

THE XVII-TH CENTURY'S THIXOTROPIC PAINTING MEDIUM

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

CRISTIAN MANGUTA

Valahia University of Targoviste, Faculty of Sciences and Arts, 130082, Targoviste, Romania

Abstract: *At the beginning of the XVII century, in Europe was born a new, exuberant, aristocratic style that served the Catholic Church interests, being manifested through a special dynamic- Baroque. This new vision spreads from Italy to the Flemish countries, and it was represented by virtuosity, rhythm, and grandeur. The genius painters Peter Paul Rubens and Anthony van Dyck were at the top of it, creating a connection between the Flemish culture and the Italian Renaissance ideal. Great cities from Flanders like Bruges, Liege and Anvers had become art developing centers. The media typology that was used for creating a personal painting vision in this period of time was very diverse, in the center of attention being put thixotropic gels. From the very first beginning, Flemish painters wanted a soft, workable material, but in time the needs turned to flexible, consistent pastes, so the richness of detail was more evident. The preparations consisting in lead, oil and mastic resin can be found in paintings dating from this period, as well as in historical sources that were investigated in the previous article, real bases for the practical studio experiences with the gel media recipes.*

The glaze technique was a real improvement of oil painting effects, because of the mediums comparative treatment. The analysis offers clues for a better reconstruction of the old glaze mediums recipes.

Keywords: *Gel mediums, thixotropic character, "Black oil", essential mastic varnish, Old Flemish School, Rubens, Van Dyck.*

1. INTRODUCTION

From the previous centuries artists searched for new painting recipes, that were able to help them create different plastic effects, during the execution. The discovery of the thixotropic compound of mediums and colors was the essential factor for the improvement of a painting aspect and durability. In such conditions was created a complex mixture, that changed the color consistency, stability, offering in the same time enormous working possibilities.

In this article one can observe the systematic creation methodology of two types of thixotropic gels, belonging to Peter Paul Rubens and his apprentice, Anthony van Dyck. The attention was put on recipes that can adjust the understanding of the XVII century oil painting technique.

As the baroque painters discovered, under the great influence of the Italian School, new painting formulas, it is interesting to study their literature and studio research that was taken by the New English School. From this point of view, the evolution of oil painting

medium suffered gradual modifications, and its proprieties had changed from the high standards to the inferior ones.

Since XIX century the Louvre restorators had conceived complex research studies, and it is a fact that Jacques Maroger [1] and Marc Havel [2] tried to revive the old secret painting recipes, the most ideal being Rubens and Van Dyck's medias.

2. DISCUSSIONS

Rheology is the science of flow, which is a phenomenon found in every painting operation. In this article, the principles of rheology were applied to the artistic technology in use. The rheological profile indicates the mediums fixing/ flowing grades, which determines their consistence. The studied behavior is the thixotropic one, thixotropy meaning a change in the initial aspect of a product, induced by a touchable intervention.

A thixotropic gel suffers from the tension, passing in a fluid stage, but this phenomenon isn't plasticity. When the action stops, the system is coming back to its initial, gel stage [3].

The first historic appearance of the oil painting media can be found in the XVI century [4], further references being related to XVII-XVIII centuries. If one examines Rubens or Van Dyck's canvases, a fine texture, very close to a granulated spume can be observed. Between the color stratification, the brushstrokes had still remained in their original place.

The painting material has also changed, from the transparent parts of the painting to the impasto light zones. The working pastes involve limpid spumes, amber like effects, enriching the oil painting surface [5].

2.1. Rubens thixotropic gel media reconstruction recipe - cited by Jacques Maroger [6]

Ingredients: - 20 parts of nut/linseed oil;

- 2 parts of ceruse/ litharge (PbO);
- 2 parts of double distilled, spirits of turpentine;
- 1 part of mastic resin;
- 1 part boiled "Black oil";
- 1 part essential mastic varnish.

[Note] - the oil used is linseed oil, cold pressed, from Laverdure (Paris, France);
 - the litharge from Laverdure (Paris, France);
 - the spirits of turpentine from Laverdure (Paris, France);
 - the mastic resin was Chios mastic, purchased from Ochra (France).

Materials: - flat bottom glass balloon;
 - metallic support;
 - heating source;
 - glass baton.

2.2. Oil heating process

- the litharge must be transformed in powder, and then mixed with oil, so an orange liquid can be obtained;
- the glass balloon containing the mixture must be low heated on the fire source;
- from time to time, the homogeneity is adjusted by continuous agitation;

- at 100°C, if ceruse is used during the heating process, the oil can create spume because of the amount of water contained by this lead compound. But this phenomenon can be avoided if ceruse is replaced with litharge;
- at 180-200°C, the oil tends to create smoke and a brown coloration. This is a clue of intimate combination between the reaction products;
- at 150°C the litharge is almost combined with the oil, if the oil sticks on the glass baton;
- between 210-230°C the two compounds are homogeneous combined, and the oil becomes black;
- at 280°C, if the fire is too strong, or the oil is boiled for a long period of time, the resulted product will deform in a rubber, and it cannot be further used in painting. That is why the temperature must always be low, and the heating process can't take more that two hours. When the oil becomes black (as a coffee) and the spume is reddish, it is a sign that the litharge is totally incorporated in oil.
- at 350°C the oil can auto inflame, representing a danger of arson;
- when the heating process is over, and the temperature reaches 75°C, the oil must be deposited in a bottle, and then sun exposed for a month, without air. After that the oil will be clearer and bleached. Finally it needs to be filtered and kept in a cold place;
- this oil can be replaced with a thickened or plaster one, to obtain a drying transparent product [7];
- the oil is black, fluid, transparent, gaining the tendency to flow and spume during the execution. It is necessary to be stabilized by an essential mastic varnish in order to become the thixotropic gel medium.

2.3. The process of obtaining the essential mastic varnish

Mastic is a soft resin, known under the common name of “mastic in tears” [8]. It was used in Antiquity, the best being the Chios- Greece variety, but it needs to be fresh and not sandarac altered. It melts at low/ high temperatures as well as in spirits of turpentine, double distilled.

- the resin is containing all kinds of impurities that needs to be cleansed in a solvent, and then filtered. After that the resin can be transformed in a soft powder;
- the powder must be put in a lint bag and introduced in a glass jar filled with a double quantity of turpentine;
- the jar is then sun exposed for a week, in summer time;
- the resin will liquefy and combine with the spirit;
- than the lint bag and the impurities must be removed;
- the solution (varnish) is filtered and sun exposed again for 30 days;
- this varnish is strong, but good for mixing with the black drying oil, to obtain painting mediums.

Table 1. Essential mastic varnish recipe description

Author	Combination	Volatile essence	Resin	Name
J.Maroger	In sun light, closed vessels	Spirit of turpentine double distilled	Mastic in tears	Rubens mastic varnish [1:2]
C.Yvel	In fire, glass vessel	Bordeaux spirit of turpentine	Powder mastic resin	Mastic varnish [3:2]
Ch.Eastlake	In sand bath	2 litres of spirit of turpentine	450 pounds mastic resin	Van Dyck mastic varnish
J.F.L.Merimee	In water bath	Fresh spirit of turpentine	Purified mastic resin	Mastic varnish solution

2.4. The process of obtaining the thixotropic gel medium

The previous prepared black oil is gradually warmed up. When it reaches 100°C, an equal quantity of essential mastic varnish must be added. The mixture must boil for 5 minutes in order to become a transparent, homogeneous jelly.

-the media must be kept under water, without air [9].

-if the combination between the black oil and the essential mastic varnish is done with a palette knife, in a cold state, the liquid mixture will transform in a jelly; and if it is left to rest, it will return to its initial liquid phase. But if this transformation takes place, the medium is considered to be a “Megilp”, a deformed recipe of the original one [10].

In the XVIII century, J.F.L. Merimee considered this type of medium a “painting varnish” or an “English varnish”. He also sustained that if the drying oil contains more litharge, and the varnish more resin, the final gel media is gaining consistency. But once reached this stage, the working maneuverability will decay, so it is an advantage, as well as it is a disadvantage.

Other safety measures indicate the oil, varnish or medium preparation in a larger bowl. The boiling process must be done slow and under continuous stirring. The oil vapors must not be inhaled, that is why the whole experience must be done outside.

-the usage of the asbestos plate and low temperature are two important factors that are controlling the oil burning.

-if the bowl is humid, at 100-150°C, the water can reach the hot oil, and produce accidents.

-the jelly medium can then be combined with all colors on the artist palette.

Ever since 1620, Tourquois de Mayerne Manuscript [11] (friend of Rubens and Van Dyck) is offering black litharge oil recipes. When the oil is concentrated, the resulted medium isn't going to be clearer enough to be combined with the white or other sensitive colors, without destroying their harmony. This artificial drying oil has both qualities and defects, thanks to its components and boiling reaction conditions. Black oil with minimum, ever though is very drying, it is also colored, but when produced with litharge, is more consistent than the ceruse one. If nut oil is used instead of linseed, the maximum of vitality, transparency and brightness can be obtained.

After a long period of diverse experiences and results, Rubens gel medium has been reconstructed. For Anthony van Dyck medium, it is recommended to study his works by technical expertise that can reveal the characteristics of a different, less consistent working media.

If Rubens' s paintings are presenting a sponge texture, with visible brushstrokes, Van Dyck' s details are constructed by incisions in the color glazes, with touches lost in the entire surface. But for a better understanding of van Dyck' s media, one must research Eastlake' s recipe, after an XVII century English manuscript [12].

Table 2. Recipes for the principal types of glaze media

Glaze media formulation	Author, source	Century	Usage	Recipe
Oil modified by sun/fire treatment	Eraclius manuscript Le Begue manuscript	XII	Preparing the oil to distemper water colors	Oil boiled with lime = saponificated oil + ceruse(sun exposure)
Drying oil and essential varnish	Britanic manuscript [Eastlake]	XV	Van Dyck medium for oil colors	Nut oil boiled with ceruse + mastic varnish, spirit
Drying oil + essential varnish +wax	Charles Eastlake	XIX	Thick medium gel for oil colors	Linseed oil boiled with litharge +mastic varnish+ spirit(wax is added in a hot state)
Drying oil + essential varnish	Jacques Maroger	XX	Rubens medium for oil colors	Black oil (linseed/nut boiled with litharge)+ mastic varnish+ spirit combined at heat

2.5. Anthony van Dyck' s "Black oil" reconstruction

Ingredients: - 1 ½ - 2 ounces of ceruse (hydrated lead carbonate);

- 1 pint of nut oil (Rubens preferred linseed oil, according to his writings);

- the oil must be put on a low fire source, in a glass bottle;

- while the oil boils slowly, ceruse can be gradually added;

- the hot oil is then filtered through a woolen cloth, and let to set in sun to thicken. But it must be used in a month, because it loses its drying power. If this happens, the oil can remain sticky for a long period of time, and painting effects could not be further created.

Table 3. "Black oil" recipes descriptions

Author	Combination	Raw oil	Sicative / Auxiliaries	Name
J.F.L.Merimee	In hot state- 240 C for 1 hour	Linseed/nut	5 % litharge	Black oil
J.Maroger	In hot state- 250 C for 2-3 hours	Linseed/nut	6-10% litharge/ceruse (sometimes raw umber)	Black oil
C.Yvel	In hot state- 175 C for 1 hour	Nut	15 grams litharge	Black oil

2.6. Anthony van Dyck mastic varnish reconstruction

- 1 pound of mastic must be transformed in powder, and then put in a glass vessel among 2 pounds of spirits of turpentine;
- the vessel must be kept in sand until it gets hot, without reaching the boiling point, under continuous stirring, until the intimate incorporation of the mastic resin. This final solution is in fact the varnish;
- after the complete homogenization, the bottle must be removed from the heat source, left a while to set, and then filtered. Next is the sun exposure in a closed bottle, without air intervention, for bleaching and cleansing.

2.7. Anthony van Dyck thixotropic gel medium reconstruction

- to 1 pound of essential mastic varnish is added ½ pint of drying oil;
- this mixture must be put on a low heating source, under continuous stirring;
- it is left to boil for 15 minutes, until it reaches the combination of the two ingredients;
- the mixture must not contain impurities, but if it does the entire process must be repeated, until the resulted product becomes a white, clear media.

The good recipe, transformed in the actual measure unity, contains:

- 44-46 grams ceruse for 0.600 liters of nut oil;
- 450 grams mastic in tears for 900 grams double distilled spirits of turpentine;
- the mixture contains 450 grams varnish for 0.300 liters of Black oil
- the medium incorporates 150 grams mastic, 300 grams turpentine, 0.300 liters oil with an amount of 24 grams of ceruse in it [13].

It can be observed that the resin impurities and humidity influence the jelly behavior. The “Black oil” must be well filtered and used in low quantities. The excessive use of this media, combined in a cold state, can produce fragility and blackening of the oil painting film. If amber varnish, spirits of lavender, burn plate oil, or wax are added, all these products can contribute more or less to the gel medium improvement.

Zilotty [14] cited Merimee, but just like Doerner [15] he doesn't speak about the gelatin state of the mastic and drying oil mixture. Eastlake considered Mayerne Manuscript a starting point in his research, just like Berger, Doerner, and finally Maroger. Gettens [16] defines “megilp” as a jelly painting medium, consisting in mastic resin, drying oil and spirits of turpentine, but the presence of litharge is missed.

Merimee, like Maroger considers “Black oil” the medium base. Merimee had also talked about the essential role of mastic resin in the medium components. This secret medium is dating ever since Van Dyck and Tourquois de Mayerne were servants at King Carol I.

After Rubens disappearance, the remains of his painting medium were cited by Reynolds through incomplete recipes of the XVIII century English School, Leslie Carlyle [17] and James Groves.

The thixotropic gel medium reconstruction had confirmed its qualities: maneability (the quality of permitting superimposing on wet, for an excellent conservation of the oil painting, without the risky mixing of colors in time), a good execution through maximum transparency and atmosphere, oil glazes applied on wet, the entire and rapid drying.

All the previous qualities cannot be obtained if:

- one uses in oil color dilution just turpentine, that creates mat areas.
- one uses just drying oil, that ruins the painting because of its mediocre drying power.
- one uses a thick/thin varnish, that needs adjustments of the flexibility and working proprieties.

The Flemish painters had understood the role of oil added to the essential mastic varnish, in different quantities. This is, in fact, the base in obtaining the thixotropic gel medium [18].

CONCLUSIONS

Throughout the XVI-XVII centuries can be observed how thick varnishes become, thanks to the spirits industry, mixed and finally thixotropic mediums. The viscosity of these products was, at the beginning, hard to control, but in time the thixotropic structure had permitted an excellent liberty of manifestation [19].

The reconstruction of the mediums was possible due to the fragments of recipes and laboratory analysis of Rubens and Van Dyck' s paintings. If a drying oil is mixed with an essential varnish in a hot state, the result is the thixotropic gel medium. Here can appear differences; the oil consisting in litharge is thicker that the ceruse one, the essential mastic varnish sun exposed and not directly exposed to fire is better, offering good qualities. Rubens medium is more consistent, though it is ductile, and simpler than Van Dyck' s product [20].

REFERENCES

- [1] Maroger, J., *The Secret Formulas and Techniques of the Old Masters*, Studio Publications, New York, 1948.
- [2] Havel, M., *Technique de la Tableau*, Cercle de la librairie, Paris, 1974.
- [3] De Viguerie, L., *Historical evolution of oil painting media: A rheological study*, Science Direct, 2009.
- [4] www.jamesgroves.com
- [5] Perego, F., *Dictionnaire de materiaux du peintre*, Paris, 1990.
- [6] Cotte, M., *Kinetics of oil saponification by lead salts in ancient preparations of pharmaceutical lead plasters and painting lead mediums*, Science Direct, 2006.
- [7] Merimee, J. L. F., *De la peinture a l'huile*, Huzard Libraire, Paris, 1830.
- [8] Havel, M., Delacroix G., *Phenomenes Physique et peinture artistique*, Paris, 1981.
- [9] Eastlake, C., *Materials for a History of Oil Painting*, Longman Brown Green and Longmans, London, 1847.
- [10] De Viguerie, L., *New insights on the glaze technique through reconstruction of old glaze medium formulations*, Science Direct, 2006.
- [11] De Mayerne, T. T., *Pictoria sculptoria tinctoria et quae subal ternarium artuim spectantia*, Versini C. *Le manuscript de Torquet de Mayerne*, Lyon, 1620.
- [12] Berger, E., *Beitrag zur Entwickelungs, Geschichte der Maltechnik*, Konigl, Munich, 1904 -1909.
- [13] Lazarescu, L., *Pictura în ulei*, Deva, 1996.

- [14] Zilloty, A., *La decouverte de Jan van Eyck*, Paris, 1941.
- [15] Doerner, M., *The Materials of the Artist and their use in Painting, With Notes on the Techniques of the Old Masters*, Harcourt, London, 1935.
- [16] Gettens, R.J., *Painting materials: a short encyclopedia*, New York, 1966.
- [17] Carlyle, L., *The Artist's Assistant*, Archetype Publications, Ottawa, 2001.
- [18] Manguta, C., *Journal of Sciences and Arts*, **1**(10), 2009.
- [19] Van Der Berg, J.D.J., *Analytical, chemical studies on traditional linseed oil*, University of Amsterdam, 2002.
- [20] Kotulanova, E., *Degradation of lead based pigments by salt solutions*, Science Direct, 2008.

Manuscript received: 22.02.2010

Accepted paper: 22.05.2010

Published online: 22.06.2010