

غابة للفنان ديشامب – دراسة المواد والأساليب الفنية للصيانة د. مصطفى عطية عبد الجواد

لدراسة المواد والأساليب الفنية التي استخدمها الفنان الفرنسي المعروف جان باسكال ديشامب، فقد استخدمت طرق تحليل وفحص علمية غير متلفة. الفنان الفرنسي ديشامب ولد في باريس بداية القرن العشرين وكان عضواً في صالة الفنان الفرنسي، وقد كانت لوحاته تعرض في معارض صالة الفنان الفرنسي هذه قبل عام ١٩٣٩. ومن طرق التحليل والفحص التي استخدمت، التحليل بطريقة حيود الأشعة السينية والميكروسكوب الإلكتروني الماسح لتحليل والتعرف على المواد الملونة والمواد المألثة في طبقة اللون وأرضية التصوير، كما استخدم طريقة التحليل بالأشعة تحت الحمراء للتعرف على نوع المادة الرابطة لأرضية التصوير وطبقة التغيرية، وللتعرف على نوع الوسيط الزيتي استخدم التحليل الكروماتوجرافي الغازي، كما استخدم التحليل الكيميائي الدقيق والميكروسكوب الضوئي للتعرف على نوع ألياف الحامل الورقي الكرتوني، كما طبقت طريقة القطاع العرضي لدراسة البناء الطبقي وعدد طبقات اللون والأرضية على الحامل. وقد أثبتت هذه الدراسة أن الحامل الورقي مصنوع من لب القش، وحجمه ٣٦٠×٢٦٩ مللي، وقد طبق الفنان أسلوب اللابريما في طبقة اللون، كما استخدم الفنان الدرجات اللونية أحادية اللون وقد استخدم الفنان خام امبر واحمر فينيسيا وازرق السماء وبيض الزنك كمواضع ملونة رئيسية في اللوحة، كما استخدم زيت الخشخاش كوسيط زيتي في طبقة اللون. ونظراً لأن اللوحة فقدت شكلها الفني بسبب وجود عدة مظاهر فيها مثل دكانة الورنيش ووجود فجوتين فيها وحموضة الحامل الورقي الذي جعله في حالة هشاشة شديدة، فكانت عمليات الترميم العلاجية والتي استخدم فيها المواد والطرق المناسبة، ونظراً لتأثر الحامل الورقي بالرطوبة، والعالية نسبياً في جو مصر، فقد أدخلت مادة جديدة لعزل الحامل الورقي من الرطوبة، بل وجعله مانع للماء إلى حد كبير.

FOREST LANDSCAPE OF DESCHAMPS-A STUDY OF MATERIALS AND TECHNIQUES FOR CONSERVATION

Abstract

Non-destructive methods to study a painting belonging to the French painter Deschamps Jean Pascal carried out using scanning electron microscope (SEM.), X-Ray diffraction (XRD), infrared analysis method, gas chromatography, optical light microscopy (OLM) and micro chemical analysis. The French painter Deschamps Jean Pascal was born in Paris at the beginning of the 20th century. He was a member of the French Artist Salon. He exposed his paintings in this Salon prior to 1939. Materials and reconstruction of this painting have been studied. The size of the painting is 269x 360 mm. The support is made of straw paper board, and alla prima technique is used. The artist's work is monochrome in tone. Raw umber, Venetian red, cerulean blue, zinc white are the main pigments in the painting. The oil painting losses its artistic image, i.e. the darkened varnish, the two lacunas, and the acidified strawboard which is very brittle. The conservation treatment used suitable materials and methods. A new method was used to protect the board of the painting from high relative humidity or even from the water making it waterproof. The experimental study was made to confirm that this material is a appropriate one for this subject.

Keywords: Deschamps, strawboard, alla prima, monochrome, lacunas, conservation, new method.

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1. Introduction

"Forest landscape" painting is from a private collection in Egypt. This Painting that belongs to the French artist, Jean Deschamps Pascal, from the beginning of the 20th century, was not previously described or studied. Knowledge of the significant features, painting technology and technique of an oil painting provides the conservator with a supportive tools that help in selecting suitable conservation treatments. Undertaking conservation works enable studying the materials and technical structure of the painting.

In this research, the painting "Forest landscape "of the French artist, J. Deschamps Pascal was examined. The painting materials, the build-up of the painting layers and the painting technique were identified. The results confirmed that the materials used in the painting are standard ones for French landscape painting in the beginning of the 20th century. The subject of this painting is a landscape that consists of a lake surrounded by a forest (trees, bushes, grass and some parts of the dry wood). There is a church behind the forest, and some houses are built by the lake beach. The upper half of the painting consists of a clear white- blue sky. Two people in a boat give the landscape its spirit. The mountain can be seen behind the forest .

Since beginning of the second half of the 20th century, canvas was considered to be easier for painting, transporting, exposition of pieces of art, and treatment.¹ On the contrary, the traditional canvas or wooden panels were heavy, clumsy, and inconvenient to transport. Canvas could be punctured and panels could be scratched during transport. New light-weight boards were developed such as millboards, academy board, and straw boards.²

The presented work aims to study the materials and reconstruction of the painting of the French painter Deschamps Jean Pascal, and the deterioration phenomena from which the painting suffers from; in order to select appropriate conservation materials and methods. Due to the

¹ -Fli k J. Warsztat malarski Lukasz Cranacha Starszego. Acta Universitatis Nicolai Copernici, Zabytkoznawstwo i Konserwatorstwo XXI. 47-55. Torun,1994.

² - Katlan A. The American artist's tools and materials for on-site oil sketching. JAIC 38, 21-32. U.S.A., 1999.

severe condition of the painting, the author studied waterproof material to protect the board from humidity and water.

2. Study of materials and reconstruction of the painting

2.1 Methods of examination and analysis

1. X-Ray diffraction (XRD) was used to analyze the inorganic materials in the paint layer and the ground layer. A Philips X-Ray diffraction equipment, model PW/1710 with Co radiation, Fe filter at 40 KV, 30 MA and scanning speed 0,02/s was used. From the diffraction charts, the dA and the relative intensities were obtained and compared with "(JCPDS. 1967)" files.
2. Gas chromatography was used to identify the oil medium of the paint layer.
3. Optical light microscope (OLM) for stratiagraphic analysis; a cross- section of the painting was examined with a zeiss standard stereomicroscope, type stemi DRI663 using reflected light. To apply the suggested method by the author, vertical photo microscopy (VPM) was used to study the direction of the brush.
4. Herzberg Stain test was performed to identify the pulp paper board.
5. Examination with a scanning electron microscope attached with Energy dispersive X-Ray analysis (EDX) unit was carried out using model Philips XL30 KV and resolution for W (3.5nm)
6. IR was used to identify the glue size.
7. visual inspection.

2.2 Results and discussion

The elemental analysis of the filler and the pigments using (SEM) attached with (EDX) unit yielded considerable information about the filler. Analysis of the ground layer gave this result: Pb and Ca. Analysis of the paint layer by XRD corroborated these elements as a filler of lead white, hydrocerussite (13- 131 JCPDS¹) with lead carbonate, cerussite (5- 0417 JCPDS) and calcite III, calcium carbonate (17- 763 JCPDS).

Analysis of a paint layer sample from the brown part of the forest beside the lake gave these elements: Fe, Al, Si, Mn and Zn, Co , XRD analysis

¹ - JCPDS. Index to the Powder Diffraction file. American Society for Testing Materials. Pennsylvania. U.S.A.,1967.

corroborated these elements as a pigment of raw umber, iron oxide hydroxide (8- 98 JCPDS) with aluminum oxide, α Al_2O_3 (10- 173), silica oxide, SiO_2 (11- 695) and manganese dioxide, MnO_2 (12- 716) in the upper layer, as for the middle and under layer, the artist used zinc oxide, zincite, ZnO (5- 0664) as a white colour and cerulean blue, cobalt tin oxide, CoSnO (28- 1236) as a blue colour(fig.1).

The second sample from the lake provided these elements: Zn, Co, Fe. XRD corroborated the same elements also as a zinc oxide, zincite, ZnO (5-0664), cerulean blue (28- 1236) and Venetian red, epsilon iron oxide (16- 895) in imprimatur(fig.2).

The third sample from the sky provided these elements: Zn and Co, XRD corroborated zinc oxide, zincite, ZnO (5-0664)and cerulean blue (28- 1236).

Herzberg Stain was used to identify the pulp paper of the board. The test revealed under an optical light microscope that the board support of the painting is from semi chemical straw pulp (fig.3.4). The straw pulp has been used since 1844^{1,2}.

IR analysis is a method used to identify the sizing coat on the paper board, the interpretation of the IR spectrum revealed that; OH group are due to cellulose of paper and Arabic gum, CH stretching bond of aliphatic group of both Arabic gum and cellulose and C=O stretching bonds of different hydroxyl group both cellulose and Arabic gum.

A photomicrograph examination of cross- section samples taken from sky, lake and forest areas showed the darkened varnish layer. There are two to three layers in the paint layer, the imprimatur layer is found only in the lake and forest areas, and there are two layers in the ground; the first layer is thicker than the upper. The ground is applied on the straw paper board.

The suggested method (VPM) is used to study the features of the painting. This method showed that the painter used two or three types of

¹ - Browning B. L., The analysis of paper. INC, New York,1980.

⁵ - Abdel Hamid H., Scientific approach for restoration and conservation of manuscripts, wood and textile. Cairo, 1984.

brushes for applying the paint layer. One was used for the sky area, the same brush or another was used for the lake area but applied with a different method. The third type of brush was used to paint the forest. This method also proved that the artist used little amount of oil to create the sky compared to the amount used to paint the water area of the lake, and he used more oil to build the forest. This method also showed that the painter used the brush in all directions to create the sky but he used one direction from left to right or from right to left to create the lake. The forest area was created by multidirectional strokes and the pointlist method.

The GC analysis of a sample from various places in the painting showed the presence of a small amount of saturated fatty acids and detectable levels of palmitic and stearic acids . The interpretation of these results indicates the presence of poppy oil. The use of IR spectroscopy to identify different drying oils and terpenoid varnishes is highly unlikely due to the complex composition of these natural products ¹.

3. Painting technique

The character of the artist's painting is indicated by the number of layers revealed in a cross- sections, a photomicrographs of the cross- sections made from three samples taken from the painting illustrate the build- up of the painting and the reworking of this painting. After examining the painting and studying the cross- sections, the number of the layers in this painting were identified, as some samples showed the two layers structure while others showed three layers. The ground is white and consists of two layers; the first layer is more thicker than the second. There is a reddish white imprimatur in the lake area, and the forest.

For the modeling the sky, cerulean blue and zinc white was found in the two layers of the cross- section. The second cross-section sample taken from the lake area consists of two layers painted in tones of cold blue, cerulean blue and zinc white, warmed with reddish imprimatur under it. The area of the forest was painted after the lake area because the

¹ - Favaro M., Vigato P., Andreotti A. & Colombini M. La Medusa by Caravaggio: Characterization of the painting technique and evaluation of the state of conservation. 295-305. Italy,2005.

two layers of the lake area were found under the brown- raw umber- of the forest, and this was confirmed by the VPM method.

There is no underpainting in the sky area and the lake area; but it is found in the forest area. The paint layer is applied in the two layers in first two cases, but three layers were found in the forest area. The brush stroke is individual and very clear, especially in the sky area, and was applied using a tough flat brush. The finishing touches were made in "waving- technique" which is short, crude lines scored into the wet paint with the end of a brush articulate the sky area. The shadows of the forest is most smooth and fluid. From VPM investigation method it was noticed that the artist blended the pigments on the palette and applied them directly to the board.

To sum up, the artist's work is monochrome in tone. The ascetic colours are based on different blues- acquired by mixing almost the same pigments but in different amounts of particular ingredients. Three pigments were used in most paint layers; cerulean blue, zinc white and raw umber

4. State of the painting preservation

The painting was exposed to severe conditions, improper storage, and neglect; this caused several deterioration phenomena, i.e. tears, darkening of the varnish layer(fig.5), cracks, dirty appearance, scratches, lacunas(fig.6), and brittleness of the paper board. The intensity of the colours has been lost due to the dirty appearance and the darkened varnish, but the original intensity of the colours is preserved under the frame. Two lacunas are found in the sky; one of them on the upper edge of the painting. The abrasion, tears, cleavage and flaking can be seen mainly in the sky area, and they appear in the forest area also. The lake area and the area of the artist's signature are the most preserved areas. The support is brittle and discoloured, it has turned to grayish brown, and the PH value is 5,5. (fig.7), PH is the prime indicator of paper permanence, not lignin ¹. When the oil is exposed to environmental

¹ - Burge M. D., Reilly M. J. & Nishmura W. D. Effects of enclosure paper and paperboard containing lignin on photographic image stability. JAIC 41, 279- 290. U.S.A., 2002.

action or due to passage of time, it deteriorates and the fatty acid ratio also changes ¹. The oil of the painting is poppy oil (fig.8).

5. The conservation process

The painting was separated from the frame, the dirty darkened varnish layer was removed using acetone To consolidate and improve the adherence of the paint layer and the ground to the straw paper board, a solution of 5% and 10% of Beva 371 in white spirit was applied by brush, and then the paint layer was faced by square parts of Japanese paper using Beva 371, (fig.9), this step was made to give the paint layer a protection during the treatment procedure in the back of the painting. To restore lacunas of the board. An inserted piece of special acid free board was placed in the lacunas and fixed to it by the "window method". The thickness was the same as the thickness of the straw board (fig.10). To deacidify the straw board it was brushed with 2,5% magnesium carbonate with distilled water ², that increased the PH value to 7.

To mend the board tears, the edges of the tears was brushed with 10% water solution of rabbit skin glue then the edges were mended by using a cauter. In order to consolidate the board 5% of plectol B500 was applied by the brush. For mounting processes, Japanese paper of the same board size was glued on the back of the painting board using 5% of plectol B500, and some Japanese paper strips were also glued on the edges of the board, and then an acid free board was used to mount the original board using plectol B500.

Toluene was used to remove the cushion layers of Japanese paper from the paint's layer. The flaking paint layer was additionally pressed to the board. The emulsion fill was used on the flaking areas (fig.11). For retouching processes restoring colour "Restaura Art" pigments was used. Before repainting it was applied retouching varnish layer. After drying was applied the repainting area, Beva of finishing varnish was used for revarnishing the painting. Modern varnishes are more stable than natural

¹ - Vicente J., Adelantado J., Carbo M. Castro R. & Reig F. Identification of Lipid Binders in old oil paintings by separation of 4-bromomethyl-7-methoxycoumarin derivatives of fatty acids by liquid chromatography with fluorescence detection, Spain, 2005.

² - Lienardy A. Evaluation of seven mass deacidification treatment. Restaurator 15, 1-15, Germany, 1994.

- Phibbis H., To glaze or not to glaze an oil painting. Preservation practice, National Gallery of Art, 104- 108, Washington ,2004.

varnishes¹. To protect the straw board from the high relative humidity found in Egypt wacker BS 1001 was tested. Wacker BS 1001 is a solvent free, silane/siloxane emulsion. This material is widely used with inorganic materials such as stones, but its effects on the properties of organic materials is unknown. After testing Wacker BS 1001 on samples from the straw board, it was observed that total impregnation can form a homogenous layer on paper fibers, thus isolating the straw board from relative humidity and water. Changes in the mechanical properties of the straw board were also observed. However, the author preferred to impregnate a polyester sheet with Wacker BS 1001 (1:4), which was then glued to the back of the painting (fig. 12). Multidirectional brush strokes and signature of Deschamps are in (fig. 13 & 14). The painting before restoration and after are shown in (fig. 15 & 16).

6. References

Article reference:

- Browning B. L., The analysis of paper. INC, New York, 1980.
- Burge M. D., Reilly M. J. & Nishmura W. D. Effects of enclosure paper and paperboard containing lignin on photographic image stability. JAIC 41, 279- 290. U.S.A., 2002.
- Favaro M., Vigato P., Andreotti A. & Colombini M. La Medusa by Caravaggio: Characterization of the painting technique and evaluation of the state of conservation. 295-305. Italy, 2005.
- Flik J. Warsztat malarski Lukasz Cranacha Starszego. Acta Universitatis Nicolai Copernici, Zabytkoznawstwo i Konserwatorstwo XXI. 47-55. Torun, 1994.
- JCPDS. Index to the Powder Diffraction file. American Society for Testing Materials. Pennsylvania. U.S.A., 1967.
- Katlan A. The American artist's tools and materials for on-site oil sketching. JAIC 38, 21-32. U.S.A., 1999.
- Lienardy A. Evaluation of seven mass deacidification treatment. Restaurator 15, 1-15. Germany, 1994.
- Phibbis H. To glaze or not to glaze an oil painting. Preservation practice, National Gallery of Art, 104- 108, Washington, 2004.

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- Vicente J., Adelantado J., Carbo M. Castro R. & Reig F. Identification of Lipid Binders in old oil paintings by separation of 4-bromomethyl-7-methoxycoumarin derivatives of fatty acids by liquid chromatography with fluorescence detection, Spain, 2005.

Book reference:

- Abdel Hamid H. Scientific approach for restoration and conservation of manuscripts, wood and textile. Cairo, 1984.

7. Materials

Beva 371, Plextol B 500, and Japanese paper:

Company: Restauro-Technika, Supplier: Slawomir Prezedpelski

Address: 87-100 Torun, Poland

tel. +566740389, +566511923,

Fax +566511923

e-mail: restauro@restauro.com.pl.

Wacker BS 1001: Company: Wacker-Chemie GmbH, Werk Burghausen – Germany.



Fig. 1. Cross-section from the forest area

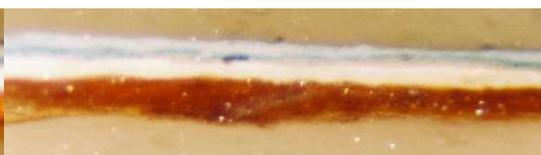


Fig. 2. Cross-section from the lake area

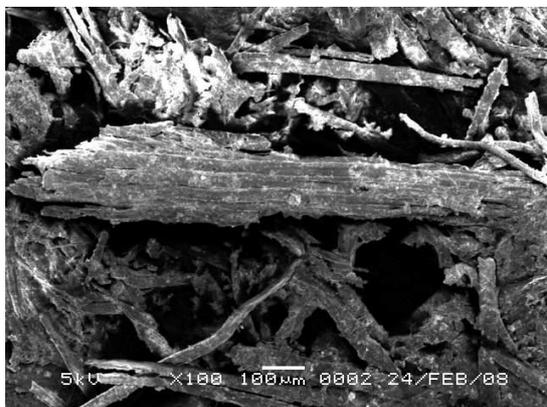


Fig. 3. SEM examination of the straw board

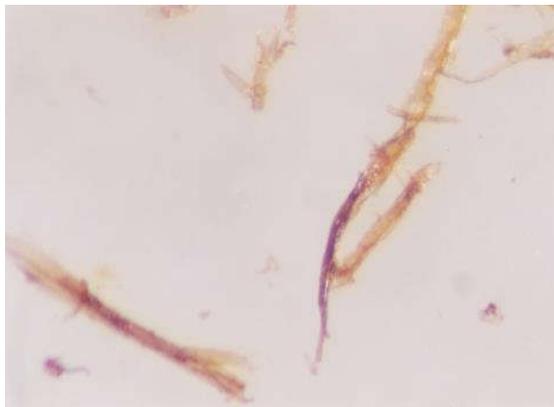


Fig. 4. A microscopic image of the straw pulp from the support.



Fig. 5. The darkened varnish of the painting.



Fig. 6. The lacuna and the darkening of the board.

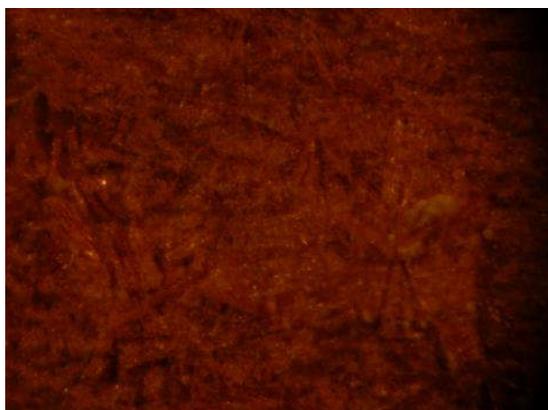


Fig. 7. Microscopic image of the support.

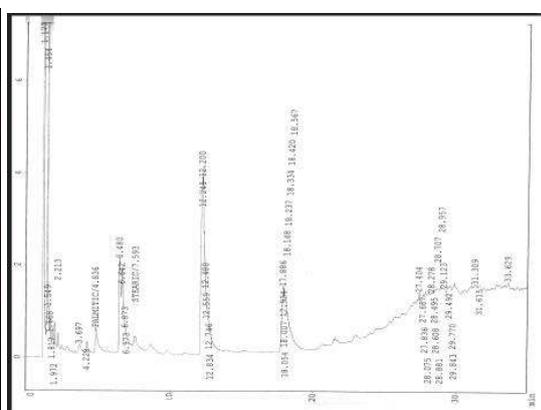


Fig. 8. GLC pattern of poppy oil.

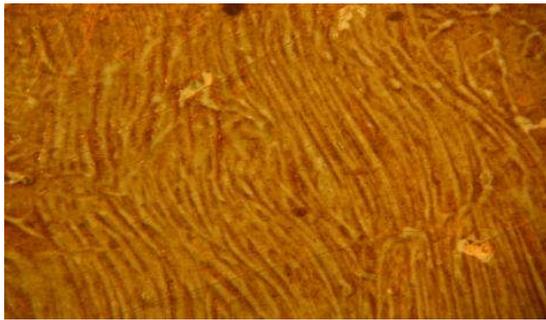


Fig13. Multidirectional brush strokes.



Fig. 14. Signature of Deschamps.



Fig. 9. Consolidation of the paint layer.



Fig10. Treatment of the board.



Fig. 11. After the removal of the varnish.

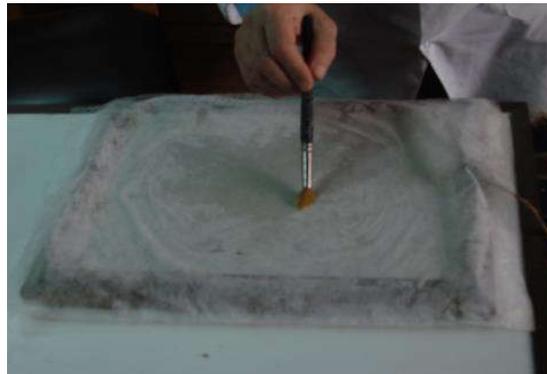


Fig12. The wacker isolation layer.



Fig. 15. The painting before conservation.



Fig. 16. The painting after conservation.