

A Preliminary Look at Surface Finishes on Tibetan Furniture

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Introduction

The Los Angeles County Museum of Art's collection includes 48 pieces of Tibetan painted wood furniture, primarily acquired within the last 20 years. Over the course of 2023-2024, LACMA's Conservation Center carried out research and analysis of three pieces from this grouping to begin to understand the original materials and later restorations, as well as to guide future stewardship. The technical study was contextualized within the existing body of English-language art historical [1-3] and conservation literature [4] and informed by conversations with generous conservation colleagues with experience working directly in the Himalayas. This poster presents the early findings and aims to create connections with cultural heritage workers involved in the care of Tibetan furniture, both within and outside of institutions.

The three objects (pictured below), of different forms and with different condition issues, were selected for the project. *Folding Table with Dragons and Auspicious*

Symbols (LACMA Accession No. M.2010.78.1) exhibits a relatively intact decorative surface with glossy varnish. *Desk with Snow Lions* (M.2010.81.8) has a very degraded paint layer and tacky uppermost coating. *Altar Table with Auspicious Symbols* (M.2007.109) has a vibrant, and relatively intact polychromed surface obscured by a dark, uneven layer. These differing condition issues pose questions for display and storage, including aesthetic concerns surrounding legibility and presentation, as well as collection care issues related to dust accumulation on open view and surface protection during storage and transit. Of greatest interest is better understanding dark surface layers and determining if these relate to the accumulation of soot from ritual burning of yak butter candles, later exposure to soil or soot in homes or other storage locations, and/or the application of black or blue paints in the 20th-century to intentionally obscure the vibrant polychromy [3].

Methodology

The study relied on close visual examination followed by the use of non-destructive analytical techniques to better understand the three selected objects. This first round of analysis included visible light and ultraviolet induced visible fluorescence imaging followed with digital microscopy and portable x-ray fluorescence spectroscopy (XRF).

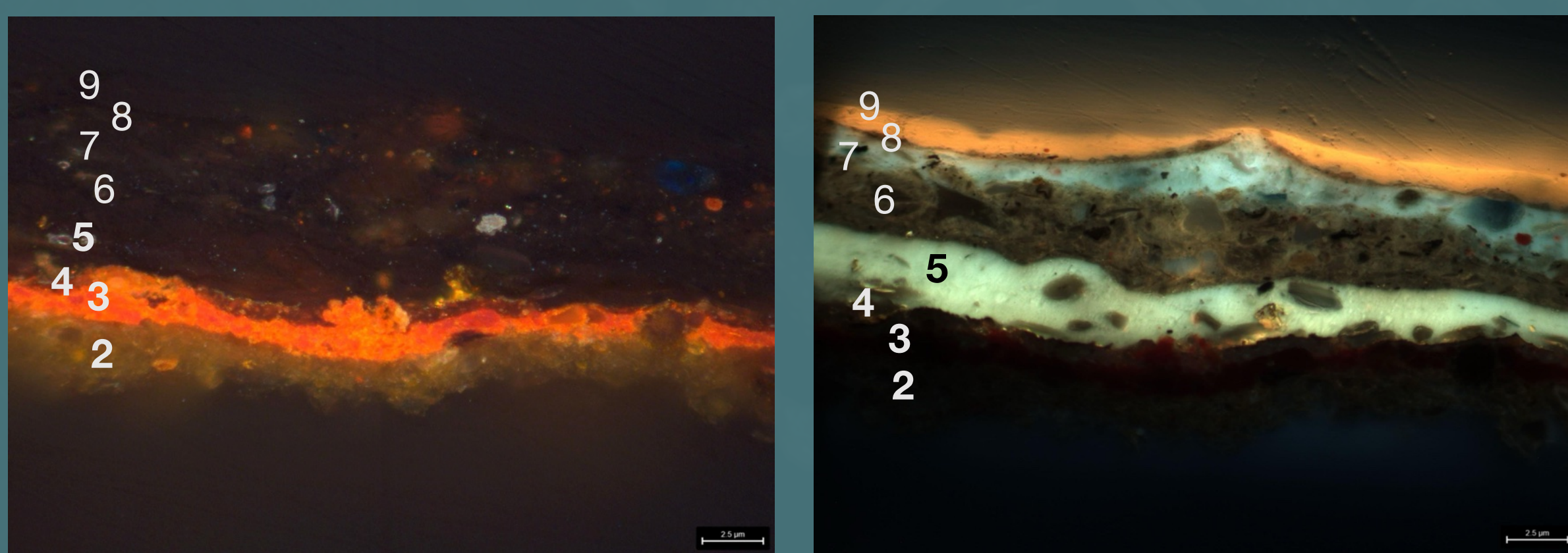
After this initial phase, small cross-section samples of the paint surface were collected and mounted in resin. Two samples were obtained from each of the smaller objects and seven from the larger *Altar Table*. These samples were examined in visible and ultraviolet light using a light microscope. Sample 7 from the *Altar Table* was chosen for further analysis via SEM-EDS. Surface scrapings were collected using a layer-by-layer separation technique from an area adjacent to the cross-section sample for ATR-FTIR analysis.

Results and Observations

Folding Table with Dragons and Auspicious Symbols



Accession No. **M.2010.78.1**, 17th-18th century, 11 x 25 1/2 x 12 in.
Gift of Ruth Hayward, Ph.D. and Robert Hayward, M.D., in honor of John Hix, Senior Conservator, LACMA, through the 2010 Collectors Committee, photo: Yosi Pozellou / LACMA Conservation Center

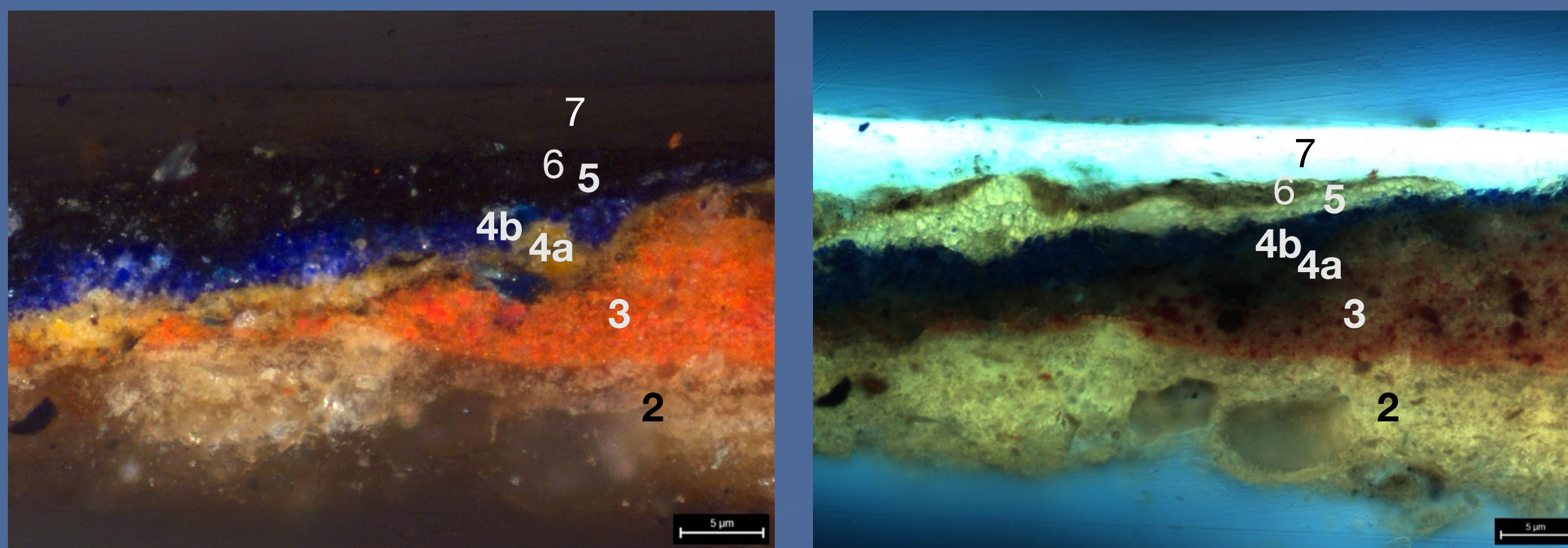


Sample 2, **400x magnification**, (left) bright field illumination, (right) ultraviolet illumination

Desk with Snow Lions



Accession No. **M.2010.81.8**, 18th century, 24 x 12 x 9 1/2 in.
Gift of the 2010 Collectors Committee, photo: Yosi Pozellou / LACMA Conservation Center

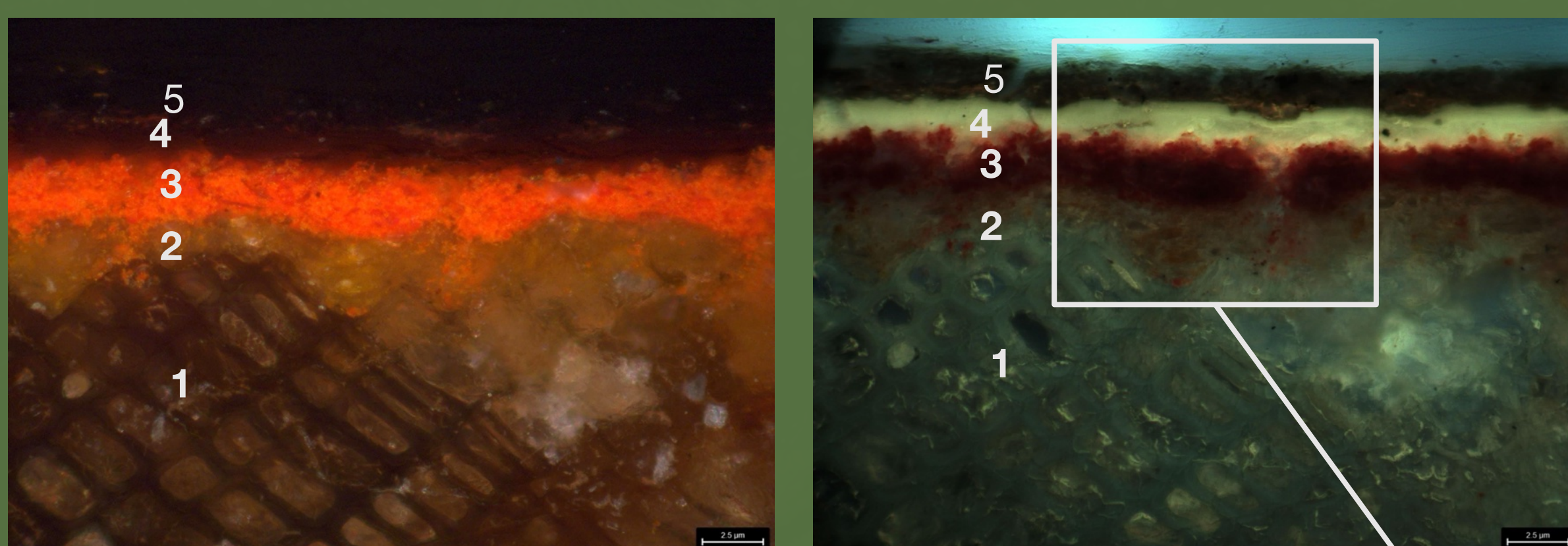


Sample 1, **200x magnification**, (left) bright field illumination, (right) ultraviolet illumination

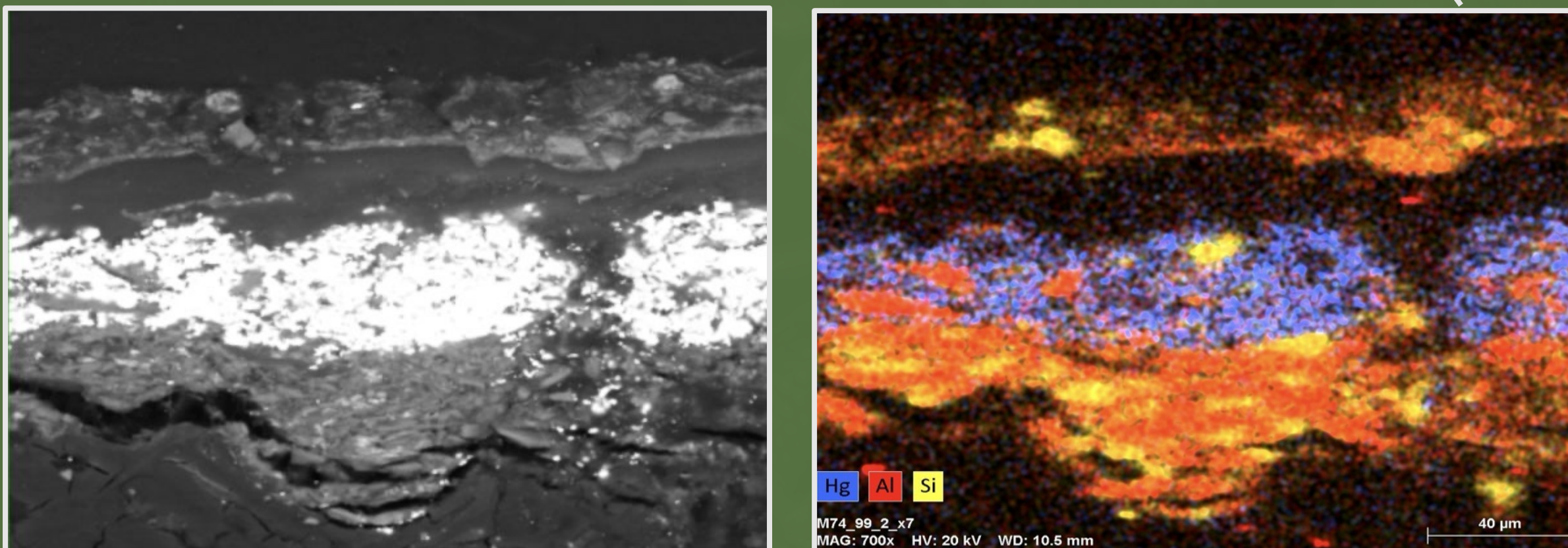
Altar Table with Auspicious Symbols



Accession No **M.2007.109**, 19th century, dims: 24 3/8 x 33 7/8 x 11 3/4 in.
Gift of Ruth Sutherland Hayward and Robert W. Hayward in honor of the 18th birthday of the 11th Panchen Lama, Gendun Choekyi Nyima, and the continuation of the historic relationship between him and the Dalai Lama - as each other's teachers, photo: Yosi Pozellou / LACMA Conservation Center



Sample 7, **400x magnification**, (left) bright field illumination, (right) ultraviolet illumination



Sample 7, **700x magnification**, SEM-EDS (left) backscatter electron image, (right) elemental map for mercury (violet), aluminum (red), and silicon (yellow)

Cross-section Microscopy

All three objects show visual similarities in their **early coating stratigraphies** (layers 1-5, outlined in bold in table 1 at right). This includes a wood substrate, single beige-colored ground, paint layer with fine pigment particle size and even distribution. Layer 4 shows different decorative techniques including metallic leaf in *Folding Table* and additional paint color layers in *Desk*. All examples have a transparent varnish on top.

In all examples, a dark layer is visible on top of the original decorative coatings, although its morphology differs in all three. Above this layer the coating history and visual characteristics continue to change. *Folding Table* has at least two additional varnish layers making it the most complex.

pXRF

Elemental characterization of painted regions on all three objects shows elements related to traditional mineral pigments, also found in thangka painting, including cinnabar/vermillion (Hg), ochres (Fe), and azurite or malachite (Cu) [5].

Altar Table, and to some degree *Desk*, appear to also utilize more modern pigments including elements likely related to emerald green (Cu and As). *Altar Table* also appears to have chrome orange and/or yellow (Cr).

The metallic decoration on *Folding Table* contains gold, whereas that found on *Altar Table* is likely brass (Cu and Zn).

FTIR

Results were inconclusive due instrumental constraints and sample size / layer thickness limitations.

SEM-EDS

Analysis of *Altar Table* showed mercury in the red layer as anticipated for cinnabar/vermillion. The beige ground contains aluminum and silicon suggesting the use of a clay in the preparatory layer. Titanium was also found in this layer, likely related to trace elements in the clay.

Wood Identification

Preliminary wood identification indicate *Populus* sp.

Layer	<i>Folding Table</i> S2	<i>Desk</i> S1	<i>Altar Table</i> S7
9	Varnish (orange in UV)	-	-
8	Thin soiling	-	-
7	Varnish (milky blue in UV)	Varnish (blue-white in UV)	-
6	Thick dark layer (soiling?)		-
5	Varnish (yellow-green in UV)		Dark layer
4	Gold leaf (gsr shog) w/ size	Blue paint layer	Varnish (yellow-green in UV)
3	Red paint layer (vermillion/cinnabar - mTshal)		
2	Ground layer		
1	Wood	[Wood - not sampled]	

Table 1. Coating layers as observed in cross-section. **Bold** text indicates original coating system and *italics* indicate attributes from other analytical techniques.

Digital Microscopy

Photomicrographs clarified a variety of decorative techniques including brass powder (rag rdul) and raised gesso work (skyo 'bur).



Photomicrograph of *Altar Table* showing brass particles (rag rdul) used for decoration, 20x magnification



Photomicrograph of *Altar Table* showing raised decoration (skyo 'bur) and dark layer, 20x magnification

Conclusions

All three objects studied show close similarities in their original decorative stratigraphies including use of a wood substrate (*Populus* sp.) possibly with a size layer, a single clay-containing ground, paint layers containing traditional mineral pigments, and a transparent varnish with a yellow fluorescence in UV. This is consistent with materials reported in both the art historical [1, 2, 3] and conservation literature [4]. The differences within these layers relates to the use of more modern pigments of chrome yellow/orange and emerald green in *Altar Table*, and possibly *Desk* (pending the confirmation of emerald green), highlighting a consistency in technique with expanded use of pigments over time. This roughly corresponds to their curatorially-assigned dates and reflects the more complex stratigraphies seen in the earlier objects. Further work with SEM-EDS will help clarify dates and pigment use within the individual layers.

The differences in condition issues observed macroscopically correspond to these differences in later coating histories. The glossy uppermost surface on *Folding Table* is likely shellac applied on top of multiple earlier varnishes, aligning with the hypothesis that shellac only came into wider use recently on Tibetan furniture [3]. The thick, tacky coating on *Desk* corresponds to a relatively recent coating applied over

very eroded and soiled original layers. The dark, opaque surface on *Altar Table* relates to a heterogeneous layer (or possibly layers) of still unknown composition. Future analysis will focus on the identification of binders using GC-MS, particularly where characterization was difficult with LACMA's FTIR set-up. This will be essential for better understanding the dark alteration layers.

These later coating layers reflect differing histories of use, storage, and maintenance. Extant examples of Tibetan furniture survived the tumultuous history of Tibet after the invasion by China and the Cultural Revolution. Their surfaces tell a complex story. This study emphasizes the need for an individualized approach to conservation interventions informed by both the material composition and an understanding of the object's specific history. As part of EU Horizon's GREENART project, LACMA will continue to research these objects and consider the application of controlled selective cleaning systems for the removal of later coatings applied to *Desk* and *Altar Table*, as appropriate. We are hoping that this project can be enriched through collaboration with colleagues. Please contact us if you have experience caring for Tibetan materials or working in the region.

Acknowledgements

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