

“Bits & Pieces” by Lindsay Gibbs

Colour Correction using a calculator

An old adage states that “learning is a process of diminishing deception” and so it is with “Levels” in Photoshop (Elements).

Almost every book tells you to set the RGB (red, green, blue) values for the “white” eyedropper in “Levels” to 245,245,245 and the RGB values for the black eyedropper to 10,10,10 .

You are then invited to hold down the “Alt” key and move the “center-slider” from the left-hand side of the histogram across to the right-hand side of the histogram taking note of the points at which the screen goes from “white-to-black” (left-hand-side) and “black-to-white” (right-hand-side). You are then told to click the “white-to-black” point with the “black eye-dropper” and the “black-to-white” point with the “white eye-dropper”.

When you do this you will observe that the histogram (assuming the image is low contrast) will expand such that the “black” point is at the left-hand edge of the histogram and the “white” point is at the righthand edge of the histogram. The image contrast is now optimum.

But wait ... the same contrast adjustment could have been obtained by simply positioning the left-hand “levels” slider at the left-hand edge of the histogram and positioning the right-hand “levels” slider at the right-hand edge of the histogram. The contrast will be the same as for the first method. So which method is correct?

The first method should give a better result if the image has a colour cast as the eyedroppers force the RGB values for black and white to be the same. The second method would be my preference if the image doesn't have a colour cast.

What is meant by a colour cast?

Fig 1 shows the RGB histograms when a white card is photographed under a tungsten lamp.

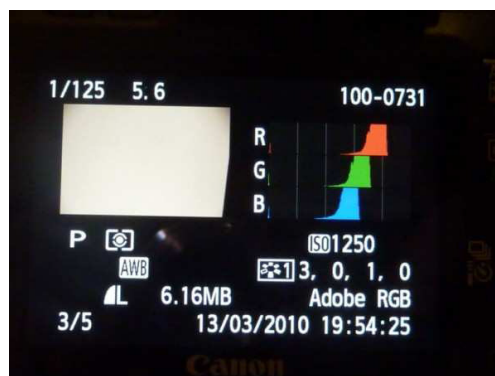
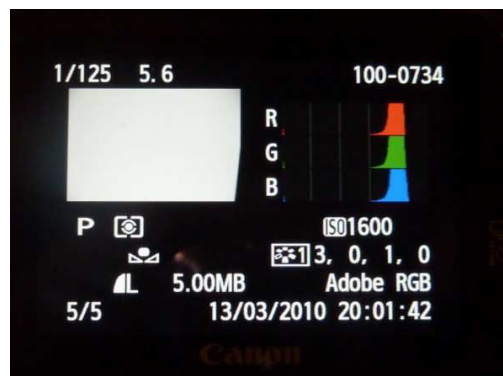


Fig 2 shows the same RGB curves when a custom white balance has been applied. Three things should be apparent:

- the card now looks white
- the histograms have not altered shape
- the histograms now line up vertically

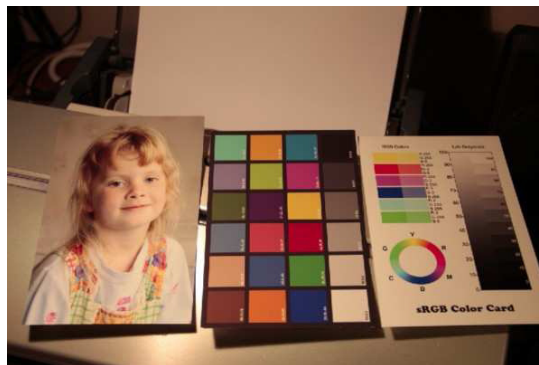


White Balance simply means that the RGB values for any particular shade of gray (from black through white) have the same numeric value.

It is interesting to note that the eyedropper tools in Photoshop achieves a similar effect by sliding the RGB histograms until each of the RGB values under the eyedropper matches the numerical value entered into the eyedropper window.

Removing a colour cast (as per the book)

Based on what I have just said I should be able to click the white square in Fig 3 with the white eyedropper in “levels” and presto the colour cast will vanish.



I wish it were so simple. If you look at Fig 4 you will see that the colour cast has indeed gone but the image now appears overexposed.



What went wrong?

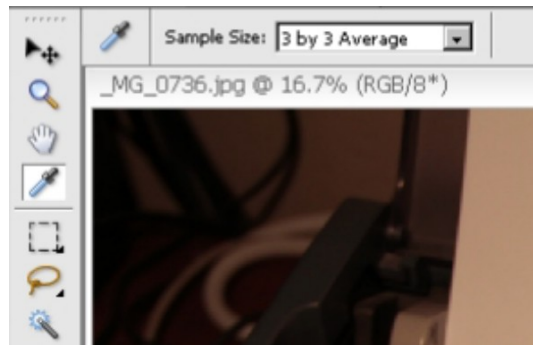
The reason why Fig 4 looks over-exposed is that each of the RGB values for the white square have been forced to 255,255,255 which are the default values for the “white” eye-dropper. No allowance has been made for the tonal value of the white square. The “white eye-dropper” needs different numbers for the image to look good.

Colour correction using a hand-held calculator

The following method will give you a perfect white balance every time.

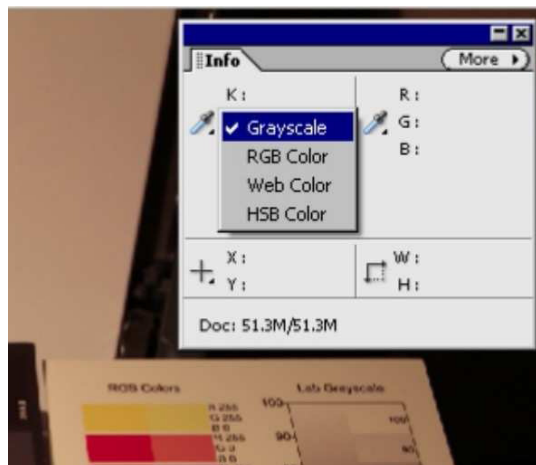
Step 1:

Open your image then click the eyedropper tool and set your sample size to 3x3 or larger as shown in Fig 5



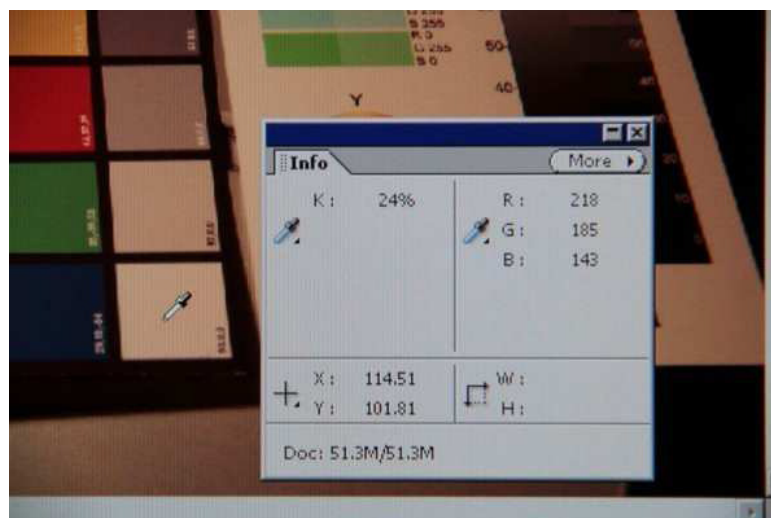
Step 2:

Open the “Info” palette, right-click the top left eyedropper and select “grayscale” as shown in Fig 6. A “K” (short for black) will appear.



Step 3:

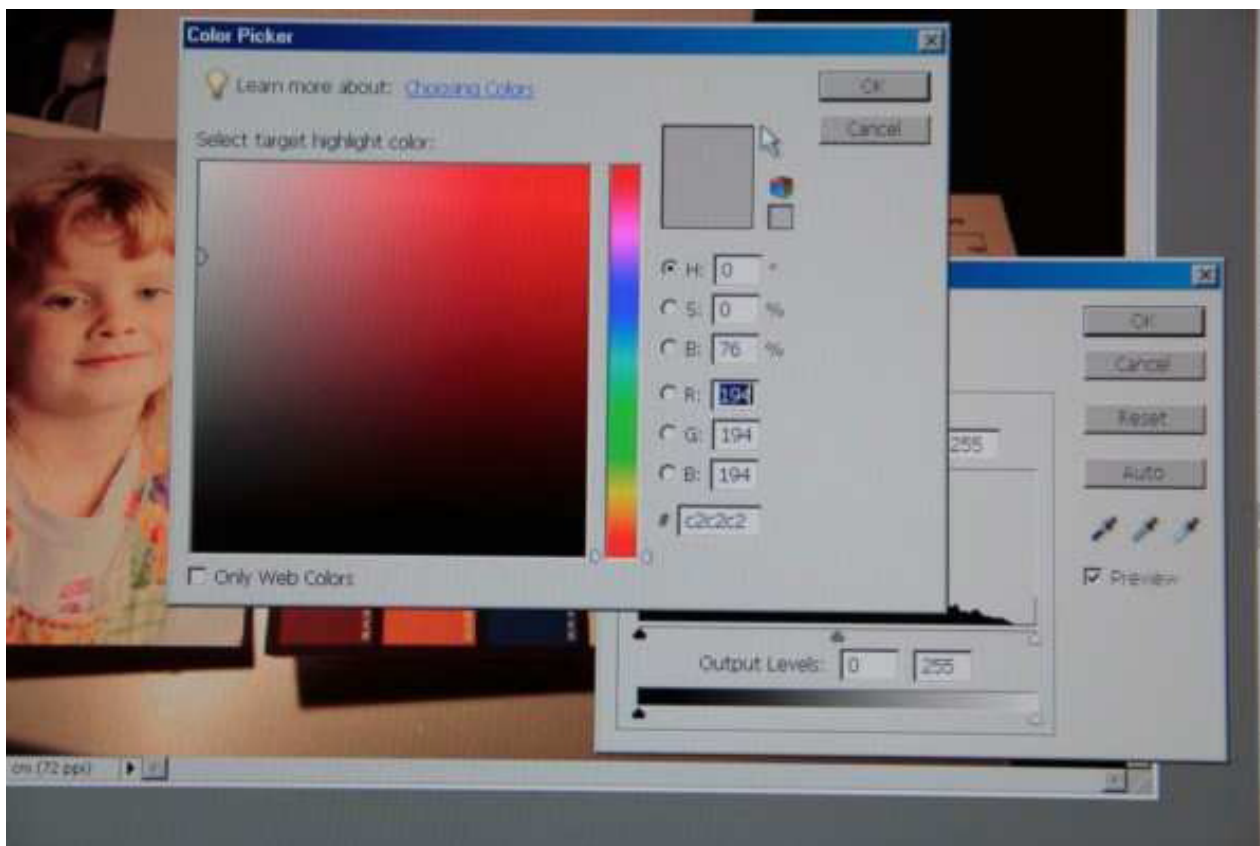
Click the “K” eyedropper then move the cursor over the white square as shown in Fig 7. Note the “K” value when you click the eye-dropper. In this example the value is 24%. The 24% is telling us that if this image were printed in monochrome then the white square needs 24% black ink to have the correct tonal value.



That is the white square is not white (255) but in fact a shade of gray with a tonal value of $(100-24)/100 \times 255 = 194$.

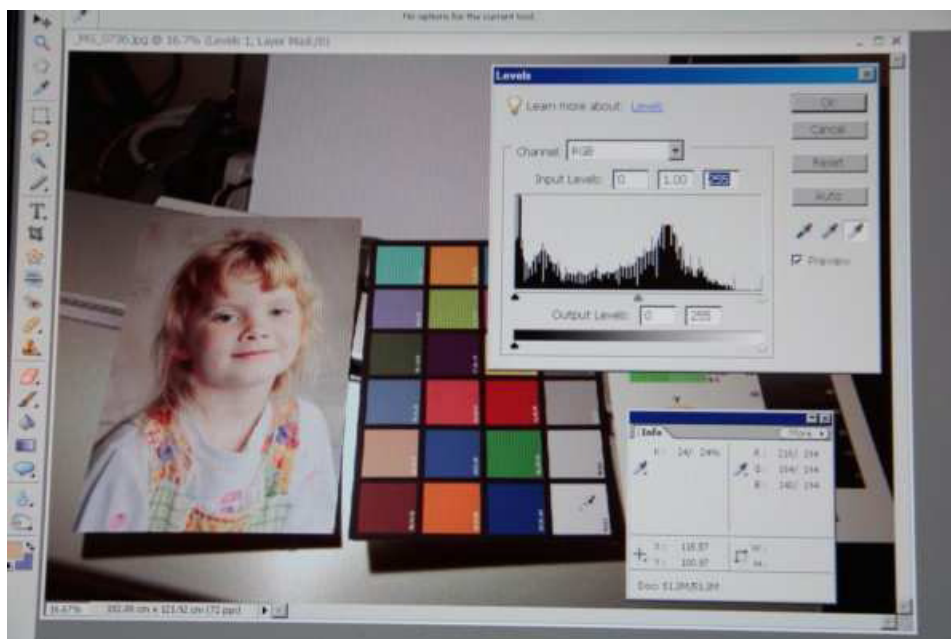
Step 4:

Double click the right-hand “white” eye-dropper and set the RGB values to 194 (the calculated value) as shown in Fig 8. Click OK to close the window.



Step 5:

Click the “white” eye-dropper then click the white square as shown in Fig 9. Your image is now colour corrected. The before and after values are shown in the Info palette.



Notice that the colour corrected image (Fig 10) is not over exposed. Notice also that the white square actually looks white even though it is a shade of gray :)



The above principle also works for the other eyedroppers. For instance if there is a dark neutral colour in your image then measure the K value and calculate the RGB values for the “black” eyedropper as above.

The key thing is that you only use a single eyedropper using this method. Leave the remaining two eyedroppers alone. Feel free to alter the contrast using the “levels” sliders.