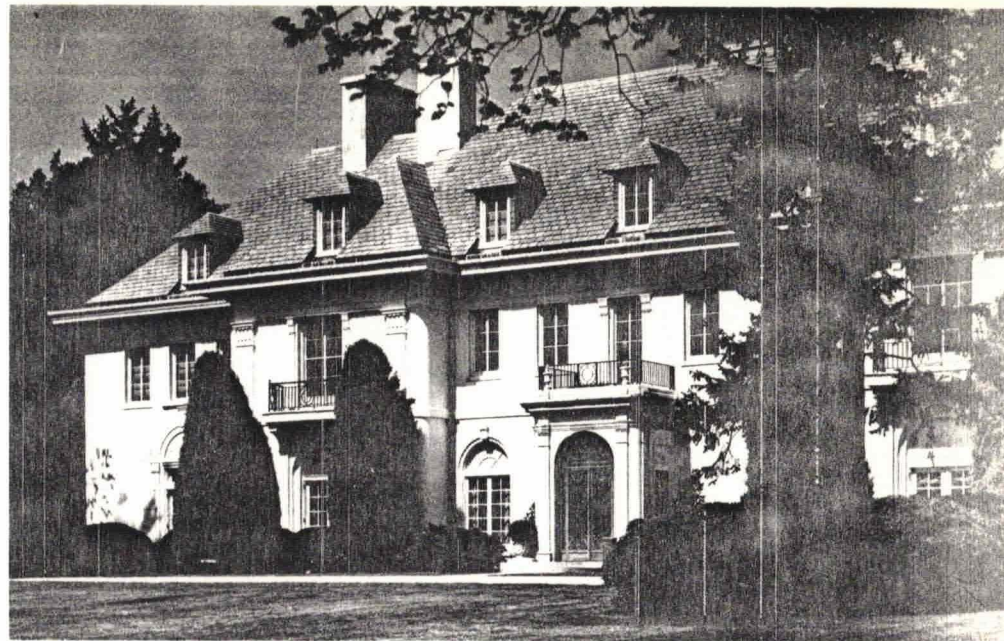


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CONSIDERATIONS FOR THE CARE OF TEXTILES AND COSTUMES

A Handbook for the Non-Specialist

Harold F. Mailand

INDIANAPOLIS MUSEUM OF ART



Cover:

Franco-Flemish
Fragment of Tapestry, Verdure
Silk and wool
Gift of Mrs. Harold Hartley
71.239
(Detail showing abrasion of silk yarns)

Page one:

Lilly Pavilion of Decorative Arts which houses the Textile
Study Exhibition Rooms, and the Textile and Costume
Storage facilities.

ACKNOWLEDGEMENTS

This handbook is the result of four years of research and internships with textile specialists and conservators commencing in 1975 at the following museums: Clarissa Palmai, Anni Jackson and Helen Kovacs of The Textile Museum, Washington, D.C.; Rita Adrosko, Katherine Dirks and Lois Vann of The Division of Textiles, National Museum of History and Technology, Smithsonian Institution, Washington, D.C.; Larry Salmon and Leslie M. Smith of the Department of Textiles, Museum of Fine Arts, Boston, Massachusetts; Elizabeth Lawrence of The Costume Institute, Metropolitan Museum of Art, New York, New York; and Peggy Gilfoy and Martin J. Radecki of the Indianapolis Museum of Art, Indianapolis, Indiana. These internships have been made possible through matching grants from the National Endowment for the Arts, the Indiana Arts Commission and at the author's own expense. I am extremely grateful to the institutions and their staffs for providing these opportunities, as well as to the other consultants who generously shared their time and expertise.

In 1977 a matching grant from the Indiana Arts Commission made possible the realization of the following goals. First, this grant provided the necessary impetus for the Indianapolis Museum of Art to meet the storage and maintenance needs of its major collection of over 8,000 textiles and costumes. This accomplishment made possible a more accessible collection for textile research, exhibitions, and conservation programs. Also with the new facilities it became possible to provide a resource and training center for those individuals and institutions seeking information regarding the conservation and housing of these vulnerable objects. Second, this grant sponsored the Textile Conservation Seminar held at the Indianapolis Museum of Art on May 5 & 6, 1978. This seminar brought together concerned individuals to consider possible approaches for the care of textiles and costumes. In conjunction with this seminar, the first edition of this handbook was printed.

Special recognition must be given to those individuals who directly assisted in the preparation of the seminar and to those who gave of their time, energy and talents in order that this collection be properly housed. Special thanks must go to the following: Martin J. Radecki, Chief Conservator, for his encouragement, suggestions, and assistance with many projects; Denny Paff, Museum Carpenter, whose uncompromising standards for workmanship have yielded the magnificent examination/work table and the costume storage units; Dr. Keith Ruddell, Al Norris and Jessie Manuel for constructing the rolled storage units; Sherman O'Hara and his staff for their assistance in the preparation and installation of the storage units and the hanging of the Seminar exhibition; The Conservation Laboratory Assistants for their clerical and installation assistance; and to Leah Orr and Susan Prendergast-Schoelwer for leading two special seminar topics. Thanks are due to Hilary Bassett, Registrar; Vanessa Wicker-Burkhart, Associate Registrar; Robert Drum, Building Superintendent; Matthew Cornacchione, Controller; and Robert Yassin, Director, for their support and for their part in expediting the housing requirements of this collection. Also, a special acknowledgement must go to the following volunteers who assisted in the overwhelming task of preparing the textiles and costumes for proper storage: Margaret Agnor, Jane Beering, Lois Benson, Eleanor Best, Barbara Boyd, Dorothy Brandt, Alice Buschmann, Beulah Cobb, Susan Cumming, Mae Danneman, Geraldine Dean, Druscilla Defalque, Ramona Duncan, George Enyart, Barbara Felland, Judy Hinkle, Tom Honderich, Ruth Houghton, Patrick J. King, Linda Keller, Kathleen McDermott, JoAnne Moore, Ken Myers, Mary Nyland, Leah Orr, Dr. Keith Ruddell, Sue Schier, Staci Sipe, Frances Steegmann, Elfa Taylor, Mimi Taylor, Tenna Tuege, Chris Vogler, Julie Welch, Nelda Wert and Kay Yune. The Museum and those who will utilize this collection in the future owe each of the above a great debt of gratitude.

INTRODUCTION

Man's manipulation of fibers into wearing apparel, furnishing goods, and decorative or artistic embellishments dates back as long as the history of civilization itself. Textiles give a richness to one's environment and provide a more complete reality to any historic or artistic presentation. One must consider that whether the textiles or costumes in any collection are hand or machine made, they are no longer replaceable. These important documents, therefore, deserve and should be provided with the best possible housing and care. Common attitudes that textiles and costumes are decorative, worn by everyone, seemingly endless and readily available have unfortunately subjugated them to low priority. Subsequently they are treated as the ugly step-children of most collections. Due to this all too frequent lack of attention, many collections are now faced with the consequences of severe and irreversible damage. It is imperative, therefore, to go beyond the disastrous "out-of-sight is out-of-mind" attitude if there is to be any cultural repository of textiles and costumes for future generations to learn from and to enjoy.

There are several approaches that professionals use for conservation or restoration of textiles. Those techniques range from exclusive use of the needle and natural fibers and fabrics to very sophisticated adhesives which would require descriptions beyond the scope of this handbook. It is important to consider that whatever first aid or long-term treatment is employed, it should be completely reversible and removable at any future point with a minimum amount of damage to the piece itself and that it should not be at the expense of its historical or artistic significance. When in doubt always consult a professional regarding specific conservation, cleaning, storage or exhibition problems. Keep a record of any treatment undertaken and document it with photographs.

This handbook is basically designed as a guide to preventive maintenance. Good housekeeping is essential in the care and preservation of every collection. Any individual, society or museum can achieve safe, clean and accessible storage. It is also hoped that this handbook will heighten the reader's awareness of the problems confronting fiber objects and will consequently trigger appropriate solutions to the specific problems confronting individual collections. The author of this handbook and the Indianapolis Museum of Art can in no way be responsible for the interpretation of the contents of this Handbook.

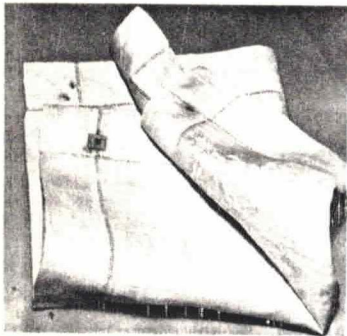
Checklist for handling textiles

1. Wash hands before handling textiles.
2. Do not smoke, eat, or drink in the exhibition, work, or storage areas.
3. Use only pencils for taking notes or for sketching.
4. Remove sharp jewelry and tie back long hair before handling textiles.
5. Do not place personal items or wraps in work or storage areas.
6. Use the least amount of light necessary while working; otherwise, keep the gallery, work and storage areas dark.
7. Do not place any objects such as tools, light fixtures, books, etc., on textiles.
8. Use both hands and arms or a flat support covered with acid-free paper, muslin, or polyethylene plastic when moving textiles.
9. Never place textiles directly on, in or next to paper, cardboard or unsealed wood.
10. Keep work surface constantly clean.

CLIMATE CONTROL

The natural fibers (wool, cotton, linen and silk) comprising the bulk of most museum textile collections, expand and contract (breathe) according to the temperature and moisture content of the surrounding air. Severe and rapid changes in temperature and especially in humidity, cause adverse swelling and shrinking of the fibers. This physical action results in structural damage whereby the fibers lose their natural properties of resiliency, elasticity and tensile strength.

It is therefore recommended that textiles, in general, be placed in an environment with a temperature of 70°F. + or - 5°F. (21°C. + or - 3°C.), and a humidity level of 50% relative humidity + or - 5%. Regarding energy conservation, one may consider a seasonal temperature change. In the winter months the temperature can move towards 65°F. (18°C.), and 75°F. (24°C.) in the summer months. This measure will provide an energy savings and also allow for a safe and comfortable temperature level for the textile objects. The main consideration here is to provide an environment which can be stabilized, as much as possible, within these temperature and humidity ranges, and to avoid severe and rapid changes outside these ranges. Place hygrometers and thermometers throughout the exhibition and storage areas for easy reference, and record the data on a regular basis.



Linen napkin showing rust stains due to a cardboard label attached with a metal staple and exposure to high humidity.

Textiles should not be housed in basements where humidity can be a major problem, nor in attics which have poor insulation. If there is no climate control for the major physical plant facility, it is recommended that all textiles be stored in a common area. With the textiles centrally located, precautions can be made to stabilize their immediate environment, thus providing a micro-climate for this very vulnerable part of a museum's collection. Portable humidifiers, dehumidifiers, air conditioning units and radiating portable heating units can be employed safely to maintain more stable conditions through the year. If the budget does not allow for such basic and important expenditures, entertain the prospect of personal or business donations or grant support.

To stabilize the humidity levels in exhibition cases and enclosed storage cabinets, silica gel can be used. This chemical absorbs excess moisture in the air and will in turn release moisture when the humidity level is low. Both textile and silica gel must be preconditioned and stabilized before being placed into the desired environment. House the granules in muslin bags and suspend, or place in open containers. These devices should not come in direct contact with textile objects. If this procedure is not suitable for exhibition or storage environments then provide ample air circulation within these crucial areas to prevent extreme humidity and temperature conditions from developing or remaining static.

(For further reading see: Matthai; Stolow.)



A panel from an 18th c. fire screen showing damage caused by high temperature, low humidity, light and abrasion.

LIGHTING

The effects of light on textiles need to be seriously considered. Light is a form of energy existing in a broad spectrum of both visible and invisible rays. In regard to textiles, both visible and ultra-violet light can cause fading and the internal breakdown of the textile fibers. Cotton fabrics which have been dyed with certain vat and sulfur dyes will deteriorate extensively if exposed to intense light. This damage is not usually detected until after cleaning, when slits or holes occur. Finishes on textiles are also affected which, in turn, can accelerate the breakdown of the fibers themselves, as evidenced by the splitting of some Victorian weighted silks. These photochemical reactions occur at an imperceptible rate; therefore, irreversible damage can occur before any deterioration becomes visible. Damage due to improper lighting is accelerated by high temperature, high humidity, smog and acidic atmospheric gases.

Improper lighting can be defined as lighting that is too intense, produces excessive heat, and/or has a high degree of ultra-violet radiation. Sunlight is the major source of ultra-violet light, and where sunlight is used for gallery lighting, windows should be screened with an ultra-violet-absorbing filter. There are two basic types of ultra-violet filters: one, a liquid is sprayed directly on the windows; the other, UF-3 Plexiglas, is placed in front of the windows or used in exhibition cases and formal frame devices. These types of ultra-violet filters normally have a life span of approximately seven years, although some have been tested to be effective after ten years. Sunlight should be completely blocked out in storage areas by opaque covers on windows.

Fluorescent lights also have a high output of ultra-violet radiation, although new types have been developed which have little or no ultra-violet output. Normal fluorescent tubes need to be covered with ultra-violet filtering sheaths which slide over each tube. The most beneficial aspect of fluorescent lighting is that it produces less heat than incandescent light. This can be an important consideration when lighting enclosed cases, where too much heat may be a serious problem. In these situations, filtered fluorescent tubes may be the ideal type of lighting.

Incandescent lights have negligible ultra-violet output, but a high infra-red output. The major concern with incandescent lights is the heat generated by this type of lighting. Incandescent lights should be used at a distance, for example, as a spotlight housed in the ceiling of a gallery. This placement will allow the heat from the lamp to dissipate before it reaches the textile. Incandescent light in a case can raise the case temperature, thus lowering the humidity and drying the textile. Incandescent lights are a good type of gallery lighting if precautions are taken against the heat build-up, intensity and length of exposure on the object being displayed.

Ideally, textiles should be exposed to exhibition conditions only three to four months of the year to minimize light damage. Keep exhibit areas in low light. Keep the intensity of illumination at ten foot-candle power. *Never exhibit textiles in direct sunlight.* Artificial light should be kept at a minimum. Turn lights on or open window coverings only when necessary for viewing or working. Use black-out blinds for storage areas. Keep storage areas dark when not in use.

(For further reading see: LaFontaine.)

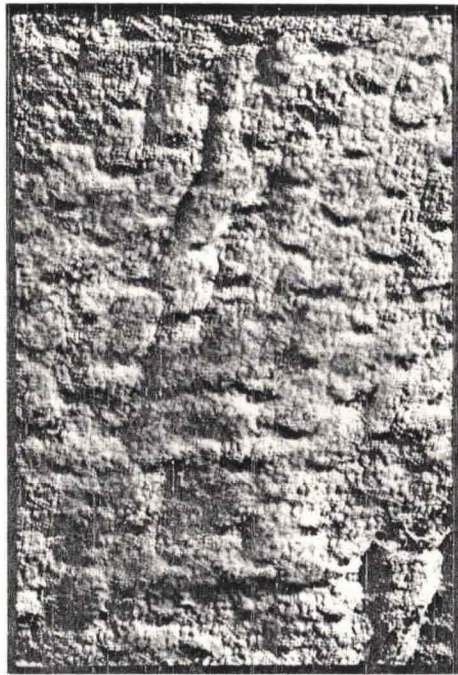
MILDEW

Mildew is produced by molds which are simple plants belonging to the group known as fungi. Molds which cause mildew are always present in the air and can grow on many fiber surfaces, provided that there is a favorable environment of moisture and humidity. Prolonged exposure to mildew will cause staining and structural damage to cellulose. The best approach for avoiding mildew is preventive maintenance. This is possible by maintaining a relative humidity level of 50% + or - 5%, as well as good air circulation. Keep textiles clean. Soiled textiles are more prone to support growth. Do not store textiles in a basement or in areas where water leakage is possible. Avoid sealing textiles in plastic. Instead, wrap the textiles with acid-free paper or muslin, allowing the pieces to breathe freely. A sheet of plastic (polyethylene film) may be placed on top of textiles or storage units as long as the air is free to circulate. Paradichlorobenzene can be effective in inhibiting mildew growth (see *Clothes Moths*, p. 7).

If mildew does occur on washable pieces, spot or wet-clean with recommended detergent solution (see *Wet Cleaning*, pp. 8-9). If this method is not suitable for the textile, kill the mildew growth by placing the piece flat on a clean surface in a room with circulating dry air, or by taking the piece outdoors on a day with less than 50% relative humidity. Avoid long or direct exposure to the sun. Mildew growth can also be killed by using a low-power setting on a portable hair dryer held at least 12 inches away from the piece. Another method is quarantining the piece in an airtight chamber or wrapping it in polyethylene plastic film containing paradichlorobenzene crystals for one to three weeks. Remove the desiccated infestation by gently brushing and/or vacuuming the entire piece. If the storage or exhibition area is not a climate-controlled environment, do not encase a textile in an airtight framing device or place the textile in direct contact with glass or plexiglas. This may cause condensation on the glazing material, thus creating an ideal environment for mildew growth and damage.

The main consideration here is to keep textiles dry and clean, to allow good air circulation and to inspect and rotate the textiles on a regular basis.

(For further reading see: United States Department of Agriculture, "Mildew.")



An archaeological textile that was sandwiched between two plates of glass, showing mildew stains (lighter areas) where high relief of the weave came in contact with condensation on the glass.

INSECTS AND RODENTS

Clothes moths, silverfish, carpet beetles and rodents are capable of causing considerable damage to a textile collection. Good maintenance is imperative to guard against this form of destruction. Textiles should be regularly inspected, vacuumed, aired and rotated. Clean storage areas frequently to minimize lint, dust and hair which build up.

Clothes moths and *carpet beetles* are especially attracted to objects with wool content. Paradichlorobenzene crystals are effective in controlling both insects. The vapors given off from the crystals are heavier than air, requiring that the crystals be placed above the items being treated. Never place crystals directly on the textile. Instead, place the crystals in small muslin bags and suspend throughout the storage area. If an area is infested, use 1 pound of crystals for each 100 cubic feet. Do not use paradichlorobenzene around feathers, parafin, petroleum plastic products or leather. If this measure is not appropriate or desirable then consult a professional exterminator for alternatives.

Silverfish and *firebrats* are attracted to materials containing starch, glue, paste, and sizings, and subsequently can cause structural damage to textile fibers. To control these pests along with other crawling insects keep storage areas clean, consult a professional exterminator and request that an appropriate insecticide be employed that has a residual action. This insecticide should be sprayed along floors, baseboards, moldings, pipes, corners, cracks and other hard-to-clean areas. Never spray insecticides directly onto the textile itself. Note special health and safety precautions, and consult local Environmental Protection Agency regulations.

Mice, *rats* and other *rodents* can also cause damage to textiles via food and nesting patterns. Snap traps, poison bait or a professional exterminator can prove effective in controlling these pests. Locate and barricade entry locations. Keep devices and pesticides away from the textiles. Do not house foodstuffs in textile storage areas. Keep the area clean and in order.

(For further reading see: United States Department of Agriculture, "Pests"; Ward.)

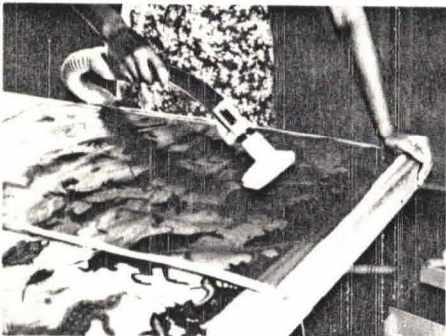


Signature block of a 19th c. cotton and wool Jacquard doublecloth coverlet showing wool loss (in vase form) due to clothes moth.

CLEANING

One of the prime concerns in the care of textile collections is maintaining the pieces in a stable and neutral state. This can be accomplished by storing clean textiles in a clean, inert housing. Unfortunately, most textiles come into a collection in various states of usage, cleanliness and disrepair, and have, after many years of neglect, lost their original appearance. The soil, stains, and dust not only dull the (appearance) of the textiles, but also aid in accelerating the gradual destruction of the fibers through chemical and abrasive action. To halt or reverse this process, the cleaning of the piece should be considered. Among the possibilities are vacuuming, wet cleaning and dry cleaning.

Vacuuming is the easiest and most readily available approach. The textile should be laid flat on a clean, smooth surface. Use the low power setting, or open the venting slots to reduce suction on a regular domestic canister model, or use a low-powered hand-held vacuum. Use the small, smooth-edged attachment and gently pass over both sides. Clean the support surface before turning over the textile. Place fiberglass screening, edged in twill tape, on top of extremely fragile or heavily abraded textiles. This procedure acts as a protective device against further abrasion and loss. Vacuum textiles carefully before and after exhibition.

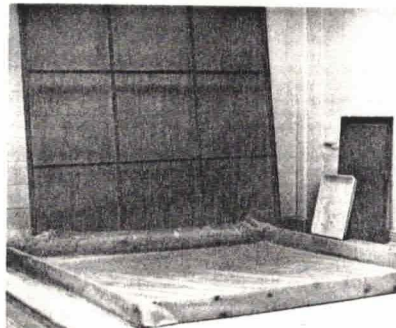


An Indonesian textile in the process of being vacuumed with a low power setting. The textile is being protected with a layer of fiberglass screening edged in cotton twill tape.

Wet Cleaning is the process whereby the textile is cleaned in a water and detergent solution. First, the textile must be checked to determine if it is color fast. Do this by testing a colored area with a drop of water, let it soak in, and press with a white cloth or absorbent paper. Then apply a drop of the detergent solution and check again to see if there is any color moving onto the white blotting material. Check all colored areas of the textile in this fashion. If any of the colors bleed, stop; the wet cleaning process cannot be employed. If the textile is colorfast, continue the process by preparing a detergent solution containing ½-ounce of detergent to each gallon of water. Soaps should be avoided as they react with the metal ions in (hard) water and form precipitates (soap scum) which can be deposited on the textile. Use a non-ionic detergent such as Orvus WA Paste, D.W. 300, Igepal, or a very mild dishwashing detergent such as Ivory Liquid. It is best to use distilled, deionized, filtered or softened water for the detergent bath and rinses. If the above solutions are not readily available, at least try to provide distilled or deionized water for the final rinse. Hard water is not recommended, as this solution contains mineral deposits such as iron which can cause yellowing, staining and can, in time, cause the breakdown of textile fibers. If areas of the textile are fragile or abraded, then sandwich the areas or the entire piece in silk or nylon tulle or fiberglass screening (depending on size and strength of the textile). Sew the textile between the two screens and stabilize weak areas with stitches. Keep the needle at a 90° angle, and pass it between thread crossings, to avoid damage to the yarns. Place larger or sturdier textiles on one layer of fiberglass screening that is larger than the piece. In this way the screening acts as a flexible cradle, which allows the entire textile to be moved or suspended with minimum stress. When the textile is prepared for wet cleaning, gently submerge it in the detergent solution at 70° to 80°F. for no more than one hour. If the textile is badly soiled and yet strong, the detergent bath can be repeated for more thorough cleaning. The bath chamber must be of glass, inert plastic, stainless steel or porcelain. Photographic plastic trays, bath tubs, sinks and wood box frames lined with polyethylene can be readily employed. Do not agitate the textile, as the fibers cannot withstand

much strain while wet. It is important that the wet cleaning chamber be large enough to accommodate the entire textile as flat as possible. Adequate size will allow for maximum flushing of the detergent and ease of handling. Carefully flush the suds solution through the textile by using a cellulose sponge, pressing down evenly with an open hand. Rinse at least four times or until no trace of suds remains. The final rinse should read at or near 7.0 on the pH scale indicating a neutral solution state. This can be checked with pH paper strips or a pH meter. To dry, place the textile on a clean, flat surface or on an elevated screen device in a well-ventilated area; shape and block carefully to its original size. Remove excess water by pressing gently with clean, white cotton toweling, mattress padding, sheeting or muslin. To remove wrinkles and fold marks from small, flat textiles, shape the textile on a flat piece of glass, plexiglas or any other inert non-porous surface. Upon drying, remove the textile and it will have a self-ironed surface. *Historic textiles should never be pressed with a hot iron.*

Remember, the prime reason for wet cleaning is to return the textile to a clean, neutral and stable condition. Frequently, there will be no visible change in appearance. The above is recommended only for a textile in good and stable condition. Textiles which employ a high-twist yarn structure, textiles with special finishes, and textiles which are extremely deteriorated should not be wet cleaned by



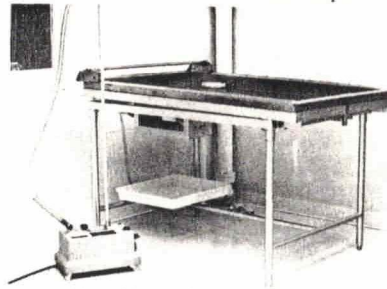
A view of the central lab showing possibilities for wet cleaning: inlaid tile wet cleaning chamber, wood box frame lined with polyethylene plastic, wet cleaning chamber, plastic tray, and drying screens.

the non-specialist. Avoid the use of commercial heavy-duty or special cleaning agents, as these may contain fluorescent, brighteners, perfume, and softening agents which are not appropriate for historical textiles. These harsh commercial products may not be completely removed during rinsing and may eventually cause structural damage to the fibers.

(For further reading see: McHugh; Office of Museum Programs, "Wet Cleaning.")

Dry Cleaning should be used only for removing oil-borne stains. Historical textiles should be hand cleaned only by a professional dry cleaner, as the common commercial solvent extracting process places too much strain on the textile, thereby damaging it severely. Insist that fresh solvent be used. White or light colored textiles can easily become discolored if the solvent is not clean. Request that all dyes be checked. In general, only contemporary and/or very sturdy textiles should be dry cleaned.

Steaming is an aid in shaping and blocking fiber objects and is very helpful in relaxing wrinkles and creases. The textile should be as clean as possible and vacuumed before steaming. Otherwise, surface dirt or stains may become more permanently bonded to the fibers after steaming. Avoid placing the steamer head directly on the textile to prevent intense heat and condensation. High-twist fabrics such as chiffon and crepe should not be steamed as the twist will relax and lose the intended shape.

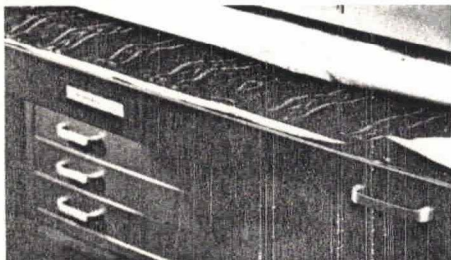


A view of the stainless steel wet cleaning table equipped with sliding water spray device. The steamer is utilized for gently relaxing wrinkles and folds from textiles and costumes.

STORAGE

There are many approaches to the storage of textiles. Below are a few recommended solutions which can be employed to meet the specific size and condition of the textile, and still regard existing housing situations and budget considerations. There are four basic approaches to storing textiles: flat storage, rolled storage, costume hanger storage and framed textile storage.

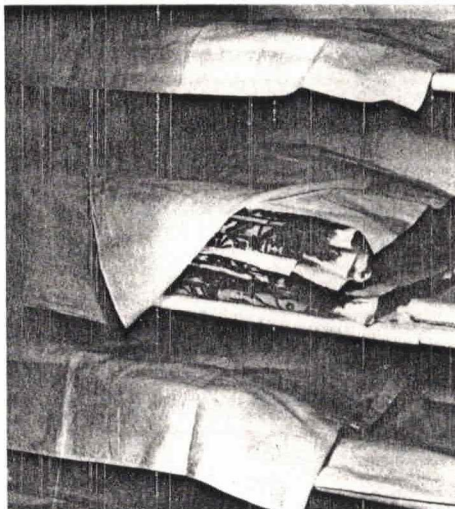
Flat storage allows the textile to rest in a horizontal position, permitting the fibers to relax and the textile object itself to maintain its natural tension. The textile should be prepared by first gently vacuuming both sides (see *Vacuuming*, p. 8). Preferably the textile should be stored with no folding; however if the housing does not allow this, then the textile should be folded, with acid-free tissue paper crumpled into the shape of a tube and placed along the fold for structural support to prevent sharp creases from forming. As fibers and their products age, they become less resistant to flex abrasion, thus causing textiles to split where consistent creases and pressure are placed. Therefore, reposition the folds when returning the piece to storage. When storing textiles on top of one another, separate each textile with a layer of washed, unbleached muslin or a layer of acid-free paper. Never place a larger or a heavier textile on top of a smaller, or more fragile textile. If the textile contains metallic yarns, interleaf the complete textile with washed muslin or acid-free tissue paper to protect other areas of the textile or other textiles from coming into contact with the oxidation (tarnishing) process.



View showing flat textile storage in metal drawers lined with acid-free paper.

Proper housing for flat textiles is crucial. The housing surface should be large enough to accommodate the entire dimension and to equalize the weight of the textile. It is important that any surface with which the textile comes in contact be inert or made inert. Raw wood contains natural acids and resins which, in time, leach out and eventually stain or burn textile fibers, especially cellulose materials, accelerating the chemical breakdown of the fibers. Wooden shelves and drawers, therefore, must be sealed with polyurethane varnish, and lined with washed, unbleached muslin or heavy-gauge acid-free paper. Stored textiles should not come in contact with raw metal which is subject to condensation and oxidation (rusting). Metal housing should be lined with polyethylene plastic film, and either washed, unbleached muslin or acid-free paper.

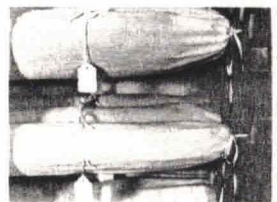
(For further reading see: Office of Museum Programs, "Protective Lining".)



View of open flat storage for quilts and coverlets. Wood shelves are cantilevered on a metal track system, sealed, and covered with heavy gauge acid-free paper.

Rolled storage is well suited for pieces too large or too heavy to be housed flat in shelves or drawers. The main support for the textile is a cardboard tube two to six inches in diameter, depending on the scale of the textile. The tube should be sealed with polyurethane in order to prevent the paper processing acids from leaching through to the textile. Also, cover the tube with several layers of washed, unbleached muslin or heavy gauge acid-free paper. The textile should be laid out completely flat on a table or on a clean, flat floor large enough to accommodate the entire piece. Vacuum the textile gently and thoroughly, on both sides (see *Vacuuming*, p. 8). Smooth out bulges and fold marks. Align the top and bottom ends, as well as selvages (woven edges), by using the edge of the table as a straight edge or margin indicator. For the most part, the tube should be laid perpendicular to the warp threads (yarns parallel to the selvages), with the back of the textile against the tube, so that the textile face is exposed when rolled. Pile fabrics, such as velvets and rugs, should be rolled as above, taking note to roll the textile in the direction of the pile. For pieces larger than three feet, two people should assist in the rolling. The important consideration is to keep the edges coiling as uniformly as possible with consistent tension, avoiding slack areas which might create folds.

Place the end of the textile on a two- to three-inch flap of the acid-free paper and begin to roll. Textiles should be interleaved with acid-free tissue paper if the weave is uneven; if the textile is fragile, brittle or abraded; if special dyes and finishes are present; or if the textile contains metallic threads. Roll the textile on the tube several rotations, stop to lift or slide the textile towards you, and roll again, proceeding in the same manner until finished.

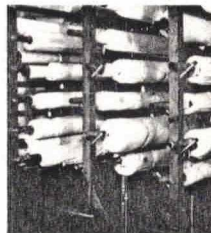


Detail of smaller rolled textiles housed in a wooden cabinet. In addition to permanent cloth labels, white drop tags with accession numbers have been tied to the outside for easy identification.

Secure the textile on the tube with cotton twill tape, tied in several places to prevent unrolling. Cover the textile with washed, unbleached muslin, cotton sheeting or loosely-rolled plastic secured gently with twill tape. Plastic should be used only where humidity levels stay within the recommended range (see *Climate Control*, p. 4). Keep the ends of the plastic covering open to allow air circulation. Use drop tags for identification of the pieces. Special attention must be given to double-layered or sandwich textiles, such as coverlets, quilts, or lined rugs and tapestries. Rolling such objects can cause a different tension on the face than it does on the back. Also, this rolling can produce strain on the one side and wrinkles and creases on the other. Therefore, some such-layered textile pieces may be better stored flat, folded or hung over a pole, rod or tube which is padded and wrapped with muslin or acid-free paper. Full linings may have to be removed or replaced with eight- to ten-inch wide support straps for proper rolling and storage.

Rolled textiles can be housed in several ways. The covered rolled pieces can be placed on horizontal shelving. Do not stack too high, as this would create too much weight and pressure on the bottom textiles. Place a wooden dowel rod, electrical conduit, heavy gauge pipe (depending on the scale and weight of the particular rolled piece) through the cardboard tube and suspend the support device in one of the following fashions: held by "S" hooks attached to chains bolted to the ceiling, or suspended from a track system, supported by wooden posts into which have been driven metal or wooden pegs at an angle to the posts, or by pegs which are mounted into enclosed storage units.

(For further reading see: Craft, "Part I".)



View of large rolled tapestry and rug storage.

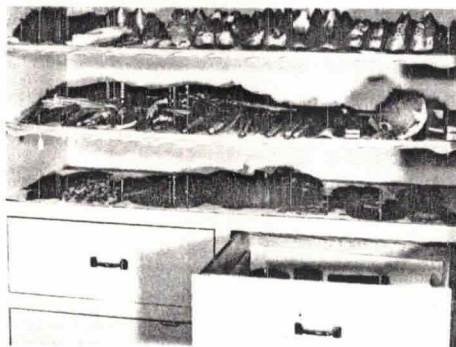
Costume hanger storage is one approach for housing these three dimensional textile objects. Each costume requires individual consideration. Those costumes which are strong enough to be hung, should be supported by an inert hanging device that takes on the general shape of the shoulder. Molded white inert plastic hangers, which come in several sizes prove to be quite successful. Due to the smoothness of these hangers, some strapped garments may tend to fall off. This problem can be alleviated by wrapping cotton twill tape around the shoulder form. If this hanging device is financially prohibitive, then regular laundry/dry cleaning wire hangers can be employed. These hangers must first be shaped with Pellon or polyester fiber-fill and then wrapped with muslin or cotton sheeting strips to take on a full and natural shoulder form. Never use the bare wire hanger, as this can easily rust, cause the shape of the shoulder to be distorted, create severe creasing, uneven stress, isolated abrasion, and eventual splitting of the fabric.

The shoulder area should not take the total weight of heavy or elaborately shaped costumes. Trains, trousers, and long or heavy skirts should be supported by stitching cotton twill tape carefully along the seams, and then extending the twill tape to the neck of the hanger, thereby equalizing the weight more evenly. Sleeves, ruffles and other fabric embellishments may also require additional support. Acid-free tissue paper can be employed to shape these areas and thereby prevent distortions and creases from forming. Heavily beaded or structurally fragile costumes should not be hung. These costumes are best housed in flat, horizontal storage units. Again, use the acid-free tissue paper to support and shape the costumes to prevent creases from forming. Always minimize the stacking of costumes. Hang costumes so they are readily accessible and away from heavily trafficked areas. Costumes should be spaced comfortably apart from each other to avoid abrasion and creasing. Walk-in closets or special hanging units are advisable, such as: open or enclosed metal cabinets, wooden storage units that have been sealed with polyurethane varnish, portable clothes racks and metal or wooden closet poles supported from the ceiling or attached to the walls. For open units, use muslin curtains to cut harmful light (see *Lighting* p. 5) and to filter out dust. *Never store costumes in plastic bags of any kind.*

(For further reading see: Craft, "Part II"; Harris, "Perishable"; Jachimowicz.)



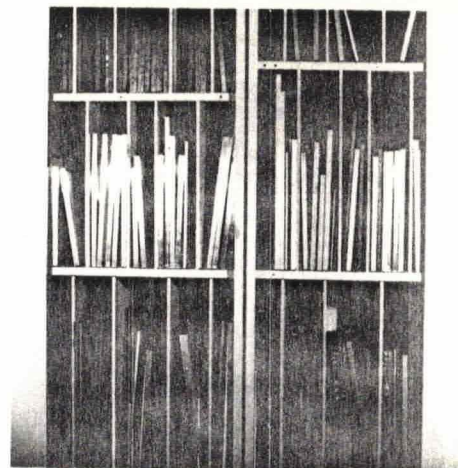
View of costume storage units that accommodate both hanging and horizontal shelving.



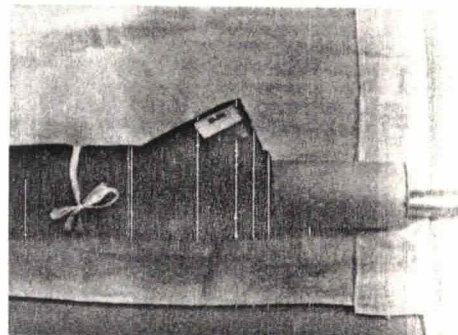
Built-in closet with shelves and drawers adapted for costume accessories. Shoes and hats have been reshaped and supported with acid-free paper to prevent distortion.

Framed storage provides a bulky and rigid storage problem. Properly framed textiles (see *Framing*, p. 16) on exhibition should be returned to storage a part of the year. Ideally, framed textiles should be stored flat, allowing the textile to once again return to its natural tension. Horizontal shelving or large pull-out drawer units can solve this requirement. Unfortunately, this method of storage requires a large amount of space; therefore, other alternatives can be considered. Vertical storage bins constructed of metal or wood will take less space. Tilt the frames at an angle which will allow the textile to relax somewhat. Interleaf the frames with acid-free cardboard dividers in order to protect the glass and framing device. Framed panels of pegboard or heavy-gauge screening can also be used. These vertically framed panels can be suspended from the ceiling, hinged or securely mounted to the wall. The framed textiles can then be hung in the traditional manner with hooks eyes, wire, and supported by the appropriate pegboard hardware or "S"-shaped hooks. Again, keep the storage area clean and in order, and allow for good air circulation. If storage areas cannot be kept dark, cover the framed textiles with muslin cases.

Labeling should provide a means for safe and easily accessible information regarding a specific textile object. A label can contain didactic information such as provenance, date, artist, technique, donor and/or just an accession number which corresponds to a numerical record file giving more specific information. Labels can be of cotton or linen twill tape with information typed or printed on with an indelible laundry pen. This label is then stitched to the textile. If this method is not appropriate for the piece, a small drop tag, preferably of acid-free paper, can then be attached to the piece with cotton thread. Attach labels in a consistent place, such as the lower right-hand corner on the reverse side of flat pieces and along neckline, sleeve or hem of costumes. Store textiles so that the label is readily visible to prevent unnecessary handling. Never attach labels with staples, pins or adhesives. Remove all old labels or notes and place in a separate, historical file or with permanent record files.



View of metal cabinet storage for framed works.



Close-up view of a rolled textile. A cardboard tube is wrapped several times with heavy gauge acid-free paper. The textile is rolled on the covered tube with cotton twill tape label positioned at the end. The textile is then tied and secured with cotton twill tape, and covered with washed, unbleached muslin. This wrapper is made with a sleeve on both ends through which cotton twill tapes are inserted. The wrapper is rolled around the textile and the tapes drawn to entirely enclose the textile. A metal conduit/pipe is inserted inside the cardboard tube to support the entire weight of the rolled textile and also act as a hanging device.

MOUNTING AND EXHIBITION

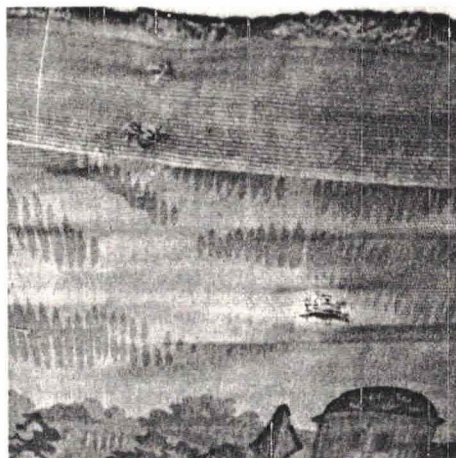
Proper display of textiles and costumes for exhibition will prolong their life and provide the means for better support, visibility and enjoyment of the piece. There are several approaches that can be safely employed for the mounting and exhibition of textiles and costumes.

The main consideration here is to equalize the weight of the textile on the support device. Avoid strain on the same warp and weft thread. *Never directly tack or nail a textile to a wall.* Adhesive tape, raw metal or unsealed wood should never come into contact with the textile. Back the textile with muslin and/or polyethylene plastic film if placed against a wooden wall or outside wall which might absorb moisture. Never hang any textile in direct sunlight, over heat sources, ventilation ducts, near water pipes or plant material.

Sleeves are recommended for textiles that are strong enough to support their own weight. A muslin sleeve stitched to the top back side of a textile equalizes the tension and weight of the piece. This hanging device can be made by using washed, unbleached muslin that has been ironed and creased. The width of the sleeve should be full enough to support the device, such as a dowel rod or electrical conduit, and to prevent misshaping of the textile. Stitch the sleeve to the textile with natural fiber sewing threads. Pass the needle through both sleeve and textile at a 90° angle using a running blind hem stitch. Make sure the thread catches a crossing of the warp and weft yarns on the face of the textile. Insert the rod or pipe and hang the textile by passing the wire through the conduit or around the edges of the dowel rod and suspend from the ceiling or wall. (See directions for making a muslin sleeve on page 15.)

Velcro can also be used as long as it is sewn onto another support fabric. One side of the velcro should be machine stitched onto either a 2 to 3 inch cotton twill tape or a strip of washed, unbleached muslin that is then hand stitched onto the textile. This method is suggested only for strong, sturdy pieces such as rugs. This form of hanging device should be removed when preparing the textile for storage, as it creates unequal tension for the piece when rolled or folded.

Pinning. Textiles can be pinned to fabric covered surfaces if the other approaches are not feasible. The pins must be rust-proof, such as those labeled "silk" or "brass" pins. Textiles must be pinned to a clean fabric surface, such as unbleached muslin or other natural fabrics. In addition to the pins, the backing fabric actually supports the textile due to the natural friction between the two layers. Plastic covered cardboard or foamcore with the fabric covering this surface can be readily employed. Also stretching muslin over a sealed wooden frame gives a good pinning surface. *Keep in mind the disadvantages of pinning textiles.* Pins can rust, leave holes which may not relax, cause too much tension on the warp and weft areas thereby causing irreversible damage. At best, pins should be used only as a temporary solution to exhibiting textiles.



View of a large printed textile showing crease lines where it was previously folded, and areas of loss and distortion due to being nailed to a wall for an extended period of time.

DIRECTIONS FOR MAKING A MUSLIN SLEEVE

The following approach is recommended for textiles strong enough to support their own weight and in good repair. This method allows for even distribution of weight at the top of the textile; prevents the hanging support device (electrical conduit, dowel rod, etc.) from coming in contact with the textile; prevents distortion on the top face of the textile; and provides a lightweight, flexible, and reversible means to display a textile. For a coverlet sized textile, wash, iron and cut a strip of unbleached 100% cotton muslin 8½ inches wide and 1 inch longer than the top width of the textile. Lay strip horizontally as seen in fig. 1. Bring top edge (aa) forward and place along line (dd), creating a fold line at (cc). Press fold line (cc) with iron. Bring edge (ee) forward creating a fold line (dd) at edge (aa) as seen in fig. 1. Press fold line (dd). Lay out sleeve as seen in fig. 1. Bring edge (aa) forward creating a fold line at (bb). Press fold line (bb).

To reinforce sleeve opening with a double folded hem, lay out sleeve as seen in fig. 1. Fold edge (ff) backward and place along line (hh) creating a fold line at (gg). Press fold line (gg). With first fold in place, fold pressed edge (gg) back and place along line (ii) creating a fold line at (hh). Press in fold line (hh). Repeat hem folding pattern for other sleeve opening. With hem folds in place assemble sleeve as seen in fig. 1.

Place the back side of the sleeve on the top, back side of the textile as seen in fig. III and fig. IV. Pull the sleeve taut, straight, and perpendicular to the draping axis of the textile. The sleeve openings (bb) should be ½ inch in from each side edge of the textile, and the top edge (cc) should be ½ inch below the lowest point of the top, back edge of the textile. This placement will prevent the sleeve and subsequent hanging support device from being noticed from the front. With hem folds in place open the sleeve while keeping sleeve section between (aa) and (bb) in place against back of textile. Secure the sleeve in place temporarily to the back of the textile with a horizontal row of straight pins. Stitch the sleeve to the textile with cotton sewing thread in a blind hem stitch running along line (bb). Pass the needle through both textile and muslin sleeve at a 90° angle. Make sure the thread will catch at least one crossing of the warp and weft yarns on the face of the textile as seen in fig. V. Remove pins. Place a row of blind hem stitching ½ inch up from folded edge (dd) passing the needle through the textile and the three layers of the muslin sleeve. Cut hanging support device to measure ¼ inch beyond each sleeve opening (hh). Insert hanging support device into sleeve. Insert monofilament, wire, etc. into hanging support device and suspend ensemble from hanging rail, ceiling, or wall with metal clips, screw eyes, or nails. Note: for other sized textiles, adjust the width of the sleeve and the distance between fold lines as per size and weight of the individual piece. Various weights of cotton muslin and cotton sewing thread are generally recommended for most weights of textiles, however, silk fabrics and silk thread may be used for light weight silk textiles.

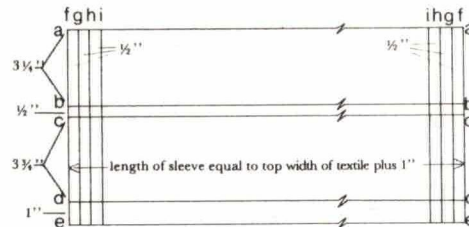


Fig. 1 Folding pattern for sleeve

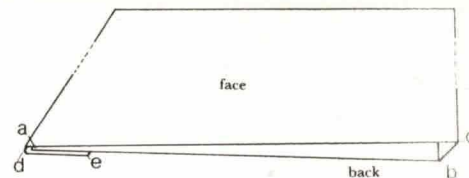


Fig. 2 Cross section of folded sleeve

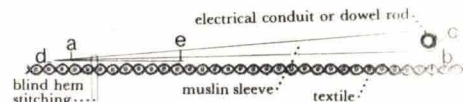


Fig. 3 Cross section of sleeve folded, attached to textile with blind hem stitching, and supported with hanging device.

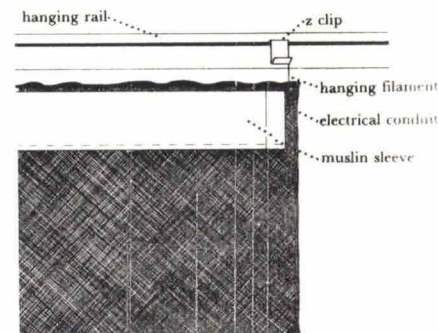


Fig. 4 Reverse side of a textile showing the muslin sleeve, electrical conduit, hanging filament, Z clip, and hanging rail.

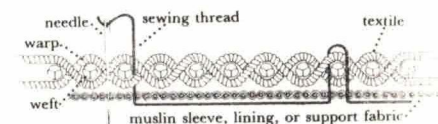


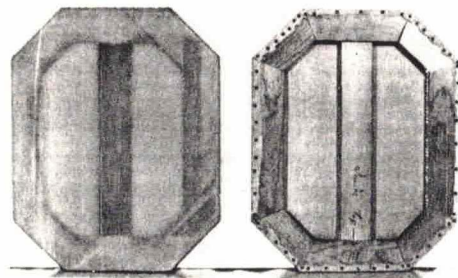
Fig. 5 Cross section of blind hem stitch.

Framing is recommended if the textile is too fragile for the above methods, if it is to be placed on exhibition for an extended period of time, if it is to be exhibited in a heavily trafficked area, or if it is to travel on exhibition. The framing procedure basically involves tightly stretching washed unbleached muslin over a wooden strainer (canvas stretcher) frame and securing with rust-proof staples or brass tacks. The strainers can be purchased or readily made by hand. The wood should be sealed with polyurethane or covered with acid-free paper before stretching fabric over it. The textile can then be stitched to this fabric support surface with natural fiber sewing thread. Keep the needle at a 90° angle and pass the needle through both muslin and textile using a running blind hem stitch. Make sure the thread catches a crossing of the warp and weft yarns on the face of the textile (see p. 15, Fig. V). The stitching should take on a zig-zag pattern with ½ to 1½ inch floats (depending on the scale of the textile), running on the back. Stitch along the outer dimensions of the textile and provide enough stitching in the central area to allow sufficient support for the strain of vertical hanging. If needed, glass or plexiglas can be used to protect the surface of the textile. Never rest the glass or plexiglas directly on the textile. Otherwise too much pressure is placed on the fibers and condensation problems can develop. Pellon-faced pegboard or Pellon-faced perforated fluted Mylar allows maximum protection for the back and good, filtered air circulation. The Mylar is light weight and inert, while the pegboard should be coated with polyurethane varnish to seal in the wood acids. Use a synthetic adhesive such as Jade no. 403, Elvace no. 1874 or Promacto A-1023 to adhere the Pellon to the Mylar or pegboard. Remember, adhesives, glass, unsealed wood and metal should never come in direct contact with any textile. (For further reading see: Gross; Fikioris, "Remounting".)

Matting can also be considered as a means for providing a rigid support for small flat textiles. For matting, always use 100% rag board (museum board) which is composed of cotton linters and usually has an additional buffering compound to stabilize the board at a neutral pH level. One approach is to cut two mats of the same size; one for the support of the textile and one as a window mat. The

window opening should be cut a little larger than the textile itself so there will be no pressure applied to the edges of the textile. The support mat should have holes perforated in it to allow a needle to pass through to secure the textile in a blind hem stitch fashion as discussed under **Framing**. Another approach would be to stretch washed unbleached muslin over the support mat and stitch the edges together on the back with a curved needle. Then block the textile on the face of the stretched muslin and secure in place with a small curved needle and the appropriate natural fiber sewing thread. A window mat may be cut for this method also. To hinge the window mat to the support mat use an acid-free linen tape with water activated gum. The window mat approach serves as a riser device thus preventing the textile from coming in direct contact with glass or plexiglas if it is formally framed. Likewise, when not framed the window matted textiles can be stacked in drawers or storage boxes safely, requiring less space than a framed textile while still allowing for ease of examination and handling. If a textile is thicker than a single layer of the mat board, elevate the window mat with additional layers of mat board. Elevating the window mat above the surface of the textile will prevent possible abrasion if stacked or handled. This will also prevent condensation from coming in contact with the textile if glazed.

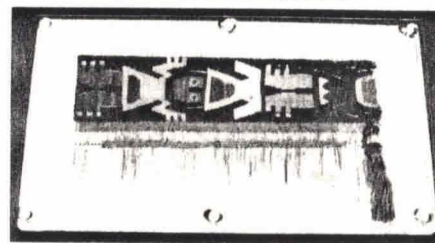
(For further reading see: Craft, "Part II"; Piechota.)



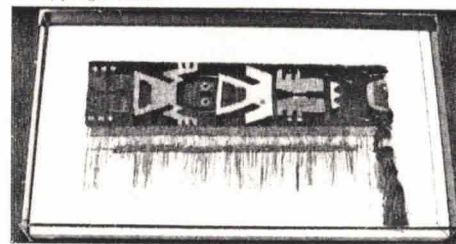
A two-part framing device showing stained cotton fabric (left) dug to prolonged contact with unsealed wood.



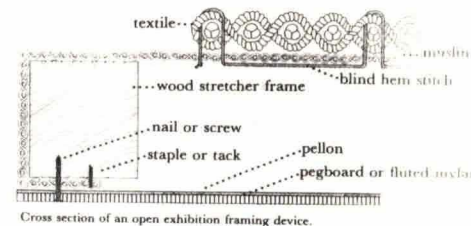
A textile fragment mounted on ragboard with a ragboard window, glazed and formally framed with aluminum strip moulding.



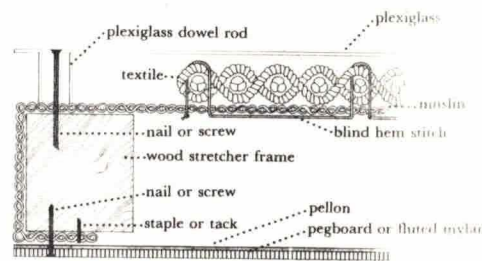
An example of a textile fragment stitched onto the face of a muslin covered wood strainer that is glazed with a sheet of plexiglass elevated by plexiglass dowels.



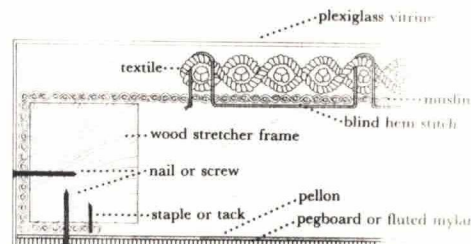
The same textile on the same mount that is glazed with a five-sided plexiglass vitrine.



Cross section of an open exhibition framing device.



Cross section of an enclosed exhibition framing device using a sheet of plexiglass and plexiglass dowel rod risers.



Cross section of an exhibition framing device enclosed with a plexiglass vitrine.

Mannequins and other costume support devices should be carefully considered. A good costume silhouette is not just a stylistic luxury but a structural necessity for most three-dimensional textile objects. Many costumes are so engineered that a full body figure is crucial to equalize and support the total weight of the piece. Adjustable wire forms covered with layers of muslin, department store mannequins or armatures constructed of wood and wrapped with many layers of Pellon, and/or muslin are several possibilities that can be employed to meet the needs of a full figure form. For flat constructed costumes, cardboard forms padded with Pellon and then wrapped with muslin can give good support. Costumes should be protected from the form itself with wrapped muslin, cotton t-shirts and/or appropriate undergarments. Caution must always be given not to force any costume over an available support form. *Historical costumes should never be worn for any occasion or purpose.* Contemporary body figures, corseting and postures have changed greatly and would place too much stress on these fragile garments. Perspiration and body oil stains are inevitable when a historic costume is worn. Although these stains may not be discernible at first, they will in time oxidize, darken and become difficult, if not impossible, to remove.

(For further reading see: Harris, *Costume Display*.)



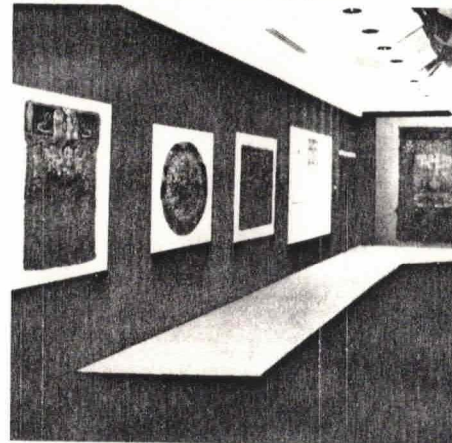
A small Victorian-shaped fiberglass mannequin modified to properly support and to give the appropriate silhouette to an 18th c. English costume. A corset was constructed of acid-free rag board and linen cut to create a wedge-shaped bodice with a narrow back and flat front. The mannequin was lengthened with acid-free rag board to accommodate the linen side hoops (paniers).



View of the same mannequin supporting the 18th c. English costume.



Coverlet exhibition utilizing the sleeve hanging device.



An exhibition utilizing the muslin covered wood strainer frames for viewing textiles. The elevated platform allows the viewer to move along the exhibition while providing a psychological traffic barrier between the objects.



View showing metal cabinet surfaces lined with velvet. The flat bar pieces are protected with plexiglas panels elevated with plexiglas risers. Magnifying glasses are available for closer examination of detail.



View of a Textile Study Exhibition Room with panels constructed of foamcore wrapped with polyethylene plastic and then faced with Osnaburg cotton fabric. Costumes are displayed on abstract "T" shaped wooden structures that are padded with polyester fiberfill and then wrapped with muslin.

SOURCE LIST FOR SUPPLIES

Please note: addresses and telephone numbers are given for specialized items only. Consult these firms directly for ordering or request a list of local representatives or distributors for your area. This is only an aid to find solutions for particular problems and is in no way a complete list or an endorsement for these products or their dealers.

Acid-free Materials

The following companies carry some or all of the following items:

acid-free tissue papers (smooth or textured finish, roll or sheets), acid-free wrapping papers (various weights and colors), acid-free rag board (various weights and colors), acid-free storage boxes (various sizes and construction), acid-free rolling tubes, and acid-free linen tape.

Andrews/Nelson/Whitehead
31-10 48th Avenue
Long Island City, NY 11101
(212) 937-7100

Charles T. Bainbridge's Sons, Inc.
50 Northfield Avenue
Edison, NJ 08817
(201) 225-9100

Conservation Resources, Inc.
1111 North Royal Street
Alexandria, VA 22314
(703) 549-6610

Light Impressions Corporation
131 Gould Street
Rochester, NY 14610
(716) 271-8960

Process Materials Corporation
301 Veterans Boulevard
Rutherford, NJ 07070
(201) 935-2900

Rising Paper Company
Housatonic, MA 01236
(413) 274-3345

Spink & Gaborc
32 West 18th Street
New York, NY 10011
(212) 255-8451

Talas
130 Fifth Avenue
New York, NY 10011
(212) 675-0718

University Products, Inc.
P.O. Box 101,
Holyoke, MA 01040
(413) 532-4277

B.W. Wilson Paper Company
2501 Britton Hill Road
Richmond, VA 23234
(804) 358-6715

Adhesives

Elvace No. 1874, Jade No. 403, Promacto A-1023:

Talas
130 Fifth Avenue
New York, NY 10011
(212) 675-0718

Cardboard Rolling Tubes

Most paper/container manufacturing firms and most local carpet dealerships

Detergents

D.W. 300
Lever Brothers
Lever House
390 Park Avenue
New York, NY 10022
(212) 688-6000

IGEPAL CA-630
GAF Corporation
140 West 51st Street
New York, NY 10020
(212) 582-7600

Orvus WA Paste
The Procter & Gamble Distributing Co.
P.O. Box 599
Cincinnati, OH 45201
(513) 562-1100

Fiberglas Screening

any local hardware store

Foamcore

any well-stocked lumber company

Frame Backing Materials

Fluted Mylar (48" x 60" sheets):

Artistic Manufacturing
13821 Progress Parkway
North Royalton, Ohio 44133
(216) 237-8720

Artistic Woodwork Company, Ltd.
991 St. Vital Boulevard
Montreal, Canada, 459 Quebec
(514) 323-3075

Pegboard

Any well-stocked lumber company

Hangers

Long-neck, white moulded plastic hangers in various sizes
Frankel Plastic Corporation
493 Seventh Avenue
New York, NY 10018
(212) 947-0450

Light Filtering Devices

Fluorescent tube filtering sheaths:

Filter Light Corporation
P.O. Box 6292
Greensboro, NC 27405
(919) 852-3089

UF-3 Plexiglas
any Rohm and Haas plastic dealership
Window glass coating:

Transparent Glass Coatings Co., Inc.
1959 South La Cienega Boulevard
Los Angeles, CA 90034
(213) 870-4777

Lining and Support Fabrics and Related Supplies

Crepeline—silk chiffon, natural (off white) or smoky brown:
Talas
130 Fifth Avenue
New York, NY 10011
(212) 675-0718

Cotton thread, linen thread, muslin, nylon tulle, needles, pins (silk or brass), Pellon, twill tape, silk thread, Velcro:
most well-stocked fabric or department stores

Metal Storage Units

The Interior Steel Equipment Co.
2352 East 69th Street
Cleveland, OH 44104
(216) 881-0100

Spacesaver Corporation
1450 Jamesville
Fort Atkinson, WI 53538
(414) 563-6362

Stacor Corporation
285 Emmet Street
Newark, NJ 07114
(201) 242-6600

pH Paper Strips

EM Laboratories, Inc.
500 Executive Boulevard
Elmsford, NY 10523
(914) 592-4660

Gallard-Schlesinger Chemical Mfg. Corp.
584 Mineola Avenue
Carle Place, NY 11514
(516) 333-5600

Talas
130 Fifth Avenue
New York, NY 10011
(212) 675-0718
any well-stocked supply store

Polyethylene Plastic Film

any plastic or hardware store

Polyurethane Varnish

any well-stocked paint store

Plastic Polymer Trays (wet-cleaning)

any well-stocked photography store

Stainless Steel Wet-Cleaning Table

Mouron and Company, Inc.
320 West 16th Place
Indianapolis, IN 46202
(317) 926-5378
most custom-made stainless steel firms

Steamer

Jiffy Steamer Company
Box 869
Highway 51 North
Union City, TN 38261
(901) 885-6690

continued

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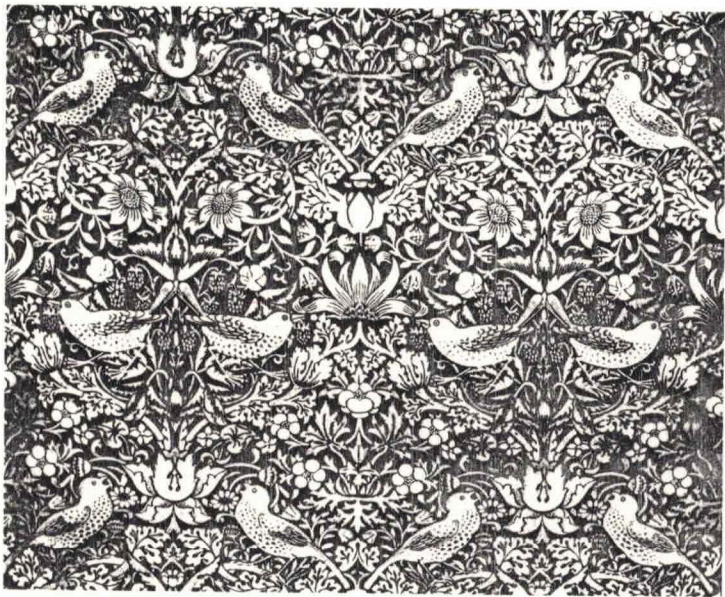
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William Morris and Company, England
Furnishing Fabric, "Strawberry Thief" pattern, 1883
woodblock and indigo discharge printed cotton
Gift of Miss Charity Dye
20.109