

CONSERVATION OF AN EARLY 19th CENTURY HOLY DOOR - THE MAIN STEPS AND RESULTS

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Abstract:

The paper presents the main steps undertaken in the complex conservation and restoration process of a 19th century Holy Door, originated from the oldest orthodox church in Codlea (Brasov county), presently belonging to the local Museum of Traditions. This paper comes in addition to a previous presentation and publication (Timar et al 2019), which focused on the initial conservation state, the scientific investigations and the urgent active conservation measures taken to consolidate the very frail painting layer, "gilding" and wood substrate. Also, cleaning and selective stripping tests assisted by microscopy and X rays fluorescence (XRF) allowed a better understanding of the artefact as a background on the following steps to undertake in a second phase of the restoration process, which are presented in this paper. They consisted in further cleaning / partial stripping of the sculptured "gilded elements" revealing remains of the original polychromy, further consolidation of the substrate and of the frail original painting layer, followed by the actual restoration of the four painted icons. This included critical gaps obturation and filling of lacunar areas with a mixture of fish glue and chalk, followed by a careful cleaning of the darkened painting areas with a mixture of ethyl alcohol- ethyl acetate, revealing surprisingly bright original colours alongside evident proofs of a previous restoration. Finally, chromatic integration was achieved with water colours by the tratteggio technique and the object was varnished with Dammar resin in turpentine. Besides visual observation, colour measurements in the CIELab system were employed to assist and control colour integration. As a result, the patrimonial value of the Holy Door, residing from liturgical, spiritual, artistic, historic and documentary valences, was highlighted and preserved for further generations. Nevertheless, the importance of continuous monitoring and preventive conservation should not be neglected.

Key words: scientific conservation, cultural heritage, holy door, polychrome wood, microscopy, colour integration, colour measurements.

INTRODUCTION

Holy doors, also named royal doors or beautiful gates, are the central doors of the iconostases in the Eastern Orthodox churches. These are most often very complex polychrome wood artefacts, with sculptured elements, gilded and painted surfaces and a high patrimonial value residing from their liturgical, spiritual, artistic, historic and documentary valences (Yudin 2017, Timar et al. 2019 and literature cited herein). At the same time, such complex artefacts of wood structures covered with quite rigid composite coating layers are highly sensitive to many degradation factors, such as: variations of the air relative humidity and environmental temperature, sometimes exceeding the acceptable limits for preventive conservation, the attack of insects and fungi, which may cause serious structural degradation of the wooden substrate and of

the decorative coating layers (Bratasz 2013, Lelong et al. 2017, Bratasz and Simon 2021). Moreover, exposure to carbon and fats reach smoke from candles and incense, inappropriate handling/cleaning and structural repairs, as well as "aesthetical refreshing" interventions by over-painting, "re-gilding" to maintain a nice and shiny aspect. This "care" and "conservation" measures, taken as gestures of faith and love, usually result in more damage, while the original aspect of the artefacts may be altered or totally changed (Harrison 2006, Harrison 2011, Labo 2016, Lelong et al. 2017, Cotețiu 2017).

Such an example is a 19th Century Holy door, originated from the oldest Orthodox Church in Codlea (Brasov County), presently belonging to the local Museum of Traditions, this paper is referring to. Actually, this paper comes in addition to a previous presentation at ICWSE 2019 and publication (Timar et al. 2019), which focused on the presentation of the initial critical conservation state, the scientific investigations and the urgent active conservation measures taken to consolidate the very frail painting layer, "gilding" and wood substrate.

When undertaken for investigation and conservation in our laboratory in 2018, the Holy door was in an extremely bad conservation state (Fig.1a), with massive active insects' attack, very frail wooden substrate which led to ruptures and losses of material, severe degradation of the painting layer with very poor adhesion, extensive cracking and flaking which resulted in significant lacunar areas, as detailed in the previous publication (Timar et al. 2019).

Active conservation methods to preserve the very frail painting layer, the "gilding" and the wood substrate presenting massive insects attack, were applied in the first phase of the complex conservation-restoration process. Microscopy, FTIR spectroscopy and XRF were employed to investigate the original technique and materials and also to assist the cleaning/partial stripping interventions. These methods in conjunction with cleaning/ partial stripping tests revealed that the apparent "gilding" consisted in fact in thick layers of Cu-Zn based bronze lacquers (over-painting), while isolated remains of the original materials, such as Ag leaf and traces of blue, green, ochre colours were discovered in some areas (Timar et al. 2019). All these were considered scientific proofs of a complex polychrome wood technique as original decoration, similarly to other related artefacts (Lelong et al. 2017, Cotețiu 2017). It was concluded that, very likely, extensive degradation of the original polychromy occurred in time and several layers of over-painting with Cu-Zn bronze type lacquers were applied from time to time to mask the resulting defects (including lacunar areas of the original polychromy) and/ or to give/maintain a bright shiny aspect to the sculptured frame. As a result, the original aspect of the holy door was completely hidden, leading to a false perception of the artefact at a first visual examination (Fig.1a compared to Fig.1b,c after the first phase of conservation-restoration).

OBJECTIVE

The objective of the research work presented in this paper was to complete the conservation and restoration of the valuable 19th century holly door (Fig.1) in accordance to the principles and code of good practice, having as background an adequate documentation and the results of the previously presented scientific investigations. Accordingly, the further steps in the second phase of the conservation and restoration of the artefact (presented in this paper) were taken with the view of its correct perception in the original form, while also maintaining traces of its long history.

These focused on three main practical objectives:

- completing the cleaning/ selective stripping of the unoriginal "gilding" (over-painting) to highlight remains of the original polychromy, while also retaining traces of historic interventions, up to a level agreed with the museum curators;
- conservation and restoration of the original painted areas, namely the four icons, all in a precarious conservation state in terms of loss of adhesion, extensive flaking, lacunar areas and extreme darkening;
- chromatic integration of lacunar areas and control of intervention by colour measurements.



Fig. 1.

The Holy door general aspect (front view) a) initial conservation state; b) after emergency active conservation of the painting layer and gilding with Japanese paper and partial cleaning/ stripping of the gilding - unoriginal bronze layers partially removed in phase I of restoration; c) details after restoration phase I (original state for the phase II of conservation-restoration).

CONSERVATION - RESTORATION INTERVENTIONS AND RESULTS

Cleaning of the frame and sculptured ornaments

In the first phase of restoration, the cleaning/partial stripping of the unoriginal thick layers of bronze type lacquers applied on the sculptured elements was done progressively employing a mixture of Chromofag (commercial solvent-based stripping solution) with ethyl alcohol (2:1). Neutralisation with diluted ethyl alcohol and raw linseed oil was applied to avoid any degradation of the original polychrome layer. After several tests, in this second phase of restoration, cleaning was continued employing a solution of dimethyl-formamide and ethyl acetate (2:1), in several steps with close control under magnifying glass. Reflective microscopy was also employed to highlight remains of the original polychromy discovered in isolated areas, as exemplified in Fig. 2. Very small colour samples were taken with cotton swabs and gentle rubbing in an attempt to employ advanced investigation methods, such as total X ray fluorescence (T-XRF) to identify the original materials (remains of metallic leaf, pigments), but these aspects will be the subject of a further publication.

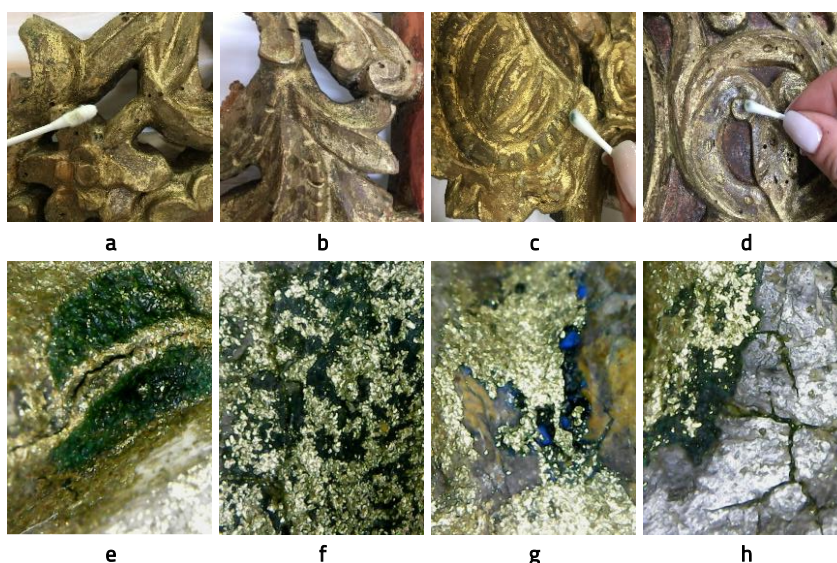


Fig. 2.

Some details of the sculptured "gilded" ornaments after cleaning in the second phase of restoration: a,b,c,d – macroscopic aspect; e,f,g,h microscopic aspect revealing traces of the original polychromy / colour pigments: bluish-green (e), dark blue (f), blue and ochre (g), dark blue and silver leaf (h).



Fig. 3.

Phases in the restoration of the "external frame": a, b-consolidation with Japanese paper/fish glue and warm pressing with electro cauter; c-filler (putty) and comparative aspect of a filled lacunar area (red arrow), consolidated finishing layer prior cleaning (black arrow) and after cleaning (blue arrow); e-aspect after consolidation, filling and cleaning.

The "external frame" of the holy door presented extensive lacunar areas by the detachment and loss of the entire original finishing layer. Though consolidation with Japanese paper/fish glue and thermal treatment at 60°C under pressure, followed by cold pressing was applied to rebuilt adhesion between the substrate and the finishing layer (Fig.3 a,b), cleaning prior filling the lacunar areas would have been too risky, as the solutions could have migrate causing more adhesion problems. Therefore, all the lacunar areas were carefully cleaned with ethyl alcohol and refilled as in the original technique: first a thin layer of warm fish glue solution (5%) was applied to promote adhesion and then the filler, prepared by adding mountain chalk fine powder to the adhesive solution, was applied in small drops. Operation was repeated as necessary (Fig.3 c,d) and after the complete drying of the filler the surfaces were gently levelled employing a moist cork rubber. The frame was then cleaned in two phases, employing the same solutions and technique as presented before for the other "gilded" surfaces. Previous tests on small surfaces have proven that underneath several layers of bronze there was an reddish-orange colour, which was considered as the original (areas pointed by blue arrows in Fig.3 c,d). Therefore cleaning was done until this original layer was visible (Fig.3e). Small missing parts of the carved ornaments were completed with a putty prepared from fish glue solution (5%) and chalk.

Restoration of the painted icons

The four painted icons (I1, I2 of the top register from left to right and I3, I4 in the bottom register, from left to right in Fig.1a) were initially in very precarious conservation state, with serious problems related to the loss of adhesion between the wood substrate and the painting layer due to the ageing of materials and the inappropriate storage environmental conditions. There were extensive lacunar areas where the whole painting layer was lost, while the remaining painting layer was crackled, presented extensive flaking and extreme darkening, making nearly impossible to recognise the depicted religious themes and figures. Urgent active conservation measures were applied as first steps in the complex process of conservation, as presented in the previous publication (Timar et al 2019). Consolidation with Japanese paper / fish glue and successive warm and cold pressing was locally repeated, by case, before removing the protective paper. Also, consolidation of the wood substrate with Paraloid B72 in ethyl acetate by injecting into the insects galleries was repeated where necessary, employing this time the flying holes from the painted surfaces too. This type of flying holes, especially the large ones situated on the depicted Saints' faces where then obturated with hemp fibres previously immersed in warm fish glue solution and then pressed into the holes.(Fig. 4a,b). The lacunar areas and the obturated flying holes were then filled employing the same materials and technique as in the case of the frame (Fig.4 c,d,e).



Fig. 4.

Obturation of the insects flying holes (a,b) and filling of the lacunar areas of the painted surfaces: degreasing with alcohol (c), application of fish glue for adhesion (d) and filler (e).

The following phase was the cleaning of the darkened painted surfaces. After several tests, a solution composed of ethyl alcohol and ethyl acetate was found as efficient and was employed to clean all the icons. Surprisingly bright colours (red, blue, green) were discovered by cleaning (Fig.5). Also the depicted religious on the four icons, namely figures St John, Holy Virgin Mary, St Peter and St Mark, could be recognised by the written text and specific features. Previous restoration interventions were obvious, including overwriting the inscriptions and repainting on some faces were obvious and not quite adequate, but they were kept unchanged as part of history.



Fig. 5.

Cleaning of the painted surfaces: a,d-initial aspect before cleaning; b,e-aspect during cleaning; c,f-aspect after cleaning.

Colour integration and colour measurements

According to the technical principles of conservation-restoration all the interventions should be reversible and harmoniously integrated into the context of the whole artefact, while still remaining recognizable to the viewer at a closer examination to allow differentiation between the original and restored areas. These are reasons why integration is made in thin lines or dots of several colours, from light to darker ones, so that the final impression is a colour close to the neighbouring original, but slightly lighter. Accordingly, chromatic integration of all the white filled areas was a critical step within the process of restoration. Water colours were employed to ensure reversibility, while the surfaces to be integrated were pre-treated with a thin layer of egg yolk emulsion for a better adhesion. Integration was done mostly by the "tratteggio" technique in fine lines, as exemplified in Fig. 6 a-c for the St Mark icon (14), while the aspect of the whole artefact after this phase is depicted in Fig. 6d. The final step in the restoration process was application of a protective varnish layer on the whole surfaces. Natural Dammar resin in turpentine (6%) was applied on two successive layers on the face and edges, while a solution of Paraloid B72 in ethyl acetate (7%) was applied on the back of the artefact.



Fig. 6.

Colour integration of the painted surfaces: a-the icon of St Mark (I4) before integration; b-the icon of St Mark (I4) after integration; c-details of integration bottom right side; d-general aspect of the Holy door after integration.

Non-destructive colour measurements in the CIE Lab system were performed employing a portable AVA Spec USB2 spectrometer with optical fibres, equipped with an integration sphere with a measuring aperture of 8 mm (Fig. 7). Measurements were done comparatively on original and colour integrated areas, prior and after varnishing. Some examples of data are presented in Table 1, as averages of 2-4 measurements or single measurement, depending on the available surface of a certain colour.



Fig. 7.

Colour measurements of selected original and integrated areas of different colours.

Table 1

Selection of comparative colour data in the CIELab system for original and integrated areas of painted surfaces, prior and after varnishing with Dammar resin in turpentine

| Measurements before varnishing | | | | | | | | | | |
|---|-----------------|-------|-------|-------------------|-------|-------|--|------------|------------|------------|
| Colour / Zone | Original colour | | | Integrated colour | | | Colour differences Integrated-Original | | | |
| | L | a | b | L | a | b | ΔL | Δa | Δb | ΔE |
| Reddish orange - frame | 50.74 | 23.59 | 21.95 | 49.23 | 26.95 | 20.15 | -1.51 | 3.37 | -1.80 | 6.23 |
| Light brown - background of I2 - upper part | 40.14 | 8.71 | 14.38 | 41.90 | 10.00 | 8.56 | 1.76 | 1.29 | -5.82 | 6.22 |
| Dark brown - background of I2-bott | 32.67 | 4.77 | 1.68 | 34.25 | 3.86 | 4.02 | 1.58 | -0.91 | 2.34 | 2.97 |
| Dark blue - sky background I1 | 37.56 | -6.08 | -1.58 | 41.64 | -3.36 | -4.08 | 4.08 | 2.72 | -2.50 | 5.50 |
| Dark green -garment in I1 | 29.95 | -0.37 | 2.63 | 32.35 | -0.37 | 2.20 | 2.40 | 0.00 | -0.43 | 2.44 |
| Red - garment of Holy Virgin -I2 | 38.46 | 25.98 | 12.84 | 39.37 | 20.39 | 9.21 | 0.91 | -5.59 | -3.63 | 6.73 |
| Pink - face of Holy Virgin -I2 | 51.91 | 13.18 | 14.73 | 47.22 | 12.23 | 9.97 | -4.69 | -0.95 | -4.76 | 6.75 |
| Measurements after varnishing | | | | | | | | | | |
| Colour / Zone | Original colour | | | Integrated colour | | | Colour differences Integrated-Original | | | |
| | L | a | b | L | a | b | ΔL | Δa | Δb | ΔE |
| Reddish orange - frame | 49.94 | 24.52 | 18.97 | 47.97 | 22.82 | 14.42 | -1.97 | -1.70 | -4.54 | 6.37 |
| Light brown - background of I2 - upper part | 41.87 | 8.59 | 11.94 | 42.28 | 8.13 | 12.75 | 0.41 | -0.46 | 0.81 | 1.02 |
| Dark brown - background of I2-bott | 34.06 | 1.96 | 4.95 | 35.45 | 3.68 | 4.56 | 1.39 | 1.72 | -0.39 | 2.25 |
| Dark blue - sky background I1 | 32.37 | -2.37 | -0.18 | 32.41 | -1.14 | 0.27 | 0.04 | 1.23 | 0.45 | 1.31 |
| Dark green -garment in I1 | 29.47 | -0.26 | 2.75 | 31.51 | -2.50 | 7.93 | 2.04 | -2.24 | 5.18 | 6.00 |
| Red - garment of Holy Virgin -I2 | 38.63 | 22.98 | 13.26 | 40.43 | 17.41 | 9.66 | 1.80 | -5.57 | -3.60 | 6.87 |
| Pink - face of Holy Virgin -I2 | 51.03 | 17.21 | 16.51 | 49.04 | 13.01 | 10.48 | -1.99 | -4.20 | -6.03 | 7.61 |

Both detail images in Fig 6 and colour data in Table 1 clearly highlight some differences between the original and integrated colours, in terms of lightness (L) and chromaticity (red-green chromatic component a, yellow-blue chromatic component b). Generally, the integrated areas were lighter in colour than the original, which is reflected by positive ΔL values (lightness difference integrated-original). The exceptions within the data in Table 1 (especially those for the external reddish-orange frame) and generally this data should be considered, however, with care as the measurements could not cover all the integrated areas. The global colour differences ΔE between the original and integrated colours varied in the range 1.02 (very small differences barely visible by a trained eye) to 6-7 units (small to medium colour differences visible by the human eye). Colour measurements highlighted also some colour changes brought about by varnishing, for both the original and the integrated colours, but a general trend could not be detected. More research is needed.

CONCLUSIONS

Following a complex approach, based on documentation and results of previous scientific investigations, the main challenges in the conservation and restoration of the valuable early 19th century Holy Door originated from the oldest Orthodox Church in Codlea have been successfully addressed:

- important steps were achieved in understanding the manufacturing techniques employed and identification of the original and later interventions materials, which altered the original aspect of the artefact;
- all the original elements from the wood substrate to the multi-layered complex polychromy and painting were preserved by adequate methods;
- appropriate methods of cleaning / controlled partial stripping were identified and applied in order to remove the unoriginal bronze layers and reveal the small remains of a complex polychromy with blue, green, red-orange, ochre, colours, partly applied on silver leaf;
- the liturgical significance of the artefact was regained by the restoration of the painted icons, the depicted religious figures becoming recognizable after a careful cleaning;
- the whole process allow a better understanding and appreciation of this beautiful historic artefact.

It could be concluded that the patrimonial value of the Holy Door, residing from liturgical, spiritual, artistic, historic and documentary valences, was highlighted and preserved for further generations. This was possible only by a huge effort and cooperation between students, specialists, laboratories and institutions to serve successfully a common goal of cultural heritage conservation. Nevertheless, the importance of continuous monitoring and preventive conservation in exposure should not be neglected.

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