

Decorative Coatings of the Saint Demetrius Basarabov Reliquary's Wooden Pedestal

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Conservation state assessment of the Saint Demetrius Basarabov reliquary's wooden pedestal

1. Structural degradation at the level of the wooden support

1.1. Cracks and ungluing of the component parts of the support

The processes of absorption and removal of water from the wood structure, combined with the fluctuations of microclimate values, determined the appearance of specific forms of wood degradation. The degradations occurred through the dimensional changes of the wooden structure, favored by its drying, through the evaporation of water from the substrate and determined the appearance of cracks of different depths and sizes, spacings, displacements and ungluing of the constituent elements. Also, the natural defects of the wood had a significant contribution in deterioration, causing movements, displacements, fractures of the support, irregular dimensional changes of the fiber. Sometimes, these forms of degradation were caused and accentuated by mechanical shocks, or mishandling of the piece.

1.2. Gaps in the carved wooden support

1.2.1. Gaps in the carved decoration

The polychrome sculpture elements have been accidentally bumped, scratched or eroded, thus resulting in gaps of various shapes and depths. Gaps (Figure S1) are caused by the combined effect of wood drying, mechanical shocks produced by careless or wrong handling and contamination with biodeteriogens. Also, with the formation of gaps in the carved wood decoration, the polychromy was also lost.





Figure S1. Gaps of different depths

1.2.2. Lack of some elements/component fragments sculpted with polychromy

Following the appearance of the numerous forms of degradation of the wooden support, certain constituent elements of the pieces have been lost. In general, the lack of these elements is justified by the combined action of all the degradation factors that had a destructive impact on the components, and especially by the anthropogenic factor.

This form of degradation was produced by a decrease in the mechanical strength of the support and by mechanical shocks caused by mishandling (Figure S2).



Figure S2. Lack of carved elements/fragments

1.3. Biodeteriogens - biodeterioration caused by xylophagous insects

The activity of xylophagous insects is identified by the nutrition processes of their larvae. It have been highlighted flight holes created by the larvae that have reached maturity and which have become insects, both on the backs of the pieces and on the polychrome surfaces (Figure S3). The activity of xylophagous insects affects the mechanical strength of wood and favors the appearance of other structural degradations.

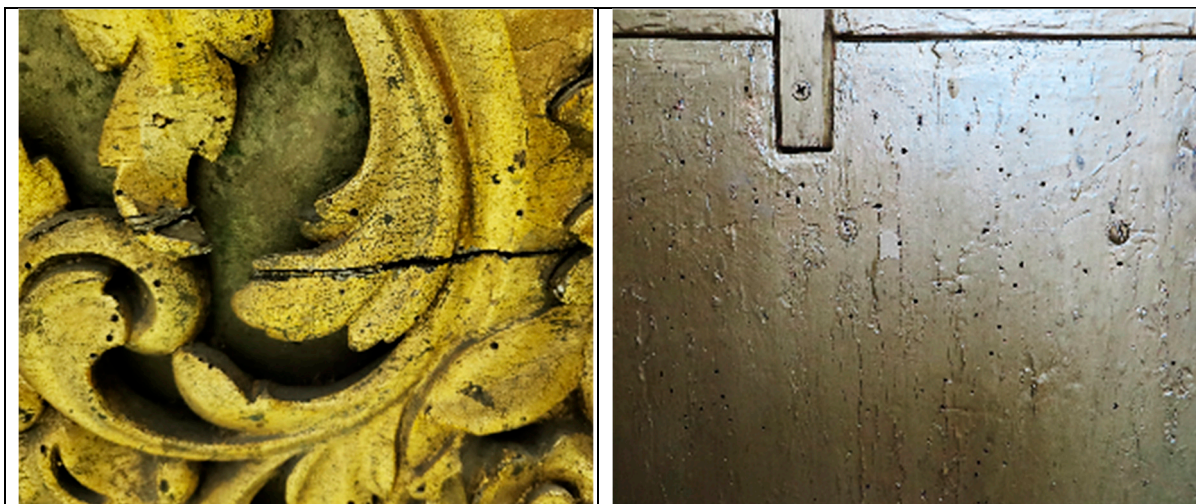


Figure S3. The presence of the flight holes of xylophagous insects on the verso of the pieces and on the carved polychrome surfaces

1.4. Previous interventions

1.4.1. Repainting and repolishing

Areas were identified where repolishing and/or repainting interventions were carried out on the gaps that reach the wooden support. This type of intervention not only affects the surface of the carved decoration aesthetically, but also from a physico-chemical point of view, the action of the chemical compounds of the materials used in the repainting/repolishing interventions, may accelerate the deterioration of the wood fiber.

1.4.2. Improper fixing

Various metal fixing elements (nails, screws) were identified, introduced by methods that do not correspond to the conservation and restoration methodology. The presence of these elements in the wood structure produces structural degradation - cracks, splinters, wood fractures. It also damages the general appearance of the surface and causes degradations at the polychromy level.

2. Degradations at the level of polychromy

2.1. Weakly adherent, superficial deposits

Various types of loosely adherent deposits were identified on the polychrome carved surface. They are represented by dust and cobwebs trapped between the decorative elements as well as other materials suspended in the air.

Where the relief of the wood favored the accumulation of deposits, they are found in the form of a compact layer, adhering to the surface of the wood. These deposits have a mixed composition, being formed from the category of organic and inorganic materials, such as microcrystals of salts, carbon particles, and various types of microparticles of mineral origin. Cobwebs represent an active degradation factor that through the strong electrostatic character of the web threads attract and retain in their network dust particles and other microparticles from the atmosphere (Figure S4).



Figure S4. Superficial deposits of dust and the presence of cobwebs

2.2. Clogged adherent deposits

In the portions where the topology of the wood has favored the accumulation of deposits, they are found in the form of a compact layer, adhering to the surface and identified on the entire surface of the polychromy and more agglomerated in the concavities. These deposits alter, from an aesthetic point of view, the perception of the specific color. At the same time, from a physical-chemical point of view, the presence of deposits on the surface of the wood is a real cause of wood degradation, through the combined action of the nature of the deposits with the microclimate factors.

The eventual presence of microparticles from microscopic fungi and other microorganisms can represent a source of nutrients for micro/macroorganisms, the risk of contamination, followed by the occurrence of wood biodegradation phenomena, being very high.

Also, the wax from the candles used in churches is a physical-chemical degradation factor of the polychrome layer, through the action of the oxidation products resulting from the natural aging of the wax.

2.3. Cracks of various depths in the polychromy layer generated by the movements of the support

As a result of natural aging and dimensional changes, such as contraction and expansion movements of the wooden support, the pieces have suffered various degradations at the level of the polychromy layers, among which are cracks of various sizes and depths. The differences in the elasticity of the wood fiber and the preparation layer caused the appearance of these cracks starting from the support to the surface. This fact also explains the appearance of visible cracks and micro-cracks at the joints of some polychrome carved elements.

2.4. Active detachments with a tendency to produce gaps of polychromy layers

Detachment of the polychromy layers as well as cracks occurred due to the natural aging of the materials and dimensional changes of the wooden support. These appeared as a result of the loss of adhesion of the preparation layer to the support, a form of degradation resulting from changes in the elasticity of the binder of the preparation layer, as well as through the aging processes of the materials. The presence of detachments represents a risk for the painting as the dislocated fragments can easily be lost.



Figure S5. Detachments of the polychrome layer



Detachments and dislocated polychrome layer fragments

2.5. Gaps and erosions of various depths in the polychromy layer

The enhancement of the detachment process of some fragments finally led to their loss, forming gaps on extensive surfaces in the polychromy layer. These are of various depths and sizes. Thus, on the surface of the carved and polychrome elements, there are both deep gaps up to the support and also superficial gaps of the erosion type, resulting from excessive rubbing.

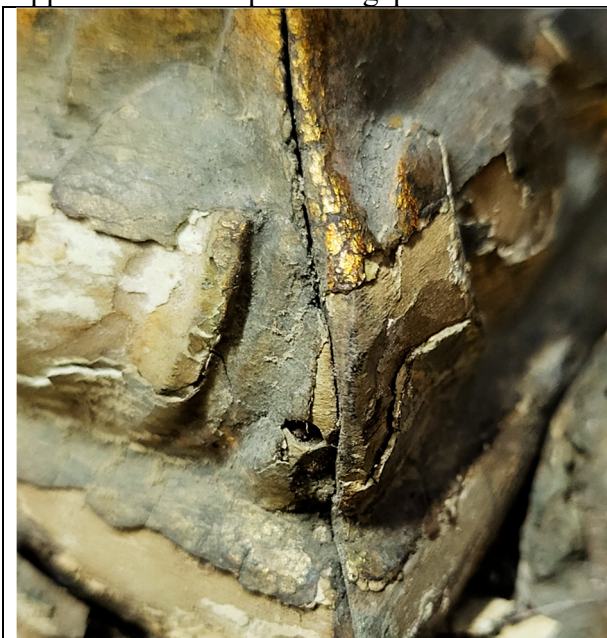


Figure S6. Gap in the polychromy layer, up to the level of the wooden support



Extensive gap areas – irreversible loss of the polychrome layer

2.6. Previous interventions carried out on polychrome elements

The surfaces of the polychrome carved ornaments underwent repainting and repolishing interventions in different stages. Overlapping layers of bronze were applied to the surfaces with

rich carved decoration. They do not fully respect the general chromaticity and/or the original character of the decor and affect the whole ensemble from an aesthetic point of view.

An example of the originally decorated gold gilded sample analysis by optical microscopy of the wooden pedestal is depicted the Figure S7.

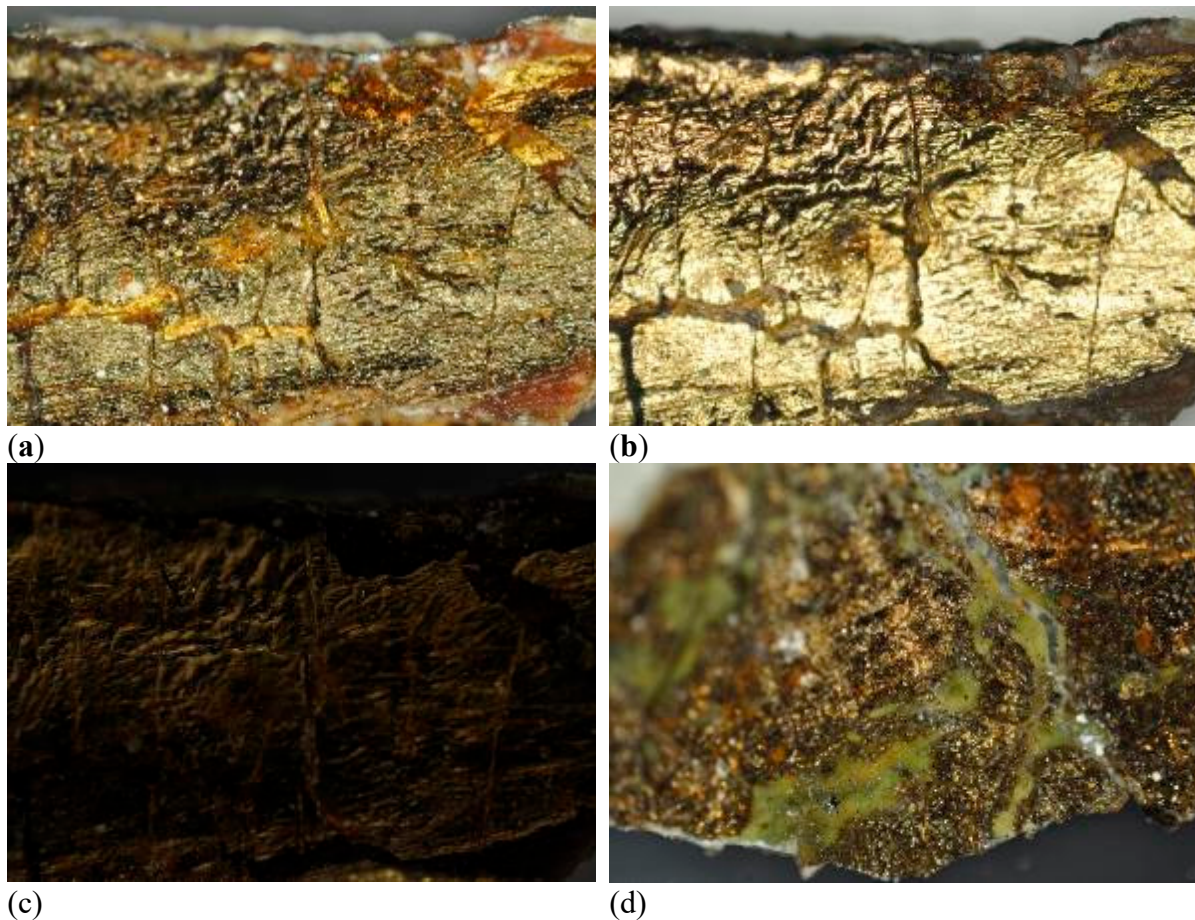


Figure S7. Optical microscopy images of the sample 2 originally decorated with gold foil : a) in polarized light (x50); b) reflected light (x50); c) ultraviolet fluorescent light (x50) d) reflected light (x50)