Chapter 8

Double Weave

Double weave is such an important construction that many books have been dedicated to this one structure, and a few include more than two layers. If you know nothing at all about double cloth, perhaps you should read some of those books first, and weave a sample or two on a shaft loom. *DOUBLEWEAVE on Four to Eight Shafts* by Ursina Arn-Grischott (see Appendix K–Bibliography) is an excellent book to get you started. We won't be dealing with multi-layered cloths such as triple and quadruple cloth but once you understand double cloth, you will be able to proceed with those constructions using Photoshop in your own work

Definitions

The road from single to multiple cloths may take several directions. A single cloth of whatever structure (plain, twill, damask) may be modified with additional warps which float on the back and interlace with the main cloth at specified intervals (warp-backed); or with additional wefts which do the same (weft-backed); or with additional warps and wefts both of which intersect with the main cloth at certain points and also interlace with each other to form a second cloth.

If this second cloth does not intersect with the main cloth, except perhaps at both edges (as in tubular cloth) or at one edge (cloth woven double width), the structure is a true double weave. If the cloth is reversible, that is, either side of the cloth can be considered the "right" side, then both sides of the cloth may be interchanged to form designs in a jacquard construction.

Which Side?

When describing the cloth, we assume the viewer is looking at the cloth as it is woven on the loom, whether or not this is the face or "right" side in use. Looking at the layer that weaves on top, we indicate warp risers as black marks. Inverting this layer (changing black marks to white and vice versa) is not the same as viewing this actual cloth layer from the back side, which would flip the draft (as if turning the page of a book) as well as invert it. Additionally, viewing the bottom layer from weaving position is a mental gyration, because in real life this side of the cloth is hidden underneath the top layer or layers; but if we imagine viewing it with our x-ray vision, rising warps would be black marks in the draft.

Now imagine the total draft, including the warps and wefts of both layers; if we invert this entire draft (black to white and white to black), we will not only be changing which layer weaves on the front, but also which face of each layer comes to the front. Sometimes when constructing Pattern Presets (weaves) we include not only the weaves, but also the inverse of the weaves. The inverses are not always useful, but frequently offer surprises and interesting texture variations to add to the palette, and once a weave is constructed it is little extra work to add the inverse to the list.

Stitching

Layers may be left separate or stitched. If separate, the cloth may shift and slide around during weaving, and cause tension problems. When the cloth is removed from the loom, the separate areas may pucker and bubble in uncontrollable ways. This is especially problematic in large design areas. If the design areas are small, this may not be an issue. (Of course, you might like this effect and call it a design decision.)

The layers can be stitched together at intervals by stitch points hidden between warp floats or weft floats or both by judicious placement in the drafts. For some structures, like balanced plain weave, hiding these stitch points is not always possible. The designer may consciously choose to make the tie points visible, no matter which structures are used for the individual layers; piqué and matelassé fabrics (both variations of double cloth) are constructed with visible ties which form a pattern of their own.

Layers may be stitched by having a warp from the top layer drop beneath a weft from the bottom layer (the same as a weft from the bottom layer rising above a warp from the top layer); or having a warp from the bottom layer rise above a weft from the top layer (the same as having a weft from the top layer drop beneath a warp of the bottom layer). This can be thought of as stitching down or stitching up. These stitch points may be inserted often or spaced widely, as dictated by the end use of the cloth.

Other Combinations

More than two cloths may be woven simultaneously; it is possible to weave triple, quadruple, and other layer multiples either separately or tied, and the multiple layers may be interchanged for figured jacquard design.

Additional warps or wefts, whose only function is to add bulk but not a visual effect on either surface, can be floated between the layers. These floating warps or wefts, if they are assigned special colors, may periodically exchange position with working ends or picks to increase the color palette options in jacquard cloths. Some cloths use these extra warps or wefts throughout the fabric specifically for the option of increasing the color palette, not for the enhanced weight (though that will occur).

Designing for Face of Cloth

When planning double weaves, consider that the weave diagrams indicate warp and weft threads side by side in the order they are threaded in heddles and thrown in the weft, but in actuality the threads of the top layer sit directly above the corresponding threads of the bottom layer, effectively hiding that layer. The actual sett of the cloth will modify this, but in general one layer will hide the other(s). Single pixels in a full draft don't allow for one layer to hide the other. To avoid single pixels, it is best to design for the face of the cloth. Work at half size in the design process (or the factor appropriate to the number of warp and weft systems), then after the file is flattened and reduced to the desired number of colors, expand to the desired number of pixels. When resizing, be sure to select the **Nearest Neighbor** option. If using three warp and weft systems when designing for triple cloth, use one third the final pixel count for the face of the cloth; and when designing for quadruple cloth, with four warp and weft systems, use one fourth the full count. See Chapter 4 for more information on designing for the face of the cloth.

Double Weave Development in Photoshop

Following is a suggested strategy for designing double weaves, both stitched and unstitched. For this example we will make a double weave from a 2/2 broken twill and a 3/2/1/2 straight twill. Create a Photoshop template whose pixel dimensions equal the repeat size of the weave (that is the combined width and height of the two structures), and enlarge it on the screen for better visibility (800% or more). We like to add an extra couple of pixels along the top and left for indicating warp and weft system identity (in this example, red for cloth A and blue for cloth B). These borders are not part of the structure. The structure grid in this example is 16x16, for two layers each comprising an 8x8 weave. The grid portion is color keyed also: dark pink for cloth A warp and weft and medium blue for cloth B warp and weft. The figures in color can be found on the CD in the Chapter 8 folder (Figure 8-1).
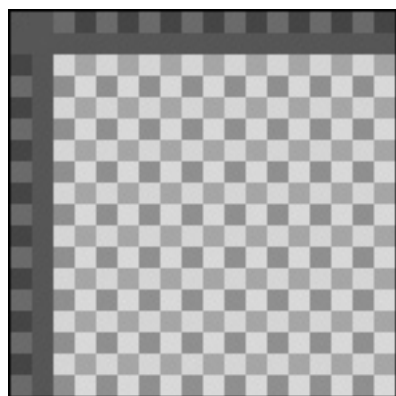
8-1
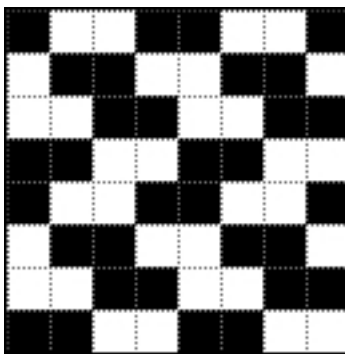
8-2
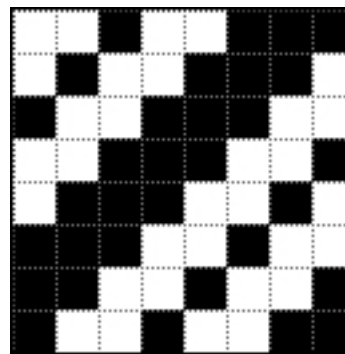
8-3

Create an 8x8 pixel grid for each layer, white background, and enter the weave in it with the Pencil tool, color black. Be sure you are working at the pixel level. In **Photoshop>Preferences>Guides, Grid & Slices**, specify gridline every 1 pixel, subdivisions 1 (In Windows, Preferences is found under the Edit menu). **View>Show>Grid**.

Figure 8-2 is a 4-end broken 2/2 twill, which could have been drawn on a 4x4 grid, but is here entered with two repeats warpwise and weftwise to match the size of the weave in Figure 8-3, a 3/2/1/2 straight twill. Expand both of these weaves to twice their size (**Image>Image Size**, use Nearest Neighbor, change height and width to 200 percent, click OK), thus:
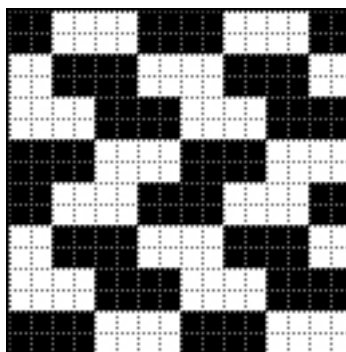

8-4
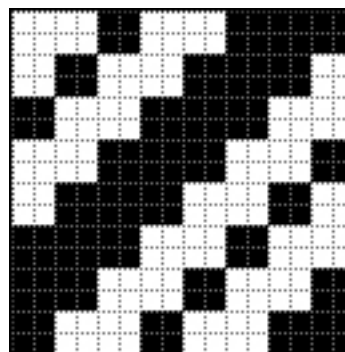
8-5

Then remove the marks in every other row and every other column; you can use the Pencil tool and foreground color white for this; or you can use the Single Column Marquee tool + Shift, then the Single Row Marquee Tool + Shift and select all the columns and rows, then Fill with white (Figure 8-6 on the next page).
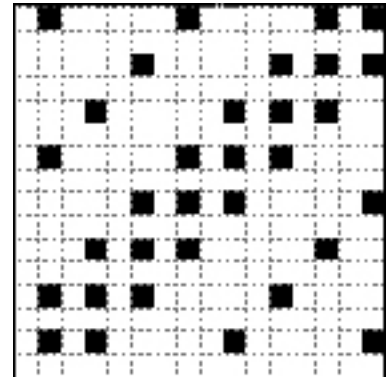
Note that Figure 8-6 is Figure 8-4 modified so that marks fall on the odd ends and picks only. Figure 8-7a is 8-5 modified then modified further using **Filter>Other>Offset**, check Wrap Around and make Horizontal 1 pixels right and Vertical 1 pixels down, click OK. The marks now fall on even ends and picks only.
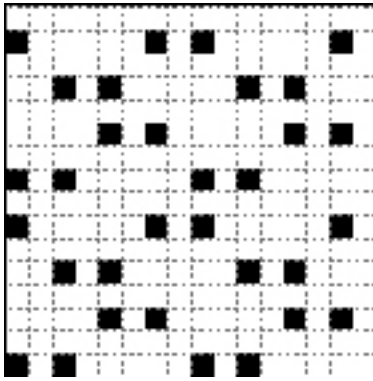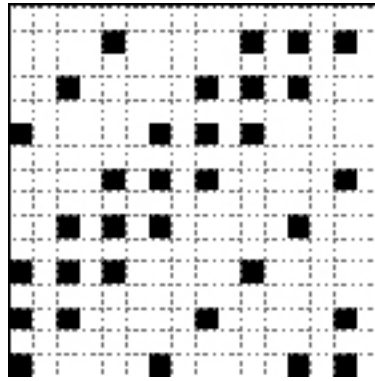
8-6   8-7a   8-7b

Now open the double weave template illustrated in Figure 8-1, if it is not already open. We added four new layers by clicking the Make New Layer icon at the bottom of the Layers palette. Label them as in Figure 8-8, which shows our Layers palette.

Look at the Layers palette. So far the Background layer, which has our color-keyed grid, is the only layer containing information.

Turn off all the eyes except on the Background layer and *Cloth A*. Click on *Cloth A* in the palette; it will turn blue, to indicate that it is the active layer and you may enter information in it. To be certain this layer is empty, **Select>All** and hit the Delete key. Working with an empty layer ensures that the paste operation will not create a new layer.

Open Figure 8-6 if it is not already open. This 2/2 broken twill will be entered in *Cloth A*. With the Magic Wand, Tolerance 0, Anti-alias and Contiguous unchecked, click on one of the black pixels. **Edit>Copy**. Go back to the template file, and with *Cloth A* still active and visible, **Edit>Paste**. The pixels have not been pasted exactly where you want them. With the Move tool (keyboard shortcut V, or press and hold the space bar) move the pasted pixels so that they cover only the dark pink squares, which represent the warps and weft

8-8

of Cloth A, indicated in red along the top and side border. Turn the eye icon for *Cloth A* on and off to check that the new pixels indeed reside on that layer. Save the template file and give yourself a pat on the back. You have just entered a broken twill as one layer of your double weave! Your file will now look like Figure 8-9 illustrated on the next page.
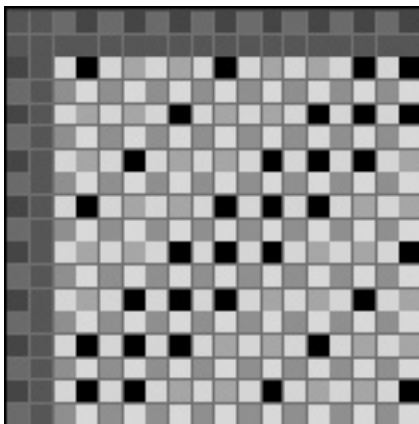
On to the second layer. Open up the file illustrated in Figure 8-7b if it isn't already open, which represents the 3/2/1/2 straight twill to be pasted into *Cloth B*. With the Magic Wand tool, click on one of the black pixels. **Edit>Copy**. Go the template file which you just saved (Figure 8-9), be sure
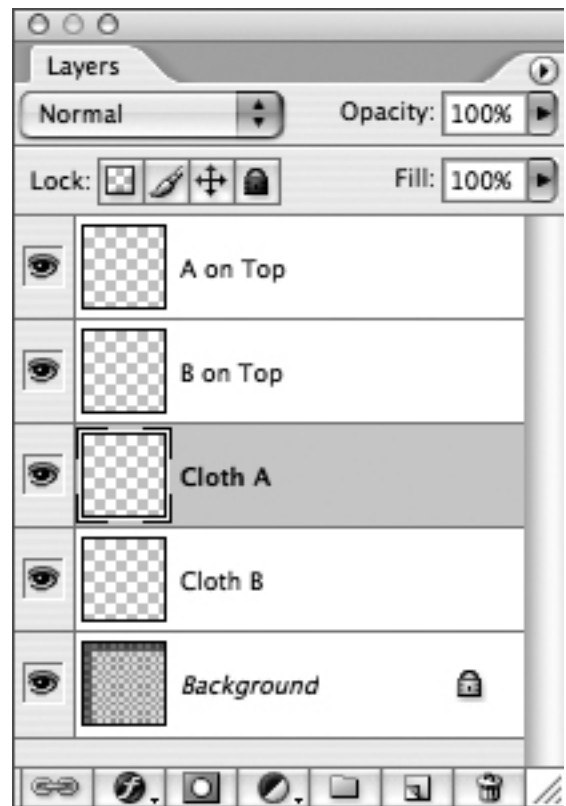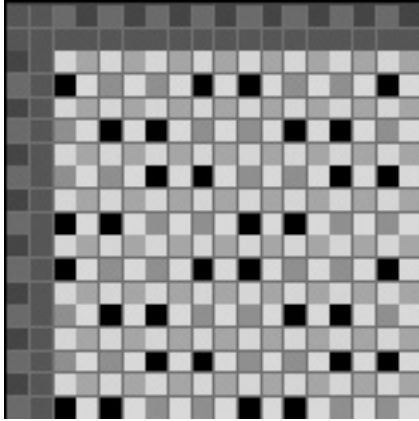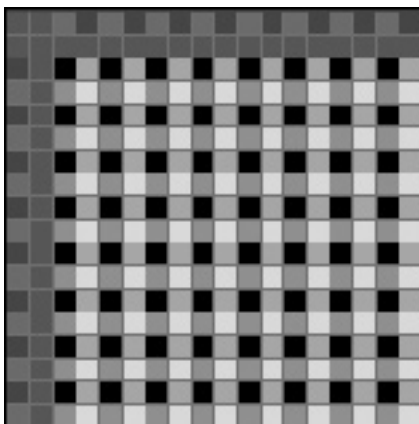
8-9

8-10

8-11

Cloth A is invisible (if it is visible, click on the eye icon to make it invisible), click on the *Cloth B* eye icon to make this layer visible, and click on the *Cloth B* title to highlight it and make it the active layer. **Edit>Paste.** Again, you will have to move the pixels into position with the Move tool, this time placing the black marks on the medium blue squares, which represent the warps and wefts of Cloth B. Save your file; it will now look like Figure 8-10 when only the Background and *Cloth B* layers are visible.

Still working in the template (Figure 8-10), in the Layers palette temporarily turn off the Layers named *Cloth A* and *Cloth B*, make the Background layer visible and active. When you choose to make Cloth A weave on top, you must raise all the A warps while weaving Cloth B. So we want to have black pixels (indicating warp up) in all the squares which raise the A warps while throwing B weft picks (light blue squares). With your Magic Wand tool (have contiguous unchecked) click on a light blue square in the Background. All the light blue squares will be selected. Now click on the layer *A on Top*, making it visible and active. The selection is still active. Go to **Edit>Fill**, Use: Black, click OK. With only the Background and *A on Top* layers visible, your file should now look like Figure 8-11.

We need a layer that will allow Cloth B to weave on top of Cloth A. We are going to perform a similar operation for raising all the B warps while weaving the A wefts. We need risers in all the light pink squares. If the previous selection is no longer active, with the Magic Wand (contiguous unchecked), click on a black pixel to select all the black marks from the *A on Top* layer. Use the arrows on your keyboard to move the selection so it falls on the light pink squares. Turn off the visibility of all the layers except the Background, then click on *B on Top* layer to make it visible and active. You will see the selection marquee moving around the light pink squares. **Edit>Fill**, Use: Black, click OK. The template will now look Figure 8-12, with only the Background and the *B on Top* layers visible.

If you wish to weave these two cloths, the 2/2 broken twill and the 3/2/1/2 straight twill, as two unstitched layers with no connection to each other except in the places in the design where the cloths switch from front to back, then your file is ready for "harvesting" the weave structure as a Pattern Preset. By the way, we saved the completed template as ***DoubleWeaveTemplate16 x16U**.psd** (naming files with a punctuation mark at the front, such as an asterisk, will bump the file to the top of an alphabetized file list, a useful trick when you need to find things fast). The "U" in the name means unstitched. This file may be found on the accompanying CD in the Chapter 8 folder.

Saving the Pattern Presets

We will start with the Preset that weaves Cloth A on top. In the Layers palette of the template, turn on the eye icons of the Background, *Cloth A, Cloth B*, and of *A on Top* layers. The Layers palette should now look like Figure 8-13, and the image window should look like Figure 8-14.

We intend to save the Pattern Presets as black and white marks. We need a layer of white to replace the colored squares of the present Background layer. With the Background layer visible and active, click on the Create a New Layer icon on the bottom of the Layers palette (second icon from the right). Now turn off the visibility of the Background, and all other layers, except the new layer. Rename that layer *White*. With white as the foreground color, use the Paint Bucket to fill the layer with white. Now click on the eye icons for the layers *Cloth A, Cloth B,* and *A on Top*. With a Fixed Size Rectangular Marquee tool of 16x16 select the 16x16 structure in the lower right of the image. **Edit>Define Pattern** and name the Pattern Preset. (For more information on creating, saving, and using Pattern Presets, read Chapter 4.) You may copy this structure to a new file, flatten it, invert it (**Image>Adjustments>Invert**), and save it as a Pattern Preset with another name–two weaves for the price of one! The Layers palette will look like Figure 8-15 on the next page.

Our two Presets, saved in the folder *DWEX* (found on the CD in both the Chapter 8 folder and the master Weave Presets folder, under Double Weaves), are *DWEX101a* and *DWEX101b*, and look like Figures 8-16 and 8-17 on the next page.

Back to the file ***DoubleWeaveTemplate16x16U**.psd*. You now want to create a weave with Cloth B on top. Turn off the visibility of the layer *A on Top*, turn on visibility of *B on Top*, and have the *White* layer visible. With the 16x16 Fixed Rectangular Marquee, select the structure in the lower right and **Edit>Define Pattern** and give it a name (ours is called *DWEX104a*). Now make the inverse structure (copy it to a new file, flatten and invert it), and save that

Note: for more accurate viewing of these illustrations, open the full color versions on the accompanying CD.
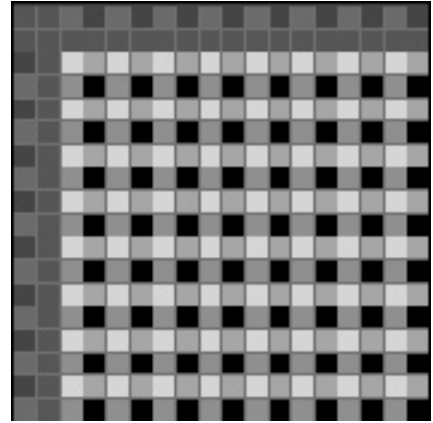
8-12
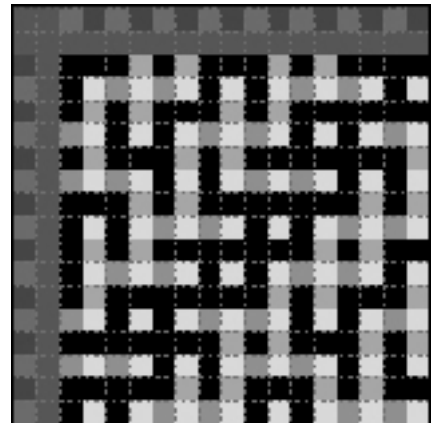
8-14

8-13

as a Pattern (we called it *DWEX104b*). The two new Pattern Presets are shown in Figures 8-18 and 8-19.
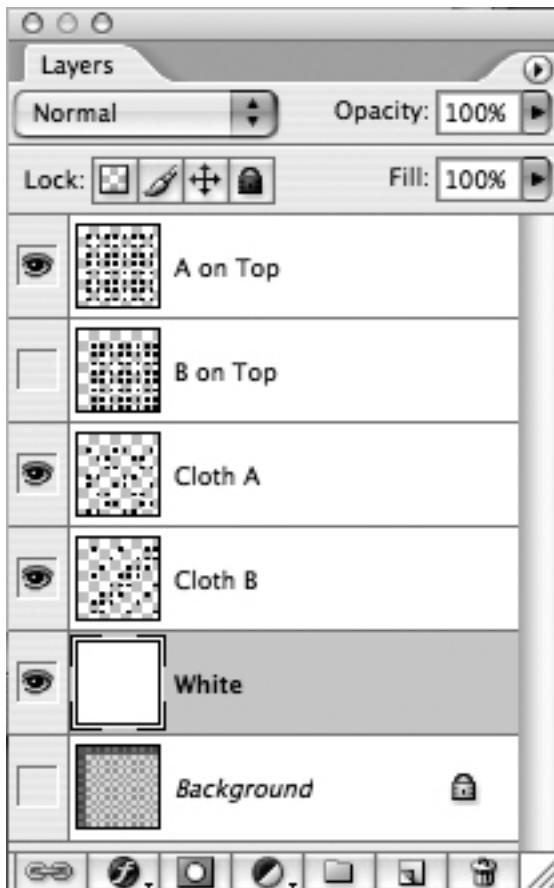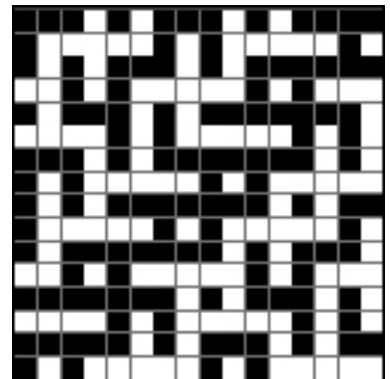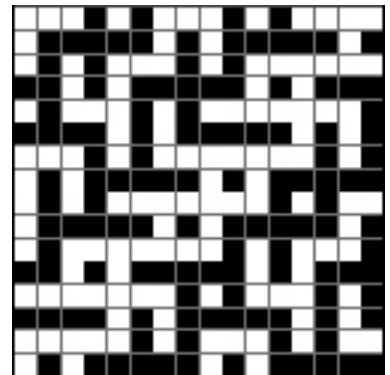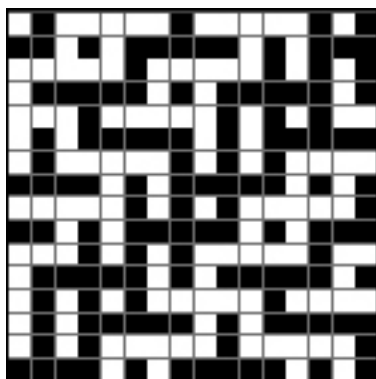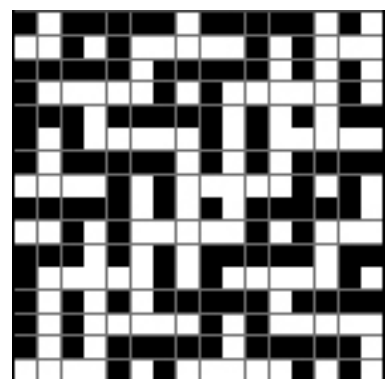

8-15

8-16   *DWEX101a*

8-17   *DWEX101b*


8-18 *DWEX104a*

8-19 *DWEX104b*

Stitched Weaves

There are several reasons why you may choose to stitch or not to stitch your layers together. If you are designing for industry, you may be bound by standards of flammability, abrasion testing, and other factors. Industrial looms may operate more reliably if layers are stitched. If you are designing art pieces for a handloom, on relatively short warps, these factors might not concern you; however, large areas of unstitched double weave can pull unevenly as they wrap around the cloth beam, or the fabric may hang unevenly when mounted for display, or when cut and tailored into garments. Short runs for creating differential shrinkage in the cloth might work best with separate layers: perhaps you want to have some areas stitched and some areas separate. We have already seen how to design unstitched double weaves. Let us now modify our Photoshop template with the same two weaves, and see how to stitch them together.

There are templates saved on the CD that you can use, but we think it is a good idea for you to work through the process of building a template so you will really understand the method. Therefore, take the file **DoubleWeaveTemplate16x16U**.psd, duplicate it, and save the duplicate as **DoubleWeaveTemplate16x16**.psd. Note that we have eliminated the "U" for "unstitched". Our new template will deal with cloth layers that are tied or stitched together in some way.

We want to add two Layer Groups to our template and some layers in each group. Figure 8-20 shows the Layer palette with the new Layer Groups and Layers added and named. You can add Layers or Layer Groups through the menu **Layer>New>Layer** or *Layer>New>Layer Group*, or you can use the flyout triangle on the upper right corner of the Layers palette or click on the icons at the bottom of the Layers palette (the Create a New Group icon is the third from the left; the Create a New Layer icon is the second from the right). To turn the visibility of any grouped layer on and off, the Layer Group layer must first be turned on. The visibility status of a Layer Group supersedes the visibility status of any layer within the group. Consult the Photoshop Help menu for more information on working with Layer Groups.

To make your Layers Palette conform to Figure 8-20, click on the *A on Top* layer and then click on the Create a New Group icon at the bottom of the Layers Palette (or follow one of the other methods described above). The new Layer Group will be created above the *A on Top* layer, and be called *Group 1*. It will have an image of a folder to the left of the name. Click on the name and rename it *A on Top*. Now highlight the *A on Top* layer from the original template that has information in it and drag it onto the new *A on Top* Layer Group. Rename that layer *Raise Warp A when weaving Weft B*. Did you notice that this layer is now indented under its Layer Group name? If you click on the small disclosure triangle to the left of the folder image in that Layer Group, the layers in the group will be displayed or hidden.
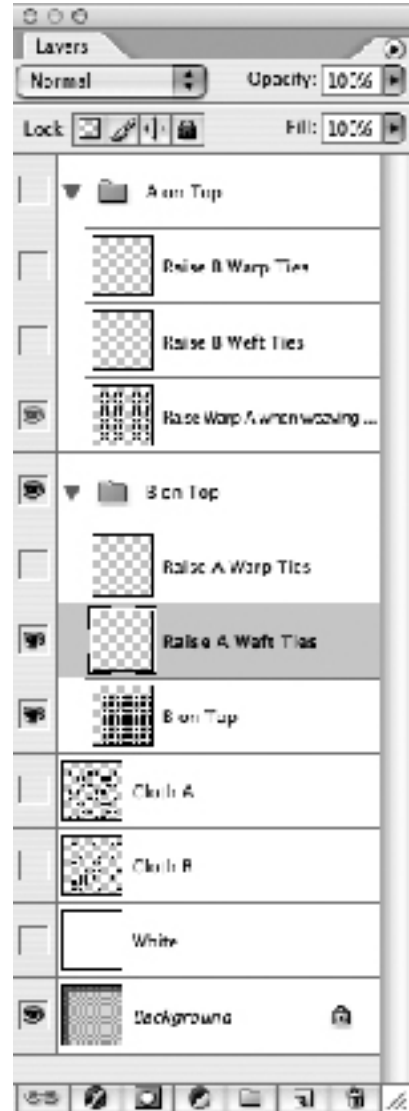
8-20

Note on version differences: the discussion on Layer Groups assumes the use of Photoshop CS2. If you are using Photoshop CS, Groups are called Sets. Simply substitute "Sets" for "Groups" and you will be OK. In addition, CS2 has eliminated the paintbrush icon column (indicating active layer) from the Layers Palette. When a layer is active, it is highlighted in blue. Photoshop Elements does not support Groups or Sets.

Leave it so that you can see all the layers. Now, with the *Raise Warp A when weaving Weft B* layer highlighted, click twice on the Create a new Layer icon at the bottom of the Layers palette. Two new layers will be created in the group. Rename these layers *Raise B Warp Ties* and *Raise B Weft Ties*.

Now we want to repeat the process, making a Layer Group called *B on Top*; renaming the *B on Top* layer from the template to *Raise Warp B when weaving Weft A*, and placing it under Layer Group *B on Top*; then adding two new layers to the group, called *Raise A Warp Ties* and *Raise A Weft Ties*.

Photoshop's layering capabilities (assuming that all layers are at 100% opacity, which is the way we want them here) dictate that layers at the top of the Layers palette hide any layers lower down in the order. So our strategy is to put the layers containing the basic cloth weaves (*Cloth A* and *Cloth B*) at the bottom of the stack, and any modifications above them.

For ease in reading the stitched template, we have assigned the marks for warp up as black pixels in both the *Cloth A* and *Cloth B* Layers. The marks for *Raise Warp A when weaving Weft B* and *Raise Warp B when weaving Weft A* are also left as black. However, we will assign the marks indicating stitching via raising warps from the bottom layer over the wefts of the upper layer as dark blue; and we will assign the marks indicating stitching via sinking warps of the upper cloth under a back pick (raising the wefts of the bottom cloth over the warps of the upper cloth) as yellow. This will make it easier to visualize which marks represent stitchers. Before selecting areas to make Pattern Presets, we will duplicate the template and turn the blue marks black and the yellow marks white.

Identifying Good Stitchers

In general, try to hide the stitching points of multilayered fabric. If the face structure is warp-faced, then place the tacking points between floats of the face warp. This would mean having a back warp rise over the front pick between floats of two warp ends. If the face structure is weft-faced, then place the tacking points between floats of the face weft. This would mean having a face end sink under the back weft under the floats of two top picks. Some structures will not allow for clear masking of the tacking points and of course you might want to have the stitching points show as decorative, as well as functional, marks.

If you are planning on using your cloth as a reversible fabric, then you also want to consider the stitching points in terms of both sides of the cloth.

Again, you might find one side hides the stitching completely, but the other side shows the tacking points.

A on Top: Identifying Good Warp Stitchers

As we said, if at all possible we want to place the warp stitchers from the lower cloth between rising warps of the upper cloth. Let us first look at our template with a structure where Cloth A is on top. Turn off the visibility of all layers except *Cloth A*. Turn on the Layer Group *A on Top* and the layer *Raise B Warp Ties*. Click on layer *Raise B Warp Ties* to make it the active layer. Make foreground color dark blue and choose the Pencil tool. In the image window, in rows and columns where Warp B intersects Weft A (light pink squares on our background grid), make marks between the black marks of Cloth A. Add as many or as few stitchers as you wish. We have chosen one tacking point per row per repeat. The file now looks like Figure 8-21, and the Layers palette looks like Figure 8-22 (If it is difficult to identify the stitchers in this black and white illustration, refer to the color image of Figure 8-21 on the CD).

8-21

8-22
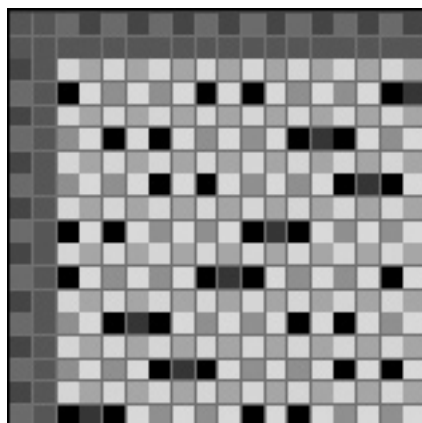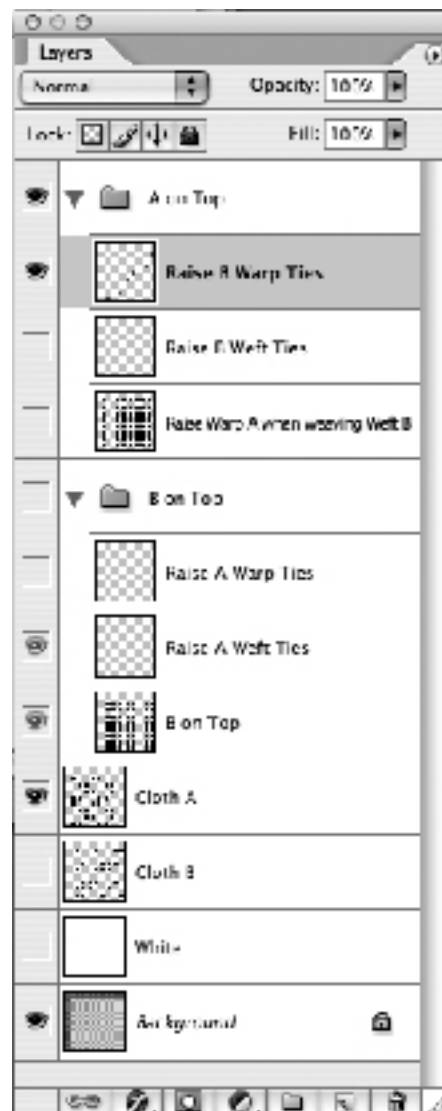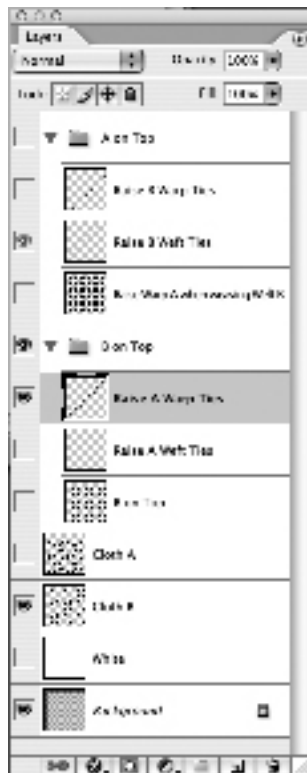
A on Top: Identifying Good Weft Stitchers

Perhaps you wish to use weft stitchers instead of warp stitchers when Cloth A is on top. Turn off the layer *Raise B Warp Ties* and turn on *Raise B Weft Ties* and make it the active layer. With foreground color yellow, mark intersections of the weft B and warp A (light blue on our background grid) between two weft floats of Cloth A wherever possible. We were not able to find places between two weft floats on every pick, and compromised by placing stitches beside a single weft float in these cases. The file and its Layer Palette now look like Figures 8-23 and 8-24. These yellow marks can be seen more easily on the CD.
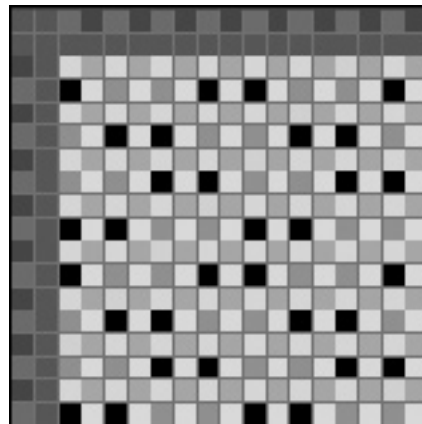
8-23

8-24

B on Top: Identifying Stitchers

To identify good warp stitchers when weaving cloth layer *B on top*, turn off all layers except the Background, turn on *Cloth B*, turn on Layer Group *B on Top*, and turn on and make active the Layer *Raise A Warp Ties*. Enter ties in dark blue. Looking at the twill of the face structure, we were able to find tacking points between warp floats of the face warp. These risers are placed on the light blue squares where face ends meet back picks. See Figure 8-25 for the image and 8-26 for the Layers palette.

8-26
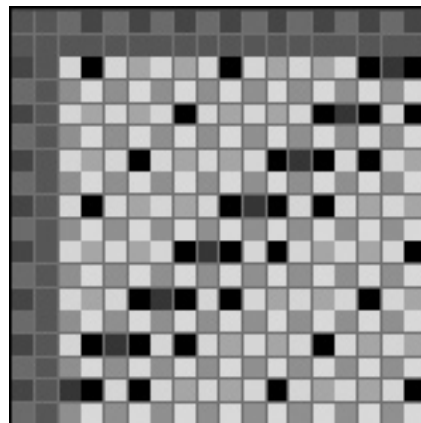
8-25

To identify good placement of weft stitchers when weaving cloth layer *B on top*, turn off all other layers, turn on *Cloth B*, turn on Group *B on Top*, turn on and make active *Raise A Weft Ties*. Enter ties in yellow on light pink squares. We were able to find places where a top warp could sink behind the back pick and be hidden between floats of the top weft (Figures 8-27 and 8-28). The stitching points show up clearly in the color template on the CD but are hard to see on this page.

Save your stitched template. We saved ours as **DoubleWeaveTemplate16x16**.*psd*. Now duplicate the template and put the original away. Turn on the Layer Group *A on Top*, and make the *Raise B Warp Ties* the active layer. Use the Magic Wand tool and select the blue marks. **Edit>Fill**, Use: Black, click OK. Now make the *Raise B Weft Ties* the active layer. Use the Magic Wand and select the yellow marks. **Edit>Fill,** Use: White, click OK. Do the same with the Layer Group *B on Top*. Again, change the blue marks to black and the yellow marks to white. Save this file. See Figure 8-29. It will be helpful to refer to this image in color on the CD.

Now we can save the Pattern Presets. Turn off the visibility of the Background layer and turn on the visibility of the *White* layer. Have both the *Cloth A* and *Cloth B* layers visible. Make the *A on Top* layer visible, as well as *Raise Warp A when weaving Weft B*. Make the *Raise B Warp Ties* also visible. With a Fixed Size Rectangular Marquee of 16x16 select the structure in the bottom right of the image and **Edit>Define Pattern**. Name it (we called our image *DWEX102a*).

8-27

8-28

8-29
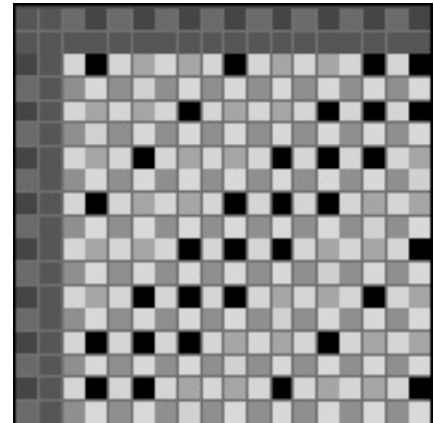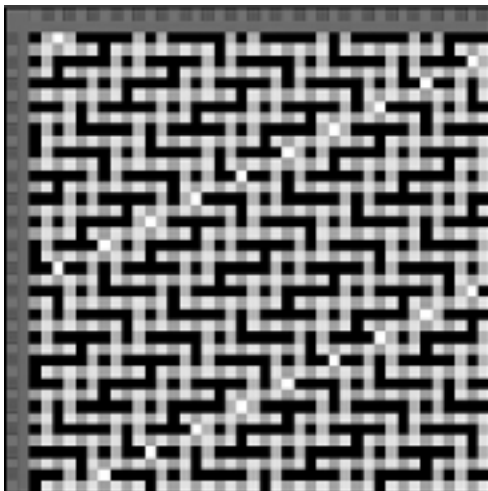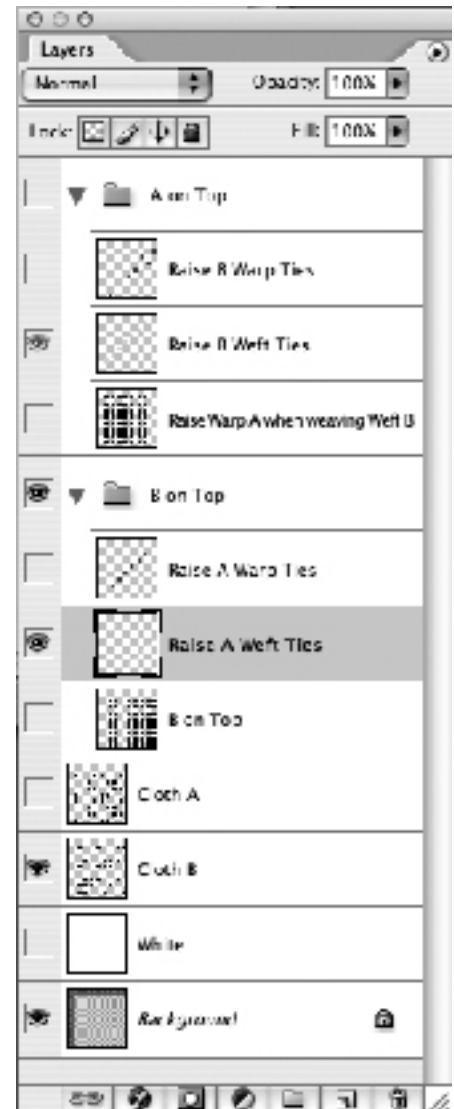
Edit>Copy Merged. Open a new file 16x16. Then Edit>Paste in the new file. Flatten the file. Now perform Image>Adjustments>Invert and Edit>Define Pattern and name the Pattern (we used *DWEX102b*). The two structures look like this:
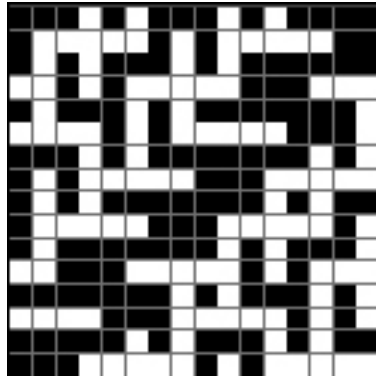
8-30 DWEX102a
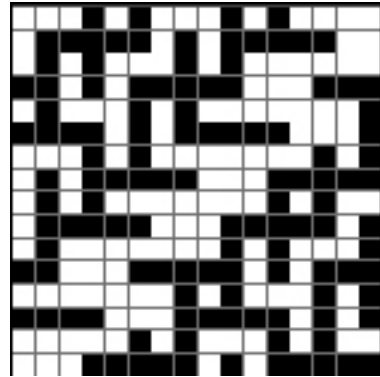
8-31 DWEX102b

We saved all the versions of the structures as Pattern Presets as outlined in the following chart.

Pattern Presets DWEX.pat
2/2 Broken Twill (A) and 3/2/1/2 Straight Right Twill (B) as Double Cloth

Pattern Preset #	Layer on Top	Photoshop Stitching Layer
DWEX101a	A	Not stitched
DWEX101b	Inverse of above	
DWEX102a	A	Warp B stitched
DWEX102b	Inverse of above	
DWEX103a	A	Weft B stitched
DWEX103b	Inverse of above	
DWEX104a	B	Not stitched
DWEX104b	Inverse of above	
DWEX105a	B	Warp A stitched
DWEX105b	Inverse of above	
DWEX106a	B	Weft B stitched
DWEX106b	Inverse of above	

Using Threshold to Make All Pixels Black and White

Another method of turning all the pixels of the template into black and white is to use Threshold. If you Edit>Copy Merged the layers that you want for a Pattern Preset and then Edit>Paste them into a file of the size of the Preset (16x16 in our example), you can go to Image>Adjustment>Threshold, and accept the default settings. The grid lines will be visible if the grid is turned on, but will have no effect on any pixel operations. The blue and black marks will turn black, and the white, yellow, and other colors from the Background will turn white.

Other Repeat Sizes

These **DWEX** Presets and their associated templates are only one example of possible repeat sizes. If a double cloth of two layers of plain weave, no stitching, is wanted, a 2x2 grid for each layer, total 4x4, is sufficient. ***DoubleWeaveTemplate4x4**.psd* (found on the accompanying CD) is an example of such a template. Figure 8-32 shows double plain weave with *Cloth A* layer on top, and Figure 8-33 shows double plain weave with *Cloth B* layer on top. Both these illustrations contain image windows and Layers palettes. The Presets for these two basic plain weaves are contained in the set **DWplain**.

8-32

Combining Two Weaves of Unequal Size

If you wish to combine two weaves whose repeat sizes are not equal, you must use a template size equal to a multiple of both weaves. For example, if combining a 1/4 satin (repeat size 5x5) and a 2/2 twill (repeat size 4x4), the repeat size must be 20x20 for the face of the cloth in order to accommodate both weaves completely, and 40x40 to account for the warps and wefts of both cloth layers. The template for constructing these weaves is found in the file ***DoubleWeaveTemplate40x40**.psd* on the accompanying CD and the Pattern Presets are found in the file **DWEX40x40.pat**.

8-33

In selecting stitching points for these two weaves, it was found that there are too few raised warps in cloth A (a 1/4 satin) to hide warp stitchers from the lower cloth; weft ties (yellow in Figure 8-34) were chosen instead when this layer weaves on top.

8-34

8-35

Pattern Presets DWEX40x40.pat
Cloth Layer A is 1/4 satin, Cloth Layer B is 2/2 twill

Pattern Preset #	Layer on Top	Photoshop Stitching Layer
DWEX40x40 101a	A	Weft ties from B
DWEX40x40 101b	Inverse of above	
DWEX40x40 102a	A	No ties
DWEX40x40 102b	Inverse of above	
DWEX40x40 103a	B	Warp ties from A
DWEX40x40 103b	Inverse of above	
DWEX40x40 104a	B	No ties
DWEX40x40 104b	Inverse of above	

Here are a couple of examples of what the weaves look like:
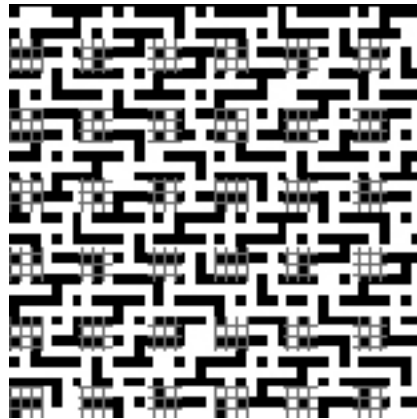
8-36   DWEX40x40 101a
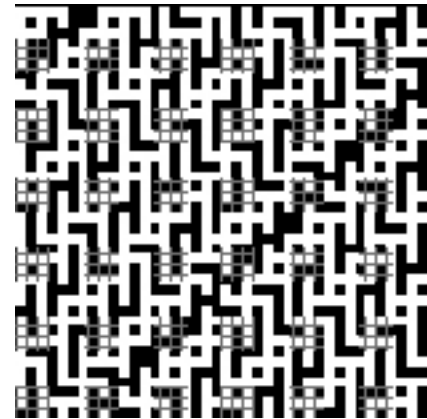
8-37   DWEX40x40 103a

A Brief Digression: Layer Comps Palette

As we increase our weave designing capabilities, particularly with multiple layers, the Photoshop files become increasingly complex with many more layers to manage and make visible and invisible. Here is where the Layer Comps palette shines. We love using Layer Comps with our double weave files, and will show you the high points. To access the Layer Comps palette, go to **Window>Layer Comps** or drag the Layer Comps tab from the palette dock at the upper right of the screen.

We have made a small RGB demo file called ***Comps Demo.psd***. It contains a white background and six layers with various graphic information. On the next page Figures 8-38, 8-39, and 8-40 illustrate what it looks like with all six layers turned on, and screen shots of the Layers palette and the Layer Comps palette.
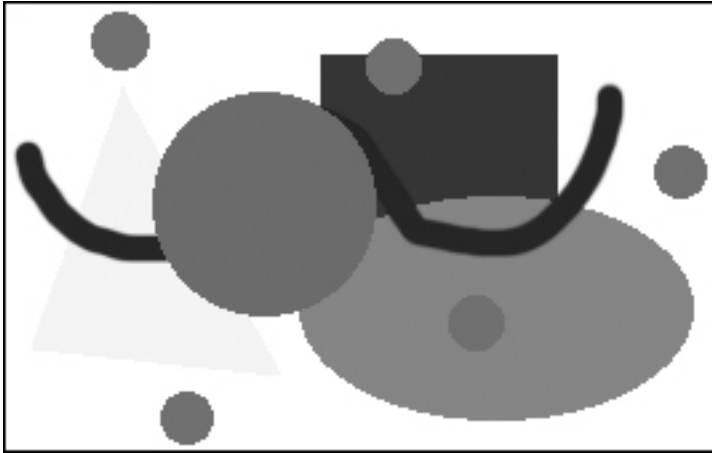
8-38

8-39

If we click on the Layer Comp named *"Red, yellow, & purple on,"* the image will look like Figure 8-41:
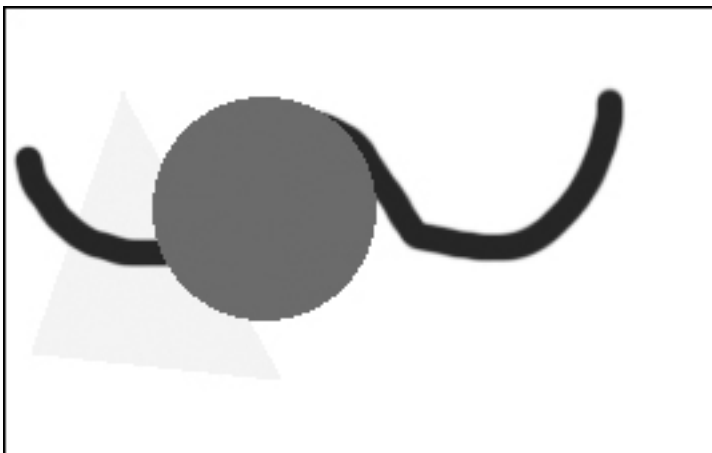
8-41
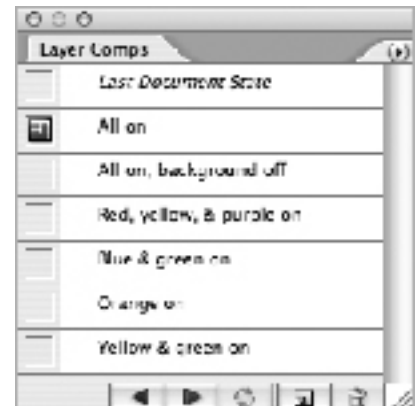
8-40

The other Layer Comps in this palette work in similar fashion. If you wish to make your own Layer Comp, entitled *"Yellow & green on,"* you would go to the Layers palette, turn off the visibility of all the layers except the Background and the *Yellow Triangle* and *Green Oval* layers. Then in the Layer Comps palette, click on the *Create New Layer Comp* icon (the little page icon just to the left of the Trashcan), and the New Layer Comp window pops up. Give your layer comp its title, *Yellow and Green on,* click all three **Apply to Layers** boxes (Visibility, Position, and Appearance (Layer Style)), and click OK (You may also make a new Layer Comp via the flyout triangle on the upper right of

the Layer Comps palette, and choosing the item **New Layer Comp…**). Your image and Layer Comps palette now look like this:
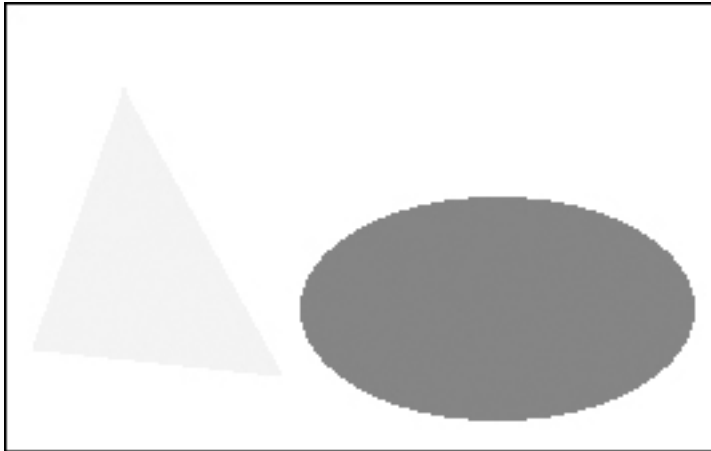
8-42
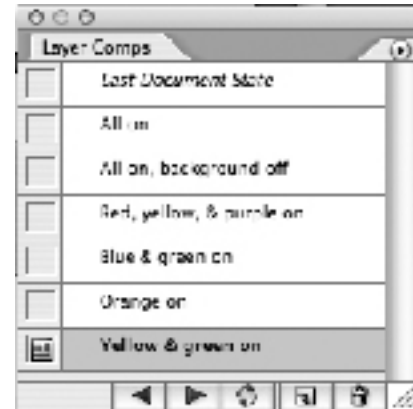
8-43

You may quickly cycle through all the Comps in your Layer Comps palette by repeatedly clicking on the left- and right-facing arrows at the bottom of this palette.

Double Weave with Three Wefts

Here is another of the seemingly endless combinations of multiple layers both separate and joined that are possible with compound fabric. So far we have worked with two warps and two wefts. Now we will add a third weft.

The weaves in the layers will all be plain weave (although they could be other weaves as well). The warps will be designated A and B, and the wefts A, B, and C. When warp A weaves with weft A we will call the layer AA, when it weaves with weft B we will call it AB, and so on. In each letter pair, the first letter indicates warp and the second letter indicates weft.

The stuffer weft will also act as a stitcher weft to bind the top and bottom layers together.

In the template ***DW+Stuffer16x24Stitched**.psd,** the color indicators along the top are red for warp A and blue for warp B. Along the side the color indicators for weft are red for weft A, blue for weft B, and green for weft C. These are merely identifiers; the actual yarn colors can be anything. The main point is that the sequence of weft systems should remain the same for all the weave structures in a file. Figure 8-44 shows the Background layer of the template with the grid turned on, and Figure 8-45 shows this file with the weave *DWST201* turned on in the Layer Comps palette. The full color versions of Figures 8-44 and 8-45 may be found on the accompanying CD.
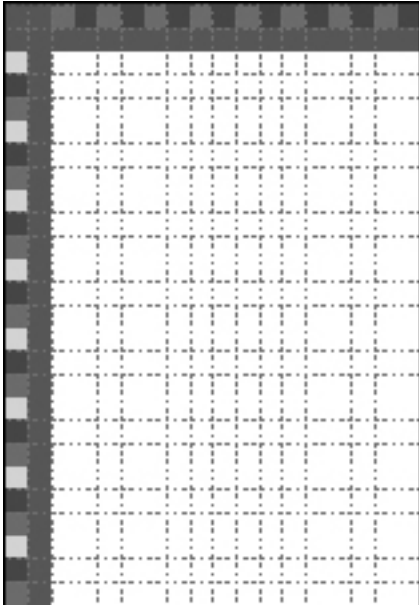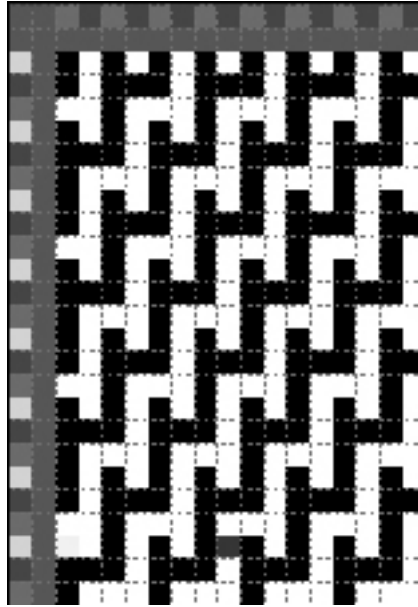
8-44   8-45 DWST201

We have created a table to map out how the various warps and wefts will behave. The Pattern Presets (weaves) which we will eventually make from this table, are listed in the left-hand column.

Pattern Presets DW+Stuffer.pat
Plain Double Weave with a Third (Stuffer) Weft

#	Top Warp	Top Weft	Stuffer Weft	Stuffer Ties over Warp (yellow pixel over black)	Stuffer Ties under Warp (navy pixel over white)	Bottom Warp	Bottom Weft
DWST201	A	A	C	A	B	B	B
DWST202	A	A	B	A	B	B	C
DWST203	A	B	C	A	B	B	A
DWST204	A	B	A	A	B	B	C
DWST205	A	C	A	A	B	B	B
DWST206	A	C	B	A	B	B	A
DWST207	B	A	C	B	A	A	B
DWST208	B	A	B	B	A	A	C
DWST209	B	B	C	B	A	A	A
DWST210	B	B	A	B	A	A	C
DWST211	B	C	A	B	A	A	B
DWST212	B	C	B	B	A	A	A

From this table we have entered the risers in the appropriate layers in our template. To keep track of which layers are turned on or off we have used the Layer Comps palette. To access this palette, go to **Window>Layer Comps** or drag the Layer Comps tab from the palette dock at the upper right of the screen. By clicking on the icon to the left of each row in the Layer Comps palette, different combinations of Layers in the Layers Palette are turned on.

8-46

In the template, they are labeled according to their descriptions in the above table.

So far, the stuffer wefts float between the top weave and the bottom weave. This gives us all the combinations in the above table. We did not save the unstitched weaves, but they are perfectly good weaves. If your image has many small areas with color changes, you might prefer using unstitched weaves, rather than stitched ones. In that case, go to the template, turn off the layer that stitches the cloth layers together, and save these new weaves as Pattern Presets.
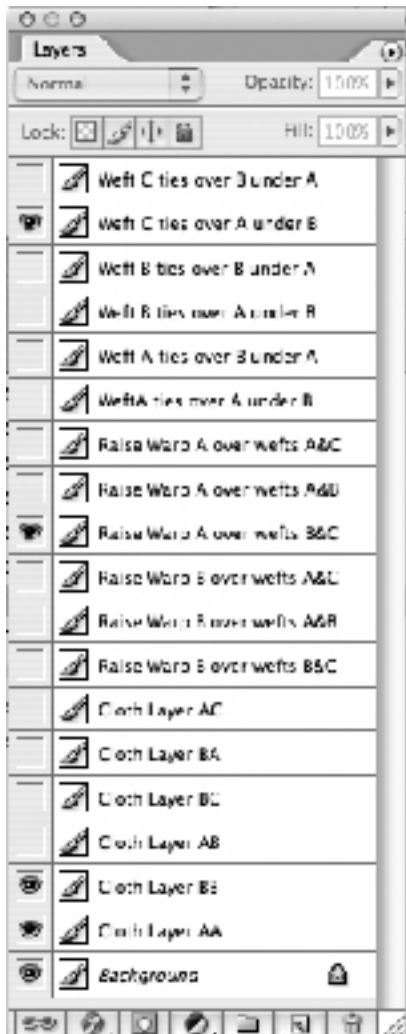
Stitching Method

We decided to stitch the layers together to form a more integrated cloth. The method we have chosen is to have a stuffer weft from time to time rise over a warp of layer A and sink under a warp from layer B on the same pick. By indicating weft up with yellow, and weft down in dark blue, and having these stitchers appear towards the top of the Layers Palette, they will effectively override any information beneath them when the combined layers are copied into a new window and thresholded to black and white.

We have saved all the combinations from the template **DW+Stuffer16x24Stitched**.psd to our Presets file DW+Stuffer.pat. They are numbered DWST201 through DWST212. We have not saved the inverse of these weaves in separate files, because some of them are already the inverse of others (i.e., the inverse of DWST201 when woven looks the same as DWST209).

Figure 8-45 shows the template **DW+Stuffer16x24Stitched**.psd with the weave DWST201 selected in the Layer Comps palette, Figure 8-46 shows the Layers palette for this weave, and Figure 8-47 shows the Layer Comps palette with the weave DWST201 selected.

Look at the Layer Comps palette and turn various comps on and off: observe the Layers palette as you make changes in the Layer Comps palette, to see how the weaves are combined. When you are familiar with this method of inputting weaves, you may want to set up some templates of your own
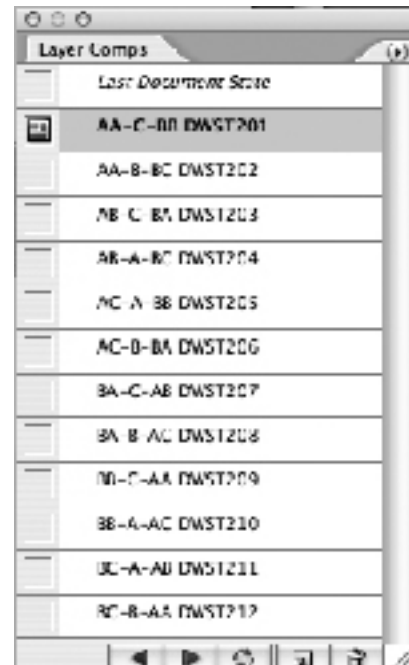
8-47

weaves and experiment with original weaves in layers. As you can see, the possibilities multiply rapidly. Some options you may want to consider are:

1. Use two or more layers
2. Stitch or don't stitch the layers together
3. Decide how frequently to stitch
4. Combination of weaves (similar or different)
5. Ratio of warp systems (1:1, 2:1, 3:1, etc).
6. How many weft systems to use.

Double Twill

We decided to create a group of double twills that would give us a varied color palette with two warps and three and four wefts. From the hundreds of options possible, we narrowed our focus to 4-end straight right twills. We decided that the design of our cloth would not be reversible, and the layer weaving on the bottom would always be 2/2 twill (this narrowed our options further). The top layer could be 1/3, 2/2, or 3/1 twill. We also decided that our two weave layers would be stitched, and the stitching method would be that of a warp from the bottom layer rising over a weft of the top layer. Finally, we determined that the frequency of stitching would be two stitchers for every warp-wise and weft-wise repeat of the weave structure. In the first group of double twills with two warps and three wefts, the top layer could be woven with one or two wefts, and in the second group with two warps and four wefts, the top layer could be woven with one, two, or three wefts. Wefts not weaving with the front warp would weave with the back warp, rather than float in the middle.

"Forest Floor" in progress: the structure is double twill with a four-color weft rotation. These weave presets may be found in the set DTwill4Wefts.pat.

The following four tables outline the various combinations we achieved with this double twill setup:

Pattern Presets: *DTwill3Wefts.pat*
Template: *Double Twill 3 Wefts.psd*
2 Warps, 3 Wefts

#	Top Warp	Top Weft	Top Weave	Bottom Warp	Bottom Weft	Bottom Weave
601	A	A	1/3	B	BC	2/2
602	A	A	2/2	B	BC	2/2
603	A	A	3/1	B	BC	2/2
604	A	B	1/3	B	AC	2/2
605	A	B	2/2	B	AC	2/2
606	A	B	3/1	B	AC	2/2
607	A	C	1/3	B	AB	2/2
608	A	C	2/2	B	AB	2/2
609	A	C	3/1	B	AB	2/2
610	A	AB	1/3	B	C	2/2
611	A	AB	2/2	B	C	2/2
612	A	AB	3/1	B	C	2/2
613	A	BC	1/3	B	A	2/2
614	A	BC	2/2	B	A	2/2
615	A	BC	3/1	B	A	2/2
616	A	AC	1/3	B	B	2/2
617	A	AC	2/2	B	B	2/2
618	A	AC	3/1	B	B	2/2

#	Top Warp	Top Weft	Top Weave	Bottom Warp	Bottom Weft	Bottom Weave
619	B	A	1/3	A	BC	2/2
620	B	A	2/2	A	BC	2/2
621	B	A	3/1	A	BC	2/2
622	B	B	1/3	A	AC	2/2
623	B	B	2/2	A	AC	2/2
624	B	B	3/1	A	AC	2/2
625	B	C	1/3	A	AB	2/2
626	B	C	2/2	A	AB	2/2
627	B	C	3/1	A	AB	2/2
628	B	AB	1/3	A	C	2/2
629	B	AB	2/2	A	C	2/2
630	B	AB	3/1	A	C	2/2
631	B	BC	1/3	A	A	2/2
632	B	BC	2/2	A	A	2/2
633	B	BC	3/1	A	A	2/2
634	B	AC	1/3	A	B	2/2
635	B	AC	2/2	A	B	2/2
636	B	AC	3/1	A	B	2/2

Pattern Presets: *DTwill4Wefts.pat*
Template: *Double Twill 4 Wefts.psd*
2 Warps, 4 Wefts

#	Top Warp	Top Weft	Top Weave	Bottom Warp	Bottom Weft	Bottom Weave
701	A	A	1/3	B	BCD	2/2
702	A	A	2/2	B	BCD	2/2
703	A	A	3/1	B	BCD	2/2
704	A	B	1/3	B	ACD	2/2
705	A	B	2/2	B	ACD	2/2
706	A	B	3/1	B	ACD	2/2
707	A	C	1/3	B	ABD	2/2
708	A	C	2/2	B	ABD	2/2
709	A	C	3/1	B	ABD	2/2
710	A	D	1/3	B	ABC	2/2
711	A	D	2/2	B	ABC	2/2
712	A	D	3/1	B	ABC	2/2
713	A	AB	1/3	B	CD	2/2
714	A	AB	2/2	B	CD	2/2
715	A	AB	3/1	B	CD	2/2
716	A	AC	1/3	B	BD	2/2
717	A	AC	2/2	B	BD	2/2
718	A	AC	3/1	B	BD	2/2
719	A	AD	1/3	B	BC	2/2
720	A	AD	2/2	B	BC	2/2
721	A	AD	3/1	B	BC	2/2
722	A	BC	1/3	B	AD	2/2
723	A	BC	2/2	B	AD	2/2
724	A	BC	3/1	B	AD	2/2
725	A	BD	1/3	B	AC	2/2
726	A	BD	2/2	B	AC	2/2
727	A	BD	3/1	B	AC	2/2
728	A	CD	1/3	B	AB	2/2
729	A	CD	2/2	B	AB	2/2
730	A	CD	3/1	B	AB	2/2
731	A	ABC	1/3	B	D	2/2
732	A	ABC	2/2	B	D	2/2
733	A	ABC	3/1	B	D	2/2
734	A	ABD	1/3	B	C	2/2
735	A	ABD	2/2	B	C	2/2
736	A	ABD	3/1	B	C	2/2
737	A	ACD	1/3	B	B	2/2
738	A	ACD	2/2	B	B	2/2
739	A	ACD	3/1	B	B	2/2
740	A	BCD	1/3	B	A	2/2
741	A	BCD	2/2	B	A	2/2
742	A	BCD	3/1	B	A	2/2

#	Top Warp	Top Weft	Top Weave	Bottom Warp	Bottom Weft	Bottom Weave
801	B	A	1/3	A	BCD	2/2
802	B	A	2/2	A	BCD	2/2
803	B	A	3/1	A	BCD	2/2
804	B	B	1/3	A	ACD	2/2
805	B	B	2/2	A	ACD	2/2
806	B	B	3/1	A	ACD	2/2
807	B	C	1/3	A	ABD	2/2
808	B	C	2/2	A	ABD	2/2
809	B	C	3/1	A	ABD	2/2
810	B	D	1/3	A	ABC	2/2
811	B	D	2/2	A	ABC	2/2
812	B	D	3/1	A	ABC	2/2
813	B	AB	1/3	A	CD	2/2
814	B	AB	2/2	A	CD	2/2
815	B	AB	3/1	A	CD	2/2
816	B	AC	1/3	A	BD	2/2
817	B	AC	2/2	A	BD	2/2
818	B	AC	3/1	A	BD	2/2
819	B	AD	1/3	A	BC	2/2
820	B	AD	2/2	A	BC	2/2
821	B	AD	3/1	A	BC	2/2
822	B	BC	1/3	A	AD	2/2
823	B	BC	2/2	A	AD	2/2
824	B	BC	3/1	A	AD	2/2
825	B	BD	1/3	A	AC	2/2
826	B	BD	2/2	A	AC	2/2
827	B	BD	3/1	A	AC	2/2
828	B	CD	1/3	A	AB	2/2
829	B	CD	2/2	A	AB	2/2
830	B	CD	3/1	A	AB	2/2
831	B	ABC	1/3	A	D	2/2
832	B	ABC	2/2	A	D	2/2
833	B	ABC	3/1	A	D	2/2
834	B	ABD	1/3	A	C	2/2
835	B	ABD	2/2	A	C	2/2
836	B	ABD	3/1	A	C	2/2
837	B	ACD	1/3	A	B	2/2
838	B	ACD	2/2	A	B	2/2
839	B	ACD	3/1	A	B	2/2
840	B	BCD	1/3	A	A	2/2
841	B	BCD	2/2	A	A	2/2
842	B	BCD	3/1	A	A	2/2
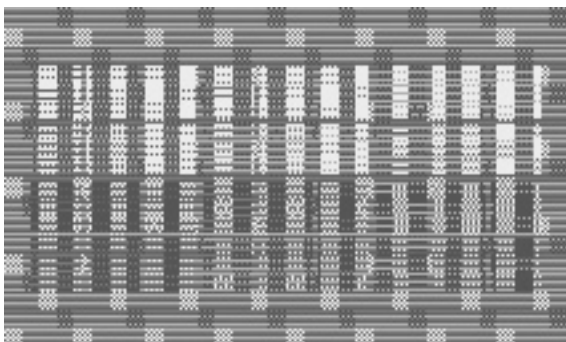
8-48

8-49

If you open the files ***Double Twill 3 Wefts.psd*** and ***Double Twill 4 Wefts. psd***, and then open their associated Layer Comps palettes, you may cycle through the various Layer Comps and see how we have built these weave descriptions.

The Pattern Presets (weaves) for all these double twills can be found in the files ***DTwill3Wefts.pat*** and ***DTwill4Wefts.pat***. They are saved in the Pattern Presets folder of the Chapter 8 folder, as well as in the Double Weave folder of the master Weave Presets folder on the CD.

We have designed weave blankets to test the weaves on a black and white warp of 880 ends. If you have such a setup you may weave our blankets with your own yarns to build your own palette. The blanket files can be found on the CD named as ***DoubleTwill3WeftsBlanket.tif*** and ***DoubleTwill4weftsBlanket.tif*** and their weave simulations are called ***DoubleTwill3WeftsBlanketSimulation.tif*** (Figure 8-48) and ***DoubleTwill4weftsBlanketSimulation.tif*** (Figure 8-49).

Project From Start to Finish: Joseph-Marie Jacquard Banner

We created a small project using the stuffed double weaves found in ***DW+Stuffer.pat***. We first tested the weaves in a sample blanket woven on a TC-1 with natural and black mercerized cotton as warp, 880 ends sett at 30 epi, with a 3-weft rotation (red, blue, and beige). The blanket is called ***BlanketDW+Stuffer.tif***, and is also included on the CD. We suggest you weave a blanket with these presets using your own choice of yarn type, size, and color to derive your personal palette.

The project was begun with a new blank file ***josephmarie1.psd***. We were working on the TC-1, warped as above with 880 ends. As this is double weave, we designed for the face of the cloth with half that number, 440. The size of our initial RGB file is 440x 144 pixels, background white.

With the Text tool, color black, font Impact (chosen because of its simple, bold outlines), size 42, we positioned the cursor on the image and typed "Joseph-Marie Jacquard." With the Warp Text tool (found on the Options Bar), we–surprise–warped the text. We then rasterized the type (converted

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it from editable text to pixels) by **Layer>Rasterize>Type**. We now have a white background and a layer containing black text (Figure 8-50).

To add a few graphic elements behind the text, we highlighted the Background layer, created a new layer above it, and named the new layer *Graphic Elements*. With the layer *Graphic Elements* highlighted, foreground color set to red, Elliptical Marquee tool, we marqueed a few circles and filled them with the Paint Bucket tool. As the *Graphic Elements* layer is below the text layer in the Layers palette, the text floats above the circles (Figure 8-51).

Finally, we made the text transparent. With the text layer highlighted in the Layers palette, we clicked on the Opacity slider and set it at 50%, with the result shown in Figure 8-52.

This gave us four color areas we wished to use in our design: the background, the red circles, the text over the background (gray) and the text over the circles (darker red). We saved this file as a layered file, *josephmarie1.psd*, in case we wanted to go back to it later for tweaking. The Layers palette is shown in Figure 8-53.

We duplicated the file as *josephmarie2.psd* and put the original away for safekeeping. We flattened the new file and indexed it to 7 colors via **Image>Mode>Indexed Color**, and in the Index Color box chose Palette: Exact, Colors: 7, Forced: None, Transparency: unchecked, Dither: None (when indexing, the two colors of text did not appear until we got up to 7 colors). When we consulted the Color Table (**Image>Mode>Color Table,** check the Preview box), we found that we could combine some of the colors in order to get the four we wanted. With the Color Table window still open, after some experimentation, we left the first, second, and seventh color chips alone, and combined the third through sixth by highlighting all four, clicking OK twice when the Color Picker appeared, then OK in the Color Table window. We converted this file to RGB, then back to Indexed Color, and now the Indexed Color box appeared just

as we wanted: Palette: Exact, Colors 4. In checking the Color Table once more (**Image>Mode>Color Table**) we saw our four colors (Figure 8-54).

We further tweaked the colors in this final table (by clicking on each color patch in turn, then selecting the desired colors in the Color Picker) so that our screen image would match the four colors we wanted to use from our sample blanket, which were dark blue (DWST210), red (DWST207), beige (DWST205), and light blue (DWST204). The corrected image and associated color table appear as in Figure 8-55.

The final image was once again converted to RGB, doubled in size to accommodate the actual number of warps and wefts, and saved as *josephmarie3.psd*. Resizing goes like this: **Image>Image Size**, and in the image size box check Constrain Proportions, Resample Image: Nearest Neighbor, in the width box double the number (we entered 880), the height automatically updates, click OK.

In the Tools palette, we set our foreground color to something distinctive, in this case lime green, and added borders to the top and bottom

of the file for 1/7 satin hems. **Image>Canvas Size** and enter 360 in the height box. Note that all height measurements are multiples of three, as we are using a 3-weft rotation. We also provided for a 16-pixel wide 1/7 satin selvedge, which nicely tames the edges of this 3-shuttle stuffer weave, on both side edges of the file. To do this, marquee an area 16 pixels wide on both side edges, and fill it with the lime green. The file, still flat, measured 880x360 pixels, and is illustrated in Figure 8-56. For correct color visualization, consult *8-56.tif* on the accompanying CD.

This file was saved, duplicated, and the duplicate saved as *josephmarieWeaves.psd*. Layers were assigned, one to each color (now five including the green selvedges and hems). Refer to Chapter 5 for more
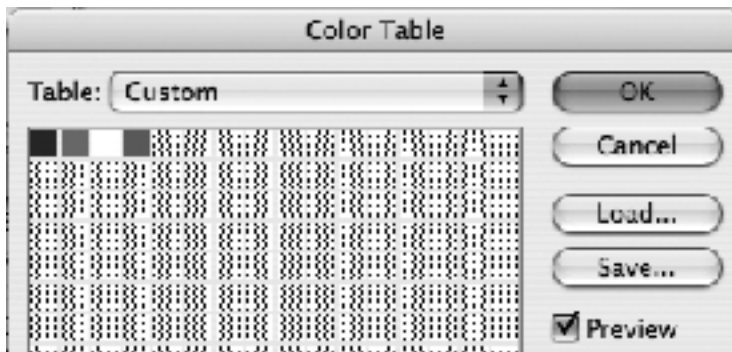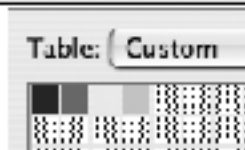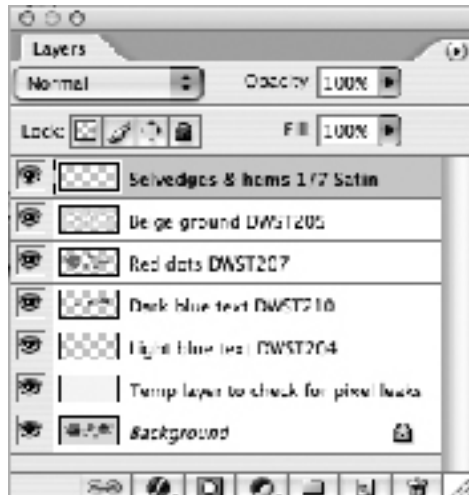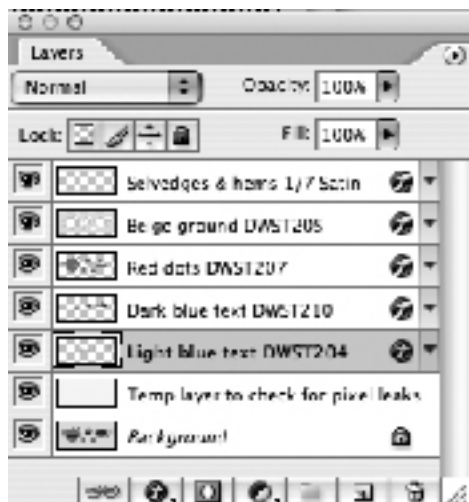
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information on separate layers for each color. The Layers palette at this point looks like Figure 8-57; note that we indicated which weaves to assign to the layers in the names of each layer.

We checked to be sure the *DW+Stuffer.pat* weaves were loaded into the Presets (**Edit>Preset Manager>Patterns**); then assigned the weaves as Layer Styles. We again saved *josephmarieWeaves.psd*.

After weaves were assigned, the Layers palette looked like Figure 8-58 and the image is shown in Figure 8-59 on the next page.

We duplicated the file, flattened it, and saved it as *josephmarieWeaves.tif* (An enlarged image of the upper left corner of this .tif file can be seen in Figure 8-59b, at the end of this chapter.) At this point the .tif file was ready to weave, but we first checked it by doing a weave simulation (see Appendix C), which looked like Figure 8-60, shown on the next page.

In its existing state, the Pixel Aspect Ratio is square, that is, epi=ppi. We wove a few inches from the center of *josephmarieWeaves.tif* on the TC-1 to check pick count. In calculating our Pixel Aspect Ratio (actual ppi/epi=Pixel Aspect Ratio), we found that our ratio was 1.25, and the pixel height of our file had to be adjusted.

We went back to *josephmarieWeaves.psd*, **Image>Image Size**, and in the Image Size window unchecked Constrain Proportions, made sure that Resample Image was set to Nearest Neighbor (very important!), and changed Height to 288 (which was the original 360 pixels multiplied by the new Pixel Aspect Ratio). Fortunately 288 is also divisible by 3; if we'd come up with a different number, we would have adjusted it so it was divisible by 3.

We then duplicated the resized version, flattened it, and saved it as *josephmarieWeaves.tif,* replacing the original .tif file. The weaves flowed in correctly to the new dimensions. The file was downloaded to the TC-1, where the floats were checked and corrected in the loom control software. It was then woven. Round circles, no squashing or stretching! What bliss! This entire design process took less time to perform than it took to describe in writing. Joseph-Marie Jacquard would have loved it.
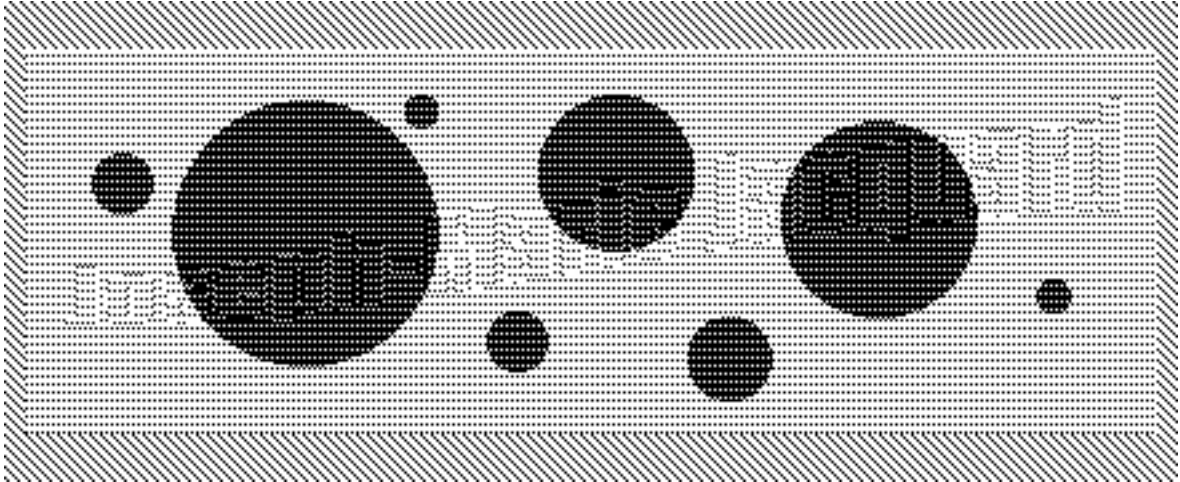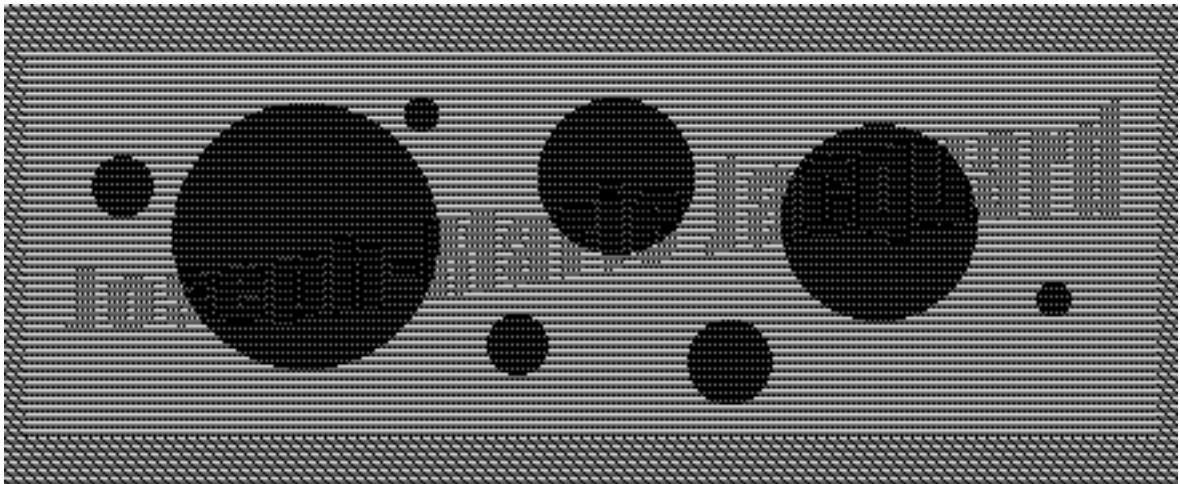
Palette Options

A word about the Layers palette as used in this chapter: you may have noticed that some of the Layers palette illustrations are slightly condensed, and others expanded. We occasionally condense Layers palettes to save screen space. You can change the appearance of your own Layers palettes by clicking and holding on the flyout triangle at the very upper right corner of the palette, and choosing Palette Options. In the Palette Options window your are offered four options from no thumbnail (most compact) to the largest thumbnail, which gives you more information but takes up the most space on the monitor. In general we prefer the smallest thumbnail, but for files with many layers we tend to use no thumbnail. Choose the view that works best for you.
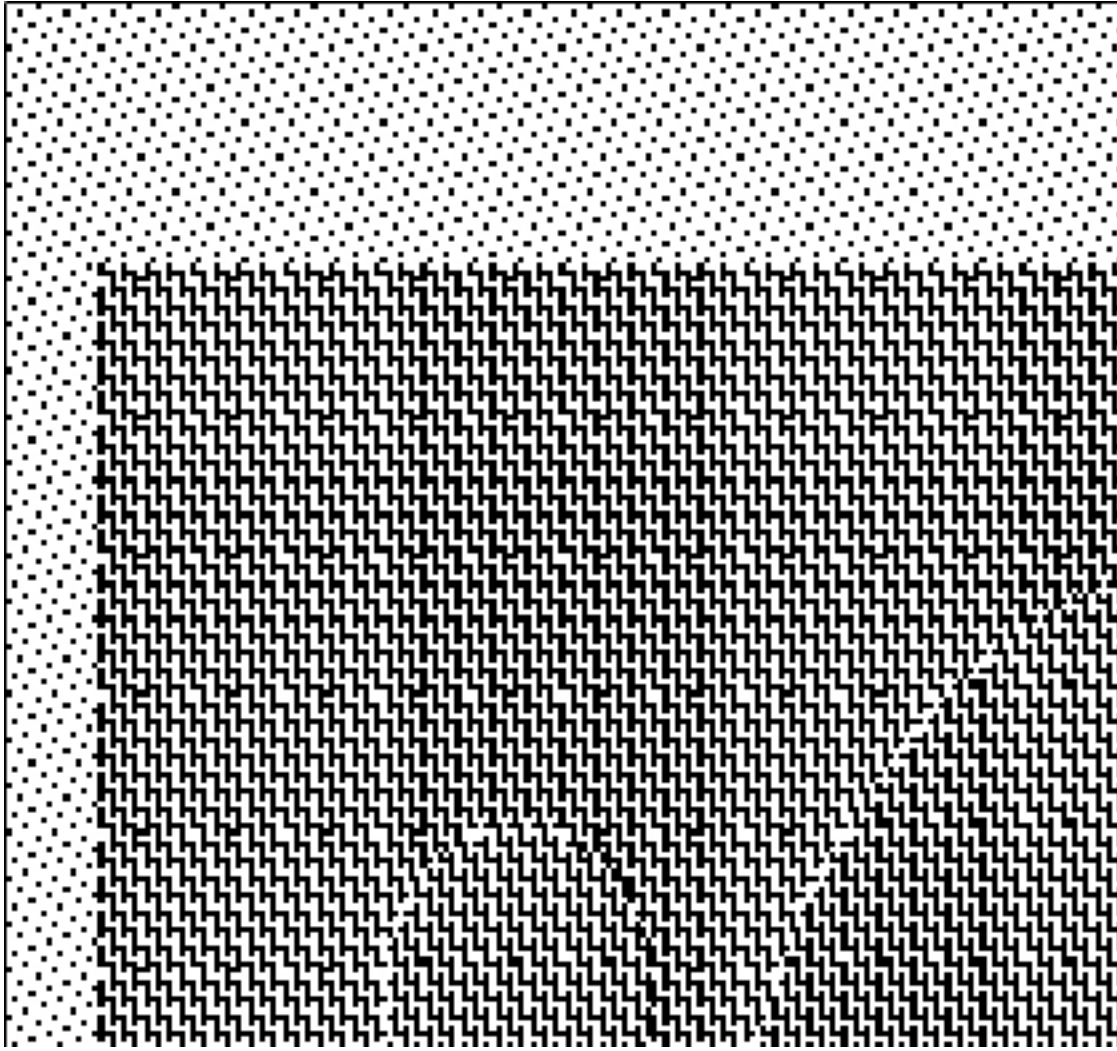
8-59b The upper left corner of 8-59, enlarged.