

Figure 1. Lacquer table from the Ming dynasty, c. 15th century.



Figure 2. Export lacquer card table, c. 1800.

LACQUER LOSS COMPENSATION REVISITED: MORE BIG HOLES IN THE TOP

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ABSTRACT

This paper presents the treatment of a Chinese export lacquer card table (1800–1815) with uninterrupted provenance in one home and family. The table is one of a pair owned by the Society for the Preservation of New England Antiquities (SPNEA) and its treatment was designed and executed with the intention that the second table would be similarly treated at a later date. The paper focuses on the consolidation of the lacquer and the compensation for the multiple large losses on the top, including the losses to the decorative images. Details on the preparation of the proposal and treatment estimate are included.

INTRODUCTION

Chinese lacquer furniture goes back much further than Chinese export lacquer furniture. Figure 1 illustrates one such earlier example, a black lacquer table from the Ming dynasty, c. 15th century, in a classic Chinese furniture form.

In the 18th century, 300 years after that table was made, China opened up to trade with the West. When it did, Chinese craftsmen began to make lacquer furniture using European furniture forms for export to the new Western markets. The furniture was luxury cargo, shipped along with porcelain and silk to wealthy Europeans and Americans furnishing their homes in the latest style, with the finest goods.

One such wealthy buyer was Theodore Lyman, a Massachusetts merchant who furnished his c. 1800 home with the best that money could buy. Some of what his money bought was a pair of card tables, one of which is pictured in figure 2.

TREATMENT GOALS

In the 200 years since the tables were made, they suffered severe losses to the lacquer and decorative scheme on their tops. One table was selected for exhibition in the SPNEA traveling exhibit *Cherished Possessions*, prompting its arrival in the conservation lab. The goals of the treatment for the table were straightforward: stabilize the lifting lacquer, remove as much of the surface grime as possible, and compensate for the losses to the lacquer and decoration in such a fashion that the table could be appreciated as an intact representative of the best Chinese export furniture. Furthermore, the treatment should be designed and executed with the intent that the second table could be similarly treated at a later date.

WHY OLD LACQUER IS DIFFICULT AND LABOR INTENSIVE TO TREAT

Lacquer starts out as a perfectly smooth, well-adhered coating. It is also durable, being insensitive to heat, oil or water. But as lacquer ages it oxidizes, cracks, and delaminates, and as a consequence loses its smoothness, adhesion and durability. (fig. 3)

Lacquer oxidizes when exposed to light. The surface gets a little rough and looks dull, and it becomes sensitive to everything that it wasn't sensitive to before. Heat from a hot dish or hot knife will change the color permanently. Hand oils, as in a fingerprint, will remain etched in the surface. Water, if not removed



Figure 3. Contrast between exposed and protected lacquer surface.

immediately, will change the color and also dissolve the lacquer.

Lacquer cracks because it is a rigid coating on a moving substrate. Cracks are nature's way of relieving stress. Wood moves and lacquer doesn't, and therein lies the stress. There are different patterns of cracking varying in shape, size, orientation, and distortion from the plane. This is important to remember when it comes to loss compensation because a fill will not be believable if it fails to account for all of the variables that make up the cracking pattern.

Lacquer delaminates for the same reason that it cracks. Lacquer goes on as a viscous liquid, but once it has hardened it is useful to think of it as a rigid, incompatible veneer. Veneers come loose because the substrate moves differently than they do, and the same is true of lacquer.

PREPARATION OF THE ESTIMATE

The estimate for the treatment was based on the author's experience with other lacquer treatments and the condition of the surface. Timed tests were conducted to see what would work to consolidate

and clean the lacquer, and how long it would take to make the fills look good. Simple multiplication and division, with a bit of intuitive fudging, were then applied to calculate the overall totals.

For surface cleaning and consolidation:

- The total surface area was 3478 sq. inches: 3478
 - Approximately 50% of that surface was not delaminated, so subtract 1739 sq. inches 1739
 - It took roughly one hour to clean and consolidate four sq. inches, so divide 1739/4 435 hrs
- The working estimate for cleaning and consolidation was 435 hours

For loss compensation

- There were eight large losses requiring duplication of the aged surface and decoration, at approx. 10 hrs. per site 80
 - There were multiple smaller losses not needing texture or decoration 16
- The working estimate for loss compensation was 96 hours

CONSOLIDATION

With the assistance of Marianne Webb's *Lacquer: Technology and Conservation*, the choice of con-



Figure 4.
Consolidant
testing.

solidating agent for the delaminated lacquer on this table was made with the following criteria in mind:

- ability of the solvent carrier to “relax” the tented lacquer where necessary so that it would lay flat
- adequate adhesion of the lacquer to the wooden substrate
- nominal penetration of the adhesive into the substrate to maintain an adequate resin coat between the lacquer and wood
- good penetration of adhesive to areas not directly accessible (the “wicking” factor)
- no damage to oxidized lacquer surface in application of adhesive or removal of excess adhesive

With those criteria in mind, the consolidant possibilities were narrowed to Aquazol and fish glue. These were then tested on both flat and tented areas of loose lacquer. (fig. 4) For areas where the lacquer was loose but flat, the following protocols were tested:

1. Dilute fish glue¹ (2 ml + 5 drops H₂O + 2 drops EtOH) injected under loose but not tented lacquer, pressure overnight.
2. 10% Aquazol² 50/200 1:1 in EtOH/H₂O 3:1

injected under loose but not tented lacquer, pressure overnight.

3. 10% Aquazol, then 20% Aquazol in EtOH/H₂O 1:1 injected under loose but not tented lacquer, pressure overnight.

For the delaminated lacquer that was also tented, the following protocols were tested:

4. Dilute fish glue injected under tented area, no pre-flattening or pre-hydration.
5. EtOH/H₂O 1:1 injected under tented areas and pressure overnight to flatten (no adhesive). When flat and dry, injected with dilute fish glue and weighted overnight.
6. Same as #5, with small amount of EtOH/H₂O solution injected again before injection of fish glue to improve penetration to inaccessible areas.

The Aquazol mixture proved to be inadequate as an adhesive. Increasing the concentration improved its adhesive ability but reduced its penetration to the point where it was not satisfactory. The fish glue proved to be a good choice, provided that the lacquer and wood were appropriately prepared and “primed.” To that end, protocols #1, 5 & 6 were used as needed.



Figure 5. Detail of large losses on exposed top.



Figure 6. Mold locations for different cracking patterns.

The consolidation of the delaminated lacquer with water-based adhesives was necessarily a cautious one to avoid discoloration. Substantial oxidation on the top and legs made it essential that any excess water or adhesive be removed almost immediately. To that end, each time an area was injected and weighted, the weights were removed after a minute or so and any excess material removed with a swab. This was repeated at least twice for each delaminated area.

The application of pressure to the loose lacquer while the adhesive dried required its own variations to ensure adequate weight where needed. On especially flat areas a Plexiglas caul was placed di-

rectly over the area to be weighted and pressure applied. On more irregular areas, a sandwich of silicone-release Mylar,³ Pellon and a Plexi caul were placed over the area to ensure that the low areas also received pressure while drying.

LOSS COMPENSATION

Compensation for the losses in the lacquer and decoration varied with the size of the loss and the degree of aging of the surface. Small losses (no larger than the diameter of a pencil) could be filled with pigmented wax, Modostuc,⁴ or any one of a number of filling materials that could be leveled and toned to be unobtrusive. With larger losses (fig. 5) the surface quality of the old cracked lacquer needed to be duplicated, including the color, gloss and decoration. For these losses, a simple flat fill of Modostuc or wax was not acceptable.

To duplicate the surface quality of the old cracked lacquer, the first step was to “copy” the old surface with a silicone mold. On this table

there were at least three distinctly different cracking patterns in the areas of loss. Silicone rubber⁵ molds of intact surfaces in each area were made so that losses in those areas could be compensated with casts of the same pattern. (fig. 6)

The second step was to make casts from the molds, effectively creating synthetic veneers that could be fitted into the areas of loss. The synthetic lacquer casts were made from a bulked epoxy⁶ toned with dry pigment⁷ (iron oxide black) to shift the color towards the original surface. The amount of pigment relative to the epoxy was by eye, so there was some variation in the final grey color of the casts. Pencil rubbings outlining the losses were then glued onto the epoxy casts in the appropriate

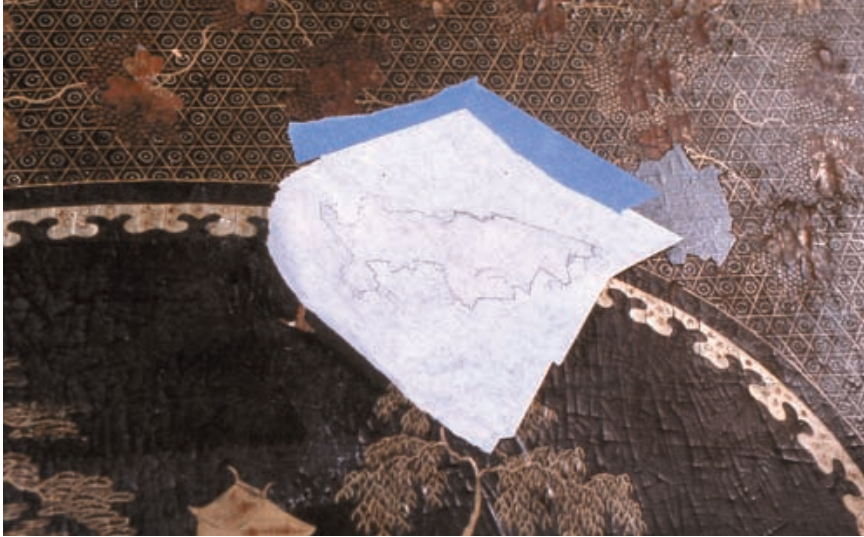


Figure 7. Replacement lacquer veneer cut to fit irregular loss.



Figure 8. Toning background color of replacement lacquer before in-painting decoration.

orientation, and cut out with a back-bevel using a jeweler's saw. (fig. 7) The thickness of the cast was adjusted with coarse sandpaper. The fills were adhered with liquid hide glue,⁸ and the small seam gaps filled with pigmented beeswax.

Once the replacement "lacquer" was in place, the next step was to color it to match the brown-black of the original lacquer. Prior to coloring it, the oxidized original surfaces were coated with 10% B-72⁹ in Cyclosol¹⁰ to restore saturation. The replacement lacquer was then air-brushed to match. (fig. 8) As needed, surfaces were polished with bone black pigment and Stoddard solvent to adjust gloss.

DECORATION

The final step in loss compensation was to reproduce the missing decoration of leaves, flowers, part of a boat, and the diamond grid line. This involved replacing the missing or incomplete images, and also duplicating opacity, color and wear patterns. Initial attempts with traditional in-painting techniques and a hare-brained effort with colored pencils were all deemed unacceptable. Ultimately, the best result was achieved with a variation on oil-gilding.

The decorative leaves and shapes were sketched on with pencil and sized with a tinted quick oil size. (fig. 9) The oil size was tinted red, green or



Figure 9. Sizing the missing decorative images with quick oil size.



Figure 10. The top after treatment.

yellow depending on the final color desired. The sized image was then "gilded" with mica pigments. After the gilding, the fine lines of the grid were easily trimmed with a sharpened bamboo skewer to thin the line width.

Gilding on the surface with mica pigments was not an ideal substitute for the original technique of embedding gold powder between lacquer layers. The mica pigments were somewhat transparent, their reflectivity varied with angle of viewing, and the palette was limited. Nonetheless they were deemed acceptable.

CONCLUSION

The result of this treatment was a table that appeared to be old but well-maintained, with its surface secure and complete and the decoration largely intact. (fig. 10) The treatment of the second table at a later date should proceed along the same lines, with the necessary adjustments for differences in surface sensitivity and intended use.

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MATERIALS USED

1) 3110 RTV Silicone Rubber®. Dow Corning Corporation (mfr), Midland, MI 48540; Essex Group, Fort Wayne (distr), IN, 800-774-4643.

2) Aquazol® (poly(2-ethyl-2-oxazoline), water- and alcohol-soluble resin, available in mw=50, 200, 500). Conservation Support Systems, P.O. Box 91746, Santa Barbara, CA 93190-1746

3) Araldite® 1253 (aromatic epoxy bulked with titanium dioxide, amorphous silica, iron oxide, and phenolic resin). Ciba Specialty Chemicals Corporation of North America (mfr.), East Lansing, MI 48823-5691, 517- 351-5900; Plastic Tooling (distrib., special order), 800-328-8788; Industrial Sales Assoc. (distrib., kits only, minimum of 24 kits), 978-851-9494, or for individual 5 oz. tube kits (\$9.50): RNS Direct, 770-844-1748.

4) B-72, Paraloid® (a copolymer of ethyl methacrylate and methyl acrylate). Rohm and Haas (mfr.), Pittsburg, PA; Conservation Resources International, L.L.C., 8000-H Forbes Place, Springfield, VA 22151, 800-634-6932.

5) Cyclosol 53 (slow drying aromatic solvent blend, including trimethyl benzene). Guard-All Chemical Co., P.O. Box 445, Norwalk, CT 06856, 203 838-5515; (To obtain product literature from manufacturer: Shell, 3200 Southwest Fwy., Ste. 1230, Houston, TX 77027, 800 457-2866).

6) Dry pigments. Pigments are selected on the basis of long term stability and colorfastness. Various suppliers and manufacturers including: Kremer Pigments, 228 Elizabeth Street, New York, NY 10012, 212-219-2394, Mohawk Finishing Products, Inc., Rt. 30 North, Amsterdam, NY 42010 (518) 843-1380, and Conservator's Emporium, 100 Standing Rock Circle, Reno, NV 89511, (775) 852-0404.

7) Fish Glue (liquid). Kremer Pigments, Inc., 228 Elizabeth Street, New York, NY 10012, 212-219-2394.

8) Modostuc (PVA-based water-soluble putty). Peregrine Brushes & Tools, P.O. Box 200, 41 North Center, Wellsville, UT 84339.

9) Mylar® (polyester film), manuf. Dupont, optically clear, colorless, chemically inert (no plasticizers), dimensionally stable

10) Titebond® Liquid Hide Glue. Franklin International, Columbus, OH 43207, 614-443-0241.