METHODS AND MAKESHIFT

by Robert Futernick

This paper is about several conservation methods that I use. In some cases, the methods borrow heavily from other conservators, and in other instances, an idea has simply burst forth during a period of "California Dreamin'." The techniques themselves are somewhat mundane and need not be taken too literally. Instead, what's important is the attention to a problem and the somewhat random thinking that follows. It is the process of solving problems, the process of modifying existing methods, and the process of inventing a new technology that I hope to emphasize and encourage.

CASTING FIBERS ON JAPANESE PAPER TO CHANGE ITS SURFACE

Long-fiber Japanese paper is often used to fill a loss. Two or more sheets are cut to size, laminated, and affixed to the edge of the damaged paper in a way that the long Japanese fibers extend slightly onto each side of the artifact. This type of repair is strong and flexible because of the inherent qualities of Japanese paper and because the strain caused by attachment is spread over a relatively wide area.

In most instances, this repair technique is totally adequate. However, there are times when repairing art on paper that the appearance of a Japanese paper fill may be different enough to cause distraction. When this is the case, a simple method of altering the texture of Japanese paper can be used and is described as follows:

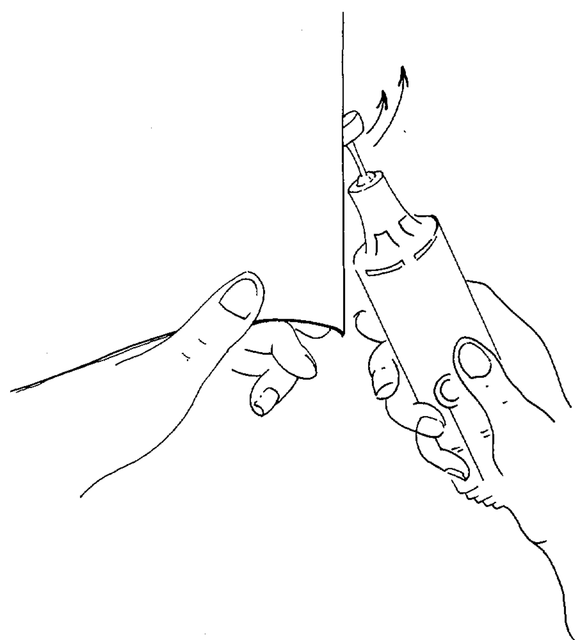
Suitable Japanese paper is sprayed with water and placed on a temporary mylar support. It is coated with a thin application of dilute starch or methylcellulose. Western paper fibers derived from beating old papers are cast into a very thin sheet by using a leaf-casting or sheet-forming apparatus. While the casting is still very wet, it is "couched" onto the Japanese paper and pressed between blotters to effect the bond and dry the papers. If lens tissue is used instead of Japanese paper, casting can be done directly on the tissue, avoiding the need for transfer (casting directly on Japanese paper unfortunately produces uneven results). In either case, the surface may be further altered by burnishing with a bone folder and toning with watercolor and an air brush. The thin laminate is then employed in the usual manner, using the long-fiber technique.

Do you read this and say, "So what? Why pulp and not a thin laminate of Western paper or some other technique altogether?" Sometimes another procedure is more appropriate, but the long-fiber technique has several advantages: It is quick and yields a very flexible repair; when pulp is used, colored fibers can be mixed to achieve an array of surface tones; an amazingly small amount of pulp is required because the thinnest dispersion favorably changes the surface of Japanese paper; like Japanese paper, re-pulped paper is dimensionally stable and less likely to cause cockling from uneven tension; and it is particularly easy to accurately cut the pulp laminate to fit the contour of the loss.

PARING PAPER EDGES

There are a variety of reasons for thinning the edge of a paper: to prepare paper for insertion into a loss, to fashion the inside edge of an inlay mount, and in those instances when it is appropriate, to thin the edge of the original artwork. Paring paper with a knife, even with the most skilled hands, is a tricky process. It is too easy to cut out more than is necessary or to flatten the paper texture on the reverse of the area being thinned. A rotating-shaft tool such as a Dremel offers an alternative method:

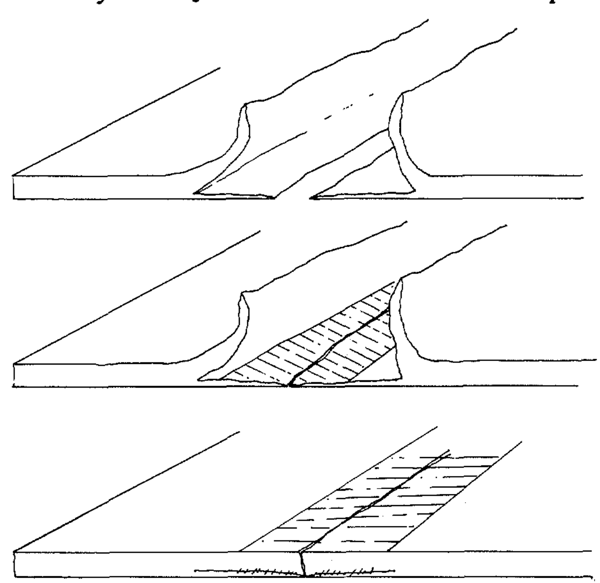
The paper is held in the air near the edge with a light placed behind the sheet so that sheet density can be seen. Experimentation will tell you the appropriate grit and speed for the grinding wheel. The wheel is brought against the sheet so that the rotation moves away from the edge. (You only have to go the wrong way once to realize how important it is to have the correct rotation.) The tool is moved along the edge until the desired material is removed. The slope of the bevel can be lengthened by making successive passes, each time bringing the grinding wheel further toward the interior of the sheet. This process may seem overblown, comparable perhaps to chopping a single garlic clove in a Cuisinart. But actually a great deal of control is achieved with the Dremel. For example, it is possible to thin very weak paper to an extremely fine edge without causing any loss on the surface. As the thinning occurs, the paper begins to bend away from the wheel, preserving those last few fibers.



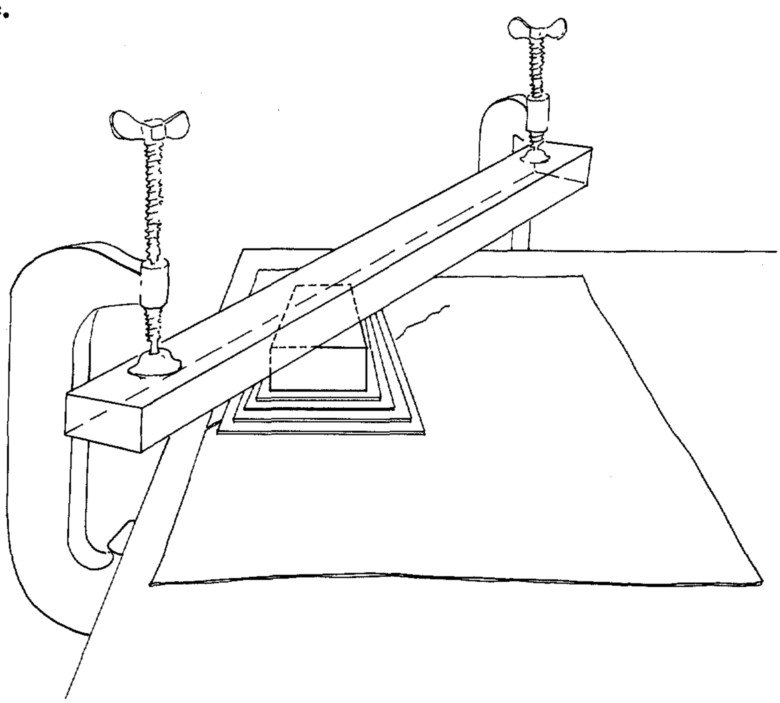
REPAIR OF THICK PAPER

The successful repair of thick paper is difficult. This is especially true if tear edges do not overlap. It is customary to place a thin Japanese paper mend on the reverse, but this, at best, functions as a hinge. After a minimum of flexing, either the fibers or adhesive or both fail. A structural alternative is to add several repair papers equal to the thickness of the original. This method, borrowed from arc welding technology, works if you're not bothered by the big bump on the back or the resultant cockling. Jane McAusland (Paper Conservator, 1978, Vol.3, p.29) describes an amazing but extremely difficult technique involving splitting the paper at the tear edge to allow for the insertion of repair tissue. I attempted this method a few times without success until recently when I was faced with a do or die situation:

By wetting the area around the tear with a solution of water and alcohol (25 parts water to 75 parts alcohol to avoid tiding), separation became possible and I was able to carry out Jane's marvelous technique. After insertion of the internal strip and closure of the flaps, another strip of repair paper can be affixed to the verso for additional strength. This method yields good alignment of the torn edges, a very strong connection, and a minimum of paper build-up on the reverse. The whole process can be improved if heavy local pressure is applied to the tear site during drying. For needed tonnage, a wooden bridge that balances on a pier above the damage is C-clamped to the table's edge.



C-clamping and local pressure is also useful in removing stubborn draws and deformations. A stepped stack of the pressing blotters on top is needed to avoid impressing marks in the artifact. In many cases, overall pressing is performed after local pressing to even out the results. Obviously, textured papers and vulnerable media do not hold up well against heavy pressure.



DRY LININGS

Soluble media, dirty papers and moisture reactive sheets don't agree with wet lining, saturated repair paper or dripping hinges. Chris Clarkson has invented a dry lining technique that involves printing a dry paste adhesive (low water content) onto lining paper through silkscreen fabric using a squeegee. This creates a non-film pattern of tiny dots. An emulsion-coated "silkscreen" (polyester screens are better) and photoprocessing yields additional flexibility in spacing the adhesive dots. This serves to further reduce the moisture and, in many instances, the flatness of the lamination will be improved. An alternate method:

Dry paste is merely spread with a squeegee on polyester web or woven fabric. A slightly damp (expanded) Japanese lining or repair paper is brushed onto the coated polyester support. After contact, the sandwich is turned over and the polyester is pulled away from the paper at a sharp angle leaving a very thin coating of dry paste. Both woven polyester fabric or web are good surfaces for adhesive transfer because of their ability to accept and transfer a thin even layer of adhesive, and because their inherent flexibility affords ease in separation from paste coated paper.

These transfer and adhesive printing methods are particularly good for keeping the fibers of narrow repair paper extended at a water-torn edge during pasting.

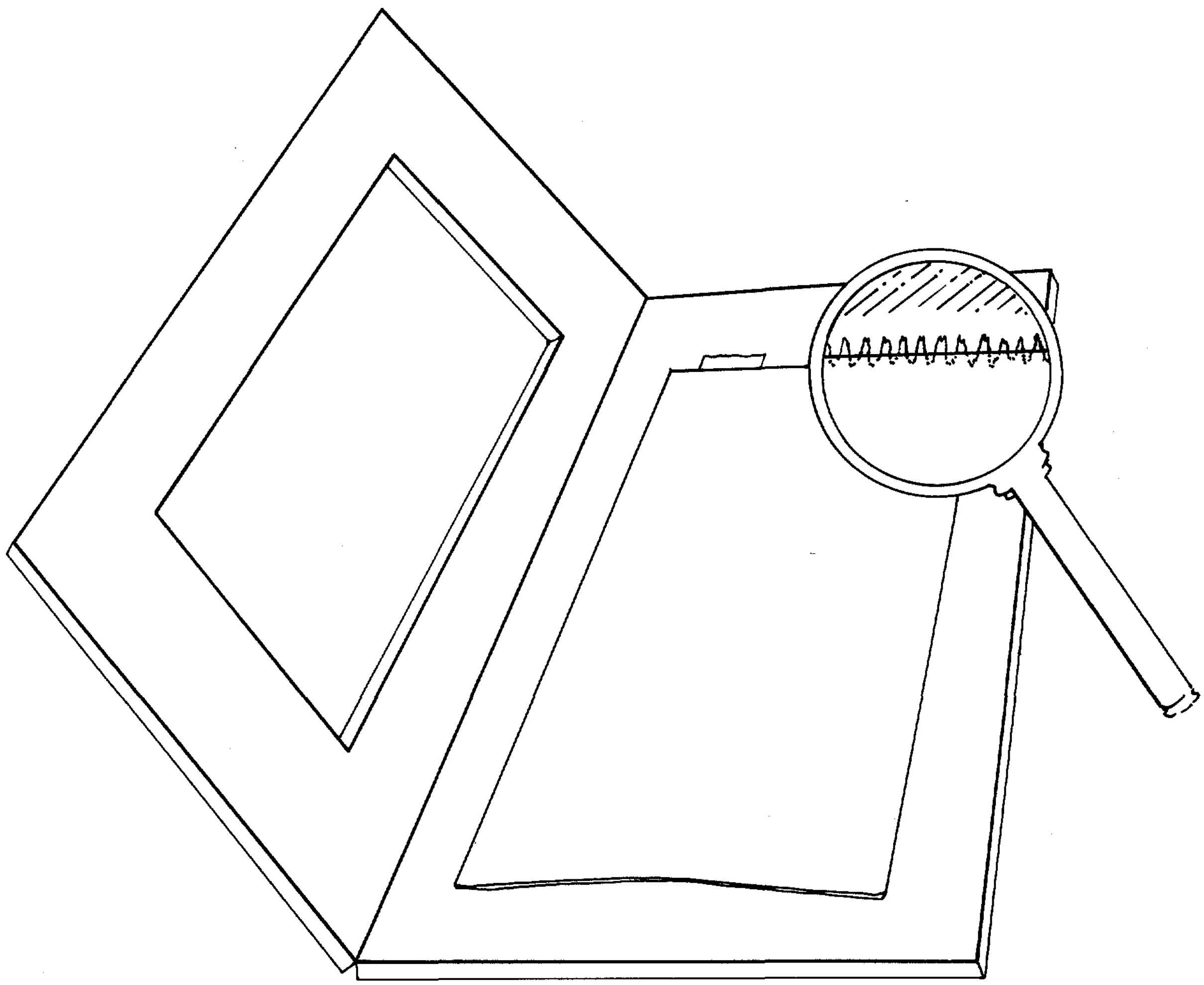
STRETCH DRYING LINED ARTIFACTS

If one end of a strip of wet paper is attached to a ceiling and the other end to a 500 pound weight on the floor, the paper may not lift the heavy mass as it dries, but it will make a good try. Likewise, works of art that are wet-lined and immediately affixed to a drying board come under considerable tension. Hence the stories of separating tears and the horror stories of split artifacts. To avoid this problem, it is common practice to let the lined object dry without restraint and then to spray or brush it with a controlled amount of water just prior to stretching. This is safe and effective but there are times when even more control during drying is desired.

In these instances, the size of the lining paper is made larger by selecting a larger lining sheet or by adding paper additions to existing edges. Though this larger format can create even more tension, the extensions are watched and kept moist during the drying. Small slits cut parallel to the edge of the artifact can be made so that the extension will open like an accordian yet still resist. As the artifact loses its water and begins to assume its final size, the extensions can be left to dry themselves so that mild tension is maintained across the stretched artifact. Katsuhiao Masuda suggests folding or crumpling the paper extension prior to attachment to achieve the same results.

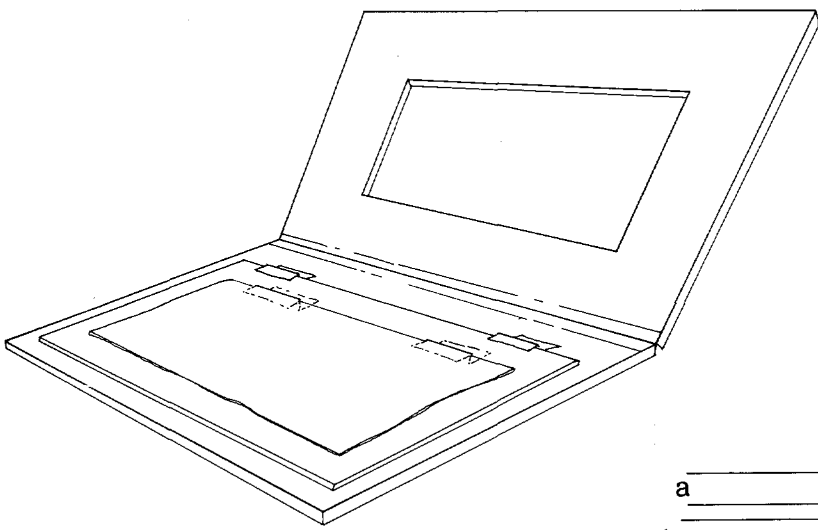
HINGING ARTIFACTS TO MATBOARD

Very thin, lightweight, moisture-sensitive papers are difficult to successfully hinge into mats. Almost any attachment to the verso of the artifact causes visibility on the surface as well as buckling of the paper. An ideal hinge for this material would be thin, attached only to the very edge of the artwork, and would accommodate for lateral expansion and contraction. Peter Waters suggests making tiny knife cuts in the "attachment edge" of the hinge. Alternate segments are removed creating a tiny comb. Only 1 mm of the comb ends need to be pasted and attached to the artifact. Once the hinge is affixed, the distance between the comb segments will widen and narrow in response to changing moisture levels. Attachment of the hinge to the backboard is made 5 mm above the top edge of the art (instead of at the top edge) as an additional provision for lateral expansion and contraction of the sheet. Is the hinging strong enough? Sure - the art itself is "featherweight." An 8" x 10" sheet tips the scales at .5 grams.

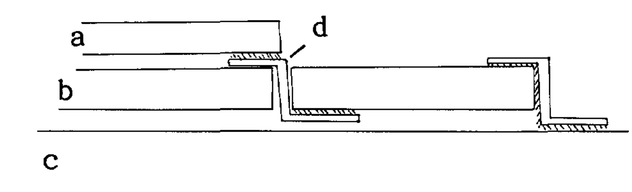


The "heavyweight" presents the opposite problem. A large sheet of thick paper with lots of media is heavy. Folded hinges, needed when edges of the artwork are to be viewed, have difficulty supporting the weight. An alternate method:

Hinges are attached to the top edge of the artwork. The art is positioned within the mat. The two points along the top edge where each hinge extends away from the artifact are marked with a needle. The art is removed temporarily. A mat knife is used to connect the points designating the hinge locations and to cut through the matboard. The hinge material is pushed through the slits so that attachment can be made on the back of the mat board. An easier variation on this technique is to undertake the same procedure on a 1-ply matboard cut larger than the artifact but smaller than the mat backboard. Once the attachment is made, the artwork and its 1-ply backing can be easily positioned within the mat package. The 1-ply backing is then securely fastened to the mat backboard. A side benefit: When an old mat requires replacement, the artifact itself does not need rehinging.



a. Artwork
b. 1-ply matboard
c. 4-ply backboard
d. Japanese paper hinge



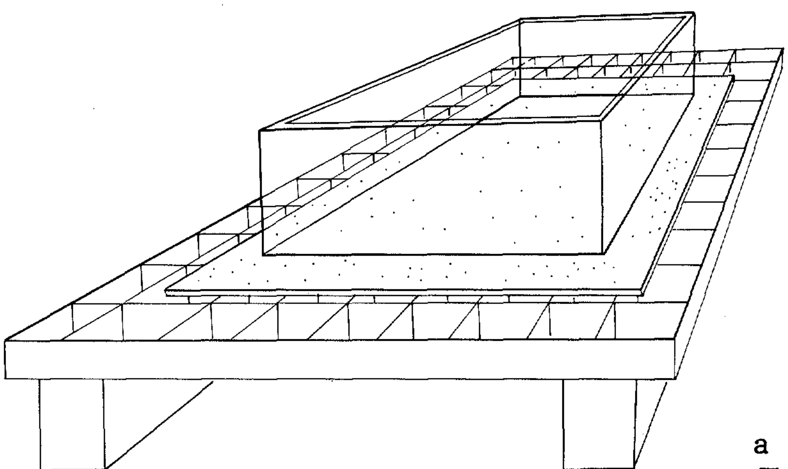
WASHING PAPER

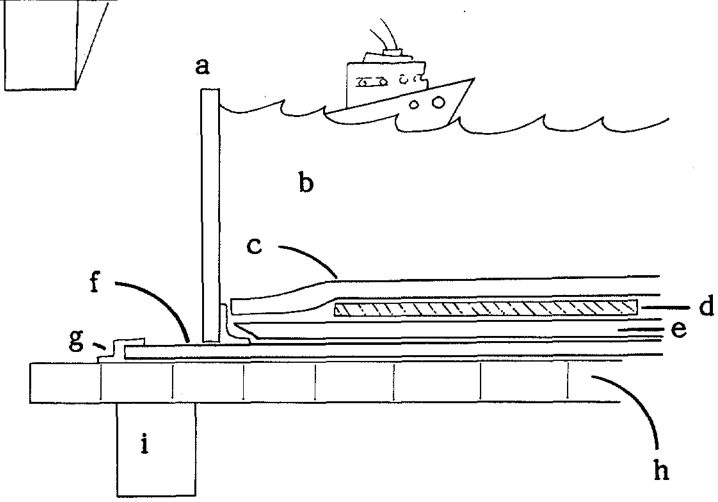
The efficiency of washing can be increased by agitating the solution. This replaces the "dirty" water near the artifact with fresh water, promoting diffusion and extraction. Still, bathing is slow and usually incomplete. We often notice discolored material extracted and deposited on blotter(s) even after long washing periods (2-4 hours). Furthermore, there are instances when "enhanced washing" is desired, either to remove more discoloration (avoiding the need for stronger solutions) or to remove the residues from previous treatments (enzyme or bleaching). In the following paragraphs, several methods for enhanced washing are discussed.

Flow-through cleaning (the drip coffee-filter technique)

A simple, makeshift apparatus is described to illustrate flow-through cleaning:

A plastic or aluminum lighting diffuser (1/2" square cells) is placed on several 3/4" x 3/4" wooden spacers which serve to lift the grate off the sink bottom. A plastic window screen is lightly stretched and taped (duct tape) to the margin or edge of the lighting diffuser. A strip of 1/8" Plexiglas, 12" x 72", is bent and glued at the join to form a rectangle 16" x 20" (convenient size) which is open at both ends. The Plexiglas rectangle, like the walls of a washing tray, is placed and taped (duct tape) onto the screen-covered support. The wetted artifact supported by a sheet of polyester web cut to fit within the rectangle is placed on the screen support. A wet blotter also cut to fit within the rectangle is laid on top of the artifact. The space above the blotter (defined by the Plexiglas rectangle) is filled with water. The weight of 10" of water holds the artifact and blotter on the support, while a very thorough cleaning occurs because of the movement of liquid through the artifact. The water level needs to be maintained at the top of the Plexiglas rectangle. To accomplish this, a simple faucet valve can be set with a hose placed in the tank. A more elaborate arrangement might involve placing an inexpensive float valve from a toilet in the top of the tank.





a. Plexiglas rectangle
b. Water
c. Blotter
d. Artwork
e. Polyester web
f. Screen
g. Duct tape
h. Lighting diffuser
i. Wooden block

How is this different from spray-water washing while the artifact is placed on the top of a suction table or leaf-casting surface? It's not, except that the process can go on for many hours untended! In fact, a suction table, set up to handle a continuing flow of water, is an ideal surface and support for this process. Suction can be applied at the beginning to hold the sandwich down and initiate the process. Once flow is established, suction can be used continually for a faster wash, intermittently if you like to flip switches, or not at all for the energy conservators among us.

You have probably guessed that the blotter set on top of the artifact serves to catch any particulate material that is sometimes found in even the purest of water. Whatever gets through .020" of paper probably won't stop in your object.

Cleaning by evaporation

This method also enhances washing by promoting flow-through, but the process is more subtle than the "drip technique" just mentioned.

A screen is stretched and stapled to a wooden frame so that the screen floats at the water level when placed in a tray of water, even as the water level changes. The damp artifact is set on a wet blotter which has been placed on the screen. Water should not puddle on the artifact; the screen, blotter and paper should instead "float." Several layers of lens tissue are temporarily mounted to the uppermost side of the object with the aid of a soft brush. Then wait! As water evaporates into the air from the uppermost paper, water is drawn up from the tray through the artifact. This will continue until mold breaks out if you let it. The process is accelerated by warming the bath water, heating from the top with a light, and/or blowing air across the surface with a fan. In each case, evaporation is speeded and more soluble material is drawn through the artifact and deposited in the cover sheets. Paper pulp, temporarily cast onto one side of the artifact, will make even better contact with the object and further enhance the extraction process. The capillary forces doing the work here are not weak. A cellulose wick, suspended vertically into a pot of water, will lift fluid over 12" in the air.

REMOVAL OF PRESSURE-SENSITIVE TAPES AND ADHESIVES

Many artifacts with pressure-sensitive tape cannot safely withstand immersion in a solvent bath without adverse affects to media or paper color. When this is the case, an alternate approach is suggested:

The adhesive carrier can sometimes be removed by merely pulling it away, using gentle and even pressure (as suggested by Smith, Jones, Page, and Dirda, Book and Paper Group Annual, 1983). For more difficult cases, blotter or cotton wool is stuffed into a glass jar so that when the jar is inverted, the stuffing remains in position. One or more solvents are added to the absorbent stuffing. The solvent chamber is then inverted onto the reverse of the taped area. After a time (10 - 30 minutes), the adhesive is soft and swollen, and the carrier may be easily pulled away. With the adhesive in the softer condition, it is usually more susceptible to the action of an eraser or rubber cement pick-up-square. Solvent effectiveness is certainly related to matching solubility parameters. Effectiveness is also a function of time. The vapor chamber allows safe increasing of exposure time, while confining exposure to a localized area. Media is usually not vulnerable to fumes, and tiding does not usually occur. If vacuum table treatment of the adhesive is proposed, pre-treatment with vapor may be an effective softening technique prior to "hosing down the patio."

Heat from an air gun or a heated spatula is also helpful for softening certain adhesives prior to pulling the carrier away. The opposite, freezing the area with dry ice or liquid nitrogen, can work to embrittle other kinds of adhesives so that they may be safely chipped away.

Extraction without pliers

Here is an excellent method for promoting extraction of adhesive stains, while limiting lateral movement of discoloration within the paper. This technique involves a variation on the many good poultice methods discussed in the pressure-sensitive tape article previously cited.

Starch and water are mixed together in a beaker. The mixture should be viscous, but thin enough to allow for spreading with a brush or pallet knife. An area slightly larger than the stain is coated. Usually the poultice is applied to the reverse of the artifact. If, however, the pressure-sensitive adhesive is on the front surface, the starch mixture may be applied to the front also.

Uncooked starch has little adhesive strength itself, but it will form a solid mass and make good contact with the artifact. Since water - and not organic solvent - is the vehicle for attaching the poultice, there is usually no movement of stain at the time of coating. Nevertheless, the starch and water poultice should be relatively dry to avoid tiding of water soluble-products.

When the starch is completely dry, the artifact is placed, poultice side down, on a stretched screen which allows access from below. Warm air from an air gun is directed onto the surface of the poultice. Simultaneously, solvent is applied to the stained area from the other side. The solvent can be dripped or brushed on, but an air brush allows for a steady and feathered-edged application. The solvent quickly moves through the sheet and into the dry, warm poultice. By continuing the application of solvent to the stain and warm air on the poultice, a very strong flow is established, not unlike that achieved on the vacuum table. Because of the poultice's tight contact with the paper and the highly absorbent character of the starch, extraction of dissolved adhesive may be more complete than suction methods, and tiding is often avoided altogether.

When the operation is complete, the poultice can be moistened and scraped away easily with a scalpel. A little water on a cotton swab will help remove the poultice residue and aid the cleanup. What limits this method is the difficultly of removing every last granule of starch. This is a problem with all poultice methods but troublesome nonetheless, especially with colored or toned papers. Aqueous packs of Fuller's or diatomaceous earth and paper pulp are materials also worth experimenting with. Perhaps the addition of a very small amount of adhesive (e.g. methylcellulose) will be required to ensure temporary and weak bonding of these poultice materials if they lack cohesive qualities.

The starch pack as described is an incredible extractor. Usually, this is an advantage, but it is possible to create an undesired lightened area. Color or discoloration from aging, toning, or sizing is sometimes persuaded to move out in the treated area by the power of capillarity. Therefore, pretesting is essential.

NOT JUST ANOTHER PASTE RECIPE

Mix an equal volume of starch and water to form a thin cream. Stir boiling water into the cream in the proportions you usually use. Thickening will occur.

Then, place the mixture in a microwave oven if you are tired of stirring. Experiment with cooking times and temperature. This paste does not need spiking with thymol or formalin because it's so easy to make and discard on a daily basis.

This method of bursting starch granules with tiny waves creates paste doesn't spoil easily because mold knows that food prepared with microwave just isn't that good. We've seen spores packing their bags for labs unknown.