

# Fifteenth-Century Bookbinding Structure in Italy and the Netherlands: A Survey of Manuscripts and Incunabula

## ABSTRACT

A systematic, qualitative survey of sixty fifteenth-century books from Italy and the Netherlands investigated the materials and structures of their bindings. Findings indicate common use of all-along sewing, tied-down endbands, laced-in sewing supports and endband cores, and sturdy endleaves often made of parchment. A high level of quality in both material and technique occurs regardless of a text's geographical origin, production method (printed or manuscript), or text block material (paper or parchment). Structural binding features that differ frequently between the two regions include preparation of the spine folds for sewing, number and width of sewing supports, shaping of wooden boards, animal origin of the covering leather, style of the turned-in leather corners, and the location of clasps on the binding. Both historians and conservators may find this survey useful in the identification and repair of fifteenth-century bindings, and in the design of durable and protective conservation bindings.

## INTRODUCTION

The fifteenth century witnessed a major transformation in the European book trade. Two interdependent technological developments encouraged a radical increase in the production and distribution of books. Paper, manufactured in Europe since the thirteenth century,<sup>1</sup> became cheaper and available in larger quantities than parchment, and consequently its use as a writing support increased. Parallel with this shift in the raw materials for bookmaking, the invention of movable type around 1450 allowed multiple and identical copies of a text to be printed.<sup>2</sup> The technological advances of printing resulted in more accurate texts and exponentially greater production capability than had been possible with traditional manuscript production. These concurrent developments in paper manufacture and printing had a dramatic impact on the book trade, transforming it from a small, local retail business into a speculative, inter-

national network.<sup>3</sup> The period from 1450 to 1500 was a time of experimentation in the book arts, when new materials and technologies were introduced, adapted, and then reconciled with the traditional aesthetics of manuscript production. By the turn of the century, commercial printers and booksellers had produced and distributed an unprecedented number of books throughout Europe.<sup>4</sup>

Up until the nineteenth century many books were bound at the time of sale, according to the new owner's specifications, rather than by the publisher as they are today.<sup>5</sup> The owner influenced the type and style of binding, paying more for extra decoration or higher quality materials. While the decoration of historical bookbindings has been studied and published extensively,<sup>6</sup> the interior structures and materials that make up the bindings have been given much less scholarly attention.<sup>7</sup> However, these features occasionally may provide evidence of origin in cases where it is not clear from the binding decoration alone. This evidence may be found in stylistic and structural details that are peculiar to a specific time period or geographical region. By analyzing the methods of book construction of a particular place and period, we refine the process of dating and locating the origin of bookbindings, perhaps revealing clues about book distribution and provenance.

Knowledge of historical bookbinding structure is important for book conservators as well as historians. Conservators must be able to develop durable and historically sympathetic conservation bindings that also protect and support their contents. When repairing an original binding, the conservator should be able to distinguish between original and replacement elements, and should design repairs that recognize how the original elements functioned and appeared before they were damaged or replaced.

This survey attempts to describe qualitatively many of the structural and material features of fifteenth-century bookbindings from Italy and the Netherlands.<sup>8</sup> This period was chosen because it represents a time of radical change in the production and distribution of books, and because in many ways bindings from this period have survived better

than their descendants. The survey focuses on bindings made in Italy and the Netherlands, two major hubs of cultural activity during the Renaissance. Scant information has been published to date on binding structures that were produced in these regions in this period. The survey was designed to address three basic research questions:

1. *What kind of workmanship was used to produce bindings of the fifteenth century? What has allowed these books to survive five centuries of use and deterioration?*

“Workmanship,” in the context of this survey, refers to the technical skill and choice of materials that go into a binding and affect its longevity. The most important aspect of a bookbinding is the sewing structure, since it holds the pages together. The endleaves protect the outer pages of the text. The exterior elements of a binding, the boards and the covering, protect not only the text block itself, but also the sewing structure and the endleaves.

2. *Are there differences between bindings of manuscript and printed books during the period when printing was first developed? Are there differences between bindings of text blocks produced on paper and those produced on parchment?*

Most fifteenth-century book collectors understood the physical difference between manuscripts and printed books, although they disagreed over which medium was preferable.<sup>9</sup> The survey recorded the differences in the bindings between manuscripts and printed books, and between paper and parchment text blocks.

3. *What are the differences in binding technique between the regions of Renaissance Italy and the Netherlands?*

The decoration of bookbindings from both the Netherlands and Italy is well documented.<sup>10</sup> However, information on the structures of these bindings is often not published. The geographical origins of both the bindings and the text blocks were recorded so that regional differences between binding structures could be analyzed.

The survey was developed in the hopes of answering these three questions and meeting several additional goals. The first goal was to contribute a small body of systematically gathered and carefully synthesized data to the existing knowledge of fifteenth-century European binding technique, in the hope that it might assist others in the identification of bindings of similar date and provenance. The second goal was to observe binding structure and condition from the point of view of a conservator in order to enhance our collective knowledge of durable and stable binding techniques. The third goal was to refine the method of survey data collection and analysis to maximize both efficiency and detail.

## METHODOLOGY

A number of researchers have used survey methodology<sup>11</sup> to assess historical bookbinding structures. A few have published their results, and more studies are under way.<sup>12</sup>

Each of these researchers has developed his or her own “survey instrument,” a blank form used to gather the data. In designing the instrument for this survey, those of several other researchers were compared and then assessed according to the goals set for this study.<sup>13</sup> In addition to these blank forms, other published works about bookbinding structures and bibliographical descriptions of bookbindings were consulted.<sup>14</sup> A pilot study determined the range of variables that would be necessary for the full survey, which included descriptions of materials and techniques as well as condition information. The survey instrument for this study emphasized the use of standardized choices to maintain consistency and to facilitate conversion of the data to a computer database. When unusual features warranted further description, drawings and notes were made individually.

The sampling method is best characterized as “stratified.” Each book was examined briefly before it was included in the survey to determine whether or not it was an original fifteenth-century binding. This pre-examination was necessary since very little information on bindings was available from collection catalogues. Books were surveyed from the collections of the Walters Art Gallery, the Library of Congress, the Pierpont Morgan Library, and Beinecke Library at Yale University. Each of these institutions has a different acquisition policy that affects the types of books they collect, and none of these modern collections can be said to represent statistically the whole population of books produced in the fifteenth century. Both the pre-examination of each book and the statistical limitations of the collections introduced bias into the sampling method and therefore precluded the possibility of a random sample. Instead, a conscious effort was made to sample in a stratified manner, looking for substantial numbers of books from two different categories, geographical origin and method of text production. Both printed and manuscript texts were selected from each of the two regions, Italy and the Netherlands. Once these categories were represented, books were chosen to represent a range of production dates.

The data gathered on hand-written survey forms was organized to create two different products. First, individual data elements were entered into a custom-designed relational database using Paradox for Windows. Systematic manipulation of the database correlated the different structural binding features, identifying both generalized trends (characteristic of all or almost all of the members of a set) and anomalies (characteristic of only one member of a set). For example, the variable of “number of sewing supports” was compared with the variable of “geographical origin of the text.” The resulting correlation revealed that almost all of the books with three or fewer sewing supports were produced in Italy, and almost all of those with four or more sewing supports correlated with the Netherlands. The

whole body of data was compiled and correlated in this manner. The second product of the survey was a catalogue of individual binding structures described in prose.

## RESULTS

The general independent variables used to stratify the sample were unrelated to the specific topic of the inquiry, binding structure. The sample can be broken down according to these general variables as follows. Of the total of sixty books, thirty-five of the texts were produced in Italy, and twenty-five were produced in the Netherlands. Among the Italian books seventeen are manuscripts and eighteen are printed books; the selection from the Netherlands consists of fourteen manuscripts and nine printed books. Seventeen manuscripts were produced before the advent of printing in each of the two regions. Forty-five books were produced after approximately 1475, and of these, sixteen are from the Netherlands, twenty-seven from Italy. Of these forty-five books, fourteen are manuscripts, twenty-nine are printed, and two of the texts are composed of separate sections of both manuscript and printed text. The sample includes over ten printed books from each decade between 1470 and 1500.

Specific information on original owners was rarely available, but educated guesses were made for half of the sample. Ten books may have been owned by institutions such as monasteries or churches, and twenty-three books owned privately. In addition to the notes written in the margins, the use of a book is also indicated by dirty and damaged page edges. Twenty-seven books show evidence of extensive use, including all of the books attributed to institutions. The amount of decoration in each text was also recorded to indicate whether it was a deluxe or utilitarian item. In addition, other codicological evidence such as pricking and ruling, number of leaves per gathering, signature marks, and folding format of paper leaves (i.e., quarto, octavo, etc.) was recorded.

The results of the database analysis reveal useful and instructive things about fifteenth-century book structure from Italy and the Netherlands. Since the sample was not randomly chosen, conclusions must be limited to qualitative description rather than quantitative statistics. The findings should not be used to generalize to the whole population of fifteenth-century books from Italy and the Netherlands, but they do indicate a variety of structures that may be found in these books.

The data analysis found a number of structural binding characteristics common to all or most of the books sampled. The longevity and protective nature of fifteenth-century structures in general was evaluated both by these common features and by the areas of frequent damage, deterioration, and subsequent repair found in the sample.

The techniques that appear consistently across the sample reveal that keen attention was given to creating sound interior structures, the most essential parts of a binding. These features, along with the absence of other timesaving shortcuts, indicate that the fifteenth-century binders intended to make durable bindings. Every book in the sample that retains its original thread is sewn all-along, without skipping sewing stations, providing a strong sewing structure. Where present, endbands are tied down in every gathering, increasing the chance of the endbands' survival, and reducing the twist of the text block along the spine axis.

The sewing supports and endband cores of all the books are laced into the boards (both wood and pasteboards), providing the greatest possible strength along the joint area. The lacing patterns in the books were determined in several ways. First, the spine edge of the boards and the inside of the boards under the pasted-down endleaves were examined for lumps or depressions where the supports may have been laced into channels cut into the wood (fig. 1). Second, the turn-ins were examined for deliberate vertical slits adjacent

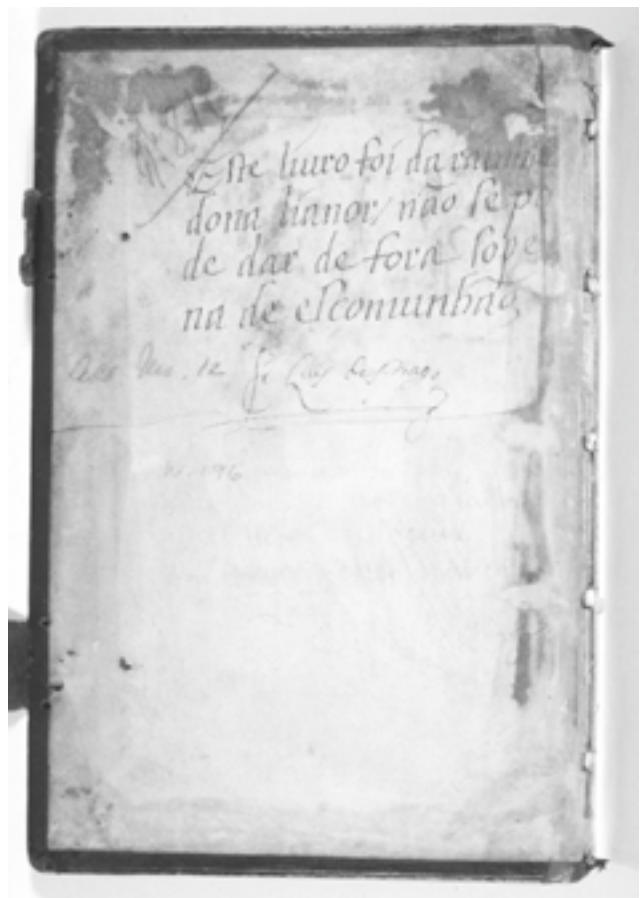


Fig. 1. Laced-in sewing supports leave depressions under the paste-down along the right edge of the wooden board. Walters Ms. W. 196.

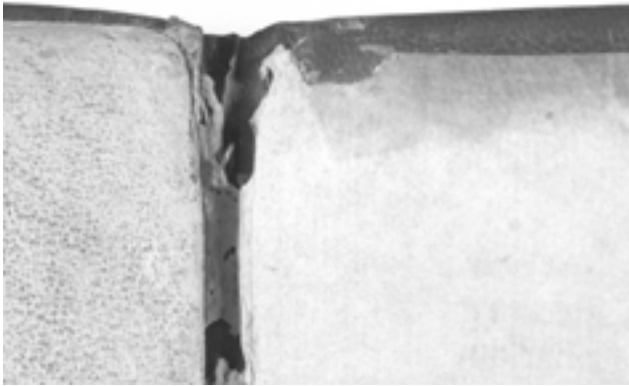


Fig. 2. The leather turn-in is cut deliberately near the spine to accommodate a former laced-in endband core, which is no longer attached. Walters Ms. W. 352.

to the spine. During the process of covering a binding with laced-in endband cores, the leather is cut near the spine as it folds over the board edges to accommodate the endband cores (which straddle the gap between the text block and the boards). If the current endband cores are not connected to the boards, but the slits in original spine leather are still visible, it may be assumed that originally these cores were laced into the boards (fig. 2).

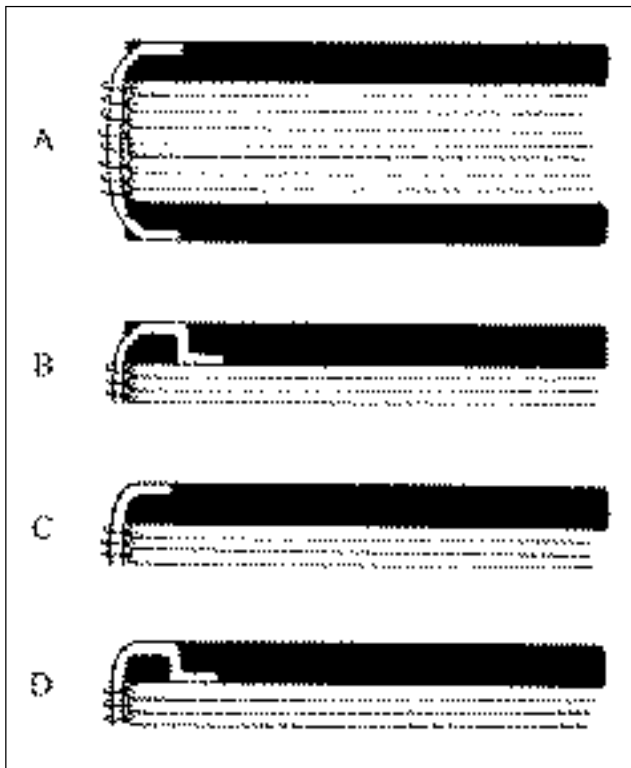


Fig. 3. Four different sewing support lacing patterns: (A) Tunnel to outer channel; (B) Tunnel to outer to inner channel; (C) Outer channel; (D) Outer to inner channel.

Four different sewing support lacing patterns were found in the sample (fig. 3). Only a few early Italian printed books in the sample have the medieval-style tunnel lacing in which the sewing support is fed through a hole in the thickness of the board. Tunnel lacing was eliminated gradually during the course of the fifteenth century. The other lacing patterns use only channels in the surface of the boards, which are less time-consuming to carve than tunnels. Almost all of the boards in the sample with outer channels only are Italian. Almost all of those from the Netherlands have both outer and inner channels.

Many of the books in the sample are bound with wooden boards. The area of the boards that is adjacent to the text block shoulder is square and unshaped in almost all books in the sample (fig. 4). During the fifteenth century, books generally were stored lying horizontally,<sup>15</sup> and had characteristically flat spines or only slightly rounded ones. Later binders deliberately over-rounded the spine, using a technique called “rounding and backing.” They encouraged the spine to keep its artificial shape by adhering linings to the spine, and by beveling the area of the boards adjacent to the shoulder to make room for the curvature of the text block (fig. 5). These measures were taken in part to combat the forces of gravity imposed on



Fig. 4. Wooden board edge is square in the area adjacent to the text block shoulder. Walters Ms. W. 356.

books that are shelved standing up vertically. However, the rotation of books from the traditional horizontal position on the shelf to a vertical one did not occur as general practice until the sixteenth and seventeenth centuries. This change in shelving orientation caused specific damage to the fifteenth-century books over time, as will be discussed below. Many of the books in the sample have been repaired, and in the process of repair the original spine shape may have changed. However, the presence of unshaped, flat shoulder edges on wood boards is evidence that the boards are probably original, and that the fifteenth-century text blocks were not originally rounded and backed.

Clasps, or evidence of their former presence, were found on every book in the sample. Parchment tends to cockle if left unrestrained, and fifteenth-century binders treated paper text blocks the same way as their parchment cousins by attaching interlocking metal clasps to the edges of the binding. By the sixteenth century, however, binders realized that paper was much more stable than parchment, and the use of clasps declined.

All books in the sample were bound with durable materials. Linen thread was used for sewing both the text block and the primary endbands. Tawed skin, which appears whitish or sometimes was dyed crimson, is stronger than tanned skin and was used for most of the sewing supports and endband cores. Parchment, more durable than paper, was used for many of the original endleaves. Almost all books in the sample are covered in full tanned leather.

The features found commonly in most if not all of the books in the survey indicate good workmanship was used in creating these fifteenth-century bindings. Care was taken to attach the different structural elements to each other as securely as possible. Patterns of damage and repair in the survey sample indicate that good workmanship in a binding has led to the survival of the most important interior structures. Although repairs to a damaged binding may obscure or alter original structures, they highlight the parts of a binding that are most vulnerable to damage and degradation over time. In this survey, repairs were found both on books that were used repeatedly and on those that bore little evidence of use.

The most common type of damage in the sample is torn or missing endcaps, which are located at the head and tail of the spine. Once books were rotated on the shelf to a vertical position, the endcaps became highly susceptible to abrasion and tearing as the books were pulled off the shelves. Almost three-quarters of the books in the sample have been rebacked, a repair in which the spine and joints of the cover are reinforced with a piece of new leather. The joints take most of the stress and have the widest range of movement in a binding, causing the leather around them to crack and the sewing supports to break over time. Even without the stress of frequent movement, leather degrades

over time in part due to the presence of acid left over from the manufacturing process. Thus the frequency of damage to and repair in the spine area is not surprising, given how vulnerable the endcaps and joints are to damage and deterioration.

Damage and repair is evident in other areas of the books too. Approximately half of the sample has had endleaves replaced. Modern book dealers often had this done as a quick way to tidy up an old binding, regardless of the condition of the original endleaves. Endbands are missing or replaced in approximately half of the sample; damage in this area is also primarily due to movement on and off of shelves. Original clasps are missing on over one-third of the books in the sample. They may fall off or break off, but also may have been removed intentionally in later centuries. In contrast with the frequency of these damages and repairs, very few of the text blocks have broken or resewn sewing structures. This is a testament to the strength and durability of all-along sewing on raised bands with linen thread.

Since external structural elements like the endcaps and the joints have failed at much higher rates than the sewing structure, it could be said that binders in the fifteenth-century understood the importance of protecting the most essential, interior parts of the binding. It is clear that these bindings were constructed with durable structures and materials that were intended to survive use over long periods of time. Nonetheless, even the highest quality tanned leather covering and tawed sewing supports have failed over time in the joint area. Later binders have also grappled

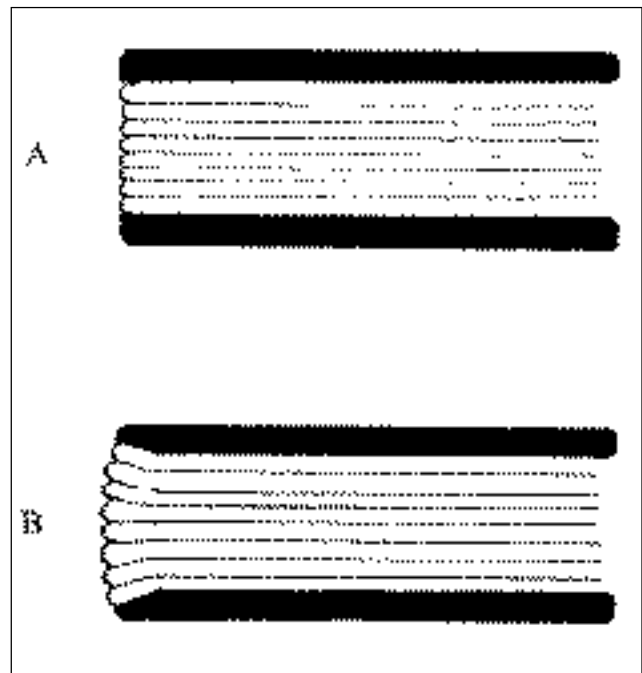


Fig. 5. Board shape in the shoulder area: (A) Square, earlier style; (B) Beveled to accommodate rounded text block, later style.

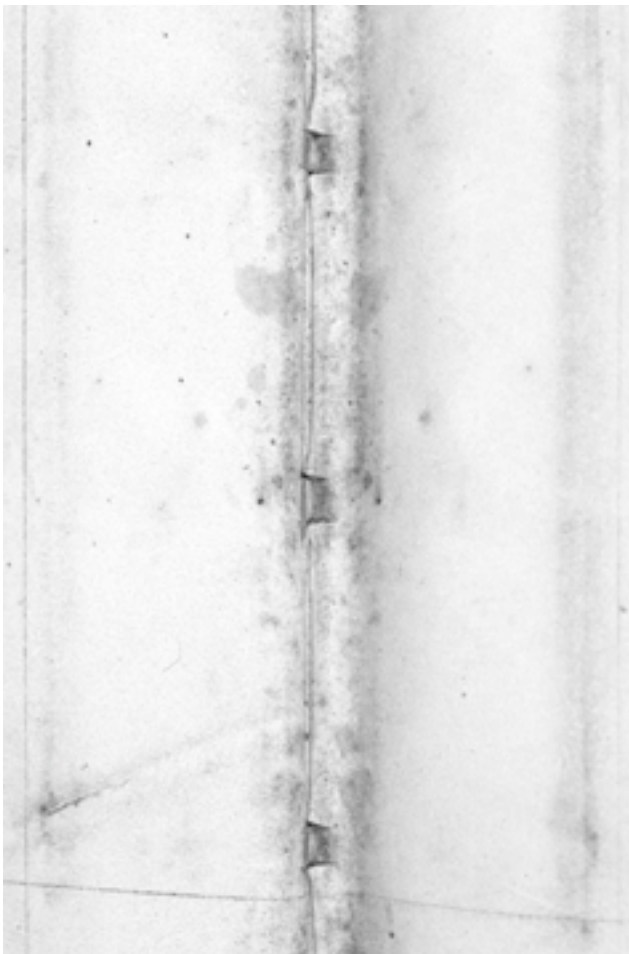


Fig. 6. Preparation of gatherings for sewing: double slits are cut into the spine folds, common in fifteenth-century books from the Netherlands. Walters Ms. W. 168.

with this issue and have experimented with different materials and structures in order to combat the problem.

The survey reveals very few structural differences between the bindings of manuscripts and printed books. The one significant difference is in the use of parchment guards in the spine folds of the text block. The purpose of the guards was to reinforce the area where the thread pierced the spine fold to prevent the page from tearing. These guards are found only in paper text blocks, which in this sample are more likely to have printed text. Most of the manuscripts in the sample are on parchment and consequently did not require reinforcement. When paper was first introduced as a text block material, it was considered to be much weaker than parchment. However, several sheets of paper nesting together create a strong gathering that does not need the reinforcement of the guards. Over time, binders recognized this, and the use of guards declined. The parchment guards found in this survey are used on books dated until about 1490.

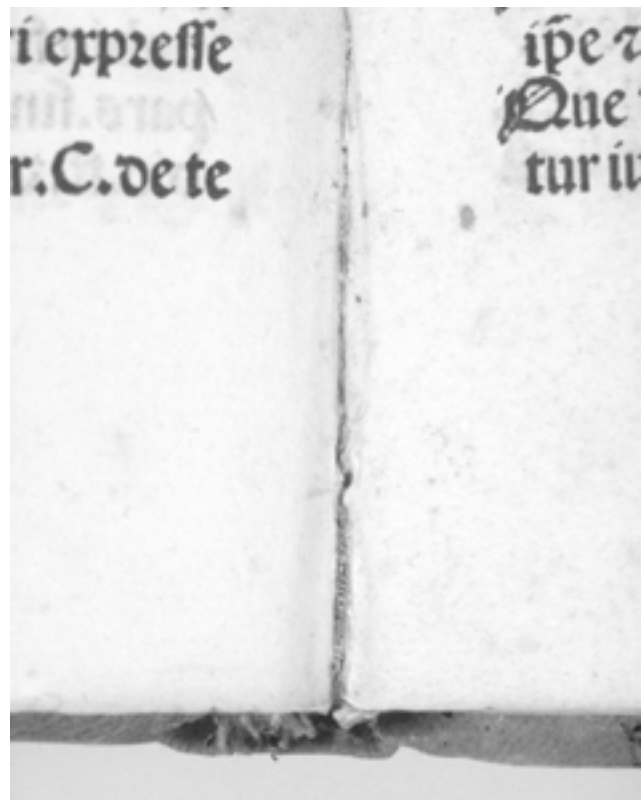


Fig. 7. Preparation of gatherings for sewing: holes punched through the spine fold with a needle or awl protrude slightly, common in fifteenth-century books from Italy. Walters Inc. 91.518.

The survey also shows that a number of structural features of the bindings differ between the regions of Italy and the Netherlands. These features are outlined here in the order of the binding process, beginning with sewing and text block preparation, and continuing with board attachment, board shape, covering, and clasps.

In each region the spine folds of the gatherings were prepared differently before they were sewn together. In the Netherlands, most of the spine folds were marked with a series of either single or double slits made by knife cuts used to indicate where the needle was to go in and out of the spine fold (fig. 6). Almost all of the Italian books have round, punched sewing holes that were made with an awl or needle (fig. 7).

There are several ways in which sewing supports differ between the two regions. Over two-thirds of the Italian books have three sewing supports, regardless of the size of the book. There was no standard number of sewing supports in books from the Netherlands, although they often have more than three, even on the small books. There is also a significant difference in the width of sewing supports. Approximately two-thirds of the Italian books in the sample have wide sewing supports of 8 mm or more. The

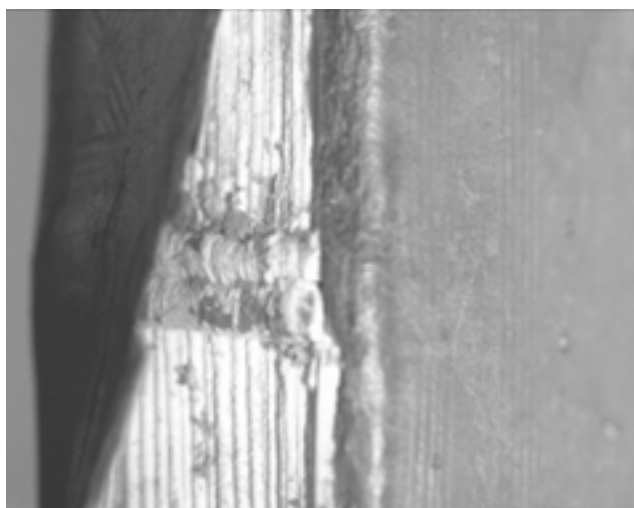


Fig. 8. A split, alum-tawed sewing support as seen under the detached spine leather. Walters Ms. W. 396.

Italian supports are often slit down the middle and sewn with the thread winding separately around each half of the split support (fig. 8). Two-thirds of the books sampled from the Netherlands have quite narrow sewing supports, 5 mm wide or less.

The survey includes only books that have stiff covers. Only six of the sixty books in the sample are bound with pasteboards, and these all come from Italy. Of the books with wooden boards, those from the Netherlands tend to have thicker boards (8 mm) while those from Italy tend to be thinner (7 mm). The type of wood is difficult to identify conclusively, but the presence of extensive insect damage to the boards indicates that the wood may be beech. All of the books in the sample with insect-damaged boards are of Italian origin.

The category of “board shape” proved to be one of the most complicated sets of data. The survey recorded the linear profile of each board edge, including the outside, inside, spine, and shoulder edges (fig. 9). There are a few

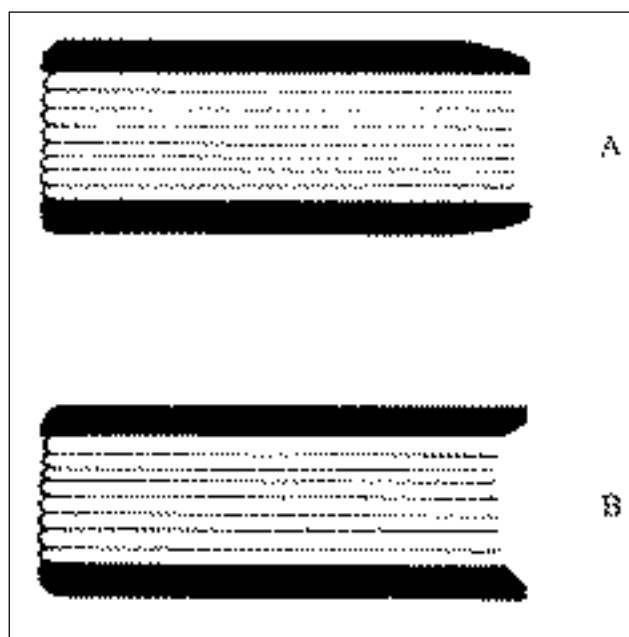


Fig. 10. Board shaping: (A) Cushioned outside edge and square inside edge, common in fifteenth-century books from the Netherlands; (B) Square outside edge and beveled inside edge, common in fifteenth-century books from Italy.

significant trends. Almost all of the books from the Netherlands have either unshaped or slightly softened inside edges, and many of these have gently sloping or “cushioned” outside edges. All of the more angular, beveled inside edges, and almost all of the unshaped outside edges are Italian (fig. 10).

Most of the bindings in the sample are covered in full tanned leather of calf-, goat- or sheepskin. Almost all of the calfskin-covered books come from the Netherlands, and most of those with goat- and sheepskin come from Italy. In addition to the difference in animal origin of the covering leather, the cuts made in the excess leather at the corners of the boards vary somewhat. More than half the

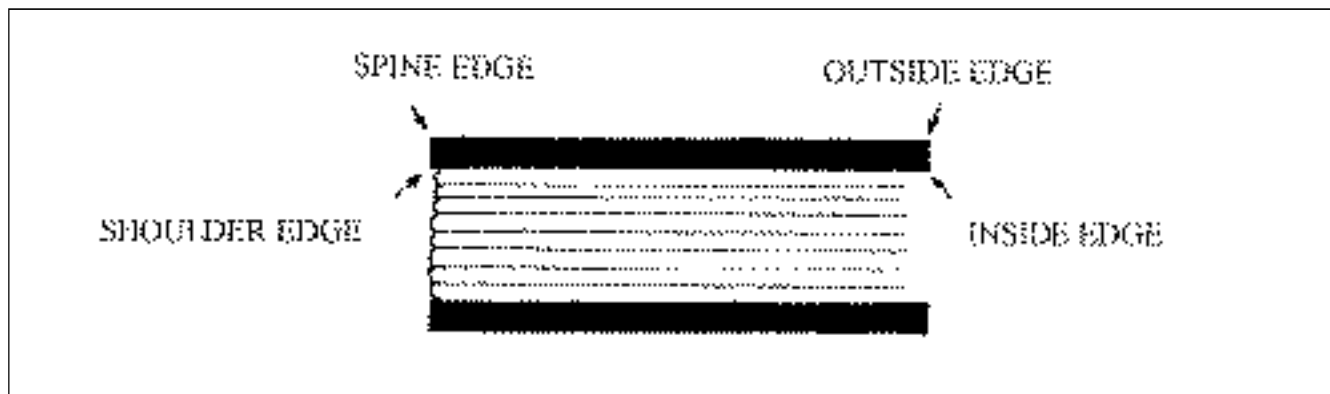


Fig. 9. Areas of the boards that were examined in this survey.

books from the Netherlands have tongue corners that have a narrow tab in the middle (fig. 11). Most of those from Italy have mitered corners, with a simple diagonal slit where the two pieces of folded leather butt against each other (fig. 12).

The hinging point of the metal binding clasps is a well-known indicator for geographical origin.<sup>16</sup> In this sample, almost all of the clasps on books from the Netherlands hinge from the back cover and connect to the catch on the front, whereas most of those from Italy hinge from the front and catch on the back.

## CONCLUSION

After close examination of the sixty books in the survey, it is clear that very few of the specific features identified in the survey are exclusive to one region or the other. Table 1 summarizes some of the structural features that were found on many of the books by geographical origin. The information contained in this table should not be interpreted as rigid law. In fact, it is common for a fifteenth-century binding from the Netherlands to have features that may be more characteristic of Italian bindings, and vice versa. However, in a book that has three or more features associated with one region, the geographical origin of the binding is usually clear.

In most of the books in the sample, the geographical origin of the binding matches that of the text. In the few where they do not match, however, the binding can be taken as an indicator that the text traveled soon after it was produced. In aggregate this kind of information can contribute to our understanding of the history of book production and distribution throughout Europe.

Despite the great increase in book production that was brought on by the printing press, the analysis of books in

this sample indicates that during the 1400s binders continued using time-intensive medieval binding techniques at least until the end of the century. It is clear, however, that the binders were thinking about their choices, and occasionally made subtle modifications (such as the elimination of edge-tunnel lacing and parchment spine-fold guards) that paved the way for more dramatic changes in the sixteenth century.<sup>17</sup>

Complementing the historical information gathered here, the conservation implications of this research in many ways support what conservators have already put into practice. We know that all-along sewing is more reliable than abbreviated sewing, and that sewing on raised bands can be very sturdy. We should note that the survival of the text depends much more on a sturdy sewing structure than on the durability of the covers. Widespread damage to the endcaps and endbands in this sample emphasizes the need for reinforcement in these areas, and cautions against over-paring the leather in these areas. Contrary to common practice, the results reveal that extending the sewing supports across the joint to the boards does not reinforce a leather covering material enough to produce joints that survive over time. This reflects a growing concern that even the highest quality leather is not stable enough in the long run to serve as the primary joint material.

I recognize that the data presented here represents only a very small portion of the history of bookbinding and that other scholars have studied these materials in greater depth. The main purpose of this study, however, was to refine the method of data collection and analysis with the use of a systematic survey. That said, I hope that publishing the results of this small survey will be helpful to others in the identification of fifteenth-century bindings from Italy and the Netherlands. Furthermore, I hope that by demonstrating how specific structures and materials have survived and/or

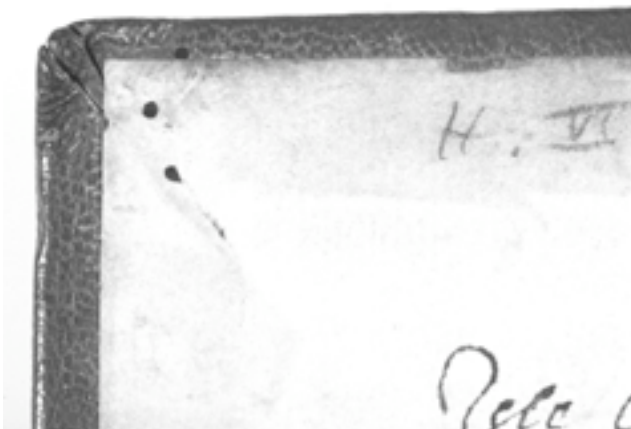


Fig. 11. Tongue corner, common in fifteenth-century books from the Netherlands. Walters Ms. W. 352.



Fig. 12. Mitered corner, common in fifteenth-century books from Italy. Walters Inc. 91.20.



Italy	The Netherlands
Punched sewing preparation	Slit sewing preparation
Three sewing supports	Four or more sewing supports
Wide, split sewing supports	Narrow, unsplit sewing supports
Outer channel support lacing	Outer to inner channel support lacing
Board thickness 7 mm	Board thickness 8 mm
Beveled inside board edge	Square inside board edge
Square outside board edge	Cushioned outside board edge
Tanned goat or sheep leather	Tanned calfskin leather
Mitered corners	Tongue corners
Clasps hinge from the front cover	Clasps hinge from the back cover

Table 1. Structural features of many fifteenth-century full leather bindings from Italy and the Netherlands.

failed over the course of five centuries these data may assist conservators in developing better conservation binding structures. I will be glad to share the data from this survey, the survey instrument, and the catalogue of individual binding descriptions, in the hope of encouraging others to document and publish descriptions of historical binding structure from other places and time periods.

#### ACKNOWLEDGMENTS

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#### NOTES

1. Dard Hunter, *Papermaking: The History and Technique of an Ancient Craft* (New York: Dover Publications, Inc., 1974), p. 60.

2. Conrad Haebler, *The Study of Incunabula*, translated by Lucy Eugenia Osborne (New York: The Grolier Club, 1933), p. 38.

3. For discussions of the transformation of the book trade during the fifteenth century, see: E.P. Goldschmidt, *Gothic and Renaissance Bookbinding*, Vol. I (Boston: Houghton Mifflin, 1928), p. 43; Elizabeth Eisenstein, "From Scriptoria to Printing Shops: Evolution and Revolution in the Early Printed Book Trade," in *Books and Society in History*, edited by Kenneth Carpenter, Papers of the Association of College and Research Libraries Rare Books and Manuscripts Preconference, 24-28 June 1980, Boston, Massachusetts (New York and London: R.R. Bowker Company, 1983), p. 33; and Lotte Hellinga, "The Codex in the Fifteenth Century," in *A Potencie of Life: Books in Society. The Clark Lectures 1986-1987*, edited by Nicholas Barker (London: The British Library, 1993), p. 81.

4. For a summary of a study of the increasing sizes of editions published in the last quarter of the fifteenth century, see:

Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing 1450-1800*, translated by David Gerard, edited by Geoffrey Nowell-Smith and David Wootton (London: NLB, 1976, orig. pub. 1958), p. 217.

5. Nicholas Pickwood, "Onward and Downward: How Binders Coped with the Printing Press Before 1800," in *A Millennium of the Book: Production, Design & Illustration in Manuscript & Print 900-1900*, edited by Robin Myers and Michael Harris (Winchester and Delaware: St. Paul's Bibliographies and Oak Knoll Press, 1994), p. 63.

6. For general histories of bookbinding concentrating on decoration, see: E.P. Goldschmidt, *Gothic and Renaissance Bookbinding* (Boston: Houghton Mifflin, 1928); [Dorothy Miner,] *The History of Bookbinding, 525-1950* (Baltimore: Trustees of the Walters Art Gallery, 1957); Paul Needham, *Twelve Centuries of Bookbinding, 400-1600* (New York: Pierpont Morgan Library and Oxford University Press, 1979).

7. L.M.J. Delaissé, "Towards a History of the Medieval Book," in *Codicologica Volume I: Théories et principes*, edited by A. Gruys and J.P. Gumbert (Leiden: E.J. Brill, 1976), 75-83. Delaissé discusses the "archaeological method" of examining bound manuscripts as a holistic approach to the study of all aspects of manuscript production.

8. I undertook this study as a master's thesis, which, along with a catalogue of individual binding descriptions, is housed in the library of the College of Library and Information Services at the University of Maryland in College Park under the same title as this paper.

9. Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing 1450-1800*, translated by David Gerard, edited by Geoffrey Nowell-Smith and David Wootton (London: NLB, 1976, orig. pub. 1958), p. 77.

10. See, for example: Staffan Fogelmark, *Flemish and Related Panel-Stamped Bindings: Evidences and Principles* (New York: Bibliographical Society of America, 1990); Anthony Hobson, *Humanists and Bookbinders* (Cambridge and New York: Cambridge University Press, 1989).

11. For a discussion of survey methodology in the context of libraries, see Helen M. Gothberg, "The Library Survey: A

Research Methodology Rediscovered," *College and Research Libraries* (November 1990), pp. 553-559.

12. Denis Carvin, *La Reliure Médiévale* (Arles: Centre Interrégional de Conservation des Livres, 1988); Carlo Federici and Konstantinos Houlis, *Legatura Bizantine Vaticane* (Roma: Istituto Centrale per la Patologia del Libro, Gratelli Palombi Editori, 1988); Jan Szirmai, "Evolution of the Medieval Codex: Some Mechanical Considerations," *Convengo Internazionale La Legatura dei Libri Antichi tra Conoscenza, Valorizzazione e Tutela*, Parma, 16-18 November 1989, author's offprint; there are other studies under way in Great Britain, France, and Italy.

13. Blank, unpublished survey forms of Nicholas Pickwoad, Christopher Clarkson, Jane Greenfield, and Sylvie Merian were analyzed as well as published forms of Denis Carvin, *La Reliure Médiévale*; and Carlo Federici, *La Legatura Médiévale*, 2 vols. (Roma: Istituto Centrale per la Patologia del Libro, editrice Bibliografica, 1993).

14. Jane Greenfield, *ABC of Bookbinding* (New Castle, Delaware and New York: Oak Knoll Press and Lyons Press, 1998); Leon Gilissen, *La Reliure Occidentale Antérieure à 1400, d'après les Manuscrits de la Bibliothèque Royale Albert Ier à Bruxelles* (Turnhout: Brepols, 1983); Heinz Petersen, *Bucheinbände* (Graz: Akademische Druck-u. Verlagsanstalt, 1988); Philip Gaskell, *A New Introduction to Bibliography* (New Castle, Delaware and Winchester: Oak Knoll Press and St. Paul's Bibliographies, 1995).

15. For a description of the history of book shelving practices, see Henry Petroski, *The Book on the Bookshelf* (New York: Knopf, 1999).

16. Edith Diehl, *Bookbinding: Its Background and Technique*, vol. I (New York and Toronto: Rinehart & Company, Inc., 1946), p. 65.

17. For information on the changes in bindings beginning in the sixteenth century, see: Nicholas Pickwoad, "Onward and Downward: How Binders Coped with the Printing Press Before 1800," in *A Millennium of the Book: Production, Design & Illustration in Manuscript & Print 900-1900*, edited by Robin Myers and Michael Harris (Winchester and Delaware: St. Paul's Bibliographies and Oak Knoll Press, 1994), 61-106; Mirjam Foot, "Bookbinding and the History of Books," in *A Potencie of Life*, edited by Nicholas Barker (London, The British Library, 1993), pp. 113-121.

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