

A Collection of Old Weave Patterns

Weave patterns provide design ideas, inspiration, and just plain fascination. Old weaving books are wonderful sources of patterns. There are dozens of old weaving books devoted in whole or part to patterns.

Oelsner [1] is the most accessible. Donat's "Large Book" [2] and Posselt's dictionary of weaves [3] are well known. Other sources include Barker [4], Brickett [5], Falcot [6], Fressinet [7], Gruner [8], Kastanek [9], Neville [10], Schams [11-12], Serurre [13], Werner [14], two of Donat's other books [15-16], and Posselt's book on textile design [17]. A complete list of old books with weave patterns would run pages.

There are, of course, many newer books with weave patterns. The advantage of the old books is that they are no longer covered by copyright and their patterns can be used without concern for violating intellectual property rights.

While some old weaving books can be found in libraries (Complex Weavers Lending Library [18] is an excellent source, as is the Digital Archive of Weaving Documents [19]), the patterns are scattered, presented in a variety of ways, and organized differently. And, of course, there are many duplicates.

About the Patterns

This collection begins together thousands of patterns from many sources, including those mentioned above. There are more than 13,000 patterns in all in the collection.

The patterns are shown as grid plots — drawdowns — with black cells where the warp is on top and white cells where the weft is on top.

They are grouped by size according to the number of ends/columns. Within these groups, they are arranged in sections by the number of picks/rows. Finally, within the sections, patterns are roughly ordered by structural complexity (see Appendix A).

While it would be useful to have the pat-

terns sorted by weave type — twills, satins, and so forth — the taxonomy of weave patterns is controversial and problematical. Furthermore, many weave patterns fall into the inevitable "miscellaneous" category. In any event, classification by type has not been attempted here.

The collection of patterns here is far from complete. Completeness is a practical impossibility for patterns of more than trivial size. For example, there are $2^{16} = 65,536$ possible 4×4 patterns, although not all of these are structurally weavable and many are equivalent under simple geometrical transformations. The number of usable, distinct 4×4 weave patterns nonetheless is many thousand. As the size increases, the number of patterns grows to astronomical proportions. For 16×16 patterns, there are $2^{256} \approx 10^{77}$ possible patterns, a number larger than the number of elementary particles believed to comprise the universe.

Neither do the patterns in the collection include all those that appear in the old weaving literature. But they do include a good percentage of them.

Three things have been done in putting together the patterns for this collection:

1. Patterns with repeats have been reduced to *unit motifs* — the smallest subpatterns from which entire patterns can be produced by replication.
2. Patterns with more ends/columns than rows/picks have been rotated 90° so that all patterns have at least as many rows/picks as they do ends/columns.
3. Patterns with more warp thread than weft threads on top have been "turned over" (this reduces the amount of ink/toner needed to print the patterns).
4. Patterns that equivalent under the geometric transformations of rotations in 90° increments, horizontal and vertical flips, and column and row rotations have been replaced by a single pattern.

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6. Duplicates have been removed.

In this version, some equivalent patterns as described above that should have been removed earlier have now been removed. On the other hand, a few patterns that accidentally were omitted in the last version are now included here.

What's to Come

There are many as yet untapped sources of patterns, and material from these is planned for future editions of this collection.

More large patterns, suitable only for drawlooms or Jacquard-equipped looms, are possible.

Then there is auxiliary information that might be useful to weavers, such as:

1. Listing of loom resources (shafts and treadles) required when they are less than the number of ends/columns or picks/rows.
2. Float information.

The collection could be published as Web pages, with additional material such as WIFs and pattern repeats, which would give a better idea of the visual appearance of the use of a pattern than its unit motif does. This would be a substantial undertaking (See Appendix B for a brief description of what was involved in preparing this "print" version of the collection.)

Accessing the Patterns

The patterns are contained in three PDF files, with a file for each group by number of ends. Links to them can be found at Reference 19.

Free WIFs of most patterns are available from Kris Bruland's Web site [20].

Use of the Patterns

All of the patterns in this collection come from old weaving books long free of copyright. Individual patterns may be used freely without permission or attribution. See also Appendix C for comments on the copyright-

ing patterns.

Other uses of all or substantial parts of this collection without express written permission is prohibited.

Acknowledgment

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<http://www.handweaving.net>

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Appendix A

Structural Complexity

When presenting hundreds or even dozens of patterns of the same size, some form of ordering is helpful.

In this collection, the ordering of patterns of the same size is roughly by increasing structural complexity. This vague but somewhat imposing term may deflect probing questions, but that is not the intent.

As used here, structural complexity of a pattern means the following:

1. First, row and column line patterns are determined and the number of different ones up to circular permutations are counted. For example, a 2/2 twill has only one distinct line pattern: 1100. All rows and columns are circular permutations of this line pattern. Such a pattern therefore is simpler than, say, a spot weave produced by overlaying a repeated motif on a plain ground.
2. Within groups of patterns with the same number of line patterns, patterns are ordered by the number of blocks of 0s and 1s. For example, a 2/2 twill has two blocks in its single line pattern: 11 and 00, while a 2/3/1 twill has three blocks in its line pattern: 11, 000, and 1.

This method of ordering puts satins and regular twills at the beginning (a true satin has one line pattern and two blocks). Patterns without symmetries and little evident organization come last.

There are more sophisticated measures of pattern complexity that may be used in future editions of this collection.

Appendix B

How this Collection Was Constructed

This collection could not have been produced without the use of computers, capable application programs, and several special-purpose programs that were written to handle various matters related to graphics capture, analysis of structural complexity, and assembly of the patterns into documents.

The first step in capturing patterns involved computer scanning of old weaving books to produce computer images for further processing. Most of this scanning was done earlier for the creation of the Digital Archive of Weaving Documents [19].

A program was written to extract the patterns from computer images, analyze them, and produce “machine-readable” files that contain pattern information in a compact form.

These files were then analyzed and named according to their size and structural complexity, so that file names are in the alphabetical order according to the desired order of the patterns.

Another program was written to assemble individual pattern images into page images.

The publication form of the collection was produced in PageMaker. Because there are many pages of images, the task of placing them by hand in an orderly fashion on the pages of word-processor documents would have been time-consuming and tedious. Instead, PageMaker’s scripting language—a primitive programming language for specifying PageMaker’s operations—was used.

The scripts needed, however, were too long, tedious, and detailed to be written by hand. Instead a program was written to write the scripts based on the names of the image files to be placed on pages.

Finally, the PostScript output from the PageMaker documents was converted to PDF using Acrobat Distiller.

Appendix C

Patterns and Copyright

As mentioned earlier, the patterns in this collection were taken from books long free of copyright. The issue of the copyrightability of patterns, however, is interesting in itself.

Any work with sufficient original content can be copyrighted, whether it be a writing, a picture, a weaving draft, or other creative works.

The key phrase is *sufficient original content*. What is *original* can be understood fairly easily if not easily determined in specific cases. Copies of other works, modifications of them, and so on are not original. This includes modification of existing patterns.

What constitutes *sufficient* original content is harder to determine. The copyright law leaves this to the courts to decide. There are, however, some specific cases worth noting. Most amateur photographs are not copyrightable because they lack sufficient original artistic expression. Most professional photographs, on the other hand, are copyrightable because of the selection and posing of the subject and the artistic techniques used.

With respect to weave patterns, there is an interesting analogy. The courts have ruled that digital typefaces (fonts) are not copyrightable because the images, composed of individual pixels, are not large enough to satisfy the sufficiency requirement. (On the other hand, mathematically described type faces can be copyrighted, presumably because there can be more complexity in such fonts.)

In many respects, a weave pattern is analogous to a digital character. Both are composed of rectangular arrays of elements, each of which is black or white.

The question then would seem to be how large a pattern has to be to allow for the possibility of sufficient original content. Presumably, small weave patterns are not copyrightable, even if original. On the other hand, large original patterns, such as used for Jacquard-equipped looms, presumably are copyrightable.

There is nothing to prevent a claim of copyright, whether the claim is valid or not. In fact, such claims are common in cases where it is clear they are not valid, such as in facsimile reproductions or reprint of books that themselves have been long out of copyright.

What is copyrightable can only be determined by the courts, and the process is expensive and often long. This recourse usually is taken only when substantial value is involved. It also should be remembered that court decisions are subject to reversal as the result of subsequent litigation.

It's worth noting that a compilation of uncopyrightable items cannot itself be copyrighted simply because of the mass of material and the resources needed to produce it. Again, copyright commonly is claimed for compilations, despite the fact that the courts generally have ruled such claims are invalid.