

Conservation of the Old Hat

Sung-Kyung Im and Myung-Sook Han[†]

Dept. of Costume and Textiles, Sang-Myung University
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Abstract

This research is to conserve the old hat and restore its shape and place it on a supportive form in a stable protective container. The hat is a homemade construction, utilizing three different machine made laces, and two cotton net fabrics. The exterior, particularly the top crown piece, as well as the lace along the brim's edge has been generally soiled and discolored. Inside the crown, the cotton net has broken threads, and thread loss in several areas. The paper covering the two wires is very weak, and has discolored the lace in the areas of contact. The plastic buckles of the velvet ribbon have also discolored the areas where there is contact. The wash/bleach bath procedure was very effective. Virtually all of the light brown surface discoloration stains were removed. The darker brown spots, particularly concentrated around the two paper covered wires and assumed to be rust, were 90 % removed by the treatment. The brown spots apparently were due to the degradation of the paper covering, and not caused by the wire itself. The buckram foundation lost about 50 % of its stiffness, but this was not a major concern due to the fact that this hat should remain in its mount, which has been designed to serve for both storage and exhibition purposes.

Key words : conservation, discolor, wash/bleach bath procedure, degradation.

I. Introduction

The goal of this paper is to conserve the old hat and restore its shape and place it on a supportive form in a stable protective container.

1. General Description

The hat is a composite construction of cotton fabrics, cotton lace being the predominant element of this ladies hat. In the young miss section of the 1908 Sears catalog, page 1041, a similar hat in both shape, and materials is described as a "duck hat, made in a mushroom shape, with tam crown." Also, due to its small size, it

is my belief that the hat was made as a spring cap for a teenage school girl circa 1907-09.¹⁾ (Fig. 1)

The hat is a homemade construction, utilizing three different machine made laces, and two cotton net fabrics. These fabrics have all been hand stitched onto a cotton buckram foundation, which defines the hat's shape. The brim's shape was defined and supported through the use of a paper-wrapped wire around the circumference. A similar wire supports the circumference around the crown's base, supporting that area where the hat rested on the wearers head. There is a light blue velvet ribbon which circles the crown base, being the lone additional decorative element.

E-mail : hans@smu.ac.kr

¹ Sears catalog (1908), 1041.

consists of tan cotton threads wrapped around a core of black thread.

2) Exterior

Overhanging the brim foundation by $\frac{1}{2}$ inch, and covering approximately 6 inches up, and therefore a majority of the hat's shape, is a piece of openwork cotton, Levers machine-made bordered lace. This lace is approximately $11\frac{1}{2}$ inches wide. On both side edges are $1\frac{1}{4}$ inch Lever lace borders. Their design consists of spaced oval eyelets, with an open oval center, interspersed on a diamond mesh background. The 9 inch wide center fabric is a fine plain, weave cotton net. This bordered lace was folded over 1 inch off center, so one lace border was next to the other. The piece was then stitched to the buckram foundation, giving a double bordered effect along the brim.

Center cotton net:

wrap and weft - 1 ply, low X twist,

35 threads/cm

weave pattern - 1/1 plain

The outermost piece of lace is a cotton, Shipley machine cut-work, embroidered lace. The design is a row of eight petaled flowers, with the petals being open cut-work with embroidered edges. There are embroidered scrolled diagonals, heartshapes, and cut-work eyelets. The lower edge of this lace hangs $\frac{1}{2}$ inch over the brim, and forms a 9 lobed V shape, with cut and embroidered eyelets in each lobe. This was probably a scrap piece, for the upper edge is torn and uneven, and the width varies from $3\frac{1}{4}$ to $6\frac{3}{4}$ inches around the hat. The lace has been folded over and stitched onto the hat forming 15 pleats, 8 folding right, 7 left. The pleats vary from 2 to $\frac{3}{8}$ inches in width. This piece of lace was carefully placed in order to reveal the under layer of bordered Levers lace, between the diagonals of it's lobed diagonal bottom edge.

Cotton Shipley lace:

wrap - 1 ply, medium z-twist, 38 threads/cm

weft - 1 ply, medium z- twist, 35 threads/cm

weave pattern - 1/1 plain

The crown of this hat is covered by a $9\frac{1}{2}$

inch in diameter piece of the same cotton Shipley lace which covers the brim and lower crown. This top piece was stitched to a double layered cotton cheesecloth fabric. The lace was attached using a running stitch along its outer edge. The 12 inch diameter cheesecloth liner was gathered and sewn on the outer edge, forming a 9 inch diameter piece which was then placed over the crown top, and running stitched to the buckram foundation.

Cotton cheese cloth:

wrap and weft- 1 ply, medium z twist,

19 threads/cm

weave pattern - 1/1 plain

Around the lower crown was a 1 inch wide, and 30 inch long piece of light blue silk velvet ribbon. This ribbon had four plastic with an unknown metallic coating, beaded oval designs, 1 inch high, $\frac{1}{8}$ inch wide. 2 of these ovals were $3\frac{3}{4}$ inches apart on either side of the center front, while 2 were $2\frac{3}{4}$ inches apart flanking a bow made from the ribbon, which lay on the rear brim. The underside of the ribbon was woven in a satin weave, but the raised silk threads made deciphering the weave construct impossible.

II. Method and Result

I. Condition

The general condition of the hat is good. The white lace has faded in color. The exterior, particularly the top crown piece, as well as the lace along the brim's edge has been generally soiled and discolored. Inside the crown, the cotton net has broken threads, and thread loss in several areas. The paper covering the two wires is very weak, and has discolored the lace in the areas of contact. The plastic buckles of the velvet ribbon have also discolored the areas where there is contact.

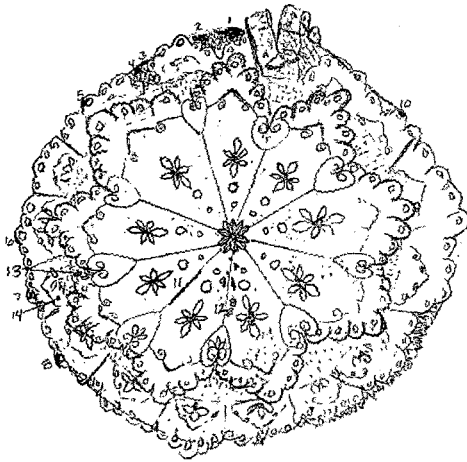
The lace which hangs over the wire support on the brim's edge, has become misshapen because it has been folded under the hats shape due to improper storage.

For specific condition problems see diagrams

on <Fig. 2> through <Fig. 6>.

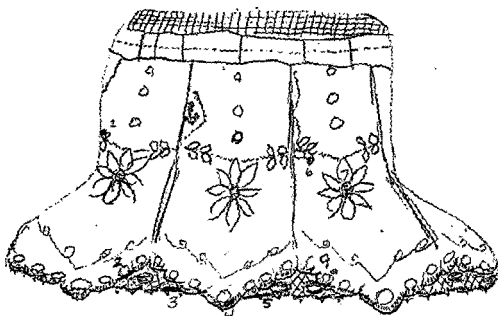
In <Fig. 2>, numbers 1 to 10 have brown stains, probably rust. Number 1 is the largest stain which is 3/8 inches in length. Light brown discoloration is covering approximately 65 percent of surface. The number 11 is the 1 1/2 inch long tear at seam, with frayed threads and 1 inch tear from center point of crown. Number 12 to 15 have small holes less than 4/1 inch in diameter.

The body of the hat is marked by 15 folds of Shipley lace around it's circumference. Fold 1 is located between the two front buckles of the velvet ribbon. The folds are numbered going counter clockwise from there. Since folds 1, 5, and 15 have no visible spot problems, except for



scale: 1' = 2 1/4"

<Fig. 2> Condition: crown lace and overhead view.



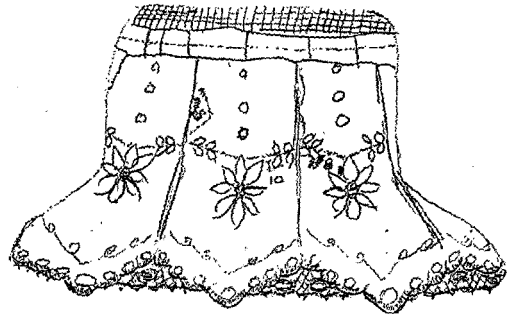
Fold 2 Fold 3 Fold 4

<Fig. 3> Condition Diagram: Fold 2-4.

general discoloration, they were omitted.

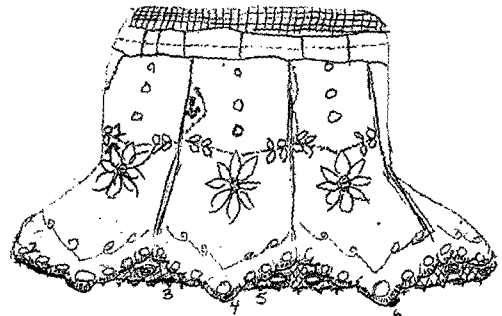
In the <Fig. 3> and <Fig. 4>, numbers 1 to 10 are small brown spots, approximately 1/8 inch. It may be rust. Light brown surface is discolored. Number 9 is a small hole, 1/8 inch. Number 10 is brown spot which is 1/2 inch long and appears more like spill stain.

In the <Fig 5> and <Fig. 6>, Numbers 1 to 9



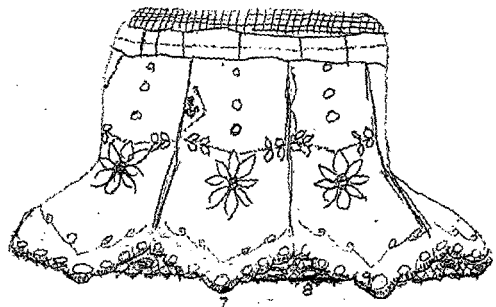
Fold 6 Fold 7 Fold 8

<Fig. 4> Condition Diagram: Fold 6-8.



Fold 9 Fold 10 Fold 11

<Fig. 5> Condition Diagram: Fold 9-11.



Fold 12 Fold 13 Fold 14

<Fig. 6> Condition Diagram: Fold 12-14.

are brown spots and appear to be rust. Number 2, 3, 5, 6 and 8 are brown spots on Levers lace. Number 2 is 2 inches long by $\frac{1}{4}$ inch wide. Number 8 is $1\frac{1}{2}$ inches long.

2. Conservation Treatment

The goal of the treatment was to first stabilize the degradation of the fabrics comprising the hat, restore its shape, and place it on a supportive form in a stable, protective container.

1) Wash/Bleaching Bath Procedure

To stabilize the fabrics, a bleaching/washing bath procedure was performed.

(1) Materials

- 7 liter wash basin
- triple beam balance
- beakers-2,000 mls., 1,000 mls., 2-600mls., 3-50 mls.
- graduated cylinders - 100 msl., 10 msl.
- glass stirring rods
- white cotton towel
- mylar plastic film
- thermometer
- hair dryer
- 2 blocking forms.

The first problem with the bleaching formula was that it was designed by fabric weight and assumes the object will not be a three dimensional shape. Since it was desirable to retain the hat's form. The formula applied in the bleach procedure was determined by the total volume of solution required to completely submerge the hat and crown. A seven liter wash basin was used in this procedure.

Through manipulating the formula, it was determined that 4.8 liters of total solution would provide adequate submersion and workable numbers.

Formula based on ingredient % to total volume - 4800 mls.

The three sodium solutions contain 10% chemical by weight and 90% distilled water.

<Table 1> Bath solution

Bath solution	Ingredient %	Volumes
Sodium hydroxide	5% solution	240 mls.
Sodium bicarbonate	5% solution	240 mls.
Sodium metasilicate	20% solute	960 mls.
Hydrogen peroxide	5% by volume	240 mls.
Total of ingredients in bath	35%	1,680 mls.
Total distilled water	65%	3,120 mls.
Total bath solution		4,800 mls.

<Table 2> Sodium solution

Sodium solution	Weight	Distilled water	Volumes
Sodium hydroxide	24 grams	H ₂ O	216 mls.
Sodium bicarbonate	24 grams	H ₂ O	216 mls.
Sodium metasilicate	96 grams	H ₂ O	864 mls.

(2) Procedure

- 1) Weigh 24 grams sodium hydroxide, place in 600 mls beaker, add 216 mls water and mix. Our solution into 2,000 mls beaker.
- 2) Repeat using sodium bicarbonate.
- 3) Repeat using 96 grams sodium metasilicate, 864 mls beaker, add 216 mls water and mix. Our solution into 2,000 mls beaker.
- 4) Measure 240 mls hydrogen peroxide add to 2,000 mls beaker. Mix.
- 5) Pour solution into basin, add 3,120 mls water. Mix.
- 6) Add 4.8 grmas Triton X-100(1 gram per liter of total solution). Take solution temperature. Mix.
- 7) Place hat in bath, agitate gently for 1 minute.
- 8) Place crown in bath, agitate gently, let both sit for five minutes.
- 9) Remove pieces and place on cotton towel

for 30 second, then place on mylar and fold mylar over so both pieces are encased.

- 10) Cover mylar with towel, allow to sit 1 to 1.5 hours

Bath temperature 72 °F
Bleaching time - 1 hour 20 minutes

- 11) After removing from mylar, place crown on blocking form

- 12) With a hair dryer, blow dry wires on hat, then place on separate blocking form.

The bath contained sodium hydroxide, sodium bicarbonate, sodium metasilicate, and hydrogen peroxide. Since the stitching around the crown piece had been broken in several spots, was generally loose and ineffective, it was removed and the piece was given a separate bath treatment.

2) Conservation Treatment

The silk velvet ribbon because of the oval beads and raised velvet surface was removed before washing. It was steamed, blocked, and reattached later.

It was decided the two paper coated wires had to be left on the piece during the wash treatment. Immediate drying, utilizing a hair dryer was performed after the wash procedure, and stabilization of both the paper and wire was successfully achieved.

After the washing, drying and blocking was performed. Two blocking forms were made utilizing cotton gauze covered, circular shaped ethyfoam blocks, one for the crown and one for the hat. Polyester batting was placed on top of the hat's form and under the gauze cover for cushioning. Two nylon tubes filled with batting were sewn into circular shapes, one to cushion the hat's brim, the other to fill the circumference of the crown during drying.

Once dried, the crown was gathered around the edge using a running stitch. It was then attached to the hat with white cotton thread, employing a double back stitch. The ribbon was reattached in the back utilizing two stab stitches and placed back on the hat.

The mount was constructed using the ethyfoam blocking form made for the hat. Polyester batting was placed on top of the block, and the form covered with a cotton gauze fabric. The nylon donut used for the hat blocking was covered with felted cotton and used to support the brim in the storage container. The container was constructed of acid free board and measured 8.5 inches in height, 19 inches in width and 13.5 inches in depth. The donut was secured to a separate acid free board using cotton twill tape. The mount was placed into the donut and secured from movement by the snug fit.

3. Results

The wash/bleach bath procedure was very effective. Virtually all of the light brown surface discoloration stains were removed. The darker brown spots, particularly concentrated around the two paper covered wires and assumed to be rust, were 90% removed by the treatment. The brown spots apparently were due to the degradation of the paper covering, and not caused by the wire itself. The buckram foundation lost about 50% of its stiffness, but this was not a major concern due to the fact that this hat should remain in its mount, which has been designed to serve for both storage and exhibition purposes.

III. Conclusion

The initial three problem areas considered when first examining the duck hat were:

- 1) Understanding it's compositional make up in order to make informed decisions as to appropriate treatment.
- 2) Debating whether the removal of the two covered wires was warranted, in terms of maintaining structural integrity, and considering the time limitations relative to this procedure.
- 3) Would exposure to water in a bath treatment remove the starch in the buckram foundation to a significant degree? If so would the buckram retain enough stiffness

and be able to retain its shape?

Happily, the decision to leave the wires in place worked out extremely well, due to immediate hand-drying followed by placement on the blocking mount. The buckram lost stiffness, but not enough to significantly effect its shape. I feel confident that this piece has been stabilized, and its new conservationally correct storage environment will allow it to endure for many years to come.

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