A SPLENDID WELCOME TO THE ‘HOUSE OF PRAISES, GLORIOUS DEEDS AND MAGNANIMITY’

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ABSTRACT
Among the highlights of the Islamic art collection at The Metropolitan Museum of Art is the earliest surviving reception room from Damascus (AH 1119 /AD 1707), known as the Nur al-Din Room. The wooden paneling and ceilings of this interior are embellished with gesso relief decoration, called ‘*ajami*, which is gilded, tin-leafed, glazed and painted to create a complex interplay of reflective or matte and intensely colored surfaces. As in many such rooms, the current appearance no longer reflects the original aesthetic, largely due to later varnishes that have darkened. This paper presents the results of a thorough study of the Room’s materials and manufacturing techniques. The investigation, combined with research into its history and the study of Ottoman interiors in their original settings, enables a more accurate reinstallation and presentation of the room in the newly renovated galleries for Islamic art.

ÖZET
Metropolitan Sanat Müzesi’ndeki İslam sanatı koleksiyonunun en önemli parçalarından biri, Şam’dan (H1119 / 1707) gelmiş olup günümüze ulaşan ve Nureddin Odası denen kabul odasıdır. Bu iç mekânın ahşap pano ve tavanları “Acemî” (Acem/İran tarzı) denen kabartma alçı bezemelerle kaplıdır; kabartmalar, parlak ya da mat ve yoğun renkli yüzeylerin karmaşık etkileşimini yaratmak üzere altın yaldız ve kalay varakla kaplanmış ve boyanmıştır. Nureddin Odası’nın da şu andaki görünümü daha sonra eklenen perdahların kararmasıyla özgün estetiğini yansıtmamaktadır. Bu çalışmada odada kullanılan malzeme ve yapım tekniklerinin inceleme sonuçları sunulmaktadır. Bu inceleme, kabul odasının tarihi konusundaki araştırmalar ve özgün Osmanlı iç mekânları araştırmalarıyla birleştirildiğinde, odanın yeni renove edilen İslam sanatı galerilerinde yeniden ve daha doğru enstalasyonu ile sergilenmesine olanak tanımaktadır.

INTRODUCTION

Within the Islamic art collection at The Metropolitan Museum of Art (MMA) is the so-called Nur al-Din Room, a magnificent reception chamber (*qa’a*) from a private house in Damascus. This interior is of singular importance as the earliest known surviving nearly-complete Damascene room, established by an inscription giving the date AH 1119 (AD 1707) [1].

The MMA’s Islamic art galleries are currently being renovated and will reopen in the fall of 2011. The Nur al-Din Room was dismantled in 2008 and moved from its previous location off the introductory gallery, to be reinstalled in a more appropriate context, adjacent to the galleries devoted to Ottoman art. Deinstallation presented an opportunity for the in depth study and conservation of this important Damascene interior.

DESCRIPTION OF THE NUR AL-DIN ROOM

The Nur al-Din Room is a fine example of a type of interior decoration that flourished in Damascus between the sixteenth and early nineteenth centuries [2, 3]. The wooden paneling and ceilings of these rooms were elaborately decorated with gesso relief work, called *‘ajami*, incorporating metal leaf, transparent colored glazes and bright tempera paints to create variously textured surfaces. Together with the interior’s other embellishments, the overall effect was intended to welcome, honor and impress guests, Fig. 1. Unfortunately, discolored varnish layers now largely obscure the original opulence.

Like most Damascene reception rooms, the Nur al-Din Room is divided by an arch into two areas: a small rectangular anteroom (*‘ataba*), where guests would have entered from a courtyard, and a raised square seating area (*tazar*) occupying two-thirds of the interior space. The floors of both areas, as well as a Mamluk-period fountain placed in the center of the *‘ataba*, are decorated in *opus sectile*. A large decorated niche (*masab*) is located in one wall of the *‘ataba*. The room is approximately 8 m long, 5 m wide and 6.8 m high.

Fig. 1 Nur al-Din Room as installed in the 1970s in the Islamic art galleries. The Metropolitan Museum of Art, Gift of The Hagop Kevorkian Fund 1970 (1970.170). *Image: © The Metropolitan Museum of Art.*

Integrated within the wooden wall paneling are several niches with shelves, multiple pairs of cupboard doors, four shuttered window niches and a pair of entrance doors. The paneling is crowned by a concave cornice. Between the cornice and the ceiling is a white plaster wall incorporating pierced stucco windows with colored glass. The rectangular ceiling in the *‘ataba* is composed of four exposed beams and three coffers, framed by a cornice with a three-tiered *muqarnas* frieze. The *tazar* ceiling comprises concentric squares of varied patterns, framed by a concave cornice. Carved and painted squinches extend down from the four corners of both ceilings.

The wooden ceilings, cornices and wall units display detailed floral and geometric designs, executed in fine *‘ajami*. A range of motifs was used to create various patterns. Flowers and vines are plentiful, gathered in vases within *cartouches* or strewn over glazed, tin-leafed backgrounds. The abundance of Damascene orchards and gardens is also evoked by bowls of fruit and vegetables. Astral patterns and geometric borders appear frequently and *muqarnas* decoration is used in the cornices, *‘ataba* ceiling, and *masab*.

As is typical for reception rooms in Islamic houses the wall paneling, lower cornice and *tazar* ceiling cornice are adorned

Fig. 2 1930s image of Nur al-Din Room taken before it was disassembled and sold. On the reverse of this image the words ‘Nur ad-Din north side’ are written in Arabic. *Image: © The Doris Duke Foundation for Islamic Art.*

with calligraphy, here containing verses of two poems as well as an independent couplet. The poem on the wall paneling, beginning with ‘House of praises, glorious deeds and magnanimity’, celebrates the strength of the house and the virtues of its owner, although neither is mentioned by name [1]. The last line, in the panel above the *masab,* reveals the date the room was completed. The second poem, beginning on the upper cornice and continuing onto the lower cornices, contains praises to the Prophet Muhammad. The source or author of these poems has not been identified but the independent couplet is by the fourteenth century Moroccan poet Lisan al-Din Ibn al-Khatib. The wooden framework surrounding the polychrome wall panels has been left unpainted to delineate and highlight the splendor of these decorative elements.

HISTORY AND PROVENANCE

The Nur al-Din Room was removed from its original location in the early 1930s and was sold in 1933, together with another Damascene interior said to be from one of the Quwatli family houses, by the dealers Georges Asfar and Jean Sarkis to Hagop Kevorkian, a New York dealer and collector. The sales contract states that the “Nourredin House” was located “in Soukel Harir and Soukel Kayatin, in the ancient quarters of the City of Damascus”. The Arabic words ‘*Nur al-Din jihat al-shamal*’ (Nur al-Din north side) are written on the reverse of one of a set of photographs taken of the room in the early 1930s, prior to its disassembly Fig. 2.[1] Since recent research has confirmed that no house of this name existed in the old city, it most likely refers

[1]These photos are marked with photo studio stamps, either ‘Photo Chaoui Damas’ or ‘A. Scavo et Fils, Photographes, Beyrouth’. The cardinal directions of the walls remain the same in the MMA installations.

Fig. 3 1970s installation of the west wall (left) showing the relocated entrance doors and 1930s image of the same wall (right), showing the original location of the panel with the red cupboard doors. *Images: © The Metropolitan Museum of Art and The Doris Duke Foundation for Islamic Art.*

to the nearby tomb of Nur al-Din, the famous twelfth-century conqueror.

Both interiors were shipped to New York in 1934 but were not installed until the 1970s, when the Hagop Kevorkian Fund donated the Nur al-Din Room to the MMA and the Quwatli House interior to New York University’s Kevorkian Center for Near Eastern Studies. In the 1950s, Kevorkian sold two wall panels from the Nur al-Din Room, together with the *opus sectile* stone riser of the elevated *tazar*, to Doris Duke, who included them in the ‘Baby Turkish Room’ in her Honolulu home, Shangri La.

1970 installation

The Nur al-Din Room was installed as one of the highlights in the MMA’s new Islamic art galleries, which opened to the public in 1975. By comparison with the 1930s photographs it is obvious that the arrangement of the panels, except on the east wall, was significantly altered. This was confirmed by study of the recently dismantled sections, which revealed evidence of alteration to the joinery in the 1970s, as well as original eighteenth-century and 1930s numbering systems.

The entrance section, originally located in the north wall of the *‘ataba* leading to the courtyard, was moved to the west wall because of gallery space constraints, Figs 2 and 3. The panel with red cupboard doors in the center of the west wall was thus displaced and so moved to the north wall in the *tazar*. The paired vertical panels originally on either side of this cupboard were relocated to opposite walls in the *‘ataba*.

Although historic photographs of the *masab* are lacking, it is evident that the current configuration is a pastiche of elements from the Nur al-Din Room and other sources, including tiles from the Museum’s collection. The inscription panel bearing the room’s date and the trilobed vault filled with gilded *muqarnas* are the only elements known for certain to be original.

Selected elements from the Quwatli house interior were used in the 1970s installation of the Nur al-Din Room, including an iron window grille and sections of two inlaid stone risers that were combined to replace the *tazar* riser sold to Doris Duke. The square marble panels with red and white geometric patterns in the *tazar* floor came from the courtyard floor in the Quwatli house. Now placed orthogonally, they were originally arranged diagonally, as is evident from historic images of the Quwatli house. Furthermore, two of the marble *opus sectile* panels originally located on the wainscoting of the west wall of the *‘ataba* were instead incorporated into the ‘*ataba* floor.[2]

During the 1970s installation missing panels and framing elements of the wall paneling were replaced in pine, stained

[2]The *‘ataba* wainscoting, the *tazar* riser, the large cupboard doors with the round medallion and architectural vignettes and the center section of the east wall appear to be part of a late eighteenth-century or early nineteenth-century modernization of the Nur al-Din Room.

to match the original cypress frames. Drywall screws were employed instead of the original hand-wrought nails to attach the architectural elements to a freestanding wooden framework.

MATERIALS AND TECHNIQUES

A primary focus of this study and conservation project was investigation into the materials and manufacturing techniques of the Nur al-Din Room. Using information gathered from other Syrian *'ajami* rooms in German collections [2, 3], from Shangri La in Honolulu [4] and from surviving rooms in Syria [5, 6], a more complete picture of the original appearance and construction of the Nur al-Din Room has emerged.

Woodwork

The room was disassembled into more than 200 elements, of which 164 were woodwork. The majority of these elements were constructed from several pieces using traditional woodworking techniques. The rear surfaces are generally rough, with saw and other tool marks. All painted elements are made from poplar (*Populus tremula*), whereas the unpainted framework is cypress (*Cupressus sempervirens*) [3]. Unpainted inset panels in the entrance doors are black mulberry (*Morus alba* L.) and those on the window shutters are probably made from wood of the family *Rubiaceae*.

Mortise and tenon, lap and scarf joints, as well as hand-wrought nails, were used for joining and extending wooden elements. Loosely bound bundles of hemp fibers, adhered with a collagen-based adhesive, fill gaps or reinforce joins. Mortise and tenon joints connect the ceiling cornices to the squinches and the unpainted ends of the *'ataba* ceiling beams were probably supported originally by the walls of the room.

Some interesting construction methods were used in the wall paneling. The walls are clad with 16 independent framed units, in which the vertical stiles are mortised to receive the tenons of the horizontal rails. X-radiographs of the joints revealed that the mortises were coarsely cut, with the tenons held loosely without adhesive or pegs, as is observed throughout the room. Some of the long stiles were created by connecting two cypress boards end-to-end with a tenoned scarf joint, a sophisticated and economical method of joinery, Fig. 4. These joints appear as lines across the front of the stiles at varying heights. The joint was designed to resist both tensile and compressive forces and is locked by the insertion of two wedges, without any adhesive. This joint is seen in other surviving Damascene rooms dated to the eighteenth century, in both vertical and horizontal frame members.

Fig. 4 Tenoned scarf joint of vertical stile: drawing of side view (left), photograph in three-quarter view (center) and X-radiograph taken from the front (right). *Drawing: Beth Edelstein, photograph: Mechthild Baumeister, X-radiograph: Timothy Hayes, all © The Metropolitan Museum of Art.*

On the front of the cypress frames two parallel lines, scribed along the edges of each stile and rail, mark the placement of applied polychrome elements such as calligraphy panels and cupboard frames. The reverse of each applied element has a shallow rebate planed to a uniform depth, as measured from the front, to ensure that panels and frames varying in thickness project the same distance from the wall frame and produce a tightly fitting joint. Two of the widest vertical panels are constructed from two boards with butt joints along their lengths, secured with a series of short horizontal battens attached with wooden pegs. The various panels, cupboards and shelving borders are attached to their respective frames with hand-wrought iron nails.

The vertical stiles of each wall unit are held in position by mortise and tenon joints, with the upper and lower horizontal rails spanning the width of each wall. Two nail holes (5–8 mm in diameter) are visible at varying heights on most stiles, indicating where large hand-wrought nails were originally used to mount the wall units to the wood, brick and plaster substrate of the building.

Surface decoration

The original palette of the decorated surfaces was dominated by bright colors combined with reflective metal leaf to produce a variety of surface effects, Fig. 5. Broad fields of bright red, lustrous orange and vibrant green were embellished with finely painted vines and flowers, while gilded *'ajami* calligraphy, scrollwork, and serrated leaves flowed across brilliant blue backgrounds. These surfaces are now largely obscured by darkened varnish layers, applied periodically while the room was in its original location. The presence of varnish also complicated the interpretation of analytical data. Where possible, samples for material analysis were taken from protected areas revealed when the room was disassembled.

Preliminary examination of the decorative materials was carried out with X-ray fluorescence (XRF) spectrometry, polarized light microscopy (PLM) and fluorescence microscopy. The composition of paints and glazes was further studied in cross-section with a combination of attenuated total reflection-Fourier transform infrared spectroscopy (ATR-FTIR), Raman microscopy, surface-enhanced resonance Raman spectroscopy (SERRS) and scanning electron microscopy (SEM) with energy-dispersive X-ray spectroscopy (EDX). Additional media characterization was carried out using Fourier transform infrared spectroscopy (FTIR), pyrolysis-gas chromatography-mass spectrometry (Py-GC-MS), gas chromatography-mass spectrometry (GC-MS), high performance liquid chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA). Corrosion products of the tin leaf were identified by X-ray microdiffraction (micro-XRD). Historical Persian treatises and relevant western sources [7–9]

Fig. 5 Detail of *'ataba* ceiling panel with gilded and tin-leafed *'ajami* against a smalt background. Note the corrosion of the unglazed tin leaf and the discolored smalt; other colors are more representative of the original palette. *Image: Mechthild Baumeister © The Metropolitan Museum of Art.*

Table 1 Summary of analytical results

	Pigment/colorant	*Binder*	*Methods*	*Comments*
PAINT				
Red 1	Red lead, often in combination with few vermilion particles	Egg (whole)	Raman, FTIR, GC-MS, Py-GC-MS, ELISA	ELISA indicated ovalbumin. The oil : protein ratio suggests whole egg
Red 2	Vermilion	Oil–protein	Raman, ATR-FTIR	Most likely egg medium. Found in conjunction with red lead underlayer
Pink	Organic red lake (probable cochineal)/lead white	Egg	Raman, SERRS, FTIR, ELISA	FTIR indicated oil and protein
Violet	Organic red lake/smalt	Oil–protein	Raman, SERRS, FTIR	SERRS yielded a poor spectrum for the organic red
Blue 1	Smalt (potash-based glass)	Egg (whole or white)	Raman, FTIR, GC-MS, Py-GC-MS, ELISA, SEM-EDX	ELISA indicated ovalbumin. SEM-EDX suggested 1–2% cobalt content; barium, arsenic, and aluminum are also present. GC-MS and Py-GC-MS show non-drying oil. The oil : protein ratio lies between that of egg white and whole egg
Blue 2	Indigo/lead white	Oil–protein	Raman, FTIR, PLM	—
Green 1	Basic verdigris/lead white	Egg (whole or yolk)	Raman, FTIR, GC-MS, Py-GC-MS, ELISA	ELISA indicated ovalbumin. The oil : protein ratio lies between that of egg yolk and whole egg
Green 2	Orpiment/indigo	Oil–protein	Raman, FTIR, PLM	—
Yellow	Orpiment	Egg	FTIR, Py-GC-MS, ELISA	ELISA indicated ovalbumin. GC-MS methods showed non-drying oil and small amount of *Pinaceae* resin. Probable contamination from the oil-resin varnish
Orange	Orpiment/vermilion	—	Raman	—
Black	Carbon black	Protein–gum	FTIR, Py-GC-MS, GC-MS	Source of protein and gum not identified
White 1	Lead white	Oil–protein	FTIR, ATR-FTIR, Raman	—
White 2	Gypsum ($CaSO_4{\cdot}2H_20$)	—	Raman	Exposed ground layer used as white background
GLAZES				
Green	Verdigris	Drying oil–*Pinaceae* resin	FTIR, Py-GC-MS	Probable linseed oil, based on the palmitic to stearic acid ratio
Red	Cochineal (probable), no inorganic substrate	Drying oil–*Pinaceae* resin	Raman, SERRS, FTIR, ATR-FTIR, Py-GC-MS, SEM-EDX	Sample likely contaminated from upper varnishes
Orange	Aloe (probable)	Drying oil–*Pinaceae* resin	FTIR, Py-GC-MS, GC-MS, HPLC	Probable linseed oil, based on the palmitic to stearic acid ratio. Specific markers for aloe were not detected by HPLC
Yellow	Undetermined	Drying oil–*Pinaceae* resin	FTIR, Py-GC-MS HPLC	Sample likely contaminated from upper varnishes
PREPARATION LAYERS				
Wood size	—	Collagen glue	FTIR, ELISA	ELISA indicated collagen
Ground and *'ajami*	Gypsum	Collagen glue	FTIR, ELISA	ELISA indicated collagen
METAL LEAF				
	Composition		**Methods**	**Comments**
Tin	Tin, cassiterite (SnO_2) and romarchite (SnO)		SEM-EDX, micro-XRD	Romarchite and cassiterite are corrosion products
Gold	95.5% gold, 4% silver and 0.5% copper		SEM-EDX	—

were consulted for the interpretation of the analytical results, which are summarized in Table 1.

Materials and techniques identified in the Nur al-Din Room correlate well with those reported in other Syrian *'ajami* interiors [10]. In the Nur al-Din Room the poplar was generally prepared with a collagen glue size and a white ground of gypsum bound with collagen glue, applied in varying thicknesses. The calligraphy and designs were sketched in black or transferred with a punched stencil, then built up with the *'ajami* paste, also made of gypsum and collagen glue. Interestingly, *'ajami* is used to create both raised and sunken relief, Fig. 6. In selected areas the ground layer served as a white background for black geometric patterns.

Gold and tin leafs were applied in abundance, probably with an additional size. The thinner gold leaf may have been applied simply by wetting the *'ajami* paste. Gold was used mainly for significant *'ajami* decorations, such as the calligraphy and the medallions, and for the *muqarnas* decoration. In contrast, tin leaf was applied over large areas, usually coated with transparent green, red, orange or yellow glazes to produce shimmering effects. Occasionally the silvery surface was left exposed. Where the glazed tin was used together with painted decoration, both tin and glaze layers are present under the paint, Figs 6 and 7a. This feature reflects both the low cost of tin and the efficient method employed for working on a large scale. Where tin leaf is decorated with patterns executed in colored glazes, the outline was first painted in black, Fig. 8a. The red and green glazes were also used over opaque paints to add depth and contour to flowers, or for small decorative motifs, Fig. 6.

Fig. 6 Detail of *tazar* ceiling panel, showing the use of *'ajami* to create raised relief decoration in the background areas and sunken relief within the recessed 8-pointed star. The *'ajami* is decorated with tin leaf and glazes. *Image: Mechthild Baumeister © The Metropolitan Museum of Art.*

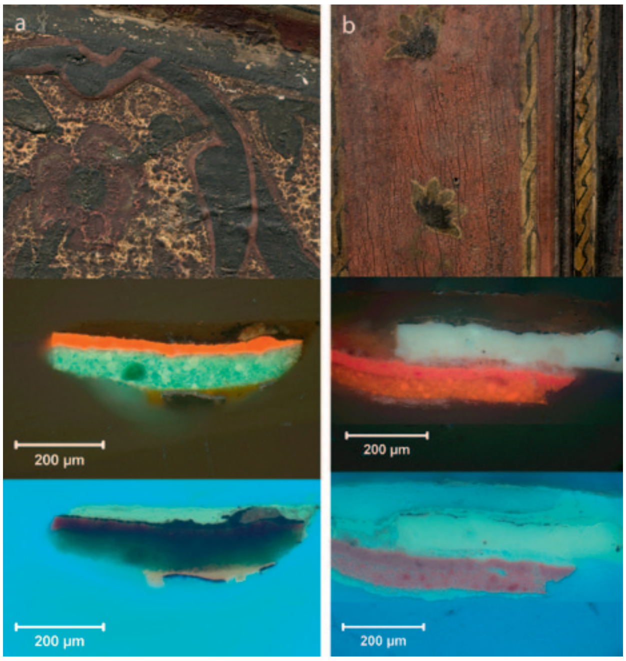

Fig. 7 (a) Location and cross-section in visible light and UV of the outline of a painted green leaf on glazed tin leaf background. From top: varnishes, black outline, red outline, green paint, orange glaze, tin leaf; (b) location and cross-section in visible light and UV of black and white border on red background. From top: varnishes, black outline, white paint, vermilion over red lead, ground. *Images: Beth Edelstein © The Metropolitan Museum of Art.*

The glaze medium is a mixture of *Pinaceae* resin and a drying oil; analyses of green and orange glazes sampled from areas uncontaminated by later coatings suggest linseed oil. FTIR shows that the green glaze contains verdigris and SERRS analysis indicates cochineal as the colorant for the red glaze. Since no colorant could be detected in the yellow glaze, it is possible that its presence is below the detection limit of the techniques used or that the color is rendered by the golden tone of the oil-resin medium. The orange glazes probably had aloe as the colorant, suggested by a characteristic orange fluorescence and the detection of *p*-hydroxycinnamic acid when analyzed by GC-MS methods [11].[3] Aloe is documented as a yellow-orange colorant for oil-resin varnishes [9].

The pigments identified — lead white, vermilion, red lead, orpiment, verdigris, smalt, and indigo, with carbon-based black for the underpainting, outlines and decorative borders — are mostly consistent with those found in other Ottoman Syrian interiors [2, 12]. Additional colors were achieved through pigment mixtures, including lead white with red lake for pink and red lake with smalt for violet. A green made of orpiment and indigo, a light blue of lead white and indigo and an orange of orpiment and vermilion are also found in selected elements. Many red areas were painted using a thin layer of vermilion over bright orange red lead, Fig. 7b.

Of particular interest is the presence of egg as a binder, as is noted in historic treatises [7, 8]. Egg was found consistently in the red, pink, yellow, green, blue and violet paints analyzed by ELISA and GC-MS [13]. FTIR and GC-MS analyses indicated varying amounts of oil and protein, suggesting that different ratios of egg white to yolk may have been used. Smalt layers appear to contain the smallest amount of oil, consistent with an egg white medium. This interpretation is supported by data obtained from reference egg–smalt mixtures applied to an animal glue and gypsum ground. The choice of egg white as a binder may have been dictated by the tendency of smalt to discolor in media containing oil. FTIR and GC-MS analyses of the black paint indicate the presence of both protein and polysaccharide gum, the nature of which has not been determined. Although polysaccharide gums are mentioned in the historical treatises [8] they were not detected in any other paints.

Later surface coatings

All surfaces were varnished, although fewer layers were applied to the upper cornices and ceilings, Fig. 5. Py-GC-MS results from samples removed from both decorated and unpainted surfaces and from metal hinges confirm that these varnish layers, like the original glazes, are drying oil and *Pinaceae* resin mixtures.

CONSERVATION TREATMENT AND REINSTALLATION

Condition

The most complex condition issues regarding the *'ajami* decoration are the aged varnish layers and the widespread tin corrosion, both of which impact negatively on the overall appearance of the room and the stability of original surfaces, Fig. 6. The varnish has solubilized and intermingled with the orange glaze, leaving a rough texture with raised, darkened 'islands' where the glaze–varnish mixture has contracted, Figs 7a and 8. The yellow, red and green glazes, though often deteriorated, have not interacted with the varnishes in this way, suggesting that the composition may have influenced the solubility of the orange glaze, Fig. 8.[4] All surfaces have been adversely affected by tension created by the multiple varnish layers, causing extensive flaking and loss to the glaze, tin leaf and paint layers. This is most pronounced in the glazed tin leaf decoration, Fig. 6.

The corroded tin leaf produces disruptive changes to color and texture over large areas, particularly where the tin is unglazed, Figs 5 and 6. Viewed in cross-section the tin appears to have corroded to varying degrees even where protected by glazes

[3] Although *p*-hydroxycinnamic acid — the major detectable component of aloe by GC-MS methods — is also present in turmeric and benzoin, distinctive chemical markers of these and other yellow colorants were not detected.

[4] In the Aleppo Room at the Museum für Islamische Kunst in Berlin the yellow and to a lesser extent the red glazes were removed with solvents in an earlier cleaning, leaving the green glazes intact [12].

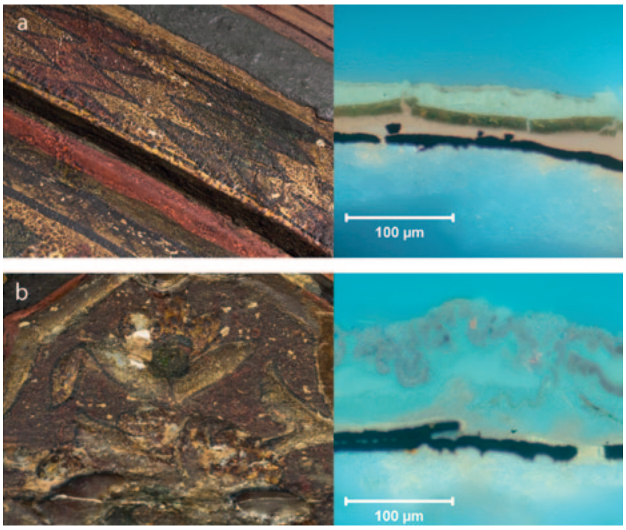

Fig. 8 (a) Location and cross-section in UV of glazed tin leaf decorations with black outline (black not visible in cross section). From top: varnishes, green glaze, orange glaze, tin leaf, ground; (b) location and cross-section in UV of glazed tin leaf. From top: varnishes, orange glaze solubilized in the varnish, tin leaf, ground. *Images: Beth Edelstein © The Metropolitan Museum of Art.*

and paint layers. The identification of the tin oxides romarchite and cassiterite on both coated and uncoated leaf reveals no correlation between the extent of the corrosion and the presence of associated materials such as size, glazes, paints or varnish layers.

The structural integrity of most poplar elements is significantly compromised by past insect infestation. Earlier repairs compensating for this damage were probably carried out during preparation of the room for sale in the 1930s, suggesting that the infestation occurred in Damascus. The room was fumigated when it came to the Museum. Insect channels underlie many decorated surfaces, leaving them unsupported and susceptible to physical damage. In addition there is evidence of major water damage that occurred while the room was *in situ* in Damascus.

Treatment

When the room was disassembled in the spring of 2008 the individual elements were moved to a temporary work and storage space in an adjacent gallery. Treatment focused on consolidating flaking surfaces, mitigating the effects of the insect infestation and integrating visually disruptive restoration and losses. Attempts at removal of the darkened varnish layers were deferred for the time being. A deciding factor was the similar solubility of varnishes and glazes and the resultant intermingling of these layers. Furthermore, there are numerous restorations painted to match discolored varnish surfaces, as well as interruptions in the glazed tin decoration due to losses that are now masked by varnish layers.

A 5% aqueous solution of sturgeon glue was selected as the consolidant for lifting and cracking relief decoration as well as for all flaking surface layers. Areas of insect-damaged poplar wood were consolidated with a 5% solution of Butvar B98 (polyvinyl butyral) in isopropanol and acetone (60:40). Exposed channels were stabilized by the insertion of Japanese tissue impregnated with a 4% aqueous solution of methylcellulose (1500 cps) or with balsa wood. On the reverse and along the edges structurally weak areas were faced with Stabiltex polyester fabric adhered with the Butvar solution to provide stability during handling and reduce the accumulation of dust and dirt. After consolidation, the surfaces were integrated by in-painting areas of loss and unsightly restorations with gouache and acrylic paints.

Concept for 2010 reinstallation

A study of Ottoman Syrian interiors in their original settings included a thorough survey of features in the Nur al-Din Room that are missing or have been altered. These include the configuration of the entrance and window niches, the *masab* and fountain, the stone types in the wainscotings and the *opus sectile* patterns characteristic of eighteenth century *'ataba* floors, fountains and *tazar* risers. In conjunction with in depth technical and archival research, these findings enable a more accurate reconstruction of the Nur al-Din Room than in the 1970s installation. Some of the 'non-historical' and pastiche elements — such as the fountain, floor designs and *masab* tiles and stonework — will be retained because any configurations proposed at this time would be overly conjectural.

Most significantly the new installation will return the wall units to their original positions, thus restoring the order of the calligraphy texts. The entrance and window niches will be built to specifications based on extant Damascene Ottoman houses. The missing panels now installed at Shangri La and from which the aged varnish layers were removed will be photographically reproduced and digitally altered to match the varnished surfaces of the Nur al-Din Room. The images will be printed on fabric and adhered to modern panels of the original shape and dimensions.

During this investigation a series of flat cornice boards, originally surmounting the lower cornice of the Nur al-Din Room and now cladding a steel framework in the Kevorkian Center library, came to light. These boards, originally placed projecting into the room with painted decoration on their exposed undersides, served both as shelves for display and to frame the *'ataba* and *tazar* ceilings.

A metal substructure of steel beams and adjustable Unistrut framing elements will replace the 1970s wooden framework. The elements of the room will be attached to this substructure with bolts and screws. To replicate the original appearance, the heads of the new hardware will be altered to mimic those of hand-wrought nails.

CONCLUSIONS AND FUTURE PROSPECTS

The principal value of this study and treatment project is a greater understanding of the original appearance of the Nur al-Din Room, in terms of both its surface decoration, which has been significantly altered by later varnish layers, and its layout, which was rearranged in the 1970s with elements from other Damascene interiors. The new installation presents to the visitor a more accurate interpretation of this important Syrian reception room. Results of the investigation will be disseminated to the public via a computer kiosk and a page on the MMA's website, including documentation of the creation of reconstruction panels, along with analytical results and images, to demonstrate the original appearance of this splendid *'ajami* room [15]. The materials characterization will also serve as a basis for a future assessment of the feasibility of removing the varnishes.

APPENDIX: EXPERIMENTAL

Cross-sections were examined under a Zeiss Axioplan 2 microscope, equipped with a high-pressure 100 watt mercury lamp and a 100 watt halogen lamp.

Raman microscopy was performed using a 785 nm laser. For SERRS the samples were exposed to hydrofluoric acid vapor and then added to a drop of a silver colloid solution prior to analysis with a 488 nm laser. This method was developed by Marco Leona, Department of Scientific Research at The Metropolitan Museum of Art.

GC-MS characterization of varnishes and glazes was performed on samples treated with Meth Prep II (Alltech) using separate scan and SIM acquisition modes. Quantification of oil and protein and determination of the protein source were performed on hydrolyzed samples derivatized with MTBSTFA and 1% TBDMCS (Pierce Chemical); synchronous scan/SIM acquisition mode. The procedures were adapted from those developed by Michael Schilling, Analytical Technologies Section, Getty Conservation Institute, Los Angeles. Py-GC-MS samples were treated with TMAH, 25% in methanol and introduced into the double-shot pyrolyzer 2020iD (Frontier laboratories Ltd, Japan) for pyrolysis at 550°C; separate scan and SIM acquisition modes were used.

Details of GC-MS, Py-GC-MS, ATR-FTIR, FTIR, SEM-EDX and Raman spectroscopy set-up and procedure are given elsewhere [14].

ELISA results were obtained using horseradish peroxidase conjugated antibodies based on a protocol developed at the University of Applied Sciences and Arts in Hildesheim that was further modified at MMA. The analytical procedure and results are presented in a poster summary in this publication [13].

X-ray microdiffraction was performed on corroded tin leaf with a Rigaku Dmax/Rapid instrument using Cu Kα radiation.

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