

Using Histograms

Handout by Alex Dumestre

1960 PC Users Group

Digital Photography SIG

In doing some research for this presentation I came across <http://www.luminous-landscape.com/> by Michael H. Reichmann, a well known landscape and nature photographer. This is an excellent Web site for serious photographers. Although it sometimes gets a bit technical, it is *photographer technical*, not *engineer technical*. Check, in particular, the *Tutorials* section (and its subset, the *Understanding Series*).

Here are excerpts from Reichmann's article "Understanding Histograms" on that site:

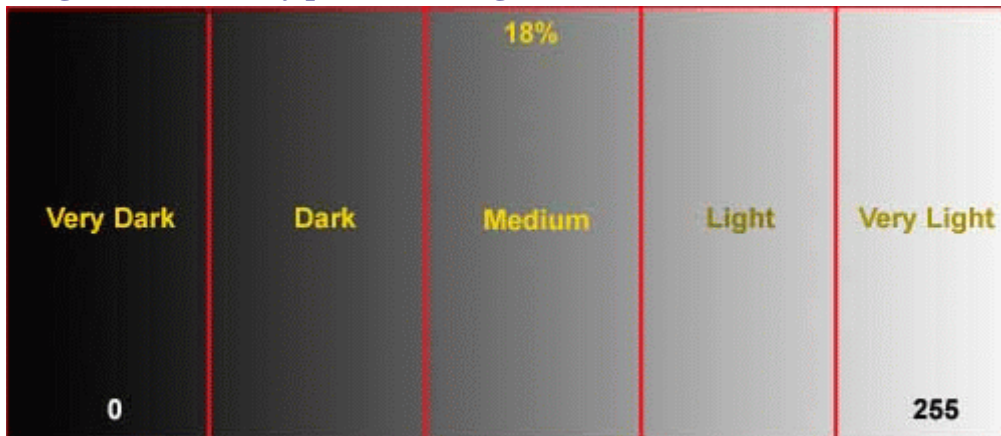
Possibly the most useful tool available in digital photography is the histogram. It could also well be the least understood. In this article we will look at what a camera histogram tells the photographer and how best to utilize that information.

Virtually every digital camera, from the simplest point-and-shoot to the most sophisticated digital SLR has the ability to display a histogram directly, or more usually superimposed upon the image just taken.

In an image recorded in 8 bit mode there are 256 discrete brightness levels between absolute black (0) and absolute white (255). 18% gray (the point that all exposure metering measures) has a numeric value of about 128, half way between black and white. If you think about it this is fairly logical. This means that if you are exposing for an average subject, say something like a scene with people, trees, grass etc, these subjects will be exposed at about the mid point of the camera's dynamic range. Why is this important?

The Histogram

This is where the histogram comes in. It is a simple graph that displays where all of the brightness levels contained in the scene are found, from the darkest to the brightest. These values are arrayed across the bottom of the graph from left (darkest) to right (brightest). The vertical axis (the height of points on the graph) shows how much of the image is found at any particular brightness level.



Note that I somewhat arbitrarily labeled each of the five zones (or F stops) containing the dynamic range recordable by the cameras as Very Dark / Dark / Medium / Light / Very Light. But each of these 1 stop ranges contains within it just over 50 discrete brightness levels ($5 \times 50 = 250$ not 256). It's a good idea to consider about 4 - 5 points at the very bottom (black) and another 4 - 5 points at the very top of the scale (white) to be so close to the extremes as to not really be part of the image-forming segment of the graph.

With the exception of a histogram that is very heavily bunched up to the right (overexposed) there really isn't such a thing as a "bad" histogram, or for that matter a "good" one. The histogram simply shows you the way things are, and it's then up to you to decide if what it is telling you needs to be acted upon. Here are some examples.

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Virtually every digital camera, from the simplest point-and-shoot to the most sophisticated digital SLR has the ability to display a histogram directly, or more usually superimposed upon the image just taken. On most cameras the histogram display takes place on the rear LCD screen.

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