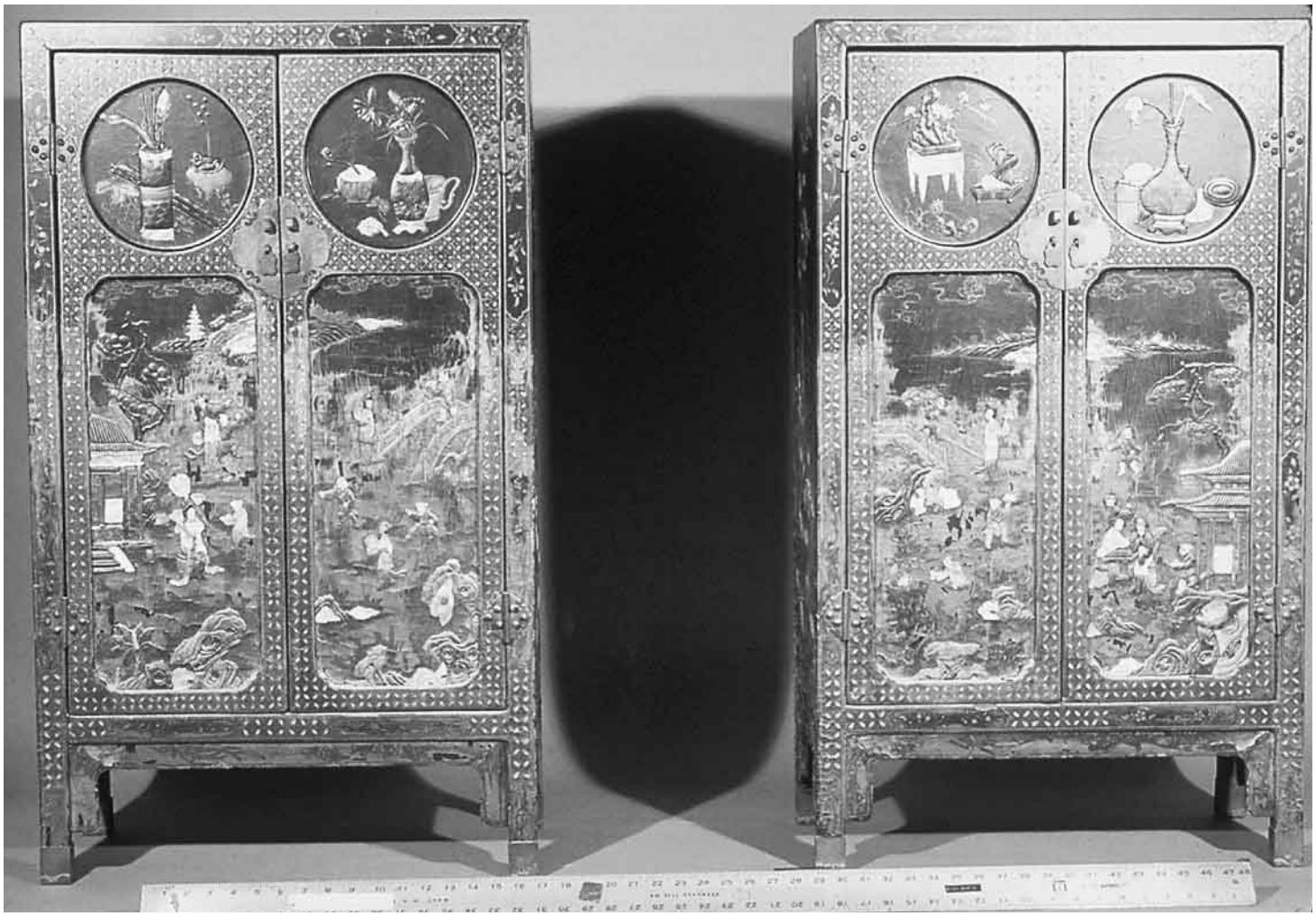

Figure 1: Before treatment, Chest "A" and Chest "B"

After the deluge: The conservation of two Chinese chests

Kathy Z. Gillis, Assistant Objects Conservator, Virginia Museum of Fine Arts, Richmond, Virginia

Introduction

IN THE SPRING OF 1995, THE NAPA VALLEY in California was besieged with rain and flooding. People were evacuated and possessions were left behind to fend for themselves. Colonel and Mrs. Melvin Clark returned to their home to find some objects had been in standing water for six days. Among their belongings was a pair of Chinese lacquer chests. *(fig. 1)* The pieces were brought to the Oakland Museum of California Conservation Center for encouraging words and undertaken as a private project for treatment by intern Cristina Bartolomé and myself. The treatment undertaken considered the fact that the objects would be returning to the owners and not placed within a museum environment.

Examination

The chests were composed of a wooden substrate onto which a chalky ground layer was applied, followed by a coating of dark lacquer. The uppermost layer was a clear coating. Approximately two-thirds of the height of the chests from the bottom had been exposed to the standing water. The literal "tideline" of exposure was easily visible on the finish. Under these extreme conditions, it was remarkable that the chests did not suffer greater structural damage. The surface seemed to be affected the most.

Both the exterior and interior surfaces were affected. *(fig. 2)* On the interior, the coating was blooming, but not actively flaking. The exterior varnish, however, was delaminating from the lacquer. Surprisingly little damage was evident in the wooden structure under the lacquer. The lacquer coating seemed to act as an excellent water barrier. The wooden and ground components under the lacquer were only damaged in areas where there was previous structural damage to the legs of one of the chests.

This was the case for one of the patients (Chest "A") where a portion of the material between the proper left legs had been detached. *(fig. 3)*

Figure 2: Before treatment, Interior, Chest "B"

The corresponding areas on the front and proper right side of the chest and both sides of Chest "B" were split at the joins and were subject to movement. The substrate wood, however, appeared to be in stable condition, with most of the damage occurring to the varnish and lacquer layers.

The exterior varnish layer, which was actively flaking, was soluble in acetone, fluoresced yellow-green under ultraviolet (UV) illumination, and burned rapidly, indicating the likelihood of a cellulose nitrate-based coating. Under UV examination, it was also apparent that the existing coating had been sprayed on, without removing the hard-

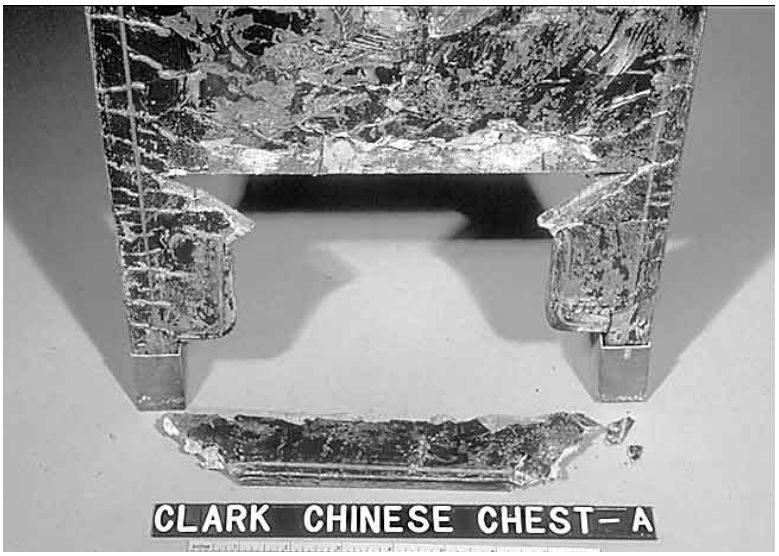

Figure 3: Before treatment, structural damage to Chest "A" proper left side.

ware, since shadows were visible under the drop handles. The interior varnish had been applied as a much thinner coat but appeared to be the same varnish.

All these factors suggested that the coating was modern and not original to the chests. On top of the lacquer, decoration had been applied, painted, and inlaid, and some areas had been gilded or painted with gold. All the decoration, gilding, and paint were under the varnish on the exterior of the chests. The gold decoration on the interior, however, was applied over the varnish.

There were two removable shelves, one from each chest. Each exhibited a green-colored bloom in visible light, and some areas displayed mildew. One shelf had flaking paint. The underside of each of the chests also appeared to have active mildew spores.

Treatment

The detached piece from the bottom proper left side of Chest "A" was reattached to the chest using hot hide glue and Acryloid B-72 acrylic resin in acetone. Loose pieces of wood around the legs and the top front moldings on the interiors of both chests were secured using hot hide glue. Areas of flaking lacquer, areas of loss, and areas adjacent to losses were consolidated using solutions of Acryloid B-72 acrylic resin in acetone. The concentrations of resin-to-solvent varied from 20% to 30%.

The losses around the detached piece were filled using a wax-resin mixture (polyvinyl acetate AYAC, ethylene acrylic acid copolymers A-C 540 and A-C 580, and an antioxidant, Irganoz 1076). This fill material had been used with good results and undergone testing over a number of years by John Burke, Chief Conservator at the Oakland Museum, as well as other conservation professionals. A barrier coat of polyvinyl acetate AYAC was applied to the surfaces to be filled. The fill material had good adhesion to the barrier layer, was easily sanded with acetone, produced a sheen similar to the lacquer, and was easy to control. Color matching proved to be the biggest challenge, since dry pigments had to be added to the wax-resin mixture during its preparation. Since the color of the lacquer was not completely uniform, it was difficult to achieve a match that was suitable in all areas of loss. The wax resin was heat-set into place and

Figure 4: After treatment, area of loss on Chest "A"

Figure 5: Detail of flaking varnish, Chest "B"

solvent-polished using acetone on cotton swabs. Additional smaller areas of loss on both chests were filled using this mixture and/or pigmented wax. *(fig. 4)* Subsequent to this treatment, information about this fill material was published in the Spring 1997 *Journal of the AIC*, in an article by Susanne Gänsicke and John W. Hirx, entitled "A Translucent Wax-Resin Fill Material for the Compensation of Losses in Objects."

Although testing was carried out for the feasibility of resolubilizing the varnish, in many areas, the varnish was literally falling off in large sheets. *(fig. 5)* Much of the varnish, therefore, could be easily removed mechanically, and wooden applicators, microspatulas, and Teflon spatulas were used in this phase of the treatment. On the exterior of the chests, varnish that did not pop off easily was removed using acetone on cotton pads and swabs. The coating on the upper third of the chests, where the varnish had not been affected by the water, was also removed using acetone. This was done in order to assure uniform aging of all exterior surfaces in the future.

The interior coating and the back of the chests responded more easily to testing for resolubilzation and evening out, and therefore did not necessitate complete removal. This option was preferred on the interior, since the décor was on top of the varnish. A 50:50 solution of acetone and ethanol was used for this resolubilization. Some severe areas of blanching inside the chests were removed by swabbing with pure acetone. These areas fortunately did not hold any decoration *(fig. 6)*.

The mildew on the shelves and bottom surfaces of the chests was removed using Stoddard solvent. The flaking paint on the shelves was consolidated with Acryloid B-72 acrylic resin in acetone.

After complete removal of the old varnish it was decided to replace the clear coating we had removed to provide the lacquer with a barrier from the environment. A replacement coating would also improve the appearance of the cloudy surface. A variety of options were discussed among the staff of the Conservation Center, and the coating cho-

Figure 6: After treatment, Interior, Chest "A"

sen was polycyclohexanone resin (Larapol K-80) in Stoddard and toluene. Irganoz 1076 was added to this mixture to hinder cross-linking of the resin. This coating could be brushed over the exterior lacquered surfaces providing a thicker coating than the previously sprayed varnish. Larapol was also applied to any interior surfaces where blanching varnish had been removed. We wanted a coating that could be removed with solvents other than acetone so that the coating we had applied could be distinguished from the acetone-sensitive coating that had been resolubilized on the interior. In addition, all exterior surfaces were then waxed using Renaissance Wax to add an additional moisture barrier.

The areas that had not experienced flaking varnish on the upper third of the chest did not change appreciably in appearance as a result of the treatment. The remaining areas, however, did change. (*figs. 7 & 8*)

Conclusion

The chests appeared to be in remarkably good shape after the extreme conditions to which they were exposed. Their condition is a testament to the durability of a uniform, healthy lacquer coating. The cellulose nitrate-based coating over the lacquer probably also contributed to the difficulty the water had in getting to the underlying layers. The decision to reapply a protective clear resin coating and Renaissance Wax was arrived at by consensus at the Oakland Museum Conservation Center to provide the lacquer with a barrier between the lacquer surface and the environment. Hopefully, these two chests will not be subjected to a similar situation, as the owners have now moved to higher ground.

Acknowledgements

I would like to thank John Burke of the Oakland Museum Conservation Center for assisting me in carrying out this project and educating me in the use and properties of the wax-resin fill material. I would also like to thank Mark Fenn, also of the Oakland Museum Conservation Center, for his assistance in providing the visual materials for this publication.

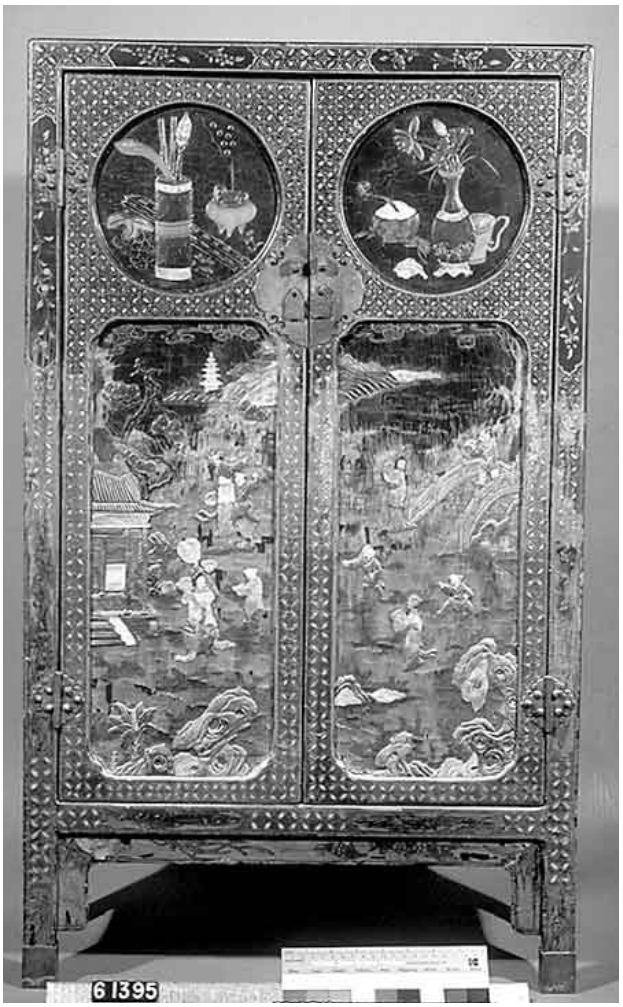

Figure 7: Before treatment, Chest "B"

Endnotes

1. Gänicke, Susanne and John W. Hirx. "A Translucent Wax-Resin Fill Material for the Compensation of Losses in Objects." *JAIC* Vol. 36, No. 1, Spring 1997, pp. 17–29.

2. This mixture was chosen based on a report in the *Journal of the International Institute for Conservation–Canadian Group* (JIIC-CG), Volume 3, No. 2, pp 7–12 by Raymond H. Lafontaine (CCI), which suggested the inclusion of a 2% antioxidant and a UV absorber. See also De LaRie, Rene and Christopher W. McGlinchey, "New Synthetic Resins for Picture Varnishes," in *Cleaning, Retouching and Coatings: Technology and Practice for Easel Paintings and Polychrome Sculpture: Preprints of the Contributions to the Brussels Congress, 3–7 September 1990.* See also Lawrence, Cynthia, *The Effects of Solvent*

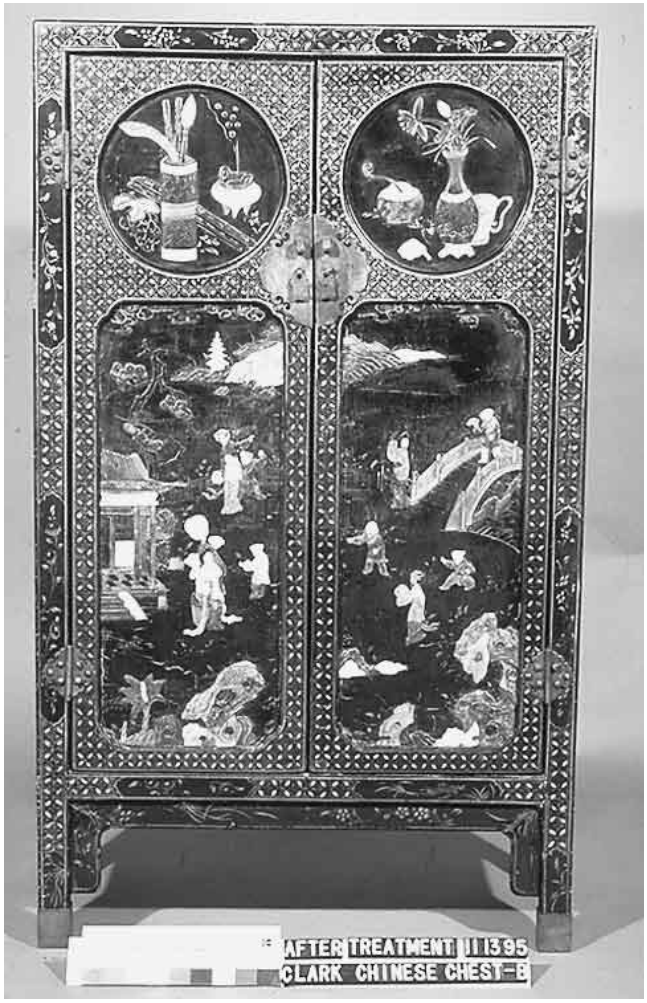

Figure 8: After treatment, Chest "B"

Variations on the Long Term Properties of Resin Coatings. Master's Thesis, Queen's University, Kingston, 1990. See also Cruickshank, Wendy Ann, *A Comparative Investigation of Two Polycyclohexanone Resins: Ketone Resin N and Larapol K-80.* Master's Thesis. Queens University, Kingston, 1985.

Questions

1. Are the decorative motifs in the circular panels on the front of the Chinese Chests original? Was a curator available for consulting? Did you have a chance to perform analytical tests on the material?

I do not know if the decorative motifs are original. This question was raised during examination before the treatment by the staff of the conservation center. Since there was no curator available for consulting on this project, no definitive conclusion was reached. We did not carry out any analytical tests on the materials.

2. How many hours went into the treatment of the Chinese Chests?

Roughly 600 hours.

3. Was cupping evident in any areas of damaged lacquer? How did you treat the cupping?

Cupping of the lacquer was not excessive and it was treated with Acryloid B-72 or in some cases, application of heat. To areas adjacent to the fills, the edges of the lacquer were secured by heating the wax/resin mixture.

4. Are you concerned about the reversability of the wax/resin fill on a lacquer surface?

No. It was actually a challenge to get the wax/resin fill material to adhere to the substrate. A coat of polyvinyl acetate AYAC was applied to areas of loss before application of the wax/resin material. This provided a barrier coat as well as a surface to which the fill material would adhere.

5. Are you concerned about the light stability of Larapol K-80 coating?

Antioxidants were added to the Larapol K-80 coating. Some research has been carried out at the Canadian Conservation Institute, which suggests that using antioxidants can hinder the yellowing of Larapol K-80 over time.

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