

Board Reattachment Discussion

Subject Coordinators: CONSUELA METZGER, PAMELA BARRIOS
Presenters: ERIC ALSTROM, MARY BAUGHMAN, BETSY PALMER ELDRIDGE, BETH RYAN (*for*
DAVID BROCK), ELAINE R. SCHLEFER, FRIEDERIKE ZIMMERN
Bibliography: RENEE DEVILLE

ABSTRACT

The presentations and subsequent discussions of techniques for reattaching detached book boards are summarized. The discussion was structured around four main themes: joint tacketing, Japanese paper hinge repair, board slotting, and other. Rebacking was not included in the discussion; rather, less invasive, less time-consuming repair methods were stressed in response to perceived interests and trends in the field. A methodology documentation form developed at the University of Texas was introduced by its authors; it is intended as a template for gathering information on board reattachment methods for a future chapter in the Book Conservation Catalog. Book conservators are encouraged to contribute to the development of the chapter by filling out a form and sending it to the address given (see Appendix 6).

INTRODUCTION & SCOPE OF DISCUSSION

The goal of this discussion group was to share information, comments, and experiences about methods of addressing one of book conservation's most common repair tasks, the reattachment of detached cover boards to books with little or no other damage. Although the discussion was not formally limited to leather bindings, emphasis on these objects occurred naturally, since it is these bindings that most frequently fall victim to board detachment as the leather deteriorates, dries out, and can no longer withstand the rigors of constant flexing at the

This open discussion took place on June 2, 2001, during the AIC 29th Annual Meeting, May 30–June 5, 2001, Dallas, Texas. The moderators organized and led the discussion and recorded notes. Readers are reminded that the moderators do not necessarily endorse all the comments recorded and that although every effort was made to record proceedings accurately, further evaluation or research is advised before putting treatment observations into practice.

joint. Traditional rebacking methods were excluded from this discussion on the grounds that they are already well-documented in the literature and that many alternative techniques have been developed specifically as ways to avoid rebacking. While rebacking is appropriate and necessary in many situations, conservators also need a repertoire of other techniques that are less invasive, less time-consuming, and that require fewer specialized craft skills. Less invasive techniques have obvious advantages where preservation of an historic book structure is paramount. Faster treatment methods are a necessity where there is a need to stabilize large, non-rare collections efficiently, as in a production-oriented collections conservation unit, or where funds are limited for the repair of a single item, as is frequently the case for conservators in private practice. Simpler repairs that do not require advanced leather-working or book restoration skills make it possible to handle older collection materials within the normal work flow of a general collections repair unit staffed by technicians or students, while still respecting the nature of the original artifact. As always, when choosing among the various treatment options, conservators must weigh all of these factors and ultimately decide what is appropriate within the given context of condition, use, storage, and intrinsic value of the artifact.

When the moderators planned the discussion session, they elected to organize it around what seemed to them to be the dominant themes in current practice. The categories were defined as: tacketing, Japanese paper hinge repairs, board slotting, and, of course, other. As anticipated, there were many possible variants on each technique, and some methods discussed were hybrids of two or more of the broader categories. Discussion of each category was kicked off with one or more short presentations describing specific techniques. A summary of each presentation and of any subsequent discussion follows. For details or further explanation, readers are encouraged to contact the presenters directly or consult the print sources listed in the bibliography prepared by Renee deVille (Appendix 1).

SUMMARY OF PRESENTATIONS AND
DISCUSSION (IN ORDER OF APPEARANCE)

I. Other

A. Inside Cloth Hinge

The first presenter was Betsy Palmer Eldridge, who described a technique she referred to as the inside cloth hinge. This repair, which Betsy described as one of the “older” techniques, was used in Carolyn Horton’s workshop in New York City during the 1960s and 1970s. Betsy stated that she finds this technique particularly useful for nineteenth-century sets and considers it one of the least invasive options for these materials. It is similar to a technique published by Middleton (1998).

The basic procedure involves a cloth hinge saddle-sewn (rather than overcast as in Middleton’s method) through the shoulder of the book block, adhered to the shoulder and inside board edge, and then either inserted under the pastedown or pasted down onto it to form a new attachment between the board and the book block. A layer of paper that is visually compatible with the endpapers may be pasted down over the cloth on the inside. The hinge can be made from a colored cloth that blends with the exterior of the binding. The small gap that remains at the joint on the outside of the cover afterwards may be blended in or disguised with leather dust if the book is covered in leather.

Structurally, the repair creates a strictly internal connection for the board (that is, there is no point of attachment on the exterior of the boards or spine). The hinging point of the board is at the top of the shoulder, making it most appropriate for tight-joint books. It also must be noted that the spine covering has to be removed to carry out this repair, making it especially attractive for books with hollow backs. The time required is less than one-half hour per board.

For Betsy’s step-by-step description of the inside cloth hinge, see Appendix 2.

B. Pleated Paper Hinge

The second presenter was Elaine Schlefer, who talked about another technique that was used in the Horton workshop. It consists of an internal Japanese paper hinge that is attached to the shoulder with adhesive, pleated back on itself, and inserted under the covering material on the outside of the book (see Appendix 3).

Elaine uses this method for very deteriorated tight back books, as the spine covering does not need to be lifted. However, the board must be completely detached for this repair to be used. Elaine has found this technique successful even for large and heavy books.

Discussion of the Pleated Paper Hinge

It was observed by both Elaine and the group that the endleaves must be firmly attached and the text block solid for this technique to be used; therefore any page repair or spine consolidation must take place prior to board attachment.

Some people prefer to add a cosmetic overlay of toned tissue or thin leather to cover the outside of the joint, although it was observed that so little of the tissue generally shows that this step is often not necessary.

There was some discussion of whether it was desirable to use PVA (i.e. polyvinyl acetate dispersions such as Jade or Elvace) rather than starch paste to re-adhere old leather that had been lifted or had become detached. Because of their quick drying properties and relatively low water content, PVAs are often used where there is fear that contact with the moisture in starch paste will cause blackening, shrinkage, and stiffening of deteriorated vegetable-tanned leather—despite the fact that PVA bonds are not easily reversed. One person reported good success with pre-sizing the underside of the old leather with a coat of paste, which is allowed to air dry completely without setting the leather down. A second coat of paste is applied for setting down; the first layer acts as a barrier and prevents too much moisture from wicking through to the surface. Another colleague uses Lascaux 360, an acrylic that, unlike most PVAs, is reversible in a range of solvents when dry. While it is not likely that the Lascaux resin could be removed completely from the old leather using solvents, a solvent-based repair system may be safer for very deteriorated leathers than an aqueous one.

C. Split Linen Flange

A third technique was presented by Beth Ryan, on behalf of David Brock. The head and tail panels of the spine covering are lifted. The exposed spine panels are lined with strips of airplane linen cut wider than the spine. The overhanging flanges are split horizontally. Half of each flange is inserted under the board covering, while the other is taken to the inside of the board and inserted under the pastedown. David has published this method in the *Abbey Newsletter* (see Appendix 4).

This repair can be used in both general and special collections, and is especially useful for tight-back books. It does require some lifting of the old spine, but this is limited to the head and tail panel. Modifications are possible to avoid or minimize the need to lift the entire panel (Primanis 2000).

II. Joint Tacketing

Joint tacketing is a technique that provides mechanical board attachment via thin linen cords or threads that are anchored to the text block by looping them through holes drilled or stabbed through the shoulder. The free ends of

these threads are then laced through small tunnels drilled at an angle into the spine edge of the board, emerging on the inside at a short distance from the spine edge. To anchor the tackets, the threads are either tied together or frayed out and stuck down on the inside of the board. The number of tackets may vary, but generally corresponds to the number of broken original sewing supports. The technique and some of its variants have been published in articles by Cains and Swift (1988), Espinosa and Barrios (1991), and Primanis (2000).

Mary Baughman was the presenter for this category and described the technique as it is currently practiced at the Harry Ransom Humanities Research Center (HRHRC) at the University of Texas in Austin.

At the HRHRC, a Japanese paper hinge is usually added on the inside and sometimes on the outside of the joint to supplement the thread tacket. This adds extra support and stability, preventing undesired movement of the board. These hinges can be colored to match the covering materials or end papers to obtain a better cosmetic result. Based on her experience, Mary stressed the structural importance of the internal hinge for the long-term stability of the repair. She also pointed out that tacketing can be easily combined with other attachment methods like cloth hinges and flanges inserted into split boards, both of which provide an additional attachment site to complement the tackets.

Mary often consolidates the old covering leather with Klucel G, to stabilize it as much as possible before carrying out the rest of the repair.

If the spine folds are exposed at all, she sometimes lines the affected area with tissue to consolidate the attachment of the gatherings prior to stabbing the holes through the shoulder. To prevent fragments of text paper bursting out through the spine and becoming detached when the needle is pushed through, she supports the spine with a piece of Plexiglas during this operation.

For Mary's documentation of this technique, outlined on a form she developed to aid compiling board attachment methods for the Book Conservation Catalog, see Appendix 5. For a blank form on which to record your own methods and submit them to Mary for the Book Conservation Catalog, see Appendix 6.

Discussion of Joint Tacketing

Follow-up discussion from the group described variations on ways to finish the tacket without tying a knot. Where it is not considered visually problematic, some people simply fray out the ends of the threads and paste them down onto the inside board face, on top of the pastedown. If the tacket must be less obtrusive on the interior, the ends of the threads can be hidden underneath the pastedowns or covered with paper patches.

Several people expressed a preference for using a needle instead of a drill for making the tacket holes through the shoulder of the book. The material that is pushed aside by the needle can be pressed back into place around the tacket thread, helping to seat it more firmly than when a tunnel is cleared out using a drill. One person suggested taking some of the twist out of the tacketing thread to make it softer and less likely to cut or pull out through the shoulder.

Other comments pointed to a consensus among those present that the shape of the shoulder does not seem to be important for the success of the repair. However, one person warned that tackets can fail when the shoulder is mobile (i.e. when the sections comprising the shoulder of the book open all the way back to the fold, rather than being fixed in place by adhesive and/or linings). There was agreement among some present that boxing after tacketing is an option, perhaps a necessity in some cases.

The time required for the "no-frills" thread tacket is about one-half hour; cosmetic integration of the repair or addition of complementary hinges increases time and cost.

III. Board Slotting

Board slotting as a production repair method for nineteenth-century books with very thin covering material at the joints was originally developed by Christopher Clarkson at the Bodleian Library, using an industrial milling machine. The method involves milling out a slot in the spine edge of the detached board, creating a space into which a new cloth flange extending from the spine is inserted to form the new attachment. The technique is most easily used on books whose spines can be easily lifted to allow attachment of the flange, e.g. those sewn on recessed or flat supports, or those with hollow tubes.

Freiderike Zimmern demonstrated the board slotting technique and a purpose-built machine that she helped develop in conjunction with the German engineering firm Becker Preservotec. The design of the new machine reduces the time required to execute the repair. Using the new machine, the technique requires about fifteen minutes per book, not counting time for color-matching and other cosmetic procedures. Friederike's detailed description of her work on slotting and a list of references on the technique can be found in the *Book and Paper Group Annual*, volume 19 (Zimmern 2000).

Friederike observed that the durability of the repair depends on the fold endurance of the repair cloth and on the stability of the adhesive used to stick the cloth into the slot. She tends to use cotton rather than linen, due to its greater fold endurance. PVA and gelatin are both somewhat stronger than paste for bonding the repair cloth in the slot, but she feels that starch paste forms a more than adequate bond.

Some advantages of this repair are:

- No effect on gilding or other surface decoration

- No damage or interference with original pastedowns or covering leather
- No manipulation of degraded leather
- Slots created with the machine are more exact [as opposed to splitting boards by hand]
- No swelling of the boards at the spine edge after repair, since material is removed to accommodate the new flange.
- Doesn't disrupt evidence of old repairs
- Can be used to stabilize boards that are only partially detached (works best if cords pass to the inside of the boards)

A cosmetic leather overlay can be put on top of the linen hinge if desired.

IV. Japanese Paper Hinge Repair

This type of repair was developed and refined by Don Etherington in the 1980s and is now in widespread use in the U.S. The basic method involves attaching detached boards using two adhered strips of Japanese paper, running the whole length of the joint, one on the inside and one on the outside. The papers may be toned, waxed, or burnished to match the original covering or not, as appropriate. A popular material for the external hinge, especially for general collections, has been moriki paper, which is available off the shelf in a variety of deep, opaque colors. The success of the repair depends on the strength and flexibility of the Japanese tissue and on forming a solid adhesive bond between the repair strips and the original binding parts. Adhesive preferences vary with the individual, but there seems to be general agreement that PVA or PVA mix forms a stronger and more reliable bond between the repair paper and the old leather than starch paste, which also carries the risk of blackening degraded leather. This repair, and numerous others presented during the session, is described by Middleton (1998).

Eric Alstrom was the spokesperson for this technique, and he presented two variants used in his lab, one for tight-back books and another for hollow backs (see Appendices 7 and 8).

Discussion of Japanese Paper Hinge Repair

Discussion brought up the following comments and observations:

Solutions of Klucel G in ethanol used to consolidate friable leather can actually dry out the surface of the leather and cause it to flake. This can in turn exacerbate the problem of separation of the grain layer from the corium beneath. If a repair strip is anchored only to the surface of a poorly-attached grain layer, the repair inevitably fails when the leather splits. To create a firmer point of attachment, some people scrape away the outer layer(s) until they reach material that is more cohesive—either an inner layer of the leather or the surface of the board itself. Others lift

the old leather and insert the outer repair paper underneath. This increases the time required and disrupts the existing binding to a greater degree, but it does address the problem of the repair popping off when the cover is opened.

A Klucel/ethanol solution applied on top of the repair strip before burnishing down with a bone folder can create more slip between the tool and the repair, reducing friction that can cause the grain layer of the leather to split away as the repair is boned down.

Surface texture compatible with older leather and cloth can be imparted to Moriki (and presumably other) papers by boning or pressing through a piece of window screen material. The screen can be shifted around to produce an overall random pattern in lieu of a grid.

Kiwi leather softener, which is sold as an aerosol spray, was mentioned as a successful treatment to increase flexibility of brittle leather. However, little is known about its content and it must be used in a fume hood due to intense solvent vapors. Research into this material was urged.

A mixture of Klucel G and the Leather Conservation Centre's SC6000 acrylic and wax emulsion was offered as an effective consolidant for friable leather.

On the subject of Klucel G dissolved in ethanol used as a consolidant for friable leather, it was generally agreed that despite its widespread use for this purpose, leather coated with Klucel G remains vulnerable both to mechanical damage from external sources and to continued flaking and crumbling from within. While Klucel G provides an unobtrusive, matte, and reasonably stable surface coating, most people felt that it is really not very effective at increasing cohesion between the grain layer of leather and the friable layers beneath. However, in the absence of any acceptable material that is more robust or that penetrates better, a surface application of Klucel G (brushed or sprayed) seems like a benign enough treatment that may provide some benefits, especially for the immediate containment of red-rot.

ADDITIONAL DISCUSSION TOPICS

Some final remarks as the scheduled discussion time was ending included a plea for the documentation and recording of original spine linings that are exposed during treatment. Conservators are often the only people ever to see these interesting historic binding features, and we should take the responsibility of documenting them before they are either removed or concealed again under new repair materials. A fascinating photo archive of manuscript fragments, printer's waste, and decorative papers used for spine linings could eventually be compiled from various conservator's records. Where appropriate, boxing could be considered as a substitute for repair, in order to preserve access to interesting or significant spine linings.

FINAL THOUGHTS

Although a bit pressed for time, the presenters and the rest of the discussion group managed to pack in a great deal of information and to engage in a very free exchange of experiences and ideas. A good indicator of the vitality of the topic was that discussion continued among smaller groups after the scheduled session was over.

The range of ideas presented and discussed was evidence of persistent inventiveness in book conservation. While new techniques and materials are constantly being tried, older, time-tested techniques are also being retried, modified, reexamined and updated. This interweaving of old and new has resulted in an expanded menu of repair options that can be tailored very effectively to the needs of individual artifacts and binding structures, and to the financial and staffing constraints of institutional repair facilities or clients with limited resources.

The fact that numerous current techniques are adaptable to a wide range of materials helps compensate for the sliding scale that exists within library collections for the definition of “rare.” Books that would certainly be in closed rare-book stacks in a small or special library exist in huge numbers in the open stacks of large research libraries. The development of sensitive yet time-efficient repair methods for these books alleviates the potential ethical dilemma posed by the need to treat older or artifactually significant items in a production book repair unit.

Book conservation seems sometimes by nature to involve procedures that are more invasive than would be considered acceptable for most museum artifacts. This is largely due to the fact that despite ongoing projects to digitize library materials, most books are still used, and working parts must continually be replaced in order for a book to serve its function as a textual research tool. The constant search for less invasive repairs, that minimize the visual and structural disruption to historic bindings yet impart enough strength to allow a certain amount of handling, is an ongoing challenge. The ideas presented at the discussion group in Dallas, and those contained in the sources listed in the bibliography (Appendix 1), show that book conservators are rising to meet that challenge.

Compiled and respectfully submitted, with apologies to the participants and presenters for any errors of fact or interpretation. The moderators are grateful to the subject coordinators, the presenters, and to the assembled group for their contributions to this shared body of information.

MARIA FREDERICKS
Head of Conservation
Columbia University Libraries
New York, New York
mf360@columbia.edu

ETHEL HELLMAN
Collections Conservator for Widener Library
Harvard University
Cambridge, Massachusetts
hellman@fas.harvard.edu

APPENDIX 1: BOARD REATTACHMENT: A WORKING SELECTIVE BIBLIOGRAPHY OF TECHNIQUES, STRUCTURES, AND GENERAL REFERENCES

The terms following each reference are brief notations of the categories that define this bibliography: technique, case study, conservation design/structure, and general.

- *Technique* refers to all articles that mention or define particular board reattachments.
- *Case study* is used to differentiate references that utilize a specific technique to perform treatment on a single item or a collection of specific materials.
- *Conservation structure/design* refers to articles that discuss either the history of book structures as they relate to contemporary conservation designs or articles that define new structures for treatment rebinding.
- *General* includes articles that may serve as references discussing structure, history, or materials and which were selected because they relate directly to the topic of board reattachment.

- Aurand, Gudrun. 1996. Combining two minimum intervention techniques in conservation and achieving a functional and aesthetically pleasing result. *Guild of BookWorkers Newsletter* 104. (Available at: <<http://palimpsest.stanford.edu/byorg/gbw/news/gbw104/gbw10411.html>> with additional information about the treatment at: <<http://www.wsulibs.wsu.edu/holland/masc/conservation/boardattachment.html>>.) (technique—multiple)
- Baird, B. J. and M. LeTourneaux. 1994. Treatment 305: A collections conservation approach to rebinding laced-on-board binding structures. *Book and Paper Group Annual* 13:1–4. (conservation structure/design)
- Biondi, R. 1987. A different method of putting boards back on a book block. *Restaurator* 17:9–10. (technique—sewing support extension)
- Biondi, R. 1989. An alternative method for reattachment to a bookblock. *Bookbinder* 3:37–38. (technique—joint tacket)
- BookLab, Inc. n.d. Collection maintenance repair for publisher’s cased books. BookLab BookNote 3. (collection repair)
- BookLab, Inc. n.d. A sewn boards binding for library and limited edition work. BookLab Booknote 8. (design/structure)
- BookLab, Inc. n.d. Historical prototypes for conservation

- binding. BookLab Booknote 9. (conservation structure/design)
- Brock, D. 2001. Board reattachment. *Abbey Newsletter* 24:97. (technique—fabric flange)
- Brockman, J. 2000. Rigid flexibility, the concave spine binding structure. *Bookbinder* 14:65–72. (binding design—concave spine attached with flange)
- Brockman, J. 1995. Rethinking rigid spine. *New Bookbinder* 15:12–17. (binding design—concave spine attached with flange)
- Brockman, J. 1991. Rebacking—an alternative approach. *New Bookbinder* 11:36–46. (case study—reback with split boards)
- Bull, W. 1988. A photograph album. *Bookbinder* 2:51–62. (case study—split boards)
- Cains, A. 1994. In situ treatment of manuscripts and printed books in Trinity College, Dublin. In *Conservation and preservation in small libraries*, eds. N. Hadgraft and K. Swift. Cambridge: Parker Library Publications. 127–131. (technique—joint tacket)
- Cains, A. 1976. Techniques of preservation based on early binding methods and materials. *Paper Conservator* 1:2–8. (technique—multiple)
- Cains, A. 1983. Repair treatments for vellum manuscripts. *Paper Conservator* 7:15–23. (brief reference of binding/board reattachment)
- Cains, A. 1981. Book conservation workshop manual, part one: preparation of the book for conservation and repair. *New Bookbinder* 1:11–25. (general theory and technique)
- Cains, A. 1985. Book conservation workshop manual, part five: continuation of specification and observation. *New Bookbinder*, 5:27–55. (general theory, technique and repair)
- Cains, A., and K. Swift, eds. 1988. *Preserving our printed heritage: the Long Room project at Trinity College Dublin*. Dublin: Trinity College. (general theory, technique and repair)
- Clarkson, C. 1992. Board slotting—a new technique for re-attaching bookboards. In *Conference papers Manchester*, ed. S. Fairbrass. London: Institute for Paper Conservation. 158–164. (technique—board slotting)
- Clarkson, C. 1982. *Limp vellum binding and its potential as a conservation type structure for the rebinding of early printed books: a break with 19th and 20th century rebinding attitudes and practices*. Hitchin, Hertfordshire, England: The Red Gull Press. (conservation structure)
- Clements, J. and K. Keus. 1997. A board reattachment, circa 1560. *New Bookbinder* 17:17–18. (case study—vellum flange)
- Cockerell, D. 1991. *Bookbinding and the care of books*. New York: Lyons & Burford Publishers. (general theory – structure, design and repair techniques)
- Cockerell, S. 1958. *The repairing of books*. London: Sheppard Press. (general theory, structure and repair)
- Conn, D. 1996. Board reattachment for circulating collections: a feasibility study. *Book and Paper Group Annual* 15:29–40. (study comparing the strength of board reattachment techniques)
- Conroy, T. 1987. The movement of the book spine. *Book and Paper Group Annual* 6:1–30. (general theory and structure)
- Cunha, G. M., and D. G. Cunha. 1972. *A manual and bibliography of the care, repair and restoration of library materials*, 2nd edition. Metuchen, NJ: Scarecrow Press. (general theory, repair technique and bibliography)
- Espinosa, R., and P. Barrios. 1991. Joint tacketing: a method of board reattachment. *Book and Paper Group Annual* 10:78–83. (technique—joint tacket)
- Espinosa, R. 1983. Specifications for a hard-board laced-in conservation binding. *Book and Paper Group Annual* 2: 25–49. (conservation design/structure)
- Espinosa, R. 1993. The limp vellum binding: a modification. *New Bookbinder* 13:27–38. (conservation design/structure)
- Etherington, D. 1995. Japanese paper hinge repair, for loose boards on leather books. *Abbey Newsletter* 19:48–49 (technique—Japanese tissue)
- Foot, M. M. 1993. *Studies in the history of bookbinding*. England: Scolar Press. (general theory—structure, design and history)
- Fredericks, M. 1992. Recent trends in book conservation and library collections care. *Journal of the American Institute for Conservation* 31:95–101. (technique—multiple; brief descriptions)
- Frost, G. 1982. Historical paper case binding and conservation rebinding. *New Bookbinder* 2:64–67. (conservation design/structure)
- Grandinette, M., and R. Silverman. 1995. New book repair methods in research libraries. *Abbey Newsletter* 19:29–33. (technique—multiple)
- Greenfield, J. 1983. *Books: Their care and repair*. New York: The H.W. Wilson Co. (general repair)
- Greenfield, J. 1989. *The care of fine books*. Cowley, Oxfordshire: Conservation Resources (UK) Ltd. (general theory)
- Hadgraft, N. and K. Swift, eds. 1994. *Conservation and preservation in small libraries*. Cambridge: Parker Library Publications. (general theory and repair techniques)
- Johnson, A. W. 1989. *The practical guide to book and paper conservation*. London: Thames and Hudson Ltd. (general theory, binding and repair techniques; editions in both English and Spanish)
- Jones, M. 1992. *Collection conservation treatment: a resource manual for program development and conservation technician training* Berkeley, CA: Association of Research Libraries. (general collection repair techniques, compiled from over twenty U.S. preservation departments)
- Kellar, S. 1988. Case history: the conservation of a chained

- binding. *Book and Paper Group Annual* 7:23–27. (case study)
- Kellar, S., and B. R. Levy. 1996. Exploring medieval board attachment and joint reinforcement: two methods that provide superior strength, flexibility and permanence. In *International conference on conservation and restoration of archive and library materials, Erice*. Rome: Istituto Centrale per la Patologia del Libro. 427–435. (technique)
- Langwell, W. H. 1976. Hard wearing hand bound books. *Designer Bookbinders Review* 8:5–7. (technique—nylon cords)
- Lavender, K., and S. Stockton. 1992. *Book repair: A how-to-do-it manual for librarians*. New York: Neal-Schuman. (general repair and collection care)
- Levy, B. R. 1987. *Rebacking leather bound books*. Guild of Book Workers, videocassette. (technique—reback)
- Levy, B. R. 1991. The restoration rebinding of *Speculum Naturale*. *Book and Paper Group Annual* 6:79–84. (technique—flange)
- Lindsey, J. 1991. A limp vellum binding sewn on alum-tawed thongs. *New Bookbinder* 11:3–19 (conservation design/structure)
- Mahon, G. 1998. Strength in the joints, flexibility and flow: the binding structure known as ‘K-118’. *Bookbinder* 12:11–15. (technique - flange)
- Maver, I. 1990. Conserving the records of the first Astronomer Royal. *Paper Conservator* 14:31–45. (case study, collection)
- Middleton, B. C. 1996. *A history of English craft bookbinding technique*, 4th revised edition. New Castle, Delaware: Oak Knoll Press. (general theory, structure and design)
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- Middleton, B. C. 1998. *The restoration of leather bindings, third edition*. New Castle, DE, and London: Oak Knoll Press and The British Library. (general theory and techniques—revised and expanded)
- Mitchell, J. 1991. Restoration of leather bindings. *Bookbinder* 5:52–56. (technique—whipstitch endsheet in joint with flange)
- Morrow, C. C. and C. Dyal. 1986. *Conservation treatment procedures: a manual of step-by-step procedures for the maintenance and repair of library materials*, 2nd edition. Littleton, Colorado: Libraries Unlimited, Inc. (general repair and collection care, excellent glossary and reference list for library application)
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Suggestions or additions to this list are welcome.

RENEE E. DEVILLE
 Conservator in Private Practice
 New Orleans, Louisiana
 devillere@excite.com

APPENDIX 2: THE INSIDE CLOTH HINGE

A repair technique suitable for books with a tight joint and hollow-back structure, bound in either full or partial leather, typical of the late nineteenth century. It provides a connection between the text block and the board on the inside of the joint, similar to an endpaper connection. When extra strength is needed, it may be combined with other techniques that provide a connection on the outside of the joint, such as a traditional covering-in material, or a connection in the middle of the joint, such as a sewing support or extended spine liner. Even when used alone, it can be a relatively strong, quick, inexpensive, non-invasive repair method. The steps are as follows:

Remove the old board, and either remove the hollow tube spine entirely, or slit and open it on the side to be repaired.

Select a book cloth that matches the color of the covering-in material or that complements the endpapers (alternatively, size and color one to match). A paste-sized, plain white cloth of an appropriate weight may also be used. Cut a hinge the height of the text block (or a little longer) and roughly one inch wide, depending on the size of the book.

Tip the hinge, face side down, onto the top of the shoulder of the text block with a narrow bead of quick drying adhesive. Stab through the shoulder with an awl at regular intervals (roughly one-quarter of an inch, marked off with dividers) into a cork that is used to support the outside of the spine.

Sew the hinge on through the stabbed holes using a harness stitch (a saddle stitch). Start from one end, using double needles to minimize the stress on the hinge (which at this point can also incorporate an endpaper or a text section). Avoid overcasting and whipstitching, which leave bumps on the top of the shoulder.

Fold the sewn-on hinge back up on itself and adhere it to the shoulder. When dry, fold it back down on itself again (onto the text block) with the fold of the hinge carefully parallel to the top of the shoulder. Crease the hinge with a bone folder at the base of the shoulder to create a seat for the board.

Glue up the spine edge of the old board with a bead of adhesive and place it in position on top of the hinge (which lies on top of the text block) with the squares carefully aligned. Tie up the book firmly with tape or an elastic bandage to apply pressure to the joint area.

When it is dry, the board can be opened up. It will hinge and pivot properly on the top of the shoulder. The remaining part of the cloth hinge can then either be neatly trimmed down to approximately one-quarter to one-half of an inch and glued directly down onto the pastedown on the inside of the board, or alternatively can be worked in under the pastedown. That decision generally depends on whether or not it is possible—or worthwhile—to try to lift the pastedown. Either way, the board will be quite securely attached.

At that point, various esthetic options are possible. One is to cover the inside of the cloth hinge with paper to improve the visual end result. In the case of a decorated endpaper, the paper covered inside hinge can be painted to match the pattern, or in the case of a plain colored endpaper, can be colored or camouflaged with chalk or pastels. Similarly on the outside of the cover, any small gaps at the joint can be camouflaged with old leather scrapings pasted into the gap, as suggested by Bernard Middleton.

The entire procedure rarely takes more than thirty minutes per board. Reattaching two boards and replacing the spine with a new paper or cloth hollow tube can usually be accomplished in less than an hour of bench time.

The process is not a new one. It is well described and diagrammed in Bernard Middleton's book, *The Restoration of Leather Bindings* (pp 94-99). There it is called an "overcast cloth joint" and is combined with additional attachment techniques. For large, heavy books such as lectern bibles, every possible device—inside, outside, and middle connections—needs to be used to gain enough strength over the joint area to reattach the boards. But in many situations with smaller or lighter weight books, only one or two types of connections may suffice. An inside cloth hinge that makes no attempt to disturb the thin, brittle, degraded covering-in material on the outside may prove to be a good choice. It is not a restoration, but a simple, honest, sympathetic repair.

BETSY PALMER ELDRIDGE

Independent Conservator of Books, Manuscripts and Archival Materials
Toronto, Ontario
Canada
bpeldridge@aol.com

APPENDIX 3: PLEATED PAPER HINGE

This technique can be used only on books that have a substantial shoulder and a firm and secure text block. It is most useful for tight-back bindings whose spines cannot be removed easily.

1. Completely sever any remaining connection between boards and text block. Clean off the spine edges of boards and trim off any cord remnants. Carefully lift the board leather for an inch or so from the edge of the boards. (If the book is half- or quarter-leather; the board covering should be lifted to the edge of the leather).
2. Remove the first fly leaf if it is tipped on. (If it is sewn on, a new flyleaf can be added later.)
3. Use sized Japanese tissue to form the hinge. Moriki works well and often can be color matched to the bind-

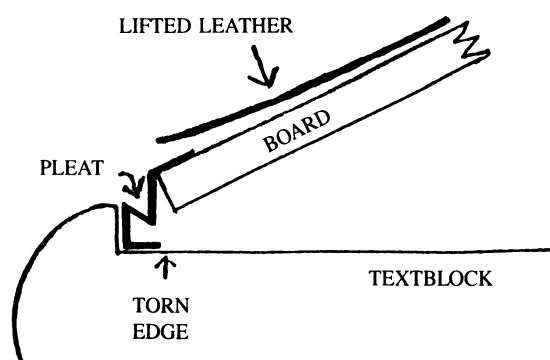


Fig. 1. Pleated paper hinge

- ing without dyeing. Paper can be sized with methyl cellulose or with PVA/methyl cellulose mix. If coloring is required, acrylic paint mixed into the methyl cellulose works well. (Very little of the hinge will be visible on the outside, so coloring may not be necessary.)
4. Cut the paper to the exact height of the boards and about three inches wide. Tear one edge with a water pen. Crease sharply (valley fold) along the length about one-quarter inch in from the torn edge (fig. 1).
 5. Paste up the one-quarter inch area and the shoulder area of the book, and attach the hinge to the text block and the shoulder. Rub well until dry. The hinge should be centered top to bottom, matching up exactly with the spine. The excess paper at the head and tail of the text block will be trimmed off later.
 6. Crease the paper sharply at the top of the shoulder and fold it down along the shoulder to the text block.
 7. Crease sharply at the point and bring the rest of the paper back up to the top of the shoulder.
 8. Crease sharply once again at the top of the shoulder. Now you have formed a pleat.
 9. From the last crease, measure the hinge to the desired width and cut off the excess paper.
 10. Glue out the exposed board area and the spine edge of the board. Attach the hinge, pushing the board snugly back into the shoulder (make sure the pleat is between the board edge and the shoulder).
 11. Place polyester film between the lifted leather and the paper hinge to prevent the leather from attaching to the board at this stage, and also between the text block and the board. Give the book a firm nip in the press in this position.
 12. Remove the book and gently pull the board forward, opening the pleat. Glue up the interior of the pleat with mix and press the board snugly into the shoulder area. Bandage the book firmly (first protecting the spine area with waxed paper) with an elastic bandage. Allow to dry completely and remove the bandage.
 13. Check inside to make sure the hinge is firmly attached along the edge of the board.
 14. Tip or hinge on the old flyleaf (or a new one).
 15. Trim off the excess paper at head and tail of the text block.
 16. Glue down the leather on the cover.
 17. If necessary, touch up the color of the hinge area inside and outside.
 18. Repeat the entire procedure for the second board.

Remember that the board should be positioned before gluing up by using a right angle to assure proper alignment of the front and back boards.

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ELAINE REIDY SCHLEFER
Head, Preservation Department
New York Academy of Medicine
New York, New York
eschlefer@nyam.org

APPENDIX 4: SPLIT LINEN FLANGE

This is a technique I have been using at Stanford for the past two years to reattach the boards of leather-covered tight-backed books, sewn on raised bands. It involves lifting the spine leather, board leather, and pastedowns at the head and tail only.

The steps are as follows:

- At the head and tail spine panels, make a cut through the leather near the base of the band, going from shoulder to shoulder.
- Lift the spine panels
- Paste wash the spine to remove any deteriorated spine linings and adhesive.
- Paste a light Japanese paper lining on the spine.
- When the Japanese paper lining is dry, secure loose or broken endbands with thread.
- Adhere with PVA an airplane linen or cotton lining. The cloth should be cut on the bias and extend one-half to one inch beyond the shoulders and go from near the base of the band to the end of the spine. If the spine has endbands, extend the cloth onto the endbands to help anchor them a little more strongly to the text block. It is important to work the PVA well into the cloth, as the strength of this mend depends in part upon a strong bond between the cloth and the text spine. The cloth

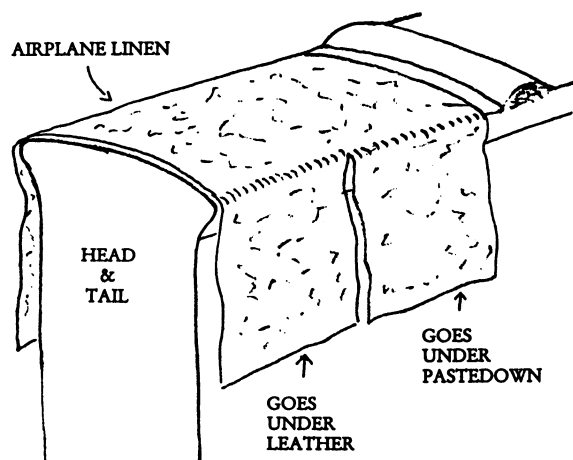


Fig. 2. Split linen flange

can be dampened slightly during the boning to achieve greater adhesion.

- Determine now if further spine linings are needed to support the spine when the book is opened.
- Lift the leather and pastedowns of the boards at the head and tail.
- Cut the extensions of the linen lining in half and fray out the edges.
- Place the boards in position on the book. Using PVA, adhere the outer half of the extensions to the boards, going underneath the lifted leather. Allow to dry.
- Open the boards and glue (PVA) the inner half of the extensions to the boards, going underneath the lifted pastedowns. When dry, readhere the pastedowns.
- Before gluing down the lifted leather, adhere a wet-torn strip of Japanese paper over the linen showing in the joint. I usually use a heavyweight Uda. This strip should begin slightly underneath the lifted board leather and extend a little way onto the spine. This will hide the weave of the linen and add strength to the joint. Color the Japanese paper to match the leather with artist's acrylics mixed in a little methyl cellulose. Mixing the acrylics in methyl cellulose slows down their quick drying time and makes their application easier.
- Readhere the lifted board leather and spine panels.
- Open the boards and paste a strip of suitable weight Japanese paper in the hinge area, running from head to tail and from the base of the shoulder to the top of the board. This adds a little to the strength of the attachment and gives a neater appearance to the inside of the covers. The narrow line of paper that shows in the joint when the boards are closed can be colored with the acrylic paint/methyl cellulose mixture to match the leather.

I've successfully used this method of board reattachment on large (quarto) and small books, with a few variations depending upon the weight and size of the book. While this technique doesn't entirely replace leather rebacking in my conservation work, I'm finding that I use it more often.

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DAVID BROCK
Rare Book Conservator
Stanford University
Palo Alto, California
dbrock@sulmail.stanford.edu

APPENDIX 5: JOINT TACKETING (PAGES 74-78)

A description of joint tacketing as an alternative to rebacking was distributed during the discussion session,

using a standard format drafted for the Book Conservation Catalog (see also Appendix 6).

MARY C. BAUGHMAN
Book Conservator
Harry Ransom Humanities Research Center,
The University of Texas at Austin
Austin, Texas
m.c.boffman@mail.utexas.edu

ERIC ALSTROM
Collections Conservator
Baker Library, Dartmouth College
Hanover, New Hampshire
eric.c.alstrom@dartmouth.edu

APPENDIX 6: ALTERNATIVES TO REBACKING—
BLANK FORM (PAGES 79–81)

The Board Reattachment: Alternatives to Rebacking session at the AIC meeting in Dallas provided an opportunity to present this form and an example of a treatment procedure that can be described using the form. I developed the form, in consultation with Chela Metzger, in the hope that the form will be used as a tool to compile a section for the AIC Book Conservation Catalog. Since the meeting I have received two responses from conservators who used the form to describe a Japanese paper hinge repair (Kristen St. John) and cloth hinge/spine lining repair (David Brock). I welcome the interest of other conservators and will be happy to send an electronic version of the form to anyone interested in this project.

MARY BAUGHMAN
Book Conservator
Harry Ransom Humanities Research Center,
The University of Texas at Austin
Austin, Texas
m.c.boffman@mail.utexas.edu

CONSUELA METZGER
Instructor,
Graduate School of Library and Information Science
Preservation/Conservation Studies Program,
The University of Texas at Austin
Austin, Texas
chela@gslis.utexas.edu

APPENDIX 7: JAPANESE PAPER HINGE REPAIR
FOR TIGHTBACK LEATHER VOLUMES (PAGES
82–83)

APPENDIX 8: JAPANESE PAPER HINGE REPAIR
FOR HOLLOWBACK LEATHER VOLUMES (PAGES
84–86)

Instruction sheets developed for use at the Baker Library, Dartmouth College, were distributed at the discussion session.

Name of Technique: joint tacket (hereafter shortened to "tacket")

Purpose: used to reattach board(s) to a text block

Brief description and features of the technique

This technique is for books that have been backed. Loops of thread are used to attach the board(s). Each loop of thread is inserted through the shoulder of the text block and through the gutter edge of the board. The threads are tied on the inside of the board. A guard is adhered along the gutter edge. The guard secures the thread and prevents movement of the board. The sewing of the text block must be secure before tacket attachment. This technique is not appropriate for text blocks with brittle paper, or with very small shoulders. It is not suitable for books with thin or brittle boards.

Potential alterations or damage to the book

Will this repair obscure structural features of the book? e.g. lacing-in pattern, features of sewing?

What damage might occur if the repair fails?

External factors to consider

Is there any reason to leave the book in its present condition?

What level of use will this book have in the future?

Is the book in a circulating or non-circulating collection?

Is the book in an open or closed stack library?

Will the book be kept in a box?

Will the repair be obvious?

Would an obvious repair create aesthetic problems if the book were to be exhibited, or for other reasons?

What are the ethical considerations about changes to the structure?

Features to record, observe, consider

- Weight and dimensions of text block
- Movement needs of the text block, particularly at the shoulder
- Depth of shoulder
- Security of the sewing or leaf attachment throughout the text block
- Condition of the leaves of the text block
- Security of the end leaf attachment
- Thickness of boards, materials used to construct boards
- Condition of boards, condition of board covering material

Prepared by

Mary Baughman, Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin, Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@glis.utexas.edu

Procedure

Removal of previous repairs or restorations

- Old repairs at the hinge or joint that might interfere with the tacket treatment may be removed.

Consolidation of materials

- Powdery leather covers may be consolidated with a solution such as Klucel-G.

Preparing the text block

- Reattach and repair loose gatherings at the front and back of the text block so that the attachment of the tackets will be secure. If only the first and last gatherings are loose, the tackets can help to secure these gatherings. Pierce the spine from the base of the shoulder through the backs of the gatherings. Insert the thread. The number and spacing of tacket threads is determined by the dimensions of the text block.
- The bump-in, bump-out question; both methods work.
 - Bump-in - The loop of the thread exits the hole on the spine (as shown in the illustration by Mary Baughman). The loop is pulled up to the shoulder and the two ends of the thread go through it to anchor it at the shoulder. The loop is under the threads at the point where they go over the shoulder.
 - Bump-out - The two ends of the thread exit the hole on the spine (as shown in the illustration by Olivia Primanis). With the bump-out method, the loop is on the outside of the threads at the point where they go over the shoulder. In theory this prevents the loop from sliding back across the spine.

Preparing the spine and the back of the text block

- Tight back binding - If the tackets are allowed to show on the outside of the covering material, it is not necessary to prepare the spine. For a tight-back book with raised sewing supports or raised bands, position the tackets near the supports, but avoid damaging or obscuring the sewing of the text block, and the areas where supports are attached to the boards. After the board is reattached, color the tacket thread to make it less visible on the spine.
- Tight back binding - To conceal the tackets on the outside of the spine covering material, lift small areas of the spine covering material at the tacket sites.
- Hollow back or case binding - Release at least one edge of the spine covering along the shoulder. The text block back can be lined with paper, cloth, or both before the tacket holes are pierced. For more strength and a smoother spine, the back can also be lined after the tackets are inserted. The effect of multiple linings on the "openability" of the text block must be considered.

Prepared by

Mary Baughman , Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin ,Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gslis.utexas.edu

Preparing the board and attaching the joint tacket threads

- No board preparation is necessary if the tacket threads will be tied on top of the pastedowns. Pierce the board through the pastedown. Each tacket thread site has a v-shaped channel. Both threads in a pair enter the hole at the gutter edge, then each thread branches to an exit hole. Knot the thread ends, soften the knot with paste, hit the knot with a backing hammer to diminish the knot lump. After the tacket threads are frayed out and adhered, they can be left visible or concealed with paper patches. For a small or lightweight book the threads can be frayed out and pasted down without the knot.

options -

- Lift the pastedown along the gutter edge of the board so that the tackets can be concealed under the pastedown.
- Lift only small areas of the pastedown and a few layers of the board where the tackets will be tied. Readhere these small areas after tying the tackets. The boards must be fairly thick for this technique to be successful

Inner hinge - guard

- Adhere a Japanese paper guard along the inner hinge, after the tacket threads are inserted and adhered to the boards. For large books, use a cloth guard.
- For a more aesthetically pleasing repair, two paper guards can be used: Japanese paper for strength; and over it, a paper that has been colored to blend with the endpaper.

Outer joint attachment

- Strips of leather, cloth, or paper can be adhered over the joint after the tacket threads are inserted and adhered to the boards.

Treatment variations

- The joint tacket can be used with stab joint endpaper and/or with a hinge under the pastedown.
- It can be used with other board reattachment techniques, such as a split hinge.

Prepared by

Mary Baughman , Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin ,Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gslis.utexas.edu

Tips

- Consider carefully the number, spacing, and location of the tacket threads. For example, avoid insect damaged areas of the text block spine, avoid inscriptions on the pastedown, and avoid the sewing supports and the sites where they are attached to the boards.
- When piercing the boards or spine, use a piece of Plexiglas to push against. This prevents bursting through the board or spine. You can see the needle as it begins to exit, and you won't poke your finger.
- Protect the free endpaper with a thin piece of card while piercing the shoulder.
- Stagger the depth of the tackets as they pierce the text block by changing the angle of the needle as it enters the shoulder. This lessens the possibility that a group of gatherings will be pulled off the text block.
- Be sure the spine tacket locations precisely match the board tacket locations.
- Before tying the threads, determine the desired angle of board opening and construct a support for the board. Be sure that the edge of the board and the edge of the shoulder are in alignment.
- Use long threads so that a thread that is already inserted through the board doesn't pull out while you're inserting the next one.

Troubleshooting

- Problem: The board crumbles or flakes apart during piercing.
Solution: Consolidate the board with paste, cover the tacket thread with paste before pulling it through the tacket holes in the board. OR Use another technique to reattach the board.
- Problem: The tacket pulls through the edge of the board.
Solution: Paste the board back together. Use a lower angle when inserting the needle in order to make the exit holes farther away from the edge of the board. Widen the distance between each hole in a pair of exit holes.
- Problem: The tacket pulls through the shoulder.
Solution: Use a lower angle to make a hole farther into the spine.
- Problem: After the guard dries, the reattached board is not properly aligned.
Solution: Lift half of the guard - either along the board edge or along the shoulder. Reposition the board and readhere the guard. If the tacket threads aren't loose enough to do this, you will have to repierce the holes.

Prepared by

Mary Baughman , Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin ,Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gslis.utexas.edu

Materials

thread - linen thread in various weights, depending on the size of the book. When the boards are reattached and the thread is knotted, it will be easier to fray out and paste an un-waxed thread.

Japanese paper - not toned or toned with acrylic, watercolor, pastel, etc
paste - to secure thread to the spine; boards and text block to the hinge

Tools

sewing needle mounted in a handle, etching needle, dissecting needle, Dremel tool, or lightweight drill with precise speed control for piercing or drilling tacket thread holes. If power tools are used it may be necessary to anchor the book or boards with clamps or another device during drilling.

small piece of Plexiglas or card to push against when piercing or drilling

small pliers to extract tight needles

sewing needle - size varies with the size of the text block and tacket holes.

dental floss threader for inserting the tacket threads

backing hammer for flattening knots and consolidating boards

syringe filled with paste to insert paste inside the tacket holes

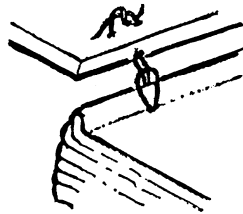
Diagrams

Illustration by Olivia Primanis

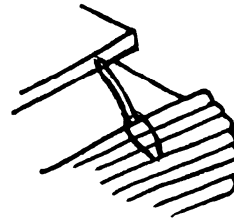


Illustration by Mary Baughman

Case studies

This technique has been used on many books at the Harry Ransom Humanities Research Center. It works well on books of all sizes. There must be at least a little backing shoulder for the technique to work well. The use of a hinge to secure the board attachment is an integral part of the repair. For heavy books, more tackets and thicker thread are used.

It can be a very quick repair if little effort is made to conceal it. It can also be used in situations that call for an aesthetically pleasing or concealed repair. It does not obscure features of historic binding structures. The joint tacket repair is relatively easy to master and relatively easy to reverse with little damage to the book.

This text of the presentation given by Mary Baughman at the AIC meeting in Dallas, was revised in Oct. 2001. Thanks to Gary Frost, Leslie Long, and Olivia Primanis for their comments.

Prepared by

Mary Baughman, Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin, Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gslis.utexas.edu

AIC Book and Paper Group
Board Reattachment

Alternatives to Rebacking - Blank Form

22 Oct, 2001 1

Name of Technique:

Purpose: used to reattach board(s) to a text block

Brief description and features of the technique:

Potential alterations or damage to the book:

Will this repair obscure structural features of the book? e.g. lacing-in pattern, features of sewing

What damage might occur if the repair fails?

External factors to consider:

Is there any reason to leave the book in its present condition?

What level of use will this book have in the future?

Is the book in a circulating or non-circulating collection?

Is the book in an open or closed stack library?

Will the book be kept in a box?

Will the repair be obvious?

Would an obvious repair create aesthetic problems if the book were to be exhibited, or for other reasons?

What are the ethical considerations about changes to the structure?

Features to record, observe, consider:

- Weight and dimensions of text block
- Movement needs of the text block, particularly at the shoulder
- Depth of shoulder
- Security of the leaf attachment throughout the text block
- Condition of the leaves of the text block
- Security of the end leaf attachment
- Thickness of boards, materials used to construct boards
- Condition of boards, condition of board covering material

Prepared by

Mary Baughman , Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin, Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gsliis.utexas.edu

AIC Book and Paper Group
Board Reattachment

Alternatives to Rebacking - Blank Form

22 Oct, 2001 2

Procedure

Removal of previous repairs or restorations

Consolidation of materials

Preparing the text block

Preparing the spine and the back of the text block

Preparing the board and attaching the joint tacket threads

Inner hinge - paper or cloth guard

Outer joint

Treatment variations

Tips

Prepared by
Mary Baughman , Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin, Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gslis.utexas.edu

AIC Book and Paper Group
Board Reattachment

Alternatives to Rebacking - Blank Form

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This text of the presentation given by Mary Baughman at the AIC meeting in Dallas, was revised in Oct. 2001.
Thanks to Gary Frost, Leslie Long, and Olivia Primanis for their comments.

Prepared by
Mary Baughman , Book Conservator
The University of Texas at Austin
Harry Ransom Humanities Research Center
P. O. Drawer 7219
Austin, Texas 78713-7219
(512) 471-9117 office (512) 471-7930 – fax
m.c.boffman@mail.utexas.edu

and

Consuela(Chela) Metzger, Instructor
The University of Texas at Austin
Graduate School of Library and Information Science
Preservation/Conservation Studies Program
Austin, TX 78712
(512) 471-8293-office (512) 471-8289-fax
chela@gslis.utexas.edu

Japanese Paper Hinge Repair for Tightback Leather Volumes

Definition: This technique is used for reattaching boards on tightback-style leather bindings. The leather should be in good condition and not exhibit red rot. Books should be no larger than 10" in height and 1 1/2" in thickness.

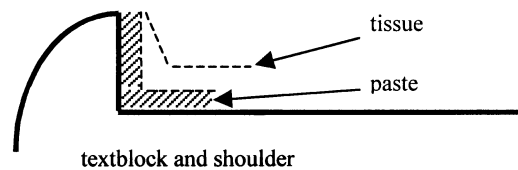
The boards are reattached with moriki solid dyed Japanese paper. The board reattachment is built with two layers of tissue, one on the outside joint and one on the inside hinge, which forms a durable and strong attachment. Headcaps and board edges and corners can also be rebuilt using moriki paper.

These instructions are adapted from Don Etherington's technique of tissue hinge repair.

Materials:	PVA/wheat paste mixture	Tools:	bone folder
	wheat paste		straight edge/ruler
	Klucel-G		scissors
	Moriki solid-dyed Japanese paper		glue brush
	Mulberry or other heavy Japanese paper		brush for Klucel-G
	SC6000 Wax or Renaissance Wax		soft cloth for wax
			waste paper

Steps:

1. If covers are not totally detached, remove them carefully. Loose endsheets should also be removed. Clean the spine edges of both front and back boards to remove paper and leather which may hang over the edge.
2. Treat leather with Klucel-G to consolidate leather on boards and spine. This will ensure that the adhesive will adhere the moriki strip to the leather. If the leather exhibits signs of red rot, the volume should be rebound, since the Klucel-G will not consolidate the leather. Let dry completely.
3. Attach a strip of feather torn moriki (about 1" wide, or wide enough to act as an internal hinge, see *Step 4* on how to feather tear) to the inside hinge (both front and back) with wheat paste and fold at shoulder. This will allow for the thickness of the inside hinge when reattaching board. The moriki should match or compliment the color of the endpapers if possible. Mulberry paper can be used for white/off-white endpapers. If the endsheet is loose on the textblock, the moriki hinge can be pasted on under the tipped on endsheet to make a cleaner looking repair. This acts as a tissue guard would after the repair is complete.



4. Choose a color of moriki to match leather. Feather tear a strip 1/4" to 5/16" wide, extending 1/2" longer on either side of the boards.
Note: To feather tear Japanese papers, use the pointed side of a bone folder dipped in water (preferably where brushes have been standing and has a small amount of PVA in it) and run the folder along a straight-edge over the moriki. Make sure fibers are dampened along whole area to be torn. If the moriki is to be dyed or stained, it can be done at this point or after it is attached at the joint (Step 4.)
5. Position boards with weight on top. Make sure boards are even in relation to each other as well as with the textblock. The tissue hinge is in place, folded up along the shoulder (between the shoulder of the textblock and the edge of the board). Paste-up moriki strip with PVA/paste mixture and attach along joint, with the 1/2" extra at head and tail. Press down lightly with the side of your hand so that the paper sinks into all the undulations and across the edges of the raised bands (if present). Use fingers to lightly spread out feathered edge of tissue to blend with leather. Let dry thoroughly.
6. Coat moriki strip with Klucel-G along whole surface (including the turn-ins) to consolidate paper fibers. Let dry.
7. Turn in strip at head and tail. Cut tissue so that the edge of the tissue will line up with the pastedown endpaper. If it is left longer, it will be mostly covered by the tissue guard on the inside, but not necessarily. Let dry with cover propped open slightly before proceeding to other cover.
8. Finish attaching moriki (or mulberry) tissue guard on inside. The tissue guard might have to be trimmed. Use feather tear where appropriate.
9. Apply a thin coat of wax (Renaissance for matte finish books, SC6000 for glossy leather) with a clean soft cloth and buff. This makes the tissue appear much more leather like. Before the wax is applied, moriki can be dyed with acrylics to better match the leather.
10. For corners and edges of the board where the leather is missing, use small pieces of feather torn moriki (adhered with mixture) to cover the area. Apply Klucel G, and after dry, coat with wax.

Inspect work: Make sure the tissue is firmly attached to the leather and not pulling away. Boards should open naturally and be properly aligned with textblock. Wax should be buffed to remove excess.

Japanese Paper Hinge Repair for Hollowback Leather Volumes

Definition: This technique is used for reattaching spines and boards on hollowback-style leather bindings. The leather should be in good condition and not exhibit red rot. Books should be no larger than 10" in height and 1 1/2" in thickness.

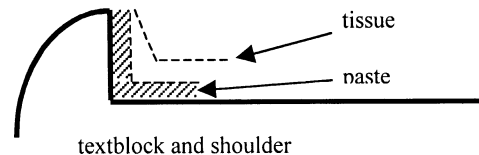
The spine is rebuilt with a new hollowback and a spine of moriki solid dyed Japanese paper. The board reattachment is built with two layers of tissue, one on the outside joint and one on the inside hinge, which forms a durable and strong attachment. The original spine can be reattached or a new printed label can be adhered. Board edges and corners can also be rebuilt using moriki paper.

These instructions are adapted from Don Etherington's technique of tissue hinge repair.

Materials:	PVA	Tools:	bone folder
	wheat paste		straight edge/ruler
	PVA/wheat paste mixture		scissors
	Klucel-G		glue brush
	Moriki solid-dyed Japanese paper		brush for Klucel-G
	Mulberry or other heavy Japanese paper		ace bandage
	Cotton blotter or .010" folder stock		soft cloth for waxing
	SC6000 Wax or Renaissance Wax		waste paper

Steps:

1. If covers and spine are not totally detached, remove them carefully. Clean the spine edges of both front and back boards to remove paper and leather which may hang over the edge.
2. Remove any paper linings from back of spine of cover. It is best not to wet or dampen the linings, since water can darken and stiffen the leather.
3. Treat all leather surfaces of the boards and spine, including reverse side, with Klucel-G to consolidate leather. This will ensure that the adhesive will adhere the moriki strip to the leather. If the leather exhibits signs of red rot, the volume should be rebound, since the Klucel-G will not consolidate the leather. Let dry completely.
4. Clean textblock spine of all paper and cloth linings and adhesives. Mechanically tear or scrape what is loose. Paste wash spine to remove all remaining linings and adhesives. Then using wheat paste, adhere a piece of Japanese paper to act as a barrier to the hollowback.
5. Attach a strip of feather torn moriki (about 1" wide, or wide enough to act as an internal hinge, see *Step 8* on how to feather tear) to the inside hinge (both front and back) with wheat paste



and fold at shoulder (see illustration). This will allow for the thickness of the inside hinge when reattaching board. The moriki should match or compliment the color of the endpapers if possible. Mulberry paper can be used for white/off-white endpapers. If the endsheet is loose on the textblock, the moriki hinge can be pasted on under the tipped on endsheet to make a cleaner looking repair. This acts as a tissue guard would after the repair is complete.

6. Attach two on, one off hollow back to spine of textblock using PVA. Cut a piece of 80# paper to height of textblock and at least four times the width of the textblock. Adhere paper to spine of textblock, lining up one end even to shoulder of spine. Fold over two times even to width of spine, then fold over one more time, just shy of width of spine and cut along this last fold. Back fold second fold and adhere to first layer of hollowback. Rub down and let dry thoroughly. The result is two layers attached to spine and one layer which springs away from spine.
7. Cut a spine stiffener from cotton blotter or .010" folder stock. If using blotter, pair the edges on one side of the blotter only at a 60° angle. Use a leather paring knife or a scalpel.

H = height of covers

W = width of hollowback

Note: The cotton blotter molds better to the shape of the spine. Also, the blotter can be paired easily to help soften the sharp edges. Pairing is recommended to help blend the repair into the existing structure and to help the longevity of the repair itself.

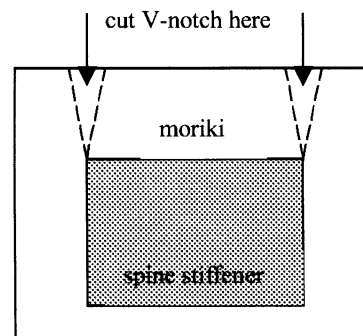
8. Choose a color of moriki to match leather and feather tear a strip to the following dimensions:

H = height of spine stiffener + 1/2" + 1/2"

W = width of spine stiffener + 3/8" + 3/8"

Note: To feather tear Japanese papers, use the pointed side of a bone folder dipped in water (preferably where brushes have been standing and has a small amount of PVA in it) and run the folder along a straight-edge over the moriki. Make sure fibers are dampened along whole area to be torn. If the moriki is to be dyed or stained, it can be done at this point or after it is attached to the book.

9. Adhere the spine stiffener to the center of the moriki (leaving 1/2" top and bottom and 3/8" left and right) with PVA/paste mixture. The unpaired edges face the moriki. Cut V-notches at head and tail at corners of the spine stiffener. Turn in moriki (between the notches only) onto the spine stiffener. If desired, a piece of cord can be placed under the turn in to make a faux headcap. Rub down and let dry thoroughly. This is called the spine assembly.



10. Attach the spine assembly to the hollowback using PVA. The spine stiffener should be centered on the hollow side to side and extend to the height of the boards at head and tail. Make sure the spine assembly is attached all over, especially the hinge edges. An ace bandage can be wrapped around the book at this point to help it stay in place. Let dry thoroughly.
11. Using mixture, adhere joints of spine assembly to the cover boards. Smooth onto leather and fan out feather tear to blend the repair into the original leather.
Note: If desired, the moriki can be cut wider without a feather tear so that the joints wrap further onto the boards and cover the original leather. This is useful if the original leather is deteriorated, but the original boards need to be reused.
12. Coat moriki with Klucel-G along whole surface (including the turn-ins and the entire spine) to consolidate paper fibers. Let dry.
13. Turn in flaps on along joints at head and tail. Use PVA/paste mixture. Cut tissue so that the edge of the tissue will line up with the pastedown endpaper. If it is left longer, it will be mostly covered by the tissue guard on the inside, but not necessarily. Let dry with cover propped open slightly before proceeding to other cover.
14. Finish attaching moriki (or mulberry) tissue guard on inside. The tissue guard might have to be trimmed. Use feather tear where appropriate. Use wheat paste.
15. Reattach original spine using paste or a laser printed label using PVA. Use an ace bandage to help hold leather spines in place while drying. Place a piece of wax paper or hollytex between bandage and book.
Note: For fragmented spines which need to be reattached, a thin tissue and paste can be used to reattach the pieces before attaching the whole to the spine.
Note: Brush a thin layer of Klucel G on a laser printed label to keep it from smearing over time.
16. Apply a thin coat of wax (Renaissance for matte finish books, SC6000 for glossy leather) with a clean soft cloth and buff. This makes the tissue appear much more leather-like and also conditions the leather itself. Before the wax is applied, moriki can be dyed with acrylics or water-soluble dyes to better match the leather.
17. For corners and edges of the board where the leather is missing, use small pieces of feather torn moriki (adhered with mixture) to cover the area. Apply Klucel G, and after dry, coat with wax.

Inspect work: Make sure the tissue is firmly attached to the leather and not pulling away. Boards should open naturally and be properly aligned with textblock. The hollowback should be firmly attached to the spine of the textblock and should open along the shoulders. The spine assembly and original spine should be thoroughly adhered down. Wax should be buffed to remove excess.