Documentation, Conservation and Storage of the Robert G. Myers Collection of Late Intermediate Period Peruvian Textiles

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CONTENTS

TEXTILES

ILLUSTRATIONS

Color Plates

INTRODUCTION

This collection of 24 ancient Peruvian textiles was assembled by Dr. Robert G. Myers and Dr. Sarah K. Myers between 1962 and 1972 while they were living in Lima, Peru. The Myers's learned from friends who owned a large hacienda called Macatón, in the town of Chancay, that *huaqueros*, or treasure seekers, could be hired on the farm to find pottery and other artifacts located in the pre-Columbian ruins. Two digs were undertaken by the couple in 1963 and 1964. A dozen ceramics and three mummy textiles were recovered. The mummies were reinterred afterwards on site. Textiles Nos. 14, 18, and 21 are from one of these digs. All others were purchased from dealers in and around Lima (Color Plates A-D.)

The collection was brought back to the United States in 1972. For seventeen years it remained largely untouched in an acidic brown cardboard box, with the exception of Nos. 2 and 22, which were framed and displayed until 1978. The collection was first made known to this conservator in 1989, at which time the textiles were placed in an acid-free storage box and preliminary documentation was done by Peruvian textile scholar James W. Reid.

A complete assessment of the condition of the collection was undertaken in 1991, at which time the textiles were brought to New York and soon after stored in the graduate textile laboratory at the Fashion Institute of Technology for future treatment.

When the collection was first organized and a technical analysis performed, the textiles were placed in order from structurally simple but visually ornate, to structurally complex and visually simple. This general order has been retained for this thesis, with some adjustments. The number given to each textile reflects its position in this order. It is an indication neither of its value relative to the other textiles nor of the order in which the textiles were collected.

Chapter 1 of this thesis begins with a brief history of pre-Columbian Peru and its textile industry. Each textile technique used by the ancient Peruvians in this period and location is fully described and illustrated, using the textiles in the Myers collection as examples.

In Chapter 2, an overview of the field of archaeological conservation is given. The background and procedure for the proposed conservation treatments are presented. A section on treatment results discusses the discoveries and the success of the proposed methods.

Chapter 3 describes the recommended storage materials and environment for textiles. The chosen location for storage is described, as is the method of constructing the storage mounts and boxes. Suggestions for future display are also made.

Appendix A contains color plates of the textiles in the collection before and after treatment. A list of supplies and suppliers can be found in Appendix B. Individual reports containing the technical information, condition, proposed treatment, and post treatment for each textile in the collection are located in Appendix C.

Chapter 1

DOCUMENTATION

Pre-Columbian Peru

In the beginning of the second millennium A.D., the geographical region known now as Peru was dotted with many small political confederacies. Each possessed its own ruler and its own more-or-less stringent guidelines for the production of textiles. No single dominant political or cultural force controlled these states, but a network of trade routes thrived between the coastal deserts, the Andean highlands, and the tropical jungle (Kidder 1).

Evidence of this trade can be found in the graves of the central coast region. Due to the extremely arid climate of the central coast, ancient burials have been recovered in which desiccated mummies, textiles, and other associated objects are preserved. The moister climates of the north and south coasts provide a poorer environment for preservation; however, many textiles from these neighboring states have turned up in central coast graves (Rowe, Costumes and Featherwork of the Lords of Chimor 16).

For the first four centuries of the second millennium A.D., the Inca, based in the highland city of Cuzco, were one of these many small tribes. In the beginning of the 15th century A.D. the Inca began to expand their territory through military action. In less than 60 years they conquered coastal and mountain regions alike, spreading their empire over approximately 350,000 square miles (Jones 7).

The Inca leader Topa Inca died in 1493 leaving his son Huayna Capac to rule for 34 years. The two sons of Huayna Capac, Huascar and Atahualpa, fought for leadership from 1527 to 1532. A victorious Atahualpa was returning to the Cuzco for his coronation in 1532 when he was captured by Spanish *conquistadores* (7).

Francisco Pizarro had landed at Tumbes, just south of the present-day Ecuadorian border, late in 1532. Capturing the future ruler, Atahualpa, only months later, Pizarro went on to conquer Cuzco in 1535 (Sawyer int.). Moving inland from the coast, the *conquistadores* destroyed the many individual confederacies. Regional textile industries had continued under Inca rule but were altered forever by new Spanish laws. Although native textile traditions did survive in the hidden valleys of the remote Andes, coastal weaving traditions ceased. With the eradication of ancient burial practices in the face of Christianity, the demand for and preservation of textiles ceased (Rowe, <u>Costumes and Featherwork</u> 18).

The Ancient Peruvian Textile Industry

Pre-Columbian Peruvian textiles are made of cotton and wool fibers. The *gossypium barbadense* variety of cotton was cultivated in colors ranging from white, tan, and brown, to a grayish-mauve (19).

Wool was gathered from four members of the Camelid family: the llama, alpaca, vicuña, and guanaco. The llama, a domesticated animal living mostly in the highlands, was valued more as a beast of burden than for its wool. The alpaca was preferred for its long, soft wool, ranging in color from a highly prized white to shades of brown, gray, and black (25). The alpaca was herded only in the highlands, where the exportation of wool to the coast and jungle was a major industry. Vicuña and guanaco wools were only used in very rare cases, as these animals were never domesticated (Kidder 1).

The ancient Peruvians were master producers of bright cotton and wool yarns. Blue was achieved with indigo, a native plant dye. A variety of vegetable dyes could produce shades of yellow. Red came either from *relbunium*, a madder-related plant, or more frequently from the cochineal insect, whose red body was ground into a dye powder. Mollusks were harvested from the coastal waters to make a rare purple dye. Colors could also be made darker with a mordant, and dyes were combined for a range of shades (Rowe, Costumes and Featherwork 19).

The art of weaving began in Peru during the Pre-Ceramic Period (B.C. 3000-1800)[1] At this time they were also masters of netting, twining, knotting, and basketry (Reid 10). By the end of the Early Horizon Period (B.C. 1800-0), all textile techniques practiced by the ancient Peruvians were already known (6). So accomplished were these weavers that their range includes every basic weave and decoration method known in any period or any place in the world (Crawford 4).

The majority of traditional Peruvian textiles, both ancient and modern, are woven on back-strap looms. Continuous warps are looped around wooden bars, which are then attached to a strap. The strap is passed around the weaver's body, and tension is achieved by tying the other end of the loom around a tree or stake (Lanning 72). Back-strap looms limit the width of most textiles to roughly the distance in which a shuttle can be easily passed back and forth by the weaver. Ancient Peruvians wove large tapestry panels on vertical looms, and horizontal looms have also been found from the pre-Columbian period (Reid 9).

A typical weaver's basket from the Late Intermediate period contains a variety of simple tools with which extraordinary designs were created. Thin wooden sticks were used for bobbins, with which yarns were passed across the weaving, and spindles, used to spin and wind the fibers. Larger pieces of bone or wood functioned as loom bars, weaving swords, picks, shed sticks, and beaters (Plates E-F). Other common items found in weavers' baskets include unspun fibers, yarns, chalk, needles, and spindle whorls (Stone-Miller 68).

The majority of weaving baskets have been found in the graves of women. Their inclusion signifies that weaving was more than simply a duty, it was a sign of status. Nearly every level of society was involved in some stage of textile production, however. The degree to which the different ranks and sexes took part varied according to time period and political state (Reid 8). For example, when the Inca conquered the confederacies of the central coast, they imposed strict laws on who would perform each task, what types of textiles could be woven, and what they must look like (Rowe, "Provincial Inca Tunics" 40).

The vast majority of excavated Peruvian graves contain mummified bodies wrapped in layers of textiles. Many graves from the central coast also include textile offerings, looms, wood, stone, metal, and ceramic objects. These gifts were provided for religious reasons: they were believed to have assured a safe passage to the lower interior world (Reid 11).

Textiles were woven in honor of major ceremonial and religious events in a person's life, such as birth, marriage, and death. Once a textile was buried in proximity to a human, it became a magical object. Royal mummies were frequently cleaned and maintained with fresh textiles. This was done out of respect for deities, who took the forms of animals like birds or fish, fantastic creatures like the dragon, and geo-physical features such as stones and rivers. Respect for the dead was also believed to bring fertility and prosperity for the living (5-14).

Textile Structures and Functions

The majority of the textiles in the Myers Collection belong to the Late Intermediate Period, which lasted from A.D. 900 to 1476. All of the textiles except for No. 12, *Brown, White, and Red Band*, were produced in the central coast region, by the Chancay or Rimac cultures. Textile No. 12 is Inca.

The wide array of techniques found among these textiles attests to the remarkable versatility of the Late Intermediate Central Coast weavers. Three of the woven pieces fall into the category of *Q'ompi* or fine wool, or wool and cotton, tapestry (Scheville 83). Because there was no industry for the production of wool on the coast, all wool yarns had to be imported from the highlands. Wool tapestry items from the central coast, therefore, were extremely valuable and in all likelihood would have belonged to the more powerful members of the society (Stone-Miller 43).

Tapestries such as textile No. 1, *Tapestry Fragment*, are composed of densely packed weft threads which entirely conceal the warp (Plate 1a). Where fields of color meet, a slit is formed, and in geometric tapestries such as this these slits become an element of design. Within a lattice of red are diamond-shaped lozenges enclosing zoomorphic figures. These brown, yellow, and pink bands of lozenges run parallel to each other in zigzagging vertical lines.

Textile No. 2, *Loincloth*, was part of a male's wardrobe (Plate 2a). The plain-weave wrapper is now only about twenty inches long, but originally it would have been much longer in order to wrap around the waist and between the legs. The slit tapestry technique was used for the colorful border which hung down the front of the wearer. Stripes and fret patterns, as well as the looped fringe, are all typical of Chancay textiles (Stone-Miller 149).

Textile No. 3, *Strap with Finials*, is probably a ceremonial piece which was never worn in life (Plate 3a). The form of the textile is very similar to numerous examples of head ties and bands from the central coast which were wrapped around the head with the finials next to the ears (Stone-Miller 92).[2] There is none of the distortion which would have resulted from being wrapped around head, which supports the conclusion that it was not worn.

The entire textile is tapestry-woven: a sign of wealth and status. The length of the band has representations of fish and waves in wide brown, red, and yellow bands. On either end of the strap were two finials, of which only one remains intact (Plates 3c-d). Each was composed of two squares of tapestry depicting anthropomorphic figures sewn back-to-back, with sticks or reeds crossed inside to keep the shape. Several strips of plain-weave with loose warp threads were layered around the squares. This fringe is all that remains of the second finial. Two layered cords or tassels are suspended from the complete finial. They were constructed by wrapping thin strips of the same fringe around a central cord of cotton.

Textile No. 4, *Human Hair Rope*, is constructed of five individual lengths which have been twisted together (Plate 4a). Human hair was used frequently for ceremonial wigs, and, in the case of this piece, functional objects (Stone-Miller 253).

Although textile No. 5, *Figural Sculpture*, depicts the head and hair of a human female, it is made of wool, and not human hair (Plate 5a). Figural sculptures were used in elaborate ceremonies and are often found in graves. The face of this figure is made of a warp-faced cloth, and the hair is un-woven wool yarns. Inside the cavity of the head are the remains of the reeds which once formed the body of the figure. The shape of this head suggests that it is Rimac, and not Chancay (Stone-Miller 156).

There are seven examples of *Awasqa*, or warp-faced bands, in the collection. No. 6, *Red and Pink Band*, demonstrates the use of complementary warp yarns, which take turns weaving on the front and back of the piece (Plate 6a). The design created by this warp exchange is a stylized flying bird. Because of their strong nature and dense construction, warp-faced bands were used as both functional and ceremonial objects and are still made throughout the Andes.

Textile No. 7, *Red and White Band*, is identical in technique to the above example. Evidence of the two separate sets of warp can be seen in the mirror effect on back and front. When one of the zoomorphic forms is red on the face, it is white on the reverse (Plate 7a). In these, the simplest demonstrations of complementary warp weaving, it is clear that both warp yarns are integral to the structure and are not part of a supplementary design.

Another sample of complementary warp weaving with two sets of warp can be seen in textile No. 8, *Tan and White Band Fragments* (Plate 8a). This piece is much narrower than the previous two, however, and it is of finer yarns. It appears, from the piece of plain-weave cotton fabric to which it has been sewn, that it was used as a trim on another textile.

Textile No. 9, *Red, Brown, and Yellow Band*, differs from the previous examples in that it has three sets of complementary warp threads (Plate 9a). When one thread is weaving on the face, the other two float on the reverse. Here the presence of two threads occupying the same space on the back gives it a more mottled appearance than the front, making it easy to distinguish between the two.

Tubular interlacing was practiced throughout Peru; however, No. 10, *Tubular Band*, is actually a flat, complementary warp band which has been sewn into a tube (Plate 10a). There are only two colors of warp at any one point in the band, and warp-substitution has been used to achieve the variation. Alternating colors of warp thread are joined with a "dovetail" whenever a change is desired. A tube such as this may have been made in place of a true tubular braid for any number of practical reasons.

In textile No. 11, *Band with Red Border*, the technique of warp-substitution is much clearer than in No. 10 (Plate 11a). Each segment of the design utilizes two different colors, requiring that the warp threads be changed for every repeat. On either side of the central design is a very tightly packed red border.

Textile No. 12, *Brown, White, and Red Band*, is of warp-faced double-cloth with a circular weft which weaves first with the warp on one face and then with the other (Plate 12a). Because there is a great deal of interchange between the two layers of warp down the center of the band, a hollow tube has been formed only on the edges in the dark red. Not to be overlooked in this band is the use of yarns of reverse twist. Alternating warps of Z-and S-twist yarn are used down the central design, which achieves a slight color change and a herringbone appearance. In modern Peruvian weaving, this is thought to have magical powers, which may be a belief handed down through the centuries (Scheville 87). Placing strips of like-spun yarn near the side selvedges is also practical, as it keeps the edges from twisting under. This textile is charactaristically Inca.

The Myers Collection contains three examples of brocaded plain-weaves which have designs woven in supplementary weft yarns (Nos. 13, 14, 15). These designs are achieved while the cloth is still on the loom. There are also three examples of delicate Peruvian gauze, along with an unadorned plain-weave. One of the gauzes has been resist-dyed. Further examples of treatment after the textile has been taken off the loom are seen in No. 23, *Painted Fragment*, and No. 24, *Feathered Fragment*.

Textile No. 13, *Brocaded Lozenge Fragment*, is a fragment of plain-weave cotton cloth decorated with two lozenge designs with feline heads, a bird form, and stepped patterns (Plate 13a). The design was achieved while the piece was being woven by passing colored yarns through the weaving shaft and laying them on the plain-weave ground. These yarns are supplementary and, unlike the multiple warp threads in Nos. 4-10, they do not effect the structure of the cloth. When not in use the yarns float behind the cloth until they are needed again. As was usually the case in Chancay textiles, supplementary yarns cover more than one warp at a pass (d'Harcourt 39).

Textile No. 14, *Brocaded Bird Fragment*, consists of two pieces of white cotton plain-weave ground embellished with diagonal bands of supplementary birds (Plate 14c). The seams suggest that at one time this may have been a garment or was sewn closed around the mummy (Plate B).

The third brocaded textile, No. 15, *Pouch*, is constructed of one rectangular cloth which was folded in half and sewn up the sides (Plate 15a). Diagonal bands of red, yellow, and ocher birds are woven of supplementary yarns which float inside the pouch when not weaving on the surface. From the bottom left corner is suspended a 5 cm tassel of brown and yellow wool yarns wrapped with a pink and ocher striped wool band. In addition, from each top corner can be seen the remains of a strap of white cotton, which appears to have been a tubular interlacing.

Unlike the previous examples of plain-weave (Nos. 2, 13, 14, and 15) textile No. 16, *Brown Openwork*, is woven in a very amorphous weave, with only 1 warp and weft per cm (Plate 16a). Two corners have been sewn together, suggesting that the textile was used for carrying belongings. Textile No. 17, *Openwork with Red Border*, is identical in structure to the previous example, but it has a border on one side of loosely-packed tapestry weave (Plate 17b). This border suggests that this textile may have been part of a garment.

Textile No. 18, *Striped Plain-Weave Shroud*, is known to have been a burial shroud (Plate D). It contains many different colors of warp and weft, which made both the dying and the loom preparation very time consuming (Plate 18b). Although the textile is a plain-weave, the blue weft threads predominate throughout, giving the piece an overall blue tinge. Blue was a common color for Chancay burial textiles such as this (Stone-Miller 46).

Textile No. 19, *Pink Headcloth*, is made of highly spun single-ply cotton threads with an open, crepe appearance (Plate 19a). Chancay culture is known for having made very fine veils, or head cloths, both for daily use and for ceremony and burial

(46). This cloth was made by sewing two long strips of the same material into a square.

True Peruvian gauzes are distinguishable by their use of non-parallel warp threads. In textile No. 20, *Yellow Headcloth*, each warp yarn crosses over its neighbor for one pass of the weft, and then straightens and crosses over the other neighboring thread and so on (Plate 20a). Openwork gauzes evolved from the crossing and uncrossing of more than three warp threads. This headcloth was achieved by grouping four threads for one pass, then crossing the two outermost threads with the outermost threads of the neighboring groups. After 3 cm of gauze, two thin plain-weave strips with paired wefts were woven, divided by a unit of gauze. This square shape was made by connecting two long strips of the same material.

Textile No. 21, *Resist-Dyed Headcloth*, is very similar in construction to No. 20 in that it alternates openwork and plain-weave in regular bands (Plate 21a). Here, after 4 cm of openwork and .5 cm of plain-weave with paired weft threads, there are two units of openwork followed by 2.5 cm of tabby plain-weave. The color pattern of this gauze was achieved through resist-dyeing. Some impermeable substance, such as clay, was applied to the surface after the initial dye, and the textile was given a second bath. The lighter areas represent where the resistive substance was placed. Constructed of two pieces, the horizontal bands of openwork and gauze do not align across the central seam. The resist-dyed pattern is uninterrupted, however, revealing that in the sequence of execution, accessory dye treatment was done last.

In textile No. 22, *Embroidered Gauze Fragment*, a heavier yarn of the same color and fiber is used to embroider design onto the gauze structure (Plate 22c). The threads are attached to the ground fabric with a system of knots (d'Harcourt 52-53). Fish and bird creatures cohabitate in this piece, while waves and geometric steps further elaborate the design.

In addition to resist-dyeing, a non-woven design could be achieved by painting colors onto the surface of a textile. Textile No. 23, *Painted Fragment*, is of plain-weave, weft-predominant white cotton with geometric patterns applied in shades of brown after weaving (Plate 23a). The pattern is visible on the reverse only where the warp and weft threads were loose enough to allow the paint to pass through the weave.

Among the most extraordinary of all applied designs in Peruvian textiles are those made with feathers. The amount of feathers needed to cover one small garment like textile No. 24, *Feathered Fragment*, would have required perhaps thousands of birds (Plate 24a). The feathers were attached by forcing the quill over a cord and tying it with a piece of yarn. The cord is then attached to the textile with stitches which pass through or below the tied yarns (123).

Chapter 2

CONSERVATION

The conservation of ancient Peruvian textiles requires an understanding of the two very closely related fields of textile conservation and archeological conservation. It is an unfortunate reality that, for many years, textiles were considered a last priority for salvage during archaeological excavation. The field of textile conservation can be said to have been born out of the conscientiousness of archaeologists such as Junius Bird, who, by the 1930's, had brought equal recognition to textiles and other organic archeological materials.

There are many similarities in the practices and ethics of these two fields. Both textile conservators and archaeological conservators share a common set of responsibilities, which are, according to Cronyn:

> 1) to investigate artifacts and to identify and remove adjacent substances which may be interfering in the understanding of the morphology and technology of the object;
>
> 2) to stabilize archaeological materials and prevent further deterioration of archaeological evidence following excavation; and
>
> 3) to further treat those objects which are suitable for educational or display capacities (8-9).

When the Myers Collection was first considered for conservation, the cleaning and stabilizing of all 24 textiles seemed a superhuman task. In addition to being dirty, some of them were crumpled and torn. A policy of minimum intervention was adopted, with only the wrinkled and dirtiest textiles slated for anything more than a thorough vacuuming. This conservation project would assure that any degradation products were removed, that the textiles were returned to their natural shapes, and that they were placed in a stable environment

Prior to conservation, each textile was thoroughly inspected for dirt, stains, tears, repairs, creasing, fragility, and insect damage. A proposal for conservation and storage was also made. The results of these examinations can be found in Appendix C.

Proposed Treatments

Vacuuming

The primary technique for the cleaning of soiled textiles is vacuuming (Leene 40). Air-removable particles such as dust or debris from burial can be removed using low suction and a soft brush attachment. A canister vacuum with a water-filled dust trap collects the dirt that is vacuumed and prevents it from being redistributed into the air.

The vacuum attachment is placed on the textile in a row-by-row manner and not brushed across the surface, which can dislodge loose fibers and damage weak areas. In the case of those textiles which were exhibiting high rates of powdering and decay, a sheet of thin fiberglass screening would be laid over the textile during vacuuming to prevent loose fibers from dislodging or being sucked into the vacuum tube.

When a textile requires a very gentle vacuuming, a dental vacuum provides precise suction. The dental attachment is smaller than that of a standard vacuum (approximately 1 cm in diameter) and can be applied to small areas. In addition, most dental vacuums come equipped with a water trap, as well as with a rheostat which allows the suction to be adjusted from 1 (weakest) to 10 (strongest).

Following these proposed treatments, all 24 textiles in the Myers Collection would receive a vacuuming before storage or further conservation. In all but one case a Rainbow Model D-3® canister vacuum would be used. Textile No. 24, *Feathered Fragment*, would be vacuumed with a Steri-Dent® vacuum at suction 2.5 or under. According to research by Sara Wolf and Paul S. Storch, this level of suction results in the least disarticulation of the hooks and barbules of the feathers (32).

Although this is not the most effective way to remove particulate soils, it is the least harmful to the structure of the feathers. Given the relatively strong condition of the ground fabric on this textile in comparison to the brittle, fragile feathers, it was felt that a more conservative treatment would be the most beneficial to the piece's long-term stability.

Fifteen textiles in the collection would receive no further treatment after vacuuming, except for photography and storage in acid-free materials (Nos. 3, 4, 5, 6, 7, 8, 9, 11, 12, 15, 16, 17, 22, 23, 24). Of the nine remaining textiles, Nos. 4, 13, 14, 18, 19, 20, and 21 would be humidified. Nos. 1 and 2 would be humidified then wet cleaned.

Humidification with Steam

Humidification is the treatment of a textile with moisture in the form of water, cool water vapor, or steam. The purpose of humidification is to add strength to brittle fibers in danger of breaking, to slowly introduce moisture to a textile before wet cleaning, or to relax creasing and realign warp and weft.

In some instances, it is not desirable to eliminate wrinkles and folds on archaeological textiles, as their presence may indicate something about the use of the textile before burial (Billings 11). However, this collection had been inadequately stored for almost thirty years, and it was evident that the creases were the result of past storage techniques and not original usage. Failure to relax the folds in these textiles would eventually lead to breakage of the fiber and disintegration of the woven structures.

The initial method of humidification which would be used on the textiles was steaming, using an Osrow Touch Up and Go® hand steamer, followed by blocking with stainless steel pins. The benefits of using steam are that it provides a quick, localized application of moisture, which relaxes creases without the need for immersion. The hand steamer is also portable and quick to heat up, and it is highly effective.

When using steam followed by blocking with pins, it is necessary to place the textile on a Fome-Cor® board or other surface into which pins can be stuck. Steam is applied locally, beginning in the center of the textile. The textile is flattened out by hand, realigning the warps and wefts. Pins are placed within the realigned area, taking care not to overstretch the fabric or put stress on the fibers. It is also vital that the pins be carefully inserted between the warps and wefts, not piercing the yarns. The process of steaming and pinning sections is repeated until the entire textile is blocked. The pins may be removed when the textile has dried or the creases have relaxed.

The use of steam in conservation is sometimes inappropriate, due to the risk of stains setting with the heat. However, stain removal was not a concern with this collection. It was felt that effectiveness in relaxing fibers locally without the need for prolonged contact with moisture was of primary importance.

If steaming does not remove the creasing, contact humidification with wet blotters can also be performed. A piece of acid-free blotter paper is cut to the size of the area being humidified and moistened with distilled water. Wrinkles and folds are smoothed out by hand and the moistened blotter is applied over the area. Glass weights are then put over the blotter paper and left until the creases are relaxed (Plate 21b).

Textile No. 4, *Human Hair Rope*, was in extremely brittle condition, and was beginning to split and crack where knotted. The application of steam to the object would give it suppleness and potentially reduce the amount of breakage it received during handling and storage. The *Striped Plain-Weave Shroud*, No. 18, was also in a considerably crinkled and very delicate condition. Steam would be used to relax the fibers and reorient them in the original warp and weft directions.

Textile No. 13, *Brocaded Lozenge Fragment*, possessed a large area of creasing along the one remaining bottom selvedge. Steam would be applied to this area, and the textile would be pinned out on a soft board to block it to its original shape. Textile No. 14, *Brocaded Bird Fragment*, had considerable creasing, staining, and areas of loss, which rendered it too fragile to wet clean. Instead, it would be humidified with steam to enable it to be gently unfolded; then the warps and wefts would be re-aligned. It might have been necessary to apply light weights in addition to pins. If glass weights were used, a layer of blotting paper would be placed between the textile and the glass to prevent any condensation from migrating to the textile.

Humidification with Gore-Tex®

Gore-Tex® is the registered name for a microporous polytetra-fluoroethylene (PTFE) membrane developed by W.L. Gore and Associates, Inc. (Andrasik 1). It comes laminated onto a supporting fabric, which can be anything from fine wool to polyester felt. Because of the ability of the PTFE membrane to distinguish between water in a vaporous state and as a liquid, Gore-Tex® was adopted for use in paper conservation several years ago. It is still fairly new to textile conservation.

Gore-Tex® has one billion pores per square inch, each of which is 20,000 times smaller than a drop of liquid and 700 times bigger than a water vapor molecule (1). When moisture is applied, the water droplets cannot pass through, but air and water vapor are free to circulate. Water vapor will penetrate the Gore-Tex, humidifying the textile fibers without their ever becoming "wet."

A humidification chamber can be created using two sheets of Gore-Tex®, a moist blotter, a sheet of polyethylene, and weights. The textile is sandwiched between the membrane sides of two sheets of polyester felt-lined Gore-Tex®.[3] A damp blotter is laid on top of the Gore-Tex®, followed by a polyethylene sheet and finally by the weights. A microenvironment is created between the layers of Gore-Tex® which slowly humidifies the fibers and results in an overall relaxation and reorientation of yarns. This treatment has been most successful with flat unembellished textiles.

Textiles Nos. 19, 20, and 21 are all square women's headcloths of highly spun yarns in loosely woven gauze and plain-weave structures. Prior to storage, they would receive a two-part humidification treatment. First, the creased edges would be blocked out with steam and weights. Next, the entire textile would be placed in a Gore-Tex® microenvironment.

Textiles No. 1, *Tapestry Fragment*, and No. 2, *Loincloth*, were going to be humidified before wet cleaning. For fragile textiles, Hillyer recommends pre-humidification prior to washing, as it lessens the chance of splitting of the fibers which can happen with the sudden swelling caused by immersion (20).

Wet Cleaning

Wet cleaning of archaeological textiles is receiving more acceptance since falling out of favor after many years of damage and mishandling of textiles during washing. It is now generally accepted that when a textile is very dirty and is experiencing accelerated degradation as a result of this soiling, it should be stabilized by wet cleaning (Hofenk de Graaff 62). Bearing in mind the reduction of weight of the piece as a result of solubilization in water of broken fibers, there are still many benefits to immersion in water.

Hillyer points out several positive effects of water on archaeological textiles (18). The first and most visible of these is the relaxation and realignment of the fibers. In addition, water reduces degradation products and accumulated acidity, which brings the pH of the piece closer to neutrality. Soil removal and decreased brittleness are also generally achieved by wet cleaning.

Before washing, textiles would be tested with room-temperature and 80° F distilled water and with any surfactants under consideration. The purpose of testing was to compare effectiveness of each surfactant and check for colorfastness. If there was significant bleeding of dyes, the piece would not be wet cleaned. If there was slight bleeding of the dyes, a decision would be made as to whether the benefits of wet cleaning outweighed the risk of loosing dye and staining the piece.

Distilled water would be used for all stages of testing, as well as the first immersion and last rinse (Landi 69-70).[4] The temperature of the testing solutions and bathwater would never be over 100° F, as the natural fats which constitute a percentage of the composition of protein fibers might be removed, leaving them brittle (Hofenk de Graaff 64). In addition, protein and cellulosic fibers might shrink in high temperatures.

The function of a surfactant is to surround dirt particles and allow them to be carried away in the water (62). The washing solution would contain either the nonionic surfactant Triton X-

100®, or the anionic surfactant Orvus WA Paste®. The benefits of a nonionic surfactant include its neutral pH. In contrast, anionic detergents produce a slightly alkaline solution in water. The anionic surfactant Orvus® also acts as an anti-redeposition agent, preventing loosened soils from reattaching to the fibers during washing (personal communication, Susan Ann Mathisen, Cathedral Church of St. John the Divine).

The alkalinity of an anionic surfactant solution can be a drawback when washing protein fibers such as wool, which are naturally acidic. Nonionic surfactants are neutral, but are less effective cleaners. To improve their effectiveness, additional chemicals are usually added to the solution.

Sodium metasilicate and sodium-carboxymethylcellulose are both complex-builders which combine with a nonionic surfactant to make a more effective washing solution (Hofenk de Graaff 63). The function of a complex-builder is to improve the cleaning abilities of the washing solution by absorbing dirt and preventing it from reattaching to the fibers.

A recommended concentration of surfactant and complex-builders has been determined by Hofenk de Graaff. Too low a concentration may not remove much soil. Too high a concentration can cause the solution to surpass Critical Micelle Concentration, or the point at which the effectiveness of the surfactant no longer increases.[5]

If a nonionic surfactant solution was chosen for wet cleaning the two textiles, the following formula from Hofenk de Graaff would be used: 1-2g/L of Triton X-100® nonionic surfactant;

.5g/L of sodium metasilicate; .05-.1g/L of sodium-carboxymethylcellulose in distilled water (64). If an anionic surfactant was preferred, a .1% solution of Orvus WA Paste® in distilled water would be used (Leene 64).

Traditionally, many archaeological textiles have received treatment before wet cleaning with a solution of glycerin and water. Initially developed by Pat Reeves of the Los Angeles County Museum of Art, glycerin treatment allows for a gentler relaxation of the fibers upon immersion and for release of trapped dirt. An after-bath of 20% glycerin in water has also been recommended to make the textile more supple for conservation (Carter 164). Due to the number of drawbacks, glycerin treatments are now used very rarely. Once introduced into fibers, glycerin can never be removed and often leaves a tacky residue on which dirt and dust accumulate and insects feed. Therefore no glycerin would be used here.

Textiles No. 1, *Tapestry Fragment*, and No. 2, *Loincloth*, were slated for wet cleaning. After an initial vacuuming and local humidification each textile would be encapsulated in a sheet of fiberglass screening. This screening would extend several inches beyond the edges of the textile for handling. A running stitch would be passed around the periphery of the textile, and several stitches would be taken in the body of the textile to prevent slippage within the screens. Throughout the washing process, the pH of the wash water would be tested with ColorpHast Indicator Strips® and recorded (Plate 2h).

The textiles would be placed face up in the washing table and given a bath of room temperature distilled water (Landi 72). Dyed areas would be monitored for dye bleeding. After soaking for about ten minutes the water would be drained and the tank re-filled with 80° F tap water.

The pre mixed washing solution would be warmed to approximately 100° F and sponged onto the front and back of each textile. After draining the water, the textile would be rinsed until no detergent was visible. It would then be given a final bath of distilled water at room temperature. This would remove any remaining surfactant and further neutralize each piece. The textiles would then be removed from the water, gently rolled in white cotton toweling, taken out of the screens, and placed on a flat surface for blocking (Landi 80-81). Fine stainless steel ball-headed pins would be used to hold the textiles to shape during the drying process. After blocking, the textiles would be covered with a wicking cloth, which absorbs any migrating soils and oxidation products. The textiles would be allowed to dry, under supervision, in a well-ventilated room.

Treatment Results

Although it is vital to plan every step of a conservation project, it is not unusual for the conservator to make adjustments in the number or method of treatments. The following section describes what discoveries and changes were made during the vacuuming, humidification, and wet cleaning of this collection. Detailed accounts of individual procedures are available in Appendix C.

Vacuuming

Before each textile was vacuumed, careful examination was made of the nature of the soiling. In many cases, encrusted dirt, bits of feathers, and pieces of the muslin in which the textiles had been temporarily stored were found on the surface. This kind of dirt was not effectively removed by vacuuming through fiberglass screens. Instead, the screens were removed, the textiles carefully vacuumed, and the largest of the foreign particles were picked off by hand or with tweezers.

In the case of No. 24, *Feathered Fragment*, the screen was used to vacuum the front of the textile, with the rheostat on the dental vacuum set at 2.5 as planned (Plate 24b). For the back of the textile, which has no feathers, the screens were not used. The suction was also raised to 4 for more thorough cleaning.

When the remainder of the collection was vacuumed, only textiles Nos. 9, 18, 19, 20, 21, and 22 were vacuumed using the screens. These textiles either displayed a large amount of loose yarns or are finely twisted, almost weightless gauzes. All other textiles were carefully vacuumed without screens.

Humidification

Initially it was thought that only those textiles which were extremely brittle or creased would receive a humidification treatment. Although all of the textiles had become somewhat dry after burial and storage, steaming and blocking were going to be used sparingly. As mentioned earlier in this chapter, steam can set stains and overstretch yarns.

Humidification with steam and blocking with stainless steel pins was performed on textiles Nos. 4, 13, 14, and 18, as planned (Plate 14c). This was successful in lessening the creasing, but it was not eliminated. Following the first successful Gore-Tex® treatment, on textile No. 19, it was decided to try this method with the remaining creases on the previously steamed textiles.

This time, the creases were completely eliminated. As a result of the overwhelming success of the Gore-Tex® humidification treatment in eliminating creases and folds in these textiles, every piece in the collection, with the exception of Nos. 1, 2, 4, 5 and 24, was humidified in this manner.[6] Even those textiles which were not overly creased were provided with a twenty-minute humidification to rehydrate the fibers and make them less brittle (Plate 19c). More serious creases were treated for twenty minutes, inspected to see if the wrinkles had relaxed, and given an additional twenty minutes if necessary.

Wet Cleaning

Preliminary testing with the anionic surfactant Orvus WA Paste®, and the nonionic surfactant Triton X-100® combined with sodium metasilicate and sodium-carboxymethylcellulose as complex-builders, showed equal amounts of soil removal. It was decided, therefore, that one textile would be washed in each to see which was more successful in removing stains and neutralizing the pH.

First textile No. 2, *Loincloth*, was washed in the wash table using the concentration proposed earlier in this chapter for nonionic surfactants (Plate 2g). When the detergent solution was introduced into the wash water, the pH of the textile rose from an initial 5 to the very alkaline reading of 10. This was due to the use of sodium metasilicate, which tests showed to have a pH of 13. After the washing was complete, the pH of the textile did, however, return to 5, which is an acceptable pH for a partially woolen textile (Plate 21h).

After drying, the textile appeared considerably brighter than before, although the white plain-weave wrapper still had some staining. The fringe was successfully untangled, showing a previously unnoticed shade change due to the use of two different dye lots in the manufacturing of the yarns. The lighter of these two shades corresponds to a more degraded section of the fringe, suggesting that the chemical composition of that dye bath contributed to the accelerated decomposition of the yarns. The textile was measured after drying and was found to have increased slightly in size, owing to the relaxation of the creases and the expansion of the yarns upon rehydration.

The second textile to be washed, No. 1, *Tapestry Fragment*, produced a distinct odor of moth balls when tested with 80° F distilled water. As the owner never stored any of the textiles in moth balls, it is assumed that the contamination was made prior to the purchase from a dealer. Because the active ingredient in moth balls, Naphthalene, is harmful to both textiles and humans, it was decided that the textile should be carefully washed under the fume hood. The small size of the textile and the availability of plastic washing trays facilitated this procedure.

A .1% solution of Orvus WA Paste® was prepared according to instructions presented earlier in this chapter. The pH of this solution was found to be 5. Because of the small size of the washing trays, it was not uneconomical to use distilled water in every phase of the wet cleaning. When the Orvus® solution was sponged into the textile, there was no fluctuation in the pH. After washing and rinsing, the pH remained at 5. When the textile was dry, it was noticeably cleaner and the fibers were soft and unwrinkled. The final pH was 5.

A comparison between these two detergent solutions showed no visible difference in cleaning capacities. The lack of fluctuation in the pH of the anionic detergent bath is a positive attribute. As the differing location of these wet cleaning treatments was not a factor in the success of the surfactant, I have concluded that a detergent solution without the addition of alkaline complex-builders poses less of a risk to the textile fibers.

Conclusion

In addition to the discovery of the success of Gore-Tex® humidification treatments in providing gentle, effective removal of creasing and hydration of archaeological textiles, and the preference for more neutral detergent solutions, these conservation treatments provided one more important piece of information. I had been told by the owner that textiles Nos. 14, 18, and 21 were believed to be from the same grave. The Brocaded Birds *Fragment*, No. 14, was taken from a mummified infant. No. 18, *Striped Plain-Weave Shroud,* can also be seen in a photograph of the adult mummy (Plate D). There was no strong evidence, however, that No. 21, *Resist-Dyed Headcloth,* belonged to this group, other than the fact that it has apparently been cut with scissors or a knife, like the other two textiles.

During the vacuuming procedure, it was noted that No. 14 possesses a seam which appears to have been sewn closed with a heavy-weight white cotton 4-ply, 2-Z-twist yarn. A yarn of the same color and structure was found at two points along the edge of No. 18 (Plate 18d). These yarns appear to have been used to secure the textiles in the mummy bundles and may even have come from the same length of yarn. An identical yarn was later found knotted in the center of textile No. 21, *Resist-Dyed Headcloth.* This supports the hypothesis that these three textiles did indeed come from the same burial. If this headcloth belonged to the adult mummy, the mummy was a female. The child, therefore, may have been hers.

Chapter 3

STORAGE

A three-step procedure for establishing a proper storage environment has been developed by Lucy Commoner of the Cooper Hewitt Museum, the Smithsonian Institution's National Museum of Design (Commoner 1-2). First, the specific storage needs of the collection are assessed: Should the textiles be stored flat, rolled, or folded? Next, a projection must be made of the future use of the textiles while they are in storage. Finally, the storage location and furniture are evaluated for environmental and chemical stability as well as light and dirt levels.

Dennis Piechota, in his analysis of storage methods at the Peabody Museum, outlines a more specific set of considerations for archaeological textiles (11). Fine arts storage conditions have always surpassed the standards used for anthropological art storage, Piechota argues, and in order for anthropological collections to "remain an unimpeachable scientific resource" their chemical stability should not be compromised by inappropriate storage. Following this guideline, a storage system was developed for the Robert G. Myers Collection which will reduce handling while increasing accessibility, provide environmental stability, and contain only materials which are acid-free, easily purchased, and relatively inexpensive.

Storage Materials and Locations

The poor condition of many Peruvian textiles can be attributed not only to the effects of burial and excavation but also to the conditions in which they have been stored. It is mostly within the last three decades that museums have undertaken to improve their storage facilities and address the special needs of each type of material. Today even private owners can create an inexpensive and safe environment in which to store works of art in their homes.

Many of the materials traditionally used to store works of art are harmful to organic materials such as textiles, feathers, wood, bone, and paper. Standard cardboard moving boxes are probably the most common environment in which textiles are stored in the house. These can often be obtained free of charge from any large grocery store, are easily assembled, and can be stored flat. Unfortunately, brown cardboard contains a high percentage of wood pulp, which is high in acids and lignin.[7] Acids attack textiles by breaking the molecular backbones of the fibers.

Newspaper is another common household item which frequently makes its way into textile storage locations. Individual textiles are wrapped in it, padded with it, and even, as in the case of some quilts or dress patterns, constructed using it. Newspaper is also full of acids and will break down textiles in much the same way cardboard does. In addition, newspaper contains printing ink, which is difficult to remove from clothing or even hands.

A number of mail-order catalogs that are now available to the general public provide a complete range of storage materials and supplies such as acid-free cardboard and tissue, pre-made acid-free boxes, and cutting tools (see Appendix B). In addition, many large cities have supply houses which will sell archival supplies at considerable discounts from the catalogs.[8] A local private conservation facility is another good place to go for supplies, as well as for advice on storage and treatment.

Although storage materials are vital to the safekeeping of textiles, the climate and location in which they are kept is equally important. Attics and basements are convenient storage places in the house, but they are rarely suitable for textiles: Attics are often cold in winter, hot in summer, and humid all year round. Because textiles are made from organic materials, they respond to dramatic fluctuations in temperature and humidity by swelling and contracting, which can break the fibers. In addition, attics attract dust, insects, rodents, bird droppings, and they are rarely monitored. Similarly, basements are home to a number of vermin and are subject to flooding.

Storage in the main areas of the house is preferable. Open shelves are suitable, providing they are not in a dusty area, there is no animal traffic near by, they are not in direct light, and they are not poked at or jostled.[9] Drawers and closets are also suitable, assuming similar precautions are taken. Wooden shelves and drawers are often coated with layers of paint. Old paint can be high in lead, which is harmful to both humans and textiles. Unfinished wooden surfaces also give off levels of formaldehyde and should be sealed with a clear polyurethane finish such as Minwax®.

Ideally, textiles should be placed in acid-free boxes or tissue before being put in drawers, closets, or shelves (Finch

38-39). This provides a barrier against dirt, light, and acidic surfaces, makes the textiles more easily transported, and makes them less likely to be disturbed. The room in which textiles are kept should retain a fairly constant temperature and humidity level all year.[10] Humidity- and temperature-monitoring equipment can be purchased from most archival-supply catalogs and need not cost more than about $15.00 per room.[11]

The chosen storage location for this collection is a closet in the owner's guest bedroom. This room was chosen for its lack of human and animal traffic, cigarette smoke, and light. One of the shorter sides of the closet is against an outside wall of the house. This is not ideal, as temperature and humidity fluctuations tend to be greater toward the outsides of houses, and there is the potential for storm damage. However, the benefits of this location outweigh the risks.

The closet is 48 inches wide. There is one shelf at eye-level which is 14½ inches deep. There is another shelf 13½ inches above the first which wraps around the sides and back of the closet and is 14½ inches deep. There is 16½ inches of space above the second shelf. This closet will accommodate at least two standard 6x40x18-inch acid-free storage boxes on the bottom shelf and two or three on the top shelf if needed. When put in place, the storage boxes will be outfitted with Humidity Indicator Strips for easy monitoring. An indoor thermometer will also be hung on the closet wall.

Inside the Boxes

Box 1: Rolled Textiles and Small Textiles

Because of their size, three of the four largest textiles in this collection (Nos. 19, 20, and 21), were placed in storage first. The solution to the unique storage requirements of these large textiles was to roll them. A system was devised in which the textiles could be stored in a minimum of space, with as little weight as possible resting on them (Plate 20b).

A standard 6x40x18-inch acid-free storage box was chosen to house the three rolls. Acid-free cardboard tubes measuring 3¼ inches in diameter were cut to 39 inches in length using a retractable-blade knife. A smaller-diameter tube would have required the textiles to be rolled in a greater number of layers and sustain a tighter arch around the tube. A larger-diameter tube would have made it hard to use the standard storage boxes.

A system of Ethafoam® blocks was devised in order to secure the three tubes within the box. Ethafoam® is made from expanded polyethylene, and was chosen for its inert nature, thickness, easy manipulation, shock absorption, and slightly gripping texture (Piechota 14). A cut-out support for each end of the three tubes was planned out on paper and made into a template. With a serrated knife, a block of Ethafoam® was cut, the template was traced onto the Ethafoam®, and four identical tube-supports were made to support each end of the tubes and to fit above the end of the tubes once the textiles were put in place (Plate 23b). The total height of the Ethafoam® supports is just under 6 inches--the height of the box.

The three textiles to be rolled (Nos. 19, 20, and 21) were vacuumed, humidified, and blocked before storage. Close attention was paid to the edges of these pieces, as they had previously been wrinkled and bunched up. A completely smooth textile will roll more evenly and run a much smaller risk of sustaining any further creasing while stored. Although these three textiles were all originally square, each of them has acquired a new shape thorough use and burial. They are now bowed in at the sides and have extended corners from being folded in half and tied. All of these dimensional characteristics were taken into account when planning the size of the tubes and during the rolling.

The textiles to be rolled were in turn laid out on a flat surface and oriented in the warp direction so that the center seam would be perpendicular to the tube and not cause a bump midway through the rolling. A leader of cotton muslin was cut to 45 inches wide and 12 inches long. This was placed at the near end of the textile, with the first 4 inches of the textile resting on top of the leader cloth. Rolling commenced at the near edge of the leader cloth. As the roll was advanced, the leader cloth picked up the textile, securing it to the roll. This assured that there was no slippage or bunching of the edges. During rolling, the weft threads were kept parallel to the tube to ensure that the textile was straight.

After rolling, the three tubes were wrapped in a piece of cotton muslin of the same size as the leader cloth. The extended ends of the muslin cloths were stuck into the ends of the tubes to seal off the edges from dust. Cotton twill tape was cut and tied at each end and in the center of the tubes (Plate 21d). This material was chosen because it is resistant to tears, lies flat, and is chemically inert. An identification tag consisting of a paper label attached to a cotton string was knotted to the center tie.[12] The three tubes were then placed onto the Ethafoam® supports within the box, and the remaining Ethafoam® blocks were placed over the ends of the tubes.

When the tubes were in place, there was space below them measuring 18x33x1 inches. This was utilized for the storage of small flat textiles (Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, and 23).[13] The space was divided into ten sections containing textiles, with three spacers (Plate 19b). To form a support for each textile, a piece of single-ply acid-free corrugated cardboard was cut to approximately 1/2 inch larger than each textile (Piechota 12). This was done on a self-healing cutting board with a retractable-blade knife. The cardboard was chosen for its light weight, easy cutting, and inert properties.

After conservation, each textile was wrapped in a piece of unbuffered acid-free tissue paper and placed on its board. Unbuffered tissue was used as an inert, cushioning, translucent dust barrier. Several pairs of slots were cut on each side of the boards, and 1/2 inch cotton twill-tape ties were threaded through the slots from behind. The twill tape was tied on top in half-bows for quick untying. These ties keep the textile in place and serve as a handle for lifting (Plate 23b).

Labels were knotted to the center tie on each board. When all of the boards were put in place inside the box, cardboard spacers were cut to fill the empty spaces (Plate 9b). They were secured in place with J-Lar® transparent pressure sensitive adhesive tape. J-Lar® is acceptable for use by the conservation community because it is inert and shows little evidence of yellowing with age (personal communication, Vuka Roussakis, American Museum of Natural History). Because of the uncertainty of the extreme long-term effects of adhesives, however, it was used here sparingly, and not in direct contact with textiles.

The exception to the above format for securing these small textiles to their boards was No. 4, *Human Hair Rope*, which needed to be secured in several places over its 84-inch length (Plate 4b). The cardboard support was cut with a series of 36 slots for three twill tape ties. After conservation, the rope was laid on its board in an accordion pattern and secured at each of the slots with the twill tape. This would hold the textile in place and prevent it from coiling or turning up. This also allowed the rope to be stored in a relatively small space, remain with other small, flat textiles, and still have a minimum of distortion.

The four rolled textiles and ten small textiles were placed into the box in the following order: the bottom two Ethafoam® supports were set into either end of the box; the spacers, having had their exact location previously determined, were taped in place; the ten textiles on their boards were arranged in place; the tubes were set into the Ethafoam® supports; the top support blocks were placed over the ends of the tubes and the box was closed.

Box 2: Rolled and Partially Rolled Textiles

Two of the textiles which are stored in Box 2, No. 2, *Loincloth*, and No. 3, *Strap with Finials*, required custom mounts which are a variation on both rolled and flat textile storage containers. The third textile, No. 18, *Striped Plain-Weave Shroud*, was rolled in a very similar manner to the rolled textiles in Box 1.

Due to decay, over half of textile No. 18 is missing. It is now a large rectangle with many long warp and weft yarns extending from the remaining fabric. After vacuuming, humidification, and untangling of the long yarns, a single layer of unbuffered tissue was laid on top of the textile. The purpose of this tissue was to interleaf each layer of the textile as it was rolled and to prevent the yarns from catching on each other. A 3¼-inch acid-free tube was cut to approximately 39 inches in length. A leader of cotton muslin was cut to 45 inches wide and 12 inches long, and the textile was rolled in the manner described for Box 1.

Textile No. 2, *Loincloth*, experienced a slight growth in dimensions after wet cleaning, which made it too large to be stored flat in a standard 6x40x18-inch box. A system was devised instead which would allow the thin, plain-weave wrapper to be rolled and the border and fringe remain flat (Plate 2d).

A piece of 2-ply acid-free cardboard was cut to 18x22 inches. This dimension conformed to the size of the tapestry border and fringe combined. When laid inside the box it took up about half of the space. A 3¼-inch diameter acid-free tube was cut to approximately 21 inches long. Ethafoam® supports were constructed to hold the tube about 1 inch above the cardboard base and were taped to the top right and left corners of the base with J-Lar® pressure sensitive tape.

The textile was laid out on a table, and a single layer of unbuffered tissue was laid on top for interleaving. The plain-weave wrapper was rolled onto the tube, leaving the tapestry border and fringe unrolled. The textile was transferred to the cardboard base and the ends of the tube set into the Ethafoam® supports. A piece of unbuffered tissue was placed over the border and fringe, and a paper identification tag was tied to the tissue.

For No. 3, *Strap with Finials*, the storage mount was almost identical (Plate 3b). A piece of two-ply acid-free cardboard was cut to 18x18 inches, corresponding to the remaining space in the box. A 2¼-inch diameter acid-free tube was cut to approximately 17 inches long, and Ethafoam® supports were constructed and taped to the top corners of the base.

The textile was laid out on a table. Interleaving tissue was laid down and rolled from the end of the strap from which the finial is detached. Before the textile was transferred to the cardboard base, slots were cut into the base into which twill tape was inserted. These ties were placed to secure the fringes of the finial which is attached to the rolled strap, as well as to secure the second finial, which was placed on the base just below the first. The ends of the tube were set into the Ethafoam® supports, the finials were secured with the twill tape, and an identification tag was tied to a central piece of twill tape. A piece of unbuffered tissue covers the finials.

In order to accommodate No. 18, *Striped Plain-Weave Shroud,* space was cut in the two cardboard bases to allow the Ethafoam® blocks to be taped to the box. The bottom exterior corner of each base was removed. The Ethafoam® blocks were taped to the interior of the box, the two cardboard bases were inserted, the three textiles were installed, and the box was closed.

Box 3: Flat Textiles

Seven flat textiles were stored in Box 3 (Nos. 1, 13, 14, 16, 17, 22, and 24.) Four rested on individual acid-free cardboard supports on the bottom of the box, and three sat above in a tray.

Before any textiles were put in the box, the supports for the upper tray had to be fitted (Plate 16b). Three long 3x1-inch strips of Ethafoam® were measured and cut. Two were placed along the short ends of the bottom of the box, and one ran down the center of the box. These were secured with J-Lar® pressure sensitive tape. Textile No. 17, *Openwork with Red Border,* was placed on an individual storage board which fits on one side of the central Ethafoam® block. No. 13, *Brocaded Lozenge Fragment,* No. 14, *Brocaded Bird Fragment,* and No. 16, *Brown Openwork,* were placed on individual boards and fit into the other half of the bottom tier.

A single sheet of 2-ply acid-free corrugated cardboard was cut to the internal dimensions of the box and set onto the

Ethafoam® supports to form the upper tray. Two small holes were cut in the tray to allow air circulation and for lifting it out. Textile No. 1, *Tapestry Fragment,* was placed on an individual support measuring 18x21 inches. The remaining two textiles, No. 22, *Embroidered Gauze Fragment*, and No. 24, *Feathered Fragment*, each were placed on boards equalling one half of the remaining area. The box was then closed. In all cases, the acid-free cardboard supports in Box 3 were identical in construction and materials to those in Box 1.

Before being placed into the storage closet, all three boxes will be fixed with labels in pencil stating which textiles are inside. A photographic record of each box will be kept nearby for reference (Finch 39). Although the boxes are ready to be returned to the owner, the storage closet is still in need of preparation, and suitable transportation must be arranged.

Future Recommendations

Once the Myers Collection is placed in storage, it will be necessary to inspect the boxes periodically for insect infestation, humidity increase, water damage, or tampering. Insects hatch in large numbers in the spring and summer months, and it is also during these seasons that doors and windows are most likely to be open, permitting new insects to enter. In order to minimize the chance of infestation and provide more constant humidity and temperature levels in the room in which the textiles are being stored, it is suggested that the room be air-conditioned in warmer weather.

As mentioned previously in this chapter, the storage closet has one exterior wall. There is always a chance that water may seep into the closet through this wall, making it vital that the closet be checked for leaks when there are heavy rains. In the event that a child or pet gains entrance to the room and disturbs the storage boxes, the boxes should be checked for foreign objects, dirt, and disarray.

In the future, the owner may wish to have some of the textiles mounted for display. A display mount must be made according to standards which are similar to those for storing textiles: Only chemically inert materials may be used and the procedure must be minimally intrusive to the textile. In addition, the mount must have ultraviolet-filtering glass or plexiglass to minimize light damage (Carter 166).

Whether the Myers Collection remains in its designated storage materials and location or is displayed in an archival mount, it will be available for research and personal enjoyment for decades to come. The removal of harmful dirt and creasing has slowed the internal processes of deterioration and minimized the chances of damage from external forces. Although no environment can reproduce the contextual and climatic conditions in which the textiles existed during burial, the collection is now receiving the respect it deserves and the protection which it is owed.

ENDNOTES

1. The chronology of periods in Peruvian history which is used throughout this thesis was developed by John H. Rowe.

2. This textile may have also been worn as a stole, with the bands across the shoulders and the finials in front.

3. Through experimentation I found that placing the textile against the membrane side of the Gore-Tex®, rather than the felt side, was more effective in humidifying the textile and relaxing creases.

4. When it is not possible to use distilled water for all stages of the wet cleaning process, it is vital that the first and last baths be in distilled or deionized water and that a complex-builder be added to the washing solution. These steps will help to prevent any minerals in tap water from being deposited onto the textile (Hofenk de Graaff 64).

5. The average Critical Micelle Concentration for a nonionic surfactant is about 2g/L.

6. Textiles Nos. 1 and 2 only needed steaming prior to wet cleaning. Textile No. 5, *Figural Sculpture*, was too three-dimensional to humidify in this manner without running the risk of uneven absorption of the water vapor, leading to stress between moister and drier areas.

7. Lignin is found in the cell walls of plants, and when present in paper products, it contributes to chemical degradation (University Products, 92/93, Syracuse, NY, 155).

8. TALAS is an excellent source for archival materials in New York City. It is located at 213 W. 35th Street, New York, NY 10001; 212-736-7744.

9. Textiles should be stored away from light and displayed below 50 lux (500 foot candles)(Leene 113).

10. The recommended environment for textile storage is from 60 to 65˚F and with relative humidity from 50 to 60% (Finch 28).

11. A 5-pack of Humidity Indicator Strips from University Products cost only $6.95 in 1992/93. A standard room thermometer can be easily purchased at any hardware store for under $8.00.

12. These labels will be written in pencil. In no case should a label come in contact with a textile (Finch 39).

13. Although access to these textiles requires that the tubes be removed, accessibility is not of primary importance as this collection is not intended for study.