

THE XVII-TH CENTURY'S THIXOTROPIC PAINTING MEDIUM

I. THE OLD FLEMISH SCHOOL GELS AND THEIR  
RECONSTRUCTION FOLLOWING RUBENS AND VAN DYCK'S  
RECIPES

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**Abstract:** *The thixotropic medium appeared in the XVII-th century oil painting under the form of different flexible gels. All those gels had permitted the most spectacular painting effects that can be seen in Rubens and Van Dyck's paintings, artists from the Old Flemish School. Investigating historical sources there can be found some media formulas that indicate, in their preparation, the use of drying oils. The medium's behaviour is analysed based on its compounds and properties during the painting process. The consistence differs from "Black oil" or "Oxi-polimerized oil" as the base. The combination in a hot or cold process, of a leaded drying oil with a specified quantity of mastic spirit varnish, appears like a jelly which can be used in glazing technique. Using this famous painting medium represents a starting point for a new conservation and restauration treatment.*

*Keywords: Thixotropic gel medium, Old Flemish School, leaded drying oil, mastic spirit varnish.*

## 1. Introduction

"Thixotropy" ethimologically derives from the Greek terms "thixis" (change) and "tropos" (touch), and it means change produced by a touchable intervention. A thixotropic gel has the characteristic to pass through different stages, from solidification to fluidification, only by a simple gesture of agitation, and then by cooling down, to come back to its initial consistence. The lead's reaction, which incorporates the mastic resin (plays a mechanic fixing role) after the evaporation of solvent agent (that has an active role in combinations) it is in fact the base of the Flemish painting media.

The use of thixotropic gel mediums in the XVII-th century's oil painting had determinated the existence of an impressive number of paintings produced by the Old Flemish School's artists. One of those was Peter Paul Rubens, of whom it is presumed to be the discoverer of the best gel medium formula, making a connection between the First Flemish School characteristics and the Italian School dating dating from the XVI-th century.

The glazing medium has been used during the Gold Period of Dutch and Flemish painting, in the hands of well known painters: Anthony Van Dyck, Johannes, Metsu, Rembrandt van Rijn, Vermeer etc. The composition of this famous gel medium due to the improvements in oil painting technique, which were made in the last period of Renaissance.

## 2. Discussions

Historical documents brought to light a number of possible formulas of this gel, named sometimes "Megilp", "Painter's butter", "English Varnish" or "Flemish medium". Italian Renaissance painters had gradually influenced the Flemish method of painting, due to the spatial and chromatic effects, and to a medium almost perfect that could recreate the illusion part of the reality.

The glazing Baroque technique presents a new vision on form, that demands a gradual fading out of the painting material from the monumental paintings. This pictorial style had determined artists to look for a rapid technique, using a better, most malleable material than their predecessors.

That is how complicated works appear, printed on canvasses stuck on wall, which needed a thicker gel medium, behaving like a gel, that could be easily changed during the execution. Thanks to this special material, based on the new discovery of volatile essences and alcohol, the oil painting conquered all the frontiers in the XVII-th century.

In a same way the essential varnishes appeared, and in combination with oil, the resulting mixture could offer optimal fixing properties, a quicker drying and also durability in the wet Nordic climate. Rubens was the one who transmitted the secret of gel medium to his apprentices, but in time the quality of the vehicle diminishes.

The reconstruction of thixotropic gel medium is based, first of all, on a correct analysis of the formulas that were found in the XVII-XVIII-th centuries in the English School, but in time all remained just a story about this medium existence in XVI-th century [1]. The stories from the XVII-th century [2, 15, 16] talked about a tradition born in the time when Van Dyck and Touquois de Mayerne [1, 19, 20, 21] were servants at the court of Carol I. Something of this deformed technique was still in use in the time of Reynolds [3, 13, 14], under the name of "Megilp" or "Painter's butter" [4, 5]. In the same period had appeared "English Varnish", which has also been used in painting, and it was very popular among the XVIII-th century French writings.

Nowadays, Havel thinks that this old vehicle had deteriorated so much that it remained just a combination between resin and drying oil [6]. Other references date from the XIX-th century and are some kind of promoters to the library labour. The studies made by Canadian scientists [7], and also American modern painters [8, 9, 17, 18] bring to light new insights on this subject.

Studying museum paintings, today specialists try to reconstruct the thixotropic gel medium used by the Flemish School's artists. Rubens canvasses present, on a close watch analysis, a texture so rich and diverse, that has a granulated spum appearance. Also the brush strokes, the trails from the underlayers to the top colour stratification, can be observed. Changes tend to appear in the material aspect, the transparent glaze parts being the most exposed to light, followed by impasto rich colored pasta. It can be observed that the painting

material creates a passing zone through semi-translucid effects and oil pastas, in an amber coloration, almost unreal.

Colour became art, due to Rubens's geniality and the medium used, remaining the greatest technical achievement since then. The upper sources present a starting point by saying that the oil is the thixotropic gel medium's base, which by heating it with a metallic agent becomes a more drying and saponated vehicle.

Analyzing old formulas it can be observed how oil divides itself in two different forms of saponification: one fluid (Black oil) and the other dense (Emplastic oil). Thanks to these modifications, which strictly depend on the incorporated lead concentration as well as the warming conditions (fire, sun), heating temperature (high, low), heating time (shorter, longer), it can be analyzed, from the historical point of view, the manuscript formulas and treatments of drying oil presented in Table 1.

From the analysis the next conclusions can be drawn:

-the oil which was treated with a litharge percentage under 25%, directly on fire, becomes black and fluid. If the litharge quantity is higher than 25%, the lead particles tend to remain in suspension in oil, having a browned appearance, which can be whitened with water intervention.

-“Black oil” tends to be more transparent when a lower quantity of lead ( 2% ) is added. If the raw linseed oil is changed with a nut oil, after the lead treatment and sun bleaching, the oil still has the power to remain fluid.

This lead treated oil is quick drying and thick. [10, 22, 25] ”Liquid soap” it was renamed by Jacques Maroger [4], and became a malleable vehicle, that changes its consistence under brush touches.

The “Emplastic oil” can be obtained by direct fire intervention , as well as adding in it a little quantity of beeswax [11] or virgin wax(10%) [3, 24] at the end of the treatment process. This way, the final product becomes more dense and opaque. If the warming operation implies water, then the emplastic painting medium is lower in coloration and has a creamy appearance, maintaining brush strokes,[4, 6, 23] presenting all the characteristics of an usual soap. Before the painting intervention, it needs to be diluted with a mastic spirit varnish, in order to retain its initial appearance[3].

The lead and lime soap formation offers the product the consistence of a lubricant , and also facilitates mixtures that can contribute in obtaining great effects by incorporating water solutions. This technique implies water in the binding agent and offers precious qualities. If the water and wax proportion grows, it results the Impasto Medium [6] and the Venetian Medium, based on wax.

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**Table 1. "Black oil "recipes**

<b>Compounds</b>	<b>Author-source</b>	<b>Drying oil recipe</b>
1 ½ -2 ounces lead compound 1 pint of raw nut oil	English Manuscript(cited Eastlake) The XVII-th century	Van Dyck's drying oil
With a higher dissolved litharge quantity in oil(in suspension)	English Varnish(cited by Merimée) The XVIII-th century	Black drying oil
With a higher oil presence in litharge. Cold combined lead doesn't colour from the "Black oil"	G.de Lairaisse(cited by Merimée) The XVII-th century	Sun-bleached oil,with fire intervention
5% litharge	Provided by Merimee(cited by Maroger in "Painting technique") The XVIII-th century	"Black oil"
Gold pure litharge ½ ounces 2 drames red lead 1 oka nut oil.	Mayerne Manuscript The XVII-th century	Mytens's leaded oil
6-10% litharge	Maroger-"Secret Formulas and Techniques of Old Masters" the XIX-th century	Maroger's "Black oil"
2 parts linseed/nut oil combined with 1 part litharge becomes a soluble soap(can be prepared in wet conditions just by separating the glycerine agent)	Merimee The XVIII-th century	Merimee's Lead Plaster Oil"
1 part lead compound for 3-4 parts linseed/nut oil	Maroger The XIX-th century	Maroger's Lead Plaster Oil (Antoanello da Me painting media)
1 part litharge 3-4 parts linseed/nut oil 3-4 parts water	Maroger The XIX-th century	White plaster medium (Leonardo da Vinci's painting media)

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Merimee and Maroger thought that wax was a part of the Megilp as the historical sources and formulas had sustained. [3, 4, 14, 15]. The Emplastic oil comes from the ancient medicine [4, 6, 16].

In the past, the painting medium was called "Painting varnish" and it represented a vehicle incorporated in color. In old manuscripts, the term "medium" does not appear. In Latin, "medium" means a "way" or a "modality" that gives value to color nuances. Another role in the execution is to enrich the pastes as well as the binding material, that is how is assured flexibility, versatility, conservation and drying quality. The imagination is free to develop creative possibilities and technical achievements, by adopting the media to the artist's needs. These amazing proprieties can't be obtained with raw oil.

In an usual sense, the term "varnish" assumes a fluid product resulted after an intimate combination between an oil and a resin, being capable of solidificating itself with the aid of a chemical oxidation process. His role is to protect a surface painted in oil or tempera colors. A tempera varnish presents the inconvenience of being too solid and too compact due to the hard resin dissolved in the oil's composition. That is one of the reasons why painters thought to compensate the loses of the varnish with a more thicker oil, less drying, but diluted with a mixture of spirit essences, it could result the "Mixed Varnish".

At the end of the Renaissance the artists of the Venetian School developed this technical part by recreating it into a mixture of leaded oil and Venetian turpentine oil. So Rubens changes the addition of turpentine oil into a mastic spirits varnish. The fragility of a varnish obtained from mastic resin and turpentine has been compensated by the presence of the leaded oil, which played the plastifier's role.

In de Mayerne Manuscript can be remarked how Rubens said to his apprentices to put a little quantity of "Black oil" in the spirits varnish to assure its mobility and durability in the wet climate. This mixture composed from a mastic spirits varnish and lead drying oil will give stability to the painting film after its drying. The transformation in linoxine state implies two processes: one physical process, due to the evaporation of the binding material, and a chemical one, when the initial compounds become a whole new solid composition. Those two processes complete each other and densify the common varnish when the essence evaporates.

Rubens is the first artist that manages to combine, in a cold state, a quantity of Black oil with other almost equal of mastic spirits varnish, to create the thixotropic gel media. The XVII-th century English Manuscript contains recipes from Van Dyck and Kneller that describe in detail this gel medium, obtained by heating, on a low fire, a drying oil with a mastic varnish; the manuscript also says that this was Van Dyck's discovery.

In the XI- th chapter of his book, Maroger is trying to describe Van Dyck's painting technique, and also adopts Doerner's medium, which was in essence the same of Rubens. It was a nut oil heated with a lead carbonate to speed its sicativity, but in the same time it had to be combined with mastic resin dissolved in proportion of 1:2 in spirits of turpentine. This vehicle was implied with colors, excepting lead white.

Another spectacular experience it's due to Maroger and speaks about the combination, in a cold state, between a mastic varnish and lead based oil. The result was a gelatinous painting vehicle.

In presenting the English Varnish, Merimee, based on his own facts and experience, had tried not to color the amber gel, so the Black oil was replaced with a leaded oil prepared without fire. Historical documents shown by the Canadian researcher Leslie Carlyle follow the English School tradition and speak about the obtaining of gel mediums through a variety of ways. The "Megilp" or "Painter's butter" is a well-known mixture of drying oil and spirits varnish, made by cold agitation in a bottle, as Claude Yvel' [12] experiences had shown.

### **The reconstruction of the thixotropic medium**

Studying the nowadays Flemish medium, it can be remarked that it is the result of three basic materials: a drying oil(fluid /dense), mastic resin(purified and powdered), turpentine (double distilled).

Maroger considered this formula his best achievement. He was preoccupied by this subject since 1954 when, with Camil Versinni's help, manages to prepare this thixotropic product, which later became a base for the scientific worker Marc Havel. The medium was trade as an art product from "Bourgeois Aire" as well after the firm fusions with "Le Franc".

The most important ingredient in the Flemish medium is the heated oil that can be stabilized in association with another element, like turpentine dissolved resin. The oil must not spread so it needs this kind of stabilizer. If the essential varnish had been used in the dilution process, after the essence evaporates, it will remain just a compact material that could reject the brush, eventhough it might have permitted "wet on wet" procedure. If all those qualities would have been put in function, for a shorter execution time, and a better, finer form, it still needed a drying oil to be the plastifier.

The process of introduction the varnish in oil colors appears in other sources as well: Strassbourg Manuscript (the XV-th century), Vasari and Van Mander's writings (the XVI-th century) and Mayerne's Manuscript (Gentileschi, the XVII-th century).

### **Conclusions**

It can be observed in the interval between the XV-XVIII- th centuries how common varnish becomes gradually, thanks to new discoveries, "Mixed Varnishes", and finally "Thixotropic gel mediums". The initial maneuverability problems are, in time, controlled due to the thixotropic gel structure, offering great liberty to the painting act.

Brush strokes are different, but diverse, going through different grades of consistence, in the execution time. When the proportion of essence contained by the resin varnish is lower, its evaporation from the thixotropic gel will modify the medium's fluid character. The excess of viscosity or fluidity in the gel will make a harder malleability. Rubens used a quantity of essence each time he mixed colors, so that pastes may remain fresh.

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The new Old Flemish School media is the greatest achievement due to technical progress of the last century, offering precision, impasto character and a whole new chromatic gama, so close to the natural elements, being without exception the key, the secret element used by great painters of the XVII-th century, like Rubens and Van Dyck, to create exceptional artistic works, that hadn't been exceeded until today.

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