HATS OFF TO WET CLEANING!

Camille Myers Breeze and Marlene Eidelheit

ABSTRACT - Even three-dimensional archaeological hats can be candidates for wet cleaning. Two 1000 year old, cross-knit looped, four-cornered Peruvian hats were brought to the laboratory of the Cathedral of St. John the Divine caked in dried mud and littered with old insect casements. The crust of dirt on both the exterior and interior did not come off completely by mechanical means and it was soon clear that only total immersion could liberate the hats from their muddy cocoons. Because of the inherent strength of these two Peruvian hats, stainless steel chicken wire supports could be used to prevent their three-dimensional shape from being an obstacle for a much needed wet cleaning treatment. The availability, affordability, and adaptability of the stainless steel material, as well as its proven stability in aqueous environments, makes it highly adaptable for temporary use with many types of three-dimensional textiles and hats.

1. INTRODUCTION

Wet cleaning Peruvian flat textiles is done on a regular basis in the Textile Conservation Laboratory of the Cathedral of St. John the Divine, but a precedent had not been set for washing three-dimensional archaeological textiles. A method developed at the laboratory has made the wet cleaning of pre-Colombian archaeological hats both safe and successful. A primary concern was to support the hats internally to prevent them from collapsing or shrinking, yet have all sides accessible for cleaning.

2. ANALYSIS

The first challenge came when two four-cornered hats were brought to us for cleaning and mounting. Current archaeological evidence suggests that these hats come from the Tiahuanaco culture, which controlled much of modern-day Chile, Bolivia, and southernmost Peru during the second half of the first millennium C.E. Tiahuanaco four-cornered hats are recognizable by their lack of supplementary pile, often found in similar hats from the Huari culture, as well as by their geometric and zoomorphic decorative motifs. (Frame, 1990:10)

Both of these hats were made from alpaca yarns. They were constructed by cross-knit looping, from the center top downward, using a larkshead knot (Frame, 1995) (figure 1). Each hat is almost six inches in diameter. This is evidence not only that the ancient Peruvians were small by modern standards but that their practice of carrying babies between cradling boards resulted in deformed, elongated skulls. (Cobo, 1990:200-201)

3. REHYDRATION

Before the hats were brought into the laboratory, they had been stored flat. We found old, inactive insect casements inside the corners. One of the hats is missing an entire corner. The owner was especially concerned about the thick coating of mud on parts of the interior and exterior. This did not come off easily when spot tested, and it soon became clear that only total immersion could liberate the hats from their muddy cocoons.

Prior to cleaning, each hat was placed in a Gore-Tex® humidification chamber to allow the brittle fibers to rehydrate slowly and thoroughly. The humidification chamber was made by laying a sheet of Gore-Tex® laminated

polyester felt inside a cardboard ring and clamping it in place with clothespins. Using a block of ethafoam as a temporary support, a hat was placed inside the chamber (figure 1), which was then covered with a second piece of Gore-Tex®. Wet blotters were placed below the bottom sheet of Gore-Tex® and above the top sheet of Gore-Tex®. The entire chamber was then covered with polyethylene, and the edges were sealed to make a microenvironment. Weights placed on the chamber ensured contact between the blotter and the Gore-Tex®.

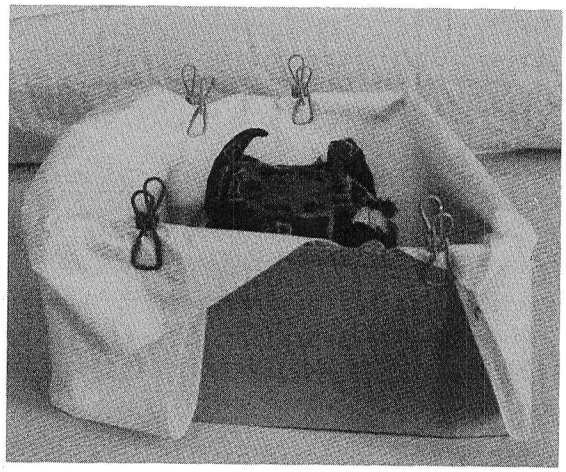

Figure 1. Four-cornered hat in the Gore-Tex® humidification chamber, uncovered. Mary Frame© 1995.

This initial humidification restored a great deal of suppleness to the hats and allowed them to return to their normal shape. While still on its temporary support, each hat was vacuumed with a microsuction attachment to remove the loose surface soil and then covered with temporary nylon net to protect the frayed edges.

For wet cleaning to be successful, the hats needed to be accessible both inside and out, and they had to be supported. We remembered an advertisement we had seen in a catalog for a device which allows one to "clean baseball caps in dishwasher and washing machine." Made of sturdy polypropylene, this clever item supports the cap while leaving the majority of the surface accessible for cleaning. A four-cornered version was soon in the works.

4. CHICKEN WIRE TO THE RESCUE

We gathered a variety of materials and tested them for strength, malleability, and stability in water. Fiberglass screening was too flimsy. Polypropylene sheeting could be cut into squares and sewn together, but it would not conform to the hats, which are not perfectly cubical inside. Metal mesh was more malleable, but the sample we found gave off bits of silver powder, indicating a finish of some kind. We settled on stainless steel chicken wire with 1/4-inch squares. Not only could it be bent easily into the shape of a hat, but it could be fine-tuned to support each protuberance. All cut edges were trimmed of sharp points where possible and carefully folded in some spots to make the exterior and rim smooth (figure 2).

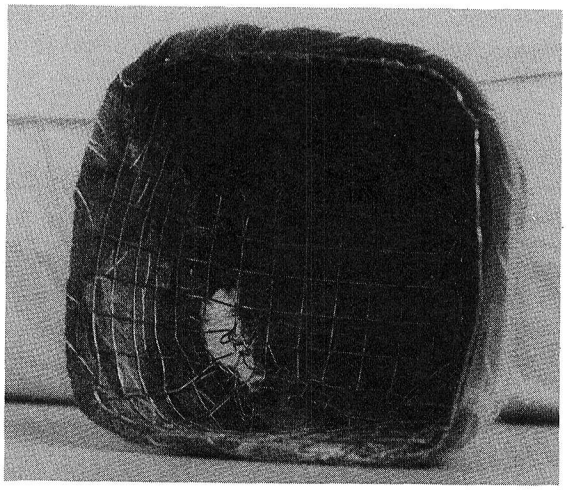

Figure 2. Interior of four-cornered hat with temporary netting and chicken wire frame.

Before wet cleaning, both hats were tested for colorfastness. All dyes were found to be stable. Following a survey of the available literature and a series of tests to determine which surfactant and wash additives were most gentle and effective in cleaning Peruvian textiles, we found that the mild, anionic surfactant Orvus WA Paste was highly successful in loosening water-soluble dirt. The first hat to be cleaned was placed in its frame and allowed to soak in a bath of 75° deionized water for fifteen minutes (figure 3). After soaking, the hat was sponged on all sides with a 0.5% solution of Orvus in deionized water and allowed to sit for three to five minutes before being rinsed off. This was repeated two or three times, at which point the nylon net covering the exterior was removed to free the chunks of dirt that began to flake off. A soft-bristled brush was gently passed over areas especially burdened with soil; for this the wire support provided a firm base.

After the soil was removed and the hat was rinsed, it was given a final bath in deionized water, taken out of the bucket, and gently blotted with a terry towel. The hat was allowed to dry while still on the wire support. Due to the hydrophobic nature of the tightly spun wool yarns, drying was complete in an hour or two.

Once both hats were wet cleaned they could be stabilized. The frayed corners were patched with like-colored fabrics and supported with triangular pillows. A replica of the missing corner was made by crochet, which, when turned sideways, imitates the larkshead knot. Custom mounts were constructed, and the hats were returned to their owner (figure 4).

5. CHICKEN WIRE AND CHEESECLOTH

The next opportunity to test our wet cleaning method came a few months later with another four-cornered Tiahuanaco hat. Although the hat appeared to have been cleaned before, it still had one particularly dirty side and some whitish, soily deposits. The areas of thickest deposits were beginning to crack, suggesting that the soil was alkaline in pH and was compromising the chemical structure of the acidic alpaca fibers.

First the hat was placed on a small, temporary support and vacuumed to remove loose particulate matter. Next it was rehydrated in a Gore-Tex® humidification chamber and then spot tested inside and out with a 0.5% solution of Orvus and deionized water. This resulted in a solvation of the whitish soils but no immediate removal of the thicker encrustations. The decision was made to wet clean.

A custom form was made for the hat, again out of chicken wire. The hat was vacuumed to remove particulate soils. It was then wet cleaned without net, because the hat was in excellent condition and the net was found to trap chunks of dirt. The soiled side was lightly brushed with a soft-bristled tool to facilitate removal of encrusted dirt. As with the other cross-knit looped hats, the light brushing was found to be a harmless and effective way to loosen the waterlogged dirt from tightly spun yarns. In order to monitor the migration of any remaining water-soluble soils, the hat was covered and filled with cotton cheesecloth for drying. When dry, the cheesecloth was removed and found to be dirty directly above and below the side with the thick deposits. This side was remoistened and spot cleaned with an

Figure 3. Four-cornered hat during wet cleaning.

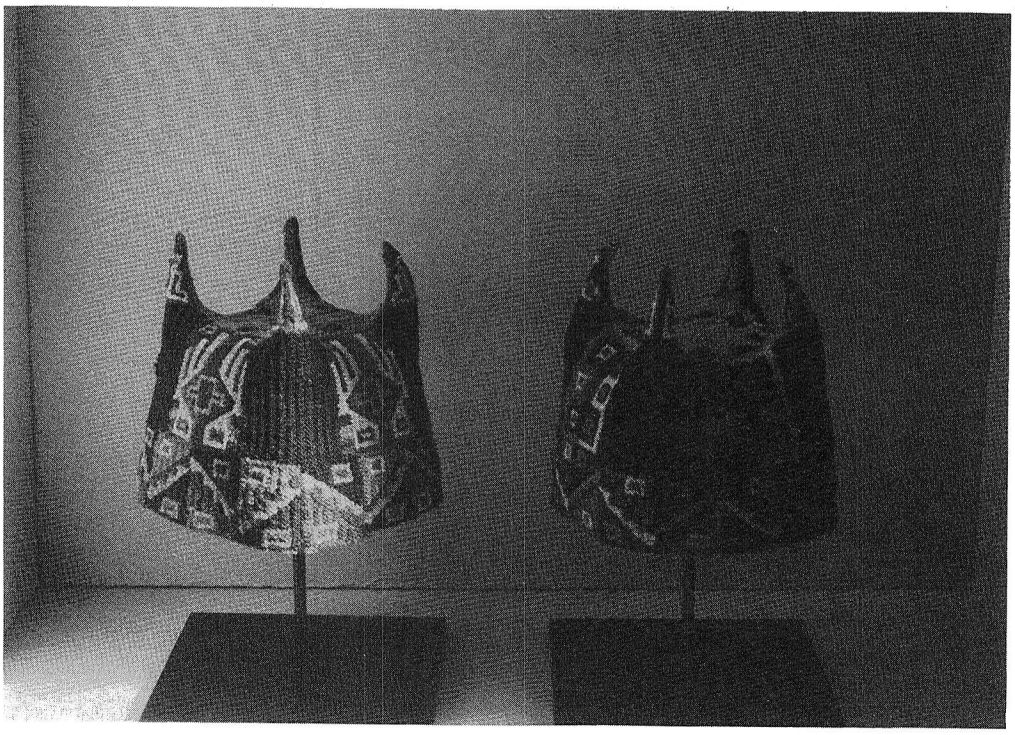

Figure 4. Two four-cornered hats after cleaning and mounting.

identical 0.5% Orvus solution until the soil was removed.

6. BASKET CASE

A new set of considerations existed for the treatment of an ancient round Peruvian hat (figure 5). It belongs to the same owner as the first two four-cornered hats, who believes they come from the same archaeological site. The presence of supplementary pile yarns is reminiscent of Huari hats, but this example resembles others found in the Atacama Desert south of Tiahuanaco territory. The Tiahuanaco were a trade culture, and it was not uncommon for trade emissaries to be buried along with ranking members of the region they were visiting when they died (Oakland). This round hat, we conclude, belongs to the local culture; the four-cornered hats, to a Tiahuanaco traveler.

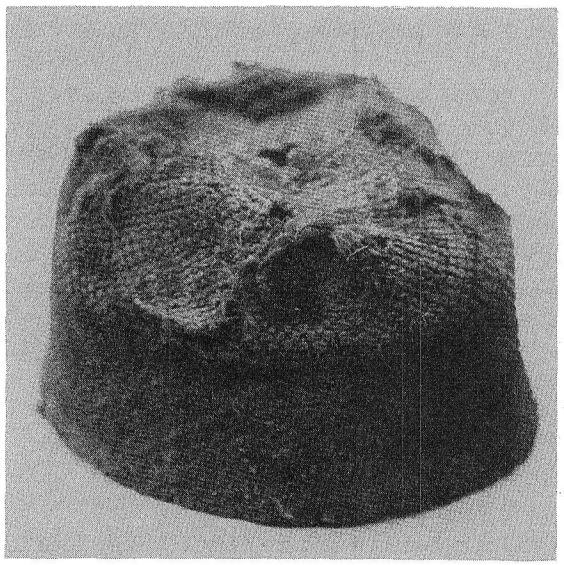

Figure 5. Round pile hat before treatment.

Like the four-cornered hats, this was also cross-knit looped in a larkshead knot. Unlike the others, though, it was constructed in a spiral and contains supplementary pile, more visible on one side than the other. The very top of the hat has some loss and a loose flap of fabric. Vertical slits, first thought to be decorative, appeared to be areas where the extremely tight foundation had split, releasing the brown yarns. The biggest concern in wet cleaning was how the pile would react if the hat were immersed. The tightness of the foundation assured us that the pile would not pull out, and spot tests showed that when wet, the clumps of dirt attached to groups of pile could be removed without taking any pile with them.

Because of the round shape of this hat, a chicken-wire support was neither practical nor particularly easy to make. Instead, a basket-shaped support was improvised out of plastic-covered wire, strips of polyethylene mesh, and twill tape. A ring of wire at the top allowed the hat to be lifted easily in and out of the wash bucket. After washing, the remaining pile could be fully admired, as could the curious use of a lighter cotton yarn for the very top of the hat, instead of the brown wool used elsewhere in it.

7. POLYPROPYLENE MESH

The treatment of archaeological hats in the laboratory continues to evolve as we find suitable materials with which to construct frames. The most recent effort involved a tapestry hat with braids from Nazca, on the south coast of Peru. To make the support, a fine polypropylene mesh was cut to the dimensions of each band of the hat and sewn together with a linen thread. This thick thread was chosen because it passed easily through the holes in the polypropylene mesh without using a needle.

After the hat was vacuumed and tested for colorfastness, it was placed on its frame and sewed directly to it for support. The braids and weak areas were netted. A bracket made of plastic- covered wire allowed the hat to be suspended within the bucket, while the braids

were coiled at the bottom. The hat was bathed in deionized water and then lifted out and gently sponged with a 0.5% solution of Orvus. This wet cleaning treatment was extremely effective in removing the dirt and deterioration products with minimal stress to the hat.

8. CONCLUSION

Wet cleaning was beneficial to these archaeological hats because it resulted in removal of trapped soils; relaxation and realignment of fibers; and reduction of degradation products and accumulated acidity. After the encrusted soils were removed, the hats were also less brittle and their designs more discernible. Our use of wire and plastic supports, permitted by the inherent strength of the pre-Colombian hats, allowed for much-needed wet cleaning treatments despite the hats' challenging three-dimensional shape.

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CAMILLE MYERS BREEZE has been a conservator at the Textile Conservation Lab at the Cathedral of St. John the Divine, New York since 1992. Prior to that she interned at the Textile Conservation Workshop in South Salem, New York, and was a volunteer at the Intermuseum Conservation Laboratory in Oberlin, Ohio. She holds a BA from Oberlin College and a MA from the Fashion Institute of Technology.

MARLENE EIDELHEIT has been the director of the Textile Conservation Lab at the Cathedral of St. John the Divine, New York since 1992. Previously she was assistant textile conservator at the American Museum of Natural History working on their pre-Columbian textile collection while working freelance on many private collections. She spent four years conserving tapestries in Florence, Italy, before which she worked in the conservation lab at the Isabella Stewart Gardner Museum. She holds a BFA from Tufts University and the School of the Museum of Fine Arts, Boston, and a MA in Museum Studies from the Fashion Institute of Technology. Author's address: Cathedral Church of St. John the Divine, Textile Conservation Lab, 1047 Amsterdam Ave., New York, NY 10025, USA.

This paper is dedicated to the memory of Cecily Bloomfield, Textile Conservator, 1963--1995.