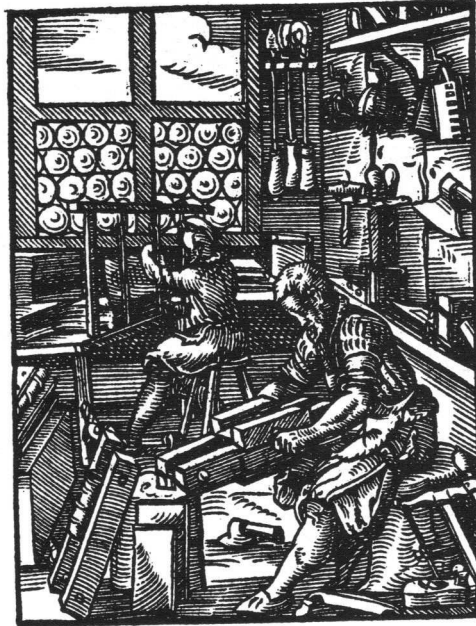


# Beginning Bookbinding

Atlantia University

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*Woodcut, Hans Sachs, 1568. Reprinted from Marks (1998).  
The figure in back is sewing quires onto cords using a sewing frame,  
and the figure in the foreground is using a plow to trim page edges.*

## Materials

### Paper:

I use Bienfang Calligraphic Parchment Paper. Any nice paper will do.  
Use vellum if you wish and if you can afford it.

### Sewing thread:

Linen bookbinding thread is best, but any heavyweight thread, such as hand quilting or upholstery thread, will work.

### Sewing supports:

Medium-weight cord (I use hemp cord) or leather thongs

### Adhesives:

Modern: PVA, otherwise known as Elmer's Glue-All  
Period: Wheat paste (for leather covers) and hide glue

### Boards:

Modern: Davey board, aka binder's board (or any heavy, dense cardboard)  
Period: Hard wood, such as oak or beech

Embroidery thread (for endbands)  
Waxed paper (lots of it!)  
Heavy cloth or leather

**Tools:**

Awl, or thick needle mounted in a wood block  
Exacto knife or mat-cutting knife  
Needles: long shaft, large eyes  
Vise, Black & Decker Workmate, or other squeezing device  
Hammer, flat-head screwdriver  
Ruler, pencil  
Old paintbrushes  
Scissors

## Steps

### Planning & Page Layout

Except for ledgers and other books designed to be written in, medieval books were always written and illuminated before binding. If you make an error, it is much easier to redo a few pages than to rebind a book! However, this means you need to carefully plan your book before beginning any work. How much text do you have? How many miniatures do you want to do? What dimensions do you want the final book to be?

Before go any further, you will need to select your paper (or vellum or papyrus). Modern paper that is commercially manufactured will have a grain—the direction of the fibers. All materials for your book (paper, Davey board or wood boards) must have the direction of the grain parallel to the spine. Otherwise, your pages will not lay flat and your covers will warp in strange directions.

To determine the grain, cut a square piece of your paper and bend it. It will be harder to bend against the grain. Do not assume that the grain will run in the long direction of the cut sheets—the paper I use, Bienfang Calligraphic Parchment, has the grain running along the short (8.5-inch) direction.

Next, you need to determine what size quires (how many pages to the quire) and how many quires you need.

What are quires? In books, pages are grouped into sections before being bound. Look closely at the top of the spine in any hard-bound book and you should be able to see the sections. In medieval England, these sections were called *quires*; in publishing today, they are called *signatures*. These sections are made of sheets of paper folded in half at least once. The number of pages in each section can vary, but it is always divisible by 4. A typical number is 16.

For our purposes, it is easiest to fold sheets of paper in half only once, and use multiple sheets of paper to make our quires. For thick books, four sheets folded in half (to make eight leaves, or sixteen pages) make a good size quire; for smaller books, two sheets per quire are fine. Cut your paper to the size you want each sheet (which will be two leaves, remember), taking into consideration the grain direction.

Now fold the sheets into quires and *number the pages*. When doing the calligraphy and illumination, your sheets will get all out of order, and the page numbers are essential to sorting everything out.

Leave the first two *leaves* (four pages) of the first quire and the second two leaves of the last quire blank. We will use these leaves in the endpapering process. Start your text/illumination on the third leaf (sixth page).

A word about paints: whether you use gouache, acrylic, egg tempura, or something else, experiment with your paints and paper to see how they respond to slight moisture and heavy pressure, both of which they will be exposed to during binding.

### **Sewing the Quires**

After all your artwork is finished, it's time to sew the quires together. Sewing styles varied by geographic region and time period. In the gothic period, quires were sewn onto supports, either leather thongs or cord.

Decide how many cords you want on the spine. Three or four are usually fine, no closer than an inch apart. You will need to punch holes through the folds of your quires where the cords will be attached, and you will need two additional sets of holes within a half inch or so of each end of the spine. So if you use four cords, you'll need six holes. The cords should be spaced evenly from each other, but grouped slightly toward the top end of the spine (by a half inch or so).

**For this project: The length of the paper at the spine is 8.5 inches. Mark holes at 0.5, 1.75, 3.5, 5.25, 7.0, and 8.0 inches.**

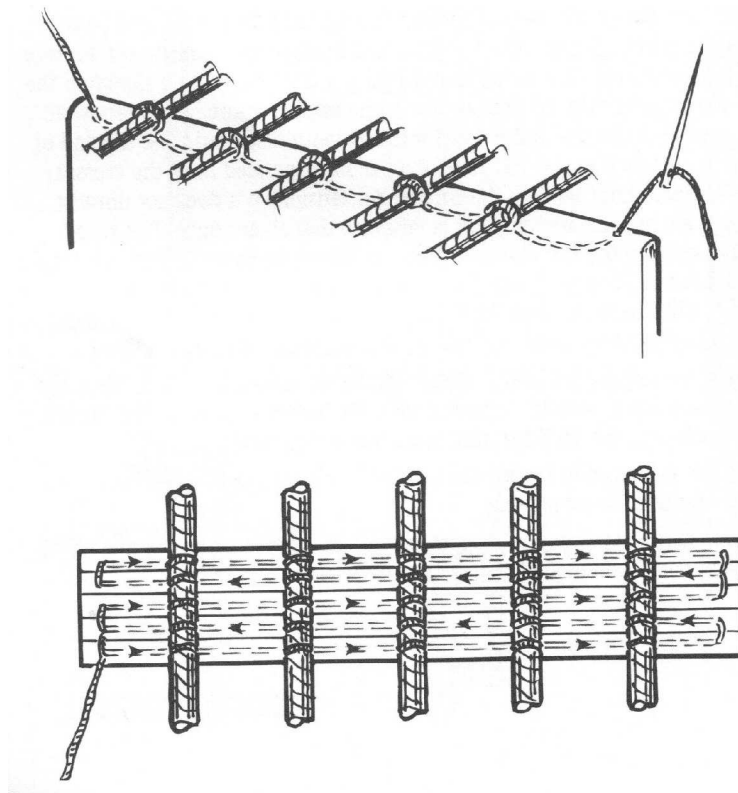
Notice that the holes are slightly asymmetric. This ensures that you won't mistakenly sew a quire on upside down. (There's no safeguard against sewing quires out of order though!)

Mark the locations on the outside fold of the outside sheet of each quire. Line your quires up next to each other to ensure that the marks all line up. Use an awl or a thick needle set into a block of wood for a handle to punch the holes through an entire quire at a time.

If you are using an improvised sewing frame, set the nails to the distances corresponding to your cords and loop your cords over them. Your cords should be at least 10 inches long or more, depending on the thickness of your book.

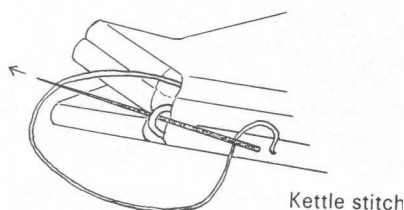
Arrange your quires in order, and start with the final quire of the book. Place only the final quire on the sewing frame. The top of the pages is to your left, the bottom of the pages is to your right, and the fold is facing you. Make a small loop knot in the end of your thread, and pull it from the outside to the inside of the fold. Leave only the knot on the outside of the fold; you may want to put another piece of thread inside the loop so it doesn't pull through the hole in the quire.

Your needle should exit out the next hole in the quire. Loop the thread around the cord hanging in front of the hole, and send the needle back through that same hole. Repeat the process for each hole. At the final hole (where there is no cord), set the next quire on top of the first and send the needle through the hole of the next quire. Repeat the process in the reverse direction for the second quire.



*Reprinted from Lhotka (2000).*

When you reach the end of the second quire, use a *kettle stitch* (also called a *chain stitch*) to pick up the loop of thread you started with at the beginning of the first quire. Then add the third quire, put the needle in the first hole of the third quire, and keep going.



*Reprinted from Banister (1975).*

When you have sewn all the quires, tie off the thread and remove the cords from your sewing frame. Congratulations! You now have a *text block*.

### **Trimming the Pages**

If your page edges are reasonably even and you like the way they look, don't trim them. Skip this step altogether.

Trimming can be done now, after the spine has been shaped, or after the boards are attached. You can mix and match as you like; it's even possible to trim the pages after boards have been attached.

In early period, a drawknife would have been used to trim page edges. The plow was introduced in late period. It's an expensive piece of equipment but great fun to play with. The quick and dirty way to trim edges is to clamp the text block in a vise or

something similar and use a belt sander to sand the edges down. Be sure to wrap the text block in extra sheets of paper to protect it from the clamp. Be careful not to let the edges of the paper get too hot; the heat can react with the size used in the paper manufacturing process and can fuse the paper together.

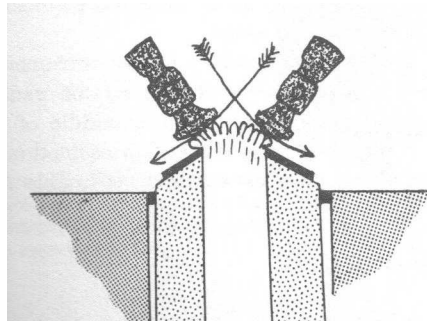
NOTE: Whenever you put pressure on your book, insert sheets of waxed paper between all the leaves. Otherwise the paint you used may end up sticking the leaves together or transferring to the opposite page.

### **Rounding and Backing the Spine**

In late period, binders began to shape the spines of their books. This shaping process enables the covers to sit better against the text block and results in an elegantly shaped spine. It also prevents the spine from caving in under the weight of the text block over time.

To *round* the spine, shift the quires of your book so that the folds of the middle quires stick out slightly more than the outside quires. (Be sure to insert waxed paper between the leaves before you start this process.) When you have a nice curve, carefully insert the quires into your vise or clamp. Leave about an eighth or quarter inch of the spine protruding from the clamp. The spine should be facing up.

To *back* the spine, take a hammer with a smooth, slightly rounded face and gently tap the spine in an outward sliding motion. Start at the center quires and slide the hammer off the outside quires, forcing the quires to fold over one another. Do not hit hard, do not hit directly downward, and do not hit the cords (which might cause the stitching to break). Take the flat of a flathead screwdriver or a ruler and smush the quires near the cords that the hammer can't reach.



*Reprinted from Banister (1975).*

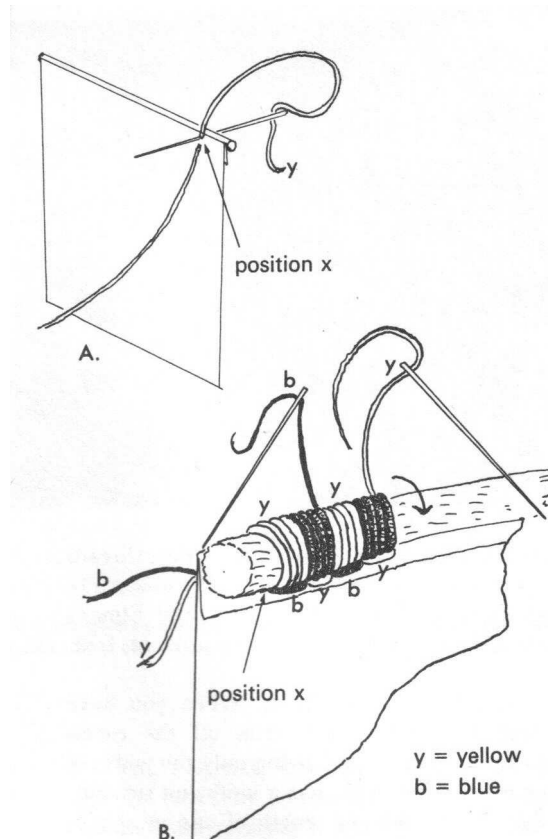
When you are finished, the spine should have a mushroom shape. Next, take some PVA glue or hide glue with some glycerin added (for flexibility) and spread a thin layer over the whole spine, except for the rows of holes that have the kettle stitches. You'll reuse these holes if you choose to sew on endbands rather than glue them on. Let the spine dry thoroughly.

### **Endbands**

In modern hardback books, endbands are the decorative bits stuck on at the head and tail of the spine. In period, when most book boards were made of wood, endbands helped support the covers, and they also provided some protection for the page edges. They were usually made of whatever material was used for the sewing supports and were sewn directly to the text block either as part of the main sewing process or as a separate

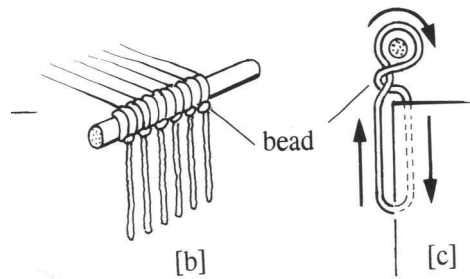
secondary sewing process. In very late period, some endbands were sewn onto fabric and the fabric was glued to the spine before covering; that is how endbands are still done today.

If you are using binder's board, not wood, you can skip the endbands altogether because the support they provide isn't necessary. This will also make covering your book easier, because you will not need to work the cover around the endbands where they join the spine and the boards. If you chose to make fabric endbands to glue on, follow the diagram for the sewing steps, then glue the finished endbands to the spine before covering the boards. (If you chose to make sewn-on endbands instead, you can still use this same sewing pattern to cover the sewn-on endbands with decorative embroidery thread.)



*Fabric endbands glued on to the spine. Reprinted from Banister (1975).*

If you are using wooden boards, endbands are necessary: sew endbands directly to the text block after the spine has been shaped and pages trimmed. Cut two more lengths of cord, one for each end, that are the same length as the rest of your cords. Lay these along the edges of the spine. Using the last row of holes on each end (the holes that have the kettle stitches in them), sew the cord to the pages using this stitch:



*Sewn-on endbands. Reprinted from Szirmai (1999).*

In later period, extra loops around the cord were added between the “tie-down” stitches to add support, so that there was an even, solid mass of thread over the length of the endband cords. This makes it easier to add a decorative layer of embroidery thread over the top of the functional stitches for decoration, if you like. After you have finished sewing on the endbands, add some glue to cover the stitches on the spine.

### **Making the Boards**

Throughout almost all of period, boards were made of wood, usually oak. Often channels were cut for the cords, and wood pegs secured the cords. Pasteboard was also used in late period.

A modern substitution if you are carpentry-challenged is to use binder’s board, also known as Davey board. It’s available from most bookbinding suppliers online. It is much denser than normal cardboard and will hold up to the wetness of your adhesive better without as much warping. As with paper, know the grain direction of the board before you use it. Grain should be parallel to the spine of the book. Use an exacto knife or mat-cutting system to cut the boards and make the holes for the cords.

Late-period bookbinding styles used boards that were slightly larger than the text block dimensions. This overhang is called the *square* of the boards, and typically was only a quarter inch or so. So, if your text block is 5.5 x 8.5, you could make your boards 6 x 9. The holes for the cords should be set at least a quarter inch in from the spine edge.

### **Lacing on the Boards**

The cords wrap around the outside of the boards first, then enter the holes and emerge on the inside faces of the boards. Fray the ends, apply your adhesive liberally, insert waxed paper between the boards and the text block, and press in a vise or under a stack of books overnight.

Be careful not to make the boards too tight: when the book is open, there should be a gap between the text block and the boards. This allows the boards the freedom to open and close gracefully. If the boards are laced on too tightly, the boards won’t lie flat when the book is closed.

### **Lining the Spine**

To ensure a smooth spine after covering (so that the ridges of the quires are not as visible), the spine is often lined with scrap leather, parchment, or paper. This is not

necessary for a basic book made with binder's board, but if you use wooden boards, I would recommend using scrap leather to line the spine. Cut several pieces 3 or 4 inches long and the correct widths to fit between the sewing supports. Glue them around the outside of the spine but wrapping onto the inside of the covers. This provides additional support for the heavy wood boards.

### **Adding the Hinge**

If you lined the spine using the wrap-around method, the lining functions as a hinge. If you did not, then you'll need to add a hinge to each inside face of the boards (one for the front cover and one for the back). This is a piece of fabric, leather, or modern binder's tape that connects the boards to the first and last pages of the text block. Remember that there should be a small gap between the boards and the text block when the covers are open, so don't make your hinge too restrictive. Glue one edge to the board and one edge to the first page of the text block. The extra bit that spans the gap between the cover and the text block will crease when the covers are closed.

### **Covering the Book**

Although leather is the traditional material for covering, fabric was commonly used in period, particularly velvet for luxury bindings. It is easiest to experiment with fabric first, then move on to leather when you are comfortable with the process, particularly because leather can be pricey.

(You can buy inexpensive leather, usually pig skin, on eBay—this is what I have used. This kind of leather is not the kind normally used for bookbinding, however, because it has been tanned and dyed with modern chemicals that make the skin resist water. Good bookbinding leather is vegetable tanned and is more expensive.)

Cut out your covering in one piece: place the book on the covering and wrap the covering around the spine to the front cover. Leave at least an inch or more around all the edges of the book. If you have sewn on endbands, you will need to cut slits in the covering where the covering will wrap around the edges of the board and behind the spine.

Wrap some extra paper around the text block to protect it from moisture and glue during the covering process.

If you're using fabric, use PVA as your adhesive. Warning: it dries very fast, so you will need to work fast, but it also seeps through the fabric, so you'll need to use it sparingly. Spread the PVA on the boards and spine. Stretch the fabric over the spine, stretching it over the cords as much as possible so you won't get too many wrinkles between them. Smooth down the fabric over the covers with your hands, making sure there are no wrinkles. Carefully open the book, and spread glue on the inside edges of the boards, then fold the top and bottom edges of the covering over the boards. At the spine, the covering is folded over onto itself. Then fold the fabric on the outside edges over the boards. To reduce bulk at the corners, you can mitre them (cut a triangle off the fabric at the corner before turning the edges over). There were many different styles of handling corners during period, so anything that you choose is fine.

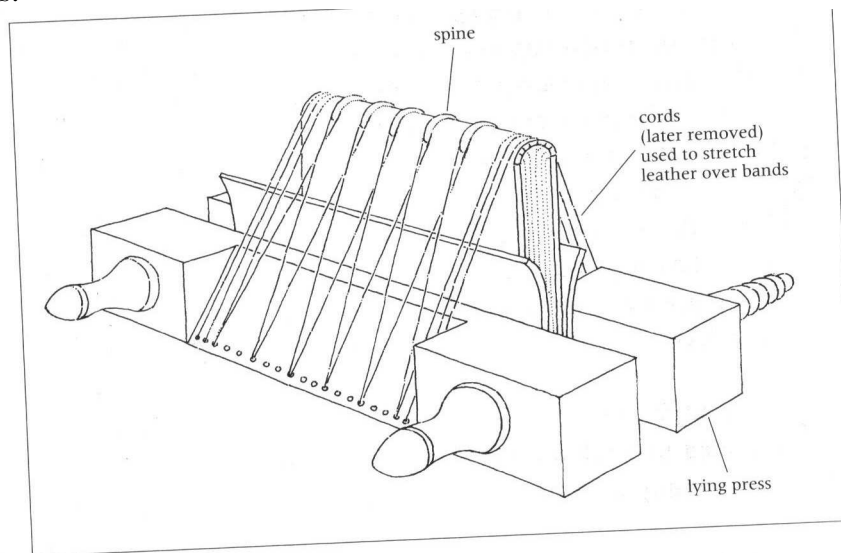
If you're using leather, use wheat paste as your adhesive. It's available in dry, precooked form from Talas; you just mix it with water and use it. It's very similar to old-fashioned wallpaper paste. Spread the paste on the leather thickly, then fold the leather in



half and set it aside for 20 minutes or so. This lets the paste absorb into the leather and get it nice and moist. Unfold the leather and apply another coat of paste, and put paste on the spine and cords of the book, working it into all the grooves. Stretch the leather at the spine vertically before applying it to the book, to try to give yourself some extra leather to work around the cords.

Then start at the spine, and stretch the leather over it. Apply a lot of pressure. Wheat paste takes days to dry, so you've got plenty of time. Smooth it over the covers, following the same steps you would use for fabric.

After you've applied the covering material, insert waxed paper between the covers and the text block, then place your book under pressure, in a vise or under a stack of books. If possible, try to "tie up" the spine of the book by wrapping cord or string around the entire book and vise, making sure that there is a cord on each side of every sewing support. This ensures that the covering material will adhere to the sewing supports.



*Reprinted from Marks (1998).*

Leave your book under pressure until it is thoroughly dry: a day for fabric covering and several days for leather. Be careful the first time you open it; the joints and spine will be very stiff. Your covers may also have warped some, because the covering material pulls on them. This may somewhat be corrected during the endpapering process.

## **Endpapers**

Endpapers are leaves from the text block, plus possibly additional decorative papers, that are glue to the inside covers of the book. They hide the turn-in of the covering material and the hinge of the book.

Your first step is to make inside faces of the boards flat. Your covering material has some thickness, and you want to even this out by adding some filler paper to the inside face that is cut to fit within the area left uncovered by the covering material. Glue some sheets of paper together and paste them to the inside covers using the same adhesive you used for the covering material.

After that is dry, fold the first leaf of the text block over the inside cover and paste it down. Because you left a small gap between the boards and the text block, and this gap disappears when the book is closed, this sheet will have to wrinkle at the spine when the book is closed. Repeat for the last page of the book and the back cover.

You can add decorative paper to both the inside covers, and also flyleaves—loose leaves that are pasted along one edge to the new first and last leaves of the text block. Decorative papers look nice and also protect the text block from the covers of the book.

### **Fastenings**

Ribbon fastenings were common in period and are the simplest to make. You can also experiment with other latches and clasps. These closings were used in period because most books still used vellum for pages, which swells and forces the covers open.

## **Resources**

### **Books**

- Banister, Manley. 1975. *The Craft of Bookbinding*. New York: Dover.
- Lhotka, Edward R. 2000. *ABC of Leather Bookbinding: A Manual for Traditional Craftsmanship*. Newcastle, DE: Oak Knoll Press.
- Marks, P. J. M. 1998. *The British Library Guide to Bookbinding: History and Techniques*. Toronto: Toronto University Press.
- Mitchell, John. 1993. *The Craftsman's Guide to Edge Decoration*. Worthington, U.K.: The Standing Press.
- Szirmai, J. A. 1999. *The Archaeology of Medieval Bookbinding*. Aldershot, U.K.: Ashgate.

### **Mailing Lists**

SCA Bookbinders: <http://groups.yahoo.com/group/SCA-BINDERS/>  
Bookbinders: <http://groups.yahoo.com/group/bookbinding/>

### **Suppliers**

Talas: <http://talasonline.com/>  
J. Hewitt: <http://www.hewit.com/>  
John Neal, Bookseller: <http://www.johnnealbooks.com>  
Hollanders: [www.hollanders.com](http://www.hollanders.com)