Lighten, Darken, Luminosity, Color

Topics: Fleshtones, blending modes, redeye reduction.

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This archive, to be released over several years, collects the columns that Dan Margulis wrote under the *Makeready* title between 1993 and 2006. In some cases the columns appear as written; in others the archive contains revised versions that appeared in later books.

Makeready in principle could cover anything related to graphic arts production, but it is best known for its contributions to Photoshop technique, particularly in the field of color correction. In its final years, the column was appearing in six different magazines worldwide (two in the United States).

Dan Margulis teaches small-group master classes in color correction. Information is available at http://www.ledet.com/margulis, which also has a selection of other articles and chapters from Dan's books, and more than a hundred edited threads from Dan's Applied Color Theory e-mail list.
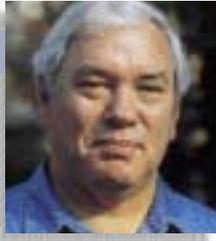
Lighten, darken, luminosity, color

From smoothing a complexion to coercing the viewer into seeing more vivid colors, four blending modes stand out as retouching powerhouses. Many people who should be using them are deterred by their very confusing names

Someone once explained photographic redeye to me as how the eye's lens, startled by the intensity of a flashbulb, opens in such a manner than only red light reflects back. I don't know whether this is right, but I know the phenomenon exists, and that it causes no end of headaches to people who have to work with the resulting photograph.

There are many ways to repair redeye, but I'll illustrate what I consider to be the quickest and most effective, in RGB mode throughout.

In RGB, neutrals—whites, grays, and blacks—are made up of equal values of red, green, and blue. As we would like the center of the eye to be black, we need all the channels to look approximately alike there.

The current brilliant red, however, indicates that the red channel (A) is blown out. Making a perfect selection of the pupil for retouching purposes is annoying. Painting in a pupil with the burn or the sponge tool is tedious. Making a rough selection of the entire eye followed by a move limited to reds in Image: Adjust>Hue/Saturation or Adjust>Selective Color is commendably lazy, but may leave the pupils too light.

Instead, make a rough selection with the lasso tool. It needn't be particularly accurate; you just need to get the whole pupil and none of the eyelid. Ignore how much of the rest of the eye is selected. Now, expose the red channel with a Command-1.

At this point, Image: Apply Image. Specify either green or blue as the source (I chose green here) and 100% opacity. This replaces the red channel in the selected area with a copy of what's in the green, ensuring that the red and green are equal in the pupil, as they should be.

They will now also be equal in any other parts of the eye that may have been selected. That's not right. These are blue eyes. The red should be slightly darker than the green. Thanks to this blend, it isn't, so the eyes wind up blue in some parts and gray in others.

There's a one-step solution. The blending mode should not have been Normal—a replacement—but Darken.

When pupils are light in the red channel (A), the result is redeye (B). The condition can be corrected by blending parts of the green channel (C) into the red. This must be done using Darken mode, however, to avoid changing the eyes from blue to gray. D and E are the final red and composite.

"Darken" doesn't mean what it seems to. It means, don't permit any part of the blend to get lighter. Blending the green into the red causes the pupils to get darker, therefore is acceptable. But in the rest of the eye, the green is lighter than the red. Lightening isn't allowed, so this part of the blend is ignored. Only the pupils change in the red channel.

Color, contrast, curve, collage

Darken, and its counterpart, Lighten, are two of the four most important Photoshop blending modes other than Normal. Figuring out when to use them can be a problem, because there is so much natural camouflage. That the color of the pupils is so grossly wrong can blind us to the fact that they are also much too light.

The trick is to look at the picture once for color, once for contrast. The blending modes mentioned in the title will then make their uses abundantly clear.

The color looks good in image F, but the cat could use more snap. Those who know how to color-correct in LAB will have an easy time with this, but it can also be done in CMYK, or, as today, in RGB.

F

G

the shapes of the curves must be different for each. That changes color. The blue will have to get lighter overall and the green darker. The cat winds up red, and the grass gray.

Since this was not sufficiently ugly, noticing that the green channel seemed crisper than either of the others, I applied unsharp masking to it only. The result is G.

Now, I pasted G on top of F as a second layer. The final step was to change the layering mode from Normal to Luminosity—meaning, use the contrast from the top layer, but the color from the bottom. The hybrid animal is version H.
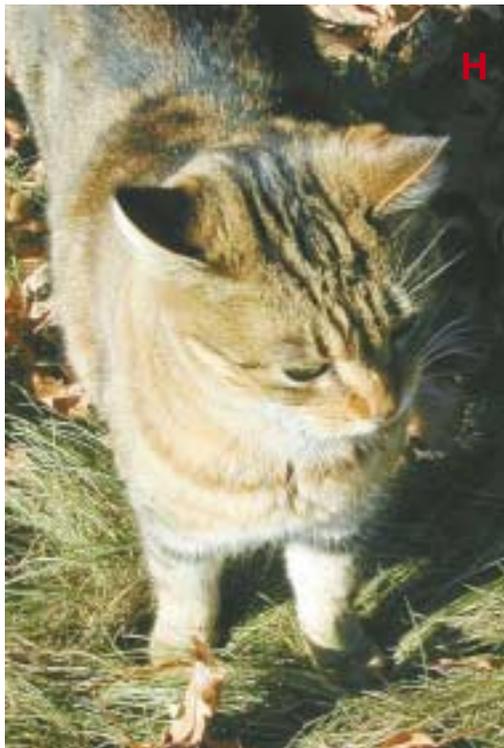
H

The cat in F is the right color, but a bit flat. One can therefore use curves to make a second version (G) just for contrast, ignoring color completely. Image H uses Luminosity mode: it combines the color of version F with the detailing of version G.

Cyan, magenta, yellow, blue

The lesson, particularly important to professional photographers, is that once you have adequate color, you can go crazy with contrast-enhancing moves. The original color can always be restored with one of these luminosity blends.

The next exercise is also of interest to professional photographers or anyone else with an imperfect knowledge of the fragility of the CMYK colorspace, or with the mistaken view that there's some perfect way to get there from RGB.

My words are inadequate to describe the scene. Fortu-

The strategy is to forget the color altogether and shoot for something more detailed. We make a copy of the original for future use. Then, we apply contrast-enhancing curves to each channel.

There are two interest objects here, the cat and the grass. Both are dark in the blue channel, both relatively light in the green, while in the red the cat is light and the grass dark. To maximize contrast,

J

nately, we have those of one of the great travel writers of our time, Alexander Theroux.

"The deep blue of Oregon's enchanting Crater Lake, the deepest lake in North America, almost intolerable in its beauty, can swamp with emotion the flickering power of analysis. The lake is 1,932 feet at its greatest depth. Fed only by snow and rain—and drained by sun and wind alone—the lake suffers no silt from running water, the sunlight striking it reflecting the blue rays, while the rays of the other colors are absorbed, all serving to make it the bluest blue lake in the world."

Translation: Image J, a vile disservice to its subject, bears about the same relation to the blue of Crater Lake that the cat on the facing page does to a lion. Yet this is as blue as it gets in CMYK: the cyan is at or close to 100% coverage at the bottom of the image, and the yellow and black that contaminate blue are at zero.

My idea of the best way to treat this is Version L.

To get there, one need only think of the image as the reverse of the cat in F. That had good color and poor contrast. Here, it's the opposite. So we save a copy of J and then apply curves to alter the color.

The idea is to throw yellow into the background to emphasize the blue of the water. It's easy to do that with a curve: just increase the quartertone point. It won't affect the water, which starts with zero yellow, but it will definitely get the sky and the mountains. A similar move in the lightest part of the magenta turns the sky more of a purplish color, and makes the mountain warmer.

These two moves, however, add unwanted weight, seen in Image K. So, we paste it on top of J, not in Luminosity mode as with the cat, but in Color mode, telling Photoshop to use the new color, but to revert to the detail of the original.

Greenery, yallery, Grosvenor gallery

These types of blends can often be done in CMYK. Redeye can be corrected by transferring magenta into cyan, rather than green into red, for example. But as the blends get more complex, RGB is generally best. Its darkest shadows are about equal in each channel. In CMYK, the cyan is awkwardly darker. Also, owing to an absolute limit on the quantity of ink, shadow detail in magenta

and yellow is often suppressed, a serious impediment to blending.

The best detail may happen to fall in any one of the RGB channels, or certain detail may be better in one but other parts better in another. As the redeye picture suggested, faces usually are best in the green channel. This is food for thought for the luminosity-blending buccaneer.

These blending modes can be stacked on top of one another with great effect, but it can get tricky. A common theme is to have one correction for color, then one for contrast, followed by a grand reunion.

Crater Lake is one of the bluest objects found on the planet. The most brilliant blue that can be had in print doesn't do justice to it (J). The best solution is to create a version that forces more yellow into the background (K) making the water look bluer by comparison. This, however, costs contrast. Version L is K pasted on top of J in Color mode.

M

N

O

The original, M, is flat and has a purplish cast. Cases like this can often be fixed with a two-pronged attack: a series of blends to produce an image with better color but poor contrast (N) and one with excellent detailing but horrible color (S). The two can then be combined into version R. At left, O, P, and Q are the original red, green, and blue channels.

P

If the photographer of Image M had done his job as well as the models did theirs, the little girl's hair wouldn't be blue and the entire image wouldn't seem purple. Examining the individual RGB channels shows why. In fleshtones, the red should be the lightest by far and the blue the darkest.

It seems right to start with a curve that lightens the red overall and darkens at least the dark half of the blue, so as to make the hair more yellow. But the main problem is the skintone: the blue is supposed to be darker than the green, and in most places it's lighter.

Therefore, we blend the green into the blue, in much the same way that the green went into the red when we were curing

Q

redeye some pages ago, This time, we don't need a selection, but we do need to use Darken mode instead of Normal. Otherwise the hair would become more neutral.

It's currently somewhat green, as the red and blue are darkest. If the red and green were equal and the blue were darkest, that would be a yellow. So, another blend: red into green. And once again, it has to be Darken mode, because the idea is to darken the hair, not lighten the face.

Actually, the green does need to be lightened in the faces, because the blue and green start at the same darkness. For a healthy golden skintone, the blue should be slightly darker. So, once again, red into the green, but this time in Lighten mode, at the low opacity of 10%.

With the faces as washed-out as they are in M, lightening them further with that last blend may not seem wise. But remember, all we're doing here is establishing a version that's right for *color*—not depth, not contrast. And, after one set of modest curve adjustments, that's what we have in version N, which now gets saved.

Returning to the untouched Version M, the blue channel has extraordinary contrast, but parts of the face are so washed out that I'd be afraid to blend with it. Instead, I'd start with the green, which seems to be better detailed than the red.

Noting that the teeth could stand to be whitened in the green, and not caring a whit what doing so may do to the color, I'd lighten the highlight slightly, followed by a new kind of blend.

Usually, one blends into the single channel that is open on the screen. But if the composite is open, we can still blend a single channel into it. So, with RGB active, I designated green as the source, 100% opacity.

If the mode is Normal, the result will be a black and

R

S

white image: all three channels will be the same, copies of what the green was. Here, though, I chose Darken, which did different things to the red and blue: only those parts that start out lighter than the green were replaced.

At this point the issue of the washed-out fleshtones can be liquidated. Curves that darken the midtone of the red and green channels add weight. Finally, comparing the green to each of the others reveals that it seems to be better in every way than the red, though not than the blue. So, we apply the green to the red, 100% opacity, Normal mode—in other words, we replace it. The result is Version S.

Never mind that the mother and child look like they're from Mars. Skin color is no issue, being a problem already resolved by the existence of Version N.

At this point one flips a coin. If it comes up heads, paste S on top of N and change layering mode to Luminosity. If tails, paste N on top of S and change it to Color. Either way, the result is Version R.

Blur, brighten, blend, bravo

Bringing out detail this strongly has its downside. Z would be just fine if the subject were the skin of an orange or the bark of a tree. Female faces are another story. Nowadays they seem always to appear in print either as weather-beaten as Version X or as obviously and offensively retouched as the centerfold of *Playboy*.

While we don't want the older woman's skin to resemble that of a crocodile, neither should it match the smoothness of the little girl's. Reducing the wrinkles without losing the natural feel can be done as follows, starting with four identical layers, the bottom one of which remains untouched.

• Apply Gaussian Blur, radius 2.0, to the second layer. After doing so, apply a curve to the layer that lightens it slightly.

• Change mode on the second layer to Darken. Since the last move made it lighter, not much will happen to the bottom layer, except that white spots will fill in because of the blur to the second, lighter layer.

• Apply Gaussian Blur, radius 4.0, to the third layer. The extra radius is needed because dark spots in skin are usually larger than white spots. Then, a curve that darkens the layer slightly.

• Change blending mode on the third layer to Lighten. In much the same way that the second layer eliminated white spots, the third layer kills age spots and other blotches.

The skin of version R (shown enlarged above as U) can be smoothed with the aid of blending modes. W is a slightly blurred and lightened version of U; when applied in Darken mode to U the result is X. Y is a heavily blurred and lightened version of U; when applied to X in Lighten mode, the result is Z. Then, with the use of a fourth layer and a layer mask (above) the softer skin is merged into the overall image. The final version is T.

• Compare the untouched fourth layer with the blurred composite beneath it. Make arrangements to merge the two with a layer mask, which we discussed in some detail last time. The idea is to get a believably soft fleshtone without forfeiting the sharpness of the hair, the eyes, and the mouths.

It's a long way from the mundane redeye of Version B to the shocking difference between M and T. Yet if you know how to do one, in principle you know how to accomplish the other. Lighten, darken, luminosity, color. Understand what they mean, and lifelike images are yours for the asking.