

CULTURE AND CONNECTIONS

PRELIMINARY RESEARCH AND PRESERVATION- RESTORATION INTERVENTIONS FOR WOOD ICONS

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Abstract

The preservation-restoration intervention means making efficient again a product of human activity, the preservation consisting of multiple actions whose purpose is to treat and keep valuable cultural artifacts, both mobile and immobile. The restoration of works of art implies the establishment of a work methodology specific for each object, in compliance with general principles, the principle of minimum intervention being the basis of every methodological restoration proposals. The purpose of restoration is to restore the potential unity of the object. The restoration interventions must be recognizable without producing a historical or esthetic fake, reversible and performed with materials compatible with the original. For this reason, the first and most important action undertaken in order to treat a work of art is scientific documentation, consisting of analysis, tests, written, photographic and drawn documentation, all of these necessary in order to emphasize the technological aspects of the conservation status of the studied objects, as well as the proof of evolution of the performed interventions. The methodological preservation and restoration operations undertaken on the surface of the “Virgin Mary's Entrance into the Church” icon from the Jitianu Monastery Collection (Craiova, Romania) have been done following a thorough scientific analysis and in accordance with the restoration principles. The purpose of the biological investigations has been to confirm the active attack of xylophagous insects, the recommendation being the treatment of the wood with a bioacid introduced in the flight orifices through injection and brushing. The physico-chemical investigations done through the FTIR (Fourier transform infrared spectroscopy) and XRF (X-ray fluorescence) techniques have shown degradations caused by the work technique, by identifying the type of primer and pigments used in the painting of the icon. The restoration interventions that have been undertaken have been thought and applied based on the types of degradation existing on the surface of the wooden structure and painting layer, following scientific research based on modern restoration principles, always and inalienably respecting the authenticity of the object. During the restoration process, the reversibility and compatibility with the original of the materials used, as well as the legibility of the interventions made.

Keywords: Restoration, preservation, mobile patrimony, wood icons, degradation factors

Introduction

Before any intervention of conservation and restoration of icons on wood, it is necessary to make a scientific documentation containing physical, chemical and biological analyses, consolidation and cleaning tests, as well as a written, photographic and drawn

documentation. The documentation must be reveal the scientific nature of the restoration, and also highlight the technological aspects of icons, the state of preservation and the conservation - restoration methodological operations performed on the studied objects.

The scientific research carried out before the restoration operation, like the microscopic examination of the paint layer stratigraphy, composition of the nent materials through FTIR (Fourier transform infrared spectroscopy) technique and XRF (X - ray fluorescence), aim the proper understanding of the studied object and helps to identify the chemical composition of the materials used in making the work. These studies are useful in preparing a restoration methodology specific to each particular item, the results obtained after the research being those which argue each intervention of conservation and restoration on the work (ACS, 2013).

If the term conservation refers to a set of actions aiming at the treatment and care of valuable cultural objects, both mobile and immobile, intervening on the microclimate to minimize the degradation of cultural property (Ionescu, 2010), the restoration implies the methodological moment to recognize the work of art in its physical consistency and its dual aesthetic and historical polarity in order to be for transmitted to the future (Brandi, 1996). Restoration involves the intervention on the work, following the principle of minimal intervention and aims to restore the potential unit of the object.

Taking into account the principles of conservation and restoration of heritage values, the restorer faces conservation issues of the original artistic features, with certain forms of degradation that can influence, sometimes fundamentally, the aesthetic appreciation (Boldura, 2013).

The study case study chosen to illustrate all the methodological conservation - restoration operations is the icon of the 19th century - “The Mother of God goes into Church”, painted in tempera on wood, in the Jitianu Monastery Collection (Craiova, Romania). The icon “The Mother of God goes into Church” comes from the Church of Bîrzeiu - Gilort (Gorj County, Romania) and is currently in Jitianu Monastery Museum Collection, a collection that includes the major genres of Romanian ancient art as icon painting, embroidery, silverware, wood and stone carving.

Since the degradation of the artwork is a result of uncontrolled evolution processes that have various causes, with an interdependence between these cases, one creating favorable conditions for the entry into action of the other, it was necessary for the icon painted in tempera on wood in the Jitianu Monastery collection to be carried out biological, physical, chemical investigations. There were also analyzed the changes suffered in time by it, to decide the treatment and to act efficiently on the causes that generated numerous degradations. Thus, by their reduction, it was also secured the long - term protection of the work.

On the icon “the Mother of God goes into Church” made in tempera on wood, several physical, chemical, biological and anthropogenic factors acted simultaneously, which generated degradations in the wooden structure and the paint layer. The changes caused by the microclimate instability were the main cause of physical factors, being also influenced by the original material in the work of art, like the hygroscopic nature of wood.

Conservation status of the painting on wood has been influenced by humidity, the more pronounced degradation occurring when it was repeated the cycle of increase and decrease of humidity, each change in the quantity of water in the wood substrate causing expansions and contractions, which caused major problems in the conservation of the wooden structure and paint layer.

The adsorption and desorption process has led to dimensional changes and at the same time has had an effect on the physical properties of the icon made from organic materials. The hygroscopic materials swelled and contracted as a result of changes of humidity values,

causing successive dimensional and shape changes, that have lowered their resistance and elasticity. The sudden loss of water modified the volume of wooden structure, favoring the emergence of craquelures, detachments and finally the appearance of gaps up to the wooden structure.

Another factor that acted on the icon was temperature, the degradation driven by it influencing directly the relative humidity, thereby determining the size change of the expansions - contractions support and causing numerous chemical processes (Moldoveanu, 2003).

The excessive temperature values have influenced the production of specific degradation processes on the icon, the emergence of dryness situations causing contractions on the wooden structure, which caused craquelures and cracks on the paint layer surface which over time turned into deep gaps of the color film.

The icon “the Mother of God goes into Church” has been exposed for a long period of time to various types of physical and chemical changes, with these agents largely contributing the anthropogenic factor. The object did not have its own storage and appropriate treatment conditions to keep and prolong its conservation status, but has been in contact with untrained persons who handled and conducted improper actions on the paint layer and the wooden support.

The wooden structure presents on the entire surface adhering deposits, poorly adherent and compact fatty deposits or as dregs, which is due to a stratification of tar and dust, made by weathering, which in contact with water and sweat have adhered to the surface of the substrate. Tars are fat particles from the incomplete combustion of the wax components of the manufactured candles. They have cause fatty, sticky deposits that have contributed to the reinforcement of adhesion connections of dust and dirt.

It is known that candles have often a heterogeneous composition, rarely consisting only of beeswax, which is the least harmful, in the composition of candles entering also paraffin, microcrystalline wax, fully unrefined hydrocarbon parts, etc. Paraffin wax is obtained from fuel oils (paraffin) and through distillation, purification and crystallization is obtain mineral wax. Thus, when candles burn, very fine coal particles are eliminated, which are the result of the complete combustion process and tars which are as we said fat particles making the candle.

By the long exposure to candle flames there were developed on wooden support of the icon, specific residue depositions, oxidations and accidental carbonizations of depth and breadth.

The slightly convex bending of the countertops depends on how the wooden plank was cut and is due to the natural aging process of the wood and water loss in the substrate. The panel was cut across the wooden fiber and on the entire surface of the reverse side there could be sees traces of manual processing. Although the panel was finely processed there were distinguished traces of chisel and fiber abnormalities. The nodes being oriented perpendicularly and transversely on the fiber panel had the tendency to be expelled because of the tension created in those areas due to microclimate changes compressing and constantly expanding the panel wooden fibers.

The presence of nodes also influenced the emergence of cracks, the phenomenon being due to the excessive stresses on a relatively small unit of volume. Other types of cracks of the substrate were those formed as a result of the dimensional movement of the wood caused by humidity and temperature sudden variations.

On the entire surface of the icon, both on the back and the paint layer, there were the flight holes and galleries arising from a xylophagous attack. They embrittled the wood, the moisture being thus able to easily penetrate into the depth of the wooden structure, causing losses of support material.

Weakening and the emergence of gaps in the wooden structure were produced by the combination of several factors. Thus, there was a symbiosis between the 1st degree colonizers represented by fungi and 2nd degree colonizers, xylophage insects. Since cellulose is the main constituent of wood, it provides a favorable environment for the development of fungi, their action resulting in the loss of chemical integrity of the wooden structure, thus allowing xylophage insects to develop and weaken the wood's stamina. With this component's loss, due to biological attack, the wooden fiber decayed and with the mechanical action there were formed lacunar spaces of various sizes and shapes.

Other forms of degradation found on the back of the icon, on the support, were the cuttings that occurred after the manual chisel processing of the wooden structure, the fractures due to some external mechanical factors and numerous holes and lacunar areas practiced in the support for mounting of various types of hangers. Here were also observed many stuck adhesive labels that were not compatible with the wood and inscriptions made by anthropic factor with inappropriate material. The anthropic factor, through careless handlings and storages of the icon, has also produced numerous bumps and scratches on the wooden structure surface.

In the paint layer, the icon painted in tempera on wooden support presented old age craquelures as a network, which were determined by external mechanical factors and also moisture variations, which with the swelling and contraction of the support, have caused changes in the wood size thus causing movements of the painting's substrates. The paint layer losing its elasticity over time could not follow the same movements of the support, causing its breakage in horizontal and vertical networks. Also due to the same factors, there also appeared cracks of the primer layer and implicitly the painting.

The gaps found in the paint layer were produced naturally by the aging of the binder and forced through repeated and aggressive cleanings. They were caused by the weakening of adhesion between the layers of the painting, determined by the penetration of moisture into the substrate through cracks and craquelures. Thus, on the surface of the paint layer there were deep gaps until the primer and wooden structure and surface gaps. The surface ones were the film gaps were of old varnish that has lost its elasticity, causing it to become brittle and easily get away from the color film. In some areas, it was exfoliated with color film, thus leaving only the preparation layer, the whole process being favored by the presence of micro - cracks and the constant movement of the support.

Adherent and poorly adherent deposits visible on the color film surface of the icon "the Mother of God goes into Church" have appeared from the action of external factors such as airborne particulates, solid, liquid and gas contaminants. They were deposited on the surface of the varnish film and were embedded in it, mostly by the mechanical frictions from dusting, condensation, relative humidity and air flow speed. The natural resin varnish has undergone a process of browning, the cause of this phenomenon being represented by the presence of light and oxygen.

The surface of the coating layer has shown in some areas, particularly at the bottom of the icon, agglomerations due to heat sources. When icons present in the paint layer carbonizations and fire burns from candles, besides the affected area, due to the high temperature, the varnish contracts and it gathers in small brown granules.

In the category of damages caused by anthropic factors there were observed erosions, scratches and various inappropriate interventions like the repaintings and adding different materials to decorate the surface. The erosions occurred due to circumstance washing with detergents, bleach, homemade soaps as well as the anthropic attempts to revive the color layer with oil lamp, water, lower tar, thus producing environments for the growth of microorganisms. As inappropriate interventions, on the surface paint layer of the icon, there

were found repaintings and various unscientific operations, as the application of inappropriate material to cover the lacunar areas.

The biological deposits found both on the surface of the paint layer as well as the back of the icon were droppings left by insects trapped in spider webs as well as various residues appeared on the surface of the paint layer after the xylophagous attack. The conservation of the paint layer thus depends, in the first instance, on the support's condition, its reaction with the environment as well as for most, on the anthropic factor.

After analyzing the technological processes for the execution of the icon and after assessing the conservation status of the wooded structure and the paint layer, there were conducted investigations aimed at the object's stratigraphy. Thus, the object was observed in direct light and grazing, in UV light, under the microscope and the optical stereomicroscope. With these methods there were highlighted the forms of degradation of the support and paint layer as well as the technique peculiarities of making the icon.

The biological investigations have been carried out on the surface of the icon after there were observed flight holes with morphology specific to xylophagous insects present in both the back and the surface of the paint layer. In order to verify the biological activity of the insects, the object was monitored over a period of two weeks, and then specific tests were carried to check the adherence to needle in the flight holes, as well as the water content in them. Photographs were also made with the optical microscope Nikon AZ 100, where there were highlighted bodies of the insect *Anobium punctatum*, and in a flight hole tunnel, image magnification of approx. 50x, it could be observed the laying of eggs with xylophage insect eggs, a sign that the biological attack was active.

Following the tests conducted on the icon it was confirmed the active presence of xylophage insects, which resulted in making a biocide treatment with Per-Xil by injecting biocide in flight tunnels and brushing the entire surface of the support. After the biocide was absorbed into the wood, the icon was sealed with plastic, thus achieving a micro - gassing thus allowed the biocide to act in a controlled space.

To analyze the stratigraphy it was necessary as a first step to sample the loopholes that allow this, on the surface of the icon and embedding in synthetic resin to be seen and photographed with the optical microscope Leica DM LS. It was used this semi - destructive technique to be able to photograph with the microscope and stratigraphically analyze the composition of component materials by FTIR technique.

The first method to identify the stratigraphy was to analyze the macroscopic characteristics perceived by the naked eye or with a magnifying glass that could zoom 10x-15x, then the microscopic analysis of up to a 100x magnification. The stratigraphic analyses helped to observe the number of primer layers in the composition of preparation layer, existing on the icon surface, at the same time being able to observe the primer's granulation and the small impurities presented in it.

The investigations made to identify the nature of the pigments used in making paint layer were carried out by XRF technique by a specialist. The advantage of the method is that the analysis is performed directly on the surface investigated not destroy and there can be used surfaces of several cm² from homogeneous and inhomogeneous materials.

Other advantages are that the analyses can be simultaneous and rapid; they can be performed in situ with equipment portable to the cultural assets of all types and sizes, being able to be applied to conductive and non - conductive materials. The XRF technique is very used in the analysis of the first layers of the surface and for a first determination of the nature of cultural asset substances (Marinçaş, 2003).

Following XRF tests conducted on the paint layer of the icon "the Mother of God goes into Church", there were obtained seven graph pairs which told exactly what type of pigments there were used on the examined areas. Thus, it was found that the icon has a

gypsum primer, which chemically is dihydrated calcium sulfate (Istudor, 2011), gold foil and as pigments there were identified cinnabar red, iron ocher, iron oxide, copper - green, yellow, lead white and a little blue enamel. The result of the XRF analysis also contributes to establish the period of the icon.

The FTIR (Fourier Transform Infrared Spectroscopy) analysis is a technique which analyzed the types of chemical bonds of a molecule through the production of an infrared absorption spectrum. Thus, after tests conducted it was revealed in all analyzed samples, the presence of calcium sulphate, indicating that primer layer is gypsum. Also, it was also highlighted a protein binder, probably glue. In several samples it was found a resin similar to shellac, possibly from the coating surface layer and it was also identified a silicate that can come from the bolus under the gold leaf.

Depending on the results of the investigations made on the surface of the icon painted in tempera on wood, it was proposed and carried out a conservation and restoration methodology, supported by tests of the proposed operations. Initially there was a prophylactic consolidation aimed at ensuring the separation of the paint layer and preventing the process of accentuated degradation of the paint layer to the stage of production of gaps. The prophylaxis was followed by a heat consolidation, through the application of hot glue onto the surface of the foil, pressing with a hot spatula and applying a cold press to remove water from the substrate by the condensation of the water in the glue solution.

Degreasing and grouting gaps were the following operations made on the icon surface of the paint layer. The degreasing was necessary to ensure the putty holding that was to be applied to prevent its expulsion. The putty was performed with fish glue mixed with purified chalk mountain powder and applied in several layers, taking into account the thin on fat rule.

Treating gaps requires an intervention on the damages and not aims at completing the artwork. If icons have gaps in a percentage higher than 20 % or they are spread on areas where there were details that can only be reconstructed by making a fake, the correct decision is not to putty the gap because the putty polish is the first phase of the final aesthetic presentation. All the putty gaps will have to be chromatically integrated which in some cases is impossible without making a fake. If the gaps have very large sizes there will be a putty edging of their borders, putty that will prevent the peeling of the paint layer and will be integrated with shades reproducing the color of clean wooden support.

In order to remove different types of deposits present on the surface of the paint layer there were initially conducted cleaning tests using the solubility triangle and seeking to check the efficiency of the various substances in the removal of adherent and poorly adherent deposits. Thus, after the tests it was determined that there is a deposit on the surface of icon arranged in an uneven layer of the varnish film, and besides the chemical removal of depositions it was also performed a mechanical cleaning by using the scalpel.

Another important step was the chromatic integration or retouch, being one of the last stages of the final aesthetic presentation in the conservation - restoration approach of an object of fine art. The operation had to be subordinated to those fundamental principles of restoration that require the readability of the intervention as aesthetic attitude and reversibility as technical execution. It aims to restore the motifs and figural elements to the extent that existing landmarks allow us.

The chromatic integration of putty areas was performed by reconstituting the motifs and figurative elements to the extent that existing landmarks allowed us. The large and small putty were integrated in rittoco and tratteggio technique, using water colors and egg yolk emulsion.

The tratteggio technique is based on coloring large putty areas, using for this a network of fine lines drawn vertically with a tipped brush; they are obtained from the decomposition of tones forming that color and placing them in transparent, superposed layers,

the reconstruction of the basic tone being achieved optically by juxtaposing color tones of chromatic retouch.

The integration of color erosion and small gaps of color film was made in *rittocco* technique. The technique is achieved by decomposing the original tone in juxtaposed points that optically reconstruct the original tone of the intervention area. After varnishing the work, some areas were also chromatically integrated and in varnish colors, taking into account the dosage of used diluents used (oil essence and turpentine) to obtain a gloss according to the original material. The last performed operation was the varnishing, made with dammar varnish in concentration of 12 % and aiming at protecting the paint layer.

A scientific documentation is required in the conservation - restoration process of icons on wood. The restoration interventions performed were designed and implemented based on the types of degradation existing on the wooden surface structure and the paint layer after a scientific research based on modern principles of restoration, permanently and inalienably respecting the object's authenticity.

The research results help the restoration process, taking into account during operations of the used materials' reversibility and compatibility with the original, as well as the readability of the performed interventions.

References:

- ACS (2013). *Restoration notebooks* (p. 99). Bucharest: ACS publishing.
- .Ionescu A. G. (2010). *The conservation and restoration of iconc in the collections of „Astra” Museum* (p. 8). Sibiu: Astra Museum publishing.
- .Brandi C. (1996). *Restoration theory* (p. 184). Bucharest: Meridiane publishing.
- Boldura O. (2013). *Mural painting in North Moldavia. Aesthetic changes and restoration*, 3rd Edition (p. 15), Bucharest: ACS publishing.
- Moldoveanu A. (2003). *Preventive conservation of cultural assests* (p. 67), Bucharest: Ministry of Culture.
- Marincaș O. (2003). *Scientific investigations applied to good heritage* (pp. 26-27), Iași: Performantica publishing.
- Istudor I. (2011). *Notions of painting chemistry* (p. 184), Bucharest: ACS publishing.