Editing Photographic Tone and Color Using Live Picture

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INTRODUCTION

Live Picture 2.6 has a broad and nearly complete range of photographic editing capabilities. Someone using Live Picture for fine photographic editing in color will need to know not only just what is available within Live Picture, but also the exact character of the effects of the many tools, to make best use of them.

This document will identify and clarify the full suite of tools in Live Picture that I will refer to as the tone and color controls. I will not discuss here the controls that pertain to compositing, painting, distorting, using special effects plug-ins (or their equivalent), or cloning.

In future versions of Live Picture, the suite of tone and color control tools will become complete and improve dramatically in many ways. Every kind of control will be applicable to any selected range of colors or tones, and be applicable by brush or globally. In the meantime, using the current version, the great majority of image corrections involving color or tone that one might wish to perform can be accomplished.

ABOUT THE LIVE PICTURE TOOLS

Live Picture's tools derive from two very different mathematical approaches to editing images, each with important advantages.

The first approach is employed by the various **IVUE tools**, which work globally, "within" a given IVUE image layer—these effects are not brushed on, nor do they affect other image layers which may be present in your "composite". A single Look-Up Table (LUT) is maintained for each IVUE image layer that contains the cumulative effect of all IVUE tool corrections made to that image layer. This LUT is applied to the IVUE image data from

the hard disk, with a negligible computational time penalty, whenever the image is ripped (to the screen or during a build). This process is similar to traditional image editing, except that the edits are maintained separately from the image file, which offers tremendous advantages. The word IVUE (short for Image View) thus is used to refer to both the special image file format that makes quick screen display possible at any resolution and the tools used to create and modify Look-Up Tables that are applied to images in IVUE format.

To use the IVUE tools, click on an image layer in the Layer Stack to select it. Then go to the Layer menu and scroll down to the IVUE Correction submenu, where you will find the tools. Because edits made with these tools only apply to a single IVUE image layer, the IVUE Correction sub-menu is unavailable until you tell Live Picture which layer you would like to edit, by selecting it. Several other functions (e.g. creating a cloning layer or using the positioning tools) work the same way.

The second computational method is FITS—the Functional Interpolating Transformation System—the miracle at the heart of Live Picture. The resolution-independent mathematical structures which are created by FITS edits are always manifested as layers or parts of layers, which possess the unique and wonderful ability to: 1) describe complex resolution-independent editing information such as brush strokes and complex color corrections, 2) maintain many kinds of edits independently of one another (in separate layers) and independent of the IVUE image file on the hard disk, 3) remain editable at any time, as, for example, with further brush strokes, eraser strokes, or adjustments to the edits being applied with these tools, and 4) enable the concatenation of a large number of such layers into a single rip computation of great efficiency, so that the screen image can be computed and output files of any resolution (for which quality is adequately supported by the original image pixel data) can be built. The ultimate for flexibility, the ultimate for quality, and the ultimate for efficiency.

The FITS ripping process in effect provides each and every output pixel with its own unique mathematical formula to describe the sum of the editing effects for that pixel. Multiple operations are reduced to a single step of perfect efficiency—no multiple, contradictory moves to damage quality. Furthermore, all computations are made with 16-bit per color precision instead of 8-bit per color precision, so rounding errors are eliminated and banding is kept to its lowest possible level when editing original 24-bit RGB files.

I refer to the second group of tools as the **FITS tools**. The FITS tools then consist of two or more groups of tools that are associated with the layers that one can or does create.

I call the tools in the Toolbar (except for the Color Selector) the Hand Tools, because they are the tools that tell Live Picture how you wish to "sculpt" an effect specified with other FITS tools.

I've named the rest of the FITS tools the Layer Controls. These include many ways to control various aspects of layers (and their masks and stencils) and are located in several menus, in the Control Bar, in the Layer Stack itself, and in the various dialog boxes that are particular to certain kinds of layers. They also include the Color Selector in the Toolbar.

Together, these many tools offer a huge range of image editing capabilities.

EDITING COLOR

Conceptually, almost every kind of "conventional" tone and color control can be achieved with only two tools: 1) a Color Curves tool and 2) a Selective Color Correction tool (if the tools are sufficiently full-featured).

The object of a tone and color control system is to allow any area or range of tones or colors in the image to have its red, green and blue values (when working in an RGB system) changed in any relatively direct way. Thus, the tone and color controls for color photography are:

1) Curve shape, where the slope of the curve is identical to contrast at any given point (contrast is defined in the next section). Curve tools allow any part of the tone scale of an image to have more or less contrast relative to any other parts of the tone scale (the range of tones from black to white).

2) Control over color contrast, or saturation, separate from light/dark contrast.

3) Control over light/dark contrast, separate from color contrast.

4) Color balance control (changing the relative amounts of red, green and blue).

5) Hue shift control, which may be considered a subset of color balance, but requires a different kind of tool.

6) Lightness (or brightness, or Value, or density) which when changed makes some part(s) of the image look lighter or darker.

Please note that the word value has two distinct meanings here. When capitalized, I am referring to Value in the HSV color space (see the definition on page 17). When using lower-case value I am usually referring to a number between zero and 255 used to describe the intensity of red, green or blue in a given pixel.

Some of these functions are often accomplished with tools that are functionally subsets of the two major tools, inasmuch as they can only do certain portions of what the other tools can do. These include: a levels tool, a brightness/contrast tool, a color shift or balance tool, a hue/saturation tool, and a lighten and darken (i.e. dodging and burning) tool.

As a general rule, in quality image editing, one should avoid blowing out either highlights or shadows. That is, there should be very few pixels in the image that have any values of either 255 or zero. For example, losing the last bit of cyan in a red will cause the red to lose its texture. Losing the last bit of yellow in a blue sky will cause it to lose believability too. Oddly enough, the best way to have brilliant looking highlights and shadows is not to send them to white or to black (unless they are relatively small), but rather to get them as light and dark, respectively, as they can be without losing convincing detail. Similarly, the best way to have brilliant color is to retain enough of the complementary color(s) to retain color and tonal variation in the image and, with it, believability.

The great majority of color images contain some black when properly rendered, but only a small minority contain any pure white (usually in tiny specular highlights). For this reason, the set black point tool in the Color Curves IVUE tool can be useful, but the set white point tool will not usually improve the image.

DEFINING CONTRAST

There are several definitions of the word contrast. Contrast can refer to the difference in brightness between any two pixels (defining brightness as the average or sum of the three RGB values), or it can refer to the degree of difference between the lightest and darkest of the three color values (R, G and B) within a given pixel (i.e. saturation). It can also refer to both! A fourth

definition would be the difference between any single color value of two different pixels.

To complicate matters, we often speak of an image as having a certain overall contrast level (high or low), but in fact image contrast can only be described well by a curve that shows contrast for each part of the tone scale from black to white. See Figures 1 and 2.

In color photography, the contrast at a given point in the tone scale (highlight to shadow) of a captured image is ordinarily and primarily a function of the contrast of the photographic material or materials involved, at the corresponding points on their characteristic curves. The characteristic curve, or Density vs. Log Exposure curve ("D-log E", or Hurter-Driffield curve after the originators) plots developed film diffuse transmission density in the vertical axis against a log base ten exposure scale (in lux seconds) on the horizontal axis.

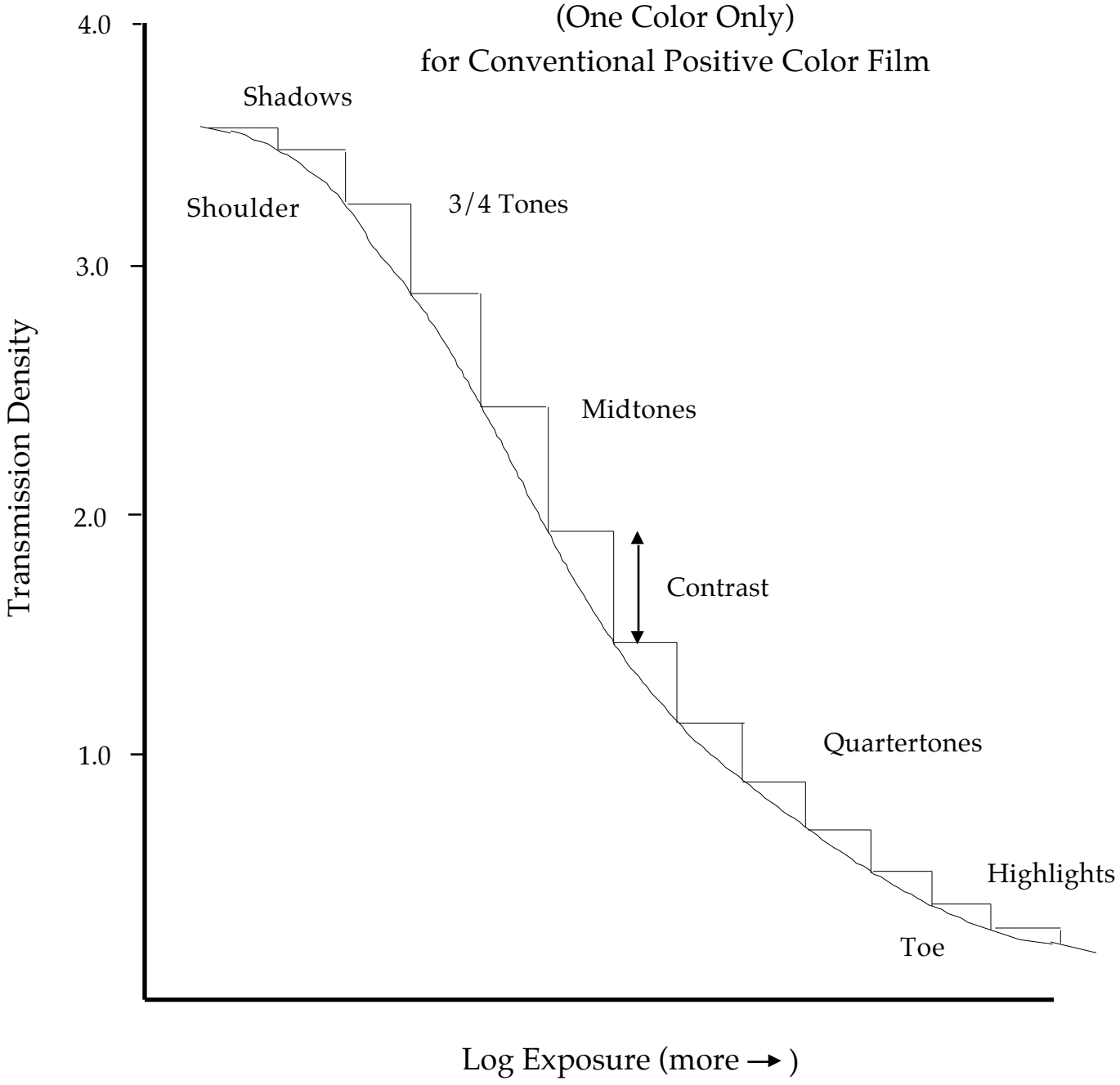
If you make a picture with a typical transparency or slide film and a part of the subject falls onto the darker middletones of the film (which depends on how you expose the film) then the film will render that part of the image with a very high contrast. If the same subject tone falls onto the toe of the characteristic curve of the film (in the highlight region) the film will render that part of the image with a far lower contrast (several times less would be typical). The same is true if the image falls into the deep shadow range of the film. See Figure 1.

In the film, as contrast varies with the slope of the curves, not only does the difference in brightness in the image between adjacent tones vary (more contrast, less contrast), but so do the differences between the RGB densities of each spot in the film vary. Note that there are three largely parallel characteristic curves for any RGB color material, one for each of R, G and B densities. Transmission density equals the log, base 10, of the inverse of the Transmission, in percent, of the film, in a given wavelength range. When T = 100%, D = 0. When T = 10%, D = 1. When T = 1%, D = 2, etc.

In other words, where a photographic paper or film has more contrast, tones in the image will have more light/dark contrast *and* more color contrast or saturation—other factors held constant. If you think about it, you will understand why—the reason for the two effects is the same. Increasing the difference between two areas that were exposed different amounts (by changing the contrast of the film itself) increases the differences between the color values just as it increases the difference between the effective brightness of each spot in the image from every other spot in the image.

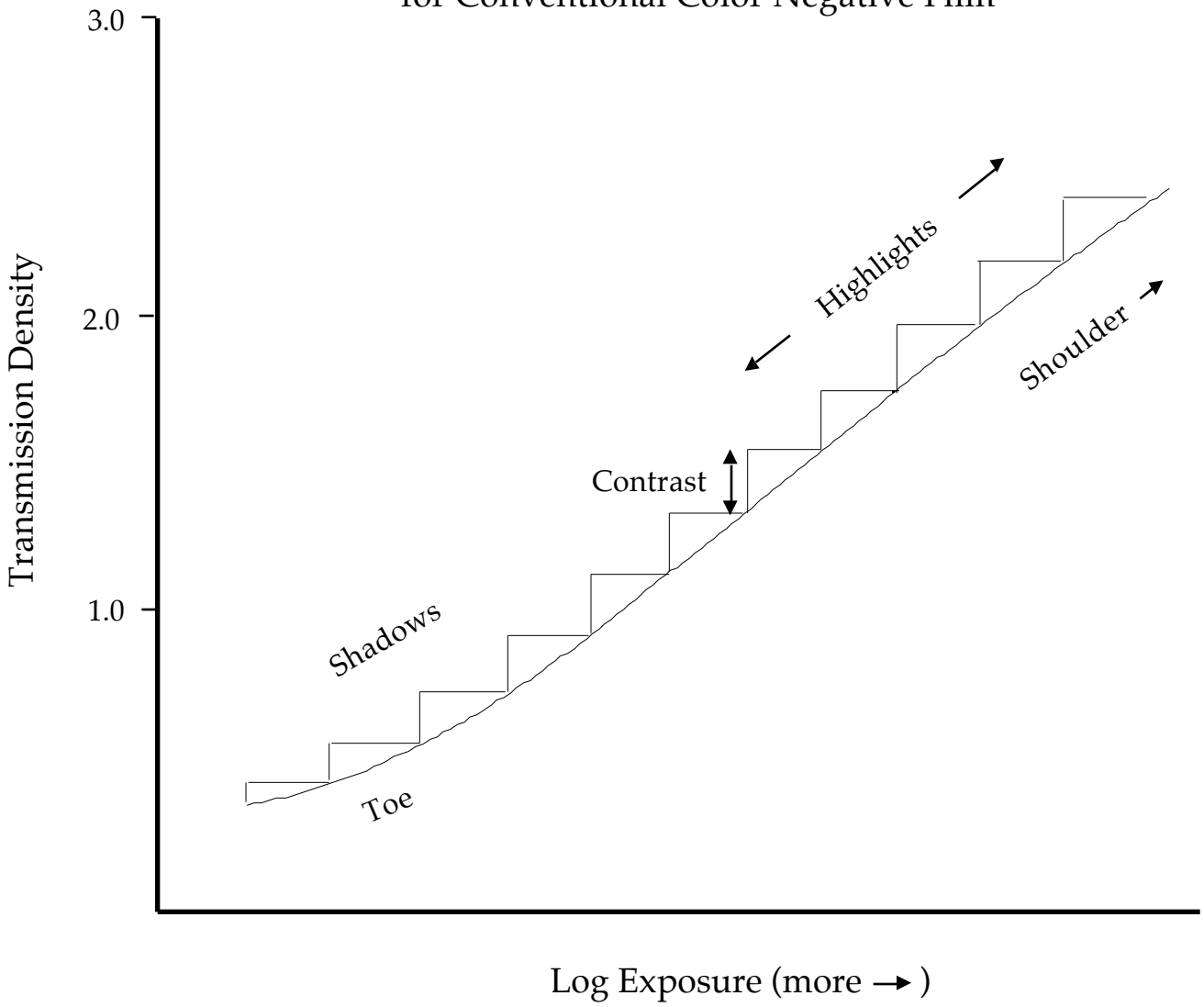
Picture a characteristic curve as a staircase, where each tread is the same length, but each riser is a different height. The taller the riser, the more the contrast in that part of the staircase (rise over run equals the tangent of the slope angle from the horizontal, which equals contrast). Unlike real stairways, photographic curves always get flat at each end (like an escalator) and with many kinds of film (mainly color positives) there is no region of the curve where each step is the same height as the adjacent steps. Color negative and black and white negative films, however, tend to have fairly extensive regions of constant slope. They therefore record images quite differently! See Figure 2.

Figure 1:
A Typical Characteristic Curve
(One Color Only)
for Conventional Positive Color Film



Slope equals rise over run, and is proportional to contrast (both saturation and light/dark contrast).

Figure 2:
A Typical Characteristic Curve
(One Color Only)
for Conventional Color Negative Film



Slope equals rise over run, and is proportional to contrast (both saturation and light/dark contrast).

ANALOG VS. DIGITAL

Controlling contrast throughout the tone scale is the biggest single part of making a well-composed photograph look right. It is vital for any photographer to deal successfully with contrast issues to succeed in producing a fine image. Complete success in controlling contrast, in color photography especially, has always be elusive, where the goal has been to make great photographic prints or reproductions from a wide range of subject matter.

It is possible, though extremely difficult, in analog color photography, to obtain significant control over the light/dark contrast in different parts of the tone scale separately and simultaneously. However, in very nearly all of the systems actually used for making color films and prints, the only way to get control over either light/dark contrast *or* saturation is to choose films or papers that vary in the character of their respective characteristic curves, and then what you get is simultaneously more or less of both, with the amount of each being a simple function of the slope of the characteristic curve. For the sake of discussion I am not considering the contrast reduction within a hand-made print that usually results when dodging and burning are done, as this falls into a different category, being applied by area within the image rather than by tone. Nor am I considering the variations in several qualities of color that occur in films and papers independently of raw contrast.

Digital controls can bring a gigantic improvement in the control over curve shape, as well as independent control of light/dark contrast and color contrast. This all by itself is sufficient reason to drive many photographers to largely switch from the analog to the digital darkroom. It is only one of several major reasons, however.

The further freedom to make virtually any kind of color shift also represents a vast improvement over what was possible with analog color photography (let alone practical). For example, one can select all the moderately saturated, medium light blues in one part of an image, and then darken them. One can select the most saturated yellows and make them a little more saturated. One can select the red-orange colors of moderate to high saturation and shift their hue toward orange or toward red. And all of these effects can easily and automatically be feathered into the image—all using Live Picture's Color Correction layer.

CONTROLLING CONTRAST IN LIVE PICTURE

There are several methods available in Live Picture to brush on linear contrast increases, including a way to brush them on with the pivot point of the curve being any point from the highlight (RGB 255, 255, 255) to the shadow (RGB 0, 0, 0)—note that "highlight" and "shadow" do not always refer to white and black, rather they often mean the more-or-less lightest or darkest tones of an image. There is one way to brush on linear contrast decreases. There is also an indirect way to brush in any Color Curves change you may want, linear or otherwise (in future versions, Live Picture will offer the ability to brush on characteristic curve changes directly, using a layer similar to the IVUE Color Curves tool).

First and foremost, **the IVUE Color Curves tool** allows essentially unlimited characteristic curve control over the entire area of any given image layer within Live Picture. Because it is an IVUE tool, you can't directly brush on corrections created with this tool. However, there is a workaround that allows you to do just that:

1) Create a second, identical image layer and position it in the layer stack directly on top of the original image layer into which you want to brush a local curve change (Option-Drag the original layer upward).

2) Select the second image layer with a single click (to highlight it in blue) and use the Color Curves IVUE tool to create, in this image layer, the effect that you wish to brush into the main layer below it (such as higher contrast in a particular area of the image).

3) Now make the second image layer active with a double click, and use the marquee tool to reduce the opacity of the second image layer to zero, making it invisible.

4) Select the brush tool, and carefully brush in the second layer where you originally wanted the local contrast change. Use the brush percentage setting to limit the extent of the effect. Use the appropriate brush size.

TIP: The Pencil Mode in the Color Curves tool lets you move the curve end points onto the horizontal axes if you use the Shift key while clicking to create points. First click on the corner point, then shift click on a point on one of the two horizontal axes, then go on with the rest of the curve in the same fashion. Don't revert to bezier mode (the spline tool) or any points you just placed on the horizontal axes will revert to the corners. If you need to move the end points as described and also to introduce a

curving change to the color curve, it will be necessary to make them in two separate visits to the dialog box. An alternative is to use the levels tool to move the end points so as to increase contrast. See Figure 3.

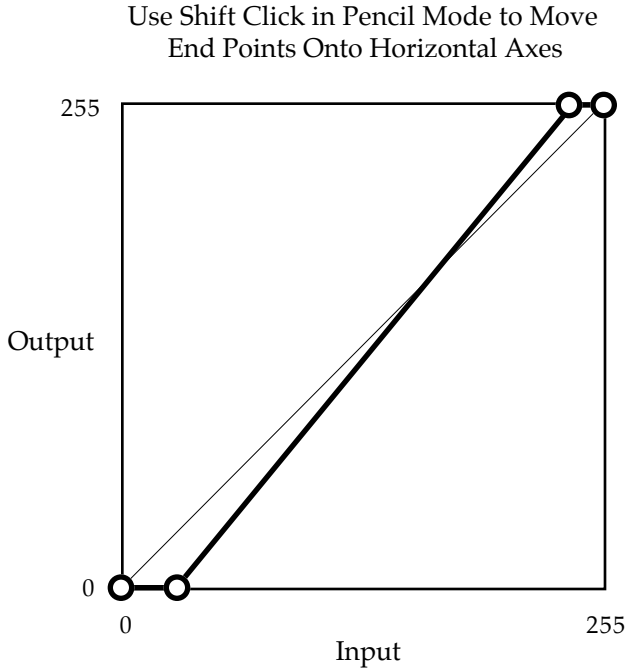


Figure 3:

Another very intriguing tool in Live Picture is **the Colorize layer**—using the brush in "Paint" mode (not "Lighten" or "Darken" mode). If you just monkey around with this tool, you're not likely to notice that when used in a particular way, the tool produces a linear contrast increase with no other color change. This capability can be a very important one if you need a local contrast increase and you can't use the technique described above for brushing in a curves tool move. For example, you might want to add contrast on top of color correction layers, which are themselves on top of the image layer(s).

To apply a linear contrast increase with the Colorize layer in Paint mode:

1) Use the color picker in the creative toolbar to select a neutral color (R, G and B values identical). It is your choice of gray that will determine the pivot point of the contrast increase, BUT inversely so! If you choose white (255, 255, 255), the pivot point will be black (0, 0, 0), and vice-versa. If you choose "middle gray" (127, 127, 127), that will be the pivot point. If you choose the quarter tone, the three-quarter tone will be the pivot, and vice-versa.

2) Adjust the opacity setting of the brush to control the degree of the contrast change as you brush on the effect (or use the marquee, set to the correct opacity, to apply the effect to the whole image).

You must be careful about how you choose your pivot point, as all RGB values above it will get lighter, and all values below it will get darker, as light/dark contrast and color contrast both increase. See Figure 4.

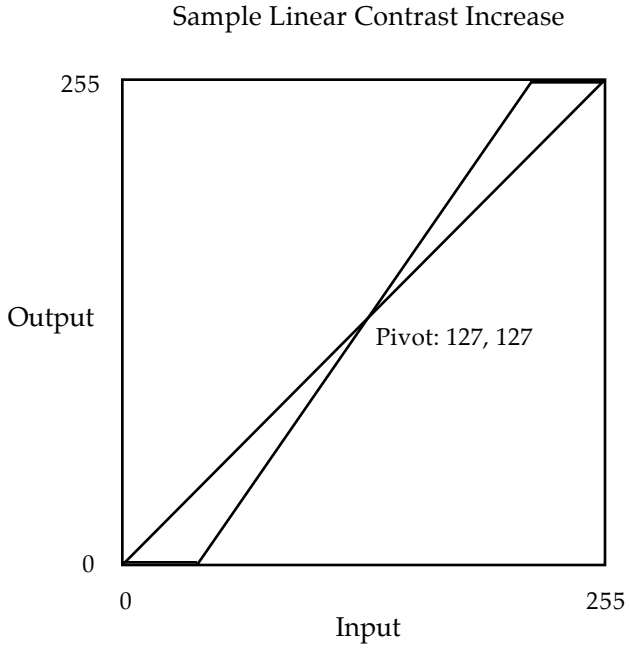


Figure 4:

You can brush on a linear contrast decrease that pivots on the shadow point (RGB = 0, 0, 0) by using **the Selective Color Correction dialog box** in a Color Correction layer to reduce the Value of the image and then brush on the change. If you apply a Value increase, however, as soon as the effect causes any RGB value to reach 255, that pixel's three values will cease to change despite further Value increases, because the Value tool is configured to maintain constant hue and saturation, which requires that the ratio of the three colors remain the same. See Figure 5.

The converse of this observation is that in a conventional contrast increase that goes too far, the hue does shift, away from the dominant color (maximum of R, G or B) and toward the secondary (medium) color, as contrast increases beyond the point where the dominant color has reached 255. Try a strong increase with both methods (increase Value in a Color Correction layer and change contrast with the Curves tool) and you will see

the difference in the color and texture of the resulting highlight areas, especially if the brightest tones in an image are colorful to begin with.

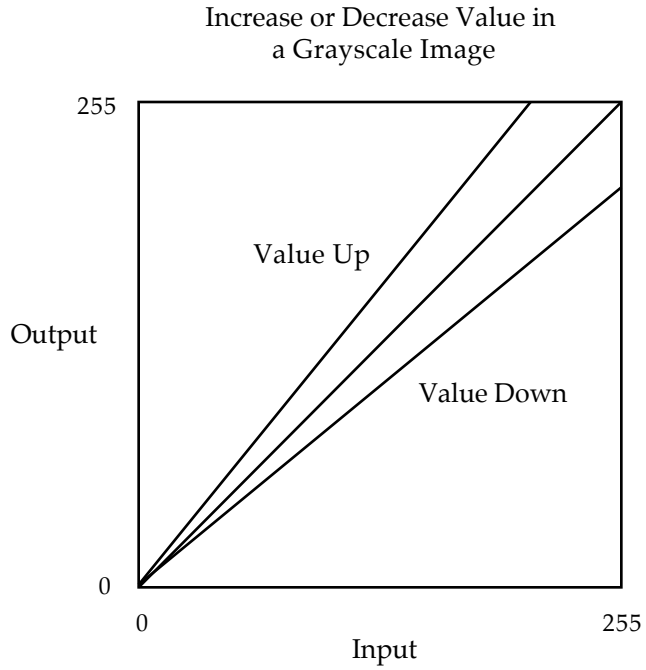


Figure 5:

DODGING AND BURNING IN LIVE PICTURE

In Live Picture, if you simply want to make a part of the image lighter or darker without simultaneously adding contrast, you need to use **the Color Correction layer** and select **Shift RGB** as the output mode. Simply move each slider up or down the same number of RGB units (e.g. 20 or 30 apiece). Then use the brush (with variable opacity settings and variable brush pressure settings) to apply the effect. This is the tool most analogous to conventional dodging and burning.

This procedure results in a perfectly linear shift of the entire image curve. Highlights and shadows can get blown, but not nearly as easily as when using the Lighten and Darken modes of the Colorize layer, as described below. Use the densitometer in the color picker to keep an eye on what you're doing. See Figure 6.

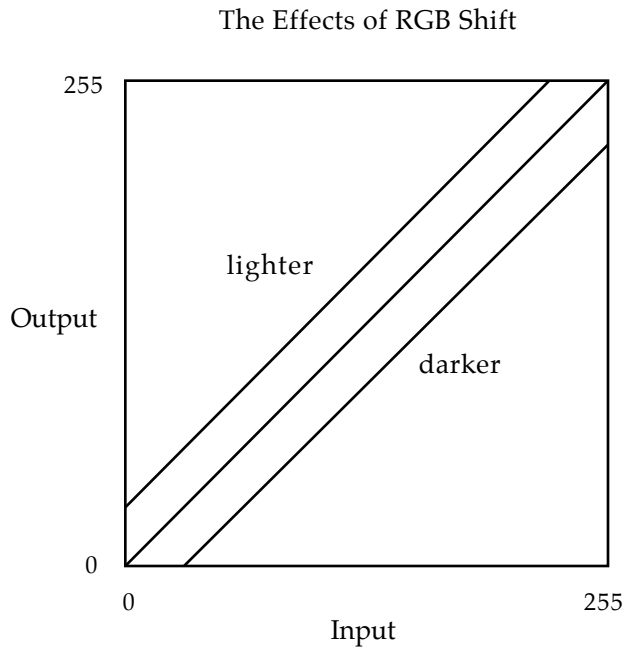


Figure 6:

When making a photographic print, the toe and shoulder of the paper provide some built-in cushion against losing highlight or shadow information altogether. This same kind of protection for use with computers while lightening and/or darkening a region of an image is available if you create a curve shape that includes a toe or shoulder and then brush it on. Use the brush-through workaround discussed on page 10.

Don't forget how nice the angle-constraining tool for the brush (at the bottom of the creative toolbar) can be for darkening edges with perfect alignment. Control-click-drag is the secret keyboard shortcut to turn on this tool and simultaneously define the direction. Remember to turn this tool off in the toolbar, or the brush will seem to have stopped working!

If you have a Wacom tablet and in the Wacom Control Panel the Pressure Stylus option is turned on, then the numerical key control in Live Picture over brush pressure will have no effect.

A vital tip regarding dodging and burning (brushing on lightness or darkness) in Live Picture 2.6 is that the Lighten and Darken options in the Colorize layer are linear contrast increases that pivot on the shadow and highlight points, respectively, and are thus subsets of the Colorize paint tool described above.

In other words, if you use Lighten, the higher any R, G, or B value is, the more it will be lightened. The shadows are hardly touched, and the brighter tones change a lot. The reverse is true of Darken. This is a useful effect for massaging contrast into an area with a brush as you simultaneously lighten or darken it, but it is less basic than the primary dodging and burning tool (the Color Correction Layer in RGB Shift mode) and it is highly prone to blowing out the highlights and sending the shadows all the way to black. See Figure 7.

Lighten and Darken in Live Picture are in fact identical to two of the six dodge and burn modes in Photoshop. Two of the others in Photoshop are the exact opposite, and the middletone dodge or burn modes create constant-radius curves that don't move at the highlight or shadow.

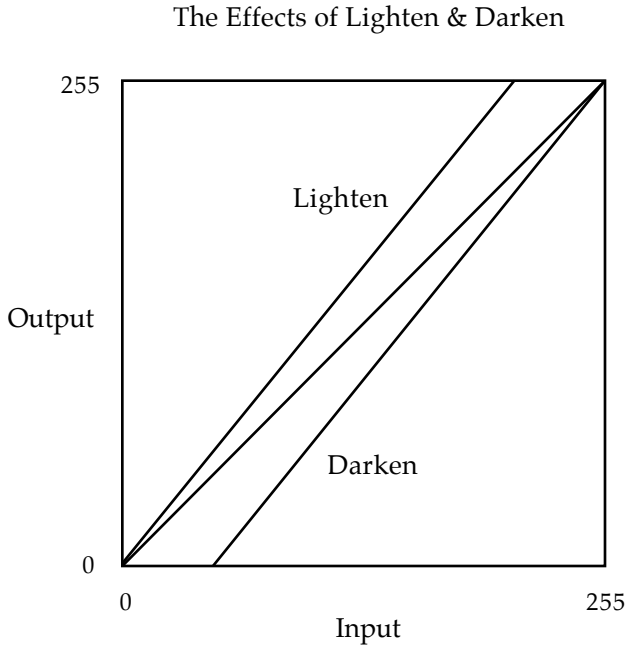


Figure 7:

TO LEARN THE WORKINGS OF THE BRUSH TOOL

Experiment with the brush by: 1) opening a new FITS file (with no image), 2) choosing a medium gray color with the Color Picker, 3) choosing Set Background in the Edit menu to make the workspace turn gray, 4) creating a Colorize layer, 5) selecting the brush and choosing Darken, and 6) brushing with various pressure, opacity, and directional control settings. The above steps make it far easier to see the exact behavior of the brush than when actually working on an image, so you can learn its touch well.

TO SEE CLEARLY THE TONAL EFFECTS OF THE VARIOUS TOOLS

I drew a double, 17-step gray scale in a draw program, and filled one side of it in with gray tones from values zero to 255, in 16 unit steps. Then I filled the other side of it (it is two scales side by side) with the same red and green values, but with blue values 20 units higher for each step, the high limit permitting.

If you open the grayscale IVUE in a new FITS file, you can take before and after densitometer readings while applying a range of effects and see for yourself how the tools in Live Picture work. This is how I learned a lot of what I have written here.

For example: open a Colorize layer and choose the lighten mode of either the brush or the marquee with opacity for the tool set to 100% (maximum effect). Apply the effect to the entire gray scale (the brush may require six or more strokes at the maximum pressure setting to reach maximum effect). Measure the resulting RGB values with the densitometer in the color picker and mentally graph them to compare them with the original values. The result will be similar to "Lighten" in Figure 7, but stronger. If you can't see the graph in your head, sketch a graph on paper, plotting measured before and after points.

Repeat with any or all other effects. The color values of the blue side provide a very limited basis for evaluating a tool's effect on such color properties as hue, saturation, and Value.

CONTROLLING COLOR SATURATION IN LIVE PICTURE

The way to change saturation independently of light/dark contrast in Live Picture is to use the saturation controls in a Color Correction layer. First, one should learn the mathematical basis of the saturation adjustment, which is a function of the color model in use.

There are many different mathematical models for saturation and Value/lightness/brightness. Live Picture uses the single-hexcone HSV color model (a space derived from the RGB, device-dependent space). In this model, the six-sided cone is upright, like an ice cream cone. The bottom tip is black and has a Value of zero and saturation of zero. The top of the cone is flat, with white in the center. The flat top of the cone is the region of Value 100%. The line from black to white includes all the grays and is the line of zero saturation. The outer surface of the cone, excluding the top, is the region

of 100% saturation. Value is proportional to the vertical height of a color in the space. See Figure 8.

Smith's Single-Hexcone HSV Color Model

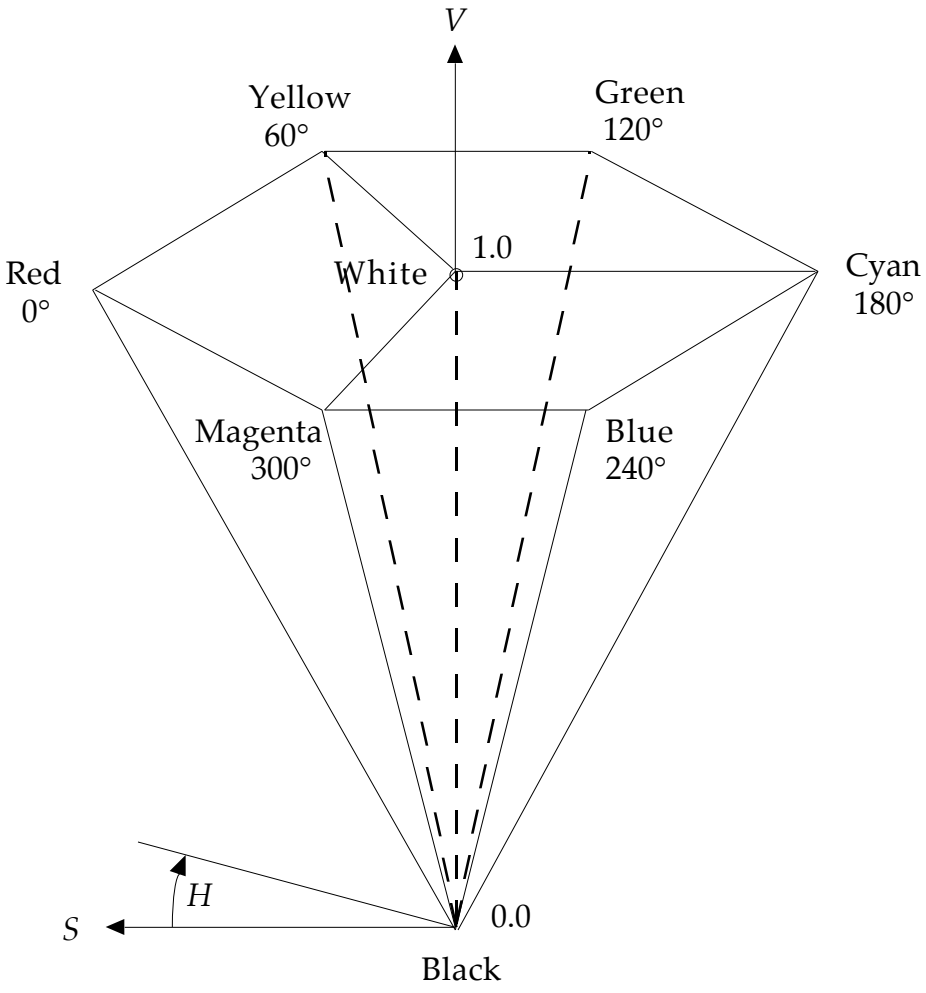


Figure 8:

Value is defined in this model as simply the maximum (R, G, or B) value for a given color. Colors 255, 0, 0 (pure red), 255, 255, 0 (pure yellow), and 255, 255, 255 (white) all have Values of 100%.

Saturation is defined in this model as max. minus min. divided by max. Thus colors 250, 50, 50 and 50, 10, 10 each have 80% saturation, because the lowest values are 80% of the way from the maximum values to zero. Color 6,

4, 0 has a saturation of 100%, but color 250, 100, 100 has a saturation of only 60%.

Given these definitions of Value and saturation, to adjust Value without changing saturation, the three R, G, B numbers have to go up or down *proportionally*. When Value is applied proportionally to the entire range of tones, a linear contrast change results instead of merely darkening or lightening affected portions of the image, as one might expect.

Recall that pixels will not lighten further, once any one of their three values has reached 255, because to do so would change the hue of the pixel (see the end of the section on controlling contrast).

This HSV model has advantages, but it needs to be understood to be used well.

Saturation, in the world of photography is equal to simply the difference between the highest value and the lowest value. Thus one should expect the colors 250, 200, 200 and 100, 50, 50 to have equal saturation (understanding that the actual luminance of RGB values on a well-adjusted monitor is at least supposed to effectively adhere to a perceptually linear scale, substantially similar to a density scale in photography.

So if you use the on-screen densitometer to assess saturation in the single-cone HSV color model, readings of colors that are actually equally saturated but of different apparent brightnesses will have wildly differing "saturations".

Another consequence of the way saturation works in this model is that colors darken as they get more saturated, at least relative to how they would change in a more photographic model.

ADJUSTING COLOR BALANCE

The Color Shift IVUE tool is an easy way to adjust color balance in Live Picture, however, one can also use the Color Curves IVUE tool, the Color Levels IVUE tool, or the Color Correction Layer's Selective Color Correction dialog box in RGB shift mode, which allows brushing on local color balance changes as well as local lightness (neutral density) changes.

The Color Shift IVUE tool provides three default curves which characterize the degree of color shift in the different regions of the tone scale, from white to black. See Figure 9. All three of these curves reach zero at both ends of the

scale, so contrary to what the manual says and the moon icons in the interface imply, there are neither highlight nor shadow modes of this tool. The shadow mode is really a three-quarter tones mode, which causes the greatest color shift near there, and a smaller amount throughout the rest of the tone scale, reaching zero at both ends. The highlight mode is really a quartertones mode, and the midtones mode is what it claims to be.

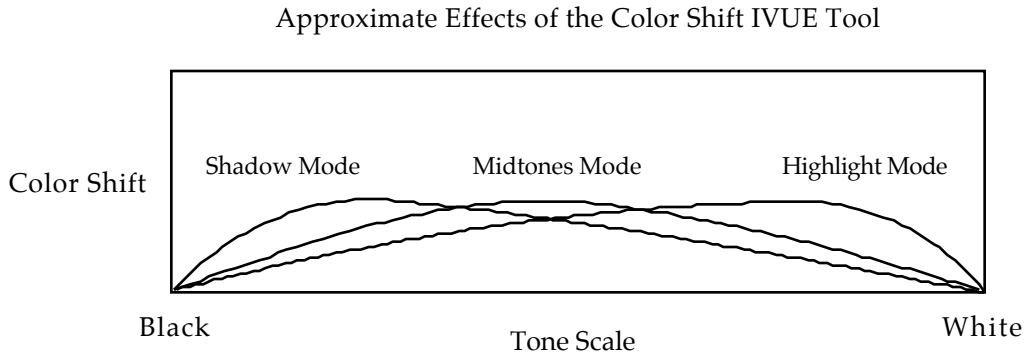


Figure 9:

The Color Shift tool doesn't automatically maintain constant brightness as you adjust the color balance, so if you wish to do so, move all three sliders (some up, some down).

HUE SHIFTING IN LIVE PICTURE

Create a Color Correction layer (Command-9) to prepare for hue shifting in your composite. It is because there are usually several layers in any given FITS file that the content of your workspace in Live Picture is called a composite, even though there may only be a single image layer.

First, note that the way to select the entire image for a given output adjustment is to check none of the three color selection boxes (H, S or V). Each selector only functions to limit the selection.

Ordinarily, one would use Shift HSV mode (from the Correction pop-up menu) to alter hues in an image. The converge modes create an effect similar to painting with a uniform color in the selected range of colors, whereas the shift modes can leave the image still looking natural.

TIP: To see better which colors you are selecting in the Selective Color Correction dialog box of the Color Correction layer, first make a very exaggerated hue and/or Value shift on the output side.

Likewise, if you are brushing in a very subtle effect in a Color Correction layer and you can't see if your brushing is having any effect, use the numerical readouts of the output sliders to set the magnitude of the shift to something far greater than what you want, so you can see exactly where the effect is going and where it isn't, then go back afterward and reset the sliders to the correct values.

With the hue input slider turned on, start by selecting the range of hues that you want to shift. You can get the eyedropper by click-dragging on either of the color picker icons (little squares), and then use the eyedropper to select from the image. If you shift click with the eyedropper tool, it will extend the selected range. Live Picture will automatically present you (in a new Color Correction layer) with a default selection range between the triangular sliders of 90 (out of 360) degrees of hue angle. Move the three sliders to alter the dominant hue selected, and the range selected. Also note that the tolerance control has a great effect on the range selected, just as the triangular sliders do, so play them off against one another until you get what you want. I usually find that low tolerance settings (e.g. 20) are more useful than high ones (50+).

The effect is always feathered smoothly into the image unless the tolerance or the selection range are set very low.

ABOUT THE LEVELS IVUE TOOL

The Levels IVUE tool has an RGB histogram display, as well as separate histogram displays for each of red, green, and blue. The RGB display is NOT a sum of the three curves. It is derived by first averaging the three values for each pixel, and then plotting the data. This combined display could be called Black & White or Gray. Therefore, if you move the highlight slider down in the RGB display to the point where it just reaches the highest value shown, many pixels may still have red, green, or blue values sent "beyond" 255 and color detail will be blown out in the highlights. To the extent that the image has neutral-colored highlights, this will not occur.

You should first check for the highest value in each of the three individual color displays, and then use the highest value found there to set the highlight slider in the RGB display.

Moving the center sliders for red, green or blue can make this tool behave much like the midtones mode of the Color Shift tool. Also, moving the center slider in the combined RGB display is one easy way to lighten or darken midtones in an image.

OTHER IVUE TOOL TIPS

All the IVUE corrections that you make to any given image layer are blended into a single LUT, and therefore settings are not retained in the dialog box when you select OK, closing the box. Several methods of backing out of IVUE corrections without choosing to Undo all your previous corrections exist: 1) Save each correction in a folder for this image and use them to rebuild the LUT, less any corrections that you would like to undo; 2) Each time you intend to make a second or subsequent IVUE correction, make it to a copy of the last version of the image layer, so that you can go back to a previous version by making the earlier layer visible again; 3) Command-Z will undo and/or redo your last correction so long as you haven't done anything since clicking OK.

Note: As IVUE corrections are accumulated in the LUT for any given IVUE image layer, the sum of all such corrections can be viewed in the Color Curves tool by opening up the individual red, green and blue curves. The curves displayed, with many anchor points, can be viewed either with the spline tool (bezier mode) or in the pencil mode, but the displays will look a bit different.

A Note on Spotting (Dust and Scratches, etc.): For the time being, spotting dust requires that you open the original file, or the IVUE file (using FASTedit IVUE), or a build, in Photoshop. This will cease to be the case before too long. You have to see ImageVue opening huge IVUE files to believe how fast it is—about 3 seconds to fill half of the screen on my 8100 at 19" resolution. Imagine how great this will be for spotting images ("pixel editing"—edits recorded to the actual image file directly).

A helpful hint is that scanning a chrome either immersed in oil—or preferably in scanner mounting fluid—substantially reduces grain in the image (as well as scratches and Newton's rings) with a drum scan. CCD scans are generally made with more diffuse light, and could theoretically be made with fully diffuse light, which would be far superior to the specular imaging systems of drum scanners in so far as grain, dust and scratches are concerned (but not rings—no advantage there). As of late 1997, CCD scanners are finally

just beginning to have the dynamic range to see the darkest shadows of the toughest transparencies well, but only just barely.

HOW SCALING WORKS IN LIVE PICTURE

There are several methods for changing the size of a digital image (changing the number of pixels in it).

You may be familiar with the three options for scaling in Photoshop. In General Preferences, under Interpolation, you choose from one of Bicubic, Bilinear, or Nearest Neighbor methods. Add to these: concatenation of square groups of pixels into one pixel (averaging the R, G and B values).

The latter process enables file resolutions to be cut, with essentially no other change in the character of the image, and is also much faster to compute than bicubic interpolation (which yields the best quality of the first three). Concatenation is, however, limited to changes in scale of factors of whole numbers (2, 3, 4, etc.). This is why Photoshop presents you with display resolution choices of whole number multiples of the original file resolution. When scaling screen displays upward, Photoshop simply multiplies pixels, turning each pixel into a group of 4 or 9 or 16 (etc.) identical screen pixels.

What if you need 89.235%? Then interpolation will occur in Photoshop, and the result of this interpolation is that the image suffers a loss of sharpness as new pixels are invented to replace the old ones. To add injury to insult, any further size changes further increase the fuzziness. After a half dozen or fewer size changes, most files will be quite ruined.

Live Picture uses yet another process, coupled with concatenation, to achieve in-between scaling percentages: pixel decimation. Let's say you want to scale down to 40%. First, Live Picture concatenates each group of four pixels into one with an average of the values of the four. Then Live Picture removes every fifth row of pixels in each direction. That's it. This is why it is possible to change the scale of a file in Live Picture to 99.13%, for example, and suffer absolutely no loss of sharpness and absolutely no change in the color values of the image. The drawbacks are that if you have very fine, perfectly vertical or horizontal lines, pixel decimation can make them disappear, and that some fine lines will get little notches or steps in them, especially where both a vertical and a horizontal row of pixels were removed at a point where they crossed the line. Imaging output systems that reveal the most detail in a pixel-decimated file may require use of Live Picture's anti-aliasing feature to ensure smooth image detail.

Ordinary, conventionally screened offset lithographic output does a good job of obscuring the effects of pixel decimation, making anti-aliasing usually contraindicated for published output (to preserve the most apparent sharpness). Laser-based RGB digital output systems (e.g.) show a lot more detail, however, and the decision whether or not to use antialiasing will depend on the subject matter and the degree of pixel decimation, which is a function of the reproduction percentage. For example a file at 51% magnification is highly decimated (down from 100%), but a file at 49% magnification is barely decimated (down from 50%). Similarly, files at 99% or 24% of original file resolution (relative number of pixels in one direction in the image) will be barely decimated.

I think this system is fantastic. I work very hard to make my 4 x 5 transparencies and negatives as sharp as I can get them and I don't want to do anything to the images that willy-nilly makes them half as sharp as they used to be. If I didn't care to make images that remind me of what I see, I might be using a smaller camera and be saving a gigantic amount of time, hard work and money.

Not only does this system allow Live Picture to very quickly scale images to any percentage with negligible effect on the character or sharpness of the image (considering the file resolution and the output device), but because of the way the IVUE format and FITS mathematics work, you can make an unlimited number of size changes while editing. Only one is ever applied to the final build, and none is applied to the original image file.

One other benefit of decimation is that it is very simple to remove more rows of pixels in one direction than in the other, so you can scrunch or stretch the image instantly and at will.

IN CONCLUSION

I guess I have to admit that Live Picture isn't literally magic, but its foundations are of such superlative quality that it still thrills me to think about it, after about a year and a half of becoming familiar with it. I find most beautiful things, including mechanisms of many kinds, very compelling. Most of my favorite mechanisms are ones that help me to make images of nature to share with the world. Live Picture will, I think, prove to be the most important of all.

My apologies for any errors in the above. There may yet be methods of tone or color control in Live Picture with which I am unfamiliar, as well as ways of changing color or tone that I have never heard or thought of. If you know of any, please let me know!

—Joseph Holmes, photographer

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ABOUT THE AUTHOR

Joseph Holmes has been photographing wild landscapes for more than 29 years, displaying his "ecstasy of seeing" in images writer Barry Lopez calls "the beauty and serenity of the earth, these catchbasins of light." Mr. Holmes' images are, in his own words, "moments distilled from the ancient interplay of sunlight upon remnants of wild creation," and were once described by Ansel Adams as "spectacular" and "carrying the torch." Among his photographs are thousands of representations of the Sierra Nevada, the southwestern wildlands, Alaska, and New England.

Mr. Holmes' photographs have been exhibited and published extensively, and his original prints are in both private and corporate collections around the country. A signed, slipcased Collector's Edition book featuring 60 exemplary photographs from Mr. Holmes' extensive archives, Joseph Holmes: Natural Light, was published in 1989 by The Nature Company, a leading retail chain and catalog merchant, and sold through 7,000 copies at $100.00 each. Limited edition original prints produced by Mr. Holmes were offered for sale in most Nature Company stores from 1988 until 1994, generating nearly $1 million in retail sales.

In addition to Joseph Holmes: Natural Light (The Nature Company, 1989) and The Father of Waters: A Mississippi River Chronicle (Sierra Club Books, 1982), Mr. Holmes' work has been presented in eleven calendars (published by Simon & Schuster, Friends of the Earth, and The Nature Company, among others) and twenty-two fine art posters with combined sales of nearly $3 million. Image Conscious, the San Francisco fine art poster publisher, is currently publishing a new series of posters featuring Mr. Holmes' photography. His new book Canyons of the Colorado (Chronicle Books 1996), with sixty-two spectacular images rendered entirely on his Macintosh, is the

first book of photographs ever rendered with Live Picture and was made with prepress image control entirely in the hands of the artist. The book was sponsored by Eastman Kodak Company and Live Picture, Inc. and achieves extraordinary reproduction quality.

Mr. Holmes has acquired a broad-based mastery of color photography, printmaking, and related disciplines, including the graphic arts, digital imaging, and production for publication. He is a photographic imaging consultant to Live Picture, Inc., the Department of Photography of The Museum of Modern Art in New York, and several other imaging companies.

Look for a gallery, soon to appear on the World Wide Web at www.josephholmes.com.