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Mapping the Crossroads: The Conservation of County Wall Maps from the Indiana State Library

INTRODUCTION

The Indiana State Library (ISL) is the primary public institutional custodian of paper-based objects related to the history of the state of Indiana and a significant part of the history of the Ohio River Valley, including the Northwest Territory. Within the ISL holdings is a rare map collection of more than 11,000 maps, a large portion of which are held nowhere else. The historical importance of this collection cannot be overstated. The maps in the collection represent state, city, county, and regional subjects. Roads, rivers, property owners, populations, businesses, and communities are some of the vital information in the historic map collection. Within this collection, there are approximately 70 mid-19th-century varnished maps listed in a “condition critical” state. These maps are oversized, varnished, and lined onto fabric. For most of these maps, even the act of handling them causes pieces to fall off. Due to their extreme condition issues, they cannot be digitized, exhibited, or used in any manner. They are all listed as restricted and unavailable to researchers. This article will summarize the processes and procedures conducted by the ISL Martha E. Wright Conservation Lab to treat and store these maps.

HISTORY

The historical importance of the Indiana maps created from 1850 to 1910 parallel the growth of the state and reflect demographic shifts across the nation. The maps depict the establishment of the last new Indiana county in 1859, the impact of natural gas discoveries in establishing manufacturing centers in the 1880s, and the movement of new Hoosiers across the National Road and to the growing city of Indianapolis. The maps show the crisscrossing railroads that made Indiana “the Crossroads of America” and the population boom that doubled the population of Indiana from 1850

to 1880. As land was stolen from Indigenous peoples, bought, and sold, as settlements were platted, named, and populated, as towns and cities emerged, maps were always part of the process. These resources show the growth of rural and urban communities and the shifting demographics brought by war, industrial growth, the Great Migration, and transportation innovation.

Following the introduction of more adaptable map-making and printing technology, it became profitable to commercially produce town, county, and city maps. These large-scale maps dive deep into communities and reveal snapshots in time: businesses, landowners, places of worship, transportation routes, natural features, and even private homes. Because they contain so many details, they are often very large, measuring 4 to 6 square feet. These maps supplement textual records, such as deeds or farm directories, and offer a visual record that adds context to data.

TREATMENT CONCERNS, LIMITATIONS, AND CONSIDERATIONS

In 2020, the ISL Conservation Lab assessed the varnished wall map collection and began creating a protocol for every aspect of its preservation, from documentation to treatment and storage. The preservation protocol required considering the limitations of both the ISL Conservation Lab and the storage of the maps upon completion of treatment. In addition, budget limitations for treatment were factored in.

The ISL Conservation Lab, constructed in 2014, is a fully equipped conservation laboratory, but much of the equipment was not purchased with the consideration of treating oversized objects such as varnished wall maps (figs. 1, 2). The laboratory sink was not large enough to accommodate a fully intact map, there were not enough large tables in the laboratory, and the suction table was not big enough to encompass an entire map. Budget was also a strong consideration in developing the protocol. The common traditional approach to removing the varnish on a wall map is to allow the map to bathe in a bath of ethyl alcohol. This approach would require

Proceedings from the AIC-sponsored event, “Varnished Wall Maps: A Collaborative Seminar to Investigate Treatment Methodology,” September 14–16, 2022.

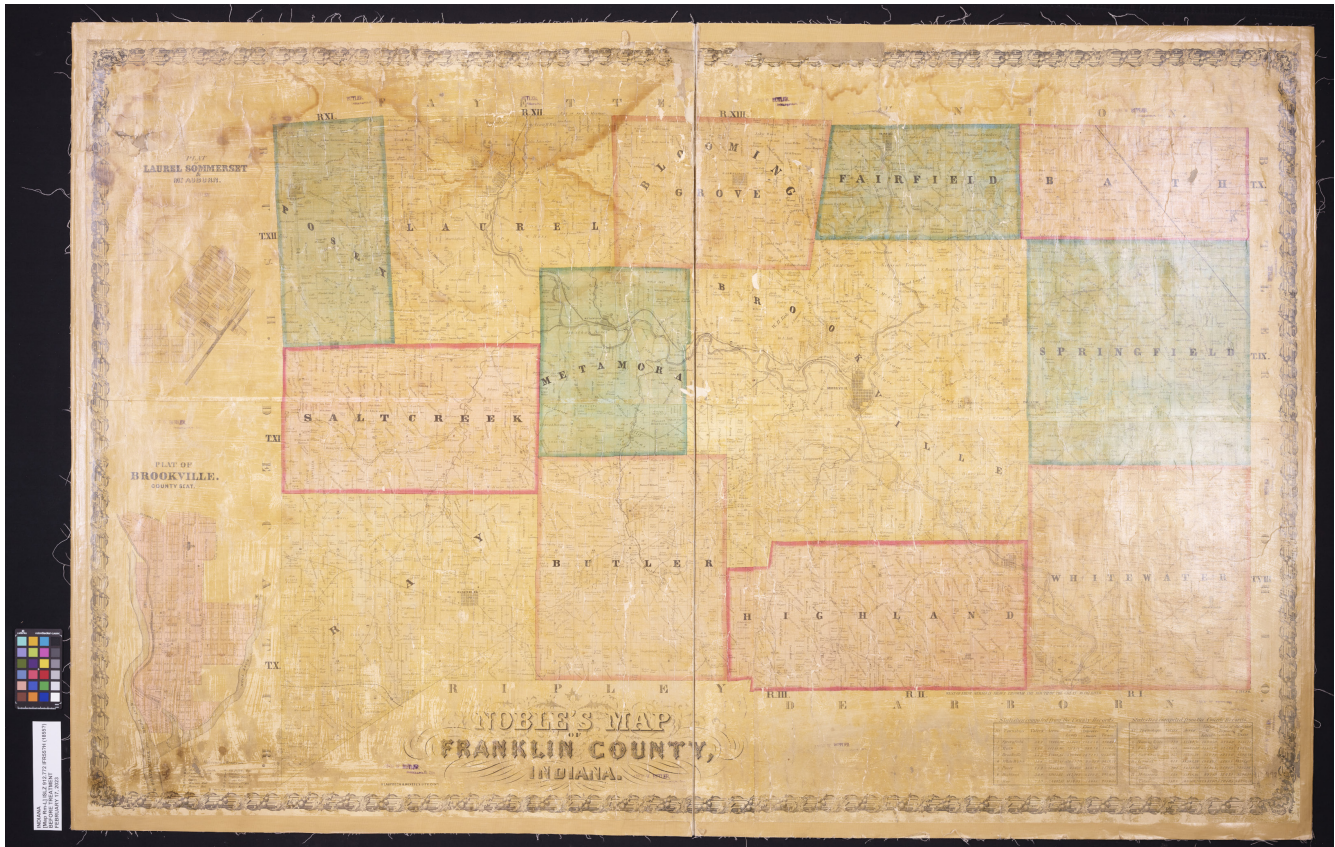


Fig. 1. Before treatment of the 1885 Noble's map of Franklin County, Indiana.

large amounts of ethyl alcohol to be purchased at an average cost of \$100 a gallon (before shipping and hazardous materials charges), and due to the size, each map would require several gallons. There was the disposal cost of the used alcohol to consider as well. This approach would have resulted in a prohibitively expensive treatment material and disposal cost of approximately \$400 to \$500 per map. This cost estimate would have either prevented the project from happening or limited the number of maps that could be treated. To get around this, the treatment protocol would need to account for the use of solvent in a manner that was more budget friendly and did not result in any secondary solvent waste that required disposal.

Storage of completed maps was also a consideration. The ISL has very limited storage for oversized paper objects. The library has very few oversized flat file cabinets (4 × 6 ft. drawer sizes), and many of the wall maps were even larger than these oversized cabinets could accommodate. There is also no mechanism for storing oversized objects rolled either, and there was no ability to either adapt or add additional storage. The treatment protocol needed to account for completed maps being stored in the ISL's existing storage.

Staffing limitations also needed to be considered. The ISL Conservation Division is staffed by one conservator. Although it was possible to occasionally ask for a second set of hands for assistance, this was not always reliable. The treatment protocol needed to be structured so that it could be accomplished by one person with sporadic assistance from library staff with no conservation experience.

TREATMENT PROTOCOL

Step 1: Testing

Testing of both the varnish and underlying media was conducted on a suction table, and one would be done in one of two ways. The first method would be to utilize a fractured piece that had already detached from the map or was about to detach (fig. 3). The second method would be to place the map face down on a blotter on a suction table or suction platen. Multiple types of alcohols were tested, and all maps showed varnish solubility in ethanol, isopropyl alcohol, and denatured alcohol. With the map face down on a suction device, alcohol was applied, through the backing fabrics, using a plastic pipet. This action would solubilize the varnish and pull it out of the

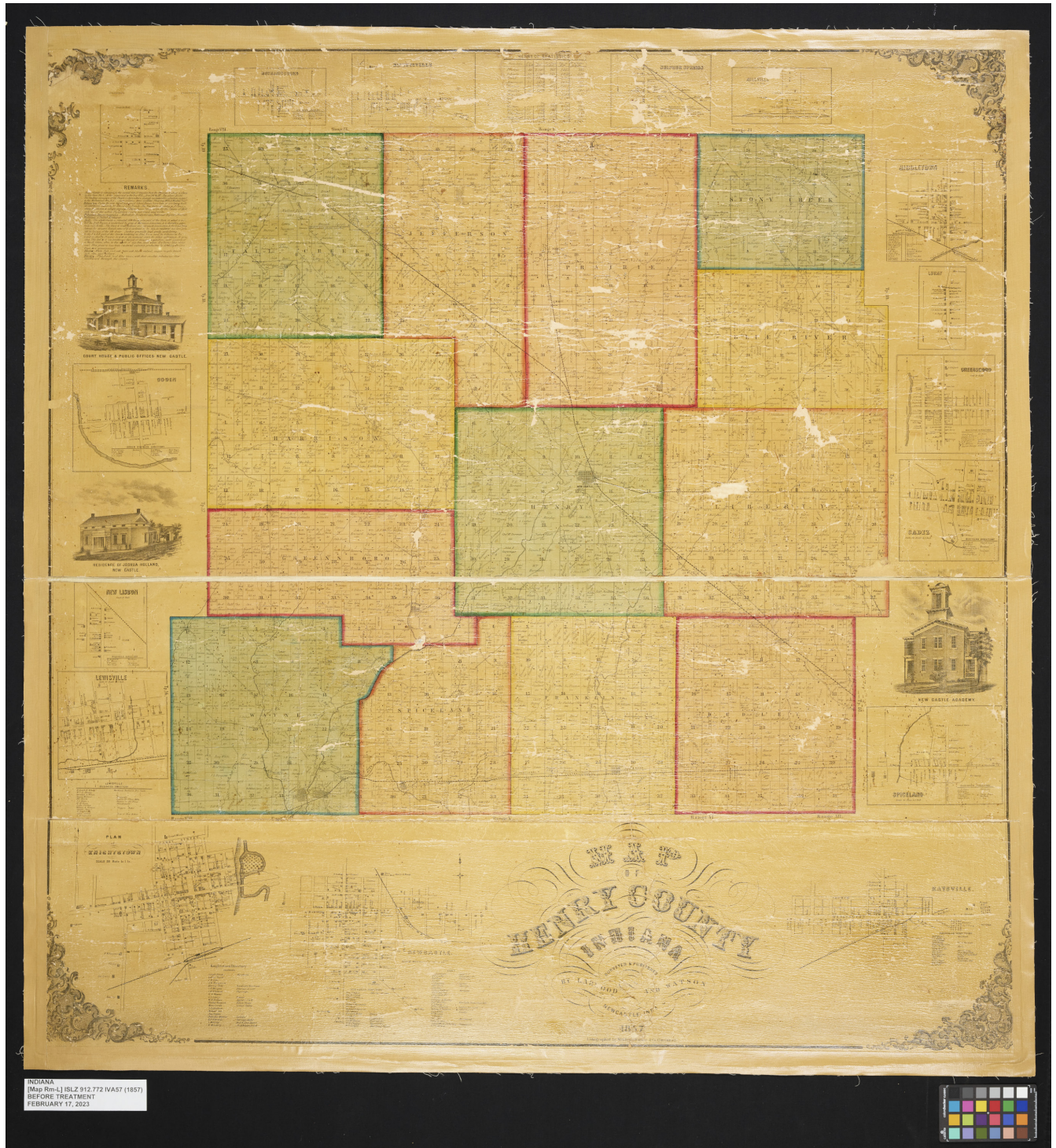


Fig. 2. Before treatment of the 1857 map of Henry County, Indiana.



Fig. 3. Varnish removal and washing of the test piece.

front of the map and into the blotter (fig. 4). The blotter was then inspected for any media transfer. Solubility testing with heated reverse osmosis water was conducted in the test areas where varnish was removed. Most maps showed no evidence of solubility issues with either the alcohol or water. If there were color solubility concerns, these concerns were relayed to the ISL Indiana Division map librarian. In these circumstances, the treatment was usually still allowed to continue based on the pretext that whatever minimal color loss did occur, it was considered an “acceptable loss” to save and stabilize what was generally considered to be an unusable map.

Step 2: Separation of the Map Panels

Once testing was completed and the treatment was allowed to proceed, the next step would be to separate the panels of the map. Most 19th-century varnished wall maps are not one single sheet of paper but rather individual panels that were seamed together before the map was lined onto fabric. For ease of treatment and accommodating the size limitations of both the sink and the suction table, the protocol dictated separating the panels along the seams.

To separate the panels, the varnish was first removed along the seams. This was done by placing the map face down on the suction table on Hollytex and blotter. The backing fabric was removed, with the application of lightly applied water, 1 to 2 inches on each side of the seam. Alcohol was then applied through the back of the map, in the exposed area. The map was then turned face up and, using a Jiffy Steamer with a



Fig. 4. Valinda Carroll conducting a varnish removal test on the suction table.



Fig. 5. Valinda Carroll using a Jiffy Steamer to separate the map panels.

focused nozzle, steam was applied to the seam while gently separating the panels with a microspatula. Blotter was placed around the working area to protect the rest of the map from dripping from the steamer (fig. 5).

Step 3: Varnish Removal

Most of the maps selected for treatment were highly fractured with pieces barely attached to the fabric. Often the fabric was the only structural element holding the map together. It was therefore essential that the treatment protocol minimize the risk of pieces of the map falling off either during the varnish removal or the washing process. This was to avoid the additional work of trying to find the location of any loose fragments afterward. To help prevent fragments from coming loose, conservators typically apply a temporary facing to the front of the map. Rather than applying a separate facing layer, this treatment achieved the effect of a facing simply with the application of a protective spun-bound polyester sheet: Hollytex was applied to the front of the map while removing the varnish face down on the suction table; as the alcohol solubilizes the varnish, it causes the varnish to act as an adhesive for the Hollytex, thereby making the Hollytex act as a facing

until the washing step. The map is placed face down on a sheet of Hollytex and then placed face down on blotter on the suction table. The suction table is turned to its highest power setting, and alcohol is continuously sprayed through the fabric (fig. 6). The map is routinely lifted, by the Hollytex, to inspect the blotter for any movement of any media and to ensure that the varnish is successfully being removed (fig. 7). The blotter is changed routinely until all varnish has been removed. When no more varnish is showing up on the blotter, the map is turned face up, and any remaining areas of varnish can be removed with the use of alcohol on cotton. It may require several occasions of flipping the map to remove all of the varnish. Then the map can be placed face up and the Hollytex carefully removed by spraying it with alcohol.

The use of the suction table to remove the varnish has several advantages over the more traditional approach of an alcohol bath for varnish removal. First, this approach used significantly less alcohol. Second, since all of the alcohol is consumed during the treatment, there is no secondary solvent waste to dispose of. Third, the use of the suction table helps to prevent pieces from coming loose. Fourth, the direction the alcohol and varnish travel while being solubilized,



Fig. 6. Marissa Maynard conducting the varnish removal of a map on the suction table.



Fig. 7. Marissa Maynard lifting the map panel during varnish removal to check the blotter for media transfer.

working face down on the suction table, appears to remove the varnish and prevent it from being driven further into the map.

Step 4: Washing

It was determined at the beginning of this process that there was a danger of conducting the washing without taking precautions to prevent loose fragments from floating around during the washing process. This would result in uncontrollable movement of loose pieces, thereby resulting in extensive work trying to find locations for all of the loose fragments at the end of the treatment. As with the varnish removal, the treatment protocol for washing was entirely designed around preventing pieces of the map from coming loose and, should any pieces come loose, making sure that they stay in their correct locations throughout this step.

The washing of the panels is conducted one panel at a time. The panels are placed on a sheet of Hollytex or Reemay on a sheet of quarter-inch acrylic. The acrylic is placed into the sink, and the drain of the sink is plugged. The sink is slowly filled with hot water until the map is barely submerged. Careful attention is paid to making sure that no pieces lift off

the map while the sink is filled with water. If possible, water is gently run over the front of the map, taking care to avoid any areas that are fractured. The map is left submerged for at least an hour. To prevent any pieces from lifting or moving around, the water is not disturbed in any way to avoid any rippling or motion. For very fractured maps, a Dahlia sprayer can be used to apply water to the front of the map. After an hour, the sink drain is slowly lifted to allow the water to drain very slowly to prevent any movement of loose pieces. If any loose pieces start to move or come off the map as the sink is draining, they are put back in their correct locations. Once the sink is completely drained and there are no more visible pools of water on the front of the map, the acrylic sheet is slowly lifted at an angle and allowed to rest on the edge of the sink.

Working across the map, gently spray the front of the map with a Dahlia sprayer while gently brushing the surface with a small brush (figs. 8, 9). It is helpful to work in a grid system corresponding with the information on the map. This removes any remaining varnish and dislodges any surface grime. This process will allow for better control of loose fragments. If any loose fragments become dislodged,

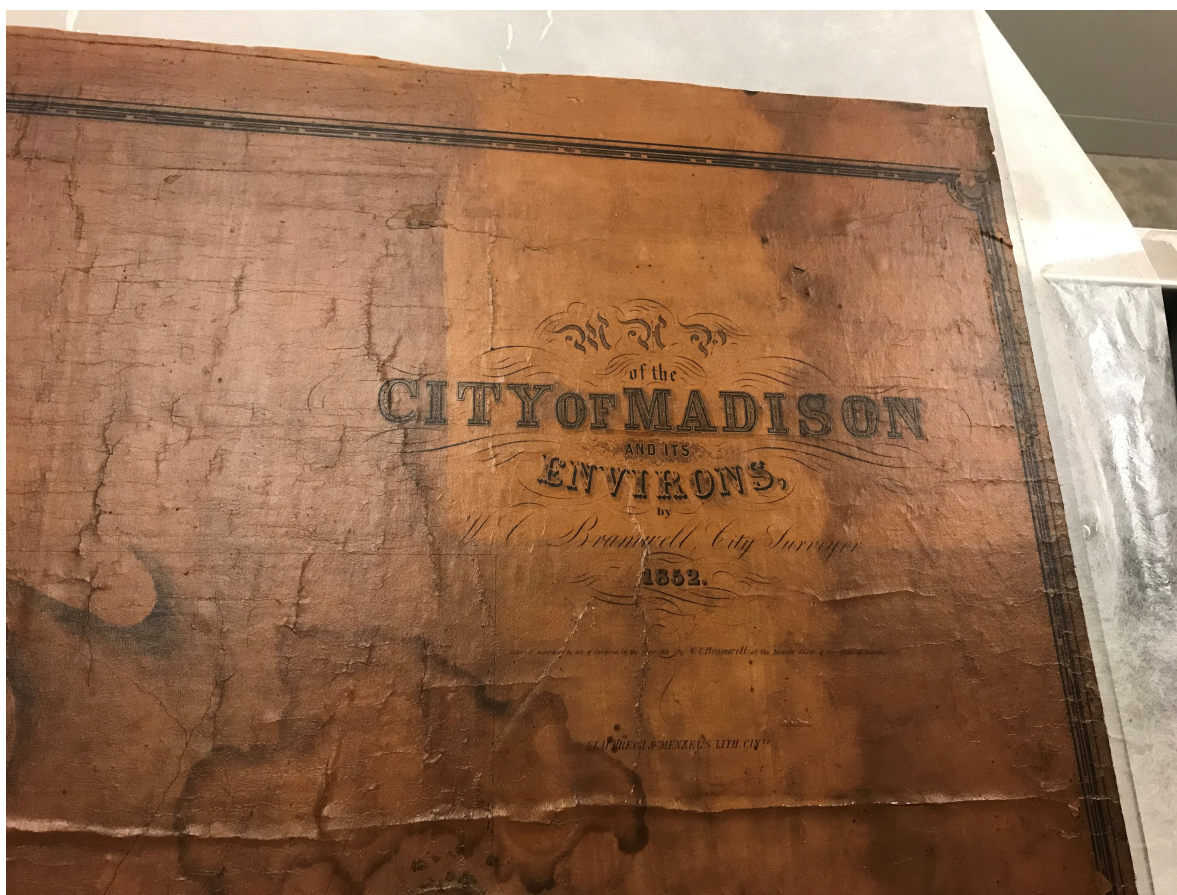


Fig. 8. Washing/cleaning of the 1852 map of the city of Madison, showing the cleaned area in the upper right.



Fig. 9. Cleaning of the map with a Dahlia sprayer and brush.

they can be carefully put back in their correct locations. Every attempt is made to keep all loose pieces in their correct locations throughout this entire process. The map may need to go through several rounds of baths during the step. If this process requires more than a day, the map panel is allowed to stay submerged overnight. Until the panel is ready to be lined, it must remain wet.

Many of the varnished wall maps in the ISL collection were silked during the early 20th century and still contain silk on the entire recto. For many of the maps, the silk had severely deteriorated and migrated into the varnish layer. Testing showed that once the varnish layer was removed, the silk would lift off during the washing process most of the time (figs. 10, 11).

Step 5: Lining the Sections

It was recognized early in the project that storage for completed maps was going to pose logistical challenges, as the ISL has limited oversized flat file storage and no storage for oversized rolled material. Many of the maps were also larger than

the 4 × 6 ft. oversize flat file drawers. There was no feasible plan to add or change the existing storage in the ISL. Given these limitations, the decision was made that the map panels would not be rejoined at the end of each treatment. The panels would be separated at the beginning of each treatment and left separated. This solved the storage problem, allowing the maps to be stored in standard flat file drawers, and still allowed for the rejoining of the panels in the future.

The lining of each panel is conducted directly after the washing step. As soon as the map panel is completely cleaned and no more baths are required, the water is drained from the sink, the map is lifted out of the sink on its acrylic support sheet very slowly, and all remaining water is allowed to drain off. Lifting the map by the Hollytex (or Reemay) support, the map is transferred to a sheet of polyester film. The panel is sprayed out with water, and a second sheet of Hollytex is applied to the front of the map. A sheet of polyester film is then put on the sheet of Hollytex. Holding the panel between the two layers of Hollytex and film, the panel is turned over (face down), and the film and Hollytex are removed from



Fig. 10. Conservation preprogram intern Lily Duncan removing silk from the front of a map.

the back of the map. The backing fabric is then very carefully removed from the back of the map, taking care to make sure that any loose pieces do not come up with the fabric (fig. 12). The fabric can be torn if necessary to aid in its removal. If the map is quite fractured, the fabric removal would start in the middle of the panel and progress toward the edges. If loose pieces start to come up with the fabric, the fabric is sprayed with additional water. Once all the fabric is removed, the Hollytex and polyester film are put back on the back of the panel, and the panel is turned face up again.

It is common with extremely fractured maps to find many of the pieces misaligned, in which case rivers, roads, and text may not line up correctly. These details would require correcting before the map is lined. Once the fabric is removed and the map is turned face up again, the Hollytex and film on the front of the map are removed. To prevent pieces from lifting when the Hollytex is removed from the surface, the Hollytex is sprayed down heavily with water. Once the Hollytex is removed, all the misaligned pieces can be corrected. This usually requires working around the entire map repeatedly in circles, as correction on one end will affect the alignment of details on the opposing end (figs. 13, 14). Once



Fig. 11. A close-up of silk being removed from a map.



Fig. 12. Seth Irwin removing the backing fabric following the washing.



Fig. 13. Valinda Carroll aligning map fragments.



Fig. 14. Valinda Carroll aligning map fragments.

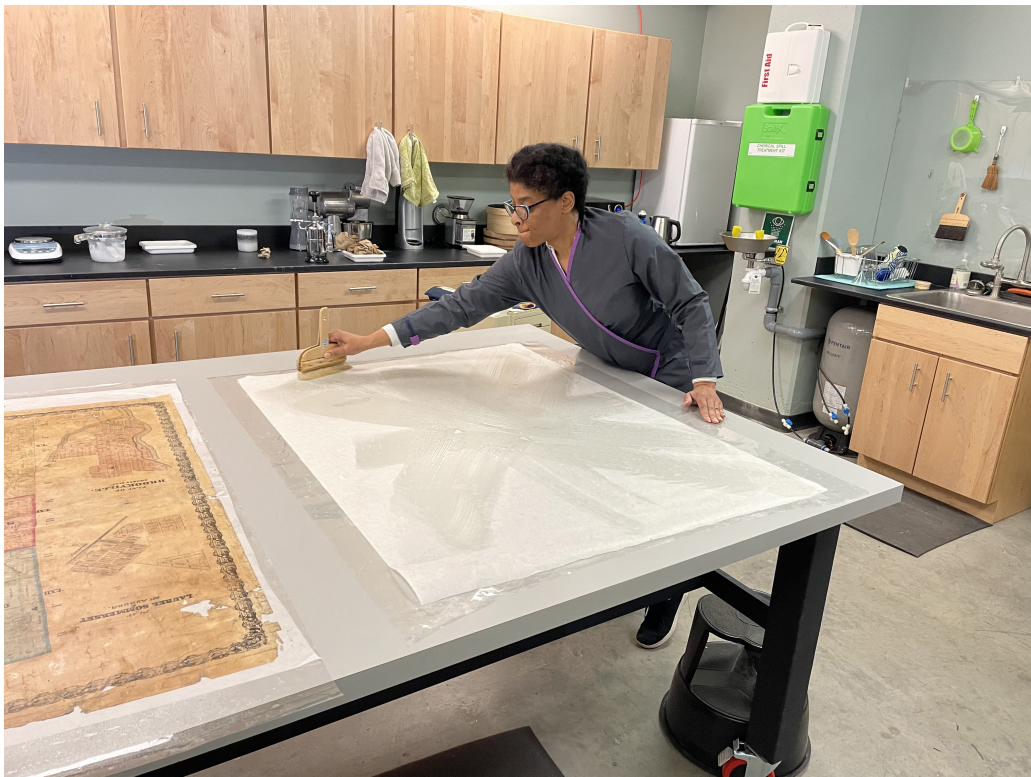


Fig. 15. Valinda Carroll preparing the Japanese paper for the lining.

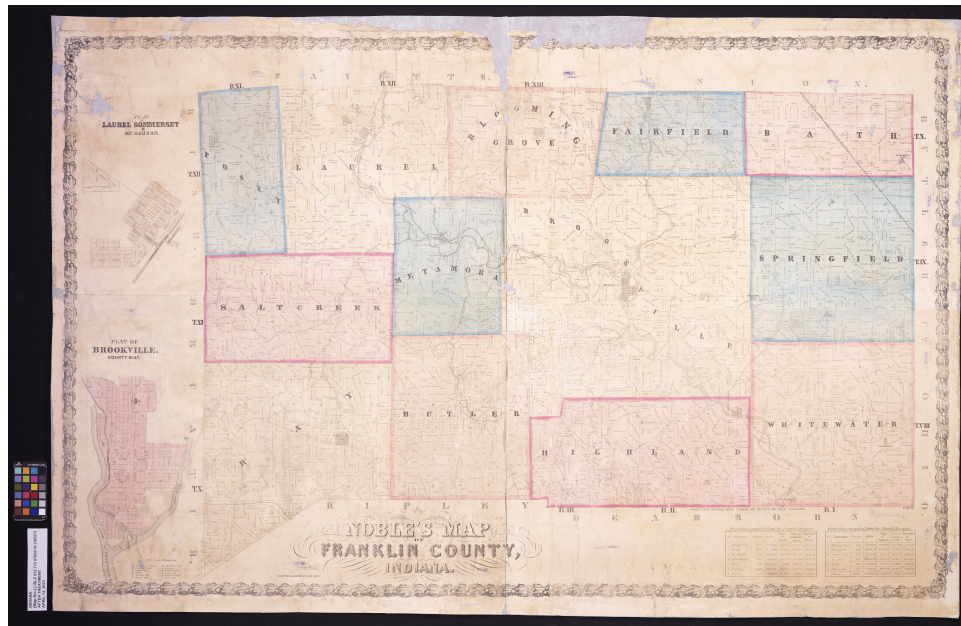


Fig. 16. After treatment of the 1885 Noble's map of Franklin County, Indiana.

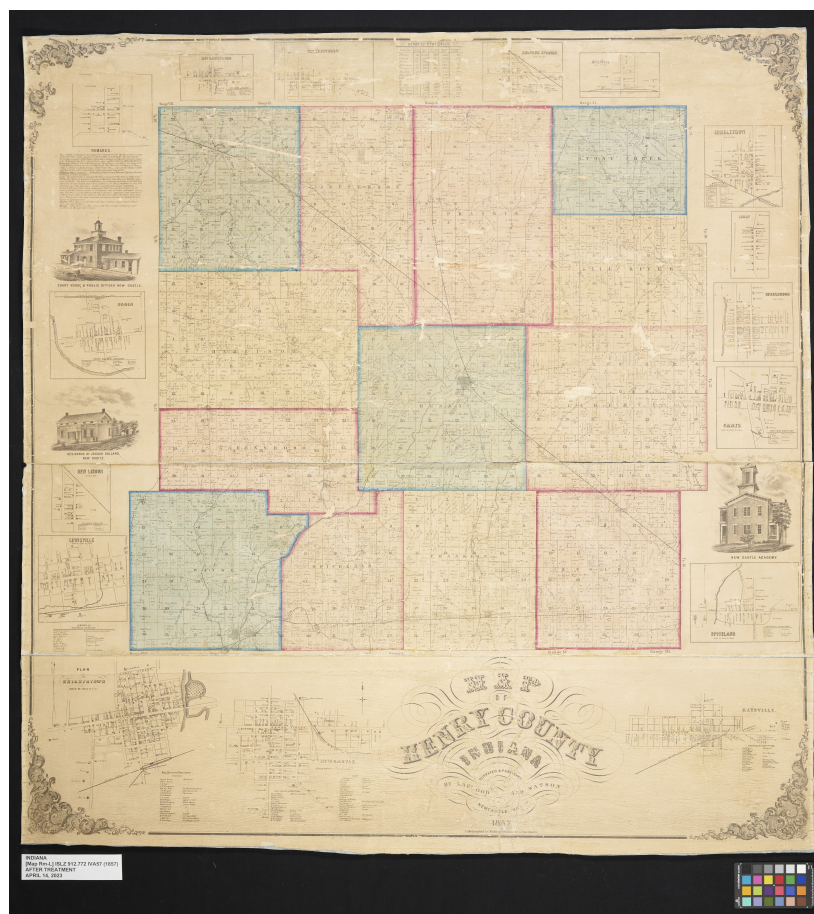


Fig. 17. After treatment of the 1857 map of Henry County, Indiana.

everything is aligned correctly, a fresh sheet of Hollytex is applied to the front and the film is put on the Hollytex. It is important that a brand-new sheet of Hollytex be used for this step as opposed to a previously used sheet of Hollytex that had been cleaned. The use of a previously used sheet runs the risk of sticking to the front of the map after the map is dry. Using a plastic card or printing brayer, the panel is smoothed out flat. The map is then flipped face down again, and the Hollytex and film are removed from the back.

For simplicity, budget, and color, 20-gsm Sekishu Medium rolled Japanese paper was the chosen lining material for all maps. Once the map panel is aligned correctly and the Hollytex and film are removed, a sheet of Japanese paper is pasted out on film and applied to the back of the map. A sheet of Hollytex is applied on the Japanese paper and then smoothed out with a printing brayer or a smoothing brush. The panel is then placed between wool felts to dry (figs. 15–17).

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