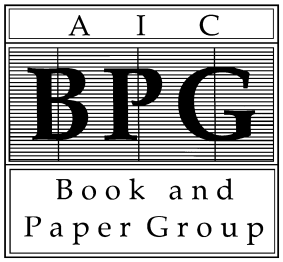


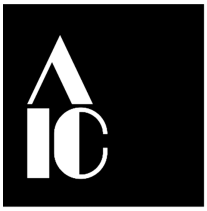

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CHER SCHNEIDER

# Treatment of a Map of Pike County, Ohio, at the Intermuseum Conservation Association

## INTRODUCTION

One of the biggest treatment issues when dealing with oversized maps is the need to safely remove the varnish layer. The varnish layer is initially applied to protect the paper, but as it ages, the varnish becomes yellowed and darkened. This discoloration obscures the map's visibility and can make it illegible. This article will discuss an approach to successfully removing the varnish from an oversized map.

## BACKGROUND/HISTORY

In 2019, while heading the Paper Department at the Intermuseum Conservation Association (ICA) in Cleveland, the author received a call from the director of the Garnet A. Wilson Public Library, located in Waverly, Ohio. The director wanted someone to come and assess an oversized varnished map that had been on permanent exhibit in the Pike County Courthouse.

The map in need of conservation treatment was a Pike County map (ca. 1884). The Pike County Courthouse went through renovations in the 1980s, and the map had been a permanent exhibit ever since. The director of the library and one of the judges had a common interest in preserving the map for the future. They procured an IMLS Library Services and Technology Act (LSTA) grant, and the judge offered his own money to conserve the print with hopes that this would stir interest in another renovation of the courthouse.

The ICA scheduled a 3-hour on-site visit for May 2019. This visit included a consultation with the library director, plus an in situ examination and testing to provide the client with a cost estimate and treatment proposal.

The courthouse is a brick colonial building deeded to the county in 1866 and located one block away from the Garnet A. Wilson Public Library. The entrance is simple, with swinging glass doors that lead into a corridor that extends the length of the building. This corridor is wood paneled along the bottom half with white drywall above and fluorescent tube lighting down the center of the ceiling.

The oversized Pike County map was behind a thick piece of glass and attached to the wall with stained wood frame molding just past security within the main entrance corridor. It measures 182.88 cm high and 349.25 cm wide, which roughly translates to 6 feet tall by 11½ feet wide.

## CONDITION ISSUES

The map is an oversized intaglio map of Pike County, Ohio, printed in black ink with hand-applied watercolors in blue, yellow, pink, and green. It is printed onto two sheets of thick cream-colored wove paper coated with a varnish layer and backed overall to linen. It was behind half-inch-thick glass secured to the wall with stained wood molding strips that create a frame.

The map was on permanent exhibit in the corridor where the overhead fluorescent light was consistently on during business hours, plus indirect outside light exposure from the front door. The environmental controls were limited to heat only, with no control over the relative humidity. Over the course of the permanent exhibit, the map had also been exposed to indoor and outdoor pollutants, such as smoking and unfiltered outdoor air, as windows and doors were left open during warm and hot seasons. All of these factors added to the map's deterioration and damage over the decades (fig. 1).

An image sent by the director of the library (seen in fig. 1) showcased that the map had many condition issues, such as being very large, dark, embrittled, and in contact with the glazing. There were undulations throughout with dark speckling that mimicked the appearance of parchment. There was much debris and grime on the surface of the map that was trapped under the glazing. The darkening and difficulty in reading the map were the major concerns of the client.

These identified issues raised many questions for treatment. What is the current strength of the paper? Could this

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


Fig. 1. The Pike County map on exhibit in the Pike County Courthouse. Image shared courtesy of the library director.

map be parchment? Is the map adhered to the glazing? How is the map attached to the wall? Will it fall immediately once the glazing is removed? Many of these condition issues were taken into consideration as the on-site examination was scheduled and conducted.

## OBSTACLES

The large size of this map presented many obstacles throughout the project. The examination, transportation, imaging, and treatment all required special considerations and accommodations. The initial examination, documentation, and testing needed to be conducted on-site due to the map's permanent display and size. To aid with reporting and testing, court security maintained a perimeter around the map, and an outside glazing vendor provided staff to remove the half-inch sheet of glass and replace it once examination was complete (fig. 2). Doors and windows were opened, and a fan was provided to dissipate the small amount of solvents used for testing.

Another obstacle during this project was safely transporting a map of this size. Fortunately, the ICA had a team of technicians experienced in packing, handling, and transporting oversized objects. It was determined the best way to transport the map would be rolled. The map was wrapped around a 2-foot diameter cardboard tube with a sheet of polyester used to create a barrier around the tube, with another sheet of polyester around the rolled map. A wooden crate was created to secure the map while in transport.

Due to the map's sheer size and weight, it could not be imaged vertically in the photo studio; therefore, it needed to be imaged horizontally on the floor. To get the proper distance for photodocumentation, imaging had to be conducted from the second floor of the building through a floor hatch. The map was placed on the first floor with a plastic barrier underneath. It took a team of four people with the photographer to photograph and move the map around safely.

Special considerations were imperative for the treatment of this map, as a significant amount of organic solvents would be used for varnish removal, but because of the size of the map, it could not be placed on a suction table, in the fume hood, or in the spray booth. The only viable option for ventilation was the elephant trunk in the paper laboratory, which was used in conjunction with a respirator. The treatment

Fig. 2. Glass removal for map examination.

work time was also limited to short intervals, and check-ins with other ICA staff were conducted to ensure that organic solvent exposure was limited.

## TESTING AND TREATMENT

Testing to remove the varnish needed to be conclusive during the initial on-site visit; therefore, a range of polar to nonpolar solvents was tested. It was determined that ethanol was the safest and best solvent to remove the varnish layer. The following is a list of the test results to remove the varnish layer from the Pike County map:

1. Deionized water removed some surface soil only.
2. A process with 2.5% methylcellulose in deionized water, with a 5-minute application, did not swell the varnish layer or visibly remove soil.
3. Isopropyl alcohol partially solubilized the varnish layer and grime slowly, but it solubilized inks.
4. Ethanol swelled and solubilized the varnish layer and grime easily, safely exposing the paper layer and ink. It did not solubilize the inks or the watercolor.
5. Acetone removed the gloss to coating and blanched the surface.
6. Methyl ethyl ketone slowly swelled the varnish layer. It did not remove inks or watercolor.
7. Ethyl acetate slowly swelled the varnish layer, but not as quickly or easily as ethanol. It did not remove inks or watercolor.
8. Toluene did not swell the varnish layer or surface soil.
9. Xylene did not swell the varnish layer or surface soil.

Once the map was transported and photodocumented, testing was conducted a second time to confirm the original testing results. The full treatment proposal included surface cleaning, tape removal, adhesive reduction, accretion removal, varnish removal, debacking, washing, tear repair, infills, and relining.

Surface cleaning was conducted on both the recto and verso of the map. A vacuum was used with a hake brush to remove loose surface soil and accretions, then followed up with white nonlatex hydrophilic foam wedges (makeup sponges), and then natural rubber sponges (soot sponges). There was clear packing tape adhered around the perimeter of the map that was removed using a hot air pencil. This method removed the tape carrier with most of the adhesive. The remaining adhesive was further reduced manually with a crepe eraser.

The varnish removal was the biggest concern for this treatment. Testing determined that the least volatile and best organic solvent to remove the varnish was ethanol: 200-proof, food-grade undenatured alcohol. The varnish removal process started with the use of ethanol-dampened cotton swabs that were rolled over the surface, utilizing the same procedure as the testing process, but due to the thickness of the varnish layer and the overall size of the map, it was quickly determined that this method would break the time and supply budget.

A revaluation of the removal process was needed; therefore, other methods were tested. Initially, larger swabs and then cotton balls were used to expedite the varnish removal process; however, the removal was still too slow and was quickly eating up the supply budget. Further testing was conducted using a humidification chamber with ethanol (fig. 3).

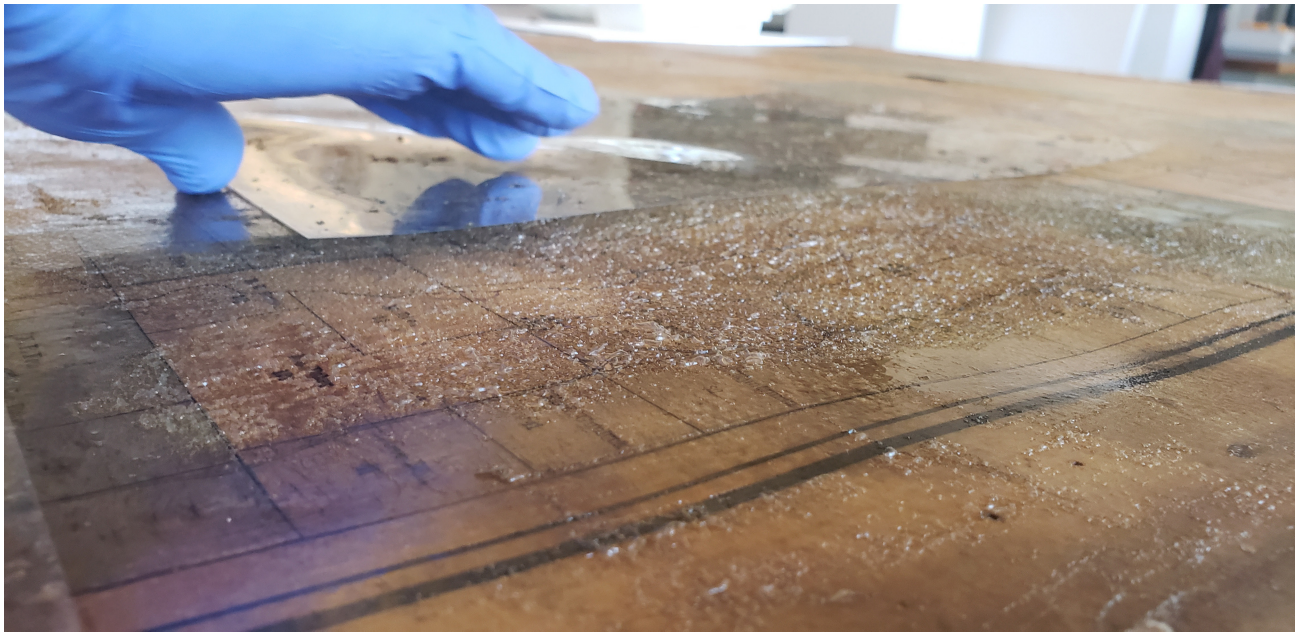

Fig. 3. The swelled varnish layer with an ethanol humidification chamber.

Fig. 4. Manual varnish removal with a microspatula after humidification.

This humidification method easily and quickly swelled the thick varnish layer, which allowed for full manual removal using a microspatula (fig. 4).

The humidification chamber was created by misting ethanol onto the varnish surface and then covering it with a piece of clear polyester sheeting. The polyester sheet allowed the surface to be visually monitored during humidification to determine the ideal swelling time. The humidification process


Fig. 5. The map before treatment.

was modified during removal to include the use of a piece of ethanol-dampened blotter under the polyester. The dampened blotter could be reused for other chambers. This also allowed for even less solvent and fewer supplies to be used overall because each new chamber did not require misting. The second modification included creating larger chambers, from 3-inch squares to 9 × 12 in. rectangles. Then multiple chambers were consecutively implemented to allow for the varnish to be removed on a rotating and ongoing basis. A final cleaning of the surface was performed by swabbing the surface with ethanol. These changes expedited the process and allowed the varnish removal to be completed within 1 week, which came in below the time and supply budget (figs. 5–7).

## SUMMARY

A typical varnish removal from paper can be conducted in a few ways, such as using swabs, a suction table, or even bathing; however, this map was not typical. It was found that the use of a humidity chamber with organic solvents was the best process to remove the varnish layer for this project. The varnish swelled quickly and easily; once swelled, the varnish layer was removed effortlessly with a microspatula, making the reduction of the varnish layer on the Pike County map a success.

The manual varnish removal by humidification was successful on this specific project for a few reasons. The paper was thick with a hot-pressed finish, and the varnish layer was heavily and unevenly applied. The size of the map would not allow for the varnish removal by suction table or a chemical bath. The paper was mostly structurally sound, with minimal tears and breaks.

The lesson learned from this project is that all treatments should be individually assessed and reevaluated during the process. A reassessment not only saved time and money by expediting the project, but it ultimately helped formulate a more successful treatment plan that was more environmentally friendly by using fewer supplies and chemicals.

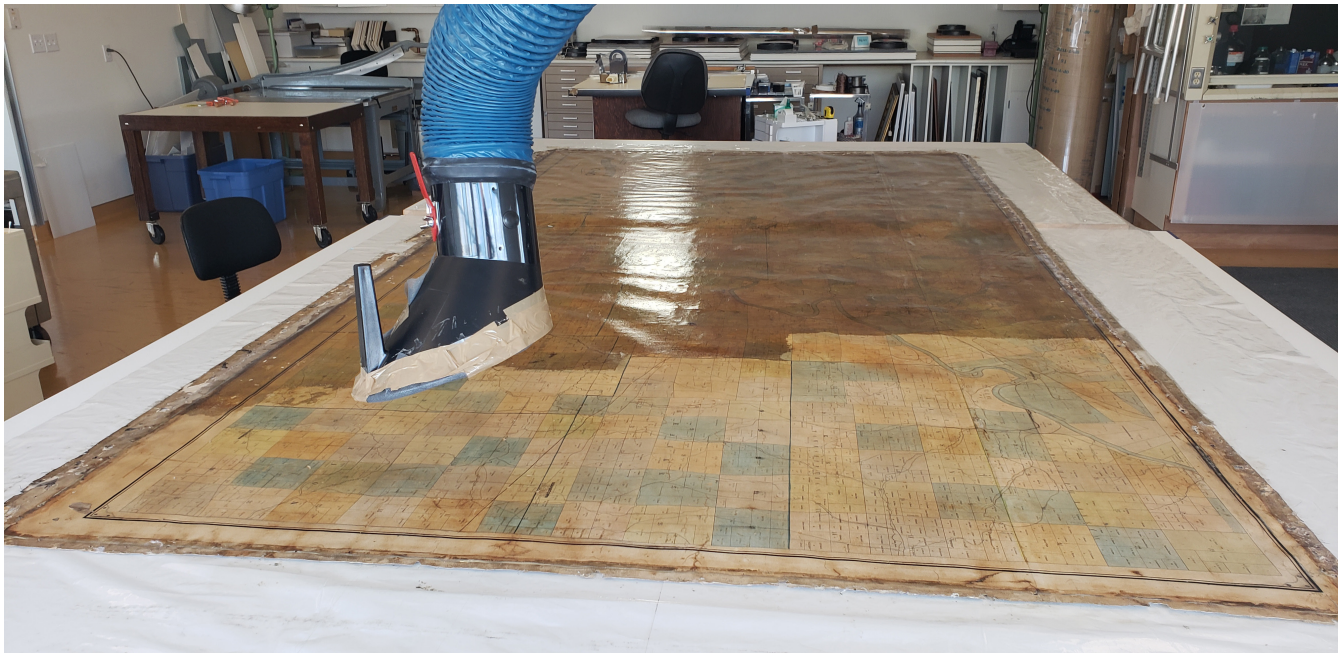

Fig. 6. The map during varnish removal.


Fig. 7. The map after varnish removal.

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