

Recent Developments in Preservation of Works on Paper

ABSTRACT

Support for works on paper can be provided with Japanese tissue and starch-paste hinges or with adhesive-free edge support. When the edges of a sheet must be exposed, hinges, to which the paste has been applied in tiny or microdots, will give good support, with minimal potential for cockling. Thicker sheets can be secured with slightly larger dots of paste on the hinge. When the edges can be covered, the sheet can be housed without the use of adhesive. Folded edge strips, with one or more folds, edge wrappers made from a single sheet of paper, and specially designed support spacers can all provide safe and steady support. The dimensions of the item will dictate the support to be used. When an item has been properly supported, it should be sequestered from harm. Well chosen glazing materials can be combined with metal/plastic heat-sealing laminates to comprise packages that can protect matted works, paintings on canvas or panel, and objects. These packages can be designed for short or long term usage and for climate protection or waterproofing.

TO HINGE OR NOT TO HINGE

Preservation of works of art and artifacts on paper is complicated by the great variety of shapes, sizes, thicknesses, and constituent materials in which such items are found. Housing for these works must be tailored to accommodate the particular needs of each. If it is critical to expose the edges of the sheet, the most benign adhesive, starch paste, can be applied to Japanese tissue hinges in the least invasive manner, using tiny- or microdots, to form the basis for hinges. Since the hinges should be invisible beyond the margins of the sheet, they can be passed

through slits in the back mat to provide steady, non-confining support. When the edges of an item can be covered, a window mat that goes over those edges will be especially beneficial, in that it will support the item through paper/mat board friction in the covered portions and the covered margins of the sheet will be restrained by the edges of the window. This situation also allows for support of the matted item with folded paper structures, without the application of any adhesive to the art or artifact. Once such items are properly housed, they can best be kept from pollution and harmful extremes of climate if they are sequestered in a proper storage system, or in a sealed package that will exclude those threats. These three areas of preservation—hinging, hinge-free support, and microclimate packaging—are detailed in this presentation, with an emphasis on currently available techniques and materials.

TO HINGE

Rapid evacuation of moisture from an applied hinge can help eliminate cockling, and this can be effected through the use of hand blotting with blotters that have been desiccated. A slide warmer, found at scientific suppliers, is the simplest and safest way to dry blotters (fig. 1). A cobalt salt card, laid on top of the drying blotters will show when they have gone from a humid to a dry state (fig. 2). Cut the blotters to be dried into a smaller size than is used for room-ambient blotters so that the two types can be easily distinguished. This allows one to safely hand dry with the desiccated type and do the final weighted drying with the normal blotters. Desiccated blotters can be stored in pouches made of aluminum/plastic heat-sealing foils (fig. 3), and a glass window in the package permits monitoring of its contents without opening.

Paste can be prepared less frequently if it is stored in sterile packages. Heat-sealing foils serve well in this area, too, since paste can be packaged in small sachets made of this foil, if proper sterile conditions are maintained during

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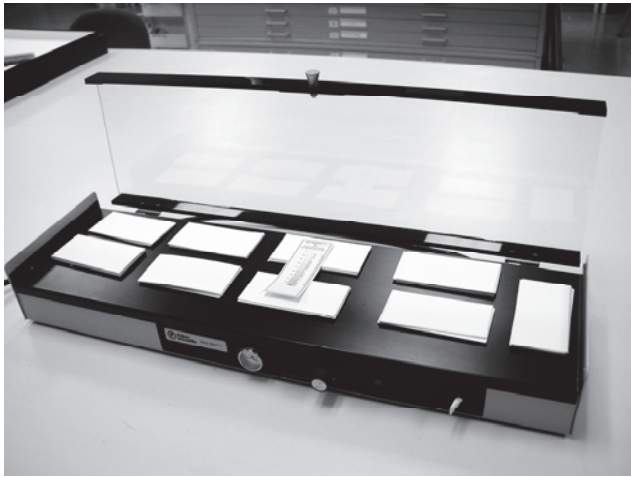
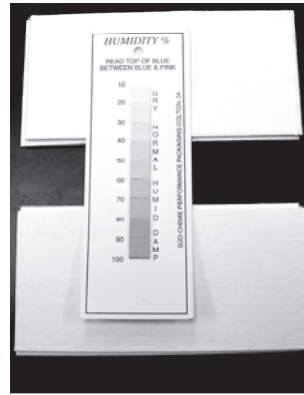
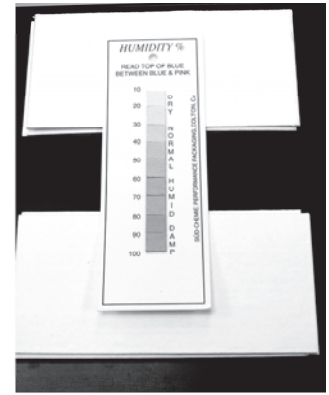


Fig. 1.



Humid Blotters



Desiccated Blotters

Fig. 2.



Fig. 3.

packaging. Alcohol for sterilization of the inside of the foil will be required in addition to the paste-making materials (fig. 4). The inside of the foil, the polyethylene side, is first thoroughly cleaned with alcohol and then freshly cooked paste is added to the center of a clean piece of foil (fig. 5). The foil is folded around the paste and heat is used to make seams, away from the paste, to form an open pouch. The paste can now be moved to the bottom of this pouch (fig.

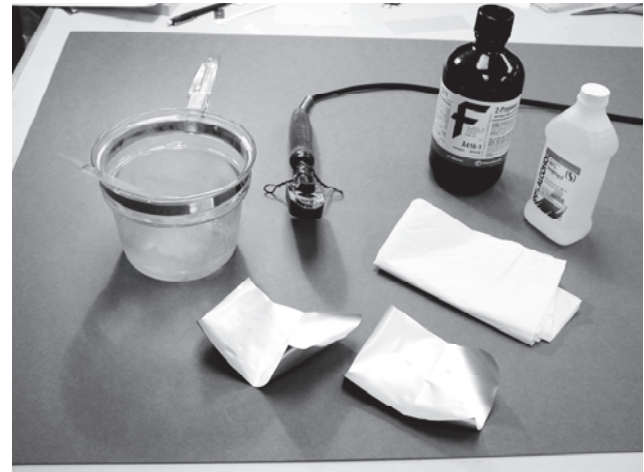


Fig. 4.

6) and excess air can be sealed out before the closing seam is bonded. The pouch can now be pressure tested and dated (fig. 7). If the contents of the package expand, sterile conditions were not maintained during packaging.

Well-strained paste is essential for all hinging applications. A simple and inexpensive method for straining employs the synthetic silk used in screen printing. A quantity of cooked paste can be placed on a square of this material and the material can be pulled around the paste mass and drawn together. This allows the operator to hold the margins of the silk together as a clean, dull blade is used to push the paste through the material and onto a clean receptor surface (fig. 8). If done just before the paste is used, the paste will have minimum exposure to spores that might be in the straining material.

Certainly the most important innovation in hinging in recent history is microdot application of paste, introduced by Matsuda Katsuhiko of the Showa Women's University, Tokyo, Japan. An applicator made of the hook side of hook-and-loop fastener can be used to transfer dots of paste to

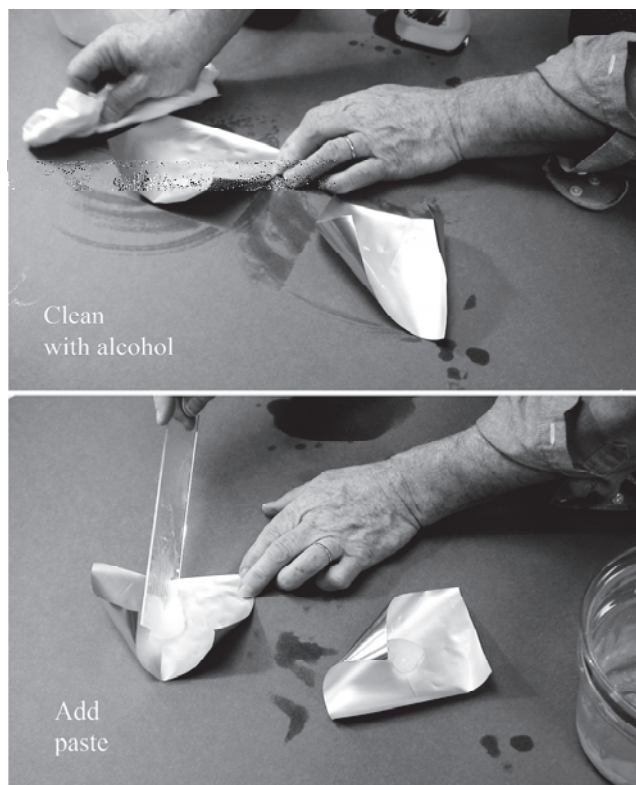


Fig. 5.

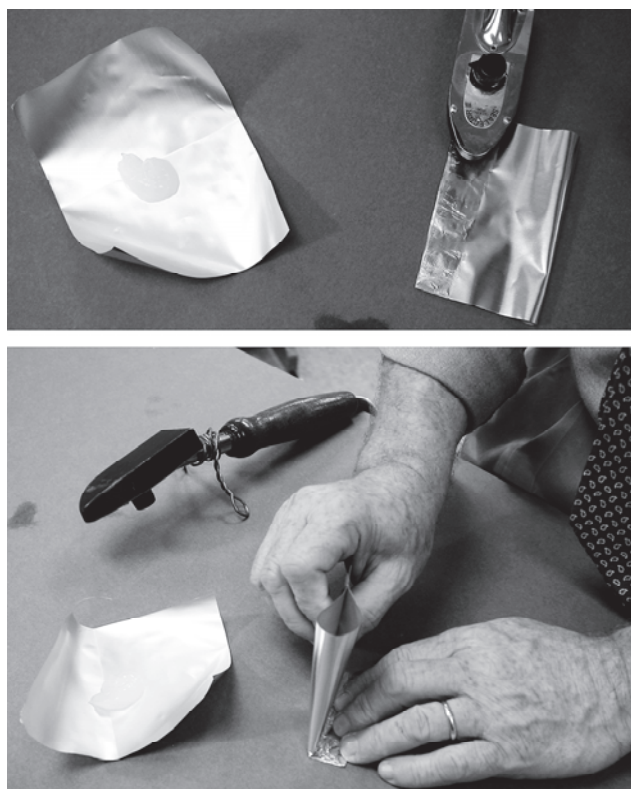


Fig. 6.



Fig. 7.

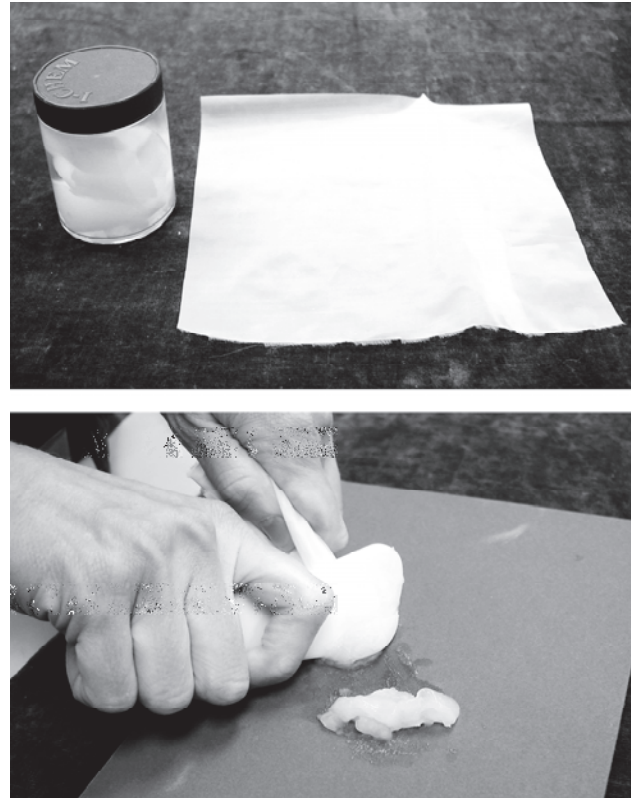


Fig. 8.

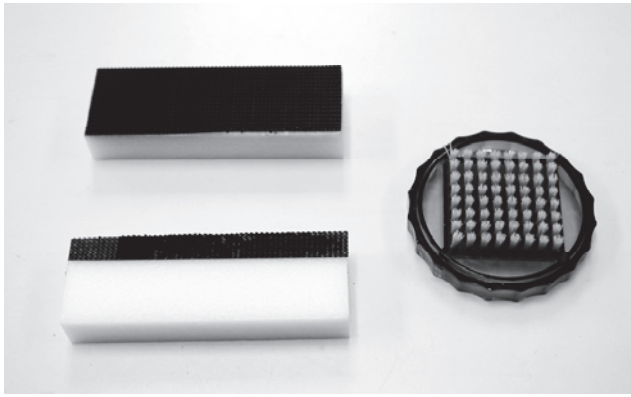


Fig. 9.

the hinge before it is applied to the art. The paste spots will dry laterally into the Japanese tissue and they will then dry laterally into the fibers of the art sheet. When properly done, this technique all but eliminates the possibility of cockling, but it must be done with some dispatch. Paste applicators for microdots can be made from a segment of the hook material that has been affixed to a larger piece of water-proof, rigid material, while larger macrodots, to be used on items that are too thick to cockle, can be made with a short-bristled brush (fig. 9).

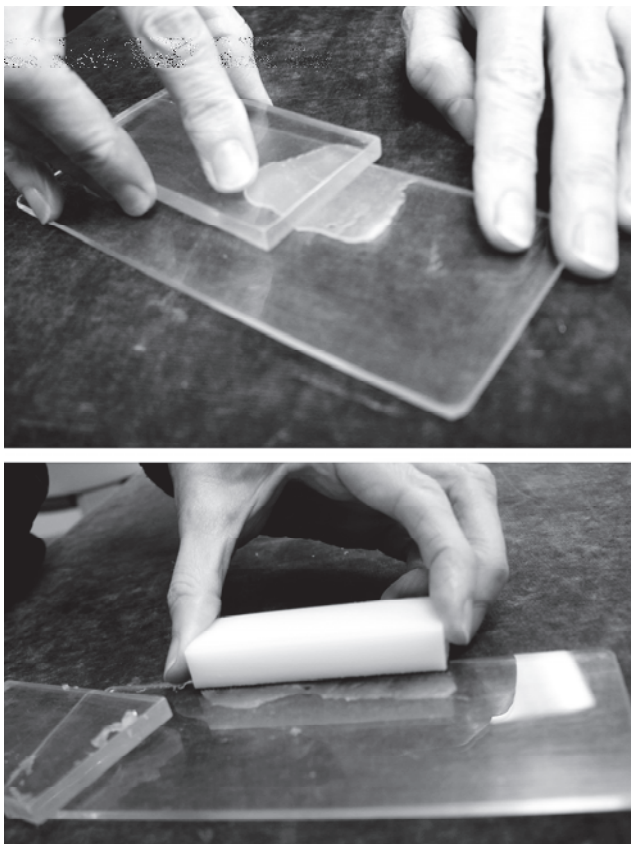


Fig. 10.

The technique begins with an even field of paste being spread out onto a clean piece of smooth, waterproof material. The paste should be viscous enough so that it can be spread evenly and thinly, without beading. The dotting applicator is pressed into this paste field and is agitated in circular motions, to charge the sides of the hooks, with care taken to ensure that the paste does not fill in between the hooks (fig. 10). The hinge can now be pressed onto the charged hooks, with sufficient pressure so that the paper will become dimpled and paste will be gathered from the sides of the hook tips, for microdots, or the bristles for macrodots (fig. 11). As one is learning this technique, coloring the paste can demonstrate whether an even field of microdots or macrodots has been created (fig. 12). Colored paste will only be used with practice hinges, of course. If the hinge will be passed through the back mat, apply it to the back of the art with its outermost row of paste dots set in from the edge of the sheet, so that the edge of the sheet will overlap the slit in the back mat. This eliminates the possibility of the sheet edge getting caught on the slit edge. For pendant hinges, the outer row of dots can be set at the edge of the sheet (fig. 13). Even though the microdots of paste are not likely to cause cockling, the hinge should be carefully dried to further ensure safety.

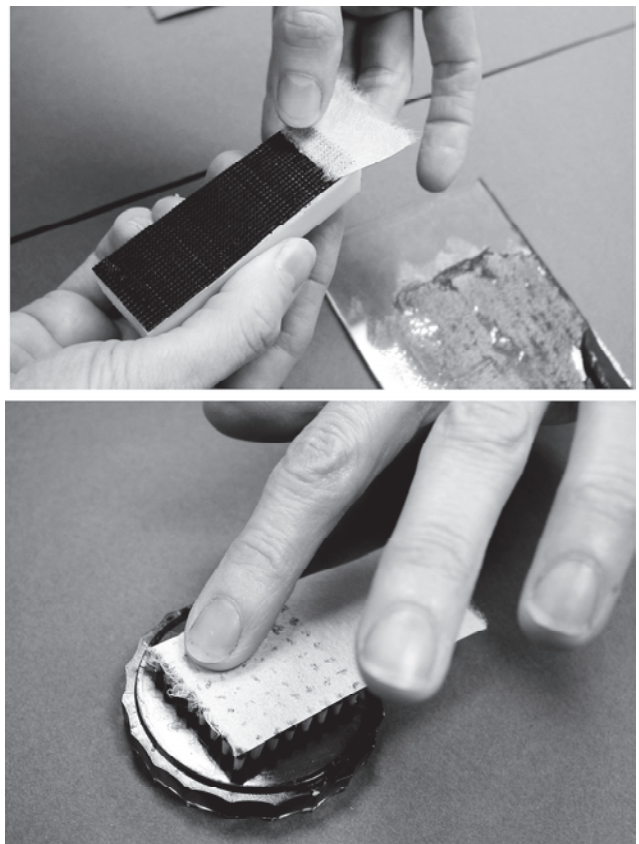


Fig. 11.

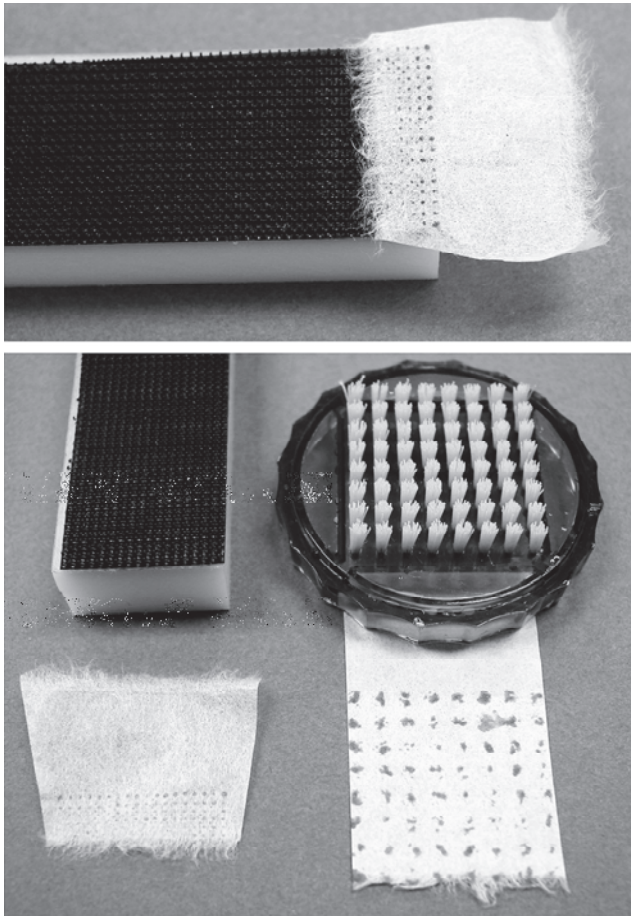


Fig. 12.

The drying should begin as soon as the hinge is laid on the art. A desiccated blotter can be set on the hinge and pressed with the flat portion of the palm near the wrist or the side of the hand. Move the blotter slowly off the hinge and away from the center of the sheet of the art. This will ensure that the damp portion of the blotter will be kept off the sheet. As was noted before, making the desiccated blotters smaller than the normal blotters aids in ensuring that the final weighting will be done with normal blotters only (fig. 14). Securing the art to the back mat comprises attaching the hinges to the back mat in a manner that provides steady but non-confining support. If the hinges are fixed too rigidly to the back mat, the sheet may cockle between the hinges as the relative humidity rises. Passing the hinges through slits in the back mat allows for steady support of the sheet, while also allowing for slight lateral movement of the sheet edges. Unfortunately, this also entails having the ends of the hinges exposed on the back side of the back mat, which is impractical in institutional settings. Since institutions tend to have stable climates, the flexibility of support that passed-through hinges provide should not be needed. Where needed, passed-through hinges may be done in the following manner.

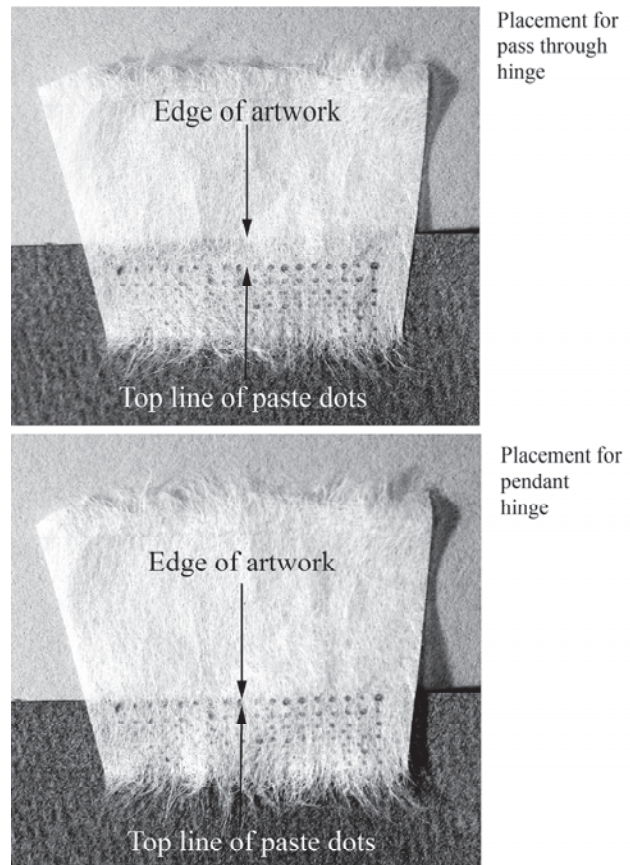


Fig. 13.

The work is placed on the back mat in the desired position and weighted in place, with hinges folded out to reveal their positions. Mark the hinge positions on the back mat with the end of a microspatula (fig. 15). Make the marks slightly under the edge of the sheet so that the slits will be in line with the fold on the hinges, which are lower than the edge of the sheet. Cut the slits on a bevel which angles out from the edges of the art. The hinges can be fed into the ends of folded pieces of paper slipped through the slits from the back (fig. 16). As the folded paper is pulled back through the slot it takes the hinge with it, safely and easily (fig. 17).

Folded hinges can be attached to back mats using cross pieces made of Japanese tissue. Since adhesion of the cross pieces requires the use of paste, position strips of polyester sheet under the edges of the art where the cross pieces will be installed, to protect the art from moisture. These strips should be weighted in place, with the weight positioned to allow one end of the art paper to be lifted as the pasted cross piece and hinge are folded under the polyester strip and onto the back mat (fig. 18). Paste can be applied to the ends of the cross piece, leaving the central section dry to allow for future removal of the cross piece from the mat (fig. 19). The cross piece can be removed later by inserting a microspatula under the unpasted portion of the cross

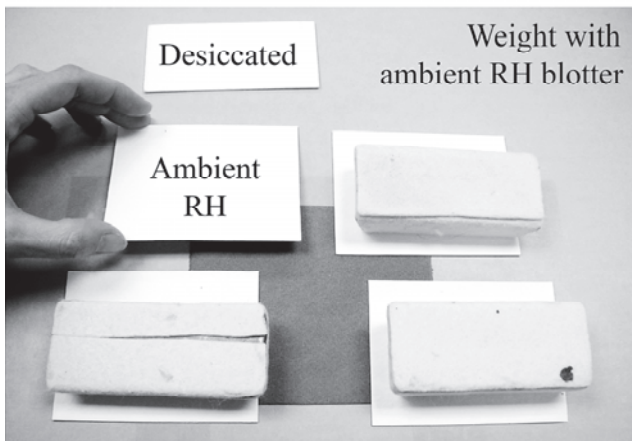
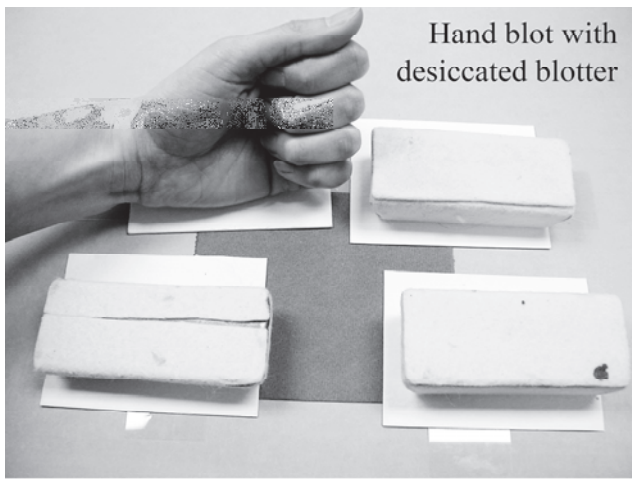


Fig. 14.

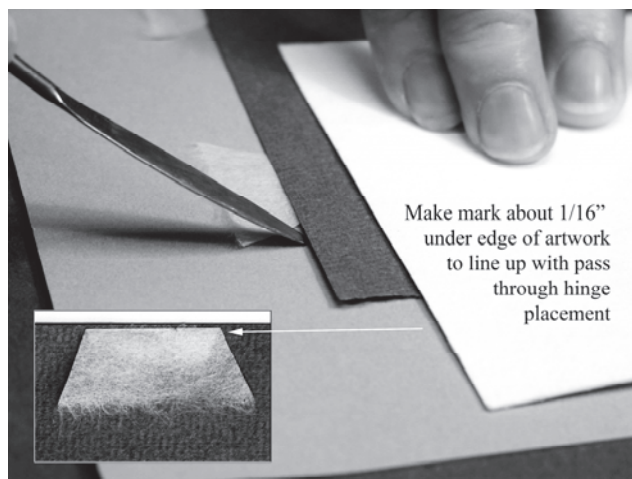


Fig. 15.

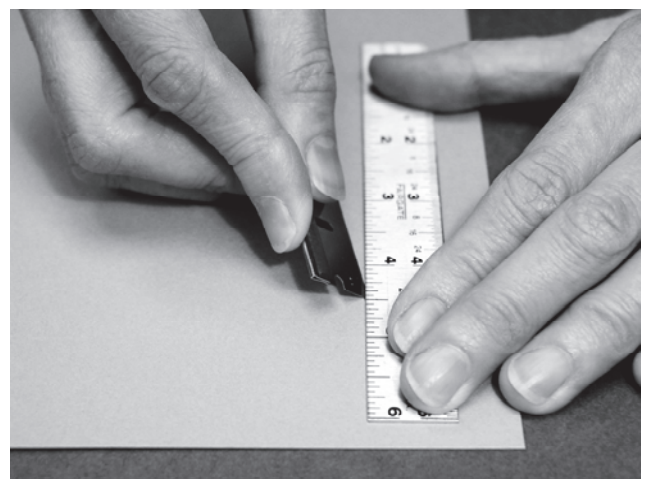


Fig. 16.

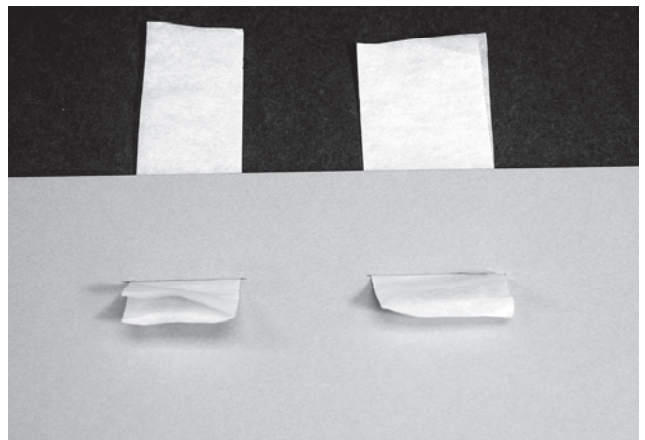


Fig. 17.

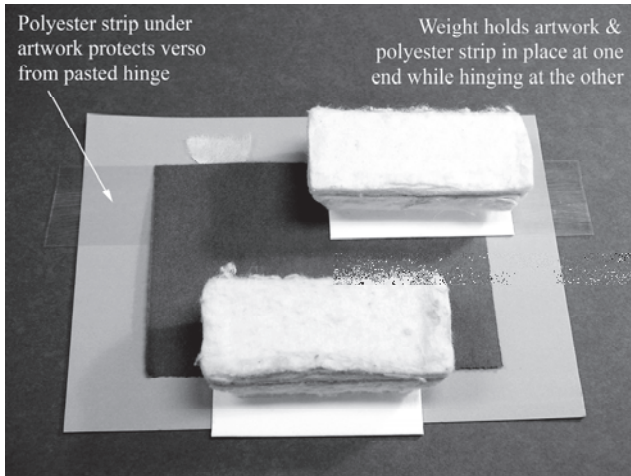


Fig. 18.



Fig. 20.

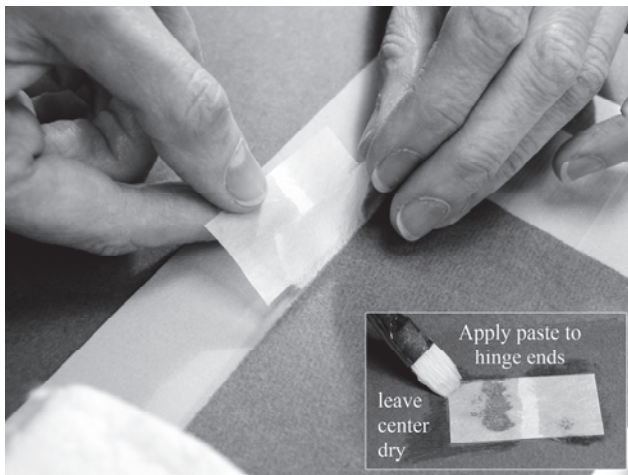


Fig. 19.

piece and working it from side to side. The pasted cross piece is set under the hinge and the hinge is pressed down onto it. Hinge and cross piece, together, are turned under the art and pressed onto the back mat (fig. 20). The cross pieces are allowed to dry for several hours, before the polyester sheet strips are removed.

Heavy items—those with papers that are two-ply thick and thicker—may be too heavy for ordinary hinging, and a reinforced hinge will be needed if they are to be displayed with their edges exposed. Hinges that fold out in two opposite directions on the back of the art can be made with Japanese tissue and polyethylene used an adhesive. A wide piece of Japanese tissue can be folded around a strip of polyethylene, and heat, from a household iron, can be used to melt the polyethylene so that it bonds to the Japanese tissue in front and in back (fig. 21). A successful bond will be evident when the polyethylene starts to show through the tissue. When that has been achieved, the bonded portion of this laminate can be cut with scissors



Fig. 21.

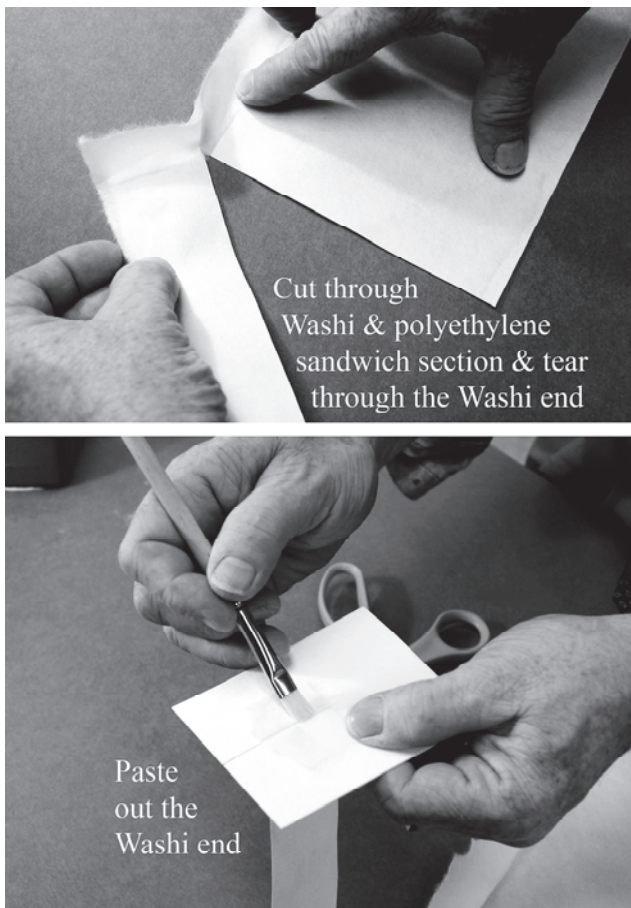


Fig. 22.

up to the end of the bonded portion and beyond that it can be torn. Since this hinge will fold out in opposite directions, applying paste is more complicated than usual. A cut can be made in a piece of blotter card and the laminated part of the hinge can be passed into that cut. Both sides of the hinge can now be folded onto the blotter and paste can be applied to both (fig. 22). The pasted hinge can be pressed onto the back of the item and dried with two blotters on either side of its central stem. This stem will be drawn through a properly placed slit in a back mat. If properly executed, such a hinge can carry a static weight of over one kilogram. If the back of the art has degraded, a piece of Japanese tissue can be pasted onto that degraded back surface and dried. A reinforced hinge can be pasted to that reinforcing tissue back pad to give it a secure foothold (fig. 23).

Degraded papers that have images on both sides can be secured in cut-out inserts with perimetric hinges (fig. 24). These hinges will have such a broad hold on the art, that only the feathers of wet-cut Japanese tissue need be applied to the outer edges of the verso of the art, working a few inches at a time. The rest of the hinge will be pasted to the back side of the insert (fig. 24). For very large works, peri-

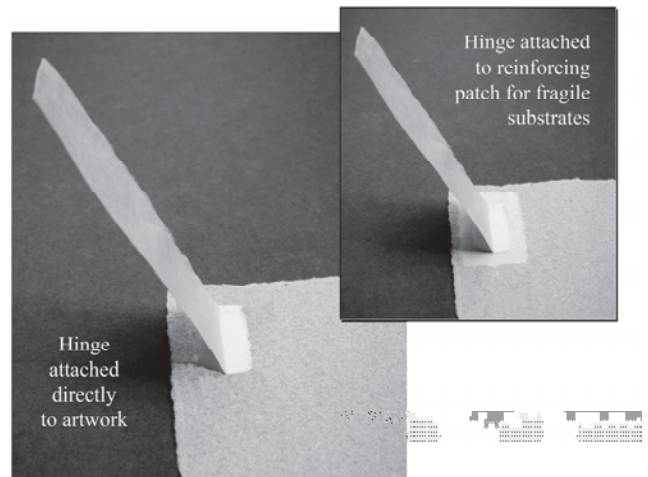


Fig. 23.

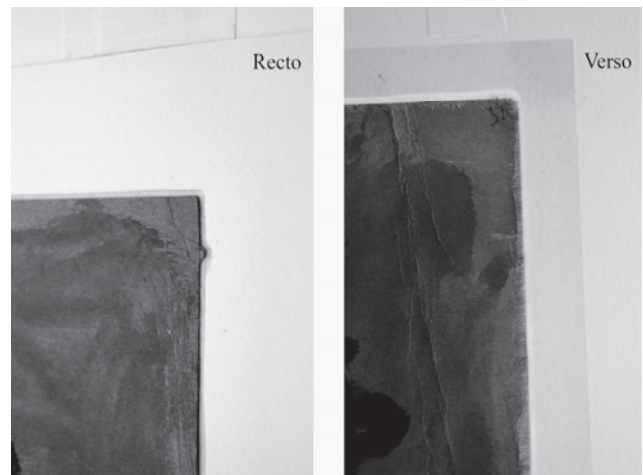


Fig. 24.

metric hinges can be pasted to their edges and drawn around a support panel of four-ply mat board and acid-free corrugated board, so that the hinges can be secured on the back side of the pane. The hinges will have to comprise strips, shorter than the margins of the art, and the ends of the strips can be pasted together to form invisible joins. This will be most useful in situations where the margins of the art need restraint or special support.

NOT TO HINGE

As benign as starch paste and Japanese tissue hinges may be, they still entail application of starch to part of the paper. A window mat that covers the edges of that same sheet will allow for support of the sheet without the use of adhesive. When this is done, the support for the edges of the sheet should be concentrated at the centers of its edges and not at its corners. Corner supports allow for the sheet to bend at its corners and fall out, while center supports keep the

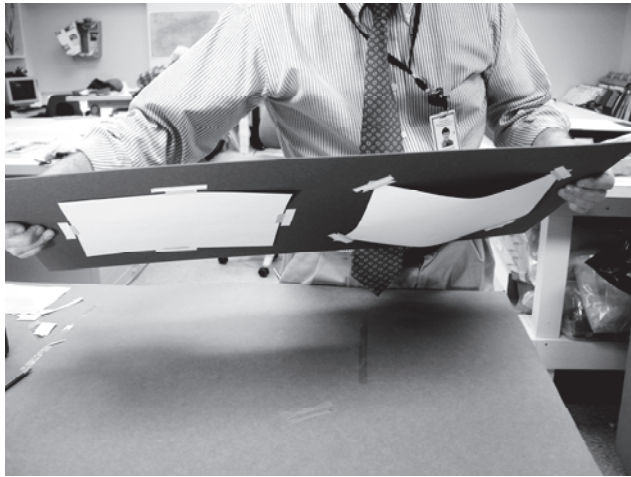
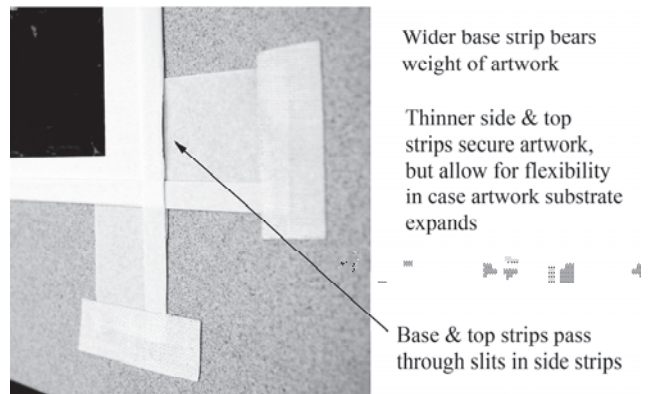


Fig. 25.

sheet in plane and place (fig. 25). Lynne Gillaland of the National Museum of American History made a central contribution to provision of hinge-free support when she outlined the use of folded paper strips or gutters that enclosed the top and bottom edges of a sheet. To these, one can add vertical strips that hold the sides of the sheet. The vertical strips have slits at their folds through which the ends of the top and bottom strips can pass (fig. 26). This permits the strips to be snugged up to the sides of the sheet, while the strips are attached to the back mat, with linen tape, only at their ends. The advantage of this configuration is its provision of steady support that will not be overly confining when the mount undergoes changes in relative humidity. Since the strips are longer than the edges of the sheet, they should loosen as the relative humidity rises and they should tighten as the relative humidity drops. In figure 26 one can see that the bottom strip has a back side that is especially wide, making it rigid to give extra support to the bottom of the sheet, while the strips that support the other three sides are narrower, allowing for more response to changes in RH. The support that such strips provide will depend on the back mat, to which they are secured, being relatively rigid. If that back mat is too flexible, it can bend and become concave, arching away from the side with the art. If that happens, the strips will become slack. An ordinary four-ply back mat should serve well until the item to be housed exceeds two feet in both directions.

As works grow to and beyond that range of sizes, the back mat will have to be made of laminates of acid-free corrugated board and matting board. To keep the support concentrated at the center of the strips, tabs can be cut in the back side of some strips, especially the bottom strip (fig. 27). A curved cut allows the tab to be formed with one cut, which can be folded out and taped to the back mat, with linen tape. Such tabs will allow edge strips to be



Wider base strip bears weight of artwork

Thinner side & top strips secure artwork, but allow for flexibility in case artwork substrate expands

Base & top strips pass through slits in side strips

Fig. 26.

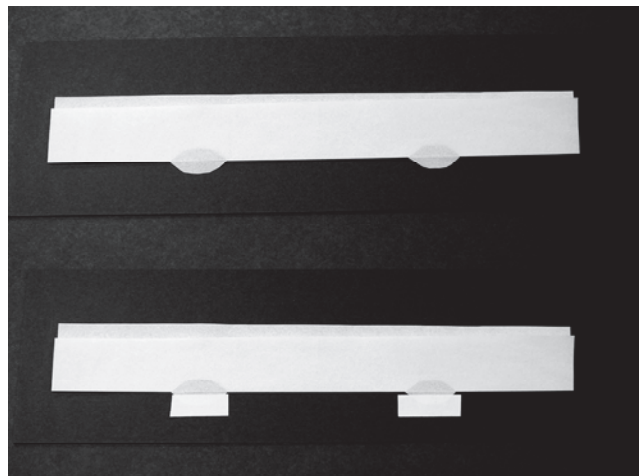


Fig. 27.

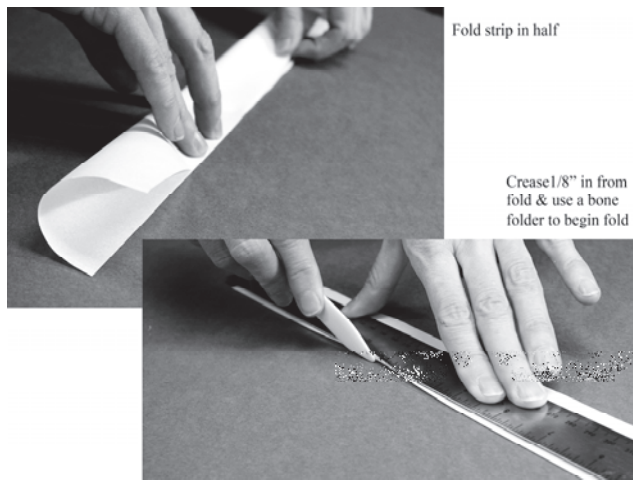


Fig. 28.

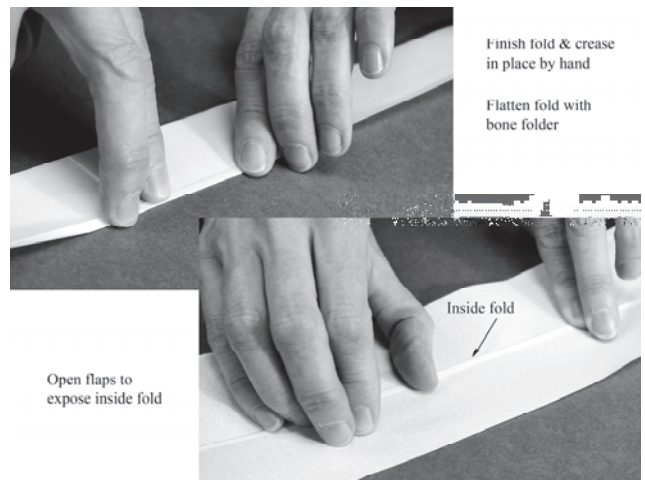


Fig. 29.

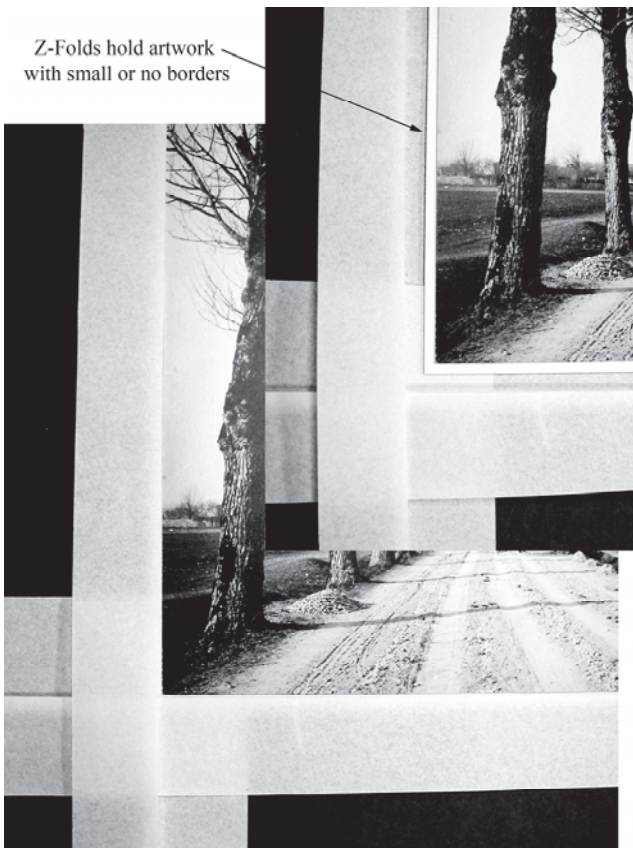


Fig. 30.

used with very large sheets if the back mat has been made thick enough to remain stiff and under tension at that size.

Another problem that is often encountered is the housing of photos and other items with a design that comes close to the edges of their sheets. Since the strip can extend over only a small portion of the art, it must be more rigid, to prevent the sheet from slipping out from under it. A strip with not one, but two, parallel folds in it, running



Fig. 31.

along its center can perform in this role. Seen end on, such a strip comprises a shape like the letter Z with a tiny central portion. This strip can be created by taking a long strip of paper, an inch or more wide, and folding it in two along its length. The folded strip is folded again, close to and parallel to the first fold (fig. 28). Both folds are burnished and the entire strip is unfolded to reveal its Z-shaped structure (fig. 29). The edge of the item to be matted will rest in the channel that is closest to the back mat and the vertical strips will be cut at that point to allow the horizontal strips to pass through them (fig. 30). Since this strip, with its extra fold, will have a greater bulk than a single fold strip would, provision must be made to avoid pressure from the window mat that might lead to embossment or abrasion of the surface of the matted item. This provision can comprise a shim mat, another window with an opening larger than the primary window that is glued to the back of the primary window (fig. 31). This shim should provide enough space so that its margins are well outside the edges of the framed work.

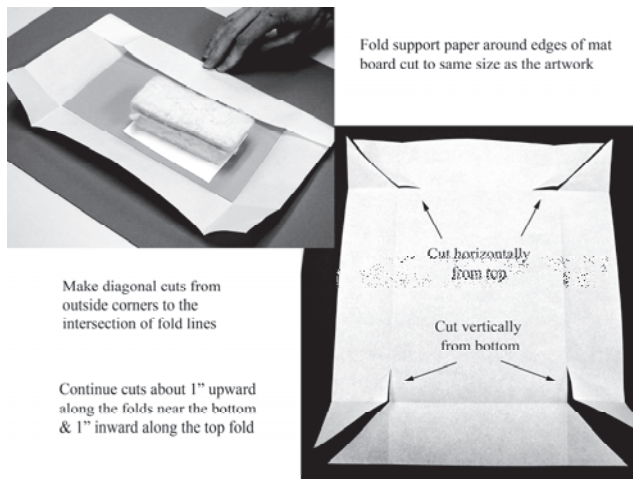


Fig. 32.

Hinge-free solutions are also most appropriate for works that are thick enough to make securing them with hinges problematical. One support can be made from a sheet of conservation quality paper that is an inch or so larger in height and width than the item being matted in all directions. The item can be placed on this sheet and the edges of the sheet are folded around the edges of the item, so that those folds reflect the size of that item. Cuts are now made that run diagonally across the corners of the support sheet, from the corners of the folded area to the corners of the whole sheet. These cuts are then extended along the inner folds, so that one pair of cuts proceeds up from the lower corners and another pair of cuts proceeds in along the top edge from the upper corners (fig. 32). The outer portion of paper will now comprise four flaps with diagonal ends. Each of these flaps can be folded down its length in a Z pattern, with the first fold going in toward the center of the structure and the next going out and the final one going in (fig. 33). Since the ends of these flaps will be diagonally cut, the uppermost folded portion, will also be the longest. This means that when the item is installed in the center of this support, and the "Z" folded flaps are properly folded and their ends go through the slits that have been made inside their neighboring flaps, the ends that proceed out from each corner can be secured to the back mat with linen tape (fig. 34).

Some photographers preferred to mount their photos onto larger support boards and when this mounting came from the artist's studio, it comprises part of the history of the photo. Securing such mounted photos into window mats in a manner that will allow curators access to the back of the mount boards can best be achieved through the use of corner supports, some of which can be opened and re-closed. These corners follow the traditional folding pattern, comprising a strip of one ply board with two forty-five degree folds near the center of the strip, so that the

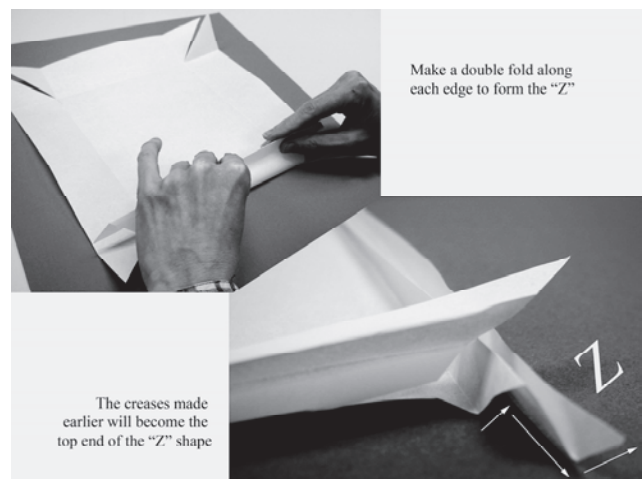


Fig. 33.

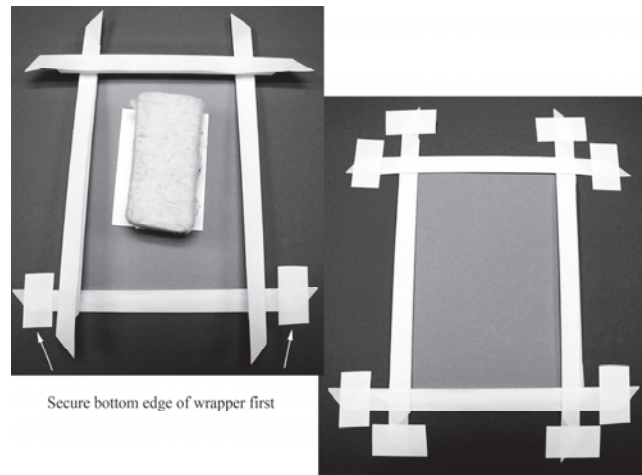


Fig. 34.

space between the folds forms a right triangle. The corners are secured to the back mat with paste or glue spotted onto the underside of the tabs on each corner. Both of the tabs in the lower corners are secured, while only the lower tabs on the upper corners are secured (fig. 35). This configuration means that the upper tab of each upper corner is free to be unfolded and later folded back so that the support board can be removed and re-installed, without damage to the corners or the support board itself (fig. 36).

Some works of art present problems that can best be solved with properly designed spacers rather than with window mats. Pastels on boards are a prime of this sort problem. Nothing can rest on the front surface of such works and they are not likely to do well if supported with hinges given their significant weight. It is likely that in the event of an impact, hinges would delaminate material from the back of the pastel. Spacers that cup the edges of the board on which the pastel was executed can provide gentle, steady support that is not unduly confining and which

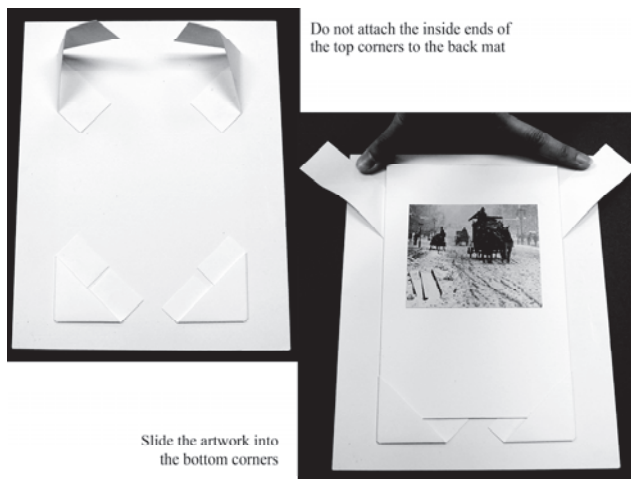


Fig. 35.

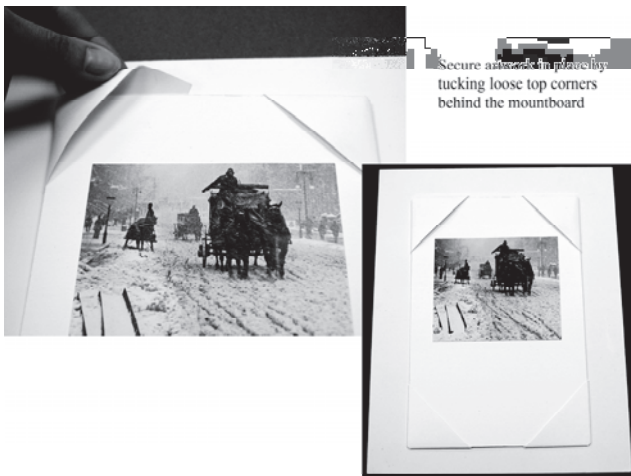


Fig. 36.

has no part that sits flat on the front of the pastel. Such spacers can be made from strips of conservation quality board, two of which have been glued together to form an L shape. This L should be strengthened with a smaller strip of board that can be glued to the inside of the joint where the first two strips come together, to form a diagonal reinforcement. This combined structure can then be wrapped with a strip of Japanese tissue, which when glued to the outside surface of the L, will give the spacer the shape of a right triangle, when seen in cross-section. These spacers are linen-taped along the margins of a back mat that is slightly larger than the outer dimensions of the pastel board, and they should fold up easily around the board, without crowding it (fig. 37). The spacers are taped together at the corners of the support to create a tray, which can safely hold the board in or out of a frame.

Other materials, such as fragments of paintings or designs on board, can be held to a back mat by very soft spacers. These spacers fold up around the edges of the back

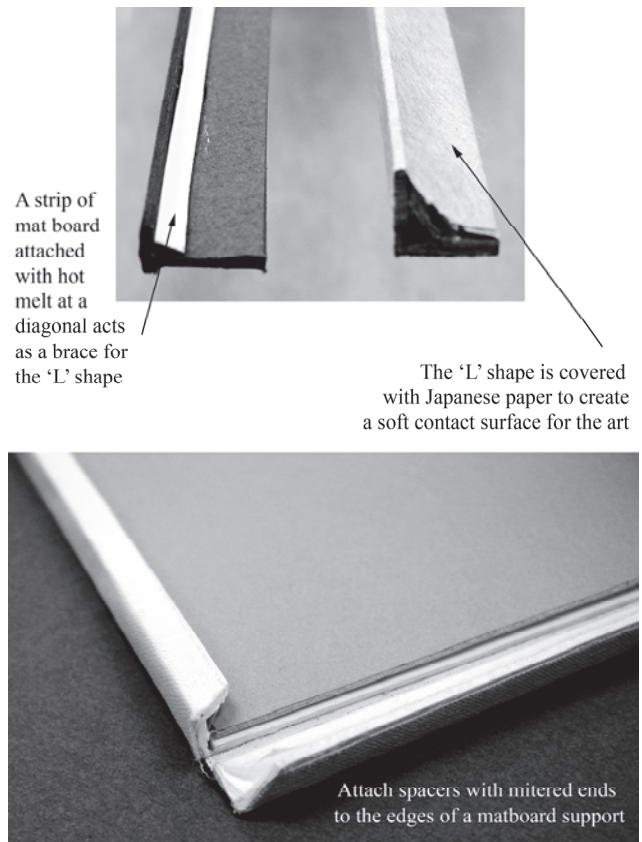


Fig. 37.

mat and onto the recto surface of the painting. The critical ingredient here is needle-punch polyester batting. That material can be attached to a piece of conservation-quality board with acrylic medium serving as an adhesive. The acrylic can be rolled onto the board, and the needle-punch can be gently pressed onto it and allowed to dry. When the adhesive is dry, strips of polyester and board can be cut on a board shear and the resulting strips can be wrapped with Japanese tissue. The tissue is glued to the board on what will become the back side of the spacer. Its front side will be soft, padded, and yielding, making it safe for use with paint layers that have impasto. These padded spacers can be taped to a back mat that is slightly larger than the fragment to be housed. When they are dry and the painting is in place, they are folded up and onto its recto and secured with strips of linen tape that hold their corners closed (fig. 38).

Sink mats are very useful in providing support of items on board that have robust edges. The problem that comes up with items that are to be stored in sinks is how the sink will remain closed when it is going into or coming out of a frame. If glue or double-sided adhesive is used to close the sink, re-opening it will be messy and dangerous. A simpler and safer alternative is lashing the window to the sink with strips of linen tape. Such tape strips can be secured to

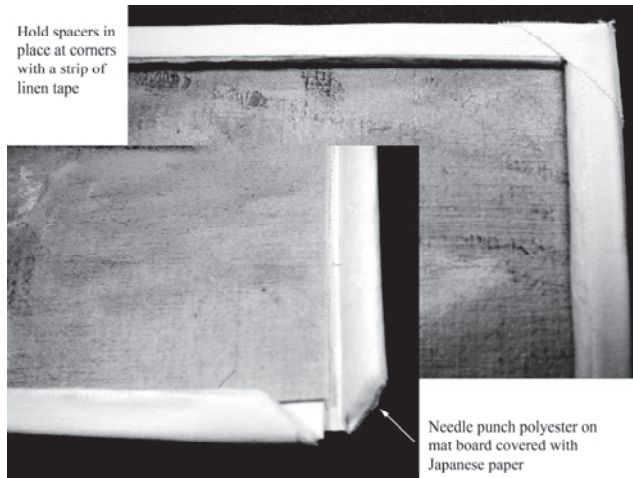


Fig. 38.

the back of the window, from where they will pass through slits in the sink to the back of the sink, where they can be taped, completing the closure. In figure 39 we see the sink, with its lifting tab and the slits cut with two intersecting arcs, to simplify the effort in cutting through such thick material. The positions of the slits can be transferred to the back mat with a marking implement that goes through

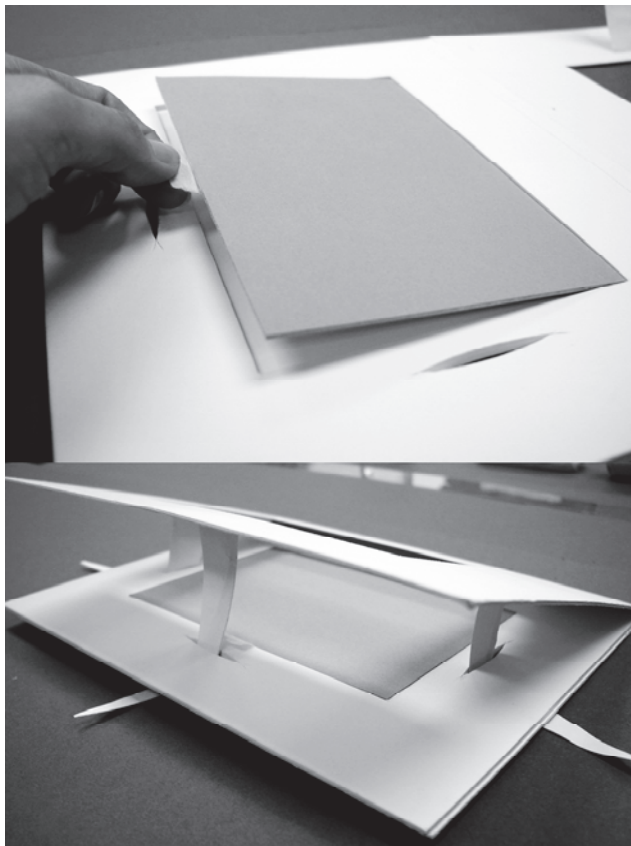


Fig. 39.

the slit from the back, when the window is closed on the sink. The pointed strips of linen tape can be situated so that they have a hold on the back of the back mat, and they bend back at the line that has been marked from the verso. The object can then be installed and the lashing strips drawn through the slits so they can be taped onto the back of the mat.

This same technique can be reversed to create a housing that combines the paper-covered bevel, found in the pastel spacer, and the lashing closure, just described. In figure 40 we see the components of what might be considered an inverse sink: a window of acid-free corrugated board combined with a window of conservation-quality mat board that has an opening slightly smaller than the opening in the corrugated board. These are glued together and the margins of their mutual opening have been wrapped with Japanese tissue to produce a shorter version of the taut-paper bevel seen in the pastel spacer. A back mat and a primary window are hinged to one side of this central support window or sink (fig. 41). Pass-through slits are cut in the window/sink and their positions are marked on to the back mat, enabling the location of the lashing strips. The item can be positioned on the back mat, and the window/sink can be carefully brought down onto it as the lashing strips are fed through

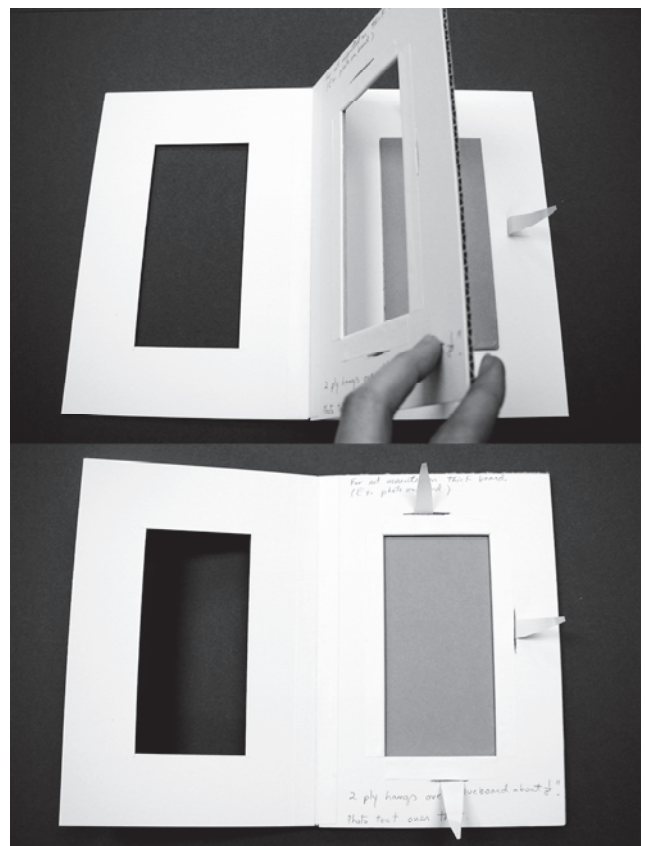


Fig. 40.

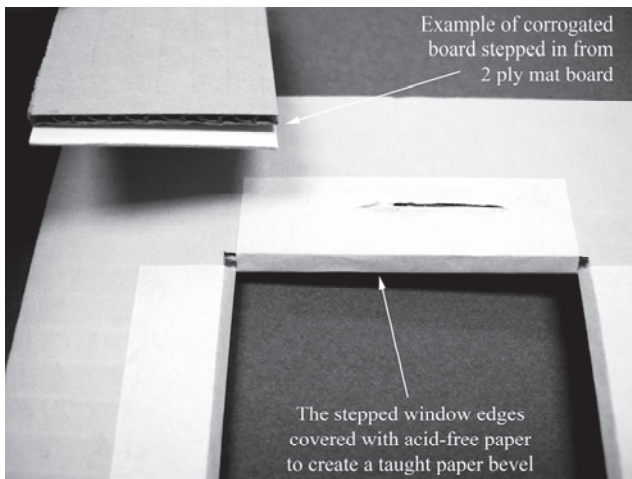


Fig. 41.

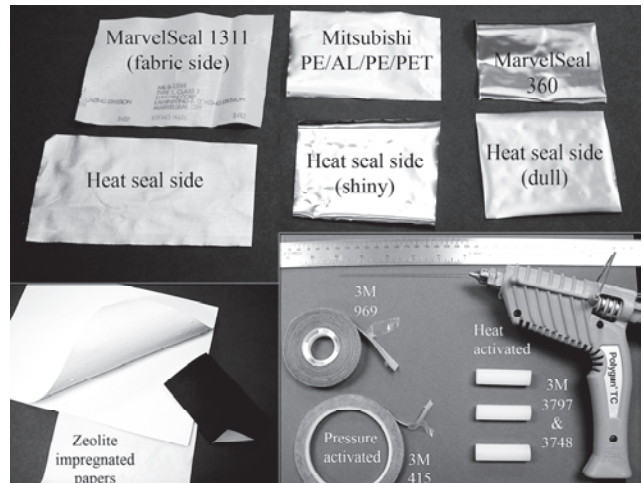


Fig. 42.



Fig. 43.

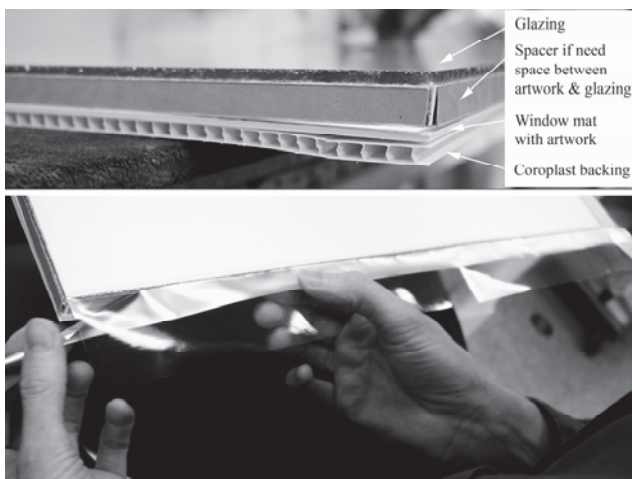


Fig. 44.

the slits and secured to the face of the sink, completing the package.

MICROCLIMATOLOGY

The two major functions that comprise preservation of works of art and artifacts on paper are support for and sequestration of those materials. In the forgoing sections of this paper, support with or without adhesive has been addressed. Here, techniques for sequestering paper-based items from pollution, light, extremes of relative humidity, and biological hazards are detailed. Successful sequestration depends on the availability of materials that can function as vapor barriers, climate reservoirs, pollutant scavengers, and light filters and packaging that combine these products to take advantage of their potentials. Traditional frames do a poor job of sequestering their contents from environmental harm. Harmful light wavelengths enter through the glazing, and pollution, excessive moisture, and desiccating air can come in through the back. Packages that fit invisibly into the frame can address these problems with modest additional expenditure of funds and time.

Heat-sealing composite foils, developed for military, medical, or food packaging applications, are critical to the creation of these packages. Such foils function because their inner layer, usually polyethylene, melts at a lower temperature than their outermost layer. That outer layer also imparts puncture-resistance to the foil. The most critical layer is the aluminum foil that is sandwiched between two layers of polyethylene, one of which forms the heat bonding layer and one of which bonds the aluminum to the outermost layer. In figure 42 we see examples of some such foils: a cotton-backed variety, Marvelseal 1311, on the left; a polyester-backed variety, Mitsubishi PE/AL/PE/PET, in the center; and a polyamide (Nylon)-backed variety,

Marvelseal 360, on the right. These foils, used in combination with laminated glass, which itself makes a functional vapor barrier, can form a package that will exclude extremes of relative humidity indefinitely. If the same foils are used with acrylic sheet, that package will give good short-term protection or longer-term protection in less demanding circumstances. None of these foils will bond to the glazing without an added adhesive. Electrical-grade hot melt, such as 3M 3797 or 3748, or pressure-sensitive tapes, such as 3M ATG 969 or 3M 415, can be used to bond the foil to the glazing (fig. 42). The addition of silica gel-impregnated paper and papers loaded with activated carbon, calcium carbonate, and/or zeolites will be a benefit for the maintenance of proper interior conditions in such a package. Various designs can be used, to meet the challenges of differing settings.

The simplest package is designed for use with matted material. It employs package sealing tape, a barrier layer to keep the tape volatiles away from the mat and its contents, and a backing of polypropylene double-wall board, such as Coroplast or Cor-X.

The critical element in this package is the foil barrier material cut into small rolls that will line the tape. Since these rolls are not commercially available, they must be created in-house. This can be done by rolling the foil off the large roll that it comes on onto a dowel, to create a smaller, tight roll that can be cut on a power miter box. When the roll has been cut, a number of smaller rolls will be created (fig. 43). Figure 44 shows a side view of such a package being created for a work that has the art hinged to a back mat and a spacer of four-ply board and acid-free corrugated board. The tape is attached to the edge of the glazing and the foil is rolled, polyethylene side up, onto the tape (fig. 45). The bottom of the package is treated first, with the tape/foil combination cut to the dimensions of the bottom. The sides are done next, with the tape/foil flush to the top edge and wrapping around the bottom corners; the foil extends around the corner and the tape extends beyond that. The corners are given a “hospital” style fold. The top is taped last with both ends overlapping onto the sides. This sequence should give some slight resistance to accidental wetting. This package will serve well for exhibition needs, especially where the climate does not stray far from the museum norm. It cannot be expected to work to exclude water during a sprinkler accident.

The next package design gives a high degree of protection against wetting and, if it is used with laminated glass, it should perform well for very long periods. This package relies on high-strength ATG, a carrierless adhesive designed to be applied with a gun that rolls it out. However, for this application it needs to be applied, carefully, by hand. The ATG can be unrolled, so that it comes away with its release paper and then, very carefully, set on

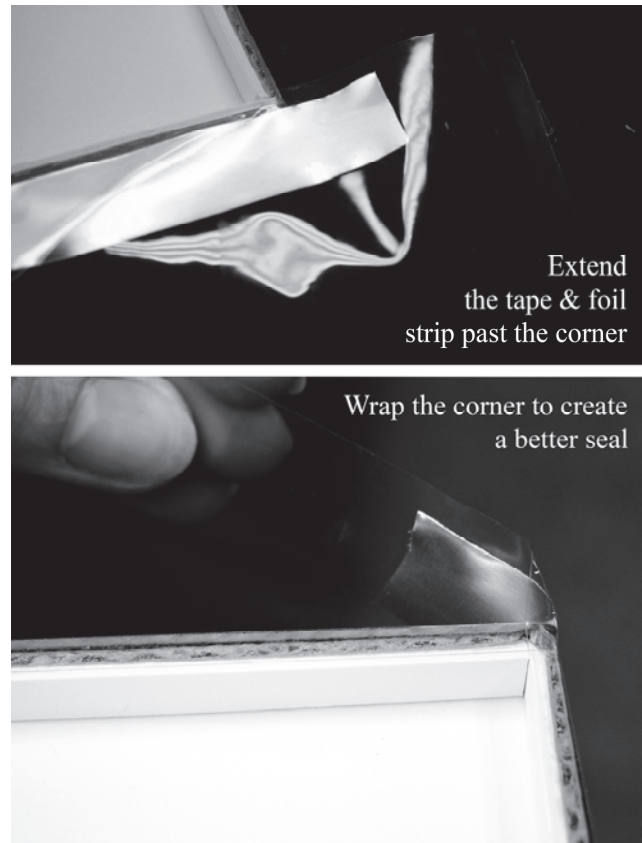


Fig. 45.

the edges of the piece of glazing. Care should be taken to ensure that the tape on the side of the glazing does not extend back to the inside edge, to prevent possible contamination of the edges of the window mat (fig. 46). The mat package, with the clean glazing fitted to it, can now be laid onto the sheet of sealing foil. That foil should have been placed on the work surface with its polyethylene side down, toward the table (fig. 46). Since the polyethylene will not be used for heat-sealing and it is difficult to make things stick to it, the foil in this case is being used in reverse to its ordinary position. Small sections of the ATG are added at the corners of the package to provide adhesive to seal the corners (fig. 46). With these corners in place, the release paper can be removed and the foil can be pulled up onto the tape and secured there with pressure, and the corners can be pinched shut (fig. 47). The excess material can be trimmed with a blade or knife and the dross can be pulled away (fig. 48).

The same package can be made with electrical-grade hot-melt glue, but that material is much harder to control and such packages can only be fitted into a frame that has wider than normal lips (rabbet widths). That type of hot-melt glue is necessary for the creation of packages that can house paintings on canvas, since the creation of corners in these packages requires that the foil be used with its

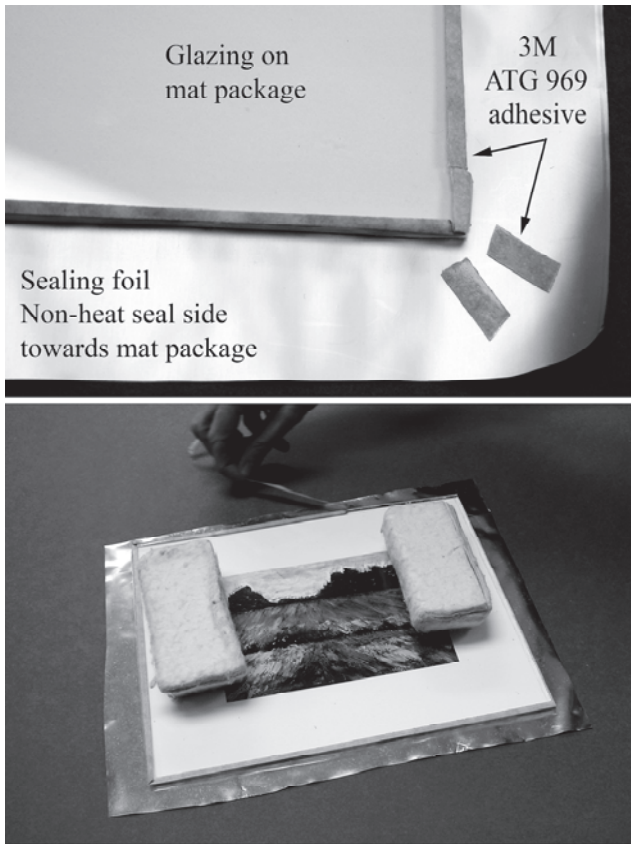


Fig. 46.



Fig. 48.

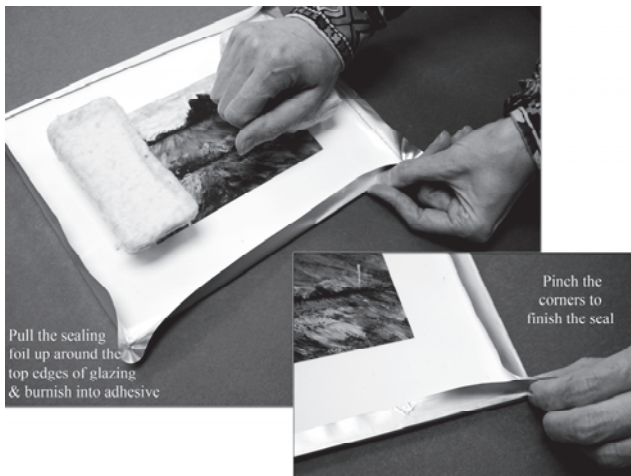


Fig. 47.

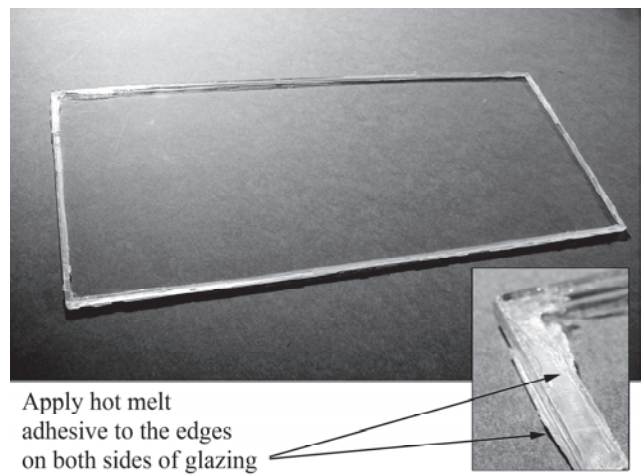


Fig. 49.

polyethylene, heat-bonding side turned in, and that side will not bond well with pressure-sensitive adhesives. Because heat cannot be used in proximity to a work of art, the paintings package must be designed so that the art can be loaded from the rear. The package can then be closed with a separate sheet of foil that is heat-bonded to the margins of the package that extend on the back of the frame.

To begin, the glue should be carefully applied to the outer edges of both sides of the glazing. This glue requires an industrial applicator gun, such as a 3M Polygun TC. The edges of the glazing are cleaned with dilute detergent and with alcohol to eliminate finger oils, which could weaken the adhesive's bond. The glue should be applied in the thinnest bead possible, to enhance its flexibility and diminish its tendency to crack (fig. 49). Strips of sealing

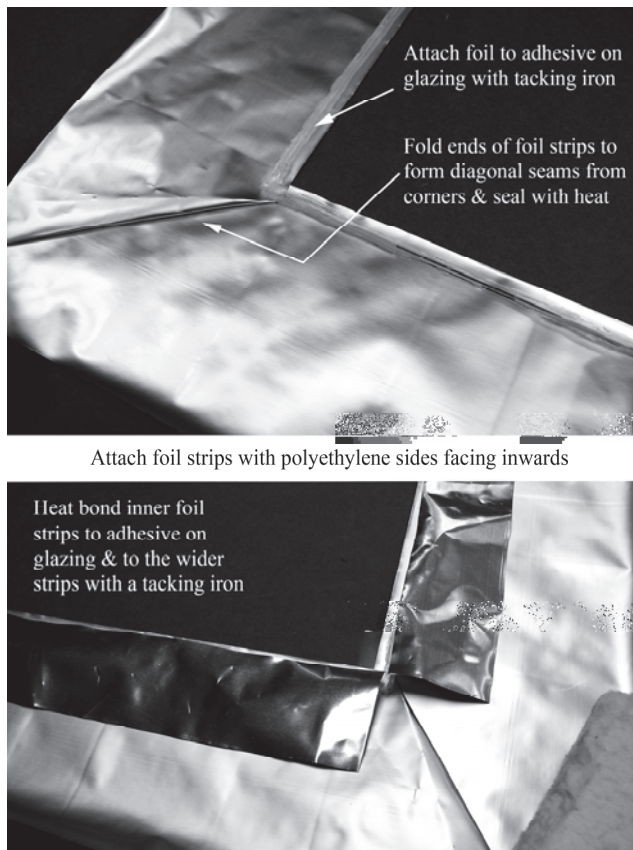


Fig. 50.

foil around three to four inches wide are heat-bonded to the glue on the edge of the glazing sheet (fig. 50), and the overlapping ends of these strips are drawn up and heat-bonded together to form the diagonal corner seen in figure 50. Thinner strips, one to two inches wide, which are only as long as the edges of the glazing sheet, are then heat-bonded to the glue on the inside of the glazing and to the inside of the wider, primary strips (fig. 50). To finish the package the corners can now be heat-bonded, again, so that corners such as those seen in figure 51 result. Here one can see how the sides of the package bend out, so that they will rest on the back of the frame and form a surface to which the added piece of foil that will form the back of the package can be heat bonded.

The techniques depicted here represent current solutions to problems found in preservation of works on paper. As new products become available and novel materials are used by artists, innovative designs and techniques will be required for preservation to succeed. Inexpensive enclosures that support modified atmospheres, glazing materials that can filter infrared radiation to reduce black body heating, glazing that becomes reflective or opaque when exposed to light at higher than preferred levels, hinge-free support for sheets that are matted with their edges exposed, book support and display techniques that allow

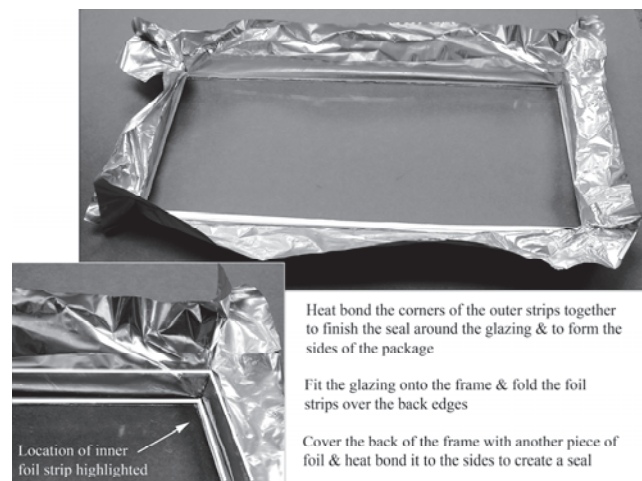


Fig. 51.

for safe and simple changing of openings during an exhibition; these are some of the techniques and materials one can envision that would aid preservation. Our task is to bring them into being sooner rather than later.

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