Photo Restoration and Retouching Using Corel® PaintShop Photo™ Pro

Second Edition

Learn How to Rescue Old Photos and Improve Your Digital Pictures!

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Photo Study 17: Improving an Overly Yellow Color Balance

WE HAVE A TRADITION in our family where we take our children to the mall on their first birthday for a special treat: a teddy bear. We broke with tradition with Grace. Unlike the boys, who each got teddy bears, we decided on an orange tabby cat for her. (We have since rectified that situation and she has her bear.)

Figure 4.1 is a photo of Grace holding Margie in the store. This photo is marred by the fact that it's overly warm (yellow). The store is filled with yellows and oranges, which were picked up by the camera. The wood floors are sort of a yellowish brown and the walls are a similar color. Grace's skin tone is in the same color range, and Margie is also orange.

There are several ways to alter the color balance of a photo in PaintShop Photo Pro.

Technique Smorgasbord

For our purposes, color has three components, and I want to talk about each one briefly:

- **Hue:** The perceived color, which for computer graphics (including digital photos), is traditionally a mixture of red, green, and blue values. The strength of each RGB component (from none, or 0, to full, or 255) determines the overall color. In the context of an RGB triplet, pure red would be written as 255,0,0. Hue also exists in different color spaces, such as HSL, which stands for hue, saturation, and lightness. In this context, hue is a continuous wheel of color ranging from red to yellow, through green and blue, to purple, and then back to red. Think of hue as the color, with different ways to measure and change it.

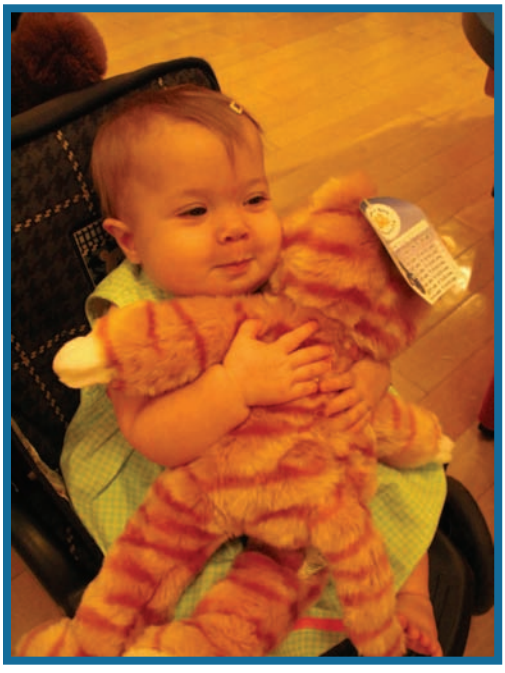

Figure 4.1
Grace holding Margie, the orange tabby.

- **Saturation:** The balance between the color itself and gray. A totally saturated color would be pure, such as pure blue, with no gray in it. Think "vibrancy." Blue with a lot of gray in it is muted by comparison. We can saturate (take gray out) or desaturate (put gray in) photos. Saturation is also related to contrast. The more gray a photo has, the less contrast it will appear to have. Ever go driving on a foggy day?
- **Lightness:** The balance of the color with white or black. This is pretty intuitive. Dark green has more black in it than light green.

As you look at the following photo studies, think in terms of RGB or HSL in order to come to a conclusion on how to fix the problem. Too little vibrancy? That's a saturation problem. Too dark? That's a lightness problem, which I cover in Chapter 3, "Finding the Right Brightness, Contrast, and Focus." Too blue? That's an RGB issue. Are the greens red and the blues yellow? That's something wrong with the hue.

There are several ways to turn colors up and down in PaintShop Photo Pro, and there are a lot of ways to push colors from one hue toward another and add or subtract the amount of gray present. I will show you several techniques as I restore this photo of Grace.

Camera RAW Lab

You have the option of opening raw-format digital photos in X3's new Camera RAW Lab. (Check your File Format Preferences to make sure it's turned on.) This replaces X2's Smart Photo Fix for raw photos. The problem with this photo is that it was shot with an old, compact digital camera that doesn't support raw.

Within the context of the Camera RAW Lab, color issues are resolved in the White balance section. It's called "White balance" because the human eye tends to see white as white, regardless of the lighting conditions. Cameras aren't so smart—they have no way to tell what should be white in a scene. We can help the situation by indicating what type of light the shot was taken in or by manually setting the color Temperature and Tint so that white is actually white. Select from one of the following scenarios to see if it fixes the color, or try to find the right Temperature and Tint settings on your own.

- **As Shot:** Data provided by the camera is used to set the white balance.
- **Auto:** Similar to telling the camera to figure the white balance based on its own internal algorithms (most people shoot with Auto White Balance), but in this case you're asking PaintShop Photo Pro to do it.

  If you want a good comparison between how your camera and PaintShop Photo Pro differ in their estimation of the white balance, switch back and forth between As Shot and Auto, noting the changes in the photo as Temperature and Tint change.
- **Daylight:** Assumes the lighting conditions were daylight. Temperature is set accordingly. Tint is not. It stays on the setting provided from the As Shot setting, or Auto, whichever you last previewed from the list.

  There is no point in repeating all this for each type of lighting, so here are the rest of the settings:

  - **Cloudy**
  - **Shade**
  - **Tungsten**
  - **Fluorescent**
  - **Flash**

- **Custom:** As soon as you grab the Temperature or Tint controls yourself, the setting changes to Custom. The Temperature is the actual temperature of certain types of light. Some are hotter than others, and being hotter changes whether it comes across as blue or red. Tint applies either a green (more) or purple (less) tint to the photo. That seems odd, but you use it to counter the opposite shade. If your photo has a purple tint, increase Tint, which adds green to the equation.

One Step Photo Fix

There's little to say here. I normally give One Step Photo Fix a try, and it often works. Figure 4.2 shows the result for this photo. It didn't correctly identify the hue problem. Next.

Figure 4.2
One Step Photo Fix disappoints.

Smart Photo Fix

Smart Photo Fix, shown in Figure 4.3, is much better. The key with using Smart Photo Fix when you're addressing a color problem is to enable the Color Balance check box on the right side of t he dialog box and then do what it s ays. Zoom in on areas in the left preview window and pick out good examples of objects that *should be* black, white, and gray and click on them to give P aintShop Photo Pro good reference points.

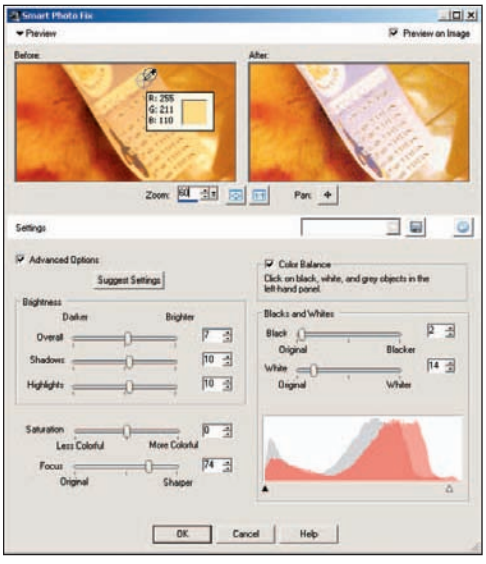

Figure 4.3
Smart Photo Fix is much better—note my color spots.

I was able to find three good color s pots in this photo. I decided on the dark area of the stroller as black, the lighter fabric of the stroller t o be gray, and part of the tag on Margie to be white. Manually selecting these points adds your "smarts" to the equation. The "white" spot I am in t he process of choosing has a little color swatch come u p for us to see, and it reads out the measured R GB value. Nice touch! You can also see t hat what should be white is very yellow. That's the problem, right there in a nutshell.

Color Temperature

Film reacts to light chemically. Because different films are designed and made differently, they can produce slightly different colors. Some, like Fuji Velvia, are prized for the beautiful colors and contrast they capture.

Color Balance

If you want a faster, easier fix, try Color Balance from the Adjust menu. Figure 4.4 shows the dialog box, which is decidedly simpler than the Smart Photo Fix dialog box. Leave the Smart White Balance option enabled (normally a good thing to do) and drag the temperature slider back and forth from cooler to warmer until you find the right balance.

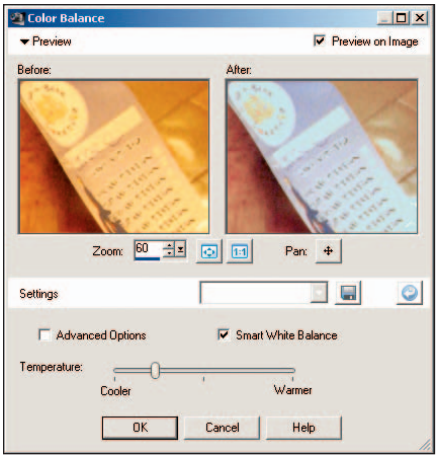

Figure 4.4
Cooling down a photo with Color Balance.

This photo has far too much yellowish orange in it, which makes it too "warm." I've drug the Temperature slider toward the Cooler side. It's not bad. You don't get as many options as you do with Smart Photo, but this is often a good place to start. If you're feeling adventurous, select Advanced Options and continue to experiment.

Channel Mixer

Figure 4.5 shows the Channel Mixer. You can open the Channel Mixer from the Adjust > Color menu. This approach gives you control over the balance of colors in each channel. With great power comes great responsibility. At least Spider-Man says so.

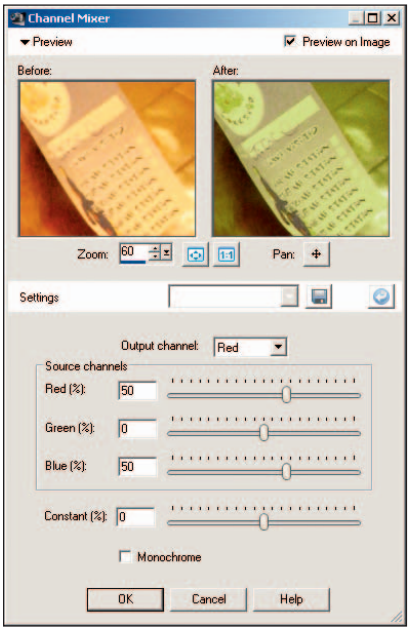

Figure 4.5
Channel Mixer is not for the timid.

Uncheck monochrome for a color photo and then choose an output channel from the top list box. Figure 4.5 shows the Red channel. The main part of the dialog box shows the percentage change to apply to each component source channel. (That was a mouthful.) The values range from negative 200 percent to positive 200 percent. That means you can change the output mix of each channel by cutting or adding red, green, or blue to that channel. To maintain the overall brightness of the image, make sure the sum of the values for the three channels (per channel) is 100. If not, adjust the Constant setting up or down to try and compensate. Don't forget to switch to the other channels and adjust them as well.

Fade Correction

Fade Correction, from the Adjust > Color menu, works to restore the proper color balance to a scanned photo print that has aged or faded. Although this is a digital photo, Fade Correction often produces good results. Figure 4.6 shows the dialog box with a preview.

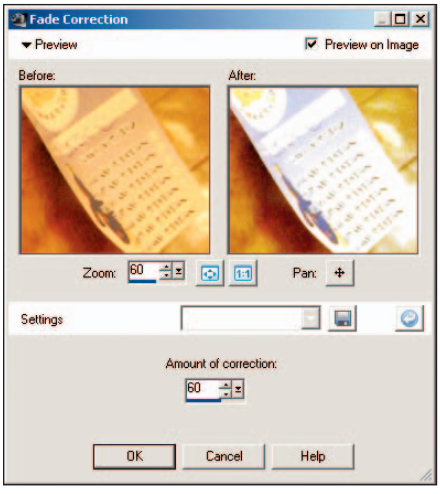

Figure 4.6
Try Fade Correction to reduce yellow.

Fade Correction turns out to be pretty good. You should understand why at this point. (Hint: Old photos often yellow with age.) Increase or decrease the amount of correction to strengthen or weaken the effect. I've put it at 60.

Adjusting Red/Green/Blue

Want to adjust the strength of the red, green, and blue component colors? Simply go to the Adjust > Color menu and choose Red/Green/Blue. The Red/Green/Blue dialog box is shown in Figure 4.7.

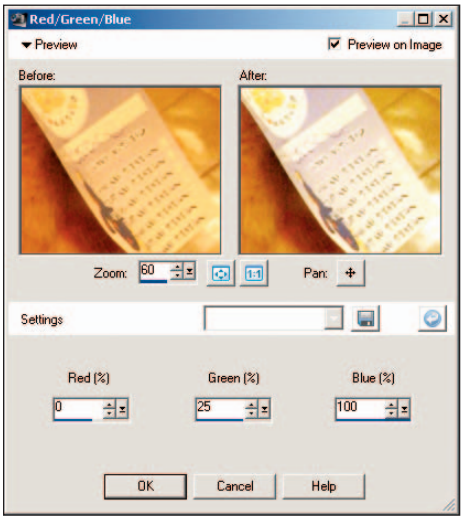

Figure 4.7
RGB is easy and effective.

Go to the Red, Green, and Blue colors and change them until you get a good balance. You can add or subtract up to 100 percent either way for each color. To use this method, it helps to know a little about color and where specific colors sit on the spectrum. For example, there's no option to turn down yellowish orange, which is what I need to do. Click on the foreground color in your Materials palette and look at the color wheel. Yellow and orange sit between red and green, with orange close to red. That's why I turned up blue a lot and green a little. I was able to counteract the excessive yellowish orange by turning those colors up. I love it when art and science come together!

Making Histogram Adjustments

Do you remember using the Histogram Adjustment tool in the last chapter? It's back in action here, because it's a useful tool with powerful color options, too. Figure 4.8 shows the Histogram Adjustment dialog box, with the Edit radio button set to Colors and the Red channel displayed. You can use the Histogram Adjustment settings to adjust the histogram of each color component of your photo by selecting the color (red, green, or blue) from the drop-down menu. Look carefully and compare the graphs for each color. This can be a diagnostic as well as restorative tool.

Red doesn't actually look too bad. I've adjusted the gamma (which is related to brightness and contrast) downward. This has the effect of darkening the red colors.

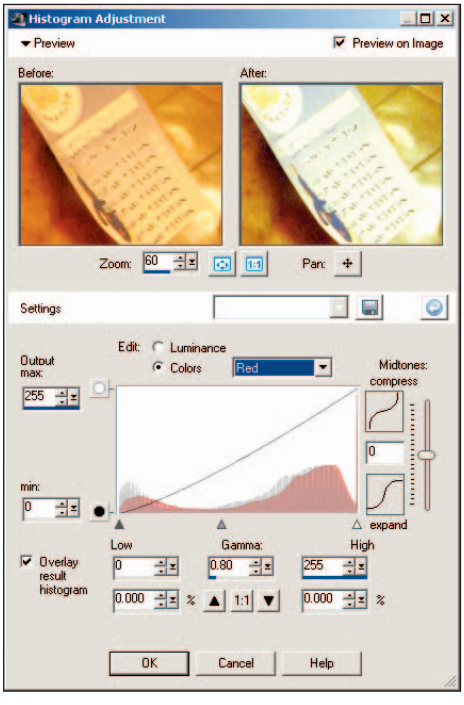

Figure 4.8
Adjusting individual colors can be powerful.

Figure 4.9 shows the Green channel. Whoa, baby. This one's out of whack. There are no (or very few) light greens present in our photo. I've moved the High value down, which has the effect of lightening the Green channel because it's remapping the existing dark greens upward (in this particular photo). It's pushing them into the lighter area of the histogram. Since the greens in this photo are skewed toward the darker side of the force, moving them upward restores balance to the photo.

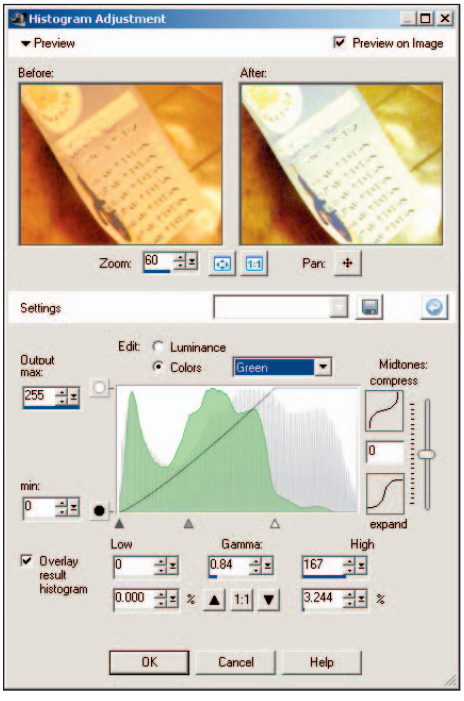

Figure 4.9
Yellow problems caused in part by the dysfunctional Green channel.

Figure 4.10 shows the last channel, Blue. Where is it? It's not really there. There is very little blue in this photo, which is why it looks so "warm" and overly yellowish orange. Drag the High slider down to lighten the blues in the photo.

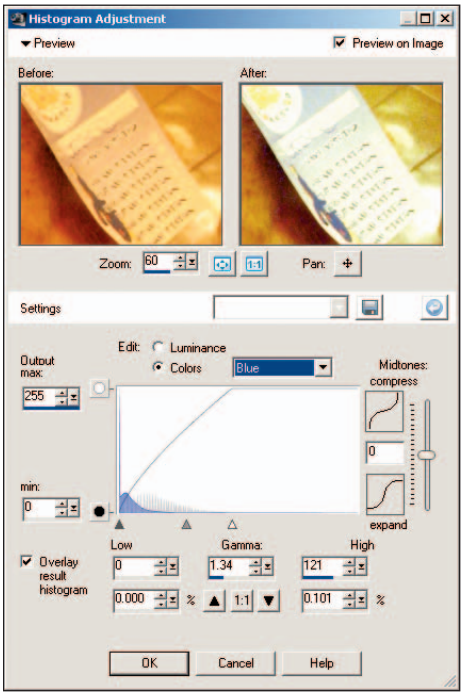

Figure 4.10
An overly warm photo lacks blue.

Finishing the Photo Study

Figure 4.11 shows the final photo. It's amazing what a little bit of color correction can do. The winning technique? Good 'ole Smart Photo Fix.

Figure 4.11
Touching photo rescued from yellow fever.

Remember, the finished photo in each study in the book is the result of *more* than what I've been showing you how to do. This is so I can show you the main teaching point but not leave you with a half-finished photo. To illustrate this fact, consider that I took the following steps to finish this photo:

1. Applied Smart Photo Fix from the Adjust menu. This was the main teaching point for this study and did the job of correcting the color imbalance. I ended my narrative here, but you can see the fully restored (or retouched) photo in Figure 4.11. When working on your photos, you will apply a number of the different techniques, too, ranging from noise reduction to color balancing to contrast adjusting or fixing physical damage, all on one photo.
2. Enhanced the contrast.
3. Duplicated this layer.
4. Performed a One Step Noise Removal on the bottom layer. This worked great on the background and stroller, but did not work as well on Grace's face. The stroller lost a lot of detail in the fabric, and Grace's face was still noisy. I came up with a way to solve that.
5. Performed Digital Camera Noise removal on the top layer. This worked great on the stroller and Grace's face.
6. Lowered the opacity of the top layer from step 5 to blend the two noise reduction layers together. I was looking to keep certain details (the fabric, for example) yet reduce the overall noise.

Copy Merged

I used to press Ctrl+A to select the entire canvas before pressing Ctrl+Shift+C to copy the merged layers together. I've learned fairly recently that I don't need to do this.

Pressing Ctrl+Shift+C (or using the Edit › Copy Special › Copy Merged menu) automatically selects and copies all visible (even semitransparent) pixels on the entire canvas, no matter what layer they are on.

I have one warning. Take care that you don't have another selection active, because if you do, as you press Ctrl+Shift+C, you'll create a merged copy of the selected area, not the entire canvas.

7. Selected the top layer. Pressed Ctrl+Shift+C to copy the merged layers together.
8. Pressed Ctrl+V to paste this blended composite layer as the top layer in the Layers palette. It was my new working layer.
9. Touched up other areas that needed smoothing or blending.

Sometimes, I'm able to give you quite a bit of detail on the extras, sometimes not. I always summarize what I've done to give you a sense of these other steps.

Photo Study 18: Warming a Cool Color Balance

FIGURE 4.12 SHOWS THREE of my four children (this was taken two days before Sam, our fourth, was born) sitting on the front porch posing for a group portrait. This digital photo was taken late one afternoon in the winter. It was cold, but it wasn't to the point where they needed their Arctic gear that day. We had Ben and Jake in their fleece jackets, cool sunglasses, and light-up shoes. Gracie was decked out in her pink coat, pink pants, pink boots, and, of course, pink sunglasses.

This is probably the sort of photo you have. It's a casual shot of everyday life that is a photo we want to keep. The problem is, it's incredibly blue. Photo-wise, blue is an opposite of the reddish-yellow colors in the previous photo study. Reds, browns, and yellows (think skin tones) make a photo look warm. Blue makes a photo look cool.

I'm going to run through several different ways to warm this photo up and then decide on a winner.

Color Temperatures

I keep putting the terms "cool" and "warm" in quotes because we use them to describe how we perceive the photo. Unfortunately, these descriptions are completely wrong when compared to the color temperatures. Although blue light is actually hotter than red, we tend to describe it as "cooler."

Figure 4.12
Brrrski-brrr.

Technique Trials

I won't go over the color theory again, but I will say this photo has the opposite problem than the previous photo study. There is too much blue instead of too little. The result is a photo dominated by the "cool" hue of light blue.

Smart Photo Fix

The Smart Photo Fix dialog box is shown in Figure 4.13. This opens up when you choose the Adjust > Smart Photo Fix menu. I've pressed the Suggest Settings button, as I traditionally do, to see where PaintShop Photo Pro leads me. Then I tweak and adjust. I've selected three color balance points in areas of the Preview window you can't see. I've chosen the black of the screen door, the white of the house siding, and the gray of the concrete porch as the color samples Smart Photo Fix will rely on to adjust the color balance. The result is good.

Figure 4.13
Smart Photo rocks.

Color Balance

Trying to fix the overly blue cast using the Color Balance technique, as shown in Figure 4.14, doesn't work too well for this photo. It takes out t he blues when I drag the Temperature slider toward the Warmer region, but the result seems lifeless.

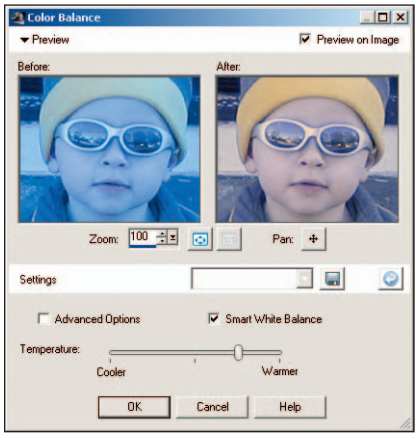

Figure 4.14
A little lifeless.

Channel Mixer

Here again is the Channel Mixer. This time I'm showing (see Figure 4.15) the Blue Output channel. I've increased the Red source a tiny bit, the Green source by a fair amount, and the Blue source a little. I tweaked the other output channels as well. All in all, I wasn't able to get very close to what I wanted.

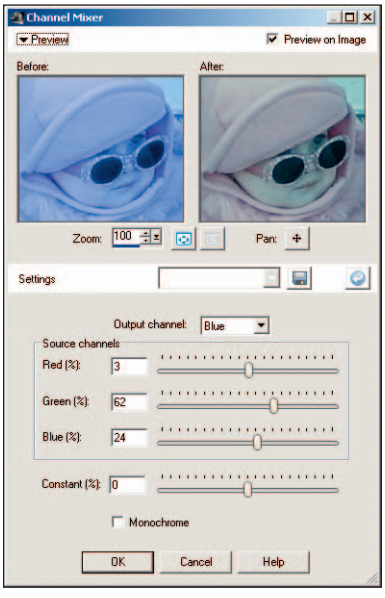

Figure 4.15
Channel Mixer doesn't work well for this photo.

Fade Correction

In the last photo, I showed you that Fade Correction could restore a yellow, faded photo. Figure 4.16 reveals that it has a certain degree of effectiveness here, too. Remember to keep trying alternative methods. If it doesn't work well for one photo, it might work for the next.

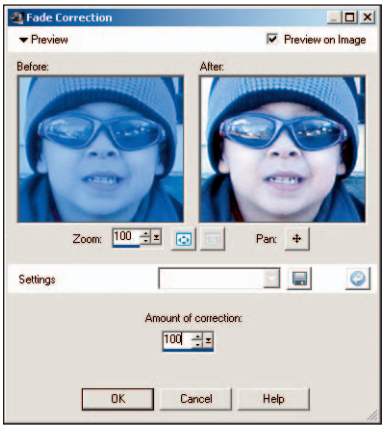

Figure 4.16
A little too much contrast.

I like what Fade Correction has done, but the result has a little too much contrast in it. I want to enhance the contrast in the final photo, but I will use a method to boost contrast that will give me greater control than this.

Adjusting Red/Green/Blue

Adjusting each component channel is the forte of Red/Green/Blue. You would think this might be the perfect solution for this problem. Too much blue? Just turn it down. I've added a lot of red (remember, adding the other components can be as effective as turning the offending one down), some green, and taken some blue out in Figure 4.17.

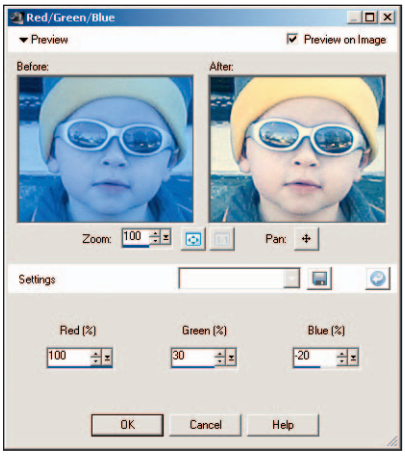

Figure 4.17
Good, but not vibrant enough.

It's not bad, but this too lacks a degree of vibrancy, which indicates a saturation problem. Can you tell what I'm doing as I go along? I'm trying to fix the problem, yes, but I'm also investigating. Contrast and saturation are on my list of things to look into after color.

Adjusting Curves

I'm going to throw you a curve ball in this study and bring back Curves. The Curves dialog box with the Red channel active is shown in Figure 4.18. The great thing about Curves, much like Histogram Adjustment, is that you can switch to each channel and therefore change the color balance. We can see from the plot that the red is too dark in this photo. There isn't enough of it because the blue has squeezed it all out. As you make these changes, look for matching colors in the photo to help you find your way. Jake's shirt is blue and he has a nice yellow stripe on his jacket. That's a good signpost. Whatever I do, that shirt should be blue and the stripe yellow. By the same token, Ben has a red shirt and Jake has a plush bug with green ears. All of these are good reference points for me to look at.

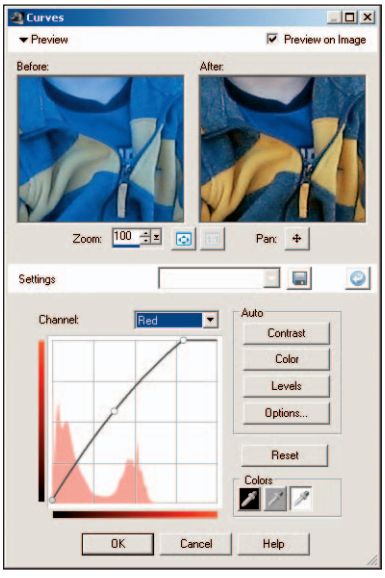

Figure 4.18
Not enough red.

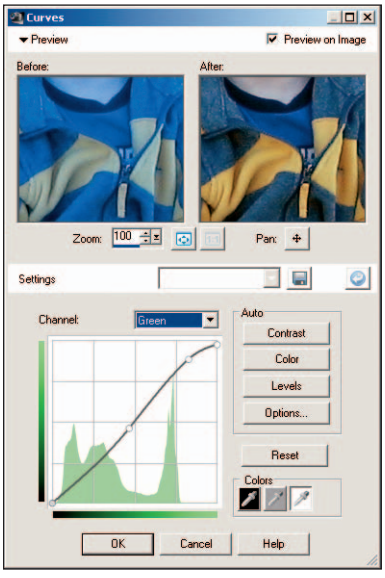

Figure 4.19
Enhancing the greens.

Figure 4.19 shows that there is green, but it's a little squished down. I can help that out by adding a few dots at the correct places. I've snuck the top down and the bottom up a bit, and bowed the curve some to lessen the intensity of the green. In the Curves dialog box, a convex-shaped curve (think "outy") intensifies that component color, and a concave shape (like an "inny" belly button) turns the color component down for each pixel.

The Blue channel in the Curves dialog box is shown in Figure 4.20. There's a pretty even distribution of blue from dark to light. That figures. There's a lot of blue in this photo!

The solution? Bow the curve inward and bring the right side of the plot down to mix some blue out of the photo.

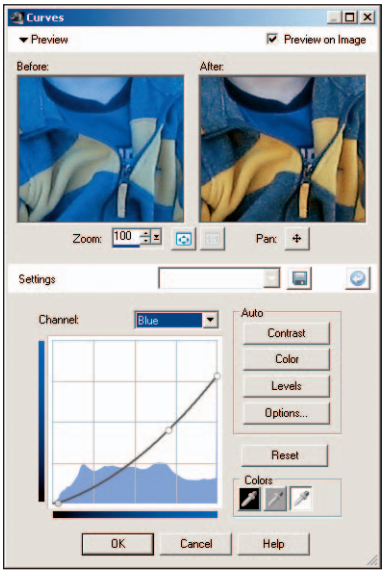

Figure 4.20
Removing too much blue.

Finishing the Photo Study

This fully restored photo, shown in Figure 4.21, is one of those "miracle" restorations. It's one that you can pull out of your portfolio and show people, and they'll all go "Wow, how did you *do that*?"

Here are the steps I took to restore this photo completely. First, I used the Smart Photo Fix as a baseline to start from. (In retrospect, I could easily have used Curves instead.) Then I fixed the contrast with a Histogram Adjustment. Next, I bumped up the saturation to make it a bit more vibrant (subtly, but you can tell if you look at Grace's pink coat). I then removed some noise, but after I did, the concrete looked funny. No matter how I tried to take out the noise, the concrete suffered. My solution? I duplicated the working photo layer and then applied Digital Camera Noise Removal to the top layer. I wanted my kids' faces to look better, so I erased everything on that layer but their faces.

I blended the two layers together by lowering the opacity of the layer with the kids' faces (the one on top, which had the noise removed). When I was satisfied, I did a Select All, Copy Merged, Paste as New Layer. Finis!

Setting Tone and Color

Improve your photography by experimenting with tone and color settings in-camera. For example, I can adjust the white balance on my Canon A480 from AWB (Auto) to Day Light, Cloudy, Tungsten, Fluorescent, Florescent H, or Custom. I can also set the colors to Vivid, Neutral, Sepia, B/W, or Custom Color. The downside to this with JPEG-only cameras is the decisions you make are locked into the photo. If you want to experiment, take and review test photos to make sure they have the tone and color you're after.

Figure 4.21
The kids are all right.