DISASTER RECOVERY AT THE UNIVERSITY OF ALBERTA, OR EVERY FLOOD HAS A SILVER LINING

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ABSTRACT—The Clothing and Textiles Collection at the University of Alberta successfully recovered from a flood which had occurred in December of 1996. Staff, students, and volunteers worked effectively throughout the salvage and recovery stages. During the salvage operation, both air drying and freezing techniques of the artifacts were utilized while documenting the damage and other diagnostic information. This documentation, as well as existing reports, proved a valuable resource throughout the recovery. Treatment techniques were explored and adapted to the needs of the artifacts in order to achieve a high level of success. The flood-damaged clothing and textiles provided numerous challenges throughout the salvage operation and recovery, whereby positive solutions were found. In the end, the flood afforded many with employment, experience, and a platform for the sharing of knowledge and techniques.

INTRODUCTION

One very cold Alberta morning, Sunday December 22, 1996, an emergency call went out to staff, students, and volunteers. A flood had occurred in the University of Alberta Clothing and Textiles Collection some time during the weekend. During renovations to the building, a fitting had broken on a pipe two floors above. Needless to say, significant damage had occurred to the Collection, with dirty water pouring from the ceiling into the compactor storage unit. The salvage team worked efficiently making the salvage operation a success. Clothing and textile artifacts were either bagged and frozen if soaked, or allowed to air dry if only slightly damp. Detailed lists of objects and their locations, as well as photographs of the entire operation, assisted with recovery treatments and insurance claims. Following the aftermath, a review of the damage and plans for the treatment of over 300 textile artifacts began. Contract and volunteer conservators were hired throughout the course of the flood recovery.

Treatments varied from wetcleaning, to spot removal using suction and blotting techniques, to altering the pH of the solution to attempt the reversal of dye transfer. Successful techniques were discovered for the spot removal of tidelines, particularly on water-sensitive objects. We found ourselves having to treat soaked textile and clothing artifacts that normally would not be wetcleaned. The results of these treatments were often successful.

SALVAGE

The exact time that the pipe burst on that -35°C morning was never established, but given the fact that some of the artifacts were already dry, we can only speculate that it had happened that weekend. The flood water was light brown in colour, which may have come from the golden coloured insulation material of the ceiling tiles, as well as from the dirt it picked up along its travels. The water was later analyzed but the cause of the colour was inconclusive. The Gas Chromatography/Infrared, or GCIR, showed trace organics including phthalates and long-chain acids such as oleic acid. Small amounts of calcium and magnesium were revealed in the Inductively Coupled Plasma Emission Spectroscopy, or ICP, analysis.

The salvage team, headed by Suzanne McLean, Curatorial Assistant, worked efficiently making the salvage operation a success. Artifacts were removed from the storage unit and dealt with according to their degree of wetness. With only two domestic chest freezers available space was limited, so only those clothing and textile artifacts that were soaked were contained in clear polyethylene bags and frozen. Those that were only slightly damp were moved to tables or hanging racks and allowed to air dry.

A number of rolled textiles were amongst those soaked. The largest chest freezer available in the Home Economics Building was not long enough to accommodate these rolls, so an alternative for frozen storage was sought. Fortunately, the Provincial Museum of Alberta has a walk-in freezer used for their natural history

collection. Several long, rolled textiles were transported to the Provincial Museum for interim storage.

Detailed lists of artifacts were generated throughout the salvage and recovery stages, as well as photographs of the entire operation. Both assisted with recovery and insurance claims. Recording the artifacts' temporary location, condition as to degree and location of wetness, and dye transfer were found to be invaluable sources of information in their recovery. Throughout the recovery process a tally was kept which recorded the accession number, object name, and treatment hours, both proposed and actual. This tally was found to be useful to keep track of complete and incomplete treatments, as well as for insurance purposes.

Once the immediate crisis was over that Sunday, a review of the damage and plans for the treatment of the artifacts began. A global time estimate for all damaged artifacts was produced for the insurance adjusters and to determine staffing needs. Those artifacts that were moved to the tables or hanging racks to dry were examined so that a time estimate for treatment could be established. Proposing a time estimate for the frozen artifacts was more difficult, since many were bagged and frozen before a conservator could examine them. For these artifacts, an estimate was established by viewing the frozen artifact through the bag, and by reviewing the initial artifact tags and lists. In most cases the estimates were completed in haste, so the time proposed for treatment of all artifacts was doubled to allow for treatments that would inevitably go over time. In the end it was found that the actual treatment hours were only fifty percent greater than the original estimate total.

A few weeks following the flood, those artifacts left out to dry were moved back into the storage compactor unit. At this time it was noticed that there were more flood-damaged artifacts than originally identified. A thorough examination was needed of all objects. Two staff members and one volunteer reexamined each artifact and found an additional 184 possible casualties. Note that only 136 were retrieved during the salvage operation. This is likely attributed to the urgency of the situation. Water was still pouring into the compactor unit when the first of the salvage team arrived; they needed to work quickly. Time to thoroughly examine each and every object was simply not available. As well, numerous volunteers with varying levels of expertise were helping. Their ability to properly identify water damage varied. But even with the second survey of the Collection, damaged artifacts continued to be found throughout the recovery process.

With the list of damaged artifacts now totaling just over 300, a priority system was developed and objects treated accordingly. Priority One objects generally received treatment first, and included the frozen artifacts and those that exhibited dye transfer. Priority Two objects, which generally had obvious tidelines, were next. Priority Three objects were treated last. It was questionable as to whether all the damage seen on these final objects resulted from the flood.

Contract and volunteer conservators were hired throughout the course of the flood recovery. In order to maintain some consistency with the treatments, guidelines were established for photography and handling of the treatment procedure including retrieving previous conservation and/or student documentation reports, and utilizing standardized condition and treatment forms which were adapted for the flood (Fig. 1).

RECOVERY

The recovery operation of the flood-damaged clothing and textiles included treatments such as wetcleaning; spot removal using suction, absorption, and blotting techniques; and altering the pH of the solution in order to attempt the reversal of dye transfer. To illustrate some of the techniques employed to treat these water-damaged textiles I will present them as case studies.

Certain procedures were followed when treating the frozen artifacts. Any existing records were retrieved prior to removing them from the freezer, since it was close to impossible, in most cases, to view the artifact properly. Time was of the essence. These records included student documentations or earlier conservation reports. They provided information such as descriptions, fibre and material identification, and diagrams and/or photographs, whereby the potential for unexpected surprises was reduced. If the artifact was dry, low-suction vacuuming generally preceded treatment.

GUIDELINES FOR DOCUMENTATION/TREATMENT PROCEDURES OF FLOOD DAMAGED TEXTILES

1. Prior to treating the textile, retrieve any existing documentation that may elaborate on dimensions, method of manufacture, fibre ID, or anything else that may help in the decision making for treatment.

2. Once the decision for treatment is made, prepare the work area, as other conservators may be using the equipment and/or space.

3. Record as much information as possible on the Condition/Treatment Report provided. Without going into great detail, record the overall condition of the object even though it may not be related to the water damage, i.e. tears, holes, etc. These aspects of the object may be affected by the subsequent treatment. Try to follow the worksheet provided.

4. If possible, do a fibre ID, or record your assumption(s) followed by a "?".

5. Photodocument the object before and after treatment, and during if deemed necessary.

6. Dry textiles should undergo vacuuming prior to any wet treatments.

7. Secure any holes, weaknesses, tears, etc. with netting prior to cleaning.

8. Record as much information as possible about the wetcleaning/drying procedure, i.e. pH, temperature, detergent concentration, time spent in baths, colour of bath (soil removal, dye loss), use of fans, drying cloths, or dye migration.

9. Record procedure, and solution concentration and pH of any spot treatments.

10. Any other observations should be noted on the worksheet in the space provided, i.e. Was the treatment successful, did anything unusual occur, how were the objects found (frozen?).

11. Record the time spent for documentation and treatment.

Fig. 1.

CASE STUDY I: ACCESSION NO. 79.8.8

An off-white, low-twist crepe silk, 1920s dress with black silk embroidery floss suffered from dye transfer. The dress had been frozen but was only damp when retrieved from the freezer. The black embroidery floss was not fast in water and subsequently transferred a purple-coloured dye to the off-white ground fabric. The transfer was evident in many areas throughout and near the embroidered sections. For this reason spot cleaning did not appear to be an option. Full immersion also did not appear to be an option because the black dye was so obviously not fast. With testing, it was found that the dye was easily removed with an anionic detergent solution of 0.2 percent Orvus WA Paste in distilled water. The curator was called for a consultation. Given the positive results of the spot test it was decided to proceed with a full immersion wetclean.

In anticipation of unfast dyes, the drying area was prepared with fans and hand-held blow dryers set out so that the dress could be dried quickly. The dress was immersed in the bath and major dye loss was evident only toward the end of the process. In an attempt to encourage the dye away from the dress, the bath water was swirled by hand. The dress was removed from the bath and blotted with white cotton towels, where dye transfer was visible. Once blotted, the dress was immediately hung on a polyethylene-covered, padded hanger, and drying was accelerated by the fans and blow dryers set on a cool setting.

Results of the wetcleaning were very positive. The dye transfer which had occurred during the flood, in most areas, was removed from the white silk with only two lightened stains remaining. There was no additional transfer of dye to the white silk. Despite gentle stretching during drying, there was some shrinkage of four percent in the lengthwise direction due to the tightening of the crepe yarn.

The fact that the transferred dye was relatively easily removed with wetcleaning might be explained because the conditions for dye uptake were less than ideal. And the fact that newly bled dye did not penetrate or diffuse into the white silk fibres upon drying might be explained because the embroidery was dried quickly. Given the sample size, simple testing methods noted in Trotman's "Dyeing and Chemical Technology of Textile Fibres" (1970, 603–4) were inconclusive except to say that the black dye is not of a basic class but possibly an acid, premetallized or mordanted dye. Further investigation is warranted.

CASE STUDY II: ACCESSION NUMBER 77.5.101

A 1930s, beige crepe silk dress with a multi-coloured floral pattern was frozen due to water damage along the back hem. Fugitive dyes on this dress included the navy blue, green, yellow, and magenta. The dye transferred into both the beige areas and the adjacent dyed areas. When this dress was retrieved from the freezer it was still wet. In order to prevent those areas from drying that were not being treated immediately, they were covered with polyethylene sheeting.

There were two objectives for the treatment of this dress. The first was to remove or reduce the dye transfer that had occurred, and the second was to prevent the formation of a tideline along the wet edge. In attempting the removal of the dye transfer, the most innocuous solution of water was tried first. Water was discriminently sponged only onto the areas of dye transfer, with disposable diapers beneath to absorb the water. Finding no success, a 0.2 percent anionic detergent solution of Orvus was sponged on in the same manner. Still no success. A more aggressive approach was taken.

With the fibre content of this dress being silk, assumptions were made that the dye might be of an acid class. An alkaline solution, therefore, might be successful in stripping the unwanted dye. An alkaline solution was prepared using a 0.1 percent solution of sodium carbonate in distilled water. The pH was lowered to 8.9 by adding 4:1 glacial acetic acid in water dropwise. This alkaline solution was applied onto the areas of dye transfer using a dropper and absorbed in a disposable diaper beneath. While the diapers worked reasonably well in pulling the liquid directly downward so as not to spread it to adjacent areas, the suction table was also tried but was found to have an inadequate draw for this purpose. Removal of the navy blue and magenta dyes was moderately successful. The yellow and green dyes tended to leave a yellow halo around the motif that only lightened with repeated applications of all three solutions, but did not disappear.

Areas which were wet but had no dye transfer were sponged with the distilled water and detergent solutions as above. They were dried quickly using hand held blow dryers set on a cool setting. A slight tideline formed upon

drying, so an attempt to remove this by sponging with only a slightly dampened sponge while feathering the edge was tried. There was some success with this technique, however applying the same solutions while using the suction table resulted in greater success. The tideline could be moved to the seam line or hidden by a motif. Treatment on the suction table also prevented the crepe yarn from further twisting and promoted a flattened texture.

CASE STUDY III: ACCESSION NUMBER 84.40.1B

An unweighted, shot silk bustle skirt and drape in brick red and teal, dated from the mid 1880s, was damaged in the flood. The front hem area of the skirt was wet and dark tidelines were evident on the right side of the skirt where it had been stained with the flood water but had already dried. The right corner of an additional skirt drape was also wet. Both had been frozen. The skirt drape was easily wetcleaned in a bath of distilled water and a 0.2 percent anionic detergent solution using Orvus. The skirt, however, was not so easily cleaned due to its multiple layers.

Two techniques were used to flush the wet area and reduce the formation of tidelines. With the first technique, the wet areas were sponged with distilled water through to a disposable diaper which was placed beneath each section of pleats and with the second, the suction table was used. Where there were layers of fabric, as with the pleats, the diaper technique was more successful, however with only single layers of fabric the suction table worked well.

Initially a saturated wet sponge was used to supply a greater quantity of distilled water to flush the area. This area was blotted with white cotton towels then encouraged to dry quickly using a hand held blow dryer set on a cool setting. Meanwhile, the perimeter of the stain was feathered out by using a slightly damp sponge. The black tideline softened but continued to move. It appeared as if more than a water mark was staining the fabric. The interfacing beneath the pleats was found to be composed of a black cotton of which the dye exhibited very poor washfastness. It was thought that this was likely the source of the black tideline.

CASE STUDY IV: ACCESSION NUMBER 73.15.16 A–D

A second silk twill-weave bodice and skirt with a brown cotton interfacing, believed to be dated from the mid 1880s, was frozen in a solid block following the flood. The salvage comments read "Bodice soaked entirely, upper half and all of skirt back soaked, two of the three small fragments are wet, one fragment dry, brown dye fugitive, boning in bodice". These comments, as well as the experience gained from the previous treatment, were found to be very useful for proposing a treatment strategy.

The degree of wetness of all the garment components was extensive, so it was decided that an immersion might be the best treatment to remove the flood water and eliminate the formation of tidelines. A number of the pieces had cream-coloured silk insets decorated with metallic threads so it was decided to test only one fragment first with the full immersion. It was known from the salvage comments that the brown dye was fugitive. The treatment of the fragment in the test immersion was successful. Although the golden brown dye did discharge as expected, it did not transfer.

The bodice and skirt were immersed in a bath of distilled water at 33°C. Initially, there was the golden brown dye discharge as had been seen with the fragment. However, once the lining on the skirt thawed and became wetted there was a severe dark brown dye discharge. It seemed that "clouds" of dye were moving into the bath. The bodice was quickly removed and blotted with white towels. In an attempt to minimize the after effects of the dark brown dye from the skirt, distilled water was allowed to run into the bath while it was draining. The skirt was soon removed and blotted with white cotton towels.

Both the bodice and the skirt were set up to dry quickly with the aid of numerous fans. Because the bodice had iron-based metal stays, which had been identified by the previous rust stains on the inner bodice and by a magnetic pull, rapid cool air from blow dryers assisted the fans with drying. There was no additional iron corrosion evident and no dye transfer to the cream-coloured silk. The positive results of being able to hasten the drying process of a wet treatment on an object with iron-based findings has led to subsequent treatments of such objects—also with positive results.

The skirt treatment was less successful, however. The cream-coloured silk had greyed somewhat and there were numerous tidelines throughout the skirt. It appeared that the dye from the dark brown cotton lining had transferred to the silk. Further treatment strategies were reviewed at this point. Removal of the greying seen on the cream-coloured inset showed some success with a controlled sponging with the anionic detergent solution (0.2 percent Orvus in distilled water) followed by a rinse with distilled water. Detaching this inset and wet-cleaning with detergent was contemplated, however it was decided that subjecting the metallic threads to a second wet treatment was not justified. The improvement to the cream-coloured silk would only be moderate, and damage to the metallic threads a higher risk. There was a possibility of a loss of adhesion of the metallic foil to the paper substrate that would be caused by the detergent solution and agitation of the sponging action.

The skirt required further treatment to reduce the tidelines. A systematic approach was taken by isolating the skirt pleats with disposable diapers beneath for absorption of the wet solutions. Removal of the black tidelines was only successful by flushing with the 0.2 percent anionic detergent solution of Orvus in distilled water, followed by a distilled water rinse over the entire area. Removal also required that the entire pleat be rewet. Basically, the tideline was moved into the seam or buried beneath the next pleat.

Treatments of the above two artifacts exhibited similar results with regards to the black tidelines. The dye from the dark brown or black cotton interfacing had extremely poor washfastness and when in direct contact or close to the outer fabric the dye migrated to the silk. Because further treatment to the tideline did exhibit removal or movement, it is likely that it could be removed if the two layers could be separated. Identification of this dye is not confirmed, however it is suspected to be either a direct dye due to its poor washfastness, or possibly be a mordanted basic dye.

CASE STUDY V: ACCESSION NUMBER 89.26.1

A green and beige plaid, silk taffeta dress with a dark beige cotton lining dated from the 1860s suffered water damage along the back sleeve edge and proper left back hem. This dress was missed during the initial salvage operation so had dried, leaving crisp tidelines in these areas and a softened hand below them.

In testing for colourfastness, the green dye from the dress's outer fabric and skirt lining did transfer in both distilled water and a 0.2 percent anionic Orvus detergent solution. The skirt lining had no tidelines visible, while that of the sleeve did. The treatment objective for this artifact was to remove the tidelines in a controlled manner, while not causing the green dye to transfer, nor excessive wetting of the lining. Therefore, flushing was not an alternative.

Conservator Yolanda Olivotto perfected a tamping technique using blotting paper. Where the tideline was faint, only distilled water was applied by using a slightly damp corner of a small square of blotting paper (only 2 mm square). The moist blotting paper was pressed against the silk, which was then immediately blotted with dry blotting paper to absorb all the water. Where the tideline was darker, the technique incorporated a 0.2 percent anionic Orvus solution followed by a distilled water rinse. This technique successfully removed the tidelines while not wetting out the lining. The crispness of the line was also removed.

CASE STUDY VI: ACCESSION NUMBER 87.13.7

A late-19th-century silk diamond-patterned quilt was water damaged along one side. It had been frozen in the walk-in freezer at the Provincial Museum of Alberta. A conservation team treated some of these rolled textiles at the museum within weeks of the flood. However, when the team examined this quilt they decided it required a more time-consuming, specialized treatment, and returned it to the freezer. Once transported to the university, another team of conservators examined the quilt and proceeded to treat it with success.

This quilt was fragile with many silk patches in a degraded state. There was dye transfer from the flood and a student documentation report had noted preexisting areas of dye transfer as well. Full-immersion wetcleaning was not an option.

The tideline, and slightly beyond in the patterned portion of the quilt and to the edge of the border, were flushed with the anionic detergent solution followed with distilled water. The perimeter of the flushed area was feathered out using just slightly dampened blotting paper, as

with the previous treatment. Alternatively, clean white cotton gloves were used instead of blotting paper. Fans were positioned nearby to hasten drying. Once the recto was treated, tidelines on the verso were reduced by using sparingly dampened blotting paper, as with the previous case study.

CASE STUDY VII: ACCESSION NUMBER 85.15.1

A turn-of-the-century, wool weft and cotton warp cream-coloured dress with an embroidered net trim over the yoke and cuffs, had water damage along the proper-left back hem. The water damage had left a brown tideline with a crisp edge.

Treatment of this dress proceeded as a standard wetcleaning in a 0.2 percent Orvus anionic detergent solution in distilled water at 27°C. The tideline was easily removed, resulting in a successful treatment.

OBSERVATIONS AND RECOMMENDATIONS

Salvage

- Volunteers poses varying levels of expertise. Have those with greater levels play more critical roles during the salvage operation, i.e. handling the artifacts and noting the damage.

- In freezing wet artifacts, ensure that they are either bagged separately in clear polyethylene bags or with a similar barrier placed between layers.

- Record all that you can about an artifact given the time you have, i.e. visible damage, fugitive dyes, materials which require special treatment such as baleen boning or iron alloyed findings. The more information the better.

- Good indicators of water damage include stains to the wrappings around the textiles such as cotton muslin and tissue paper, as well as the presence of tidelines, dye transfer, and alteration of texture.

Recovery

- Retrieve existing records such as condition reports, documentation records, donor records, photographs, etc. prior to beginning your treatment. This helps to prepare you, especially if the artifact is frozen and not easily visible.

- Only unroll or unfold frozen artifacts once they have thawed. If there are no indications of fugitive dyes, they can be placed in a cold bath to let them thaw quickly so they can be easily unrolled or unfolded. If time permits they could thaw at room temperature or cooler.

- Clothing objects with metal or organic findings such as baleen boning or iron alloyed boning can be wetcleaned but require special attention during the drying process. For organic materials, the wetcleaning should proceed as quick as possible to reduce the likelihood of thorough wetting. Weights or tension may need to be applied during drying to prevent warping. For metals, dry quickly by blotting well and use fans and blow dryers set on a cool setting.

- Wetcleaning a clothing object with bias trim can often pose a challenge in finishing, as the trim, if pulled off grain in sewing, may not easily lie flat and may tend to buckle.

CONCLUSIONS

The University of Alberta Clothing and Textiles Collection survived a flood disaster that was a crisis with a silver lining. The Collection was fortunate to survive this flood relatively unscathed. In the end, only three percent of the artifacts suffered irreparable damage. While not to say this is of no consequence, because some of those artifacts were in excellent condition with good provenance, it is to say, however that it could have been worse. In many cases the damage caused by the flood was "reversible" and the artifact was able to receive a cleaning treatment it desperately needed. When presented with a wet object that would be considered a high-risk or poor candidate for a wet treatment, techniques were explored and often found to be successful. A better understanding of the treatment procedure and results when using water based systems was gained.

Many conservators of institutions suffer from the same woes—too few staff, lack of funding, time constraints, etc. Fortunately, a team of conservators could be hired for this flood

recovery; the insurance guaranteed funding; and, although there was some pressure by the insurance adjusters to finish the work quickly, reasonable time was given to successfully treat the artifacts as needed. While this flood was an unwelcome disaster, as all are, it afforded many with employment, experience and a platform for the sharing of knowledge and techniques.

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