genus Lavandula* (Richmond: Kew, 2004), 170.



fig. 3 Lavender (left) and spike lavender (right).

Source: Hieronymus Bock, *Kreüterbuch* (Straßburg: Rihel, reprint 1551), 85.



fig. 4 Lavender (right) and spike lavender (left). Note that the lavender species have switched names compared to fig. 3.

Source: Eucharius Rößlin. *Kreuterbuch* (Franckfurt am Meyn: Egenolffen, 1550), 175.



fig. 5 One of many examples of a distillation apparatus in Brunschwig's treatise.

Source: Hieronymus Brunschwig, *Liber de arte distillandi, de simplicibus* (*Kleines Distillierbuch*) (Strassbourg: Grüninger, 1500), 16.

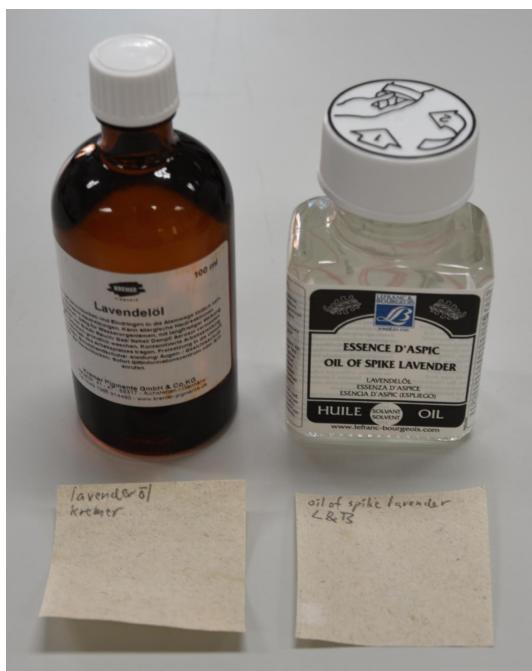


fig. 6 Two types of oil were tested: oil of spike lavender of Lefranc & Bourgeois and lavender oil of Kremer.
(Photograph: S.Wouda)

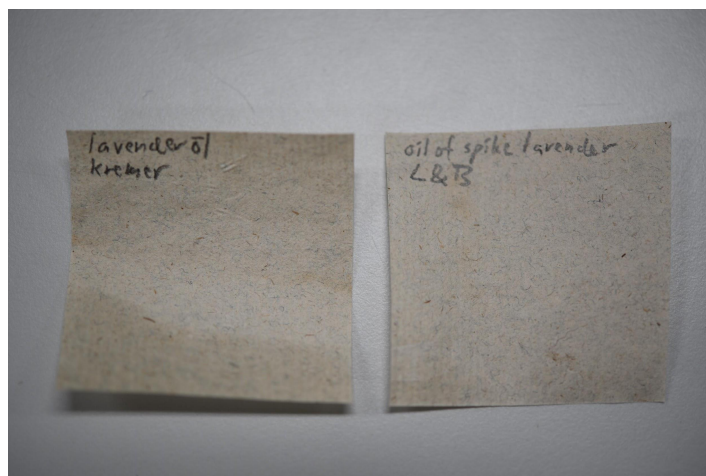


fig. 7 The Kremer lavender oil (left) initially left a stain that seemed to be fatty but not yellow. The L&B spike lavender oil (right) evaporated fast without leaving any stain.
(Photograph: S.Wouda)



fig. 8 Venice turpentine and spike lavender oil (ratio 1:1), just after the oil was added to the resin. Note the stickiness of the resin.
(Photograph: S.Wouda)



fig. 9 Two varnishes prepared of Venice turpentine and spike lavender oil, mixed in different ratios. Note the homogeneous state of the liquid, which means the resin has completely dissolved.
(Photograph: S.Wouda)



fig. 10 Tempera marble test panel with glue size layer before varnish application.

(Photograph: S.Wouda)



fig. 11 Tempera marble test panel with glue size layer after varnish application. Note the strong darkening effect of the varnish, despite the glue isolation layer.

(Photograph: S.Wouda)

Appendix 2: The use of spike lavender oil in BnF Ms. Fr. 640

Folio:

3v_b1: spike lavender varnish: some properties.

4r_1: aspic oil varnish made with lavender spike oil and powdered sandarac gum, heated.

4v_b2: spike lavender oil varnish with charcoal or lampblack.

6r_1: spike lavender varnish mixed with pigments for colored glazings on gold.

10r_1: spike lavender varnish as a base for the colors on imitation jasper made of horn. spike lavender oil to oil the unpainted underside.

29v_1: aspic varnish and sandarac as a top layer to imitate color of gold on silver.

42v_b6: varnish of sandarac, aspic oil and a bit of mastic mixed with white glue ("*bien blanche*") for painting to make white varnish on plaster.

51r_b1: aspic oil applied on a white paper sheet to transfer a pattern from an engraved stone.

56r_b2: aspic oil mixed with venice turpentine to make a varnish for tempera marble.

57r: aspic oil and turpentine colored with powdered turmeric and boiled together to give a gold color on silver.

58r: aspic oil mixed with lead white (plus a little walnut oil) as a paint medium.

58v_5: aspic oil to clean brushes, when the color has dried inside them.

60v_5: aspic oil to clean brushes when they are dry. aspic oil to ruin other painters' work secretly at night.

71v_1: varnish of aspic oil with sandarac and pulverized mastic added, heated.

73v_2: varnish of aspic oil and sandarac (2:1), heated.

73v_3: varnish of venice turpentine, petroleum oil, sandarac and aspic oil (4:1:4:4).

77v_2: varnish of petrol oil and spike lavender oil (1:1) with copperoze, heated.

77v_3: varnish of spike lavender oil and sandarac (1:1), heated, pass through clean cloth.

78r_1: varnish of spike lavender oil and (ground) sandarac (2:1), heated, with paintbrush.

79v_1: varnish of mastic, blood of copperhead snake, gum Arabic, aspic oil (1:1:1:1), heated.

84v_c4c": aspic oil to oil and smear (medals) when casting with sand. (lubricant)

89v_b1: aspic oil to rub a medal for molding a core.

98r_a1: varnish for lutes of turpentine and spike lavender oil and amber, dragon's blood.

Appendix 3: The properties of spike lavender oil in BnF Ms. Fr. 640

Folio:

3v_b1: Spike lavender varnishes penetrate materials that do not contain gum or glue de détrempe such as wood and colors. Glue not needed on iron. Turpentine varnishes do not need any glue since they are fat and viscous and do not penetrate the wood.

4r_1: Aspic oil varnish has good drying properties: ‘the former dries promptly.’ It makes ebony (frames) and guitars glossy, so polishing can be skipped. Good for moldings but less fitting for paintings, not apt for colors.

Note: Aspic oil eats the colors, since it is too penetrating.

4v_b2: Spike lavender oil varnish is a quick dryer (better than turpentine varnish).

6r_1: Aspic varnish is not suitable for verdigris.

10r_1: Clear spike lavender varnish. Oil seals the unpainted horn.

29v_1: Aspic varnish adds gloss.

51r_b1: Aspic oil evaporates when heated without leaving a trace. Heat the paper and the oil will evaporate and will leave the paper white.

56r_b2: Aspic oil will make Venice turpentine clear and liquid without fire. Pure lavender spike varnish (“*le vernis pur daspic*”) is not good for panel paintings because lavender spike oil is too penetrating and makes colors shine.

57r: It dries within a quarter of an hour in winter as well as in summer.

58r: Aspic oil will break up lakes and colors that do not have body. It is very appropriate with colors, which have body and are not greasy.

58v_5: Aspic oil as a fast cleaning agent: brushes will immediately turn soft again as before.

Aspic oil is clear like water, penetrates and less thick than nut oil.

59r_2: Do not use aspic oil on azure.

60v_5: Do not mingle aspic oil with colors, too strong and penetrating (“*brusc et penetrant*”), colors come off afterwards. Aspic oil cleans and softens dried brushes immediately. Aspic oil makes a stain that penetrates up to the wood and makes colors come off.

67r_1: Aspic oil absorbed in paper evaporates when warmed in the fire and leaves a clear paper, therefore good for varnishing.

71v_1: Aspic oil should be clear and not at all fatty. Test: soaking paper and heating it. When oil evaporates, leaving the paper clean without a yellow mark it is good and not fatty.

78r_1: Before applying the varnish, lay a coat of very clear glue.

79v_1: Before applying the varnish, lay a coat of quite clear glue.

84v_c4c”: Aspic oil disappears when reheated because the oil causes bubbling.

97v_1: Mastic varnish is very white and beautiful not at all like the aspic one: aspic varnish is not very white.

97v_1: Spike lavender oil is not as good as turpentine oil for mastic varnish.