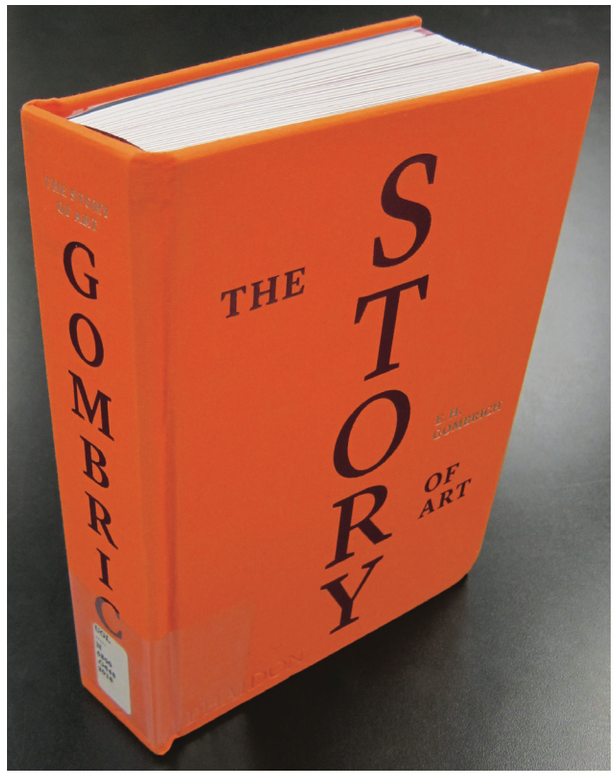

Fig. 1. A square-back, stiff-spine case binding. "Luxury edition, revised and redesigned." Gombrich, E.H. *The Story of Art*. London: Phaidon Press, 2016.

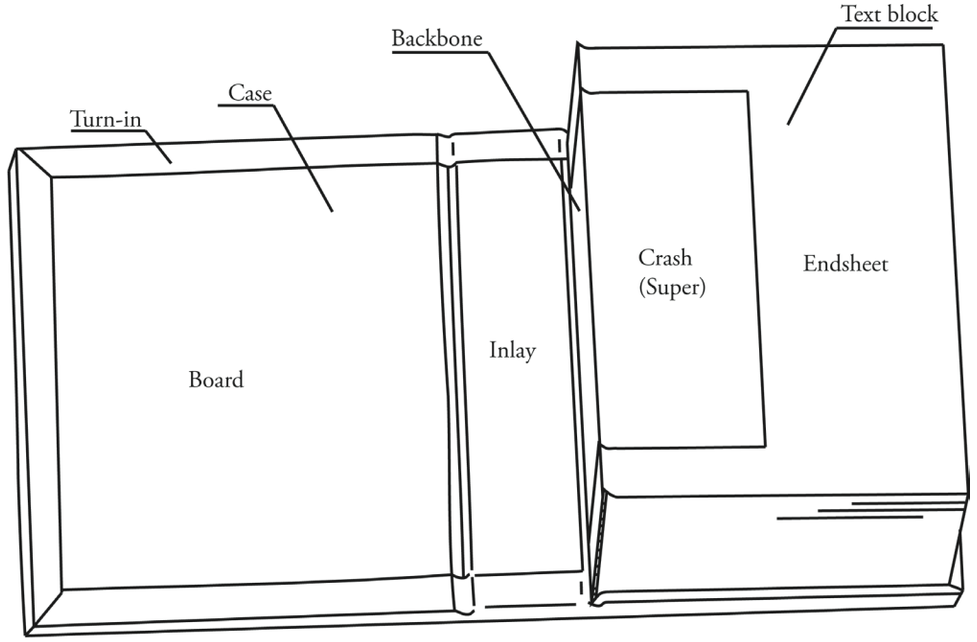

Fig. 2. Completed case before it is attached to the book block.

The Peculiar Impossibility of the Square-Back, Stiff-Spine Case Binding

Shannon Zachary

The square-back, stiff-spine case binding is a standard publishers' case binding that has a spine inlay made from the same board as the covers instead of from a thinner card or paper stock. Figs. 1–2. Unlike the familiar hollow-back and case-hollow structures developed in the nineteenth century, or the adhesive paperback bindings of the twentieth, the full-thickness board in the spine of the stiff-spine case does not flex or counter-flex when the book is opened to read. Figs. 3a–c. A Smyth-sewn (through the fold) or flexible adhesive text block naturally arches up in the middle as the book is opened. The thicker the book, the more pronounced the arch. The spine of a case hollow formed with a cardstock inlay arches in the other direction to accommodate the reduced distance from shoulder to shoulder of the opened text block. Fig. 4a. A paperback has the cover adhered directly to the backbone of the text block (tight back), which arches up with the backbone of the text block. Fig. 4b.

The stiff, full-thickness board of the stiff-spine case binding exerts force in a direction opposite to the forces of the text block as the book opens: the shoulders of the text block strain to pinch in, but the board inlay pushes the shoulders apart. Fig. 4c. All the contrary force is transferred to the hinges of the book, which typically break or are levered away from the inside of the cover. Fig. 5. Mechanically, the stiff-spine case binding must tear itself apart when the book is read. Fig. 6.

Once understood, it is hard not to see the absurdity of the stiff-board case binding structure. This study reflects a curiosity to understand the history of this structure, to explore why its popularity persists and increases, and to consider options for repair and conservation of damaged bindings.

Terminology and related structures

The terminology and structural detail relating to the stiff-spine or square-back case binding offer ample opportunity for confusion among similar terms and related structures. Already in 1933 a columnist from the Bookmaking Committee in *Publishers' Weekly* made the wry observation: "If a square or flat back is desired, the customer had better consult his binder and

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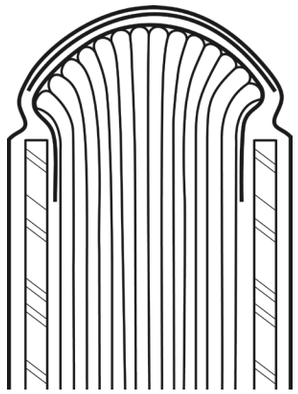
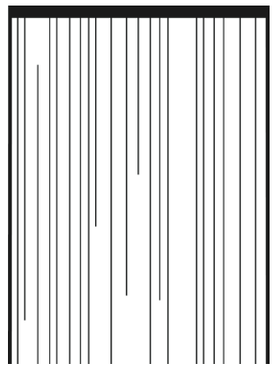
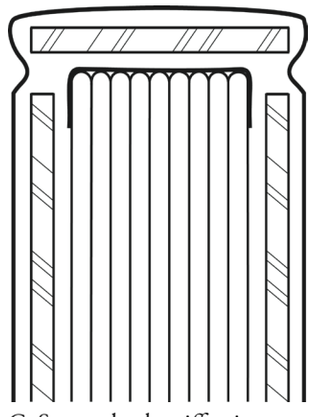
Fig. 3. Spine of the bound book.



A. Case hollow

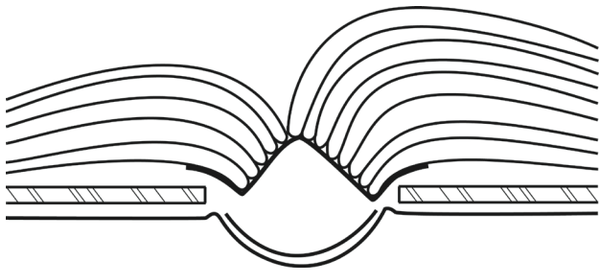


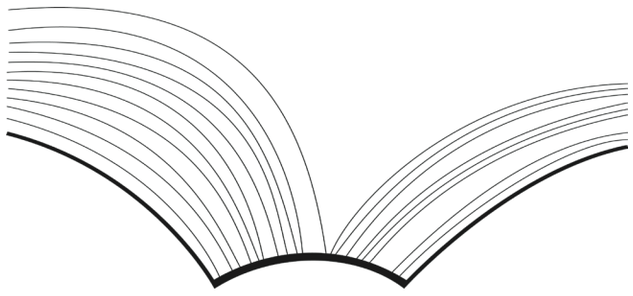
B. Paperback (tight back)

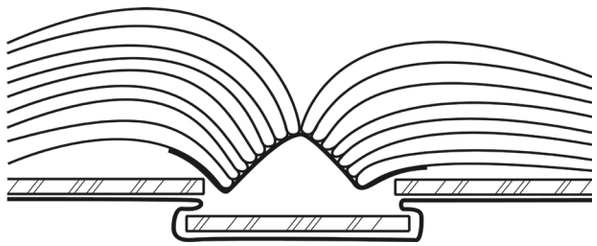


C. Square-back, stiff-spine case

Fig. 4. Movement of the spine when the book is opened.







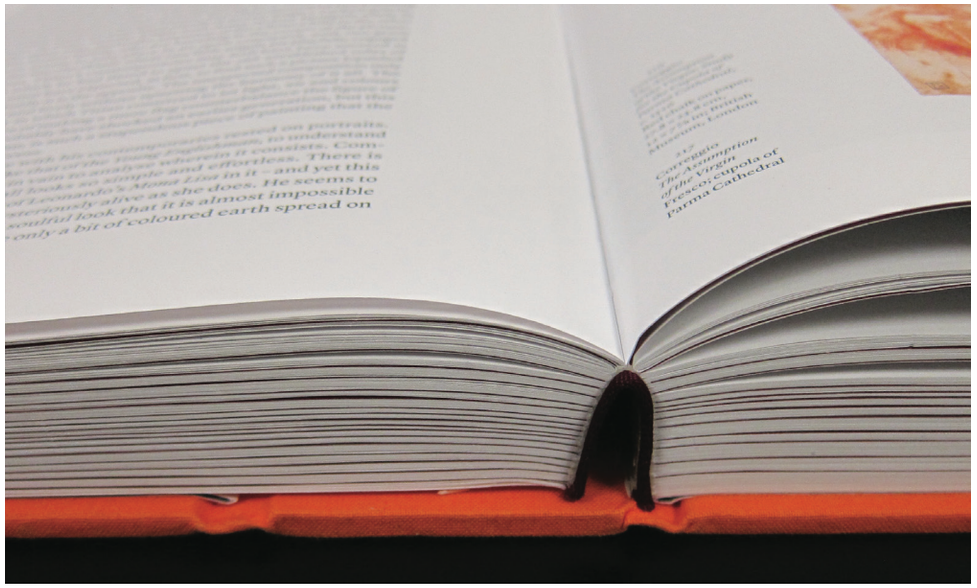


Fig. 5. The broken hinge on this binding shows the difference between the shoulder-to-shoulder distance natural to this text block when open, and the shoulder-to-shoulder distance of the stiff-board case, and thus the magnitude of force exerted on the hinge.

Fig. 6. Typical damage to a square-back, stiff-spine case after use: the endsheet along the hinge is levered off the board.

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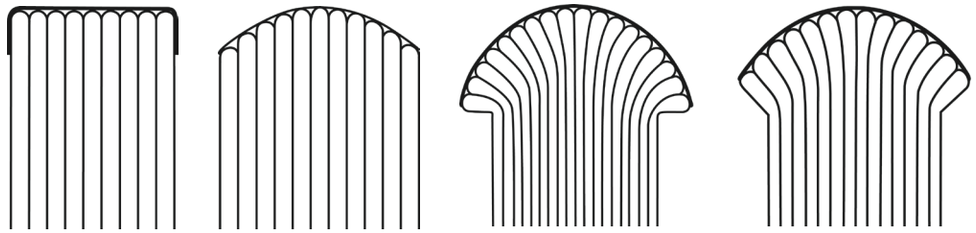
Figs. 7a–d. Text-block spine shapes.



a. Flat

b. Rounded

c. Rounded and backed (traditional hand binding with a 90° angle at the shoulder)

d. Rounded and backed (publishers' case binding, with a 45° angle at the shoulder)

make sure that they both understand what is meant by these terms, as there are differences of opinion on this point."[1]

In the late-twentieth and early twenty-first centuries, the stiff-spine case binding is sometimes referenced using the terms square or square back, flat or flat back, block-spine, or straight binding. Combined terms may appear separated, hyphenated, or blended into a single word. Complicating the matter is that both the case (cover) and the text block are routinely described as having a spine or a back.

"Flat back" is a standard term to describe the backbone of a text block that has not been rounded or backed. Figs. 7a–d. A stiff-spine case binding of necessity has a flat back, in this sense, but a text block prepared with a flat back is not necessarily bound in a stiff-spine case binding. Flat-back bindings, i.e., the backbone of the text block has not been shaped, have been common both as a publishers' binding structure and as a structure used by library binders throughout the twentieth century. Typically, the case applied over such structures has the standard, thinner, cardstock or paper inlay and possibly a slightly wider joint, both of which help facilitate easy opening of the book for use. The commonly observed downside of this structure is that the text block, especially for thick books, will sag when the book is upright on the shelf, placing extra stress on the joints near the head of the book and creating a convex fore edge.[2] If the boards are cut with squares ("squares," in this case, means the distance the boards extend beyond the text block), the text block has further to sag. Unfortunately, the structure of the stiff-spine case binding, despite the narrow joints and stiff inlay, does not correct the sagging problem unless the book is quite thin.

In the late nineteenth century, the term "flat back" also became widely used to describe a binding, either case binding or with laced-on boards, with a smooth spine – no raised bands.

1. "Bookmaking Committee Reports: Clinic Committee Makes Important Suggestions for Standard Practice." *Publishers' Weekly* 123, no. 22 (3 June 1933): 1840.

2. Rebsamen, Werner. "Why are Some Book Blocks Rounded and Backed?" *ShelfLife* 8, no. 3 (Fall 2013): 5–12.

Fig. 8. Side-sewn text block with a square-back, stiff-spine case. The sewing constrains the movement of the spine and limits the stress on the hinges.

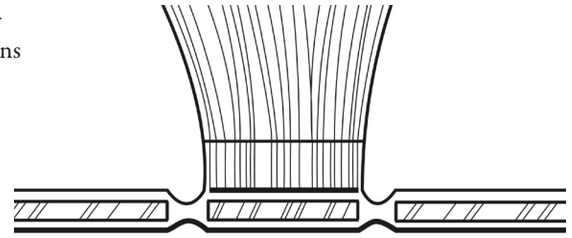
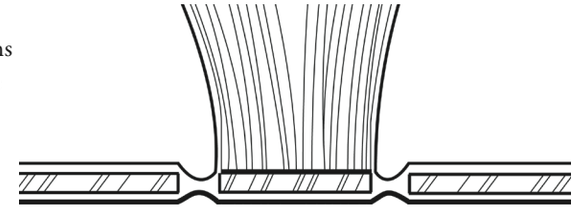


Fig. 9. Adhesive-bound text block glued directly to a stiff inlay. The glue constrains the movement of the spine and limits the stress on the hinges – but only as long as the glue holds.



The term refers to the appearance of the covering material on the spine and could be applied to a binding whether the backbone of the text block is flat or rounded and backed. In this sense of the term, the stiff-spine case binding is flat backed, and so are all case bindings unless false raised bands have been applied.

A significant variation of the stiff-spine case binding, as described above, is the use of the structure in conjunction with a stab-sewn text block. Fig. 8. While the case structure is exactly the same, with the full-thickness board inlay in the spine, the stab sewing effectively prevents any arching of the spine of the text block at all. All flexing required to open the book is transferred to the paper, and there are no extra stresses on the hinges of the binding. Whether books bound this way open much at all depends on their size and proportions and the quality and grain direction of the paper. This structure has been common for children's picture books and for library bindings originating from South Asia. Sometimes the structure is used for special art books or albums. Another – and mercifully still rare – variant involves an adhesive leaf attachment with the backbone of the text block glued directly to the stiff-board inlay of the cover. Fig. 9. The structure is similar to a paperback tight-back binding, except the stiff inlay permits no flexing of the spine at all. This structure has all the limitations of the stab-sewn binding, without its strength: the reader who fights this structure in order to open the book will most likely win, but at the cost of demolishing the binding.

The quarter-joint binding, while superficially similar to the stiff-spine case binding, is significantly different mechanically. In 1991, J.A. Szirmai posted a short note in the *Abbey Newsletter* pointing the library preservation community to P.B.G. Upton's 1952 British patent that described and named the quarter-joint binding.[3] In a longer article published in 2017,

3. Szirmai, J.A. "The Quarter-Joint Case and Its Potential as a Conservation Binding." *Abbey Newsletter* 15, no. 6 (October 1991): 96.

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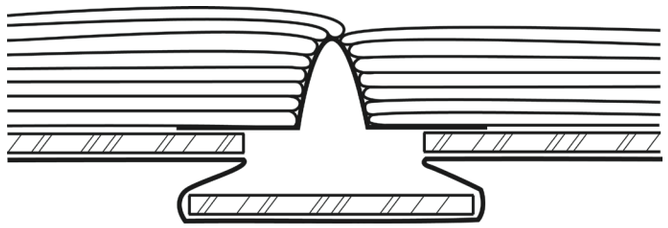

Fig. 10. Quarter-joint binding: the width of the joints is one-quarter the width of the spine, which allows the text block to open completely flat without exerting strain on the hinges.

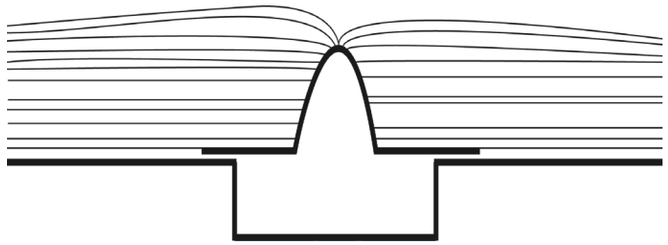

Fig. 11. Otabind paperback binding: the mechanics are the same as for the quarter-joint binding, but executed on a softcover binding.

Szirmai described in greater detail the mechanics of this structure and recommended it as a conservation binding.[4] In the 1990s, Peter Jermann wrote several studies examining the mechanics of the quarter-joint binding and its application to library binding.[5] In brief, the quarter-joint binding has the full-thickness, stiff inlay, but the distinguishing feature is a wide, unattached hinge. The geometry of the structure requires that the width of the joint must be equal to one-quarter (hence the name) the thickness of the spine to allow the book to open without exerting stress on the hinge. Fig. 10. This demonstration of the mechanics of the quarter-joint binding reveals why the publishers' stiff-spine case binding so often fails. The narrow hinge routinely used for the publishers' square-back, stiff-spine binding may serve if the book is thin, but as the book becomes thicker, the pressures exerted on the narrow hinge become proportionally greater.

Commercially the quarter-joint structure has been applied, curiously, not to hardcover bindings but only to paperbacks. The Otabind cover was developed by the Hexspoor Bindery in Holland in the 1980s for the Otava Publishing Company as a flat-opening paperback.[6] A number of proprietary variations – RepKover, Liberetto, Swissbind, Lay Flat, and others – have appeared since the Otabind. A stiff paper cover is carefully applied to the text block so the spine and a strip at the hinges on either side remain free of adhesive between the cover and backbone.

4. Szirmai, J.A. "Conservation Bindings." *Journal of Paper Conservation* 18, no. 4 (2017): 134–141.

5. Jermann, Peter. "Flexible Strength: The Adhesive Quarter-Joint Binding." *New Library Scene* 13, no. 4 (August 1994): 7–11; Jermann, Peter. *Building the Adhesive Quarter-Joint Binding*. Olean, N.Y.: Temper Productions, 1996.

6. Rebsamen, Werner. "New Softcover Binding Technology OTABIND is Coming to North America." *New Library Scene* 7 (February 1988): 11–15.

The cover is scored to hinge at the shoulders and at the adhesive line, allowing the text block to open flat. Fig. 11. Although this structure can be found occasionally, its fussy construction makes it less popular among manufacturers than the traditional tight-back paperback.

Finally, some print finishers today market a square-back booklet and catalog binding. A standard single-section softcover booklet is stapled through the fold, but a machine smashes the spine to square it off. The squared spine permits printing title and identification information on the spine of the paper-covered booklet.

Nineteenth-century origins

Although the stiff-spine case binding is largely a twentieth- and twenty-first-century phenomenon, its structural antecedents rest in some of the revolutionary developments in binding over the nineteenth century: the widespread adoption of case binding, changes in shaping the backbone of the text block, changes in shaping the spine of the binding, and the mechanization of binding.

By definition a square-back, stiff-spine binding is a case binding. Case bindings date to the early 1820s, although some previous structures presage the technique.[7] From the beginning, case bindings were constructed with an inlay made from a "piece of stiff pasteboard, of the width of the back."[8] Delaminating early cases reveal several layers of scrap paper or a thin paperboard that stiffens the spine of the case but permits it to arc when the book is opened. Full-thickness boards were not used on the inlays for these early cases; they would not make sense because the text blocks continued to be rounded and backed.

The persistence of rounding and backing in Western bindings – prompted by perception of its desirable qualities for both mechanics and aesthetics – factored against the development of a stiff-spine structure. True flat-back permanent bindings, with no attempt to shape the backbone, are rare until late in the nineteenth century. Exceptions from earlier in the century are temporary bindings in boards that were sold on the assumption that the purchaser would subsequently have the book bound properly, and even those might be rounded before binding. Cheap schoolbooks are another exception. Neither of these structures show evidence of stiff spines, which would in any case be a waste of board and effort.

The increasingly popular economic shortcut of sewing sections two-on (two sections are attached with one pass of the thread by skipping the thread back and forth between the two) or greater multiples created text blocks with less natural round. Machine sewing, introduced in 1880, also produced a squarer text block with less natural swelling at the spine to encourage rounding.[9] While publishers' case bindings in the latter part of the century continued to be rounded and backed, the shape of the backbone flattened, and

7. Carter, John. *Binding Variants in English Publishing 1820–1900*. London: Constable & Co., 1932.

8. Hannett, John. *Bibliopegia; or, the Art of Bookbinding*. 4th ed. London: Simpkin, Marshall, and Co., 1848, 127.

9. Comparato, Frank E. *Books for the Millions: A History of the Men Whose Methods and Machines Packaged the Printed Word*. Harrisburg, Penn.: Stackpole Co., 1971, 177.

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the joints eased from a crisp ninety-degree angle to a gentler forty-five; see Fig. 7d. In distinction, a high-arched round was popular for hand binding in the mid-century until the Arts and Crafts Movement brought flatter profiles into favor.[10] A British bibliophile writing in 1897 observed:

> The revival of flat backs has been the cause of some disputing. I think myself that the pleasure with which the trained eye regards the flat back is sufficient excuse for it. As far as technique goes, the flat back is, I believe, just as lasting and as flexible as the round. Much must however be determined by the size and shape of the book as to whether a flat back is adopted or not.[11]

Rounding and backing is one of the trickier operations to do well by hand and one of the more challenging to do by machine.[12] While the mechanically assistive roller rounder-backer dates to 1854, a proper rounding/backing machine was not invented until 1891.[13] In the general explosion of book production through the nineteenth century and the attendant pressure to produce bindings faster and cheaper, it would have made sense for binderies to skip or simplify the rounding/backing step, especially for thinner books.[14]

Yet despite these incentives for book manufacturers to flatten the backbone – and potentially insert a stiff inlay – books with stiff-spine inlays are rare in the nineteenth century. The most notable stiff-spine structure is the spring-back binding for ledgers. The spine of the spring-back binding is crafted from heavy layers of paperboard, but the spine shape is rounded, not flat. The binder must exert extraordinary effort and expense shaping the spines of these covers.[15] Special metal forms were made as molds for shaping wet board into the needed curve for the spring-back binding.[16] Binders even went to some trouble to round caoutchouc bindings – early rubber-based adhesive bindings – that would have no swell at the spine or any natural propensity to round.[17]

10. Middleton, Bernard C. *A History of English Craft Bookbinding Technique*. 2nd supplemented ed. London: Holland Press, 1978, 61.

11. Humphreys, Arthur L. *The Private Library: What We Do Know, What We Don't Know, What We Ought to Know about Our Books.* London: Strangeways & Sons, 1897, 55–56.

12. "By the way, no satisfactory machine has yet been invented for rounding books. Several have been tried, but none thus far have proved successful, so that this part of the business still has to be done in the same manner in which our ancestors performed it...." O'Shea, William. "Short Talks on Practical Bookbinding: Edition-work – Continued." *American Bookmaker* 3–4 (April 1887): 109.

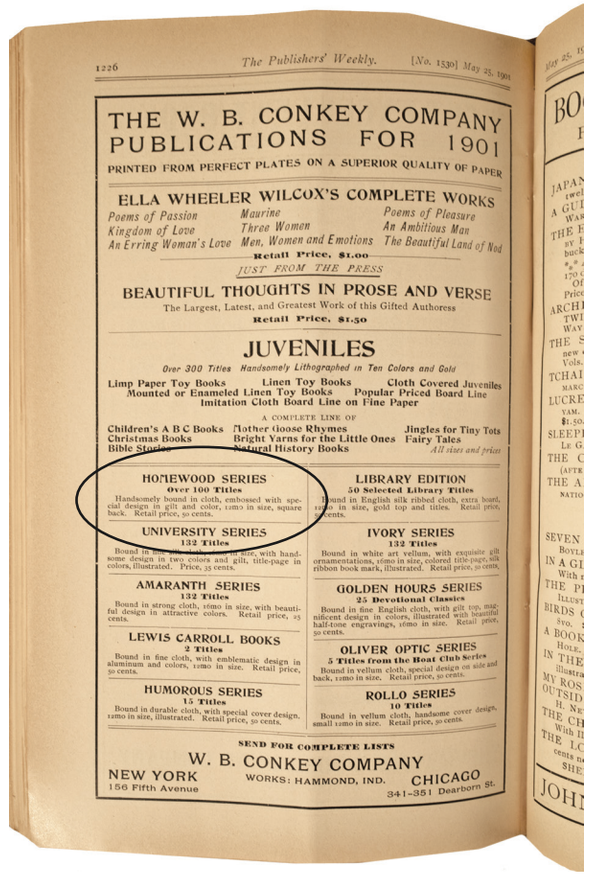
13. Comparato, *Books for the Millions,* 110–114.

14. Toward the end of the nineteenth century, "rounding and backing" of smaller, cheaper books may in fact have been achieved by heavy pressing of the bound books rather than deliberate shaping of the backbone.

15. Hannett, *Bibliopegia*, 119.

16. Pleger, John J. *Bookbinding*. Chicago: Inland Printer Co., 1924, 186.

17. "The back edge is then brought to a rounded form, by allowing the sheets to arrange themselves


1226 The Publishers' Weekly. [No. 1530] May 25, 1901

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ROLLO SERIES
10 Titles
Bound in vellum cloth, handsome cover design, small 12mo in size. Retail price, 50 cents.

SEND FOR COMPLETE LISTS
W. B. CONKEY COMPANY
NEW YORK 156 Fifth Avenue — WORKS: HAMMOND, IND. — CHICAGO 341-351 Dearborn St.

Fig. 12. Advertisement for Chicago publishers W.B. Conkey Co., 1901. The listing for the Homewood Series describes these titles as, "Handsomely bound in cloth, embossed with special design in gilt and color, 12mo in size, square back. Retail price, 50 cents." *Publishers' Weekly* 59, no. 1530 (25 May 1901): 1226.

Flat spines, in the alternative sense of the term, became more common through the second half of the nineteenth century. The practice of sewing on sawn-in cords eliminated the functional necessity of raised bands, although the aesthetic persisted in the form of false bands on leather bindings. Starched or filled cloth does not mold well over raised bands, so cloth bindings almost always have smooth, flat backs. The increasing use of cloth and paper as a cover material for publishers' bindings helped to change the aesthetic of what a book should look like.

Some book advertisements between 1870 and the early 1900s mention "square back" or "flat back" bindings. This reference appears to be a particular quirk of a few publishers, such as Chatto and Windus in London, White & Stokes in New York, and the W.B. Conkey Company in Chicago, rather than a standard practice. Fig. 12. Where examples of the bindings advertised can be located, the reference is to a smooth, cloth or paper-covered case binding on a text block that has not been rounded at all or has limited backing, and not a case with a stiff inlay.[18] Such "flatback" bindings describe a whole period of the Everyman's

in a grooved recess or mould; and in that state the leaves are all moistened at the back edges with a cement of liquid caoutchouc, or India-rubber." Hancock, William. "Improvement in Book-Binding." U.S. Patent 444 dated October 28, 1837. See also Hannett, *Bibliopegia*, 116.

18. It is not clear why these publishers chose to call out this feature in their books: Was it intended to attract a buyer who might happen to like the look of smooth spines and stamped cloth bindings,

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Fig. 13. Square-back publishers' binding, printed cloth, 1899. The binding has a square back, but the stiff inlay is not the full thickness of the boards. The book block is wire-stitched and backed. Aikin, Lucy. *Robinson Crusoe: His Life and Strange, Surprising Adventures by Daniel Defoe, in Words of One Syllable*. Philadelphia: Henry Altemus Co., 1899. Courtesy University of Michigan Library (Special Collections Research Center).

Library (London and New York) publications from 1906 to 1928.[19] An exhibit kit, dating to about 1927 and showing the stages of manufacture for Everyman's Library books, described the structure: "The back of the 'spine' is limp, only a thin card being used as a stiffener, so that the lettering or design may be stamped upon the back of the book."[20]

Between the flat-back publishers' bindings of the late nineteenth century and the stiff-board inlays of the twentieth is an intermediate structure: the inlay is a thicker, stiffer material than normally used on case bindings but is not the same, full-thickness board used for the front and back cover. This structure gives the book a distinct square back without the excessive strength of the full-thickness inlay. Fig. 13. This structure may stem from innovations in craft hand binding and short-edition binding in the late nineteenth century and developed especially where vellum (or a cream-colored paper in imitation of vellum) was

or was it to forestall complaints from bibliophiles who took the round/back side of the round vs. flat-back debate raging at the time? Likely these publishers referenced the structure because that was how they themselves differentiated between lines of the same text offered in different bindings at different prices.

19. Krygler, John B. "Everyman's Library: The Flatback Era, 1906–1928." Online exhibit, 2007: <http://www.everymanslibrarycollecting.com/flatback.html>; accessed 1 November 2018.

20. *The Processes of Modern Book Production Illustrated by Specimens of Everyman's Library*. Exhibit kit. [New York: Everyman's Library, 1927?].

used as the spine covering. For example, a White & Stokes advertisement from 1882 touts a publication as "printed on extra fine, laid paper, wide margins, bound in limp vellum, title-page and cover printed in blue, square back, wholly uncut edges."[21] These bindings helped develop an aesthetic acceptance of a smooth spine with crisp, square edges.

Twentieth-century developments

Despite the explosion of inventions that revolutionized commercial bookmaking in the late-nineteenth and early twentieth centuries, book manufacture in fact lagged behind the industrialization of other goods. Books are mechanically complex and their creation, from author to book in hand, involves many different steps and interrelated industries. Numerous separate machines were invented to perform individual tasks for binding books. Throughout the early decades of the twentieth century, "in-line" manufacturing of books meant stringing together a motley of separate machines, not a single end-to-end binding machine.[22] Skipping the machines that did rounding and backing was both easy and economically desirable under this configuration, and it is surprising that it was not done more often. Truly automated bookmaking (paper in at one end, finished book out the other) was not realized until the 1940s for softcover and the 1960s for hardcover books.[23] The fact that most book manufactories had at least some capacity for hand work through the middle of the century meant they could choose, relatively easily, to use a stiff-spine inlay when it seemed appropriate.[24]

Pinpointing just when the book manufacturers of publishers' case bindings began to produce some with a stiff, full-thickness board inlay is difficult. Inherently weak, the books so produced have tended not to survive with their bindings intact. Nor is it always possible to distinguish among handmade, machine-assisted, and machine-made structures. But a note in *Publishers' Weekly* demonstrates that by 1931 the stiff inlay as a structure was already broadly understood – and disparaged:

> A full rounded back has more strength and keeps its shape better than a square one, but many designers present expressed their preference for the latter as a matter of style. The use of a flat back with a stiff board in the backbone produces a neat binding, but it lacks flexibility, and is apt to break unless the book is a very thin one.[25]

21. White & Stokes advertisement. *Publishers' Weekly* 556–557 (16 September 1882): 383. Attempts to locate an extant copy of the book described (*Poems of Charlotte Bronté* [sic]) has been thwarted because the publishers issued this text in a number of different binding styles.

22. Comparato, *Books for the Millions*, 276ff.

23. Comparato, *Books for the Millions,* 252ff, 281ff.

24. Rebsamen, Werner. "Technical Director's Report: Witness to an Incredible Evolution in Binding Books – 1950 to 2015." *Endpaper* (November/December 2015): 7–9. Comparato, *Books for the Millions,* 295.

25. Josephy, Robert S. "Clinical Notes III: A Report of the First Season of the Book-Building Clinic." *Publishers' Weekly* 120, no. 10 (5 September 1931): 956–957.

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Fig. 14. These two thin books have a similar thickness of text block; the stiff-board spine on one of them creates room for titling on the spine while the absence of a spine on the other does not. Author's collection.

In the first half of the century, the stiff-spine inlay on publishers' bindings is almost always found on thin books, where the structure is most successful. Thin books are difficult to round and back successfully. A 1950 U.S. government manual on vocational training for binding explained the problem:

> Sometimes books of only two or three sections must be bound. When an attempt is made to back such thin books, the signatures split apart and sometimes the stitches break. It is better not to back such thin books but to employ a different binding style, such as using a strip of binder's board instead of paper for the backstrip of the cover. The width of this strip should equal the combined thickness of the book and board.[26]

A stiff inlay on thin books also offers the advantage of providing a surface for printing author/title information on the spine, which a traditional single-section case binding with no spine does not. Fig. 14. When the width of the spine inlay is equal not only to the thickness of the thin text block but also adds the thickness of the two boards, there is room for type.[27]

The stiff-spine structure gained an early popularity for children's picture books, which continues today. Often the children's books are side sewn, in the attempt to render them as indestructible as possible. Because the side sewing does not let the book open flat in any case, no stress is placed on the joints by the stiff-spine inlay. Even for Smyth-sewn books, the thin text blocks and large page size typical of children's picture books help make the structure work despite the stiff-spine inlay. In a 1951 critique, some children's librarians did, however, fault the extra wear of the cover material – especially paper – where it passes over the square edge of the spine.[28]

26. United States Government Printing Office. *Theory and Practice of Bookbinding*. Washington, D.C.: Government Printing Office, 1950, 106.

27. Rebsamen, Werner. "Saddle-Sewn, Single Section Hardcover Bindings." *ShelfLife* 8, no. 1 (Spring 2013): 4–8.

28. Melcher, Daniel. "CLA-Publishers Liaison Committee Reports on Publishers' Bindings." *Publishers' Weekly* 160, no. 1 (7 July 1951): 46.

Fig. 15. Batch of failed art library books sent to the University of Michigan Library binding unit.

More curious than the use of the structure for children's books is the persistent association of stiff-spine inlays with art books, poetry, fine press, or other books with "extra-binding" aspirations. A contemporaneous design review of the 1967 title, *The Arts of the French Book, 1960–1965*, describes the book: "Typically an art book (square back and squarish format) this is nonetheless a perfect solution for integrating varied type, illustration, and important bibliographical matter."[29] This link with artistic books may go back to the flat backs and vellum spines of the Arts and Crafts Movement; a handbound, square-back structure is common throughout the twentieth century for fine-press editions. Poetry and fine-press books tend to be thin, because of the intensity of labor per page to create them. Like the children's books, these thin books were naturally more suited to a binding with a stiff-board inlay that allowed room for type on the spine. Often such books were printed in shorter runs and might be bound entirely by hand or with fewer machine-assisted steps. The option to omit the steps of rounding and backing was a plus. The absence of rounding and backing also lets the text block open fully flat, back to the gutter. This ability to open flat was and remains especially desirable for books with photography and artwork that spreads across the gutter.

This bias for using the stiff-spine inlay for artistic books continues today. Fig. 15. While the structure may now be found on books across all subjects, it seems especially prevalent

29. Garvey, Eleanor M. and Peter A. Wick. *The Arts of the French Book, 1960–1965: Illustrated Books of the School of Paris*. Dallas: Southern Methodist University Press, 1967. Reviewed in "University Press Books: Fourth Book Design Show." *Publishers' Weekly* 194, no. 1 (1 July 1968): 71. The book has a full-thickness board inlay. The colophon describes the book as printed by offset lithography with "[b]inding and embossing of cover by Russell-Rutter Company, Inc., New York City."

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among art books. In recent decades, this association has become unfortunate. Since art books of the late-twentieth and early twenty-first centuries are typically image rich, they are often thick and produced on coated or heavily loaded paper to facilitate crisp printing. The extra weight of this type of paper exacerbates the rapid self-destruction of a stiff-board, case-bound book.

Other factors that encouraged the transition to stiff-spine cases in the twentieth century were the changes to leaf attachment. As machine sewing replaced hand sewing, and especially as thin synthetic threads were introduced in the 1940s, the natural swell of the spine from sewing was greatly reduced.[30] Adhesive-only leaf attachments, which became popular with the rise of paperbacks in the 1930s, create a text block that is completely square. The latex and animal glues used in the early part of the century were replaced by synthetic adhesives at mid-century.[31] Hot melt, polyvinyl acetate (PVA), and polyurethane are notorious for their "memory"; the text block reverts to a flat spine unless the spine is carefully manipulated at the time the adhesive is applied.[32] Paperback manufacturers found it easier not to fight the glues, but just leave the backbone flat – and so created a broad acceptance of the aesthetic of books with square spines.

Despite the factors that would facilitate a square-back design, the structure was still rare enough for this feature in a publishers' edition to be worthy of note in 1941. In an article on recent trade-book design for that year, the reviewer asserted that a new book was "unusual for its striking binding which is of an odd size, with a flat back, uncommon in trade books."[33]

Somewhere past the middle of the twentieth century, however, book manufacturers lost touch with the understanding that the stiff-spine structure is most successful for very thin books. Through the 1960s, stiff-spine inlays typically appear on books that are half an inch (1.27 cm.) thick or less. By the end of the century, the structure is common on books over two inches (5.08 cm.) thick.

The development of mammoth, automated binding machinery in the sixties and seventies made the square-back, stiff-spine case binding more difficult to achieve, not easier. If an automated machine includes an embedded rounding and backing step, then that step must be deliberately by-passed to produce a square-back binding. It can be more difficult to skip the step for selected runs than to include it. Tradition, or perhaps just better understanding

30. Comparato, *Books for the Millions,* 290.

31. Comparato, *Books for the Millions*, 247ff.

32. "[Adhesives had the] disadvantage of having a "memory" – that is, they would return to the original shape in which they had dried if they were distorted afterward. This meant that a book that was bound with a square back on the adhesive binding machine and then later rounded would return to a square, flat back after binding." Doebler, Paul. "Trade Books Get Adhesive Bindings." *Publishers' Weekly* 203, no. 14 (2 April 1973): 50.

33. Trade Book Clinic Committee. "Well-Designed Trade Books: A Blend of Traditional and Modern Typography." *Publishers' Weekly* 139, no. 9 (1 March 1941):1042. The book so described is: Brand, Renée. *Short Days Ago*. New York: Farrar & Rinehart, 1941.

of book mechanics, prevailed as the norm for these machines. Publishers' hardbound trade books were rounded and (if only just slightly) backed.

After just a few short decades of success, however, the large automated book-making machines were challenged again at the end of the twentieth century. The advent of computer-generated page layout and digital printing in the eighties and nineties, and especially the growth of on-demand and short-run printing in the first decades of the twenty-first century, created a second market less suited to the huge, end-to-end book-making machinery. While the integration of digital printing with softcover binding was achieved relatively quickly, hardcovers were more difficult. A 2015 review of the state of the industry found that, "Making hard cover cases is much more complex than soft covers.... This complexity is why case making systems originally lagged behind soft covers for digital books. Digitally printed books typically involve short runs, for which semi-manual or low-to-medium speed automatic case systems may fit the bill."[34]

In a curious return to the practices of the early decades of the twentieth century, book manufacturers at the end of the century, especially smaller companies, might purchase an assemblage of specialized, less expensive, pieces of equipment. Such equipment may require more hand feeding and assistance than the big machines. In this situation, the stiff-board case has advantages: there is no need to stock a separate material for the spine inlay, it is easier to work the turn-in across the level surface from board to inlay to board, and especially it provides the option to produce a neat-looking product without the bother of rounding and backing. If the book is not rounded and backed, the reasoning goes, the stiff spine holds the shape of the book. (In practice, the stiff inlay does not hold the shape of the spine after a period of use, which has led some manufacturers to try gluing the backbone of the book directly to the inlay.) The stiff-spine case binding has become nearly universal in the hardcover binding of vanity publications – family photo albums and the like.[35] With no capability to round and back the book, the small manufacturer might apply a stiff-spine case regardless of the thickness of the book. One example of such short-run bindery equipment is the Spiel Associates ODM (On-Demand Machines) case-making line. The cluster of machinery includes: the ODM Spreader (glues the hand-fed cloth); the ODM Slider (guides hand assembly of the boards on the cloth); the ODM Stomper (turns in the cloth); the ODM Squeezer (presses the newly made case); the ODM Sticker (cases in, one side at a time); and the ODM Smasher (builds in – presses – the case to the text block).[36] The accompanying video of the assembly in action shows the construction of a case with a stiff-spine inlay.

34. Eccles, Simon. "The Hard Route to Book Covers." *Digitalprinter* (16 March 2015): <http://www.paperandprint.com/digital-printer/features/dp-2015/march-2015/16-03-15-book-covers.aspx#.W9XhInpKhIo>; accessed 2 November 2018.

35. Rebsamen, Werner. "Photo Book Binding Structures." *ShelfLife* 5, no. 1 (Spring 2010): 3–10.

36. Spiel Associates, Inc. Manufacturers of Bindery Equipment, Long Island City, N.Y. Online catalog listing for the ODM Casemaking Line: <https://spielassociates.com/case-binders.html>; accessed 31 October 2018.

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Websites for larger book manufacturers today, however, often mention that they are willing and able to provide their customers the choice between square-back and round-back hardcover bindings. Müller Martini, the largest maker of book-manufacturing equipment, touts the Diamant MC Digital for making short-run hardcover books "whether they have rounded spines or straight spines."[37] The individual machines of the early and mid-twentieth century could be adjusted to specific jobs – with "wrenches and screwdrivers" and often hours of set-up.[38] The digitally operated specialist machines of the early twenty-first century can be reset at the flip of a switch, and programmed specifications for an earlier book run may be recalled instantly. Larger runs can be manufactured as square backs, if that is what the customer wants.

Book manufacturers today rarely give up-front guidance to the customer for making the selection between round and square backs, but imply that the difference is entirely preference and aesthetics. One company provides brief descriptions of different types of hardcover spines and contrasts a "Hard Strip" (width of the inlay equals the thickness of the text block) from the:

> Square Back: A Hard Spine with Square Back cover also uses a spine strip which is the same weight board as the front and back case boards, but the spine is made 3/16" wider than the text bulk. This creates a "square" look. This is often used on thin cased Children's books, Trade Editions, and nearly all side sewn books, without jackets."[39]

The webpage addresses differences of appearance but not of functionality.

Another company provides a description of the "sewn square back" in their online literature: "Square back indicates there is a board strip in the spine and the book block is not rounded. We have also made books with a square back book block but the cover has a paper backliner if that is the look you are after." The webpage further explicates that, "Some books need to be square back due to limitations of our automated equipment. Thin books (under 3/8" in thickness) and oblong books are the two most common applications for a square back book."[40]

The company blog of a printing broker provides description of binding options that distinguishes the "Tight Square Back" (Smyth-sewn text block adhered directly to the inlay, does not open flat) from the "Round Back" and the "Hollow Square Back": "text block is not adhered to the spine, medium flexibility depending upon format and page count of the

37. Müller Martini. Online product description for the Diamant MC Digital book-making machine: <http://www.mullermartini.com/en/usa/products-en/>; accessed 5 November 2018.

38. Rebsamen, Werner. "Why are Some Book Blocks Rounded and Backed?" *ShelfLife* 8, no. 3 (Fall 2013): 10.

39. Mennonite Press, Inc., Newton, Kansas. "Book Binding: Different Types of Hardbound Spines": <http://www.mennonitepress.com/book_binding.shtml>; accessed 2 November 2018.

40. Universal Bookbindery, Inc., San Antonio, Texas. "Sewn Square Back": <http://universalbookbindery.com/sewn-square-back>; accessed 12 November 2018.

book, lays flat, excellent for showing off spread images as in coffee table books, art books and photography books."[41]

In a brief question-and-answer thread on ColorPrintingForum.com in 2011, "BillO" asks: "Do people usually prefer a square back or a round back hardcover book?" The responses address aesthetics (some for, some against), cost (square back is cheaper, and so always promoted by the one printer responding), and the observation that the square back "stays nice and 'square' over time."[42]

Repair and conservation of failed stiff-spine cases

In a library setting, stiff-spine, square-back bindings that have broken down almost immediately after acquisition are familiar casualties presenting for repair.[43] Exacerbating the problem in recent decades is the increased use of weak cover materials – thin cloths and, especially, paper stock – and an aesthetic that tends to put square backs on thick, heavy art books. The hinges have no chance of survival if someone actually reads the book.

Typically one, or more rarely both, hinges have pulled away from the boards or broken. Options for repair are limited because reconstruction of the original structure sets the binding up for the same mechanical failure in the near future. Reinforcing the hinges, even with stronger materials, fails rapidly because the forces applied are shearing, causing delamination at or next to the glue layer. Solutions include complete rebinding or repair with modifications.

In a circulating library collection, rebinding is usually the most practical solution. Often a publishers' square-back case binding is set on a text block with solid Smyth sewing. Recasing the book in all new materials is straightforward. Unfortunately, of course, any design, stamping, or embossing of the original cover is lost in the process.

Satisfactory repairs that retain the original case are challenging. Reconstructing the case by inserting new materials or modifying the boards to create a wider hinge may solve the mechanical problem, but undermines the aesthetics of the binding. A less disruptive repair is to detach the case, remove the offending stiff inlay, and replace it with cardstock of a suitable flexibility with the grain direction running head to tail. This process restructures the binding as a standard case hollow. It disturbs the aesthetic of the original binding less, but still leaves the book with a different look. Alternatively, the existing inlay may be thinned down mechanically to reach the same result but retain the depth of any stamping or embossing on the spine. Figs. 16–18. Gluing additional layers of lining (paper or cloth)

41. Starkman, Nancy Ostling. "Book Binding Options and Our Expertise." Blog. Bellevue, Wash.: Star Print Brokers, 10 May 2018: <https://www.starprintbrokers.com/book-binding-options/>; accessed 6 November 2018.

42. "Square Back or Round Back Hardcover Book?" Discussion on BookBinding forum started by "BillO," 11 March 2011. ColorPrintingForum.com: <https://www.colorprintingforum.com/threads/square-back-or-round-back-hardcover-book.4908/>; accessed 2 November 2018.

43. Rebsamen, Werner. "Fifth and Last Part in a Series on a Study of Simple Binding Methods." In *Technically Speaking: Articles on Library Binding*. Edina, Minn.: Library Binding Institute, 1992, 30–32.

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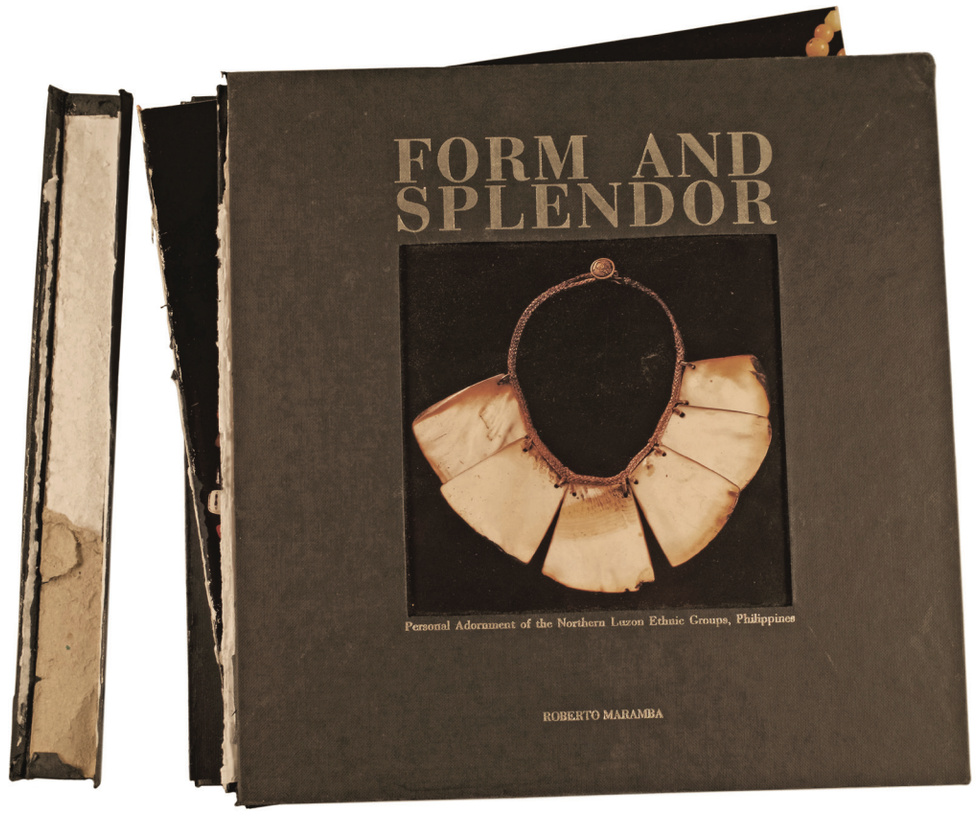

Fig. 16. Damaged stiff-spine case. Maramba, Roberto. *Form and Splendor: Personal Adornment of Northern Luzon Ethnic Groups, Philippines*. Makati City, Philippines: Bookmark, 1998.

Fig. 17. Thinning the original inlay of a stiff-spine case.

Fig. 18. Spine reconstructed.

to the backbone of the text block will broaden the arc of opening and reduce some of the pressure on the hinges.[44]

Another solution is to repair the case to its original structure, but reattach it to the text block on one side (typically the back) only. The exterior of the case keeps its intended proportions, but the backbone of the text block is free to move. Such a design loses strength in the attachment of text block to binding, of course. Heavy text blocks especially will always be at risk of twisting off the board. The repaired book will do best if it is stored in a box and does not receive heavy use – if, for example, use is restricted to a special collection reading room. Interestingly, publishers have started using this one-sided structure for some paperback books. Fig. 19. Typically the paperback is not large or heavy, and the paper cover is thicker than usually associated with tight-back paperbacks.

Trending forward

Since 1990, despite periodic pronouncements about the death of the book in codex form, the number of new print book titles published annually has exploded exponentially.[45] The average print run for each title, however, has been steadily shrinking as computer-assisted publishing continues to facilitate more and more authors writing for smaller and smaller niche markets.

44. Jermann, Peter. *Reflections on Book Structures – Part 3: Spine Control*. Olean, N.Y.: Temper Productions, 2008.

45. Greco, Albert N. *The Economics of the Publishing and Information Industries: The Search for Yield in a Disintermediated World.* New York & London: Routledge, Taylor & Francis Group, 2015.

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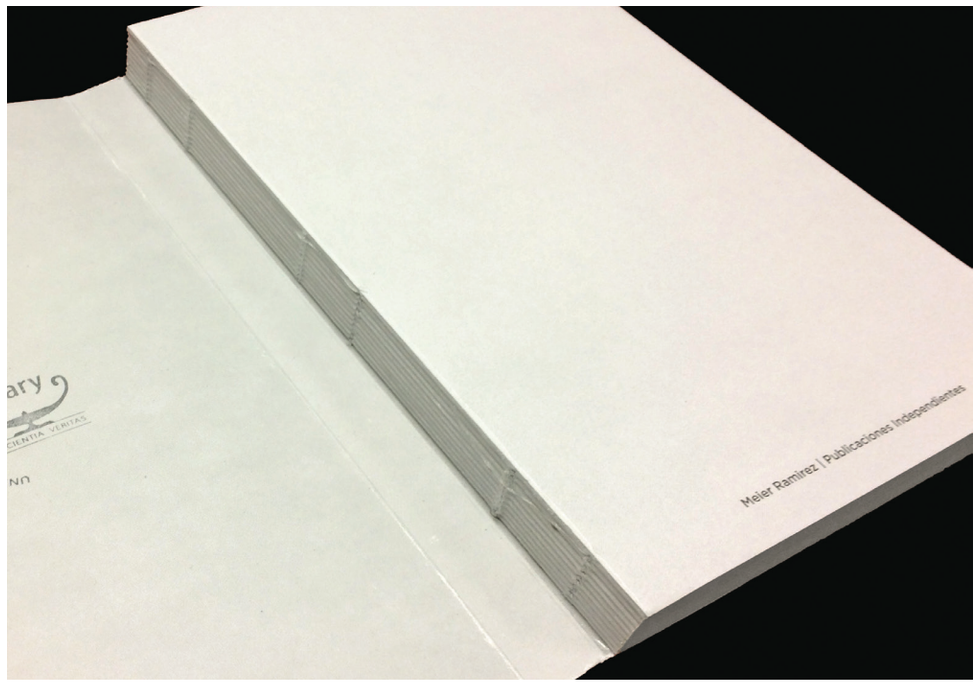

Fig. 19. Publisher's soft-cover binding constructed so the spine is detached; the book is glued in a strip along the hinge to the lower cover only. Vera Cubas, Rodrigo. *Un Lugar Para Ningún Objeto: Las Escultura Subterráneas de J.E. Eielson*. Lima, Perú: Meier Ramirez, Publicaciones Independientes, 2017.

The impact on binding is the need for simpler, less expensive machines with minimal set-up time. For case bindings, short print runs have encouraged a return to the mix-and-match machinery assemblages of the early twentieth century, rather than the single, end-to-end automated book-manufacturing machines. This environment likewise has increased the need for simpler binding styles that may be selected by have-to-do-it-all publishers who have less and less specialized expertise in bookbinding. For many, it is enough that the binding presents a neat appearance that can survive marketing, shipping, and sales, and can remain intact past the point when the customer is likely to complain. Other publishers may lack reliable advice, since each company that manufactures books will tout the machinery they have rather than the alternatives they cannot offer.

The proliferation of the square-back, stiff-spine case binding is one product of a larger general publishing trend. However mechanically illogical it may be, it has gained a sturdy persistence that is likely to continue for some time to come. A recent informal count of new acquisitions to the University of Michigan Library found that more than one-third of new hardcovers had a stiff-board inlay.

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Pete Jermann first introduced me to the mechanics of the quarter-joint binding, which set me on a path of observing commercial square-back, stiff-spine cases. Julia Miller and Cathleen A. Baker have encouraged many of us to write for the *Suave Mechanicals* series and have dedicatedly shepherded these volumes through production (and into rounded and backed case bindings). Kyle Anthony Clark drew the excellent diagrams for this essay. Elise Cabral's hands are shown treating the stiff-board inlay of a damaged case. Photographs are by the author and feature books from the University of Michigan Library circulating collections, unless otherwise noted. I am deeply grateful to the University of Michigan Library for its catalog, collections, and connections.

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