Example 3: Mother and Child—A "Legacy" Restoration Job

In this example, the original photograph (Figure 10-3-a) was made by a chain department store's portrait studio over 20 years ago. Poorly processed and taped into a cheap cardboard matte, the print hung on the family home wall for two decades. Consequently, it had faded something terrible. Although it looks like a nearly monochrome red image, there was enough color information left to do an excellent digital restoration.

When I started doing professional-quality restoration in 1998, this was the first job I ever did. The computer was slow with little memory, I could only work with 8-bit files, and all the work was done under Photoshop 4. That meant no adjustment layers, no History States, no Healing Brushes, and no clever third-party plug-ins. That's why I'm

Fig. 10-3-a This is a chain-department-store portrait made in the 1970s. It hung on a wall in this oval matte for 20 years before I received it for restoration.

Fig. 10-3-b Removing the matte reveals that the photograph has faded unevenly. Where it was struck by light, the fading is more severe.
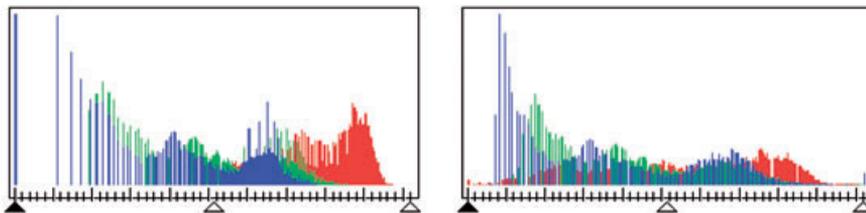
Fig. 10-3-c The scanner software histogram on the left, for Figure 10-3-b, illustrates the severe color shift in this photograph. The blue channel hasn't faded much, but the green channel has lost considerable shadow density, and the red channel barely spans the upper half of the histogram range. The histogram on the right shows the improvements possible with the adjusted scan of Figure 10-3-d; now all three color channels have data that spans most of the range of values.

including it in this book. The methods and tools I used to restore this photograph are available in just about any image processing program; this is as close to "generic" technique as you can get.

Figure 10-3-b shows an uncorrected scan of the unmounted print. There was almost no information in the red channel below middle gray, and the green channel showed considerable loss, as can be seen in the scanner software's histogram (Figure 10-3-c, left). The cyan dye image had faded the most, plus there was some dye loss in the magenta. Stain-

Fig. 10-3-d The adjusted scan has considerably better tone and a wider range of colors than the original photograph. The outline of the oval matte is very obvious; that's what needs to be fixed first.

ing had given the print an overall orange cast as well. I adjusted the scanner level sliders, expanding the red and green ranges to compensate for the dye loss and setting the white points for the green and blue ranges to compensate for the yellow-magenta stain. There was now a much better overlap between the three color channels, and the red data was spread out enough to give a decent range of tones to work with (Figure 10-3-c, right), indicating that I'd get a much more neutral overall color rendition in the scan (Figure 10-3-d).

The part of the photograph hidden by the cardboard matte had faded differently from the central oval exposed to light. In preparation for eliminating that difference, I created an oval mask (Figure 10-3-e) that precisely matched the outline of the faded area in the photograph. The Elliptical Marquee tool created a selection that approximately fit the oval. I saved that selection in its own channel and made it visible as an overlay on top of the photograph. I used white and black Brush and Pencil tools to refi ne the edge of the mask so that it exactly matched the oval area in the photograph.

After selecting the central oval area, I pulled up the Curves tool and created customized red, green, and blue curves to correct the differential fading. To begin with, I picked adjacent near-black areas in the tree on either side of the oval boundary and added adjustment points to the
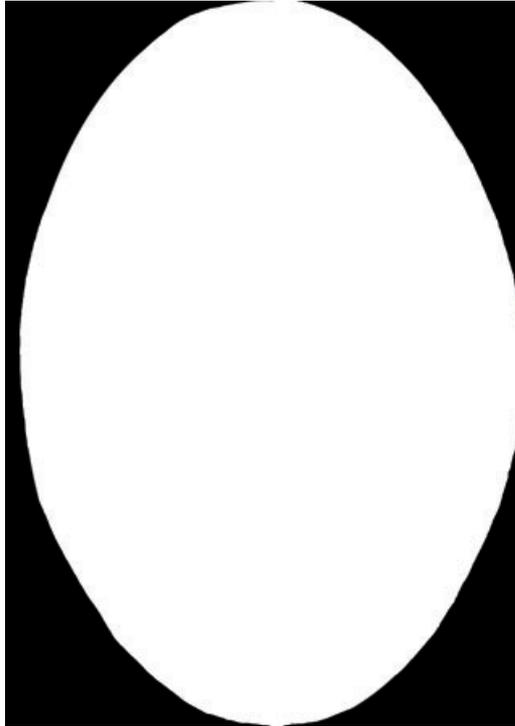
Fig. 10-3-e I created an oval matte using the Elliptical Marquee tool in Photoshop. The oval matte cutout isn't a perfect ellipse, so I painted along the edge of the mask with a hard-edged brush, using white and black tones, until I had an outline that precisely matched the cardboard matte.

individual curves corresponding to the values in the area inside the oval. I lowered those adjustment points until the areas inside and outside the boundary matched.

Next I picked a dark midtone area in the mountains in the backdrop and added adjustment points to the three color curves corresponding to the values there. I raised or lowered those points until the mountain tones matched.

I added adjustment points for an area in the sky, in the light sweater, and finally in the clouds. At each stage I adjusted only those points corresponding to the target areas to bring those areas into a good match on both sides of the oval. In this manner I worked my way up the tone scale from black to white to produce a complicated custom curve set (Figure 10-3-f) that would bring all the tones and colors together. The faded oval area was almost completely invisible in the resulting photograph in Figure 10-3-g. Now I had a uniformly degraded photograph to work with, and I could start correcting the overall tone and color.

Figure 10-3-g was dark, red, and lacked saturation. I improved the brightness and got rid of most of the red cast with the curves in Figure 10-3-h. The green curve adjustments made the shadows more neutral without affecting the middle and highlight tones. Dropping the midtone
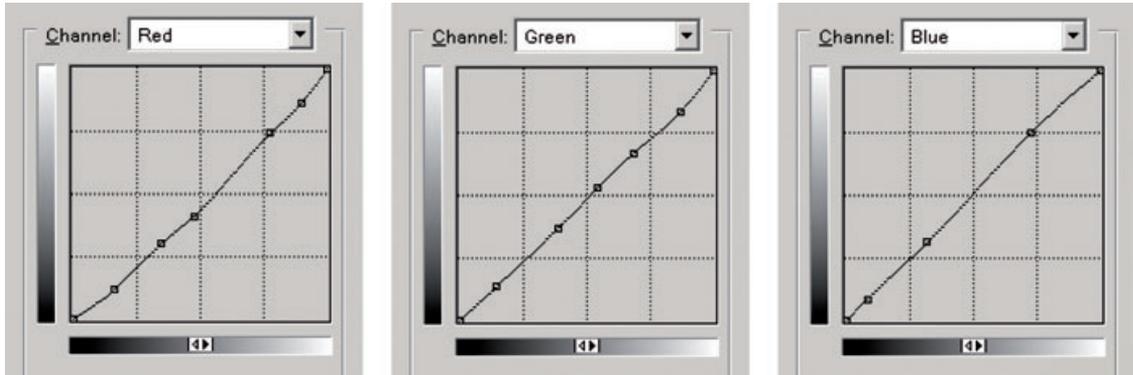
Fig. 10-3-f This is the Curves adjustment I made to Figure 10-3-d, masked with the oval mask from Figure 10-3-e. It makes the tones inside and outside of the masked area match nearly perfectly (Figure 10-3-g).

Fig. 10-3-g After the masked Curves correction from Figure 10-3-f, this photograph is uniform enough in appearance for me to begin serious color and tone restoration.
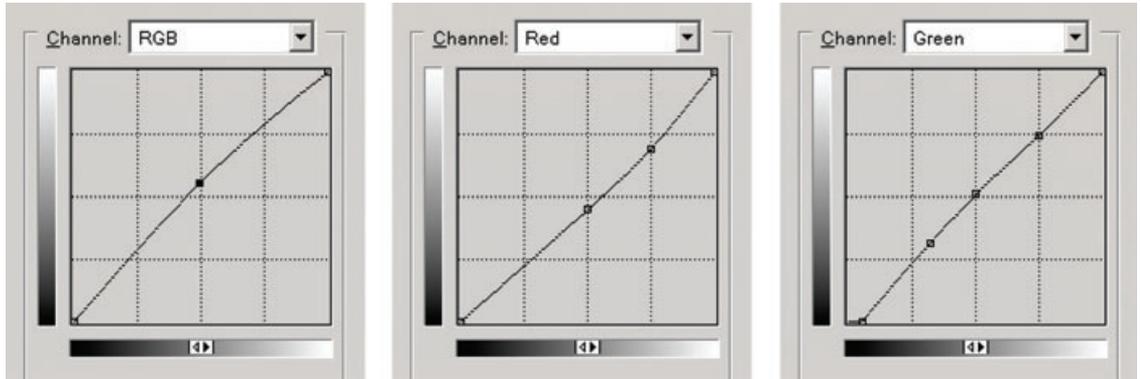
Fig. 10-3-h I made this Curves adjustment to produce Figure 10-3-i. The RGB curve lightens the photograph, while the red curve adds cyan to eliminate the reddish cast. The green curve makes the shadows more neutral by eliminating a green bias in the darker tones.

and higher red values and raising the midpoint in the RGB curve substantially improved the picture.

I followed that change with a saturation boost of 36 points to get Figure 10-3-i, which has fair overall color balance for the mother and child, but serious problems remained. The background looks far too brown. The clothing and highlights are dull and gray. The average skin tone is correct, but it's blotchy and harsh. From this point on, I worked on the photograph piecemeal, using masks. I decided to attack the background problem first.

I carefully traced around the mother and child with the Lasso tool to create the mask shown in Figure 10-3-j. I inverted that mask and applied it to the photograph to select the background. I used the Curves and Hue/Saturation tools on the background to reduce the amount of red, increase the overall contrast, and improve the saturation. I fine-tuned color curves to make the clouds neutral, the sky blue, and the foliage dark green to black (Figure 10-3-k). Then I increased the saturation by 20 points, which got me to Figure 10-3-l.

Streaks, blotches, and other defects such as surface cracks became all too visible after so much enhancement. I had to do a large amount of touch-up work with the Clone, Dodge, and Burn tools to correct the color and tone artifacts. I used the Clone tool to remove the most obvious of the cracks. I followed that with a 1.5-pixel-radius Gaussian Blur to the background to subdue noise and cracks in the background.

Having finished with the background, I deleted the selection and made some minor adjustments to the color and contrast to make the picture a bit more snappy. Next I focused my attention on the mother and child. The most evident flaw was the harsh and blotchy skin tones. Figure 10-3-m shows a full-color close-up of the faces along with the

Fig. 10-3-i As a result of the Curves adjustment from Figure 10-3-h and a 36-point increase in contrast, the mother and daughter are looking pretty good, but the background is definitely off-color. It's time for another mask, so that I can work on the two regions of the photograph separately.

Fig. 10-3-j I drew this mask by hand, using the Lasso tool to carefully follow the outline of the mother and child. It lets me perform separate corrections on the background and the people. I applied it to Figure 10-3-i and inverted it to select the background.
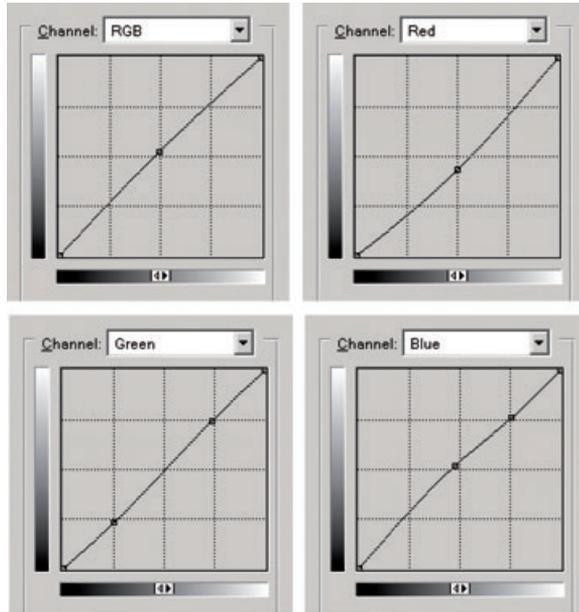
Fig. 10-3-k This is the Curves adjustment I used to correct the background. I applied this adjustment, using the mask in Figure 10-3-j, to produce Figure 10-3-l. These curves lighten the background slightly and make it substantially bluer and more cyan. The green curve eliminates some color crossover, making the shadows less green and highlights less pink, as shown in Figure 10-3-l.

Fig. 10-3-l The masked Curves adjustment from Figure 10-3-k, plus a saturation boost of 20 points, improved the background a lot. The sky in the backdrop is now a shade of blue instead of muddy green, the clouds are closer to neutral, and the tree branch is more green than brown.

Fig. 10-3-m This close-up of the faces shows the need for some skin tone corrections. The skin color is uneven and blotchy. The individual color channels indicate that the problem is not with the red channel, which has smooth and even tones, but with the green and blue channels. The green channel is a particular problem because it has too much midtone contrast; that's what makes the skin color vary from flushed to sallow.
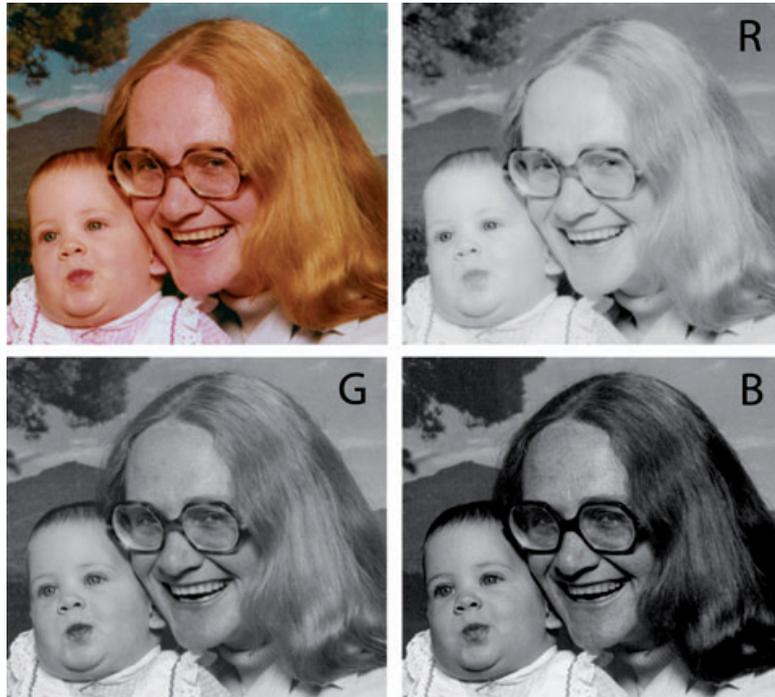
individual red, green, and blue channels. The green channel (lower left) made it clear that most of the problem was due to excessive contrast in the magenta. That exaggerated modest variations in the rosiness of the skin tones such that they ended up with sallow and flushed complexions.

To fix this, I traced out a new mask with the Lasso tool, shown in Figure 10-3-n, to let me work on skin tones and nothing else. I created a set of curves (Figure 10-3-o) to correct the blotchiness. The green curve left most tones unchanged, but it reduced the contrast in the green values between about 120 and 170, which corresponded to the range of values in the face. To a lesser degree, the blue curve lowered the contrast of the yellows, eliminating the sallow quality in the shadows and making the highlights less pink. A very slight raising of the midpoint of the RGB curve lightened the skin tones overall.

This was all it took to produce a much improved complexion for both mother and baby (Figure 10-3-p). There were still some yellow and pink blotches, especially in the shadows. I eliminated them by grabbing a good average skin color with the eyedropper and using the airbrush tool set to Color at a few percent strength to spray in that hue without altering the brightness in those areas. I also used the airbrush set to Darken to mute the highlights on the faces.

Fig. 10-3-n This mask, hand-drawn with the Lasso tool, allows me to correct the skin tones in Figure 10-3-l without altering the rest of the photograph.

Fig. 10-3-o This Curves adjustment, applied through the mask from Figure 10-3-n, eliminates the blotchy skin tones (see Figure 10-3-p). The RGB curve lightens the skin tones slightly. The major correction is to the green curve, which substantially lowers contrast in the range of the magenta tones shown in the face. The blue curve adds a bit of yellow to the highlights, so they're less pink, and subtracts a little from the shadows, making them less brown.
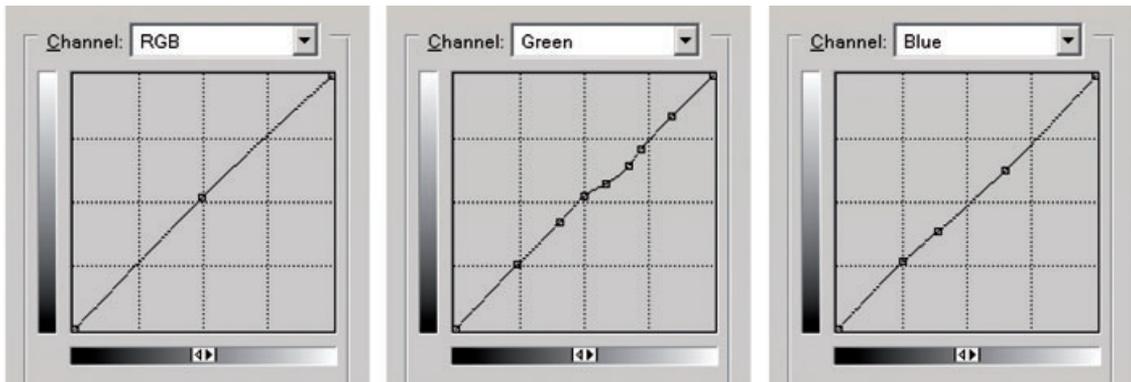
Fig. 10-3-p The enlargement on the left is from Figure 10-3-l before correction. The enlargement on the right shows the effect of the Curves adjustment from Figure 10-3-o. It really improves the skin color.

Fig. 10-3-q Here's the final restoration, after some final local color adjustments, dodging and burning-in, a little bit of airbrushing to get rid of the worst hot spots on the skin, and a thorough cleaning up of dirt, cracks, and minor physical damage. Yes, that flaming red hair is correctly colored . . . and natural, to boot!

I corrected the slightly flat and bluish highlights in the clothing by applying the foreground mask and kicking up the RGB highlight value in the Curves tool while dropping the blue highlight value a notch. I switched to the background and slightly darkened it to bring it into better compositional balance with the subjects.

The color was now almost on target except for two items—the woman's hair and her teeth. She's a brilliant redhead, not the reddish blond in the photo. I fixed that with the Burn tool set to a value of 10% for the midtones. In the channels palette I made the green channel the only active one (but left all the channels visible, so I could judge the full-color photograph) and gave the hair a couple of passes with the Burn tool. The results were perfect!

As for her teeth, which were excessively dark and yellow in the restored photograph, I first dodged them lightly overall and then dodged only the blue channel to remove some of the yellowish cast.

The final cleanup wasn't difficult, but it was very time consuming. I went over the picture at 100% magnification using the Clone, Dodge, and Burn tools to eliminate any blotches, scratches, dust specks, and artifacts along the boundary between the oval area and the surrounding area that my initial adjustments missed. The finished restoration (Figure 10-3-q) is impressive, especially considering that very little of what I did was an arbitrary application of tone and color to the image—95% of what you see truly was a restoration from data contained in the original print.