Histograms of Photographs

This document contains screenshots from Photoshop CS5 of three identically composed photographs (not taken by me) showing a seascape. The first photograph is underexposed, the second overexposed, and the third correctly exposed. The screenshots also exhibit the histograms associated with each photograph.

What does the histogram of a photograph demonstrate?

Along the horizontal axis runs the pixel information pertaining to a photograph, from the minimum value of zero pixels (which registers completely black) to the maximum value of 255 pixels (which registers completely white). Pixel values lying in between these two extremes produce shades of gray, darker towards zero pixels and lighter towards 255 pixels.

The vertical axis measures how many pixels of each particular value the photograph contains. An underexposed photograph — one that is predominantly dark — contains a preponderance of low-value pixels, and therefore its histogram shows an overwhelming mass of data on the left side (which statisticians call "skewed right"). An overexposed photograph — one that is predominantly light — has a preponderance of high-value pixels, so that its histogram shows an overwhelming mass of data on the right side (skewed left). Finally, the histogram of a well-exposed photograph is massed towards the center, with a decreasing number of low-value and high-value pixels.

Let us examine the corresponding histograms of the three photographs.

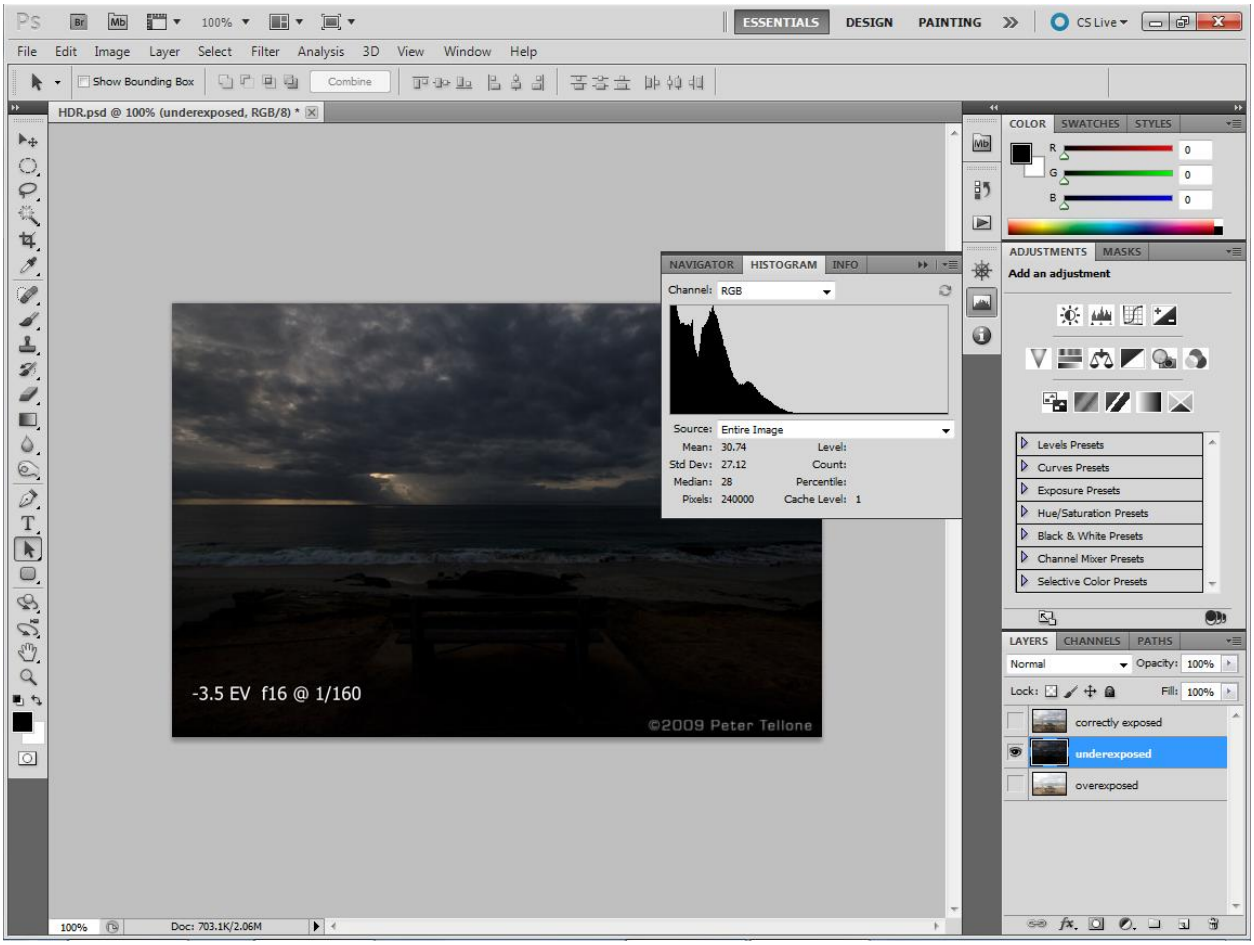

Figure 1. The histogram of this underexposed photograph is skewed right.

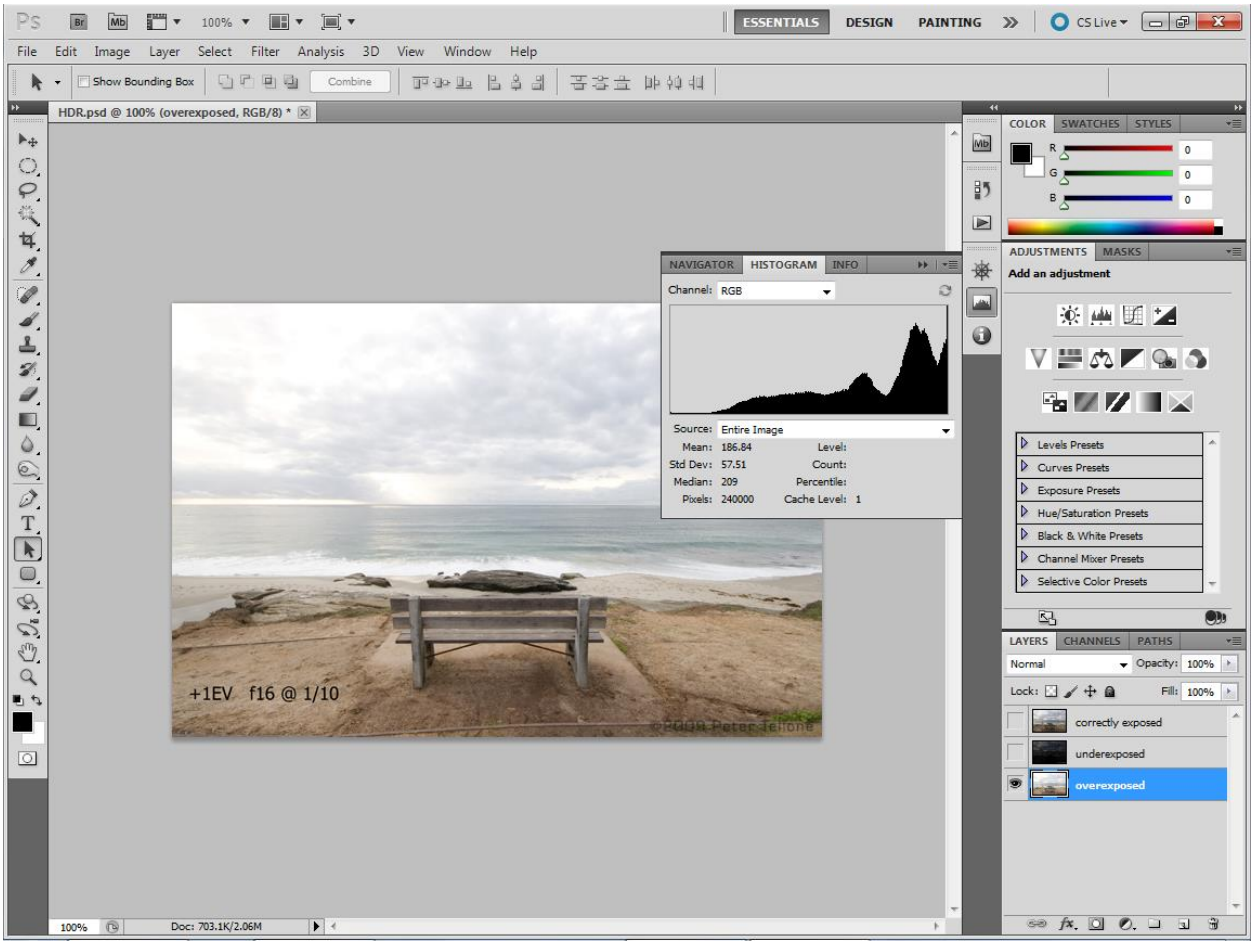

Figure 2. The histogram of this overexposed photograph is skewed left.

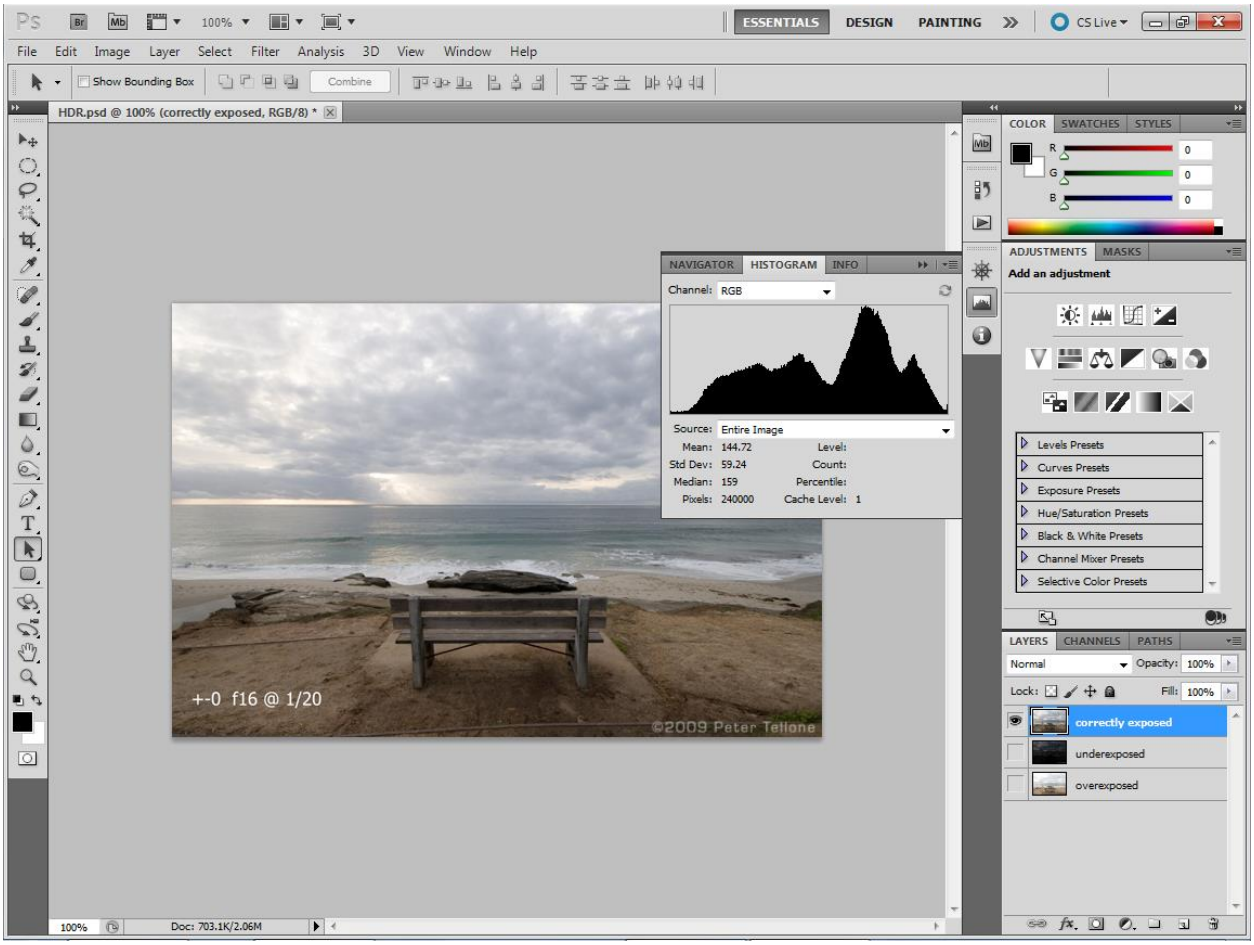

Figure 3. The histogram of this correctly exposed photograph has its data mass more or less centered.