

Plate Blending as Poker

Topics: Channel blending strategies, CMYK vs. RGB.

Column first appeared: December 1998, *Electronic Publishing* magazine.

Source of this file: Author's draft as submitted to the magazine.

Author's comment: This final installment in the three-part channel blending series focuses on how to identify opportunities for blends. As with just about everything written this early, the focus is on CMYK, but the techniques are applicable everywhere.

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 hundreds of edited threads from Dan's Applied Color Theory e-mail list.

Copyright © 1998, 2002, 2011 Dan Margulis. All rights reserved.

Plate Blending as Poker

For images that lack snap, channel blending can be the right play. Those who don't investigate blends across colorspaces are making bets without looking at all the cards in their hand.

.....
By Dan Margulis

In poker, bridge, and similar games of skill, there is a popular misconception to the effect that, to win, you've got to have the cards.

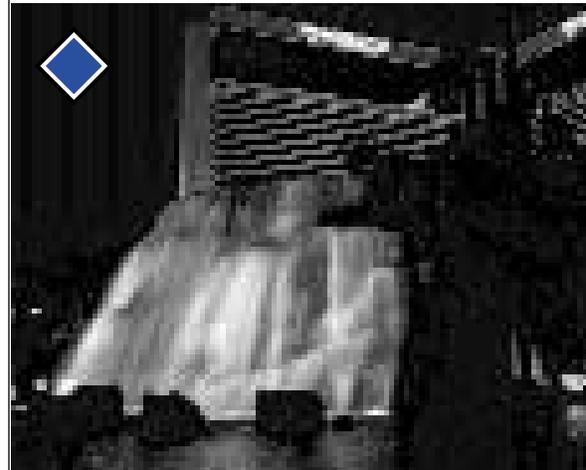
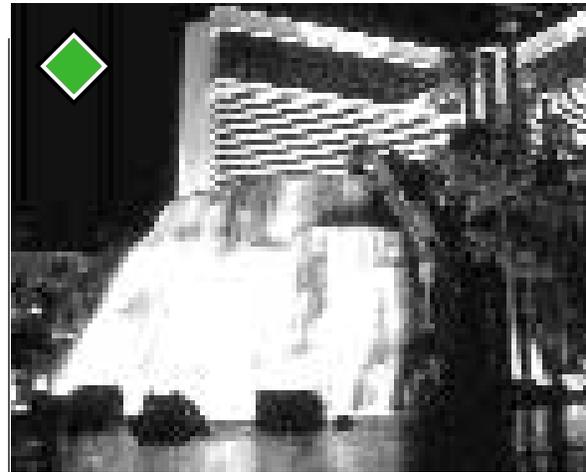
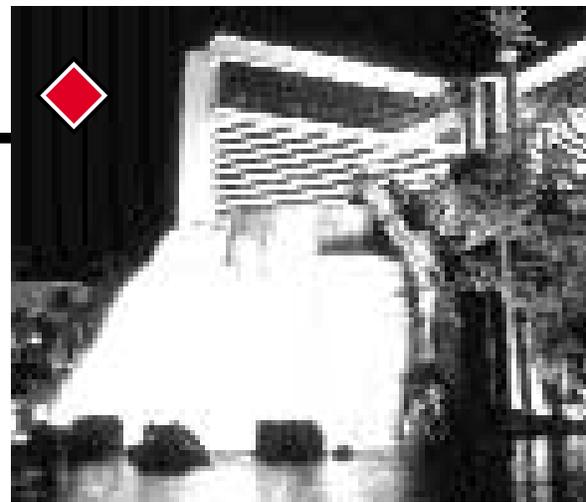
This is true only to a certain extent. The ace ranks highest even when held by someone who never played the game before. And, given enough aces, such an amateur will beat a professional—for a little while.

Professionals, however, seem to have a knack for making the most of a bad situation. With a touch of finesse,

a hand with no high pair can bluff everyone else out of the pot. And because, if nobody calls, the expert doesn't have to show his hand, nobody will ever know he started with nothing, although after seeing him in action enough, they may suspect it.

I've never devoted three columns in a row to the same subject. Being as how readers have indicated that channel blending seems to be the most difficult topic in color correction, I'll break that record here.

In August, I pointed out a particular problem that affects particular images. The particular images I referred to are those where the main objects of interest have a pronounced single color. My examples were a rose, a lime, and the face of a light-complexioned human. The particular problem is that when such pictures get into print they tend to look flat and lifeless, even if their overall color seems correct. The solution is to get more detail into the weakest channel: the cyan for a rose or a face, the magenta for a lime. The method of doing



this is often to blend in a percentage of a channel that contains more detail.

In August, therefore, I spoke generally about how to prepare for such a blend and showed examples of the technique. In October, I went down-market, offering a nearly foolproof

Left: The garish yellow cast of the original, top, may not be as big a problem as the lack of definition in the hotel's sign and in the waterfall. This file originates in RGB, and the individual channels are shown above right. By blending a percentage of the the superior blue channel into the other two, one can obtain the version at bottom left. There isn't any right answer on what color the final image should be, so please assume that the color of the bottom left image is satisfactory and that the only issue is detail.



recipe that used the cognate RGB channel as a blending source to beef up the weak CMY one.

Similarly, one could, given half an hour or so, teach a complete novice to play pretty good casino blackjack. If the dealer shows a five, you stand on any hard total of 12 or higher, and so on. But to get good at the game, one has to recognize the exceptional occasions when one should hit that 12 against a five. This column is about those exceptional cases, where one recognizes the need for a contrast-enhancing blend, but also that the customary way of executing it won't work very well.

As pointed out succinctly by Emily Dickinson in the first installment of this series, yellow objects of interest are comparatively rare. Red, green, or blue ones are much more common.

The good thing about items red,

green, and blue is that each is dominated by two CMY inks. For example, a lime is dominated by yellow and cyan. That means we can get away with murder in the third ink, which is the one that provides most of the contrast. A lime is going to print as green no matter what hijinks we indulge in with the magenta plate.

Yellow, however, isn't so easy. With yellow, we have one strong ink and two weak ones, not vice versa. That makes it entirely too easy to screw up the overall color, and means that the blending techniques shown in the last two columns won't work.

In fact, such images are better corrected outside of CMYK altogether. We have three examples of yellowish images—two yellow by nature and one because of weird lighting—and we'll attack them in RGB.

Such few yellows as are found in na-

ture tend to be warm ones. In RGB terms, this means that, while the blue channel is always going to be darkest by far, the green is likely darker than the red. The lighter the channel, the less detail it probably carries. How appropriate. Since, in the RGB roulette game, we aren't dealt any black, we need to concentrate on the red.

Hand 1: The Straight

At the moment, the highest-stakes poker games in the world are found in the hotel pictured on Page 2. And the artificial volcano in front of it is known around the gaming world.

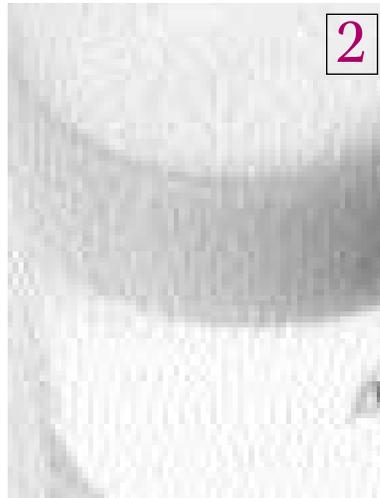
Suppose this is a publicity photograph. One would think that the hotel would like to have the viewer be able to distinguish its name. Unfortunately, in the top version of this image, this isn't happening. Let's assume that this, plus the lack of detail in the waterfall, is the major issue with this image.

Examining, as we should, the three individual channels, it's pretty clear why this is occurring. Only the blue

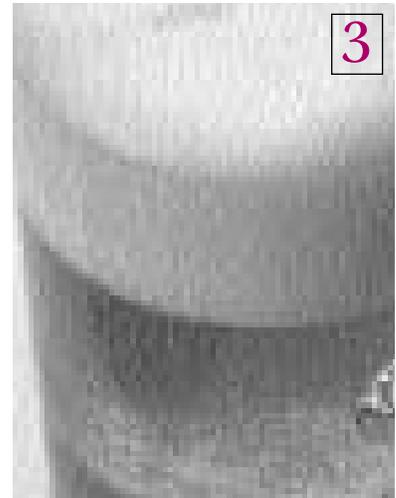
The original RGB image (1) leaves much to be desired. The first step is to examine the individual channels: the red (2), green (3), and blue (4). Another useful step is to make a copy of the image and convert it to LAB. The L channel of this document is shown here (5).



1



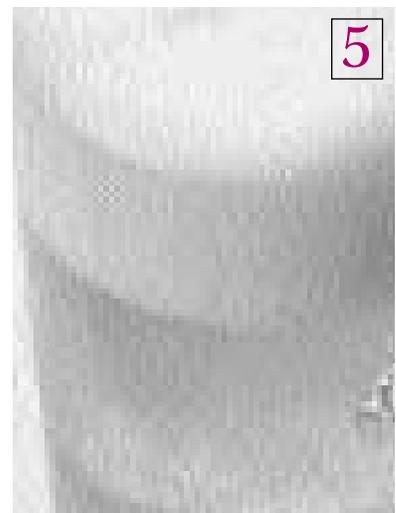
2



3



4



5

channel has decent detail. The green is better than the red, but that's about all that can be said for it.

The images we've started with over the last two columns were at least close to begin with. This one isn't. This means we should examine the possibility of correcting it *before* it hits CMYK. As with cockroaches, one wants to exterminate pestiferous channels before they proliferate.

CMYK or not, we still should go by the numbers, but with lighting this harsh, it's hard to know what they should be. In RGB, equal values create a neutral color. By that standard, the original black sky is pretty good: 15R16G14B. There are few other clues.

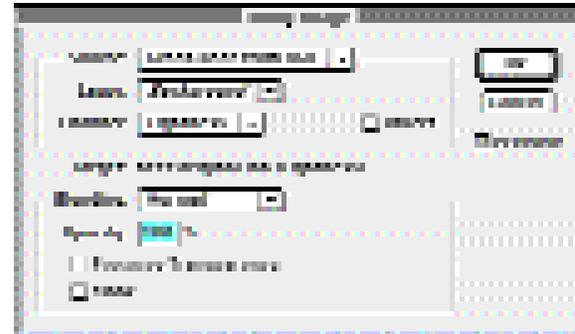
The brightest spot in the water starts at a yellowish 255R255G233B. The first step should be to shove the bottom of the blue curve to the right, lightening it slightly, so that the highlight is only about half as yellow as before. The purpose of this is to add contrast to the waterfall, prior to blending.

Reminder of the blending procedure in Photoshop: the channel

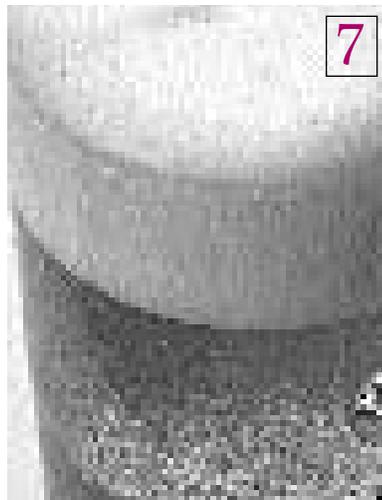
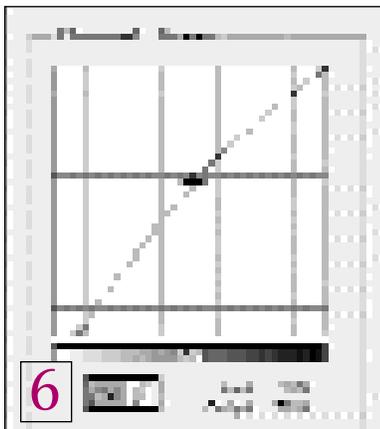
that we plan to blend into must be displayed on the screen. Then, Image: Apply Image brings up a dialog box that allows us to choose any other channel (or any one from another open image of exactly the same size, such as a copy of the current file) as the source of the blend. Then, it's just a question of putting in an opacity percentage. 100% would replace one channel with the other. 15% would create a channel that is a mathematical blend, each pixel being 85% of what it used to be, modified by 15% of the blending channel.

Here, I chose 30% of the blue into the red, 33% into the green. The exact numbers are governed by the color balance one wants. Darkening the red—which is what we are doing, as much as we are adding detail—is the equivalent of adding cyan ink. That pushes this image toward green. Dark-

ening the green channel, on the other hand, makes the image warmer. You'd probably choose different percentages than I did, but it's hard to object to the added bite in the water and the sign. In view of the lack of detail in the sky, I added a little black ink to the bottom image after conversion into CMYK, but otherwise the only difference between the two images is one curve plus the channel blending.



The correction process: 6) a contrast-enhancing curve for the green channel; 7) the green channel after that curve and unsharp masking with a wide Radius; 8) the color image after the red channel has been replaced by a copy of the green; 9) After version 8 has been converted to LAB, the L channel; 10) after version 9, using the Apply Image command shown above, is dropped into an LAB copy of the original image.



Hand 2: know when to fold 'em

For our second foray, we start with a rather more mellow yellow: the beverage of choice for prepress types. And, we introduce a wild card: the use of the LAB colorspace.

In one way, Version 1 is worse than the original hotel image. The detailing is simply ghastly. Personally, I prefer

beer with fizz. This glass looks like it's been sitting out for a week or so. It might as well be apple juice for all the bubbles it's showing.

Yet in another way, this original is superior. It may not have the good detail, but it's more or less the right color.

Consequently, the slapdash approach to channel blending used in the hotel image is apt to create some kind of ridiculous, and totally undesired, color shift in this one.

The analysis of the individual channels isn't as easy this time. Unlike the hotel, where the blue was better, period, here the blue is better only in the head of the beer. For the beer itself, the green is the best start, being the only one that contains even a hint of the fizz we'd like to intensify. And the red has nothing to recommend itself. We aren't starting with a good hand here. It's time to introduce the wild card.

The LAB colorspace separates color from contrast, putting all detail information into its L channel and all color into the A and B. For the devoted channel blender, this offers temptations, one of which is obvious and the other not.

The obvious one is that a high-contrast L channel is a good candidate to be a blend source. Copying the file and converting it into LAB will show whether this is so.

There's a case to be made for it here, but the L channel is normally at its best in a more complex image. The impact of the origi-

nal red channel is bogging this one down. The green channel has better bubbles than the L. So, let's forget the L for the time being and concentrate on the green.

Since the green channel is the only one with any fizz, we're going to have to make every pixel count. That implies a contrast-enhancing curve, followed by accurate unsharp masking.

Because the bubbles don't have any subtle detail, we can use rather heavy USM settings, especially in the critical Radius. Here, my Photoshop settings were Amount 450%, Radius 3.0 pixels, Threshold 5 levels. An image like this has to be sharpened channel by channel. So high a Radius used in the blue channel would massacre the head, and any sharpening of the red channel at all would sharpen garbage.

The modified green channel is shown as Version 7 on the preceding page. Now the blending begins, and ends. The hopeless red is thrown in, replaced by a copy of the green.

The contrast in the resulting color image is quite nice, as you can see in Version 8. There is just one small problem. The beer is now just right for drinking on St. Patrick's Day. At other times, it isn't too appetizing.

But not to worry. This is the hidden advantage of LAB. Remember, we saved a copy of the uncorrected image in that colorspace. So now, all we have to do is take our green RGB image into LAB, so that we now have one LAB image with great color and terrible contrast, and one with great contrast and green beer. Fortunately, we can channel blend, or, in this case, replace altogether.

Whether you choose to discard the L channel of the uncorrected version in favor of the L from the green one, or draw the AB from the original into the green image, the result is the same: a bubble-bearing beverage, not something that once was carbonated but has sat on the counter too long.

Bright yellow objects are normally quite difficult to correct because one channel is very strong and the other two are very weak. The balance between the weak channels is critical. The version at bottom, however, was generated from the top version in about 15 seconds. Can you guess how it was done?



Hand 3: checking and raising

The final deal of our set looks a lot like the other two. A yellowish object: heavy blue, moderate green, contrast-free red. What to do?

In this yellow pepper, the green channel is superior to the others in every way. This distinguishes the image from the last one, where the blue was better than the green in certain respects, though not overall.

So, some sort of blending seems indicated. Good practice suggests first making a copy of the image and converting it to LAB, to find out whether the L channel is a good one to use for that purpose.

The answer, as you can see on this page, is no. The L is better than either the red or the blue, but the green is better in all respects.

Consequently, it makes no sense to blend the L into anything, *but it may make sense to blend something into the L.*

This, therefore, is a 15-second color correction. Rather than correcting the RGB original, we go after the LAB copy. We replace the L channel with the green from the RGB. End of story. Separate and print.

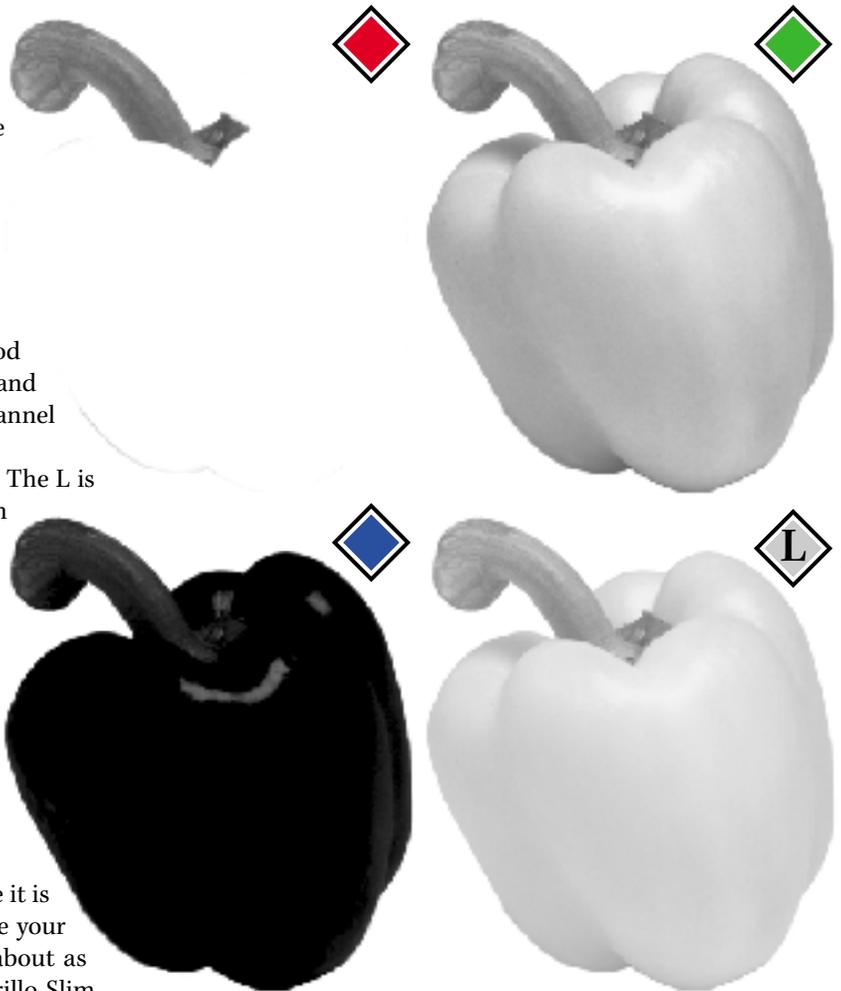
Summing up: three of a kind

This last correction is impressive not just because it is quick, not just because it is effective, but because your friendly local prepress practitioner would have about as much chance of executing it as of bluffing Amarillo Slim into throwing in a full house.

The main lesson of these last three columns is that you have to look at every channel—sometimes including those in colorspaces other than the one you’re currently in. Certain channels are critically important in establishing detail, and we must, if necessary, blend into them to create that detail. Certain others aren’t so important, but are very valuable to blend *with*.

If you play the image-processing game for high stakes, and want to continue to make use of this little understood, yet extremely powerful, tool, here are some final tips.

- The three images in this column to the contrary notwithstanding, plate blending is not a style of color correction by itself. It helps us out greatly in certain cases, but it works hand in hand with setting highlight and shadow, accurate curves, intelligent use of the black plate, and proper unsharp masking.
- Look for a dominant color, or a dominant object that is of one particular color. If there isn’t one in the image, forget about channel blending. If there is, as in a glass of beer, a yellow pepper, or a face, start thinking of how to beef up the weaker channels.
- If the dominating color is red, green, or blue, one is usually better off correcting it in CMYK. The method is to improve the quality of the weak plate: the cyan, magenta, or yellow respectively. Normally one can do this by blending the cog-



The original red, green, and blue channels of the yellow pepper opposite, plus the L channel of a copy of the image that has been converted to LAB.

nate RGB channel into it, red into cyan, green into magenta, or blue into yellow.

- If the dominating color is yellow, magenta, or cyan, RGB suggests itself, possibly in conjunction with a luminosity-layer move such as that demonstrated in the beer image.
- Don’t go to great lengths to improve the blue (RGB) or yellow (CMYK) channels. They pack the least punch by far. The only exception would be when working with a strongly blue object.
- Don’t be a colorspace chauvinist. If you insist on working only in RGB or only in CMYK, you may be placing bets without looking at all your cards.
- Stop blaming the photographer, and stop blaming your lousy scanner. If your light channels don’t carry enough detail, blame yourself instead, for not having arranged it.

And that is the bottom line. A cardplayer can’t magically turn a low card into an ace. In image processing, we *can*—provided we recognize the times when we want to.

Contributing editor **Dan Margulis'** book, *Professional Photoshop 5*, (John Wiley & Sons) is now available. Dan can be reached by e-mail at 76270.1033@compuserve.com, or by fax at 973/763-2835. For information on his small-group color-correction tutorials in Toronto, call Jane England of DPA at 800/269-5742.