

近江八景蒔絵香棚 (市立ヴェルケ・メディジチ博物館)

Pair of Shelves for Incense
(Museum Velké Meziříčí)



修復前

Before restoration



修復後

After restoration



修復後
After restoration



修復後
After restoration

近江八景蒔絵香棚

平成 20・21 年度修復事業



所蔵：市立ヴェルケ・メディジチ博物館(チェコ)

市立ヴェルケ・メディジチ博物館（チェコ）

近江八景蒔絵香棚

松本達弥

修復品名	近江八景蒔絵香棚
所蔵	市立ヴェルケ・メディジチ博物館（チェコ）
寸法（cm）	30.6 × 11.6 × 30.7（棚1基分）
修復期間	2年
修復場所	東京文化財研究所 漆修復アトリエ

1. 概要

棚は左右の図柄が対称の、二基で一对の香道具を取める香棚である。各香棚の天板の両端に筆返しを付け、内部には引出しを設ける。すぐに香遊びができる品々、十種香道具一式（香炉、香盆、香包、香七つ道具、香割道具、香札など）が収納される。現状、多くの収納品は紛失したものと思われ、今回修復品として日本に送られたものは、一基分の硯、水滴と引出し、もう一基分の硯、水滴の無い引出し、二基分の火道具類を受けるための棧と引出し、香割台、銀製鉢であった。

各棚の天板には、近江八景の「石山の秋月」、「三井の晩鐘」、「瀬田の夕照」を配し、側面には「堅田の落雁」、「比良の暮雪」、「矢橋の帰帆」の景を配している。棚板の一部には窓枠を設け、内側には紫陽花と藤を水引で束ねた図を配している。

香棚の総体は金地とし、仕切りや棚の表裏は梨子地である。天板や側面の土波、州浜、雲、山、丘などは薄肉高蒔絵に金切金を散りばめる。唐橋や家屋の一部には金、銀の金具が用いられる。樹木、家屋、波、人物、鳥などは平蒔絵で表現し、月には鉛、松、雲、山の一部には青金が使われている。脚や棚の一部には、金の平目粉を粒置きした置平目である。天板や棚の側面は、金の消粉蒔絵で一部に付描で唐草文様が描かれている。

2. 損傷状態

- ・ 棚の本地接合部の殆どが分解状態であった。
- ・ 棚板の1枚、数箇所の引出しが紛失していた。
- ・ 各部材の表裏の塗膜には、後世修復の際に塗られた塗料が劣化し、塗膜面にはしみや斑文があった。
- ・ 漆塗膜は、紫外線や経年変化による劣化で黒ずんで、銀梨子地粉が錆化していた。
- ・ 各部材の接合部には、制作当初や後補の接着剤が付着していた。
- ・ 部材の一部は接合状態であったが、外れそうな危険な状態であった。
- ・ 棧や脚の角や接合部には塗膜の欠損が多くあった。
- ・ 天板の蒔絵部分には紙片が付けられていた。
- ・ 蒔絵部分に貼られた金具の一部は剥離状態であった。

3. 修復仕様

修復は現在、文化庁の指導のもとで行われている「今ある文化財を、現状を損なうことなく保存し、永く後世に伝える」という、漆工文化財保存修復の原則に則り、現状維持修復を基本に行った。また、修復工程変更や問題点が生じた際は、東京文化財研究所の担当者、所蔵美術館の担当者と修復者の3者で協議し、修復作業を遂行した。

4. 修復の特徴及び留意点

棚一對の各部材を検証し位置確認を行い、完成図を作製した。現状では接合状態にある部材は分解する恐れがあったため、外れそうな部材は分解し再接着を行った。

修復は分解した状態でクリーニングから行い、新補の部材の完成や各部材の漆固めを終えた状態で本体構造の組立て接合を行った。各部材の接合部は際錆や金錆などをほどこし目立たないような仕上げを行った。

5. 修復作業工程

1) < 現状調査及び作業工程確認 >

蒔絵香棚（以後、本資料と呼ぶ）の素地構造、下地、加飾と現状の傷みを調査記録し修復作業工程を確認した。

2) < 修復前の記録写真 >

修復前と修復後の比較が出来るよう写真撮影を行った。

3) < 設置台の制作 >

修復品を損傷なく安全に修復作業を進められるよう設置台及び作業台を制作した。

4) < 仮止め養生 >

本資料の亀裂部分の周辺塗膜や金具は、作業中剥落しそうな状態にあるため、細かく切った雁皮紙を糊貼りし剥落防止をした。

5) < 分析 >

本資料に使われた蒔絵粉や金属の種類を判別する蛍光 X 線分析を行った。分析の結果については別紙で報告する。

6) < クリーニング >

クリーニングは本資料の表面を覆っている埃を取り去り、僅かに水分を含ませた木綿布にて汚れを除去した。尚、本資料の蒔絵部分の金具は捲れて剥落しそうな危険な状態であった為、クリーニングは充分注意し必要最小限に止めた。

7) < 後補塗料の除去 >

本資料は、ヨーロッパでの修復の際に塗料が塗られ、紫外線や経年変化により塗料が劣化していた。また、塗られた塗料が高蒔絵などの際に溜まり、黒ずんでいた。塗料の除去に使用する溶剤は充分テストを行い適切な溶剤を選択した。結果、エタノールに蒸留水を混合した溶剤で塗料除去を行った。

また、各部材の接合部の接着剤は膠が使われていたため、水分を含ませ膨潤させて竹の篋や刃物で丁寧に除去した。

8) < 表面塗膜の漆固め >

表面塗膜の塗料除去後、剥き出しになった漆塗膜の強化と今後の作業中の漆染みを作らないために溶剤で希釈した漆で漆固めを行った。漆固めは塗膜の劣化の状態によって数回行った。

9) < 剥離金貝の圧着 >

蒔絵部分にある金貝や切金は剥離状態にあり、一部捲れた部分もあった。捲れた金貝は丁寧に戻し、膠を含浸し接着した。圧着には、竹ひごの弾力を利用した芯張り圧着法とクランプを使い安定させた。

10) < 亀裂部分及び塗膜剥離部分の圧着 >

圧着の前に本資料の設置台や押さえ治具の準備を行い作業に取り掛かった。部材接合部や亀裂部分の透間から希釈した麦漆を含浸し、端金やクランプで圧着を行った。また、剥離した塗膜も同時に圧着を行った。圧着に使用した接着剤は、接着力を強くするためグルテンの量を多くした麦漆を用いた。

11) < 梨子地板の新補 >

新補する板の素地は、本資料に使われた素材と同じヒノキ材とし、漆下地を施し銀梨子地の仕上げとした。梨子地に使う銀梨子地粉は現在の蒔絵粉を使用するため、号数の違う蒔絵粉を使い梨子地のテスト手板を制作し判断した。尚、新補板の側面の消粉蒔絵部分は、新たな部分が目立ってしまう恐れと後補である証として、所蔵博物館の担当者や東京文化財研究所の担当者と協議した結果、消粉蒔絵の復元は行わず現状の黒漆塗りとした。

12) < 各部材の組立て >

各部材の接合には、接着力を強くするためグルテンの量を多くした麦漆を使い、端金やクランプを用いて接合した。尚、麦漆が完全に乾燥状態になるため、約3週間端金やクランプを付けた状態で乾燥を待った。

13) < 塗膜欠損部に刻苧充填 >

亀裂部分の戻しきれない隙間や塗膜の欠損部分には、麦漆に木粉や麻の繊維を混入した刻苧を充填し形態を復元した。刻苧の充填は必要に応じて木粉などの荒さを変えて数回に分けて行った。

14) < 際錆及び色合わせ >

欠損した塗膜や刻苧で充填した亀裂部分に、生正味漆に珪藻土を炭化した微粒子の地の粉を施し再剥落の防止とした。蒔絵部分の仕上げは、梨子地漆に細かな金粉と石粉を混ぜて作った金錆を施し目立たないようにした。

15) < 漆固め >

漆塗膜面の強化と艶を取り戻すために、溶剤で希釈した漆を数回吸わせ漆固めを行った。また、際錆を行った部分にも漆を数回吸わせて漆固めとした。

尚、蒔絵部分の漆固めは劣化した塗膜に漆を含浸し、蒔絵の表面に残った漆は溶剤で丁寧に拭き取った。

16) < 桐製保存箱及び包製の制作 >

修復した本資料を永く後世に伝えるために桐製の保存箱や絹羽二重の包製を制作した。本資料をより安全に出し入れが出来るよう慳食式の桐箱で内部に引出しを設け、本資料を夫々の引出しに入れて出し入れができる構造にした。尚、桐箱の制作は専門家に依頼した。

17) < 記録写真及び修復記録のまとめ >

修復後の写真撮影を行い、修復及び技術分析の記録をまとめ報告書を2部作成した。

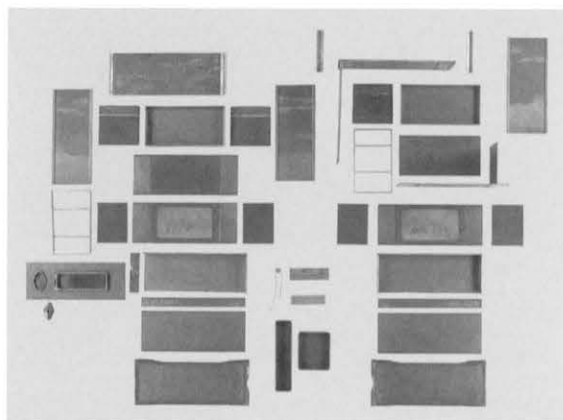


図1 修復前(表面)
Fig. 1 Before restoration (front face)

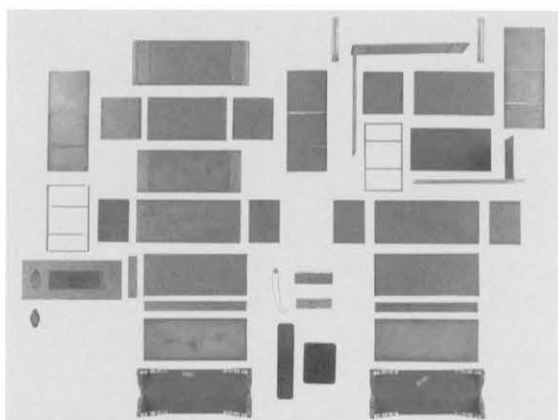


図2 修復前(裏面)
Fig. 2 Before restoration (back face)

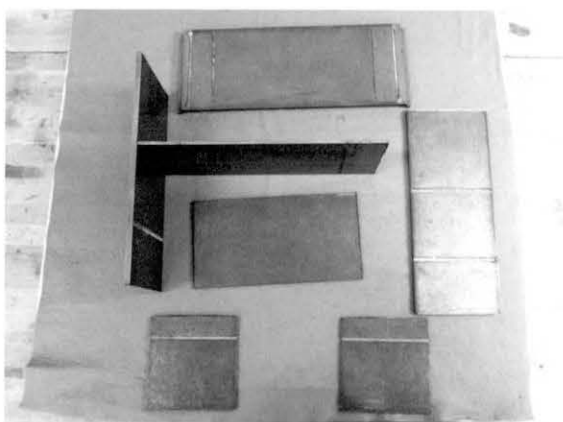


図3 各部材 位置確認
Fig. 3 Parts, confirming their positions



図4 修復前 天板部分
Fig. 4 Before restoration, top board



図5 石山の秋月
Fig. 5 "Ishiyama no shugetsu"



図6 堅田の落雁
Fig. 6 "Katada no rakugan"

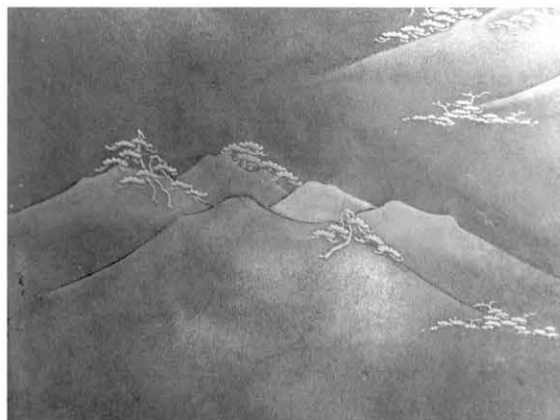


図7 比良の暮雪
Fig. 7 "Hira no bosetsu"



図8 矢橋の帰帆
Fig. 8 "Yabase no kihan"



図9 瀬田の夕照
Fig. 9 "Seta no sekisho"

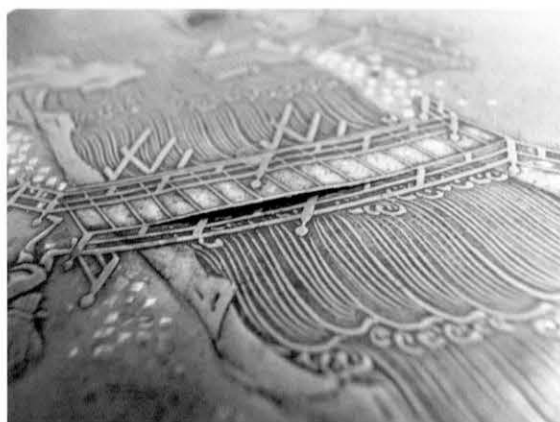


図10 金貝 剥離部分
Fig. 10 Kanagai, lifted part

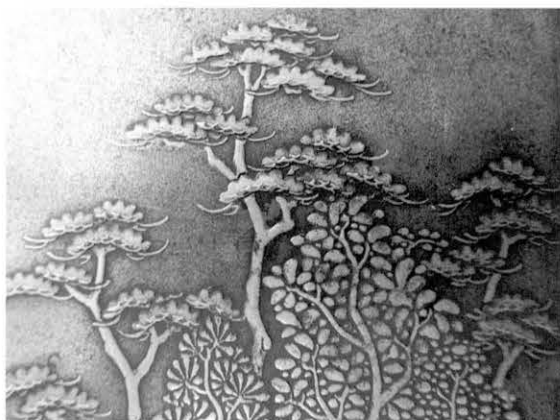


図11 後補塗料の溜まり
Fig. 11 Coating material of a past restoration that has accumulated



図12 天板に貼られたラベル
Fig. 12 Label attached to the top board



図13 蛍光X線分析
Fig. 13 X-ray fluorescence analysis

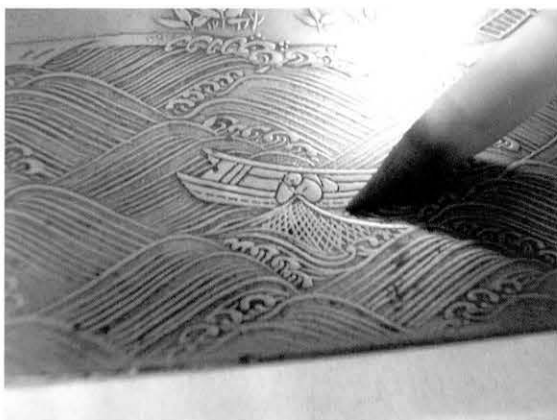


図14 後補塗料の除去
Fig. 14 Removing coating material of a past restoration



図15 塗料除去
Fig. 15 Removing the coating material



図16 塗料除去後
Fig. 16 After the removal of the coating material

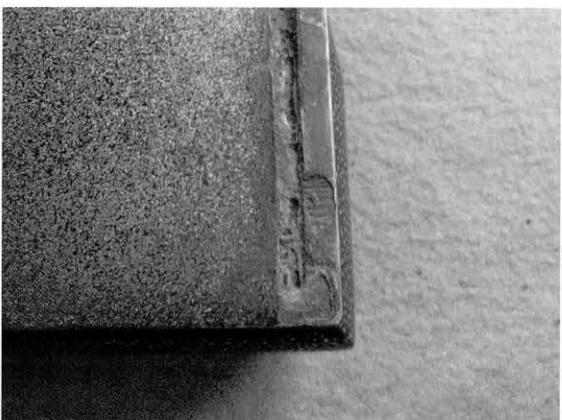


図17 接合部 後補接着剤
Fig. 17 Joint; note the adhesive used in a past restoration



図18 後補接着剤 除去
Fig. 18 Removal of the adhesive agent of a past restoration



図19 後補

Fig. 19 Trace of a past restoration



図20 後補部分 除去

Fig. 20 Removal of a trace of past restoration



図21 剥離金具部分 膠含浸

Fig. 21 Lifted *kanagai* part, impregnating urushi

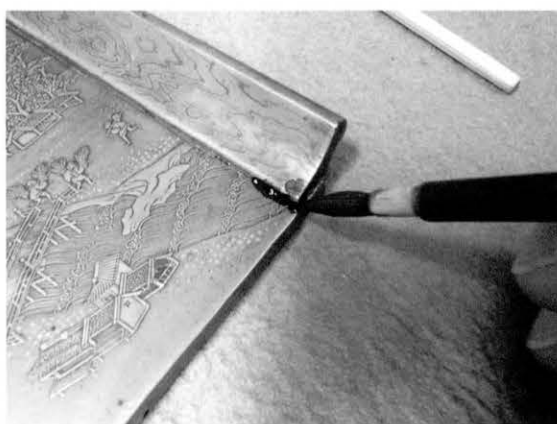


図22 亀裂部分 希釈した麦漆含浸

Fig. 22 Cracked portion, impregnating diluted *mugi-usurhi*

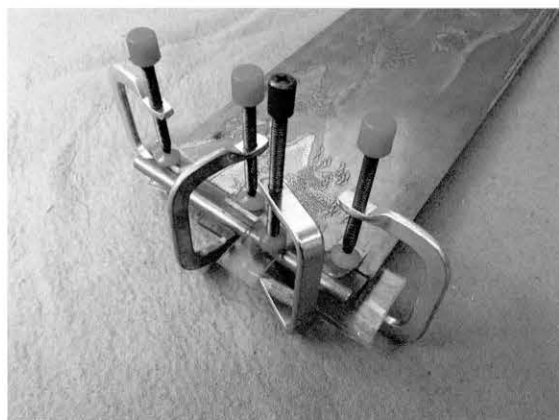


図23 クランプ圧着

Fig. 23 Stabilization using clamps



図24 梨子地塗膜 漆固め

Fig. 24 *Nashiji* coating film, *urushigatame*

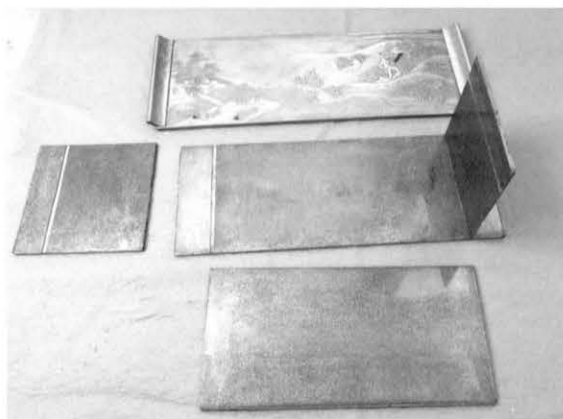


図25 組立て前
Fig. 25 Parts before assembly

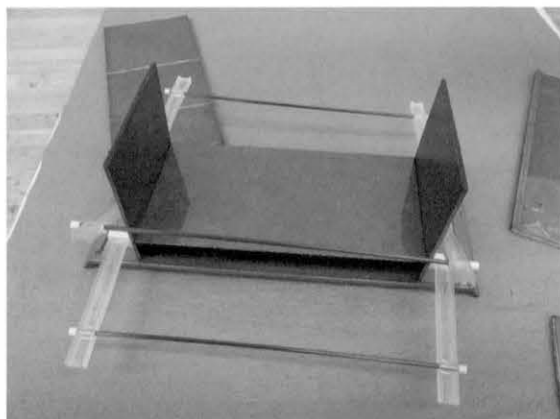


図26 組立て 仮止め
Fig. 26 Assembly, temporary jointing

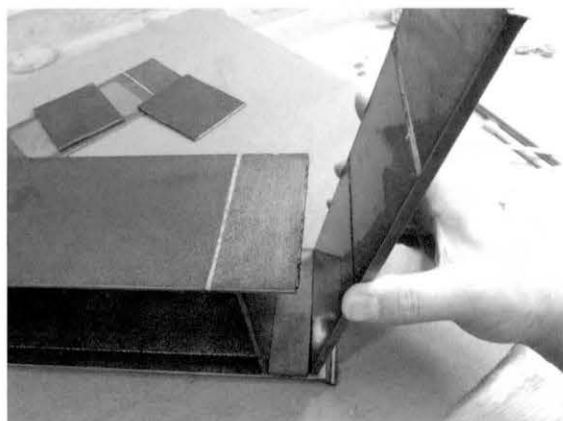


図27 組立て 麦漆接着
Fig. 27 Assembly, adhering with *mugi-urushi*

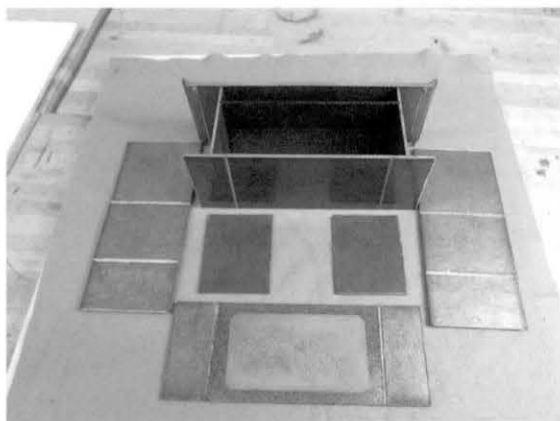


図28 組立て 位置確認
Fig. 28 Assembly, confirming the position of the parts

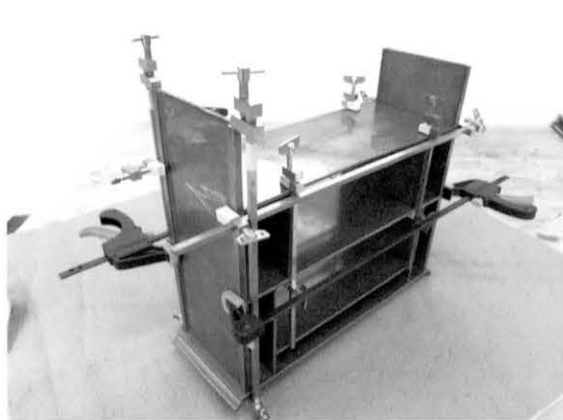


図29 組立て 側板
Fig. 29 Assembly, side boards

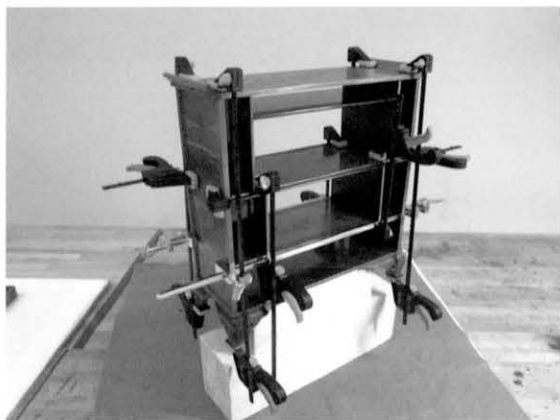


図30 組立て 圧着
Fig. 30 Assembly, press-stabilization

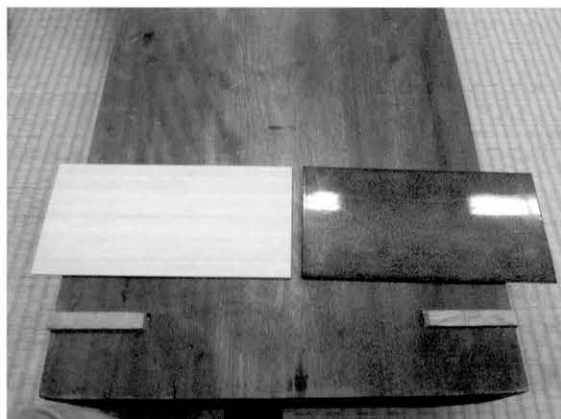


図31 復元棚板 素地完成

Fig. 31 Reproduced shelf board, substrate completed

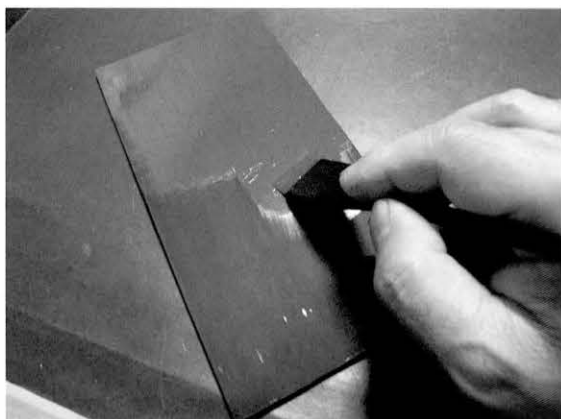


図32 粉蒔き前 絵漆塗り

Fig. 32 Before sprinkling powder, applying *e-urushi* (base coating)



図33 銀梨子地 粉蒔き

Fig. 33 Silver *nashiji*, sprinkling powder

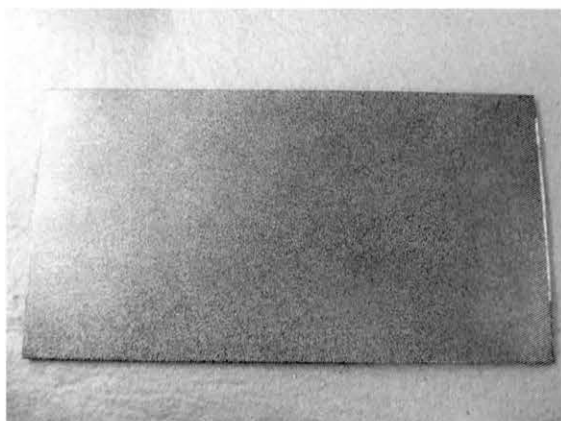


図34 復元棚板 完成

Fig. 34 Reproduced shelf board, completed



図35 希釈した麦漆 含浸

Fig. 35 Impregnating diluted *mugi-urushi*



図36 刻字付け

Fig. 36 Applying *kokuso*



図37 刻字付け部分 研ぎ

Fig. 37 Polishing the part filled with kokuso

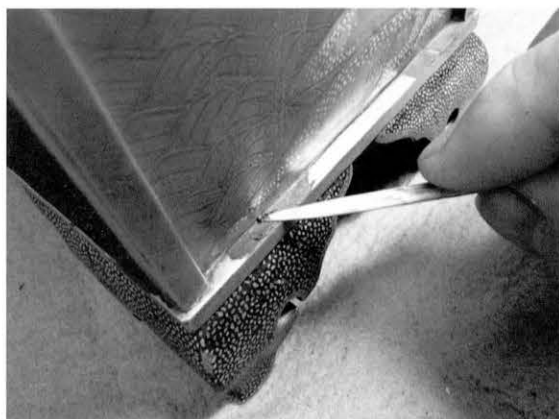


図38 際錆付け

Fig. 38 Applying kiwasabi



図39 金錆付け

Fig. 39 Applying kinsabi



図40 金錆 後

Fig. 40 Kinsabi, back



図41 漆固め

Fig. 41 Urushigatame



図42 中間視察

Fig. 42 Interim inspection

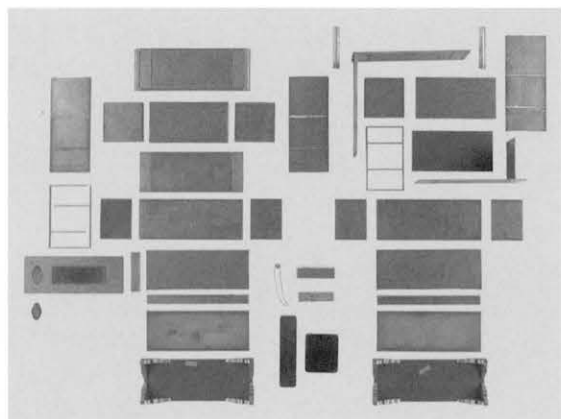


图43 修復前 表面
Fig. 43 Before restoration, front face

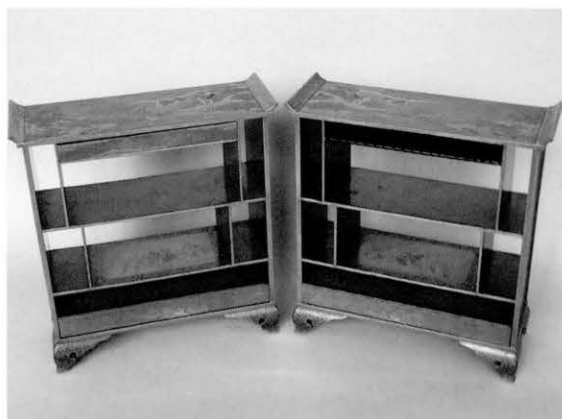


图44 修復後 香棚一對
Fig. 44 After restoration, pair of shelves for incense

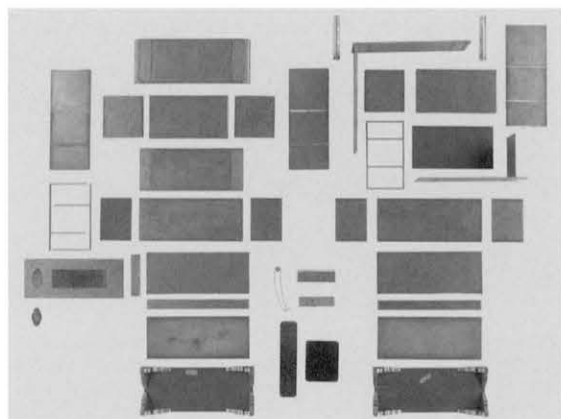


图45 修復前 裏面
Fig. 45 Before restoration, back face



图46 修復後 香棚
Fig. 46 Adjusting the substrate



图47 修復前 天板
Fig. 47 Before restoration, top board



图48 修復後 天板
Fig. 48 After restoration, top board



図49 修復後側面「比良の暮雪」、「堅田の落雁」

Fig. 49 After restoration, side with "Hira no bosetsu" and "Kata-da no rakugan"



図50 修復後側面「矢橋の帰帆」

Fig. 50 After restoration, side with "Yabase no kihan"



図51 保存用桐箱

Fig. 51 Paulownia box for storage



図52 桐箱に収納

Fig. 52 Shelves placed in the paulownia box

市立ヴェルケ・メディジチ博物館（チェコ）

近江八景蒔絵香棚の蛍光X線分析結果

早川泰弘

【調査資料】 市立ヴェルケ・メディジチ博物館 近江八景蒔絵香棚

【調査日時・場所】 2008年7月31日 保存修復科学センター 漆アトリエ

【分析装置・条件】 装置：ポータブル蛍光X線分析装置 SEA200（セイコーインスツルメンツ）
 X線管球：Rh（ロジウム）
 管電圧・管電流：50 kV・100 μ A
 X線照射径： ϕ 2mm（Al 40 μ m フィルタ付きコリメータ）
 測定時間：200 秒
 測定雰囲気：大気
 装置ヘッド～資料間距離：5-10mm

【分析結果】・得られた蛍光X線強度を一覧表に示した。

・今回の測定結果に関しては、下記の事項を十分考慮した上で、測定結果の解釈が必要である。

- (1) 今回の測定では、有機物（主元素 C, N, O, H）や染料などの検出は行えない。
 無機物であっても、軽元素（例えば Al, Si, S, Cl など）の検出は行えない。
- (2) 得られた蛍光X線強度は表面からある深さまでの組成情報である。
 （金属銅の場合：数 10 μ m 程度）
- (3) 単一部位の測定結果だけからは、複数の元素が混合されているのか、それらが層状に存在しているのかの判断はできない。

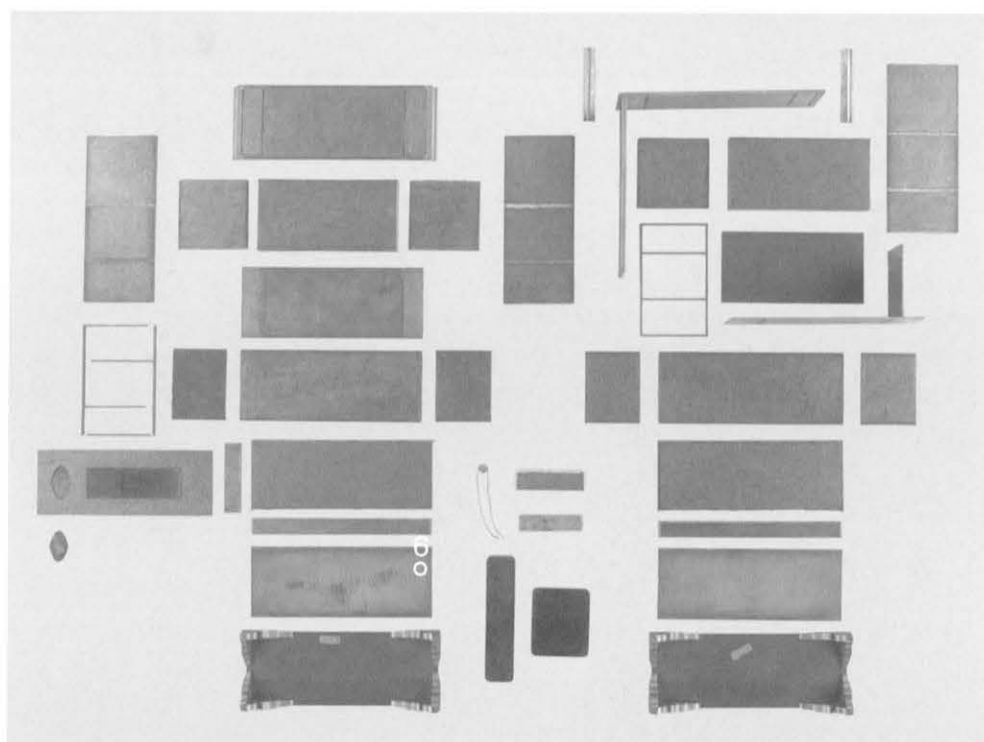
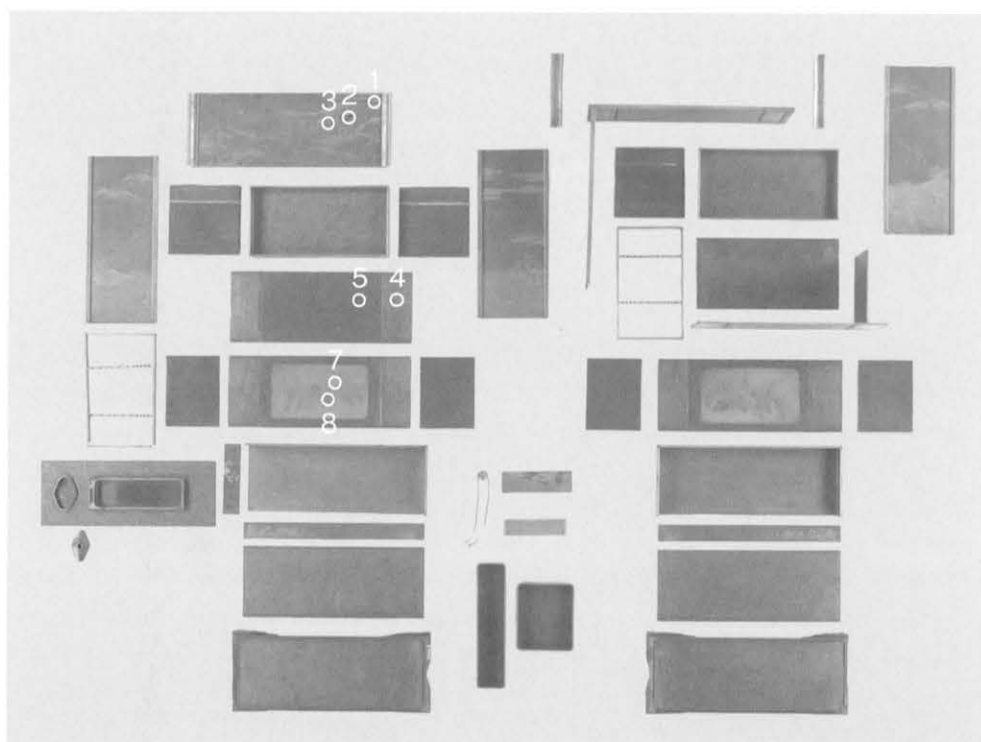
ヴェルケ・メディジチ博物館 近江八景蒔絵香棚 蛍光X線分析結果

No.	測定箇所	蛍光X線強度 (cps)					化学組成 (wt.%)		
		鉄 Fe-K α	銅 Cu-K α	銀 Ag-K α	金 Au-L β	水銀 Hg-L β	金	銀	銅
1	銀黒	3.8	7.6	15.2	13.7	19.4			
2	銀黒	58.2		3.0				> 99	< 1
3	金色地	18.1	18.7	3.4	73.7				
4	梨地	27.4	20.0	11.6	4.7				
5	梨地	21.1	18.2	9.0					
6	暗銀	44.1	10.2	11.8	12.5				
7	金		17.1	1.2	198.7				
8	青金		8.9	5.7	148.4				

【分析結果に関するコメント】

- ・本作品では多くの箇所で金粉と銀粉が併用されていると考えられ、それらの箇所については両材料の化学組成を正確に求めることは困難であり、上記表中では空欄にした。
- ・No.2は、粉ではなく単一材料の板(箔)状であり、Ag>99%以上の材料である。
- ・No.1からはHgが大量に検出された。他の箇所からは検出されない。その由来は不明である。

ヴェルケ・メデイチ博物館 近江八景蒔絵香棚 蛍光X線分析位置
Measuring points for X-ray fluorescence analysis



On the Restoration of *Pair of Shelves for Incense*
in the Collection of Museum Velké Meziříčí

Tatsuya Matsumoto

Name of the object: *Pair of Shelves for Incense*

Collection of Museum Velké Meziříčí

Dimensions (cm): 11.6 (L) × 30.6 (W) × 30.7 (H), each shelf

Place of restoration: Restoration Studio (Urushi), National Research Institute for Cultural Properties, Tokyo

Period of restoration: 2 years

1. Discription

The object is a pair of shelves for incense. It is used to hold tools for enjoying incense, and the designs on each shelf are symmetrical. Both side edges of the top board of each incense shelf are raised so that brushes will not fall off, and there are small drawers on the inside. The shelves normally contain a set of tools for incense play (incense burner, incense tray, container for incense, a pair of tweezers and six other tools, hammer-like tool for breaking incense wood, incense markers, etc.), but many of them seem to have been lost. When the shelves were transported to Japan for restoration, they were accompanied by a drawer with an ink stone and water container for one shelf and a similar drawer for the other shelf without an ink stone or water container as well as a rack for holding tools, a wooden board on which incense is broken, and silver scissors of the two shelves.

The landscape depicted on the top board of each shelf is that of “Ishiyama no shugetsu” (autumn moon over Mt. Ishiyama), “Mitsui no bansho” (late autumn at Mitusi), and “Seta no sekisho” (checkpoint at Seta); on the side is “Katada no rakugan” (flock of geese at Katada), “Hira no bosetsu” (snow at Hira), and “Yabase no kihan” (sailboat at Yabase). Inside the catouche on the shelf board of each shelf is a bouquet of hydrangea and wisteria tied with paper strings.

The shelves are gold on the whole while the divider and the front and back sides of the shelf boards are decorated with *nashiji*. The design of the embankments, wave-washed beaches, clouds, mountains and hills depicted in thin *takamakie* and further decorated with *kirikane* are found dispersed on the top board and sides. Gold and silver *kanagai* are used for parts of the bridge and houses. *Hiramakie* is used to express trees, houses, waves, figures and birds. Lead is used for the moon, and *aokin* (alloy of gold and silver) for the pine trees, clouds and parts of the mountains. *Okibirame*, in which gold *hirame* powder is laid, decorates the legs of the shelves and parts of the shelf boards. The top board and the sides of the shelf boards are decorated with gold *keshifun makie* and an arabesque design is depicted with *tsukegaki* in part.

2. Condition of damage

- Most of the joints of the substrate of the shelves were close to falling apart.
- One of the shelf boards and several of the drawers were missing.
- The coating material that had been applied in past restorations on the front and back of each shelf board had deteriorated and there were stains on the coating film.
- The urushi coating film had deteriorated and become dark due to UV ray and passage of years. Silver *nashiji* powder had rusted.
- Adhesives used at the time the shelves were made or in past restoration were found on the joints of the shelf boards.
- Part of the shelf boards were joined, but they were close to becoming detached.
- Coating film was missing in many of the corners of the shelf boards and legs and the joints.
- A piece of paper was attached to the *makie* on the top board.
- Some of the *kanagai* on the *makie* had become lifted.

3. Restoration specification

Restoration was executed in accordance with the principle of maintenance of the present condition specified by the Agency for Cultural Affairs for the restoration of urushi cultural properties. According to this principle, the aim of restoration is “to preserve, without damaging the present condition, and to pass onto later generations” cultural properties. If it becomes necessary to alter the process of restoration or if some problem occurs in the process, the matter will be discussed among the persons in charge at the National Research Institute for Cultural Properties, Tokyo, the museum owning the object and the restorer.

4. Special points to note in restoration

Each board of the shelves were verified and their positions confirmed in order to make a completion drawing of the assembled shelves. Since there was a risk that the shelf boards that are joined may fall apart any minute, those that could be disassembled were done so, cleaned and re-attached. Once new replacement boards were made and the original ones were consolidated with urushi, the shelves were reassembled. *Kiwasabi* and gold *sabi-urushi* were applied on the joints of the boards to make them less conspicuous.

5. Process of restoration

1) Investigation of the present condition and confirmation of the work process

The structure of the substrate, the foundation and decoration as well as the present condition of damage were investigated and recorded. Process of restoration was also confirmed.

2) Photographing before restoration

Photographs were taken before restoration so that the shelves might be compared before and after restoration.

3) Manufacture of a working stand

A stand and a working table were manufactured to facilitate safe restoration work that would not damage the object.

4) Temporary facing

Since there was a possibility that the coating film around the cracked portions of the object and *kanagai* might become detached during restoration, this was prevented by adhering thinly cut pieces of *gampi* paper.

5) Analysis

X-ray fluorescence analysis was conducted in order to determine the types of *makie* powder and metals used on the object. Results of analysis are reported separately.

6) Cleaning

Dust covering the surface of the object was dusted off, and the soiled surface was cleaned with a slightly moistened cotton fabric and swabs. Since the *kanagai* on the *makie* portions of the object were lifted and about to fall, special care was given and cleaning was kept at the minimum necessary amount.

7) Removal of the coating material from past restorations

Coating material had been applied in Europe in past restorations, but it had become deteriorated due to UV ray and passage of years. In addition, some of the coating material on the edges of *takamakie* had become very dark. Solvent used to remove the coating material was tested sufficiently and the most appropriate one was selected. A mixture of ethanol and distilled water was used to remove the coating material.

Since animal glue had been used as an adhesive to join the elements, it was swollen by applying moisture and carefully removed with a bamboo spatula and knife.

8) *Urushigatame* of the surface coating film

After removing the coating material that had been applied over *urushi*, *urushi* diluted with solvent was applied to consolidate the exposed *urushi* coating film and to prevent marks caused by *urushi* during the remaining process. *Urushigatame* was done several times in accordance with the condition of deterioration.

9) Press-stabilization of the lifted *kanagai*

Kanagai and *kirikane* on the *makie* decoration had become lifted and part were turned back. These were carefully placed back and adhered by impregnating animal glue. *Shimbari* method using the resilience of bamboo sticks and clamps was used for press-stabilization.

10) Press-stabilization of the cracks and lifted coating film

Before press-stabilization, a stand for parts to undergo restoration and tools were prepared. Diluted *mugi-urushi* was impregnated into the joints and spaces in the cracked portion before press-stabilizing with bar clamps. Lifted coating film was also press-stabilized. Since strong adhesion was needed, *mugi-urushi* containing more gluten was used for press-stabilization.

11) Making of the *nashiji* board

Cypress was chosen for the substrate of the new board since that is the material used originally. It was given a *urushi* foundation and finished with silver *nashiji*. Since today's *makie* powder was to be used as the silver *nashiji* powder, *makie* powder of different size was tested on a sample board before making the final selection. As for the *keshifun makie* portion on the side of the new board, it was decided that the *keshifun makie* would not be reproduced since there was a risk of the new part becoming too conspicuous and since it was agreed that this should be left as evidence of a past restoration. Instead, this part was left as it was, coated with black *urushi*. This decision was made upon

discussion with the persons in charge at the museum and at the National Research Institute for Cultural Properties, Tokyo.

12) Assembling the elements

Mugi-urushi containing more gluten, which provides stronger adhesion, was used to join the shelf boards, and clamps were used to hold the joints. Bar clamps and clamps were kept in place for about 3 weeks so that *mugi-urushi* would harden completely.

13) Filling missing parts of the coating film with *kokuso*

Gaps or cracks that could not be filled and missing areas on the coating film were filled with *kokuso* made by mixing sawdust and hemp fibers to *mugi-urushi*. The shape was also reproduced. Sawdust of different coarseness was used, depending on necessity, and applied several times.

14) *Kiwasabi* and matching of colors

Fine *jinoko* made of baked diatomaceous soil was added to *kijomi urushi* and applied around the edges where the coating film was missing and parts of cracks that had been filled with *kokuso* in order to prevent further loss. As a finishing touch for *makie*, *kinsabi* (gold *sabi-urushi*) made by mixing fine gold powder and whetstone powder to *nashiji urushi* was applied inconspicuously.

15) *Urushigatame*

In order to reinforce the urushi coating film and to regain gloss, urushi diluted with solvent was applied several times for consolidation. Urushi was also applied to parts where *kiwasabi* had been executed.

For *urushigatame* of the *makie* portion, urushi was impregnated into the coating film and excess urushi on the surface of *makie* was wiped off carefully with a solvent.

16) Manufacture of a paulownia storage box and a wrapping cloth

In order to pass the restored item to future generations, a paulownia box for storage and a *habutae* silk wrapping cloth were made. A *kendon*-style* box with deep trays was made. This would make taking out and putting back of the object easier. The deep trays would also make it easier to take out the items. The manufacture of the paulownia box was entrusted to a specialist.

17) Taking photographs for documentation and compiling a restoration report

Photographs were taken after restoration and reports of restoration and analysis of techniques used for the original were made.

Kendon-style: The door sits within a rebate in the frame and can be removed by lifting it upwards into a recess which is slightly deeper than the one at the bottom, then pulling it outwards with the aid of a fabric or built-in handle.



保存箱

A storage box with a *kendon*-style door

Results of X-ray Fluorescence Analysis of
Pair of Shelves for Incense in the Collection of Museum Velke Meziříčí

Yasuhiro Hayakawa

Date and place of analysis: July 31, 2008

Restoration Studio (Urushi)

National Research Institute for Cultural Properties, Tokyo

Apparatus and conditions for analysis

Apparatus: Portable X-ray fluorescence spectrometer SEA200 (Seiko Instruments Co. Ltd)

Target: Rh (rhodium)

Tube voltage, current: 50kV · 100μA

X-ray radiation diameter: ϕ 2mm (collimator with Al 40μm filter)

Measuring time: 200 sec.

Measuring atmosphere: Air

Distance between the apparatus and the sample: 5-10mm

Analytical results

X-ray fluorescence intensity obtained is shown in a table.

The following points should be taken into careful consideration when interpreting the measured results.

- (1) It is not possible to detect organic substances (major elements C, N, O, H) or dyes in this measurement. It is not possible to detect light elements even if they are inorganic substances (i.e. Al, Si, S, Cl).
- (2) The X-ray fluorescence intensity obtained shows an average composition from the surface to a set depth (for metallic copper, approximately several 10μm in depth).
- (3) It is difficult to determine only from a single measurement whether several elements are combined or whether they are in layers.

Results of an X-ray fluorescence analysis of
Pair of Shelves for Incense in the Collection of of Museum Velke Meziříčí

No.	Measuring points	X-ray intensity (cps)					Chemical composition (wt.%)		
		Iron Fe-K α	Copper Cu-K α	Silver Ag-K α	Gold Au-L β	Mercury Hg-L β	Gold	Silver	Copper
1	Silver black	3.8	7.6	15.2	13.7	19.4			
2	Silver black	58.2		3.0				> 99	< 1
3	Gild ground	18.1	18.7	3.4	73.7				
4	<i>Nashiji</i>	27.4	20.0	11.6	4.7				
5	<i>Nashiji</i>	21.1	18.2	9.0					
6	Dark silver	44.1	10.2	11.8	12.5				
7	Gold		17.1	1.2	198.7				
8	<i>Aokin</i>		8.9	5.7	148.4				

Comments on the analytical results

- (1) It is thought that gold powder and silver powder are used together at many places of this object and that it is difficult to obtain accurate chemical composition of both materials. For this reason, the chemical compositions are not filled in on the above table.
- (2) No. 2 is not in powder form. It is a foil of single material with Ag>99%.
- (3) A great amount of Hg was detected in No. 1 while it was not detected at other points. The reason, however, is not clear.