

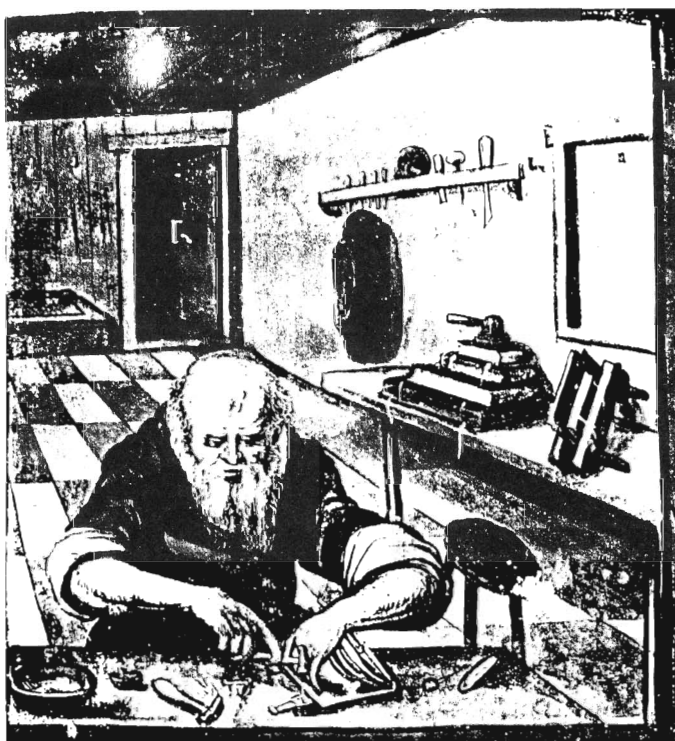


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CONTENTS

CLASPS, SCHLIESSEN, CLAUSUREN.

A GUIDE TO THE MANUFACTURE AND THE LITERATURE

OF CLASPS/J. Franklin Mowery 1

The Cover: Portrait of the Bookbinder Nicasius, attaching clasps. Nuremberg 1614. (*From the Landauerschen Gedenkbüchern, State Library, Nuremberg.*)

Editor for this issue: Kimberly A. LoDico

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Portrait of the bookbinder Johannes Landauer. Nuremberg 1532. (*From the Landauerschen Gedenkbüchern, State Library, Nuremberg.*)

CLASPS, SCHLIESSEN, CLAUSUREN. A GUIDE TO THE MANUFACTURE AND THE LITERATURE OF CLASPS/

J. Franklin Mowery

This article was first scheduled to be published in the GBW *Journal* well over 10 years ago. As you might imagine, it has taken much longer than that to compile the information and to finally sit down and write it. During my research into any articles pertaining to clasps, I was surprised to find remarkably few written in English. For the historical information given in this article, I have relied heavily upon my translation of Karl Jäckel's article, "Alte Techniken des Buchbinderhandwerks . . ." (BFB 13 (1985) #3). In addition, I have used the last 30 years of articles from the German bookbinding publication *Allgemeine Anzeige für Buchbinderei*. Over the past several years my friends have added to my collection of articles, making it necessary for me to simply offer a general thanks to those who have contributed.

Fine binders frequently wish to include clasps on their bindings, and book conservators are always coming across volumes that are missing clasps and bosses. The ability to contend with their loss was considered so important that the making of replacement clasps was part of my initial training in book conservation at the Staats und Universitäts Bibliothek in Hamburg in 1972. It was during that training that Wildred Kolmorgan showed me the rudiments of working with sheet brass to fashion a replacement clasp for the book I was working on. It was surprisingly easy, but required the right materials and tools and took a full day just to make one clasp and strap. From just a few periods of training and recent self-instruction, I eventually developed the confidence to attempt to cast a massive brass clasp. Much of this article talks about how I approach metalworking, and a goldsmith or someone who has been trained to work with metals will probably have many criticisms of my procedure and technique. Remember, however, that during the Renaissance, bookbinders were not as focused on perfection as we are today; therefore, a slightly imperfect replacement clasp will more than likely blend right in, whereas a clasp perfectly crafted by a goldsmith would stand out as a replacement.

HISTORY

The use of clasps and bosses seems to be as old as the codex of our present book form itself. It is difficult to place dates and designs on the earliest bosses, but since the early medieval period, when books were frequently adorned with work in precious metals (Figure 1), valuable jewels, antique ivory tablets, or enamels, the covers were susceptible to damage because of their size and weight.



Figure 1 Gospels from St. Agidien (Braunschweig, Germany), early thirteenth century.

Books were stored flat rather than placed upright on shelves or lecterns or at times, upright in book boxes (book chests). Sometimes iron chains were used to link the book to the desk or shelf (Figures 2, 3, 4). It was realized that there was abrasion taking place during routine handling, which threatened to damage, scratch, or soil the decorated surfaces. For these reasons, bosses were attached.

Bosses took on characteristic styles over the centuries. Bosses are usually grouped into corner plates, center plates, and edging referred to as “shoes” (Figures 5, 6, 7). Corner plates were generally heavily made to be in proportion



Figure 2 Chained library on fire (Fifteenth century woodcut).



Figure 3 The Laurentian chained library (Florence, Italy).



Figure 4 Book chained to reading desk.

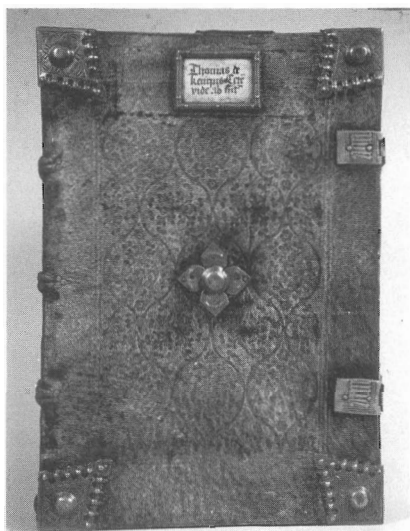


Figure 5 German incunabulum, circa 1495, with chain, corner- and center plates on the front cover (a), and evidence of simple bosses on the back cover (b).

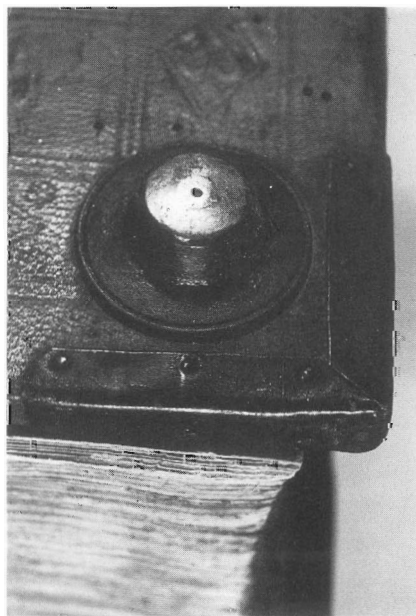


Figure 6 Flat-topped boss and corner "shoes." German, circa 1475.

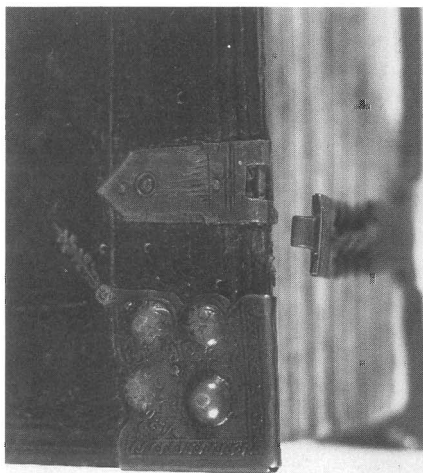


Figure 7 German binding, circa 1635, with corner plate wrapped around board edge.

with the size and weight of the book. They were constructed to fit around the edges of the board and they were nailed or riveted through the wooden board to offer maximum protection. The center plates (Figure 8) were similarly attached and sometimes had heraldic or symbolic decorations. Nail heads were left large and were often decorative themselves (Figure 9). On particularly large books, metal edging, bent around the squares of the boards to protect that part of the book, was sometimes attached (Figure 10).

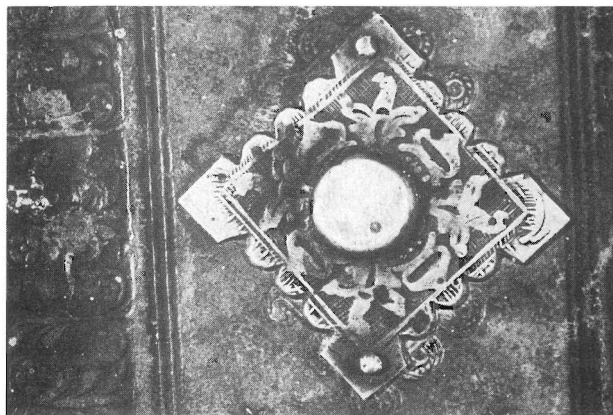


Figure 8 Center plate. Italian, circa 1490.

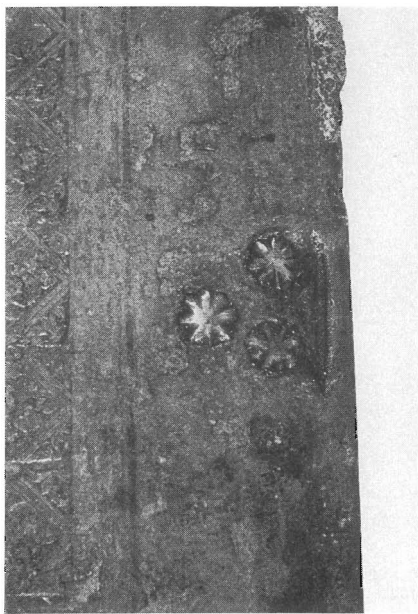


Figure 9 "Star nails." Italian, circa 1480.

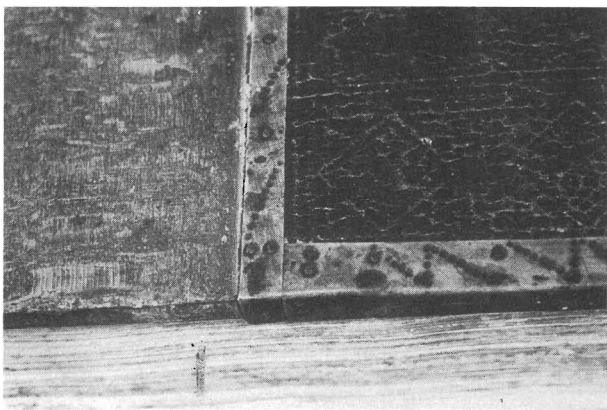


Figure 10 Metal edging around board edge.

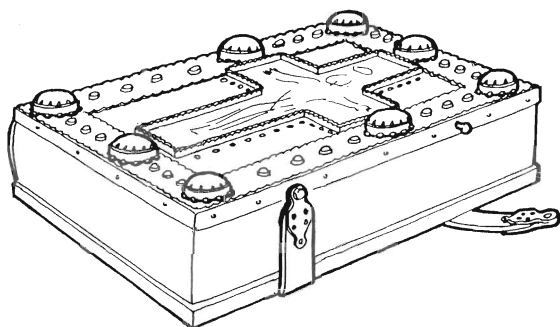


Figure 11 Jewel binding with semiprecious stones set around the surface to act as bosses.

There are several traditional forms of raised bosses; the early, raised metal boss, the wooden boss, or rarely, the horn boss. On more precious bindings, raised semiprecious jewels, enamel, or filigree work were often used (Figure 11). The raised surface was hammered (using a dapping block and punches) to create hemispheres or the flat-topped raised boss. (Germany tended to favor flat-topped bosses (Figures 12, 13, 14, 15); the use of bosses was not very popular in England). The raised surface also made it easier to reach beneath a large, heavy book to lift it. With the increase in book production and the increase during the Renaissance of private or small libraries that didn't have as much room to place books on tables or lecterns as did the monastery or university libraries of the Middle Ages, bosses were seldom used, and many books that did have them had them removed so that the books could be shelved next to each other. The increased number of books in smaller rooms led to the placement of books onto shelves. Thus, bosses were usually found only on liturgical texts.

The earliest codex books were composed of textblocks of vellum sections sewn and bound together between wooden boards. Due to the hygroscopicity (the affinity to absorb and release moisture) of the vellum and the boards, early binders were sure to have quickly learned the need to tie up, bind together, or latch closed those books they had just created. As was often the case in Medieval binding, the development of the clasp grew out of the need to keep the boards from splaying and to prevent dust and light from entering a textblock. The clasp, the wooden boards, and the sewing of the book work like a press to exert pressure on the textblock. In the sixteenth century, clasps evolved from being a structural necessity to being primarily decorative elements that reflected the artistic design and the stylistic directions of a particular period and the wealth of the owner. Clasps can be seen not only as decorative and functional but also as



Figure 12 German binding, circa 1475.

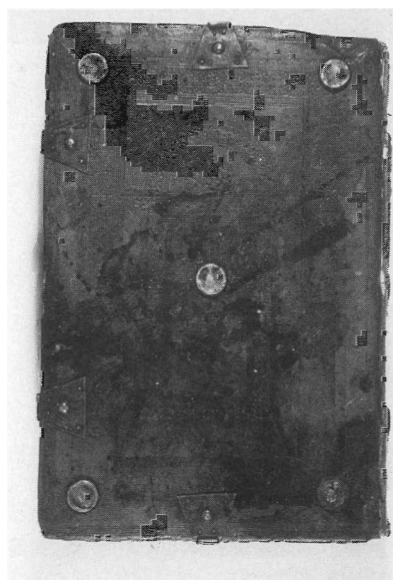


Figure 13 Italian binding, circa 1490, with flat-cap bosses.

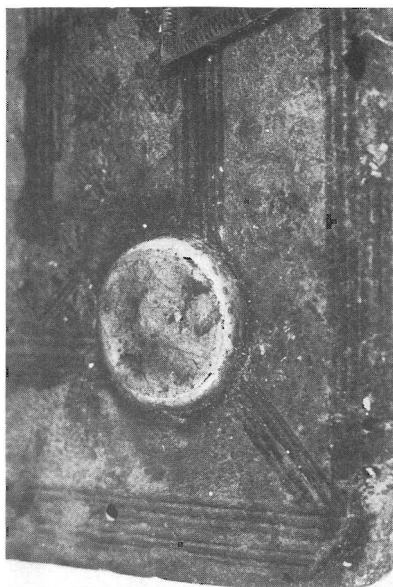


Figure 14 Detail.



Figure 15 One of the brass bosses has come away, showing the iron nail used to attach the boss to the cover.

symbolic. To open and close a book was, and often is, a sort of spiritual experience. Only a few pre-Renaissance individuals could read. Reading was a skill that was carefully guarded and the clasp was a visual as well as physical means to lock out those curious to learn the special mystery to be found within a text. When the clasp was released from a book held tightly shut, the secrets of that book were then open for the readers eyes.

A book's use and the culture in which it was produced influenced the different forms that the bindings took. For example, Islamic (Kairouan) bindings (Figure 16) were box-shaped, with the leather of the lower cover extending onto rectangular flaps that were there to protect the edges of the text. To prevent accidental opening, covers were sometimes held closed by a strap from the back cover that tied to a knot on the front. During the twelfth century, Islamic books appeared with triangular flaps (Figure 17), which again acted both as a sort of closure/protector of the fore-edge and as a page marker. Not altogether unlike the Islamic closures were the oriental bindings, which utilized wrapper-like covers that were held closed by toggles made of bone, ivory, or wood that tucked under loops in the covers (Figure 18). The medieval chemise bindings most often found on small format devotional books had extra covers made of soft leather or fabric sewn around the actual binding, and would have wrapped up the textblock to protect the precious illuminated text.

To protect a valuable book from being stolen from a monastery or from a university collection, books were sometimes chained to podiums or shelves. These chains pierced the covers and were linked to a bar attached to the furniture. Chained books were generally discontinued in the fifteenth century except in Poland, and in a very few cathedral libraries in England, where they remained in use until the end of the seventeenth century. Book bosses and clasps were probably manufactured at the same time as the chains, but were given more decorative designs. There are some Egyptian Coptic bindings of the ninth and tenth centuries that still have remnants of bone pegs that were mounted to the edges of the bottom covers, over which braided thongs were looped.

There is little written information about the designs of clasps and bosses, but there is a surprising number of these illustrated in early medieval paintings, sculpture, and miniatures. In particular, the works of Jan van Eyck, Holbein the younger, and Dürer, often show in great detail the clasps, while at the same time allow for dating and provenance.

The manufacture of clasps was the work of craftsmen; iron work was created by blacksmiths and work in brass would have been done by a "gürtler" (buckle maker). For the most part, clasps were decorated using simple tools. Decorating techniques utilized punches, inscription, chasing (manipulating the metal by hammering), and embossing. These are techniques that have been used for centu-

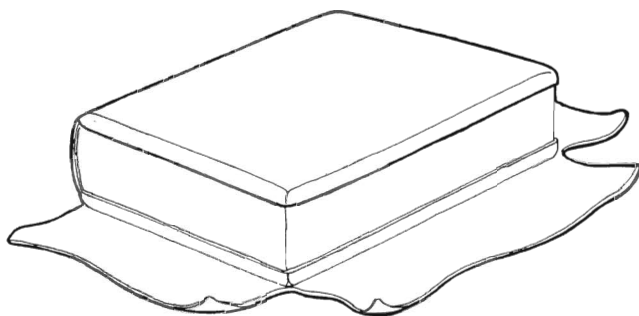


Figure 16 Kairouan binding with edge flaps.

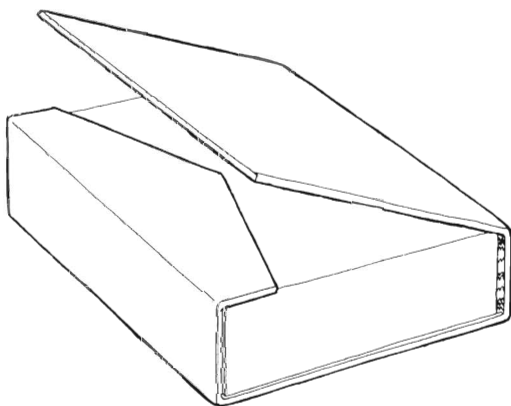


Figure 17 Islamic binding style with fore-edge flap.

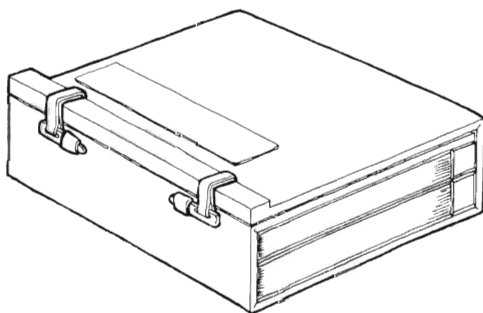


Figure 18 Oriental binding style with covers held closed with toggles.

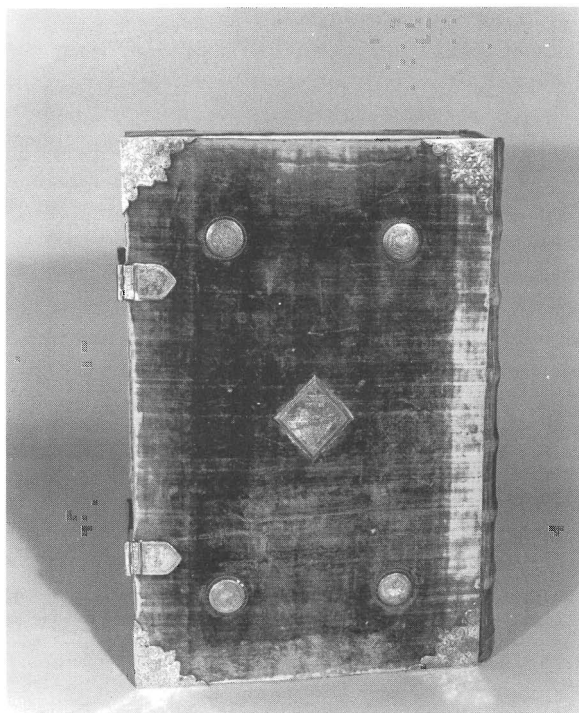


Figure 19 English bible bound for Queen Elizabeth I (1568).

ries and thus have no artistic, stylistic, or period constraints. Clasps and bosses made from gold and silver would have been fashioned by goldsmiths, and were used only on precious volumes that warranted such extravagance. Precious metals were seldom used on books after the development of printing, but silver was still used occasionally for books belonging to royalty, especially when the books were bound in velvet; bosses and clasps were attached to protect the velvet from wear (Figures 19, 20). I have seen quite a few examples of silver metalwork on bindings made for Queen Elizabeth I of England (1533–1603). There were three clasp-makers shops still located in St. Paul's Churchyard in London as late as 1634.

Trying to date the development of closure styles is not an easy task. The earliest closure identified consists of a long strap that appears to have been attached to the top cover (probably in the beginning it wasn't even attached), wrapped around the book several times, and finally tucked beneath a previous wrap (Figure 21). This strapping has been seen wrapped not only around the fore-

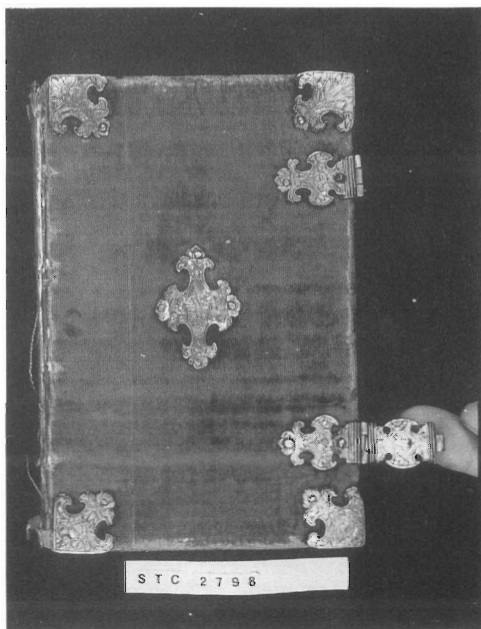


Figure 20 English velvet binding with silver furniture and the coat of arms of the Burgoyne family. Circa 1641.

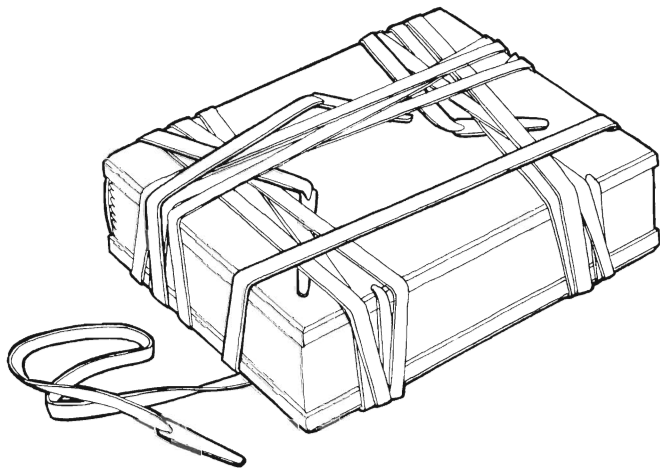


Figure 21

edge and spine but around the top and bottom edges as well. What follows is a generalized arrangement for dating clasps and bosses.

Prior to the twelfth century, metal clasps were most likely made of iron or sheet-iron. The forms were very simple, with minimal decoration. Clasps or pins made from bone or ivory would have been attached with copper nails. Brass was seldom used in this period. A common clasp structure was a single-plaited leather strap that was attached to one cover and whose end was a metal fitting with a hole in the center. This metal piece was looped over a pin projecting from the opposite cover. Jewelled bindings were fastened with this type of closure but the pin would have been mounted on the edge of the board so as not to interfere with the ornate gold work, enamel, or ivory plaques. On a less ornate binding of the same period, the pin would project from the center of the cover where the strap and the catch would reach to slip over the pin. The clasp structure was frequently a strap with a cast iron hasp that had a hole in the center that reached from the back cover over to the top cover and fastened over a pin coming from the center of the board (Figure 22). The cast hasp was often fairly ornate for this period, although there were simpler versions of this style where two pieces of metal were riveted to either side of the leather strap through which a hole is bored (this simple form could have been made of iron or brass and was made in the same way for many centuries). During the twelfth century, iron was replaced by the more frequent use of brass, more shapes were used in designing the clasps, and much more care was used in the making of the pieces. From the History of Bookbinding, 525–1950 AD, the catalog of an exhibition at the Baltimore Muse-

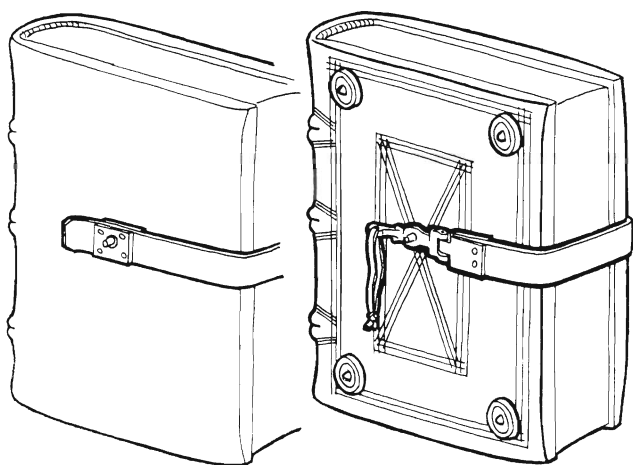


Figure 22 Drawing with variations of hasp catching a pin on the front cover.

um of Art organized by the Walters Art Gallery in 1958, there are several descriptions of clasps on bindings from the twelfth and thirteenth centuries: #106 Romanesque Binding, England twelfth century, “. . . clasp attached to long pink strap fastened to pin (now missing) on face of lower cover;” #108 Bound in “Agenda” format, England or Northern France early thirteenth century, “One long thin strap of rose leather attached to upper cover and catching over a pin in the middle of the lower cover;” #109 Binding from Seittenstetten, Austria latter half twelfth century, “. . . two clasps (lacking) fastened onto pins in the fore-edge of the upper cover.”

During the thirteenth and fourteenth centuries, clasps were ornamented by engraving and stamping, and the clasps were filed in order to create beveled edges. There also seems to have been particularly frequent use of silver gilt clasps on the privately owned bindings of wealthy individuals. Because of the increase in book production in the sixteenth century (Germany in particular), the metal that was used to make the clasps was sometimes prestamped with engraved dies. Common examples have the words “Ave Maria” or “Maria hilf.” These dies were cut into pieces according to the needed size with disregard to the letters (Figures 23, 24). The design was often cut in the middle so that the words appeared broken. Nuremburg seems to have had an industry of clasp-makers who provided brass clasps that were stamped with these typographical designs. There were floral designs made in the same way in which more attention was paid to not cut into the image (Figures 25, 26). Iron was seldom used but there were still occasional simple iron clasps being fashioned.

Toward the end of the fifteenth century the use of paper-laminated boards was introduced (Figures 27, 28), and metal clasps began to make way for leather or

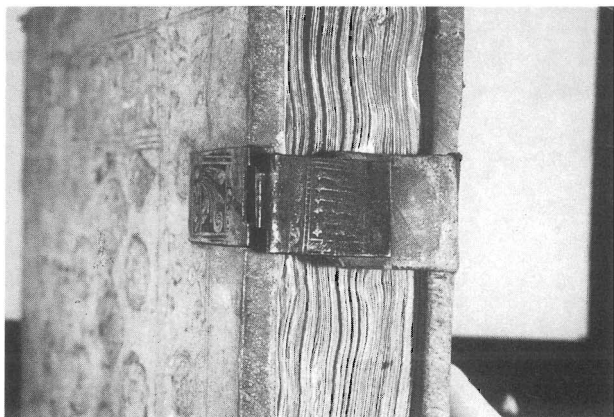


Figure 23 German, circa 1483.



Figure 24 German, circa 1487.

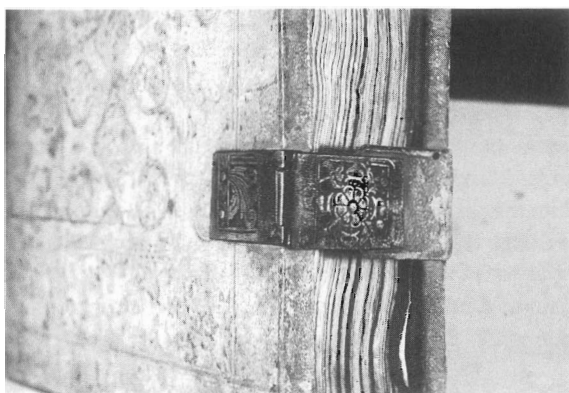


Figure 25 German, circa 1487.

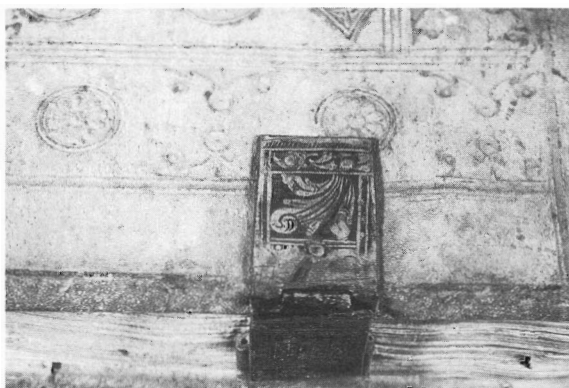


Figure 26 German, circa 1487.

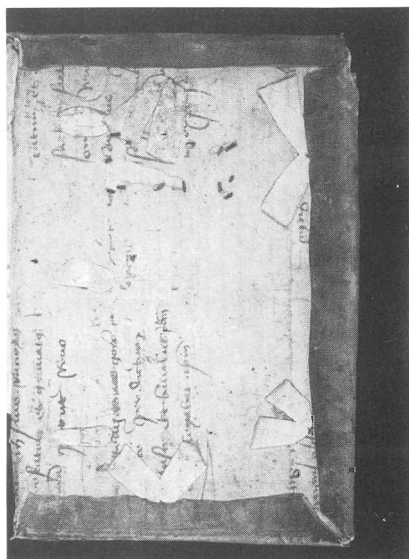


Figure 27 The inside of a 1480's binding with pasteboard made from 18 sheets of a 1450's French legal document.

fabric ties. Still, the majority of books in the beginning of the sixteenth century were bound in traditional wooden boards covered in leather with brass clasps, although this was probably done more for the sake of the bindings than for the textblocks. The paper text did not need the constant pressure required by the earlier vellum texts. In Germany, the preferred covering material was alum-tawed pigskin, which was used quite wet during covering and, upon drying, would shrink drastically and draw the wooden boards outward. Clasps could be used to reduce this warping of the covers. These clasps were usually small and very finely worked (Figures 29–33). Because of the wider use of leather decorating techniques, gilding, and panel stamping, the binders seemed to have been more reluctant to cover up the decoration with bosses and corner pieces (Figure 34).

At the end of the sixteenth and the beginning of the seventeenth century, the majority of bindings were produced without clasps, and those that had clasps were made in brass with traditional techniques. Iron work from this time is very rare although I have seen what must have been American Pennsylvania Dutch bibles that were held shut with very simple, sheet-iron clasps. Clasps become even more scarce from the eighteenth century onward, and those that are found tend to be made from very thin metal and appear to have been mass produced.

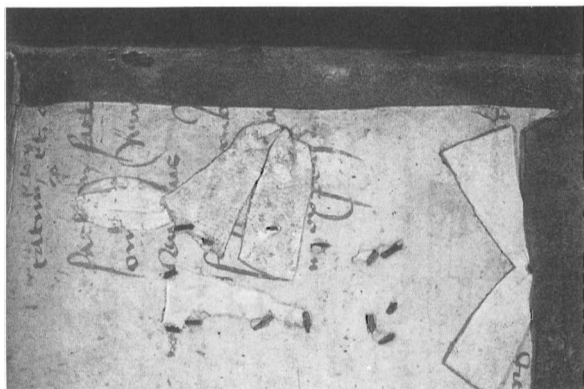


Figure 28 Detail of alum-tawed goatskin ties as they were split and pasted out on the insides of the covers.

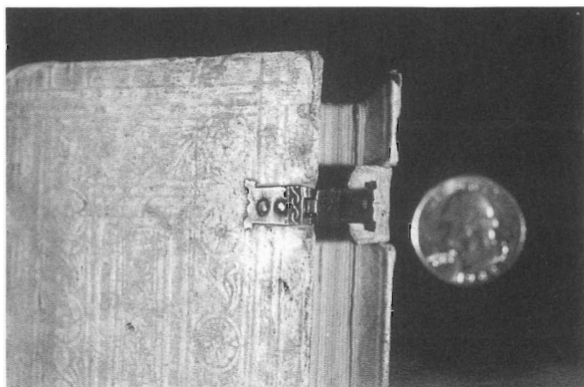


Figure 29 Dutch binding, circa 1567.

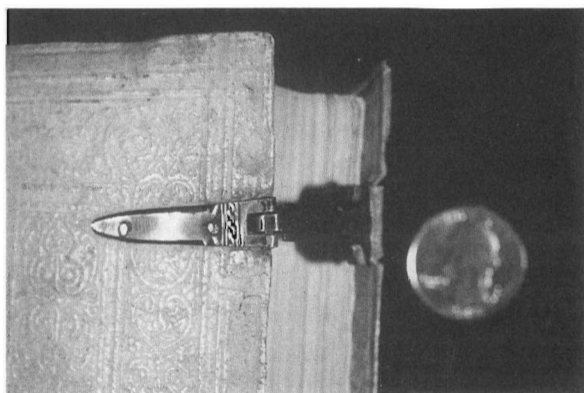


Figure 30 German binding (bullet-shaped catch), circa 1533.

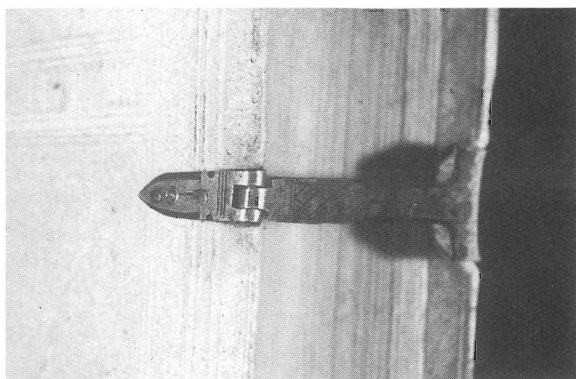


Figure 31 German binding with bullet-shaped catch. (notice the perfection of the edge bevels), circa 1572.



Figure 32 German binding with twisted, full-width metal hasp, circa 1559.

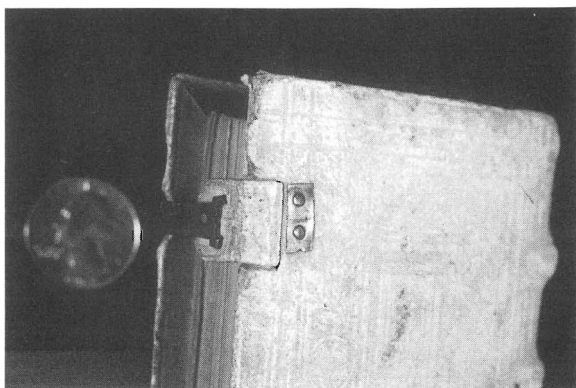


Figure 33 Common brass strap plate found on German/Dutch bindings.



Figure 34 German binding with brass clasps but no bosses, dated 1552.

They tend to be found only on bibles, and as there clearly was no structural purpose for their use, they existed only to create a traditional appearance.

Clasps from the Byzantine area of influence are found occasionally (Figure 35). Slavic clasps were generally made to fit proportionally to the size of the book. They were similar in design, with the most common motif found on the clasp being engraved circles and dots that lay over the rivets, making them disappear into the design (Figure 36). Clasps on Greek manuscripts were very similar in size and shape regardless of the size or thickness of the volume. They were of the “pin-through-the-hole” design and had a very distinctive strap design. The leather strap was usually 18 cm wide (slightly over $\frac{5}{8}$ ”) and laced over and through the lower rung of the clasp. The two ends were then evenly divided

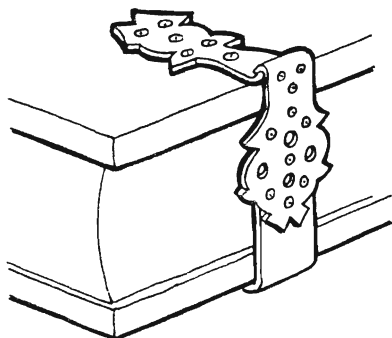


Figure 35 Slavic clasp design.

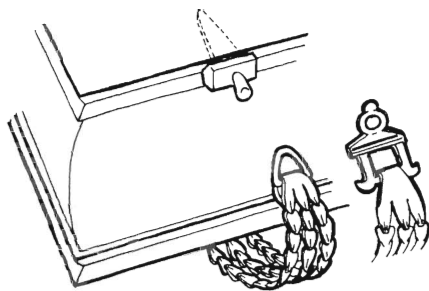


Figure 36 Greek/Byzantine clasp design.

into three tails. The tails were then given 5 mm ($\frac{1}{4}$ ") long vertical slits every 15 mm ($\frac{1}{2}$ ") and were alternately laced through each other.

Oriental books and portfolios were sometimes fitted with a toggle-type clasp. The toggle was made of bone, ivory, or wood, and was attached by a strap of fabric laced into the back cover. The toggle completed its closure by slipping under a loop on the front cover (Figure 37).

There are some regional differences in the way clasps were mounted that sometimes help in identifying the origin of the binding. In middle Europe, the use of two clasps on the fore-edge was conventional. England seemed to retain a single clasp on the fore-edge longer than did other regions (Figures 38, 39). Southern countries, especially Italy, nearly always had two clasps and often four (see Fig. 13): two on the fore-edge as well as one each at the top and bottom edges. Very early Coptic bindings are known to have as many as seven clasps, three on the fore-edge and two on the top and bottom edges. It is clear that this practice of clasps on the tail edges precluded the books from being shelved on their edges, which was not a common practice until the end of the sixteenth

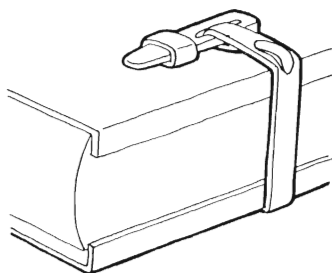


Figure 37 Variation of a peg toggle on a Western binding.



Figure 38 London binding by Andrew Ruwe, circa 1505, with single clasp. The catch plate is mounted on the back cover.



Figure 39 Detail of a catch plate that is cruder and simpler in design than would have been found on a Continental binding of the same date.

century. During the earliest centuries of book production up to the twelfth and thirteenth centuries, there seem to be more clasps with the straps attached to the front boards and catching or slipping over pins attached to the back boards. In England, Italy, Spain, and occasionally in France, the straps were attached to the top cover and the catch was attached to the back cover. In Germany, the Netherlands, and other places, however, the opposite became the norm; straps were attached to the back cover and reached up to grasp the catch on the front. Bear in mind that Jewish books begin at the back of the textblock and that the clasps catch onto the board closest to the book's beginning. Therefore, the clasps catch at the point that we normally consider to be the back.

At the beginning of the sixteenth century, with the proliferation of books in general and Aldine publications in particular, binders began to phase out the common practice of attaching clasps to bindings because these books were small and commonly bound with cardboard instead of wooden boards. Cardboard made it more difficult to attach metal clasps securely, and the weight and size of the books produced didn't call for the use of clasps. The cost of making and attaching clasps on larger and larger editions made it too expensive for the majority of books produced hereafter. In their stead, silk (Figure 40), linen, or leather ties (frequently *alum-tawed goat*) appeared (Figure 41). These materials were lighter and cheaper to manufacture. The ties were laced through a hole or a slit in the cover and adhered to the inside of the board prior to the paste-down

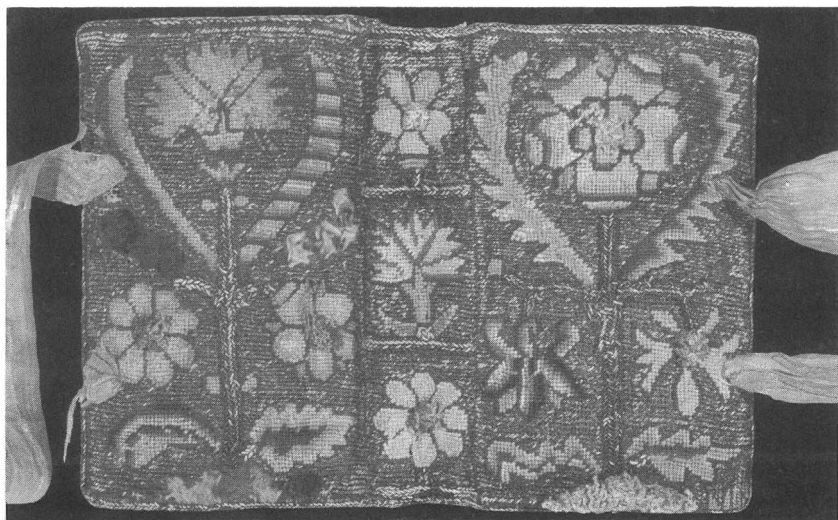


Figure 40 English embroidered binding with fabric ties, circa 1635.

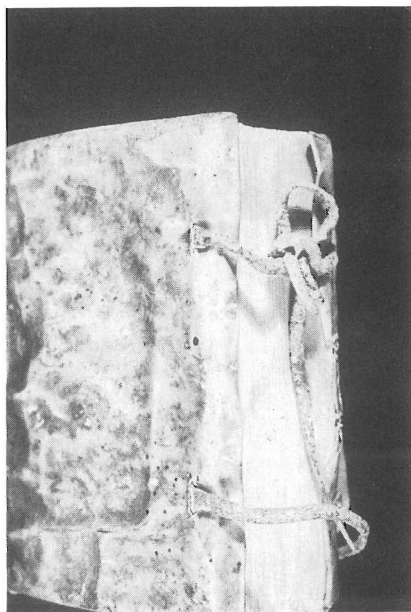


Figure 41 Vellum binding with alum-tawed ties, 1609.

being set in place. Aesthetics must have been considered in that many of the silks were brightly colored, possibly matching the endband silks. It is said that some of the textile ties, with gold tassels, were more expensive than the binding itself. Naturally, these extravagant ties were made for the nobility. (See #11:1, Binding with the Arms of Queen Ann. *Fine and Historic Bookbindings from the Folger Shakespeare Library*.) In Spain, the limp vellum bindings of the sixteenth and seventeenth centuries often used ties of sinew that looped over braided button balls or ivory balls tied to sinew, which were laced through the cover (Figure 42). Record books of parchment or leather that had front flaps over the fore-edge often had hook catches or straps and buckles (Figures 43–45).

In keeping with the idea that the clasp was a functional structure of the book, clasps were most often simple and plain but still appeared in many representative forms. The clasps were occasionally decorated to complement the rest of the binding design. One of the most startling discoveries I've ever made in my work as a book conservator was while working on an incunabulum from Italy; the original clasps were missing but clearly the design of the clasp, a flower (daisy?), was left on the fragment of the goatskin covers (Figure 46). What proved to be so amazing was that during the conservation treatment I was able to see clearly the

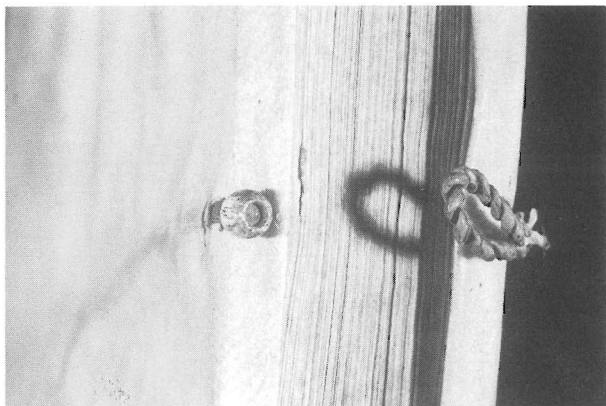


Figure 42 Spanish, circa 1617. Vellum binding with bone/ivory ball toggle and sinew loop strap. Toggle mounted to upper cover.

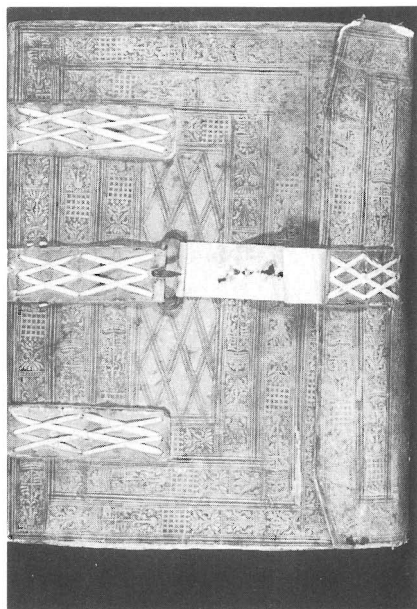


Figure 43 Sixteenth century London blank book binding with iron buckle and vellum strap.

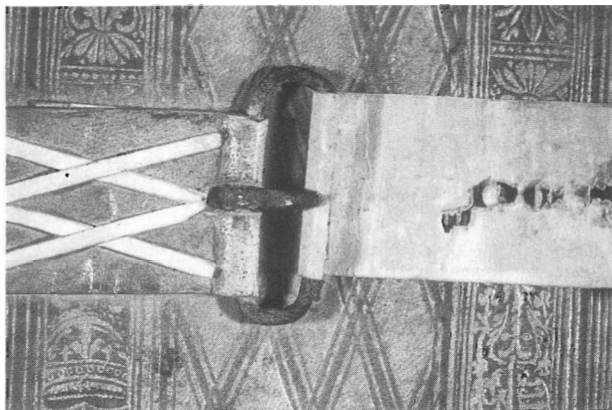


Figure 44 Detail of a buckle and tacketed overbands.

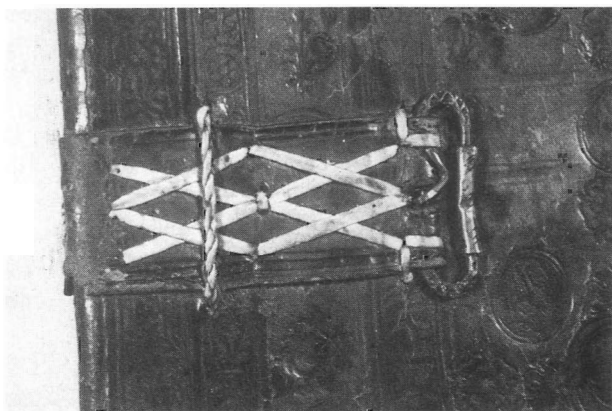


Figure 45 Sixteenth century English blank book binding with brass buckle (bent because brass is much softer than iron). Notice the twisted strap loop.

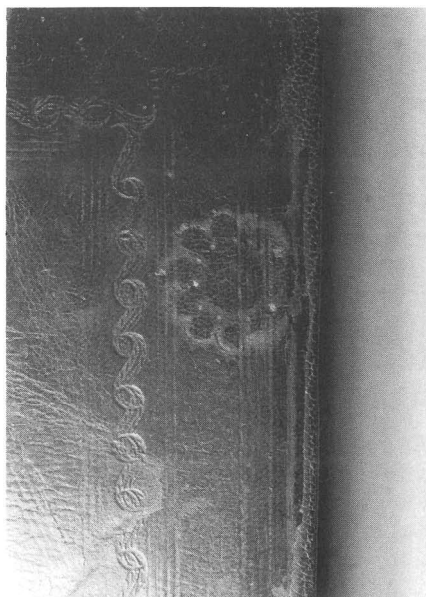


Figure 46 Repaired Italian incunabulum with evidence of a floral catch design.

watermark of the paper and, to my astonishment, it was the same design of the flower that once was the design of the clasp (Figure 47). I have always contended that there was no mistaking that this was a conscious decision on the part of the binder to tie these two designs together. On leather bindings where the hasp (the hooked part of the clasp) was attached to a strap of leather, the leather was sometimes tooled with the same tools and design as the cover.

Straps were nearly always made of leather and occasionally of vellum. The majority of straps that have survived intact were leather wrapped around a vellum core. Besides tooling, the straps were sometimes cut with designs and decorative filigree work (Figures 48, 49). When looking at old bindings with clasps you will find, almost without exception, that all books with the clasps still intact have straps that were made with vellum cores. The majority of those that have lost their clasps (if you look at the remnants of the straps that are extant under the covers) have straps that were simply rolled or made with strips of leather. The vellum core gave the strap not only strength but also a spring that facilitated the opening of the clasp. The straps were sometimes supplanted with solid metal fixtures; therefore, fitting of the clasp required much more accuracy in the making due to the fact that there was no play when attempting to adjust the

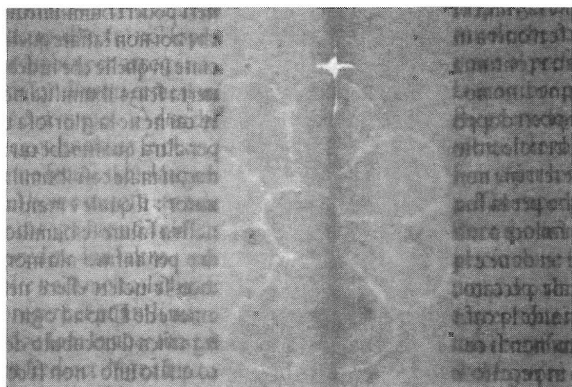


Figure 47 Dialux print image of the watermark on the paper of the Italian incunabula.

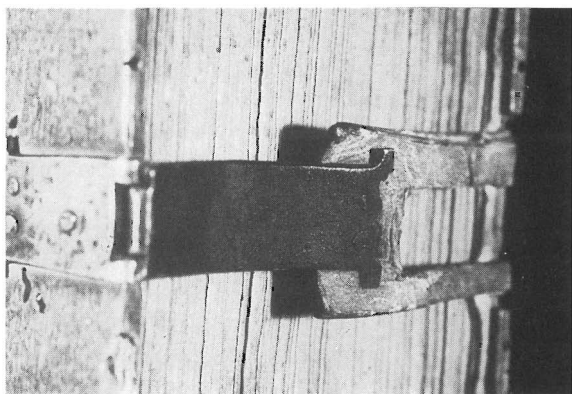


Figure 48 German binding, circa 1522, with clasp and cut-away strap.

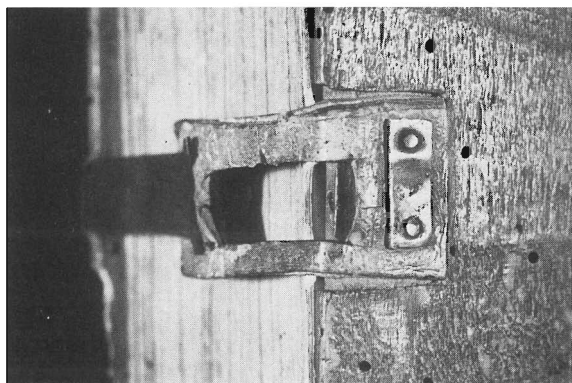


Figure 49 Back strap plate and strap detail.

tension of the clasp. These solid metal clasps came in different designs and show clearly that the book was made to create a more lavish impression (Figure 50).

The *catch* part of the clasp (the immovable part attached to the board) and the *hasp* (the part that moves and hooks over a bar or slips over a pin) have been made in very different designs. The following photographs (Figures 51–80) are mostly of books from the Folger Shakespeare Library collection and will give assorted views of the designs as well as dates and places of publication, which can often place a binding geographically. However, this will not always be reliable.

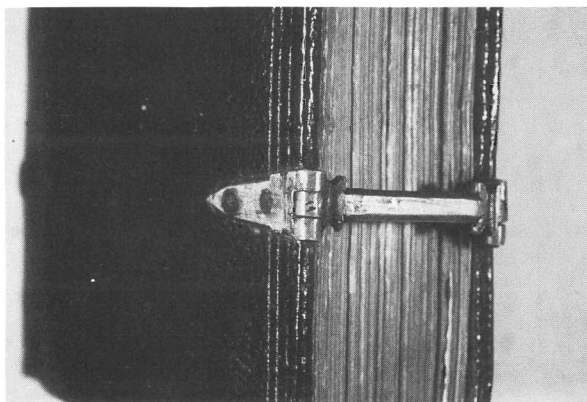


Figure 50 Solid metal hasp and catch plate on a Dutch binding, circa 1632.

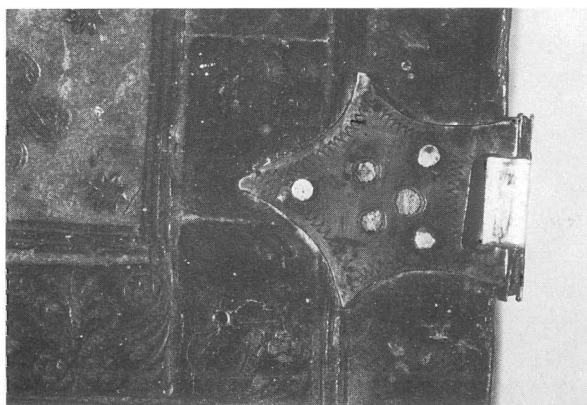


Figure 51 Italian, circa 1480, three rivets and three punched holes, catch mounted on front cover.

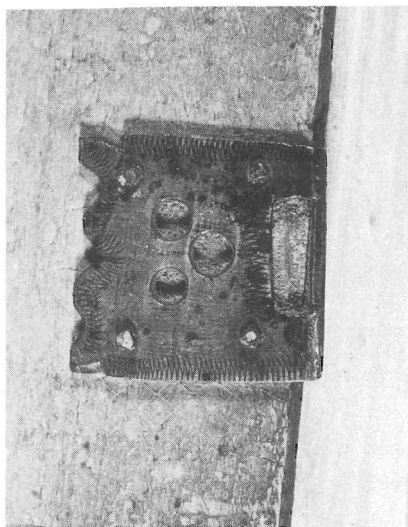


Figure 52 Italian, circa 1480, four rivets and three punched holes, catch mounted on front cover.

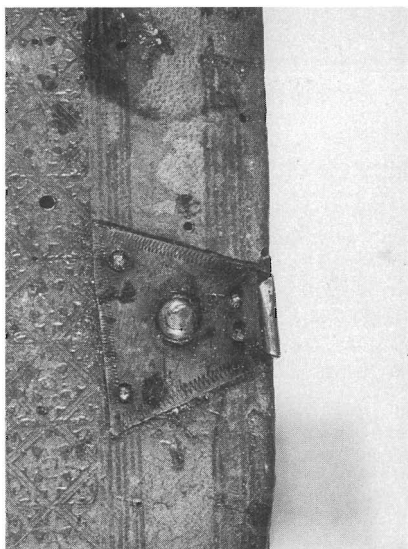


Figure 53 Italian (Padua or Venice), circa 1485, triangular catch plate rolled to form a lip, mounted on the back cover.

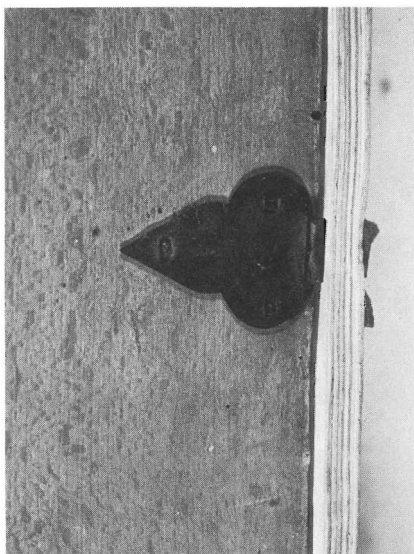


Figure 54 Italian, circa 1480, catch plate with rolled lip mounted on the front cover.



Figure 55 Northern German, circa 1482, two rivets, simple engraved lines. Catch mounted on upper cover.

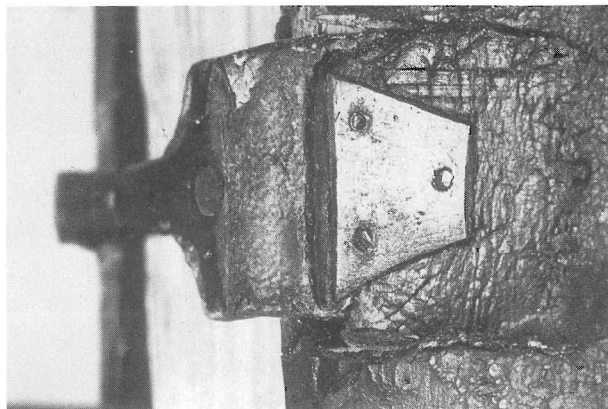


Figure 56 Strap plate of Northern German binding, circa 1482.



Figure 57 German, circa 1475, sharply beveled sides, two rivets.

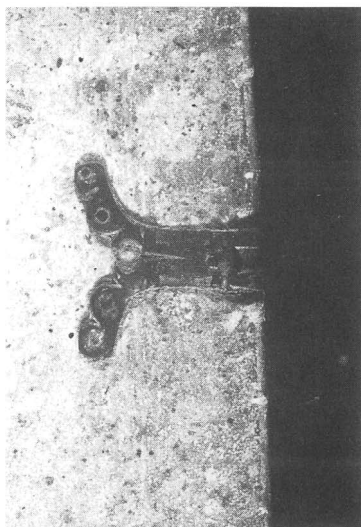


Figure 58 Southern German, circa 1492, three iron rivets.



Figure 59 German, circa 1504, with duck head and clasps and skids.

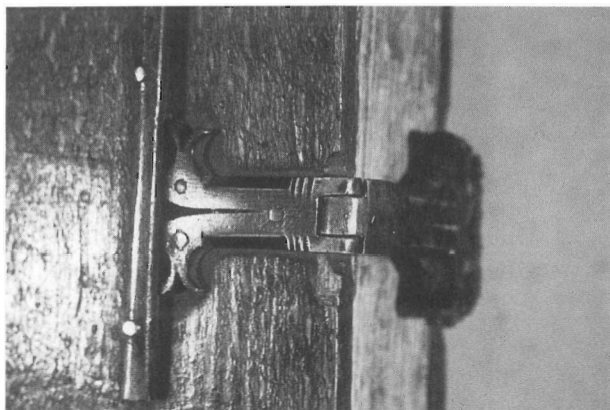


Figure 60 Detail of a catch plate and skid.

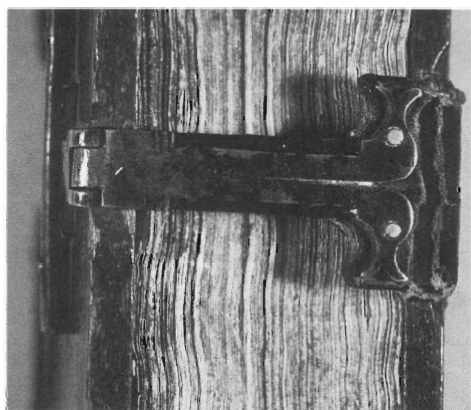


Figure 61 Detail of hasp. The rivets form the duck's eyes.

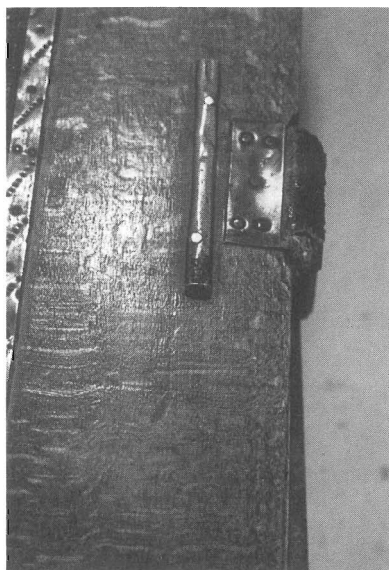


Figure 62 Detail of a strap plate.

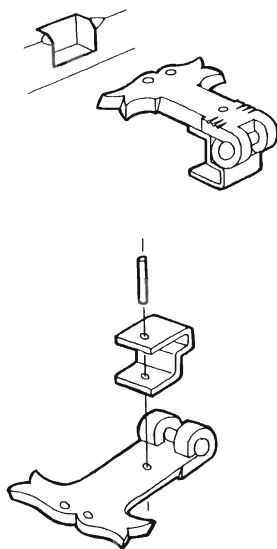


Figure 63 Diagram of a catch plate design and attachment. A thin strip of brass wraps around the fore-edge of the board, and acts as the counterplate for the riveted nails holding the catch to the board.

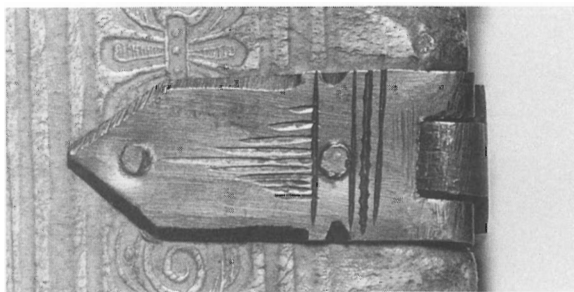


Figure 64 Typical sixteenth century German catchplate design.

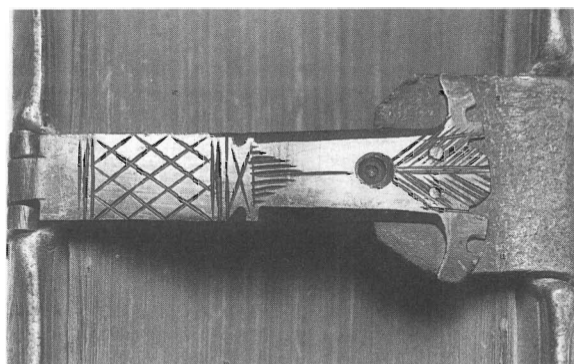


Figure 65 Typical sixteenth century German hasp design.

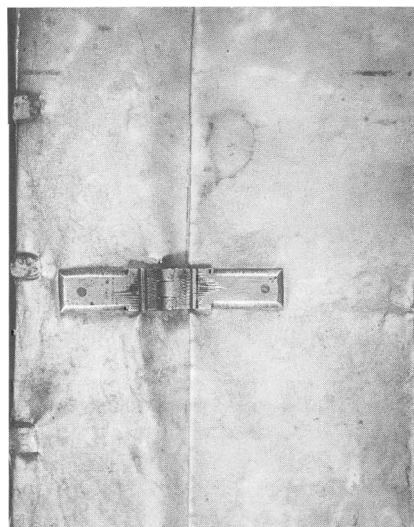


Figure 66 Dutch vellum binding, circa 1540, with fore-edge flap with clasp mounted on upper cover.



Figure 67 English, circa 1535. Catch is mounted on lower cover. (Note how the catch plate protrudes beyond the edge of the board.)



Figure 68 English, circa 1535. Typical strap attachment of two nails without a strap plate. Strap is attached to upper cover.

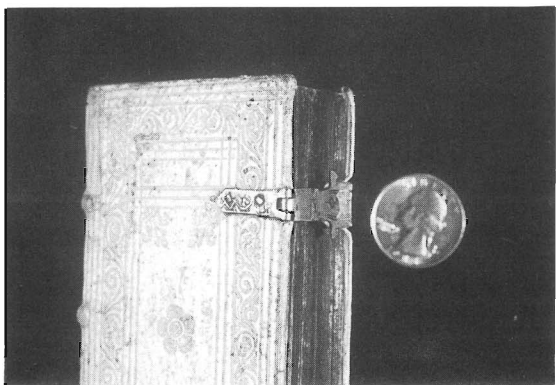


Figure 69 German, circa 1622.

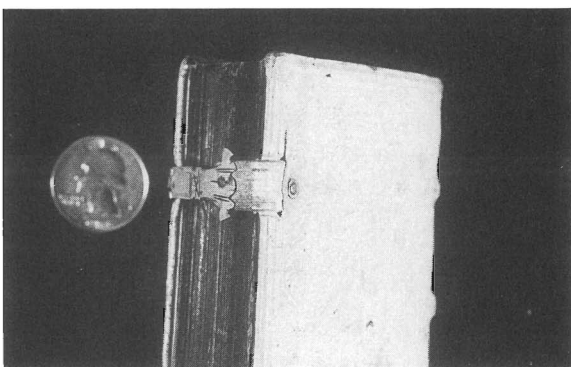


Figure 70 German, circa 1622. Detail of a hasp and strap and round single rivet strap plate.

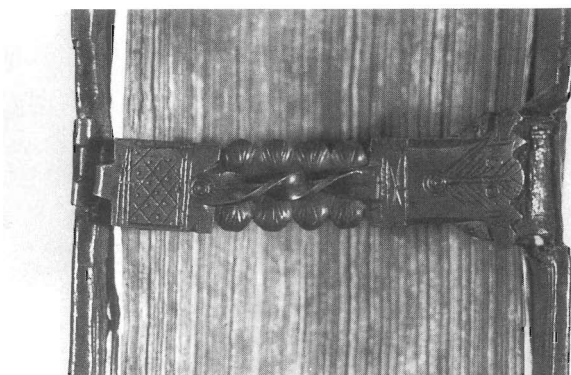


Figure 71 German, circa 1635. Compound hasp made from two pieces of brass riveted together.

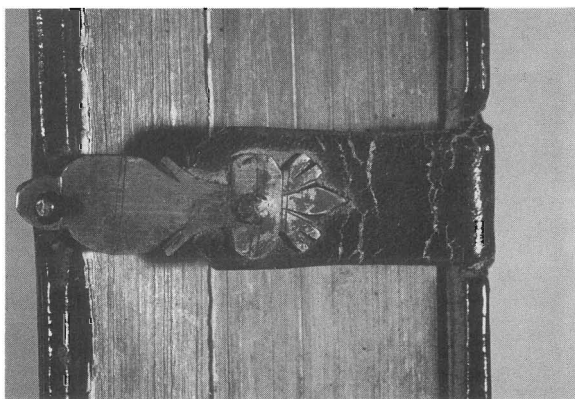


Figure 72 Austrian, circa 1643. Hasp catches iron pin driven into edge of upper cover.

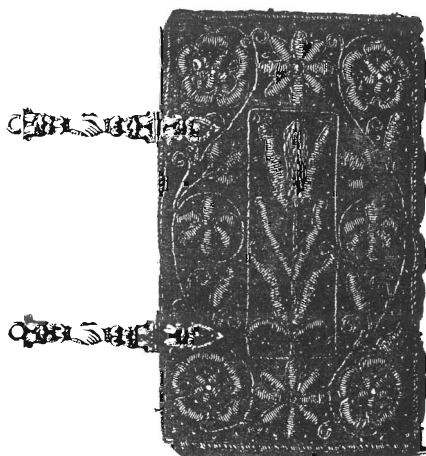


Figure 73 Danish embroidered binding, circa 1656. Full metal (silver) hasps.



Figure 74 Swiss, circa 1661. Plain hasps catching brass pin in the edge of front board.

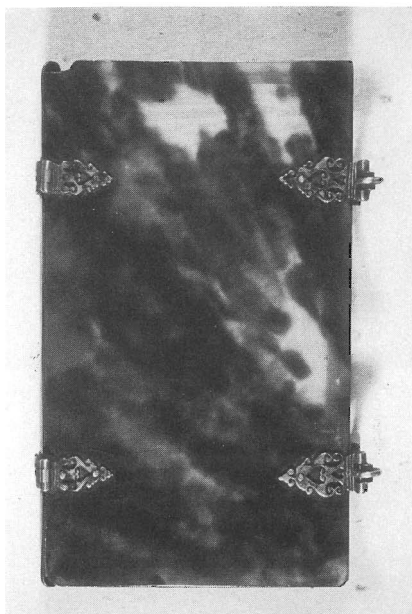


Figure 75 Dutch, circa 1700. Tortoise shell binding with silver furniture, clasps, and hinges.

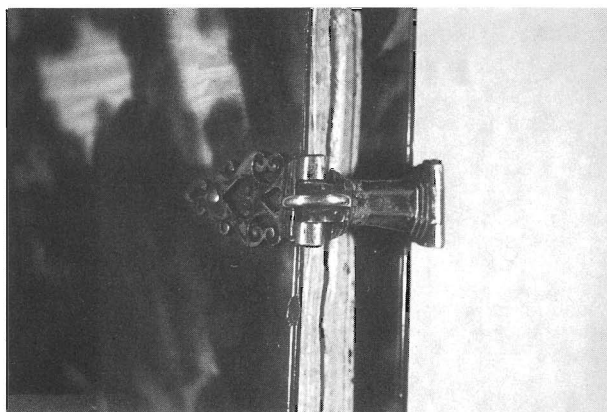


Figure 76 Detail of a lyre motif catch plate and top of full metal hasp in the shape of a truncated Tuscan column with large claw hook.

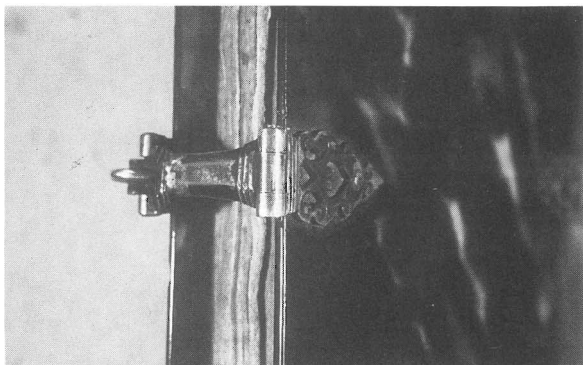


Figure 77 Detail of a hasp and a lower hinge plate.

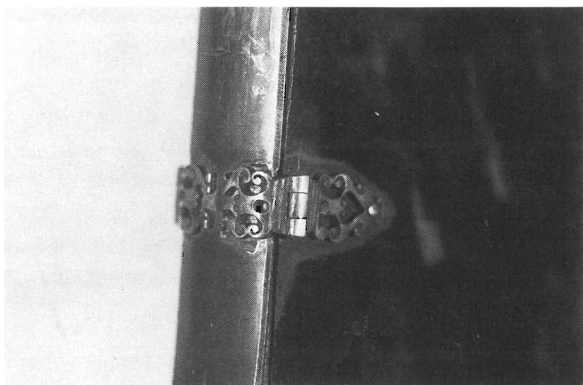


Figure 78 Detail of a silver spine piece and silver hinges.

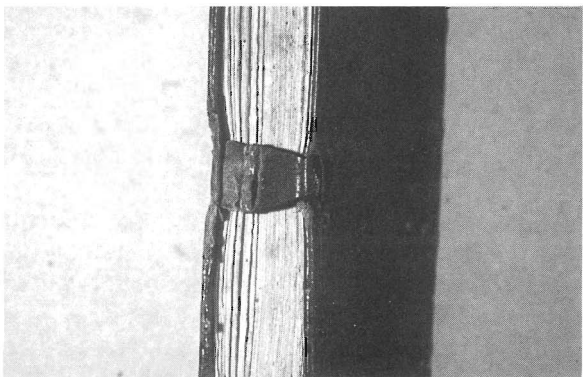


Figure 79 English, circa 1708. Very simple design catching a recessed catch on back cover.

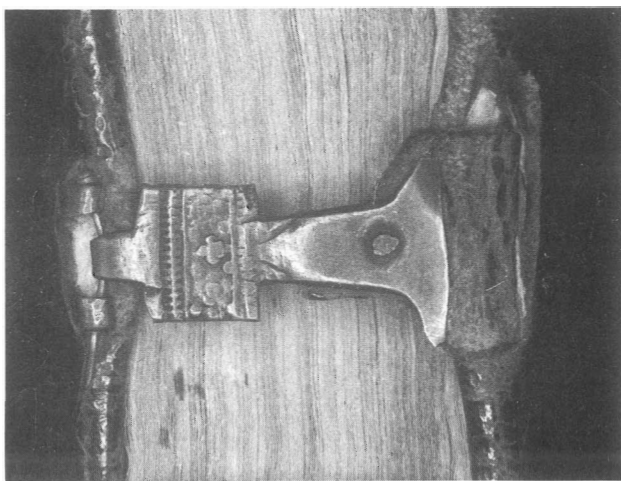


Figure 80 Eighteenth century American.

MAKING CLASPS

As I've indicated earlier, there are many different styles of clasps. Although the various styles are manufactured differently, they can all be modified from standard metalwork techniques. I will try to illustrate the steps in the making of a common sixteenth century, middle European clasp, hasp, catch, and strap.

Materials and Tools

You will need several materials and some basic tools. For standard-sized clasps, you will need a supply of sheet brass in various gauges ranging from .8 mm to 1.3 mm or 14, 16, and 18 gauge. Obviously, if an extremely large and heavy volume needs a clasp, you might need a heavier gauge (Figure 81). Also necessary are solid brass escutcheon pins in 14, 16, and 18 gauge. (To be sure you have solid brass pins use a magnet to test; if the pins cling to the magnet the pins are not solid brass, and are thus unsuitable for this work.) The straps require pieces of leather and vellum. It is sometimes possible to improvise with different tools but there are some basic tools that are necessary to do the job well. These include (1) A variable speed drill. This can be a regular home drill, a Dremel drill, a more expensive flexible-shaft type drill (Foredom) (Figure 82), or even a manual hand drill. However, you will probably find it frustrating to try to operate a manual drill while concentrating on all of the other tasks at hand. (2) A set of drill bits of various size, beginning with tiny and including those that will match



Figure 81 Sheet brass in various gauges, and brass escutcheon pins.

the sizes of the escutcheon pins. (3) A vise that can be mounted to your table. There are conventional vises and some made with suction cups on the bottom so that they are easily removable and can be put away. I prefer the vises that can swivel on their base and that have a solid metal surface at the back end, upon which one can hammer (Figure 83). The jaws of the vise must be lined with pieces of leather so that the metal clasps do not get scratched. (4) A good set of metal workers' files (not wood files) (Figure 84). Most important is (5) a good

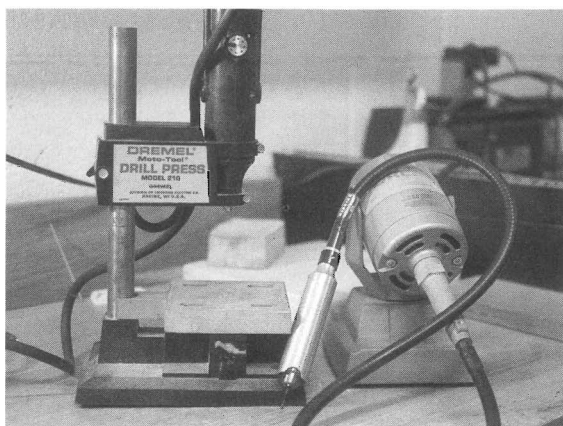


Figure 82 Dremel and Foredom drills.

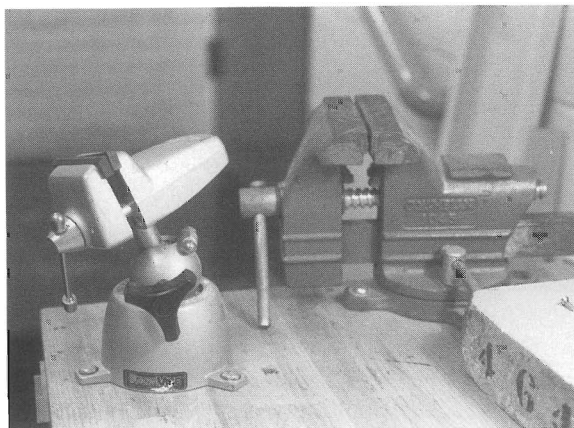


Figure 83 Standard and adjustable vices.

riveting hammer (tinnerns hammer). To fasten the pieces of metal to the boards or the straps, you will be riveting the escutcheon pins with the beveled end of the hammer. This hammer should feel good in your hand as it will become an indispensable tool in your shop. (6) A board cutter and a jewelers saw. When ready to cut the metal use the back end of the board cutter to cut the sheet metal to the width of the clasp. (Surprisingly the metal dulls the blade less than paper does.) To further cut the metal, a hacksaw or better yet, a jewelers saw is used. Be sure to have a lot of extra blades as they tend to break easily and they are



Figure 84 Files and a riveting hammer.

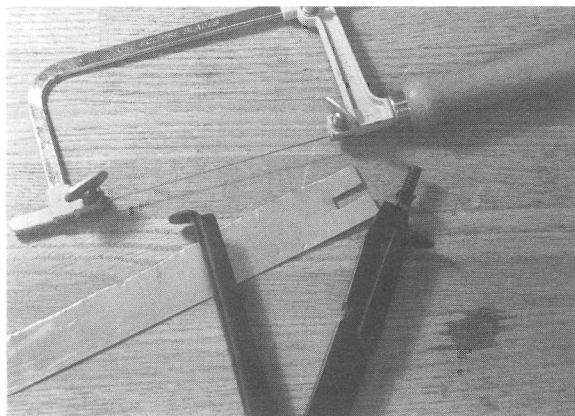


Figure 85 Jewelers saw and nibbler.

relatively inexpensive (Figure 85). I have a neat little tool called a Nibbler, which nibbles a $1\text{ mm} \times 5\text{ mm}$ bite through sheet metal. This tool makes it very easy to shape and channel the metal. A bench grinder with both fine and coarse stone wheels is also handy but not essential for rough filing and shaping. (7) Engraver's tools (called gravers or burren). These tools are used to score the metal if the clasp is to be decorated with lines. (8) Lastly, small hand tools, needle-nosed pliers, and wire cutters will be needed (Figure 86).

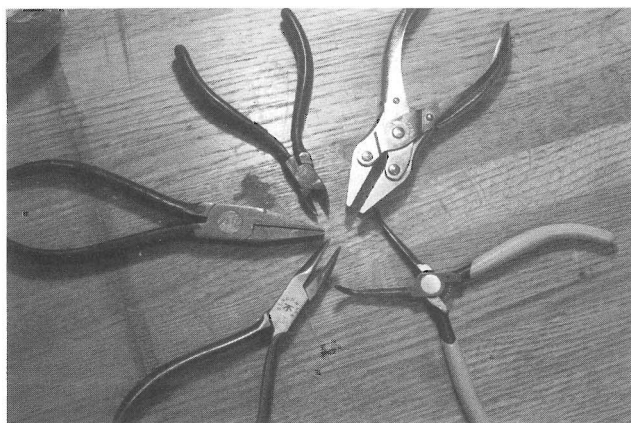


Figure 86 Various pliers and wire cutters.

You are now equipped and can begin work. When trying to match an old, existing clasp or when copying one from an illustration, sketch out on paper the desired appearance of the finished clasp. Define both the size and the dimensions. For the piece I will describe, cut a strip of brass 8 to 9 mm wide. This is done by marking the metal with scratches, aligning the scratches on the lower blade of the board cutter, and cutting the strips off. This method may cause the cut strip to curl slightly but this is easily straightened by hammering. Now that the width is set the length can be cut. Once again, the board cutter can be used or the strip can be held in the vise and cut with either a hacksaw or a jewelers saw.

Begin by making the catch part of the clasp (the mounted immovable part). With a saw or the Nibbler, cut a channel into the length of the metal strip. This will be the throat into which the hasp will clasp. The remaining standing metal strands will be curled around an escutcheon pin. (A variation is to drill a hole near the edge of the end of the clasp and, using a jewelers file, cut a slot into which the hasp will grasp.) There are various methods to curl the metal around the escutcheon pin and you will need to experiment to find the technique that works best for you. I start by using needle-nosed pliers and begin turning the thin

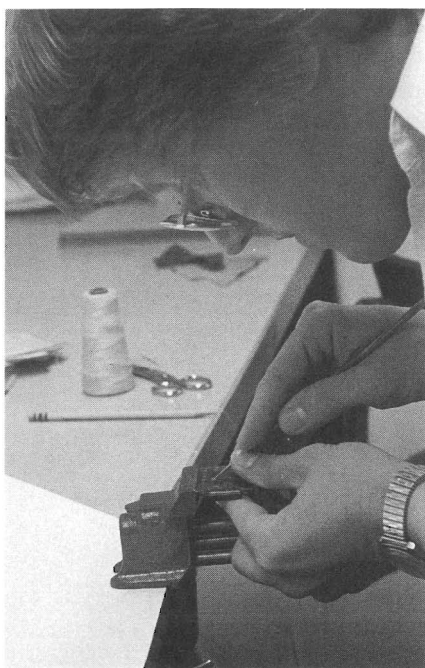


Figure 87 Engraving a hasp to match an existing one.

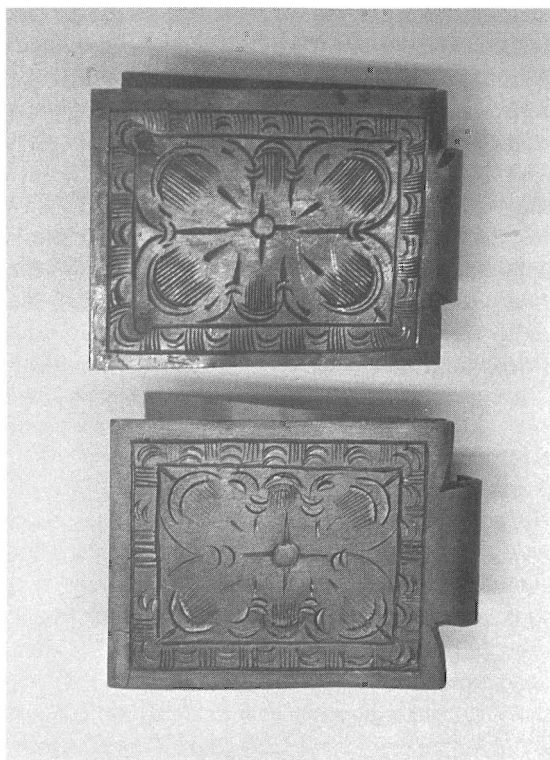


Figure 88 New and original hasp for the Huntington Library's copy of the Gutenberg bible.

edges around. Using the vise, continue to turn the metal around the pin until it is held in tightly. A variation is to turn the whole piece of metal around the pin and then cut the channel (and the pin) to create the opening. The fragments of the pin are removed and a new pin is inserted and tightened. Metal files of different shapes can be used to bevel the edges of the clasp and to shape various contours. Engravers burren can be used to repeatedly score lines and decorations into the metal surface (Figures 87, 88). To fasten the clasp to the boards, use a center punch (or a nail) to locate the position of the holes. Drill the holes using a drill bit that corresponds to the desired escutcheon pin size. With a bit that is slightly larger in size it is possible to countersink the hole to admit the pin head, or to simply remove a burr. During the drilling operations, attach the clasp to a block of wood with Scotch tape to prevent it from binding to the drill bit and spinning out of your hands. Before continuing, I will describe the method of riveting.

When using an escutcheon pin, the head should be filed flat (it is manufactured with a domed surface) (Figure 89). The flattened head provides a stable surface when the opposite head of the pin is formed. The pin head can also be filed smaller in diameter if it appears to be too large. The pin is then inserted through the two pieces of metal to be fastened and, using wire cutters, is then cut, leaving at most only 1 mm standing. The cutters cut the pin and leave a pointed shaft. This point should be filed flat. Place the pieces of metal with the pin over an anvil (on the vise, or simply on a solid piece of metal that is harder than brass), and begin by tapping the flattened shaft of the pin with the beveled head of the hammer. The brass is soft and will begin to spread. Turn the piece or your hammer continually to ensure that the forming of the head of the pin is round, not oval. Form the head until it is clearly larger than the hole and so that the pin cannot fall out. It can be slightly filed to neaten up the hammer blows but be

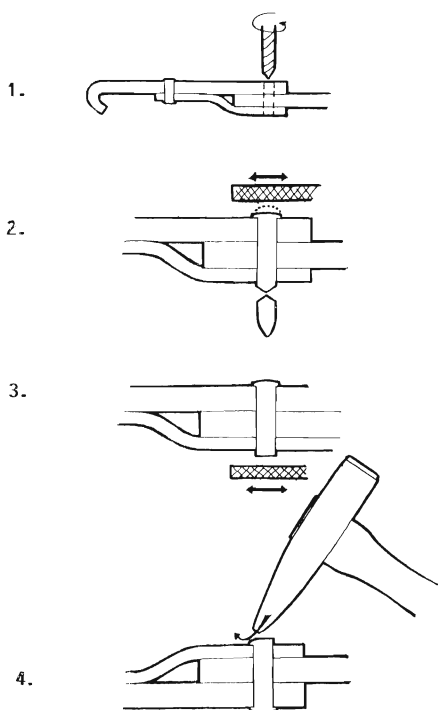


Figure 89 (1) Drill a hole; (2) Insert a brass escutcheon pin, file the head flat and clip the length; (3) File the point flat; (4) Hammer the protruding pin in a rounded motion to create a head.

careful not to file the head too much or it will weaken and may break off, allowing the pin to fall out. If you have countersunk the holes and riveted the pin well, you can file the pin heads down so that they literally disappear. Fifteenth-century Italian catches were sometimes made by curling a piece of shaped metal at the edge to create a raised roll over which the hasp would grab (see Fig. 54). This is easily done by placing the metal in a vise and leaving just a little bit of metal sticking out of the vise jaws. Hammer a small portion of the edge over and then, moving the metal out a bit more, continue tapping the metal, repeating this process until the roll is finally large enough to shape and tighten. These catches are more raised than are those mentioned previously and thus are susceptible to being knocked.

Attaching the catch to the board varies depending on whether you are using wooden boards or cardboard. If you haven't already done so, the holes for the retaining pins (those attaching the catch to the cover) are drilled and, if desired, countersunk into the brass. It is not necessary or desirable to drill the wooden boards or the cardboard unless you are concerned about splitting an old brittle board. The escutcheon pins are chosen to correspond with the drill bit size. Place the cover board opened out flat on a large piece of either wood or laminated cardboard that is at least $\frac{1}{2}$ " thick (you will be driving nails into this repeatedly, so designate a board for this purpose). Between the cover and the underlying board, place a piece of cardboard that extends beyond the edges of the cover (this will act as a lever to help pry the cover with the nails hammered through from the underlying board). Do not forget that the fore-edge turn-in is either pulled back or is not yet set down. Position the catch in place and preprick the covers through the holes in the catch with an awl. This will simply help hold the pins prior to hammering them all the way through. Hammer the pins through, making sure that you hammer straight; the pins must not go through the boards crooked. Using the cardboard under the cover, pry the board up. If you are using wooden boards, you need to cut small channels into the inside of the wooden board the length and depth of the pin, radiating from the pin toward the spine joint. Flush with the board, file a very small groove into the shaft of the pin and hammer the pin over. The filed groove will facilitate the pin bending where you want it to. The pin will lay recessed in the channel that is cut from the wood. If you are attaching clasps to cardboard, you need a brass counterplate on the inside of the boards that has holes drilled corresponding to the holes of the catch. The pins are driven through the board and the counterplate is slid over the pins. Score the cardboard around the plate to indicate where the cardboard needs to be cut out to recess the plate. Slide the plate off the pins. Under where the plate will lie peel away a sufficient amount of cardboard to allow the plate to lie flush. Replace the plate and proceed with the process of riveting the pins. Once the catches have

been attached, finish by adhering the fore-edge turn-in, which covers the pins and the catchplates.

The strap to which the hasp section of the clasp is attached is made from a piece of the same leather as was used for the covering. It should be three times as wide as the recess on the board to which one end is attached. The leather should be made longer than you think you will need, to allow for ease of handling and to ensure that you have a back-up piece in case you make a mistake in length on your first attempt. The center of the leather is left full thickness but the edges are pared to a feathered edge. Adhere a strip of medium-weight vellum down the center of the leather. This strip is one-third the width of the leather. Adhere each edge over the vellum and itself to form a laminated strap with the vellum inside. Nip it in the press to flatten any lumps and to ensure good adhesion. Let it dry.

Make the hasp section of the clasp resemble the catch in design and proportion. Instead of just cutting a channel, it is imperative to cut the sides, leaving a tongue that just fits between the opening of the catch. This piece should be made from a medium- to heavy-weight piece of sheet brass. Shape the desired contours with the Nibbler, hacksaw or jewelers saw, and the files. To allow the strap to be attached you need to form a backing plate made from a thin stock of brass. It can be cut square or made to a semblance of the hasp's shape. With double-sided tape, align and adhere together the hasp to the back plate and drill the holes for riveting. Usually you will need three holes, one at the top which is riveted first, and two others that are riveted with the strap in place. Once the first rivet is in position, slightly bend the back plate open to accept the leather strap. I usually bevel the leather where it is hidden by the metal as this creates a gentle, flowing shape. Insert the strap, making sure hasp and strap are straight. Use your awl to preprick the leather to guide the pins to enter the strap correctly. Follow the same procedure for riveting. Once attached, cut the corners of the strap off at a bevel. The edge of the strap where the vellum may appear can be toned or dyed to match the color of the leather. At this stage, curl the tongue of the hasp over so that it will grasp the pin of the catch; this is done with pliers and a little hammering. The hook of the tongue should not be too long as this will make it difficult to release from the catch. Cut or file it to the desired size. Finish off by filing sharp corners smooth,.

Attaching the strap to the board requires another thin backing plate (another one for the inside of the board if attaching to cardboard), or large decorative flat-headed pins. With the catch already attached to the board, the hasp is hooked over the catch pin and the strap is tautly drawn across the board to which it will be attached. Before covering the sides of the book a channel recess is first cut into the boards to accept the strap. The covering material was not worked into this recess and the fore-edge turn-in has not been completed. Feel the end of the

recess channel and mark the strap to correspond to the end of this channel. Now cut the strap (be a little generous, it is better to err on the long side than to be too short). Make a beveled slit in the covering leather 2 to 3 mm ($\frac{1}{8}$ ") where the recess channel lies (not quite as wide as the channel, you want a snug fit). Slightly taper the sides of your strap to help it fit in the slit and push it back until it rests against the back of the recessed channel. Hold the strap tightly in place and test the tension of your clasp; the hasp should snap over the catch pin and should release with a little pressure when squeezing the textblock. If it releases too easily, remove the strap, trim a little off the end, and repeat until the set is right. When satisfied with the clasp, release the hasp from the catch without moving the strap from its position in the board, open up the cover, and lay it out as you did for the other cover when you nailed the catch in place. Don't forget the cardboard that is used for a lever to pry the cover from the underlying board. Nail the back plates in place following the same steps used for bending nails over or for riveting a plate to the inside of the cardboard cover. Finish off by completing the turn-ins and pastedowns.

To make a solid metal hasp it is necessary to work more precisely in your dimensions as there is no way to adjust the tension of the clasp. Historically the hasp might have been shortened by bending (bowing) it to tighten it if it was too loose, but, if it was too tight, it had to be remade. Make the same catch section for the front as for the back. The hasp is identical at either end except that the hook piece (tongue) at the hinge wraps completely around the catch pin of the back cover to secure it. To make a clasp where the hasp slips over a pin that is inserted into the board edge, the pin is mounted prior to covering and turning the leather in. Historically, it was simply a shaft with a round-shaped head, with the inserted end hammered flat to create a wide spade surface that prevented the pin from turning. I have found that very often these pins have become loose and have slipped out. Thus, I make the pin as was done previously, but insert it prior to covering, drill a hole through the board and the spade end of the pin, and rivet the board and pin together. This technique locks the pin firmly in place and the boards can then be covered. To do the turn-ins, the leather is marked where the pin should protrude and a very small needle hole is made. The pin will push its way through the leather and there will be a very snug fit around the pin shaft. The hasp is made with a hole instead of with a hook and the adjustment of the tension of the strap is the same.

Spanish bindings frequently had button, or ball toggles. These both were very fragile and are often now missing. To make a ball toggle, you will need to cut a piece of bone, wood, or use a *tauga nut* (a vegetable ivory) to take the place of real ivory. Grind the edges on a grinder and follow the steps in Figure 90.

Bosses can be made from sheet metal using most of the same procedures as for

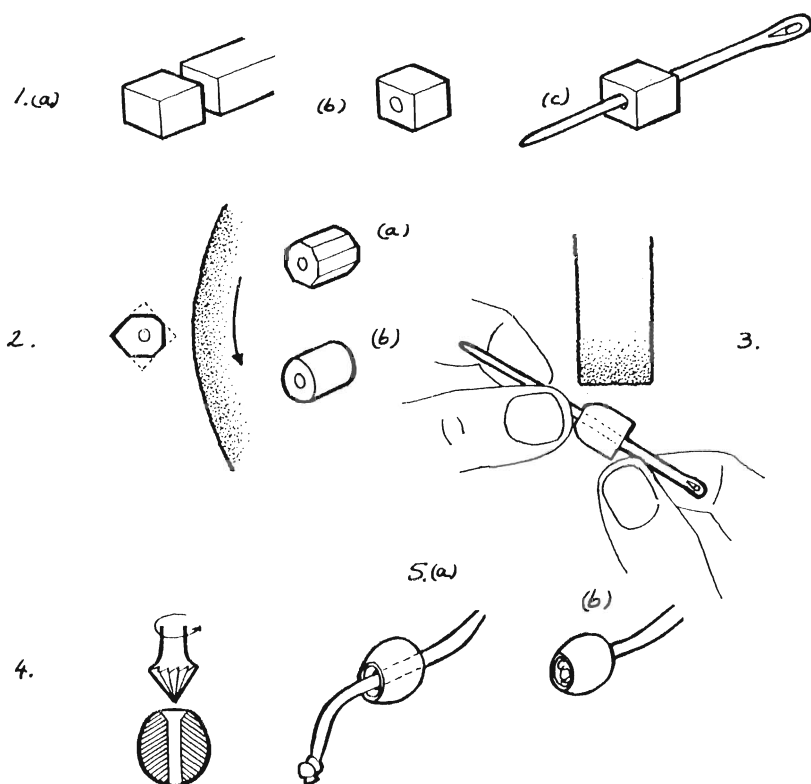


Figure 90 Steps to make round ball toggles characteristic of Spanish closures.

clasp making, with the exception of the raised areas of some bosses/corner pieces. To create raised surfaces the metal has to be *domed*, that is the metal has to be hammered into the desired form, while being stretched and thinned at the same time. A few extra tools are necessary. These include a dapping, or doming block or plate, and corresponding counterpunches (Figure 91). The metal is cut and shaped to the desired design and then the surface that is to be face up on the boards is placed face down on the dapping block over the desired size hemisphere. Using the counterpunches, hammer the metal and force it into the recess of the dapping block. You will have to anneal (heat until it glows red) several times during the process of doming the shape; annealing the metal softens it to allow it to stretch without cracking. When finished, turn the metal over. The raised surface will be protruding. It is attached in the same manner as that for attaching the catch of the clasp.

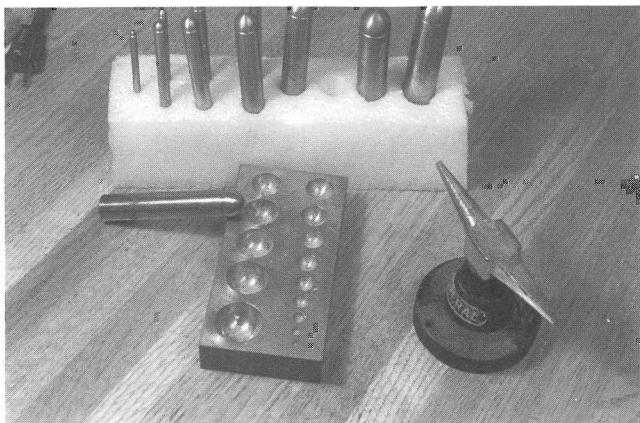


Figure 91 Dapping block set and small anvil.

Casting Metal Parts

Hasps that reach over the boards and slip over a pin are often made of a massive piece of metal that is cast rather than formed from a sheet of metal. It would be very tedious to try to make three-dimensional pieces by carving a solid piece of metal but, by casting, these pieces can be produced relatively simply. Casting is a way of producing a form by pouring metal into a mould of a required shape. The mould should have been previously formed using a part of an original intact clasp. With a few special tools and materials one can fashion a mate to another hasp if one is missing, or create an original design.

In addition to the tools already mentioned you will need a propane torch (available from Benzomatic Corp., with a jet nozzle for concentrating the flame) or a welding torch. I have a miniature torch that combines butane and micronox gases into a small jet flame hot enough to melt brass easily (Figure 92); a heat-resistant crucible (best is a high-back melting dish that makes it easier to melt the contents with a torch. This should be made of fused silica or graphite); tongs to hold the heated crucible; cuttlefish bone, which allows for a simple and cheap form of casting (cuttlebone is the shell of a cuttlefish. Pet shops carry it for birds to sharpen their beaks and for shell grit. Cuttlebone is soft, will take an impression, and will withstand molten brass) (Figure 93); wire (to wrap two cuttlebones together); and borax flux (to control the oxidation of the metal during the melting process and to help the metal flow better).

If you have part of a clasp or one side of a clasp with the other missing, use what you have to make a mould into which the melted brass is poured. First,



Figure 92 Propane torches and crucible with scrap brass on a fire brick.

prepare the cuttlebone. Use two bones for each cast. Begin by rubbing the soft inner sides of the cuttlebones together or filing them so that they fit together without rocking (do this over a waste receptacle because the powder is very fine). By rubbing the pieces together they shape each other into smooth flat surfaces that, when finished, lie in perfect contact with each other. Cut the ends so that they will stand up on a table and have a flat surface on top (Figure 94). Cut the pair so that they match each other. Use your existing piece of clasp and center it in the middle of one of the cuttlebones; two matchsticks are broken and the four

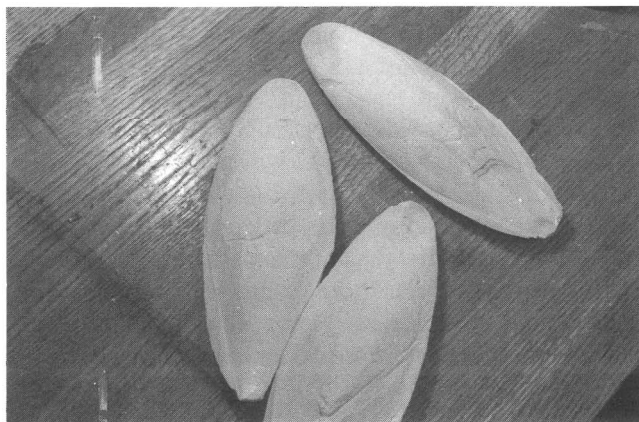


Figure 93 Cuttlebone.

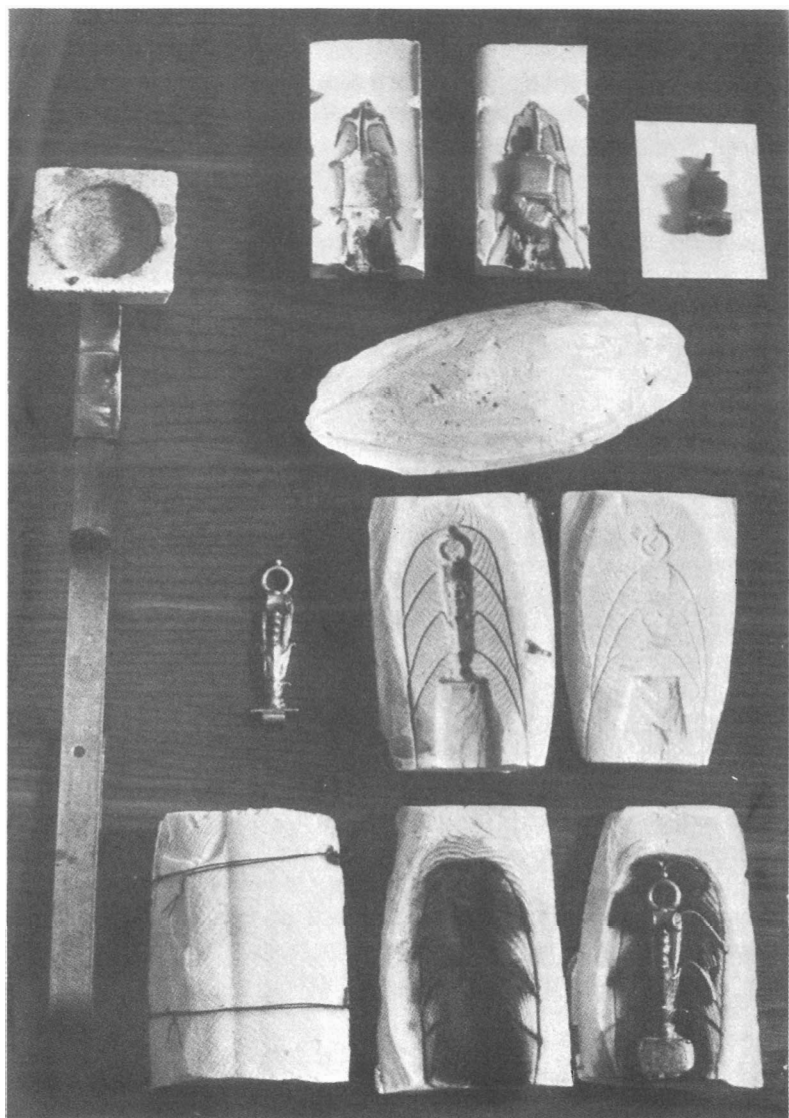


Figure 94 Progressive stages of casting a brass catch. (Courtesy of "Buchrestaurierung, Methoden und Ergebnisse" Bayerische Staatsbibliothek München Germany. Exhibition Catalogue #12.)

pieces are pushed deep into the face of the cuttlebone at the corners, away from the area to be cast (the sticks allow for easy realignment). Press the other piece of cuttlebone directly over the clasp and sticks and apply gentle pressure. Sometimes it's necessary to separate the pieces; gently remove the original clasp, blow out the dust, and repeat the process until the two faces of the cuttlebone fit together. The cuttlebone is soft enough to be shaped with a fingernail and will compress into the shape of the piece you are trying to replicate. Once the complete recess is made, the pattern is removed and the remaining dust is blown out. Air channels need to be cut into the cuttlebone from every side protrusion and from the lowest end of the form being cast. These air ducts provide outlets for air to escape when the molten metal is poured into the mould. Cut at the top a wide funnel-like mouth that is at least as wide or wider as the widest part of the shape being cast. If the opening is not sufficiently wide and the air channels not first cut curving downward then up and out, it is possible that air will be trapped and prevent a successful cast, or that the metal will harden before it has a chance to flow throughout the mould. Once this process is complete, put the pieces together again and bind them with wire. Prop the mould on either side to prevent it from falling while the molten brass is being poured.

Cut small pieces of brass (off cuts or scraps can be easily recycled here) and place more pieces of brass into the crucible than you think are necessary. There is almost nothing more frustrating than finding out that you haven't melted enough metal for your mould. You cannot pour more metal in later because the two pourings will not bond. Add a little borax flux powder, direct the blue part of the flame from your torch into the crucible, and slowly move it around heating all the metal at the same time. The brass will change color from gold to brown, then orange to red, and then finally to silver when it has become liquid. Gently swirl the liquid metal around the crucible to ensure that all the bits and pieces of brass have melted. Prepare to instantly pour the contents into the funnel opening of the cuttlebone mould. The pouring of the molten brass must be quick and directly into the opening; any slight hesitation can result in the brass beginning to set and not flow evenly throughout the inside of the mould. It will smoke a bit and it will be too hot to touch for quite a while, but within seconds it will have hardened. Carefully cut the binding wire and, with a tool, separate the halves of the cuttlebone mould. You will see a charred mess with the piece you have produced in the center. This piece will have projecting appendages where the molten metal flowed into the air ducts. Remove the metal with pliers and drop it into a glass of water to cool. When cooled sufficiently, it can be handled and the extraneous metal (from the air ducts and from the top funnel) can be cut and filed away. The surface of the metal may have a slight ripple from the structure of the cuttlebone. This too can be filed away and finished smooth. The mould can be used only

once because the heat chars and destroys the inside of the cuttlebone. However, cuttlebone is inexpensive and, if the mould is not successful, it is not a great loss in material costs. There are other, more refined ways to cast three-dimensional metal pieces, but they require more equipment and expertise. Therefore, I have found that if a particularly fine or intricate job is needed, it is worth the cost to have a professional goldsmith do it for you.

Creating a Patina on New Brass Fixtures to Help Blend Them with Naturally Aged Existing Pieces

There are many recipes for toning metals; the most common and easiest is exposing the shiny new finished pieces to ammonia vapor. Using a glass dish that can be well covered, pour a small amount of concentrated ammonia or ammonia hydroxide into the bottom. Be extremely careful as these are very caustic, having a pH of 12. The vapor is a very strong respiratory irritant. It should be used only in a fume hood or in a well-ventilated area. You will need to suspend the brass within the chamber, I frequently pleat a strip of Mylar and lay it on edge and rest the piece on it, or a piece of metal screen can be folded into a box shape and placed in the dish of ammonia, resting the brass to be “aged” on the screen. It can be left for 15 minutes to for over 2 hours depending on the concentration of ammonia. By using a glass dish, it is possible to see the brass change color and thus know when to remove the piece(s). Some sources say the metal will become brittle if left in the chamber for a long period of time, and that it supposedly develops small cracks overnight. I have never seen this happen and have personally left some pieces in overnight but, cracking is possible so be careful. I sometimes brush the brass directly with the ammonia solution; this can create darker, splotchy, more irregular and therefore, more dramatic results. Ammonia is interesting because when brushed on, the darkness already created can be removed while it is still wet. The oxidation of the metal causes it to darken once it begins to dry. When the desired look has been reached, the metal can be wiped with a cloth and a little oil, which gives a luster to the metal and will remove the blue/whitish haze that sometimes appears after patina is applied. You should patina your pieces prior to attaching them to the book, but during the attaching process you may scratch the metal. The heads of the rivets will be shiny so it may be necessary to carefully brush a little ammonia onto the surface, wiping off any excess, and finally wiping with the cloth and a touch of oil.

REFURBISHING METALS ON BINDINGS

In the refurbishing of older bindings that have silver clasps or bosses, I will clean the silver with a silver polish that is very carefully applied with small

cotton swabs (Q-tips are usually too large so I make my own by rolling pieces of cotton onto small sticks). Using a little distilled water, I thin the silver paste and, in a circular motion, remove the tarnish on the silver. Do not get the polish on the binding but, if by accident some does get on the cover, let it dry and remove the encrusted polish with a stiff brush and a fine pick. With a clean swab and a little distilled water, wipe the silver surface clean. To keep the silver from retarnishing, I have found a lacquer called "Incralac" to work well when evenly brushed onto the silver surface. Incralac is a lacquer with toluene as its solvent. It has a tarnish inhibitor as one of the components. The lacquer is best applied undiluted in a seemingly thick coat. The thick coat will spread out evenly, thus fewer brush strokes will be visible when dried. If the surface of the varnish becomes scratched, the metal exposed beneath the scratch will tarnish and result in a splotchy appearance. If the scratch is caught soon enough, a re-application of the varnish is all that is necessary but, if the silver has begun to tarnish again, all the varnish must be removed with toluene and the whole process must begin anew.

Never attempt to polish brass metal fittings. To remove the patina is considered improper, and the patina on old brass actually serves as a protection for the brass.

The process of making metal fittings for books is a skill that, like everything, requires both practice and trial and error before you will become truly comfortable and achieve consistent and satisfactory results. It may seem to be a far cry from the bookbinders normal repertoire, but book conservators are certainly going to need these skills to complete a treatment of a special book. The design binder will find that knowing these skills can open up opportunities for design elements that may have otherwise gone unexplored. It is also fun to work with a hard material that can be molded and shaped into a form that can embellish a binding both structurally and decoratively.

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