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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

Articles and reports by members and non-members are welcome for consideration. The views and opinions expressed in this Journal are those of the respective authors and do not necessarily reflect those of the Guild.

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).

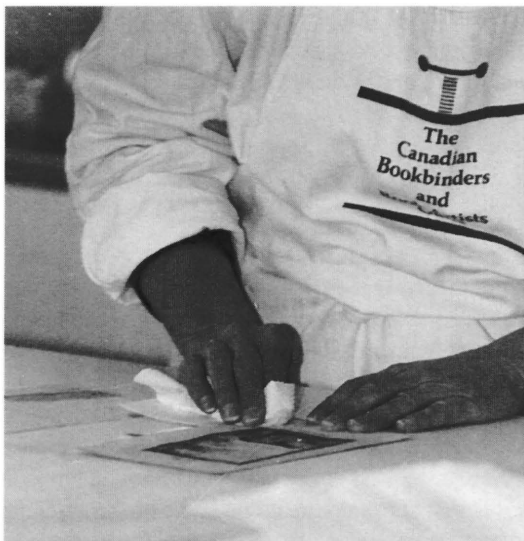


Figure 1 “Walking out” a tide line from an item with a piece of damp paper towel or cotton.

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

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 tetrahydrofuran (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.

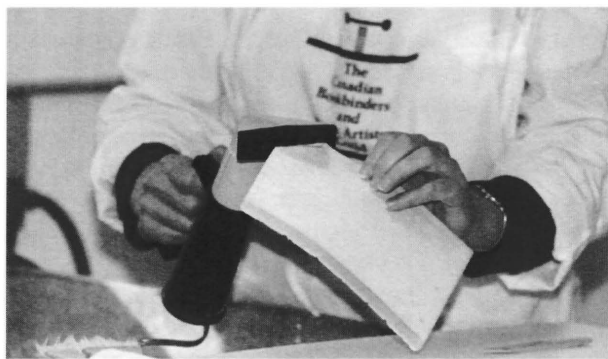


Figure 2 Use of a steamer to straighten a "dog ear."

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 $[\text{Ca}(\text{OH})_2]$ 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 $[\text{Ca}(\text{HCO}_3)_2]$. 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 $[\text{Mg}(\text{HCO}_3)_2]$. 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 alkalized 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 . . ."

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Betsy Palmer Eldridge, for her fabulous presentation and outline, which formed the basis for this report, and for her positive input and critique of this article.

William Minter and Nancie Ash for the use of their notes.

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.

PETER FISHER: ARCHIVAL PORTFOLIO BOOKS / Bonnie Garlan

Peter Fisher has been a professional photographer since 1976, and is in an especially strong position to address issues that relate to photography and bookmaking.

Concerned with developing books that would incorporate original photographic prints both safely and effectively, Peter attended *Oxbow '85* and the later *Paper and Book Intensives*. Influenced by these meetings, especially from the work of Hedi Kyle and of Pam Spitzmueller, he began to make book structures that rely on the accordion or concertina folds. The application of these folded structures, together with the liberal and integral use of handmade papers in the page designs, are two characteristic features of Peter's photographic books.

Peter's presentation at the 1989 Standards Seminar included discussion both of portfolio books and of photographing our work. This article deals mainly with the first of these topics, reflecting the relative prominence which he gave to the two at the Seminar.¹

CONTEXT AND CONDITIONS

In developing his photographic books, Peter Fisher implicitly set several requirements:

1. *The presentation of photographs in a genuinely book-like form* in contrast with a portfolio or a box of individually matted prints. The book-like features include (a) a predesigned sequence of images, encountered in a fixed order determined by the photographer; (b) a page-like structure that lies open and flat, permitting "reading" in a page-by-page way; and (c) the inclusion of text material—verbal content integrated with the photographic images.
2. *Full and easy access to the prints*, even after the book has been completely bound. The mounting and binding methods, while being protective and secure, still permit easy removal and replacement of any photograph.
3. *The safeguard of the prints*, requiring (a) materials archivally acceptable for photo storage; (b) a method of positioning the prints securely without using potentially harmful adhesive mounting techniques; and (c) sound structural designs that avoid damaging the photo surfaces. Peter's designs accomplish this by the combination of protective window mats that prevent contact between photographs on facing pages, and a folded or hinged book construction that minimizes the extent to which facing pages slide past each other as the book is operated.
4. *The use of special papers* as a covering for the window mats, to enhance the character of the photographs and to make the book more unified in its total impact. Papers so incorporated can work together with both the images and the text visually, texturally, and even thematically.

TWO SOLUTIONS

Peter brought to the Seminar two distinct kinds of photographic books that met these requirements. Each of these solutions can be adapted to either a hard cover or a flexible cover, appropriate to its content and scale.

The first solution was represented by Peter's limited-edition *Madrona Point Book*, a one-sided accordion book composed of double page-mat units hinged together side by side. In this book, he combined Cibachrome prints with calligraphed and hand-set printed texts to produce a moving and dramatic photo essay.² The entire book block was bound between hard endboards and enclosed in a clamshell box, all thematically unified by the use of cattail papers and madrona inlays.

The second solution was represented by various experimental prototypes, stages and variations in the development of Peter's "Conservation Art Portfolio." Here, individual page mats, either one sided or two sided, are sewn onto a concertina hinge that not only forms the spine of the book block but also provides for its attachment into a separately constructed protective case.

I will begin with some notes about one of the materials used in making these books, and will then discuss the accordion form and the concertina hinge book. There will be a few concluding general thoughts before turning to the topic of photographing books. A short list of useful publications appears at the end of this article.

A NOTE ABOUT MATERIALS

The main structural material that Peter employed in both designs—used for page mats, for support sheets, and for the hinging components—is CRPP1 Lig-Free Photographic Enclosure Paper, a cardstock weight material available from Conservation Resources International (see References). The CRI catalog says of this paper,

We developed this unique alpha cellulose pH neutral non-buffered, sulphur free paper specifically for archival photographic enclosures . . . The superb long chain alpha cellulose fibers we use give even this relatively lightweight paper a remarkable folding endurance of over 1,000 double folds in the *weakest* direction at 1 kg. load. (CRI catalog, p. 30).

The CRI catalog also offers other archival materials such as special boards for making cases and boxes, and a ready-made photo album. The catalog is useful not only as a source of supplies, but also because of the 12-page essay with which it opens. This remarkable piece, written for "those who are without scientific background," is an exploration—at the chemical level—of what paper really is; and a review—also at the chemical level—of the many ways in which paper deteriorates and perishes. The piece begins with atomic theory, the nature of chemical bonding, the composition of glucose rings and cellulose chains and the fibers forming the

sheet of paper. Following this are discussions of acids, light degradation, enzyme attack, and other enemies. The significance of the pH scale, the function of alkaline buffering, and the criteria for selecting materials are also discussed. You will surely be glad you read this essay, although you may end up feeling somewhat more nervous than you did before.

CRI also issues an untitled eight-page brochure that begins, "Dear Photographer: The information in this letter will help you understand our archival photographic storage products." Photographs impose some special storage requirements distinct from those relating to books, and this brochure (in conjunction with the catalog essay) will alert you to some of these issues.

For a more rigorous treatment, consult the American National Standards Institute's recent major revision of its standards for photographic enclosures: ANSI IT9.2-1988. The revised section includes a new *Photographic Activity Test* ("PAT") developed at the Image Permanence Institute (IPI) at Rochester Institute of Technology. This new test uses two standardized detectors to determine (1) the enclosure material's reaction with silver (a cause of fading), and (2) the material's tendency to stain gelatin.

IPI applied its *Photographic Activity Test* to 90 different enclosures, including 66 that used materials that could be considered "archival" (because "sold by suppliers who specialize in archival products"). In the tests, 24 percent of the presumably "archival" products failed the fading criterion and 15 percent failed the staining criterion. Clearly,

The interactions between photographic materials and enclosures are . . . more complex and varied than the commonly used archival descriptions such as 'acid-free' allow for.

The "acid-free" descriptor, for instance,

does not guarantee . . . inertness toward photographs. In some cases, the high prices paid for "archival" enclosures actually buy materials more harmful than grocery bags or newsprint (Reilly, et. al., 1989).

IPI recommends that we choose products that explicitly state that they (1) meet the requirements of ANSI IT9.2, including the *PAT* of the 1988 revision; (2) are intended primarily for photographic application; and (3) come from suppliers who are familiar with the special needs of photographs.

THE ONE-SIDED ACCORDION BOOK: MADRONA POINT BOOK

This folded book structure opens flat for page-by-page viewing and reading, but can also be extended to its full length, making it especially useful for display and exhibitions. The window mats provide some backset to protect the photo surfaces, and the folded structure minimizes the abrasion between facing pages as the book is operated.

The structural units of this form are the one-sided double page mats, hinged together side by side (Figure 1). Each of these units includes its own integral hinging flap, cut and scored, which is then adhered to the neighboring unit. These same flaps also eventually provide the attachment to the endboards that complete the binding and enclose the entire accordion.

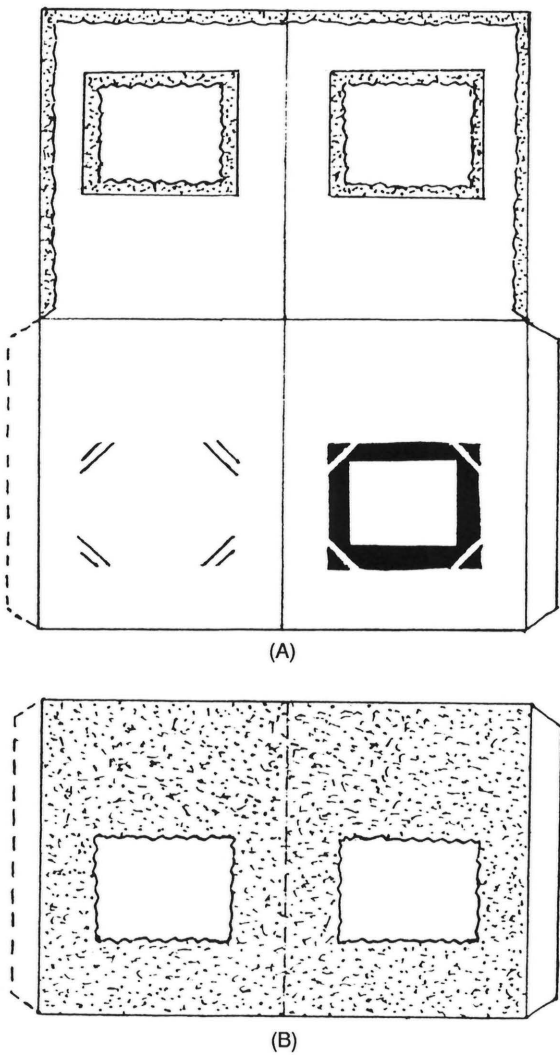


Figure 1 Double page mat for accordion book. (A) open; (B) closed.

Photographs are mounted in corner-slots that have been cut directly into the cardstock (*CRPPI*) pages. The window section of the mat is then folded down over the photographs, covering the corner-slot mounting arrangements and the border of the print.

In *Madrona Point Book*, each mat has also been overwrapped with a delicate paper made of cattail leaf adhered to the mat only at the turn-ins. At the edges of the windows the paper is wet-torn; this forms a striking contrast with the glossy surface of the Cibachrome prints. These torn edges are not glued down to the mat. However, wet-torn strips of Kozo tissue, adhered to the edges from behind, make the edges more durable and anchor them in position (Figure 2). The torn edge of the Kozo aligns with, and visually blends with, the torn edge of the cattail paper, reinforcing it around the edges of the window.

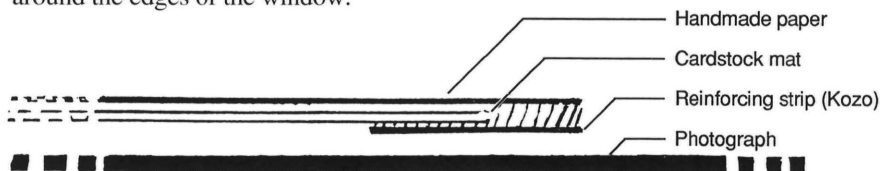


Figure 2 Detail: Cross-section through the edge of the window.

THE "CONSERVATION ART PORTFOLIO"

This portfolio book, using many of the same materials and techniques as the accordion book, was designed for temporary storage and display of photographs, but its materials and construction make it suitable for long-term storage as well. The version of the book described here is easily dismantled, since it uses adhesives only very sparingly—relying instead on the judicious use of folding, sewing, and lacing.

Each photograph is mounted separately in its own support sheet made of *CRPPI* cardstock, accurately positioned in corner slots cut into the support sheet (Figure 3). This feature allows rapid and safe removal and replacement of prints from the book. The support sheets in turn are slipped into the pockets of individual window mat pages (made of *CRPPI*). The pages may be either one sided or two sided; Figure 3 shows a two-sided version. The pages are cut with six narrow integral flaps as shown, and are scored for later folding.

The concertina hinge (Figure 4) is also folded from *CRPPI*. It contains a peak fold for each page mat that will be attached, plus an extra peak at each end for sewing on flyleaves. The flaps at the start and the finish provide for later attaching the entire block into its cover, a separately constructed case.

Peter again wrapped both the concertina and the page mats of this book with handmade papers, adhered only at the turn-ins and the back edges. The window edges were treated as shown earlier (see Figure 2), with reinforcing strips of Kozo tissue.

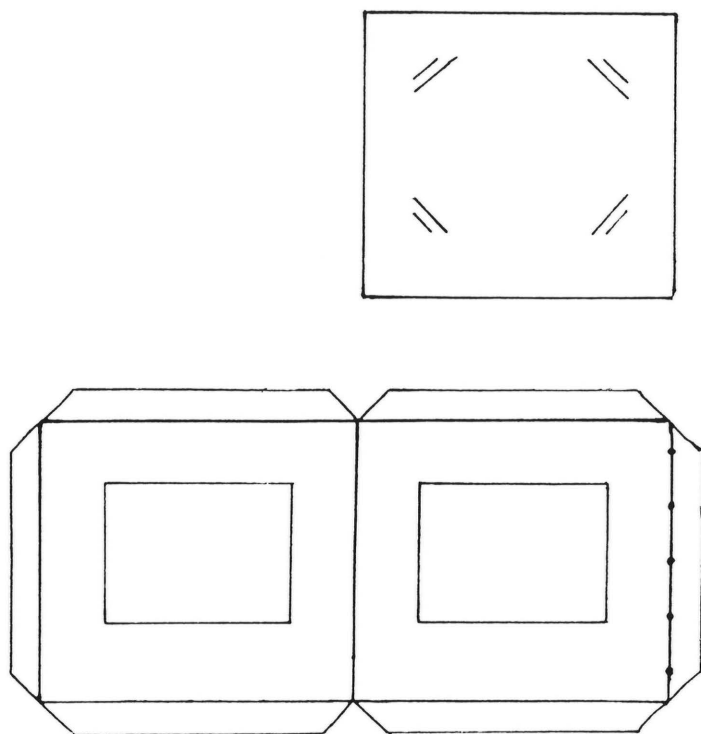


Figure 3 Two-sided page mat for concertina book, with separate support sheet.

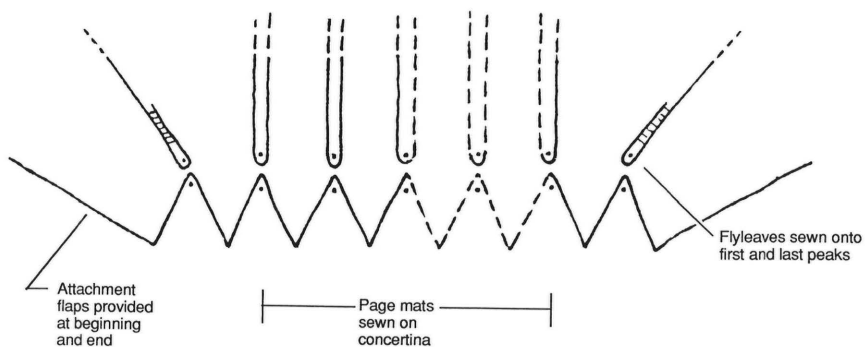


Figure 4 Sewing the flyleaves and page mats onto the concertina.

Referring now to Figure 3 for the flap numbers, Flaps 1 and 2 are folded down and glued into place, making a double thickness which helps to strengthen the head and tail edges of the mat.

Flap 3 forms the fold through which the page is sewn onto the concertina hinge with a simple three- or five-hole pamphlet stitch. Peter suggests using a moderately thick thread with a soft surface, to prevent the sewing from tearing through the folded paper. This flap could be glued down after the sewing is complete; but if it is left unglued it will be easier to take the book apart later if the occasion should ever arise.

Flaps 4 and 5 are folded down but are not glued. The support sheets containing the photographs will be installed in the mat behind these two flaps. Once they are in place, Flap 6 is tucked in behind them. This closes the mat around its contents, but still allows easy access for tasks such as cleaning and replacement.

One simple way of attaching this completed block into its case is to glue it in place by the concertina endflaps, covering the evidence with pastedowns on the inside of the board. Alternatively, Peter showed an attractive nonadhesive attachment using a five-hole lacing through the spine of the case. This method leaves exterior cords exposed to abrasion and various forms of user-inflicted damage, but worn cords can be replaced quite easily.

Here is how the laced attachment is done. First trim the attachment flaps of the concertina to a width equal to the thickness of the completed book block, then fold them inward across the back of the spine (Figure 5). Make the five holes (configuration as shown in Figure 6a) through the spine of the case *and* through both of the infolded concertina flaps; the holes must align through all three of these. The two sets of slots that will eventually hold the ends of the lacing cord (Figure 6d) can also be cut into the inner flap at this point.

For lacing, use a strong linen or flax cord about $3\frac{1}{2}$ times as long as the distance AD (Figure 6a). Stiffen the ends of this cord with a little PVA and let them dry. Then fold the cord at its center, and bring it as a small loop through all three aligned center holes "C," *from inside* (i.e., from behind the flaps; through both aligned flaps; through the spine of the case, to the outside) (Figure 6b).

From inside, bring one end of the cord through the aligned holes at A, the other through the holes at E. Both cord ends, as well as the loop, are now on the outside of the book (Figure 6b).

Now take each cord end in turn through the little loop at hole C and back through an unused set of holes. The cord that emerged at A will, after passing through the loop, reenter at D; the cord from E will reenter at B. Adjust the tensions so that the loop draws tight and grips both exterior cords firmly and symmetrically (Figure 6c). The ends of the lacing cord are now inside. To finish off, pass each end through its precut slots in the concertina flap (Figure 6d). Friction will hold them there—no need to glue or tie; just seat them firmly and trim off any extra length.

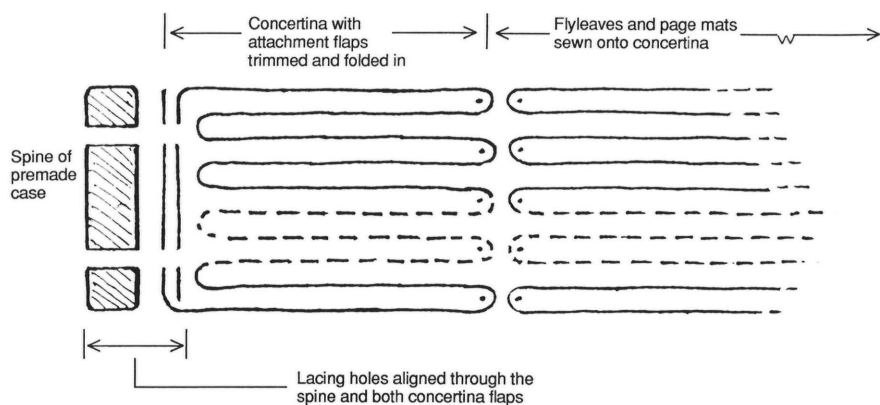


Figure 5 Preparing to attach the concertina into the case.

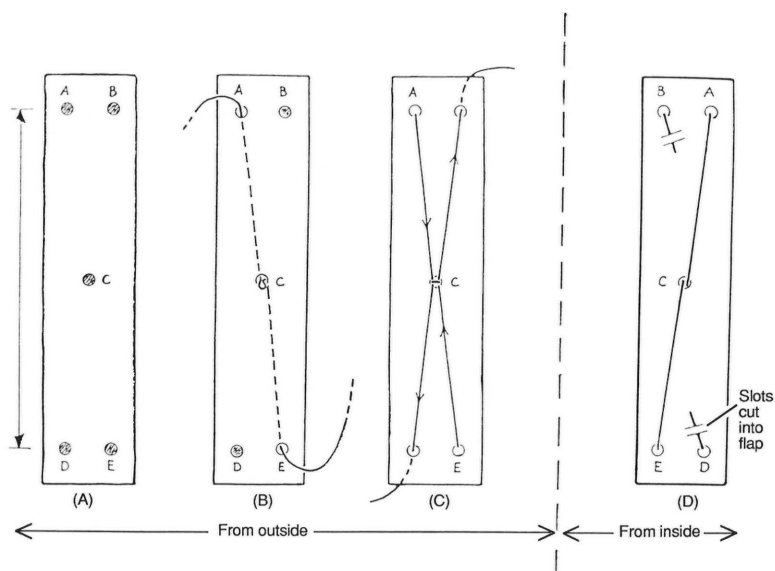


Figure 6 Laced attachment through spine of case (A–D; see text for description).

SUMMARY

Although both of these types of books were originally developed to hold photographs, they are more general in their application. Either of them can easily be adapted to contain drawings or prints, or in fact any form of work that does well in a matted presentation.

The book forms are also more general than the particular examples brought to the seminar. The accordion book, together with separate support sheets, could easily accommodate changing displays. The concertina book, with provision for custom windows and a printed text, could be a limited-edition publication. The structures are generalizable, the principles adaptable.

Using special papers to wrap the mats allows an additional range of design possibilities: varieties of color and texture and translucence, materials that resonate thematically with the subject matter, and so on. Provided the papers are not allowed to become competitive or distracting, they can add another rich dimension to the photographic book.

ABOUT PHOTOGRAPHING BOOKS

In a final brief section of his talk, Peter gave some advice, which was received with a good deal of interest, about photographing books.

For important photographs where superior quality is needed, seriously consider hiring the services of a professional studio photographer. Professionals have both the skills and the specialized equipment to get excellent results, and in certain cases this high quality may very well justify the inconvenience and the extra expense.

However, in many cases what is needed is less exacting: a good record of the work, and color slides that are “without obvious technical flaws” and that “do not insult the integrity of either the artist or the artwork.” You can learn to produce such slides reliably with a minimum amount of specialized equipment and by a reasonably simple set of procedures. The following is some advice for those who choose to go this route.³

Ideally, try to arrange a separate part of your studio area to dedicate to photography, where your equipment can stay set up as completely as possible (backdrops, light stands, and tripod). Failing this, at each shooting session try to duplicate the same set of conditions as nearly as you can. The key idea is that of repeatable results.

1. *Camera/lens/tripod*: Use a 35 mm SLR camera, and mount it on a tripod (for accurate framing of the shots, and for steadiness while using the necessary slow films). Set the camera level with the object being photographed. Use a telephoto lens; 105 mm or 135 mm is ideal—from 85 mm to 200 mm will work. This helps keep the image flat and square. (A book should look trapezoidal only if it really *is* trapezoidal.)

2. *Film and lighting*: Use a slow film, in one of the two scenarios:
 - a. outside, with diffuse light from a high overcast day, use Kodachrome 25 or 64.
 - b. indoors, use Kodachrome 40 together with photoflood lights matched to the film, in an otherwise dark room (no admixture of other kinds of light, natural or artificial).
3. *Exposure*: to get the necessary sharpness and depth of field, use an aperture from f8 to f16. Then bracket your shots; i.e., shoot each setup at several different exposures. Range as widely as from two stops below to two stops above the exposure recommended by your light meter, and make a record of these exposures as you go. This may mean five or more shots of each setup, but within these you will surely have one that is ideally exposed. As you become more familiar with the process and study your results, your bracketing in subsequent photo sessions can become less extreme.

In summary, the idea is to develop a reliable procedure that will give you good, repeatable results; to become confident with it; and to alter it only for very good reasons. Standardize as much as you can with regard to film, backdrops, lighting arrangements, and lenses. Keep records, so that you will know what you have learned. And do not worry too much about using film while you are learning. "Remember," says Peter, "the only film you waste is the film you didn't shoot!"

NOTES

1. In writing this article, I am grateful for Peter's help in supplying some additional materials that go beyond his Seminar presentation. Also, Figures 1 and 3 accompanying this article are adaptations of Peter's sketches, somewhat revised, and labeled to coordinate with the explanations.
2. For some indication of the role that this book played in helping to block a major land development project on Oreas Island, see the Seminar report by Suzanne Ferris in the *GBW Newsletter* for February 1990. *Madrona Point Book* contains excerpts from Christopher Alexander's *A Pattern Language* (New York/Oxford 1977). The letterpress printing is by Suzanne Ferris, the calligraphy by Kimberly Montgomery, the papers by Nancy Pobanz and Tim Barrett, and the binding by Constance Powers and Marguerite Bullock.
3. This short set of guidelines contains many significant gaps, even though it reflects the seminar presentation. Much more needs to be said (perhaps in some future *Journal* article) about such matters as the use of the light meter and gray card, the choice of backdrops, the use of electronic flash, and the placement of lights.

PUBLISHED SOURCES OF USEFUL INFORMATION

- ANSI IT9.2-1988. Available from: American National Standards Institute, 1430 Broadway, New York, NY 10018; Tel. (212) 642-4900.
- Bull, William. "A Photograph Album." *Bookbinder*, Vol. 2, 1988.
- Conservation Resources International: *Catalog of Archival Storage Materials and Conservation Supplies*. Conservation Resources International, Inc.: 8000-H Forbes Place, Springfield, VA 22151. Also available: Eight-page brochure about archival photographic storage units.
- The Conservation of Photographs*. Eastman Kodak Co.; LC 84-80244, 1985.
- Fisher, Peter. "A Simplified Procedure for Photographing Artwork." *Canadian Bookbinders and Book Arts Guild Newsletter*, Vol. 4, No. 2, Summer 1986, pp. 32-33.
- Horton, Richard. "The Light Album." *The Book and Paper Group Annual*, Vol. 3, 1984. Compiled by Craig Jensen, Austin, TX.
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- Catalog of Archival Supplies*. Light Impressions, 439 Monroe Ave., Rochester, NY 14607-3717. Also available, information brochures: "Mounting Techniques," "Cutting Window Mats by Hand."
- Reilly, James M., et al. "Photograph Enclosures: Research and Specifications," *Topics in Photographic Preservation*, Vol. 3, 1989, pp. 1-8. AIC Photographic Materials Group, Washington, DC. Available from: AIC, Suite 340, 1400 16th Street, NW, Washington, DC 20036; Tel. (202) 232-6336.
- Rempel, Siegfried. *The Care of Photographs*. Nick Lyons Books: New York, 1987.
- Smith, Merrily. National Preservation Program. *Matting and Hinging of Works of Art on Paper*. Preservation Office: Research Service, Library of Congress: Washington, DC, 1981.

While working as a bookbinder, *Bonnie Garlan* produced many private commissions, including bindings and book enclosures, collaborative projects with artists and printers, and presentation boxes for fiber artists, printmakers and photographers. She teaches at the Oregon School of Arts and Crafts, where she is head of the Book Arts Department.

EDGE-TO-EDGE DOUBLURE / Monique Lallier

Since the 17th century, doublures have been a special feature in French fine bindings deserving elegant treatment. During the 19th century, Marius Michel created many leather doublures, sometimes as decorated as the book covers themselves. Many decorated doublures of the 19th century were executed on Janseniste bindings.

There are two different ways to treat a doublure: (1) Framed with the turn-ins; or (2) Edge-to-edge. The technique that I will demonstrate here will give you a perfectly smooth doublure because no straight cuts are utilized.

To begin, your book must be covered and must have been allowed to dry. If your design requires an extensive use of onlays, you are better off finishing the design before fixing the doublures because it is still possible to shape the boards toward the text block if necessary.

Because you have a leather joint, you must have tipped on a card or kraft folio before the rounding and backing, to reserve the space of the leather joint. It is now time to remove it and make sure that no trace of adhesive remains on the text block.

Cut the leather you will use for the doublure $1\frac{1}{2}$ " more in height and $2\frac{1}{2}$ " more in width than the cover size. Pare the leather at .5 mm or .6 mm (the thickness of raised onlays). Some flesh is needed to obtain a cushion-like look, but if cut too thick, will make the boards gape.

Open the board flat, supporting it with pressing boards. On the turn-ins, trace a line all around the inside board with your bone folder $\frac{1}{8}$ " from the outside edge. With a sharp, flat knife, cut on a long bevel, starting at the line, toward the edge of the turn-ins. Sharpen your knife often.

If the leather surface is uneven, either scrape the leather with your paring knife using it straight upright, or sand it with medium grit. The leather surface should be as smooth as possible.

Choose a white, acid-free card that is approximately 10 pts. and not too heavily sized, and cut it a fraction beyond the bone folder line. Sand off the four edges of the card and repeat the process with the other board.

When the two sides are ready, paste down one card with mix (50% paste : 50% PVA), bearing in mind the three layers that you will apply: the card, the Arches paper, and the leather doublure. Fix the card within the edges of the leather, and a fraction beyond the bone folder line. Place a card sheet and polyester film between the text block, then close the cover. Put these in a press tightly for 5 minutes. Repeat this procedure on the other side. Let it dry beneath weight overnight.

When dry, open one board flat, supporting it with pressing boards, and sand the card from the center toward the edges, being careful not to hit the leather on the outside edge. To avoid this, I use a block sander from the 3M Co. It has a comfortable handle and the paper, which sticks on a felt base, can be unrolled. But, any other sand block will also work. Placing the side of your thumb next to the edge of the block will also protect the leather. Sand it until it is smooth. Rid the surface of flaws and unevenness. To evaluate this, you close your eyes and feel the edges with the tips of your fingers. Remember that if it is not perfectly smooth, the flaws will be seen through the doublure.

Next, choose a good paper with little sizing; an Arches text wove type paper is preferable. Cut this paper in the correct grain direction, 2 mm beyond the edges. Repeat this for the other board. When the two sides are ready, you paste (or use mix) the paper, fix it in place, rub it well with a bone folder, and place it in the press for a few minutes. Repeat this for the other side and let it dry under weight overnight.

When dry, open the cover flat on the boards, and remove the paper that goes beyond the edges of the board with a small piece of smooth-grit sandpaper. Use quick and small strokes from the inside to the outside. Be careful not to touch the leather on the outside edge. You can place your thumb underneath the paper on the edge of the cover to protect it. Pull off the paper and continue sanding with the sandblock until it is perfect. If by an bad luck you tear the paper in sanding, glue it back into place, let it dry, and sand it smooth. While the card and/or paper are drying, prepare the leather.

Cut the leather, keeping one side bigger as a security. Square two sides, the tail and the fore edge, and cut a fine strip on a bevel, straight and even, all along the edge. Use a scalpel (changing the blade as needed) or a very sharp paring knife. Work on a piece of marble or on a paring stone. Do not put too much pressure on your hand, *let the blade cut it straight as you direct it*. The blade should always be parallel to the edge of the leather. Hold the leather with your left hand, and slide the blade all along the edge.

Blow the stone often to get rid of the leather dust under the leather piece. This dust can cause awkward and expensive accidents.

When the two sides are perfect (if not, you still can cut a tiny strip and do it again), cut the head side plus $\frac{1}{8}$ " or more for the stretch and bevel it, as was done on the other sides. Cut off a fraction of the two corners.

The fourth side is the hinge. Find the right measurement by placing your doublure on the board, allowing for the stretch of the leather, and pare the part of the leather that goes beyond the board. Allow $\frac{1}{4}$ " to cover the end paper, and then cut away the surplus. Pare to a feathered edge that part of the leather that goes on the paper. You are now ready to fix the doublure.

To fix the doublure, wet the leather on the outside and apply paste to the inside. Remove all paste lumps and brush strokes by laying paper down on the paste then

removing it quickly. Slightly paste the inner board; it helps in putting the doublure in place.

Apply a second layer of paste on the leather and get rid of all lumps or brush marks with the paper.

Put the doublure in place, making sure that all the edges of the board are covered. Stretch the leather out or push it in. Let the hinge up and, with your thumb, manipulate the leather at the edge, making sure that the white paper is completely covered. Lift the cover and inspect the edges to make sure that the doublure is perfectly straight.

If the leather stretches more than anticipated, work it back into place with the palm of your hand. If you use a box calf, put the open cover in the press with 1½" of padding paper placed at each side. Do not press if you are using a grain leather.

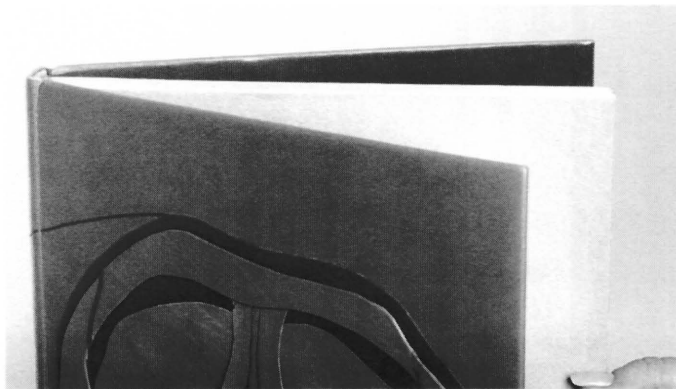
Repaste the hinge if necessary and fix it into place, being careful at the join with the turn-in caps. The leather comes down in a straight line from the edge of the boards to the text block. The small piece of leather that is now floating in the air will be cut along the edge of the block when dry, and pushed back behind the headbands to keep the square of the boards intact.

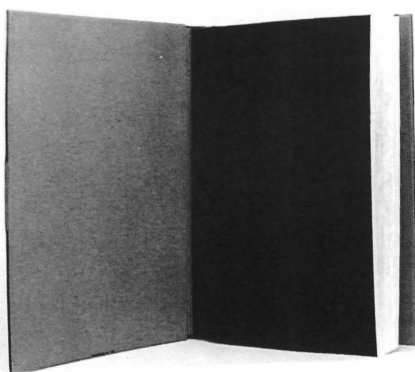
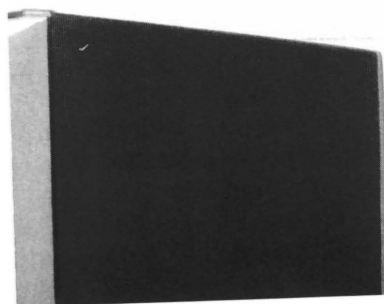
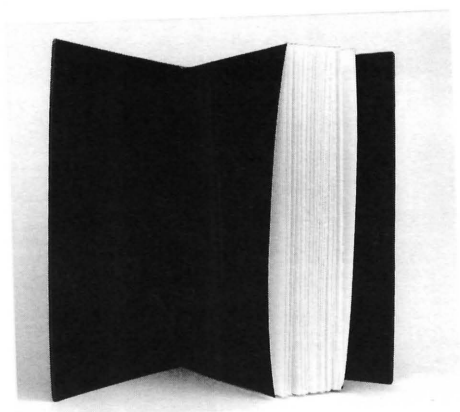
Let the hinge dry open for about 3 hours, and let the cover dry open on supported boards for 30 minutes. Then, lift the cover half way, and support it with crumpled paper or felt.

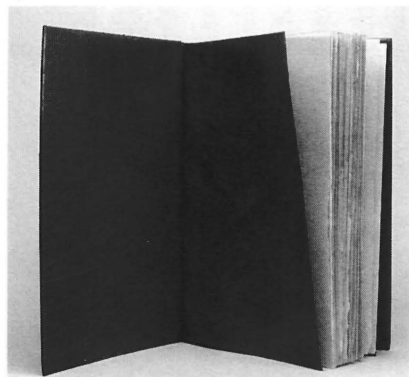
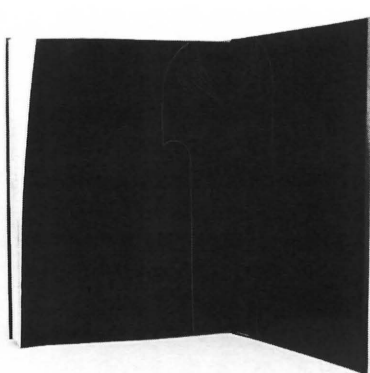
When the hinge is dry, put a card and a sheet of Mylar in and close the cover. Repeat this procedure on the other side. Be careful to put the card between the Mylar and the leather because the Mylar can stick to the damp leather and mark it.

The book can be pressed when the leather is dry. The covered flyleaf can be of leather or paper.

SOME EXAMPLES OF DOUBLURES







Step-by-Step Procedure

1. Cut the leather for the doublure larger than is needed ($1\frac{1}{2}$ " more at the head and tail and $2\frac{1}{2}$ " on either side).
2. Trace a line all around the inside board at $\frac{1}{8}$ " with a bone folder.
3. Cut the turn-ins in a long bevel with a sharp paring knife.
4. Scrape or sand the flesh side until perfectly smooth.
5. Cut an acid free white card (10 pt) not too sized, a fraction beyond the bone folder line.
6. Sand off the four edges of the card.
7. Adhere the card with mix and position it. Let it dry closed with a card and Mylar between the text block and the cover.
8. Repeat on the other side.
9. Sand down the edges of the card from the middle toward the outside of the board until it is very smooth.
10. Choose an Arches text type paper and paste it down with mix. Fix it 2 mm ($\frac{1}{8}$ ") beyond the edges of the board. Let it dry closed with card and Mylar.
11. Sand the edges of the paper until it is perfectly smooth (avoid scratching the leather).
12. Prepare the leather: pared down to .5 mm or .6 mm thickness, cut a bevel on the three sides—pare down to 0.3 mm for the hinge on the fourth side.
13. Dampen the grain side of the doublure and apply paste to the flesh side twice.
14. Position the doublure in place, stretching it out or pulling it in if necessary.
15. Fix the edges of the doublure to the outer extremities of the board.
16. Repaste the hinge area and fix in place.
17. Let it dry open for 2 or 3 hours.

18. Close the cover and repeat on the other side.
19. When the other side is finished, put it under weight and let it dry 24 hours before beginning to tool the design.

To have the leather pared:

Guy Bonnani
15 rue de Marseille
75010 Paris FRANCE

or

Lomelis Bros.
16 Spring Street
Peabody, MA 01960
Tel: (508) 532-4949

Guy Bonnani will pare bits and pieces of leather as well as the leather to cover a book, paring just the spine and turn-ins, following your pattern on paper. You can write to him in English.

Lomelis will split a full skin at your exact measure (thickness). You need to be specific in the thickness and they can transfer from millimeters to inches. They have a \$40.00 minimum charge. The last time I sent five big skins and I was still within the minimum charge.

For the paper micrometer:

Conservation Resources International
8000-H Forbes Place
Springfield, VA 22151
Tel: (703) 321-7730 or 1-800-634-6932
Fax: (703) 321-0629

Ms. Lallier studied bookbinding in Montreal, Canada, with Simone B. Roy and studied gold tooling with Roger Arnoult in Paris, France. She further trained with Edwin Heim in Ascona, Switzerland, and with Hugo Peller in Solothurn, Switzerland. She has taught bookbinding for many years and has exhibited widely.

EXECUTION OF COVER DESIGN

The cover design is done on a sheet of white paper that is the exact size of the book's covers and spine. A Japanese paper, not too thin (Washi), is placed over the design. The height is that of the book, with both front edges about 2" longer. An ink pad is used to transfer the design onto the Japanese paper. Write the numbers of gouges and pallets used onto the Washi at their correct positions. Wrap the Japanese paper lightly around the covers. The turn-ins at the fronts are held in place with Scotch tape. If the design is intricate, cut small pieces out of the Washi before the wrapping. Once wrapped around the covers, Scotch tape is also applied over the cut-out squares, thus holding the Washi in place while the first tooling through the Washi on the covers is executed. This first tooling is done with a hot brass tool through the Washi onto the dry leather of the cover. For the tooling of the design on the spine you need to place the book into a finishing press.

Take the book out of the press after tooling the spine, remove the Washi, and begin the second tooling. This is done with the hot tool applied directly onto the dry leather covers. To determine the right temperature, touch the heated tool to a wet sponge. Generally, just when the "sizzling" sound is about to stop, the temperature is just right. (The impressions from the first tooling are easily visible.)

For the next step, moisten your leather with a brush for small areas or with a sponge for larger areas. If you only have a few impressions to tool, you can moisten the whole cover for your blind tooling, but if the design is complex and takes a long time to tool, just moisten parts of your leather. (If you wait too long with your tooling after the leather has been moistened, the impression might have disappeared.) Remoisten the leather one more time if necessary and continue your blind tooling by gradually increasing the heat of your tool. To get a beautifully blind-tooled line you need to tool about five times, each time increasing the temperature. If you work with morocco, this step is especially necessary because the grain is very uneven in height. The surface of the leather has to be "crushed" down to an even level throughout the lines that will be gilt. Therefore, an even gilt line is ensured and you avoid having one that shows "cracks" because the gold could not reach down deeper than the impressions made with the brass tools. Only through moisture, heat, and pressure can this be accomplished.

The final blind tooling is now done when the leather has dried. A hot tool is now used and after the tooling is done, a rich dark brown "shining" line is visible.

With a fine brush the tooled lines are traced using glair. After this has dried, a second coat is applied.

Next, the gold leaf is cut on the gold cushion with a gilders knife into appropriately sized pieces. (I always lay a second leaf of gold onto the first one before cutting. This way, I make sure no hairline cracks appear when I press the gold into the impressions.) A pad is made from a cotton ball wrapped in a piece of fine cotton cloth tied with a string onto which a few drops of sweet almond oil is applied (sweet almond oil is the only oil that will not stain leather). The oil is applied to areas to be gilt to hold the gold in place during gilding. Now the cut gold leaf is transferred to the oiled surface of the covers with a gold lifter, a piece of bristol board, or with fingernails. To make this transfer possible you need to touch your instrument of transfer to your face; the oil from your skin will cause the gold to stick for the short period of time required to move it from the cushion to the cover. The gold leaf is then pressed gently into the impression with a ball of cotton using a rocking motion of your hand. Apply a second layer of double gold onto the first layers of gold; these four layers of gold make sure that a solid gold line is obtained after tooling. The brass tool is heated and the temperature is checked by the sizzling sound on the wet sponge. The tool is allowed to gently fall into the impression, which is easily visible. When it finds its place almost by itself and sits into the impression, the tool is gripped tightly and pressure is used to finish the tooling. When the gilding is done, the excess gold is rubbed off with a soft cotton cloth. The scrap gold is collected in a box that has a mesh lid through which the scrap gold filters. With a special gold eraser the gold dust that settled into the pores of the leather is removed. If necessary, you can use the pointed tip of an orange stick (for manicures) which is made wet and used to clean the edges of the gilt lines.

If your design consists of gilding only, repeat this process starting with the application of the glair.

Gold Tooling with Onlay

After the first gilding is finished, take the thinly pared leather for the onlay, cut a piece that generously covers the area to be onlayed with that color, wet it on the good side with water and brush the flesh side with paste water, and lay it into place. Press gently with the soft part of your palm without stretching the leather. The impression for the design on the cover is visible through the wet onlay leather. Next, tap the leather with a soft brush on a handle to set the leather into place. The impressions are now very clearly visible. With warm pallets or gouges the form is tooled.

After this tooling, the onlay leather is removed, placed between paper and boards under weights, and left to dry. All parts and colors for the onlays are tooled in this way. The covers are sponged to remove traces of the paste water that might have remained on the surface of the covers. The book is now left to dry between bristol board and pressing boards and weights.

Next, lightly scrape the “glossy” surface of the leather where the onlays will sit inside the gilt lines to ensure a solid bonding of the leather cover and the onlay.

The leather onlays are now cut exactly on the blind-tooled lines by holding your cutting tool at a 45-degree angle, so that the lighter flesh side of the onlay *cannot* be seen.

The onlay is then wetted with water on the good side and pasted on the flesh side. The scraped surface of the cover is also moistened with water using a brush or small sponge, and the onlay is pasted into its place outlined by the gilt lines. A piece of Japanese paper is placed over the onlay and the outline is traced with a thin bone folder through the paper. The Japanese paper will pick up any excess paste at the edges that has spread out when the onlay was pressed into place. Remove the Japanese paper and use a warm tool to outline with the appropriate gouges or pallets the form of onlay to ensure a tight bonding at the edges. The water from the scraped part of the covers pulls the paste from the onlay into the leather of the cover where it will stick securely. This is the only way to have onlays keep from curling up at the edges when the book is handled over decades, because the edges lay securely in the lower level of the impressions made during the process of blind tooling.

Once the onlay work is completed, the book is allowed to dry between bristol and boards and weights.

With the onlays secure, the lines are gilt for the second time in the same way as before. This second gilding covers the edges of the onlay.

When finished, each cover is pressed separately between chromed plates under high pressure for at least 12 hours to ensure an even surface.

The last step is to polish the leather with a polishing iron. It is heated but it is not allowed to get too hot, otherwise it might dry out the natural oils in the leather covers. This last polishing gives the leather a “glossy finish,” while at the same time smooths down the grain of the leather. This even surface makes the leather surface more resistant against dirt because it cannot settle easily into the crushed pores of the leather.

Blind Tooling with Onlay

If your design consists of blind tooling and onlay, proceed with the onlay technique after the first blind tooling and finish up with your follow-up blind tooling procedures.

Step-by-Step Procedure

1. Cover design in 1:1 scale.
2. Transfer of design to Washi.
3. Affix Washi to covers.

4. First tooling, hot tool on dry leather through Washi.
5. Second tooling directly on leather with hot tool.
6. Moisten cover leather evenly.
7. Third tooling with warm tool.
8. Fourth (fifth, sixth) tooling with increased heat.
9. Tooling with hot brass tool on dry covers to complete blind tooling.

Gold Tooling

10. Trace impressions with glair, let dry.
11. Trace impressions a second time.
12. Cut gold.
13. Apply sweet almond oil to areas to be gilt.
14. Place gold onto impressions.
15. Press down with cotton ball.
16. Repeat steps 14 and 15.
17. Heat brass tool, gilt.
18. Remove excess gold with cotton cloth.
19. Use eraser to clean gold dust from pores.
20. If design consists of gilding only repeat steps 10 through 19.

Gold Tooling With Onlay

- I. Place wet onlay leather on form on cover.
- II. Press down with palm.
- III. Tap down with brush.
- IV. Tool with warm tool.
- V. Remove onlay leather, let dry.
- VI. Scrape surface of leather on cover inside tooled form.
- VII. Cut onlay exactly in tooled lines.
- VIII. Wet onlay's good side, paste out flesh side.
- IX. Wet scraped surface on cover.
- X. Paste onlay down onto cover.
- XI. Trace impressions through thin Washi with thin bone folder.
- XII. Tool impressions with warm tool.
- XIII. Let dry under weight.
- XIV. Repeat steps 10 through 19 for second gilding.
- XV. Press each cover separately between chromed plates.
- XVI. Polish covers and spine.

Blind Tooling With Onlay

- A. Proceed with onlay technique after step 9, using steps I to XIII and XV to XVI.

Ms. Miura began her training in Kiel and Flensburg, West Germany. She was awarded a scholarship to study under Hugo Peller in Switzerland, studied in Stockholm at the Royal Bookbindery, and perfected her gilding techniques in Paris, France, under the direction of Professor Raymond Mondage at the Ecole Etienne. Ms. Miura has operated her own studio in Tokyo, Japan, since 1976. She has taught workshops all over the world and has exhibited widely.

THE LOGIC AND TECHNIQUES OF GERMAN BOOKBINDING / J. Franklin Mowery

The purpose of this presentation is to detail the characteristics of bookbinding that are expressly German in origin. One of the most important concepts is that the book is tailored at every step of its production, which is critical because of the underlying principle that the binding must first and foremost serve to protect the text it covers and that its function relies upon a sound structure and the use of materials that have not been sacrificed for the sake of misdirected technique.

STEPS

Textblock Preparation

The first step a binder undertakes is to align the type print of the textblock. The lines of type should flow evenly across the pages across the folds and continue at the same height on the next page. This is done by adjusting the individual sheets within a section until the top line of each page is level with the others.

Next, insert 5 blank pages evenly throughout the textblock, placing them within a section but not in the middle of a section. These blank pages are the same size as the textblock and are left in the book until the binding is completely finished, at which time they are removed. These pages build into the binding a specific amount of “air” that, once removed, will allow all the different components of the binding to relax, thus taking stress and strain off the binding. The book will function more smoothly and will last longer because the sewing and covering material will not be under tension.

“Zig-zag” endsheets are the standard. They are made from double folios of a paper that is similar to the textblock in weight, texture, and color. The folios are joined by adhering the folds back to back then, when dry, folding the one folio back around the other, making a section. Where the paper has been adhered there is formed a dip onto which a leather joint is adhered good/grain side down. This leather joint is better than the adhered-in leather joint because it is structural as it is sewn as part of the endsheet. When this has dried, the leather hinge is folded around the section and is tipped along its edge to a thin card stock, which is laid in to cover the endsheet and to protect the endsheet during the subsequent binding stages. Next, a fill card that is as thick as the leather is tipped into place to ensure that during subsequent pressing stages there won’t be an imprint of the leather joint into the endpaper. Hooked around the leather joint is a dirt sheet (this should be of a good quality paper because some will be left behind when the sheet is finally removed). Lastly, the zig of the zag is folded and is further reinforced by a strip of Japanese paper. This endsheet is now

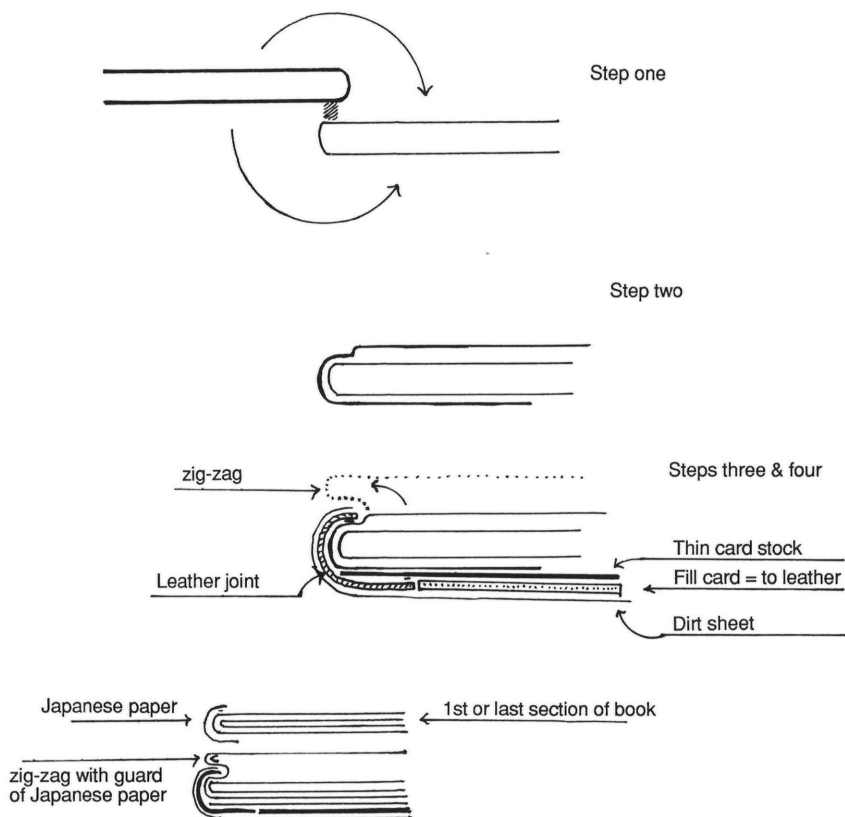


Diagram 1 Endpaper construction.

completed and is sewn twice. This will distribute the strain that occurs at the beginning and at the end of a book.

Add a loose Japanese guard around the first and the last textblock sections. This guard can be tipped to the back of the section to help hold it in place during sewing, but its main purpose is to be adhered across the joint between the endsheets and the first and last sections after the book has been sewn. Trim the endsheets and the sections to a uniform size and dimension. These could be the finished edges or only preliminary to other edge treatments. Press overnight.

Mark up the sewing stations and sew onto cords or untwisted cord. Sew the endsheets through both folds, making sure that the first and the last fold are sewn at an angle. This prevents visible holes or thread when the book is opened.

Adhere the loose guards across the gap between the first and last section and the endsheets.

Paste up the spine (making sure that the textblock is perfectly square), and allow it to dry.

Gently round and back, using fingers and bone folders instead of hammers if possible (Figure 1). If no edge treatment is to be done, line the spine with one layer of thick Japanese paper (Okawara, with wheat starch paste) between the cords and kettle stitch, not above or below the kettle stitch (the area above the kettle stitch will be filled by the sewing thread of your head and tail bands). If edge treatments are planned, do them, after which the book should be replaced in the press and the spine should be realigned. Allow all to dry.

The boards to be used are selected to match the height of the shoulders. Line the boards by wrapping them with a high quality paper parallel to the grain of the board; PVA may be used. I recommend that one always maintain the grain of one's material parallel to the spine. This will always allow you to correct a distortion in the boards. Boards that are laminated parallel can warp only concave or convex. By adding a lining or by scoring narrow parallel lines with a scalpel, a change can be effected in the pull of the boards. If you cross-laminate materials, it can happen that a corner to corner torquing can occur which is not easily straightened.

Tip a strip of 2-ply card to the gutter edge of the board (later to be removed). This is a further planned spacer that prepares enough room in the joint to accommodate the material of the turn-in and provides air to ensure that the joints are not too tight. Trim the boards to the desired height. In this process, the squares of the boards are determined by the aesthetic eye of the binder and are not determined by how tall or short the endbands may be. Endbands are sewn to fit the proportions of the boards. Leave the fore-edge of the boards long because they will be trimmed to size after the boards have been attached. Another spacer needs to be tipped into place before the boards are attached; a folded piece of paper is tipped into the joint prior to attaching the boards. This spacer will account for the thickness of the doublure.

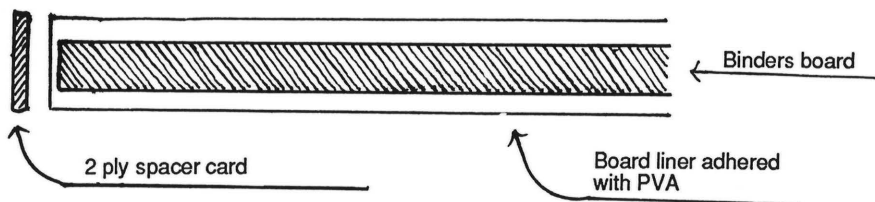


Diagram 2 Board construction.



Figure 1



Figure 2

Apply two dots of adhesive onto the boards and adhere them into their correct place. This allows the boards to be positioned accurately and prevents them from shifting during the attachment of the cords. Fan out the cord material, unravel the cord, and lay it out evenly. They needn't be more than 1" (3 cm) long. Apply paste (being very generous), apply gelatin or fresh hot glue to the board along the top surface at the joint, and work the pasted cords into the glued surface, fanning the cord very evenly (Figure 2). The gelatin will set up quickly and holds the cord firmly.

Also, when it dries it is easily sanded smooth (if you used PVA it would peel up instead of sand smoothly). Apply more paste over the cord, tear a piece of scrap paper, and cover the adhered areas (Figure 3). Do both front and back covers, place the book between smooth boards and press it tightly in a standing press (overnight or until completely dry). This process does not require the cord material to be thinned out, it allows the fibers of the cord to be laid across the joint smoothly and not stretched taut, and it further eliminates the strain on a braided cord that is flexed in a joint alternating between compressing and stretching the fibers every time the board is opened. The correct spacing of the board to the shoulder of the book is more accurately set this way than is possible when you attempt to lace in cords through the covers. This procedure avoids the unsightly bumps in the joint under the leather that are characteristic of laced-in cords. Furthermore, there are numerous historical examples of this type of attachment (even during the Renaissance). This attachment allows conservators to slip a spatula under the cord and loosen the cover from the text block for further treatment, yet still allows the cord to be reused and replaced into position. One needn't fear this to be an inferior attachment. You will never find a binding failing because of how the cord material is attached to the board. Once it crosses over the joint, the structural aspect is irrelevant.

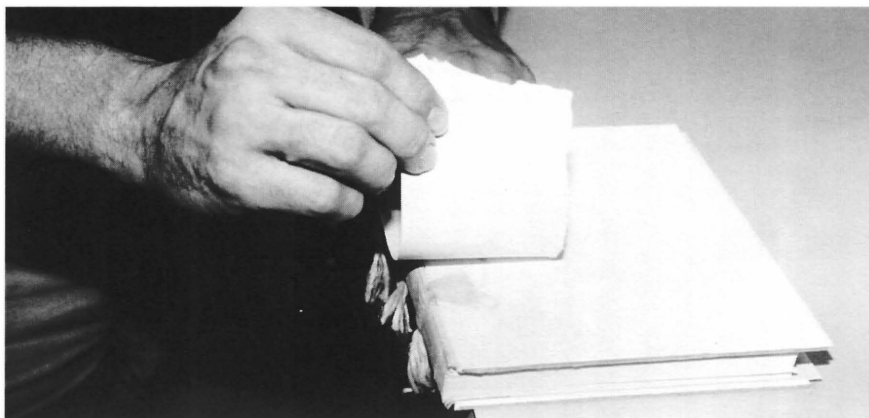


Figure 3

When Dry

Carefully remove overhanging paper from the boards. There should be a layer of the paper covering the cords. Apply moisture to the cords at the joints and mark with a bone folder. Gently begin opening the boards. This defines where the board will open from now on.

Endbands are made from strips of leather-lined vellum cut into triangular strips. Using PVA, they are wrapped twice in thin tissue (traditionally the paper used to

interleave gold leaf). This wrapped core with part of the tissue still hanging down is adhered into place on the spine. The tissue attachment holds the core in place while embroidering. The cores should be just a fraction lower than the squares of the boards. The reason why the endbands are triangular lies in aesthetics. The ancient Greeks and Romans realized that to transverse a round column to a flat support required a triangular-shaped capital (Corinthian, Ionic, or Doric) to bridge the aesthetics of round to flat. On a book there is the flat top and bottom edges of the book needing to merge with the curved round of the spine. The most aesthetic method is the triangular shape. The French sew endbands using multiple round cores that, when sewn together, form a triangle (elaborate like the Corinthian capital). The German method of sewing, with two needles creating a front bead over the triangular core, is simpler (more like the Doric or Ionic capitals). One big difference though lies in the core material. The French prefer the rolled paper cores that tend to be stiff, whereas the leather cores are quite flexible. One should always tie down in each or at least every other section. I prefer not to enter the section in the middle of the section but to enter right behind it. I find the colored thread at the top and bottom of the inner fold to be unaesthetic and thus I prefer to hide it behind the fold of the center section. After sewing, I trim the excess core along the edge of the first and last threads, and line with a thin tissue, making sure that the paper is shy of the top edge. One can improve the look of the ends of the endband cores by carefully painting to match the colors of the silk thread.

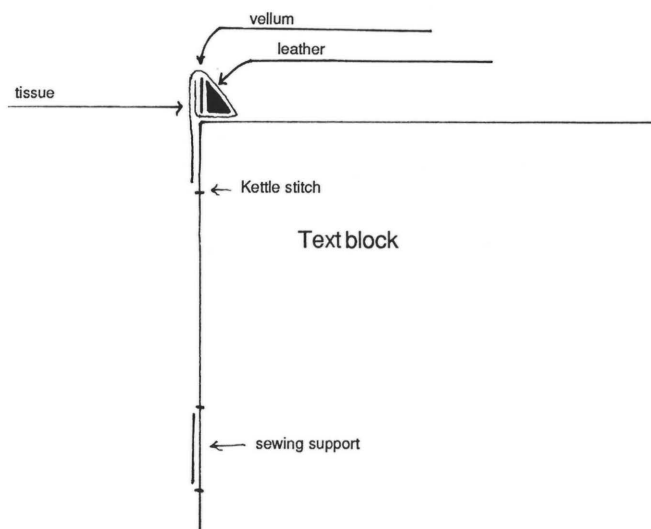


Diagram 3 Endband construction.

Construct a Hollow

Out of the same high quality paper that has been used for endpaper, construct a hollow of the book by measuring carefully the width of the spine and transferring that measurement to the paper, which should be several inches longer than the book is tall. Score and fold, then mark along the paper's edge. Score and fold again, mark along this new edge, and trim. Adhere the two flaps together and make sure not to use too much adhesive as it may ooze into the inner portion of the hollow, which would restrict its opening. Before adhering the hollow to the spine you need to trim the single paper side (not the double side made of the flaps that were adhered together) to a height that is equal to the height of the textblock and no higher. This is the side adhered to the spine. The double layered side is up and should generously extend beyond the height of the boards. Adhere the hollow with paste or PVA, making sure that the single layer is down and again, being careful not to let the adhesive ooze beyond the opening of the tube. You can help yourself by using an Ace bandage to hold the hollow in place until it dries.

Spine Linings

On top of the dried hollow, attach with hot glue as many as 7 layers of good quality paper with each layer getting progressively wider. On a flat spine this is done by adhering a wide piece of paper that is the same height as the hollow. Use hot glue, rub it into place and then further rub it by burnishing it with a hot polishing iron; this ensures a smooth, even adhesion (Figure 4). Using a wide, red, felt-tip marker, paint all the high spots on the spine (bands, endbands, and kettle stitch) (Figure 5). These marks will be a warning to you when sanding the spine linings later that you are nearing the hollow, which you do not want to sand through. Fold the lining paper and repeat the process seven times (I color code the first five linings with different colored markers just as a guide as to how far down I have sanded). Be sure to burnish well between each layer. Again, tie up with an Ace bandage and leave overnight to dry thoroughly (Figure 6).

Sand the Spine

With the linings on top of the hollow, one can sand the shape of the spine until perfect rounding is achieved, focusing on the head and tail where under no circumstances do you want there to be a flaring up due to the endbands. Make a sanding block out of a smooth piece of wood and line it with a medium coarse sandpaper. A stiff sanding block will always hit the high spots of the spine first, thus leveling any uneven areas (Figure 7). If you sand holding the sandpaper in your hand or with a soft block, the sandpaper will conform to the high and low spots and will not even

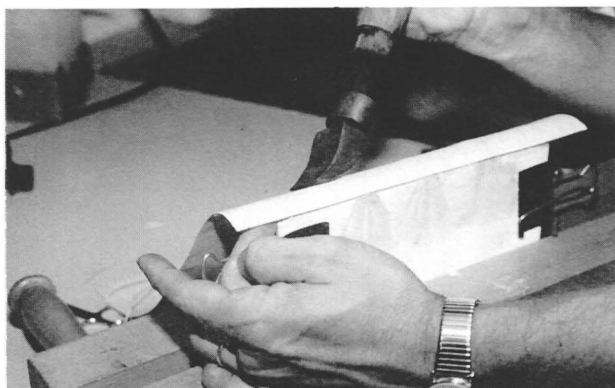


Figure 4

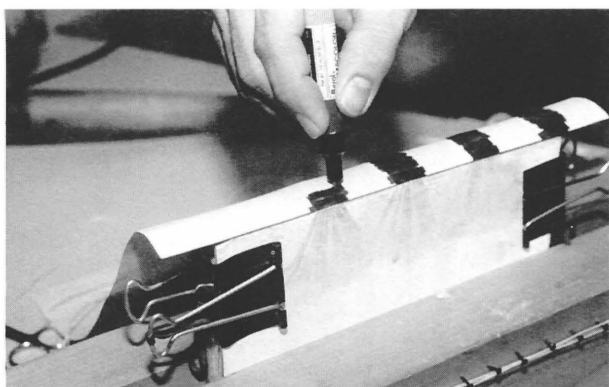


Figure 5

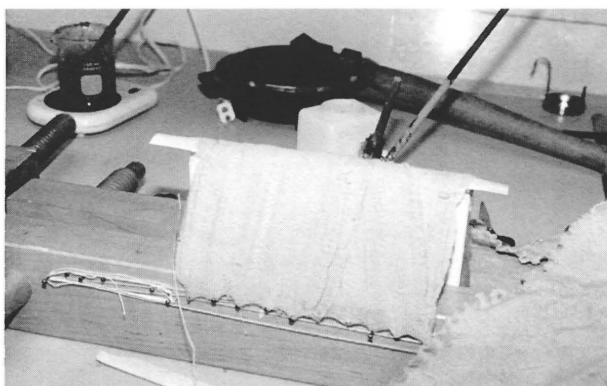


Figure 6



Figure 7



Figure 8



Figure 9

them out. The color coding will appear as one progressively sands the high spots. Continually control the progress of sanding by laying a steel-edge ruler across the spine, and sight along the spine where there are still high spots. The ruler will touch, leaving hollow areas on either side of a rise (Figure 8). Mark with a pencil the high spots and focus on those areas. When you are satisfied with the results, lay the book flat and sand the overhang, creating a crisp edge that defines the edge of the spine and the beginning of the boards (Figure 9). While sanding this you can also lightly sand the paper that lies over the frayed out cords, but be careful not to sand or abrade the cord itself; simply smooth any bumps or ridges that might appear through the covering leather.

Trim the spine linings to the exact height of the boards. This is done by laying a strip of paper and aligning it along the edge of the boards. Mark with a pencil across the spine, then cut with a good pair of scissors along the pencil line; one can smooth it out a bit if needed by carefully sanding the edge. This spine lining provides a rigid edge over which the leather will be turned along.

Back corner the boards. The width of the boards were previously not cut to size to ensure that the squares of the boards were even all the way around. Now that the boards are securely attached, they should be marked with a scalpel to indicate the proper size of the squares and trimmed in the board cutter.

PREPARE THE LEATHER

Covering in the German tradition requires that the covering procedure take place over 4 distinct stages. The leather is tailored to the book, which requires each step to dry before proceeding to the next step. The leather is pared flat, not beveled, only at the turn-ins (the turn-ins are pared to the same thickness as was the leather joint).

Measure the book with a strip of paper and transfer the measurements to the flesh side of the leather (Figure 10). I start by marking on the flesh side where the spine of the animal lies, and that is where the spine of the book will run. Using a white or silver pencil will allow the marks to show up on a dark leather (Figure 11). Leave a 2 cm turn-in all the way around. Pare the turn-ins *only* if needed; some leathers are already thin enough especially when covering large books. Hand pare the turn-in at the head and tail until no bumps are felt when turned on itself.

Covering

Moisten the leather. Paste up the spine area *only* by applying the paste at least twice and placing the spine down into position on the leather to adhere the spine (exact positioning is crucial if the sides are to fit properly)) (Figures 12 and 13). Because you are working only on one area at a time, you have plenty of time to be

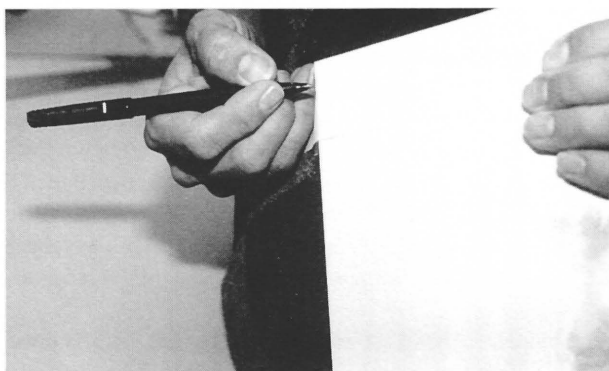


Figure 10

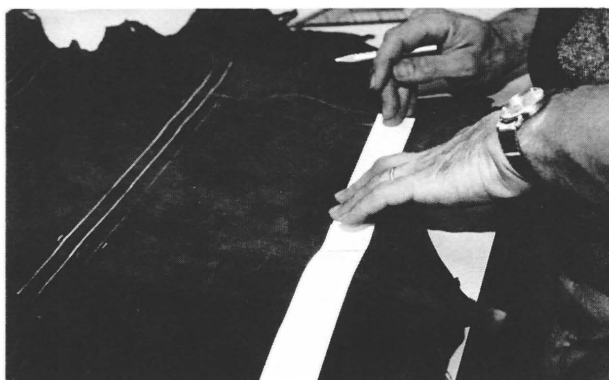


Figure 11

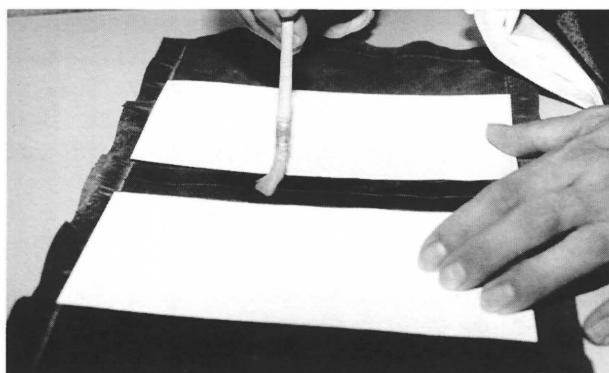


Figure 12

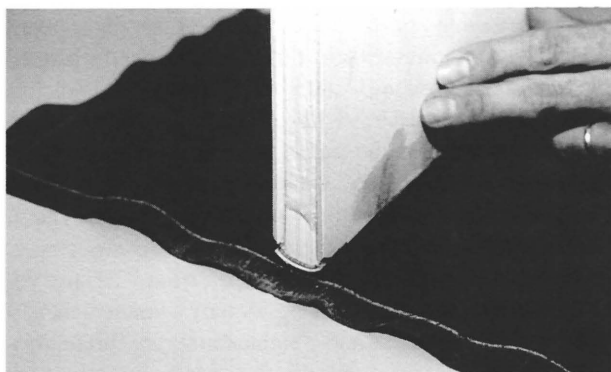


Figure 13

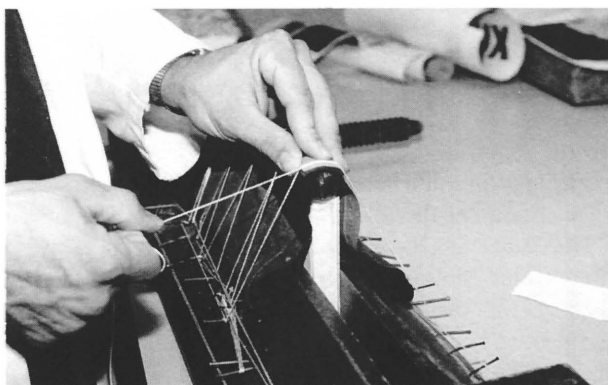


Figure 14

exact. Once you are satisfied, place the book in a finishing press and tie up the head and tail applying gentle pressure while the adhesive dries (protect the leather with pads of two rectangular pieces of the same leather as is being covered and with a 4-ply card) (Figure 14). When leather that has been moistened with water and adhesive is allowed to dry unrestrained, the leather shrinks, causing the spine to flair at the head and tail. The unadhered leather sides can be rolled up to keep them out of the way when tying up the spine. Allow to dry thoroughly.

Setting Down the Sides

Moisten the leather and apply paste only to the area of the leather being adhered to the boards (do not paste up the turn-ins). Again, apply the paste at least twice before adhering the sides down. Align the turn-ins to begin exactly at the edge of the boards.

Using the lines marked on the flesh side of the leather, set the leather to the boards. Further use your fingers by running them along the edges of the board feeling for the evenness of the leather. Because the leather was tailored to the book in a dry state, the leather will more than likely need to be drawn back (when moistened the leather will have stretched). You do not want the leather to be placed down while stretched; that causes internal stresses in the leather and reduces its strength. When satisfied with the placement, place the book between clean blotters and boards and give a *light nip* in the standing press. This levels out the paste layer and any finger marks in the leather, and leaves a smooth surface. Do not press too hard because you might crush the grain of the leather. It remains in the press for only a moment then is removed and left between the blotters and boards and weighted until dry (preferably overnight).

Head and Tail Turn-Ins

Moisten the surface of the leather at the joints before opening the boards. Begin to open the boards slowly. This will soften the paste in the joints and allow you to define the opening of the boards to prevent any possibility of the leather cracking. Turning in only the head and tail at this point allows plenty of time and calm to shape the caps perfectly. With the book on its spine, the boards opened up, and the textblock standing up, slip a thin bone folder into the hollow and slit the folds of the hollow 2 cm. This will allow the turn-ins to go inside the hollow and onto the inside of the boards. The 2-ply strip along the edge of the board is cut away at the head and tail to accept the turn-ins. Moisten the turn-ins, apply paste twice, and turn the leather in, working the edge first then smoothing the inside. Work any excess towards the joint areas as opposed to the corners (one doesn't want the leather ever to be stretched in the joint areas). Close the cover, tie a string around the book's joints, and lay it into the recesses where the boards have been back-cornered. (This is a trick that allows for a tight fit. When making the first loop of the knot, loop it several times and pull it to one of the edges and draw the ends together. The multiple wrapping prevents the thread from slipping when you loop it a second time, which finishes the knot.) Draw out a little leather at the caps to allow the caps to be the same thickness as the boards. Work the caps until perfect, using the nail of your index finger along the inside of the cap to help create the crescent shape. Wet the table surface, slide the edge of the book along the surface, and work with your bone folder to sharpen up the edge of the cap. Place the book in a finishing press between felts to avoid marring the covers, and retie with the leather pads and 4-ply card rectangles in place at the head and tail. This applies a gentle pressure while the caps dry, preventing the leather from lifting and flaring up at the head and tail (Figure 15). Allow to dry.

Moisten the joints at the head and tail on both the outside and the inside of the turn-in, making sure that you gently open the boards only enough to get the brush into the joint. Again, this prevents any chance that the leather will split and crack

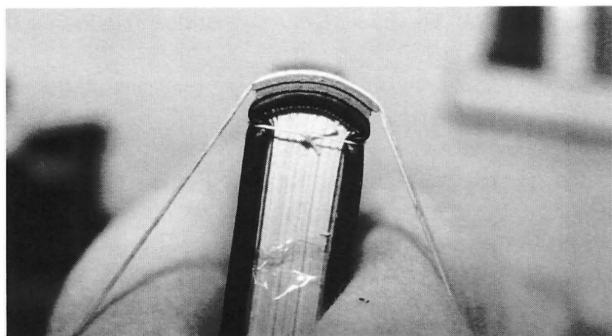


Figure 15

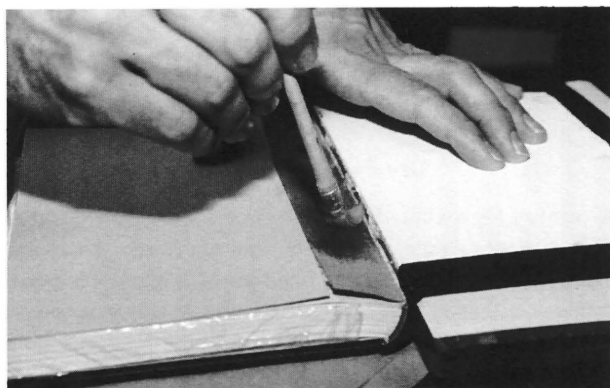


Figure 16



Figure 17

upon first opening the book. The fore-edge is now turned in, allowing the corners to be worked carefully.

The 2-ply card strip along the board edge at the joint and all the dirt sheets and space sheets on top of the endpapers are now completely removed. The leather joint is moistened and pasted up twice and worked over the joint, making sure that the board is supported at a sharp right angle at the joint (Figures 16, 17 and 18). Miter the overlap of the leather joint and the turn-in. Infill the boards with a card that is exactly the thickness of the leather turn-ins and the leather joints (both have been pared to the same thickness). Allow the leather joint to dry in an opened position. Once dry, carefully close and do the other side. When done, insert a 2-ply card between the boards and press firmly.

Do any and all finishing, gilding, tooling, and titling. When finished, cut and adhere the doublures at the front and back, and press lightly. Once the book is completely done, open the book in gradual increments starting at the front and going to the back, turning it over and repeating this from back to front. During this opening procedure, locate the five extra sheets and remove them. The book is now finished.

Step-by-Step Procedure

1. Align the print of the textblock. The first line should flow evenly across pages. Insert 5 blank pages evenly throughout the textblock, placing them within a section but not in the middle of a section. Make “zig-zag” endsheets, which are double folios with leather joints that are structural as they are sewn as part of the endsheet. Add a loose Japanese guard around the first and the last textblock section. Trim the endsheets and the sections to a uniform size and dimension. These could be the finished edges or only preliminary to other edge treatments. Press overnight.

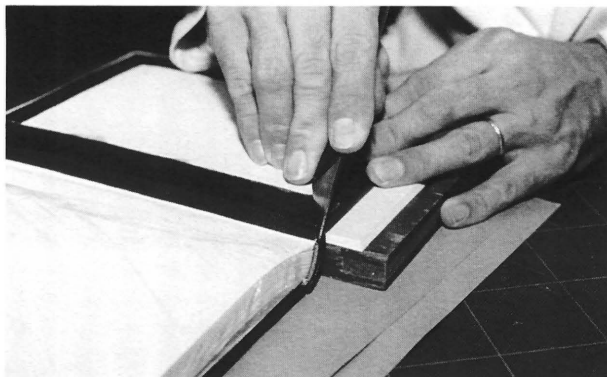


Figure 18

2. Mark up the sewing stations and sew them onto cords or untwisted cord. Sew the endsheets through both folds, making sure that the first and the last fold are sewn at an angle (to prevent seeing holes or thread when the book is opened). Adhere the loose guards across the gap between the first and the last section and the endsheets. Paste up the spine (making sure that the textblock is perfectly square) and let it dry. Gently round and back, using your fingers and a bone folder instead of hammers if possible. If no edge treatment is to be done, line with one layer of thick Japanese paper (Okawara, with wheat starch paste) between the cords and the kettle stitch, not above or below the kettle stitch. If edge treatments are planned, do so, after which replace the book in the press and line the spine. Allow to dry.
3. The boards to be used are selected to match the height of the shoulders after being lined by wrapping with a high quality paper. PVA may be used. Tip a strip of 2-ply to the gutter edge of the board (later to be removed). Trim the boards to the desired height and leave the fore-edge long. Tip a folded piece of paper into the shoulder of the textblock for space. Apply two dots of adhesive onto the boards and adhere them into their correct place. Fan the cords and apply paste to them (being very generous). Apply gelatin or fresh hot glue to the board along the top surface at the joint, and work the pasted cords into the glued surface, fanning the cord very evenly. Apply more paste over the cord and use a piece of scrap paper to cover the adhered areas. Do both the front and back covers, place the book between smooth boards and press tightly in a standing press (overnight or until completely dry).
4. Carefully remove overhanging paper from the boards. There should be a layer of the paper covering the cords. Apply moisture to the cords at the joints and mark with a bone folder. Gently begin opening the boards because this will define where the board will open from now on.
5. Endbands are made from strips of leather lined to vellum, cut into triangular strips, and wrapped twice in thin tissue using PVA (traditionally the paper used to interleave gold leaf). Adhere into place on the spine. The cores should be just a fraction lower than the squares of the boards. Sew endbands, using two needles, to create a front bead. Trim excess cord and line with a thin tissue, making sure that the paper is shy of the top edge.
6. Construct a hollow and adhere it to the spine, tying down with an Ace bandage until dry. Apply 5 to 7 spine linings with hot glue and good quality paper. Tie down until dry (overnight). Sand the spine until perfect rounding is achieved, with no raised areas (especially at the head and tail). Sand the overhang and create a crisp edge which defines the end of the spine and the beginning of the boards. The paper covering the cords is lightly sanded during this stage, being careful not to sand or abrade the cord itself; simply smooth any bumps or ridges

that might appear through the covering leather. Trim the spine linings to the exact height of the boards. Back corner the cords. Mark and trim the fore-edge of the boards to be perfectly even with the head and the tail.

7. Prepare the leather, measuring the book with a strip of paper and then transferring the measurements to the flesh side of the leather, leaving a 2 cm turn-in. Pare the turn-ins *only* if needed. Hand pare the turn-in at the head and tail until no bumps are felt when turned on itself. Moisten the leather and paste up the spine area *only*, applying the paste at least twice. Adhere to the spine, tying up left and right of raised cords of extant. Otherwise, just at the head and tail, protecting the leather with pads of two rectangular scraps of the leather that is being used to cover and with a 4-ply card. Allow this to dry thoroughly.
8. Moisten the leather and apply paste again twice before adhering the sides down and aligning the turn-ins to begin exactly at the edge of the boards. Place this between clean blotters and boards and give a light nip in the standing press. This simply levels out the layer of paste, giving a smooth surface. Do not press too hard as that may crush the grain of the leather. It remains in the press for only a moment and then is removed and left between the blotters and boards and weighted until dry.
9. Moisten the surface of the leather at the joints and slowly begin to open the boards. This will define the opening and prevent the joints from possibly cracking. The head and tail turn-ins are next, which gives plenty of time and calm to shape the caps perfectly. First, open the hollow 1 cm or so on either side at the head and tail to accept the turn-ins. The 2-ply strip along the edge of the board is cut away at the head and tail again to accept the turn-in. Moisten the turn-ins and apply paste twice. Turn the leather in, laying it smoothly in the inside and working any excess towards the joint area (one doesn't want the leather to ever be stretched in the joint areas). Tie a string around the book's joints, laying it into the recesses where the boards have been back-cornered. Work the caps until perfect, and use the nail of your index finger along the inside of the cap to help create the crescent shape. Wet the table surface and slide the edge of the book along the surface. Work with your bone folder to sharpen up the edge of the cap. Place the book in a finishing press between felts to avoid marring the covers, and retie with the leather pads and 4-ply card rectangles at the head and tail. This applies a gentle pressure while the caps dry, preventing the leather from lifting and flaring up at the head and tail. Allow to dry.
10. Moisten the joints at the head and tail both on the outside as well as inside at the turn-in, making sure that you gently open the boards only a little to get the brush into the joint. This prevents the leather from cracking upon first opening the book. The fore-edge is now turned in and allows the corners to be worked carefully.

11. The 2-ply card strip along the board edge at the joint is now completely removed as are all the dirt sheets and space sheets on top of the endpapers. The leather joint is moistened and pasted up twice and worked over the joint, making sure that the board is supported at a sharp right angle at the joint. Miter the overlap of the leather joint and the turn-in. Infill the boards with a card exactly the thickness of the leather turn-ins and leather joints (both have been pared to the same thickness). Allow the leather joint to dry in an opened position. Once dry, carefully close and do the other side. When done, insert a 2-ply card between the boards and press firmly.
12. Do any and all finishing, gilding, tooling, and titling. When done, cut and adhere the doublures at the front and back, pressing lightly. Once the book is completely finished, open the book in gradual increments, starting at the front and going to the back. Turn it over and repeat this from back to front. During this opening procedure, locate the five extra sheets and remove.

Mr. Mowery was trained as a fine binder in Germany for four and one-half years under Kurt Londonberg, with book and paper conservation training in Vienna and Florence. He has been the Head of Conservation at the Folger Library since 1977, and he has, for several years, served as President of the Guild of Book Workers.

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