

TO CLEAN OR NOT TO CLEAN? - DECISION MAKING FOR TEXTILE WET CLEANING

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ABSTRACT - This paper explores the decision making process textile conservators use to evaluate whether it is appropriate or beneficial to clean a historic textile. Primarily, the aims and objectives of the cleaning process are guided by basic conservation principles and test results for each individual textile. Three case studies are presented focusing on the factors which influence and support the cleaning treatment of textiles damaged in environmental disasters. The discussion describes the treatment and criteria which influenced the choice of conservation methods for these textiles which otherwise may not have been considered for wet cleaning.

1. INTRODUCTION

If we agree that cleaning is an irreversible process and results in the permanent alteration of an artifact, the conservator's task is to determine whether a cleaning treatment is advisable. Therefore, the decision must be made beforehand whether the benefits of cleaning, or some aspect of the expected outcome, outweigh the risks of the treatment chosen.

Although the cleaning procedure is in fact irreversible, I believe the removal of disfiguring and damaging deterioration products is beneficial if the treatment succeeds in reducing the risk of further degradation. I always hope for an improvement in appearance as well, but it is never my primary reason for choosing to wet clean.

This paper presents the decision making process I have used to justify cleaning three textiles which were damaged in environmental disasters. In each case, water had caused disfiguring and degrading stains, and the choice

of water as a solvent was dictated by this condition. Each of these textiles under "ordinary" circumstances would not have been considered for wet cleaning because of condition, construction, the presence of fugitive dyes, or type of materials.

The three objects include an eighteenth-century painted silk waistcoat; a fragile embroidered silk flag; and a wall covering with a jute foundation. In making the decision to wet clean these objects I took into consideration the condition and relative problems of the damaged material, and the logistics of modifying standard cleaning procedures.

2. EIGHTEENTH-CENTURY MAN'S WAISTCOAT

Water stains formed on a French eighteenth-century painted silk waistcoat while it was framed (figures 1 and 2). The owner was keenly interested in removing the disfiguring stains and displaying the waistcoat with proper support in the original frame. As a conservator, my aim for the treatment was to reduce the deterioration products and the textile's sensitivity to acid hydrolysis associated with water stains. If the treatment was to be successful, aesthetic improvement would be a satisfying, but secondary goal.

2.1 CONDITION EVALUATION

It was evident upon preliminary examination of the water stained areas that the green and brown surface decorative paints were water soluble. It was predicted that they would bleed if subjected to wet cleaning. Before making decisions on stain removal, it was important to investigate



Figure 1.



Figure 2.

the condition of the fibers underneath as they would probably be in a more deteriorated condition. I found the silk was significantly weakened and more fragile where stained; this condition was noticeable in several stained areas with associated fabric losses and fractures.

The decisive factor in determining the cleaning procedure was to choose between localized cleaning and wetting of the entire object. As expected, testing revealed that the unstained portion of the silk waistcoat had not been washed before. A droplet of deionized water readily wet out the stained areas and remained in suspension on top of the unstained silk. However, with the exception of the fractured areas, the silk retained good flexibility and overall strength. All surface decorative paints were stable with the exception of the green and brown pigments mentioned. Initial testing with selected solvents and blotting revealed little or no movement of the stain. While there was some risk, loss of green and brown pigment was believed to be minimal.

The adverse effects of wet cleaning which I considered when deciding between localized cleaning and immersion cleaning included changes in the surface characteristics, amount of pigment loss, and the possibility of differential shrinkage between the linen lining and the silk fabric. If the stain were to be worked locally, breakage between the outer edge of the stain and subsequent ringing were definite risks, especially considering the condition of the silk and the fact that it had never been wet cleaned. Local stain removal was rejected because of the risk of secondary staining or fracturing.

However, immersion cleaning was equally risky considering the problematic two-layered construction, and the fabric-covered wood

buttons which most certainly could not withstand contact with water. Immersion cleaning could result in loss of control and definite risk to the composite elements. Therefore, I decided to approach the treatment by rinsing the waistcoat in sections with careful attention to the drying method to maintain control.

2.3 TREATMENT METHOD

For the stained waistcoat I developed a treatment which combined the benefits of overall wet cleaning with the control of localized cleaning. This consisted of rinsing the adjacent front panels in sections, without complete immersion. This method allowed me to take the precautionary measures needed to keep the wood buttons dry, yet still wet clean the waistcoat overall. Further treatment modifications included placing a polyester film strip slotted for the buttons underneath them to prevent contact with the water.

Because of the risk of pigment loss, I decided that total cleaning time should be minimal and water temperature kept low. A dilute nonionic surfactant solution (0.05% Igepal-CO-630) was chosen for these reasons. The surfactant solution was selectively brushed onto stained areas, blotted, and the entire waistcoat panel rinsed repeatedly.

The final step was to use a cotton drying cloth to control the drying in one direction and to prevent redeposition of soluble soils and dye (figure 3). Although preliminary tests resulted in little or no reduction of the stains with blotting, the capillary action of the drying sheet drew the stains upwards and out of the textile (figures 4 and 5).



Figure 3.

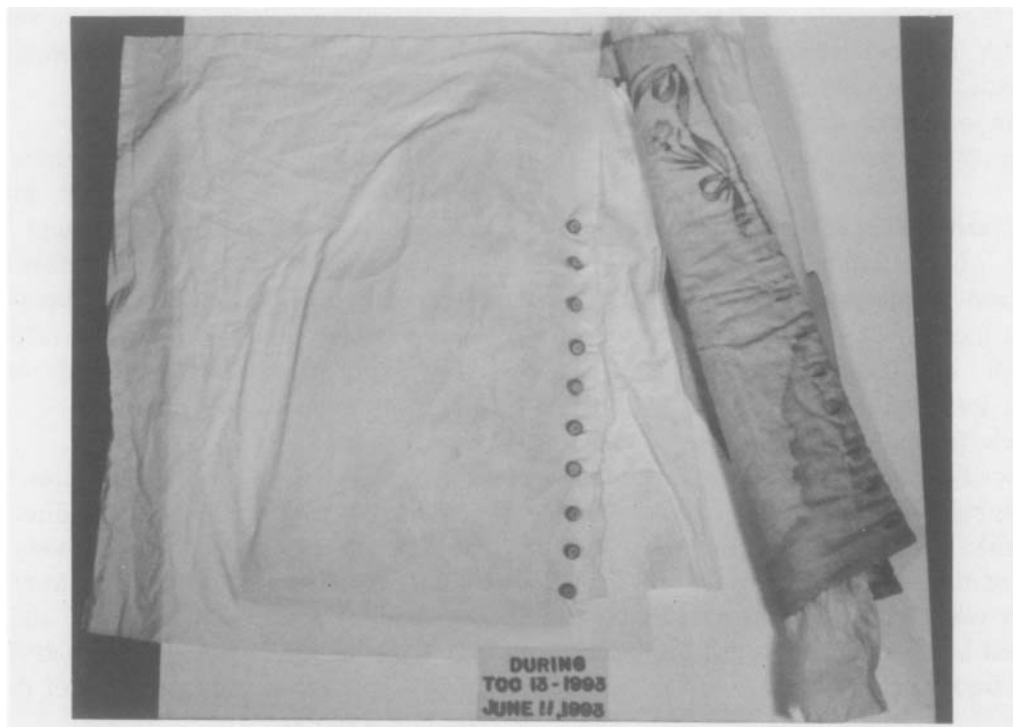


Figure 4.



Figure 5.



Figure 6.

2.4 TREATMENT RESULTS

The soluble paint dye stains were significantly decreased and no additional color loss was apparent. Degradation products and stains were reduced, and visual improvements were achieved through careful attention to modifications dictated by the needs of this particular object (figure 6).

3. SILK FLAG, WAR OF 1812

A flag from the War of 1812 (viewed on the reverse side prior to unframing) had been subjected to a water disaster resulting in fungal activity (figure 7). Severe water damage and extreme discoloration were concentrated in the lower half, forming stiffened water stains, surface deposits and stains from the mold growth (figure 8). Overall, the ground fabric condition was very poor, with shredding throughout in the weft direction. It was apparent during examination that the fabric easily powdered with abrasion or pressure.

In the initial evaluation of the fabric condition, this flag was not a likely candidate for wet cleaning. However, faced with further degradation caused by the deteriorating agents of microorganisms and their enzymatic action and the resulting stains and discoloration from the acidic mold, there seemed to be no alternative. I made the decision to wet clean, even though the ground fabric was inherently weak.

3.1 CONDITION EVALUATION

Before a cleaning strategy could be approached, the mold was tested by culturing active spores on nutrient pads. The test results showed there were at least five active types within the sample. Two essential steps were taken prior to wet cleaning to reduce particulate soils and

deposits: surface cleaning with a H.E.P.A. filter vacuum, and an application of a 70% solution of ethanol in water used as a fungicide. The extent and apparent activity of the fungi warranted these pretreatments to arrest fungal activity. I felt this treatment combined with immersion cleaning would yield better results.



Figure 7.

Other factors weighed in favor of wet cleaning. In addition to the condition problems already described, there were severe distortions, overall wrinkling and puckering due to differential shrinkage, large fabric repairs, and the heavily embroidered construction (figure 8). A wet cleaning treatment would allow for realignment of the grain, crease relaxation, and some lessening of these distortions. In addition, wet cleaning would assist in removing any remaining matter associated with the fungal growth.

Both the degree of elasticity and extensibility of the fibers would need to be carefully evaluated before undertaking the process of flattening and realignment. The weaker weft element could not withstand manipulation. At this point an important part of the decision making process was to determine which cleaning method would most safely and efficiently accomplish this without risking further damage to the weaker element.

3.2 TREATMENT

The fragility of the flag made it important to limit movement during all stages of the aqueous treatment. Therefore, the use of polyester film (Mylar) placed under the textile helped to keep fragile areas immobile during the fungicide treatment, application of the surfactant solution and subsequent rinsing. A fine nylon net covered the entire flag during cleaning as a measure to prevent movement of the textile.

The wet cleaning treatment proceeded. After the 70% ethanol and deionized water treatment was completed, several preliminary deionized water rinses began the wet cleaning procedure. One application of an anionic surfactant solution (0.20% Orvus WA paste) in deionized water was applied to the front side with a soft brush. Due to the fragile nature of the saturated silk, it was decided not to turn the

flag over during the process. In addition, the water level was kept to a minimum during the treatment, and the wash tank was tilted to drain the rinse baths. After the wet cleaning, the polyester film used for support assisted in realignment of the grain and correction of overall distortion.

3.3 TREATMENT RESULTS

The end result was a significant improvement in preparation before mounting (figure 9). The fabric distortions were decreased and stains were no longer visible. Tests conducted after treatment showed no traces of the previous fungal activity.

4. PRINTED WALLCOVERINGS, CA. 1908

The next object most definitely falls into the category of those that, under normal circumstances, would not be considered for immersion cleaning. A set of circa 1908 wall coverings adorning the walls of the library in the Sawyer mansion (now known as the Osh Kosh Public Museum) were damaged in the aftermath of a roof fire, when water leaked from the attic above. The curator was advised to remove them immediately, blot up as much excess water as possible and freeze them to prevent fungal growth. Soon after the wall coverings were removed, in June of 1994, the walls were blackened by mildew due to the high humidity and summer temperatures.

The Textile Conservation Center received the frozen wall coverings five months after the disaster. We were asked to examine them and propose treatments if the damage was not, in fact, irreversible. We would test clean one panel to determine the overall fate of the whole set. Wet cleaning was the only treatment deemed appropriate to eliminate disfiguring



Figure 8.

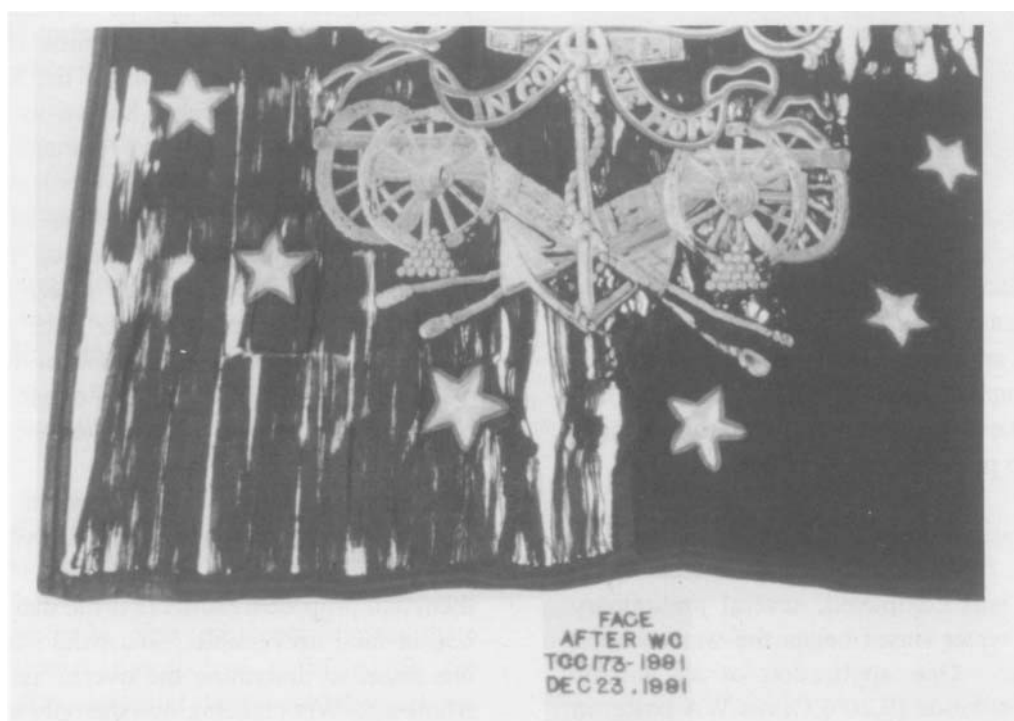


Figure 9.

water stains and sooty soils. The curator would use our evaluation to determine if the original wall coverings were to be reinstalled or reproduced.

4.1 CONDITION EVALUATION

The panels are made from a linen warp and jute weft, with a stencil-printed surface (figure 10). The jute was extremely weak, but the dominant warp in the structure was of a stronger and relatively flexible linen. This was a key factor in deciding whether the panel could withstand the wet cleaning treatment. The weft structure in fact would serve to contain the weaker jute sufficiently.

Other condition problems to consider were the solubility of the adhesive, the possibility of removing paint and plaster encrustations on the reverse (figure 11), and the need to minimize damage to the printed surface. An iodine test for the presence of starch were positive (reagent: 0.01% iodine solution of 2.4g of I₂ and 1.3g of iodine dissolved in water to 1 liter). The adhesive readily swelled when subjected to water. Although crocking was considered to be a potential problem, it was found that the soluble degradation products similar in color to the printing pigment gave the impression of poor rub fastness, but in fact this was not the case. Further examination revealed the printed surface was stable and could withstand the slight mechanical action and water necessary for the selected cleaning process.

4.2 TREATMENT METHOD

As a result of these findings, I decided to apply slight mechanical action, using a soft brush, with the anionic surfactant solution (0.35% Orvus WA paste in deionized water). This method was a valuable part of the cleaning process, as it dislodged the swelled adhesive, paint and plaster residue on the rear that could not be vacuumed beforehand. Sprayed water

assisted in flushing residual matter. Again the use of a cotton drying cloth was important to prevent redeposition of degraded fiber and possible staining. After wet cleaning, the panel was laid out, noting original measurements, and shrinkage was monitored during drying. Once dried, final measurements were taken, and shrinkage was found to be one half inch or less. Blocking, therefore, was not necessary.

4.3 TREATMENT RESULTS

The results of this wet cleaning were positive. The presence of the dominant linen warp provided sufficient protection for the jute weft during immersion. The panel was significantly cleaner and the color contrast brighter (figure 12). The yarns were noticeably softer and reduction of the old adhesive residue and plaster encrustations (figure 13) gave an overall flexibility which would not have been achieved otherwise. Overcoming the challenges of wet cleaning will now allow the entire set to be treated and re-installed.

5. CONCLUSION

In evaluating the cleaning of textiles, we as conservators make decisions that are determined by the individual object. Even when we think we know what the final outcome will be, damaged textiles always present unknown factors. Preliminary testing is the first step, but experience and intuition are equally important guides in the process by which a treatment choice is established. As we continue to weigh the compromise between effectiveness, risk and preservation, we make informed decisions for cleaning textiles.

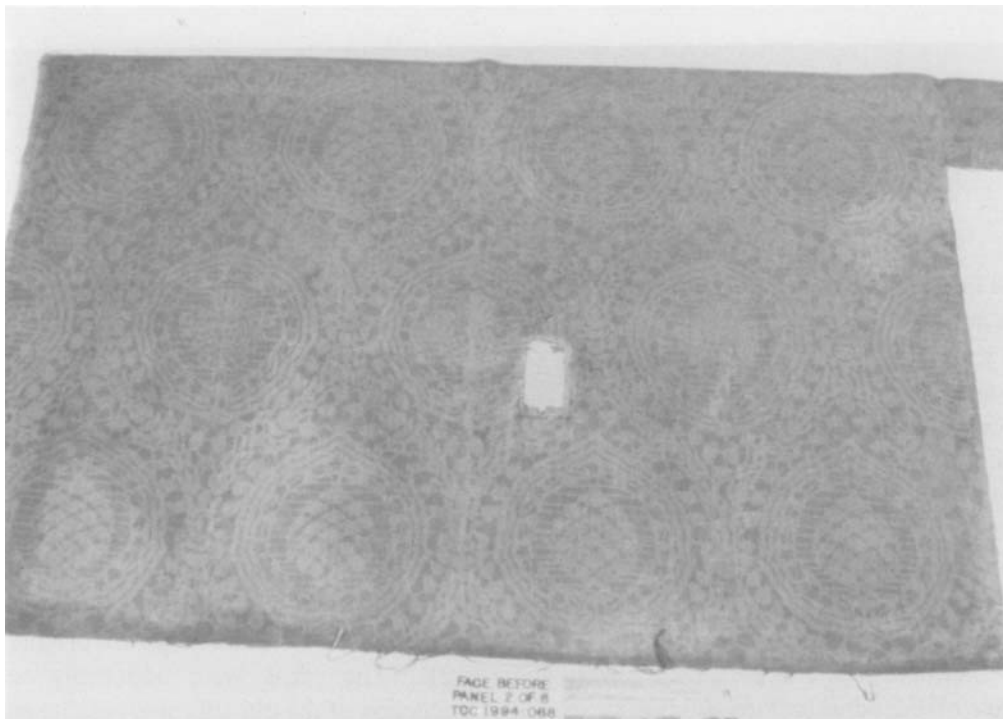


Figure 10.



Figure 11.

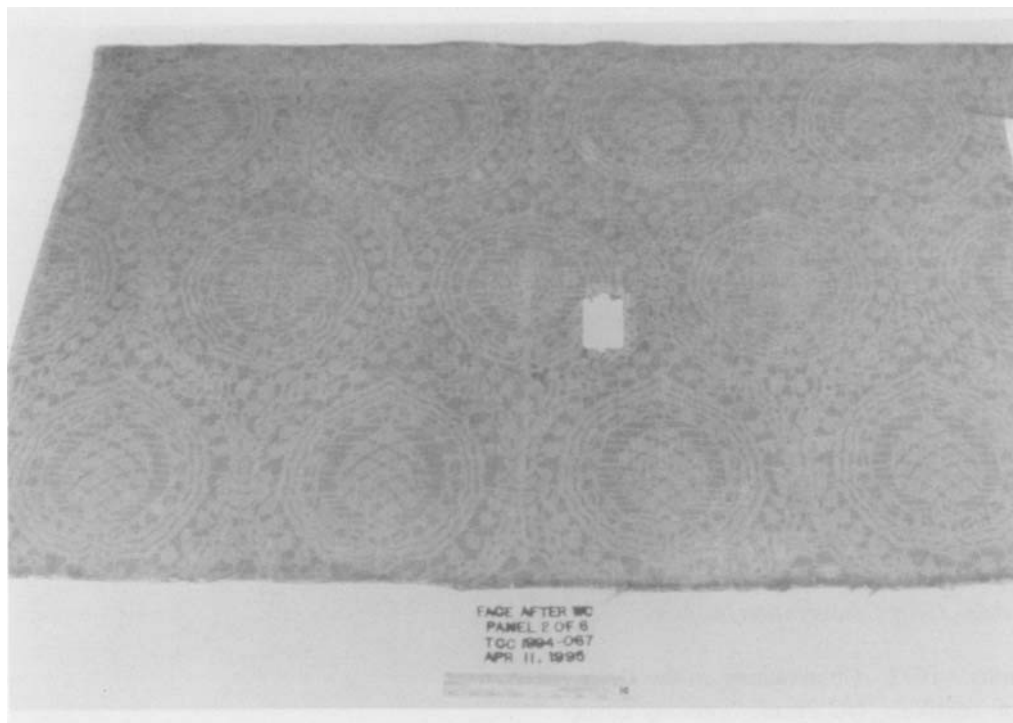


Figure 12.

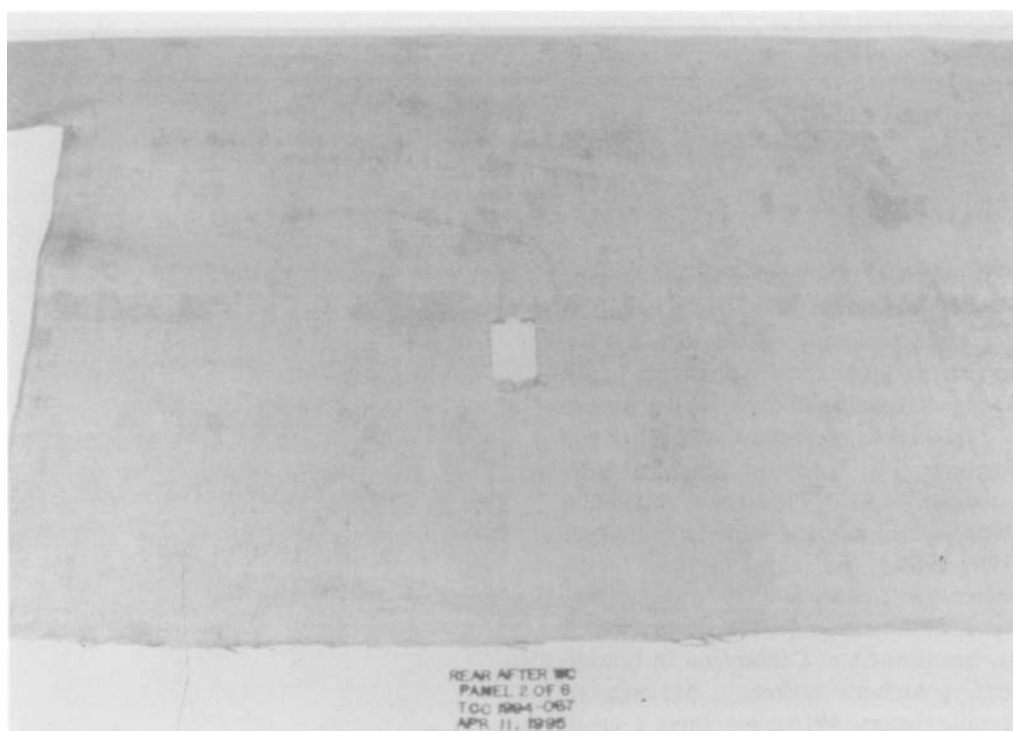


Figure 13

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