

## Application of Sewn Board Technique to Book Conservation Practice

### ABSTRACT

The association of sewn board structure with very early and non-Western binding methods has attracted interest of the book arts and limited edition communities, but the conservation field has generally not recognized useful features or preservation implications of this type.

The features useful for contemporary book conservation are the docile, flat opening, the secure cover-to-text attachment, and the sewing of both text and boards using equitable stitch chains. Preservation implications arise from an exemplary book action as well as from the non-disruptive and non-damaging sewing and forwarding of sewn board technique.

Specifically, there are advantages in the sewing, text forwarding, board modifications, and cover-to-text attachment. The chain stitch sewing adapts easily to pre-existing sewing stations. With the forwarding there is little or no shouldering and therefore no damaging or distorting backing of the outermost gatherings. The resulting uninterrupted smooth back permits effective bonding of the back lining. The sewn folio card board is used as a base for inserts and onlay stock which directly accommodates various degrees of thread swelling. The inserts can also be provided with inner and outer gutter edge bevels to seat against text shoulders. Finally, the cover-to-text attachment provides equitable, through-the-fold stitching of both gatherings and boards.

An historical context and various treatment case histories are described.

### INTRODUCTION

In book conservation work the relevant technologies of book craft span most cultures and the entire historical era.

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Curiously, none of the basic historical technologies are obsolete. Each one, ancient or modern, is as advanced and as relevant as another.

This sense of technological inclusion is a great attribute of the book crafts. While contemporary digital technologies breed six month cycles of obsolescence, the book crafts simply integrate all advances into a much larger resource. At the same time the book crafts enable the constructive interweaving of technologies that would otherwise be isolated by arbitrary partitions of time or culture.

Sewn board bookbinding provides an example of such design interweaving. The application of sewn board technique to book conservation practice looks backward to the technology of sewn board boat building in dynastic Egypt and forward to double fan adhesive binding, transfer tape bonds, and Tyvek coverings.

### THE SEWN BOARD PROTOTYPE

The sewn board structure is the earliest and most persistent type of codex binding. This project was based on prototypes from cultures of the Mediterranean basin over a period of approximately one thousand years. Features of these sewn board prototypes include leaf attachment based on stitch chains extended to attachment of both leaves and covers and a flush trimming of both pages and covers. These features dominated the first half of the history of Western bookbinding and have persisted to the present as exemplified by the modern paperback.

The structure of the sewn boards binding is associated with the advent and advancement of the codex format book in late Antiquity (Gamble 1995). Evidence locates this development in the region of North and Eastern Africa, in a period associated with Roman domination. Once established as a book structure, the sewn board technology of codex binding was subsequently adopted by both Islamic and Byzantine cultures.

## THE PAPYRUS BOOK

North African evidence for the initial development of the sewn board book binding structure is associated with sectarian works in Coptic language and with book production based on the use of papyrus. Highly-developed technologies of Egypt, including those of sewn board boat construction, provided a resource for the structural development. Archeological finds, spanning a period from the fourth through the eleventh centuries, illustrate both an established sewn board book binding technique as well as a number of variations of cover-to-text attachment (Szirmai 1999).



Fig. 1. Early Christian image shows the codex open beyond 180 degrees

A particular attribute of the sewn board binding is its consistent through-the-fold sewing pattern across the entire bound book. As a result, the boards and the gatherings act in the same manner as they respond to reader manipulation. This book action of the sewn board structure is admirably depicted in early Christian iconography. Here the codex is depicted in an over-opened position beyond 180 degrees (fig. 1). This depiction, as contrasted with the lesser openings depicting cord sewn work, portrays the docile, flat opening so characteristic of sewn board work.<sup>1</sup>

Other design traits of the papyrus book are apparent. The square shape of the papyrus book sheet is folded to produce an elongated page. Another important design trait is the equivalent crossed grains provided by the papyrus thatch. A cartonnage or pasteboard of only two pasted sheets of papyrus lays perfectly flat. The papyrus book is also distinctive because both rigid pasteboard cartonnage and pliant leaves are made from exactly the same material. Interestingly, waste manuscript leaves were converted to cartonnage, resulting in an even distribution of content as well!

A double cover or double-bound structure is a distinctive trait of the papyrus book (fig. 2). This fascinating feature suggests many options for compound cover-to-text attachments including the historical compound laced construction or a modern compound laced and cased construction. Decorating and tooling of covering leather while off the book is another distinctive trait of the papyrus era. This enabled the tooled impressions, strap lacings, and punchings, which could not be produced once the leather was attached to the papyrus cartonnage.

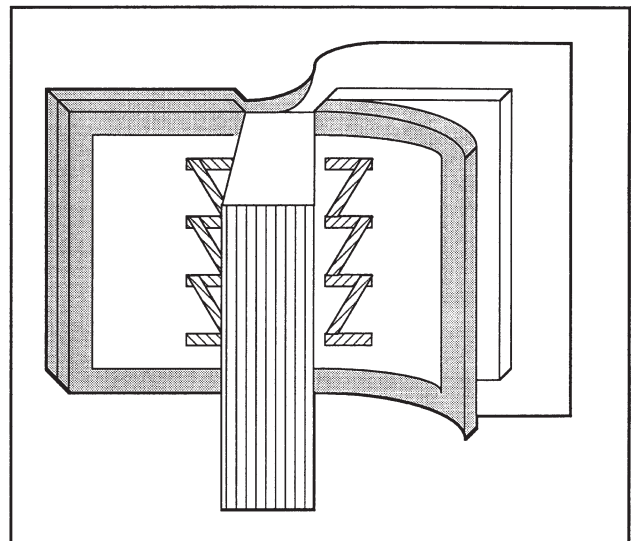


Fig. 2. Schematic of a double cover structure, typically used in papyrus books

There are indications that vestiges of the earlier papyrus book traits were conservatively preserved through subsequent sewn board binding traditions in spite of the different book making materials used. Traditional Greek and Armenian work, with vellum text leaves and wooden board covers, echoes features of the papyrus bookbinding. The edge grooving in Greek cover boards echoes a compound, double cover of Coptic bookbinding. Greek and Armenian work is also remarkable in the elaboration of endbanding carried well onto the head and tail edges of the boards. This endbanding is a reminder of mechanical reinforcement associated with papyrus cartonnage as exemplified by the coreless endbanding of Coptic binding that is carried across to the edges of the cartonnage boards. The strange zigzag patterns of gutter thread bridles, piercing and crossing over in Greek wooden boards, may echo gutter tackets originally used to secure compound, outer, and inner papyrus cartonnage covers.

The strong linen fabric linings carried over the back and onto the exterior of the boards in Eastern Church work is consistent with papyrus book work as well as the braided leather fore edge ties (Greek). Leather tooling and decoration completed prior to covering also echo a convention of the early papyrus book where cartonnage would not have supported tooling. This sequence is evident in Armenian work where spine rulings could not be accomplished after covering.

Taken together a consideration of relations between papyrus bookbinding and later vellum and sewn wooden board bookbinding exemplifies trans-culture conveyance—the same bridging needed for the application of sewn board technique to the subsequent, distant practice of book conservation.

#### ADAPTATION OF HISTORICAL METHOD TO CONTEMPORARY NEEDS

Adaptation of historical technique and structural prototype to wider practice is an established approach of modern book conservation.<sup>2</sup> Such adaptation has focused on Western methods associated with text sewing onto supports of cord or tawed thong. More recently historical case construction technique has been adapted to rebinding work. Also, adaptations from Western stationers' trade methods, including non-adhesive long stitch structures and various types

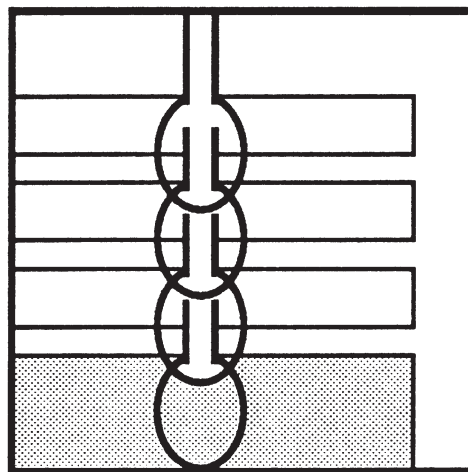


Fig. 3. Unsupported sewing

of pleated guards, have been adapted for book conservation work.

The sewn board structure, however, has not been adapted for use in book conservation practice. The association of sewn board structure with very early and non-Western binding methods has attracted interest of the book artists and limited edition binders, but the conservation field has generally not recognized useful features or preservation implications of this type.<sup>3</sup>

#### BENEFITS OF SEWN BOARD STRUCTURE FOR CONSERVATION

Preservation implications arise from the non-disruptive and non-damaging sewing and forwarding of sewn board technique. Other features useful for contemporary book conservation are the secure cover-to-text attachment using equitable stitch chains. Finally, the exemplary docile, flat opening of the sewn board structure facilitates scanning and exhibition. A prototype that has responded well to the problematic folding behavior of papyrus will also suit weakened papers of rebound texts.

The initial attraction of the sewn board structure is its association with unsupported, thread-only sewing which is so well adapted to rebinding texts with pre-existing sewing stations, frequently in the form of saw kerfs (fig. 3). The pliant, equitable stitch chains can be applied to a few or all of the various stations that each book presents. The stitch chains produce a very equitable tension from head to tail and from initial to last leaves. The flush stitch chains provide no barrier or mask to the application of adhesive linings. The resulting “smooth” back of the sewn text also enables the production of various historical appearances of either laced or cased historical binding.

The sewn board type features a text with little or no shouldering and, therefore, no damaging or distorting backing of the outermost gatherings (fig. 4). Historical

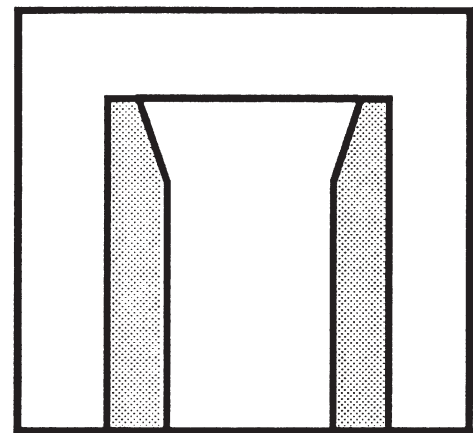


Fig. 4. Sewn board binding spine shape

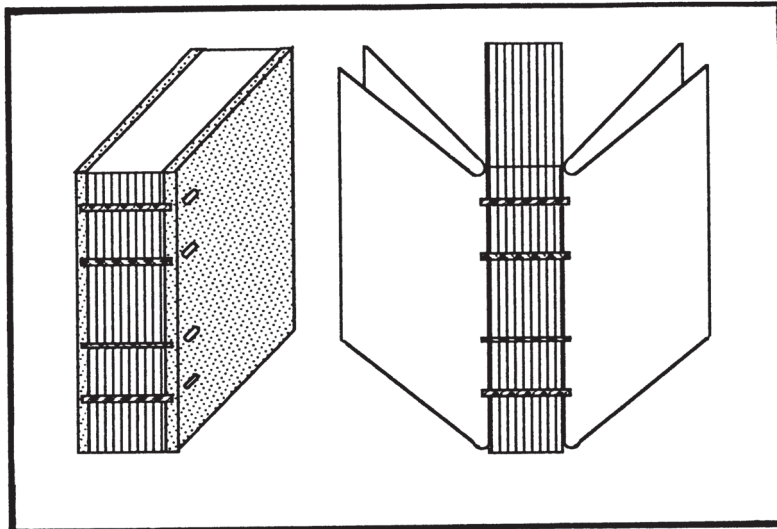


Fig. 5. Sewn card folio board structure

examples are exemplary in the application of strong, flexible back lining of linen that is carried well over onto the outer surface of the boards. Adhesion of the linen linings is frequently reinforced by subsequent endband sewing. The feature of uninterrupted bonding of a textile lining augmented with endband sewing is easily utilized in book conservation text forwarding.

The use of a sewn card folio board as adopted for much of the work in this project is a feature taken directly from historical method (fig. 5). The sewn folio board was originally a cartonnage of papyrus produced by pasting together the leaves of the outer gatherings of the book. This solution of the integration of flexible leaves and rigid covers, of cartonnage and free leaves, into a single book structure is ingenious and deserves reintroduction into the techniques of book craft generally.

The folio card foundation can be augmented with inserts within and outside the folio (fig. 6). These adhered inserts can be shaped with inner and outer gutter edge bevels to accommodate various thread swellings in the text block to produce the shoulder seated fit of work of the wooden board era. This method eliminates time consuming construction of lacing paths through the boards in applications when the sewn board design is used in place of laced board design.

The docile, flat opening action provides a full gutter reveal and greatly facilitates scanning, copying, and exhibition, particularly with modern illustrated reference works (fig. 7). The squareless, or flush, size of both cover and text prevents distortion and sagging in upright shelving. The leverage of the boards is directly transmitted to the back plane of the text, there being no set-back of the boards away from the folds of the endpapers.

## SEWN BOARD TECHNIQUES DIRECTED TO BEST APPLICATIONS

Various general applications of sewn board technique to book conservation practice were considered. Some applications were confirmed as beneficial and practical while other applications proved impractical.

### Text Block Reconstruction

Essentially all of the types of text block reconstruction, either sewing repair or resewing, can be done easily and effectively using the chains of stitches associated with the sewn board prototype. An especially effective start-up pattern for the first two gatherings was developed by Carlo Mori. This castellated, all-along pattern provides a very secure start for the stitch chains (fig. 8).

### Book Repair

Typical board rehinging work involves repair of a rounded and backed, tight joint binding. Such features are historically and structurally unrelated to the sewn board

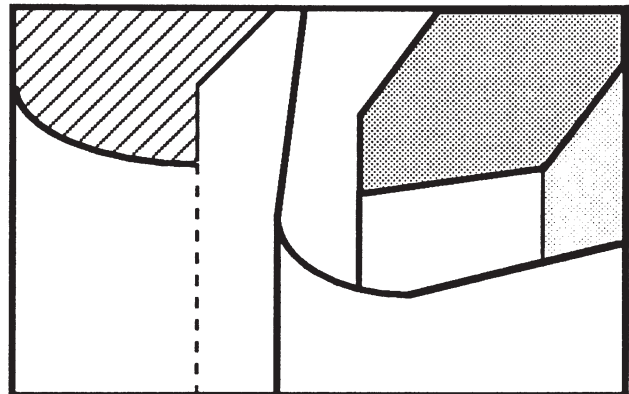


Fig. 6. Folio card foundation augmented with an insert

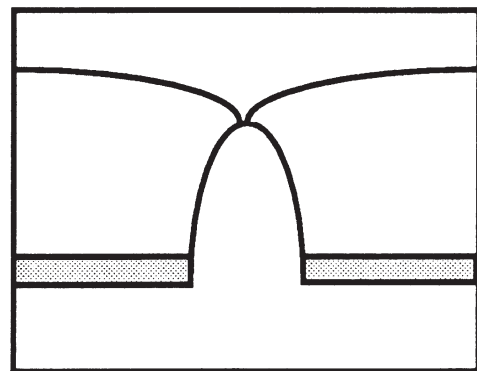


Fig. 7. Unsupported sewing structure allows the book to open fully to the gutter

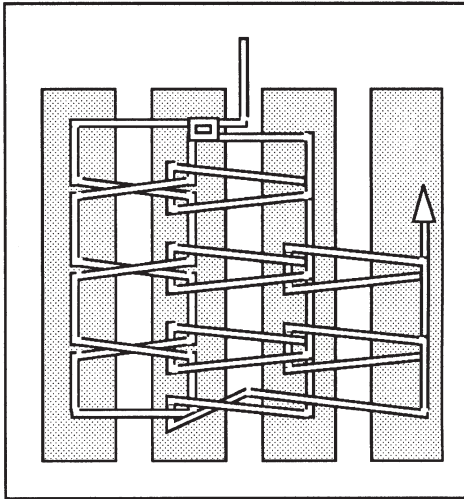


Fig. 8. Start-up pattern for the chain stitch developed by Carlo Mori

model. Board rehinging repairs can be augmented by sewn board technique using thread tacketing methods that relate to both through the board (Ethiopian) and around the board (Coptic) sewn board attachment types. However other, more productive, non-mechanical approaches to interior hinge repair and outer joint reconstruction are not related to sewn board technique. Such a non-mechanical repair approach is very well represented by the method developed by Alan Puglia and Priscilla Anderson using paper and Lascaux resin (Anderson and Puglia 2003).

Principles of sewn board action are naturally adapted to adhesive binding where options for treatment of failed publishers' adhesive bound books are needed. This genre of work has been greatly facilitated by the recent development of a precision vertical plow by Tim Moore of Concord, Michigan.<sup>4</sup> Now, quick binding designs are needed to develop the entire method.<sup>5</sup>

#### Restoration of Bindings

The method and construction of sewn board attachment does not improve or augment the standard methods of publishers' cloth cover restoration technique. Even though a standard method involves rebuilding case construction using an in-boards sequence, the sewn board methods provide no benefit and present some complication. Likewise, the methods are difficult to introduce in conventions of leather binding restoration.

#### Rebinding

This is the category of the greatest potential for application of sewn board technique. It can be widely applied, realizing advantages of stitch chain sewing and docile flat opening, to any in-boards, "laced" construction rebinding work. The board inserts accommodate variations of thread swelling, while the smooth back permits effective adhe-

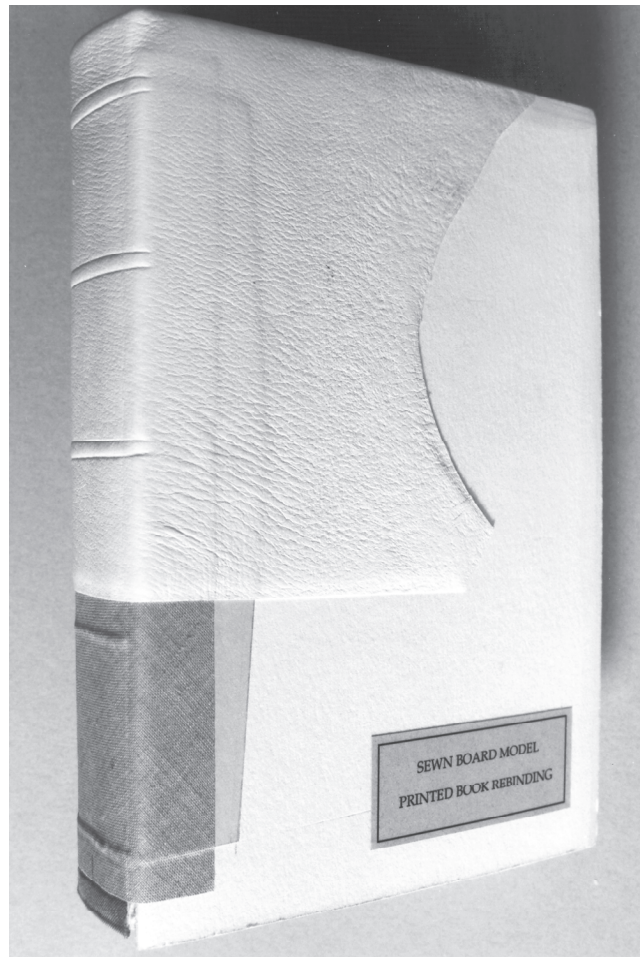


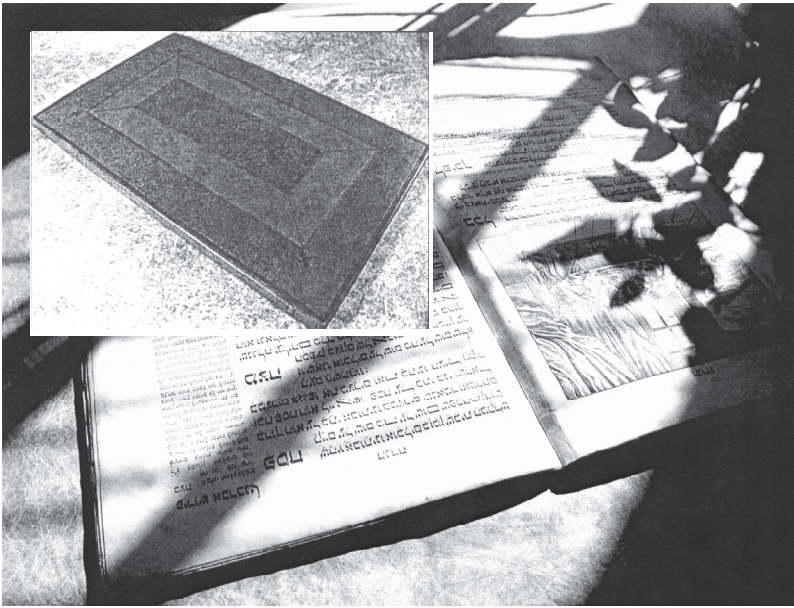
Fig. 9. Sewn-board model on a printed book, showing a raised-band appearance

sion of back linings and also enables great variation in appearance of the cover (fig. 9).

A variety of sewn board rebinding projects have been completed at the conservation lab of the University of Iowa Libraries. These case histories include (1) a late seventeenth-century *Hagadda*; (2) an atlas, Philadelphia, 1854; (3) Drawings of C. D. Gibson, 1900; and (4) a Bible, Arion Press, 2000.

1. *Late seventeenth-century Hagadda*: A fully successful application of sewn board technique with moderate weight linen thread sewing and flatback, unshouldered forwarding. The folio card boards have .80 Escaboord insert provided with a slight inner gutter edge bevel to seat against text thread swelling. The covering is in repair calf with Cambridge panel sprinkling and blind tooling. The finished book exemplifies the flat opening desired for opened reference on a table. The appearance is in accord with eighteenth-century leather covered work (fig. 10).

2. *Atlas, Philadelphia, 1854*: The maps are foliated into gatherings, with endpapers of 70 lb. Mohawk vellum beige



Figs. 10–10a. Late seventeenth-century *Hagada* rebound in a sewn-board structure and finished in the style of an eighteenth-century leather binding

paper. Sewn board forwarding was used with folio card boards and inner beveled Escaboord inserts. A spine wrapper was produced using natural linen book cloth which lapped onto the boards and met 20-pt. filler cards. The boards were covered with VanHeek Brilliantia, faded plum color, drummed on. The appearance is in accordance with mid nineteenth-century American cloth bindings with board papers. The opening action is fully suited to scanning or display (fig. 11).

3. *Drawings of C. D. Gibson, 1900*: Landscape format, published ink drawings with full display openings desired. The sewn board construction features heavy linen thread

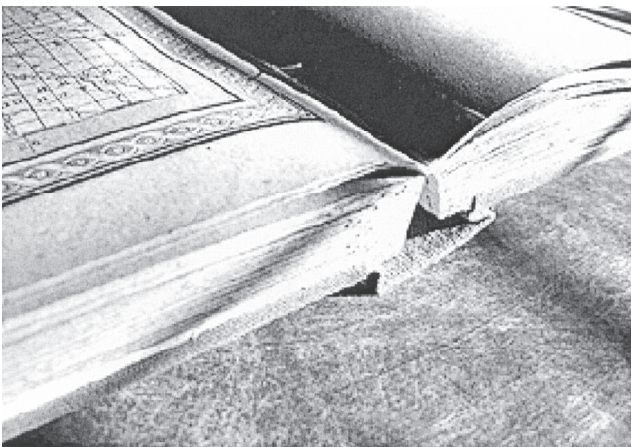


Fig. 11. 1854 Philadelphia atlas rebound in a sewn-board structure opens fully for scanning or display

sewing with wrong grain endpapers. A slight rounding was established and set with paper lining. A spine wrapper was produced using natural linen book cloth which lapped onto the boards and met 20-pt. filler cards. Colored paper caps were applied to the boards at the position of the endgrain reveals. The boards were covered with VanHeek Brilliantia, sand colored, adhered overall and provided with an upper board recess panel. The original illustrated upper board paper was washed and buffered and mounted and then applied in position on the upper board. The appearance is in accordance with the appearance of the original publisher's case (fig. 12).

4. *Bible, Arion Press, 2000*: This project contrasts sewn board construction with sewing onto supports as exemplified in the bindings of the two volumes. The New Testament is bound in the older type of the late Coptic sewn board design. The Old Testament is bound in the newer type of the sixteenth-century service book design (fig. 13).

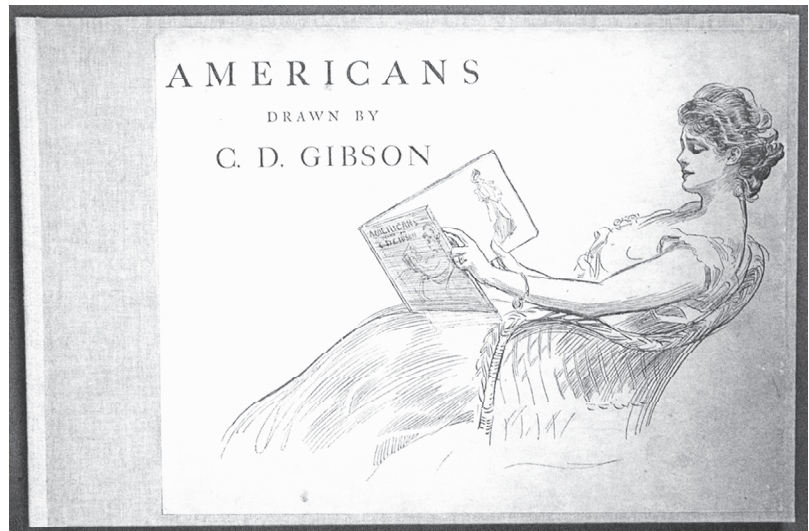
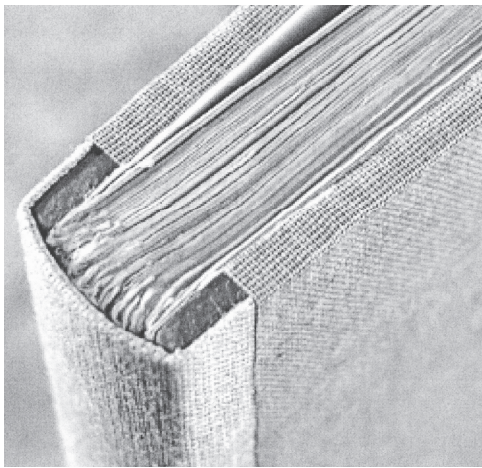
#### New Binding

The sewn board structure was adapted for archival reformatting and replacement copy binding. New archival binding is associated with reformatting of unbound fascicles and album type reformat of loose prints and documents. As such, the application is straightforward with card folio boards and an unadhered card wrapper sewn into the text block with the upper board. Another application is replacement copy binding associated with bound shelf replacement copies (preservation photocopies) of books too deteriorated to be used. This application includes double-fan binding, transfer tape bonded card boards, and Tyvek covering (Frost n.d.).

#### CONCLUSION

Application of sewn board technique to book conservation practice is indicated by the easy adaptation of chain stitching to reconstruction of an immense variety of previously sewn texts and preexisting sewing station arrays and the attribute of non-damaging, flat opening action of chain stitched texts. The sewn board attachment, based on outer sewn card folios used in association with text linings, enables direct transmission of board leverage to produce non-damaging opening and closing actions.

This book conservation structure is based on historical prototypes, the historical techniques are adapted to contemporary production methods, and the specific sewn board practice is directed to the best applications.



Figs. 12–12a. *Americans: Drawn by C. D. Gibson (1900)*: sewn-board structure with exterior binding preserving the appearance of the original publisher's binding

## NOTES

1. Chris Clarkson feels that artistic observation accurately differentiates sewn board from later cord sewn structure. He suggests that pages of the sewn board text are depicted as flat sheets while the more tightly bound, support sewn pages are depicted with draping curvature (University of Virginia Rare Book School, 2001).

2. Use of historical prototypes include Christopher Clarkson's adaptation of Renaissance Italian vellum binding (Red Gull Press, 1982), Robert Espinosa's adaptation of later European wooden boarded binding (Brepols, 1996), or Thomas Albro's adaptation of archival long stitch binding.

3. Experimental prototypes for application of sewn board structure to book conservation practice were produced in a workshop given by Tony Cains in 1987, but no publications resulted. In subsequent years proposals of sewn board technique for application in limited edition binding occurred (Abracadabra, 1993, BookNote series, BookLab [request copy from author]).

4. Tim Moore, Paper Molds & Bookbinding Equipment, 14450 Behling Road, Concord, MI, 49237.

5. A sewn board related method of "Paperback Rebinding at a Library Repair Station" was reported to the Library Collections Conservation Discussion Group of the American Institute for Conservation in June of 1998.

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GARY FROST  
 Conservator  
 University of Iowa Libraries  
 Iowa City, Iowa  
 gary-frost@uiowa.edu

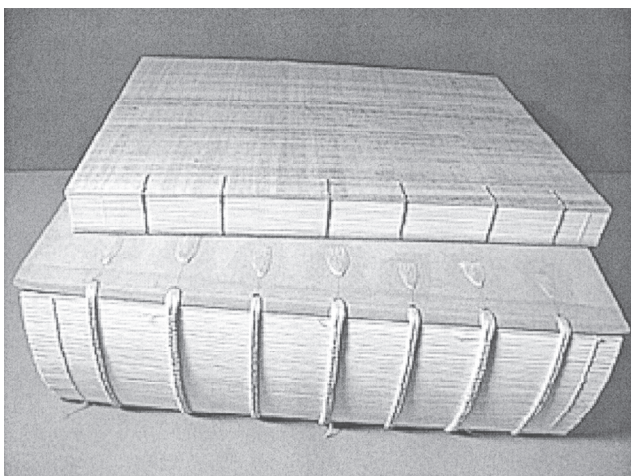


Fig. 13. Sewn-board structure on an Arion Press Bible (2000) the New Testament (top) bound in a late Coptic style and the Old Testament (bottom) in the style of a sixteenth-century service book