Preservation Matting for

By Hugh Phibbs

When we look at a Renaissance drawing on paper we are witnessing a miracle of preservation. The drawing has had to survive five hundred years during which it might quickly have been destroyed by poor handling, bad climate, or biological degradation. How can something as fragile as paper survive for such a long time?

Part of the answer is in the quality of the paper itself. Antique papers were made of stable fibers such as linen and did not contain enough lignin or harmful additives to be self-destructive. Even the most robust paper could be destroyed by pollution or mishandling without a protective storage structure.

This structure was the book. Books housed sheets of vellum before paper arrived in Europe. These early books had to provide considerable restraint to keep their animal hide pages from cockling. They did this with strong wooden covers and leather and metal clasps which kept them shut. Even when they were decorated with watercolor, the steady, overall pressure of the closure of the book did not disturb the pigment. Later, when paper came, the clasps were left off and the sewing structure changed but books remained an ideal structure for preserving prints and drawings.

Drawings not originally executed as illustrations or illuminations in books were usually plans for buildings or studies for paintings. Giorgio Vasari, the Italian architect and biographer of artists, was instrumental in creating an appreciation for drawings. He mounted drawings on larger sheets of paper and decorated the area around them with designs that often approximate tabernacle frames. He then bound these sheets into books.

This practice spread and volumes of prints and drawings could be found in the libraries of many aristocratic households. Some of these volumes had the edges of their pages gilded which helped to keep pollution and extremes of humidity away. The mass of material which was stored together in the library also helped to maintain steadier conditions. Ultimately, these volumes were broken up and the drawings stored individually. During this process, the question of how prints and drawings might safely be stored and handled was successfully answered with the invention of the window mat at the British Museum in the mid-nineteenth century.

When the drawing came out of the volume, it might be left on the sheet to which it had been mounted. Even if the window mat exposed the entire drawing, it would cover, support and restrain the mount. Prints or drawings could be stored horizontally in boxes or cabinets since window mats of the same size would tend to have similar openings. The alignment of their openings would also create a zone of decreased pressure.

The practice of attaching a drawing to a larger sheet of paper that is similar to the paper on which the work is done continues in some European institutions and is called “adding a false margin.” The use of Japanese tissue hinges to secure prints and drawings is less intrusive and has more recently gained favor. In either case, the construction of the window mat is the same and it fulfills most of the preservation functions that the bound volume once provided.

The mat is a storage, handling, and display structure. It should provide physical support, that is gentle and steady, as well as chemically inert. The support given to a work of art should be similar to the support given to a baby in someone’s arms. The baby is not squeezed or unduly restrained but is given broad gentle support. Supports for books on display are, in fact, called “cradles.”

This metaphor is worth remembering when making decisions about how tight hinges should be or how a sink mat should fit. The attributes of gentleness and steadiness can be viewed as usefully contradictory in that each limits the other; together they establish a compromise. Thus, a mat which presses too hard on the margins of a work may be too steady: it may flatten raised parts of the edges. A mat which supports a work of art too gently may loose its grip if the frame is jarred: the art may come loose. The first thing to consider in designing successful mats is the nature of the board that will be used. Most of the boards available today for use in matting are laminat-

ed. Two, four, six, and eight ply boards will provide progressively more strength (and more depth if they are used for making windows). Two ply board is frequently used in institutions for making cover windows and inserts on which the art is hinged to facilitate movement from a mat of one size to another. Two ply boards can be used in creating complex windows, but cannot be used for a window because it will not provide enough depth, and it cannot be used as a backmat since it will not provide adequate support.

The minimum requirement for a window mat package is a four ply window mat and a four ply backmat. This combination will provide a space of 1/16" in front of the art in the window and will be rigid enough to give a steady platform for hinging or handling. Thicker boards such as six or eight plys can provide a deeper separation between the art and the glazing, but their added expense makes them unlikely choices for backmats in a shop.

The commonest sheet size for matboard is 32 x 40 inches. In the past, this size was 32 x 44 and when quartered, it produced four pieces which were 16 x 22, a standard size in many museums today. The modern board can be cut into four 16 x 20 pieces, a useful standard size. Other commonly used standard sizes can be grouped according to their shapes into a set which includes more elongated rectangles, including 9 x 12, 11 x 14 , 14 x 18, 16 x 22 , 22 x 28, 26 x 34, and 30 x 40, and a more compact set of rectangles, including 16 x 20 , 24 x 30, and 26 x 32. While most commonly available boards do not exceed 40 x 60 inch sheets, some can be found in sizes ranging up to 60 x 104 inches.

Matboard is made from wood pulp or cotton fibers. Both are primarily cellulose: long, repeating chains of sugar molecules. Wood pulp also contains significant portions of branching hemi-cellulose and lignin, a group of compounds which give strength to wood. Lignin can degrade and produce acids or peroxides which are destructive to paper. Wood pulp which has been refined to remove these destructive components is called alpha cellulose. It should be free of virtually all lignin as cotton is naturally.

A board which only contained cellulosic fibers would be soft and quite absorbent, like a blotter paper. To make the stronger, more durable boards needed for mat making, other components are added. Sizings can give the board more resistance to soiling. Calcium carbonate may be added to make the board chemically resistant to the depredations of environmental pollution (which can lower the board's pH and lead to acid hydrolysis of its fibers). Other materials such as activated charcoal or aluminum silicates with specific porosities known as zeolites may be included in boards to adsorb, or physically bond with pollutants. Adhesives are also needed to bond the plys together: those most commonly used are polyvinyl acetates and starches or modified starches.

The composition of the board should be a guide to its usage. Boards which are made of unpurified wood pulp, sometimes called paper matboards, should not be used for preservation. The addition of calcium carbonate to such boards should make them more durable, but may not eliminate their potential for contamination of other materials.

Once the wood pulp has had the non-cellulosic portions removed, it should be similar to cotton in its chemical stability and inertness. Cotton has the advantage of being virtually lignin free naturally. Conservation quality boards made of purified wood pulp or alpha cellulose may be referred to as conservation boards, while those made of cotton are often called museum or rag boards. The term rag should not be understood to imply that reclaimed textiles have been used to obtain the cotton; it comes from the portion of cotton left on the bole after the textile cotton has been removed and is refined as linters.

Board which is made of cotton which does not have calcium carbonate added is called photographic board. This may be used with materials which are alkaline sensitive. Highly reactive metals such as silver, copper, or lead, or protein based textiles such as silk or wool and photographic media such as gelatin or albumen may be candi-

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dates for housing with a pH neutral or photographic board. Those photographic boards which are laminated with starch-based adhesives are safest, since polyvinyl acetate adhesives which are mishandled in manufacturing can degrade and off gas components of acetic acid, and there will be no alkaline reserve in the board to counteract it.

Opinions among photographic conservators vary as to the necessity of using this neutral board. Since the concern involves contact between alkaline material and the photograph's (protein and therefore acid) emulsion, strips of unbuffered interleafing tissue placed between the emulsion and the mat should suffice when the photo is overmatted. The edge strips described in the PFM February 1994 Preservation Supplement can be made of such tissue and will isolate the emulsion. If the photo is floated, there is no problem since the board will not touch the emulsion.

It is important to remember that the chemical and physical factors which may come into play in the life of a work of art in a frame are numerous and difficult to identify exactly. We can only ask science for guidance, not for specific answers. In short, there is too much that we do not know. What are the roles of atmospheric pollutants, adhesives and other additives in the board, residual traces of lignin, colorants, finishes, and interactions of all of the above with light? Testing for one of these factors may influence our choice of materials in one direction, while others may be ignored.

Experience is invaluable here. Cotton-based boards have been used for at least fifty years and alpha cellulose boards for almost half that long. Both have shown excellent results for storage and display of delicate material. Since chemically similar materials should have little chance for reacting with one another, the use of these pure paper-based boards next to a work of art on paper seems most reasonable.

Where a board has a colored or patinated paper on its surface, contact between that paper and the art should be questioned. Has the manufacturer used the same stringent requirements for the decorative surface paper as for the core and backing paper? If this cannot be clearly answered affirmatively, then floating the art on that paper should be avoided unless an interleaf of conservation quality paper can separate them.

The paper which is in contact with the art may change over time. It may, for example, take in gaseous emissions from the art or the environment. Very old rag mats which come off etchings may show stains which correspond to the pattern of the print (the oils in the printing ink may be expected to cause this sort of change). The board may be obviously darkened where it was near the frame, but it may have also darkened overall in ways which cannot be seen readily because there is no fresh material with which to compare it. Because matboard can be expected to take in pollution, it should be changed on a periodic basis.

The means to keep pollution out of the mat package are, fortunately, multiplying. The possibility of using active charcoal paper behind the mat package or matboard with zeolites inside have already been mentioned. Both of these materials have seen long usage in building air purification systems. Those systems forced air through the scavenging material, and therefore, would be far more likely to exhaust their storage potential than material in a mat package would. Even if the art is left for far too long in a package which has been scavenging pollutants, and some of those pollutants were eventually released, they could not exceed the amount which would have gotten to the art if no scavenger had been present.

Another material now entering the market not only physically adsorbs pollutants, but chemically reacts with and inactivates them. This material is polyethylene sheet which has been impregnated with metallic copper. As oxidizing gases pass through the plastic, the copper is oxidized by them and serves as a sacrificial scavenger. As the sheet reacts, it turns from copper colored to black, so its exhaustion point is evident and easily monitored. A sheet can be slipped between the backmat and the backing board to combat the problem of atmospheric pollution.

Any of these materials can serve to keep pollution from coming through the back of the frame, but their potential for scavenging pollutants which may be given off by works of art which are made of inferior materials is less clear. A molecule of a degraded product, which might be generated by the poor quality paper on which a work may have been executed, will have many chances to interact with the paper before it reaches the surface and can be scavenged after off gassing. It is important to remember that the mat is not the only part of the frame which can serve to keep pollution away from the art: the backing board can also accomplish this. Boards which contain plastic should slow the infusion of atmospheric pollution into the mat package.

Ultimately, the choice among the many good products on the market will depend on the aesthetic and design priorities of the framer. If photographic board is not readily available, pH neutral tissue can be used. The surface adjacent to the art can be either alpha cellulose or cotton, and materials with scavenging capacities to hold out pollution can be inside the mat or behind it.

Having chosen a board, one must ask how the mat package can be made from it. A window mat package comprises the window and backmats which have been spined together with linen tape along their longer side. This taping pattern is very important to ensure that the window and backmats do not become misaligned when the mat pack-

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age is not inside a frame. If the window is not secured, it can come disastrously loose during the unframing and it cannot serve as a secure housing while the art is framed or stored in a drawer.

The mat package must be smaller than the rabbet dimensions of the frame. This allowance is usually added into the frame, so that a 16 x 20 inch mat will go into a 16⅛ x 20⅛ inch frame. Since few frames are hermetically sealed or are in unchanging environments, this allowance permits the board to both expand without pressing against the rabbet of the frame and to contract without shrinking past the inside of the lip. One eighth of an inch can serve as an effective allowance for most frames. Jared Bark has reported that some board can expand ⅛" over a length of 40" with a ten percent rise in relative humidity (PFM Conservation Supplement February 93). This suggests that when an oversized frame is being designed, the allowance should be scaled up, as should the depth of the rabbet and lip of the frame.

Since the allowance has been given to the frame, the problem of cutting the matboards to the right size should be straight forward. It is complicated somewhat by the question of whether the board coming from the supplier is square and of exact dimensions. Usually the board is neither. Manufacturers know that if they make the board to the exact dimensions as specified, shrinkage caused by drying might mean that it would be too small in some areas. To avoid such problems boards are usually made slightly large.

If the cutting is to start from one corner, the shorter edge should be trimmed square at that corner. If a board shears, also called a paper cutter, or a wall mounted combination cutter is being used, it should be adjusted to ensure square cutting. If a utility knife and straight edge are the only tools available, a C-clamp at one end of the straight edge and a predetermined right angle on the working surface will greatly facilitate this operation.

Once the board has been squared, the cuts can be laid out. Ideally, this could be done so that the grain of the board would be parallel to the grain of the paper on which the art has been created. The difficulty of ascertaining the grain direction of the art paper, the size limitations of the sheet of board, and the expense involved make this impractical. Proper hinge design, which will permit some lateral movement of the artwork between hinges, is a better means of addressing this issue.

Once the method for cutting has been established, the issue of what size mat is to be cut can be considered. Most shops will work out from the dimensions of the art to establish the dimensions of the mat. Widths of between two and three inches are common. At the smaller end of this range one might expect to find mats

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for documents and maps or other items which tend to have blank space which creates a border around their contents. Portraits may require mat borders which exceed the three inch size to give the subject "room." Larger borders may also be employed for design purposes.

In these layouts, it is common to have the top and sides equal with a larger bottom margin. If this is done, the addition to the bottom should be large enough so that no one will accidentally tape the package together with the window upside down—an expensive mistake.

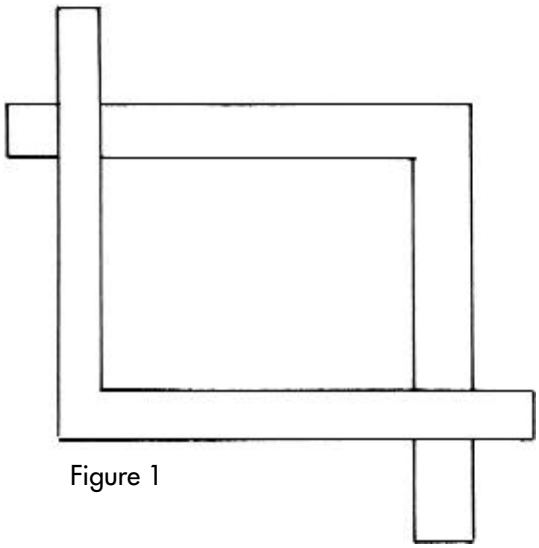

Figure 1

Working with frames which have a standard size that is independent of the mat opening presents more problems. Here, the window and the frame will usually not be congruent rectangles, and extra space may have to be apportioned to both the top and the bottom margins of the mat. This can be done visually by laying the art on top of the board and moving it into a position which looks accommodating. If the art is to be overmatted a simple tool can help here. An old mat which has been cut through at opposite corners can be used as a set of visual calipers by overlapping the cut ends to create a proper size opening (see fig. 1). This tool can also help if a work with an irregular design is to be overmatted, as the appropriate opening can easily be laid out and measured.

The measurement of the art requires a clean tape measure which will not pose any sort of danger to the art. Carpenter's tapes may not readily lock in the open position, and if they spring closed their hooked ends can put the edge of the art at risk. Also, it is difficult to accurately find the starting point on such tapes since their end hooks are often loose. It is possible, in many cases to begin the measurement at another point along the tape to gain greater accuracy and safety as well as simplification of the process.

If the work being matted is to be floated by ¼" or is to have ¼" of paper visible around the perimeter of its design, the measurement of the work can begin at the ½" point on the tape. This means that twice the required ¼" will already be factored into the measurement and the appropriate figure can be entered on the worksheet. If the edge of the window will overlap the design, this technique will not work. There are tapes available from sewing supply stores which are plastic impregnated cloth. These lack an end hook and lock in the open position, but may stretch if placed under tension and should not be trusted where complete accuracy is needed.

The layout of the opening on the mat is quite simple if the mat is sized to fit the frame. The sameness of the borders facilitates the use of production stops with a bar-type cutter, or the simple scribing of lines from the edge where stops are not used. The marking of windows should only be done with graphite or a tool which will cleanly incise the back of the window. If graphite is used, it must be thoroughly erased after the mat is cut using only a white vinyl eraser. Red or gray erasers can contain sulfur which would contaminate the mat.

Laying out windows for mats which have standard-size borders can be more problematical. Here a tool from the hardware store, called a carpenter's scribe, can be invaluable. This tool comprises a ruled rod which is split at one end to accommodate a marking point. A pencil lead can be substituted for the point. The second component of this tool is a slide with a thumb screw that can he set at any point along the rod. This allows the pencil point to scribe a line along the rod at a given distance from one side as the tool is drawn along down that side.

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The scribe also can function as a simple calculator.

If a window that is 3⅜" x 4¾" is to be marked in a board which is 8" x 10", the measurements can be started by considering the shorter side. Subtracting 3 inches from 8 inches leaves 5 inches which must be apportioned between two of the sides of the mat, so the slide is first moved to the 2½ " point. The fraction ⅜" must then be divided into two portions of 3/16" and these must be added to each side of the opening. This can be done by moving the slide 3/16" toward the pencil point so that the mat side is diminished and the window expanded. The slide is then tightened and the marks made. Similarly, on the longer side, the subtraction of 4" from 10" leads to a presetting of the slide at one half of the 6" remainder, or at the 3" mark. Having split the ¾" fraction into two we find that the slide should be moved ⅜" back toward the pencil point and tightened. Once the second set of lines is scribed the opening can be checked for accuracy.

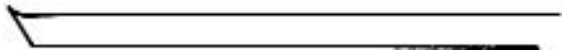

Figure 2

Confining the marks to the corner areas lessens the amount of erasing which must be done. If the opening is to be raised above the center, it can be lined out as described and moved up. If it is to be moved up ½", a set of marks should be made on the vertical lines which are ¼" above the old horizontal marks on both the top and the bottom. It must be remembered that ¼" is being subtracted from the top and ¼" is being added to the bottom to create the desired difference of ½" between the top and bottom.

Another factor to consider in creating the opening is the margins to be left around the design or the paper if the art is floated. In the latter case, a margin of ¼" is a minimum that permits for safe movement of the art if the hinges become loosened in an accident. If the art is overmatted, the opening should maintain a similar distance from the design, especially in the case of etchings. When etchings are printed, the paper is embossed by the etching plate and weakened at that point so that the mat should not press on the paper there. If there is a written legend beneath the design which requires a larger border, the other borders can be made somewhat larger to avoid calling too much attention to the written material. As the size of the mat and window grow, the margins allowed around the designs should grow in proportion. If the art is overmatted, the window should exceed the margin around the image by one inch on all sides.

The tools for cutting windows range from simple knives to automated machines. The right tool will help to ensure that clean, trim openings can be readily produced. Aesthetics have a critical role in preservation. If the work which surrounds the art looks haphazard and imprecise, a viewer will not be as likely to notice problems which may

be present in the condition of the art. Older works may benefit from antique treatments or patinas on the mat which will compliment their age, but these too should be well-crafted.

The bevel, a standard part of mat window design, has little precedent in the aesthetics of framing. Steps, ogees, and hollows are far more common elements in frames than any sort of flat incline. Bevels are powerful focusing elements, directing the eye into the opening. Indeed, too large a bevel may prove to be overpowering to some works. The bevels handsomely dress the edge of the window. Also, it is easier to draw the blade through the board in the beveled position than it is to cut through in a line perpendicular to the plane of the board. This may be a function of the fact that more of the blade is engaged in cutting fibers when the cut is beveled.

Any tool which uses a blade to cut windows will plow up the inner edge of the window into a profile (see fig. 2).This raised edge must be softened. A nail file covered with industrial diamond can be an extremely useful tool for this job; sand paper or emery boards may leave grit on the bevel contaminating it.

When six or eight ply boards are being cut, it is helpful to make the cut in more than one pass. Any attempt to drive the blade through in one pass will aggravate its tendency to drift outward as it rides up on the mass of board, resulting in “hooked” corners. If the blade is set shallow for the first pass, it will cut a good track which can be completed by setting it deeper for the following pass. The overcuts will have to be extended while cutting these thicker windows and it is safest to undercut this unfamiliar corner and complete the cut from the front. Before removing the window from the cutter, another sheet of board can be slipped underneath it to support the window as it is turned to prevent premature dropout of the window and tears at the corners of the window.

When cutting windows, it is worth remembering that the board is expensive and the blades are not. Frequent changing of the blade can avoid tearing at the front of the cut. If such small disruptions on the face of the window do occur, they can sometimes be smoothed out with the nail file by drawing it along the edge of the window in the direction opposite to that of the blade.The edge should then be burnished with a bond folder. This will shave off some fibers and reposition others.

This repair can only be done with board which has a consistent color throughout. If a board has a colored facing paper and a white core material, the use of a nail file to dress any excess material out of the corners must be done very carefully, since the file may bring some of the color from the facing paper and deposit it on the white corner. Small overcuts can be burnished down with a bone folder, but serious ones require the cutting of a new window. If white glue is used to try to mend the large overcut, it would represent a pollution of the window

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since it may extend into the back side where the window touches the art.

Each type of cutter has advantages and drawbacks. The hand-held type can be used to cut windows too large for other machines, but they will be slower to use. Whichever is used, the blade should not be set to cut any deeper than necessary to get cleanly through the board. Setting the blade deeper means that more work is required to do nothing more than make cuts in the underlying board.

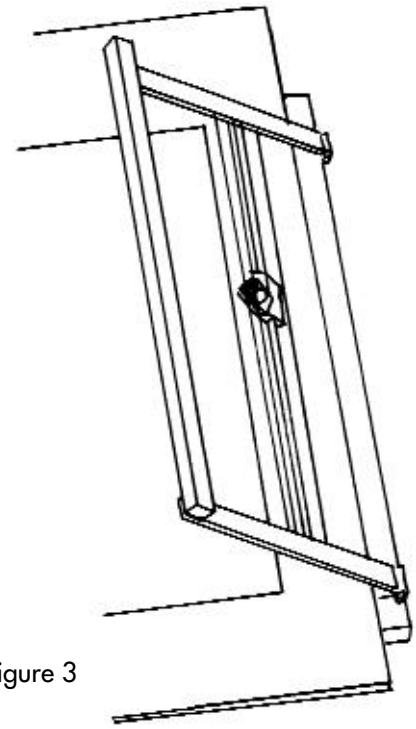

Figure 3

The underlying board can be made of any long scrap. Paper mat is easier to cut than conservation quality board, making it a perfect candidate. The underlying board should be moved between each cut so that the blade will be tracking in fresh material. The cuts should be kept parallel to avoid the possibility that the tip of the blade will be pulled into an old track.

Hand-held cutters which have pivoting heads can produce results equivalent to more complex cutters when they are used with a straight edge which has been C-clamped at one end to the work table. Bar-type cutters can be ideal for most custom framing needs and can be adapted for cutting oversized windows. To do this the window must be very lightly marked on its front side with the marks 1/16" outside the position they would have if they were on the back. The mat is then fed in from the left side so that it can fit inside the hinges which secure the cutting bar to the base (see fig. 3). The window is cut without any overcuts. Wall mounted cutters which are semi or fully automatic can greatly facilitate production and they can be adapted to meet the needs of cutting custom windows of varying dimensions.

When the linen tape is applied to create the hinge between the backmat and the window, both parts of the mat must be coplanar and snugly butted against one another (see fig. 4). Any gap here will produce a spine which is unacceptably loose. The tape is best activated with warm water and it should be dried in the closed position to ensure proper alignment between window and backmats. The mat should be made large enough that the tape will not touch the art. When it is finished, the edges of the window and backmats should be even, especially on the bottom. This will maximize support and eliminate the possibility that the boards could shift or that the window could be bearing the weight. It should be remembered that the window is much weaker than the backmat. This is one of the reasons why the art must always be hinged to the backmat and not the window.

Figure 4

The creation of more complex mats, ones with more than one opening or more than one layer, must maintain the safeguards to be observed for ordinary mats. If more than one window is being cut in a single mat, the windows must be placed far apart enough so that the art will not overlap and create the possibility of one sheet embossing its neighbor. To create a sense of visual continuity, pictures of people can be matted side by side while landscapes can be matted one over another to eliminate confusion. If openings are being cut for materials which are not all the same size or which will be placed in positions which are not symmetrical, the marking of the window must be done so that the windows are reversed, left to right, as they are being marked on the back of the

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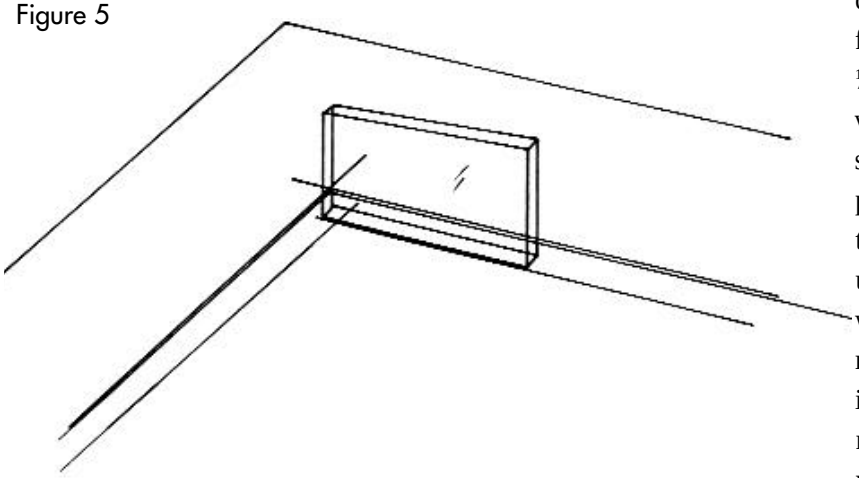
board. This is a fact which is too easy to overlook and it must be firmly impressed on everyone who cuts to avoid costly mistakes.

Figure 5



Double mats can be useful both aesthetically and as a means of increasing separation between the glazing and the art. They should be made so that the outside edges of the windows have exactly the same dimensions so that the window and backmat can be securely linen taped together. This can be simply done with the aid of strips of acrylic sheet which have varying thicknesses. These strips, called layout blocks, may be a few inches long and ⅛", 3⁄16" and ¼" thick to permit the creation of those intervals. The outer window is drawn out with the required interval factored in and is cut to that size. It is then laid face down on the back of the inner mat and held securely there while the layout block is set down twice in each corner so that a pencil can be run along its inside to create the cutting lines for the inner mat (see fig. 5). Once the inner mat has been cut and its edges erased and softened, the two can be glued together.

Since the windows which have been combined to form this mat will have the same outer dimensions, the double mat can be securely spined to its backmat. The backmat will have to be raised by another piece of board underneath it to keep the surfaces coplanar and allow for a tight hinge. This type of mat requires the use of two or more whole pieces of board and becomes expensive. One option for lowering the cost is the mixture of ordinary paper mats with conservation quality windows. This may be acceptable if the window nearest the art is of conservation quality and the interval between its bevel and that of the nearest paper mat is ¼". A study of the oxidation patterns created by poor quality mats will reveal that the discoloration tends to fade off in the first ⅛" and a ¼" interval should give some allowance for protection. Still, the presence of the unrefined ground wood in the frame may be problematic, and so this economic compromise cannot be recommended when preservation is important.

Certain works have designs on both their front, (recto), and back (verso), sides which may need to be exposed. The opening in the backmat creates a hazardous situation in that the paper artwork is vulnerable to punctures in that area. This is a greater concern when the art is stored in a box. Permanently framed items will be protected from punctures if they are glazed on both sides with a shatterproof material. The use of unlaminated glass on the back of a recto/verso mat should be avoided. The windows in a recto/verso mat will be cut in the ordinary fashion; it is the placement of the window in the backmat which poses the problem.

The verso window should be kept as small as possible. If the work is to be overmatted on the front, and it has a small area such as a signature which needs to be exposed on the back, the window in the front mat can be lightly marked out with its lines extended beyond their normal dimensions. The work can be laid face down on the mat with the parts of the lines which appear beyond the work used as guides for placement (see fig. 6). The distances from the design which is to be exposed to each of the edges of the mat should be measured and marked onto the backmat. It is critical to remember that the markings must be left to right reversed if the design is not centered horizontally. Once the back window has been cut both windows can be spined with linen tape

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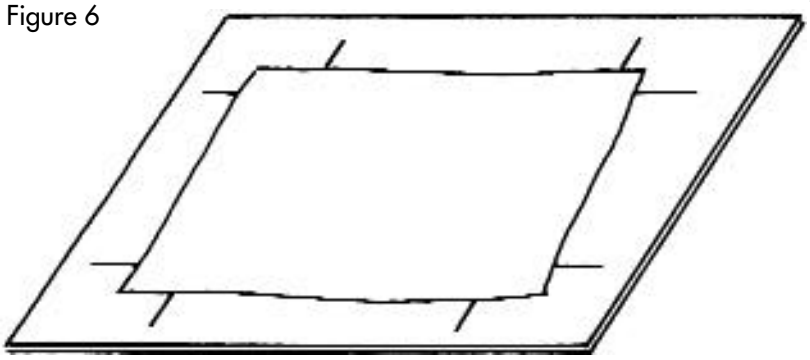
and the work secured.

If greater accuracy of placement for the window in the backmat is needed, another approach may be used. This involves cutting out the front window and placing the work, in proper alignment, between it and the uncut back window. If the work does not contain friable media, the drop out can be laid back into the opening and the entire package carefully placed in a stiff folder and turned over, with attention paid to ensure that nothing slips. The folder can then be opened and the backmat very carefully lifted to reveal the work in place on the front window, drop out combination. The marking can be done as described before.

Figure 6



If the work is to be floated in the front window, the location of the back window is simpler because the marks to outline the window will be larger than the work being matted and it can therefore be laid face down on the uncut window and located within the marks. This is only possible if the design is not friable. The opening is measured as before. The folded hinges needed to float the work must be made to cover less of the surface of the backmat if the verso opening comes anywhere them so that they will not overlap the edge of that opening and be exposed to view. In all recto/verso matting, the dropout from the verso window should be saved so it can be set in place when the hinging (or other attachment) is being made.

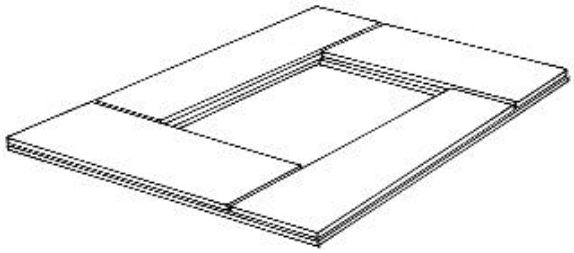
The one type of recto/verso mat which presents profound hinging problems is the window in which both sides of the work are to be floated. Work which requires this degree of exposure will have designs on both sides which extend to the edges, and finding open space for the hinges on the back of the work may be difficult to begin with. The entire weight of the work will be born by the hinges, both when the artwork is on the wall and when it is lying on a table, and so more hinges than usual will be needed. This type of mat must be handled with the utmost care when it is outside a frame, since the work is vulnerable to puncture and to flapping in air currents if it is moved rapidly. If the work is stored out of the frame for any length of time, secure a sheet of polyester to the inside of the back window. This can be done with archival grade PVA glue if the edges of the polyester have been sanded first. The hinges will have to extend beyond the sheet so that they can be attached to the mat and this will not work if the design on the back is friable.

If a six or eight ply mat is needed and boards of that thickness are not available, they can be laminated from thinner material. The simplest and cheapest adhesive to use for this purpose is starch paste. Starch is much less expensive than pure PVA and it will not dry so fast as to make the lamination process difficult. If any starch is accidentally applied to the front of the mat, it will not stick to the glazing as the PVA will. The starch will also have a higher moisture content and will require more time to dry. Thus, it is useful to do this lamination at a time, such as Friday or Saturday evening, when the board can be left under weight for a few days without getting in the way.

The paste should be cooked as usual but a much greater quantity will be needed; more than one cup per lamination. The paste can be poured into an old plastic five-sided frame which will serve as a rolling pan. A clean paint roller is then used to roll the paste onto one of the boards in a fairly generous layer. The second board is carefully aligned with the pasted board along their shorter ends and is pressed down onto it. A flat weight should

be placed on the laminated boards and left undisturbed for at least an hour. When the initial tack has been established, the board can be more aggressively dried. This can be done by sandwiching it between blotters or dry sheets of matboard which are changed periodically. It may be possible to cut the desired window board out and to dry it in a dry mount press, but care must be taken to ensure that any boards which are glued together in this manner or used as double matting have dried fully before they are used in the frame. The use of pressure-sensitive adhesives for attaching or laminating boards introduces a type of material into the frame package which is not a usual constituent of the board, and violates the concept of keeping the preservation package as simple as possible.

Figure 7



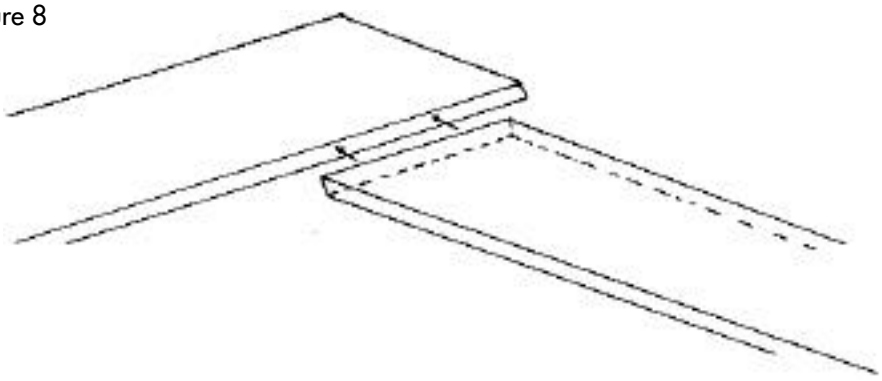
There are other options for deepening the window which make more efficient use of materials. The simplest of these is the shim mat, in which a window which has been cut to the appropriate dimension receives a lining of board which is tucked behind the edge of the bevel. This can be done with full sheets of conservation quality board or with strips of the same board. In the former case, since the shim will not show, a board which is chemically appropriate but which may be an off color can save money. If strips of conservation quality board are used, they can be applied in a pinwheel fashion to facilitate assembly (see fig. 7). If the strip method is used in a situation in which it would overlap the edges of the art, it should include a two ply liner which gives the back of the window an unbroken surface.

There are times when it is best to pull the shim away from the edge of the bevel. A drawing which is degraded at its edges or a photograph which is heavily cockled at its outer margins are cases in which pressure should not be applied to the art. A shim which is designed so that it sits outside the edges of the art can relieve this pressure.

The normal pressure which a window mat applies to the edges of the artwork is useful in most cases in that it helps to hold the sheet in place. A window design which increases the depth of the window without the expense of adding whole pieces of board can be created through the use of strips of conservation quality board which have been cut so that they have two bevels.

If the strips are cut so that one of the long sides of each is beveled, and one of the short ends of each is also beveled in an orientation opposite to the bevel of the long sides (see fig. 8), these pieces can be fitted onto the back of the window to create an extension of its bevel.

Figure 8



The window must be cut with its opening enlarged by ⅛" in height and width to account for the space required by the extensions. The extensions are then cut and fitted in a pinwheel fashion with each extending from one corner of the window and passing beyond the opposite corner on that side. To ensure that there is no

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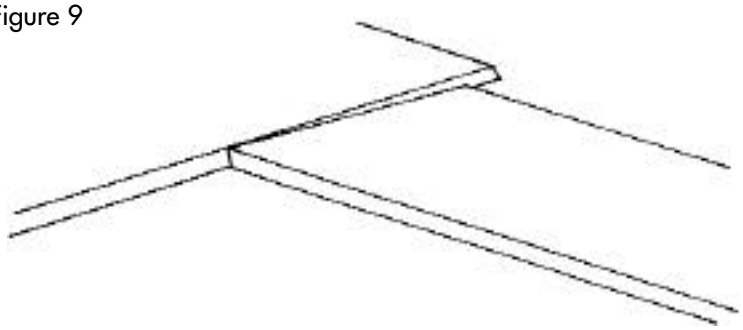
gapping at the corners, the bevels on the short sides can be cut so that the angle which their edges makes with the long edges is slightly less than 90 degrees. Thus, there will be a slight gap when the pieces are assembled on the back of the window (see fig. 9). This and the seams which separate each of the bevel extension strips require that the mat be lined with at least a two ply cover if it is overmatting the art. The beauty of this technique comes from the fact that if the bevel extensions are made of the same board as the window and are fitted together well they are indistinguishable in the frame from a mat of an equivalent number of plys which was laminated and cut through ordinarily.

Figure 9



If either this mat or the shim mat mentioned before overlaps the edges of the art, each will need a lining of two ply board. To make this type of facing, cut a piece of two ply which has the same outer dimensions as the mat, and lay both on the work surface with the two ply on the bottom and the mat, face up, on top. Marks that start at the corners of the window and proceed toward the center of the window can then be cut onto the surface of the two ply (see fig.10). (Making these marks with a pencil might leave graphite on the window.) The two ply can then be removed and graphite crossover lines can be drawn just outside the cut marks (see fig.11). A mat cutter can then be used to cut out the window denoted by these crossover lines. The two ply can be fitted onto the back of the window to ensure that it covers the back but does not show through the opening. If it does show, it should be enlarged before it is attached to the back of the window. If it fits, it can be glued in place. Since it comprises a reverse beveled window, it will have an edge which will be easy to hide behind the opening in the front window and will require little softening and clean up.

Figure 10

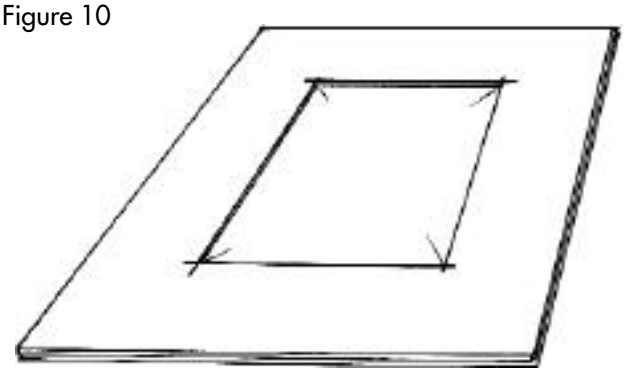
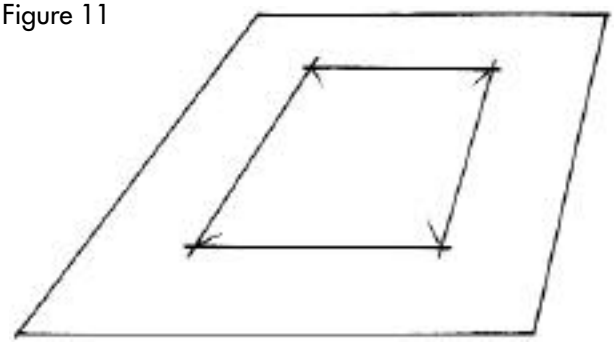


Figure 11

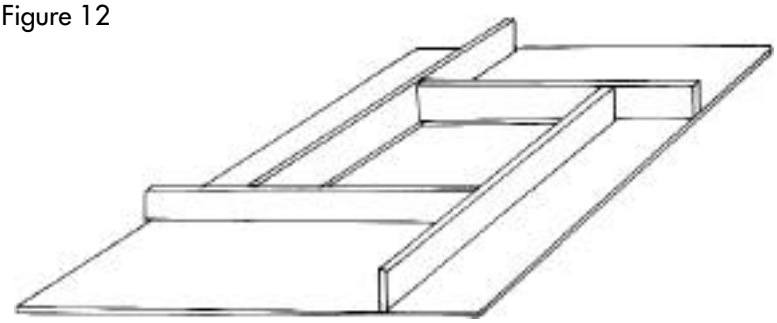


Both the shim mat and the extended bevel mat are made entirely of conservation quality board and thus can be rather heavy. Other mats can be made with added strips of board to form their exposed vertical surfaces or their bevels and which can be filled with acid-free corrugated board. These mats have the advantage of being lightweight and make the frame less cumbersome to handle. A mat package or frame which is heavy will not encourage those handling it to use the lightest possible movements.

The simplest of these mats has walls which are perpendicular to the surface of the mat itself. This type of opening can be especially useful when a small object is being

matted with a document. Because the opening lacks a bevel, it will not draw undue attention to the object and away from the document. The opening which is to have the walls should be made somewhat larger than normal to compensate for the shadows which will be cast. The added depth needed will depend on the height of the walls. In general the expansion should equal the wall height.

Figure 12



Once the mat has been cut, strips of the same board can be adhered to the edges of the opening in a pinwheel pattern (see fig. 12). Acid-free corrugated board can be used to fill the area around this opening to add support. The document will be housed under the surface of the window's other opening and will require a built-up platform of conservation quality board on top of acid-free corrugated (see fig. 13). This two-level mat allows each item to be secured to the backmat in the ordinary manner.

Deep mats, those which have added bevels and light-

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Figure 13

weight cores, can maintain the beneficial physics of the traditional window while providing as much space as may be needed between the surface of the art and the glazing. Ideally, such a mat should contain only time-tested archival materials and should make the most economical use of the materials so the labor required can be adequately rewarded. One such mat can be made by affixing carefully cut bevel strips to the back edge of an appropriately enlarged window and filling the space in back with archival corrugated board and a two ply covering.

The geometry of such a deepened window is the first problem which must be mastered. Since the bevel will be added to the back of the window, it is necessary to calculate both the factor needed for enlarging of the opening and the width of the bevel itself. If the mat is viewed in cross-section, the problem can be visualized as a right triangle in which the depth to be added is A, the expansion needed is B, and the bevel is C (see fig.14). If the legs of the triangle (A and B) can be made equal, the job is simplified. In a right triangle in which the legs are equal, the opposite angles are also equal and measure 45 degrees. A mat cutter which cuts at a 45 degree angle will thus create the simplest bevels to work with. If the cutters available cut at some other angle, there are effective and inexpensive hand-held cutters on the market which will produce 45 degree cuts.

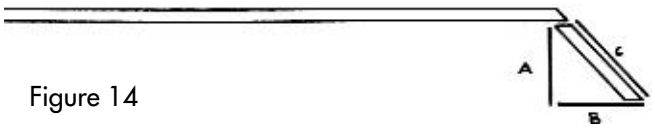

Figure 14

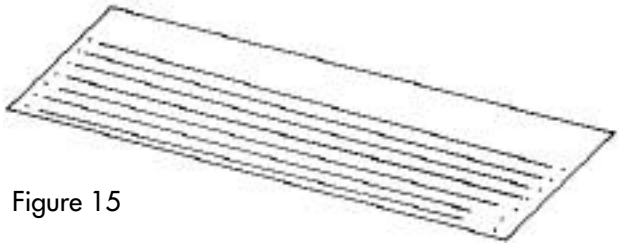

Figure 15

To determine the amount of space needed to separate the surface of the art from the glazing, one can lay the art on a flat surface and stand a transparent plastic ruler next to it to sight the highest point in the art.

A mat of this type can be made in any thickness, but in practice there are some dimensions which are especially useful since they will accommodate one, two, or three layers of acid-free corrugated filler board evenly. If a deep mat is made with a depth which exceeds ½" the bevel will be such a prominent visual element—focusing the eye on the inside of the window—that it may detract from the enjoyment of the work being matted. If a depth of ⅛" is needed, the window will be expanded by ¼" (⅛" per side) and the bevel can be cut with a width of 3/16". To produce a depth of ¼", the window will need to be expanded by ½" and the bevel can be cut ⅜" wide. For a ⅜" deep mat the expansion will be ¾" and the bevel can be cut ½" wide.

To create the strips, a long piece of the approximately board should have pencil marks placed at either end (see fig.15). The section of the board nearest the edge will not have two beveled edges and should be discarded. (If this section is given a different size from the others it will be easier to distinguish when they have all been cut.) The cutting head can be aligned so that the cuts will go right through the pencil marks or, if a bar-type cutter is used, the edge of the bar can be aligned to meet the marks. In either case, it is very important to ensure that the cuts be spaced as evenly and accurately as possible. If the strips all match, assembly will be much easier and more accurate. Once the cuts have been made, consideration can be given to the shape of the end of each strip which will per-

mit creation of the bevel.

Since each of the strips will be set at a 45 degree angle to the window, the angle of their intersection with

Figure 16

each other presents a complicated geometry problem. Fortunately, if the angle of 55 degrees is used it will be close enough to the exact answer to yield a completely useful result. To achieve this shape for the ends of the strips, a protractor should be laid along the edge of the board or one of the cuts and an angle of 55 degrees should be marked and lined across them (see fig. 16). This can be done before or after the parallel cuts have been made. The cutter should now be used to cut through the strips along this line. Care must be taken to ensure that the strips do not shift during the cutting

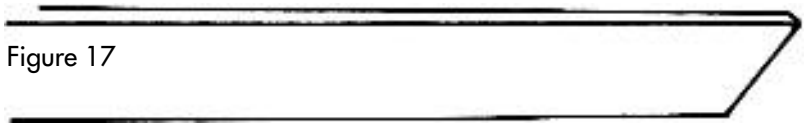

Figure 17

process. A piece of drafting tape can be used to hold them together during the cutting. This tape will be on the back of the strips and can be removed as soon as the cutting is complete to avoid contamination.

If the cutting has gone according to plan, the resulting strips will have two faces on their front sides (see fig. 17) and three faces on their back sides (see fig. 18). Since the manipulation of the strips may be somewhat confusing, it can be helpful to keep a model strip handy which has each of its faces labeled, keeping in mind that the top denotes the surface which will be bonded to the back side of the window and the bottom will be nearest the backmat while the end will butt against the neighboring bevel. The creation of the bevel strips may require some set up time, and it can be useful to cut extra strips of the most appropriate colors for storage in a drawer to speed the production of future deep windows.

In laying out the window, it is essential to remember that the presence of the bevel will require a larger opening. If an 8 x 10 inch work was being float matted with a ¼" float and a ¼"deep bevel, the opening would need to be 9 x 11 inches, with ½" for the float and ½" for the bevel. This is one of those facts which is annoyingly easy

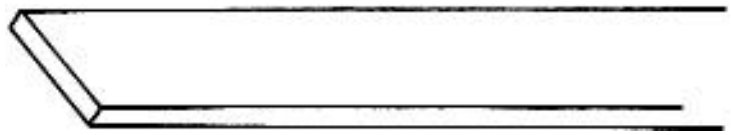

Figure 18

to forget and should, perhaps, be noted on a folder which is used to store the model strip and extra strips to serve as a reminder.

The assembly of the window requires some practice. Any graphite markings which may remain from the cutting of the window or the strips should be erased with a white vinyl eraser—not to protect the art, but to avoid the possibility of the graphite showing up on the finished product.

The strips will be glued to the back of the opening with archival PVA glue. (This should be checked to ensure that it has not begun to degrade. This degradation can be detected by the vinegar-like odor produced by the breakdown of the acetate.) The glue should be placed in a plastic squeeze bottle which will permit the application of a uniform bead of glue along the length of the surface to which the strip is being bonded. These bottles have quite a tendency to get clogged as the glue dries in their nozzles. A useful antidote to this problem is a cap which comprises a long spike of soft plastic (as can be found in the bristles of some hair brushes) which has

Preservation Matting for Works of Art on Paper

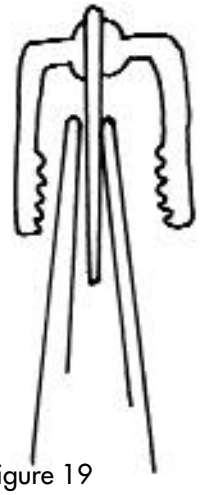

Figure 19

been welded with a hot melt glue to the inside of a plastic cap, as in this cross-sectional diagram (see fig. 19).

Before the actual mat is assembled, a small model should be built to familiarize the mat maker with the assembly process. This can be bonded with linen tape so that it will fold flat and can be used for future reference and as a teaching aid. Each strip will be aligned so that the end which contains the 55 degree angle will meet one of the corners of the window (see fig. 20).

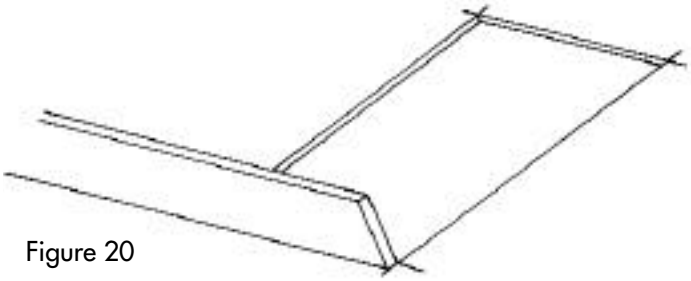

Figure 20

The most important part of the assembly is the situation of the strip along the edge of the window. This is complicated by the fact that the bevel creates an overhang which obscures the joint of strip to window edge. To facilitate the viewing of that area, a strip of mirror with dulled edges can be placed under the window so that it overlaps the opening and reflects the edge being worked on. Alternately, the window can be aligned so that the

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strip which is being applied is perpendicular to the edge of the work table and the mat maker can look under it (see fig. 21).

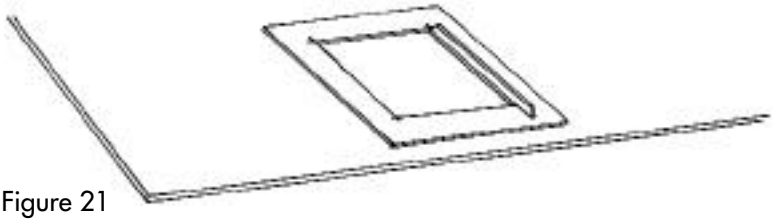


Figure 21

A bead of PVA is applied to the back of the window, near but not touching the back of the bevel. This bead is then smoothed out using a tool or a finger and the strip is set on the glued area. This must be done promptly since the glue will dry rapidly. The strip can be lifted and repositioned during the first minute, but any excess glue which oozes out of the joint should be left in place to dry. This glue can be shaved or scraped off when it is dry with a sharp blade. The archival PVA will aid in assembly since it will bond so quickly that it can serve as a contact cement and the strip should stay in place once it has been pressed down. The mat can now be rotated for the application of the second strip. This should be done so that the next strip can begin at a corner and will pass the first strip at the far end of that side (see fig. 22). Working in this manner means that the first three strips can be aligned to the corners where their application will begin without any obstruction. In the case of the fourth strip, the corner at which its application begins will already be occupied by the first strip and the final strip will have to fit in under it. The bead of glue which is applied for the last strip will have to be smoothed in the area overhung by the first strip with a tool since a finger will not fit in this space.

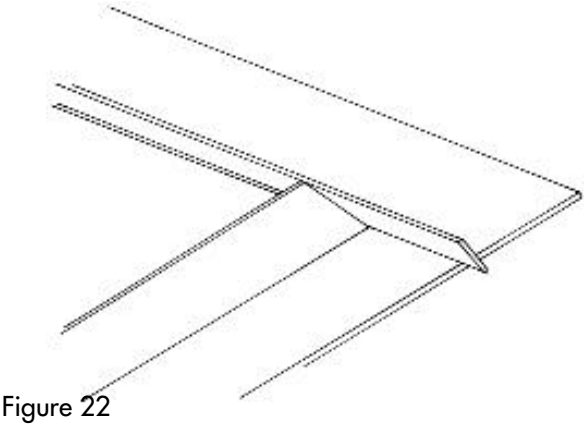


Figure 22

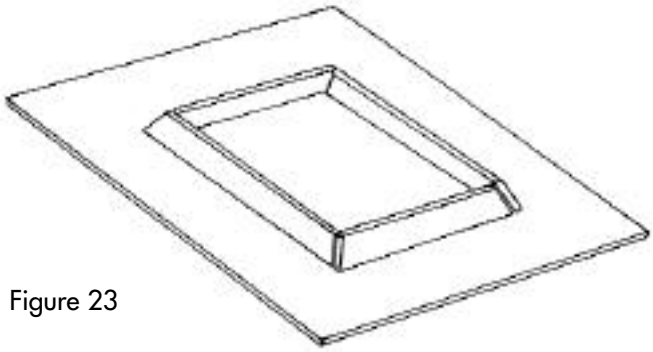


Figure 23

When all of the strips have been set in place, a bead of PVA can be run along the back of each at the point where they join the window. This will reinforce this joint. The properly aligned strip will be slightly behind or will come just up to the bevel, but it should not have any of its bottom portion showing. Lifting the mat while the strips are not fully dry risks dislodging them. If the mat is laid on an old scrap of acrylic sheet both can be lifted together and the mat will stay in place. If any of the strips is found to be intruding beyond the bevel of the window, a blade can be slipped in between the bottom of the strip and the window in the intruding portion and the two cut apart. A fresh coat of glue can be applied to the separated portion with a brush and the strip can be reattached. The resulting structure will now look like the item in figure 23.

The corners must be aligned, adhered and reinforced. This is done by first trimming the excess portion of each strip with a razor blade using smooth sawing motions so that its end is in plane with the end of the neighboring strip. Glue is carefully brushed onto the end of the strip which was cut at 55 degrees and the two ends are pressed together with attention paid to ensure that their bottoms

match (see fig. 24). A piece of linen tape will help to hold the ends as they dry and will provide added strength throughout the life of the mat. This can be made from a 1½" piece of tape which has been split so it is ½" wide. If this piece is cut at the center of one of its long sides, it can be adhered first to the side which was recently trimmed and drawn tight around the corner and applied to the other side. If the end of the split in the tape meets the bottom of the outside corner, the tape can also be applied to the back of the window (see fig. 25).

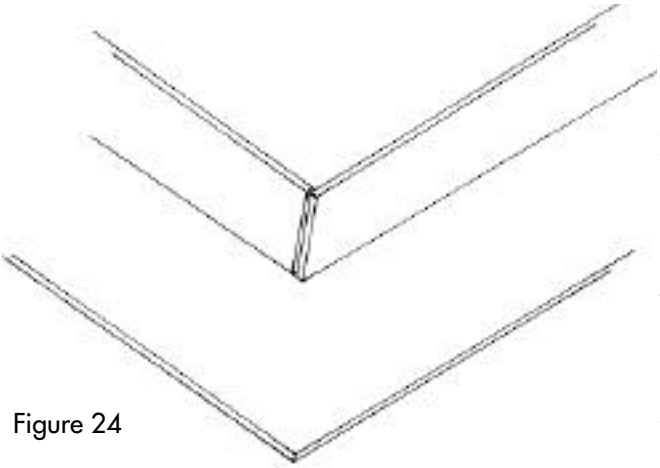


Figure 24

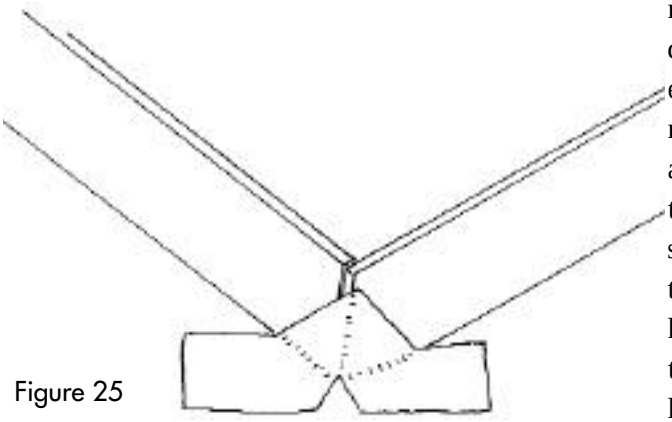
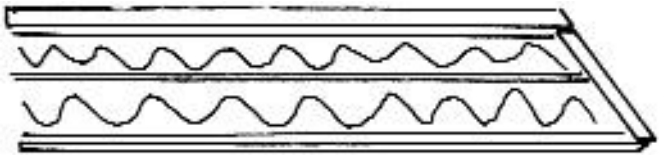


Figure 25

When the glue and the tapes have dried, the mat will begin to have enough strength to be more readily handled. The area around the bevel can now be filled with acid-free corrugated board. The board can be glued into the space in a pinwheel pattern. If more than one layer of board is used, the direction of the pinwheel should be reversed with each successive layer so that the ends will overlap the joint of the layer beneath. If the work is being floated, the window will be finished once all its components have dried. If this window is to be used to overmat the work, it must be finished in the back with a two ply facing as described before. The glue used to bond this two ply should only be applied to the corrugated board and can never be allowed to seep onto the exposed portion of the bevel where it could contaminate the art. The finished product will look like the cross-section (see fig. 26).

Figure 26



There are some forms of windows which lack the traditional bevel. The straight cut opening is sometimes used for aesthetic reasons and can be an element in window designs which support the work being housed. The primary problem with such a window is the creation of clean edges and corners. As has been noted, it is much easier to make a beveled cut; cutting through the board perpendicular to its surface requires more force. The thicker blades found in utility knives are appropriate for this task, but they must be thoroughly cleaned of the oil in which they are packed to prevent rust.

Since this window opening will have the same dimensions on both sides and will not require any overcuts, it can be marked on either the front or back of the window. The cutting process will plow up some of the board and the choice of whether the opening is cut from the front or the back will depend on individual cutting habits and the quality of the material underlying the cut. To get a smooth, even edge to the back of the cut, the material under the board should be rigid enough to keep the board from bending downward as the knife comes through. Scrap acrylic sheet can be very useful here and for other, similar cutting jobs. Whichever side is to be used as the front of the mat, the cutting should not be attempted in a single motion.

All cutting of resistant material is best done in several

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passes, with the first pass being a light, guide cut. In this case, a straight edge should be laid along the line to be cut and the cuts should start at the corners and proceed to the centers of each side. The point of the utility knife can be used to carve clean crisp corners, and if any strands of board are created by the cuts not having aligned perfectly, they can be removed with a nail file. The back of the window will not be in full view, and it can be rounded and softened with a nail file to make it less abrasive.

Other circumstances may require the use of a window with a reverse bevel. This type of opening has the advantage of presenting an accommodating edge to the art. This may be useful in cases in which there is some disfigurement near the edge which should be covered in ordinary viewing but which needs to be seen at times. The reverse bevel is easiest to cut from the front of the mat. The opening should be marked as lightly in graphite as possible and cut without any crossovers. This means that the cutting will have to be completed by cutting the corners with a blade, but this can be easily done since none of the cutting will show up in front.

If the work being matted has an outline which is irregular, and that irregularity is important to the appreciation of the work, it may be necessary to cut a window which is not rectangular. If the work is being floated in the window this task is simple. The work can be measured as if it were a rectangle, using its largest dimensions and the marks laid out as usual on the back of the window. The work can be centered, face down, between these marks and a clear plastic ruler laid along the irregular sides so that the marks there can be adjusted. This cannot be done if the medium in which the design has been executed is, friable since it could not safely be laid face down on the mat. The cutting of such non-rectangular openings may require somewhat smaller crossovers than usual.

Circular and oval opening mats can be cut with mechanical cutters, but they are surprisingly easy to cut by hand when such machines are not available. The single-edge razor blade with a reinforced backing can be drawn through the board to make beveled cuts without too much effort. A circular opening can be marked with a compass on the front of the window with the marks set 1/16" further out than the size required to compensate for the fact that the window is being cut from the front.

Works of Art on Paper

A piece of polystyrene foam board can be placed under the mat, the blade eased into the mark, and then held at the proper angle as it is drawn along the line and the board is rotated. It the cut is less than true to the line, the excess material can be shaved off with a fresh blade and the bevel can be cleaned up with a nail file. The lack of any corners makes the dressing of the bevel easier than in the case of a rectangular opening.

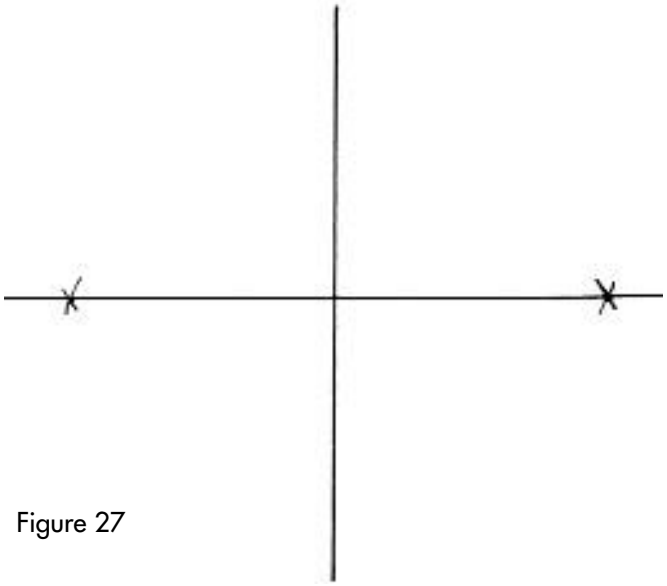
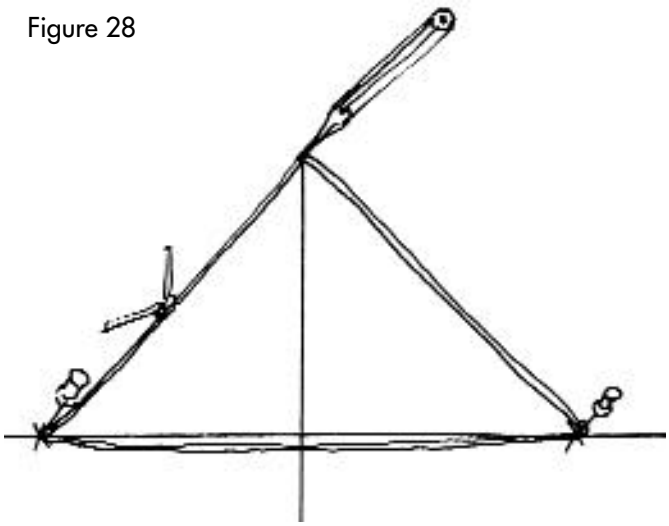


Figure 27

Drawing an oval requires more effort. The long and short axis of the oval should be drawn on the face of the window with 1/16" added to the ends of each (again, as compensation for the fact that the cutting is being done from the front). A compass point is set at the spot at which the axis intersect and the other end of the compass is positioned so that it falls at the end of the long axis. The compass point is not set at the ends of the short axis and marks are struck at the point at which it meets the long axis (see fig. 27). Push pins are stuck into these focal points and a piece of string is tied so that it creates a triangle comprising the pins and one of the ends of the short axis (see fig. 28). A pencil is set inside the loop of string and rotated to inscribe the desired oval.

Figure 28



The cutting can be done as with the circle. Since there are flatter parts of the oval, these are good places at which to insert the point of the blade. More of the blade can be inserted through the board while cutting these flatter portions and only the corner of the blade used to cut the more sharply curved portions. This permits a steadier cut in the less curved areas and more mobility in the tighter curves. More complex shapes can be cut as openings, but the increasing elaboration of the shape can begin to compete with the work being matted.

If the object being matted is thicker than ordinary paper, a sink will be needed in the mat to accommodate this thickness. The subject of sinks was treated in the Preservation Supplement (PFM February 1995) but a discussion of matting requires some review and updating of this issue. The sink can be made of strips of conservation quality board which are attached to the backmat or it can be made as a separate window which is spined along the same edge as the face mat. Its thickness should be equal to the object being matted and it should provide space for hinges to be attached to the backmat if they are to be used. All sinks need a tab which will allow the art to be raised from the sink without a tool. This tab lies under the art and is pasted to the backmat or is glued under the edge of the sink.

If the opening of the sink is made to be close in size to that of the work being matted, it is possible to elimi-

Preservation Matting for

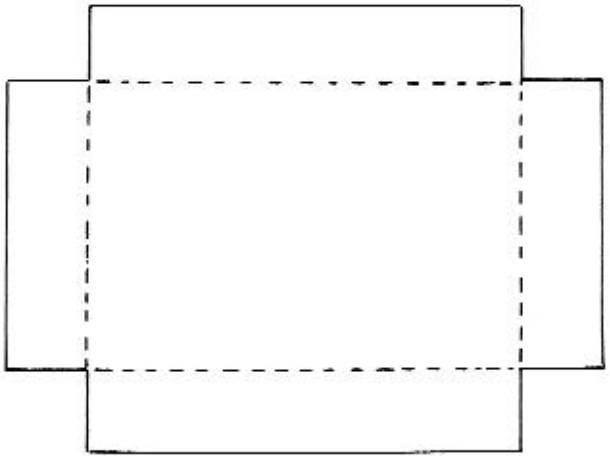


Figure 29

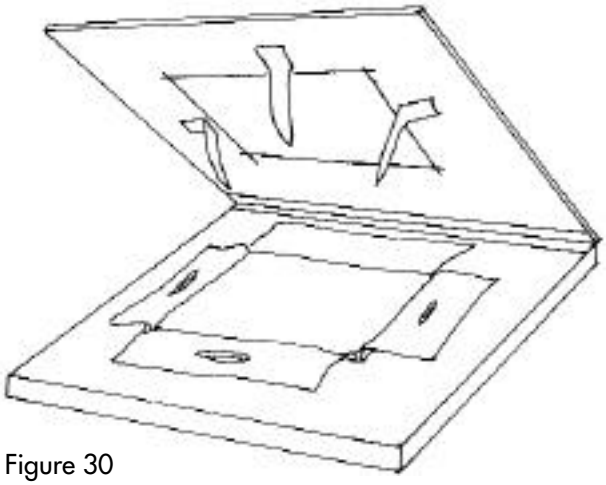


Figure 30

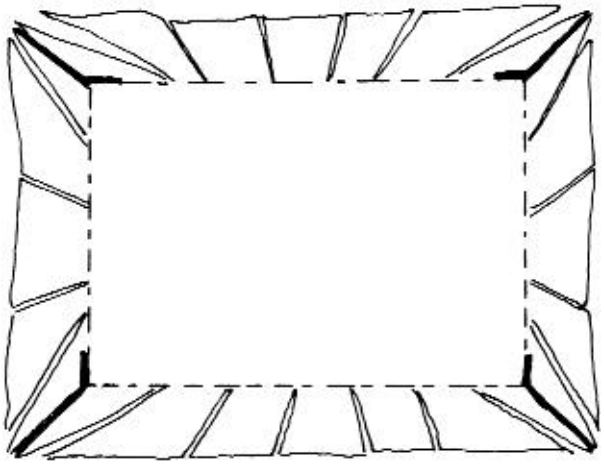


Figure 31

nate the use of hinges. If the sink were too close to the size of the matted work, however, there may be insufficient room for expansion during periods of elevated humidity. A gap can be built into the sink if it is filled with soft tissue. To do this, the work should be laid on a sheet of conservation quality paper and the position of its corners marked on the paper. The paper is then cut so that flaps are formed which intersect at these points (see fig. 29). The flaps are then folded over the edges of the work and it is set in the sink. Rolls of tissue are fitted around its edges and the flaps folded out onto the surface of the sink. The presence of this four flap folder ensures that the rolls of tissue cannot get caught in any irregular portions of the edge of the work being matted.

If the sink is made of a wall of four ply board which has been surrounded by filler pieces of acid-free corrugated board with a gap in between, tabs of linen tape can be threaded through slits in the backmat which have been cut in that gap (see fig. 30). The tabs are then taped to the back of the backmat. The inclusion of the four-flap folder under the artwork makes the addition of a lifting tab unnecessary.

Works on boards which have warped require a sink which can provide very delicate support. A technique for making such a sink was outlined in the Preservation Supplement (PFM February 1995) but that method did not provide as much stability for the object as possible, since the points at which the object was held were limited. A simpler and more stable support can be made from a sheet of conservation quality paper and a sink of appropriate dimensions.

The use of acid-free corrugated board to create this sink allows for the ready creation of different levels in the surface of the sink. This is done through the compression of the board through cutting away some of its layers. The presence of varying levels in the surface of the sink. This permits more accurate attachment of the elements used to secure the work in the sink: straps created by portions of an underlying sheet of paper which has been cut to fit the object being matted (see fig. 31). The straps at the corners are folded across the object and threaded through one another, and the object is then set into the sink and those straps are secured to the edges of the sink with linen tape. The radiating strips of the sup-

port sheet can then be gently puffed snug and secured to the sink with linen tape, creating a conforming sling (see fig. 32).

Other designs which provide support for rigid objects may be considered either sinks or windows, since they share characteristics of both. One of the simplest is a support for collectibles. These items are especially difficult to house since even the addition of Japanese tissue hinges with paste may affect their value.

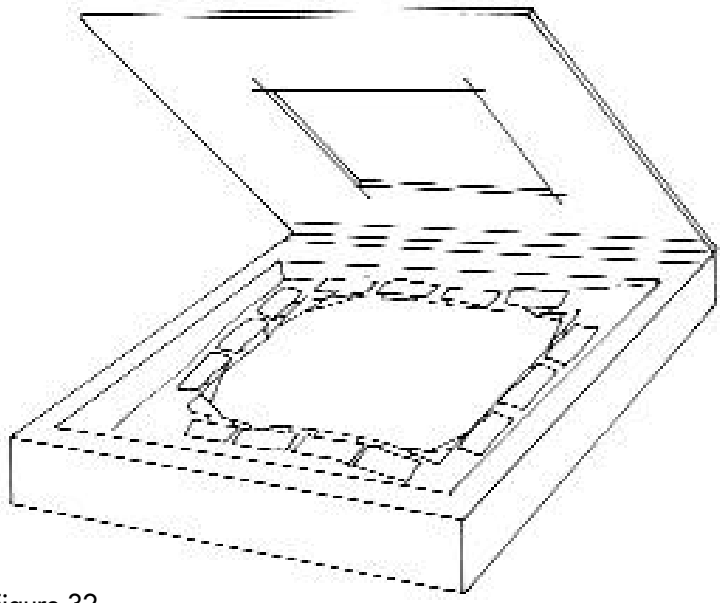


Figure 32

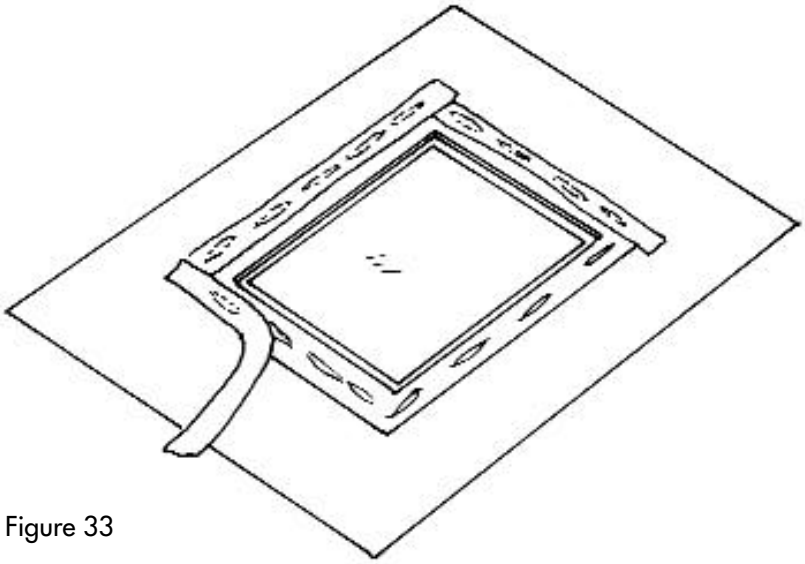


Figure 33

Items such as sports cards may need to have both sides shown and a combination of two ply conservation board and polyester sheet can accomplish this. Two sheets of polyester should be cut so that they are each larger than the opening of the window. A window which has dimensions slightly smaller than those of the two ply window should be cut in its outer edges. The edges of the polyester window should be sanded. The outer edges of the other sheet of polyester should also be sanded, and it should be cleaned and bonded to the back of the two ply window with archival PVA glue. The art can be laid into the opening once the glue is thoroughly dried. The polyester window can be fitted onto the front side of the two ply and secured with strips of linen tape which are burnished so that the adhesive on the tape reaches the two ply through the slits (see fig. 33).

Even the bevel of a window can be used as a support for rigid objects. A small object which is not delicate can be fitted with a four flap folder of strong Japanese tissue. An eight ply window can then be cut so that the edges of the object will fit onto the bevel of the window if it is placed inside. The four flap is folded around the object and weighted in place and the window is fitted over this combination with the bevel inverted so that its edges touch the wrapped edges of the object. The flaps are pulled gently through the opening of the window and secured to the front of the support mat with linen tape using equal tension on all sides (see fig. 34). The object should now be steadily supported and can be fitted with a covering window mat and framed.

A window mat can protect a work of art from damage caused by handling. It can provide steady restraint of

Preservation Matting for Works of Art on Paper

the edges of a work which it houses to mitigate the effects of variations in climate. It can cradle an object which is warped or degraded and weakened. When the edges of the window cover some of a design, they can keep that area from fading and can give us a hint of what the coloration of the whole design looked like originally. Similarly, the portions of the paper which the window covers will be protected from the damage exposure to light brings, and will serve to show the original color of the sheet.

The window mat evolved from the volume page, and will continue to evolve. The possibility of improved window mat designs which may support works of art and artifacts without changing them in any way is one of the great challenges facing preservation. Japanese tissue and vegetable starch hinges represent the minimum of change which can be accepted when an object cannot be supported by its edges, but increased use of overmatting and support from edge strips and other properly designed windows can eliminate the temptation to use hinging materials which may cause changes in the art as they age.

Advances in matting protect the framer and the work being framed. They elevate the role of the framer, as they demonstrate their ability to maintain materials which will be important to the future.