

All Over the Map: Bringing Buffalo's Stars of Cartography to Light, One Lining at a Time

INTRODUCTION

The Buffalo and Erie County Public Library Special Collections Department, which includes the Rare Book collection, holds nearly 500,000 titles including monographs, serials, scrap-books, microforms, manuscripts, organizational archives, phonograph discs, sheet music, scores, orchestrations, and an estimated 70,000 maps.¹ The conservation treatment of eight rare maps of the city of Buffalo in the library's collection was funded by a New York State Conservation/Preservation Discretionary Grant and highlighted in a recent exhibit in the library's Rare Book Room entitled, "You Are Here: Buffalo on the Map". The exhibit included more than 25 maps of the city (both originals and facsimiles) spanning virtually the entire 19th century, and featured seven of the eight conserved maps. Only one conserved map, showing the city of Buffalo at the turn of the 20th century, was left out of the exhibit due to limited secure display space.

HISTORICAL BACKGROUND²

The eight conserved maps collectively depict the growth of Buffalo, New York, from village to town to bustling city between the years 1805 and 1909. The story begins with *Map of Buffalo Village: 1805, 1850* (fig. 1). This earliest depiction, though drawn in 1850, dates to 1805, combining handwritten text about the village of Buffalo with a map depicting the city's original plan in its early days as a pioneer settlement, then called New Amsterdam. The map's text outlines the initial survey of lots and sales by the Holland Land Company and its local agent, Joseph Ellicott. It also lists the city's early newspapers and religious congregations, along with population numbers and early Buffalo history. With less than 100 dwellings recorded in 1811, the region would survive the burning of almost every building during the War of 1812 and begin a period of tremendous growth due, in large part, to



Fig. 1. Detail of *Map of Buffalo Village: 1805, 1850*, watercolor and ink on paper, 124 x 91 cm (Buffalo and Erie County Public Library, 31M-8).

the completion of the Erie Canal in October of 1825, which linked Lake Erie to the Hudson River.

In 1825 local historian Sheldon Ball wrote a brief pamphlet on Buffalo's early history, which included the first engraved view of Buffalo Harbor and a hand drawn map (fig. 2). *Ball's Plan of the Village of Buffalo* was the first attempt since Joseph Ellicott surveyed the area for the Holland Land Company

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Fig. 2. Detail of *Ball's Plan of the Village of Buffalo*, 1825, engraving on paper, 24.2 x 17.5 cm, (Buffalo and Erie County Public Library, RBR Print 251).

to extend the proposed geometrical layout of a plaza with eight streets radiating at equal angles, now known as Niagara Square. The map also notes the location of the "Grand Canal" which, at only four feet deep and 40 feet wide, was an engineering marvel of its time.

Hand-drawn in 1836, *Map of a Part of the Lower Village of Buffalo* shows how development began to focus on the harbor waterfront with a design as recommended by the minutes of a meeting of the village trustees from six years prior (fig. 3).

The first hand-colored original map of the city in the library's collection and the third oldest, *Map of the City of Buffalo* is of particular historical importance as it depicts Buffalo in 1833, just one year after it had incorporated as a city (fig. 4).

Produced in 1847 after the growing city saw a need for more facilities in an atmosphere of increasing commerce on the lake, *Map of Buffalo and Black Rock Harbors* depicts a proposed break water and new sea wall, along with a 300 ft. wide ship canal that would run just west of the Erie Canal and Buffalo Harbor (fig. 5).

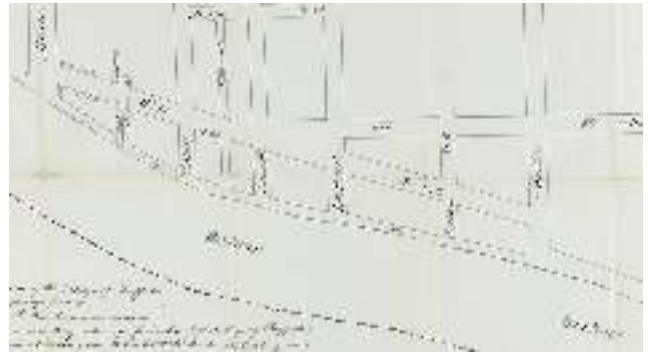


Fig. 3. Detail of *Map of a Part of the Lower Village of Buffalo*, 1836, ink on paper, 43 x 52 cm, (Buffalo and Erie County Public Library, 34M-320).



Fig. 4. Detail of *Map of the City of Buffalo*, 1833, lithograph on paper with hand-coloring, 81 x 86 cm (Buffalo and Erie County Public Library, 32M-3).



Fig. 5. Detail of *Map of Buffalo and Black Rock Harbors*, 1847, lithograph on paper with hand-coloring, 35 x 94 cm (Buffalo and Erie County Public Library, 32M-4).



Fig. 6. Detail of *Mann's Map of Buffalo Harbor & the Island*, 1888, relief print on paper, 89 x 146 cm (Buffalo and Erie County Public Library, 38M-13).



Fig. 7. *Map of the Retail Places of Business in the district covered by the Christian Homestead Association*, 1893, color lithograph on paper, 81 x 115 cm (Buffalo and Erie County Public Library, 34M-24).

Mann's Map of Buffalo Harbor & the Island of 1888 provides a detailed record of Buffalo's industrial age and development as a major inland port of the late 19th and early 20th centuries (fig. 6). The map documents long missing portions of Buffalo Harbor history by giving us the locations of commercial slips, but also the businesses on the harbor by name.

Those who like their history a bit on the gritty side will get a kick out of the 1893 *Map of the Retail Places of Business in the district covered by the Christian Homestead Association*, commonly referred to as *The Christian Homestead Map* (fig. 7). The Christian Homestead Association was one of many Buffalo charities devoted to rescuing "the unfortunate and erring through mission work". The homestead was headquartered in the heart of the canal region, or the "infected district," where all the sailors added to the increase of prostitution in the area. The lower right corner of the map tells the story



Fig. 8. Detail of *The Matthews-Northrop New Map of the City of Buffalo*, 1909, relief print on paper, 105 x 63 cm (Buffalo and Erie County Public Library, 34M-50).

with colored dots, identifying 75 "houses of ill-fame," 108 saloons, 19 "free theatre saloons", and 76 other retail establishments. Maps outlining areas of prostitution are extremely rare and this map is truly one of a kind.

The Matthews-Northrop New Map of the City of Buffalo presents a picture of the city shortly after the turn of the 20th century (fig. 8). With close to 350,000 inhabitants, it was the eighth largest city in the US. Its strategic location and unique charm secured it as the venue for the Pan-American Exposition of 1901. The advent of alternating current allowed designers to light the Exposition using power generated 25 miles away at Niagara Falls, gaining Buffalo the nickname, "The City of Light".³ Buffalo's Pan American Exposition is also known as the place where America's 25th President, William McKinley, was shot and killed. Interestingly, the newly developed X-ray machine, one of conservation's most

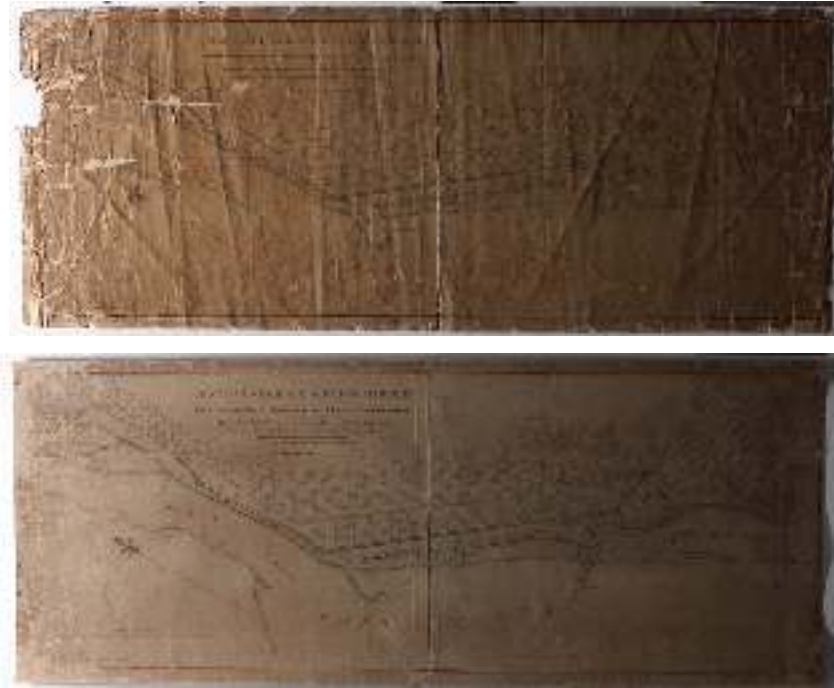


Fig. 9.

TOP TO BOTTOM

a. *Map of Buffalo and Black Rock Harbors*, before treatment, raking illumination.

b. After treatment, raking illumination.

valuable examination tools, was displayed at the fair, but doctors were reluctant to use it on McKinley because they did not yet know the possible side effects.⁴

CONSERVATION TREATMENT

While the original treatment plan outlined in the grant proposal described a complete restoration of the maps, plans had to be scaled back due to an unfortunately late notification of the library's award and a drastically reduced timeline for the work. Six of the eight maps required linings to strengthen the weak paper supports, but traditional paste linings were not feasible in several instances due to sensitivity of media as well as poor quality papers that were compromised by water damage. In the interest of balancing the preservation needs of the maps with the need for economy of time and materials, a dry lining technique using toned heavyweight Japanese paper and a heat-set film of Lascaux 498 HV and 303 HV adhesive was developed to simultaneously stabilize the maps and compensate for loss.

Map of Buffalo and Black Rock Harbors was the only map which received a wet paste lining. This map's paper support was severely discolored and embrittled, with an aged surface coating contributing to the overall darkened appearance of the map. The map was backed with a deteriorated textile which

offered little structural support and areas of the paper were actively lifting from the backing. Stored folded in half, the paper support was fractured down the middle and sustained substantial damage to the left and right edges including skinning, creasing and loss (fig. 9a). After surface cleaning and varnish removal, a temporary facing of Japanese tissue was adhered with wheat starch paste to fractured and weakened areas of the map to stabilize them during washing and backing removal. The map was first lined to lightweight Japanese paper with a 3:1 mixture of wheat starch paste and methyl cellulose and dried between felts. It was then humidified and lined with paste to heavier weight Japanese paper. The map was dried face-in on a drying board and losses in the paper support were toned directly on the intermediary lining paper using pastel pencils (fig. 9b).

The paper support on *Map of Buffalo Village: 1805* was discolored and heavily soiled. The map was backed with textile and stored folded. Fractures through both the paper support and the backing had formed at the folds from use and were held together by pressure sensitive tape on both the recto and verso, causing adhesive staining as well as delamination and cracking of the paper support. The support exhibited numerous losses at the edges and around creases and tears with the paper support actively lifting from the backing at these sites (fig. 10a). The large map was treated in quadrants after

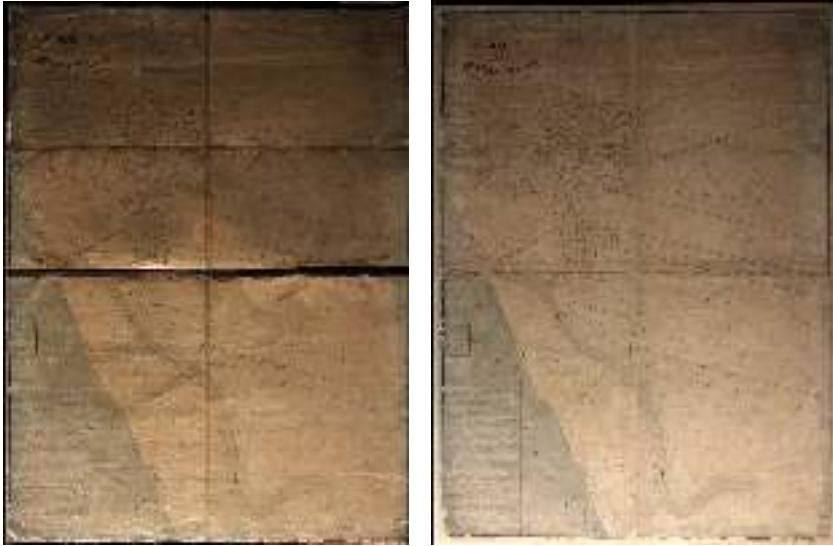


Fig. 10.

LEFT TO RIGHT

a. *Map of Buffalo Village: 1805*, before treatment, raking illumination.

b. After treatment, raking illumination.



Fig. 11.

LEFT TO RIGHT

a. *Mann's Map of Buffalo Harbor & the Island*, before treatment, raking illumination.

b. During treatment, shown face-up on prepared table after lining.

c. After treatment, raking illumination.

being separated along preexisting fracture lines. It was surface cleaned and pressure sensitive tapes were removed. The cloth backing was removed wet. The quadrants were suction washed before lining with an intermediary light weight Japanese paper and then dried between felts. Unfortunately, several new tears were introduced in the paper support from the stress of the wet-dry cycle of the aqueous treatment. The quadrants were reassembled and the entire map was dry-lined using Lascaux heat-set adhesive and a heavier weight Japanese paper. Losses were toned directly on the intermediary lining paper using pastel pencils and the lined map was stretch-mounted to archival foam board with Japanese paper hinges to prevent flexing of the support (fig. 10b).

Two of the maps were so fragile that backing removals were deemed too risky, and the new linings were carried out over the existing cloth backings. *Mann's Map of Buffalo Harbor & the Island* was heavily creased and dirty and the thin coated paper support was delaminating, as well as lifting from the textile backing. Stored folded in four, the support had fractured at its folds. The bottom left corner was

completely lost and flexing of the paper support along creases had resulted in numerous small losses (fig. 11a). Delaminating and lifting paper was first consolidated using dilute wheat starch paste applied by brush and set with a tacking iron to mitigate the formation of tidelines. Testing of the application and removal of temporary facings was carried out to assess whether backing removal was feasible; however, none was removed satisfactorily without disruption of sensitive media or damage to the paper support. Facing materials tested included Japanese tissue adhered with methyl cellulose and various heat-set tissues, including Crompton coated tissue, Bevatex, and a Plextol impregnated Tengu-jo made in house. Backing removal was deemed inappropriate, so the verso was brushed of loose surface dirt and the map was dry-lined to toned heavyweight Japanese paper prepared with a heat-set film of Lascaux adhesive with the textile backing still in place (fig. 11b). The lined map was then stretch-mounted to foam board to prevent flexing of the fragile support (fig. 11c).

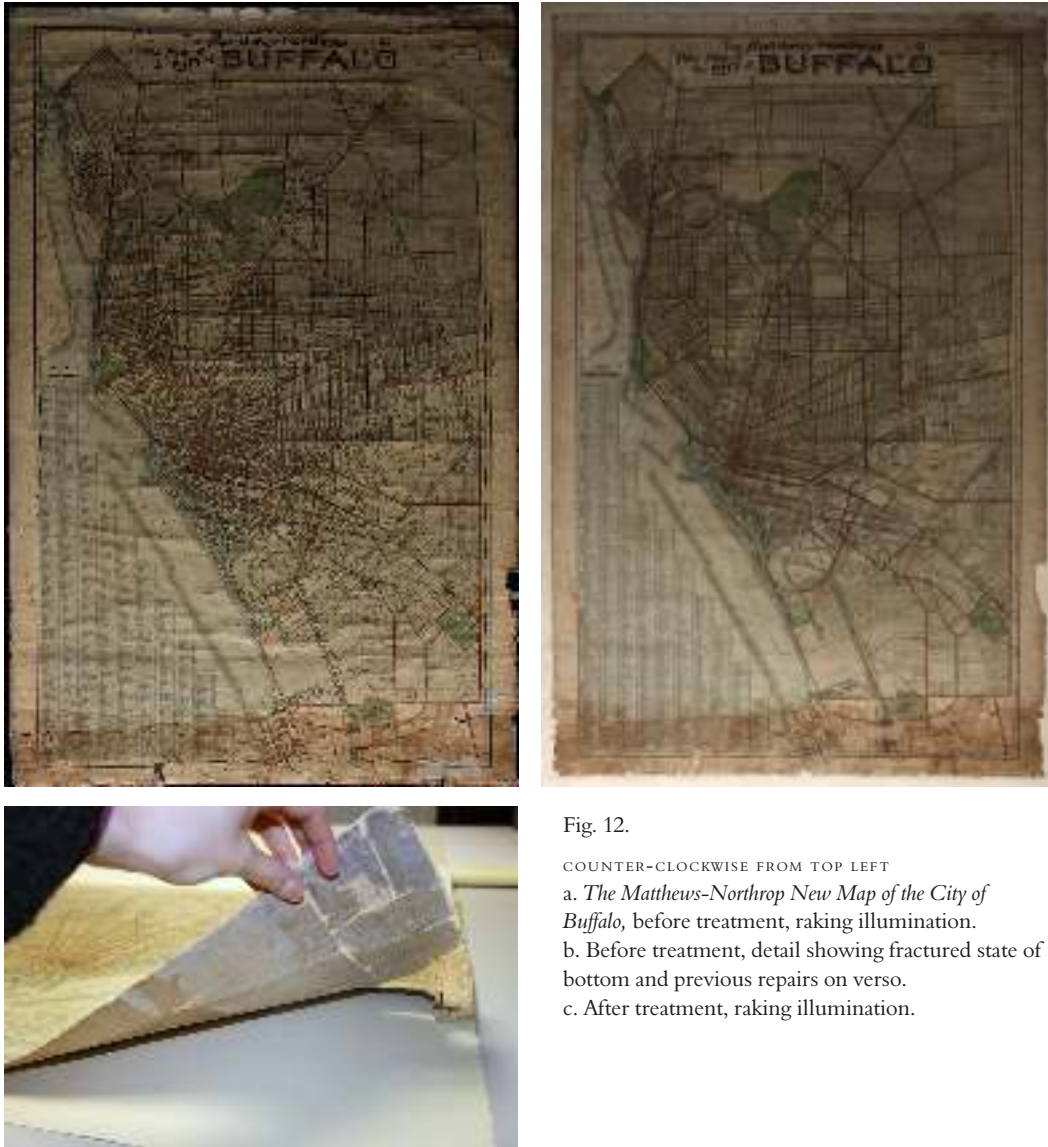


Fig. 12.

COUNTER-CLOCKWISE FROM TOP LEFT

- a. *The Matthews-Northrop New Map of the City of Buffalo*, before treatment, raking illumination.
 b. Before treatment, detail showing fractured state of bottom and previous repairs on verso.
 c. After treatment, raking illumination.

The coated paper support used for *The Matthews-Northrop New Map of the City of Buffalo* was also delaminating and lifting from the severely deteriorated textile backing. There were numerous areas of loss, especially at the bottom where the map sustained water damage (fig. 12a). Previous restoration campaigns included Japanese tissue repairs and reinforcement of the entire water-damaged bottom edge on the verso with tissue (fig. 12b). Despite these efforts to strengthen the weakened bottom edge, the bottom right corner had since fractured. Delaminating and lifting paper was consolidated using dilute methyl cellulose applied by brush and set with a tacking iron. Facings using wet adhesives were rejected due to the sensitivity of the paper and ink to water and organic solvents. Again, various heat-set tissues were tested; however, none was removed satisfactorily without damage to the map's

surface. So, like *Mann's Map*, the *Matthews-Northrop Map* was lined with the current backing in place. The verso of the backing fabric was brushed of loose surface dirt and Japanese tissue repairs were removed. Some tissue was left in place in the water-damaged bottom edge due to the extreme fragility of the deteriorated support. Dry wheat starch paste was brushed through the fabric backing in certain areas to secure the detaching paper support to the fabric, followed immediately with a tacking iron to mitigate staining of the recto. Beva 371 film was selected as the lining adhesive in this case, instead of Lascaux, after mock-ups demonstrated the stronger bond this heat-activated film would provide to such a deteriorated backing and fragile support. After lining, the map was stretch-mounted to foam board to prevent flexing of the support (fig. 12c).

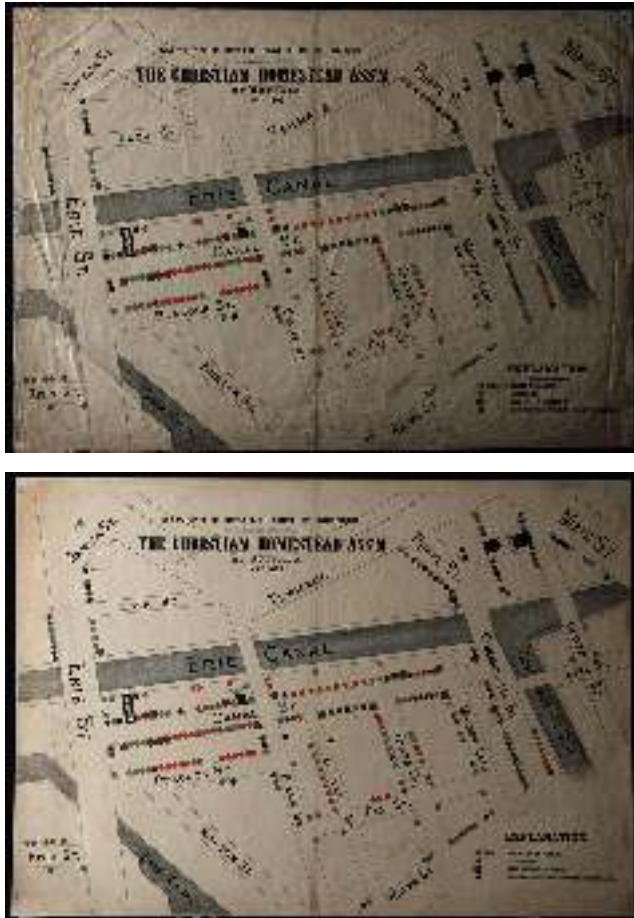


Fig. 13.

TOP TO BOTTOM

- a. Map of the Retail Places of Business in the district covered by the Christian Homestead Association, before treatment, raking illumination.
 b. After treatment, raking illumination.

The last two maps were approached similarly in terms of the lining process. The thin paper support of *The Christian Homestead Map* was slightly discolored overall and heavily creased and dirty. The support was lifting from the textile backing along creases and suffered from multiple edge losses. Pressure sensitive tape was used to reinforce a fold down the middle of the paper support and secure a tear in the bottom right (fig. 13a). After surface cleaning and removal of tape, squares of Japanese tissue were applied with 4% Klucel G in ethanol to stabilize torn and weakened areas of the support before dry removal of the fabric backing and lining to toned heavyweight Japanese paper prepared with Lascaux heat-set adhesive (fig. 13b).

Map of the City of Buffalo was probably in the worst condition of all the maps. The paper support was discolored and heavily soiled and a once-protective coating of varnish (likely shellac) had deteriorated, leaving an uneven glossy

surface with an orange cast. The map had been backed twice with cloth; however, the brittle paper support was actively lifting from the original desiccated backing. Areas of loss were numerous, most notably at the top where the map sustained water damage and was stained with tidelines (fig. 14a). Found inside its storage folder and scattered on the surface of the map were detached fragments of the paper support. Fragments were repositioned and surface grime was reduced using cotton swabs moistened with distilled water, while varnish was reduced using cotton swabs moistened with ethanol. The use of water was avoided in areas with green and blue hand-coloring, which had demonstrated solubility during tests. A temporary facing of Japanese tissue was adhered with 4% Klucel G in ethanol to fractured and weakened areas of the map to stabilize them during backing removal (fig. 14b). The map was placed face-down and the second (newer) textile backing was removed dry, by tearing away in strips at a very low angle, followed by removal of the first (older) textile backing in the same manner. The verso of the support was lightly sanded with fine sandpaper to reduce adhesive residue and dust and dirt were vacuumed from the surface to prepare it for attachment of the lining paper (fig. 14c).

TONING OF THE LINING PAPER

Because losses in the maps were not to be filled due to time constraints, it was desired that the lining paper which showed through in areas of loss should blend in with the original paper support as closely as possible. Okawara machine-made Japanese paper was selected as the lining paper and was toned using Golden fluid acrylic colors to match the variably stained support papers.

USE OF ACRYLIC DISPERSION LINING ADHESIVE

The methodology used in preparing the lining paper was developed after consulting Samantha Sheesley's article in the 2011 Book & Paper Group Annual, "Practical Applications of Lascaux Acrylic Dispersions in Paper Conservation" and after speaking with Jamey Jamison regarding her tip in the 2013 BPG Annual describing ICA Art Conservation's lining of oversized park plans using Lascaux adhesive. Lascaux 498 HV and 303 HV are both water dispersions of methyl methacrylate and butyl acrylate, thickened with acrylic butylester. In the case of Lascaux 498 HV, the thermoplastic polymer dries to film that is elastic and hard, while Lascaux 303 HV produces an elastic film that remains soft and tacky when dry. The 498 HV has a minimum sealing temperature of between 68–76°C (154–169 °F) vs. the 303 HV at a much lower 50°C (122 °F)⁵. Lascaux 303 HV is currently sold as the replacement for the now-discontinued 360 HV.

After working through numerous mock-ups, Jamison's approach of preparing lining papers by brushing on a mixture of Lascaux 498 HV and 360 HV won points with the ease of application of the adhesive; however, the resulting

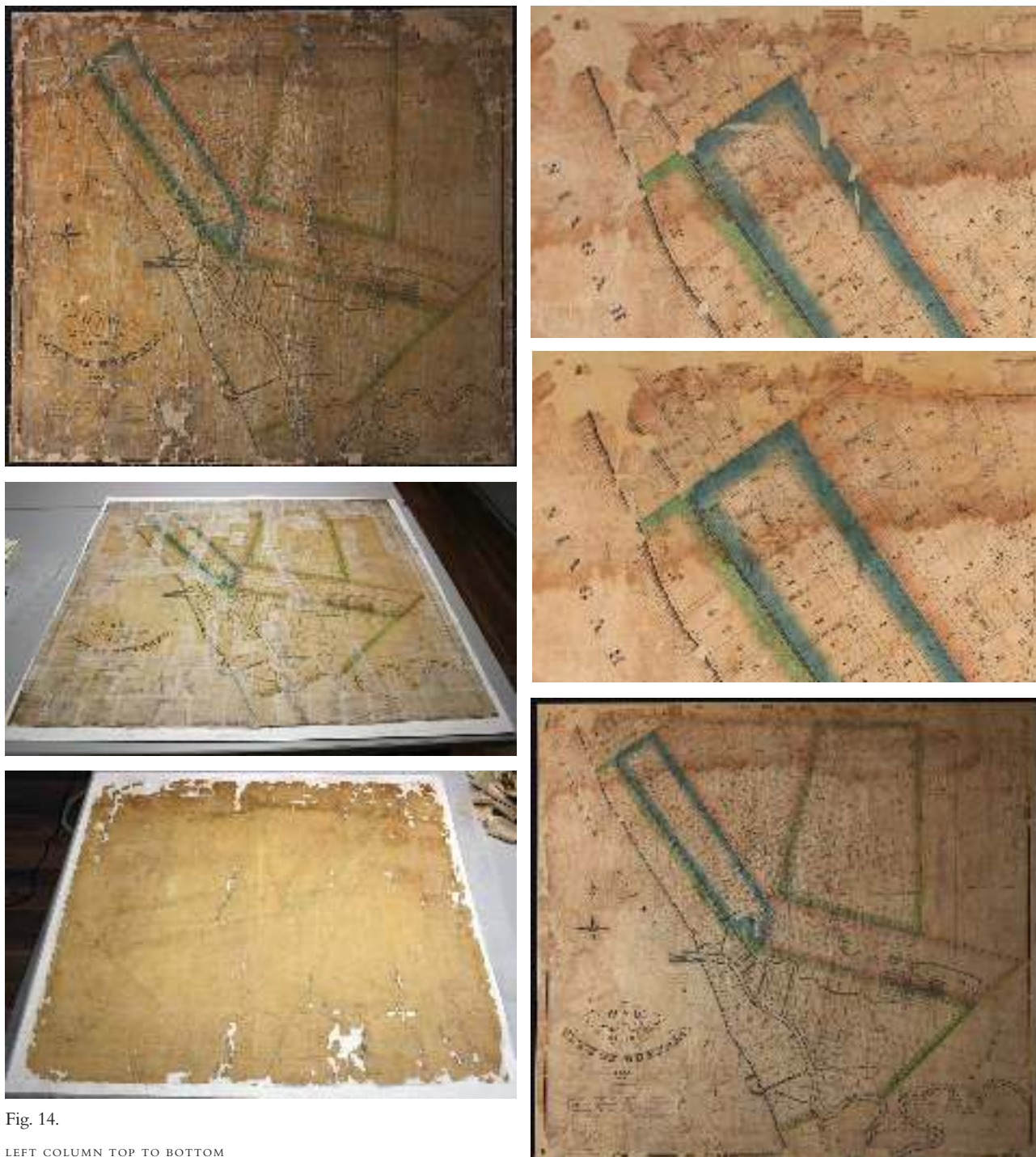


Fig. 14.

LEFT COLUMN TOP TO BOTTOM

- a. *Map of the City of Buffalo*, before treatment, raking illumination.
- b. During treatment, after facing.
- c. During treatment, after backing removal.

RIGHT COLUMN TOP TO BOTTOM

- d. Detail, before compensation for loss.
- e. Detail, after compensation with cellulose powder, dry pigment, and pastel media.
- f. After treatment, raking illumination.

translucency and pronounced darkening of the toned lining paper was deemed unsatisfactory. Sheesley's technique of heat-transferring a dried film of Lascaux 498 yielded a more aesthetically pleasing lining paper, although the slight yellow cast and glossy sheen of the adhesive film would need to be corrected. Applying cellulose powder to areas of the exposed film after heating and softening with a hairdryer did the trick, but it also caused localized planar deformations in the lining paper, which would then have to be weighted as they cooled in order to remain flat. A mixture of Lascaux 498 HV and 303 HV was tested as a cast film and transferred with heat to the lining paper. The addition of the Lascaux 303 HV resulted in a slightly tacky dried film which allowed for the application of cellulose powder without the need to thermally reactivate the adhesive.

PREPARATION OF THE LINING PAPER

The challenge now was to replicate the successful mock-up on a large scale. An 8 x 4 ft. wide, half in. thick aluminum sign was set up on sawhorses as the lining table for its smooth surface and ability to conduct heat. The surface was sprayed with water and sheets of silicone release Mylar were laid down flat with a silkscreen squeegee, overlapping slightly, to cover the table. A 2:1 undiluted mixture of Lascaux 498 HV and 303 HV was distributed in daubs over the prepared surface and spread out quickly using an 8 in. long hard rubber brayer to prevent undue drying of the thin film. Several application methods were tested, including various house paint rollers and printmaking brayers, but the hard rubber created the least amount of perceptible texture in the resultant dried film, which helped mimic the smooth support papers of the maps. The film was dried with a hairdryer and allowed to cool for 15-20 minutes.

Once cooled, the lining paper was placed toned side down in contact with the Lascaux film and hand-smoothed onto the adhesive. A clothes iron set to medium heat was measured with an infrared thermometer at approximately 75°C⁶ and was used with moderate pressure (and without steam) to tack the lining paper down from the verso through silicone release paper. Heat application started in the center and worked outwards in order to prevent creases and wrinkles from occurring. Once adhered, the paper was allowed to cool for 15-20 minutes. As an added security measure, a printing barren was used to apply pressure through the verso of the lining paper, ensuring overall physical contact between it and the Lascaux film. The lining paper was removed from the table with silicone release Mylar still in place on the recto.

HEAT-SET LINING

Following adhesion of the Lascaux film to the lining paper, the table was prepared again with new silicone release Mylar. The lining paper was placed recto up on the prepared metal table and the silicone release Mylar attached to the lining

paper was removed carefully, ensuring that the adhesive was not pulled away or torn. Any areas showing an affinity for the Mylar were smoothed back into contact with the lining using a Teflon spatula. Missing or noticeably thin areas of adhesive were patched using cut sections of prepared Lascaux film on silicone release Mylar. The map was then placed face-up on the lining paper and tacked into position with a tacking iron. Then the sandwich was inverted on the table. The lining paper was first smoothed by hand. Then on medium heat and with moderate pressure, the iron, through silicone release paper, was used to thermally activate the Lascaux adhesive and attach the lining paper to the primary support. The application of heat was again applied from the center while moving outwards. Following the application of heat, the lined map was allowed to cool on the table for 15-20 minutes before being removed to press overnight between Tycore panels.

Next, the temporary facing was removed by peeling off the dry tissue at a very low angle. Tissue and adhesive residues were removed by swabbing lightly with distilled water and then applying a square of blotter and weighting to dry. Swabs moistened with ethanol were used to remove facing residues in areas with green and blue hand-coloring. Any lifting areas of the paper support around losses/tears were secured with a tacking iron.

LOSS COMPENSATION

A mixture of cellulose powder and dry pigment was pounced with a stiff brush into areas of loss in order to reduce the slight tack and sheen of the exposed adhesive film. Any residual Klucel left from the facing interfered with the application of the cellulose powder and had to be carefully cleaned from areas of loss. Losses were further toned and stains were retouched with pastel media (figs. 14d-e).

PRESSURE-SENSITIVE LINING

To further stabilize the fractured support of *Map of the City of Buffalo* and reduce flexing of the lining paper, a second lining was carried out using Okawara paper prepared with a film of Lascaux 303 HV, applied by brush and dried. The pressure-sensitive lining support was adhered to the verso of the map using moderate even pressure with a printing barren. The lining paper was trimmed and the map was pressed for a week between thick Tycore panels to encourage bonding of the lining support (fig. 14f).

HOUSING

Finally, the six lined maps were each placed in a custom archival foam board storage folder with an image label on the front to reduce unnecessary handling.

CONCLUSION

While the extreme fragility of the Buffalo maps, combined with time constraints and a tight budget, precluded a full restoration of the maps using traditional wet lining techniques, these limitations also gave rise to the adaptation of a dry lining technique that proved to be quite successful at physically stabilizing the map supports, as well as facilitating the compensation of loss. Before conservation treatment, several of the maps could not be unfolded in order to view them in their entirety without risking further damage. Library staff were extremely pleased with the results of treatment and felt confident that the maps could safely withstand any increase in handling due to requests for access inspired by the exhibition. In an effort to curtail over-use and to make the maps even more accessible to the public, several of the conserved maps will be digitized and made available for online purchase as reproduction prints with proceeds from the sales dedicated to the Rare Books & Special Collections.⁷

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NOTES

1. "Grosvenor Room," Buffalo and Erie County Public Library, accessed June 2, 2016, <https://www.buffalolib.org/content/grosvenor>.
2. Historical background information, unless otherwise indicated, is principally taken from exhibit labels displayed next to the maps in the exhibit, "You Are Here: Buffalo on the Map," on view from October 2014-2015 in the Rare Book Room of the Buffalo and Erie County Public Library.
3. "Buffalo, NY," Wikipedia, accessed February 21, 2016, https://en.wikipedia.org/wiki/Buffalo,_New_York.
4. "Pan American Exposition of 1901," University at Buffalo Libraries, accessed March 11, 2016, <http://library.buffalo.edu/pan-am/>.
5. Technical data for these and other Lascaux adhesives are available at http://lascaux.ch/pdf/en/produkte/restauro/58370.02_Adhesive_and_Adhesive_Wax.pdf.
6. Several temperature readings were taken from various spots on the face of the iron with a Ryobi IR Thermometer (model #IR002) and averaged.
7. To purchase your own copy of *The Christian Homestead Map* or other Special Collections items visit <https://buffalo-erie-county-public-library-online-store.myshopify.com/>.

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- Jamison, Jamye. 2013. Tip: Lascaux Linings in the Treatment of Park Plans for the Cleveland Public Library. *The Book and Paper Group Annual 32*: 82-83.
- Sheesley, Samantha. 2011. Practical Applications of Lascaux Acrylic Dispersions in Paper Conservation. *The Book and Paper Group Annual 30*: 79-81.

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