Caitlin Mahony
Getty/ UCLA Program in Conservation of Archaeological and Ethnographic Materials

Mending Leather and Quillwork on a Native American Vest:

The Challenges and Achievements

1 INTRODUCTION

In the fall of 2012, treatment was undertaken on a leather Native American vest with quillwork decoration. This paper discusses the challenges that were encountered during the mending of the damaged leather and the solutions that were found, which provided stability without further compromising the condition of the substrate. The object to be discussed is from the permanent collection of the Fowler Museum at UCLA and it came to the museum as part of the Paul I. Wellman collection. Wellman was a well-known writer and journalist of the American West that lived from 1895-1966.

1: Sisseton or Santee Sioux vest part of the Fowler Museum at UCLA collection (X66.2128)

2. MANUFACTURE AND TECHNIQUES

The object is a straight-cut man's vest that is loosely attributed to the Sisseton or Santee Sioux Indians. Vests are not part of the traditional clothing of the Sioux; however, they were worn extensively by men after 1885. Vests were originally cut straight and then later designed in the European manner with points in the front (Paterek 1993, 140). This information places the vest's origination within the time period of mid-nineteenth to early 20th century. This vest is constructed from three pieces of tanned or semi-tanned leather that is with decorated with porcupine quillwork, and is lined in a red fabric.

According to Lyford's ethnography on the Western Sioux, tanning was accomplished using brains and other oils (1954, 37). It is very likely that the leather of this vest was tanned in this manner and would have been stretched during the processing as seen on this slide. Microchemical testing of the leather revealed that it is not vegetable tanned. A visual and microscopic analysis of the exposed side of the leather did not provide any indication of the animal the hide came from; however, in the Sioux environment, elk, deer, cow and more rarely antelope or buffalo, would have been available.

The vest has a seam along each shoulder line, and a seam extending below each armhole, which connects the front two panels and the back piece. The entire interior of the vest is lined with a red plain-weave fabric that appears to be machine-manufactured due to the regularity of the thread and weave. There is also an interior pocket on the PL side lined with a light brown machine-manufactured fabric. According to Lyford (1954), by the 1850s, Plains Indians, which includes the Sioux tribes, were using woolen and cotton cloth in their clothing (31).Several condition issues or inconsistencies indicate that the lining is newer than the leather used in this vest. It is unclear if the leather has been repurposed from a different vest, or whether the lining was a later

addition to the piece. What is clear is that it is atypical for the quillwork of a vest to be carelessly stitched into the seam. And it is atypical that the lining would exhibit dramatically less wear and be inappropriately smaller in size than the leather, causing the leather to fold in on the bottom edge of the back side. The surfaces of the vest are decorated with red ribbons and porcupine quillwork. There are three pairs of red ribbons on the front and two pairs of ribbons stitched to the back. There are several thread types securing the ribbons indicating multiple campaigns or replacements.

Quill was used for decoration of hides prior to the use of beads; yet, even after beads were available, the Eastern Sioux showed a preference for quill. According to the habitat map of porcupines in North America, Sioux tribes would have needed to trade for quill (Lyford 1954, 40). A variety of colored quills have been used on this vest including purple, green, orange, blue, red, yellow, and white. Aside from the white, the quills appear to be dyed. The vibrancy and hue of the colors suggest that they are synthetic. It is known that aniline dyes were substituted for native dyes after the 1880s, when they were carried west by traders. The quillwork is in an abstract floral design with stylized images of American flags, which appear to be sprouting from the plants. Apparently, between 1880-1900, there was a **"**remarkable proliferation" of American flags represented on Sioux material and the flag carried a multiplicity of meaning (Powell 1999; Logan and Schmittou 2007; Logan and Schmittou 2002).

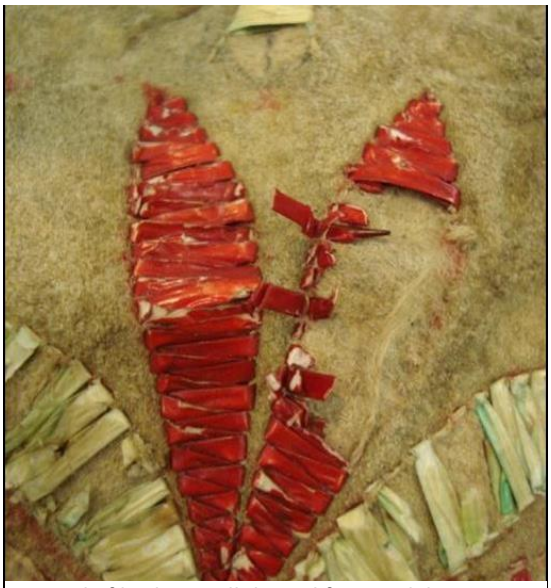
There are two different sewing techniques used in the quillwork. One is a single thread technique, where the quill is twisted and stitched after each twist, to the leather with a single thread. The result is a thin linear design that is flexible and can easily curve. The other technique, which is used for the majority of the design, is done by folding the quill back and forth over two threads. In this technique, the length that the quill continues, before it is folded back, and can be controlled by the artist to make different effects. For example, when the length is regularized, the resulting image is a straight line with a zig-zag pattern in the quill. When it is increases or decreases, the rounded or pointed shapes create leaves, buds, and five-pointed stars.

1: Detail showing tears and creases in the armhole from repeated use.

3. CONDITION ISSUES

Several surface and structural condition issues were acting on the stability of the piece. The major structural issues were damages brought to the leather from extensive use which exposed the leather to repeated abrasion and moisture. This resulted in general areas of discoloration, stiffness, and creasing as well as

localized tears and losses especially in the armhole regions that were at risk for further damage. An investigation into the shrinkage temperature (T_s) of the leather revealed a range of 32-36°C. Considering that brain tanned leather would likely have raised the T_s of the leather to the range of 50-63°C, this indicates a lowered hydrothermal stability. The major surface condition issues were an overall soiling, random staining on the leather, broken and lifting quills from extensive insect damage, fading of the purple and green quill dyes, and fraying, creasing and loss to the ribbons.



2: Detail of broken quill that is lifting and does not have stable quill adjacent.

4. TREATMENT CONSIDERATIONS

The following treatment was guided by both ethical and practical considerations. Aside from general reversibility, the evidence of use that contributes intangible qualities to the vest had to be taken in to account. A treatment had to be designed that accommodated the needs of the leather. It had suffered significant water damage and was deemed hydrothermally instable. Therefore, the mends would need to avoid the use of heat and water. There is also the factor of limited access due to the lining. The treatment designed for the quills needed to be address issues of precision, flexibility, adaptability to different quill conditions, and avoidance of adhering to leather.

5. TREATMENT PROCEDURE

As I described in the treatment considerations, the adhesive that would be chosen would have to meet the unique needs of the leather; I selected Lascaux 360 and a 1:1 combination of 360:498 as possible adhesives for this treatment. I selected these adhesives because of their known tack and flexibility and the appropriate strength for leather. I was also familiar with their ability to be brushed out into a film and reactivated with a number of solvents. This included xylene, which when tested on the leather, did not seem to create any adverse effects, especially darkening, tide lines, or drying. In order to select a carrier, I made mends with these adhesives with goldbeater skin, Reemay, Japanese tissue paper, and Hollytex and evaluated the flexibility and strength as well as the ease of their reversibility manually and with xylene.

I observed unexpectedly that the mends using a combination of 360:498 were less penetrating and more of a tack join, making it easier to remove manually compared to the 360. I also observed that the Reemay was a flexible, strong, and visually nice mend, and that its porous nature, allowed minimal application of the solvent to remove the mend. Therefore the Reemay and 1:1 Lascaux mixture were chosen for the treatment.

When the surfaces were evaluated, the front of the vest was found to be soiled more than the back, which indicates that the soiling was from storage and not from use. As soiling can be hygroscopic and attract pests it was gently reduced with cosmetic sponges. This improved the visual integration on the leather in the front of the vest. The rest of the surfaces of the vest were gently cleaned with a HEPA vacuum.

As a preparatory step to mending the torn leather in the armhole region, some of the creases were relaxed through localized rehumidification. This step was done with care not to remove the creases, as they are considered evidence of use. A blotter dampened with water ethanol mixture 70:30 ratio was applied to the leather in short durations using Gortex as a moisture membrane. When the leather became sufficiently supple, it was gently manipulated with increasing pressure until the desired alignment was achieved.

To prepare for the limited access that I would experience during the treatment of the leather, I mapped the tears and losses on a piece of Mylar, then designed a mock-up using chamois as the leather and muslin as the lining. This allowed me to practice with the adhesive mends and the timing of solvent reactivation and discover whether clamping would be needed.

4: Reemay hinges with a Lascaux film placed overtop the area where they will be adhered underneath.

The mends to the leather in the armhole regions aimed to stabilize the tears from expansion and loss. Small strips of Reemay that were coated with a film of Lascaux 360:498 (1:1) were cut to span the width of tears. Just prior to application as a mend, these hinges were brushed on one side with xylene to reactive the Lascaux. The reactivated side was then crimped with tweezers under one side of the tear, until tack was sufficient enough to hold. Then the other side was also brushed with xylene and extended to the other underside of the tear. I should note that prior to the application of some hinges, areas where the Reemay would be slightly visible were toned with Liquitex acrylics to visually resemble the leather. Overall, eight hinges were applied to the PR armhole. This same technique was applied in two areas of the PL armhole.

Once the tears in the leather were stable, a step was required to stabilize the leather to the lining, so that it was not at risk of snagging or creasing. This step was accomplished through the use of a combination of adhesive and stitching through a previous repair. First, part of the Reemay hinge was applied to the underside of the leather in the same manner as the mends in the armhole. The extending end of the Reemay had been toned with acrylics. This end was rolled and sewn through twice with a pulled thread of goldenrod colored Stabiltex. It was then stitched through a

hole of previous repair, and then back through the Reemay. The ends of the thread were tucked under the side of the leather, left unknotted. The treatment successfully stabilized the area while the mends remained inconspicuous.

When the quill was initially evaluated, it was found in a poor state due to pervasive insect damage occurring at some point in its history. There was considerable loss, and partial losses left quill lifting and loose. Three different quill conditions were discovered on my vest that each required a different approach. Each technique was adapted from findings described in the Brown 2001 article where they discussed mend techniques and flexible adhesives for lifting quill.

3: Strips of toned Tyvek placed under broken quill ready to be adhered to the quill to stabilize the row.

To treat the quill with control of the adhesive and the solvent, an adhesive film of 40 % Paraloid B-72 (w/v) in xylene was made for all the mends. This film was cut into small squares about 2mm by 2mm. Broken quill with stable quill beneath it, was treated by placing a square of the film between the two quills and using a syringe of xylene/acetone solvent , to apply a few drops to reactivate the adhesive. For quill without a quill beneath it, but next to it, a toned Tyvek bridge was used with multiple squares of film. Finally, one area which had a grouping of random broken quills with no stable quill by them, had to be treated by toning a piece of Reemay tucked under stable quill and adhering the broken quill to that substrate. The quillwork repairs using the 40% paraloid in xylene solvent were observed to be flexible and strong. As Brown's study notes, the use of xylene solvent for the adhesive is expected to bring long term flexibility to the mend. These quill repairs and the hinges were thoroughly documented as they were not easily recognizable.

Finally, to protect against further dust accumulation and light damage, an archival box was designed for its storage. A pull tray was designed to assist with handling as were internal cushioning with pull tabs for support to the structure.

6. CONCLUSIONS

Treatment was undertaken on a Native American vest to stabilize creases and tears in the leather and lifting and breaking quill. While the leather on the vest remains creased and lifting due to lining misfit, the stability of the leather increase through the use of Reemay hinges coated with a

Lascaux 360:498 (1:1) mixture, reactivated with xylene. The stability of the quill was successfully increased through the use pieces of solvent reactivated Paraloid B-72 film in xylene. Further treatment to address the fraying ribbons and further attention to the quill would be beneficial.

4: Detail showing the area where Reemay toned to the color of leather was placed under quill.

ACKNOWLEDGEMENTS

This treatment had many great advisors including Ellen Pearlstein, Tharron Bloomfield, and Vanessa Muros, as well as all my classmates. My appreciation goes to the Fowler Museum of UCLA for the opportunity to treat this great object.

REFERENCES

Brown, E. 2001 "An evaluation of quillwork and hair stabilization methods used at the National Museum of the American Indian", *Objects Specialty Group Postprints*, Vol. 8, pp. 166-180.

Douglas A. Smittou and Michal H. Logan 2002 "Fluidity of Meaning: Flag Imagery in Plains Indian Art" *American Indian Quarterly*, vol. 26 (4) pp. 559-604.

Logan, Michael H. and Douglas A. Schmittou 2007 "Inverted Flags in Plains Indian Art: A Hidden Transcript," *Anthropologist,* vol. 42(202) pp. 209-227.

Lyford, Carrie A. 1954 *Quill and beadwork of the western Sioux*. Lawrence, Kansas: Haskell Press.

Kite, Marion and Roy Thomson 2006 *Conservation of Leather and Related Materials*. San Diego: Butterworth-Heinemann.

Kronthal, Lisa, Judith Levinson, Carole Dignard, Esther Chao, and Jane Down 2003 "Beva 371 and its use as an adhesive for skin and leather repairs" *Journal of the American Institute for Conservation,* vol. 42 (2) pp. 341-362.

Paterek, Joshephine 1996 *Encyclopedia of American Indian Costume*. Denver: W. W. Norton & Company.

Powell, Timothy B. 1999 "Narratives Woven in Beads: Reading the Material Culture of the Sioux at the Height of the Ghost Dance," *Narrative*, vol. 7(2) Multiculturalism and Narrative (May) pp. 131-146.