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Unconventional Uses of Conventional Treatments: Three Case Studies in Paper Conservation

INTRODUCTION

As Brené Brown asserts, “Vulnerability is the birthplace of innovation, creativity and change” (Walters 2012). For conservators, it is when we delve into the unfamiliar with treatment projects that we face our vulnerabilities. When we are uncertain of how to proceed and are without our armor of knowledge, we become our most creative selves. These are the times that allow us to expand our thinking, probe information that is new to us, and collaborate with others, then assimilate and combine all of this with experience to develop innovative solutions to complex problems.

Fortunately, this field not only provides ample challenges but also supports and encourages experimentation and knowledge sharing. Conservators pioneer new techniques regularly, and innovation abounds in our field. We are almost overwhelmed with keeping up, making it easy to forget the tried and tested methods. What we must not forget, though, is that creativity and innovation reside in a holistic approach of bringing together the new, the old, and the potentially relevant.

The three case studies presented here will illustrate how conducting historical research, collaborating with a variety of colleagues, and adapting techniques in new creative ways can lead to highly successful treatments. The first project comes from India—a Punjabi manuscript from the early 20th century that had been saturated in disinfectant during a tuberculosis outbreak. The second is a previously repaired 17th-century Qur’an exposed to water and mold, resulting in pages blocking together. The last features a 19th-century print of Canada’s capital city Ottawa, heavily encrusted with dirt (fig. 1).

CASE 1

All of Professor Puran Singh’s possessions were burned upon his death from tuberculosis in 1931. This manuscript survived and had been disinfected against tuberculosis with an unknown

chemical. It certainly had a very pungent and yet familiar odor; one that was reminiscent of camping. The paper felt oily, and initial testing showed that water would not penetrate the surface of the fibers. The disinfectant had rendered the linen bond paper brown and so brittle that one felt it would crack with the slightest agitation. The ink had bled, presumably when the disinfectant was applied, reducing the legibility of the text.

A notable academic, scientist, and the founder of modern Punjabi poetry, Singh is celebrated to this day. Although this manuscript had sentimental value for the family, it is also the only physical representation of the personal life of this influential figure. The client’s primary goal for treatment was to make the paper strong enough for digitization, with overall preservation and a reduction of discoloration a welcome side effect. The owner understood that research and testing would have to be conducted and that there was no guarantee of finding a successful course of action.

Research began with historical medical texts on the disinfectant methods of the early 20th century. Surprisingly, nothing surfaced on what was used to disinfect items exposed to tuberculosis.

The familiar odor of the paper remained a prominent issue. While discussing the project with an elderly neighbor, she recalled that camphor oil was used as a means of warding off tuberculosis. With a little more research into the use of camphor oil as a disinfectant, the likelihood of its use on the manuscript could be comfortably asserted.

Testing possible ways of removing the oil from the paper proceeded based on a previous treatment the author carried out on a set of documents caught in a furnace oil leak. In that case, mineral spirits had proved successful. A test was conducted beginning with rolling a mineral spirit-soaked cotton swab against the surface of the paper. This produced no results, nor were the use of other solvents successful. Acetone was tested next, which instantly produced a lovely yellow swab, and yet it did not affect the ink. Based on the treatment protocol used previously to push furnace oil out of documents and into blotting paper, a full manuscript sheet was treated with exceptional results.

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Fig. 1. Left to right: A 20th-century Punjabi manuscript, a 17th-century Qur'an, and a 19th-century print of Ottawa

Each page of the manuscript was laid on a blotting paper and carefully doused with acetone applied with cotton balls. The process required two to three applications per sheet (fig. 2). The pages were then transferred to clean blotters and allowed to air-dry. Treating all 240 pages of the manuscript required 8.5 gallons of acetone and produced three-quarters of a large garbage can full of used cotton balls. This part of the treatment was carried out over 4 days.

The treatment brightened the paper considerably and allowed water to penetrate the fibers (fig. 3). Once the oil was removed, the pages could successfully be deacidified and lined with handmade paper. The lining provided renewed suppleness and provided overall strength. Although the pages appeared brighter, they remained too fragile for bathing. They were thus wet-out with a water and calcium hydroxide solution at a pH of 9.5. This brought the paper up from an average pH of 3 to an average pH of around 7. The fragments were fit in, the tears were aligned, and repair tissue was adhered to one side using wheat starch paste. The project was completed by placing each page in a numbered mylar sleeve and for digitization.

As the treatment was completed, a chance meeting with Gus Shurvell of Queen's University at the Canadian Association for Conservation of Cultural Property's annual conference in Edmonton confirmed the success of the treatment. Gus generously offered to perform tests through Queen's University's FTIR equipment. Disassociated fragments, both treated and untreated, were sent. The results of the tests were inconclusive, although the results combined with the historical research indicated that camphor oil was



Fig. 2. Using acetone-soaked cotton balls and blotting paper to wick out camphor oil

used as the disinfectant, and the treatment had succeeded in pushing out the oily product (fig. 4).

CASE 2

The 17th-century Qur'an that arrived in the laboratory during the winter of 2015 is a treasured family heirloom. The owner did not know much about it, not even the date. As the owner put it, however, with great pride, the book was "really, really old." Mold growth was evident, and the book had been repaired previously with binders tape applied along the spine and edges of the boards (fig. 5).

Prior to treatment, the author consulted with the Canadian Conservation Institute's Christine McNair and Crystal Maitland. They were both excellent sounding boards for potential approaches, and they helpfully provided a list of reference materials and potential contacts.

The most helpful resources for dating and identifying the paper and binding techniques were *Arab Paper* by von Karabacek (2001), "The Arts of the Book in the Islamic World, 1600–1800" by Marika Sardar (2000) on the Metropolitan Museum of Art website, and "Middle Eastern Bookbinding—The Islamic Book" by David Jacobs, presented in Contributions to the Symposium on the Care and Conservation of Middle Eastern Manuscripts at the University of Melbourne in 2008. Even more helpful was Sherif Afifi, conservator at the Library of Alexandria, who was a most willing and enthusiastic source of information.

The paper used in the book was most certainly handmade. It had uneven densities, as is typically found in handmade paper, and flecks of plant fibers that are typically reduced in machine-made alternatives (Hunter 1947). This likely placed the paper as being pre-19th century. The paper was heavily sized, accounting for blocking observed throughout, which was another indicator of being handmade. According to sources, the sizing may be wheat starch paste (von Karabacek 2001).

The ink, being hand applied, suggested that it was made before industrialization, and the blackness of the ink, with no red or brown undertones, indicated that it was carbon based (James 1997). The research further suggested that the ink probably contained a gall extract that created a slight translucency (Sircar 1996). These properties placed the ink to after 1600 and before 1800 (Sardar 2000).

The applique decorations on the cover were commonly used from the mid- to late 17th century and through the

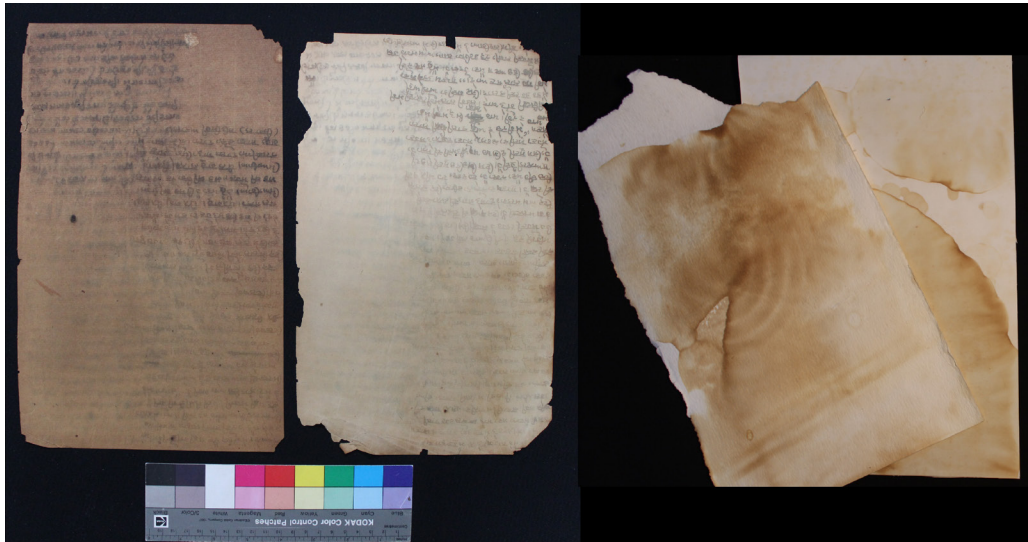


Fig. 3. Manuscript page before acetone treatment, next to the treated manuscript page and oil-soaked blotting paper

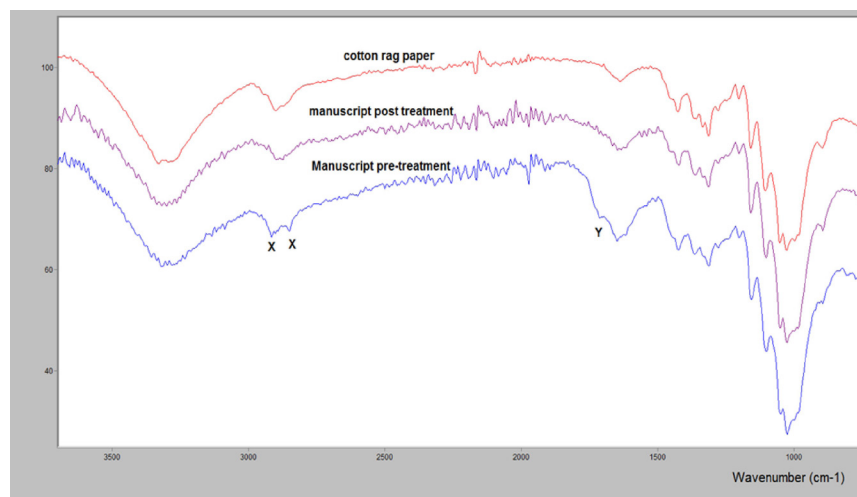


Fig. 4. FTIR results for the manuscript page prior to and after treatment, with to rag pulp paper reference line



Fig. 5. Blocked Qur'an prior to treatment

18th century, as was the hand-painted decoration found on the endpapers (Jacobs 2008). The hand-sewn whipstitch technique was more commonly applied to more substantial books but was a popular technique applied in the Middle East during the 1600s (Jacobs 2008).

Being more confident that a whipstitch style was original to the piece and could be recreated, that the ink was an insoluble carbon-based ink, and that the culprit of the blocking was the wheat starch paste sizing meant that treatment could proceed with a little more certainty. A technique commonly applied to lift prints adhered to backing boards with wheat starch paste using very hot water was used.

After disbinding, the first attempt to separate the pages involved steaming them with a wet blotter and tacking iron.

It was thought that this would be an easy-to-control method, but it resulted in dampening the edges of textblock, incubating the mold further. The process was also going very slowly, and the smell was abhorrent, even through the N100 mask.

In a subsequent attempt, one-half of the textblock was submerged in the hot tap water. There was no miraculous floating apart of the pages; however, it did allow for separation of the pages using Hollytex to provide support as each sheet was peeled off of the textblock and laid out to air-dry.

As the pages cooled, it became difficult to separate the pages, and fresh hot water had to be introduced every 15 minutes. The other challenge was that the pages were not numbered; therefore, each page was placed on a blotter, orientated carefully to keep the top and bottom and left and right aligned, and the blotter was numbered. The pages were then soaked with 70% isopropyl alcohol to kill the mold. After air-drying, the numbers were transferred to the leaves in graphite, indicating the location of the bottom recto.

Fortunately, the book was in two halves, because once the process was started, it could not be stopped for more than a few minutes or the paste sizing would reset. There was also a fear that if it were removed and set to dry, the mold would incubate and flourish. It took two very long working days, one for each half of the book, to separate the pages. The mold had eaten away the paper in many places, resulting in some small losses on every page.

Once apart and numbered, the pages were washed, resized with a thinned wheat starch paste, and the tears repaired with tinted handmade repair tissue, and the losses and tears filled and repaired. The pages could not be washed for longer than two 15-minute baths, as the paper would have turned to mush and been lost entirely.

Many photographs of the original sewing style were taken prior to treatment, and diagrams had been drawn as the stitching was cut (fig. 6). The pages were gathered into gatherings of 25 leaves and resewn through the original holes using a whipstitch and pick up sewing technique matching the original style. The spine was then glued up with a wheat starch paste, lined with Japanese paper, and the original endbands attached, then a strip of wide cotton muslin was affixed to the textblock spine, followed by a tube.

A new cover was constructed from acid-free binders board and covered in black, Moroccan-textured calfskin, which closely matched the remnants of the original binding. New endpapers were affixed, and the new cover was attached in a case-bound fashion. The case binding was employed to keep the rebinding obvious, allow for future incorporation of an Islamic binding if desired, and keep the costs down while allowing for the renewed use by the owner. The remnants of the original binding and original endpapers were humidified and stretched before being incorporated into the new binding, ensuring their association with the textblock. For this book, the case binding



Fig. 6. Original whipstitch next to the recreated whipstitch

serves the same purpose as an archival enclosure to hold all of the original components—the difference being that it is attached to the pages. In the end, a new life was given to this “really, really old” family treasure (fig. 7).

CASE 3

The latest challenge to come across the workbench was a print from Ottawa’s Bytown Museum. The quiet, friendly, and cultured capital city was once a rough town, run by gangs and thugs. Colorful historic characters include the French lumberjack Joseph Montferrand, who is said to have fought 150 Irish Shriners waiting for him on the Chaudière Bridge, and Mother McGuinty, who ran a popular Irish pub and was known for being able to land a good blow. When the town wanted to vie for the position of Canada’s capitol city, it shed the name *Bytown* and took on city status in 1855 with a campaign to shake its seedy reputation.

Although the note on the back of the print stated that it was from *Hunter’s Ottawa Scenery*, a book 13-1/2 × 10-1/4 in., it was actually produced by Whitefield as part of his 1855 series “Original Views of North American Cities” (Hunter 2008, GIGI 2018). The print’s pastoral and serene feel reflects the makeover being undertaken by the city at the time. The margins of the museum’s print had been trimmed, and the note indicated that it had been on “wooden retainers.” It is believed that this referred to a wooden stretcher and that the print was probably trimmed and coated in shellac at the time of mounting, as other copies are not coated.

Prints on high-quality, heavyweight rag pulp papers are usually a fairly common and straightforward artifact to treat. This one, however, had been coated with shellac, was encrusted



Fig. 7. Qur'an after treatment

with grime, and featured many cracks (fig. 8). Several crude repairs were present on the verso, including strips of cloth and newspaper adhered with a protein-based adhesive.

Mechanical removal of the dirt and grime caused the shellac to crack, lifting chips of the print layer, and therefore was not an option. The grime was so thick that it prevented isopropyl alcohol from penetrating the shellac, prohibiting the removal of the dirt along with the shellac layer. The shellac prevented wet submersion treatments for removal of the grime.

Finding a remedy for this problem came from techniques used in painting conservation featured in Wolbers' book on cleaning painted surfaces with aqueous methods (Wolbers 2000). If the shellac was thick enough to protect the paper from the water, a swab-washing technique had the potential for removing the grime to expose the shellac layer.

Similar to lifting dirt from a coated painting, cotton balls wetted with warm water were dabbed over the surface, followed by dry cotton balls. The wetting served to slowly dissolve the dirt, which was sucked up by the dry cotton



Fig. 9. Print partially cleaned with wetted cotton balls to remove the grime prior to shellac removal

balls—a simple and yet very effective solution (fig. 9). Various combinations of water and isopropyl alcohol were tried, but just plain warm water worked the best. Once the grime had been lifted, the shellac was removed with isopropyl alcohol, and applied and soaked up with cotton balls, followed by an aqueous treatment of the print.

Bathing in room temperature water with a small amount of Photoflo (an emulsifier commonly used in photographic developing) removed the ingrained dirt, and deacidification with calcium hydroxide was carried out in two subsequent baths. The old backing and repairs were removed, retaining the incorrect notation, and the cracks were aligned. A new cotton muslin backing was applied with wheat starch paste, and the print was dried by pressing between blotting paper, followed by infilling of the losses. Any lost media was recreated with Prisma color felt-tipped marker. Treatment finished with hinging the print to an acid-free backing board, with a window mat and a 20-pt board cover that folds backward to accommodate both framing and storage. The transformation of this



Fig. 8. Close-up image of the grime-encrusted, shellac-coated print



Fig. 10. An 1855 print of Ottawa prior to and after treatment

print was as successful as the Ottawa's 1855 transformation from rough to charming (fig. 10).

CONCLUSION

Admitting to what we do not know, facing our vulnerabilities, and taking risks always leads to amassing more knowledge, skills, and experience. The use of camphor oil on the Punjabi manuscript would never have been discovered without the casual discussion with a neighbor who suggested the possibility of its presence. Having the confidence and inclination to remove it came from previous experience, and a chance meeting led to confirming the success of the treatment. Taking the time to seek out information into Arabic papers and bindings, as well as finding support and guidance from colleagues at the Canadian Conservation Institute and the Library of Alexandria, enabled the successful discovery and application of a technique for separating the blocked pages of a treasured family heirloom. Applying a technique used to treat paintings returned life and beauty to a grimy print, giving it a new place of honor at the Municipal Museum and the ability to tell Ottawa's story once again.

Challenges are simply opportunities for growth, both personal and for the entire community. Whether it is through research into unfamiliar subjects or collaborations with experts and neighbors, and those in related fields, we can bring together knowledge and skills from a variety of sources and continue to design and employ successful treatment solutions. When we acknowledge what we do not know, and embrace our vulnerabilities, we are freed to discover and learn.

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