鳳凰文蒔絵螺鈿矢筒

平成11年度修復事業

品名：鳳凰文蒔絵螺鈿矢筒
所蔵：メトロポリタン美術館　アメリカ合衆国
品質構造：木製、漆塗、蒔絵、螺鈿
所蔵番号：E-82670

請負者　　勝又 智志
修理担当者　勝又 智志
原稿執筆　　勝又 智志

鳳凰文蒔絵螺鈿矢筒

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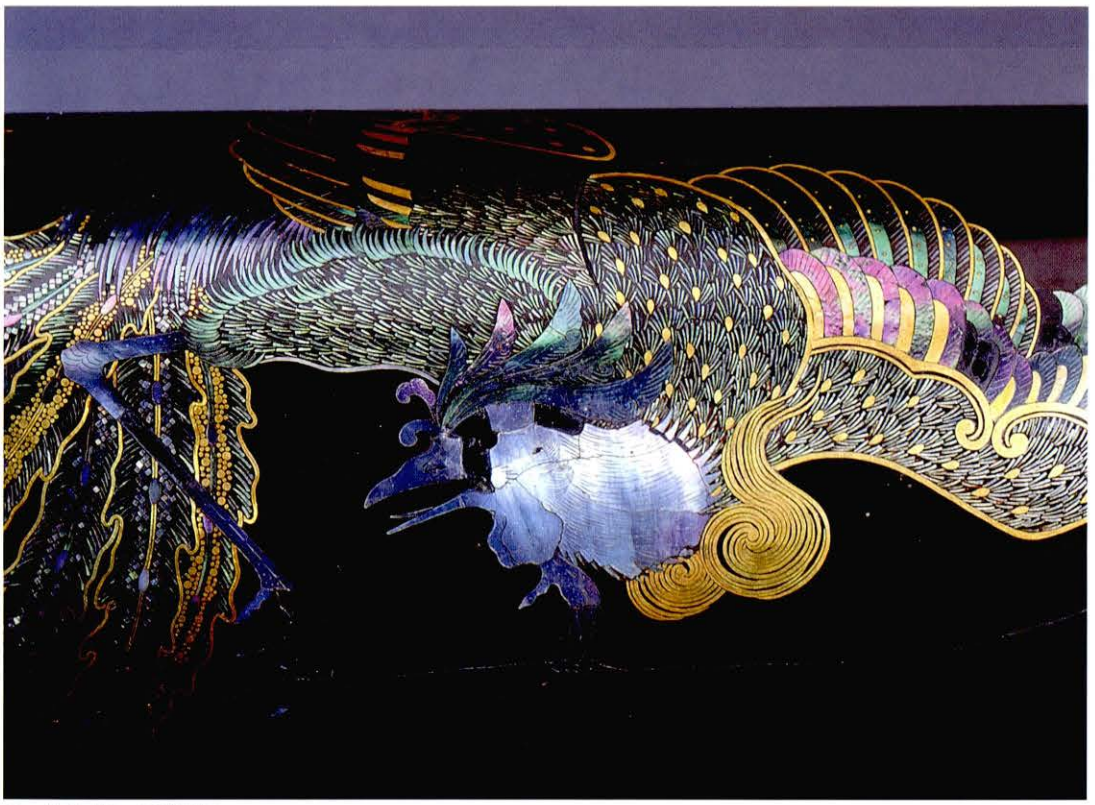

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はじめに

本報告書は在外日本古美術品保存修復協力事業の一環として、平成10年度から11年度の二年間にわたり東京国立博物館修理室において実施された「鳳凰文蒔絵螺鈿矢筒」保存修復を通じて得られた、木地構造、下地、塗り、加飾などの材料技術分析情報を記録するとともに、修復の過程を詳細に記録し、今後の修復活動の一助となることを目的とするものである。なお、関連調査として富山市郷土博物館に所蔵される柚田家による硯箱を紹介する。

概要

名称　鳳凰文蒔絵螺鈿矢筒
所蔵館　メトロポリタン美術館　The Metropolitan Museum
法量　　総長　95.5cm
　　口径　9.8cm　底径　8.9cm
　　厚　　0.4cm

木製、黒漆塗り、胴中央部に雌雄の鳳凰を、回り込むように大きく配し、口縁および底より12cmの間を梨子地とし口縁側に梅鉢紋を螺鈿で表している。上下の梨子地の内側には大小の五三の桐紋を二段に組み立て、鳳凰と共に繊細に切り合わせた青貝と金平文で表している。底裏には作者と推測される柚田重廣の銘と花押が梨子地に青貝で施されている。内部は口縁より10cmまでを梨子地とし、更にその奥は木地を摺漆で仕上げる。また、上部の梨子地には左右に銀製の梅鉢形の座金と鐶をつける。本来付随していたであろう蓋と紐は失われている。(図115)

口縁側の梨子地内に配された青貝螺鈿の梅鉢文は鉢にあたる貝の形状が丁子の形をなした丁子梅鉢文である。これは加賀前田家の剣梅鉢文と明らかな違いを見せており、この矢筒が富山藩前田家藩主のために制作されたものであり、さらに底裏にある柚田重廣の銘と花押から二代目藩主前田正甫（まさとし）が延宝６年（1678）京都の青貝細工師であった柚田清輔を招致し、藩の青貝細工師としたことに始まる越中富山柚田家の作であることがわかる。(図116)

天保９年（1838）富山藩がまとめた藩士由緒書には柚田家６代までの名が記されている。記述のなかに重廣の名を見つけることはできないものの、藩主の使用する家紋入りの御道具を当主が制作するのが通例であり、重廣を雅号とした制作者がこれらの中に実在することは想定できる。また、使用されている貝が多種であることや繊細で緻密な鳳凰の表現などを考えあわせると、制作年代は18世紀後期～19世紀初頭の作と推定される。

また東京国立文化財研究所に保管される売立帳には大正14年に某家より売り出されていることが記載されており、メトロポリタン美術館の所蔵時期がおよそ大正末から昭和初期以降と考えられる。当時の写真からは翼部分に貝の剝落がみられるものの形状に支障はなく、紐も付随していた事がわかる。(図114)

品質形状

木地は、木理が通直に通り、春材秋材が明快で、摺漆により僅かに褐色を呈しているものの

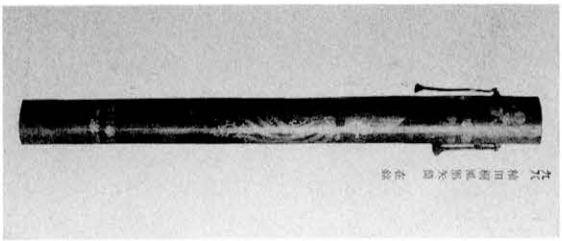

図114　大正11年の売立帳に掲載された矢筒
Quiver in the "*Uritate-cho*"

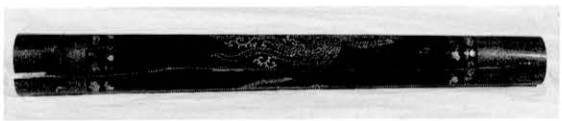

図115　修理前全景
Entire view of the quiver before restoration

図116　底裏銘及び花押
Signature and *kao* on the bottom

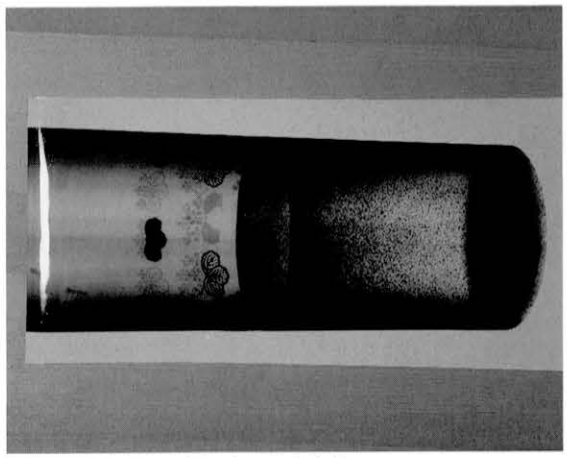

図117　X線撮影底側、木地接合状態
X-ray photograph of the bottom side showing the condition of the joining of the substrate

図118　背面上体部
Back side, upper body part

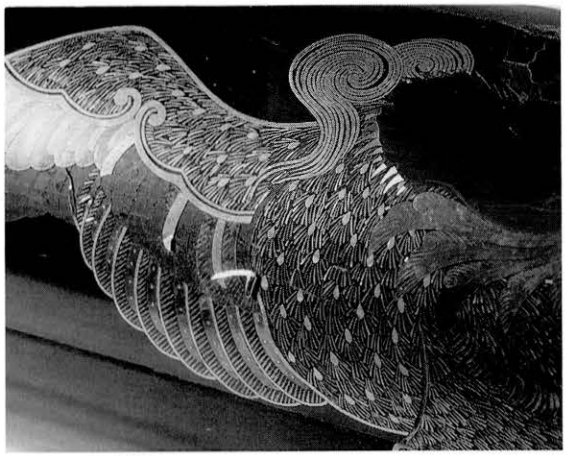

図119　正面翼部
Front side, wing part

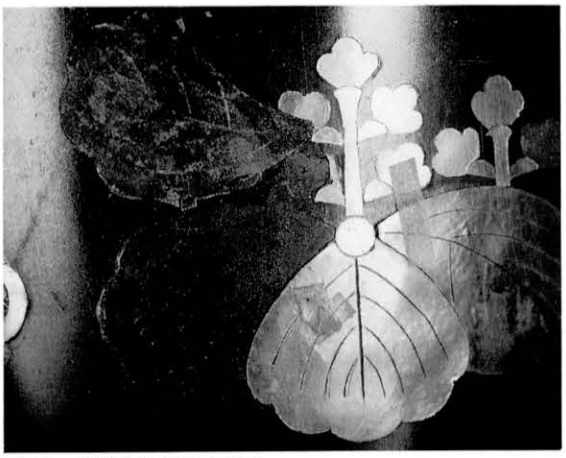

図120　桐紋薄貝裏面の状態
Condition of the backside of *kiri-mon* shell pieces

黄褐色で光沢があり針葉樹材の特色を備えていることから、桧材を使用したものと考えられる。木地構造はX線撮影により紐金具の取り付け位置に対して、45度程度斜め対角の位置に2本の繋ぎ目が確認されることから、2本の柾目角材をそれぞれ筒状に刳り、仕上げた後これを膠または澱粉糊で接合し、外側を整え、底板を取り付けたものと考えられる。底部には僅かではあるが点状のへこみが見られるが、これは内部に納めた弓矢の鏃の先端が食い込んだものと思われる。(図117)

亀裂部から観察した下地は、外側のみを総布着せとし、赤味のある地の粉及び砥粉を使用し、堅牢であることから漆を十分に混入していることが伺える。布は1センチあたり21～22本と非常に緻密に編まれた平織りの麻を使用し、下地は上下層ともにほぼ均質な状態で、現在も使用されている京都山科産の地の粉に近いものと考えられる。蛍光x線の分析からも鉄分の含有が多く認められており、強い赤味が鉄分であることを裏付けるデータが得られた。正面丁子梅鉢文付近に生じた亀裂部は下地の階層をよく表しており、デプスメーターでこれらを測定し図にまとめた。(図115、134)

塗り

平文や薄貝の剝落した塗り面を観察すると、それらの部分のみ黒色を呈しており周囲が僅かに褐色を呈している。このことから下地の研ぎが完了した後、黒漆を数回塗り、これをさらに研ぎつけ完全な二次曲面を作り上げた後、加飾を施し、透漆を3～4回塗り、平文螺鈿の素材の厚みに漆の表面が達した時点で呂色仕上げとしたものであることが解る。

加飾

中央黒漆部分を背景に雌雄の鳳凰を正面と背面に大きく配している。鳳凰は古来中国で麒麟、亀、竜、などと共に尊ばれた想像上の瑞鳥であり、聖人が出て太平の世になるとあらわれ、梧桐（あおぎり）に宿り竹の実を食し，霊泉を飲み、飛翔するときは雲を従える。と伝えられている。日本では正倉院宝物の中に多く見られ、君主の持ち物として相応しいとして江戸時代に至るまで好まれてきた文様である。鳳凰は雄である鳳と雌とされる凰からなり雌雄で表されることが通例である。

上下に配された桐紋の向きから、上昇し、嘴を開き、後ろに旋回するような強い動きを見せているのが鳳であり、こちらが正面と考えられる。対して背面にあたる凰は嘴を閉じ、雌雄で阿吽の表情を見せながら穏やかな飛翔の姿で表されている。(図14)

0.1ミリ前後の金の平文で輪郭を強調し、驚くほど深い青緑に輝く青貝を鶏冠や尾羽などの要所に配し、羽毛には微細に切り取った貝片を貼り詰めることで密度のある羽のボリュームが的確に表されている（図118、119)。さらに頭部や翼、足、桐文には細やかな線刻を施し表情豊かなものとしている。鳳凰文のある黒漆地の上下を平目粉に丸粉を交えた片暈かしの梨子地とし、口縁側にはやや鈍い光を放つ薄貝で丁子梅鉢文を前後に大きく2つ配している。その内側には大きさを違えた五三の桐紋を外側に10個、内側に13個配している。さらに口縁内部は手前より10センチまでを金梨子地の仕立とする。全体の色調の豪華な気分と繊細な仕事ぶりが見る

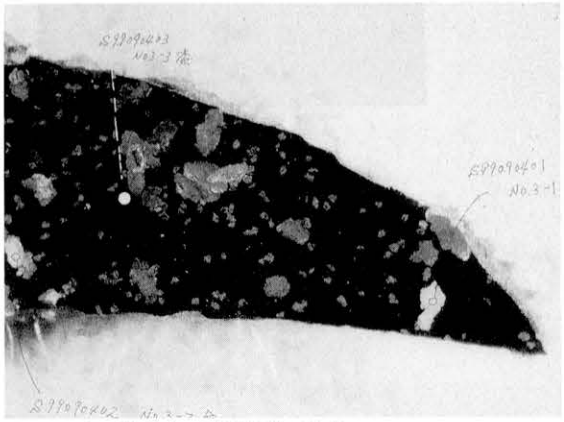

図121　表面梨子地の平目粉及び丸粉
Hirame-fun and *maru-fun* on the surface of *nashiji*

図124　孔雀鮑原貝と5日間煮立てた青貝部分
Original shell of Mexican abalone and *aogai* boiled for 5 days

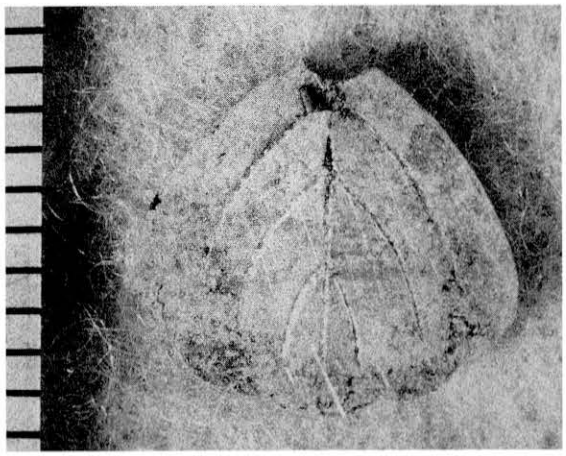

図122　桐紋平文
Kiri-mon with *hyomon*

図125　金篦での剝離作業
Splitting a shell with a metal spatula

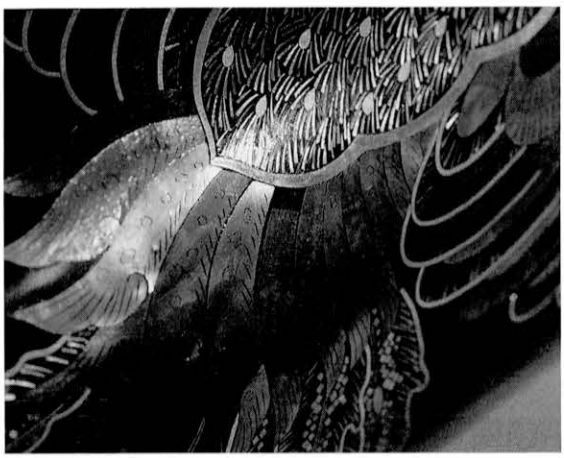

図123　背面尾羽部に見られる孔雀貝
Mexican abalone used for the tail feathers of the phoenix on the back

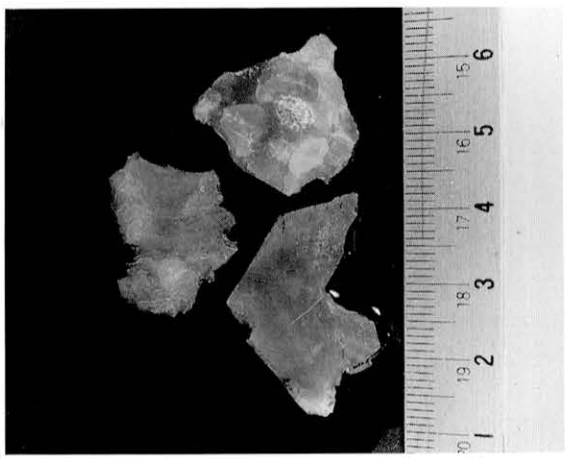

図126　2～3 cmの大きさに剝がれた孔雀鮑のヘギ貝
2-3cm sized *hegigai* of Mexican abalone

者に強い印象を与えずにおかない。数ある柚田の中でも優品と言えるもののひとつではなかろうか。

加飾に使用されるのは、薄貝とよばれる厚さ0.1ミリ前後の夜光貝と白蝶貝を主に使用し、所々に夜光貝よりさらに強い輝きを放つ青貝と、これらの貝と同じ厚みの金平文を使用し、刀、打ち抜き鏨、押し鏨、などの刃物で切り抜いた後、１枚１枚を膠または米糊を接着剤とし、鏝で加熱しながら接着し、細密に組み合わせたものと考えられる。また、貝裏面には墨と思われる黒色の粒子が極薄く塗布され、貝の輝きをより強いものとするなど他の螺鈿漆器に見られない工夫が施されている。(図120)

分析

今回の修復に先立って剝落した幾つかの部分について蛍光X線による金属分析を試みた。分析依頼した資料は次の６点である。（１）桐紋葉部金平文、（２）尾羽部霊芝雲金平文（３）表面梨子地部金平目粉（４）口縁内部梨子地粉（５）貝裏面黒色粒子（６）（３）の塗膜下地。
分析結果は次の通りであった。

（１）桐紋葉部金金貝	金96	銀 3	銅 1	%
（２）尾羽部霊芝雲金金貝	金76	銀22	銅1.5	
（３）表面梨子地部金平目粉	金76	銀17	銅 7	
（４）口縁内部梨子地粉	金96	銀 2	銅 2	
（５）貝裏面黒色粒子	金属反応なし			
（６）（３）の塗膜下地	鉄分多し			

以上のように平文には23金，18金の２種、金粉には平目粉に18金、梨子地粉に23金を使用していることが判明した。平文の中でも翼などの大型の部分には18金を使用し、桐紋などの比較的小さな部分は23金としたことが伺える。また貝裏面の黒色粒子については金属反応が出ないことから松煙または油煙の可能性が高いと思われる。(図121、122)

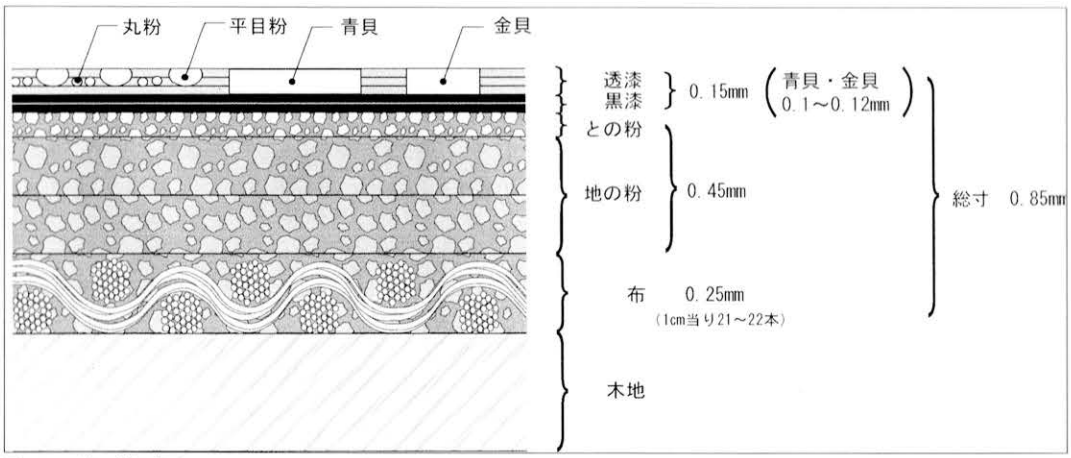

図127 漆の断面図
Cross-section of urushi layer

青貝

前述したとおり、この矢筒は柚田重廣によって制作されたものである。青貝細工のとくに細密な加工を施した漆器を柚田細工とよび国内外を問わず高い評価を得ている。その特徴は金銀平文の巧妙な細工と深い青緑色の強い輝きをもった青貝の併用にあるといえる。ただし長い間その主材料である青貝の原材料の特定はなされてこなかったのが実状である。この機会に僅かではあるが薄貝の試作をとおし柚田青貝の原貝探しを試みた。漆工技術者の間では、柚田に使用される貝は主に夜行貝と玉虫貝であるとされてきた。玉虫貝は国内産の鮑貝のごく一部の貝のさらに一部、病巣のように存在する部分を加工することで得られる特殊な薄貝とされ、高価な価格で取り引きされてきた。この玉虫貝を矢筒に使用した青貝と比較すると、色調、輝きともに、類似している。ただしこの加工貝は最大でも６ミリ角を越えることは極まれで、ほとんどは、微塵貝のように組み合わせて使用されたものであり、鳳凰の鶏冠や尾羽に表されるような３センチにも及ぶような材料が取れる原貝ではないと考えざるをえない。(図123)

近年、筆者は琉球漆器とりわけ螺鈿の漆器類の修復を手がけてきた。それらを観察すると、色調、輝き、質感に柚田の青貝に共通する一群を見ることができる。それらは、強い輝きを有し、色調の変化が穏やかに移行しており、そして、なによりも優れているのは、見る角度による色調、輝きの差違がほとんど無いのである。比較的、現在、使用される薄貝の製作法と特色を夜光貝で説明すると次のようになる。原貝を幾つかのブロックに分けた後、更に何枚かの中厚貝の状態に加工し、両面から研ぎ落とすことで約0.1ミリの厚味とする。このようにして作られた薄貝は摺貝と呼ばれ、長さが20センチにも及ぶ大きな面積を得ることができ、大型の文様を一枚で表現することを可能にした。反面、貝の真珠層の生育を無視して薄く加工するため、色調の変化が強く現れる箇所ができ、角度によって輝きが全く失せてしまう欠点を有することとなった。琉球螺鈿でも17世紀から18世紀に現れる黒漆螺鈿の作品に多く見ることが出来る。つまり琉球螺鈿の一部は現代に伝わる研磨による薄貝技術と異なる手法をとっていたと考えられるのである。この疑問に対しては、地元沖縄で漆器制作の傍ら本来の薄貝製作の復元を試みている宮城清氏から回答を頂くことが出来た。宮城氏によれば、これをヘギ貝と呼び、海水で数日煮立てた後、外側の殻を削り落とし、次に小型の金槌で徐々に振動を与えることで貝の成育過程で生じた真珠層が剥離し薄貝を得ることができるとのことであった。氏の指導の元、夜光貝の薄貝制作を試みたところ、確かに前述したような強い輝きと青味のある色調を備えた薄貝を作ることができ、琉球螺鈿の特性の一端を知ることができた。このときの経験から柚田に使用される貝は夜光貝のヘギ貝であると確信していたのであるが、その後、作品の修復を通して青貝を観察すると、夜光貝の輝きと青緑色では及ばないさらに上をゆく輝きの部分が散見されるのである。輝きの特性からヘギ貝には違いないはずであり貝種の違いであることは予測していたが、特定はできなかったのである。ただしひとつだけ気になる貝が存在した。通称メキシコ鮑、日本名孔雀鮑である。この貝は、市場では薄貝として流通しており強い輝きと茶色い斑模様に特徴がある。名前の通りメキシコ西海岸からカリフォルニア沿岸にのみ生育する日本国内では採ることのできない輸入素材である。斑模様の部分を取り除くと極小さな青緑色の部分を得ることが出来る。この部分だけを比較すると非常によく似ていることがわかるのである。ただし、摺貝の特性として見る角度により輝きが消滅するのは避けられない上、なにより大きなサイズが得られない。ならばこの鮑貝を夜光貝のヘギ貝の技術で真珠層をはがすこ

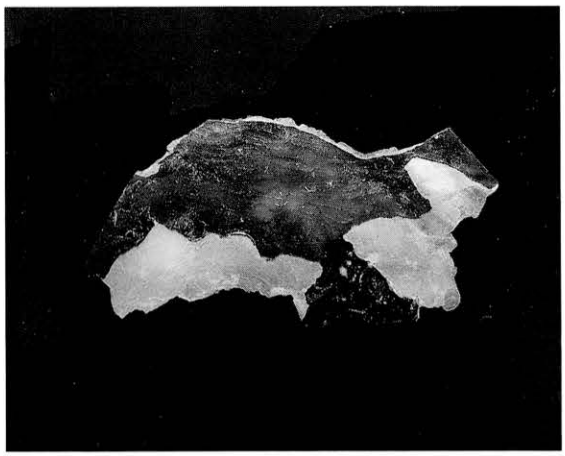

図128　剝離面に付着する褐色のタンパク質
Brown protein on the peeled off surface

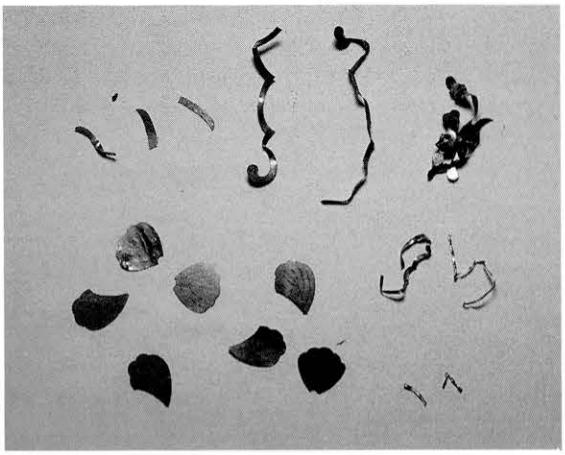

図131　剝落した平文
Hyomon that fell

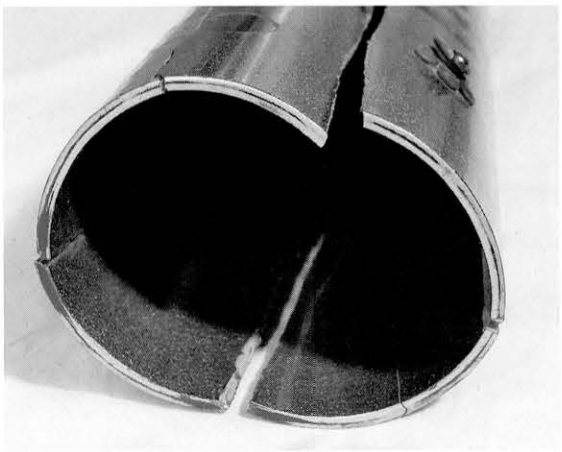

図129　6本の亀裂が入った口縁部、修理前
6 cracks near the rim before restoration

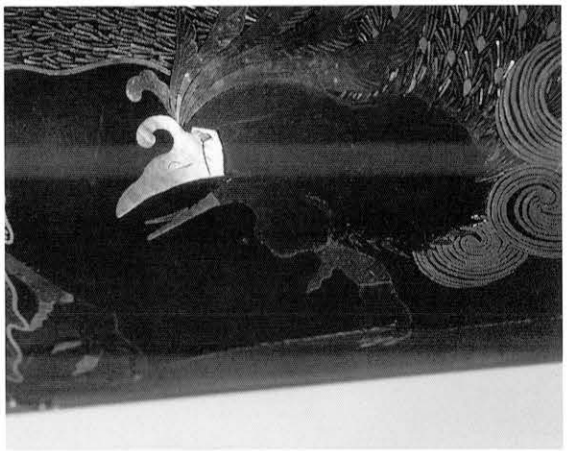

図132　螺鈿の剝離状態
Condition of the peeling off of *raden*

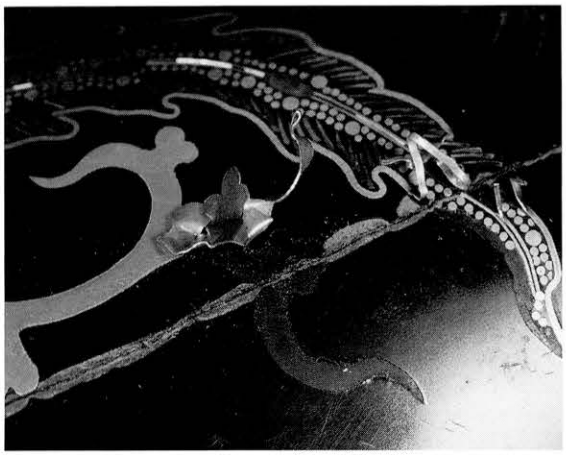

図130　平文剝離状態
Condition of the peeling off of *hyomon*

図133　剝落した薄貝
Shell pieces that fell off

とができれば、この矢筒に使用されている特殊な青貝に近い薄貝を手に入れることができるはずである。貝の輸入業者より原貝を入手し試作を行った。作業は巻貝である夜光貝と耳貝科である鮑の特性の違いからか前回に比べればはるかに困難であったが、何度目かの試作の結果、鳳凰の鶏冠部に施した程度の大きさの薄貝をつくることができた。また、その特性も本作に使われた薄貝と同様であった。(図124～126)

なお、真珠層を分解する過程で推測したことであるが、この青貝の色を決定づけるもののひとつに真珠層の間に挟まれた褐色の層の存在がある。この層は元々真珠層をつなげる役割を持つタンパク質で、剝離が困難なため最後まで密着しており、削り落とすほかないのであるが、この状態での貝は青色が強く貝の色味を確認する上で最適と言える。薄貝螺鈿を製作する場合、形状を切り抜く際の色の確認は最も重要であり、この特性と作品に使用されている貝の裏面が黒色粒子で伏せられていたこととは無関係ではないのではなかろうか。つまり柚田の工人は孔雀鮑の特性を熟知し、これを生かすために裏面を墨で伏せる技術を駆使したのではないかと推測するのである。(図128)

これらの体験から、管見ではあるが、柚田細工に使用された青貝は国内では採ることのできなかった孔雀鮑のヘギ貝を主に使用したものであり、その希少性と裏面を墨で伏せることにより、鮮やかな色彩を手に入れることができた柚田家だけに伝えられた、秘伝青貝細工が当時の人々の心を動かした所以であると考えたい。

当時の鎖国体制の中で富山という北陸の地にどのように特殊な貝が運ばれたのかは知る由もないが、近年の輸出漆器の調査からは柚田家が隆盛を極めていた17～18世紀は、オランダとの

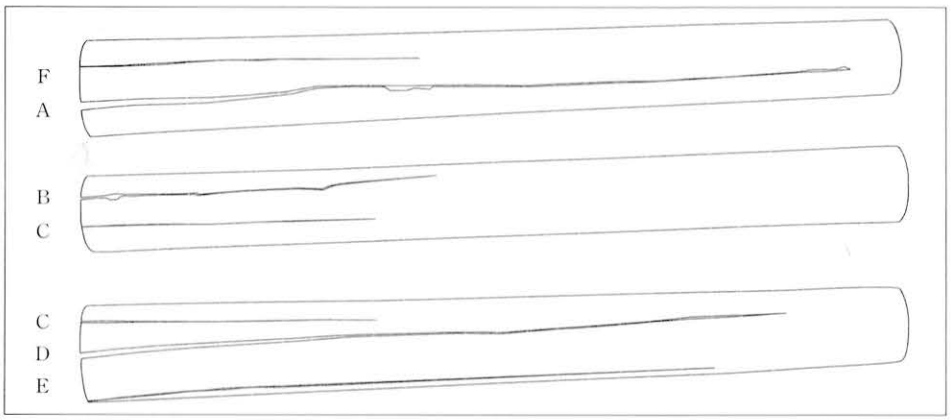

図134　修復前亀裂図
Cracks before restoration

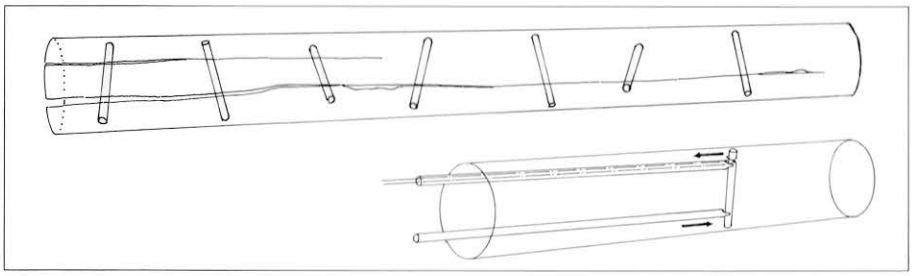

図135　心張り
Shimbari sticks inside the quiver

交易が盛んに進められ、19世紀初頭にはオランダに雇われたアメリカ船が多量の螺鈿漆器を京都の塗物商笹屋に特注し、長崎から持ち帰ったことが確認されている。このことからも日本の螺鈿漆器に対して欧米の人々の並々ならぬ興味の程が伺える。このことは、特殊な原貝の流通も同時に存在したと考えられる。また、柚田細工の始祖とされる柚田清輔が寛永から元禄年間に活躍した京都の青貝師であったことを重ね合わせれば，諸材料の入手は清輔以降の子孫も京都を通じて取り寄せることは可能であったはずである。

修理前の現状

開梱時作品は、その形状を維持できないために、口縁部に発泡スチロールの詰め物をはめることで矢筒の姿を保っていた。詰め物をはずした状態で観察すると本作側面に亀裂が６本入り、口縁部が内側に大きく入り込んでいた。本来の口縁部寸法が直径9.5cmであるのに対し、長径で11.5cm、短径では7.8cmの状態であった。(図129)

最大の亀裂は背面左に見られる。長さは92.5cmであり全長が95.5cmであるからほぼ底部に達していた。亀裂は口縁部で４㎜内部に入り込み、最大の段差は口縁より30cm付近で１cmにも達する箇所がある。亀裂時塗膜に大きなストレスが生じたためか塗膜および梨子地が欠損している。(図134-A)

続く破損は正面左に長さ80cmの亀裂が見られる。この部分は木地が左右に広がっており、最大で７㎜、平均でも４～５㎜程の段差が見られた。特にこの亀裂は正面鳳凰の主要部分を貫通しており、平文や螺鈿への大きなダメージがあった。口縁より約30cmのところまで漆による後世修理が見られることから、所蔵以前に日本で修理されたものと考える。(図134-D)

他の４本の亀裂はそれぞれ74cm (E)、40cm (F)、54cm (B)、35cm (C)の長さであった。ただし制作時の二本の接合部からの亀裂は全く無かったのは意外な事実であった。

矢筒の木地の大きな変形と裂傷は、加飾部に対しても連鎖的に大きな損傷をもたらしている。矢筒に使用された平文は、一つの単位が長くしかも曲線で組み合わされているため、亀裂部を跨ぐように引き延ばされながら剝離した後、めくれ上がるように剝がれ、複雑に絡み合っていた。完全に剝落した平文は18枚あり、いずれも変形して形状の回復が可能であるか疑問であった。また、一見問題の無いように見える大型の平文も竹篦で触れると内部に空隙のある剝離が多数確認され、全く手を触れることが出来ない状態であった。(図130、131)

平文と併用した青貝も約0.1㎜前後と薄く、剝落後細かく割れを生じやすく、形状の回復の可能性は低いと判断した。翼、頭部を中心に大型の貝が広い面積で欠落し、残った貝も各所で浮き上がり、平文同様に手の施しようがない状態であった。また、売立帳の写真から、当時既に多くの貝が失われていたことが伺える。剝落した貝片は大小合わせて104枚、塗膜断片は12枚あり、これらは別途保存されていた。(図132、133)

このようにほぼ全面にわたって破損しており、二年の期限で修復するにはあまりに多くの課題が山積した未だかつて経験したこともない修復であった。

修復

修復にあたっては、現在、日本の指定文化財修理に準じ現状維持を基本とし、材料技法とも作品製作時と可能な限り共通な素材を用いることとした。また、修復の詳細については東京国立文化財研究所及び所蔵美術館担当官と協議を重ね、修理方針を決定した。今回の修復には大

きく分けて４つの課題があった（１）木地の修復、（２）平文の修理及び接着、（３）螺鈿の接着、（４）修復後の保存管理である。以下それぞれについて報告する。

木地修復

修復に際しての最大の懸念は、まず第一に形状の回復であった。これが果たされなければ螺鈿も平文も元の位置に正確に戻る可能性がない。なんとしてでも円筒形の矢筒に戻さなければならない。だが、はたして大きく変形してしまった木地を元の形状まで戻せるものか疑問であった。木地は弾力を失い、堅い素材に取って代わったような印象であった。表面上打損による、損傷は見られないことから、これらの亀裂が乾燥によるものであることは明らかである。おそらく現在確認されるもっとも大きな亀裂が始めに弾けることで形状の支えを失い、これをきっかけに順次五本の亀裂が生じたものと考えられる。とりあえず危険な剝離状態にある平文、螺鈿の仮止めと多年にわたる塗膜の汚れの掃除ができるように、受け台を集成材とバルサー材で作り、加湿用に矢筒より二周りほど大きめの外箱を耐水性の高い杉材で製作した。通常の木地の変形に対しては湿し風呂による湿度管理で対処しているが、今回の場合は、加湿のみでどの程度木地の狂いが回復するのか、全く予測の立たない状態でのスタートであった。

剝落の恐れのあるの平文や薄貝は、細く切った雁皮紙を澱粉糊で貼り、仮止めを行った。次に掃除であるが、損傷が激しいことから、柔らかな木綿の布を湿し、固絞りした布を指先に巻き付け、軽く拭き取る程度にとどめた。

加湿は、杉箱の内側に濡れ雑巾で湿り気を与え、内部が85～90％になるように調整し、二日ごとに様子を見ながら１ヶ月継続した。その結果、形状の回復はほとんど見られなかったのであるが、指先で触れた木地の感触は、わずかではあるが弾力をとりもどしつつあり、さらに湿度管理の方向で進めるべきであるとの確信が得られた。

次に実施した対策は、矢筒内部に直接加湿を行うというものであった。この方針を決するにあたっては故田口善国先生の助言が大きな示唆となったことを報告しておきたい。

さらに、矢筒内部に何らかのシステムで小さな柱を立てることで内圧を高め、内側に巻き込むように変形した形状を元の位置に少しでも近づけることが課題であった。実際には、子供の手も入らない程に変形した開口部から、奥行きが１ｍ近くある矢筒内部に、確実に目指した箇所に最適の角度で支柱を複数立てることは、その方法論を見つけるまでは全く不可能なことであった。

内部への直接の加湿は、これまでの修復で初めての経験であった。漆工品の場合、過剰な加湿は「灼け」と言って、黒漆であれば茶色く、朱漆であれば白っぽく変色する可能性があり、塗膜や下地の状態によって結果が左右され、危険性の高い処置である。幸い下地が堅牢であったこと、木地の内部が摺り漆仕上げであったことなどから効果が期待された。ただし直接内部に水分を多量に供給する一方、木地には直接水滴が触れないよう配慮する必要があった。この作業は梱包用に使用される薄手の軟スチロール材で、１㎜厚程の高密度吸収スポンジを巻いた状態のものを使用した。軟スチロール材はほぼ完全な防水性を保ち、高密度吸収スポンジは一滴の水も残さない吸水性を維持できるものである。これを２本、直接、筒内部に挿入し数日ごとに器物の面を回転させ、むらなく加湿できるよう調節した。効果は、形状が戻るほどではないが木地の堅さが消え、本来の柔軟性を取り戻しているのが確認できた。(図136)

この期間、修理は全くできなかったのであるが、加湿を進行させながら形状を回復するため

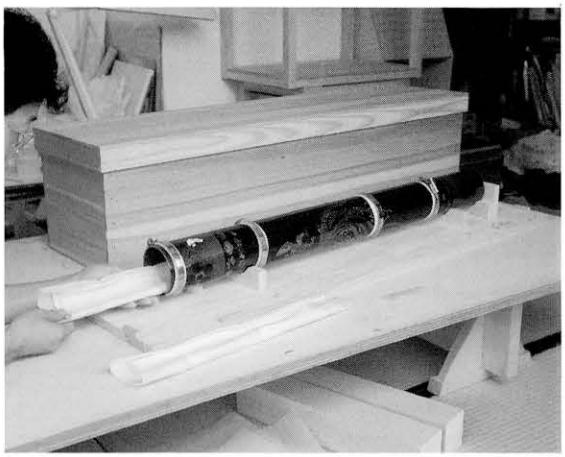

図136　加湿用の杉箱と高密度吸収スポンジ
Cedar case for humidifying and highly absorbent sponge

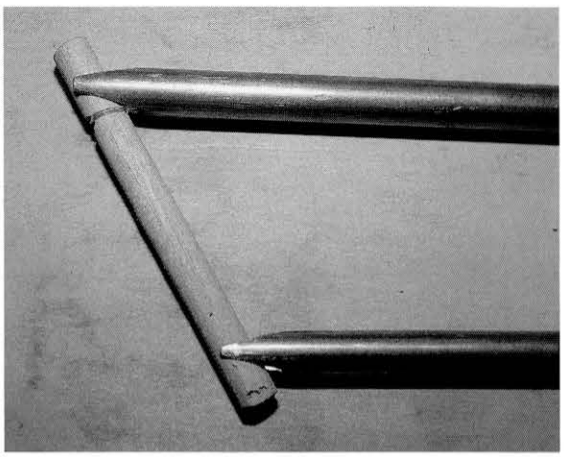

図139　治具 3
Tool for restoration (3)

図137　治具 1
Tool for restoration (1)

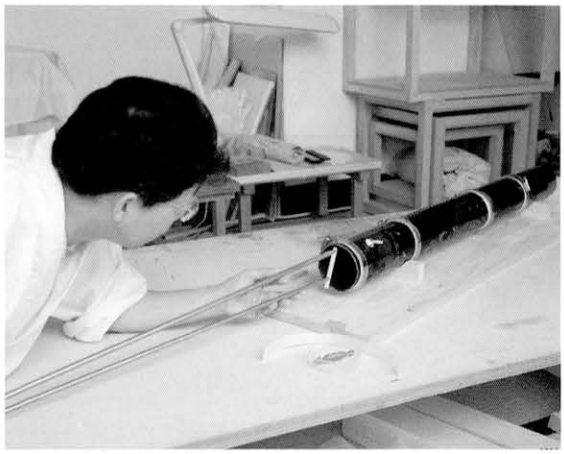

図140　内部心張り作業
Placing a *shimbari* stick inside the quiver

図138　治具 2
Tool for restoration (2)

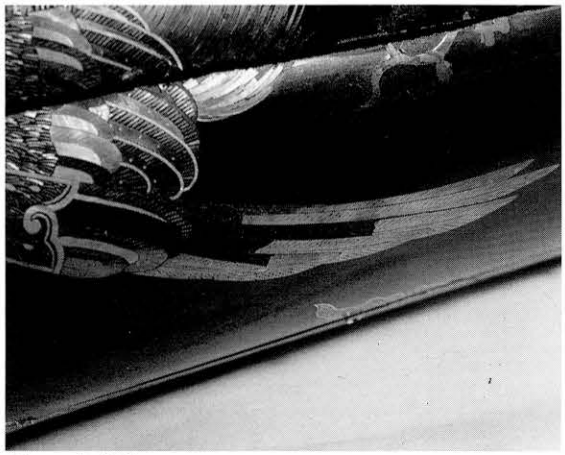

図141　加湿前
Before humidification

の治具を３種類製作した。

治具の製作

１つ目の治具は、口縁部の形状を維持するために製作したものである。径が９cm、幅２cm、厚み２mm、のアクリル製の円筒の一部を切り取り、本来はワイヤーを張るためのネジ金具を組み込んだものである。これを逆回転させる事で内側に入り込もうとする変形した木地を面で押し上げることができる。(図137)

２つ目の治具は、形状が戻った時点で、すみやかに木地を接合するため製作した。直径10cm、幅２cm、厚み２mm、のアクリル製の円筒の一部を切り取り、外側にネジが組み込まれた締め込みのできるステンレスのベルトを組み合わせ、微妙な締め付けと解除が同時に出来るようにしたものである。(図138)

３つ目の治具は、手を入れることが困難な矢筒の口から操作し、歪んだ地点に確実に心張り棒を立て、矢筒内部から歪みを修正する目的で製作したものである。先端が２本の爪となるよう加工した、長さ１mの真鍮のパイプを２本使用し、上のパイプに太めのテグスを通し、支柱となる８mm径の丸棒に巻き付け、固定したのち棒の下端にもう一本のパイプを噛ませるだけの単純な構造である (図139)。これを、筒内に挿入し上下の真鍮棒を前後に移動させ、その加減で内圧を調整出来るように工夫したものである。丸棒を固定した後は、上部に通したテグスをゆるめることで上のパイプがはずれ、下に噛ませたパイプは軽く捻るだけで簡単に外すことが出来る仕組みである。最も奥の一本が固定されたならば、次の心張り棒を順次手前に固定していくことで複数本の心張りが可能になった。この治具が完成したとき、初めて形状回復の可能性を確信することができたと記憶している。(図140、135-1、135-2)

このようにして内部への加湿を断続的に行うとともに、一度に８本前後の心張り棒を立て、徐々に位置と圧力をかえる操作を繰り返すことで、形状はゆっくりではあるが確実に回復してきた。

木地が接合できる状態までに整ったのは、矢筒を単独で加湿し始めてから約３ヶ月、治具を装着して加湿を行ってから25日目であった。当日は、前日までの台風の影響でアトリエの湿度も90%を越えており、加湿箱内部の湿度が４～５日間高湿度状態であったと考えられる。木地の復元力に感激し、興奮状態で接着の体制を整え、最初の一本目の亀裂を夢中で締め込んだ感触は忘れることのできない体験であった。(図141、142)

木地亀裂の接合

一旦、内部の心張り棒を全て取り除き、形状が元に戻り狭くなった亀裂に竹篦をかませ、僅かな隙間を確保しながら、強めに調整した麦漆を溶剤で希釈し、小筆を用いて徐々に含浸させた。余剰な麦漆は全てふきあげて残留することの無いよう注意した。含浸した直後の麦漆は、溶剤のため流動性が高く、接着力も弱いが、湿度を与えることで乾きが促進されるに従い、溶剤が揮発し粘着力が増し、強力な接合を可能にする。

麦漆の乾きを待つ間に、内側に６本から８本の心張り棒を立て、塗膜の位置を最適な地点にあわせた。次に外側から平紐を巻いた後、円筒形のアクリルを取り付け、さらに上からスチールベルトを取り付けて徐々に締め付けた。余分な麦漆を亀裂部から押しだした後、適量の麦漆の状態として再度締め直した。内部からの心張りだけでは収まらない塗膜のずれは、ラップフ

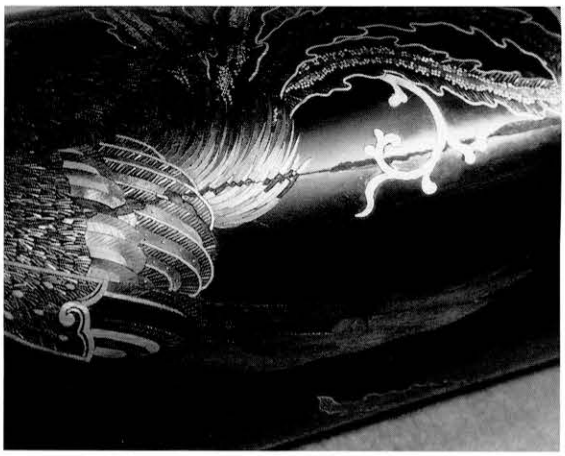

図142　加湿後
After humidification

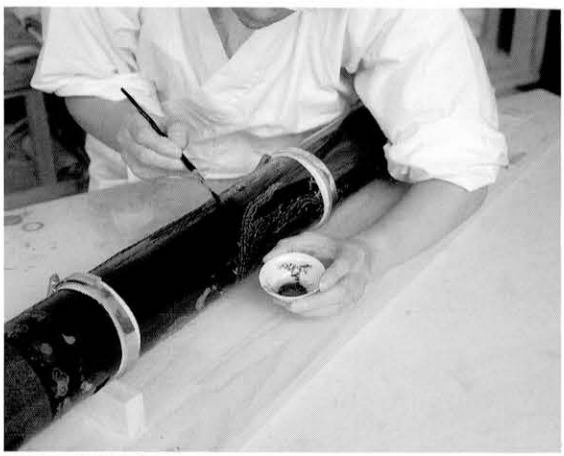

図143　麦漆含浸
Impregnating *mugi urushi*

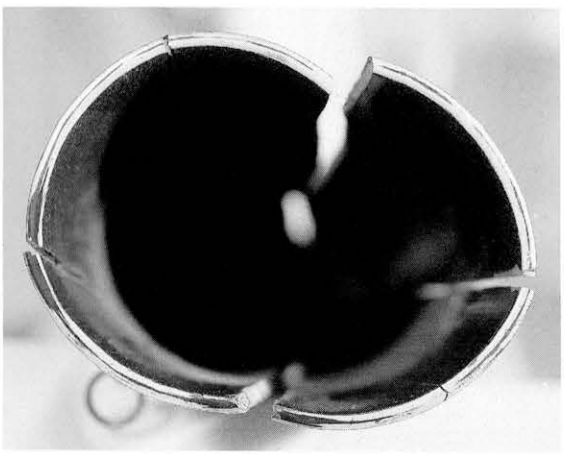

図144　口縁部修理前
Rim before restoration

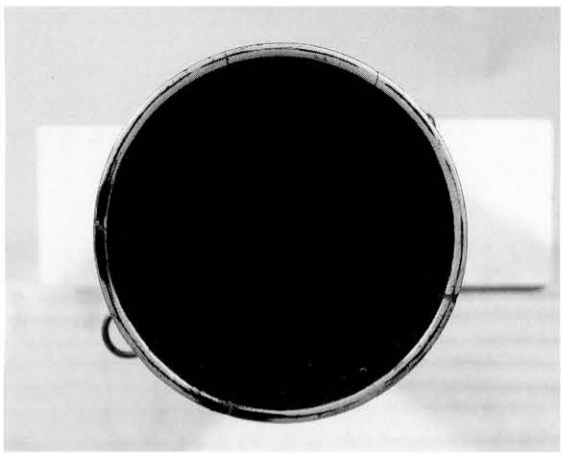

図145　口縁部修理後
Rim after restoration

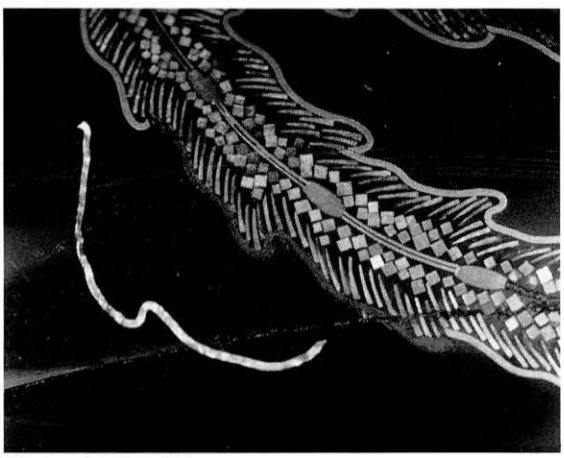

図146　変形した平文
Distorted *hyomon*

図147　フィルムに挟んで修正
Using films for repair

ィルム、ビニール、アクリル樹脂板の順に塗膜に乗せ、太めのテグスで締め込み、面を揃えたのち、やや控えめに加湿した杉箱に納めた。二日後、一旦全ての締め具を外し、接合状態を確認した。この際、部分的に形状の繋がりの悪い部分が見られたので、内圧を変える作業を再度行い、余分な麦漆を溶剤でふき取り、締め具を取り付け、湿し箱に保管した。(図143)

この作業を６本の亀裂のうち、４本までは亀裂の激しい順に１本ずつ、各１週間の乾燥期間をおいて約１ヶ月をかけて接合した。残りの２本については、それぞれが最も破損の激しい亀裂の反対側に位置することから、修復を通じて受ける湿度、圧力などの外からの急激な変化で木地が反動を引き起こすことが推測され、この動きを残りの二本の亀裂部分で解消するよう期待し、約１ヶ月の期間をおいて接合した。

最終的に６本の全てを接合し終えたのは11月下旬であった。その時期は空気が乾燥し始めており、木地の動きが危ぶまれたが、杉箱内の湿度を65%まで徐々に低下させ、形状が安定するのを見守ることとした。(図144、145)

平文

次に、剝離変形した平文の修正と接合について説明する。

正面にある80cmの亀裂は、鳳凰の翼部から尾羽にわたって周辺の平文や螺鈿をことごとく傷めている。とくに平文は欠損が多く、本体に残された平文も引き延ばされ、形状が判明できないほど絡み合い、指で触れるとバネのような弾けた音を響かせ、なました金の柔らかさがすでに失われている状態である。まず始めに、20倍のルーペを用いて絡んだ平文の状態を確認しながら二本の竹篦を用いて折れないよう徐々に広げた。平文は細い物では0.8㎜前後に加工されているため、場所によっては完全にねじ切れている部分もあり、細心の注意を必要とした。又、表面には僅かながら金に含まれる銀や銅の酸化による変色が見られるため、この扱いにも配慮した。絡みが解けた時点で、0.1㎜のポリプロピレンの透明フィルムを塗膜と平文の間に挟み、さらに上から0.05㎜の同じフィルムをかぶせ、直接竹篦が触れないようにして、その上から竹篦で圧力を加え形状を修正した。これは、平文が剝離したことで塗膜部分に生じた凹部が平文の修正時に接触による変形を起こさないようにするとともに、平文表面の保護に配慮した選択である。(図146～148)

また取り外せる平文については、矢筒とほぼ同径のアクリルの円筒に、非粘着性のテープで固定した後、同様の手法で形状修正を施した。次に、矢筒の径より僅かに小さな内径を持つアクリル製の円筒の内側に、背面が表となるように置き、裏側から再度竹篦で圧延しながら適正なアールを与えた。

剝離した平文のほとんどは強い力で引き延ばされたように変形しているため、修正後、そのままの形で元の位置に納まる可能性はほとんどなかった。このため、僅かではあるが、塗膜に残された平文の溝を彫刻刀で広げ、また平文側で余分となる部分を切除するなどの処理が必要であった。これら一連の作業に要した時間は小さなものでも半日、大きなものでは一日がかりであった。(図149)

修正を終えた平文を雁皮紙で仮止めし、平文用に調整した麦漆を溶剤で希釈し、含浸させた。余分な麦漆を完全にふき取った後、アルミ製のネットを被せ、その上から水を含ませた高密度吸収スポンジを掛けて加湿を行い、漆の乾きの頃合いをはかり、平文の上にラップフィルム、ビニールシート、樹脂板の順に重ね、心張りの枠に受台ごと入れ心張りを施した（図150、

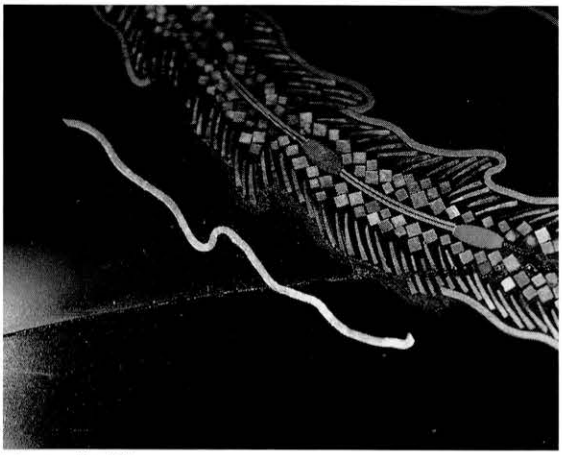

図148　修正後
After repair

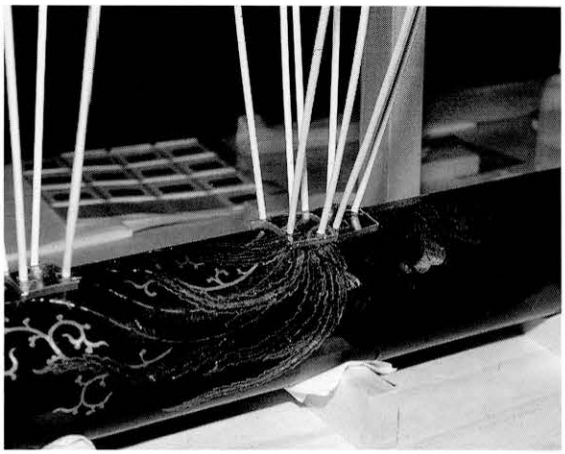

図151　心張り台による圧着
Applying pressure on *shimbari* frame

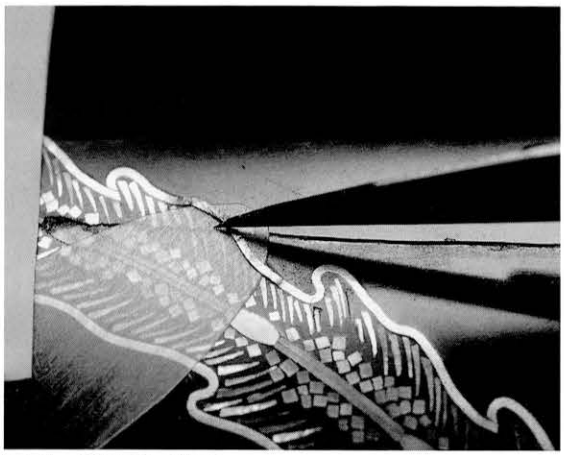

図149　刃物による修正
Repair done with an edged tool

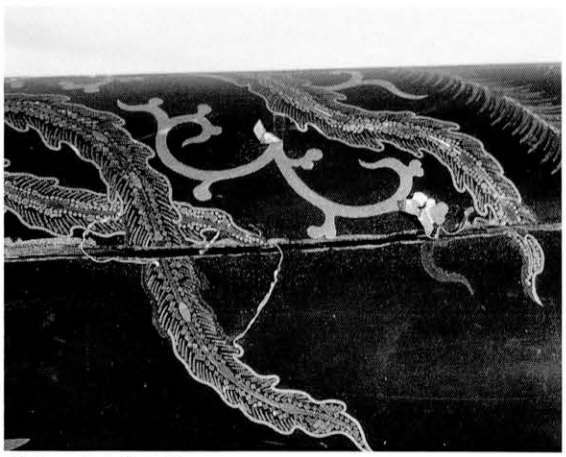

図152　平文修理前
Hyomon before restoration

図150　麦漆の含浸
Mugi urushi being impregnated

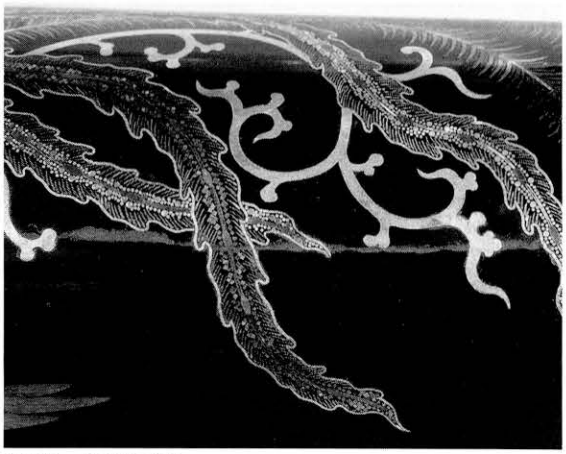

図153　平文修理後
Hyomon after restoration

151)。この際バルサー製の受けを心張りの近くに移動するとともに、矢筒内部に心張り棒を立てることで形状への影響を軽減するよう心がけた。心張りは翌日一旦取り外し、余分な麦漆を掃除した後、再度押さえ直し３～４日保管した。形状が円筒形であるため一度に押さえられる個数は自ずと限られるため、それ相応の日数を要したが、以上のような手法で剝離剝落した平文36枚のすべてを当初の位置に納めることができた。なお最終的には軽微な剝離をあわせると90カ所以上に麦漆を含浸し押さえたことになる。(図152、153)

螺鈿

この矢筒の螺鈿技法は概要のところで指摘した通り、大小さまざまな貝を膠または糊などの水溶性の接着剤を使用し、鏝で加熱しながら圧着したものと考えられる。この工法は、瞬時に接着出来るため作業性がよく、また大きな貝も割らずに貼ることが出来る。しかし、仕上がりが良好であるという美点がある一方、加熱することで貝を変形させるため貝自体に負担がかかること、また膠の水分を急激に蒸発させるため膠層に斑が生じやすい欠点がある。剝落部を観察すると大きな面積で加工された貝の剝落が目立つ、これは木地の収縮が発端となっているとしても、貝自体の形状復元力が予想外に強いものであることの証明でもある。また発色を上げ、作業性の向上を目的としたと考えられる貝裏面の墨色も、仕上がりに対しては有効であったとしても、膠と貝の間に粒子として存在する以上、貝と塗膜が直接膠で接着されたものと比べ強度が劣るのは当然である。また、接着の状態の確認には不都合である。これらの問題については銀箔で伏彩色された長崎螺鈿漆器と損傷の具合など、大変多くの共通点を見つけることができる。

最初に、剝落し保存してあった104枚の貝辺を貝の種類、色調、形状、毛彫の有無などを基準に12に分類した。この中から亀裂の形状の合う貝片を選び出し、小さく切った雁皮紙で貼り合わせ幾つかの候補を該当しそうな欠落部にあてがい、確認する作業を繰り返し行った。その結果、幸いなことに正面「鳳」の頭部と足、翼の一部などを組み立てることができた(図154)。剝落後、長期間保存された貝は元の形状に戻ろうとするため、このままでは矢筒の曲面に沿わないのでアールの調整を必要とする。そこでこれらの貝よりひとまわり大きめの雁皮紙に貝の表面側を糊で貼り合わせ、これを矢筒の外形のアールに合わせたアクリルの円筒に置き、さらに一回り大きな円筒を重ねベルトで締め込み固定した。次に、水分を含ませた高密度吸収スポンジでこれを包み湿度を与えながら１週間保管した。(図155)

矢筒の曲面に貝のアールが近づいたのを確認した後、今度は雁皮紙に水を含ませ貝片を再度分解した。貝片が重ならないように耐水ペーパーで貝破損部の形状を最小限整え、さらに塗膜際を彫刻刀で削り、１枚１枚組み上げるように雁皮紙の小片で本体に仮止めした。(図156、157)

次に、貝と塗膜の隙間に0.03㎜のフィルムを挟み、隙間を僅かに広げ、溶剤で希釈した麦漆を左手で貝表面に振動を与えながら小筆で含浸させた。余分な麦漆を完全にふき取った後、アルミ製のネットを被せ、その上から水を含ませた薄手のスポンジを掛けて加湿を行い、漆の乾きの頃合いをはかり、ラップフィルム、３ミリ厚のビニール、樹脂板の順で重ね、木地の修正の際に使用したベルトで軽く締め、接着した。途中、一度掃除のために締め直しを行い、１週間保管した。この作業を繰り返すことで剝落したほとんどの貝を元の位置に戻すことができた。

また、内部が浮き上がった状態の貝片は無数に点在しており、小さなものを含めると100カ

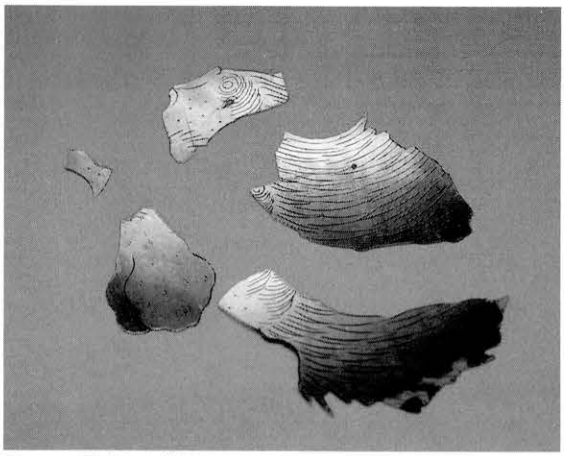

図154　剝落した薄貝（正面頭部）
Shell pieces that fell off (front head portion)

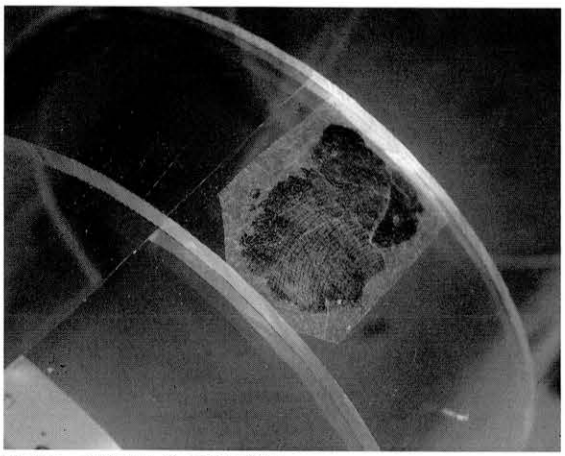

図155　和紙貼り後の形状修正
Re-shaping after attaching *gampi* paper

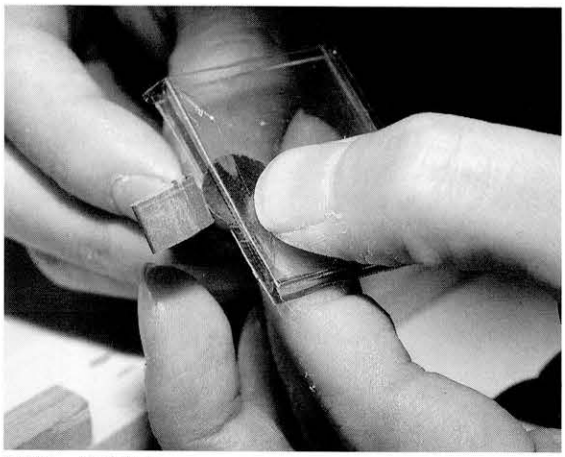

図156　貝の修正
Treating a shell piece

図157　塗膜の修正
Treating the coating film

図158　正面頭部修理前
Head before restoration, front side

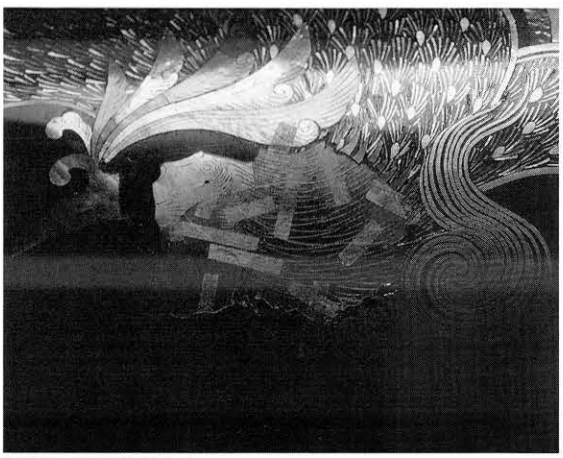

図159　同薄貝仮止め
Temporary setting of *aogai* on the head, front side

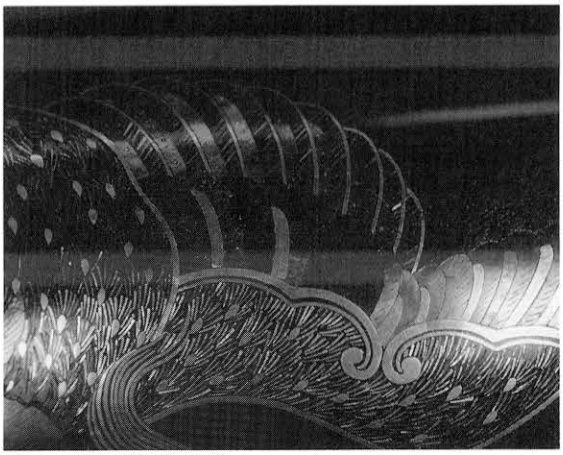

図160　正面翼部修理前
Wing before restoration, front side

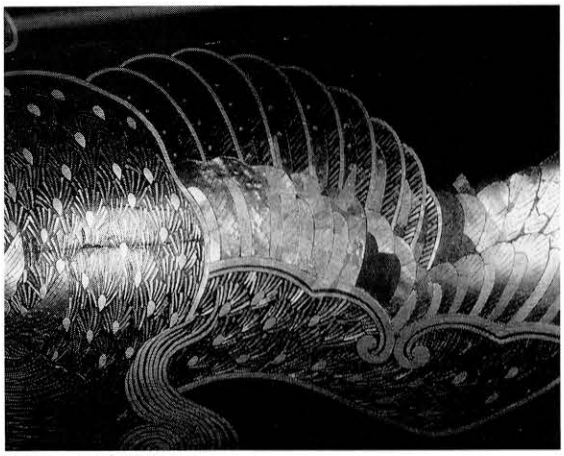

図161　同薄貝仮止め
Temporary setting of *aogai* on the wing, front side

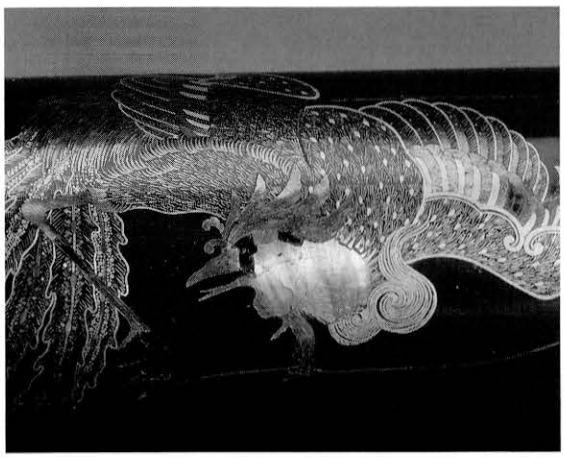

図162　正面鳳凰修理後
Phoenix on the front side after restoration

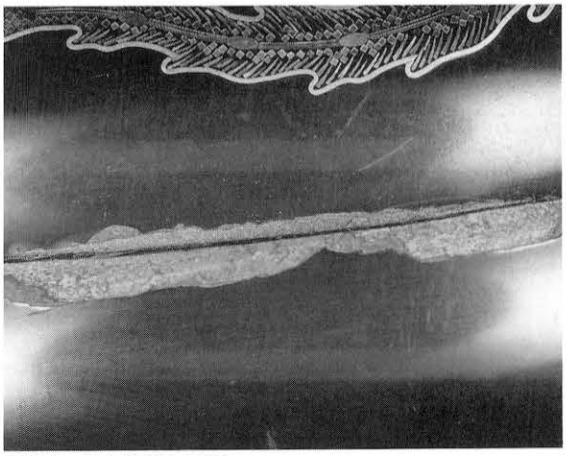

図163　中央塗膜欠損部
Loss of the coating film on the central part

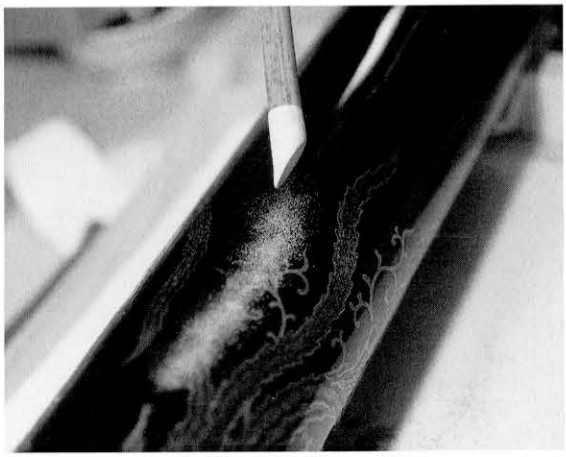

図164　地の粉、蒔き
Sprinkling *jinoko*

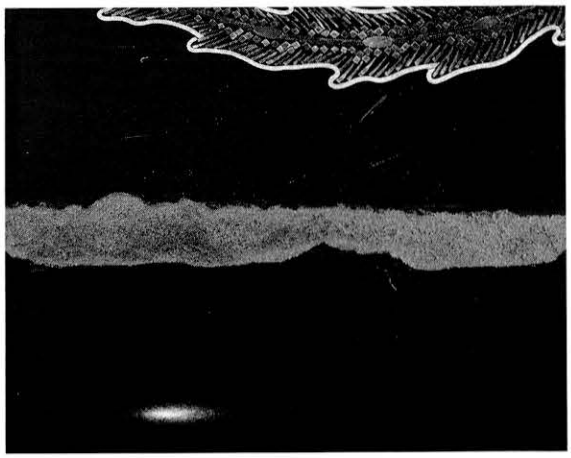

図165　修理後
After restoration

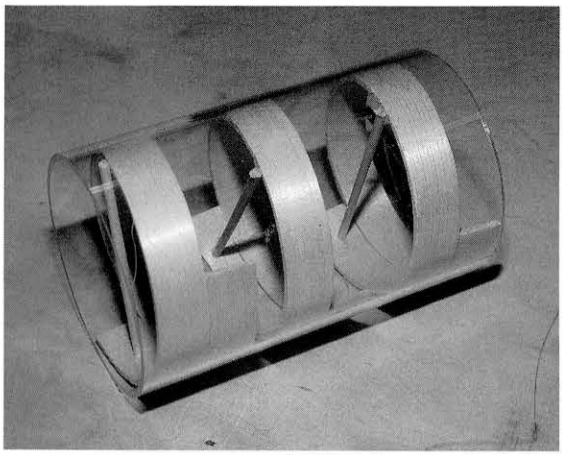

図166　アクリル製円筒と桧材
Acrylic cylinder and cypress rings

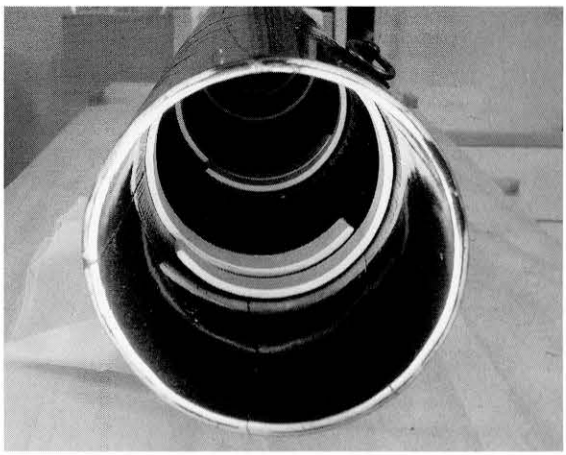

図169　内部に収まった状態
Condition of the 4 supporting tools inside

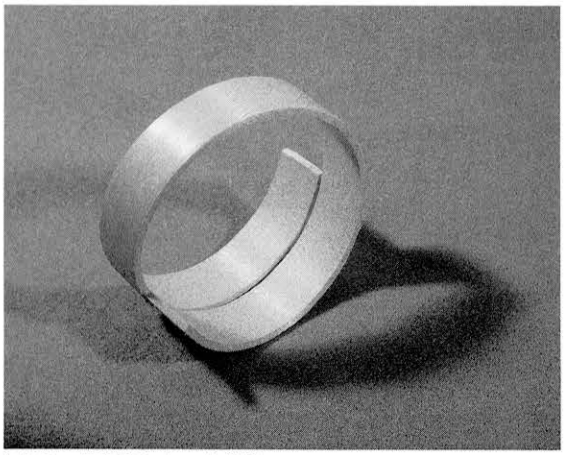

図167　螺旋状になった曲輪
Spiral cypress ring

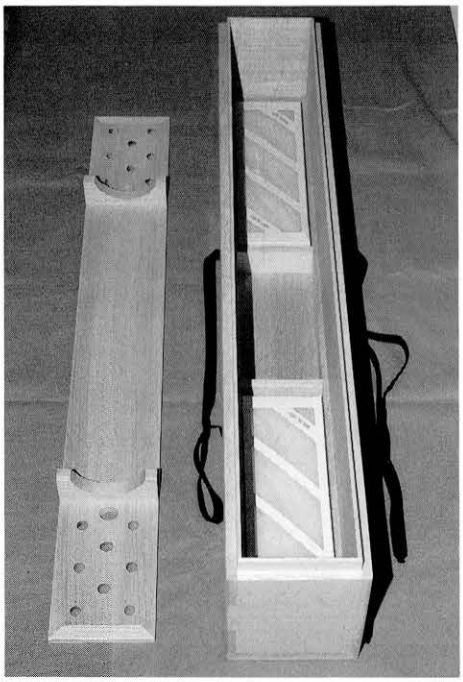

図170　桐箱内部構造と調湿材
Inside structure of the paulownia box and moisture controlling agents

図168　取付作業
Inserting the spiral ring

図171　収納状態
Quiver in the box

所以上の部分で同様の麦漆による含浸圧着を行った。(図158～162)

塗膜及び接合部の仕上げ処理

木地亀裂部はその後数回にわたり内側に入り込み、再修理のたびにその都度、麦漆の含浸を繰り返した。安定するまでの間、木地が露出したままの扱いであったが、接合から１年の段階でほぼ安定したと判断し、最終の仕上げ処理を行った。

最大の亀裂のほぼ中央部に木地が露出するほどの欠損部があり、周囲の塗膜が健全であるため傷みがより強く感じられた。(図163)

国内での漆工品の現状維持修理の原則として、塗膜の塗り直しは回避する方針でこれまで対処してきた。その理由の一つとして漆特有の艶がある。新規に塗った塗膜は、オリジナルの塗膜以上の艶を有することになり器物から浮き上がった印象を与えがちである。

塗膜の欠損に対する扱いは、その作品の状態や用途によって仕上げの処理方法が選択される。今回の場合は、塗膜の艶が比較的残っており、木地の露出部と塗膜との段差が大きく、一部に欠損が集中していたこともあり、刻苧充塡の後、僅かに艶のある黒色の極細かい下地で表面を整えた。木地部分からの工程はつぎの通りである。

（１）硬めに調合した麦漆を作り、これに麻の繊維、粗めに曳いた木粉（60＃）を適量混合して作った刻苧を竹篦で欠損部に薄く充塡した。

（２）刻苧の乾燥後、同じ調合の麦漆にやや細かい木粉（80＃）を混合して作った刻苧をほぼ塗膜面に達する高さに充塡した。

（３）約２週間の乾燥の後、刻苧表面を彫刻刀で削り、さらに砥石で空研ぎを施し平面を作った。

（４）生漆に呂色漆を混ぜ、これを地塗りし山科産の地の粉を粉筒で蒔き、蒔地の下地層を作った。(図164)

（５）蒔地の乾燥後、溶剤で稀釈した呂瀬漆で固めを施し、蒔地面を固着させた。

（６）水練りした砥石粉に呂瀬漆を混合した呂色錆を小さな桧篦で目摺るよう蒔地面に付けた。

この際、同時に剝落処理を施した貝及び平文の際にも極薄く呂色錆を付け、展示作業時などの際に、引っ掛かりの生じないよう配慮した。(図165)

また、矢筒内部に対しては、生漆を溶剤で希釈した上、刷毛塗りを施し、綿布で拭きあげる摺漆の仕上げを２回おこなった。

形状の維持について

ほぼ一年がかりの木地の修正後、平文と螺鈿の修復に12ヶ月を費やしてきた。その間何度か木地の戻りによる割れがあり、漆工品とは湿度の変動に伴い常に僅かな動きを繰り返していることを痛感した。

これらのトラブルにはその都度、加湿と接着を繰り返すことで、徐々に安定させることができたが、この時期もう一つ克服せねばならない課題があった。それは、修復完了後、所蔵先であるメトロポリタン美術館と日本国内との環境の違いによる木地の動きが予想されるのであるが、これを最低限にとどめる対応策の具体化である。

当初、樹脂製の円筒を内部に設置するなど、木地の動きを固定する方策を創案していたので

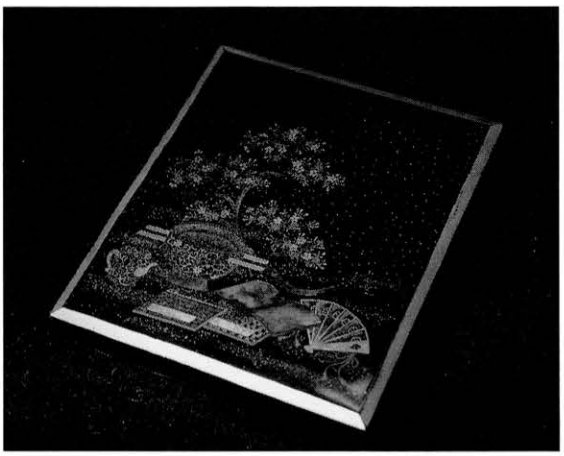

図172　硯箱全景
Entire view of the Japanese ink box

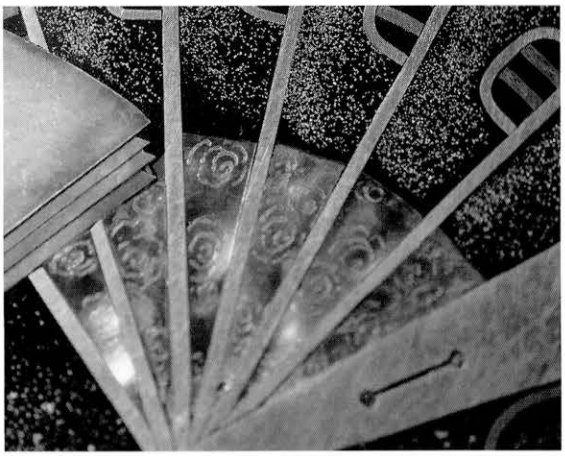

図175　檜扇付け根部の孔雀貝
Mexican abalone pieces on the wooden fan

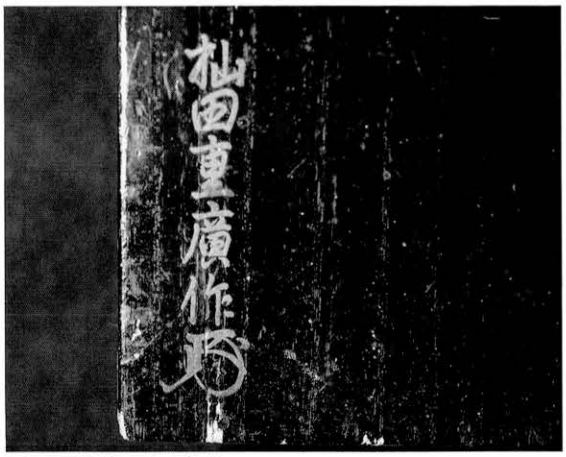

図173　外箱の銘と花押
Signature and *kao* on the outer box

図176　背景の蒔絵粉
Makie-fun on the background of the ink box

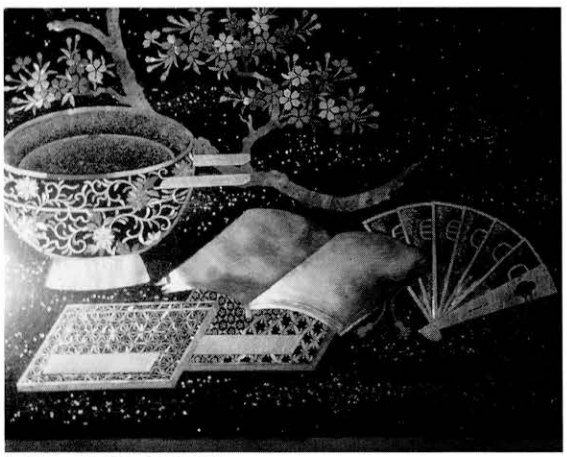

図174　蓋表の平文螺鈿
Hyomon and *raden* on the lid

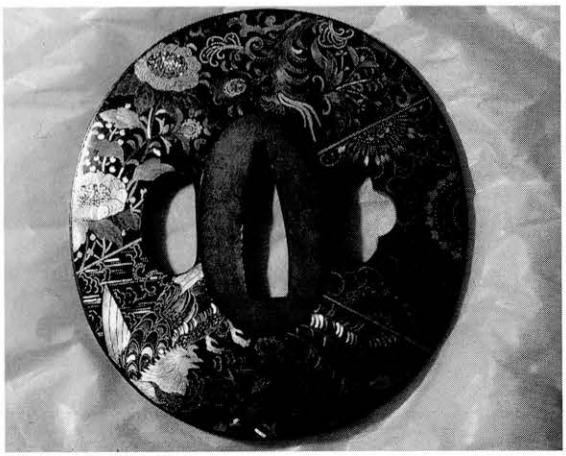

図177　鍔（大）外面
Front of the large sword guard

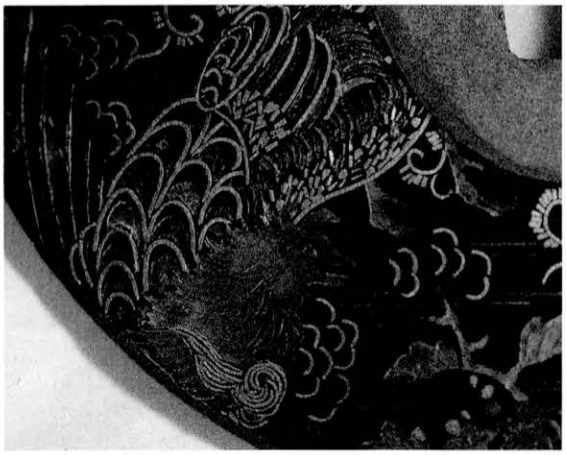

図178　鍔下部鳳凰文
Phoenix on the back side

図179　同下部鳳凰文
Phoenix on the back side

180-1

180-2

図180　外箱蓋裏銘及び花押（光久）
Signature and *kao* on the underside of the lid of the outer box (Mitsuhisa)

図181　硯箱外箱花押（重廣）
Kao on the outer box of the ink box (Shigehiro)

図182　矢筒花押（重廣）
Kao on the quiver (Shigehiro)

183-1

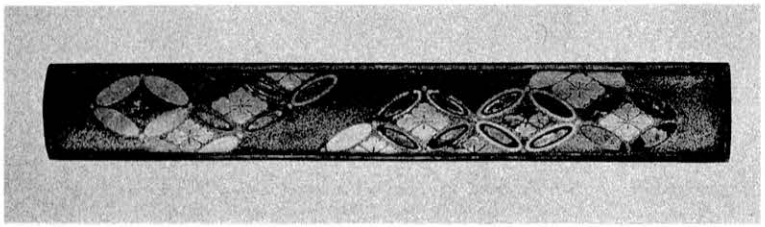

図183　小柄及び小柄の花押（重廣）
Kao on the sheath (Shigehiro)

183-2

あるが、前述のように再三にわたる接着を繰り返しているうちに、内部が木地仕上げである以上、木地は常に動き続けているのが自然であると考えを改め、動きを完全に止めるのでなく、矢筒内部に木地の動きに対応できる柔構造を持った支持具の設置をおこなう方向へ転換したのである。

しかし、私の修復経験の中で支持具の設置の機会はこれまで皆無であり、残された時間の中での開発は、厳しい状態であった。

この支持具に求められる条件は、(1) 軽量であること、(2) 構造が単純であること、(3) 取り外しが容易であること、(4) 面で支えられること、(5) 矢筒との関係が自然であること、(6) 湿度の変動による木地の動きに対して無理なく対応できることの6点であった。いくつかのアイデアの中から最終的に選択したのは、桧材による曲物の応用であった。木曽平沢の曲物師に依頼し、厚2㎜、幅2㎝のものと、3㎝の2種類を外径10㎝で各4個製作していただいた。実際に手に取って反発力や形状の馴染み具合などを確認したところ、2㎝幅の曲輪が適当であると判断した。この桧材をぬるま湯に1時間ほどつけ、材を柔らかくした後、内径93㎜のアクリル製の円筒内に、2回転のスパイラル状になるように押し込み、3日後に内径84㎜の筒に移し替えることで徐々に矢筒の内径にあわせ、湿度50%前後の環境で約1ヶ月間固定した。(図166)

アクリルの筒から引き抜いた桧材は、スパイラル状の板バネのような状態で縦横方行に反発力を有する木製の支持具に姿を変えることができた。(図167)

矢筒は口縁より底に向かって径が細くなっているので、これを矢筒の内径に合わせる必要があるが、材が木であるため指先の力のみで容易に形状の変更が可能であった。製作した支持具を手の届かない内部深くに設置することになるが、これについては内部への心張りの際に製作した真鍮製のパイプを再び活用することにした。パイプ先端の二本の爪に曲輪の奥側の端を噛ませ、回転させながら挿入することでスパイラル状の支持具は僅かな力で目的の位置に移動することが出来た(図168)。また取り外しについても同様の作業で処理することが確認できた。このようにして約20㎝間隔で4個の支持具を内部に設置することができた。完全なものとは言えないが、現状で考え得る支持具の要件をほぼ満たした仕様にすることができた。(図169)

保存箱

最後の仕事として保存箱の設計が残った。素材は日本古美術品の保存の慣例に従って桐材を選択した。米国では、日本国内での環境に対応した仕様を越える基準を要求されることから、最良の材で可能な限り厚みを持たせた印籠蓋造りとし、底部には取り外しの利く受台を設け、さらにその下に65%に設定した調湿材が2個納めることができるよう、二重構造とした。これによってほぼ最適な湿度管理が維持されるものと期待している。(図170)

最後に、四カ所で紐止めができる白木綿の共布を用意し、全ての修復箇所を確認した後、無水エタノールで拭き清め、この布に包み桐箱に収納し、2年度に渡る全ての修復を終えた。(図171)

関連調査

関連調査として柚田家の一族が制作した作品、とりわけ矢筒底面に螺鈿で記された重廣の作品を求めて、関連する施設等を調べた。国内で柚田をまとまった形で見ることができる施設は

数少ない。その中で、柚田家が幕末まで仕えた富山城の城跡にある富山市郷土博物館に連絡を取ったところ、重廣銘のある硯箱が存在することが解り、博物館を訪ね調査を実施した。

調査の概要

双紙洗小町硯箱

法量　23.9 × 20.9 × 4.5cm

総体黒漆塗り、やや幅広の沃懸地の面取りを持った被蓋造りの硯箱、内部は細かい梨子地粉で叢梨子地とし、左に硯と水滴を配し、右に懸子を納める。蓋表に金銀の平文と青貝で草紙、角盥、湯桶、檜扇を手前に並べ、背景に桜の折り枝を配している。意匠の周囲の空間には粗い平目粉を蒔き、霞状の暈かしを丸粉で表している。安定感のある構図と技術の確かさが融合した柚田の傑作の一つと言える。(図172)

硯箱には、桐製黒漆塗りの外箱が付随し、右上に平蒔絵で、「双紙洗小町御硯箱」左下に「柚田重廣作花押」が添えられている。(図173) 外箱が制作当初に共箱として用意されたものか判然としないが、外箱に記された文字と花押は矢筒の底に螺鈿で貼り込まれた銘に比べ、やや崩した書体であることと、花押の形状に僅かな違いがみられる。ただし、この硯箱が矢筒の作者である重廣と同一の人物であるか否かについては、外箱に記された銘と花押の存在よりも、その作風と材料の扱い方に顕著に現れている。先ず、主たる素材である薄貝に柚田の特徴ともいえる強い青味を放つ孔雀鮑を桜花、檜扇、角盥などの要所に用い、さらに毛彫を施している。大きな面積である桜の幹部、草紙には、原貝自体の大きな白蝶貝を使用し、同様に毛彫を施す。それに対して、矢筒では、鳳凰の鶏冠や尾羽の根本の部分などに孔雀鮑が多く用られ、梅鉢文や翼部、頭部などに白蝶貝を用い、ともに毛彫が施されている。また、檜扇や草紙の外題、角盥の取手、湯桶の注口などに精巧に切り抜いた大型の平文を貼り、角盥と湯桶の胴部には、0.3㎜前後の平文の細線を曲げながら形作った花唐草が貼り込まれている。一方、矢筒においては桐文や翼、尾羽に巻き付く霊芝雲などに大型の平文を用い、頚部、尾羽の輪郭などには細線を駆使し、対比を計り効果的である。これらは、全く同一の感覚から製作した仕事ぶりといえる。(図174、175)

さらに、作者を同一視できるのは、背景に施された霞の材料の扱いである。梨子地粉のように見える部分は、大粒の平目粉を蒔いた後、かなり大きな粒の丸粉を蒔き暈かし、丸粉が透漆に沈んだ状態が梨子地粉のように見える仕立の手法である。矢筒では上下に配された梨子地の仕立に明らかに見られるように、二つの作品に共通した柚田独特の技法と言える。これは0.1㎜程もある平文や薄貝の厚みに対応するために採られた巧妙な材料の取り合わせといえる。(図176)

以上のように多くの共通点を持ち合わせる両作品は、かなりの確度で同一の作者によって作られたと認識できると考えたい。

さて当館にはもう一点注目すべき作品がある。五代目柚田光久（宝暦13年1763～天保９年1838以降に没）の箱書きのある大小の鍔である。箱書には柚田光久75歳の作とある。表を花唐草に繋文を組み合わせ、裏側に牡丹に花文様そして鳳凰を螺鈿で表している。この中で鳳凰の表現をよく見ると、そこにはスケールこそ小さく技術の衰えも感じさせるものの、矢筒に表されていた鳳凰の特徴を見つけることができるのである（図177～179)。さらに興味深い点は、光久の銘の下にある朱の花押である（図180-1、2)。重廣の銘と花押を記した作品は現在のところ３点

確認されている。そのうち２点は今回修復した矢筒、調査対象の硯箱、さらに英国の個人コレクターが所蔵する小柄がある。３点の銘と花押を比較すると小柄と矢筒の二つは直接本体に残り、製作者自ら記したものである可能性が高いこともあり字体に共通する点が多く信憑性がある。ただしよく見ると花押は三点とも僅かな違いが見られ重廣の花押の確定は困難である。

そしてこの中に光久の花押を並べ、四つの花押を比較すると矢筒の花押が特殊であり、むしろ硯箱外箱、小柄、光久の花押に類似性が認められるのである。つまり重廣と光久は同一人物ではなかろうかという推測が立ち上がってきたのである。(図181、182)

前述したように重廣の名前は公の記録に一切出てこない、近年の研究で四代目藤左衛門（享保14年1729～文化11年1825）を重廣と推測する説があるが、息子に当たる光久がこれほど類似した花押を持つであろうかという疑問が残る。光久の鍔に表された鳳凰が父藤左衛門の作行きを模したものか、花押の類似性が示すように自らの作を振り返り制作したものであろうか、興味の尽きぬ課題である。いずれにせよこの親子のどちらかは重廣を名乗る資格があり得る。仮に、四代目または五代目の仕事であるとすれば、矢筒の制作年代は18世紀中期から19世紀初頭と言えるのではないだろうか。

今回の調査を通じて柚田重廣の技量の高さに驚きを覚えると共に感銘を受けた。そして課題の多い人物像に強い興味を抱いた。今後、さらに多くの柚田細工を技術分析する事で、江戸期の青貝技術の地域による特性や製作者が浮き彫りとなれば、一つの興味深い分野が生まれるのではなかろうか。

おわりに

二年間の時間をかけた修復を終え無事矢筒をお返しできたことに安堵している。

初めて矢筒を見たとき私は自分の顔色が青ざめていることが解りました。それほどこの矢筒の損傷は絶望的な状態でした。今振り返ると確かに私が思考し、手を動かしながら模索した結果として、展示に可能な姿を取り戻したと言えるのかもしれないが、一方で復活を信じて眠り続けていた鳳凰が私を生かして自らの力で甦ったようにも思えるのである。言い換えれば作品そのものに品格があり、修復者を突き動かしたということではなかろうか。

この矢筒が復活することで、メトロポリタン美術館を訪れた多くの人が、江戸時代日本の一地方に花開いた柚田家の仕事に感銘し、関心を払うことになることを想像するとき、修復することの意義を最も強く感じます。富山市に伝わる藩士由緒書の中に柚田家三代目光恒と四代目藤左衛門親子が日光東照宮の御霊屋の修復に関わったとの記述がありますが、自らの仕事の手を休め修復に赴いた彼らの思いも私たちと同質のものではなかろうか、この世に優れた作品を残した彼らの功績に報いることができたならば、私のように制作と修復を両立する者にとって今回の修復は幸運な出会いだったと言える。

最後に、この矢筒の修復環境を整えていただいた関係各位、分析、撮影にご協力いただいた東京国立文化財研究所の平尾良光氏、早川泰弘氏、野久保昌良氏、また貴重な資料、材料を提供し御助言いただきました沖縄県中城村の宮城清氏、富山市郷土博物館の兼子心氏、作図、記録に多大な時間を割いて協力いただいた皆様にこの場をお借りして、心から御礼を申し上げます。

On the Restoration of "*Hoo-mon Makie Raden* Quiver" in the Collection of The Metropolitan Museum of Art

KATSUMATA Satoshi, Urushiware Conservator

This is a report on the restoration of the "*Hoo-mon Makie Raden* Quiver" which was conducted at a restoration studio in the Tokyo National Museum over a period of two years from 1998 to 1999 as a part of the Project for Conservation of Works of Japanese Art in Foreign Collections. Through the restoration, data concerning technical analysis of the materials for substrate, foundation, urushi coating and urushi decorating were recorded as well as the particulars of the process, which will contribute to future restoration works. Also introduced will be a related research on Somada School's Japanese ink slab box owned by the Toyama City Folk Museum.

Description

Name: "*Hoo-mon Makie Raden* Quiver"
Owner: The Metropolitan Museum of Art
Measurements:

Length	95.5cm
Upper rim diameter	9.8cm
Bottom rim diameter	9.0cm
Thickness	0.4cm

The object is a wooden, black-lacquered quiver with a Chinese phoenix design wrapped around the central part of its body. At both ends of the quiver are 12cm *nashiji* belts with *umebachi-mon* (a crest of a plum blossom) inlaid near the rims. Inside both ends of the *nashiji*-finished area, there are two layers of large and small *kiri-mon* (crests of the leaf and flower of paulownia) which, like the phoenix design, uses shell pieces of *aogai* and decorations of *hyomon*. On the underside of the bottom, the name of the presumed craftsman, Somada Shigehiro, and his *kao* (designed monogram) are inlaid with shell pieces of *aogai*. In the inside, there is a 10cm *nashiji* belt around the rim; farther inward, the wooden substrate is coated with *suri urushi*. On the front and back of the *nashiji* belt near the rim are cord locks and silver metal fittings in the shape of a plum. The lid and string that originally belonged to the object as accessories are now lost (Fig. 115).

The *aogai* shell piece *raden* in the plum blossom of the *umebachi-mon* in the upper *nashiji*-finished area is called *choji umebachi-mon* because a part of the design resembles the shape of a clove (*choji*). This is a distinct difference from the *tsurugi umebachi-mon* (a crest of a plum blossom with a sword-like center) of the Maeda family of the Kaga clan (today's Ishikawa Prefecture), which in turn suggests that

the quiver belonged to the Maeda family of the Toyama clan (today's Toyama Prefecture). Furthermore, the name of Somada Shigehiro and his *kao* on the bottom of the quiver indicate that it was created by the Somada School of the Toyama clan in the province of Ecchu. The school was engaged in the *aogai* shell work occupation ever since the Second Lord Maeda Masatoshi invited Somada Kiyosuke, an *aogai* shell work craftsman from Kyoto, to work for the clan in his trade (Fig. 116).

"*Hanshi Yuisho-gaki*" (a document recording the names of clansmen) compiled by the Toyama clan in 1838 lists the first through sixth generations of the Somada School. Although the name of Shigehiro cannot be found there, it can be assumed that there existed a craftsman using the pen name Shigehiro since it was customary for the master craftsman of a school to make all the monogrammed tools used by lords. When the various species of the shells used and the elaborate expression of the phoenixes are taken into consideration, it can be inferred that the object was created around the late 18th century to the early 19th century.

According to a record in "*Uritate-cho*" (an auction catalogue) possessed by the Tokyo National Research Institute of Cultural Properties, the quiver was sold out by a certain family in 1925, and The Metropolitan Museum is believed to have obtained it after the late Taisho Period or the early Showa Period. Photographs in "*Uritate-cho*" show that although some shell pieces in the wings of the phoenixes appear to have fallen, the shape of the object had remained intact and that the strings still existed at that time (Fig. 114).

Materials and Structure

The substrate shows that the grain is clear and straight and, although it has turned slightly brown due to *suri urushi*, the yellow brown color has a lustrous shine. The distinctive features of coniferous wood indicate that it is *hinoki* (Japanese cypress) wood. An X-ray photograph of the structure of the substrate shows that two boards were joined at a point 45 degrees opposite from the cord lock. Therefore it can be inferred that the boards were scooped out into a semi-cylinder respectively and then joined together with animal glue or rice glue. The bottom board was attached after the outsides of the boards were trimmed. The slight dints found in the bottom are suspected to have been made from the tips of the arrows (Fig. 117).

The foundation, as observed from the cracks, has a hemp cloth applied on the outer side of the substrate, uses a reddish *jinoko* and *tonoko*, and is solid because ample amounts of urushi were used. A very dense hemp cloth (21 to 22 stings of hemp woven for every centimeter) was used. All layers of the foundation are fairly equal in quality and *jinoko* similar to that from Yamashina in Kyoto, which is still being used today, seem to have been used. X-ray fluorescence analysis shows that iron is included and data has confirmed that the reddish color is due to iron. The

cracks that appear near the front *choji umebachi-mon* show the substrate layers well. The measurements taken by a depth meter are shown in Figures 115 and 134.

Coating

Observation of the surface of the coating film on the portions where *hyomon* and shell pieces have fallen shows that only those portions are black and that their surroundings are slightly brown. This suggests that after the polishing of the substrate was completed, black urushi was coated several times and polished again. After completing this process, decoration was made and *suki urushi* was applied 3 to 4 times. When the urushi reached the thickness of the *hyomon* and *raden*, the surface was polished in a process called *roiro shiage*.

Decorations

A pair of large phoenixes is designed on the central black part of the front and back surfaces. In ancient China, like the *kylin* (an imaginary dragon horse), turtles and dragons, a phoenix was worshiped as an imaginary sacred bird. It was said that the bird appeared when a saint came at times of peace, took shelter on a paulownia tree, ate the fruit of bamboo, drank spiritual spring water and took flight with the clouds. Considered worthy of imperial possessions in Japan, it is often seen in the treasures of the Shosoin and was a preferred design up until the Edo Period. It is also common for the phoenix to be expressed in a pair, as male and female, since the name means both. On the quiver, the phoenix flying upward with its bill open and whirling towards the back forcefully is the male, and this face is considered to be the front of the quiver. On the contrary, the female phoenix has its bill closed and is gracefully taking flight on the backside (Fig. 14).

The whole silhouette is enhanced by a 0.1mm gold *hyomon*, and stunningly deep blue-green shining *aogai* shell pieces are used for the comb of the male phoenix and the tail feathers of both birds. To delicately express the fullness of the feathers, minute shell pieces are glued carefully (Figs. 118 & 119). There are also fine line engravings (*kebori*) on the head, wings, legs and *kiri-mon* for more richness.

Both ends of the black urushi-coated part are *nashiji*-finished with *hirame-fun* and *maru-fun* sprinkled in gradation (*kata-bokashi*) on the surface. Near the rim on the front and back of the quiver are 2 *choji umebachi-mon*, each made of dimly shining shell pieces. Next to both *nashiji* belts are two rows of different sized *kiri-mon*, 10 in the outer row and 13 in the inner row. Furthermore, there is a 10cm gold *nashiji* belt around the inside rim. The superb colors and delicate work on the quiver cannot but give those who see it a strong impression, making it one of the best works out of the many by the Somada School.

For the decorations, mostly *yakogai* (turban shell) and *shirochogai* (mother-of-pearl) shell pieces of about 0.1mm and, in some parts, shinier shell pieces like those

of *aogai* are used with the gold *hyomon* of the same thickness. It is considered that after the pieces were cut with knives, chisels and other tools, they were delicately combined one by one and glued on the surface of the object with animal glue or rice glue, while at the same time heating them with an iron. The backsides of the shell pieces were thinly coated with Chinese ink that appears as small black particles, thus increasing the shells' shine. Such ingenuity cannot be seen in other *raden* urushiware (Fig. 120).

Analysis

Prior to restoration, a chemical composition analysis of metal by X-ray fluorescence was done to several parts of the object that had fallen. The following are the six items which were analyzed: (1) gold *hyomon* for the leaf of a *kiri-mon*, (2) gold *hyomon* for tail feathers and clouds, (3) gold *hirame-fun* for the front *nashiji* part, (4) *nashiji-fun* inside the rim, (5) black particles on the backside of shells, and (6) coating on the foundation of (3). Analysis results are as follows (unit %):

(1) Gold *hyomon* for the leaf of a *kiri-mon*	gold 96	silver 3	bronze 1
(2) Gold *hyomon* for tail feathers	gold 76	silver 22	bronze 1.5
(3) Gold *hirame-fun* for the front *nashiji* belt	gold 76	silver 17	bronze 7
(4) *Nashiji-fun* inside the rim	gold 96	silver 2	bronze 2
(5) Black particles on the backside of shell pieces	no metal reaction		
(6) Coating on the foundation of (3)	large amount of iron		

As shown above, two types of gold seem to have been used for *hyomon*: 23-karat gold and 18-karat gold. For large *hyomon* parts like the wings 18-karat gold was used, while for small *hyomon* parts like the *kiri-mon* 23-karat gold was used. For *hirame-fun* 18-karat gold was used and for *nashiji-fun* 23-karat gold was used. Since there was no metal reaction from the black particles on the backside of shells, possibility of pine or oil soot having been used is high (Figs. 121 & 122).

Aogai

As previously mentioned, this quiver was made by Somada Shigehiro. Among *aogai* craftwork, the finest urushiware is called "Somada crafts" and is highly appraised domestically and internationally. The ingenious craftwork of the gold and silver *hyomon* and the deep blue-green shining color of the *aogai* combined is one of its features. However, for a long time, the identification of its primary material, *aogai*, had not been made. Using this opportunity, a search was made for the Somada *aogai* by attempting to make thin shell pieces from different types of shells. It has been presumed among urushi craftsmen that the shell Somada used was mainly *yakogai* and *tamamushigai*, a very rare type of domestic abalone shell which is processed to produce the particularly thin shell pieces that are traded at a high price. The colors and brilliancy of the *tamamushigai* and *aogai* that are used in

the quiver are similar. However, these processed shell pieces rarely exceed 6mm and in most cases are used in combination. Therefore, since the shell pieces for the comb of the male phoenix and tail feathers of both birds are over 3cm, it is unlikely that this is the original shell (Fig. 123).

Recently, the writer has been involved in restoring Ryukyu urushiware, in particular *raden* urushiware. Upon observation it was found that there is a group of shells, which has similar colors, brilliancy and quality to the Somada *aogai*. It has a bright shine and a mild change in colors, and there is hardly any difference in color and brilliancy when observed from different angles.

The *yakogai* shell pieces today are manufactured in the following way. First the shell is divided into several blocks and then processed into medium thick layers before being polished to a thickness of about 0.1mm. These shell pieces are called *surigai* (polished shell) and can be more than 20cm in length, making it possible to make large designs using one piece. But since this process ignores the growth and development of the pearl layer in making the pieces thinner, there are defects like color differences in some parts and complete loss of shine depending on angles. This is often seen in the black-lacquered Ryukyu *raden* made during the 17th and 18th centuries. So, a possibility of another method of manufacturing shell pieces may be considered.

According to Miyagi Kiyoshi, a local Okinawa urushi artist, thin shell pieces called *hegigai* are made by boiling shells for several days in sea water, scraping the outer shell and hammering it so as to peel off the pearl layers which have developed in its growing process. Under his guidance, this manufacturing process was tried with *yakogai*, and the results showed that bright, shining, blue-colored shell pieces like that mentioned above could be made. Thus we were able to learn something about the characteristics of Ryukyu *raden*. From this experience, we were confident that the shells used in Somada were *hegigai* made from *yakogai*.

Yet, observing the *aogai* during restoration, we found brilliancy and blue-green color of higher quality here and there. Although we were quite certain that *hegigai* or shell pieces of different type were used, we were unable to specify at first. But there was one possibility, and that was *kujyaku-awabi*, commonly known as Mexican abalone. Its brown spots and bright shine characterize this shell, which is marketed as thin shells. And by removing the spotted parts, very small blue-green pieces can be obtained. As its name suggests, this shell grows only along the Mexican west coastline up to the coastline of California. So the only way for the shell to enter Japan is by import. A comparison of *hegigai* made from Mexican abalone and *surigai* mentioned above shows that they are very similar. However, the loss of shine characteristic to *surigai* when observed at an angle still remained to be solved, as well as the problem of size. So we questioned whether or not it would have been possible to apply the *hegigai* process used with *yakogai* to abalone in order to

produce shell pieces similar to the special *aogai* used on the quiver. We were able to obtain Mexican abalone shells from an importing firm and engaged on a trial production. The difference between *yakogai* being a spiral shell and abalone being a type of an ear shell caused some difficulty, but after several trials, we were able to make a large piece of shell the size of the phoenix's comb (Figs. 124, 125 & 126). Also the characteristic features of the shell pieces were similar to those seen on the object.

During the process of peeling the pearl layer, another factor that determines the color of this *aogai* was found to be the existence of a brown layer between the pearl layers. It is a proteinaceous layer that holds the pearl layers together, and it can only to be scraped off since it is attached strongly. Before this layer is scraped off, the shell exhibits a strong blue color, making it possible to verify the color. Since the choice of color is most important in cutting out the shapes for *usugai raden*, we felt that this proteinaceous layer must have an important role to play and the black particles on the back side of the shells used for this object must not have been unrelated. Therefore, we concluded that craftsmen of the Somada School must have known the structure of the Mexican abalone and covered the back side of shell pieces with Chinese ink to bring out the characteristics of the shell (Fig. 128).

From these experiences, it became clear that the *aogai* used on the Somada craftwork was *hegigai* of Mexican abalone, not to be found domestically, and that its scarcity and vivid color produced by applying Chinese ink on the back side of shell pieces, a technique secretly handed down in the Somada School, touched the hearts of the people at that time.

In times of national policy of isolation, how such a unique shell could have been carried into a city like Toyama which is far from Kyoto, the center of culture, is unknown. However, recent studies on export urushiware tells us that Japan traded much with Holland from the 17th to the 18th centuries, time during which the Somada School flourished, and that during the early 19th century American ships hired by Holland transported urushiware which Holland had ordered to Sasaya in Kyoto, a merchant dealing with urushiware, from Nagasaki. Even from this, we can see the great interest Europeans and Americans had in Japanese urushiware. This also suggests that there was a distribution route for these special shells. In addition, since Somada Kiyosuke who started Somada craftwork was an *aogai* craftsman working in Kyoto during the 17th century, we can naturally assume that it was possible for his descendants to obtain the shells from Kyoto as well.

Condition of the Object before Restoration

When the object was unpacked, its rim was wadded with styrol fillings to maintain and protect its shape as a quiver. When the wadding was removed to make an observation, it was revealed that there were six long cracks extending length-

wise and that the rim had become distorted inward. The original diameter of the quiver, which is 9.5cm, had become 11.5cm at the longer end and 7.8cm at the shorter end (Fig. 129). The largest crack was on the left back side, measuring as long as 92.5cm and, since the full length of the quiver is 95.5cm, it had almost reached the bottom. The gap made by this crack was 4mm at the rim and reached a maximum of 1cm at about 30cm from the rim. When this crack first occurred, there must have been great stress upon the coating since we found that the coating and *nashiji* had become fractured (Fig. 134-A). The second crack, 80cm in length, was found on the left front side, causing the substrate to be expanded to the left and right. The gap thus made was 7mm at the maximum and 4 - 5mm on the average. Especially this crack, which pierced through the main part of the front phoenix, had greatly damaged the *hyomon* and *raden* parts. There were traces of previous restoration by urushi approximately 30cm from the rim, which infers that repair was done in Japan before placing the object under the Museums' ownership (Fig. 134-D). The other four cracks were 74cm (134-E), 40cm (134-F), 54cm (134-B), and 35cm (134-C) in length, respectively. Surprisingly, there were no cracks along the joints of the substrate.

The distorting and cracking of the substrate of the quiver had also caused a great chain reaction of damage to the decorations. Since the *hyomon* lines on this quiver are long and curved, they had peeled off after being stretched apart by the cracks, turned over and become entangled in an intricate way. As many as 18 *hyomon* lines had completely fallen off and all of them had become very distorted so that the recovery of their shape was doubtful. In addition, even the large *hyomon* that appeared to be in good condition revealed that there were many spaces underneath, when touched with a bamboo spatula, and the whole quiver was too fragile to touch (Figs. 130 & 131).

The *aogai* used with the *hyomon* was about 0.1mm thin and had broken in bits after peeling, and the possibility of recovery was low. Just like the *hyomon*, large shell pieces on the wings of both birds and the head of the male phoenix had been broken and lost in large areas, and many of the remaining shell pieces were separated from the surface. Judging from the photograph in "*Uritate-cho*", many of the shell pieces had already been lost. Among them 104 fallen shell pieces of various sizes and 12 pieces of coating film segments had been separately preserved (Figs. 132 & 133).

In such ways, the quiver was damaged all over and there were too many problems that had to be solved in the two-year restoration time limit. It was a restoration of a kind that we had not experienced before.

Restoration Policy

Keeping in mind the fundamental principle of maintenance of status quo for designated cultural properties in Japan today, it was decided to restore the object

by using materials and manufacturing techniques as similar to those of the original as possible. Also, decisions concerning the policy of restoration were made in consultation with the Tokyo National Research Institute of Cultural Properties and conservators of The Metropolitan Museum. There were four major tasks to be covered in this restoration: (1) restoration of the substrate, (2) restoration of *hyomon*, (3) fixing of *raden*, and (4) developing of post-restoration maintenance measures. Following are the reports on each task.

Restoration of the Substrate

The greatest concern about the restoration was the recovery of the original shape of the object. Unless this is done, it would be impossible to correctly replace the *raden* and *hyomon*. It was vital that the quiver regain its cylindrical shape. But it was questionable that a substrate that had been distorted to such an extent could be restored to its original shape. The substrate had lost its flexibility and gave an impression as if it had turned into a hard material. The fact that there was no trace of damage by physical blows on its surface clearly indicated that drying caused all the cracks. Presumably, the largest crack observed today appeared first and made it impossible for the quiver to sustain its shape. Sequentially, the other five cracks followed.

As a first step in restoration, we made a holder of laminated wood and balsa wood designed to temporarily fix the critically exfoliating *hyomon* and *raden* and to clean the dirt that had accumulated over the years on the coating. To humidify the object, a cedar case, two sizes larger than the quiver, was made. Usually, humidity control of a distorted substrate is done in a damp chamber, but this project started with no definite prospect of how much of the distorted substrate could be restored.

Shredded *gampi* paper was attached temporarily with starch glue to the *hyomon* and thin shell pieces in danger of falling off. Next, since the damage was severe, cleaning was limited to gently wiping the surface with a soft damp cotton cloth wrapped around the finger. The object was humidified by placing it in a cedar case that was dampened with a cloth, checking it every two days for one month to maintain 85 - 90% humidity. As a result, although there was very little improvement in the recovery of its shape, the substrate appeared to be recovering its flexibility and we were sure that we should continue humidity control.

The next step taken was to directly humidify the inside of the quiver. We would like to mention that the decision for this action was made greatly due to the late Professor Taguchi Yoshikuni's advice. We needed some kind of system by which we could erect very short bars inside the quiver, thereby increasing the internal pressure and making the distorted and rolled-in shape return to the original state as much as possible. In reality, the distorted rim was not open enough for even a child's

hand, and the depth being nearly one meter made it seem infeasible to erect several *shimbari* sticks securely at given right spots at appropriate angles. It seemed theoretically hopeless.

Direct humidification of the inside was a first experience in restoration. In the case of urushi objects, excessive humidifying causes "*yake*," which changes *kuro urushi* brownish and *shu urushi* whitish, depending on the condition of the coating and foundation. So it is considered a very risky procedure. Since the foundation was solid and the inside of the substrate was coated in *suri urushi*, there was high expectation to achieve the desired results. However, it was important that no droplets touch the substrate directly, even though a great amount of moisture would be applied directly on the inside. For this, we wrapped a highly absorbent sponge about 1mm thick with thin soft styrol used in packaging. The soft styrol sheets maintain their water proofing property and the highly absorbent sponge sustains its absorbency. Two of these pieces were directly placed inside, and the quiver was revolved every few days to adjust the degree of humidification evenly. The result showed that although the quiver did not regain its shape, the hardness of the substrate disappeared and its flexibility was recovered (Fig. 136).

All the while, we were unable to proceed with the restoration, but we made three types of tools to help recover the shape.

Making Tools

The first tool was made to maintain the shape of the rim. Portion of an acrylic cylinder 9cm in diameter, 2cm wide and 2mm thick was cut out and fitted with a screw normally used for stretching wires. By counter-rotating the screw, it was possible to push out the distorted substrate which tended to move inward (Fig. 137).

The second tool was made to quickly join the two sections of the substrate again after the object had returned to its original shape. Portion of an acrylic cylinder, 10cm in diameter, 2cm wide and 2mm thick, was cut out so that it could be placed on the outside surface of the quiver and subtly tightened and released by means of a stainless steel belt with screws (Fig. 138).

The third tool was made to erect bars securely at intended spots on the distorted quiver which are beyond the reach of the hand and to correct the distortion from inside. It was a simple construction using two 1m long brass pipes and a short wooden bar. Two hooks at the end of each pipe were made to clasp the wooden bar. A nylon string was passed through a hole on the upper pipe, wound around the bar and passed back. The lower pipe was used simply to clasp the wooden bar (Fig. 139). Two brass pipes would be inserted into the quiver and internal pressure adjusted by sliding the upper and lower pipes back and forth. After setting up the bar, the upper pipe was removed by loosening the string and slightly twisting the lower pipe. It was inserted so that the tool could be taken out

easily. When the farthest bar was set up, the following bars were erected one by one. To the best of our recollection, we became certain of the possibility of recovering the shape of the quiver with the completion of this tool (Figs. 140, 135-1 & 135-2).

In this way, with the continual humidifying of the inside as well as the setting up of about eight bars at the same time and the repetitious work of gradually shifting the position of the bars and changing the internal pressure, the quiver steadily recovered its shape.

About three months after the object began to be humidified without the use of any tools and 25 days after using the third tool, the substrate finally became ready to have its two sections joined again. Owing to a typhoon, the humidity in our studio had been above 90% for several days up to that day, so the inside of the humidifying case must have been in a state of high humidity for 4 to 5 days. We were very impressed by the power of the substrate to regain its original shape. The excitement of preparing the holder and the sense of repairing the first crack was an unforgettable experience (Figs. 141 & 142).

Fixing the Cracks on the Substrate

Once all the bars were removed from the inside, the cracks that had narrowed as a result of the recovery of the quiver's shape were gradually impregnated with strongly adhesive *mugi urushi*, which had been diluted with a solvent, using a small brush. The cracks were opened slightly by a bamboo spatula, leaving tiny gaps for impregnation. All excessive *mugi urushi* was carefully wiped away so as not to leave any behind. The *mugi urushi* immediately after impregnation is highly fluid because of the solvent and its adhesive power is weak. However, hardening is accelerated by adding humidity and adhesive power is increased even more as the solvent evaporates, thus making it possible to fix the cracks strongly.

While waiting for the *mugi urushi* to harden, 6 to 8 bars were erected inside for aligning the coating to the most appropriate position. Then a flat string was wound around the outside, covered with an acrylic cylinder and the quiver was gradually tightened with a steel belt. After removing excess *mugi urushi* from the cracks, it was tightened again. Those displacements of the coating that could not be readjusted with bars from inside were covered with wrapping film, vinyl sheet and acrylic resin board in that order. It was then tightened with a nylon string and, after aligning the coating surface, the quiver was put into a slightly humidified cedar case. The steel belt and all the nylon strings were removed after two days to check the condition of the crack. There were areas where the crack had not been fixed well, and so internal pressure was reapplied, excess *mugi urushi* was wiped off with a solvent and the steel belt and nylon strings were re-attached and the quiver was placed in the humidifying case again (Fig. 143).

Four of the six cracks were gradually fixed one by one, starting with the worst

one, by spending nearly a week for hardening. This whole process took about one month. The remaining two cracks were on the opposite side of the long and most severely damaged crack. For this reason, they were left untouched for about one month before being fixed, presupposing that external changes brought about by humidity and pressure from the restoration of the other cracks might cause reactions in the substrate that could correct the remaining two cracks.

It was in late November that we finished fixing all six cracks. The air was getting dry and it was feared that it might adversely affect the substrate, but we gradually decreased the humidity in the cedar case down to 65% and waited for the shape of the object to become stable (Figs. 144 & 145).

Hyomon

The 80cm crack in the front had greatly damaged the *hyomon* and *raden* from the phoenix's wings to its tail feathers. The loss of the *hyomon* was especially great, and those that were left had become expanded and tangled to the extent that their original form was hardly recognizable. When touched with a finger they made a sound like a spring being flipped, indicating that they had already lost the flexibility of annealed gold.

First, we examined the condition of the intertwined *hyomon* with a 20x magnifier and then slowly spread out the entangled gold foil strips with a bamboo spatula so as not to break any of them. Thin *hyomon* pieces were around 0.8mm wide and in places they were twisted off completely. Utmost care was needed for this process. Also, close attention was paid to parts that had become discolored due to the oxidation of very small amounts of silver and bronze in the gold. Once the *hyomon* pieces were untangled, we slipped a 0.1mm transparent polypropylene film between the coating film and the *hyomon*, and further covered the surface with 0.05mm of the same film, not letting the spatula touch the *hyomon* directly. We then pressed with a bamboo spatula to restore its shape. This was done to prevent further distortion due to contact when restoring concave portions on the coating film caused by the peeling off of the *hyomon* and to protect the surface of the *hyomon* (Figs. 146, 147 & 148).

Hyomon that could be taken off were done so and restored in the same way after they were set on an acrylic cylinder similar in diameter to that of the quiver with a non-adhesive tape. Then, using the inside of an acrylic cylinder slightly smaller in diameter and placing its backside up, we pressed it from the inside with a bamboo spatula to create a proper arch.

Almost all of the *hyomon* that had peeled off had become distorted as if expanded by strong force, and it was impossible to return them to their original positions. For this reason, we were forced to widen the grooves of the *hyomon* left on the coating film a little and to cut off excessive portions of the *hyomon*. The time

required for a series of these jobs was half a day even for a small piece and one whole day for a large one (Fig. 149).

The repaired *hyomon* was temporarily tacked with *gampi* paper, and then impregnated with *mugi urushi* diluted for use with *hyomon*. After completely wiping all excess *mugi urushi*, we covered it with an aluminum net and placed a highly absorbent sponge containing water on top to humidify. At the right time when *mugi urushi* had hardened, wrapping film, vinyl sheet and acrylic resin board were laid in this order on the *hyomon* and the quiver was put into a frame and pressed with *shimbari* sticks (wooden or bamboo sticks) (Figs. 150 & 151). Care was taken to reduce any possible adverse influence upon the shape by moving the balsa holder near the *shimbari* sticks and erecting the sticks inside the quiver. The *shimbari* sticks were then temporarily removed the following day and, after excess *mugi urushi* was cleaned, erected again and left untouched for three to four days.

Because of its cylindrical shape, there is a limit in the number of times in which pressure can be applied at one time and so several days were needed accordingly. But with this method, all 36 *hyomon* pieces that had peeled off or fallen were restored to their original positions. Eventually, more than 90 places, including minor exfoliations, were repaired by impregnating *mugi urushi* and pressing them (Figs. 152 & 153).

Raden

As mentioned before, the technique of *raden* used on this quiver is considered to be as follows.

Various kinds of shell pieces, both large and small were glued with a water-soluble adhesive, such as animal glue and starch glue, and then heated and pressed with an iron. This technique enables the gluing to be done at once, making work easier and allowing large shell pieces to be glued without breaking them. The finished look may be satisfactory, but at the same time it has its flaws in that the shell pieces are unstable because they have been shape-formed by heating and in that spots tend to appear in the animal glue layer because of the sudden vaporization of the glue.

When observing the areas from which shell pieces had fallen, it became clear that the large shell pieces had peeled off. Although their exfoliation may have been started by the shrinkage of the substrate, this demonstrated that the force of shell pieces to spring back was unexpectedly strong. In addition, the application of Chinese ink on the backside of the shell pieces, a technique that was considered to have been employed for good coloring and efficiency in work, may have been effective for a good finish. But as long as the Chinese ink exists as particles between the glue and the shell, the adhesive strength cannot be stronger than when shell pieces are directly glued to the coating. Also it was difficult to ascertain the

condition of adhesion. In this respect, the object was found to have much in common with Nagasaki *raden* urushiware, on which silver foil is applied on the backside of shell pieces, and with the types of damage found on them.

The 104 shell pieces that had been preserved were first classified into 12 groups according to their species, color, shapes, and if any, *kebori*. From here, shell pieces that matched the shape of the cracks were selected and joined with small pieces of *gampi* paper. The process of checking a number of candidates by placing them against possible positions was repeated. As a result, the head, legs and a part of the wing of the male phoenix at the front could fortunately be restored (Fig. 154).

Since the shell pieces, when preserved for a long time after falling off, try to return to their original shape, it was necessary to adjust the arch of these shell pieces in order for them to match the curving surface of the quiver. To do so, we attached pieces of *gampi* paper a size larger than the shell pieces to the surface of the shell pieces with starch glue. Then we put the shell pieces on an acrylic cylinder that was almost identical to the quiver's outer form, and further covered this acrylic cylinder with another cylinder that was a size larger. Then we tightened the whole with a belt. Next, we wrapped a damp, highly absorbent sponge around the quiver for humidification and left it for one week (Fig. 155).

Confirming that the shape of the shell pieces had become similar to the curved surface of the quiver, the shell pieces were disassembled again with damp *washi* paper. Taking utmost care not to overlay the shell pieces on neighboring ones, we minimally adjusted the damaged shape of the shell pieces with waterproof sandpaper and shaved the edge of the coating film with a knife, temporarily re-attaching the pieces one by one to the quiver with *gampi* paper (Figs. 156 & 157).

Next, we inserted a 0.03mm film between the shell piece and the coating film, and slightly spread the gap so as to impregnate diluted *mugi urushi* using a small brush while vibrating the surface of the shell with the left hand. After wiping off all excess *mugi urushi*, we placed an aluminum net and a thin wet sponge over the shell for humidifying. When the timing of the hardening of the urushi was right, we covered the quiver with wrapping film, 3mm-thick vinyl sheet and an acrylic resin board in that order, and used the belt previously employed to repair the substrate to tighten the quiver lightly for adhesion. The belt was once loosened for cleaning and then re-tightened after which the quiver was left untouched for a week. By repeating this process, we were able to return most of the fallen shell pieces to their original positions.

Besides these shell pieces, there were innumerable shell pieces that had lifted off and more than 100 pieces including small ones were similarly impregnated with *mugi urushi* and press-glued (Figs. 158, 159, 160, 161 & 162).

Finishing Process for the Coating Film and Joints

The cracks of the substrate would curve in several times, and each time the substrate was treated with impregnation of *mugi urushi*. The substrate was exposed all the while until it was stabilized. One year later, the substrate was determined to be finally stabilized and ready for the finishing process.

The loss of the coating film at the center of the longest crack extended to such a degree that the substrate had become exposed, and the damage seemed even greater since the surrounding coating film was sound (Fig. 163).

In Japan, the restoration of urushiware in principle has been to maintain its status quo, and recoating has been avoided. One of the reasons for this was the distinctive luster of urushi. Newly applied coating film would have more luster than the original, and this would give an unnatural impression to the object.

When treating lost coating film, the method of the finishing process is selected by the condition and use of that object. In this particular case, the luster had remained relatively well in the coating, but the difference between the exposed substrate and coating was great and the loss of the coating film was concentrated in one part. So, after filling the lost parts with *kokuso*, we applied a slightly lustrous, very fine foundation on the surface. The detailed processes are as follows.

1. We filled the missing area thinly with *kokuso*, which is firm *mugi urushi* mixed with hemp fiber and coarse sawdust (#60), with a bamboo spatula.
2. After the *kokuso* had hardened, we filled the area up to the level of the coating surface with similarly-prepared *kokuso* but that which used #80 sawdust.
3. After two weeks of hardening, we smoothed the surface of the *kokuso* with a knife and dry sanded it with a whetstone until it became smooth.
4. We mixed raw urushi into *roiro urushi* and applied it. Then we made a foundation layer by sprinkling *jinoko* from Yamashina district in Kyoto (Fig. 164).
5. After the foundation had hardened, we further hardened it with diluted *rose urushi* (raw urushi mixed with *roiro urushi*).
6. Next, we made *roiro sabi* by mixing whetstone powder kneaded with water and *rose urushi*. We applied this to the surface of the foundation with a small cypress spatula. At the same time, we applied *roiro sabi* thinly to the edges of treated fallen shell pieces and *hyomon* so that they would not be damaged again when the object is handled (Fig. 165).

For the inside of the quiver, we used a brush to apply raw urushi diluted with a solvent and we wiped it with a cotton cloth. This process called *suri urushi* was repeated twice.

Maintaining the Shape

We spent almost a year in restoring the substrate and twelve months in restoring the *hyomon* and *raden*. In that time, there were several retrogressions of

the substrate, causing the treated parts to become separated, and we were made acutely aware that, little as it may seem, urushiware moves constantly and repeatedly with the fluctuation of humidity. When faced with these troubles, we repeated humidification and fixing until we were able to stabilize the object gradually.

Another task that had to be cleared arose at this time. It was important to set a concrete measure for holding back the movement of the substrate to the minimum since the restored quiver would return to its owner, The Metropolitan Museum, where the shape of the substrate may change due to environmental differences. At first, measures were suggested to stabilize the substrate's movement, such as inserting a resin cylinder inside. However, after repeatedly fixing the object as previously noted, we realized that since the inside of the quiver is substrate exposed it is natural for the substrate to continue to move. So we altered our way of thinking from stopping the movement completely to setting a supporting tool with a flexible structure in the quiver so that it would react to the movement of the substrate.

However, in my experience with restoration, I had never had an occasion to set up such a tool and, considering the time left, the situation seemed difficult. The conditions required of this supporting tool were for it to be: 1) light in weight, 2) simple, 3) easily removable, 4) capable of supporting the quiver with its surface. It also 5) must not negate the atmosphere of the quiver and, most of all, 6) must react to the substrate's movement caused by changes in humidity.

From among the many ideas, the method of using a curved object made of cypress wood was finally selected. We asked a craftsman in Kiso Hirasawa district to make two kinds of cypress rings, four pieces each, with a common outside diameter of 10cm and a common thickness of 2mm but with differences in width, one 2cm and the other 3cm. As a result of checking the repulsive force and the fitting of the shape of each piece, we selected the 2cm wide cypress rings. These rings were soaked in tepid water for about one hour, and after they had become soft they were forced into an acrylic cylinder 93mm in diameter so that they would spiral twice. Three days later, they were inserted into another cylinder 84mm in diameter and gradually adjusted to the inside diameter of the quiver, at which time they were left in an environment of about 50% humidity for nearly a month (Fig. 166). The cypress rings that were pulled out of the cylinder finally had changed into supporting tools like a spiral spring capable of repulsing in all directions (Fig. 167).

Since the quiver narrows as it goes toward the bottom, it was necessary to make the spiral fit the inside diameter of the quiver. As the spiral rings were made of wood, they could easily be altered by hand to fit the shape of the quiver inside. To insert the supporting tools to points difficult to reach by hand, we used the brass pipe that we made when erecting the *shimbari* sticks to push back the cracks. The two hooks at the end of the pipe were used to clasp the farther end of the spiral

rings, and by rotating it we were able to shift the spiral supporting tools inward with little force (Fig. 168). We were also able to remove the tools in the same manner. In this way, we set up four supporting tools approximately 20cm apart in the inside of the quiver. It may not have been perfect, but we were thus able to satisfy the specification requirements (Fig. 169).

Paulownia Box for Preservation

The designing of a box for preservation was the last task. Paulownia wood, which is customarily used for preserving old Japanese art objects, was selected as material. Since standards required in the United States exceed specifications that meet the Japanese environment, we used the best wood with the most possible thickness to make a box with an overwrapping-lid. The bottom of the box was designed to be double structured—a removable holder was set at the bottom and space was provided underneath it for placing two moisture controlling agents kept at 65%RH. We anticipated that this would enable the most suitable humidity control (Fig. 170). Lastly, we prepared a white cotton cloth with strings at four places. After confirming all restoration work and cleaning the quiver with anhydrous ethanol, we wrapped it with this cloth and placed it in the box. The two-year project of restoration had finished (Fig. 171).

Related Research

As related research, we inquired into facilities associated with the Somada School in search of more objects made by them, especially of works by Shigehiro whose name appears in *raden* at the bottom of the quiver. There are very few facilities in Japan in which one can find collected works of the Somada School. Among the few, we were able to locate a Japanese ink box with Shigehiro's signature at the Toyama City Folk Museum at the site of Toyama Castle, where the Somada family worked until the end of the Edo Period. We visited the museum and conducted research.

[Outline of the Research]

Soshi arai-komachi suzuribako (Japanese ink box)

Measurements 23.9 cm×20.9 cm×4.5 cm

The box is coated entirely in *kuro urushi* and has a cover-top lid with a rather wide, planed edges in *ikakeji*. The inside is decorated with cloud-shaped *nashiji* sprinkled with fine *nashiji-fun*. The ink slab (*suzuri*) and the water dropper are on the left side of the box and the brush tray is on the right. On the topside of the lid, designs of a book, a washbasin with four handles, a pot and a wooden fan in gold and silver *hyomon* and *aogai* are arranged toward the front and a broken branch of

a cherry tree in the background. Coarse *hirame-fun* is sprinkled on the open spaces around the designs and *maru-fun* is used to express cloud-like mist. The box can be categorized as one of Somada's masterpieces exhibiting the harmony of his well-established composition and unquestionable technique (Fig. 172).

The ink box is accompanied by a black-lacquered outer box made of paulownia. The title of the object is written in *hira makie* on the upper right hand and Somada Shigehiro's *kao* is on the lower left hand of the box (Fig. 173). It is uncertain whether the outer box was made at the same time as the ink box, but the letters and *kao* are in a freer style than that in *raden* found on the bottom of the quiver; the shape of the *kao* is also slightly different. However, that the ink box was made by the same craftsman as that of the quiver, Shigehiro, is distinguishably apparent in the style and handling of the materials.

First, as for the main material, *aogai* shell pieces of Mexican abalone, which has a deep blue luster, are used for parts of the cherry blossoms, wooden fan and washbasin, a distinctive characteristic of the Somada School. They are also decorated with *kebori*. The trunk of the cherry tree and the book, which are larger than the other designs, are made with shell pieces of mother-of-pearl, which is larger, and decorated, also, with *kebori*. On the other hand, on the quiver many Mexican abalone shell pieces are used for the phoenix's comb and tail feathers while mother-of-pearl shell pieces are used for the *umebachi-mon*, wings and head. These also are decorated with *kebori*. In addition, on the ink box delicately clipped large *hyomon* pieces are used on the wooden fan, the title of the book, handles of the washbasin and the spout of the pot. And on the body of the washbasin and the pot, fine *hyomon* lines approximately 0.3mm are bent into the shape of a floral arabesque design. As for the quiver, large *hyomon* pieces are used in places such as the *kiri-mon* and the designed clouds that coil around the wings and tail feathers of the phoenix, while fine lines are found in places such as the neck and the outline of the tail feathers, effectively presenting a contrast. In these ways, the two works seem to exhibit almost identical sensitivity (Figs. 174 & 175).

Another reason for considering the craftsman of the quiver and that of the ink box to be the same is in the way in which the materials are handled for the cloud-like mist in the background. Parts where *nashiji-fun* seems to have been sprinkled are in fact fairly large *maru-fun* sprinkled in gradation and followed by large *hirame-fun*. *Maru-fun* sinking into *suki urushi* gives a *nashiji-fun* look. Since this technique can also be seen clearly in the upper and lower *nashiji*-finished parts of the quiver, we can assume that this is a distinctive technique of Somada School common to both objects (Fig. 176). This was made possible by cleverly selecting materials to match the *hyomon* and thin shell pieces having a thickness of about 0.1mm.

As stated above, the two works have much in common, and can be considered

with great certainty to have been made by the same craftsman.

Another noteworthy work in this Museum is a pair of large and small sword guards with the name of the fifth-generation Somada Mitsuhisa (1763 - 1838 or later) written in its box. The writing says that the sword guards were made by Somada Mitsuhisa at the age of seventy-five. The front side of the guards is decorated with a combination of floral arabesque and consecutive circular pattern, and the back side is decorated with a peony and a phoenix in *hyomon* and *raden*. When the expression of the phoenix is carefully observed, we are able to see characteristic of the phoenix on the quiver on the phoenix on the lid, although it is much smaller and the technique has declined slightly (Figs. 177, 178 & 179).

Another interesting point is the vermilion *kao* found under Mitsuhisa's signature (Figs. 180-1 & 180-2). There are three confirmed works with Shigehiro's signature and *kao* on them. The quiver restored in the project discussed in this paper and the related research subject, the Japanese ink box, are two of the three. The last one is a sheath owned by a private British collector. Comparing the three signatures and *kao*, we find that those of the sheath and the quiver are directly on the object, and they appear to have been signed personally by the same craftsman and in that sense the style of the signatures is also similar and quite credible. However, at close range there are slight differences in all three *kao* and it is difficult to determine Shigehisa's *kao*. When Mitsuhisa's *kao* is set alongside the other three, the *kao* on the quiver is special while those on the outer box of the ink box, sheath and sword guards resemble each other (Figs. 181 & 182). Thus, the assumption that Shigehiro and Mitsuhisa may be the same person becomes possible.

There is no official record of Shigehiro's name, as mentioned earlier, and recent studies suggest that Shigehiro was in fact the fourth-generation Tozaemon (1729 - 1825). It is questionable that his son, Mitsuhisa, would have used such a similar *kao*. Could the phoenix of Mitsuhisa's sword guards be an imitation of his father's work or, as the resemblance of the *kao* indicates, could he have reflected on his past work? These are extremely interesting questions. In any case, one of the two has the right to claim the name of Shigehiro. Assuming that the work was done by the fourth or fifth-generation Somada, the date of the manufacture of the quiver would be around the mid-18th century to the early 19th century.

Through this research, we were amazed and strongly impressed by the quality of the techniques of Somada Shigehiro. And we became interested in this man. By analyzing the techniques employed, it may be possible to find interesting facts about the characteristics of the technique of using *aogai* in different areas and about craftsmen of the Edo period.

Conclusion

I am relieved and happy to have been able to return the restored quiver safely after two years. I could feel myself turning pale when I first saw the quiver. Damage on the quiver was that despairing. Looking back, there was much thinking and groping before I was able to restore the quiver so that it may be displayed. Yet on the other hand, I cannot help but feel that the sleeping phoenix's belief in resurrection caused itself to become resuscitated through me. In other words, the work itself had dignity and character that aroused the conservator.

The significance of restoring this quiver lay in the thought that thousands of people who visit The Metropolitan Museum may be impressed by and become interested in the works of a school of Japanese craftsmen named Somada in a certain area of Japan during the Edo Period. It is written in "*Hanshi Yuisho-gaki*" that has been handed down in the city of Toyama that the third-generation Somada Mitsuaki, and his son, the fourth-generation Tozaemon, were both engaged in the restoration of the sanctuary of Toshogu Shrine in Nikko. They, like us, took time off from their work to do restoration work. As a creator and conservator of urushiware, to be given this opportunity to restore Somada's work was a fortunate opportunity. It gave me a chance to respond to their brilliant artwork.

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