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Basic Paper Treatments for Printed Book Materials

Peter D. Verheyen
Syracuse University

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The Cover: James Brockman demonstrating his rebacking and board attachment techniques at the GBW 10th Anniversary Seminar in Washington, D.C. His article is scheduled to appear in a future issue of the Journal.

Editor for this issue: Kimberly A. LoDico

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BASIC PAPER TREATMENTS FOR PRINTED BOOK MATERIALS / Peter D. Verheyen

In October of 1989, at the Guild of Book Workers' Standards of Excellence Seminar, Betsy Palmer Eldridge gave a presentation on "Basic Paper Treatments for Printed Book Materials." This 2½ hour presentation was a very ambitious undertaking, but she did a magnificent job.

Since these presentations and the synopses that later appeared in the *GBW Newsletter,* there has been some discussion. The presentations and these articles are *not* to be construed as a "how to" of basic paper conservation but rather as an introduction for those with interest but little experience. For the more experienced, they present the methods of the individual conservator for dealing with common problems. None of these methods is the only way to carry out a specific treatment. Each project has its own challenges and no two are alike. It is therefore important to continue to build our knowledge through both reading and the lessons of experience.

To facilitate our understanding and to allow us to concentrate on the demonstrations as they were performed, Betsy Palmer Eldridge provided us with a very detailed and useful outline. Her presentation was divided into 12 sections that introduced the major problems and treatments that book conservators might be faced with when working with paper.

WORKSPACE CONSIDERATIONS

Environmental concerns of the workspace, such as humidity, temperature, and lighting, should be monitored and modified when necessary. Anytime we undertake wet treatments, humidity can become a concern. It can be monitored by using recording hygrometers or humidity indicator paper, which Betsy Palmer Eldridge recommends highly. In contrast to the recording devices or even the simpler yet still expensive dial-type devices, the indicator papers are inexpensive, reasonably reliable, and long lasting. They can be placed throughout the shop and will point out trouble spots of high humidity. Air conditioners and dehumidifiers can and should be used in the summer and humidifiers should be used in the winter. A simple window fan can also work wonders to remove localized humidity.

With lighting, the main concern is ultraviolet light, which can cause problems even after a brief exposure period. Direct sunlight, indirect "north" light, and fluorescent lights emit ultraviolet light. Light from these sources can be filtered with ultraviolet filtering shades and sleeves that can be purchased from places like Light

Impressions, University Products, or most any archival supply house. Regular incandescent lights do not cause problems, except for heat buildup.

No matter where we live or work, water is not pure H_2O. It may contain undesirable metals such as iron and copper. It may also contain minerals such as magnesium and calcium, which are desirable as they provide a buffer against acids in the paper. Water may also contain contaminants such as bacteria, particulate materials, and other chemicals that are added to make it safe to drink. These are not necessarily good for the paper. Spring water often provides a natural source of good water because it has a high concentration of minerals and because it is relatively pure. Well water, tap water, and rain water carry with them the problem of contaminants, metals, additives, and possibly low pH levels. City and rain water often have acidic pH levels. The best way to deal with this would be to deionize and recalcify the water as this would remove all the impurities and return a mineral component to the water. However, this is an expensive proposition. Charcoal filters, although not ideal, will at least filter out many contaminants and most particulate matter. In addition to this, we should monitor the pH and, if low, adjust it with calcium or magnesium additives.

Hazards abound all around the working space. Betsy Palmer Eldridge suggested that we keep our tools and liquids in a separate container such as a photo tray to avoid potentially dangerous situations such as spills and scattered tools. She also suggested that we not store things above our benches. Children and pets, especially cats, should be kept clear of work spaces, even though this may sometimes be difficult to achieve. We should also avoid creating problems by bringing the objects we are working on in contact with jewelry, make up, drinks, and worst of all dirty, greasy hands. She also suggested that we have separate aprons for book and paper work, as well as a separate area that is free from leather parings, dyes, and other binding-associated hazards.

EXAMINATION AND TESTS

Before beginning any actual work, certain steps should be taken. The purpose of these steps is to analyze the paper for fiber type and for the presence of sizing to help establish which problems caused the deterioration of the paper and to determine an appropriate treatment.

One of the first steps is testing the pH. This testing should be conducted on the surface of the object as opposed to extracting a sample, which is a destructive process. There are various methods that can be used to test the pH. Digital pH meters, although being very accurate once properly calibrated, are a bit more complicated to use than are the inexpensive indicator strips. The most useful indicator strips have a range of 0-14 for liquids and 0-6 and 5-10 for paper. A piece of Mylar is placed underneath the page to be tested, a drop of water is placed on the paper and the pH strip is then placed in the "puddle" of water with a piece of Mylar on top. This is allowed to "marinate" for about one minute. The pH is read by comparing the color of the strip with the color chart on the box.

When using the digital meter, the same first steps are followed, except that now the electrode is placed in the droplet. When the display has stabilized, we have the proper reading. In testing the pH, the localized application of water can create tidelines in the paper. These can be prevented by "walking out" the potential stain with a cotton swab lightly moistened with either water only or a combination of water and alcohol (Figure 1).

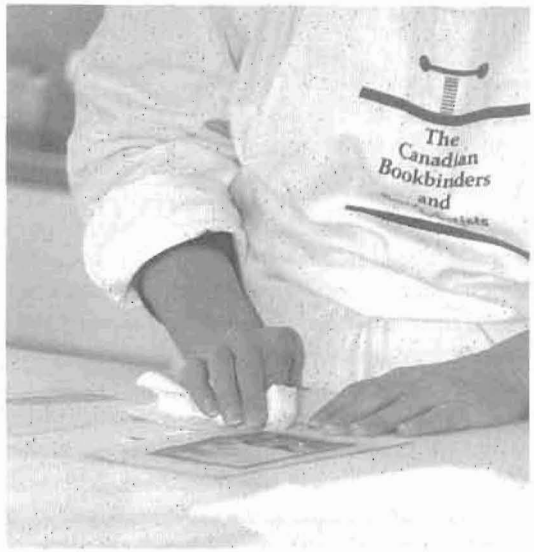

Figure 1 "Walking out" a tide line from an item with a piece of damp paper towel or cotton.

The pH should not be tested on the title page but rather on an inconspicuous spot toward the back of the book. It is also a good idea to test more than one spot on a page (i.e., the center and toward one of the edges) and to average the reading. The top edge is likely to have a lower reading than are the center or the bottom of the page because of the accumulation of dust, which is acidic.

The decision of whether or not to deacidify a page should also take into account the strength and nature of the paper. Many older papers (pre-1800s) have a pH of 4.5

All photos by the author.

to 6.0 but may be more sound and in better physical condition than a newer paper with a similar or higher pH, which may crumble. Some items cannot be deacidified because they are pH sensitive, perhaps leading to color shifts. The point of this is to indicate that factors other than just pH must also be weighed when determining the treatment.

Another test that must be performed checks for the solubility of the inks used in signatures or colors in illustrations. These may be sensitive to water and the many other solvents under consideration. In the same manner as when we were testing for pH, a droplet of the solvent in question is placed on an inconspicuous spot and then observed under a magnifying glass or microscope for any movement. A dry cotton swab can be rolled over to see if it picks up color. In either case, the inks are soluble in that solution. Inks that are soluble in water can be fixed in either paraffin in hexane or cellulose acetate in acetone. Klucel G in ethanol also works well but be sure to check for solubility in alcohol. The first two should only be used in very well ventilated areas, preferably in a fumehood.

TREATMENT PROPOSAL

A complete treatment proposal must be written and approved by the owner before any treatment can begin. The proposal should include the identification of the object, its value if available, a complete description including missing pages, plates, etc., the proposed treatment, cost, and an estimated date of completion. The proposal should be realistic, i.e., stains "reduced as much as possible" rather than "removed."

Besides the proposal, the condition should be documented, including the results of the tests that were carried out, and any complications such as mold damage, tape, old repairs, or other damages. It is especially important that the item be collated, including all leaves from the front paste down to the back, particularly if the object is to be pulled completely for washing. The pages may have erratic pagination or none at all, as is common in older materials. The method that Betsy Palmer Eldridge recommends is to *always* use a pencil on the reverse lower corner using letters from the front until the pagination is clearly marked and numbered from the back.

It is also necessary to check the complete text to make certain that no problems such as missing pages or unmarked plates have been overlooked. This should be done as carefully as possible to avoid overlooking problems and to protect ourselves against any future claims. The owner should be notified if any problems appear or develop that require consultation. The final treatment report should also include the materials and methods used to complete the job. An essential step in conservation is to photograph the project before and after, showing the endpapers, title page, and examples of text and illustrations in addition to photos of unusual findings. The photos should include color and size guides that are available at better photo shops.

SPECIAL PROBLEMS

Very often there are special problems that must be dealt with before washing, deacidification, and other conservation work can begin. First there is mold, which Betsy Palmer Eldridge divided into three categories. The first is invisible mold. Mold spores are everywhere and there is very little we can do about them. They remain nondangerous as long as the environment in which they exist is not conducive to their growth. This means that the environment should have a low relative humidity (rh) and should not be excessively warm.

Visible heavy mold is best removed alive, meaning as intact as possible. This is *not* achieved by erasing it away, a process which just grinds it into the paper. The most effective way to remove the mold is with a vacuum aspirator, which is nothing more than a vacuum cleaner hose that has been narrowed to a fine point by attaching a small funnel to the end. The bag should be discarded afterwards or disinfected and washed. Mold can also be killed with alcohol.

Mold can be killed or at least rendered inactive by exposure to sunlight (ultraviolet light) or by freezing. In certain cases, excessive deposits of mold should be killed before removal. Betsy Palmer Eldridge referred to two methods for doing this. The first makes use of the "Horton humidifier." This is made of two garbage containers, one smaller than the other, the smaller placed inside the larger, with the area between the two filled with some water. Formaldehyde is placed in a glass in the smaller container in which the books are fanned out. The large can is then covered creating a high-humidity microclimate.

Although this method kills the mold, it does have some disadvantages. It is very toxic and, as a hardener of proteins (certain glues, fixatives, and emulsions), may set stains, tidelines, and other discolorations. The second method involves a thymol chamber in which the thymol crystals are dissolved over a light bulb in the chamber and the books left therein for one to three weeks. The disadvantage of this is that it is slow.

Tape is another of those complications that provides the conservator with hours of endless "joy." Very often the client will arrive with a book which, at some point in time, was mended with tape by some well-meaning person (never the client). We are then faced with the task of removing this with as little damage and cost as possible.

Often an effective way of dealing with recently applied tape is to place the object in a freezer for an hour. This will reduce the tack of the adhesive. Heating the tape with a tacking iron with silicon release paper between it and the object will sometimes soften the adhesive allowing the carrier to be lifted off. This should be done by pulling the carrier back upon itself sharply. Solvents, which may also be used to remove the carrier, can then be used to clean up the adhesive residue. Acetone, toluene, hexane, and tetrahydrafueron (THF) are the most effective. They can be used by themselves or in combination.

It is a good idea to start with the weakest solvent and work your way up in strength. Because of the health risks involved with using these, gloves and a respirator with the appropriate filter (organic vapors) are essential. They must not be used in unventilated areas. If no fume hood is available or doing the work out of doors is not feasible, mount a window fan and open another window. Work in front of the fan with it blowing the fumes out. Apply the solvents with cotton swabs, by brushing or bathing. It is best if this is done from the back side of where the tape was, with a piece of blotter directly next to the stain/adhesive. This way the residue is not pulled further into the object. When directly applying a liquid solvent, take the same precautions as when working with water because solvents can also cause stains.

The easiest and safest method, however, for both object and conservator, is to use the solvent in its vapor form by using a "solvent microclimate" with blotter paper stuffed inside. A squat, wide-mouthed jar is soaked with solvent then turned upside down over the tape etc., allowing the heavier-than-air solvent vapor to sufficiently soften the adhesive to allow easy tape removal. A poultice using the same theory can also be made with blotter or "Gore-Tex," which is soaked with solvent and placed on the object with a piece of Mylar on top to prevent a too rapid evaporation of the solvent. The important advantage of both of these techniques is that they avoid washing the adhesive residue into the paper fibers.

Another common problem is "dog ears" which always appear in books. They should not be straightened dry because this will likely cause the fibers to break. The best way to do this is to steam the corner, causing the fibers to relax. We can apply moisture to the fold with a brush but excessive moisture can cause tidelines here too! When the corner has been straightened it should be placed between small pieces of Mylar and rubbed with a bone folder to reduce the crease. It is then pressed with the weight of the remainder of the book block (Figure 2).

The actual treatment can now begin.

Figure 2 Use of a steamer to straighten a "dog ear."

DRY CLEANING

Dry cleaning is used to remove the surface dirt before any wet treatments can embed the dirt in the fibers. Bread was traditionally used, but can leave residues that provide ideal nourishing grounds for mold and other pests. Other materials include synthetic powders such as "scum-X," grated white vinyl erasers, erasing pads, and just plain erasers. With all, it is important to not overly abrade the surface of the paper.

It is important to work the eraser in only one direction, towards and off the edge of the paper to avoid wrinkles. The pads or powders should be used in a small circular fashion to avoid streaks. To avoid getting skin oils on the paper, cotton gloves should be worn or the free hand should rest on a pad of soft paper.

WASHING / NEUTRALIZATION

The major treatment that binders face in conservation is the washing and neutralization of the paper. This has the effect of re-establishing the chemical bonds, which improves the strength of the paper and improves the appearance too. This is accomplished by washing out the degradation products in the paper such as old rosin or alum sizing, dirt, and soluble acids. This washing then brings the pH of the paper closer to a neutral pH of 7.

The items should be washed in a flat-bottomed tray without ribbing at the bottom, which may damage the item. Photo trays such as those from Cesco-lite are ideal and are available in many sizes. Always support the items being washed in the trays instead of allowing them to float freely. For this, there is a wide range of materials. Screening material of either nylon, fiberglass, or epoxy-coated aluminum work well. Others include Hollytex, Remay, or Pellon, all of which are spun-bound polyesters. These all work well, but we should be aware of potential problems. These problems can include having the pattern from the wire screen being impressed into the paper. Pellon, being dimensionally unstable, will stretch and deform, potentially causing great damage to the object. Remay and Hollytex will, with age, begin to "pill," which can snag catch tears causing more damage.

For the actual washing the items are interleaved with the support of choice and are submerged a few at a time to ensure that all are wetted out well. Washing should begin with cold water and should be changed periodically every 30 minutes or so until the wash water is clear. For some tougher stains, raising the temperature of the water can help. However, if it is too hot it will wash out more of the gelatin sizing which was widely used. This can turn a sound paper into something akin to blotter. If this happens it will be necessary to resize the paper.

ALKALIZATION

After the actual washing, it is very often necessary to further deacidify the paper by raising the pH above 7 and introducing a buffer, usually magnesium or calcium carbonate. This will react with future acid in the paper rendering it harmless. Aside from the carbonates, hydroxides are also widely used. They are much easier to use but have the disadvantage of very high pHs which can be damaging to paper in the same way as acids and, therefore, must be diluted.

There are two widely used methods of deacidification: neutralization and alkalization. The first is the "Barrow Two Step." In this, calcium hydroxide [Ca(OH)2] is mixed at 2g/liter according to Margaret Hey or at 4g/liter according to Ann Clapp. Shake well and then let settle. In solution this will have a pH of 12 which recedes to 8 when the paper is dry. This solution is used for the first bath. The second bath is made up of calcium bicarbonate [$Ca(HCO_3)2$]. In this, calcium carbonate is mixed in water at 7.3g/liter and bubbled with CO_2 until clear. This second solution has a much lower pH and is less a shock to the paper than the first.

An alternative is the so-called "Barrow One Step Method" in which, usually, magnesium carbonate is mixed in water and bubbled until clear. The result is magnesium bicarbonate [$Mg(HCO_3)2$]. Because of the presence of CO_2, carbonic acid, it is slightly acidic in solution, around 6.5, but when dry the pH reaches 7.5 - 8.5.

Both of these methods leave behind alkaline reserve, which is desirable. They each have their advantages and disadvantages. Calcium hydroxide is easier to make as it is readily soluble in water. It neutralizes weak acids in the paper better and creates a less hospitable environment for the growth of mold. Negative effects of its use are that the higher pH can discolor lignin, a natural substance that is present in almost all (especially cheaper grade) wood pulp papers. Therefore, it should not be used at high pH values. It can also precipitate on the surface. Magnesium bicarbonate is a better stabilizer of the metal particles that are sometimes present in paper and water. Its lower pH is less of a shock to the paper and may result in less discoloration of lignin in paper, but it is more complicated to mix.

OPTIONAL TREATMENTS

A light table is very useful for removing old repairs and making infills, and can be made rather easily by taking an opaque piece of Plexiglas and backlighting it. A fluorescent light under the Plexiglas in a photo tray works well. To remove old mends, use a combination of overhead and reflected light to see the mends. Backlighting allows us to see if there is any fiber loss from skinning, for example. Raking light can be used to see if there are any residues from adhesives or paper on the surface.

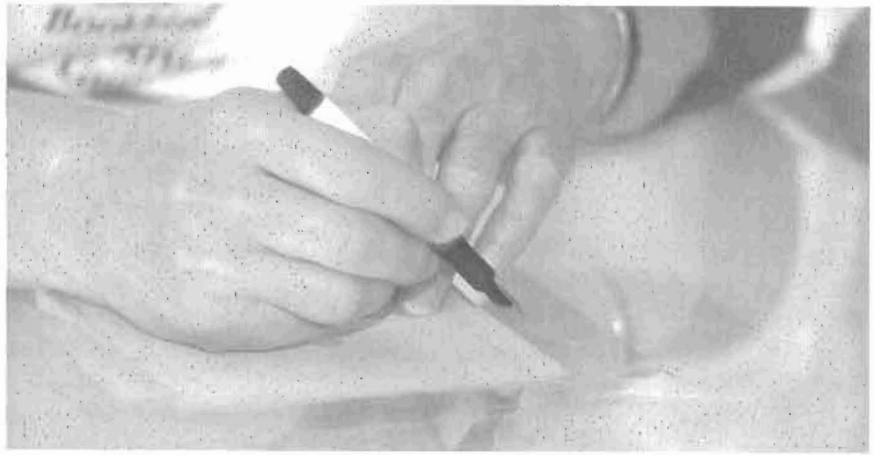

Figure 3 Using a water pen to trace the outline of an area of loss onto mending tissue.

To make inlays, the object is placed on a wet piece of Mylar then is itself wetted out. This allows it to expand and allows easy manipulation to align tears. Another piece of Mylar is then placed on top. Using the light table, the area of loss is traced onto tissue with a water pen or a very fine brush and torn into the desired shape (Figure 3). It can then be pasted out and positioned with a slight overlap. A similar procedure is used for dry inlays and repairs.

Float washing can be ideal for riskier items such as colored prints or manuscripts, where we are uncertain of the stability of the inks and colors. This allows us to observe the stability of the colors as the object is being washed.

Using wetting agents such as alcohol helps the water penetrate the paper better and break down the sizing. Ethanol or isopropanol can be added directly to the water before the items are placed in at a 1:1 ratio as Margaret Hey recommends or at a 1:16 ratio with the items being sprayed before being placed into the water.

Enzymes are very useful for delaminating endsheets or other papers or if sizing agents need to be removed from the paper. Before using them it is important to determine whether the adhesive is a protein (animal glue) or a starch, as in the case of paste. To break down protein-based adhesives we would use a protease, whereas for starch-based adhesives we would use an amylase. Both of these are used in water at a temperature of about 40°C, but not much hotter as this will kill off the enzymes.

Tough stains can often be worked out by using surfactants like "Orvus," which helps break the surface tension or by using textile detergents. These are worked to a froth with a soft brush and then rinsed away with flowing water, making sure that the force of the water does not damage the item. Other stains might be better removed

with alcohol or ammonium hydroxide. There are no clear cut solutions to any of these problems so we should have an open mind and experiment with these. Always test first for solubility of inks and other dangers.

BLEACHING

Bleaching is one of the most controversial treatments (mis)used by conservators. Its purpose is to improve the appearance of the item by lightening discolorations and reducing stains. Light bleaching is one of the easiest and safest methods with a result that lets the natural color of the item show rather than ending in a stark white. Because sunlight degrades lignin and alum rosin sized paper, it is not advisable to light bleach these. However, it is fine for rag papers. The item is placed in a deacidification bath of magnesium bicarbonate with a clear Plexiglas cover raised slightly above the tray to allow air to circulate, and thus prevent condensation and heat buildup. This is placed in the sun or in an area of open shade until the desired effect has been attained. The length of exposure depends on the latitude and time of year. If banks of fluorescent lights are used, the method is the same but the duration is longer because of the reduced intensity of the light.

The other alternative is the use of chemical bleaches. Used properly, chemical bleaches can be effective, but still have many disadvantages. Bleach is a very caustic substance and, as a result, can be very hard on paper. Visually the results are less than pleasing too, unless you like stark white paper. For further information, Betsy Palmer Eldridge suggests reading Margaret Hey's article in the Paper Conservator, Vol. 2, 1977.

LINING

When dealing with fragile materials it often becomes necessary to line them, adding strength and dimensional stability. Rice or wheat starch used as adhesives should be properly thinned down to something like skim milk in consistency. Betsy Palmer Eldridge pointed out that bookbinders, as a rule, use their paste much thicker than do paper conservators. The lining material is almost always Japanese paper; although historically, silk, linen, and other materials have also been used. The choice of tissue is determined by the weight and color of the object being lined. Kozo has the longest fibers, but mitsumata and gampi are also very popular. However, gampi does have a great deal of pull. When lining, both the liner and the object should be well dampened on Mylar to allow them to relax and to give the conservator a last opportunity to align tears. The lining tissue should also be about an inch larger on each side. Either the lining, the object, or occasionally both, may be pasted out, making sure that the paste is brushed on very smoothly and not too thick. This avoids having brush strokes show through on the completed object. Wipe away the excess

Figure 4 Pasting out the reverse of a plate on glass in preparation for lining with Japanese paper.

paste on the Mylar with a sponge. Next, pick up the Mylar with the object still on it and lay on the lining tissue as centered as possible. Now, carefully peel the Mylar off the back of the lining tissue at as sharp an angle as possible and replace it with a piece of Remay. The excess moisture can be removed with a brayer rolled across a paper towel or blotter. At this time, the fibers can be lightly pounded with a stiff brush to smooth out any wrinkles or to ensure a good bonding. If necessary, repeat on the other side and place between felts or smooth blotters under a piece of Plexiglas with a light weight on top (Figure 4).

Figure 5 The edge of a lined plate being pasted out for stretch drying on a piece of Formica.

Another way to dry the object is to stretch the tissue on a drying board, a piece of Plexiglas, Formica, or even a clean tabletop. Place the lined object face-up on the surface and then fold back and paste out the extending edges of the liner making sure that the object is smoothed out. While drying, the fibers will shrink and the object will dry flat. Care should be taken in both methods to be sure that the character of the paper and the impression of the type and texture are not destroyed. If stretched on a piece of Plexiglas, areas of loss can also be easily filled at the same time. The areas of overlap should be well rubbed down through a piece of Mylar with a bone folder (Figure 5).

DRYING AND HUMIDIFICATION

The purpose of drying and humidification is to remove the moisture from the paper, leave the fibers in one plane without cockling, and flatten it without losing type punch and plate lines. There are several ways to humidify an object. The paper can be directly sprayed, brushed, or ultrasonically humidified. A humidity chamber may also be used. The double garbage can described previously can only be used with cold water because hot water will cause too much condensation. Also a photo tray with blotter can be saturated with water and the object can be placed on a rack with the tray covered.

In a different method the object can also be "marinated" in a sandwich in which it is put between a piece of interleaving such as Remay or Gore-Tex, a wet blotter, and finally, Mylar on each side. No weight should be placed on top as the object must expand without wrinkling. Drying can be accomplished either unrestrained through exposure to the air (drying rack), under pressure, or by stretching. When air drying, the excess water on the surface may be removed with blotters. The object is then placed on the drying rack with a support such as Remay underneath. Cockling when drying is attributable to an uneven distribution of moisture. This can be controlled by placing a piece of Gore-Tex or even Remay on top.

When the objects are dry to the touch they should be placed between blotters and boards with a light weight on top. If the sheets are too dry they may need to be humidified first. To dry under pressure the same procedure is used as when humidifying, except in this case the blotters are dry. These should be changed as often as necessary, generally three times at increasingly longer intervals. Stretch drying is done the same way as described in the section for lining.

RESIZING

Resizing is often not necessary because washing will reactivate the fiber bonds and the old sizing. Sometimes, however, it does become necessary. The purpose of resizing is to give strength to the fibers and to protect the surface of the paper. If the

paper feels like blotter after washing or if it feels very limp with little body, then resizing should be considered. The different types of sizes are protein, starch, cellulose ether, or synthetic based. Protein sizes are very dilute animal glues or gelatins that are acidic. Parchment size is made from small pieces of vellum that have been cooked, resulting in an alkaline size. These have traditionally been applied by dipping the paper in a tub of the size.

Starches are very dilute, brushed-on pastes made from rice and wheat. These may be slightly acidic. The pH of these can be raised by making the paste with alkalinized water.

Cellulose ethers are methyl celluloses that are neutral in pH and are indigestible to animals and mold, which can be a problem with the other types of sizing agents. Synthetics such as soluble nylon are no longer used because they are nonreversible, cross link with age, and discolor. These sizings can be applied either by dipping, brushing, or spraying. The choice depends on the strength of the paper and the amount of sizing that should remain on the paper. Whether or not the paper is dry or wet also influences the sizing process. If it is wet the size can be thicker because not as much will be absorbed, whereas if the paper is dry the size should be thinner to prevent excess stiffening. Sized paper is usually dried on a drying rack, then humidified and flattened.

The End

The sections can then be assembled into a book block, given a final pressing and bound. As Betsy said, "The end is but the beginning . . ."

SOURCES OF USEFUL INFORMATION

Books

Clapp, Ann F. The Curatorial Care of Works of Art on Paper. 3rd Rev. Ed. Nick Lyons Books: New York, 1978.

Cuhna, George Martin. Conservation of Library Materials. The Scarecrow Press: Metuchin, NJ, 1971.

Petherbridge, Guy. Conservation of Library and Archives Materials and the Graphic Arts. Butterworths: London, 1987.

Thomson, Garry. The Museum Environment. Butterworths: London, 1986.

AIC Publications

The American Institute for Conservation of Historic and Artistic Works, 1400 16th Street, N.W., Suite 340, Washington, D.C. 20036

The Book and Paper Group Annual

Vol 2, 1983

Smith, Merrily A., Jones, Norvell, M. M., Page, Susan L., and Dirda, Marian Peck. "Pressure Sensitive Tape and Techniques for its Removal." p. 95.

Vol 3, 1984

Keyes, Keiko M. "The Use of Friction Mounting as an Aid for Pressing Works on Paper." p. 101.

Kohler, Stuart. "Spring Water and Paper Conservation." p. 105.

Baker, Cathleen. "Seven Helpful Hints for Use in Paper Conservation." p. 1.

Vol. 5, 1986

Baker, Cathleen. "The Double Sided Light Bleaching Bank." p. 88.

Garlick, Karen. "A Brief Review of the History of Sizing." p. 94.

Henry, Walter. "Resizing Following Aqueous Treatment: Current American Practice." p. 108.

Vol. 7, 1988

Kruth, Leslie. "A Survey of Recent Scientific Research Which Has Caused Reevaluation of Commonly Used Practices in Book Conservation." p. 30.

The Paper Conservation Catalog

First Edition, 1984

Humidification, Drying / Flattening

Second Edition, 1985

Neutralization and Alkalization

Fifth Edition, 1988

Sizing and Resizing, Consolidation / Fixing / Facing, Lining

Designer Bookbinder Publications

Designer Bookbinders, 6 Queen Square, London WC1N 3AR, Great Britain

The New Bookbinder

Vol. 2, 1982

McParland, Maighread. "Book Conservation Workshop Manual Part Two: The Nature and Chemistry of Paper, Its History, Analyses and Conservation." p. 17.

IPC Publications

The Institute of Paper Conservation, Leigh Lodge, Leigh, Worcester WR6 5LB. Great Britain

The Paper Conservator

Vol. 2, 1977

Hey, Margaret. "Paper Bleaching: Its Simple Chemistry and Working Procedures." p. 10.

Hatton, Matthew. "Enzymes in Viscous Medium." p. 9.

Vol. 4, 1979

McAusland, Jane, and Stevens, Phillip. "Techniques of Lining for the Support of Fragile Works of Art on Paper." p. 33.

Stannard, Trevor. "An Introduction to the Photographic Recording of Archival Material during Conservation." p. 45.

Hey, Margaret. "The Washing and Aqueous Deacidification of Paper." p. 66.

Vol. 10, 1986

Michels, Jan, and Boyd, John. "A Book Conservator Borrows an SEM." p. 73.

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Peter Verheyen has worked with John Dean in the conservation lab while he was a student at Johns Hopkins University. He has interned with Georg Reinwald in the conservation lab at the Germanisches National Museum in Nuremberg, Germany, and has completed a formal, two-year apprenticeship in hand bookbinding at the Kuntstbuchbinderei Klein in Gelsenkirchen Germany. Mr. Verheyen has studied with Julia Puissant at the Professional School for Book Restoration in Ascona, Switzerland, with Frank Mowery at the Folger-Shakespeare Library in Washington, D.C., on a Mellon Internship, and later with William Minter in Chicago. Mr. Verheyen has participated in several local, chapter, and national exhibitions. He is currently Conservator at Yale University and Chairman of the Exhibitions Committee for the Guild of Book Workers.