We Can Fix It, But Should We? A Technical Investigation of an 18th-Century Rush Seat Side Chair

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Abstract

Frequently in the course of conservation work, a greater degree of interpretive effort and research into the current condition and historical context of an object is required. During the pre-treatment investigation of an 18th century rush seat side chair, numerous questions regarding the originality of its components and current state of preservation were raised. This article will explore the ethical and practical issues surrounding intervention by the conservator. The condition of the structure and coatings are presented. Insights into period construction practices and historical coatings are thoroughly outlined. A technical investigation of the structure and coatings using radiography, microscopy, FTIR, and other instrumental techniques is presented.

Introduction

In the fall of 1997, a private client purchased an 18th-century rush seat side chair from a Hudson, New York antiques dealer. The chair was brought to the lab for conservation treatment. The client's initial request was to restore the chair to its utilitarian function, *i.e.*, the chair be structurally sound and function as seating furniture. To the client, this meant removing the degraded rush seat, repairing the broken seat lists, consolidating the loose joinery, cleaning and in-painting the coating, and finally installing a new rush seat. Upon close inspection on the chair, it became evident that there were several questions that should be answered before proceeding with any treatment. Specifically, there were questions regarding the originality of the rush seat, the front Spanish feet, and the type of coating material on the chair.

Numerous interpretations of this transitional form, with a Queen Anne back and a William and Mary base, were made in New England as early as 1720 and at least as late as 1800. New England household inventories of the period commonly list painted, rush-bottom vase-back seating (Forman, 1988). A great many of these chairs survive and are by no means a rare find. The chair does however have several distinct features. The two vase-turned elements of the front legs are executed in opposing directions. In addition, the front turned legs with Spanish feet are fabricated from a single piece of wood. Finally, the surface coating appears to be a thin brown paint that is sensitive to water. Unfortunately, since these types of chairs have only minor variations, no clear attribution of its geographic origin was found.

Period construction methods

This transitional Queen Anne form, made in the early eighteenth century would have been made entirely with simple tools. Tool marks such as those left by a plane, gouge, and an early lathe would have been evident on a chair after initial fabrication. Often tool marks are erased by age, use, excessive cleaning or aggressive refinishing. A close examination of an 18th century chair should reveal some of the following characteristics. Mortises would have been chopped quickly and in a workman like manner. The bottom of the mortise should show signs of the use of a mortise chisel and appear rough. Tenons would have been cut with a backsaw and show signs of saw marks. Chamfered edges, as on the edge of the back splat, would have been cut with a spoke shave or drawknife and would appear slightly faceted and uneven. Flat surfaces would have been planed by hand and could easily leave behind a slight concave surface or small raised ridges resulting from a nick in the plane blade. Turnings would have been produced by a Great Lathe or a simpler spring-poll lathe. Turnings made with a Great Lathe would have provided the turner with a continuously rotating blank. A spring poll lathe provided the turner with a blank that rotates in both directions and thus cutting would occur only half of the time. Due to the relatively low speed of these lathes, occasional tool marks left by a gouge or parting tool can be found. Holes drilled into the posts or legs would have been drilled with a spoon bit and would leave a slightly oval hole that terminated with a round bottom. Molded elements would have been made with carving tools, molding planes or simple scratch stock. Evidence of blade chatter could occur, which is characterized by small raised ridges that are perpendicular to the molding run. Pins, which secure the tenon in the mortise, would have been made of riven stock.

Construction

The crest rail is attached to the rear post by rectangular tenons at the post tops. Additionally the splat is secured to the crest rail and molded stay rail by rectangular tenons. The stay rail is tenoned into the rear posts. The flattened seat rails (called lists) are rounded on the outside edges. The side lists are round tenoned into the rear posts with the front of the list terminating in a corner block. The seat rails are joined to the rear posts and front corner blocks with round tenons. The front legs are round tenoned into the corner blocks. The side and rear rectangular stretchers are secured by rectangular tenons that are double-pinned into the front legs and rear posts. The front turned stretcher is secured to the front legs by round tenons. The Spanish feet appear to be continuous with the turned leg.

Condition

The structural problems that exist are quite visible to the eye. Upon close examination, the chair appears to retain all of its original parts, although the Spanish feet appear to have lost an inch in height. The chair frame is quite unstable with the pinned mortise and tenon joints being very loose and only held on by the pins. The exceptions are the joints of the crest rail, splat, and stay rail. These joints remain tight and secure.

Various nails and screws have been introduced to the loose joinery during prior repair attempts. A block is glued and nailed to the proper left rear post in an attempt to support the proper left rear of the seat list. In addition, the proper right list has its tenon sheared where it enters the post. The rush seat has losses to the front leading edge of approximately 1 inch in height and 12 inches in width. There are grooves worn into the front seat rail where the coils of the rush scoured the wood. When the grooves were counted, their numbers precisely match the rows of rush. The rush material has surface dirt, is unfinished, and shows no evidence of a prior coating. Due to the general instability of the seat frame, the degraded condition of the rush, and the loose joinery, the chair is incapable of functioning as seating furniture.

Initial condition and analysis of the coatings

The chair was inspected initially in both visible and ultraviolet illumination. The coating appears to be worn and thin, but continuous throughout

the chair. Under UV light, no obvious fluorescence was observed.

A small amount of coating was scraped from inconspicuous areas of the chair and divided up for solvent testing. Respectively, stoddard solvents, toluene, acetone, ethanol, and water were used to test the solubility of the coating. The samples were viewed under a stereomicroscope in the respective solvents and observed for any change. Water was the only solvent that caused the sample to swell. All other solvents had no noticeable effect on the coating. A sample was then taken to a hot stage and the temperature was raised to 175° C, at which point the sample charred. The sample did not melt or show any signs of flow. At this point, suspecting a protein-based binder, infrared analysis of the coating was performed using FTIR. Walter Hopwood of the Smithsonian Center for Material Research and Education identified the major component of the binder to be protein. Samples were then taken from an area in the lower section of the proper right rear stile and from underneath the front stretcher. Care was taken to ensure that the sample taken included the substrate as well as the coating layer. The samples were embedded in cubes of 100% reactive epoxy resin and polished to reveal a cross section.

Historic coatings

Since the initial coatings analysis suggested a course pigment suspended in a protein-based binder, a closer inspection of proteinaceous binding media used historically was in order.

Protein-based paints are often referred to as distemper paints. The term is imprecise and has different meanings in the different trades. In American house paint, distemper tends to mean a glue distemper. In England, the term has a broader meaning to include other types of water-based paints (Moss, 1994). Likewise the term tempera has some confusion associated with its meaning. The narrow meaning is paint bound by egg yolk or egg white. The broader meaning can include many kinds of water-based paints, including glue distemper (Moss, 1994). In short, glue, casein, egg white, and egg yolk are historical binding media, and their exclusive use in one discipline is rare.

Animal glue has been used as a binding material since the ancient Egyptians. It has seen use in general-purpose interior house paint. In the nineteenth century it was used extensively in architectural decorative painting.

The historic use of casein as a binding medium for paint is unclear. Gettens and Stout mention its use in ancient Hebrew documents. Cennini mentions the use of casein glue. In the United States, casein paints found commercial use in the late nineteenth century as interior and exterior house paints.

The use of egg white as a binder is best documented in European manuscript illumination (Thompson, 1956). There are no documented uses of egg white as a binder on painted wooden artifacts, although it may have been used as a temporary varnish (Newman, 1994). Films formed from egg white tend to be brittle and insoluble after aging, but egg white still has been used as a retouching medium (Masschelein-Kleiner, 1995).

Egg yolk was the principal medium in Italian medieval and early Renaissance paints. The binder is among the most stable of the natural binders, and thus medieval paintings often remain in good condition.

The history and analysis of protein binding media is well documented for paintings and architectural applications, but the use of a distemper coating applied to furniture is not clearly defined.

Technical investigation

The technical investigation of the chair began with a thorough visual inspection of the surface. Evidence of tools marks on the chair included; a clear hand-planed surface on the splat and raised ridges left by a nicked plane blade on the flats of the turned legs. The chamfered splat has an uneven faceted surface, and there are gouge marks under the yoke-shaped crest rail where the maker attempted to smooth marks left by the bow saw.

Clearly the surface retains all of the signs of a chair made with simple tools.

The originality of the rush seat is still in question. We found no evidence to suggest that it has been replaced, nor could we prove it was original. Therefore, the seat was treated as original material.

A series of zero-radiographs were taken to determine the internal structure of the joinery. Radiographs were taken of the Spanish feet, the post/crest rail joints, the stay rail joints, and stretcher joints. The Spanish feet are indeed original and continuous with the turned legs. The mortise and tenon joints all show clear evidence of being made by hand and were done in a workman like manner. The holes drilled to accept the lists were made by a spoon bit.

The embedded samples were viewed under the microscope and revealed a thin, but continuous coating. Coating material was visible in the pores of the wood, giving further support to the fact that we were dealing with an original coating. The samples were viewed in visible and UV light and a single continuous layer of pigment suspended in a binder, essentially a simple paint, was observed.

Considering all the information gained from the coatings analysis, the likelihood that the coating is a true distemper paint is very strong. Distemper coatings on painted furniture have been reported (Schmidt 1994, Buck 1994), but are rare.

Ethical and practical considerations

Now that the chair has lost its ability to function as seating furniture, the question remains, should this chair be treated, and if so, whose needs should be honored? What becomes more important, the need of the user to sit in this chair or the historical significance of a true survivor? Should a utilitarian object, one that has survived the test of time with all of its original components, be preserved at all cost with disregard for its function?

Faced with this dilemma, what are the options? The first option would be to honor the owner's request and fix the chair. This would mean serious intervention by the conservator to remove original material. The rush seat would have to be removed, the seat list would need to be structurally sound fot the chair to function as seating furniture, and the coating would need to be cleaned and consolidated to be aesthetically acceptable to the owner. It is not our chair. If we flat out deny the owners request, will he not take it to a restorer, and then, do we not bear some of the responsibility for the loss of historic material?

As conservators and advocates for the object at all costs, one option may be to lobby to have the object respected as a period document. Simply to preserve its current state with no intervention on the part of the conservator has risks of its own. The chair is much too fragile. Any movement of the chair risks the loss of seat material. In addition, the loose joinery and broken lists will be further compromised if the chair is sat upon. The notion of nonintervention may also lead to further losses of both function and historic material.

A balance must be struck. If we educate the client to respect the historic significance of the chair, and still minimally intrude on the object to prevent further loss of material and function, have we not done the best we can? To consolidate the loose joinery, stabilize and compensate for losses in the rush seat, restore some measure of structural integrity to the broken seat list, and finally minimally treat the coating, have we not done our best as conservators? The questions are always clear, the solutions, not so.

Treatment

Treatment began by inserting a flat metal brace underneath the rush and securing it to the seat list with hot-melt glue. A tap was left long on the list so it could be inserted in the gap at the bottom of the mortise in the rear post. Once the joints were consolidated, the list was held in place. No other method of attachment was necessary.

The loose joinery was consolidated with hot hide glue. Care was taken to minimize any glue squeeze-out. Joints that could be pulled apart were cleaned and re-glued. Joints that were loose and could not be taken apart were consolidated by injecting hot hide glue into the joint with a syringe.

David Bayne, furniture conservator at Peebles Island, was consulted for minimally-intrusive treatment of the rush seat. First the loose seat fragments were tied together with polyester thread. This helped to restore some lift that had been lost and also to consolidate the loose fragments. The losses in the rush were filled in with synthetic rush. Strips of synthetic rush were cut, one end was wrapped with Japanese tissue and glued with a white PVA. The ends of the paper were left long, leaving a boot hanging off the end. These pieces were left to dry. Once dry, the paper boot could be easily slipped over the original rush and glued in place. The opposite end of the synthetic rush was left long at this point while the glue dried. When the first joint was secure, a piece of acid free matt board was glued to the underside of the seat rail with hide glue. Next, a wedge-shaped piece of wood was glued to the matt board to compensate for the loss of loft on the leading edge of the rail. The wedge provided a good gluing surface for attaching the synthetic rush. With the wedge in position, the tails of the synthetic rush were glued to the board with hide glue. The remaining long tails of synthetic rush were woven into the bottom middle of the seat.

This method proved extremely successful. It is important to pay special attention to the twist of the original rush. It will twist clockwise on one side of the chair and counter clockwise on the other.

When all fragments had been filled in, the surfaces of the synthetic rush could be abraded and modeled to match the wear of the original seat material. The synthetic rush was then in-painted with Liquitex, Soluvar matte picture varnish and earth pigments.

The final stage of the treatment concerned the cleaning of the matt painted surface. Since it was extremely important that the surface remain matte, dry cleaning methods to remove surface dust and dirt were used. The utmost care was taken not to abrade the original surface. Considering the historical significance of this coating and the relatively few documented examples of true distemper paint on utilitarian seating furniture, it was decided that the surface remain as is. No further treatment was done.

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