REFERENCE OF STANDARD PROCEDURES

This part of the book is preliminary reading before the descriptions of the bindings. Certain information and operating procedures about paper, thread, sewing procedures and covers common to all the bindings are discussed.

PAPER

In making paper by hand, the pulp is allowed to settle randomly, assuring that the fibers are multi-directional. The resulting paper folds as easily in one direction as the other. When paper is mass-produced, the water flows across the surface in one direction, causing more of the fibers to settle in the direction of the flow. Because of this, most commercial paper tends to fold easier in one direction than the other. This is referred to as the *grain* of the paper.

In planning how to fold down a sheet, the final fold, which is at the spine, must always be *with* the grain of the paper.

Grain of the paper, like the board for the side-covers, always runs parallel with the spine of the book. This is so that in turning pages the paper naturally curls from side to side, aiding turning the page rather than the page curling up from the head and tail.

Grain Direction: Viewing a horizontal sheet, if it curls from side to side easier than from top to bottom, it is referred to as *grain short*. If the horizontal sheet bends easier from top to bottom, it is called *grain long*. Grain runs parallel with the direction of the paper in which there is less resistance to folding. Sometimes it is difficult to determine grain direction. Some papers are balanced and can be used in either direction. Other papers have a strong grain direction, but the small size of the paper can cause confusion. If bending the paper first one way and then the other does not show which direction has less resistance, there is another way to test for grain. Dampen a scrap of the paper and it will curl immediately. The axis of the curl is parallel with the grain. The curl shows the direction the paper should be folded. Grain runs up and down the sheets, parallel with the sewing.

Specifying the Direction of Grain: Paper is usually grain long. Paper companies generally list the direction of the grain as the second dimension: 23 x 35". Other companies will point out the direction of the grain by underlining that dimension: 17-1/2 x 23". This smaller sheet might come from the mill 23 x 35", grain long, but they are selling it cut in half. Sold as a half sheet, the 23" figure would be misleading listed second since it is actually the shorter side of a sheet that has been cut down.

Specifying Dimensions of a Finished Work: The dimensions of a book, section or a photograph are always listed with the height first, then the width. If the work has a third dimension, it is listed third. This book is 9 x 6 x 3/4".

Marking the Measurement: Indicate the measurement to be folded on the sheet. Never use ink or ball-point. A light pencil dot can be erased, but is inaccurate because of its width – leaving to chance whether the fold is on the left, right or center of the mark. A pin prick is better. The ideal tool is the edge of your thumbnail. The indentation along the top edge of the sheet *is* the start of the fold. Use the top edge as a guide.

To Fold Paper: Start a loose fold with the measured mark on the outside of the fold. Crease the paper down an inch at the dot. Line up the two top edges of the sheet and firmly hold in place with one hand, while completing the crease lightly with the other. The single stroke should go downward and outward, away from the point where the two top edges are being held aligned. This insures the fold is at a right angle to the top edge. Give the fold a permanent crease with a bone folder. Do not use several strokes with the bone folder as this will cause the paper to shine.

To Score with a Bone Folder: Keeping the straightedge held firmly in position, score with a pointed bone folder. Hold the straightedge with one hand and fold paper back against the straightedge, along the indentation. This can help in the process of creasing to obtain a clean fold. A bone folder indents to score, whereas a knife incises to form a score on heavier stock paper or book board.

To Score Thick Paper or Board with a Knife: Cut 1/8 the way down through the thickness of the paper or board with an X-acto® knife. Heavy stock used for covers or a fold book should give a clean fold when it is parallel with the grain of the paper. If it tends to crack at the crease, the paper will first have to be scored, that is, slightly incised where it is to be folded.

Position a right angle lining up with the bottom edge of the

cover paper. Cut along the edge of the right angle. If you cut too deeply, you will weaken the paper. Make the fold with the cut on the mountain peak.

Alternate the cuts with the other side of the sheet. Be consistent in lining up the right angle either with the top or the bottom edge. If the paper has been cut slightly off from 90°, the top and bottom edges will not be parallel and neither will the resulting folds.

To Tear Paper: Torn paper edges are often attractive in a hand-bound book. They are impossible in a commercially-made production book, which makes them all the more desirable in small edition hand-bound and one-of-a-kind books. Sometimes the deckled-edge is incorporated in the binding but the sheet is larger than the page. The other edges must be either machine cut or torn. Tearing paper can imitate the deckled-edge. Instead of placing all deckled-edges at the head and your torn edges at the tail, alternate the deckled-edge with the torn to offer less comparison between the two. Each method of tearing gives a different edge:

1. Lay a straightedge where the paper is to be torn. Firmly hold it in place with one hand, while you tear against the straightedge.
2. For a more exaggerated torn edge, use a wooden ruler which has a metal edge inserted. Since the metal is raised above where the paper is held down to the surface of the table, the tear will peel as it frays. The higher the metal edge is from the surface, the more exaggerated the tear. You can increase the height of the metal by placing masking or duct tape on the bottom of the ruler.
3. The most extreme and perhaps the best imitation of the deckled- edge by tearing is accomplished by a different approach. Fold and crease the paper where it is to be torn. Reverse the fold and crease. With a damp sponge, stroke the folded edge. Do not run the sponge on the surface of the paper, only across the edge of the fold. Reverse the fold and stroke it with the sponge. Open the paper and gently pull it in two at the weakened fold. The paper will fray more than tear, leaving an edge of hairy fibers.
4. Run a Rapidograph™ filled with water along a ruler for Eastern papers with long fibers. Hold ruler in place and gently pull. If an area resists, scrape the fiber with an exacto blade, but do not cut.

To Cut Paper: Cutting and trimming paper by hand should be done with a sharp blade using a metal straightedge as a guide. Slits are made in the same manner. Whenever this text says *cut* or *slit,* this is the assumed procedure. An X-acto® knife with a #11 blade is recommended as it has a narrow point which is easily positioned, and is thin so it does not throw a burr on the paper.

Never cut directly on the table, not only to protect the furniture, but to avoid a ragged cut. Always use a self-sealing cutting mat under the sheet to be cut. Scrap book board is a poor substitute. Your cut will be imperfect if it extends over an area where the book board is incised from a previous cut. Only use #11 blades with a self-sealing mat. Heavy-duty blades will shorten the life span of the mat. A cutting mat may seem expensive, but it is a valuable tool and a pleasure to use.

Paper Cutters: An ideal paper cutter has a clamp-bar close to the blade to hold the paper in position so it does not creep as the blade slices through the paper. The clamp-bar should come down parallel with the plate, so it must be hinged at both ends. A cutter with a clamp-bar having a single hinge located near the fulcrum of the blade is to be avoided.

The right angle bar may be located along the top or bottom edge. It should be adjustable, and all paper cutters should be checked monthly with a large metal right angle to determine if the angle bar needs adjusting. Do not take it for granted that all paper cutters cut at a right angle. Few do. Only those capable of being adjusted and which are serviced regularly will give you an accurate cut. In folding, especially concertinas, it is impossible to achieve acceptable folds if you do not start with a sheet with 90° corners.

Never try to cut several sheets of paper at once. The bottom sheets will be ragged, and probably not cut at 90°. The practice abuses the hinge of the blade.

Never cut book board or card on a paper cutter. If you do not have a board shear, cut by hand using a heavy-duty mat knife and straightedge. Place scrap book board underneath. Do not use mat knives on self-sealing cutting mats.

SHEET

A sheet is one piece of paper with a front and a back side.

A single sheet can be altered to become several pages by alternately folding it back and forth upon itself to become an Oriental fold book.

A sheet folded down into a section becomes a codex.

Several sheets can be compiled and bound as a book, either as fan, venetian blind or a codex.

In constructing a codex with a given number of single sheets, the paper grain direction should be parallel with the backbone.

Three kinds of single sheet codex bindings are described in this text: *Album Binding,* page 98; *Single Sheet Pamphlet Stitch,* page 71; and *Stab Bindings,* beginning on page 72.

FOLIO

Folding a sheet in half yields a folio. The fold is the back bone, and parallel with the grain. A folio consists of 4 pages. With a folio, the terms *front* and *back* are irrelevant. Each surface is a front during the act of viewing. Each is a back when that page is turned. To consider the right side of a two page spread as the "front" to be imaged, and the left as a "back" to remain empty, is to negate 50% of display.

In hand binding, folios may be stacked one on top of each other, and each sewn separately. These sewing units are folios, and not sections:

SECTION

Assembled Section: Two or more folios, one *inside* the other as a sewing unit, is a *section*:

Folded Down Section: In production work, compiling folios into sections is not an efficient procedure. It would require printing each individual folio at a time. Or, several folios would be printed on the same sheet, then each cut and assembled into units as sections. This would be cost-prohibitive.

In production printing signatures are machine-folded down. If it is not a blank book, it is first printed in imposition. A machine folds the sheet in half, two or more times. The folds alternate against and with the grain. The head, tail and foredge are trimmed leaving only the fold along the backbone. Trimming is generally done after sewing, when all the sections, called the book block, can be trimmed at once. If there is a paper cover, this is attached to the book block prior to trimming. This saves time, and insures uniformity, since all the units are held in position by the binding.

A single sheet of paper can be manipulated into a codex book structure:

In hand binding, sections are hand-folded down. Folding down a sheet into a section requires two or more folds. Each fold after the first consists of folding layers of paper, and folding against a fold. This tends to result in unsightly wrinkling at the second and third folds.

To avoid this, after each fold, slit the fold more than half way, but less than 2/3 the length of the fold. Use a dull knife, such as a clam knife. Make the next fold, then slit it in the same manner. The slits relieve the pressure, allowing the additional folds to crease neatly without wrinkles at the corners, referred to as *crow's feet.* The part of each fold that is not slit holds the section together until it is sewn and the slits are extended to the backbone with a knife, or the edges are trimmed with a blade.

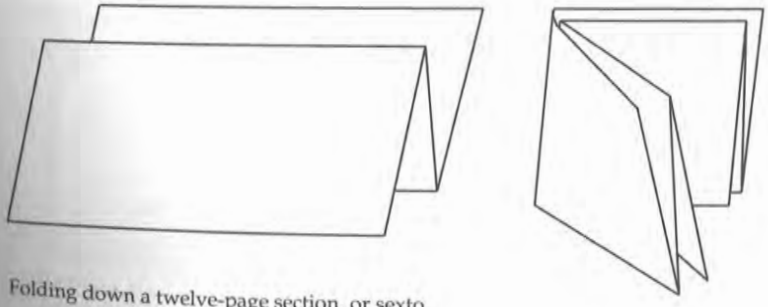
Quarto: A section consisting of 8 pages is made by folding the sheet in half, first against the grain. The result is then folded in half again, with the second fold perpendicular to the first.

In folding down a section, the final fold is always with the grain, since it will be at the back, aiding the hinging action.

Octavo: Folding a sheet in half three times yields a 16 page section. The first fold is with the grain, the second against, and the final fold is with the grain.

A very thin paper might be able to be folded in half four times, giving a 32 page section. However, the inside folds tend to wrinkle and pages within may slightly vary in size. In addition, when the book is sewn, it tends to gap open at the center folio. If 32 pages are needed, it is better to use four quartos, or two octavos.

Sexto: A 12 page section is constructed by first folding the sheet in thirds, against the grain. This is referred to as a *Z*-fold. The result is then folded in half perpendicular to these folds, with the grain:



Folding down a twelve-page section, or sexto.

PROPORTION and SIZE of BOOKS

Proportion and size of the book depends upon the manner in which a sheet is folded into a section. For economy of paper, sheets are usually folded down utilizing the entire sheet. If the sheet is 18 x 24" and two inches is cut off the shorter side, to give a sheet 16 x 24", over 11% of the paper is wasted. Cost of production rises that amount.

If the book is to go into production, dimensions of the book are affected by three factors:

1. Standard sizes in which reams of paper are sold.
2. The direction of the grain of those papers.
3. The maximum size of sheet the printing press will accept.

One of the first considerations in creating a book must be where it will be printed. Different printers have different size presses. Next, the paper must be selected, as it may not come in a proportion that will cut down efficiently to fit that press. The desired paper may be grained the wrong direction, and another paper must be chosen.

Whether the book is to be a production or a one-of-a-kind, size of paper is a limitation with which to contend. If the sheet is 18 x 24", the following are the options of proportion and size of the resulting book, when the full sheet is folded down.

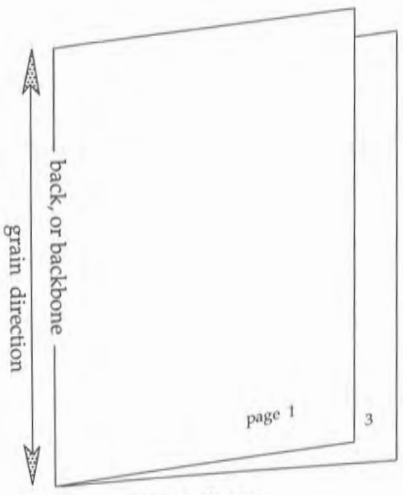
If Grain Short: Sections created with an 18 x 24" sheet, halved with each fold are shown on the facing page. The sheet folded down creates the following:

18 x 12" Folio (1 fold, 4 pages)
18 x 6" Quarto (2 folds, 8 pages)
9 x 12" Quarto (2 folds, 8 pages)
9 x 6" Octavo (3 folds, 16 pages)
4-1/2 x 12" Octavo (3 folds, 16 pages)
6 x12" Sexto (12 pages) A section created with a 18 x 24" sheet with a *Z*-fold yields a sexto, also referred to as 6to.

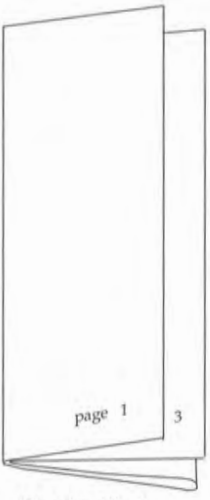
If Grain Long: Sections created with an 24 x 18" sheet, halved with each fold are illustrated on page 42.

24 x 9" Folio (1 fold, 4 pages)
24 x 4-1/2" Quarto (2 folds, 8 pages)
12 x 9" Quarto, (2 folds, 8 pages)
12 x 4-1/2" Octavo (3 folds, 16 pages)
6 x 9" Octavo (3 folds, 16 pages)
8 x 9" Sexto (12 pages) A section created with a 18 x 24" sheet, with *Z*-fold is also called a 6to.

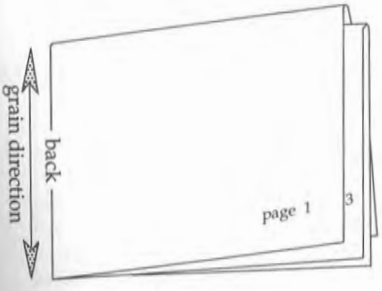
GRAIN SHORT



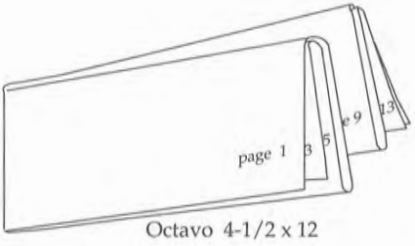
Folio 18 x 12



Quarto 18 x 6

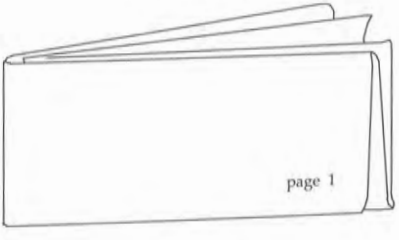


Quarto 9 x 12

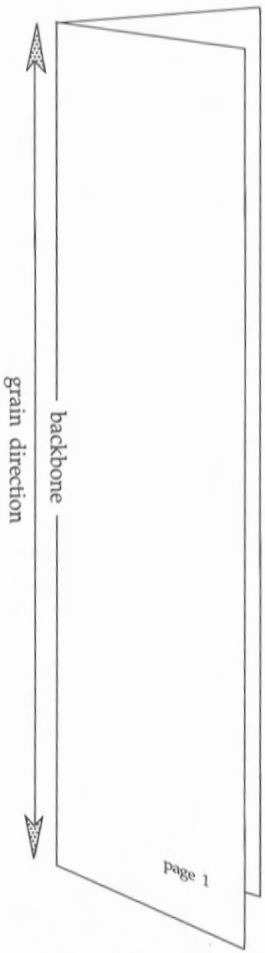


Octavo 4-1/2 x 12

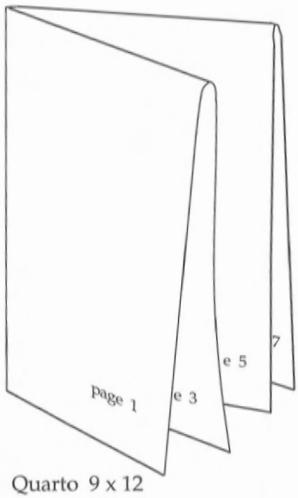
Octavo 9 x 6



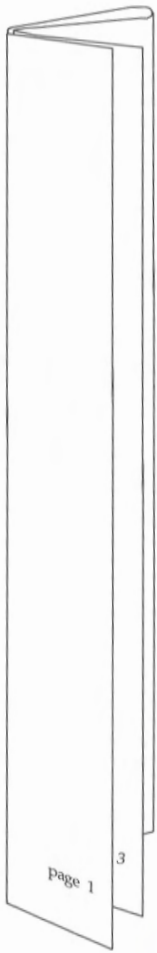
Sexto 6 x 12



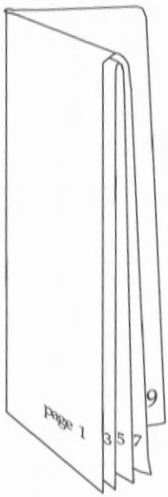
Folio 24 x 9



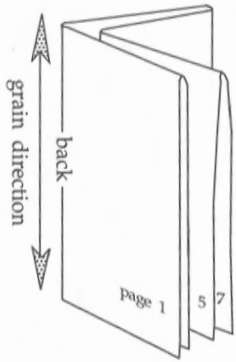
Quarto 9 x 12



Quarto 24 x 4-1/2

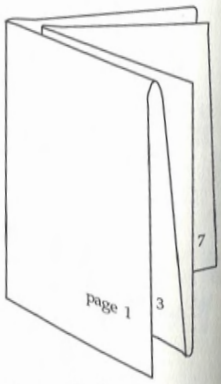


Octavo 12 x 4-1/2



Octavo 6 x 9

GRAIN LONG



Sexto 8 x 9

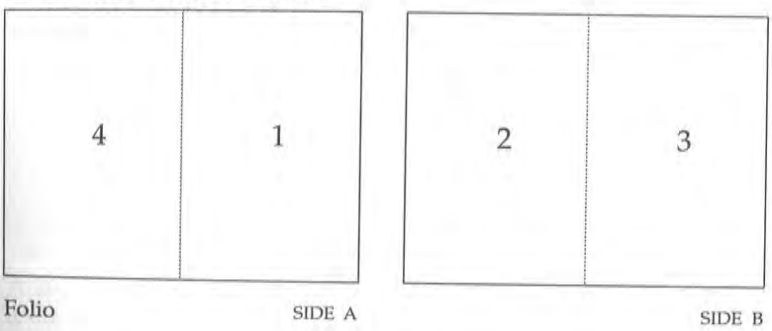
IMPOSITION

In commercial printing, the sheet of paper is printed, upon which are many pages, unless it is a broadside (poster). This sheet is then turned over, and the corresponding pages are printed on the back. The first side is called *Side A*. The other is *Side B*. Number of pages are determined by how it is folded down, into a folio, quarto, octavo, sexto, duodecimo, et cetera.

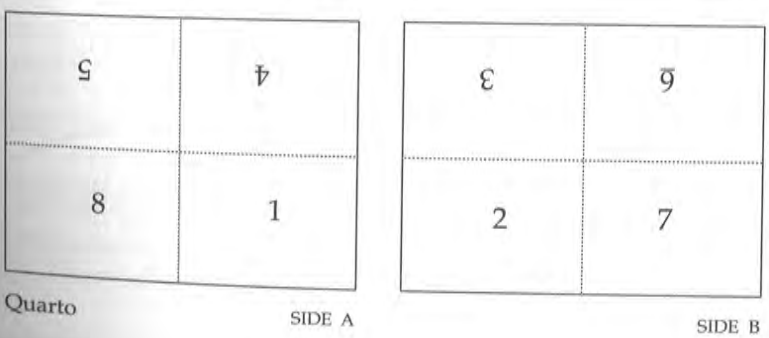
Looking at the flat sheet, the layout of pages is not in numerical order, and some pages might be upside down. The layout of the sheet is in a constructed order (it is *imposed*) so that the pages eventually will be upright and in consecutive order, after the printed sheet is folded down into a section referred to specifically as a *signature*. See: *Glossary*. The layout of this constructed order on the flat sheet is referred to as *imposition*.

One or more sheets may be printed, resulting in that number of signatures in the finished book. This text book was printed on twenty sheets, creating that number of 16 page signatures, making a 320 page book. Put another way, this book is a 20 sheet octavo. Since the page size is 9 x 6", it was printed on an 18 x 24" sheet.

DIAGRAM OF IMPOSITIONS



Folio SIDE A SIDE B



Quarto SIDE A SIDE B

5	12	9	8
4	13	16	1

Octavo SIDE A

7	10	11	6
2	15	14	3

SIDE B

8	5
9	4
12	1

Sexto SIDE A

6	7
3	10
2	11

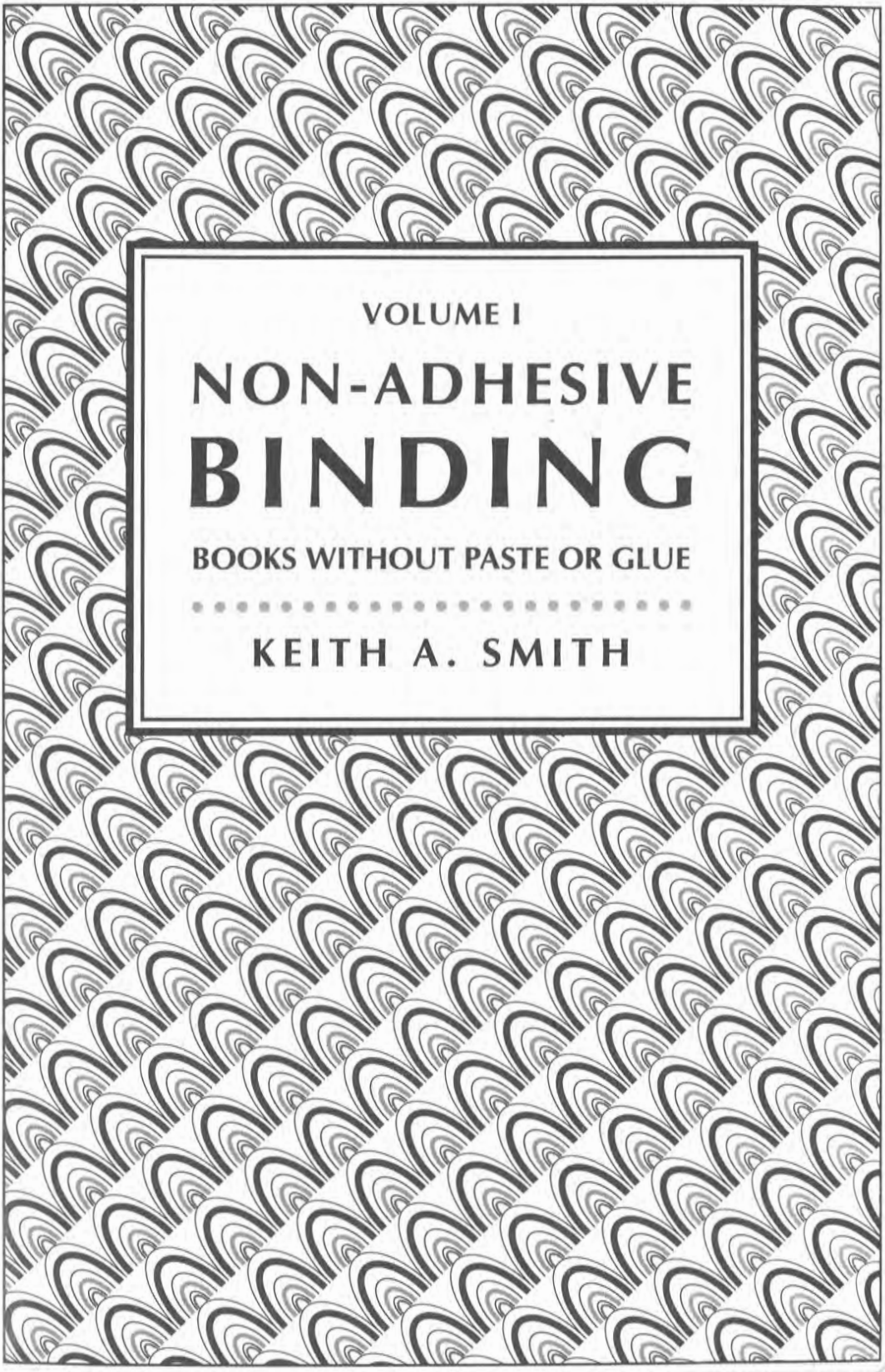
SIDE B

ENDSHEETS

Often the first and last sections of a multi-section binding are a different paper than the remainder of the book block. These are endsheets at the front and back of the book. If you wish, they might be a folio or quarto, even though the remainder of the book block is octavo or larger.

Endsheets are often a fine laid paper. The text weight paper is the same or lighter weight than the book block. Often they are a color different from the book block. They may be the same color as the cover. I see endsheets, cover, jacket, liners, straps, flaps, thread, and cord as the opportunity to introduce additional colors to the binding.

The term *end papers* refers to adhesive binding. It is a folio, half of which is pasted down on the inside of the board cover. The remainder extends across the gutter as the first page of the book block.


VOLUME I
NON-ADHESIVE
BINDING
BOOKS WITHOUT PASTE OR GLUE
KEITH A. SMITH