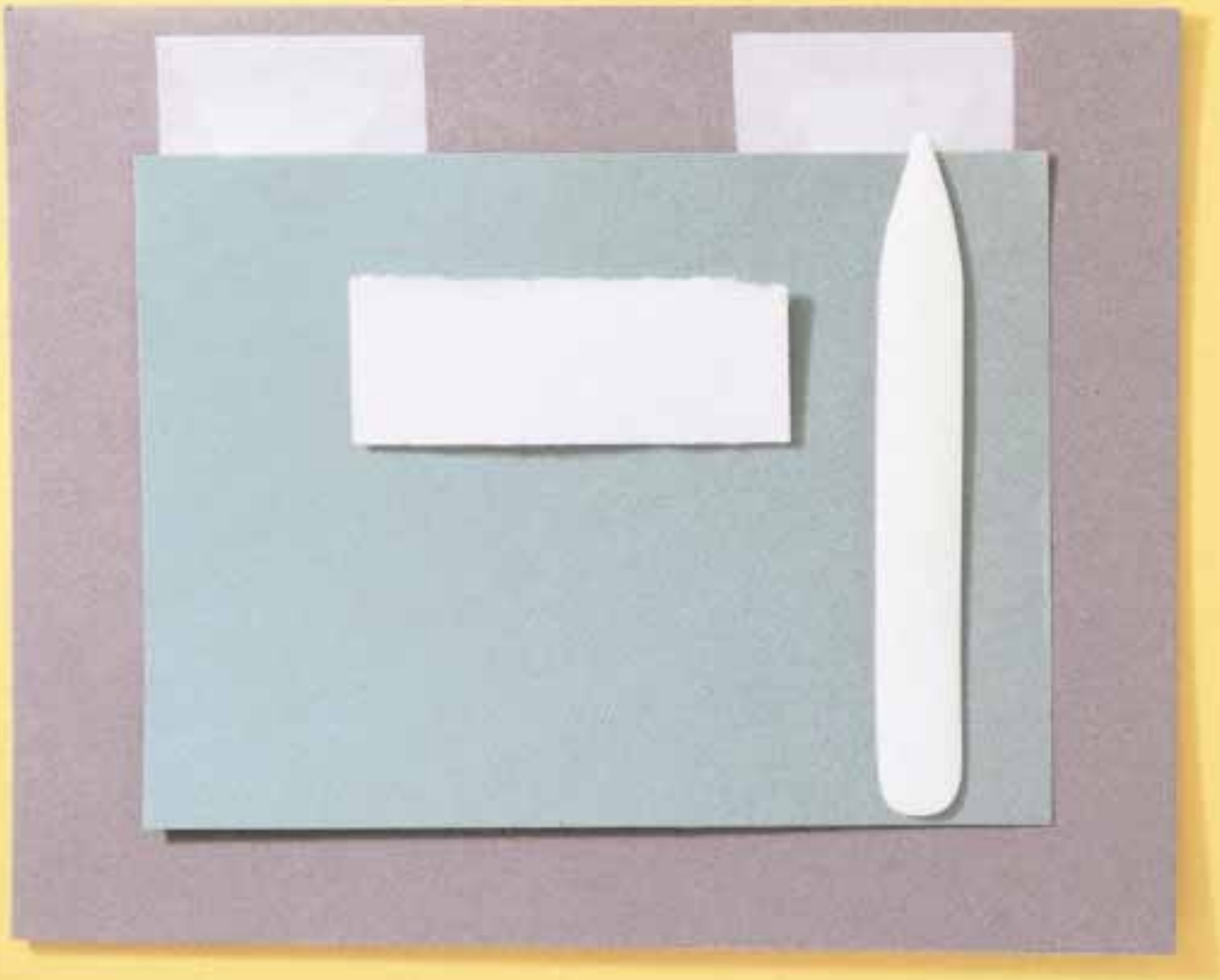
Preservation Hinging

By Hugh Phibbs



A Supplement to
Picture Framing Magazine
April 2000

Preservation Hinging for Works of Art On Paper

The methods of safely securing artwork to its housing is one of the most important areas of preservation framing. That which is adhered to, or serves to support, the art must be as chemically inert and as physically non-restraining as possible.

Any adhesive which is to be used with a work of art on paper must have proven over time that it will not discolor, migrate into the paper or the medium, or promote oxidation. It must be removable without the application of solvents or significant amounts of water.

Proper attachment of the art into its housing is neither quick nor easy, since it must be tailored to the needs of each particular work. No one method will fit all cases, and each technique must be practiced extensively before it is used on works of art. Yet there is no part of preservation framing more essential or satisfying than hinging.

The term hinging is used in preservation and conservation to refer primarily to tabs made of Japanese tissue which are adhered to the back of the art with vegetable starch paste. There have been many methods published for the making and using of such hinges. Yet the reason for their preference to other methods and materials have not always been discussed.

The methods presented here are discussed in terms of what problems they are intended to solve. They are not to be seen as the only valid approaches to securing paper borne art in housings, but rather as one avenue which has produced successful results. It is also important to look at preservation and conservation issues from the perspective of a conservator and to understand the terminology he or she might use, since that terminology illustrates their concerns.

Adhesives

The adhesives commonly used with paper are often classified by their method of activation. One type is activated by water. These are active when wet and relatively inactive when dry. Their active phase is brief, and unless they contain oxidative components, they will be inert when dry.

The other major group is the pressure activated adhesives, which are usually called pressure sensitive. These employ rubber or acrylic compounds which may or may not have been modified with plasticizers and tackifiers to make them adhere to the paper when pressed in place.

In some senses, these can be considered to be in a constant active phase, which raises concerns about their ultimate stability. It is usual for such adhesives to increase their hold with time. Those which contain rubber may oxidize, harden, and ultimately give up their hold.

Acrylics, which are quite stable when unmodified, are logical candidates for more benign pressure sensitive adhesives. The plasticizers used to soften the acrylic and the tackifiers used to make them sticky are the elements which cause the most concern. These adhesives may migrate into the art and are especially worrisome when the art contains plastic, such as resin-coated photographs, acrylic paintings, printing ink which have synthetic binders, and synthetic fabrics.

The chemical consequences which these additives pose is less clear, but there are physical concerns to consider. As the film of modified acrylic ages, it may undergo a process known as cold-flow, in which it creeps in and around the fibers of the paper, making it difficult to remove. This process, combined with the possible effects of oxidation, can make the adhesive difficult to remove over time, requiring the application of solvent. If the solvent is used locally, it may leave tide lines. These tide lines may be invisible at first, becoming apparent only later.

Acrylic adhesives may also be activated with heat; this type does not need tackifiers. Such acrylics will still contain plasticizers, however, and thus will have some doubt attached to their chemistry. The heat will cause the acrylic to flow, not in the slow, cold manner, but rapidly. It is all but impossible to ensure that it will not invade and surround the fibers of the artwork. If more heat is added to attempt a removal, the acrylic may be driven further into the paper.

Preservation Hinging for Works of Art On Paper

For these reasons, pressure sensitive adhesives must be avoided for the hinging of fine art (fine art, in the context of this supplement, is considered to be art works which are irreplaceable or otherwise valuable).

While water activated adhesives have been made from animal, vegetable, and mineral sources, paste made from vegetable starch is the only adhesive which can be used on works of art in preservation framing.

Animal glues come from milk, blood, hide, and other tissues. Vegetable-based adhesives commonly come from pure or modified starches. There are even mineral-based water activated adhesives which have been used for centuries to glue wood. They can be reversed in hot water, which makes them useful for frame and furniture conservation, but they are not suitable for use with paper. These glues can have too strong a hold, and may discolor and form films which can crack in dried atmospheres. Furthermore, the need to use hot water, rather than cold, to reverse them makes them poor candidates for use on paper borne art.

Emulsions made from synthetic polymers are useful in constructing mat packages and other housings, but they are far too strong and irreversible for use on art. Synthetics must be scrutinized with extra care since they have not been used for as long a time as natural adhesives have, and cannot be considered as time-tested.

Vegetable-based adhesives have been used for hundreds of years with excellent results. A vegetable starch should be pure and free of gluten, the proteinaceous portion

which can make the past tough and difficult to remove. Paste can be made from any one of a wide range of vegetable sources, but wheat and rice are the most often used.

The primary problem with starch adhesives is their short shelf life. A well-cooked starch may last a few days if kept sealed at room temperature. Refrigeration causes the water to separate from the paste in a process known as retrogradation. Retrograde paste cannot be used.

The addition of fungicides can greatly prolong the shelf life of a paste. However, the use of pastes with fungicides has been shown to cause changes in the paper which will initially show up only in fluorescent light, but which may eventually become visible as discoloration in ordinary light. This leaves two options: fresh cooked paste and paste which has been cooked and dried and can be rehydrated when needed.

Working with Paste

There are numerous methods for cooking paste. In order to succeed, each must supply enough heat to the starch granules to ensure that they rupture and that their contents flow into a gel. Traditional cooking uses externally applied heat. This must be done carefully so that the paste is not overheated or scorched.

A double boiler is the most widely available source of steady, even heat. The cooking pot should be covered with an inert material, such as a non-stick cooking surface or glass, since a metal pot can pollute the paste with bits of metal.

The water used must be carefully chosen; tap

water contains chlorine and its compounds, as well as other ions which can interact with the paper. Distilled water is so pure that it may leach material out of the art and into the paste. Paper conservators use water which has been deionized to avoid such problems, but this water is not readily available.

A good quality bottled water which is not distilled is a good compromise. One should be sought which has a minimum of impurities.

To understand the mechanics and potentials of starch paste, it is useful to look at the type of adhesive it is. Starch, like cellulose, is a polysaccharide. Both are long chains of sugar molecules with oxygen atoms linking them together. Because starch is so chemically similar to the cellulose which comprises paper, its addition to the paper does not introduce much that is unknown.

A starch paste is a low tack adhesive which does not achieve its bond until completely dry, and so must be kept securely in place throughout the drying process. It does not discolor as it ages and it can be reversed with the addition of minimal amounts of moisture. These characteristics make it an ideal adhesive for use with artwork on paper, but its hold is not too strong and as the art increases in weight, the design of the hinge must be modified.

If the heat to cook the paste is provided by a conventional burner, the cooking process may consume up to an hour. It is possible to abbreviate this process without compromising the cooking by boiling some of the water first and adding this to a mixture of paste and cold water.

Most formulas call for one part of starch and five parts water, by measure. It may be helpful to add one part water to the starch some hours prior to the cooking to initiate the swelling of the granules. The starch must only be added to cold water; adding boiling water to it will produce a doughy, unusable result. If one part of water is added to one part of starch and set aside, the remaining four parts of water can be brought to a boil in a separate pot.

As the boiling water is stirred into the milk white water and starch mixture, that mixture should become translucent. As the cooking progresses, this translucence should become more pronounced. The mixture should be full of small bubbles and should form ribbons when the stirring implement is lifted from it. The paste must be stirred throughout the cooking process and the stirring should continue after the pot is removed from the heat as the paste is cooled to room temperature.

When the paste is cool, it can be strained to eliminate any lumps. A simple strainer can be made by stretching silk (the kind used in screen printing) over a plastic embroidery hoop.

The cool paste will be too thick for proper application and should have additional room temperature water worked into it. Begin by breaking the paste mass up with a clean bristle brush. Gradually add enough water to create a paste which has the consistency of heavy cream. A number six bright bristle brush is ideal for this purpose (and must be kept free of paint at all times).

Storing Paste

This paste can be kept in a clean, sealed container for four to five days. As it ages, it will show signs of water separating and of fungal infestation, such as black or colored spots or an unpleasant odor. Always sniff the paste before using it.

Recently, medical syringes have been used in museums as sterile containers to extend the shelf life of paste. The paste can be poured directly from the cooking vessel into the sterile syringe and capped with the plunger at one end and a tightly fitted cover at the nozzle. Paste stored in this manner can be used for a number of weeks if sterile conditions are maintained by cleaning the cap and nozzle with alcohol each time the cap is removed and paste extruded.

Another sort of sterile package can be made from polyethylene/aluminum/nylon laminate film. Rectangular pieces of this material should be cut, four to six inches on a side, and their matte, polyethylene side must be thoroughly cleaned with alcohol. The pieces

of laminate should now be folded double with the polyethylene side in and should be bonded along the edge which is perpendicular to the folded side.

Once the paste has been cooked, it can be carefully poured directly from the pot into these packets (see Figure 1). The packet should be held near where the bonded side meets the folded side in such a way that the unbonded sides are spread apart, allowing the paste to be poured into the interior without any touching the outer edges of the packet. When the paste is in place, any air can be squeezed out and the unbonded sides can be secured with heat. If a sterile package has been created, the paste inside should keep for some time. If the package shows signs of expanding, it has been contaminated and should be discarded.

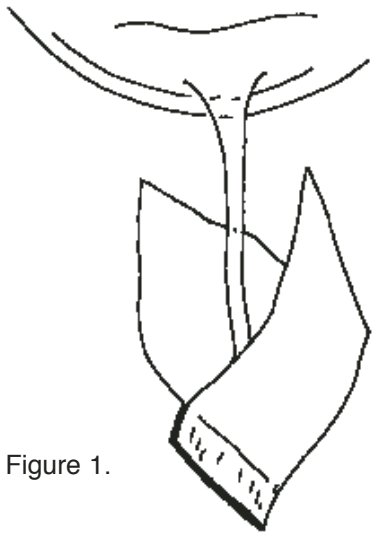


Figure 1.

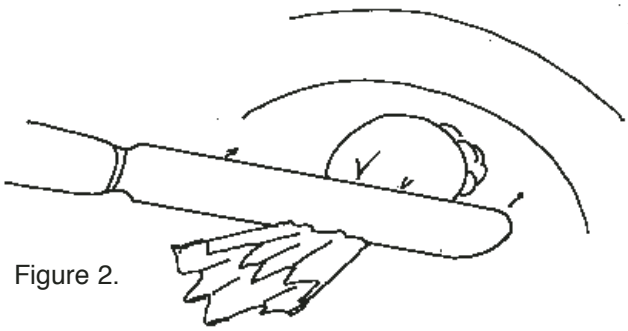


Figure 2.

Before the package is cut open so that the paste can be used, it can be massaged from without to break up and soften the paste. The paste should be removed and then strained just prior to usage (straining it before storage may result in contamination).

Place the paste on a clean piece of the synthetic silk that is large enough so that the outer portions of the fabric can be gathered together behind the mass of paste. This creates a sachet of fabric with the paste inside, which can be placed on a clean plate and squeezed with a knife from back to front so that the paste is pushed through the fabric and strained (see Figure 2). Water can then be added to the paste so that it has a more workable consistency.

Cooking Alternatives

The use of a microwave to cook the paste is one alternative to the traditional, time-consuming process of cooking paste. The radiation of the microwave will cook the paste by heating the granules from within. Paste cooked in this manner has not been used for as long a time as externally heated paste, but it seems to work well. Since the point of the cooking process is to explode the starch granule and cause its contents to flow into a gel, the internal heat which the microwave radiation provides should be ideal.

For this method, one part of starch should be added to five parts of cold water in a microwave-safe container. The cooking time will depend on the power of the oven and the quantity being prepared. For most ovens, the mixture should be cooked for 10 to 20 second intervals with the oven set on high. The mixture should be stirred in between these intervals. This should produce a paste equivalent to traditionally cooked paste in a few minute's time. It should be thinned and stored in the same manner as traditionally cooked paste.

It is possible to purchase pre-gelled pastes which have been fully cooked and then dried. These come as a powder to which cold water can be added when the paste is needed. Since these materials are stored in a dry form, they will not need a fungicide. Like traditional paste, once the water is added, it should be watched for fungal infestation.

Similarly, Japanese tissue, which has had freshly cooked paste applied to it and then promptly dried, can be a safe means of storing paste. The material can be activated by the addition of moisture, but care must be taken to avoid washing off the paste layer.

Each of these methods will require extensive practice with scrap paper to acquaint the user with their potential.

Other Materials Needed

The pH of the Japanese tissue and the paste should be near enough to neutral to make the addition of calcium carbonate or other alkaline materials unnecessary. It is difficult for the framer to gauge the quantity of this material which will be taken up by the paste, and adding too much could have negative results. An overly alkaline hinge can buffer the area it is attached to and cause it to age differently from the rest of the paper. Some pigments and inks are alkaline sensitive and could be affected. Lacking the equipment to carefully measure the effect of adding an alkaline reserve, the framer should trust the paper and paste.

The other materials needed for successful hinging are an acid-free blotter, bristle brushes, weights, waterproof interleaving material, and conservation quality (chemically inert with a neutral pH) matboard.

The blotters can be purchased from archival suppliers either as cards or as sheets. Cutting the sheet into cards 3"x 4" makes them easy to handle. A ½" bright bristle brush will work will for brushing the paste on the hinges.

Weights are more difficult to obtain. A two lb. weight will have enough mass to hold the hinge during the drying and will be easy to handle. Two pounds of glass or steel will be rather bulky. Lead will give sufficient weight in a compact size, but it must be properly packaged.

Lead shot can be bought from hunting supply stores and then bottled in impact-resistant rectangular bottles with lids which screw on and can be secured in place with tape or hot melt glue. Alternatively, skin diving belt weights can be made flat on one side or lead ingots can be bought from metal suppliers and hacksawed into appropriate sizes.

Because some forms of lead are hazardous to health, it should always be handled with gloves and should be covered when used as a weight to protect the user and the art. Thick felt can be glued to the lead with a PVA glue to form a covering, and the addition of an extra piece on the bottom of the weight will give more room for air circulation and will serve as a cushion. If lead shot is used in bags, the bags should be made of, or lined with, some material which prevents the minute particles which erode off the shot during use from escaping.

Polyester web and sheet polyester are both useful for isolating surfaces during the hinging process. The web can be found at archival suppliers or at fabric stores; it will keep the hinge from sticking to the blotter during the drying process while allowing the moisture to pass through. Sheet polyester can also be found at archival suppliers and will make a water resistant barrier for use between the folded hinge and the art.

It is difficult to say which types of Japanese tissues should be purchased, since their names can change from one supplier to the next. Most archival suppliers will list hinging tissues as such and will separate them from artist or writing papers.

The paper should have long fibers, no fillers, and a minimum of visible impurities. The sheet should be even in color and texture and should not have been bleached to avoid the possibility of residual chlorine. A lightweight and a middleweight tissue can cover any need, since the middleweight can be laminated with paste to support heavier objects.

Art Handling

All handling and hinging of art must be free of mistakes. This means that each procedure must be practiced extensively before being used. It also means that this work must be undertaken in a secure space where no interruptions will interfere. The space must be free from strong air currents, dust, and sprays. No food, drink, or smoking can be allowed in this area. Only those who have been trained in handling art should be permitted in the space during the hinging operation.

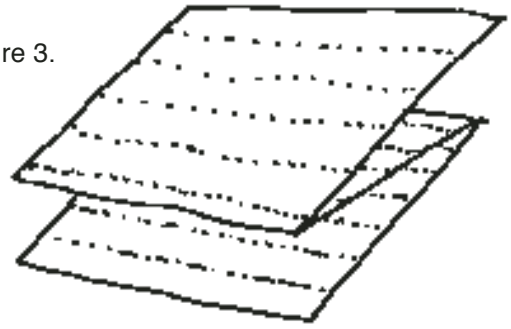
One way to meet these conditions and maximize the use of the work surfaces is to do this work at the

end of the day. The work table should be comfortably high and must be covered with a material which can be washed or changed and which will show dirt. Ideally, the table should stand free of the wall to allow access from all sides. The area should be uncluttered with nothing hanging overhead. Fluorescent lights with UV absorbing sleeves give the best task light with a minimum of shadow.

Proper handling of paper is a skill which should be practiced before working on paper borne art. Paper should only be touched at its edges. If it must be turned over, it should first be placed in a folder so that the folder can be turned with the art in it. Art on paper should not be rolled, especially to diameters small enough to permanently change the formation of the sheet.

If the edge of the sheet needs to be lifted, first lift the board or folder on which it is resting, then bend it down so that the edge of the sheet is exposed. Do not attempt to pry up the edge of the sheet with a fingernail. Do not drag tissue off the surface of the art; roll it or lift enough of it so that air can be trapped between the tissue and the surface of the art and it can be "floated" off.

Figure 3.



The Hinge

In Japan, papers have been used not only for writing and painting, but also as building materials, for centuries. This could not have been done without papers which are very strong and flexible. The fibers of the paper mulberry, gampi, and mitsumata used in Japanese paper or "washi" are very long and strong.

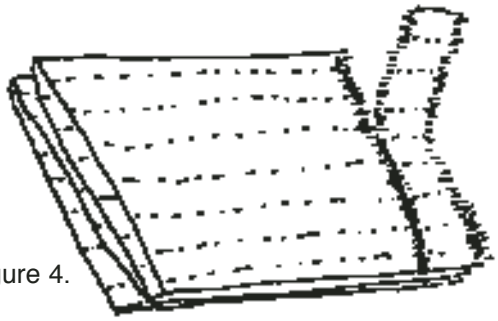
The fibers in a sheet of Japanese tissue run parallel to the chain lines, which can be seen running across the sheet about an inch apart when the sheet is held up to the light. This gives the paper great strength and fold endurance in that direction. Hinges should be designed to take advantage of this feature.

These fibers should always be perpendicular to the edge of the paper being hinged. This will allow the hinge to give maximum support and will help the art to respond to changes in humidity, since the hinge will expand and contract across its grain and thus along the edge of the art.

The first step in creating hinges is the wet cutting of the strips from the tissue. The individual hinges will be torn from these strips. A sheet of Japanese tissue should be folded two or more times down the length of the chain lines (see Figure 3).

A straight edge is then laid across one end of the folded sheet one inch from the end. Next, water is brushed onto the Japanese tissue along the edge of the straight edge. A bone folder is run down the wetted zone, scoring the tissue and driving the water into its lower layers.

Figure 4.



The sheet can now be lifted and pulled apart along the wetted score line. This process should be repeated until a sufficient number of strips have been created (see Figure 4). The strips should then be unfolded and dried.

Since the chain lines will be perpendicular to the length of the strips, hinges of any width which may be desired can be created by tearing pieces of the strip to the appropriate length. If the hinges are torn in trape-

Preservation Hinging for Works of Art On Paper

zoidal shapes, the smaller side can be attached to the art and the larger side to the mat. This gives more material to work with in the attachment of the back mat.

All the hinges will be 1" deep, which allows one-quarter of their surface to be pasted to the art and three-quarters to be affixed to the back mat. The hinge should never extend more than ¼" in from the edge of the art, except in extraordinary circumstances.

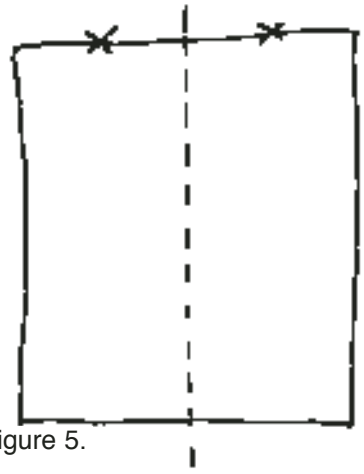


Figure 5.

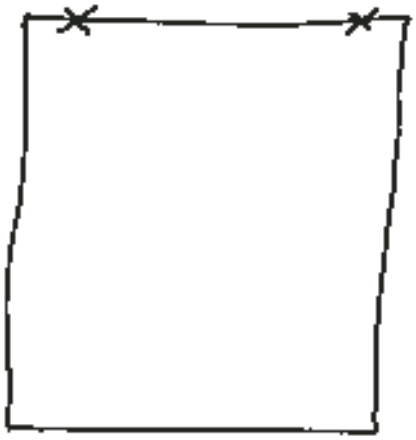
Hinge Placement

Keeping the hinges at the edge of the art makes them easier to cut if the work needs to be removed from its mat. It also allows the art to be turned on its hinges so that the back side can be examined. In placing the hinges across the top edge of the art, consideration can be given to two issues: the distribution of weight of the sheet and the resistance to swaying, which can dislodge the hinges.

If the only issue to be considered was the support of the weight of the sheet, the ideal place for two hinges to be set would be halfway between the corner and the midpoint of the sheet (see Figure 5). This position will not give adequate support to prevent it from rocking on its hinges and dislodging them, however, especially when the art is float mounted.

Setting the hinges on the corners prevents sway, but it holds the art at the corner, a vulnerable area. Placing the hinge on the corner also makes it impossible to add a cross-piece to the hinge of the object that is floated. Setting the hinge in from the corner by a distance equal to its width is an effective compromise. The width of the hinges should be proportional to the size of the art. Hinges ½" to ¼" wide are appropriate for smaller works, while hinges two to three inches wide will support the largest works if used in sufficient numbers.

Figure 6.



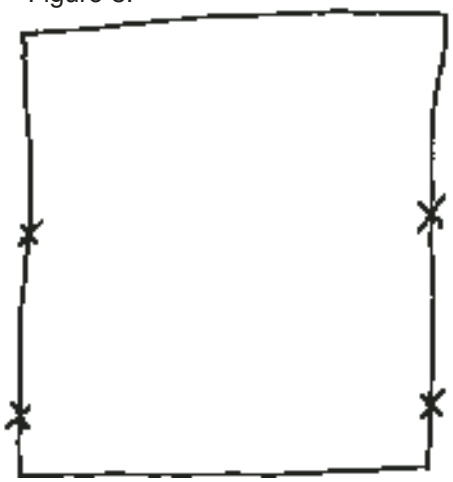
If the window mat covers the edges of the art, the hinges should extend up from the top edge of the art and be attached to the back mat with a cross piece at that point (see Figure 6). These pendant hinges need only to be attached to the top edge of the art, since the friction between the mat package and the edges of the art will provide good support as long as the window is held closed. The strength of this friction is seen when an overmatted work is being positioned in the window. The art cannot be moved unless the window is lifted completely off the art. This broadly distributed, gentle support is very beneficial to the art and overmatting should be used whenever possible.

Figure 7.

When the entire artwork is exposed in a window or on a back mat, the hinges will support the entire weight of the art. Because of this, complications arise. These hinges must be folded behind the art or passed through slits in the back mat.

In the case of the folded hinge, top hinges might roll off the back mat if the frame receives a blow to its bottom side. This mode of failure is not harmful to the art, since the portion of

Figure 8.



the hinge attached to the art remains static (see Figure 7). It can, however, be safely avoided in many cases by adding hinges to the sides of the art. The side hinges must not be near the bottom corners or they will constrain the paper and cause diagonal cockles across the corners. If the first side hinge is placed 3" to 6" above the corner, subsequent hinges can be positioned to divide the distance between that hinge and the top (see Figure 8).

The one edge of the art which should not receive folded hinges is the bottom. The hinge would have a physical response to a blow to the bottom of the frame, which would be the opposite to that of the hinge on the top edge. For the bottom hinge, the static side would be the side attached to the backing board and the rolling side would be attached to the art (see Figure 9). As the hinge failed, it would rip off the art and would be likely to tear some of the back of the art's paper with it.

Figure 9.

Having a combination of top and side hinges gives protection against impacts from any direction. The hinges which are folded in the direction parallel to the impact will shear in response to a strong blow while the hinges whose folds are perpendicular to the direction of the impact will roll.

As the size of the art increases, the hinges used should become larger and their number should increase. The exact number will be determined by the needs of the paper; a light paper will need more because it is less rigid, while a cockled paper may permit fewer since its hinges should only be placed where its contours will touch the back mat. Ordinarily, if the hinges are placed along the top and side edges of a floating work or art at the rate of about one per foot (excepting the first two on the top edge), the work should receive sufficient support. Pass-through hinges can be placed similarly, but hinges on overmatted works need only to be attached to the top edge of the art.

Beginning the Hinging

The hinging supplies should be laid out on the work table as the hinging begins. This way, everything which is needed can be easily reached. The art should be face down on the board with an appropriate number of weights next to it. The clean blotters should be kept in a stack. This will be used to wick or "sponge" the moisture out of the hinges as they dry.

Blotters will also be used as a surface on which the paste will be applied to the hinge. These paste-out blotters must never be mistaken for the drying blotters. If the clean-out blotters are kept whole and in a stack and the past-out blotters are made from the same cards which have been torn in half lengthwise, the two groups cannot be easily mistaken. Once the drying blotters have been used, they must be kept separate

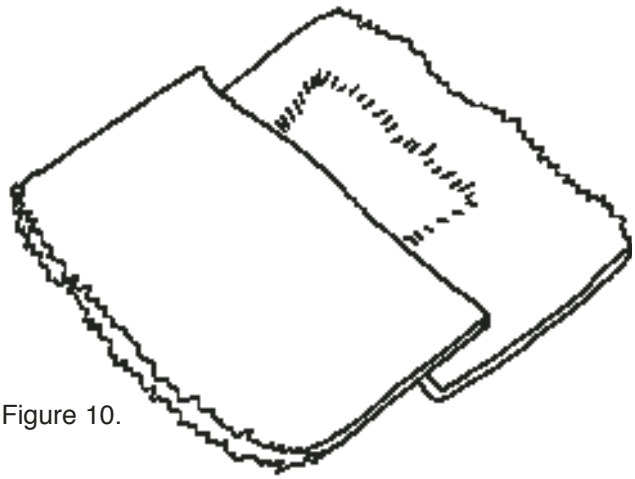


Figure 10.

from the stack of clean ones for use on another day.

The edge of the art which is to receive the hinges should be the one nearest to the worker. A strip of polyester sheet should be under that edge. A hinge which has been torn to the appropriate length should be laid on a paste-out card with another paste-out card covering all but ¼" of its width (see Figure 10). When paste is brushed onto the exposed portion of the hinge, the remainder will stay dry, which will be useful in the application of the hinge.

The paste should be brushed onto the hinge down the length of its fibers (parallel to the chain lines) so that the hinge will not be stretched from side to side. The hinge should be left on the paste-out card after the paste has been applied so that some of the moisture in the paste can wick into the blotter. The sheen on the surface of the paste should go from glossy to matte to indicate that the moisture content has been reduced. If the feathers on the hinge begin to stick to the paste-out card, it has been left too long.

The paste will be applied to all the exposed portion of the hinge, including the feathers. Some feel that it is better to leave the feathered edges unpasted to facilitate the removal of the hinge at a later date. The approach outlined here emphasizes keeping the hinges on the artwork for as long as possible by designing their attachment to the back mat so that the hinge can be removed without cutting it. The

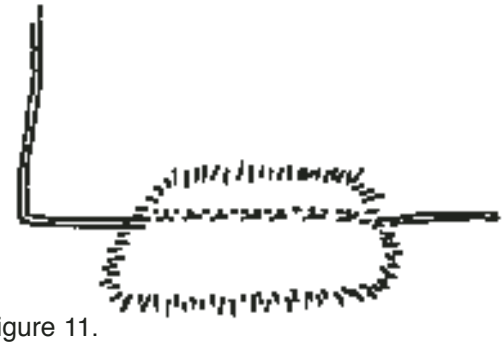


Figure 11.

attached feathers will increase the hold of the hinge and create an "edgeless" edge which lessens the possibility of the outline of the hinge appearing on the face of the art.

The hinge which has been pasted and allowed to briefly dry on its card should be lifted and pressed down onto the back of the artwork with its wet/dry margin on the top edge of the art, if that edge is straight (see Figure 11). In the case of a heavily textured paper, it may be necessary to pounce the hinge onto the surface with a clean bristle brush. In ordinary circumstances, as soon as the hinge has been pressed onto the surface of the art, the drying process should begin.

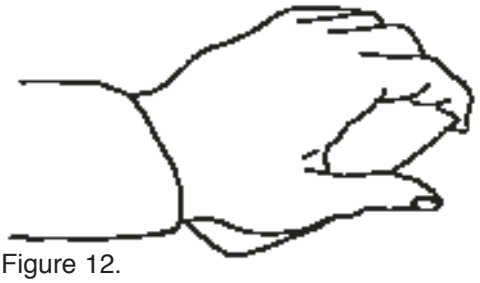


Figure 12.

Hinge Drying

Hand-drying a hinge is extremely important in the effort to create an attachment which does not cockle the art. The dry card can be used as a sponge to wick or clot out most of the moisture in the hinge in a minute or two. To do this, the card should be held in the palm of the hand with the fingertips wrapped over one of the short edges of the card. The portion of the card under the area of the hand nearest the wrist should be pressed onto the hinge using gentle pressure (see Figure 12).

The first contact should be as brief as possible to prevent the paste on the feathers from becoming adhered to the blotter. Subsequent blottings should be held for a few seconds and each should get progressively longer. The damp portion of the card is moved off the art as the blotting progresses. After one or two blotters have been used and the hinge has received five to ten blottings, a fresh blotter should be placed on it and a weight on top of that.

The weight should be left in place for at least one hour. Most hinges will be dry in that time, but reac-

tive papers (those that cockle readily) may require more time. It is important to remember when weighting the art in place that a clean blotter card must always be used under every weight since the weight may accumulate dirt on its surface.

Modern papers may be very likely to cockle because they may contain fillers or be formed on machines which may involve high pressure and temperatures. It can be helpful in drying hinges on these papers to use blotters which have been dried beyond the relative humidity of the surrounding air. Blotter cards can be desiccated in a microwave oven by laying them out on a sheet of conservation-grade board or paper in shallow stacks and turning the oven on for short periods. The stacks should be rotated often and the blotters must be vigilantly watched to prevent scorching and fire. The drying intervals will vary according to the power of the oven used.

These dried blotters can be stored in a metal cookie tin which has been cleaned and lined with conservation-grade paper. A cobalt salt humidity indicator strip can be left with them to monitor their condition. These desiccated cards should be used for the hand-drying portion of the procedure, but an undesiccated blotter should be weighted in place for the final phase to avoid over-drying the hinge.

Figure 13.

If the artwork is on paper which has deckle edges, the hinge should not be pasted onto the deckles. Here the wet/dry line on the hinge can be positioned inside the deckles so that it will fold safely there (see Figure 13). This same procedure should be followed if the hinge is to be passed through a slit in the back mat. The wet/dry line should be positioned slightly inside the edge of the art, even if that edge is straight. This way, the slit in the back mat can be made to fall under the art so that it does not engage the edge of the art.

Once the hinges are dry, their attachment to the back mat should be considered. If the hinge is to be folded, it should be creased so that it will fold easily as it is being turned. Whether the hinge is pendant or folded, a cross-piece can be used to secure it to the back mat in a fashion which allows for its later removal.

The cross-piece is a piece of Japanese tissue which is cut, not torn, with the paper's fibers running down its length. It should be wider and longer than the portion of the hinge it will cover by about ¼" to ½" in all directions.

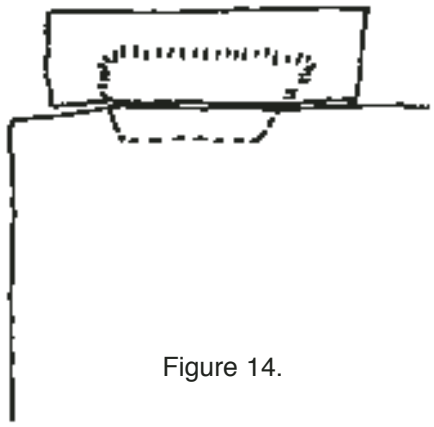


Figure 14.

The use of the cross-piece with the pendant hinge is quite straightforward. Once the art is in position and weighted, the cross-piece should be laid on a paste-out card and paste brushed onto it. The pasted cross-piece should be laid across the exposed portion of the hinge with care taken to prevent its touching the art (see Figure 14). It should then be pressed onto the back mat with a clean blotter which should not be in contact with it for long enough for adhesion to result. It can then be blotted several times more and a fresh blotter can be weighted on it to complete its drying.

Preservation Hinging for Works of Art On Paper

Later, if the art needs to be removed from its mat, the location of the hinge behind the cross-piece will be evident so that the cross-piece can be cut around the hinge. This will allow the art to be removed from the mat with its hinges intact. Desiccated blotters can be very useful in attaching the cross-piece to the back mat.

In the case of a float mount, attachment of the folded hinge to the back mat begins with the weighting of the art in its proper position on the back mat, since no window is being used. The hinges, which have been creased at their fold line, should now be unfolded so they are exposed at the margin of the art. A strip of polyester sheet should be laid under the edge of the art where the hinges are located and should be weighted in place at the end, away from the first hinge to be worked on (see Figure 15).

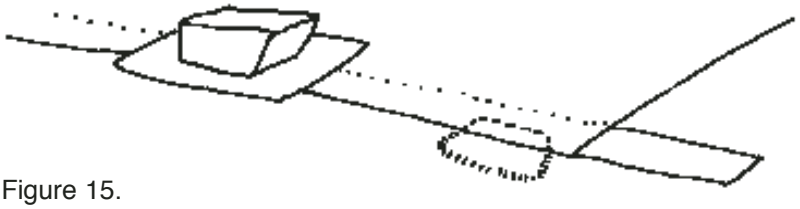


Figure 15.

A cross-piece which has been cut and laid on a blotter should have paste applied to all of one side. The hinge should be lifted and the pasted cross-piece should be placed underneath it as close to the edge of the art as possible without touching (see Figure 16). The hinge should be pressed onto the cross-piece and more paste should be applied to the edges of the hinge (see Figure 17) but its center should be left to dry. The dry center portion makes it easier to turn the hinge over with a microspatula since there is no paste at that point to stick to the tool. It will also allow the hinge to be taken off the back mat at a future date.

Figure 16.

Once the hinge and cross-piece are stuck together and the extra spots of paste have been applied to the hinge, it can now be turned under the art (see Figure 18). The edge of the art and the interleaf of polyester should be lifted together so the hinge can be folded under the interleaf. Then the art, the interleaf, and the hinge can be pressed onto the back mat.

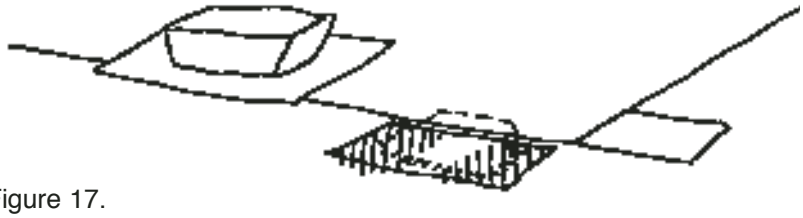


Figure 17.

A weight can be positioned on top of the hinge with a blotter and possibly a piece of spun polyester separating it from the surface of the art. The polyester interleaf will serve to isolate the dampness of the hinge from the art, but it will also allow the drying process. The interleaf should be left in place for at least two hours. The interleaf strips should be longer than the edges of the art so they will be noticed and removed when the drying is complete.

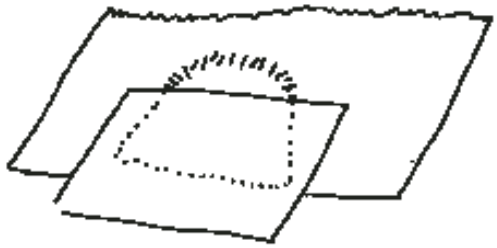


Figure 18.

If the hinge is to be placed on a deckled edge and it will not be passed through, the need for its fold to

fall under the deckles can make the addition of the cross-piece awkward. This can be easily avoided if the cross-piece is attached to the hinge before it is affixed to the art.

Figure 19.

One way to achieve this is to lay the hinge on a paste-out blotter and apply paste to the part of the hinge which will have the cross-piece attached to it. The cross-piece should be laid across the hinge so that ¼" of the short side of the hinge remains exposed (see Figure 19).

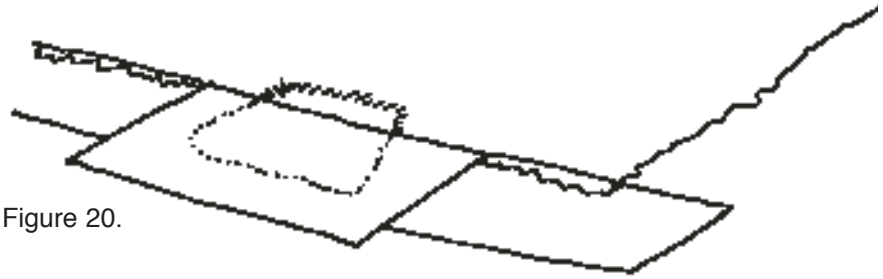


Figure 20.

The hinge and the cross-piece are then pressed together, lifted from the blotter, turned over, and set on another paste-out blotter. The cross-piece is masked and paste is applied to the part of the hinge which will be attached to the art-work. A strip of polyester sheet should be laid on the edge of the art so that it masks the deckles. If should then be weighted in place.

After a brief drying interval, the hinge is positioned on the edge of the art so that the cross-piece covers the deckles. Is is blotted dry using the usual technique (see Figure 20). Once the drying is complete and the art has been weighted in place on its back mat with interleaf strips under its edges, the paste can be applied to the cross-piece and back portion of the hinge.

The edge of the art should be lifted so that the hinge and cross-piece hang down and can be supported with a strip of board while paste is applied to their outer edges. When this has been accomplished, the hinge can be folded under the interleaf and weighted for final drying.

The cross-piece will reinforce the hinge and will help its resistance to rolling if the frame receives a blow to the bottom. A further advantage to both of these cross-pieced hinged designs comes from an attachment to the back mat which is less confining and more flexible than hinges which are pasted straight to the back mat. This may allow the art to expand and contract more independently from the back mat.

The folded hinge can also be removed from the back mat without the addition of moisture. Since no paste has been applied to the center of the hinge, a microspatula can be slipped under the edge. While the front of the art is stabilized with a blotter card, the microspatula can be gently moved from side to side, freeing the hinge and the cross-piece from the back mat (see Figure 21). These cross-pieced hinges

Figure 21.

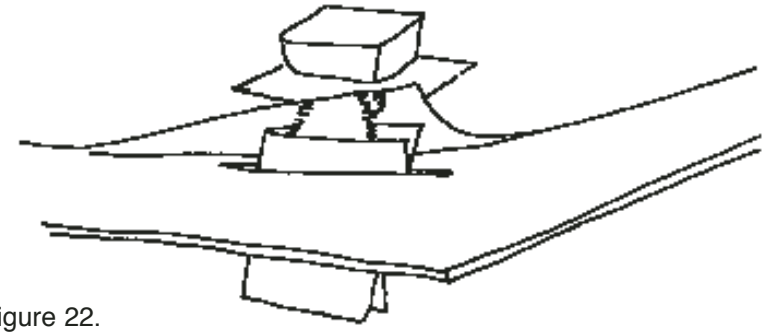


Figure 22.

can be reattached with paste to a new mat package and the hinges can stay with the art for as long as possible.

If the folded hinges are instead passed through slits in the back mat, they should be applied so that their attachment stops just short of the edge. The slits through which they will pass should be cut so that they fall under the art and small folders of paper should be inserted in the slits. The hinges can be placed in these folders so that when each folder is pulled through the slit, it takes the hinge with it (see Figure 22). This permits the hinges to be manipulated through the back mat with a minimum of stress. The hinges can be affixed to the back side of the back mat with tabs of linen tape.

Stronger Cross-Pieces

In addition to the traditional method explained here, there is a way to create stronger cross-pieces for pendant hinges. In the original design, some pasting of the hinge to the back mat is required. Without that paste, the hinge would not give sufficient support. Unfortunately, the removal of such hinges from the back mat can be quite difficult. A stiffer cross-piece which could provide enough support without any paste on the hinge can solve this problem.

In creating a stronger cross-piece for folded hinges, it is important to keep it as simple as possible. The introduction of any new materials can lead to unforeseen consequences. A cross-piece which is folded double and pasted to itself uses nothing that would not be present in the original hinge. The portion of the cross-piece which is doubled will have more bulk than an ordinary cross-piece, but it should be remembered that that part of the cross-piece will be near the edge of the window mat or spacer. There is little likelihood that any pressure could ever be applied to that part of the art, rendering the increased bulk of the cross-piece harmless.

This type of cross-piece should be made from a strip of Japanese tissue which is wet so that the strip runs down the grain of the tissue and has a width of 1¼" to 1½". The strip is wet cut to provide "edgeless" feathered edges, both at the margins of the cross-piece and down its interior where the folded portion meets the main part of the cross-piece. The fold in the cross-piece will provide a straight edge over which the hinge can be turned.

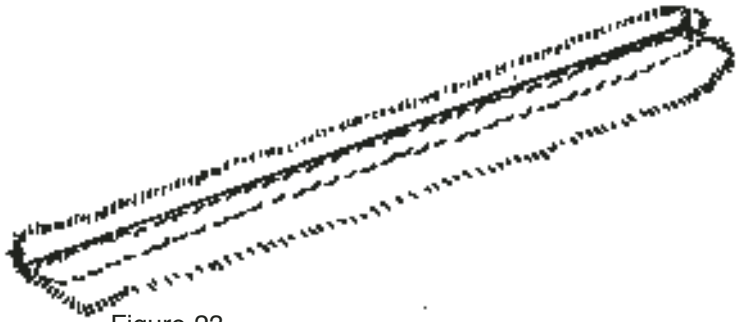


Figure 23.

When the strips have dried from the wet cutting, they can be folded down their length along a line ¼" from one side. They can now be laid on a clean surface and fresh paste can be painted on the main part of the strip, starting at the fold and extending away from it for more than ¼" (see Figure 23). The smaller part of the strip can then be pressed onto the paste down the length of the strip, leaving a small section at one end unpasted so that the direction of the fold will be evident when the strip is dry. (The technique for application of the paste and the reference section at

the end of the strip are ideas provided by preservation framer Jamie Stout.)

The strips can be allowed to air dry, since any cockling which may occur will be relaxed when paste is applied to them during the hinging process. The hinges should have been secured to the art in the usual fashion. Once the art is weighted in place, the cross-pieces can be torn from the strip. Paste should be applied to the side of the cross-piece where the folded portion is exposed so that this side will be attached to the back mat and will be furthest from the art. It can be difficult to distinguish the sides of the strip when the paste is dry, and the reference section at the end will be useful here.

The hinge can now be folded up and away from the back mat and the pasted-out cross-piece can be attached to its underside. The hinge and cross-piece can then be turned under the strip of polyester sheeting which has been weighted in place under the edge of the art as part of the traditional hinging protocol, and then carefully pressed onto the back mat for final drying.

Figure 24.

These reinforced cross-pieces make future removal of the item from its mat simple. A microspatula can be inserted between the back of the hinge and the front of the back mat and carefully worked from side to side while it is held flat against the back mat. If anything gets torn, it will be the cross-piece and not the hinge.

Another advantage comes from increased ease of hinge attachment to the back mat. Previously, the application of paste to part of the hinge could be quite tricky if the hinge was set back from the edge—as it must be if the edge is deckled. The reinforced cross-piece can be pasted out, applied to the hinge, and the combination turned under the interleaf with little effort. Since many things which are floated have deckled edges, the extra step involved in folding and pasting the hinge will be paid back with this easier application of the hinges to the back mat.

Very thin items and heavy ones will still require pass-through hinges. When there is not enough time to allow the cross-pieces to dry under the interleaf, the pass-through can provide a short cut. However, for most items which require floating, this cross-piece will simplify application now and will save the hinge in the future.

Folded or Pass Through Hinges

The nonpenetrating quality of starch paste makes it a benign adhesive but also creates a grip which is not the most tenacious. It is sufficient for most art papers, but its low tack must be compensated for when heavier or degraded papers are to be hinged. Folded or pass-through hinges on artwork on board which is two or four plys thick will tend to roll off the board as the frame is moved around and the art is displaced.

A more resilient hinge can be formed with a 4" to 6" long strip of Japanese tissue with the chain lines running down its length. Fold this strip in two at its midpoint (see Figure 24). The last ¼" of each of its ends should be folded out, and paste should be applied to the rest of the strip. When the pasted section is folded onto itself, a hinge with the shape of a "T" will be created.

The hinge will be wider (where it is attached to the art) than an ordinary hinge and will have to extend further in from the edge accordingly, but these objects are more physically robust than art on normal paper. The top of the "T" will have feathers extended out in two directions. It should be pasted and applied to the back edge of the board using normal placement guidelines. These hinges should only be passed through the back mat, since even a very strong cross-piece will not be able to carry this load.

One final improvement to the original design of the pass-through hinge should be addressed. If the ordinary slits, described here, are used to pass through

lightweight hinges on a delicate sheet of paper, it is easy to see that they still offer too much friction and too strong a hold for such fragile material. This is not a minor issue, since the pass-through hinge is most useful with lightweight papers since they are often translucent. The attachment of the hinge to the front of the back mat would therefore show through the art.

Figure 25.

What is called for is a redesign of the slit which reduces the mass of the board where the hinge passes through and allows for the more gentle operation of the hinge.

One method of achieving this employs two slits cut into the back mat at the same place but with opposing bevel angles. This is essentially an inverted V-groove. The slit should be situated exactly as before (just beneath the edge of the art). The slits can now be cut with a cutter or by hand using a straight edge, depending on the skill of the craftsperson. There will be a V-shaped strip of board which will be partially released from the back of the back mat by the cutting. This strip can be trimmed out at its ends and the slit will be complete. The hinges can be passed through with paper sleeves, as before, and secured with gummed paper or linen tape (see Figure 25).

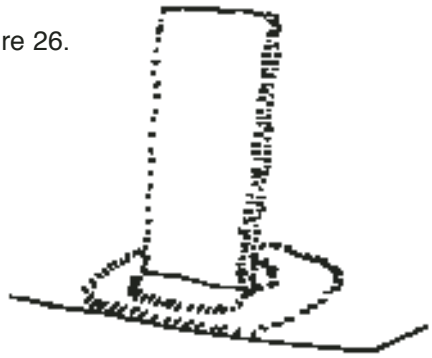


Figure 26.

This more elaborate pass-through slit diminishes the mass of the board at the point at which the hinge transits and creates a more physically sympathetic setting. It is important to make the cuts carefully so that they do not create an unsightly opening in the front of the back mat which might show under the edge of translucent papers.

This is yet another advantage to this method. If a work were to be removed from a back mat through which hinges had been passed using prior techniques, the unthreading of the hinges from the slits could be difficult and hazardous to the hinges and, ultimately, to the edges of the art. "Teasing" the hinges back through the slits often results in torn or dislodged hinges. The bending of the back mat required to open the slits is also potentially dangerous to the art. The inverted V-shaped slit lends itself to easy rethreading of hinges back through the back mat and enhances safe removal of the art.

Creating Patches

A similar departure from the normal rules can be necessitated by situations which require floating heavy papers which are degraded or do not have enough integrity to their back surfaces to allow for normal hinging. Very heavy watercolor papers and cast pulp papers are examples of the latter.

In this case, a patch of Japanese tissue can be pasted to the art at the site where the hinge is needed. This patch should be larger than the hinge and should have its feathers pasted out for maximum support. Here again the attachment is further in from the edge than would be optimal, a compromise dictated by the nature of the material on which the art was created. Once the patch is dry, a folded hinge or a double "T" hinge can be applied to it, depending on the amount of weight to be supported (see Figure 26).

The problem of water-resistant materials, such as resin-coated photographs, remains. The plastic on the back of the photo will not allow the starch to form a sufficient bond. If a synthetic material was used, any plasticizers or tackifiers it might contain could migrate into the plastic of the photo. Modified starch, or dextrin, will stick to the plastic. Linen tapes which con-

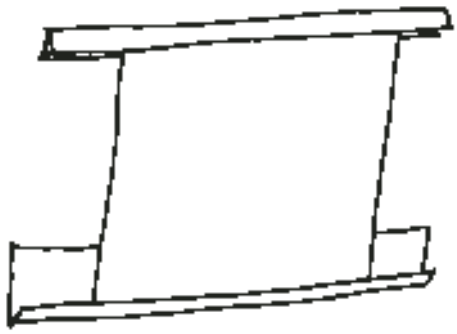
tain dextrins can adhere to RC papers, but they are too strong for safe hinging and they will cockle the paper.

Another source of dextrin has been suggested by paper conservator Judith Walsh. Postage stamps, which are water activated, contain dextrin, and the unprinted portion at the margin of a sheet of stamps will not contain any inks which might contribute to oxidation. If a patch of the stamp edge material is affixed to the part of the photo where a hinge is needed, it will, when dry, create a site to which a starch and tissue hinge can be attached.

Edge Strips

Since any local application of moisture to a sheet of paper may cause the transportation of oxidized material in the paper to the evaporation zone (setting up the ultimate possibility of a tideline becoming visible there), it can be helpful to secure the sheet with external supports. In considering edge support for a sheet of paper, it is essential to ask first whether the sheet can be supported from its edges.

Figure 27.



One approach to the question is to ask whether a sheet of paper of the weight being considered would be able to stand if it were formed into a cylinder and stood on end. This is, of course, an academic question and not a test to be carried out on the art. Were the sheet rigid enough to be supported from its edges, the factors which must be considered are more physical than chemical. It is easy to find conservation-grade papers to fashion the supports from, but the configuration of the support must be carefully considered.

Since the most frequent impact which a work of art receives is a blow to the bottom, and the most extreme form of this occurs when the frame falls off the wall, external supports should be designed to minimize damage in this sort of accident. If the sheet is supported on all corners, its downward inertia in such an accident may drive it into the corner supports with such force that the areas adjacent to the corners may cockle.

Edge strip supports could also concentrate the support at the corners to such a degree that they would cause the same type of damage in that type of accident. However, they can be designed to correct that problem.

The edge strips are created from folded strips of conservation-grade paper. Two strips will enclose the top and bottom edges, and two more will enclose the sides. The top and side strips can be made so that their front and back sides will be equal.

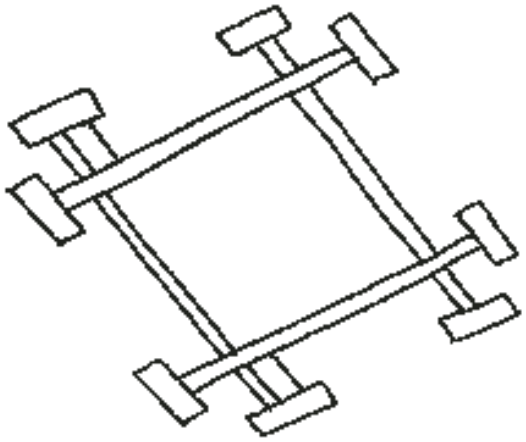
The easiest way to do this is to fold a sheet of paper a number of times and cut through it near enough to the fold to make strips of the width desired. The bottom strip should be much wider in back than it is in front. If the front is ¼" wide, the back should be 1" to 1½" wide. This strip will have to be made by carefully folding one edge of a strip of paper. The bottom strip will be strengthened by its thicker back the way an I-beam is strengthened by the center "I" section (see Figure 27).

When the strips have been made and the art is weighted in place on its back mat, the top and bottom edges of the art should be enclosed in their respective strips. Weights should then be placed to these top and bottom strips to hold them in place. The side strips should be folded together and laid along one side of the art. The side strips should then be marked at the points where they will intersect the top and bottom strips and cut at their folds between those marks.

Next, the ends of the top and bottom strips should be fed through the cuts in the side strips so that the side strips can be slid down the top and bot-

tom strips and onto the sides of the art (see Figure 28). Each of the ends of the strips can be secured to the back mat with linen tape. A gentle tension can be applied to each strip as the second end is attached. This more solid bottom edge will not only lessen the possibility of corner damage in a fall from the wall, it will provide even more support across the bottom at all times.

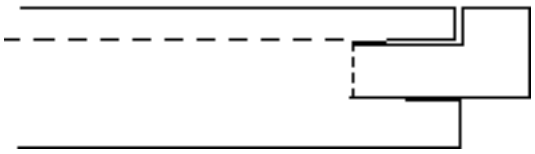
Figure 28.



As the size of the art increases, even stronger, more rigid strips may be necessary. The creation of more rigid strips depends on increasing the number of folds in them.

A strip of conservation-grade paper, 1" or 2" wide and long enough to exceed the longest dimension of the art, should be folded in two lengthwise. These strips should then be laid at the edge of a table or other support which has a 90° angle between its top surface and its side. The strips should overhang the table or other surface by ⅛" and each strip should be creased by pressing it around that edge. The crease should then be reinforced by folding it flat with a bone folder.

Figure 29.



One side should then be folded out, so that the resulting shape will comprise a compressed "Z" shape if seen in cross-section. This strip, with its compound folds, can be used with the art tucked into the fold on either side, depending on which will fit the dimensions of the mat better.

These strips will be fitted to the art using the same technique as the one-fold strips, with one precaution. Since these strips will be thicker than the one-fold strips, this thickness could emboss the edges of the art if pressure were applied to that area. This can be avoided by the addition of a shim mat to the underside of the window mat. This shim should be large enough so that its opening is larger than the art and will lift the window above the edges of the art with no pressure on them.

The limitations to the use of edge supports like these come primarily from the nature of the edges of the paper being matted. If the design covers the front of the sheet and must be seen in its entirety, hinges and a floating presentation will be needed. If roughly ¼" of the edges can be covered, edge strips with a single fold and overmatting can be used. If slightly more than ⅛" of the surface of the work being matted can be covered, edge strips with two folds placed close to the center of the strip, but on opposite sides, can be used in combination with a shim mat.

There are cases in which a work may have a large area which can be covered on its top and bottom portions but must have the areas near its sides exposed almost to the edges. If the sheet can be held securely at its top and bottom margins while it is overmatted on all its edges, the overmatting at the sides can cover a minimal area of the sheet, between ⅛" and 1/16". Here, only two strips will be used to secure the sheet being matted.

The areas to be covered at the top and bottom should allow for at least ½" to be enfolded in the support strips. These strips should be folded down their length along a line which parallels the center of the strip

so that, when folded, there is more paper on one side of the fold than on the other. This will allow for more of the strip to be behind the item being matted and less in front so that the strength of the strip can be maximized.

When the strips have been folded, they can be laid along the top and bottom of the paper being matted and marks can be made on the strips to indicate the width of the top and bottom of the paper. The strips are now removed and a number of cuts are made in the end of each (see Figure 29). These cuts will create tabs which can be folded around the upper and lower corners of the work and then secured to the back mat after their end portion has been slipped through a slit in the folded part of the edge strip (see Figure 30). These tab portions of the strips will serve to limit lateral movement of the work when it is secured in the window mat.

Figure 30.

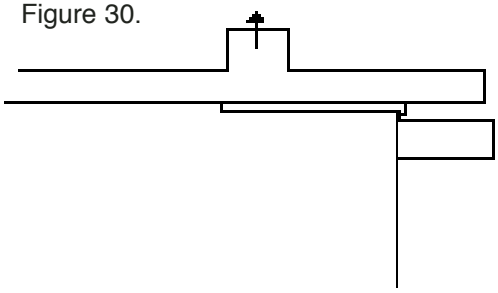
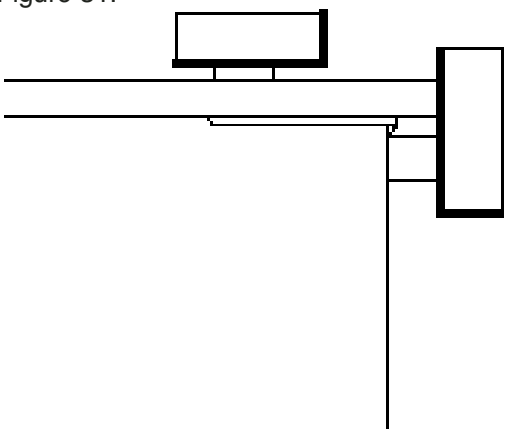


Figure 31.



Ultimately, there will be two portions of the strip which will extend beyond each upper or lower corner of the work, two tabs which extend above the upper edge, and two which extend below the lower edge. Eight strips of linen tape will be needed to snugly attach each of these areas to the back mat (see Figure 31). This, of course, can only be done after the work has been properly positioned in the window and weighted in place.

Like other paper and linen tape edge support designs, this one allows for the expansion of the work in the window if the relative humidity rises, since the paper which comprises the support strips will also expand; conversely, both will contract if the relative humidity decreases. These support strips do not enfold the entire perimeter of the sheet and are only safe for use on the sides of the matted item. It may be wise to include a note on the back of the frame to ensure that the frame is not left stranded on its side in light of the interrupted support on the sides of the art.

The lack of the complete support on the sides is a drawback of this design, but when weighted against the risks which hinges pose and the need for exposure of the edge portions of the work being matted, it can certainly be justified when an ample portion of the work can be enclosed.

Another problem which occurs as the size of the edge support grows in relation to the artwork's size is that of the flexibility of the supports themselves. The strips will be designed so that their back side is wider than their front, but even if this feature is scaled up to accommodate a large work, there may be enough flexibility to make handling a problem. The strips must be secured to the back mat at their centers, especially along the bottom edge where the weight of the sheet will fall.

The use of tabs has been described as a means of maintaining support across the center of the strip as the size of the support grows. These tabs are cut out of the back side of the bottom strip and linen taped to the back mat below the lower edge. This can ensure that the bottom strip will serve as a steady ledge without sagging and will spread the impact of a blow away from the corners if the frame is dropped.

The use of these tabs should be confined to the

lower strip since they will impede the expansion of the paper being supported in the event of a rise in relative humidity. The strips themselves are designed to allow for expansion since they are taped to the four-ply back mat outside the point at which they cross and the paper of which they are made will also expand if the humidity rises.

When the strips are installed around the art, they can be drawn snug from end to end as the linen tape is applied to each end. This will provide a modicum of restraint against the front edges of the paper in the support. The longer the strips are, the less this restraint will be, especially at the center of each strip. This problem is compounded by the fact that the stiffness of the back mat will decrease as its size increases. It would be possible to address this last problem by substituting six and then eight-ply for the ordinary four-ply of the back mat as the size increases, but they introduce considerable expense and weight.

Figure 32.

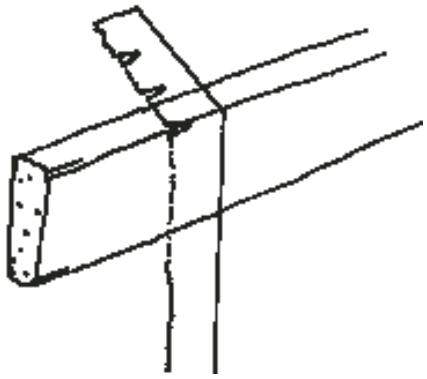


Figure 33.

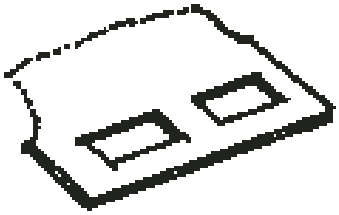
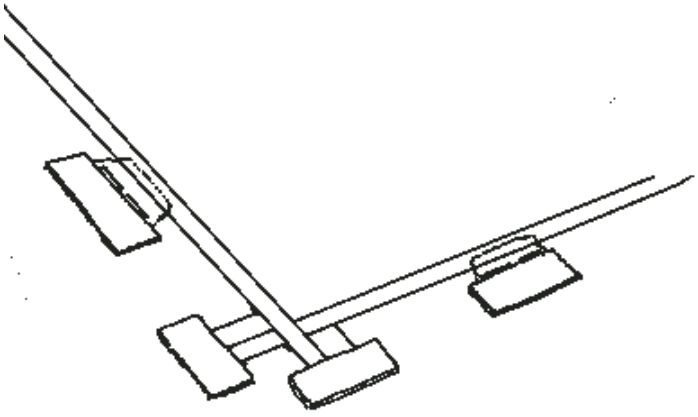


Figure 34.



Any adhesion of the back mat to a rigid support will remove whatever chance it has to expand and contract along with the art it is supporting and if the attachment is confined to the edges of the back mat, it can be expected to warp.

A means of restraining the edges of the paper in the support so they will not pop out of the support strip if the back mat is flexed is needed. This must not confine the expansion of the supported paper's edges, nor should it have the potential of embossing the edges of the paper if pressure is applied to the front of the window mat.

Any support which covers only a fraction of the edge has the potential of concentrating pressure on the portion of the paper it covers. The difficulty in producing a reinforcement which will provide the appropriate pressure on the front of the strip comes from the fact that material which is rigid enough to produce the pressure will be thick enough to raise the pressure problem. Since the danger comes at the edge of the reinforcement, the problem may be addressed by eliminating those edges. A model for this can be found in wet cut hinges in which the feathering of their edges diminishes their bulk so gradually as to render the hinges edgeless. Creating a similar edge in a five mil polyester is more difficult than wet cutting Japanese tissue.

If the polyester sheet is folded around a block of wood and the exposed corner is sanded until the sheet is cut, the edge which results will be graduated. If the wood has a somewhat rounded corner, the graduation will be accentuated.

The production of these reinforcements begins with a long cut sanded into a strip of polyester. When this is completed, the sheet is turned 90° and cuts are made which will be the sides of the reinforcement (see Figure 32). When a series of those tabs has been creat-

ed, they can be cut out in the polyester and holes can be cut in the unsanded rear portion of each tab. These holes will allow the tabs to be secured to the back mat with linen tape (see Figure 33).

The tabs should be installed with the sanded side down so the diminished side of the edge will be facing the art. The tabs can be taped to the back mat at a slight distance from the outside edge of the strip to allow for expansion of the paper being supported. They will be rigid enough to provide support from this distance (see Figure 34).

They should be installed to avoid pressure being directed to the area where the gap in the back of the strip is located. These reinforcements can be applied to all the edges of the work since they will not restrict expansion. The work of art which is supported in this manner should be restrained enough to permit normal handling, but it is still wise to place the backing board beneath it whenever it is lifted.

Hinge Maintenance

Once proper hinges have been put onto a work of art they should be kept in place as long as possible to minimize the stress to the art. The strategy for hinging described here includes design features which work toward this end.

The pendant hinges are attached to the back mat with a pasted cross-piece so that the hinge can be detached by cutting the cross-piece around it. The folded top hinges have an unpasted portion on both hinge and cross-piece so that a spatula can be inserted under them in the removal process. The side hinge design has paste only on the cross-piece, since it carries less weight and should have more flexibility to avoid cockling the art. This permits easy removal of the hinge from the back mat.

These side hinges are attached loosely enough to the back mat that they can be removed without the addition of any moisture. If a strip of polyester sheet is slipped into the fold of the hinge and a piece of blotter is placed on the surface of the art over the hinge, a microspatula can be inserted between the back of the hinge and gently worked from side to side to free the cross-piece from the back mat. Since no paste has been applied to the hinge itself, it will come up clean and any matboard which might come up will only be on the cross-piece. This process does not work as well with the top hinges, since they have been designed to cling more tightly to the back mat and have had the paste applied to both the hinge and the cross-piece. Ordinary (not cross-pieced) folded Japanese tissue hinges which have not been created with any unpasted portion will be even more difficult to remove from the back mat.

Careful application of moisture to the portion of the hinge on the back mat can soften the paste and allow for much more successful removal of old folded hinges from their back mat. The moisture must be added to the back portion of hinge and not to the art. This can be done with the use of a simple tool made by cutting a strip of polyester sheet 2" x 6" to 10" long. A strip of heavy weight Japanese tissue, 1" x 3", should be affixed to the polyester along one edge by means of acrylic pressure sensitive adhesive. A tab of tape, folded back on itself and attached to the polyester on both sides on the same edge as the tissue strip, will aid in the manipulation of the strip. Enough of these removal strips should be made to accommodate all the hinges which may be expected to be encountered on the art.

Water should be carefully applied to the tissue on the strip. The art should be lifted as much as the hinges will allow without any stress and the moistened strip should be carefully positioned over the part of the hinge on the back mat. A blotter should be placed on top of the art over the hinge and a weight should be placed on the blotter. This should be left in place for at least 20 minutes.

At the end of that time, the weight should be removed and a microspatula should be inserted under the hinge and gently worked from side to side to dislodge the softened paste and free the hinge. The microspatula should be kept parallel to the back mat at all times and if the paste does not yield to gentle probing, more moistening will be needed. As the hinge comes away from the back mat, the edge of the

Preservation Hinging for Works of Art On Paper

art can be lifted slightly to facilitate a view of the procedure. Once the hinges have been released from the back mat, they can be turned out and allowed to air dry. If the hinges have suffered in the removal process, they can be reinforced with more tissue and used again to attach the art to a new mat.

As preservation framers become more fluent with techniques necessary to maintain hinges on art, hinges can serve as an invaluable adjunct and support mechanism which will allow works of art on paper to be moved form one housing to another with virtually no physical change resulting for the art.

Hugh Phibbs is the coordinator of graphics conservation services in the Department of Exhibitions and Loans, Conservation Division, National Gallery of Art, Washington, D.C. He has a BA in philosophy from Cornell University and an MFA in painting from the University of Michigan. He has taught workshops for the AIC, the conservation programs at Winterthur/University of Delaware and the State University of New York at Buffalo, New York University, the Smithsonian Resident Associates Program, and preservation/conservation seminars for the Professional Picture Framers Association. He co-compiled the matting and framing section of the Book and Paper Group Outline. In addition, he is the author of both PFM's "Preservation Practices" and the previous four Preservation Supplements.

Most of the material in this publication originally appeared in "Preservation Hinging For Works of Art On Paper" by Hugh Phibbs, a 1994 supplement to Picture Framing Magazine. Updated materials and techniques included here were originally published as part of Preservation Practices, a monthly column in Picture Framing Magazine written by Hugh Phibbs.

art can be lifted slightly to facilitate a view of the procedure. Once the hinges have been released from the back mat, they can be turned out and allowed to air dry. If the hinges have suffered in the removal process, they can be reinforced with more tissue and used again to attach the art to a new mat.

As preservation framers become more fluent with techniques necessary to maintain hinges on art, hinges can serve as an invaluable adjunct and support mechanism which will allow works of art on paper to be moved form one housing to another with virtually no physical change resulting for the art.

Hugh Phibbs is the coordinator of graphics conservation services in the Department of Exhibitions and Loans, Conservation Division, National Gallery of Art, Washington, D.C. He has a BA in philosophy from Cornell University and an MFA in painting from the University of Michigan. He has taught workshops for the AIC, the conservation programs at Winterthur/University of Delaware and the State University of New York at Buffalo, New York University, the Smithsonian Resident Associates Program, and preservation/conservation seminars for the Professional Picture Framers Association. He co-compiled the matting and framing section of the Book and Paper Group Outline. In addition, he is the author of both PFM's "Preservation Practices" and the previous four Preservation Supplements.

Most of the material in this publication originally appeared in "Preservation Hinging For Works of Art On Paper" by Hugh Phibbs, a 1994 supplement to Picture Framing Magazine. Updated materials and techniques included here were originally published as part of Preservation Practices, a monthly column in Picture Framing Magazine written by Hugh Phibbs.