

Adventures in Parallel Threading, Part I

by Sandra Rude

It all started with Sheila O'Hara's article on double-faced twill in *Handwoven* magazine. I liked the idea of a cloth with two distinctly different faces, woven with a single shuttle.

Sheila's design uses a divided draft. The first four shafts always weave one face of the cloth, and the second four weave the other. The two warps alternate; an end from warp A followed by an end from warp B, and so on. The cloth is essentially two warp-faced twills arranged back to back. The single weft interlaces with one end in four on each face with every pick.

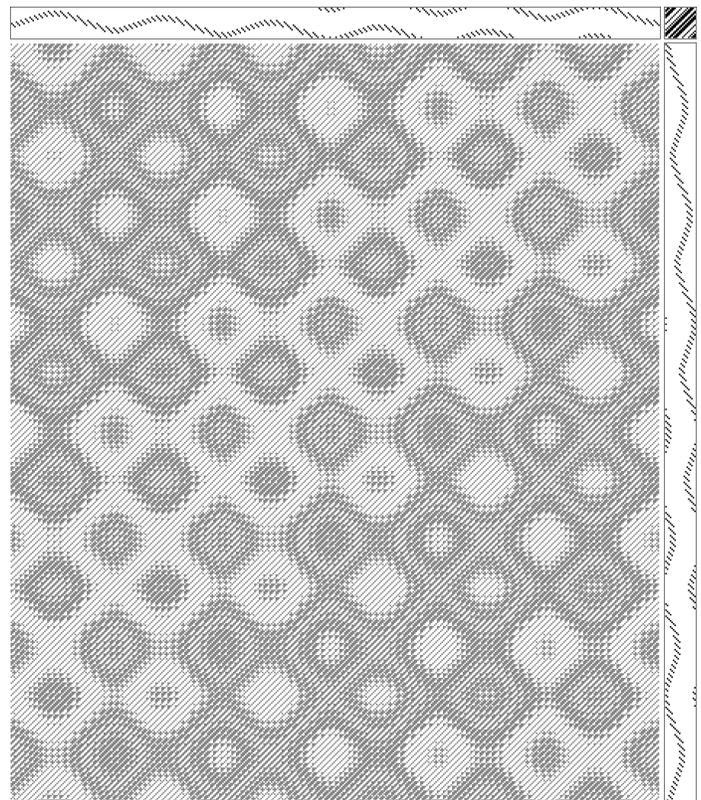
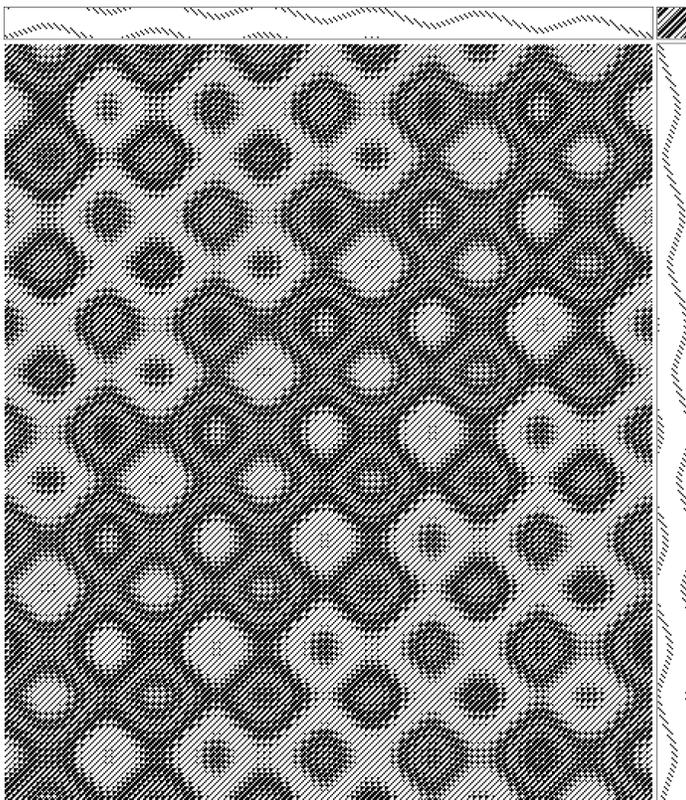
Sheila's article got me thinking about double-faced twill in which the design incorporated networked curves rather than stripes. I posted a query to the Weavetech list asking if this were possible. Bonnie Inouye pointed me to Alice Schlein's article on echo weave, a topic that at the time was being explored by a number of weavers, including the multishaft study group of the Potomac Craftsmen Guild. Back I went to the bookshelf, this time to *Weaver's* magazine.

In Alice's drafts illustrating the article, the original networked design line is "echoed" by another copy of the

same design line threaded in a different color and offset from the original design line by some number of shafts. A design line can have two, three, or more echoes. Each design line and echo uses as many shafts as are available. That gives you more design flexibility than double-faced twill, in which each face can only use half the available shafts.

In reading the article, I noted that echo weave is not a weave structure per se, rather it is a threading method that opens a new range of design possibilities that can be applied to a number of structures, often twills or satins. Both of these are good choices for supple, drapy scarves, which is what I want to weave.

The recommended sett for echo weave, like that for double-faced twill, is similar to double-weave – that is, twice as dense a sett as one would normally use for one's chosen yarn woven in the chosen structure as a single warp layer. Bonnie had said that some weavers in the study group had used more open setts for their echo weave experiments with good results. A close sett results in cloth with two distinct faces, in which the warps are predominant and the weft almost disappears, somewhat like double-faced twill.



1. Curve A, warp black

2. Curve B, warp grey

A more open sett looks more like conventional twill, but with more color blending because the weft-dominant areas are more visible.

Another variable is the offset between the original design line and its echo(es). The most common choice is to divide the total number of available shafts by the number of design lines. In other words, for a 16-shaft design with two design lines (the original and one echo), the two design lines are positioned eight shafts apart. However, this isn't cast in stone – you can choose any offset you wish to use. Try several variations in your weaving software first, check for excessive floats, and thread your loom with the version that you like best.

With a goal of lightweight cloth, I plan my first project using 20/2 tencel. I would sett this yarn at 45 epi for conventional twill. For echo weave, I decide on a sett of 56 epi, which is about 25% closer than normal.

Here are the steps I go through to create the design:

1. Recycling is good, right? I choose a design line from a project I have already woven as a conventional networked twill, one which consists of advancing curved shapes. See Figure 1. Note that the design line begins on shaft 1 (at the right end of the threading) and all warp threads are black. Note also that although I weave on a twenty-four-shaft loom, the draft has only twenty shafts and twenty treadles. I'll add four shafts for a basket-weave selvedge later, after the threading and treadling are designed. The treadling is "as drawn in" for now, and the tie-up is a 3/1/1/3 twill variation.

2. After saving the design as Curve A, I save it again with the name Curve B. In the Curve B file, I change the color of the warp threads to grey and "wrap" the entire threading up by eight shafts, so that the right-most end is on shaft nine. See Figure 2. Once the changes are made, I save Curve B again.

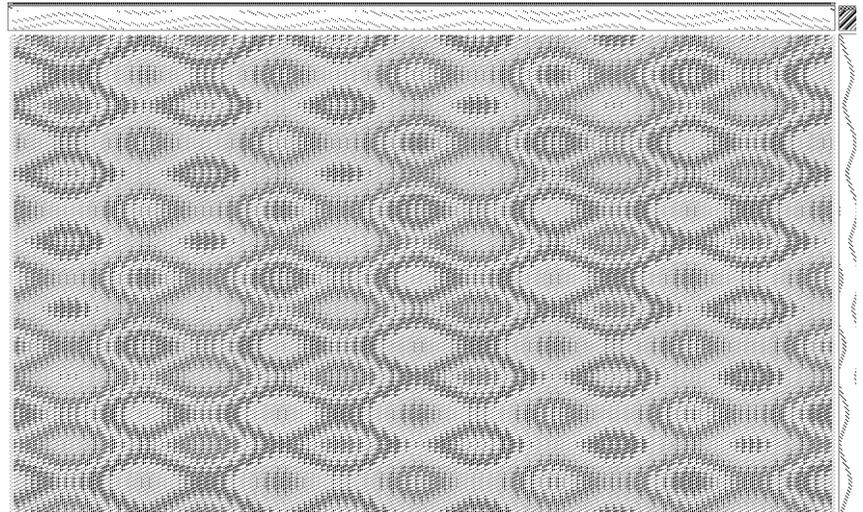
3. With both files open, I instruct WeaveIt Pro to "interleave" the two drafts. Most weaving software has an interleave function – you'll have to explore the menus to find it. In WeaveIt, look under the Design menu. Note that WeaveIt takes the first end from the file that is "active" when you select the interleave function, and the second end from the "inactive" file, and so on.

4. The Interleave Draft dialog box has several options. I choose "Create New Draft" and "Interleave Threading" and turn off all

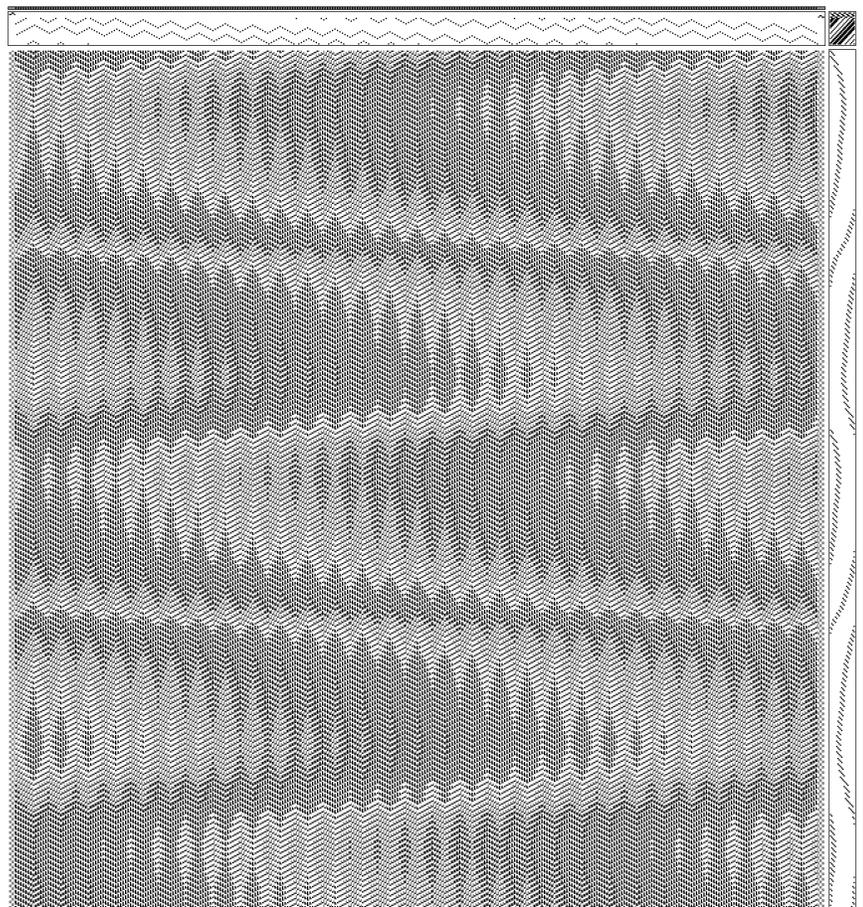
the other checkboxes. (If I select "Use new shafts" I'll get a divided draft, which I don't want. And I don't select "Interleave Treadling" because I want a single design line in the treadling, not an interleaved pair of design lines.)

5. WeaveIt creates a new file that contains the interleaved threading. I save this file with a new name (Echocurve), and copy the tie-up and treadling into it from the file Curve A. I save the file again.

6. Next, I set the draft to twenty-four shafts and twenty



3. Both curves



4. Scarf

treadles, and edit the threading to add basket selvedge ends on shafts twenty-one and twenty-two on the right side and shafts twenty-three and twenty-four on the left side. I fill in the upper four rows of the tie-up with basket weave, and save the file one more time! See Figure 3.

7. Since recycling is still good, I make several copies of the draft, and try out other networked treadlings I have on file that are compatible with a four-end network initial. I may also make changes to the tie-up. Some versions are attractive, some not so good. The good ones I keep, the others hit the trash bin.

Alice's article recommends using contrasting colors for the two warps. Some echo weave proponents use light and dark, as in shadow weave. For my first project, I dye warp A in a medium dark teal, and warp B in light blue, in quantities sufficient for three scarves on the same warp. Each scarf is woven with a different 30/2 tencel weft color: blue-violet, red-violet, and light green.

After weaving the scarves, plying the fringes, laundering and pressing, I notice two things: First the degree of color

blending. There are areas where warp A dominates, where warp B dominates, where the weft dominates and interlaces mostly with warp A, and where the weft dominates but interlaces mostly with warp B. Using only three yarn colors, optical blending yields four colors in the cloth. What fun!

The second thing I notice is the degree of iridescence. This is most apparent in the scarf with a red-violet weft against the teal and blue warps. The closer the colors are to complementaries, the more iridescent the result. The luster of the tencel also contributes to the effect.

So on to the next echo weave project. Bonnie had mentioned that using an advancing point twill design line creates a cloth where the weft appears and disappears as your angle of viewing changes, so of course I had to try it.

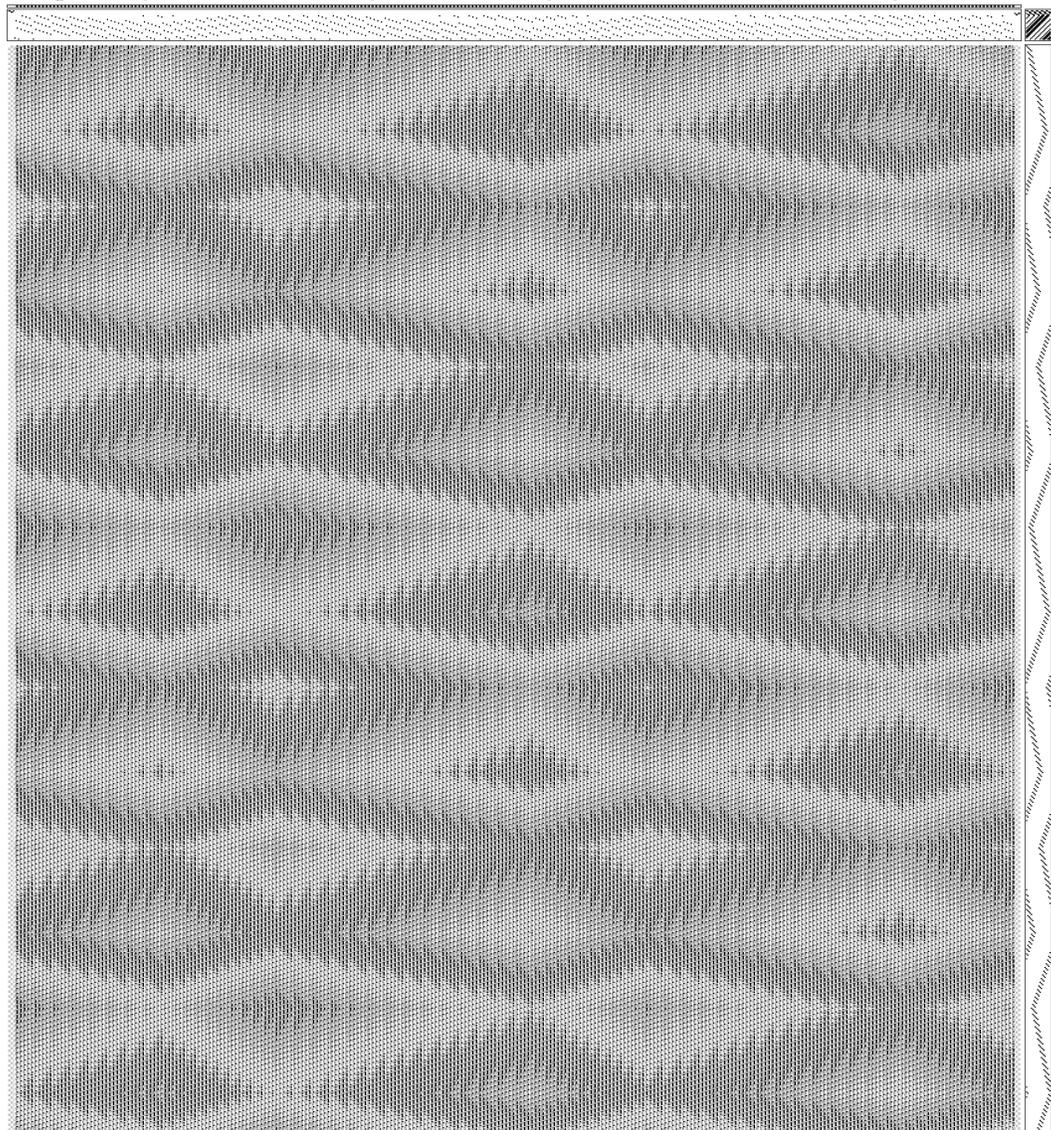
This project used 30/2 tencel for both warp and weft, sett at 60 epi, which is about 10% closer than I would use for this yarn in a conventional twill. The draft is shown in Figure 4. The warp colors are navy and medium blue (black and grey again in the monochrome printed version). Of the many treadling versions that I tried out in digital format, I

ended up weaving four. And Bonnie was right, the visual effect of weft color appearing and disappearing as the cloth moves is intriguing.

Getting brave, I wove my third project with three design lines (the original and two echoes) using black, grey, and white 30/2 tencel warp sett at 60 epi and bright colors of the same yarn for weft. The draft is shown in Figure 5, whose treadling uses the original design line, and Figure 6, which uses a different networked design line.

Be warned that most weaving software doesn't allow you to interleave three designs at a time. I emailed Sally Breckenridge, author of WeaveIt, asking how to accomplish it. Her solution worked, but involved some tedious editing.

First you create three files containing the design lines at the offsets you choose, warp ends colored appropriately. For simplicity, let's call the files A, B, and C. Interleave A with B and save the resulting



5. Three echoes, part of scarf length

file. In another run, interleave C with itself. You'll end up with a file whose threading has doubled ends (that is, 1, 1, 2, 2, 3, 3, etc.). Now interleave the A+B file with the C+C file. This action results in a file whose warp threads are ordered A1, C1, B1, C1, A2, C2, B2, C2, etc. What you really want is A1, B1, C1, A2, B2, C2, etc. Edit the threading and delete the first C1 thread, the first C2 thread, the first C3 thread, etc. As I said, tedious in the extreme. If anybody has a more efficient method to suggest, by all means let me know!

I noted that my design line is now three times as wide as in the original file. For scarves or other narrow cloth, I need to truncate the original design to one-third of the number of warp ends that will give me the width I want. In the case of a large-scale design, I may end up with only one or two iterations of the motif. Also, the design is stretched horizontally, so motifs change in shape. Circles become wide ovals, for example. I can partially compensate for this by weaving fewer picks per inch, to elongate the design vertically back to something closer to its original proportions. The projects that were sett at 60 ends per inch

were woven at 40 picks per inch. This also gives the scarves nice drape even at relatively close setts.

To see color scans of all of these echo weaves scarves, visit www.3springshandworks.com/textiles, and look on the page called "Extra Features" for a PDF copy of this article that includes color images of drafts and color scans of the finished scarves.

What's the next step in this adventure, you ask? Well, on one hand I'm working on drafts that interleave two different design lines, rather than two copies of the same design line. On the other hand, I'm back where I started with Sheila's double-faced twill, designing a divided draft that weaves double-faced networked twill, with the same design line in different colors on each face, offset from one another both horizontally and vertically. And then there's Verda Elliot's article in *Weaver's* magazine that describes a divided draft with two superimposed twills for

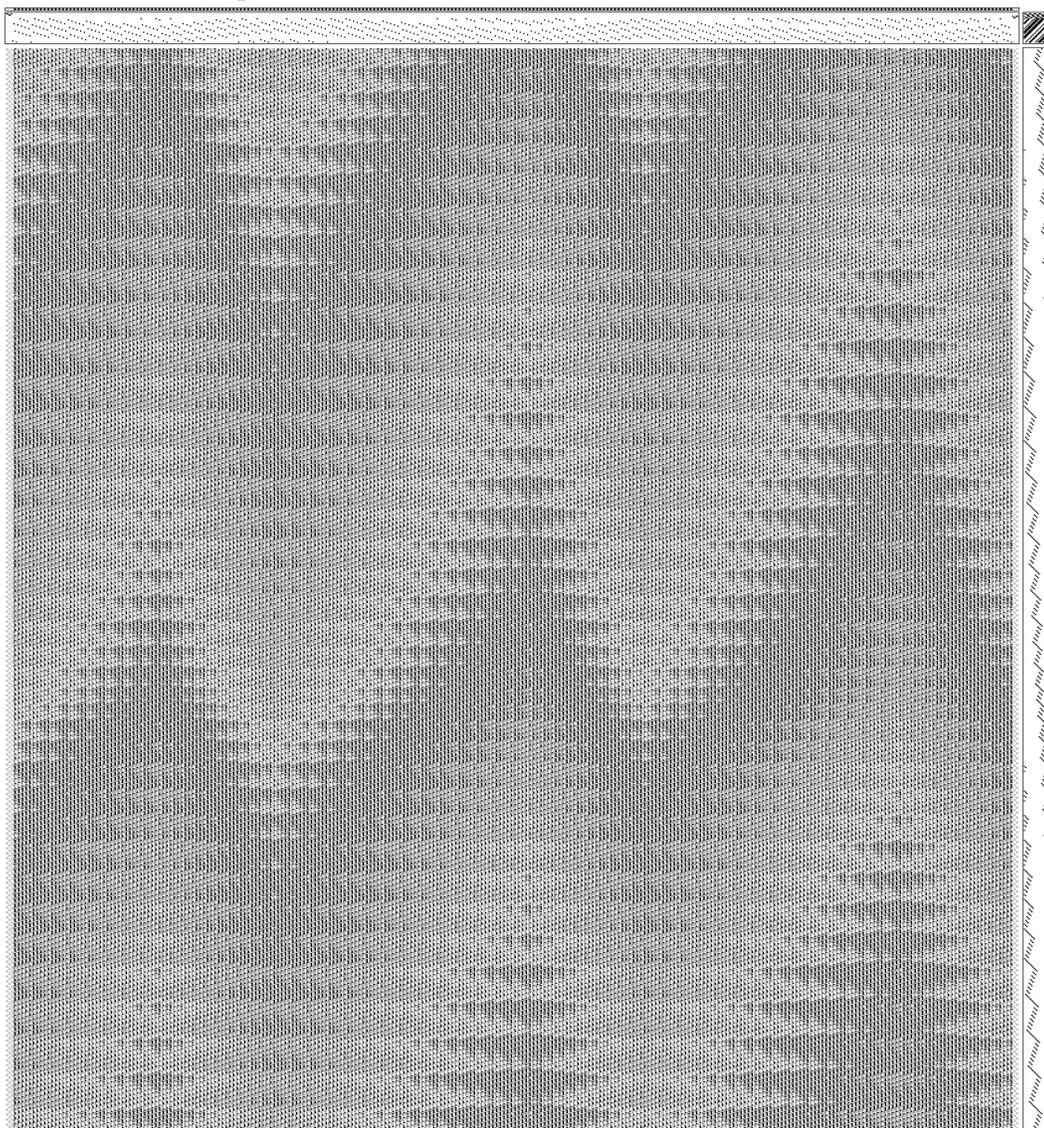
a moiré effect. The journey has only just begun. Stay tuned. Part II will be along later...

References:

- Elliot, Verda. "Woven Moire". *Weaver's*, Issue 20, 1st Quarter 1993. Page 38 and back cover.
- O'Hara, Sheila. "Turning Over a New Leaf". *Handwoven*, Issue 111, September/October 2002. Front cover and page 24.
- Schlein, Alice. "Echo Weave: Something Old and Something New". *Weaver's*, Issue 32, Summer 1996.

Color graphics and photos: see

<http://complex-weavers.org/journal.htm> and http://3springshandworks.com/complex_weave_structures.htm



6. Different design line, three echoes