



## **Conservation of the 1823 Map of Fort St. Anthony: Making It Available for Future Generations of Minnesotans**

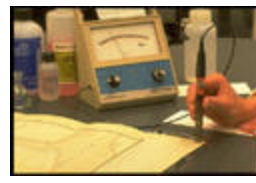
Conservator Kathy Ludwig, who specializes in treating and stabilizing paper items within the Minnesota Historical Society collections, said that while the 1823 map of Fort St. Anthony (since renamed Fort Snelling) is in good condition, considering its age, treatment was necessary to assure that future generations of Minnesotans would be able to view and research the document.

The map-maker used black carbon ink and ink washes on paper that was hand-made from rags. The marginal notes, which tell us so much about the fort in 1823, were written in iron-gall ink, an ink similar to that used to draft the Declaration of Independence. The map has spent the majority of its life folded into a size that would roughly fit into a legal size envelope. Because it was folded for so long, the paper weakened along the folds and in some areas it separated, with small segments missing.

"Our main concern with the map is its chemical and physical preservation. We want to ensure that the information contained within the map is preserved forever and that the intrinsic attributes of the original map are preserved for as long as technically possible," Ludwig explained. "To accomplish this, the information on the map has been digitized and will be transferred to other formats, such as the Society's web page, a microform or a printed facsimile. The original map has been treated by the Society's conservation staff so that it will continue to live its life in a chemically stable environment and be physically protected so that it can be handled safely."



surface cleaning



pH testing

### **Photo Documentation, Cleaning and Repairing Tears**

The treatment of the map involved extensive photo documentation to record the condition as received and after its conservation treatment. The map was then gently cleaned on the front and back with a ground eraser crumb that removed surface dirt. These particulates often harbor contaminants that can accelerate the deterioration of the paper. The tears were repaired from the back with a Japanese kozo tissue and wheat starch paste.

These materials were used because they are strong, flexible, non-damaging, do not discolor and are reversible. All paper conservation repairs are formulated to be easily removed, if necessary, without altering the artifact. The approach to archival repair strives to be as minimal and unobtrusive as possible. In this map the breaking tears were bridges but the areas of loss were left unfilled. The goal was to make the map safe to handle and, in this case, that could be done without filling the small holes.



tearing tissue



applying tissue

## Deacidification

After the tears were repaired the map was chemically neutralized. Acid is a major factor in paper deterioration. Acidity, like the stress caused by folding the paper, can cause the paper's fibers to weaken and break which ultimately results in overall embrittlement and discoloration. The acid may be present from the manufacturing process; from the paper absorbing atmospheric pollutants like sulfur dioxide which converts to sulfuric acid with atmospheric moisture; or, from the paper being stored in contact with other acidic materials such as wood or cardboard. Paper acidity is measured in units called pH (power of hydrogen). The map's pH was determined by using a pH meter which gave a surface reading of 4. This measurement indicates that the surface of the paper is acidic which is most likely due to the alum used in the gelatin sizing. Paper is sized to make it less absorbent so that inks do not feather or blur.

The neutralization process is commonly called deacidification. Deacidification neutralizes paper acids and leaves behind a microscopic buffering salt of magnesium or calcium embedded into the fibers to absorb future acids as they are generated. (You might think of it as giving the paper a dose of Tums!) The paper does not look any different. The process does not make the paper regain its original strength or color, but will slow down the rate at which the paper will continue to deteriorate over time. Papers that are treated this way are expected to have their useful lives extended 3-5 times, as has been demonstrated in accelerated aging tests performed by the Library of Congress.



solubility testing



deacidifying

## Encapsulation

As a final measure for physical protection and safe handling, the map will be encapsulated in a polyester film envelope. This envelope is sealed around the edges with an ultrasonic welder. The plastic is sealed to itself, not to the map, so that the map can be removed at any point in time. This process is not lamination, but merely a plastic envelope to provide additional support for handling, and will protect the paper from hand oils and soil.

## Controlled Exposure

The controlled exposure of the document to light is very important. The intensity and duration of exposure will be controlled, monitored, and recorded by Minnesota Historical Society staff. The effects from light are cumulative and can promote and accelerate the chemical breakdown of paper and cause inks to fade, especially the iron gall ink. Every effort will be made to eliminate ultraviolet radiation and to minimize the overall exposure to visible light. These measures are all done to ensure that the map will be preserved for future generations.

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**Kathy Ludwig, former archives conservator  
Minnesota Historical Society**

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