The Channel-Choice Mutiny

Topics: Masking, channel structure

Column first appeared: February 2003, *Electronic Publishing* magazine.

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

Author's comment: This is the second of two columns on masking, culminating with warnings about how too many people resort to unnecessary selections (see Column 56, "The First Refuge of the Fearful".
The idea of masking across colorspaces had rarely been seen before the appearance of this piece.

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.

The Channel-Choice Mutiny

If you need to create a mask for local correction, most everyone agrees that the best way to start is by finding a channel where the desired object is well defined. But sometimes that channel isn't even in the same document.

That quintessential prepress manager, Captain Philip Francis Queeg, once remarked that there are four ways of accomplishing anything: the right way, the wrong way, the Navy way, and my way. On my ship, he said, we do things my way.

The good captain, though not a Photoshop user himself, would have been right at home with the topic of December's column, how to make and deploy selections in natural images. Like his towlines, however, his temper would be frayed by the kind of annoying request that clients often make in pictures like A: change the color of the flowers to something completely different, like B.

The right way of doing this is apply some series of curves or other color-altering transactions to the flowers only. For this, some kind of selection is needed. The wrong way is to painstakingly select each flower with the pen tool or even the magic wand or the Select: Select Color Range command.

The Navy way, by which I mean the method advocated by almost all experts who have any pretense of knowing what they're talking about, is to look for a channel that might be made into a selection, copy it, edit it slightly to eliminate all unwanted areas, then load it into the original as a mask, and proceed with the curves or whatever.

If we're working in CMYK, the cyan channel is just such a sailor. Red flowers don't have much cyan in them, but stems and gray backgrounds do, as you can see in D. If working instead in RGB, the red channel (C) is a close relative and can be used in the same way.

As another wartime novel about a different service branch pointed out, there's only one catch. One can save either the red or the cyan as a separate file, and enhance its contrast enough so that the flowers are pure white and the background pure black—almost. There would still be white speckles in the background, where the granite sparkles. Even if the mask were blurred before being applied, which is usually a good policy, those white areas would still be partially selected, and we'd get purple pixels in the background.

Instead, consider making a copy of the image, converting it to LAB and using E. That's the A channel, in which a lighter gray is something more magenta than

green, such as the flowers; a darker gray something more green than magenta, such as the stems; and a medium gray something neutral, such as the entire background, speckles and all.

A pint of strawberries
Forgetting the complicated LAB for the moment, this selection was simple. Therereally

The bottom version's flowers are more detailed, but the top is actually the original. To get from one to the other convincingly requires a selection, or mask.

The red channel of RGB, left, and the cyan of CMYK, center, are cousins. Either could be used as the start of a mask for the flowers. But both have mottling in the background where there are lighter spots in the granite. The A channel of LAB, right, doesn't have this problem, because grayness in the A channel implies only neutrality and not lightness or darkness.

wasn't any reason to prefer CMYK to RGB. When the object to be selected is light, that's usually the way it is. With darker objects, it's another story.

The cow in H is also easy to isolate. Being as red as it is, in the green channel of RGB (F) it's much darker than the background. If this were a perfect world one would also be able to rope the cow with the green's cousin, the magenta of CMYK.

But the presence of an absolute ink limit is a nasty complication in CMYK shadows.

In dark neutral areas such as the lower half of the cow, the magenta and yellow, and to a lesser extent the cyan, have to be ghosted out to accommodate a large volume of black ink and still stay within the arbitrary limit. We could probably still use this magenta channel for the start of a selection but it's easy to

F

G

H
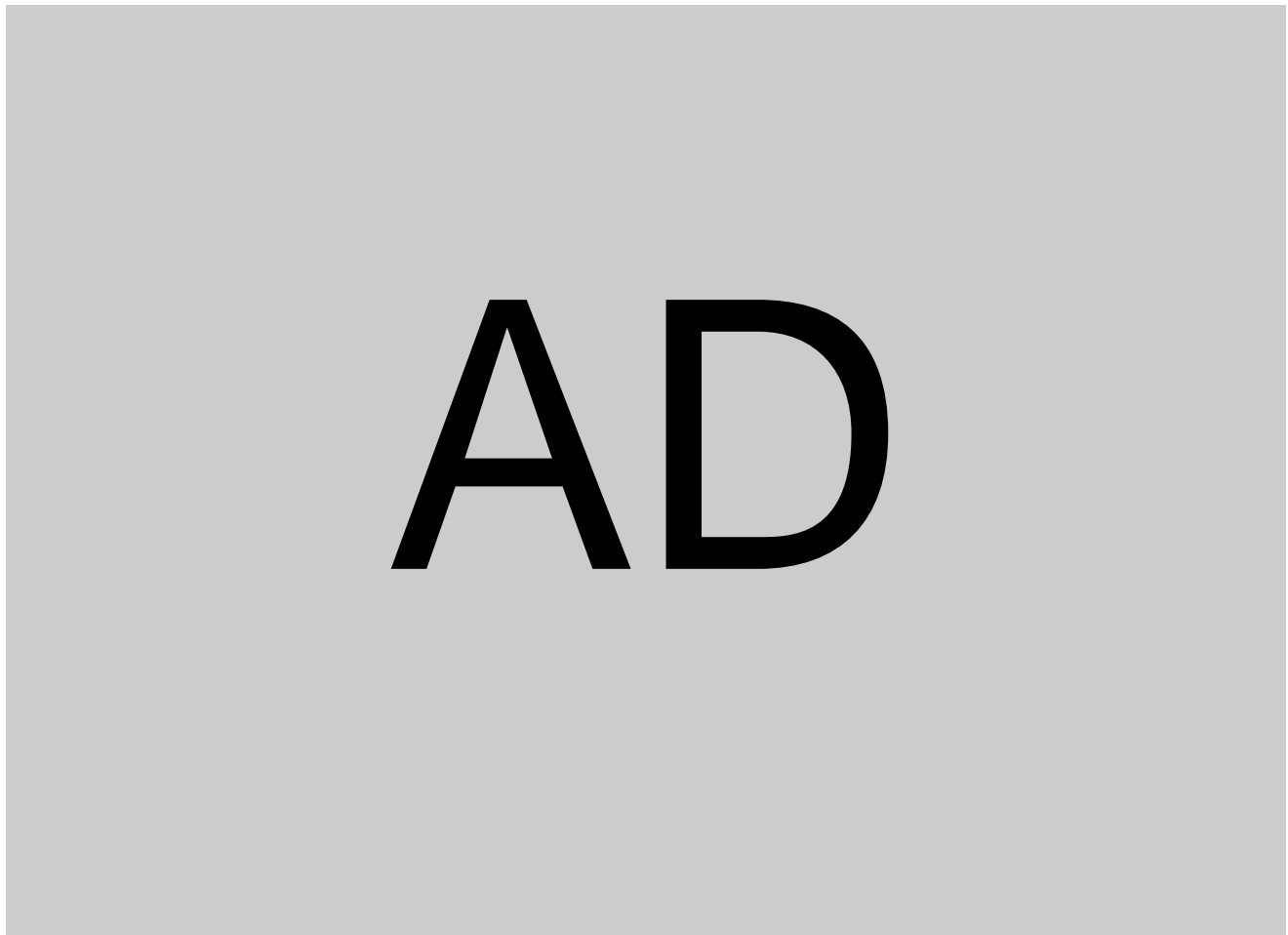
imagine CMYK images that wouldn't work. In such cases we'd have to make a copy of the image, convert it to RGB, steal the green channel, and use that for the selection.

While RGB is usually better than CMYK for this type of maneuvering, those with a good knowledge of both can sometimes get better results with a hybrid approach that exploits the uniqueness of CMYK's black.

In I, an RGB image, the trees aren't quite differentiated enough from the greenery that overlaps them to get a good selection of either. To fix this quickly and dirtily, one can make a copy of the image, convert it to CMYK, and then blend the black channel into the original RGB in Soft Light mode (J). This works because the black of CMYK is always heavy in relatively dark and relatively neutral objects such as tree trunks, and rather light in areas of a pronounced color such as leaves. Using Soft Light or one of its close relatives, Hard Light or Overlay, forces the trees darker in the RGB original and the greenery lighter. The green channel is now usable as a selection.

The cougar of image K is tougher to grab. The animal is somewhat red and the background rather cyan, so the red channel (L) is a reasonable start, but in many areas foreground and background are almost the same darkness. In the green channel, the animal is outlined in the opposite way: it's marginally darker than the background, but again, there are too many ambiguous transitions.

When two channels offer partial se-

The peculiarities of CMYK can be useful or harmful in making selections. Above, the cow is well defined in RGB's green channel, but the green's cousin, the magenta, falls victim to the suppression of CMY shadows caused by a total ink limit. Below, both versions were created in RGB, but the black channel of a CMYK copy of the image was blended into Q to make R, in which the tree can be easily selected.

I

J

lections there are usually ways to combine them, but the way can be absurdly obscure. Here, if you happen to be into the Apply Image or Calculations commands, the way would be to decide which channel to base the mask on, multiply it into itself, blend an inverted copy of the other into it, and increase contrast. If you favor the Channel Mixer, it's probably easier but you have to use CMYK because CMYK has an analog to Multiply mode that the RGB Channel Mixer lacks, unless you feel like copying the RGB file to a duplicate layer, inverting it, placing an Adjustment Layer>Invert on top of that, and then working as though you were in CMYK.

To condense a war novel into a few sentences, while K was still in RGB I made a copy of it and applied the Channel Mixer at Green=200% Green, –100% Red. This created a more pronounced variation between animal and background in the green channel, which immediately became the magenta channel because I converted the document to CMYK. Then, a second Channel Mixer at Cyan=200% Cyan, –100% Magenta. In the result, N, the cyan channel is a reasonable mask.
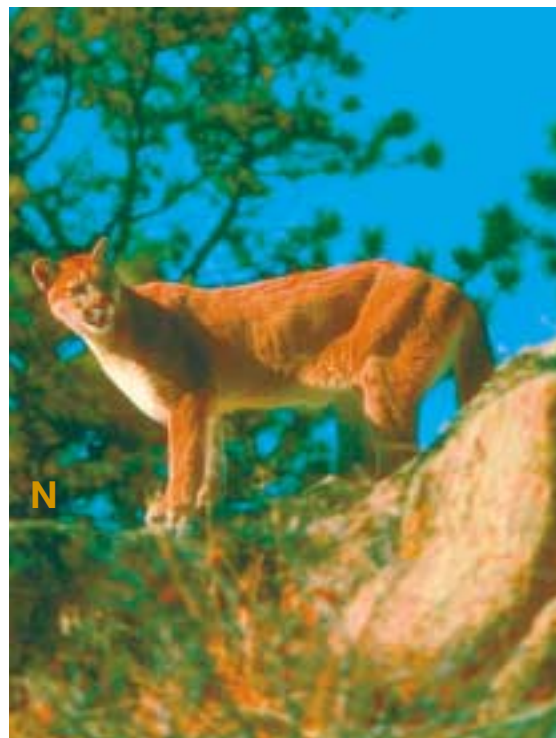
The cougar in K is basically lighter than its background in the red channel, but darker in the green. Neither is a perfect selection, but judicious use of the Channel Mixer can create N, in which the cyan channel would serve for a mask.

The missing key

The chances of your needing to execute one of the above maneuvers are about the same as your being asked to con a minesweeper through the center of a typhoon. Face it: not that many people often need to make very complex selections. Those who have to do it once in a while can always get by by handpainting the mask, which is equally effective if considerably more time-consuming. For those who have to make such selections by the ton, such as people silhouetting products for placement in catalogs, an investment in Corel's KnockOut ($280 street as a Photoshop plug-in or standalone app) is worthwhile. It's RAM-hungry, there's a learning curve, and for easy stuff like the selections of A and H it's slower than what's shown here. But it can make, if you use it correctly and patiently, accurate masks even of complex things like unkempt long hair.

Still, why spend the space on this esoteric topic not just here, but in December's column? I reiterate what I said then: forgetting those who must select because an object is being silhouetted or going into another picture altogether, most

people apply selections and masks far too much.

Rather than advocating that you spend a lot of time applying corrections through painstakingly-made selections, I'd suggest that you carefully compare I to J and K to L. The versions designed to create the masks aren't particularly attractive in their own right—but then again, neither are the originals. Now, consider the possibility of blending the selection version into the original, at, say, 25% opacity. That kind of subtle move would be very good for the trees of I, and would make the cougar stand out much better than in K, without the oversaturated colors of N.

And that's really the mutinous moral of these last two columns. Selections are sometimes needed, but most people overuse them. But by taking the buccaneering approach of treating images as though the object was to create a mask, one can often create a more realistic base image.