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Conservation project of a gilded and painted canopy from the 18th century

Abstract

Whilst studying at the Istituto di Restauro delle Marche in Macerata, Italy, a challenging conservation treatment was carried out on a late 18th century baroque canopy, located in Montecassiano Municipal storage, Italy, and it is probably part of the collection from the Augustinian Convent of the same town. The decorative scheme for this wooden artefact consists of water gilding and tempera on carved wood, with further additions of paper decoration, shaped as stars. In the first phase of restoration, a study was carried out on the techniques and materials. With the aid of diagnostic investigations it was possible to characterise the painted and gilded surfaces, the paper decorations, and the wood species and their distribution in such a way as to be able to understand the choices made by the author. At the same time, an accurate mapping of the object and its degradation has been useful to identify and understand its conservative events and to plan an adequate intervention. The aim of the treatment was to restore readability and functionality to a particularly degraded artwork, aiming to reconstruct the integrity of the object as decorative furniture, whilst respecting its uniqueness and story. A complex restoration was carried out which consisted of restoring the wooden structure and functionality of the canopy, followed by aesthetical restitution.

Keywords

Water gilding, tempera, acrylic resin, polyvinyl acetate, epoxy putty,

Fig. 1a. Upper view.
Fig. 1b. Front of the object.
Fig. 1c. Lower view.

This paper presents the research and conservation treatment carried out at the Istituto di Restauro delle Marche, a recognised institute for conservation and restoration of cultural heritage based in Italy. The object of the study is a late 18th-century baroque canopy; the restoration focused on principles of reversibility, interpretation and minimum intervention.

The canopy is a carved wooden wall decoration, adorned with water gilding, tempera and paper ornament. It was collected in the Municipal storage of Montecassiano, a small village in the Marches region, and it was probably made for the Augustinian Convent of the same town. The convent was established in the 15th century and included a church dedicated to St. Augustine where the canopy may have come from; in fact, following the Napoleonic suppressions of the monastic orders, the whole complex came under town ownership.

Initial investigation

The canopy is constructed as two main parts: a horizontal structural piece of timber and a carved decoration which is applied directly on the first structure. The decoration starts from a central moulding on which the carving is applied. The upper part is shaped as acanthus leaves volutes, and the lower with lambrequins (fig. 1b). Each lambrequin is adorned with floral pattern pastiglia and the background is engraved with horizontal lines.[1] The front of the canopy is gilded throughout using water gilding on a brown-reddish bole. These ornaments are characterised by a style of transition between Baroque and Rococo. The sinuous lines and the original play of twines create asymmetry and movement typical from the Rococo, but at the same time the object shows its balance in the specularity of the main volutes and in the carved curvy moulding.

The upper surface of the object is completely coated in a pale blue tempera, with no further decoration since it was not meant to be visible (fig. 1a). In fact it displays the original hard-

1. Pastiglia decoration consists in low relief modelled in gesso (calcium sulphate and rabbit skin glue). It is a typical decoration for frames, chests and other gilt objects.

Fig. 2. The moulding and the lambrequin decoration of this baroque canopy show similarities with the object treated. Church of St. Lorenzo, Mestre. (Ve)

ware. Consisting of two brackets nailed directly on the horizontal structure, which was used for hanging. This type of hanging system is not fixed, but it is made to easily remove the artefact from the two pins in the wall; this may mean the canopy could have been used for other purposes, for example during processions.

The lower surface visible is decorated to simulate a starry sky (fig. 1c). It is painted in the same manner with the monochromatic blue hue, but with the addition of many eight-pointed paper stars, glued onto the panel, and a sixteen-pointed star applied on the central lambrequin. This kind of decoration, which may seem unusual, was actually used sometimes in commissions within the same region, when the clients were not very particularly wealthy.

The overall dimensions of the canopy are quite small (height 51, width 125, depth 34 cm). No documentation has been found about the artefact, but it is possible, due to its starry sky decoration and reduced depth, that it was created as ornament for a Holy Mary painting. Furthermore, the starry sky is considered to be a Marian symbol, highlighted by the number eight, and its multiple, which symbolizes salvation and perfection.

Since no information has been found about the canopy, other examples of similar decoration helped to characterise and date the artefact. For instance, another wall decorative canopy from the same period with similar features is located in St. Lorenzo's Church in Mestre, Venice, but in that case it is bigger and deeper since it is placed above a statue (fig. 2). About the paper ornament, a baroque altar from a town in the same region, Monte San Martino, consecrated to the Holy Mary, shows a very similar gilt carved decoration upon a pale blue tempera layer with many paper stars (fig.3).

Fig. 3. The canopy is an integral part of the decoration of the altar. The paper starts are glued all over the light blue painted surface but, in this case, they are five-pointed. Church of St. Martin Bishop, Monte San Martino. (Mc)

Technical investigation

During the first part of the project, the materials and the executive technique were studied to assess the object, in order to carefully plan the conservation treatment.

The wooden structure

The canopy is made by a spruce plank where all the carved ornaments are applied (fig. 4a). The acanthus leaf-like carving is created adding several blocks, glued each other and on the front of the horizontal panel (fig. 4b); the decoration was whittled directly on the canopy. Instead, the lambrequins were previously shaped separately and then added on the back of the moulding, glued and secured with nails, generally two (fig. 4c). The hardware consists of two looped brackets nailed into the wood with the purpose of hanging the canopy on the wall through two pins. Both the nails and the brackets appear to be handmade and there are no traces of tampering; meaning that the hardware is probably original.
From a macroscopic examination was already possible to identify two different wooden species but in order to have an objective response, a microscopic analysis was carried out. Three thin sections of the wooden support were made for the three main structure of the object: the plank, the carvings, and the lambrequins. The specimens have been analysed under microscope and the recognition was made for comparison and with aid of the dichotomic keys. The results confirmed the presence of spruce for the horizontal structure (fig. 5) and poplar for the two decorations (fig. 6). The choice of two different wooden species corresponds with different use and purpose, in fact the poplar is a uniform and easy to carve hardwood, which

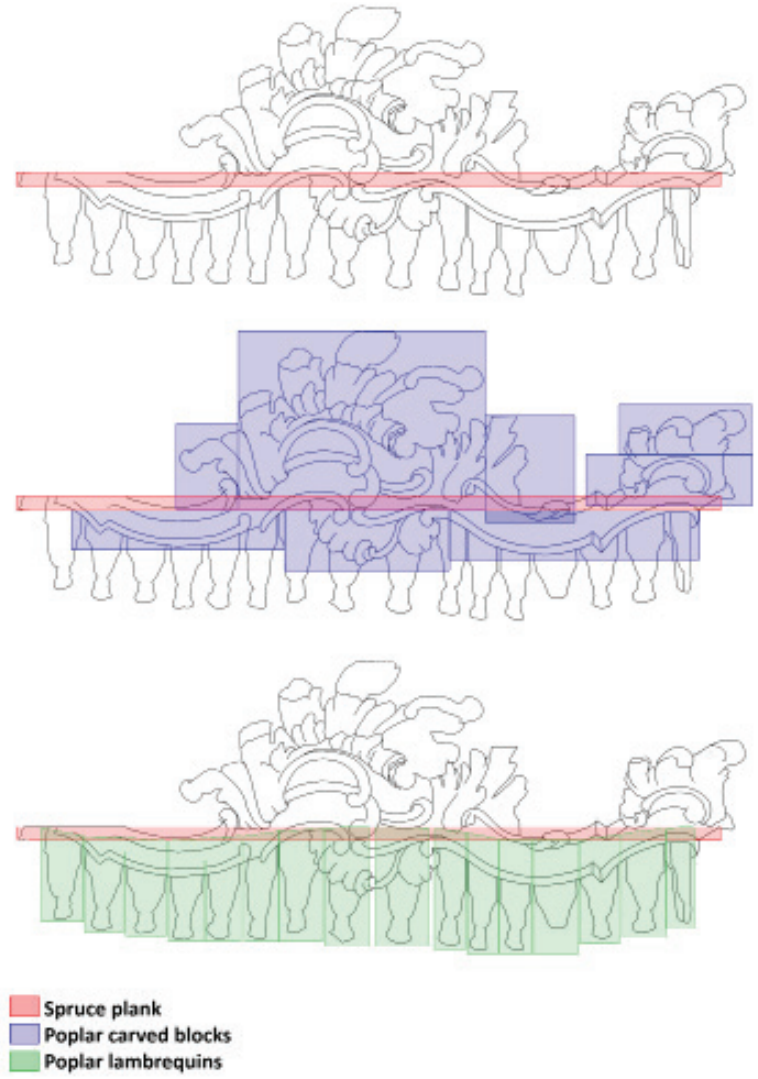

Fig. 4a. Front of the object, the red area highlights the position of the structural plank.
Fig. 4b. The carved elements are glued directly on the plank and each other.
Fig. 4c. The lambrequins are glued and nailed just on the wooden panel.

is always been preferred for sculptures and ornaments. On the other hand, the spruce is a soft, cheap and easy to find softwood, which was generally used for the structure of furniture, on the hidden and not visible parts.

The painted and gilded surfaces

Due to the poor condition of the object, as abrasions and losses, the stratigraphy of the painted and gilded surfaces were already clearly visible. The gold leaf was applied only on the front of the object, on the decoration, over a red-brownish bole and with an underneath gesso ground. This gesso is applied all over the object as preparatory layer, underneath the pale blue tempera layer too. On the inner surface of the panel, eight-pointed paper stars are directly glued upon the paint layer. In addiction another star is applied on the central lambrequin, but it shows sixteen points.

As aid to deeply understand the materials, the executive technique and the stratigraphy, three cross-sections from the three main surfaces (gilding from the front, tempera from the inner

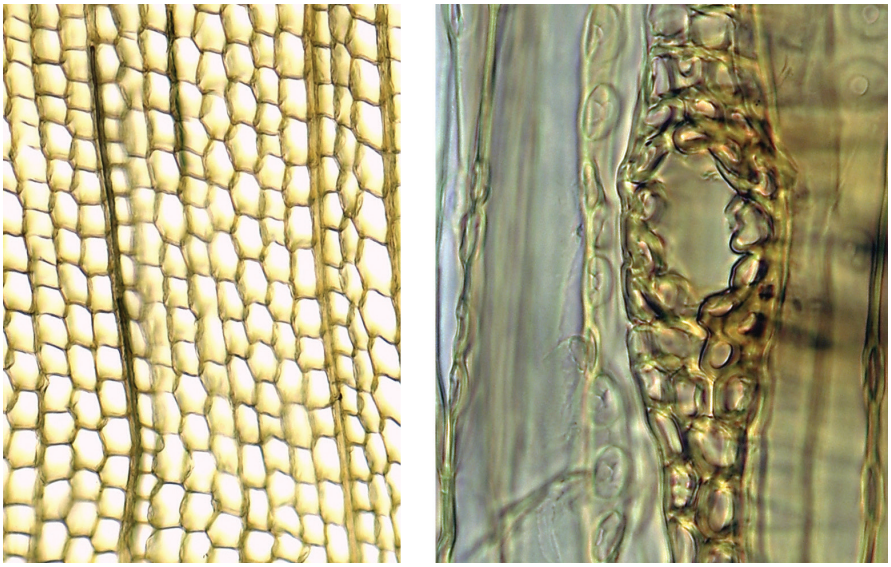

Fig. 5. The transverse section 100x (left) shows a typical gymnosperm. The tangential section 400x (right) highlights a resin canal with thin-walled epithelial cells, which characterise spruce wood. (Picea abies)

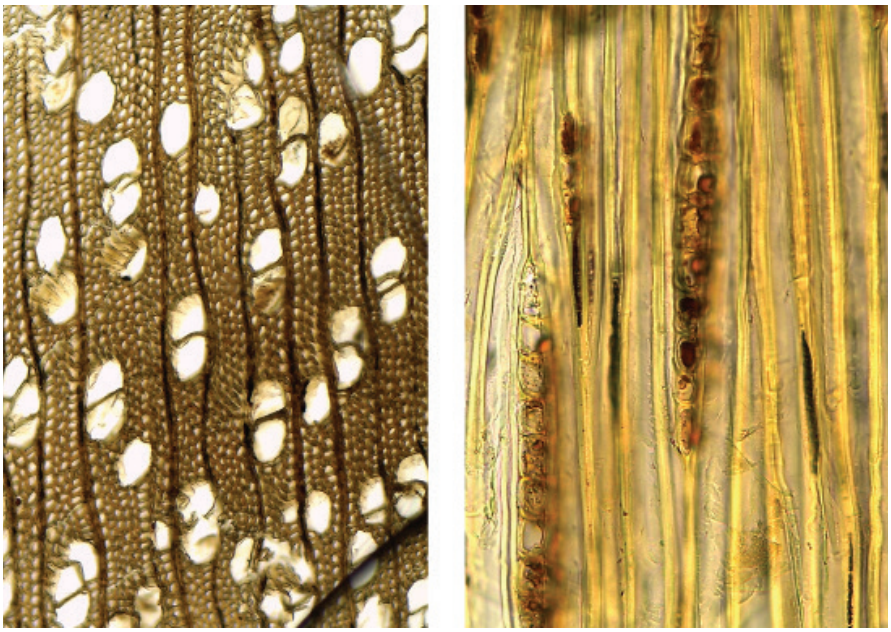

Fig. 6. The transverse section 100x (left) is typical of an angiosperm with big vases among fibers and vessels; the rays are not visible. The tangential section 400x (right) highlights uniseriate rays. The section features poplar wood. (Populus)

and upper sides) were made and observed under the microscope. The gilding sample shows a thick layer of gesso ground and a very thin one of bole (fig. 7). Concerning the painted surfaces, the specimens point out at least three different coatings of gesso, decreasing in thickness, and a very thin layer of tempera (fig. 8). On the tempera samples, histochemical tests were carried out to identify the presence of lipids or proteins as binder. The cross-sections have been stained using two reagents: Brilliant Blue R for proteins and Oil Rd O lipids, and the staining was positive just for the Brilliant Blue R. The analysis confirmed the primary hypothesis of animal glue and gypsum as gesso ground and animal origin glue binder for the painted film. The stars on the inner surface of the canopy are made by a thick paper and are directly glued on the paint layer (fig. 9), in some areas traces of glue are visible. The surface shows lines traced to build up the their shape, and shadings along the edges as decoration and to create a chiaroscuro, for a three-dimensional appearance. Furthermore, a sample of the paper was isolated and analysed under microscope, discovering that it was made by quite long linen

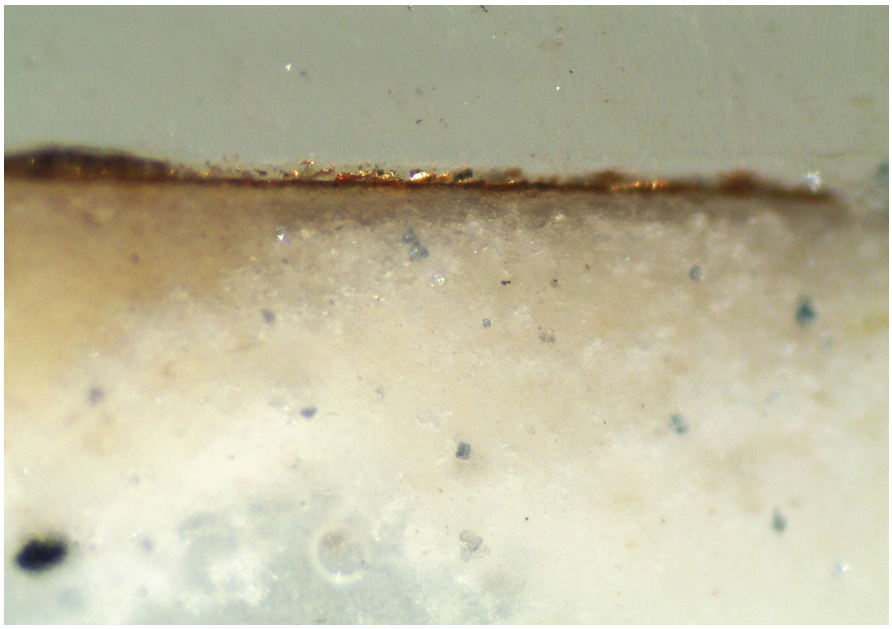

Fig.7. Gilt surface, 100x. The red bole is very thin and at the very top the gold leaf is visible.

Fig. 8. The tempera layer, 100x. The tempera is very thin if compared with the gesso ground and seems to be applied just in one coating. No varnish or other superficial material are visible.

fibres. Due to the thickness of the paper, its composition and the length of its fibres is possible to affirm that the stars are contemporary to the canopy and so it is not a later addition. In fact, after the second half of the 19th century, mechanical processes caused a reduction of fibres length and paper thickness; moreover the cotton became more common as raw material.

Note on condition

Condition checking revealed the canopy was in very poor condition due to a previous inadequate storing. The artefact was long stored in a historical building with water infiltration problems from the ceiling that almost certainly affected the canopy; in fact it shows damage referred to water percolation (figs. 10-12).

The wooden structure

Referring to the structure of the object, the damage is mostly caused by contact with water and high environmental humidity levels. Some elements of the acanthus carving are partially detached, forming fissures and highlighting the bond-lines among the elements. Others blocks had totally lost their adhesion and completely unglued from the main carving; a part of them was found with the canopy and was collected to be repositioned, but others got lost. This kind of losses are characterized by a flat and smooth surface (fig. 13). Proper losses of wood, present at some volute ends, are mostly caused by breakage and are featured by an uneven surface. Furthermore, old woodworm damage is visible but mostly gathered on the right side, causing a weakening of the wood at some acanthus leaves tips; it appears inactive and is covered in dust. Ultimately the hardware is completely oxidised but sound.

Fig. 9. General overview of the starry surface. Due to the oxidation of the paper, a difference in colour is visible between the surface of the star and some torn areas.

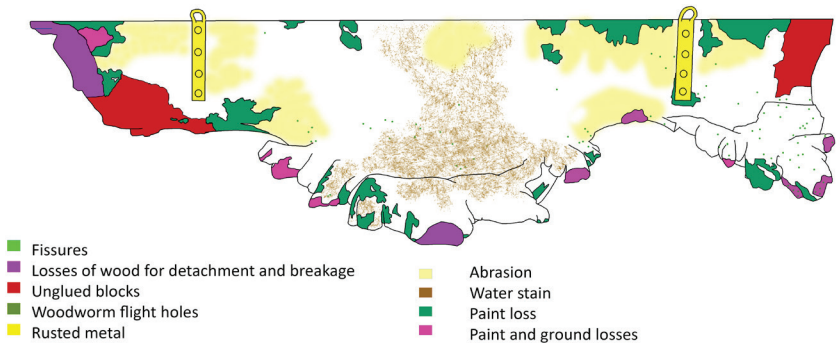

Fig. 10. Condition mapping, top view.

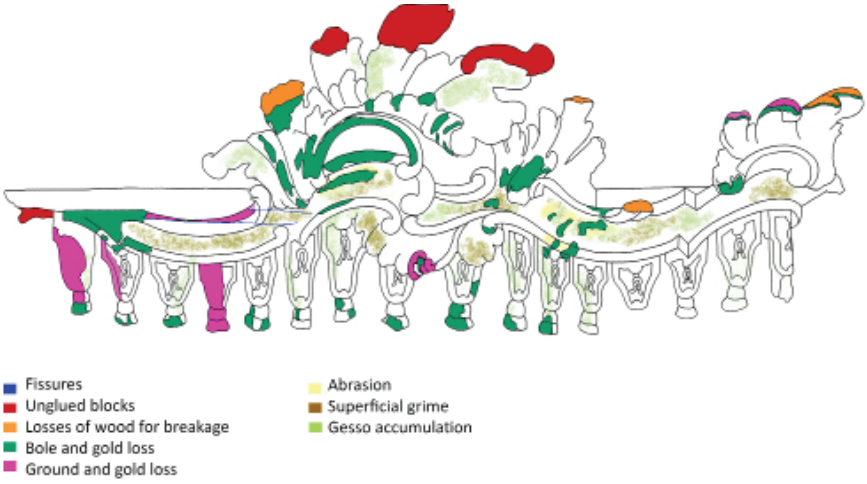

Fig. 11. Condition mapping, front view.

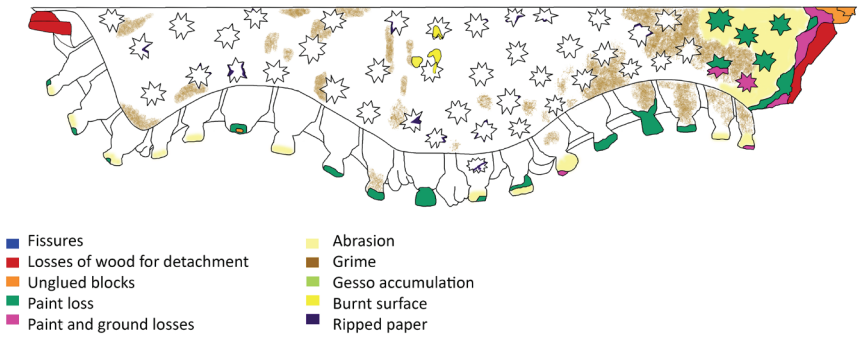

Fig. 12. Condition mapping, bottom view.

Fig. 13. Central decoration of the canopy.

The painted and gilded surfaces

Concerning the decorative surfaces, almost throughout the gilding and its ground show areas detached from the wooden support due to flaking, which caused also plenty of losses over time. In some areas accumulations of gesso are visible over the gold leaf: during a water percolation the preparatory layer was solubilized, gliding and drying over the gilt surface. The gold is generally abraded and, for this reason, the underneath bole is visible (fig. 13).

The tempera and its ground are not coherent and losses are present in many areas of the artwork. The two different surfaces display a different state of conservation and it may mean that the canopy was generally stored upside down, with the starry side up and so more exposed. In the upper side of the artefact, the surface is powdery and the dirt is partially imbibed. On the starry surface, the paint and gesso layers are more stable than the gilding, but the paint layer shows some water stains, caused by the peculation dripping from the ceiling. The paper stars suffered the water damage too: some partially de-attached from the painted surface, other are lost showing the underneath gesso and wood; few are ripped (fig. 14). All the paper is oxidized, turning brownish; it is possible to notice the difference in colour between the oxidised paper through the torn areas. Overall dirt and dust gave the gold and painted surfaces a dull appearance.

Fig. 14. The left side of the artwork is the most damaged.

Fig. 15. In this area the original wood was degraded and not capable to support the decoration anymore. For this reason it was thinned and consolidate adding an insert.

2. Acril 33 is an acrylic resin in aqueous dispersion composed of a copolymer ethyl acrylate - methyl methacrylate (EA-MMA) and manufactured by C.T.S. srl. It has a solid content between 45-47% and creates transparent, stable and UV resistant films.

3. Tylose MH300p is a methyl hydroxyethyl cellulose soluble in cold water and insoluble in warm water and organic solvents. Its aqueous solutions have a neutral pH and for this reason it is used as thickening agent, as well as adhesive and consolidant for paper, photographs and textile. Tylose is a registered trademark of SE Tylose GmbH & Co. KG.

4. Paraloid B72 is an acrylic resin, an ethyl methacrylate co-polymer. It an a hard thermoplastic resin which has good lightfastness and a Glass Transition Temperature around 40°C. It is sold as transparent pearls, soluble in medium polarity solvents and insoluble in water and aliphatic solvents. It is manufactured by Rohm and Haas.

5. Bindan-P is vinyl adhesive specifically formulated for wood, it is a polyvinyl acetate (PVAc) aqueous emulsion manufactured by Bindulin.

Conservation treatment

The restoration aimed, first of all, to stabilise the object by fixing the insecure parts.
The first stage was to consolidate the different surfaces. The flaking gilding was consolidated using Acril 33[2] diluted 1:1 with deionized water, applied by injection or with a small paintbrush according to the area to treat. The paper stars detached from the painted surface were glued using Tylose MH300p[3] 8% in water and left under gentle weigh until dried. The upper surface of the canopy showed powdery paint which needed to be consolidated. Since the surface is water sensitive an aqueous consolidant had been avoided. For this reason, the Paroloid B72[4] 1% in acetone was chosen; it was applied in two different times using Japanese tissue as an interlayer, to avoid the mechanical abrasion of the brush on the delicate surface.

Structural intervention

When the canopy was stabilized the intervention on the wooden support was carried out, with the aim to give back the structural function to the canopy as well as a proper aesthetical balance. First of all the fissures were glued and the loose blocks recollected were reassembled

Fig. 16. The insert created on the spruce panel.

Fig. 17. The image shows several losses in the wooden support, especially on the moulding.

using Bindan-P[5] as adhesive. Where the wood was damaged, it was reinforced using a wooden insert realised with more blocks to reduce tensions and by choosing the same species (figs 15-16). All the new wood involved in the treatment was preventively treated with Per-xil 10[6] in order to prevent woodworm infestation.

Another insert was made along the moulding with the purpose to allow the successive adhesion of a loose lambrequin as well as to recreate the continuity of the decoration (fig. 17). The lambrequin was then fixed to the new moulding (fig. 18) through two small wooden dowels and using the two holes left in the lambrequin from the original nails.

A structural element with a decorative feature was also created in order to guarantee the stability of the overall artefact when hanged. The replacement was made without inventing due to the presence of specular part on the opposite side and original clear traces on the surface, as reference (fig. 19). This element is fundamental to avoid the forward overturning of the object after hanging. The replacement had either a structural and an aesthetical purpose, in fact it is also important to increase the appearance and optical balance of the composition. Other minor inserts were created to fill wood losses in the carved decoration, when the reconstruction was certain. But unfortunately, some important elements in the volutes ends were still missing, and in this case a replacement without invention was not possible. For this reason it was decided to leave the losses visible in order to respect the issues the canopy has undergone over time.

Furthermore, a lambrequin missing knock was created using a cast. First of all, a comparative test was made in order to choose an appropriate coating as interlayer between the silicon gum and the gilding to protect the gold: four coatings were applied on a sample with a gilt surface with similar characteristics to the original. Then pieces of silicon gum were applied on the coatings, consequently the gum was detached, and the films removed using the same solvent used for the application. After the test (table 1), Paraloid B72 5% in acetone was chosen as temporary interlayer coating between the silicon gum and the original gilding to protect the original and delicate material. After building up the negative mould trough the use of a silicon gum, called Silical 110[7]; the replacement was made in Balsite[8] with 5% of ethanol, to make it more fluid (fig. 20). The mapping of the front (fig. 21) shows the structural treatments carried out on the whole object. It also highlights that the replacements improved the balance of the overall decoration.

Fig. 18. Inserts in the carved moulding and repositioned lambrequin.

6. Per-xil 10 is the commercial name of a wood preservative based on permethrin (0,40%) and piperonyl butoxide (0,06%) manufactured by C.T.S. srl. It has low toxicity and it is formulated with an odourless hydrocarbon solvent.

7. Silical 110 is a silicone kneadable rubber suitable for all moulding techniques which require specific processing features (long working time) and mechanical features as tensile strength, tear resistance and low shrinkage. It is supplied by C.T.S. srl.

8. Balsite is a two-component epoxy-based putty (Balsite W + Balsite K), purposely formulated for patching and reconstructing wood artefacts; it shows good adhesion power, absence of shrinkage and a relative elasticity. Balsite can be easily moulded to rebuild missing sections and, furthermore, it can be carved after the material has hardened. Balsite is a registered trademark of C.T.S. srl.

Fig. 19. The two decorative elements necessary to contrast the weight of the object against the wall, when the canopy is hanged. The one on the left was carved according to the traces on the object and the original specular, visible on the right.

Fig. 20. The Balsite replacement.

TABLE 1

INTERLAYER COATING	DETACHMENT	DAMAGE	RESIDUALS AFTER REMOVAL	EASINESS TO REMOVE
1. Mastix Varnish Lukas	++	+++	+++	-
2. Regal Varnish CTS	+++	+++	-	+
3. Paraloid B72 5% in acetone	+	+++	+++	+++
4. Klucel G 5% in acetone	+	-	+++	+++
5. No film	+	-		
6. No film	+	-		

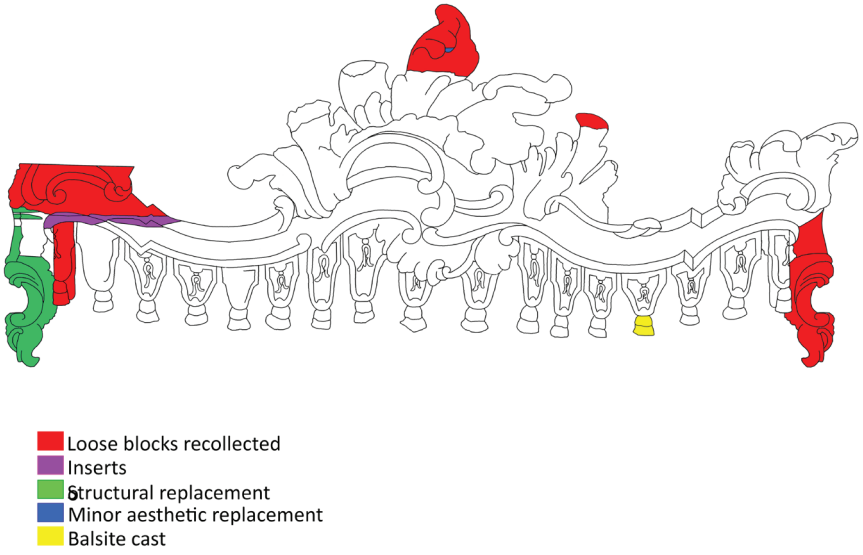

Fig. 21. Mapping of the structural intervention.

Fig. 22. Cleaning test on the gilt surface using the oil-in-water emulsion pH 8.5 with triethanolamine.

9. Oil-in-water emulsion recipe: 90 ml ligroin, 10 ml deionised water, 4 ml Tween 20. First of all the emulsifier is added to the water, then the ligroin is added drop by drop under continuous mixing through a magnetic stirrer. Chelating agent and pH modifier can be added to the water with the emulsifier.

10. Triethanolamine is an amine produced by reacting ethylene oxide with ammonia. Its primary use is as a pH adjuster, but it has also property as buffering agent and surfactant. During the test, it was added to the water by drops until reaching pH 8.5.

11. Gellan gum is a water-soluble anionic polysaccharide which creates high-retention rigid gels, mostly used in conservation to remove water-soluble grime from water-sensitive surfaces. It forms transparent and stable gels even at a very low concentration (as 1%).

12. Triammonium citrate is a citrate salt in which all three carboxy groups are deprotonated and associated with ammonium ions. In conservation, it is used in aqueous solution as chelating agent.

Cleaning

The main problem encountered during the cleaning was related to the dissimilarity of the surfaces, each with a different degradation; and this has led to different approaches for every material. The hardware was treated at first; the thick layer of rust was reduced by scalpel and then removed using a rust converter, tannic acid based. To protect the iron and avoid further oxidation, a coat of Paraloid B72 5% in acetone was applied. Concerning the gilding, many solvents, mixtures and water in oil emulsions[9] where tested, in order to find an appropriate method reliable on such a very delicate surface. After performing the tests, the results of which are visible in the table (table 2), the emulsion with added triethanolamine[10] at pH 8.5 was chosen as the most effective (fig. 22). It was applied and gently worked on the surface with a soft brush; removed at first with a dry cotton swab and then with ligroin. For the same reason, several solvents and mixtures were tested on the tempera but without effect (table 3), as well as the same emulsions already tried for the gilding, and furthermore a rigid aqueous gel made by gellan gum[11] at the concentration of 2% and 4% were tried (table 4). The gellano gels were tested on the paper as well, resulting in a partial removal of the imbibed dirt. In the end, the emulsion pH 8.5 + TEA and gellano 4% in water were chosen to clean the inner tempera layer and the aqueous gellano gel 4% was used for the paper stars on it; performing a combined cleaning was preferred to partially remove the imbibed dirt from the inner part of the canopy. The emulsion was used as for the gilding and then, allowing the surface to dry between the two treatments, small squares of gellano gum were applied, left to work between 5 and 7 minutes, and then removed (fig. 23). The different water-in-oil emulsions were also tested upon the very fragile paint layer on the upper side of the artwork and in this case the one with Triammonium Citrate[12] 2% carried out the best result (table 5) (fig. 24).

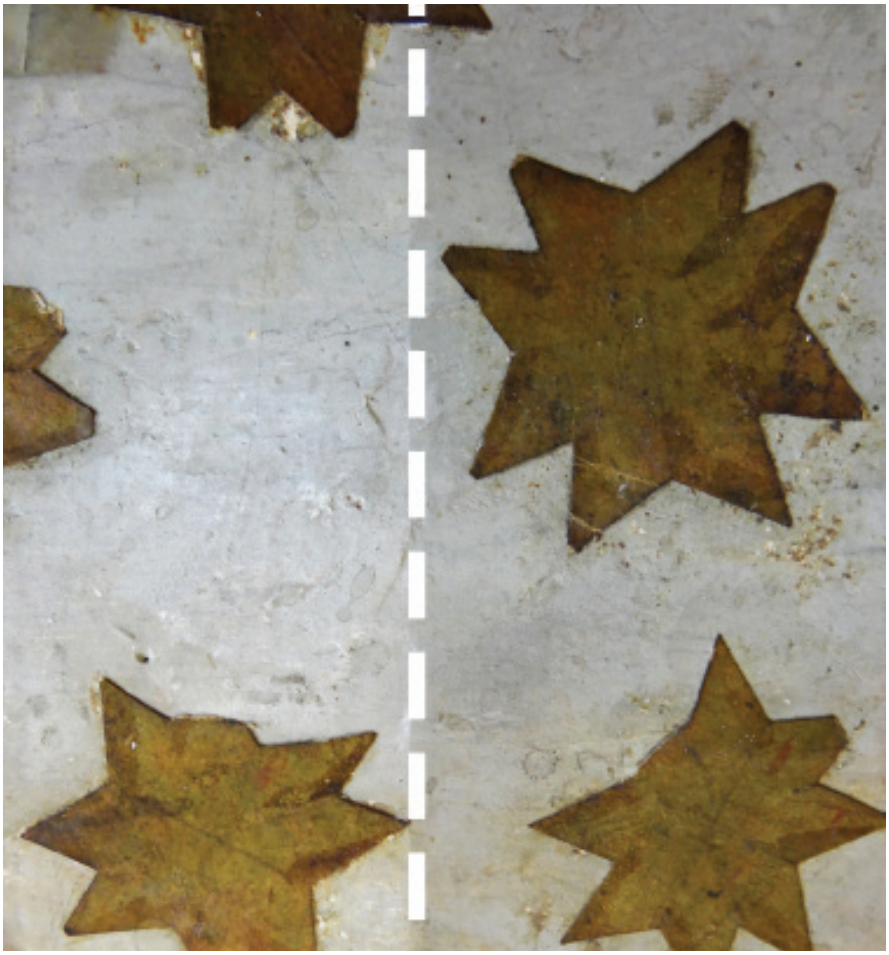

Fig. 23. Cleaning test on the bottom surface after the combined cleaning performed by the emulsion pH 8.5 with triethanolamine and gellano gum 4%.

Fig. 24. Cleaning on the upper surface using oil-in-water emulsion with Triammonium citrate 2%, the cotton swab is visibly soiled.

TABLE 2

SOLVENT	EFFECTIVE ON BOLE	NO RESULT	LOW RESULT	AVERAGE RESULT	GOOD RESULT	VERY GOOD RESULT
Ligroin fd 97, fp 2, fH 1		X				
White Spirit fd 90, fp 4, fH 6		X				
Ligroin 50% Acetone 50% fd 72, fp 17, fH 11			X			
Acetone fd 47, fp 32, fH 21			X			
Ethanol fd 36, fp 18, fH 46	X					
WATER-IN-OIL EMULSION						
Emulsion pH 7				X		
Emulsion + Triethanolamine pH 8,5					X	
Emulsion + Triammonium Citrate 2% pH 7	X				X	
Emulsion + Citric Acid pH 5.5	X				X	

TABLE 3

SOLVENT	**SOLUBILITY PARAMETERS**	**EFFECTIVE ON PAINT**	**NO RESULT**	**LOW RESULT**	**AVERAGE RESULT**	**GOOD RESULT**
Ligroin	fd 97, fp 2, fH 1		X			
Ligroin 80% Acetone 20% (LA2)	fd 87, fp 8, fH 5		X			
Ligroin 60% Acetone 40% (LA4)	fd 77, fp 14, fH 9			X		
Ligroin 40% Acetone 60% (LA6)	fd 67, fp 20, fH 13			X		
Ligroin 20% Acetone 80% (LA8)	fd 57, fp 26, fH 17			X		
Acetone	fd 47, fp 32, fH 21			X		
Ligroin 80% Ethanol 20% (LE2)	fd 85, fp 5, fH 10			X		
Ligroin 60% Ethanol 40% (LE4)	fd 73, fp 8, fH 19			X		
Ligroin 40% Ethanol 60% (LE6)	fd 60, fp 12, fH 28			X		
Ligroin 20% Ethanol 80% (LE8)	fd 48, fp 15, fH 37			X		
Ethanol	fd 36, fp 18, fH 46	X		X		
Acetone 50% Ethanol 50% (AE2)	fd 42, fp 25, fH 33		X			

TABLE 4

WATER-IN-OIL EMULSION	EFFECTIVE ON PAINT	NO RESULT	LOW RESULT	AVERAGE RESULT	GOOD RESULT	VERY GOOD RESULT
Emulsion pH 7		X				
Emulsion + Triethanolamine pH 8,5			X			
Emulsion + Triammonium Citrate 2% pH 7		X				
Emulsion + Citric Acid pH 5.5	X		X			
RIGID GEL						
Gellano 2%	X			X		
Gellano 4%				X		

TABLE 5

WATER-IN-OIL EMULSION	EFFECTIVE ON PAINT	NO RESULT	LOW RESULT	AVERAGE RESULT	GOOD RESULT	VERY GOOD RESULT
Emulsion pH 7		X				
Emulsion + Triethanolamine pH 8,5	X			X		
Emulsion + Triammonium Citrate 2% pH 7				X		
Emulsion + Citric Acid pH 5.5	X		X			

Fillings

The treatment of the object was carried on with the filling of the losses of the preparatory layer and the support either. Small wooden losses in the support, mostly caused by the attack woodworm infestation, were filled using Balsite putty. All lacunas in the preparatory layer were filled using a gesso composed by Bologna gypsum[13] and rabbit skin glue 10%. The putty was applied by spatula or brush, depending on the area, on the losses as well as on the replacement and inserts, in order to provide a homogenous surface to retouch. Therefore all the new gesso was carefully carved and smoothed down using sandpaper, scalpel and gouges. The surface of the fillings was levelled and structured to blend with the surrounding paint layers (fig. 25).

13. Bologna gypsum or Gesso di Bologna, is a mineral composed of calcium sulphate di-hydrate,

Varnishing and Retouching

About the aesthetical treatment, in order to provide a uniform superficial saturation and to isolate the original surfaces from the inpainting, an intermediate varnish was applied on the whole canopy. For this purpose many varnishes, both natural and synthetic, have been tested either on the tempera layer and on the gilt surface. After the results, the varnish which showed the best optical saturation of the overall object was the Mastix Firnis 2201[14] diluted 3:1 in de-aromatized white spirit (tables 6-7). It was applied by brush, in one layer, and carefully avoiding the paper. The retouching was focused on the reversibility and recognisability of the treatment, and for this purpose the two decorative surfaces were treated differently. Maimeri "Restauro" varnish colours[15] were chosen for their reversibility and as very compatible with the intermediate varnish. Since the tempera layers were made using a uniform pale blue colour, the most appropriate kind of inpainting was considered to be a mimetic retouching. In this way the monochrome surface was uniform due to the toning of the fillings, avoiding to create a retouching which could change the perception of the surface. About the four paper stars missing, the aim was to recreate the idea of the lost stars but without replacing them. The shape of the star was recreated using a pale blue tone, not yellowed due to the grime, as it is the original colour left after their losses. From the original traces already visible on the surface, the shape of the stars were built up using the retouching colours; in such a manner it is clear that the stars are lost but it is still visible where there were originally located. In this way the overall appearance of the inner and upper surfaces of the canopy was uniform: no losses in

14. Mastix Firnis 2201 is a mastic resin based varnish, produced by Lukas-Nerchau GmbH.

15. Maimeri "Restauro" Varnish Colours are retouching colours specially formulated for conservation. They are made of three ingredients: the high quality pigments, pure resin binder from the island of Chios and crude oil derivate. They are manufactured by Industria Maimeri S.p.A.

the paint layer are visible, but is noticeable that some stars have been lost over time (fig. 26). Concerning the gilding, due to the numerous amount of losses and poor condition of the gold leaf a new gilding was excluded, to avoid to compete with the new one. It appeared necessary to find an appropriate inpainting technique which allows to the gilt surface to find its original colour but without hiding the historical issues it underwent during the centuries. To improve the legibility and the appearance of the decoration allowing the treatment to be recognizable, among the different inpainting styles the *selezione cromatica* (literally chromatic selection) was chosen. This technique was theorised and applied by Umberto Baldini[16] and Ornella Casazza[17] with the purpose to recreate a golden colour which matches the original golden surface in such a way to avoid the replacement of the gold leaf; which would not be recognizable and reversible. The gold *selezione cromatica* is a variant of *tratteggio*[18] style retouch, employing very small colour-matching brushstrokes following the dynamic movement of the carving. This technique involves the use of just three different layers of colour: yellow-ochre, to imitate the gold leaf; red-brownish, for the bole underneath; and green, as complementary colour to simulate the colder tone and reflex of the metal. The system of layers gives the effect of vibrant and unified colour. The selezione cromatica is totally reversible and recognizable, in facts the small lines that compose the inpainting are visible within one metre from the object but they integrate perfectly the lacunae from a further distance (fig. 27). In the end the canopy was completely varnish by brush in order to protect the object, to reduce the discolouration of the inpainting, and to improve and level out the overall saturation of the object. For this aim a very stable and durable varnish was chosen, which would not affect the retouching colours and the previous varnish due to its different solubility parameters. Furthermore, in the future, it could be selectively removed without affecting the other treatments. The varnish used was a mixture of Regal Varnish Gloss and Mat[19] 3:1 and was applied by brush (fig. 28).

16. U. Baldini, Teoria del restauro ed unità di metodologia, vol. 2, Nardini, Florence, 1978.

17. O. Casazza, Il restauro pittorico nell'unità di metodologia, Nardini, Florence, 1981.

18. Tratteggio is a system of just vertical lines that, viewed from the distance, forms the colour or pattern that integrates the lacunae with the original. This kind of retouch rebuilds the image and makes it more legible being at the same time apparent and recognizable to the observer. The desired colour is achieved by putting successively the layers of small vertical lines of colours.

19. Regal Varnishes Gloss and Matt are two picture varnish with high stability, and based on the aliphatic resin Regalrez 1094, diluted in de-aromatized petroleum oil and with the further addition of a UV stabilizer Tinuvin 292. Regal Varnishes can be applied by spray and by brush and can be mixed together to obtain half-matt effects. They are transparent, have high yellowing stability and they remain reversible in non-polar solvents even over time. Regal Varnishes are developed by C.T.S srl.

Fig. 25. Filling of the object.

Fig. 26. Mimetic retouching in progress on the most damaged area of the inner surface, on the left corner.

Fig. 27. Detail of the tratteggio on the carved decoration. All the different strips of colour are clearly visible.

Fig. 28. The selezione cromatica after varnishing appears almost like a golden surface.

The improvement in the canopy is clearly visible in the before and after treatment pictures. Thanks to the treatment the right balance was given back to the object because the replacements are still recognizable, and the losses in the upper decoration are the proof the poor conservative situation of the object before being restored (figs 29a-29b). The canopy is now hanged in the church where it possibly came from above a painting depicting the Virgin and Child. After the overall restoration campaign, the canopy has successfully resumed its decorative function (fig. 30).

Fig. 29a. The canopy at the end of the treatment.

Fig. 29b. The bottom of the object at the end of the restoration campaign

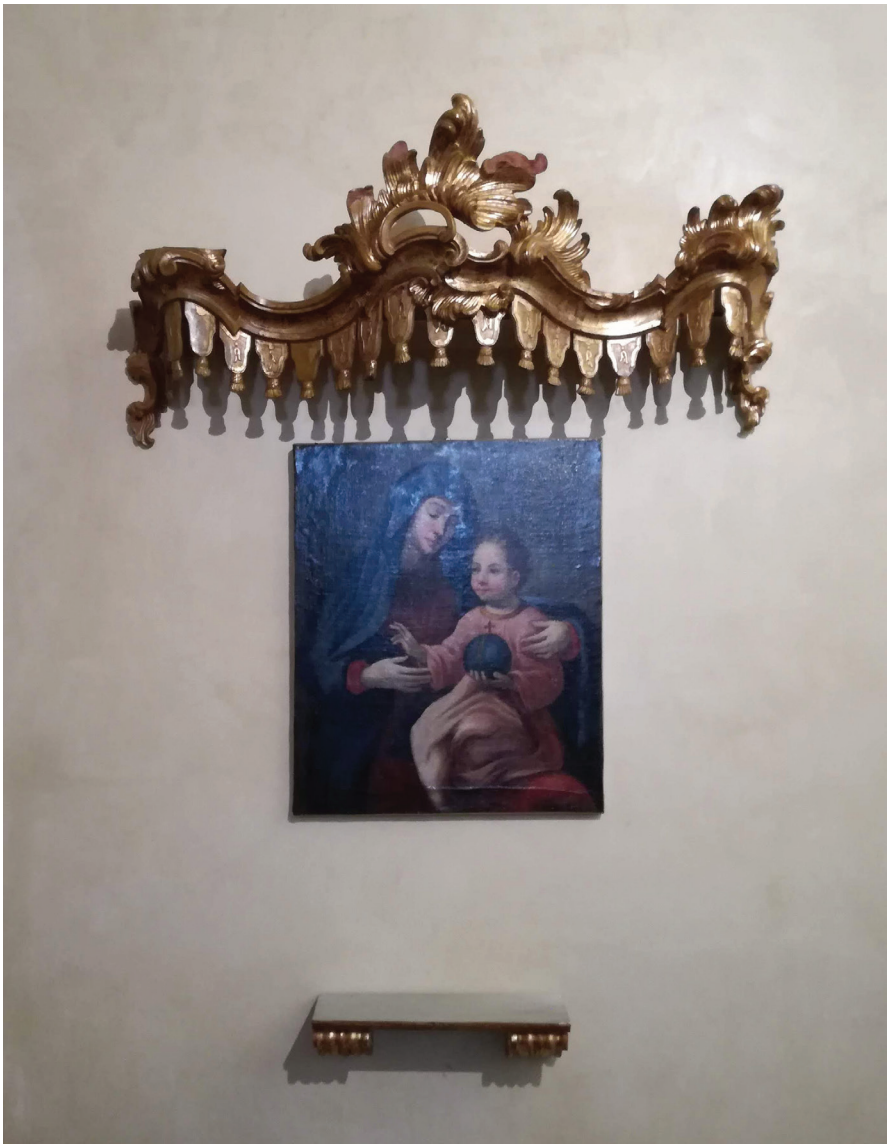

Fig. 30. The canopy in situ. With the right lightening and at an appropriate distance, the retouching is perfectly matching the object and it is almost invisible.

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Biography

Letizia Marcattili is a paintings and wooden artefacts conservator. After finishing her conservation degree at Istituto di Restauro delle Marche, Italy, in 2017, she started to gain experience working in private studios and public institutions, treating a variety of artworks spanning paintings on canvas and panel, frames and wooden sculptures. Her research and publication interests are related to the conservation treatments she carried out, and a selection of her papers have been published in conference proceedings by the IIC Italian Group, Cesmar 7, and the Institute of Conservator-Restorers in Ireland. In 2019 Letizia joined the conservation team at the National Gallery of Ireland, becoming the dedicated project conservator for the "Lavinia Fontana Conservation and Research Project", sponsored by a grant provided by the Bank of America. Aiming to highlight the career and technique of one of the first female artist of the Renaissance, this project is focusing on research, study and analysis, as well as on treatment of the painting.

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