Medieval Manuscripts

BOOKBINDING TERMS, MATERIALS, METHODS, AND MODELS

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MATERIALS, METHODS,
AND MODELS

This booklet was compiled by the Special Collections Conservation Unit of the Preservation Department of Yale University Library. If you have any comments or questions, please email Karen Jutzi at karen.jutzi@yale.edu.

A NOTE ON DATES:

The terms Carolingian, Romanesque & Gothic refer not to an absolute range of dates, but to the style of board attachment (and other characteristics).

The date ranges for Carolingian, Romanesque, and Gothic bindings used in this booklet are taken from J.A. Szirmai's *The Archaeology of Medieval Bookbinding* (Aldershot: Ashgate, 1999).

Szirmai describes Carolingian bindings dating from the 8th through the 12th century (*Archaeology*, 100); Romanesque ranging from the second half of the 11th century to the end of the 14th century (*Archaeology*, 142), and Gothic bindings from the early 14th century through the 17th century (though he limits his discussion of Gothic bindings to no later than 1600) (*Archaeology*, 174). This is a rather broad range, as the dates are based on earliest and latest examples.

For comparison, in the syllabus for his 2011 Rare Book School course *Introduction to the History of Bookbinding*, Jan Storm van Leeuwen dates Carolingian bindings from 800-1000; Romanesque from 1000-c.1250, Gothic from 1150-1420, and Renaissance from 1420-1600 (*Syllabus* 2011, 71-72). I consider these dates to be the peak range when the style was most prevalent.

Table of Contents

Materials

Wood

Planks cut radially

Quarter-cut

Quarter-sawn
Wood for book cover

Boards for bookbinding were traditionally quarter-sawn. The growth rings in quarter-sawn wood run mostly perpendicular to the surface of the board, which makes the wood less likely to warp or shrink from moisture or changes in humidity.

The process of quarter sawing was to cut the log lengthwise into four wedged-shaped pieces. The wedges were then tipped on their points and the boards were sawn along the axis (see illustration above).

In England, the predominant wood used in bookbinding was oak; beech was common in Italy. Oak and beech were the most common woods used on the Continent, but birch, lime, chestnut, maple, poplar, plane, pinewood and walnut have all been used at one time or another (Szirmai 1999, 103, 151, 216).

Quarter-cut and quarter-sawn illustrations courtesy of *Introduction to Manuscript Studies* (Ithaca: Cornell University Press, 2007) by Raymond Clemens & Timothy Graham.

Leather

The process of making leather is called tanning. The word derives from the use of tannins—from the Medieval Latin *tannare* ("tan, dye, a tawny color") and *tannum* ("crushed oak bark"), probably from the Celtic word *tann* ("oak tree"). Tannins were traditionally derived from crushed oak bark.

The skin was soaked in water, then placed in a solution of lime. This loosened the hair and other bits, which could then be scraped off over a beam of wood with a blunt knife. The liming process also swelled and loosened the fiber structure (Vest 2000, 16-17). The skin side was scraped to clean it and level it out. The grain side was scraped with a knife to remove any remaining hair, lime, grease or dirt, then trimmed of unwanted pieces. The scraping process was called "scudding."

The skin might then be "bated" (immersed in warm water and dog dung) or "puered" (which used bird droppings instead of dog dung), which, after another round of scudding, produced a very smooth grain. "Bran drenching" was sometimes used instead of bating/puering: the skin was soaked in a warm solution of barley or rye and stale beer or urine, which neutralized any remaining lime in addition to softening the skin (Burns 2011).

After another washing, the hide could either be tanned, tawed, or made into parchment.

The tanning process began by soaking the hides in the tanning solution (in England, crushed oak bark and water). This was done in pits. The skins were constantly moved around in the pits to ensure the tannins (and thus the color) spread evenly. The hides would then be layered with ground oak bark, the pits were filled with a weak tanning solution, and the hides were left for up to a year (Burns).

At the end of the tanning process, the hides were rinsed, smoothed, and left in a dark place to dry slowly. The leather was then staked (the flesh side was stretched and pulled over a blunt metal or wooden edge—see *Alum-tawed skin* illustration), shaved to the desired thickness, and greases were applied to make it supple.

Scudding

Note bindings in cupboard, and the tub used to soak skins.

Die Hausbücher der Nürnberger Zwölfbrüderstiftungen.

Amb. 317b.2° Folio 77 recto (Mendel II) Stadtbibliothek Nürnberg

Alum-tawed skin

Also called white-tawed or whittawed skin.

The process of tawing skin began with the same steps as tanning leather or making parchment: the skin was soaked in lime, scraped over a beam of wood with a blunt knife, bated or puered or bran-drenched, and washed again. The skin was now ready to be tawed.

A tawing paste made with water, alum, salt, egg yolk, and flour was mechanically worked into the wet, dehaired pelt (Vest). Once the paste solution was absorbed by the skin, it was hung up to dry for several weeks (this was called "crusting").

Once dry, the skin was stiff and inflexible. The final step was staking (as portrayed on the right), which softened the skin and left it brilliantly white and stretchy.

Staking

Note skins drying in background.

Die Hausbücher der Nürnberger
Zwölfbrüderstiftungen

Amb. 317b.2° (Mendel II)
Stadtbibliothek Nürnberg

Parchment & Vellum

The terms parchment & vellum are often used interchangeably, but historically parchment was made from split sheepskin, while vellum (from the Old French *velin*, from *vel, veel* "calf") was made from calfskin.

The same initial steps of tanning and tawing were followed, to de-hair and clean the skin. After a final washing, the skin was stretched on a frame and scraped with a crescent-shaped knife called a *lunarium* to remove additional flesh. The stretched skin was left to dry, after which it was thinned further by sanding.

Parchment and vellum are very sensitive to moisture and fluctuations in humidity levels. The clasps and wooden boards of medieval bindings served to compress and restrain the parchment during these fluctuations.

Scraping

Die Hausbücher der Nürnberger Zwölfbrüderstiftungen.

Amb. 317.2° Folio 34 verso (Mendel I)
Stadtbibliothek Nürnberg

Terminology

Parts of a medieval book

UPPER BOARD

CATCH PLATE

EDGE

SEWING SUPPORT

TIE-DOWN

ENDBAND

LOWER BOARD

ENDCAP

HEAD

SQUARE

CATCH

FASTENING

TURN-IN

V LACING

CLASP

FORE EDGE

TEXTBLOCK

TONGUE

BOSS

BOARD SHAPES

SPINE

PIN

STRAP

ROUNDED

CHAMFER/ED

JOINT

ANGLED

CAMBERED

SQUARE

BEVELLED

TAIL
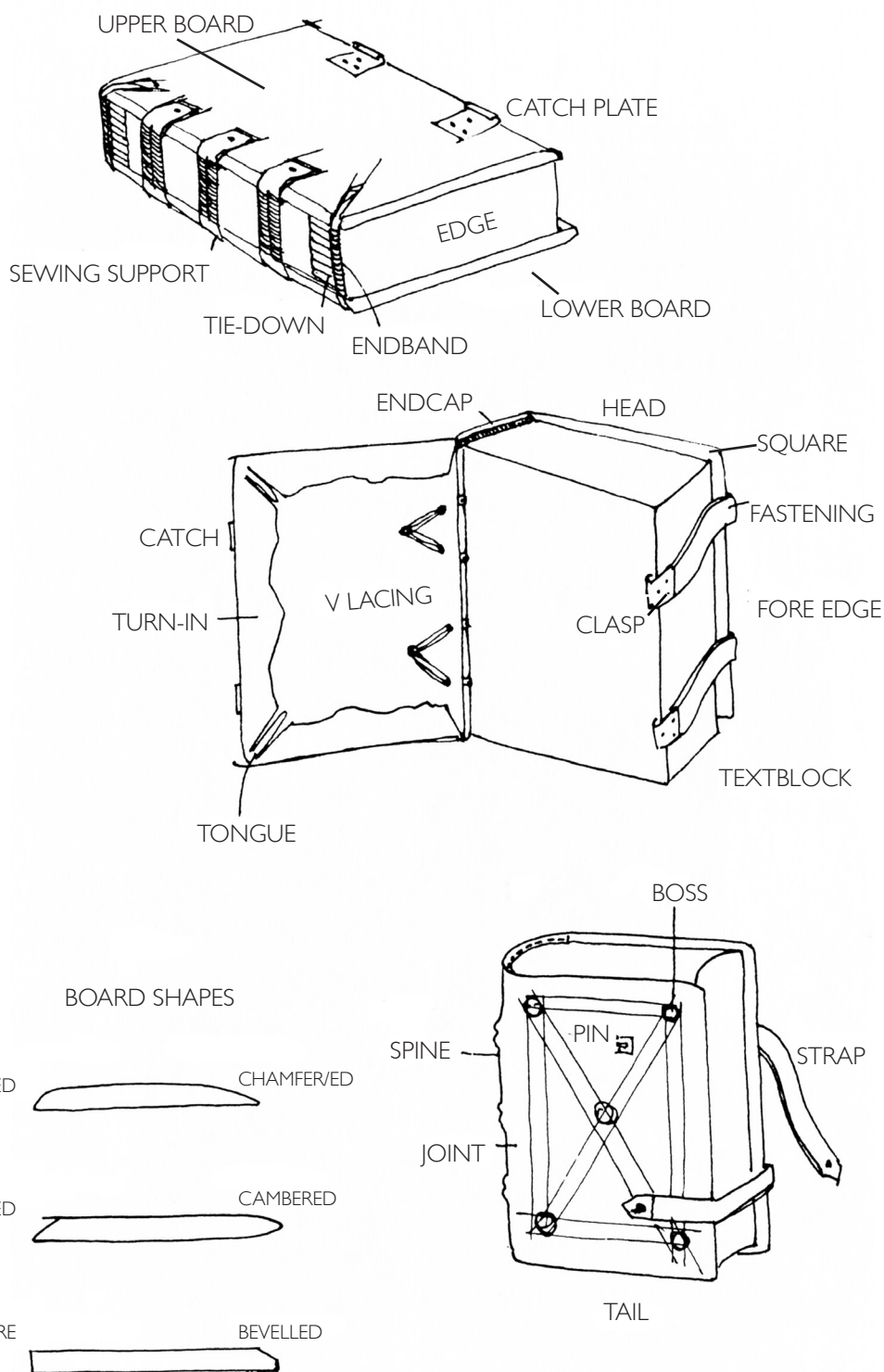
Drawings by Jane Greenfield from *Catalogue of Medieval and Renaissance Manuscripts in the Beinecke Rare Book and Manuscript Library, Yale University, Volume I: MSS 1-250*, by Barbara Shailor.

Outside structure

HEAD

ENDBAND
(HEADBAND)

BOSS

CATCHPLATE

TITLE WINDOW
(FENESTRA)

ub glôse ûgis & mûis & barbat

CENTER PIECE

RAISED BAND

SPINE

FORE EDGE

BLIND-TOOLED
TRIPLE FILLET

ENDBAND
(TAILBAND)

CORNER PIECE

CHAIN ATTACHMENT

Marston MS 287

TANNED LEATHER COVER with
DIAPERED CENTER PANEL

TAIL

Inside structure

HEAD

TURN-IN OF
TAWED SKIN

PEG

WOODEN
BOARD

CHANNEL

CHEMISE
ENVELOPE

FORE EDGE

ENDLEAF OF
MANUSCRIPT WASTE

SEWING
STATION

Osborn a56

TAWED THONG

TUNNEL

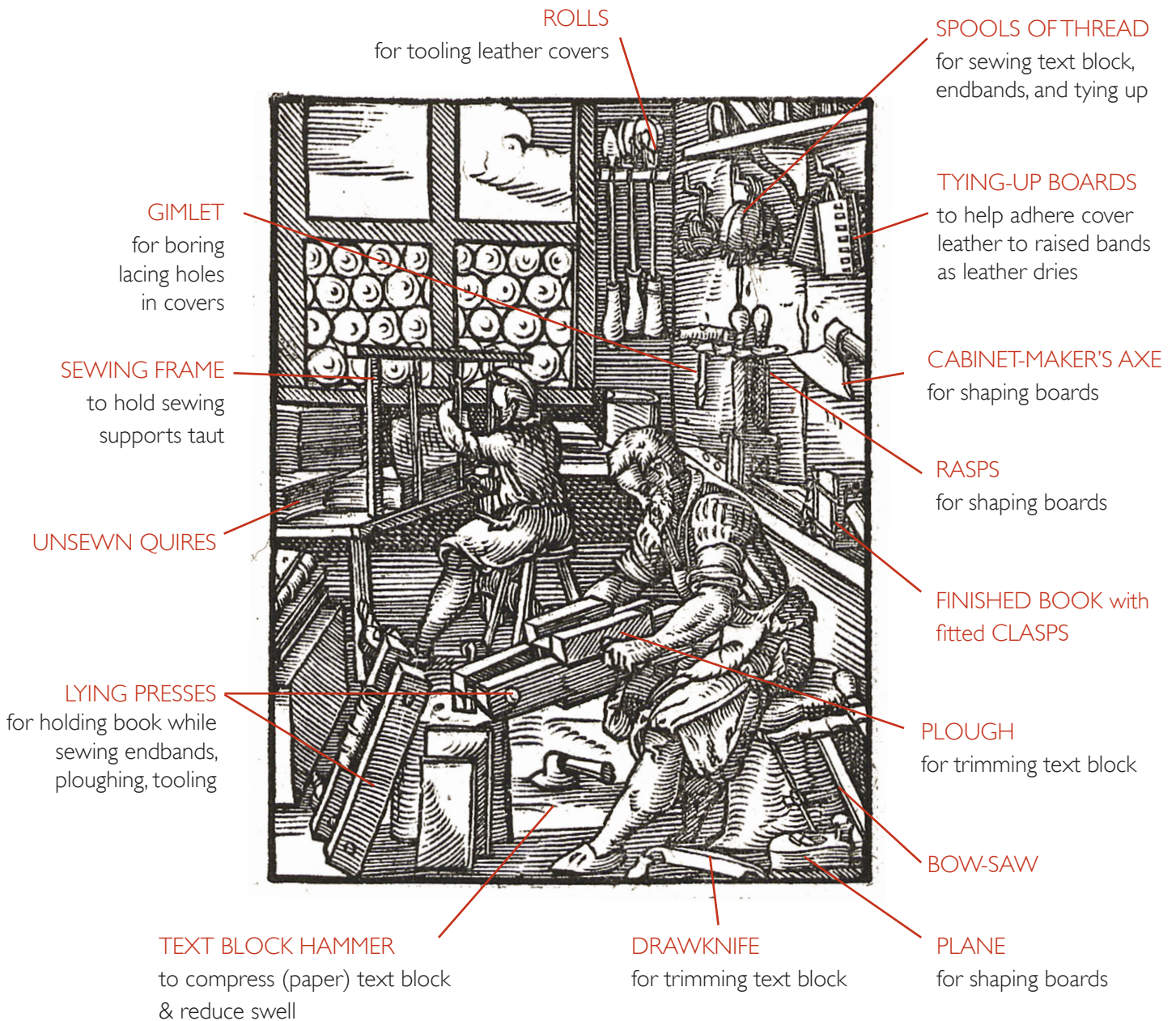CHEMISE OR OVERCOVER
(NOW TRIMMED)

TAIL

16

Bindery tools

FROM *THE BOOK OF TRADES*
BY JOST AMMAN & HANS SACHS (1568)

Though a depiction of a Renaissance bindery, many of these tools were also used in the Middle Ages.

ROLLS
for tooling leather covers

SPOOLS OF THREAD
for sewing text block, endbands, and tying up

GIMLET
for boring lacing holes in covers

TYING-UP BOARDS
to help adhere cover leather to raised bands as leather dries

SEWING FRAME
to hold sewing supports taut

CABINET-MAKER'S AXE
for shaping boards

UNSEWN QUIRES

RASPS
for shaping boards

LYING PRESSES
for holding book while sewing endbands, ploughing, tooling

FINISHED BOOK with fitted CLASPS

PLOUGH
for trimming text block

BOW-SAW

TEXT BLOCK HAMMER
to compress (paper) text block & reduce swell

DRAWKNIFE
for trimming text block

PLANE
for shaping boards

Sewing & Supports

MOST COMMONLY USED FOR MEDIEVAL BINDINGS

KETTLE STITCH (LINK- OR CHAIN-STITCH)

SINGLE STRAIGHT SEWING — SLIT BAND

PACKED HERRINGBONE SEWING—DOUBLE BAND

ALUM-TAWED SKIN

PACKED STRAIGHT SEWING—TWISTED THONG

SINGLE STRAIGHT SEWING—SINGLE BAND

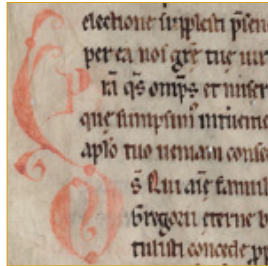PACKED STRAIGHT SEWING—SINGLE CORD

SINGLE HERRINGBONE SEWING—DOUBLE CORDS

VEGETABLE FIBER CORDS

KETTLE STITCH (LINK- OR CHAIN-STITCH)

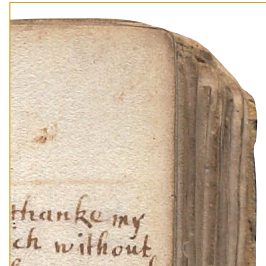# Carolingian bindings

8th - 12th c.

Characteristics

CAROLINGIAN

MS 481.108 folio 1R

Beinecke MS 331

TEXT BLOCK

Parchment

Flush with boards

Beinecke MS 224
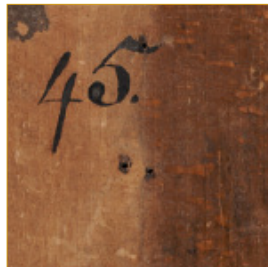
Marston MS 243

SUPPORTS / SEWING

Thin, double cords of vegetable fiber (flax, hemp)

Raised

Herringbone pattern

Beinecke MS 393

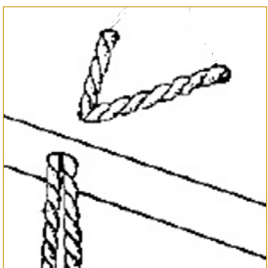*Beinecke MS 688*

Beinecke MS 393

BOARDS

Thick

Predominantly oak (also beech, poplar)

Little to no shaping

Same size as text block

Szirmai Archaeology, 105

Beinecke MS 84

LACING

Through edge of boards

Upper board laced before sewing

Flat spine (not convex)

Note: The manuscripts pictured are used to illustrate characteristic details, but may fall outside the category / date range of Carolingian bindings.

Binding steps

CAROLINGIAN

1. Prepare boards first: determine placement of sewing stations; make tunnels and channels to attach sewing supports; chisel recesses for fastenings.

2. Lace through vegetable-fiber supports to upper board.

3. Prepare quires for sewing by cutting 3-6mm slits into spine folds at predetermined sewing stations (slits were common on insular manuscripts; pierced holes common on continental—often French).

4. Sew quires to supports, using a herringbone pattern, beginning with first quire.

5. After last quire is sewn, lace supports through lower board and secure by twisting and pegging; trim excess with chisel.

6. Reinforce board attachment by attaching pastedowns (generally first leaf of the first quire & last leaf of last quire; usually blank; never manuscript waste).

7. Trim edges of text block flush with boards (probably using a drawknife).

8. Sew endbands through tab lining.

9. Construct strap(s) using same material as book covering.

10. Dampen and paste out covering leather (commonly chamois); adhere to boards (usually not spine); turn in. Turn-ins will be on top of pastedowns—a characteristic of Carolingian bindings.

11. Sew perimeter of tab endbands to adhere tab lining to cover tab.

12. Cut slit for strap and feed strap through.

13. Attach strap(s) to recess(es) in cover with iron or brass nails through thickness of board.
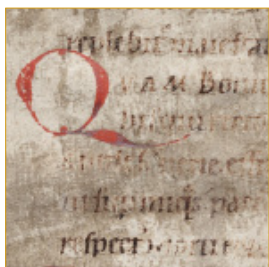
14. Attach pin(s) to edge of lower board.

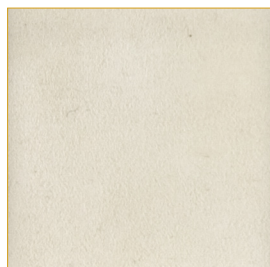(Szirmai 1999, 99-139)

Romanesque bindings

SECOND HALF OF 11TH - END OF 14TH c.

Characteristics

ROMANESQUE

Beinecke MS 481

Beinecke MS 688

TEXT BLOCK

Parchment (thin, sheep)
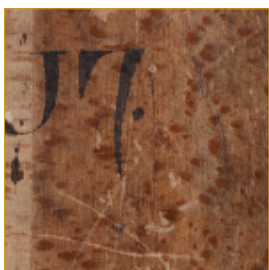
Flush with boards

Marston MS 93

Marston MS 262

SEWING / SUPPORTS

Thick alum-tawed slit straps

Sewn straight or "packed" (wrapped multiple times)

Beinecke MS 393
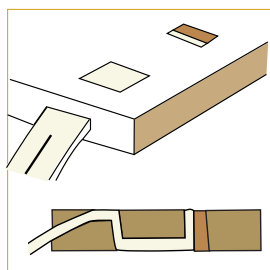
Beinecke MS 873

Beinecke MS 393

BOARDS

Thick

Oak, beech, or poplar

Minimal or no shaping

Same size as text block— no squares

Beinecke MS 393

LACING

Through edge of boards

Flat spine (not convex)

Straight lacing path

Note: The manuscripts pictured are used to illustrate characteristic details, but may fall outside the category / date range of Romanesque bindings.

Binding steps

ROMANESQUE

1. Determine placement of sewing stations; pierce quires with awl or sewing needle, or cut slits with knife or chisel.

2. Sew onto alum-tawed thongs (usually slit). Sewing could be herringbone pattern (as in Carolingian bindings), single straight sewing, or packed straight sewing.

3. Prepare wooden boards by drilling tunnels through spine edge and chiselling/carving out channels and recesses for sewing supports; back-corner to accommodate endbands; shape boards (optional).

4. Lace ends of sewing supports through boards; secure with wooden pegs and trim off excess.

5. Trim edges of text block flush with boards (probably using a drawknife or chisel).

6. Add tab linings for endbands.

7. Work endbands through tab linings. Endbands could be herringbone or straight sewing on double supports, possibly with colored thread; plain wound primary; or plain wound primary with secondary embroidered endband in colored linen or silk.

8. Line spine (often with chamois leather): full lining; patch linings between sewing supports; lining extending onto inside or outside of boards.

9. Cover boards with either chamois/alum-tawed skin or tanned brown leather using starch paste.

10. Paste down parchment endleaves over turn-ins. Endleaf construction could vary, but the majority were sewn with the textblock and were often the first and last leaves.

11. If covered with tanned leather, tool in blind.

12. *Optional but likely:* Add secondary cover (chemise or overcover).

13. Add fastenings and furnishings. Long-strap fastenings are predominant, but could also be Carolingian-style edge fastening).
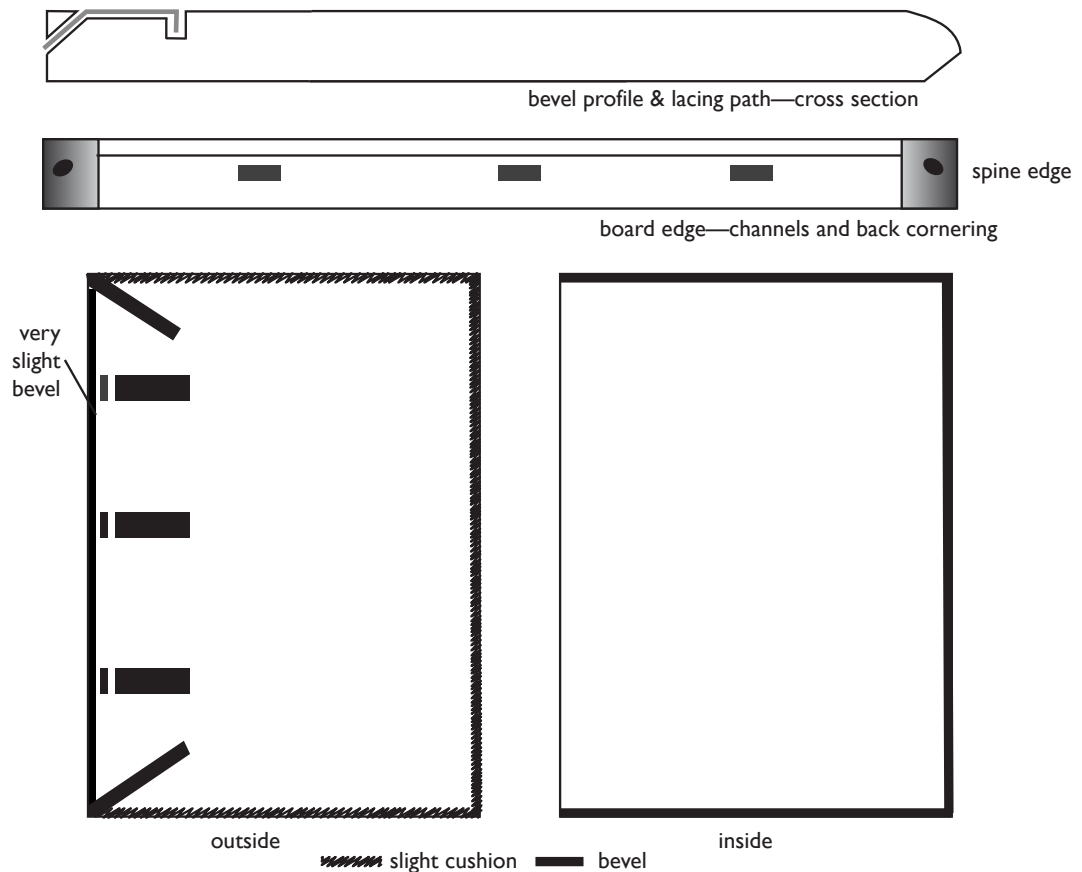
(Szirmai 1999, 140-170)

MS 4

ROMANESQUE / GOTHIC

St. Antonius, Confessionale

154 x 103 (95 x 69) mm

Written in Italy, end of 15th century. Original sewing on three tawed, slit straps, Kermes pink, laced through tunnels in the thickness of wooden boards into rectangular channels on the outer face. Twisted, tawed cores of plain, wound endbands laid in grooves. All supports pegged and gypsum [?] used to fill in around them. Spine lined with brown calf, wanting, except under endband tie-downs. Covered in brown calf, blind-tooled with a rope interlace panel border. Corner turn-in tongues. Two catches on lower board, stubs of straps on upper. Boards worm-eaten and detached and most of the cover wanting. Minor repairs to endleaves and headband made ca. 1976.
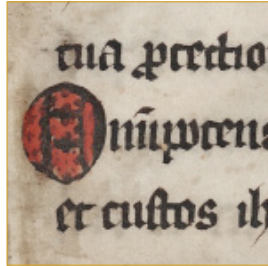

bevel profile & lacing path—cross section

spine edge

board edge—channels and back cornering

very slight bevel

outside

inside

▨▨▨▨ slight cushion ▬ bevel

Gothic bindings

EARLY 14TH - 17TH c.

Characteristics

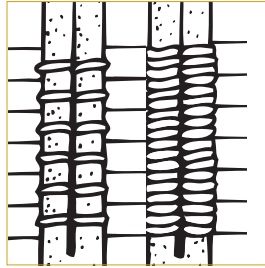## GOTHIC

Beinecke MS 481.122 folio1R

Beinecke MS 287 folio 3r

TEXT BLOCK

Parchment, parchment & paper, or (later) all paper

Smaller than boards

Marston MS 93

SEWING / SUPPORTS

Alum-tawed skin; vegetable-fiber cords (later)

Straight or packed sewing (often "packed" due to thicker sections)

Beinecke MS 710
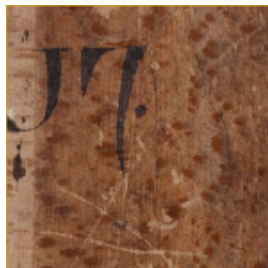
Beinecke MS 873

Beinecke MS 287 folio 24R

BOARDS

Thick

Oak (beech, poplar)

Lots of shaping

Larger than text block (has squares)

Beinecke MS 417

Beinecke MS 287

LACING

Over edge and through top of boards

Rounded spine

Laced after sewing

Note: The manuscripts pictured are used to illustrate characteristic details, but may fall outside the category / date range of Gothic bindings.

Binding steps

GOTHIC

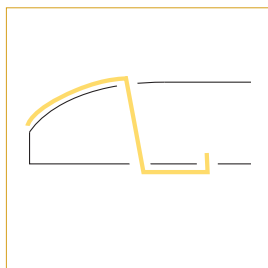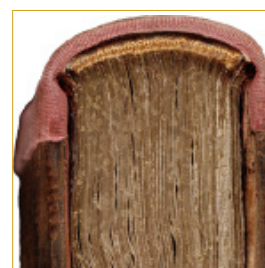1. If paper was used for quires, reinforce the inner centerfolds with parchment stays (*optional—some binders were initially suspicious of paper, believing it lacked strength and would need reinforcement to be sewn*).

2. Add endleaves to textblock. Endleaves are almost always parchment; often manuscript waste. Endleaf attachment varies widely.

3. Decide number of sewing supports and placement of sewing stations; cut or pierce holes for sewing.

4. Decide material of sewing supports: vegetable fiber cords (single or double) or alum-tawed skin (slit thong; intertwisted slit thong; double thong, loosely or tightly twisted single or double thongs).

5. Sew quires onto supports—either herringbone (single or packed), straight, or packed. To save time, endbands can be sewn along with quires (integral sewing).

6. Consolidate spine with adhesive (hide glue).

Optional: do not glue up spine.

7. Round spine with backing hammer if text block is paper (*to compensate for "swelling" of text block from sewing thread. Parchment's tendency to cockle cancelled out any swelling from sewing thread, so mechanical rounding with hammer was generally not needed*).

8. Line spine with parchment, leather, or chamois (patch; transverse; slotted; comb).

Optional: do not line spine.

9. Trim edges of textblock (with drawknife; with plough after first quarter of 16th century).

Optional but not common: decorate edges (paint; stain; gild; gauffer).

10. If not sewn integrally, work endbands now. Endbands varied: primary plain wound; saddlestitch over primary wound; primary wound plus secondary embroidery in colored linen or silk ("Renaissance" endband); primary wound with secondary braiding; primary embroidered in colored linen or silk; "short-cut" (stuck-on).

11. Prepare boards: shape and prepare tunnels & channels for lacing and clasps. Board edge shapes varied widely (rounded; beveled; chamfered; partially chamfered; beveled and chamfered; rounded and beveled, etc.), as did lacing path patterns (straight, staggered, V-shape, or any combination).

12. Lace ends of sewing supports into boards; peg.

13. Cover boards in dampened leather (usually tanned or tawed) with starch paste or combination of paste/animal hide glue. Could also be covered in precious textiles, primarily or secondarily (see below).

14. "Tie up" raised bands with cords to adhere damp leather firmly around raised supports while drying.

Optional:

- Stain alum-tawed leather, either before or after covering (sap green, saffron, brazilwood, irongall ink, verdigris...).
- Decorate/tool tanned leather.
- Add overcover (leather overcover; precious textile chemise; girdle book; overback).

15. Attach fastenings (long-strap; hook-clasp) and any furnishings: corner pieces, center pieces, bosses, shoes, heels, title windows (*fenestra*), edge strips, skids, chains.

(Szirmai 1999, 176-254)

MS 84

GOTHIC (GIRDLE BOOK)

*Boethius: De consolatione philosophiae.*

100 x 80 (68 x 41) mm

Binding circa 15th century, possibly German or Dutch. Although early, it is not the original binding. Resewn on three narrow, tawed double thongs. The endbands do not seem to have laced cores, but a primary sewing may have been sewn to the head and tail of the chemise, underneath the braided secondary endbands The thongs are laced into grooves in beech boards, the pattern reversed; one horizontal above one V lacing on the upper board and a V above a horizontal on the lower. The thongs are pegged. The outer wrapper of tawed skin, now grey, is sewn to a tawed, pin, inner chemise around the outer edges of the boards. The wrapper extends about 130 mm to a Turk's head knot at the tail, about 25 mm at the head, and has an overlap of about 50 mm on the upper board. The edges of the wrapper are turned in and hemmed. The book hung upside down when attached to the girdle by having the knot slipped under it, but was right side up when picked up (still attached to the girdle) to be read. A strap-and-pin fastening, the pin on the upper board, consists of a thick, brown leather strap nailed to the lower board and tacketed to the cover with a leather thong ending in an anthropomorphic brass clasp, the head of which catches on the pin.

bevel profile & lacing path

outer front
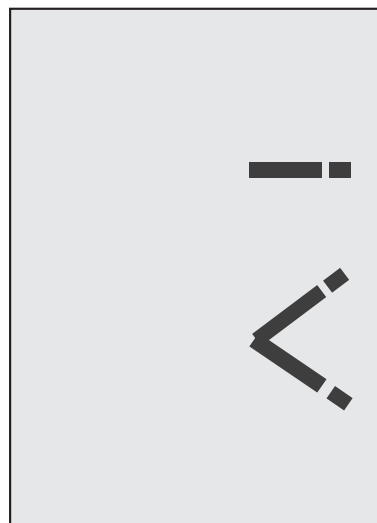
inner front
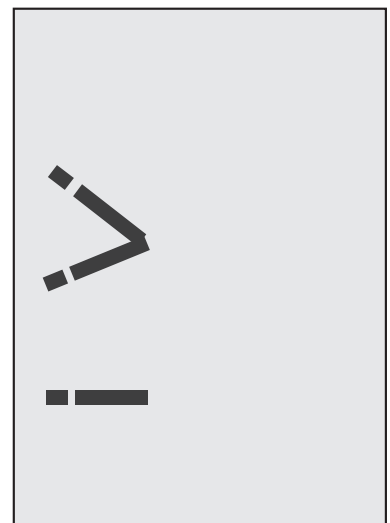
inner back

Limp bindings

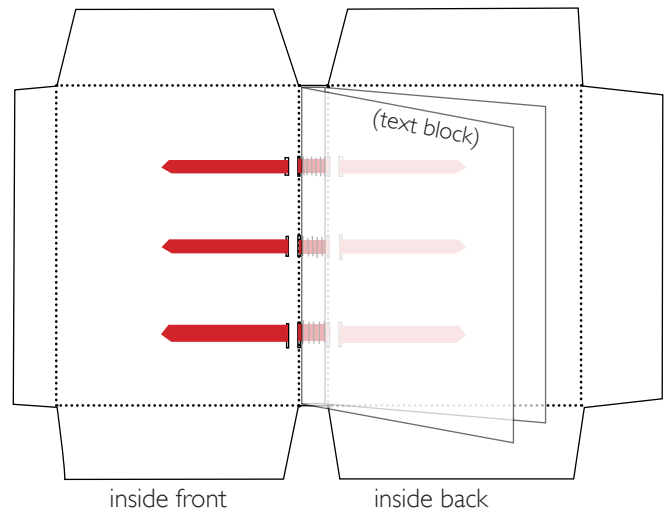# MS 610

LIMP PARCHMENT (LACED)

Bouche of Courte.

305 x 205 mm

Limp parchment with remains of
leather ties. Manuscript on paper.

outside back   outside front

inside front   inside back

(text block)

•••••• fold
——— alum-tawed slips*

——— LACING PATH

——— sewing
——— alum-tawed slips
——— parchment case
——— text block
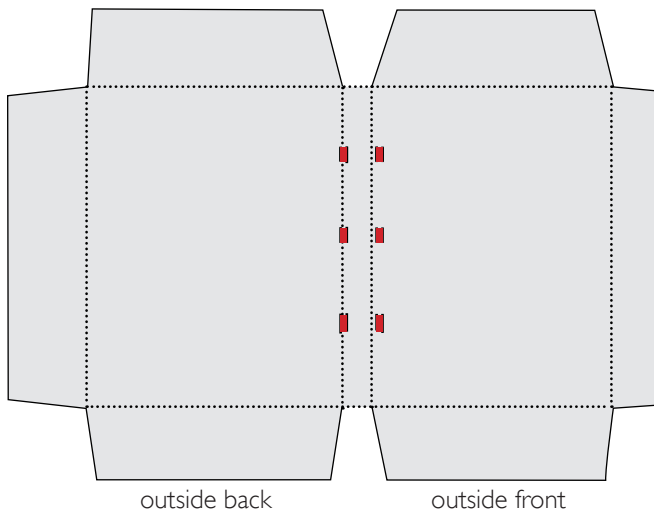
not to scale: width of slips enlarged for clarity

MS 649

LIMP PARCHMENT (TACKETED)

Sermons of Graeculus O.F.M. and Conradus de Waldhausen Can Reg.

220 x 150 mm

Damaged original limp parchment binding with flap, made from several pieces of parchment sewn together by means of parchment strips. The sewing runs through the spine and is gathered in decorative patterns over two strips of heavy leather.

spine

sewing pattern
sewing stations
parchment stays

10 folios

10 stitches

8 stitches

12 gatherings

1
2
3

3 pieces of parchment stitched together with parchment strips

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Above image: A monk using a sewing frame. 12ᵗʰ century. Bamberg, Staatsbibliothek, MS Patr. 5, fol. 1V.
Cover image: Beinecke Rare Book & Manuscript Library, Beinecke MS 866.