Example 9: Restoring a Very Old and Large Print

This photograph was too large to scan in a single scan. In fact, because of its size, 12 × 19 feet, I had to split it into three scans (Figure 11-9a). As I explain in Chapter 9, Tips, Tricks, and Enhancements, page 307, successfully reassembling the complete photograph from individual scans involves aligning detail and matching tone and color rendition between scan segments.

Fig. 11-9a This 12 × 19-foot photograph was too large to scan in a single pass; it was necessary to scan it in three sections to get it all.

Fig. 11-9b As this overlay of the three scans shows, their tones don't match perfectly; repeated scans from moderately priced scanners often come out slightly different.

Simply overlapping the scans (Figure 11-9b) won't do the job. Affordably priced flatbed scanners simply aren't that precise; there will usually be slight geometric distortions (probably not visible here) and small differences in tonal rendition. This is all fixable by hand, as I explain online at http://photo-repair .com/dr1.htm, but it's much faster to use the Photomerge operation in Photoshop (Figure 11-9c), which works *very* well in versions CS3 and CS4 (and in Elements 6 and up).

Fig. 11-9c The Photomerge operation in Photoshop produces a perfectly aligned and tone-matched composite from the three scans in Figure 11-9a.
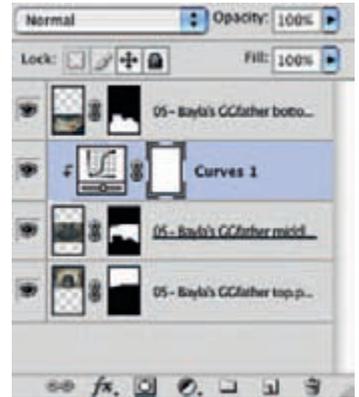
Fig. 11-9d Photomerge puts each component scanned into a separate layer, so you can make adjustments to individual components or the cut lines before merging them.

Since Photomerge places each scan component in a separate layer, you can still do individual tone color adjustments to the scans, should that be necessary. Use attached adjustment layers (Figure 11-9d), as I explain in Chapter 9.

Once you are satisfied with the scan merge, there's no reason to keep them in separate layers, so flatten the image into a single layer and save it as a new file.

In Chapter 4, page 96, I described how Channel Mixer produced the cleanest, most defect-free grayscale image from this full-color scan by mixing 150% red with –50% blue. Figure 11-9e shows the converted image. Now it's time to go in and clean up the remaining damage.

It's apparent that the portrait was heavily and crudely retouched, most obviously in the facial hair and the eyes, and there's not a lot of fine detail in the original photo. In fact, this is as much a drawing as it is a photograph. That's going to make it a lot easier to clean up the damage, which is mostly small-scale.

Fig. 11-9e I used Channel Mixer to combine the red and blue channels of Figure 11-9c to get a grayscale image that's much cleaner than the original scans.

Fig. 11-9f This close-up shows that the parts of the photograph with the emulsion entirely missing are much lighter than the rest of the photograph. That makes it easy to select these areas using the Color Range… selection tool.
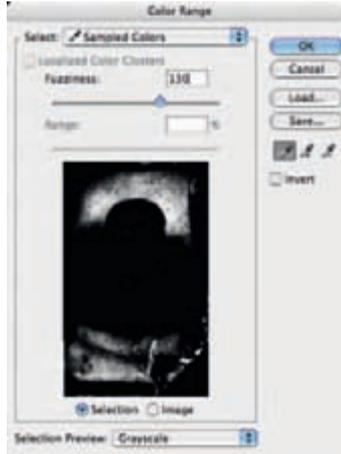

Fig. 11-9g Clicking the Color Range… eyedropper on one of the white areas and setting the Fuzziness to 130 produces a good selection of the most badly damaged parts of the photograph.

I duplicated the base layer containing the photograph so that I could apply filtration in a separate layer. I began with the parts where the image was entirely missing because they were white, much lighter than any part of the photograph proper (Figure 11-9f). I made a selection of the white areas using Color Range…, clicking the eyedropper on one of the pure white areas and setting the Fuzziness to 130, as shown in Figure 11-9g. This produced the selection shown in Figure 11-9h.

I applied the Median filter with a radius of 14 pixels to the selected regions. That filled in the damaged areas with surrounding pixel values (Figure 11-9i).

To separate out some of the remaining damage, I used the noise reduction/Lens Blur method that I describe in detail in Chapter 7, page 224. I made a copy of the photograph and applied very aggressive noise reduction to it, using the settings shown in Figure 11-9j. This produced a blurry photograph where only the strongest edges were preserved. In this case, that mostly corresponded to damaged areas.

I applied the Find Edges filter to that blurry photograph, inverted the results, and increased the brightness and contrast of the image with the Curves adjustment shown in Figure 11-9k. I called up the Lens Blur filter (Figure 11-9l), which turned that image into a mask that would select for the worst of the remaining damage while ignoring most of the real image detail. I copied that mask and pasted it into a new channel in the original photograph so that I could load it as a selection.

Fig. 11-9h The Color Range… settings in Figure 11-9g produced this mask that selects for the worst damage in the photograph.

Fig. 11-9i Median filtering of the parts of the photograph selected by the Color Range… tool has eliminated a great deal of the damage from Figure 11-9e in a single step.

Fig. 11-9j The extreme noise reduction settings shown here blur out everything except the hardest-edged details in the photograph, which include many damaged areas.

Fig. 11-9k The Noise Ninja plug-in, the Find Edges filter, and an inversion got me to the mask image on the left. Applying the Curves adjustment in the center brought out the edges of the damaged areas more clearly, as shown on the right.
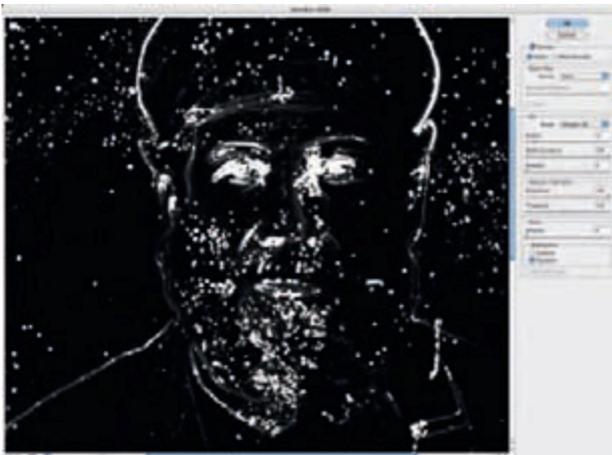

Fig. 11-9l The Lens Blur filter turns the mask in Figure 11-9k, right, into one that selects for entire damaged areas and not just their edges.

This mask is not perfect; it also selects a bit of the detail in the photograph. I used a black brush to paint over the mask channel where it had included real edges, resulting in Figure 11-9m.

I duplicated the photographic layer that I cleaned up with the Median filter so that I could apply the next stage of filtration separately from that one. I loaded the mask I had just created as a selection and applied the Dust & Scratches filter (Figure 11-9n).

The newly filtered image layer looked really great, but by clicking the eyeball next to that layer to turn it on and off I could see that there were spots I had missed when retouching the mask. A few bits of real photographic detail had been obliterated by the Dust & Scratches filter. I expected that would happen, which is why I did the filtration in a separate layer. By adding a mask to that layer and painting into it with black wherever I didn't want Dust & Branches filtering, I could undo that loss of detail (Figure 11-9o). The mask and the filtered photograph are shown in Figure 11-9p.

Fig. 11-9m Here's the mask image that Lens Blur produced after a little handwork to black out edges and real details that the mask undesirably also selected for.

Fig. 11-9n This Dust & Scratches filter, apply selectively through the mask from Figure 11-9m, eliminates a lot of the remaining damage.

Fig. 11-9o The Dust & Scratches filter in Figure 11-9n did its work on a duplicate of the Median-filtered layer that I masked with Figure 11-9m. I added a mask layer to the newly filtered layer so that I could paint out the Dust & Scratches effect where it obliterated real photographic detail instead of damage. The painted mask is shown in Figure 11-9p, along with the resulting photograph.

Fig. 11-9p Here's the mask that modified the Dust & Scratches filter, along with the now twice-filtered photograph.

Aside from the large rips and tears, almost all the remaining damage is small in size and sharp-edged (Figure 11-9q). One more pass with a masked filter ought to take care of it. Because the damage already has clear edges, I don't need to use Noise Ninja to isolate it; the Find Edges filter will work just fine all by itself.

Fig. 11-9q A close inspection of the twice-filtered photograph shows that most of the remaining damage is small and sharp—an ideal candidate for removal by masked filtering.

Once again I made a copy of the photograph, applied the Find Edges filter, inverted the result, and applied the Lens Blur filter with the settings shown in Figure 11-9r. To capture the finer detail and extract it from the background, I used a smaller radius and a much higher threshold. The resulting mask image included a lot of low-level background from the photograph, so I used a Curves adjustment (Figure 11-9s) to make the white (selected) stronger and to push the background closer to black. This got me the mask shown in Figure 11-9t.

Fig. 11-9r The Lens Blur filter with these settings produced a good candidate for a mask, although it was somewhat low in contrast, as shown in Figure 11-9t, top.
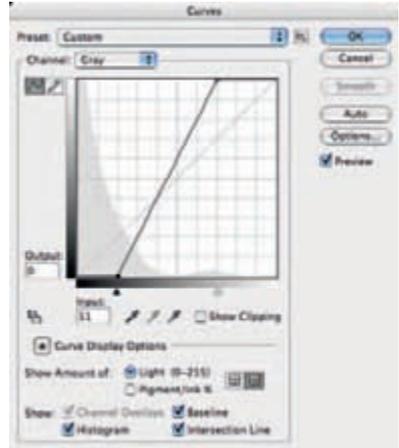
Fig. 11-9s This Curves adjustment turns the mask image at the top of Figure 11-9t into the one at the bottom.

I'm sure you know the routine by now: I copied the mask image into a new channel in the photograph, loaded it as a selection, and applied the Dust & Scratches filter (Figure 11-9u,) to get Figure 11-9v. Compare that to Figure 11-9q to see the improvement.

Almost all the damage has been eliminated, and we're down to the routine (and tedious) handwork. There's a bunch of small stuff to clean up, but nothing that the Spot Healing brush can't handle in short order. The lion's share of the work lies in the dark stains and light fade marks that cover much of the print.

To fix those, I turned to the masked dodging and burning-in layer approach I described in detail in Chapter 5, page 146. I created two masked curves

Fig. 11-9t The new image mask before (top) and after (bottom) the Curves adjustment from Figure 11-9s. Some edges are still visible and need to be painted out by hand, but this is only a few minutes' work. The resulting mask does a very good job of selecting only damage.
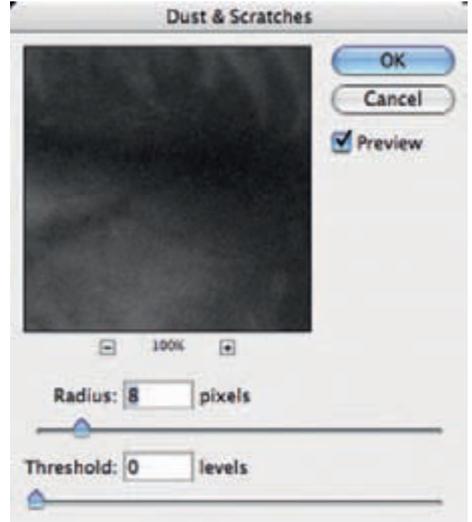

Fig. 11-9u Applying this Dust & Scratches filter to the masked photograph produced Figure 11-9v.

Fig. 11-9v The original photograph is now almost damage free except for large tears and a few isolated spots that selective filtration couldn't catch. The main work left to do is to clean up all the stains and faded spots that practically blanket the photograph.

adjustment layers, as shown in Figure 11-9w. The top curve creates a dodging layer; by airbrushing white into the layers mask (left), I can lighten up the photograph. Similarly, the bottom curve creates a burn-in layer that locally darkens the image.

It took a couple of hours, work to dodge and burn in the corrections to this photograph; it was pretty messed up. But finally I'm getting close to a clean photograph!

Figures 11-9x (a) and (c) show the photograph before and after my mask work.

Fig. 11-9w These masked dodging (left) and burning-in (right) adjustment layers let me controllably paint out dark and light blotches that remain in the photograph.
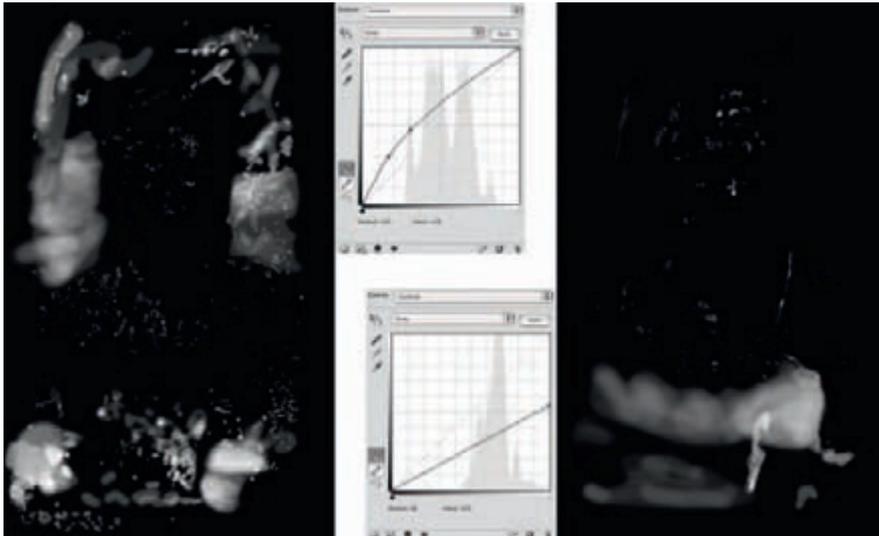

Fig. 11-9x (a) The photograph before dodging and burning in. (b) The same photograph after applying the dodging adjustment layer from Figure 11-9w, left. (c) The result of applying both dodging and burning-in masked layers. (d) The photograph after median filtering to smooth out the background and some cloning to fill in missing portions.

I created a new flattened layer with the magic key sequence Command-Option-Shift-E and used the Magic Wand and Lasso tools to create some masks that isolated the outer border, the background, and the scrolls at the top and bottom of the photo, as illustrated in Figure 11-9y.

I used those various selection masks in combination with Median filters of differing radii to clean up the most of the remaining irregularities. A 30-pixel radius worked well in the outer border and 50 pixels was best for the background and scroll regions. I faded the filtration by 50% to retain some of the structure and texture in the photograph so that the blends didn't look too artificial. Then I used the Clone stamp to paint over the large tears and recreate the missing pieces of the print, which got me to Figure 11-9x(d).

Fig. 11-9y The Magic Wand and Lasso tools work quickly in a photo of this type to select portions of the background for median filtering, because the areas to be filtered are well defined.

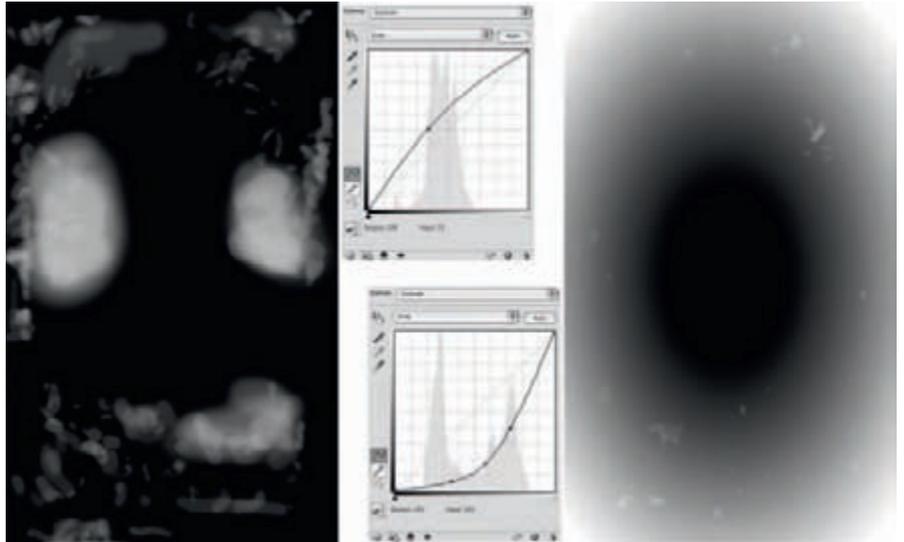**Fig. 11-9z** Two more masked adjustment layers provide the final touches.

Fig. 11-9aa The finished photograph prints very nicely at its original size. It looks a lot more like a drawing than a photo, but it's an attractive and recognizable likeness of the subject. Compare this to the original in Figure 11-9c.

Looking at that result, I felt there were still some large, shadowy stains in the middle of the photograph. It was a judgment call; that might have been the way the original looked, but it looked odd to me. Since this photograph isn't anything close to a literal rendition of the subject, I decided to go with my artistic instincts and not worry about the historical veracity.

I created another hand-masked dodging layer (Figure 11-9z) to eliminate those shadows. Finally I added a darkening layer with an oval gradient to darken up the borders and direct attention to the portrait (more artistic judgment rather than original intent). This, plus some minor overall Curves adjustments to brighten up the whites and increase contrast, got me to the photograph in Figure 11-9aa .