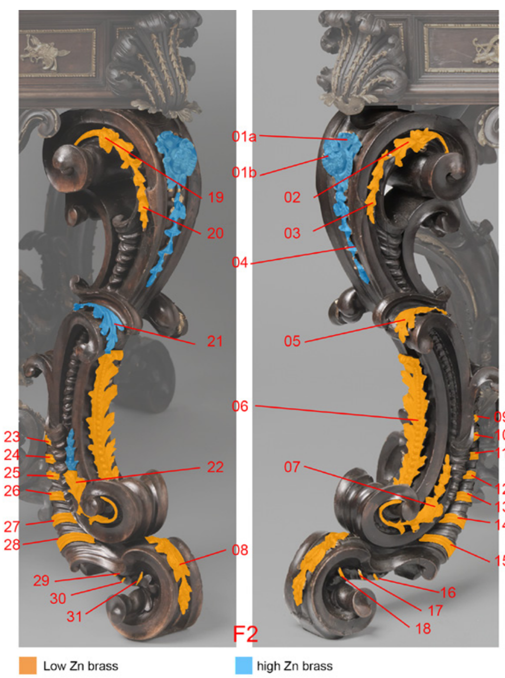

Wooden Artifacts Group Postprints

Presentations from the 2017 AIC Annual Meeting in Chicago, Illinois
Wooden Artifacts Group Sessions

Wooden Artifacts Group

Postprints of the Wooden Artifacts Group Session and Joint Session of Architecture + Wooden Artifacts

Chicago, Illinois

45th Annual Meeting American Institute for Conservation
Chicago, Illinois

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POSTPRINTS OF THE WOODEN ARTIFACTS GROUP SESSION AND THE JOINT SESSION OF ARCHITECTURE + WOODEN ARTIFACTS

ANNUAL MEETING

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ELIZABETH PEIRCE

Old Meets New: Consolidation Techniques

ABSTRACT—As Chinese export lacquer degrades, it becomes increasingly more sensitive to staining by polar solvents. This is a particular problem when trying to consolidate the lifting and cracking surfaces on export pieces. Adhesives bound in an aqueous solution, such as fish or hide glue, run the risk of damaging the lacquer surface, although they are more compatible with the ground. The author developed a system using silicone solvents as a barrier layer during consolidation to protect the lacquer while still using aqueous adhesives, maintaining high compatibility while minimizing the risk of damage.

1. INTRODUCTION

1.1 LACQUER MANUFACTURE AND DEGRADATION

Lacquered pieces are made from the sap of the Anicardiaceae family of trees, which are closely related to poison sumac or poison ivy. There are three main types of lacquer: *Toxicodendron verniciﬂuum,* providing urushi or qi lacquer to Japan, China, and Korea; *Toxicodendron succedaneum* for laccol lacquer in Vietnam and Taiwan; and *Gluta usitata* for thitsi lacquer in Burma and Thailand (Getty 2010; Schilling et al. 2014). Each sap has its own working properties that affect the manipulation of the material for final production. The Getty Conservation Institute has performed extensive research into identifying different additives through their Recent Advancements in the Characterization of Asian Lacquer program.

Lacquer polymerizes when exposed to both heat and humidity, creating a hard, shiny, insoluble surface (McSharry et al. 2007; Webb 2000). Lacquer for the domestic market was made with more care to properly cure the layers between applications; however, export lacquer artisans who were working to meet the increasing demands of the Western market did not have the time necessary to produce the same high-quality product. Instead, several shortcuts were taken to lessen the production time, including using protein-based binders such as pigs' blood for the ground instead of lacquer and applying thicker layers of lacquer to build up the surface quickly (Getty 2010; Heginbotham and Schilling 2011; Milklin-Kniefacz et al. 2014). Although export pieces may still have a very fine appearance when new, they are inherently more susceptible to degradation over time due to the shortened production period (Petisca et al. 2011).

As lacquer is exposed to light and fluctuations in RH, it begins to degrade. Frequently, export lacquer suffers from multiple, closely spaced, parallel cracks across the surface. These cracks are caused by a combination of stresses, both from the shrinkage and expansion of the wooden core and the tension that forms in the lacquer itself as it cures (Schellmann 2011; Webb 2000). These cracks will lift and curl, eventually leading to loss of material. Light damage causes the lacquer surface to degrade, creating microcracks in the surface that causes a matte, dull appearance (Von Stein 2012; Webb 2000; Yamashita and Rivers 2011). The degradation has more than an aesthetic alteration: the lacquer surface becomes friable, sensitive to polar solvents, and sensitive to physical abrasion (Webb 2000; Webb, pers. comm.). In some instances, a varnish layer would be applied to resaturate the matte surface and restore the gloss.

1.2 LACQUER CONSERVATION AT WINTERTHUR

Export lacquer can be found in almost any collection. Winterthur alone has 33 pieces of lacquerware, ranging from small fan boxes to sewing tables to larger case furniture and screens. Although there had been isolated treatments focusing on individual pieces in the past, there had not been a comprehensive survey of the lacquer collection in many years. In 2012, a survey of the lacquer was conducted, and it was felt that this collection as a whole was at the greatest risk if conservation intervention was not undertaken (Auffret, Matsen, and Petisca 2014). The survey was used as part of a grant application to the Institute for Museum and Library Services (IMLS), which was awarded in 2013. The two-year IMLS grant provided funding to complete three main objectives: to educate staff and students about lacquer conservation, to treat six objects in the collection, and to perform and share research on the material composition of lacquer pieces (Institute of Museum and Library Services 2017). Knowing that lacquer conservation requires specialized training, the grant also provided funding to hire lacquer conservation specialist João Petisca to treat objects and train staff in lacquer conservation.

2. LACQUER SCREEN

2.1 HISTORY AND CONSTRUCTION

One of the six pieces to be treated during the IMLS grant campaign was a six-paneled screen, seen in figure 1 in situ in the China Trade Room. Located on the third floor of the museum, the China Trade Room focuses on Chinese export lacquer,

Fig. 1. Chinese export lacquer screen 2004.0040.002 seen in situ in the China Trade Room at Winterthur. Photo courtesy of Jim Schneck, Winterthur Museum.

displaying 11 of Winterthur's 33 pieces of Chinese export lacquer. The screen was donated to the museum in 2004 at the bequest of Mrs. Violet Thoron, descendent of William Ward of Salem, Massachusetts. It was most likely given to Ward by his brother-in-law, Captain William Grey, who was an important New England shipowner and importer of Chinese export lacquerware (Auffret et al. 2014). The provenance dates the piece to the first quarter of the 19th century.

The six-paneled screen is decorated with two-toned gold designs (fig. 2). Each panel has a central scene depicting birds and small trees on the front, and birds with bamboo on the back. The front of the screen has a wide, elaborate border depicting typical Chinese iconography—bats, butterflies, spiders, paper scrolls, fans, and flowers. Each panel measures 211.8 x 54.6 x 2.54 cm (83.4 x 21.5 x 1 in.). The panels have a "breadboard" construction—three long, wide boards with vertical grain capped at the top and bottom

Fig. 2. Overall image of screen 2004.0030.002 before treatment. Courtesy of Jim Schneck, Winterthur Museum.

with narrower, horizontal boards. The top rail has been mitered to join with the outer panels, whereas the bottom rail sits squarely in between the feet. The vertical boards are held together with wooden dowels, whereas the top and bottoms have been fixed in place with long, straight nails (fig. 3). Wood identification performed on a small sample shows that the screen is made of Chinese swamp cypress (*Glyptostrobus pensilis*), a tree native to southeastern China (Alden, pers. comm.). The cross section seen in figure 4 shows four layers: two coarse ground layers separated by an interleafing layer, most likely paper, and two layers of lacquer. Pyrolysis gas chromatography/mass spectrometry analysis performed by the Scientific Research and Analytical Lab at Winterthur determined that there is a protein binder in the ground, the lower lacquer layer is made with laccol, and the upper lacquer layer is urushi.

2.2 CONDITION

Overall the screen was in fairly good condition, particularly when compared to other examples in the collection. However,

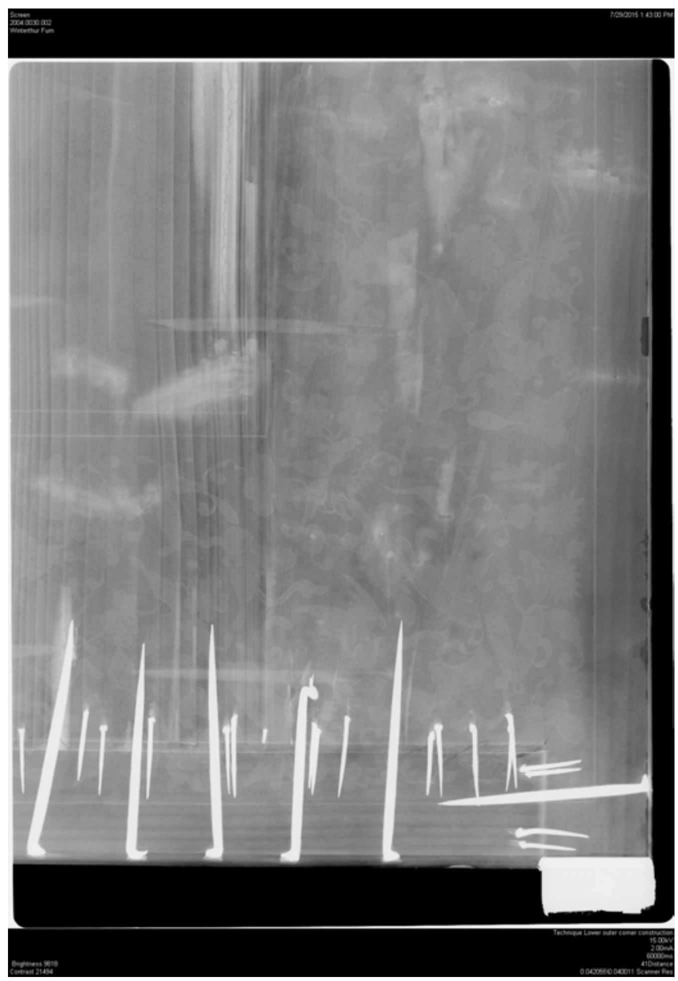

Fig. 3. X-radiograph of one of the panels of screen 2004.0030.002. The long nails used to attaché to top and bottom boards can be seen, as well as the wooden dowels that peg the vertical boards together. Courtesy of the Winterthur Museum.

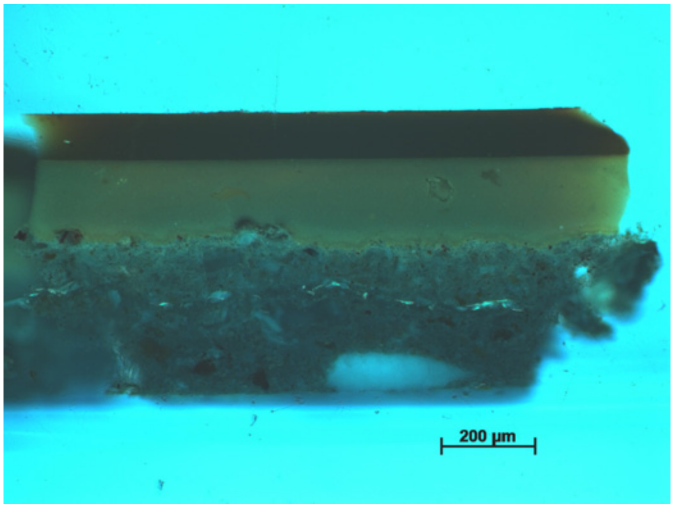

Fig. 4. Cross section depicting layer structure of screen 2004.0030.002. The cross section is illuminated under UV405 to better highlight the layers. Courtesy of Catherine Matsen, Winterthur Museum.

there were several large vertical cracks that coincide with the joins of the vertical boards, most likely caused by the shrinkage of the substrate. Numerous horizontal cracks had formed across the surfaces of the lacquer, particularly concentrated along the edges of the face of the panels and along the vertical cracks. Many of these cracks were severely lifting, leading to breakage and loss of material. Losses were particularly concentrated on the outside edges of the two outermost panels, where improper handling has caused extensive damage (fig. 5).

There were multiple fingerprints along the edges of the faces of all panels. On multiple panels, there are splashes and smears of an unknown substance on the surface, both on the fronts and the backs of the panels. Additionally, there is evidence of previous restoration campaigns on several panels, some of which are more stable than others. There are two types of repairs: a thick, hard, supportive fill placed within curled and cracked areas, and a thinner black paint or varnish that was applied to losses without bulking. There appears to be an additional coating on the sides of the panels and near the hinges that fluoresce a pale green-white under UV light.

3. TREATMENT

3.1 ORIGINAL TECHNIQUE

Until this point, all other lacquer coated objects during this campaign had been consolidated in the same way. First, a mixture of water and ethanol was injected beneath the lifting flakes to soften the protein binder in the ground (Umney and Rivers 2003). The flake was then covered with a sheet of silicone release Mylar, followed by a sewn baggie filled with steel shot. The baggie had been placed on a hot plate on low and heated until it felt warm against the inside of the wrist. This combination of

Fig. 5. Detail of damage and loss on the edge of screen 2004.0030.002. Courtesy of Jim Schneck, Winterthur Museum.

Fig. 6. Bain marie made of a modified mason jar with a copper tube set into the center of the lid. The mason jar was filled with water then placed into water in a standard glue pot. Courtesy of the Winterthur Museum.

moisture, warmth, and gentle pressure helped to relax the flake down flat. The setup was left for several minutes to allow the flake to fully relax.

Hide glue of 192 g was chosen as the consolidant for its compatibility with the protein ground, quick tacking time, and strength. It was both strong enough to hold the flake down while still weak enough to release before causing other areas of the lacquer to crack should further movement occur. Additionally, the long-term aging properties should be similar to those of the ground, maintaining its resolubility and retreatability over the years. The hide glue was warmed in a specially designed bain marie (fig. 6) that heated the glue without having it be in contact with water. The adhesive was injected beneath the lifting flake, which was then pumped to evenly distribute the glue. Any excess adhesive or "squeeze-out" was wiped from the surface using a dampened poly(vinyl alcohol) (PVOH) sponge.

Silicone-release Mylar was placed over the flake, followed by a warmed silicone rubber pad and block. The warmed rubber pad helped keep the hide glue slightly fluid to allow the flake to

Fig. 7. Author Liz Peirce clamping using the Shimbari table. Courtesy of the Winterthur Museum.

lie flat and acted as a cushion between the block and the lacquer surface. The setup was clamped using a modified Shimbari technique to apply even downward pressure (fig. 7).

This method had been successful in all prior executions. However, one of the main differences between previous treatments and the China Trade screen was the presence of a varnish layer. Varnish layers would frequently be applied to degraded lacquer surfaces to restore luster and gloss. Although these varnishes are problematic—they darken and crack over time, and potentially become insoluble and irreversible as they age—they do act as a barrier layer that protects the surface of the lacquer from the consolidation process. The six-panel screen, although no longer highly glossy, had not been varnished in its history. Preliminary spot tests did show that the lacquer was sensitive to both water and ethanol, but this was expected based on normal degradation of lacquer. Theoretically, with careful application, the pre-established technique could have been successful. However, on the second area to be consolidated, when the

Fig. 8. Humidification chambers. Courtesy of the Winterthur Museum.

warmed baggie was removed, the lacquer surface beneath had solubilized, leaving a disfigured melted-looking surface. The first thought was that the damage was caused by human error, assuming that too much of the ethanol:water mixture had been injected beneath the surface. Another area was tested, this time being extremely careful to only inject a few drops of the mixture. However, the same issue occurred. It is believed that the combination of the injected water and ethanol with the warmth from the steel shot baggie created a microenvironment, causing the water and ethanol to condense on the surface. At this point, treatment stopped and the technique was reassessed, both with regard to how to properly relax the flakes and whether proteinaceous adhesives should be used.

3.2 NEW TECHNIQUE

3.2.1 Humidification

The risk of continuing to inject liquid solvents beneath the surface of the lacquer was considered too great, leading to different softening tests. The first attempt involved placing the same warmed baggies onto the surface of the lacquer with the aim that heat can help soften protein adhesives and the lacquer itself (Webb 2000). This technique was effective in areas that were barely lifted but was unsuccessful on areas with more severe lifting. Prolonged exposure was avoided due to the concern that excessive heat could cause irreversible color changes to the lacquer (Webb 2000). A different solution was required.

Marianne Webb very kindly shared her humidification technique that uses localized humidification chambers placed on the lacquer surface. Three chambers were made—one round and two rectangular (fig. 8). The rectangular chambers were best for long cracks in the surface and were made of Vivak—a clear thermoplastic sheet that can be easily bent and shaped. The transparency of the Vivak provided good visual access to assess whether there were any unexpected reactions on the surface of the screen. The round chamber was best for small areas of lifting lacquer and was made of two heavy duty stackable plastic cups with the bottoms removed. For both systems, a piece of cotton cloth was wetted and wrung out until just damp, then placed over the top of each chamber. The cloth was clamped in place either with a rubber band or was sandwiched between the two cups, taking extreme care to ensure that the cloth did not touch the lacquer surface in any way. This technique locally raised the RH on the surface of the lacquer, permitting the ground to gradually soften and relax. Once the flakes were pliable, they would be dry clamped flat to help set the shape.

3.2.2 Adhesive Selection

The second challenge was to evaluate the adhesive selection. There had been several issues with the hot hide glue. Excess adhesive that squeezed out onto the surface during consolidation left stains and the quick gel time for the glue made working with the adhesive in a syringe difficult. The syringe had to frequently be reheated during consolidation, as the adhesive gelled inside the needle before it could be injected beneath the flake. Additionally, the hide glue was highly viscous, requiring a larger needle size to accommodate the viscosity. The larger needle made injection into small or barely lifting areas potentially dangerous, as the insertion of the needle could cause lifting areas to break off.

Synthetic adhesives were also considered, including Paraloid B-72, Plextol B500, and Lascaux Medium for Consolidation. All three had been previously used in other consolidation treatments (Chase et al. 1988; Webb 2000; Webb, pers. comm.). A 1:1 Plextol B500:Lascaux Medium for Consolidation mixture was tested by wicking it beneath the surface of the crack. However, the combination was found to not only be too weak to hold the flakes flat but also left an oddly shiny surface around the edge of the crack where it had been wicked in. B-72 was considered but ultimately was rejected for several reasons. Most importantly, there was a desire to maintain consistency between treatments in this campaign, and using B-72 or other synthetics rather than a protein adhesive limited treatment options in the future.

Protein adhesives were revisited, eventually leading to the selection of Art Colle fish glue, a highly refined fish glue from France. It was selected for its strength, good working properties, and compatibility with the ground. Because fish glue is liquid at room temperature, the adhesive did not need to be heated to maintain fluidity. The lower viscosity of the fish glue also meant that a smaller needle could be used. However, because the adhesive was still transported in water, a barrier coating or masking layer needed to be applied to protect the surface from excess adhesive during consolidation.

3.2.3 Barrier Layer

There were several factors that needed to be considered to determine the best material for this application. The barrier layer needed to flow into the microcracks of the lacquer to properly protect the surface from adhesive. However, applying a varnish layer, such as Paraloid B-72 or Laropal A81, was not desired (2004.0030.001 Treatment Report 2016; Arslanoglu and Learner 2001; Coueignoux 2011). The application of a varnish layer would have altered the gloss of the surface, and complete removal of the localized varnish would have been very difficult. Instead, the barrier needed to evaporate completely while still providing coverage. Additionally, the barrier ideally should be

Fig. 9. Detail showing area before treatment (A), application of silicone solvent (B), clamping (C), and after treatment (D). Courtesy of the Winterthur Museum.

nonpolar, creating an oil-on-water effect that would help propel any excess adhesive on top of the barrier and away from the lacquer.

Richard Wolbers had suggested the use of silicone solvents as a barrier during varnish reduction for the cleaning of the companion piece to the screen, a kneehole desk donated to the museum in the same gift. The silicone solvent had been applied to flood the surface while a cleaning gel was worked into the varnish layer to slowly reduce the coating. It was thought that the solvents may be used in a similar capacity on the screen. Because the screen was not varnished, tests were performed in discreet areas to see if either D4 or D5 left any tide lines as it evaporated. No tide lines were found, and the surface appeared unchanged. There had been concern about the full evaporation of the solvents from the microcracks in the surface; however, research into the complete evaporation of the solvent has been promising (Stavroudis 2012; Sullivan, Brogdon-Grantham, and Tiara 2014). A 1:1 combination of D4:D5 was used for its optimal working time, allowing approximately 45 minutes before the solution fully evaporated.

3.3 RESULTS

The chambers were placed over the desired area and left until the flakes could be flexed without breaking. The cloths were rewetted as necessary. Once the flakes were relaxed, a 1:1 ratio of D4:D5 silicone solvent was liberally applied to the surface (fig. 9). Art Colle fish glue was then injected beneath the surface, and the flake was pumped to distribute the adhesive evenly. Any excess at this point was wiped with a lightly damp PVOH sponge. The surface was then blotted with a Kim wipe, and more of the silicone solvent was applied. This step was performed to ensure that no excess adhesive or water was left behind, and that there was a continuous coating of the silicone solvent. A layer of silicone-release Mylar followed by a silicone rubber pad and wood block were placed on top of the area to be consolidated. The setup was then clamped, tightened, and immediately released. All of the layers were removed, and the area was checked for any squeeze-out. Any excess adhesive was wiped with the PVOH sponge, blotted with a Kim wipe, and more solvent was applied. The setup was clamped again and left for 15 minutes, then the process was repeated again until no excess adhesive was found. The clamps were then left on for 2 days to allow the fish glue to fully set.

4. CONCLUSION

Overall, the technique was highly successful. It was most effective on the smaller areas of delamination that could be consolidated in one session. The long cracks were more challenging, as they needed to be worked in small sections to successfully secure the lacquer, and it took longer to humidify the larger surface area. The long cracks also tended to be the areas that were the most severely lifted, which made it more difficult to estimate how much adhesive was beneath the flake, leading to more squeeze-out and repeated clamping and unclamping of the system. However, the silicone solvent significantly reduced the risk of staining on the lacquer surface. The solvent is easy to control, staying where it is brushed without wicking under the flakes. It evaporated without leaving tide lines and had a working time that allowed for repeated manipulation of the surface. It is hoped that this technique could be used in other scenarios when consolidation is potentially damaging to the sensitive lacquer surface.

ACKNOWLEDGEMENTS

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REFERENCES

2004.0030.001 Treatment Report. 2016. Winterthur Museum. Treatment of the kneehole desk. Internal document.

Arslanoglu, J., and T. Learner. 2001. The evaluation of Laropal A81: Paraloid B-72 polymer blend varnishes for painted and decorative surfaces—Appearance and practical considerations. *Conservator* 25: 62-72.

Auffret, S., C. Matsen, and M. J. Petisca. 2014. Chinese Export Wares in an Americana Collection. https://www.incollect.com/articles/chinese-export-wares-in-an-americana-collection.

Chase, W. T., P. R. Jett, S. P. Koob, and J. Norman. 1988. The treatment of a Chinese red lacquer stationary box. In *The conservation of Far Eastern art: Preprints of the contributions to the Kyoto Congress*, eds. J. S. Mills, O. Smith, and K. Yamasaki. London: International Institute for Conservation of Historic and Artistic Works. 142-145.

Coueignoux, C. 2011. The effects of consolidation on the appearance of powdery pigmented Japanese lacquer surfaces. In *East Asian lacquer: Material culture, science and conservation*, eds. S. Rivers, R. Falkner, and B. Pretzel. London: Archetype. 135-147.

Getty. 2010. Characterization of Asian and European lacquers. 2010. *Getty Conservation Institute*. http://www.getty.edu/conservation/our_projects/science/lacquers/.

Heginbotham, A., and M. Schilling. 2011. New evidence for the use of Southeast Asian raw materials in seventeenth-century Japanese export lacquer. In *East Asian lacquer: Material culture, science and conservation*, eds. S. Rivers, R. Faulkner, and B. Pretzel. London: Archetype. 92-106.

Institute of Museum and Library Services. Grant. https://www.imls.gov/grants/awarded/ma-30-13-0010-13.

McSharry, C., R. Faulkner, S. Rivers, M. S. P. Shafer, and T. Welton, 2007. The chemistry of East Asian lacquer: A review of scientific literature. *Reviews in Conservation* 8: 29-40.

Miklin-Kniefacz, S., M. Griesser, W. Parson, V. Pitthard, and S. Stanek. 2014. Searching for blood in Chinese lacquerware. *Studies in Conservation* 59 (1): S252-S253.

Petisca, M. J., J. C. Frade, M. Cavaco, I. Ribeiro, A. J. Candeias, J. Graça, and J. C. Rodrigues. 2011. Chinese export lacquerware: Characterization of a group of Canton lacquer pieces from the 18th and 19th centuries. *Proceedings of the ICOM-CC 16th Triennial Conference Postprints.*

Schellmann, N. 2011. Delamination and flaking of East Asian export lacquer coatings on wood substrates. In *East Asian lacquer: Material culture, science and conservation*, eds. S. Rivers, R. Faulkner, and B. Pretzel. London: Archetype. 107-121.

Schilling, M. R., H. Khanjian, J. Chang, A. Hegnibotham, and N. Schellmann. 2014. Chinese lacquer: Much more than Chinese lacquer. *Studies in Conservation* 59 (1): S131-S133.

Stavroudis, C. 2012. More from CAPS3: Surfactants, silicone-based solvents, and microemulsions. *WAAC Newsletter* 34 (3): 24-27.

Sullivan, M., S. Brogdon-Grantham, and K. Tiara. 2014. New approaches to cleaning works of art on paper and photographs. *ANAGPIC.* http://cool.conservation-us.org/anagpic/2014pdf/anagpic2014_sullivan_etal_paper.pdf.

Umney, N., and S. Rivers. 2003. *The Conservation of Furniture.* New York: Butterworth-Heinemann.

Von Stein, C. 2012. *Environmental evaluation of Winterthur's China Trade Room as it pertains to the long-term care of its Asian lacquer collection.* Student Report.

Webb, M. 2000. *Lacquer: Technology and conservation.* Oxford: Butterworth-Heinemann.

Yamashita, Y., and S. Rivers. 2011. Conservation of the photodegraded surface of the Mazarin chest. In *East Asian lacquer: Material culture, science and conservation*, eds. S. Rivers, R. Faulkner, and B. Pretzel. London: Archetype. 217-228.

FURTHER READING

Crossman, C. L. 1991. *The decorative arts of the China trade: Paintings, furnishing and exotic curiosities.* Suffolk: Antique Collectors' Club.

Rivers, S., R. Fulkner, and B. Pretzel (eds). 2011. *East Asian lacquer: Material culture, science and conservation.* London: Archetype.

Williams, J. L. 2008. The Conservation of Lacquer: Case Studies at the Asian Art Museum of San Francisco. http://s3.amazonaws.com/aam_phase2/pdf_assets/files/000/000/208/original/Williams_2008_Conservation_of_Asian_Lacquer.pdf?1384300665.

SOURCES OF MATERIALS

ArteColle Fish Glue (refined clear fish glue from France)
Source unknown

Ethanol, Plextol B500, polyvinyl alcohol sponges, silicone release Mylar
TALAS
330 Morgan Ave.
Brooklyn, NY 11211
212-219-0770
http://talasonline.com

Exel hypodermic needles, 25G x 1-1/2 in. x 0.5 x 38 mm & 22G x 1-1/2 in. x .07 x 38 mm
EXELINT International Medical Products
800-940-3935
http://www.exelint.com

Brooklyn Tool & Craft Hide Glue, 192-gram strength
Woodcraft of Wilmington
Shoppes of New Castle
166 S. Dupont Hwy., Suite H
New Castle, DE 19720
302-323-0400
https://www.woodcraft.com

Kimwipes
Fisher Scientific
300 Industry Dr.
Pittsburgh, PA 15275
800-766-7000
https://www.fishersci.com

Lascaux Medium for Consolidation
Kremer Pigments
247 W. 29th St.
New York, NY 10001
212-219-2394
http://shop.kremerpigments.com

Silicone rubber pads, 1/8 in. thickness
NovelTools
https://www.amazon.com

Silicone Solvent D4 & D5
Clearco Products
15 York Rd.
Willow Grove, PA 19090
800-533-5823
http://www.clearcoproducts.com

Vivak, 40 pt. thickness
University Products Inc.
517 Main St.
Holyoke, MA 01040
800-628-1912
https://www.universityproducts.com

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