Hand Bookbinding

Materials, Methods, and Techniques as they Relate to Preservation and Conservation: An Overview

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Abstract

This paper examines a range of materials, methods, and techniques used in contemporary Western hand bookbinding from a preservation and conservation perspective. While certain materials and techniques can produce a hand-bound book with a long expected life as a readable object, the range of available materials and extant binding styles, combined with the lack of any official standards for the craft, can result in objects that are less stable and less durable. A wide range of common binding materials and methods are discussed in terms of their contribution to the stability and usability of the finished object; the lack of agreement between expert hand bookbinders regarding best practices is also demonstrated. Standards that have been established for the purposes of library preservation and conservation, which are also relevant to hand bookbinding practices, are noted. This paper then discusses certain materials and methods used in bookbinding in East Asia, including some traditional methods that have begun to be incorporated into contemporary bookbinding and book arts. Finally, trends in hand bookbinding and book arts, as well as certain issues concerning the concept of the book-object and the debate between aesthetic value and usability, are explored.

Keywords: Hand bookbinding, bookbinding, preservation, conservation, binding methods, binding materials

Since the introduction of various kinds of machine binding, hand bookbinding has become a niche craft practiced by book artists, book conservators, and a small number of binders and presses seeking to preserve traditional methods. From a preservation standpoint, hand-bound books are especially complicated objects, since the work of each bookbinder will display different strengths and pose different challenges regarding the durability and life of the book. The kinds of materials used in the
book’s construction, the techniques used to bind the book block, and the various methods of attaching boards or endpapers to a book block, all contribute in a significant way to the strength of the book’s spine. They also determine the optimal temperature and relative humidity conditions for the book, and the ability of the book to function as a useful object without incurring damage from being opened or read. This paper, which provides an overview on hand bookbinding from a preservation perspective, will begin with a discussion of the common materials, methods, and techniques employed in standard Western bookbinding and their relation to the durability of the hand-bound book. Following this discussion, the paper will cover traditional methods of certain Eastern cultures, emphasizing points of relevance to preservation and conservation professionals. Lastly, the paper will conclude with the main ethical debates in the field of bookbinding, which have greatly affected the choice of materials and the methods used by bookbinders in all variations of the craft.

The materials chosen by a bookbinder for a potential project are of the utmost importance, as materials have a more significant impact on the eventual life of a book than either binding methods or storage conditions. Pamela Richmond (1989) writes, “As the main point of any binding, whether it is of leather or of cloth, is to protect the text, it is the binder’s duty to ensure that he is not hastening the book’s demise by using unsatisfactory material” (p. 35). Although international and national standards specifying the materials that should be used in the process of library bindings already exist, these standards are not commonly followed in the areas of book arts and fine bookbinding, and there are no official standards enforced by the bookbinding community. Furthermore, while attitudes toward some materials are essentially common knowledge in the field of bookbinding, the applicability of certain other materials is a point of contention. What follows is an examination of the basic materials needed for the process of bookbinding and rebinding and their variations.

Paper chosen for the construction of a book block and for the endpapers of a book should ideally qualify as “permanent paper,” i.e. the paper’s pH levels, alkaline reserves, tear resistance, and lignin levels should fall within certain parameters laid out by the National Information Standards Organization (NISO) in their standard on permanence of paper (2010, pp. 3-4). This standard is echoed, at least in part, by bookbinding guides that espouse the use of archival-quality paper (which should meet both the pH and lignin level specified by NISO for permanent paper) or, at the very least, acid-free paper. While book artists use a variety of papers in their work, several bookbinders recommend rag content

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1To qualify as permanent paper according to NISO standards, a paper must have: a pH level between 7.5 and 10; an alkaline reserve equivalent to “2% calcium carbonate” based on the dry weight of the paper; no more than 1% lignin content; and a certain level of machine tear resistance as defined by the weight of the paper (NISO, 2010, pp. 3-4). These standards have to do with the life of the paper and the two major factors which cause damage to paper: acidity and physical damage. The pH guidelines ensure that permanent paper begins its life as basic, rather than acidic, and the alkaline reserves help to stave off acidification in the future. Lignin-free paper is generally thought to be less susceptible to acidification and more durable; low lignin levels and a high tear resistance contribute to a more durable paper that should endure more strain and use than non-permanent paper.
paper over wood pulp paper. Aldren A. Watson (1986) notes that rag content paper is “more flexible, more durable, and less likely to yellow than wood pulp paper” (p. 17). With regards to paper weight, Kathy Abbott (2010) suggests using paper between 80 and 130 grams per square meter (gsm) for the pages of the book and paper between 60gsm and 130gsm for endpapers or covering papers.

The boards used to construct the front and back covers (as well as the spine board, if using a flat-back binding technique) are a point of contention between bookbinders. Generally, they agree that boards must be strong enough to resist warping caused by the shrinking of covering materials as their adhesive dried, but disagree on the best material for the job. Andrew Haslam (2006) notes that while yellow strawboard was the choice of binders for many years, it has in recent years been largely replaced by greyboard, or millboard (also called binder’s board) in the case of books needing boards of greater weight (p. 221). Philip Smith (1974) concurs that millboard is the best material, though he also notes that strawboard, while too brittle for most bindings, has certain advantages in that it is not prone to becoming acidic due to atmospheric pollution (p. 64). In contrast to the above authors, Abbott (2010) strongly advises against the use of greyboard, as “it has poor strength and is not acid-free” (p. 11), and advises using either acid-free or archival millboard. However, her directions for determining the grain of the board used—in this case, millboard—suggest using the flexing method of grain determination, which would only be possible with a very thin variant of millboard, as it requires folding the material over and rolling the fold (p. 21). Abbott’s statement about the pH level of greyboard is dubious as well, given that several variations of archival or acid-free greyboard are available through bookbinding and conservation materials suppliers. Richmond (1989) notes that greyboard, while softer than millboard, is “ideal for cloth work,” while millboard is suitable for “leather binding and good quality heavy cloth work” (p. 35). Watson (1986) agrees, labeling millboard or binder’s board “the most satisfactory board,” given its ability to resist warping during the pasting stage of covering the boards (p. 18).

There are numerous kinds of adhesives used in contemporary bookbinding, but the most prevalent ones are various kinds of cold glue and paste. The most commonly used cold glue is polyvinyl acetate (PVA), which is available in a variety of emulsions and can be internally plasticized. Richmond (1989) notes that this adhesive is favourable for its flexibility when dry and for its solubility in water (p. 42). Using water-soluble adhesives is a priority in bookbinding; according to Richmond using such adhesives is “an aid to future binders who may have to do further work on the binding” (p. 42). PVA is commonly used in gluing spines and spine linings, as well as when gluing tapes or covering materials to boards, because it is able to “[form] bonds between porous and non-porous materials” (Zukor, 2000, p. 9). The paste used in bookbinding is usually starch-based and made from either wheat starch or rice starch. On the whole, starch-based paste has a longer drying period than PVA, which allows

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2Zukor (2000) notes that rice starch-based paste is sometimes sold pre-mixed in a tube, and can contain added fungicides or plasticizers; for this reason, she recommends wheat starch-based paste made by heating wheat starch flour with water until it thickens (p. 7).
for the manipulation of the materials being pasted after application, and is therefore used primarily to paste paper materials together. Animal glues, such as hide glue or bone glue, have been used in bookbinding in the past, particularly in leather binding; however, as Smith (1974) explains, these glues have a “tendency to brettalize [sic]” and “attract mould under humid conditions” (p. 32). As a result, biostatic adhesives like PVA are generally preferred now (Cains, 1974, p. 171).

Any hand-bound books that are also cased books require a spine lining of some sort of fabric. The most commonly-used fabric is referred to as “mull” or “super.” Watson (1986) states that the mull used to line the spine “should have a weave open enough to allow good paste penetration, yet enough body to stand up to repeated flexing,” and recommends white linen or white muslin (p. 18). Abbott (2010) rails against using anything marketed as mull, which she finds “too weak,” and recommends a thin cotton fabric called “fraynot” instead (p. 12). Alternatively, Catherine Burkhard (2007) suggests that fraynot can be more usefully employed as a flexible material for an optional spine-strengthening mechanism called a “hinge cloth” (p. 1).3

The thread and sewing tapes used in the binding process can have a significant effect on the long-term strength of the binding. Sewing thread must be strong enough to withstand the pulling involved in tightening knots, but soft enough that it will not cut into the paper when pulled tight. Thread should also be either pre-coated with wax or waxed with a block of beeswax prior to sewing to ensure that the thread moves smoothly and holds a knot well. Watson (1986) recommends using linen binder’s thread when possible, and substituting it with “No. 16 or No. 25 mercerized cotton” if binder’s thread is unavailable (p. 18). Abbott (2010) also suggests linen thread as the best thread material for bookbinding, and while she suggests having a variety of thread thicknesses and plies available for different kinds of bindings, she does put forward 25/3 linen thread—that is, three-ply thread with a thickness gauge of 25—as the best general purpose thread (p. 12).

Sewing tapes are spaced out evenly along the spine and used to support the binding. Watson (1986) suggests that between the cotton, linen, and polyester tapes available to bookbinders, cotton is the best given its durability and pliability. He points out that linen tape can be sized with agents that affect their pliability and ability to be adhered easily, while polyester tapes are far too thin (p. 18). Abbott (2010) suggests unbleached Irish linen tape, which would presumably not be sized with any additives and should therefore be relatively pliable (p. 12). Certain kinds of binding—especially leather binding—use different varieties of tape, such as the diagonally woven polyester tape, or may replace tape with the use of cords. NISO advises using tapes made either of cotton or linen, with a minimum width of 0.5 in or 13 mm, and threads made of cotton, nylon, cotton-covered polyester, or linen for hand-bound books sewn through the fold, but advises against the use of linen thread elsewhere, especially in side

3Burkhard recommends that mull be used for its usual purpose, pointing out that the material used to line the spine must be a heavily-sized, open-weave fabric (though the tightest weave available is sometimes the most durable).
sewing (2000, p. 18). Where cords are used, as in certain leather bindings, Laura S. Young (1995) suggests unbleached hemp or flax twines as the most durable (p. 33).

The covering material chosen for a given book also has a huge impact on the life of the book. The three main covering materials used in standard bookbinding are leather, cloth, and paper, though certain branches of book arts and decorative bookbinding may use other materials. For the sake of brevity, this paper will only address the numerous kinds of leather used in bookbinding from a very general perspective. Leather is one of the oldest covering materials, and the many processes by which it is manufactured (and the differences in the animals whose skin is used to make the leather) create a multitude of issues surrounding the choice of leather used for a book. Haslam (2006) also details the differences in certain skins that could eventually affect the usage of the book; for instance, morocco or goatskin is pliable, while pigskin is not, and sheepskin is more inclined to split than leathers made from the hides of other animals (p. 230). Given the many variables that can affect a leather's strength, Cains (1974) concludes that, “it is better to cover a book in a good linen or cotton buckram than a leather of uncertain durability” (p. 171).

It is worth noting that paper-covered books have proven to be quite durable when the right kinds of paper and binding methods have been used. While paper coverings were used from the 17th century onward for titles and materials that were thought to be somewhat ephemeral, many of these pre-19th century bindings still survive today, potentially due to the way in which rag paper was made and processed during this period (Cloonan, 1991, pp. 12-13). Cloth is a more popular covering material in Western bookbinding, and cotton and linen are very commonly used. Book cloth can come sized in agents like starch or pyroxylin. starched cloth is cheaper and resistant to creasing, but can absorb moisture, while pyroxylin (which has waterproofing qualities) can affect the stiffness of the cloth and is much more expensive (Haslam, 2006, p. 230). Currently, pyroxylin is the preferred sizing agent for varieties of buckram cloth. The sizing or filler used in covering cloth is crucial to ensuring that the adhesive does not filter through the weave of the cloth (Richmond, 1989, p. 40). Coverings can involve multiple materials; Abbott (2010) refers to a book covered in a single material as a “full binding” (p. 55), while Young (1995) describes “one-quarter, one-half, and three-quarter” bindings, which use differing amounts of two materials—for instance, book cloth and decorative paper—to create a two-tone effect (p. 9).

The methods and techniques used in the bookbinding process can also have a significant impact on the life of the book from a preservation standpoint as well as the ability of the book to function as a readable object. Bookbinding begins with a book block, either consisting of signatures or sections

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4Smith (1974) points out that while all leathers have “pronounced hygroscopic tendencies” and often warp and change size when in contact with water, “some leathers are more vulnerable than others” (p. 32). This variance, Smith writes, is due to the manufacturing processes associated with the leather; binders choosing to work with leather should be aware of the potential “dimensional instability” of their materials and make allowances for changes in size when bringing any water-based adhesives into contact with the leather (p. 32).
constructed from folded paper or taken from a book with a deteriorated binding that is being rebound. Restoration binding involves many factors that are not an issue in constructing an original binding, one of which is the careful preparation of the book block. The book must be “pulled,” which involves removing the cover from the text, separating each section or signature from the block, and cutting any cords, tapes, threads, or mull which have held the book together at the spine (Diehl, 1980, v. 2, pp. 29-30). The remnants of the glue must then be removed completely from these sections before the block can be rebound. While in the past this process used to be achieved using one’s hands and a sharp knife to scrape glue away (Diehl, 1980, v. 2, pp. 30-31), this is now usually done with the aid of something like methylcellulose, a weak adhesive, which can soak old adhesive out of even varnished paper when used in 2.5% or 3% solutions (Abbott, 2010, p. 12; Baker, 1982). If the book being rebound was originally a rounded and backed book, the binder must also knock out the groove from the original shape to ensure a solid rebinding (Watson, 1986, p. 106).

If the book block is being constructed by the binder, there are other factors to consider in the folding of signatures. Paper must be folded so that the paper grain is parallel with the book’s spine, just as board and cloth grain must run parallel to the spine. Folds must be made very precisely so that the textual layout of the printed sheets may be preserved. Haslam (2006) notes, “A misplaced fold has the effect of shortening one margin and lengthening another, leading to irregularities in the position of the print area in the bound copy” (p. 220). If signatures are being constructed out of several sheets of pre-cut bookpaper, as opposed to being made through several folds of a large sheet, the individual sheets must be folded into a signature as a single unit, as the combining of sheets folded individually can cause the signature to spring open and allow adhesives to leak between signatures (Watson, 1986, p. 32). Folded signatures must be substantial enough to allow for sewing through the folds without the thread tearing the paper, while still being slim enough as to allow for rounding and backing, even if the book is being bound in a different way. Inordinately thick sections can cause friction and strain on the thread during binding, while too many thinner sections can also affect the rounding and backing process (Smith, 1974, p. 25).

Once the book’s signatures are completed, the bookbinder must consider how the endpapers of the book will be incorporated into the binding. Diehl (1980) writes that endpaper sections should comprise at least two folded sheets at either end of the book, and should be sewn with the book rather than being tipped in or pasted in after binding (v. 2, p. 67). The method of tipping in endpapers is sometimes used when only one sheet is wanted at each end. However, this technique weakens the binding of the book and can sometimes cause cockling on the leaf to which the endpapers are pasted, and is therefore not recommended (Haslam 2006, p. 220). Haslam (2006) recommends using a method known as “guarding” for this kind of endpaper attachment, and for any other single leaves which must be included amongst bound signatures. Guarding involves pasting a thin strip of paper or other reinforcing material to the edge of the single leaf and then folding and wrapping this strip around the adjacent signature prior to sewing (p. 220). This method ensures that the endpaper or other single leaf is sewn in with the rest
of the signatures without increasing the risk of the single leaf being torn during the sewing process, which would also weaken the binding. It is also possible to use part of the book block as a pastedown to fulfill the role of an endpaper, which avoids this extra reinforcing material along the spine and the use of adhesives in this process.\footnote{Pastedowns and endpapers are both used to cover the underside of the covering material and to provide additional support in connecting the book covers to the book block. When endpapers are used, they are glued down to the covering material. The first and last leaves of the book block, however, can also be used in this way, in which case they are called “pastedowns.” Using pastedowns can create a stronger overall structure, but this process will also make the finished book less flexible than one which uses endpapers.}

Once the book block is constructed, it can be pressed prior to sewing; this allows the signatures to “form a stable relationship with each other, and the leaves are more likely to remain in alignment for the life of the book” (Haslam, 2006, p. 220). This can be done in a regular book press or a nipping press, or, for larger titles, a standing press. After this pressing stage, the signatures must be pierced using a piercing awl and either a piercing board or a piercing or pricking cradle. A “piercing board” is a board with an angled side that allows a signature to be partially opened and laid over the pointed side. Holes are then pierced through the signature, with its outermost sheet facing up, and come into contact with the board (Watson, 1986, p. 37). Piercing cradles, a kind of inverted piercing board, are more common, whereby the signature is laid inside the cradle open to its innermost folded sheet, and is pierced until the awl comes into contact with the cradle (Abbott, 2010, p. 18). In either case, the holes must be pierced in the same location on all signatures, with two holes pierced for the head and foot kettle-stitches and one hole pierced for either side of each sewing tape. Ideally the tip of the piercing awl should be “smaller in diameter than the sewing thread so that the paper will grip the thread when it is drawn through” (Watson, 1986, p. 37). Watson (1986) also notes that holes pierced around the future tape positions should be “spaced a fraction wider than the exact width of the tape” to avoid puckering in the tape when the thread is pulled tight (p. 36). This is the method for sewing through the fold, and as such, holes are pierced precisely through the fold of the signatures. Sewing through the fold increases the flexibility of the finished book and ensures that the book will be able to be opened flat without damage to the spine, if done correctly (Watson, 1986, p. 23).

After piercing, the signatures are ready to be sewn. Sewing tapes, their position on the book spine having already been determined through measuring prior to piercing, are positioned on the sewing frame—an essential piece of equipment for keeping tension in the tapes while the book is being sewn. NISO outlines guidelines for tape placement regarding hand-bound books that are sewn through the fold, the most popular method of sewing in hand bookbinding, and specifies that for the optimal durability of the spine, tapes should be placed between one quarter inch and one inch from the head and tail of the spine, and evenly spaced between (2000, p. 5). NISO also specifies that spine length should determine the number of tapes to use: book blocks less than eight inches long should be sewn using two tapes, book blocks between 8 in and 12 in long sewn with three tapes, and book blocks greater
than 12 in long should be sewn using four or more tapes (2000, p. 5).

When the frame is ready, the first signature is laid down on the frame and positioned against the sewing tapes. A knotted length of thread is pulled through the hole at the foot of the spine using a bookbinding needle, then reinserted and brought back through the hole immediately to the right of the first tape, and then into the signature again through the hole on the tape’s left. Thread is worked in and out of the tapes in this way until the hole at the spine’s head is reached, when the thread is pulled out and pulled tight before the next signature is laid on. The thread is then worked through this new signature back along the spine, winding in and out of the tapes. Signatures are secured to the signatures below them through simple kettle-stitches either at the head or foot, depending on which signature is being linked. The process is completed with a double kettle-stitch to secure the final signature. It is imperative that the thread is pulled tightly, or the binding will be weak and loose, but pulling too tightly can cause the signature to tear or the spine to cave in and curve (Watson, 1986, p. 42). To prevent swelling in the signatures that have already been sewn, these can be pressed down while sewing up using a bone folder.\(^6\)

This is a simple method of sewing up which is commonly used by bookbinders today. However, many binders utilize methods in which the thread is not only woven around the sewing tapes (or, in certain kinds of leather binding, the cords) in this way, but is wrapped around the cords or sewn through the tapes themselves (Diehl, 1980, v. 1, p. 59). While these methods may strengthen the link between the signatures and the tapes or cords, they also pose an additional problem regarding the tension with which the thread is pulled and the signatures are sewn, as pulling too tightly or, indeed, not tightly enough in this kind of binding would ultimately have a greater effect on the eventual strength of the spine itself and on the strength of the attachment between the boards and the book block. If the book block is quite thick or comprised of many signatures, it can be useful to knock out some of the swelling in the spine prior to rounding and backing (if the book is to be rounded and backed) to compact the work (Watson, 1986, pp. 107-108). The book block is then placed in a finishing press to be rounded, backed, and glued, or, in the case of a flat-back binding, only glued. In this process, adhesive (PVA is recommended for this stage) is worked into the spine, between the signatures and into the tapes, before the lining material (mull or super) is positioned on the spine and then glued down as well. Any excess glue is wiped away and the book is left to press and dry completely before further work is done. Whether rounding and backing is done depends on the kind of book the binder wishes to construct. NISO recommends that for the most durable binding, any hand-bound books which have been sewn through the fold and have signatures which are thicker than 0.25 in. or 6 mm should be rounded and backed (2000, p. 9). After the spine has been glued, any additional reinforcing material—perhaps

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\(^6\)A bone folder is a common folding tool used to create and press sharp creases. These tools were traditionally made from a leg bone taken from a cow, goat, deer, or other animal, while in the past ivory and bamboo folders were also sometimes used. Today, bone folders and Teflon folders are the most common.
fraynot—can be added to the spine; NISO recommends that this material be included for any volumes sewn through the fold or recased which have a thickness exceeding 1.5 in., and suggests alkaline paper or an additional layer of the material used to line the spine initially (2000, p. 10).

At this point, hand-bound books comprised of constructed signatures are ready to be trimmed, as hand-bound books are not trimmed until after the spine has been glued (Haslam, 2006, p. 221). After trimming, the covering boards are attached to the book block. There have historically been many methods for the attaching of the boards, and methods have evolved with the changes in the materials preferred for covering boards. P. J. M. Marks (1998) describes the early practice of Coptic sewing, which “involved the thread being passed directly through pre-bored holes in the boards,” as well as a technique for books constructed using wooden boards and leather thongs (in place of sewing tapes) in which a groove or tunnel was cut into the board for the thong to be channeled through before being secured to the board with a wooden peg (p. 38). Cloonan (1991) delineates “boards,” in her description of early paper-covered bindings, as specifically boards through which the sewing supports—tapes, cords, or thongs—have been laced, as opposed to “cases,” the term she uses for boards which are constructed separately and then attached to the completed book block (p. 6). Variations on this technique include the splitboard or Bradel binding, in which a piece of material wider than the book’s spine is attached to the spine with glue and then glued into the split sections of the boards, which are partially split for this process (Cloonan, 1991, p. 10). This process is primarily used for leather binding, but one could find both cloth-bound and paper-bound books that are constructed in this way (Cloonan, 1991, p. 10). It should also be noted that while cloth has been historically used as the supportive material in Bradel bindings, current guides recommend the use of durable paper instead (Young, 1995, p. 37). Another variation, used in leather binding, is what Diehl (1980), somewhat ironically, calls a “flexible binding,” in which signatures are sewn around cords that are then laced through the boards before the covering leather is attached directly to the boards and to the backs of the signatures; this binding is very inflexible, but Diehl asserts that it is “the strongest of all types of binding” (v. 2, pp. 24-25). Leather binding methods that involve any sort of lacing-in, however, have been found to complicate certain future repairs an item might need, as this method prevents conservators from accessing every edge of the board easily and causes difficulty when repairing joins (Hagadorn & Peachey, 2010, p. 42).

Board attachment methods that do not involve the lacing-in of any sewing supports fall into two categories. The first method is what Abbott (2010) calls “casing in,” in which the covering materials are attached to the boards first, so that the case is completely finished prior to being attached to the book block (p. 57). Abbott (2010) suggests this method for rounded or rounded and backed books, and instructs binders to attach the tapes to the boards, then the mull (or, in her case, fraynot), and then the endpapers (p. 57). Watson (1986) suggests a different method for a flat-back binding, which involves a backbone board in addition to the front and back boards (pp. 47-50). This method involves coating the mull in paste, with waxed paper beneath the mull, and then pressing the board down onto the pasted mull before folding the board back and adhering the tapes atop the pasted mull. Once the
covering boards are attached, the covering material is measured and cut, and the backbone board is adhered to the spine of the covering material, which is then attached to the boards one side at a time and folded over before the endpapers are pasted down (Watson, 1986, pp. 50-62).

It is difficult to compare the two methods properly given that they are intended for different styles of binding. In any case, at this stage in the binding process, the technique with which the binder applies adhesive both between the boards and covering material and between the boards and the endpapers is critical to the book’s longevity. Watson (1986) writes, "[t]he difference between an expertly done binding and a second-rate one is often nothing more than carelessly applied paste" (p. 27). Adhesive should be applied in a thin layer from the centre to the edges, in order to ensure that the material being pasted will lie flat, without any air bubbles (Watson, 1986, pp. 27-28). It should also be done quickly enough to avoid the material being positioned improperly, but slowly enough to ensure that there are no creases (Watson, 1986, pp. 27-28). This part of the process also determines whether the book is what Young (1995) calls a “hollow back” binding, in which the cover is not directly attached to the spine of the book block, or a “tight back” or “fast back” binding, in which the cover or case is directly attached to the spine (p. 5). Interestingly, both Abbott’s rounded and backed binding and Watson’s flat-back binding fall into this category, though other flat-back bindings do not. Diehl’s “flexible binding” falls into this category as well. The Bradel binding is a kind of hollow back binding; other techniques include the English split board binding and the German tube binding (Young, 1995, pp. 5-7).

Bookbinding in Western cultures—specifically Western European and North American bookbinding—differs in many ways from the diverse styles, materials, and methods used in East Asian bookbinding. While many book conservators working in North America and Western Europe may not come across these kinds of items in their collections, both the traditional techniques of East Asian bookbinding and contemporary practices in countries like Japan and South Korea are being incorporated more frequently into the work of book artists around the world as more research is done on these methods. Furthermore, certain practices, styles, and materials have been shown to create books which are relatively stable and which can survive punishing conditions for long periods of time. As a result, the bookbinding history of these cultures should be of interest to book conservators and preservation experts.

Palm-leaf manuscripts, which are prevalent in historical collections in Myanmar, Cambodia, and Thailand, but which are also found elsewhere throughout Southeast Asia, are generally constructed out of one of two kinds of palm leaves: palmyra or talipot. In relation to preservation concerns, while palmyra experiences embrittlement due to acidification relatively quickly, talipot has been reported to remain in good condition for 600 years, preserving the Buddhist texts, folklore, and medical texts written in these manuscripts (Dean, 1997, p. 130; p. 132). Palm-leaf manuscripts are held together by bamboo splints or by braided cords that run through holes at either end of the book, and are finished with wooden covers attached to the cords or fastened with webbing. Manuscripts bound using the braided cord method, while incurring some mechanical damage from the friction between the cord
and the palm-leaf pages, can withstand much more of this kind of damage than similar structures with pages made of paper (Dean, 1997, p. 132). Parabaiks, another kind of hand-bound book found in these areas of Southeast Asia, are constructed as accordion fold books without covering boards—a form popular with book artists today. Dean (1997) notes that both white parabaiks, full of rich illustrations, and black parabaiks, generally intended to be ephemeral, are able to survive extreme climates, fungus, and insect damage, perhaps due to their use of “crude paper made of bamboo, bark, straw, or leaf fibre” (pp. 132-133). Traditional bookbinding in Indonesia incorporates binding methods used in the Islamic world, binding practices and materials used elsewhere in Southeast Asia, and certain European materials introduced during the Dutch colonial period. Bindings from nineteenth-century Central Java, for instance, are constructed using boards made of leather which are then covered with another layer of leather, and often include fore-edge flaps or envelope flaps. The text blocks in these bindings consist of either European paper or a type of Indonesian tree bark paper called dluwang, which is much more frequently used for spine linings and pastedowns (Plomp, 1993, p. 575). These bindings have survived intact, while Indonesian bindings constructed using boards made of thin pasteboard or paper—such as those created in nineteenth-century Western Sumatra—have largely fallen apart (Plomp, 1993, pp. 583-584).

Hand bookbinding practices in East Asia often originated in China and subsequently spread to Korea and Japan, where these practices evolved further to become more distinct in each region. Minah Song (2009) charts the move of several of these binding styles from China to Korea, including the concertina binding, the whirlwind binding, and the butterfly binding. Notably, the latter was the first folded single-leaf binding to be spread throughout East Asia, as opposed to the continuous-leaf concertina and whirlwind bindings (Song, 2009, p. 61). The side-stitched binding, a format which originated in China but became much more widespread in Korea and Japan, is one of the more influential Asian binding methods, and the style is also referred to as “thread binding, side-sewn, stabbed, stitched, [and] bag or pouch binding” (Munn, 2009, p. 106). In Korea, side-stitched books were covered with silk or layers of hanji—Korean mulberry paper—applied with a wheat-starch paste and treated with beeswax in an early method of sizing to prevent insect damage (Song, 2009, pp. 65-66). The text blocks in these books were bound using paper twists, and attached to the covers using thick thread waxed with beeswax through five holes placed 12-15mm from the spine, in the Korean tradition (p. 68). This is further than the standard distance from the spine for the side-stitching in a side-stitched binding, which is closer to 9mm (Munn, 2009, p. 106).

Side-stitched books in the Chinese tradition are generally bound with a softer thread than those in the Korean tradition, and have flexible paper covers rather than boards of layered paper. While traditional Japanese side-stitched books use the sturdier thread and boards common in the Korean method—known as seonjang—both the Chinese method (xian zhuang) and the Japanese method (fukurotoji) employ four stabbed holes in the attachment of the covers, rather than five (Munn, 2009, p. 108-109). Fukurotoji binding exploded in popularity in Japan during the Edo period (1603-1868),
due to a great increase in public literacy and an increased need for books. The *fukurotoji* books from this period are characterized by an inner binding (the *nakatoji*) using holes at the foot and the head of the book and a paper twist, which made the binding strong and durable (Hioki, 2009, pp. 80-81). The Japanese style of side-stitched binding remains quite popular today, especially among book artists, and is often taught at European and North American binderies, though some contemporary variations on this form eschew the inner *nakatoji* binding and bind or adhere the pages directly to the covers, resulting in a book which is much less flexible and less durable.

One of the preservation difficulties that arise from the realm of hand bookbinding is the relative lack of standards and best practices within the community. While certain aspects of the bookbinding process are generally agreed upon, the materials a bookbinder should use—as the disagreements between Abbott (2010), Richmond (1989), and Watson (1986) have shown—is very much a topic for debate. The greatest amount of relevant standards exist in the realms of library binding and preservation binding or rebinding, where there are, in places, clear guidelines and best practices for certain kinds of hand bookbinding. The NISO (2000) standard on library bindings, for instance, provides specific recommendations throughout for items being sewn through the fold by hand, as aforementioned. The materials and techniques used in hand bookbinding, however, are in some ways ignored in other standards regarding preservation binding and library binding. John McIlwaine’s register of standards, guidelines, and best practices for preservation, *First, Do No Harm*, lists several works on repairing specific kinds of binding and on library bindings, yet the only work listed on hand bookbinding (aside from the aforementioned NISO standard) is Laura S. Young’s *Bookbinding and Conservation By Hand: A Working Guide* (2005, pp. 40-42). McIlwaine (2005) lists two ISO standards that are relevant to the realm of preservation binding (p. 41), though the first, ISO 11800:1998, specifically limits its scope by excluding hand bookbinding (section 1). The scope of the second, ISO 14416:2003, doesn’t mention hand bookbinding at all.

The materials considered in this essay are the materials generally used in standard Western bookbinding, and are the ones recommended for conservation bookbinding. Nonetheless, in the wider world of book arts and decorative bookbinding, the choice of covering cloths, decorative papers, and materials with which to adorn ornate leather covers results in the creation of book-objects with a multitude of preservation issues. Anna Embree and Amanda Thompson (2007) calculated numerous metrics with which book cloth has been measured in the past for a variety of decorative Japanese book cloths, and noted that the last relevant ANSI document on the topic of book cloths at the time of testing was now so outdated (being published in 1977) that the testing procedures it outlined had been declared inapplicable for new design without having being replaced (p. 55). The two authors also point out that there are no relevant standards for book cloths that are adhered to a paper backing or book cloths not impregnated with any sort of additive or sizing (p. 55). Many of the cloths tested by Embree and Thompson (2007) failed in areas like resistance to water spotting and abrasion resistance (pp. 58-59), and it is recommended that items bound in these materials should be kept in individual
enclosures for the life of the object for their protection (p. 62). However, the lack of current standards
regarding many materials—like these book cloths—used in decorative bookbinding and book arts,
combined with the field’s wide-ranging views on best practices and a noticeable variation in techniques
from country to country, cause difficulty for hand bookbinders hoping to create a long-lasting object
from a preservation standpoint.

Whether or not a bookbinder or book artist actually aims to create a durable, useable book—as
opposed to an aesthetic object—is itself a debate that manifests within the bookbinding community and
the book artist community. Cloonan (1995) notes the presence of the debate between “the aesthetic” and
“the practical” even in the world of conservation or restorative binding (p. 137). Restoration binding
can, in certain circles, incorporate purely aesthetic considerations into restorative treatments; take, for
instance, the practice, employed by certain British restorative binderies, of applying methylated spirits
to a new leather cover to create the appearance of wear and age (Rosner & Taylor, 2012, p. 418). Smith
(1974) delineates the differing aims of the “conservator” and the “creative artist”:

The conservator tries to prevent forms going out of existence […] in short, to prevent the
shrinkage of our heritage. The creative artist (as bookbinder) on the other hand tries to
bring immaterial forms into existence, to increase our cultural heritage. (p. 162)

This view of bookbinding stands in contrast to the view firmly stated by Cains (1974): “Bookbinding
is the process of making the protective cover for the stabilized object” (p. 170). Smith (1974), however,
implies that the two positions should be reconciled, claiming, “[t]o be an integral part of the book
both the structure and ‘decoration’ should be ‘functional,’ that is, designed with special regard to use
in a given context” (p. 82). John Anzalone and Ruth Copans (1991) highlight this need for functional
books, stressing the “paradox” by which “art bindings become art objects […] that will not be handled
or read” (pp. 259-260).

Since the 1990s, certain prominent book artists from Europe and North America have been
grappling with issues related to the durability and function of the objects they create, and some have
aimed specifically to create books that can function as books. Binder and book artist Sün Evrard has
developed a binding method, which she calls the “simplified binding,” that incorporates elements of
traditional French bookbinding in order to create a book which is “flexible” and “easy to handle” while
also offering “a variety of possibilities for decoration” (1990, p. 37). Books bound using this method can
be opened completely flat without incurring any damage. Evrard is also a member of the Tomorrow’s
Past collective, an international group of book artists and bookbinders who create conservation
bindings for damaged books. They aim “neither to imitate and by association disguise the repair work
they do, nor to copy the aesthetic style of a book’s origins, but to conserve, and to do so with the utmost
care” (Parke, 2013). The collective, which also includes Kathy Abbott, Tracey Rowledge, Jen Lindsay,
Peter Jones, and Carmencho Arregui, among others, thus merges the aesthetic and the practical, as
their bindings are both functional restorations aligned with conservation practices regarding methods and materials, as well as intricate book-objects designed in harmony with the content of the rebound text. The works created by the collective's members have been exhibited at bookbinding events several times beginning in 2003, and in 2013 these works were displayed at a design gallery in London in the Readable Objects exhibition (Lindsay et al, 2013; Parke, 2013).

While movements like the Tomorrow’s Past collective in the book-artist community are helping to steer bookbinding as an art form towards the creation of durable, conservation-friendly books, there is still a long way to go, particularly in the world of amateur bookbinding. Preservation and conservation professionals, therefore, should be sure to familiarize themselves with the methods and materials being employed by prominent book artists and more traditional bookbinders as these techniques change and evolve to reflect new aesthetic and practical concerns. As more diverse traditional practices and binding methods from around the world are brought to the forefront and adapted by contemporary bookbinders, the preservation and conservation challenges that will be raised by these methods will need to be addressed and tackled. At the same time, preservation and conservation professionals can help to bridge the gap between aesthetics and practicality in the bookbinding community by working together with binderies and book artists to promote the use of durable materials and binding methods, especially to binderies offering courses in bookbinding. Through this kind of work, the next generation of hand-bound books to enter libraries, archives, and museums might enjoy longer lives as readable objects.

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