

Histograms

All too often, you take a picture and all looks fine on the screen at the back of the camera, however when you look at it on the computer, you see that it was not correctly exposed.

Histograms give us a visual representation of the distribution of colours in an image. It is a bar chart that shows how many pixels there are for every colour.

How does this help?

Well you can immediately see whether the photograph is underexposed, overexposed or correctly exposed. The left hand side of the histogram shows the dark pixels or shadow areas, whereas the right side shows the brighter pixels or highlight areas.

Dynamic Range I

- The human eye can see a wide range of light levels, from very dark to very bright.
- Film can see a smaller range of light levels
- Slide can see an even smaller range of colours.

- This is called the dynamic range and refers to the range of colours from the brightest to the darkest colour

- The dynamic range of Digital CCD is about 5 to 6 stops, versus only 5 stops for slide

- This means if you are taking a photo of a scene with very bright and dark objects, in order to maintain detail in shadows and highlights, there should not be more than 5 stops between them.

Dynamic Range II

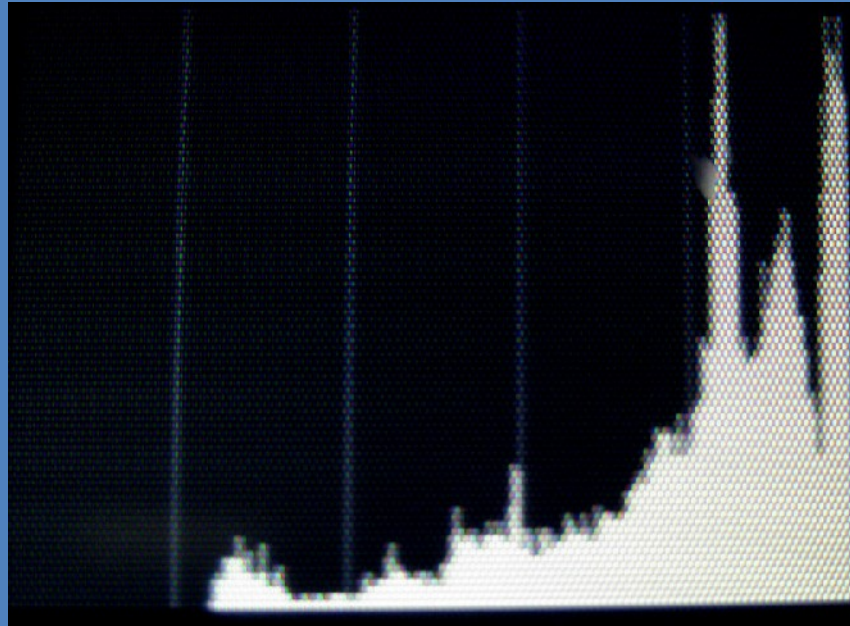
- This can be measured quickly on your camera by turning to spot metering and taking a sample from both areas
- Note that if there are more than 5 to 6 stops between the brightest/darkest areas in your shot, you will have to either try to eliminate the importance of one of the areas or expose for the area that is important
- When part of the image records as pure white, then effectively we have lost all information. This is referred to as “burnt out”
- We can see this from the histogram

Highlights

- On digital cameras it is much easier to blow out the highlights than with film (see how easy it is to get the movement effect of water!)
- Therefore our exposure strategy is to expose for the highlights, rather than to expose for the shadows as you might have done with print film.

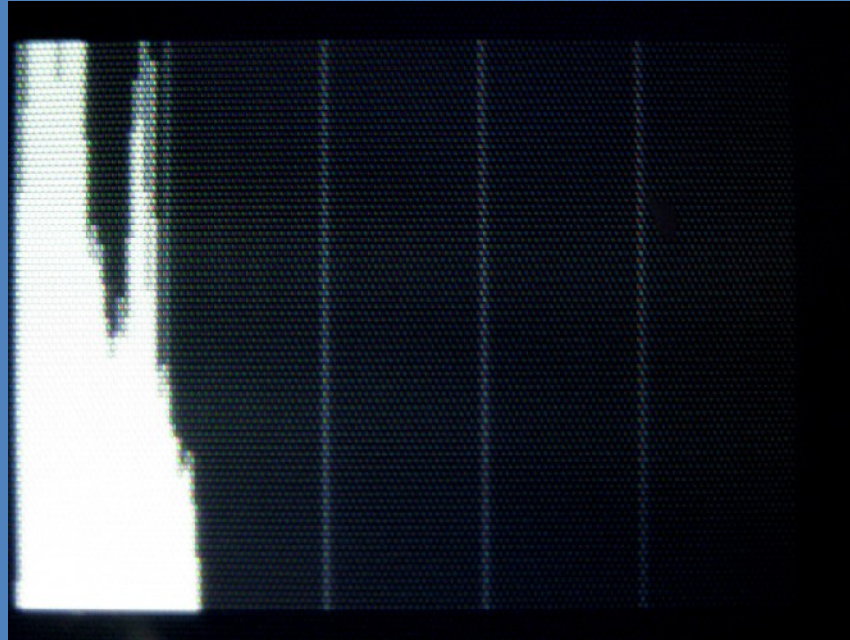


Clipped Highlights



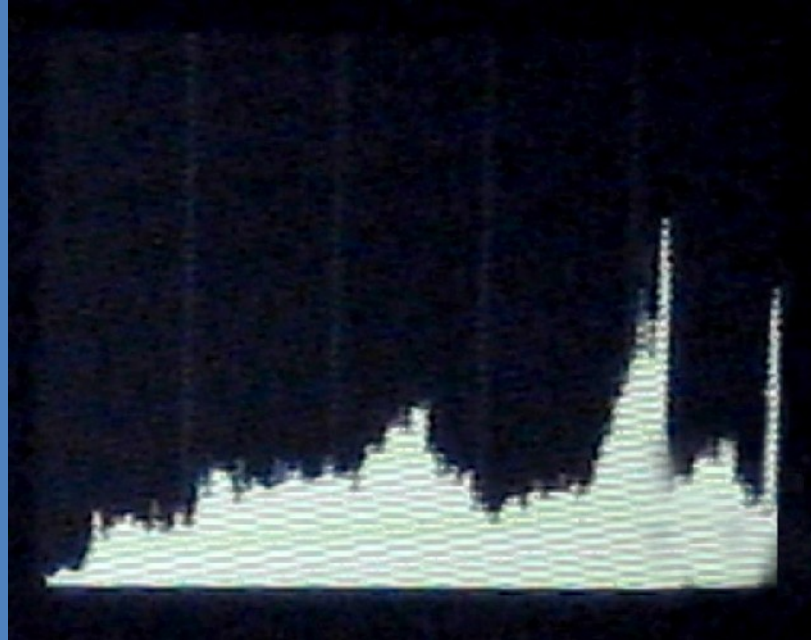
- Note that most of the data is to the right of the histogram and is clipped (or chopped off!) on the right. i.e. there is no smooth transition like there is on the left
- In this photo, data is preserved in the shadows and clipped in the highlights

Clipped Shadows



- In this histogram, the data is compressed up against the right hand side
- Detail has been lost in the shadows and there is no highlight information
- This would suggest the image is under exposed

Contrast I

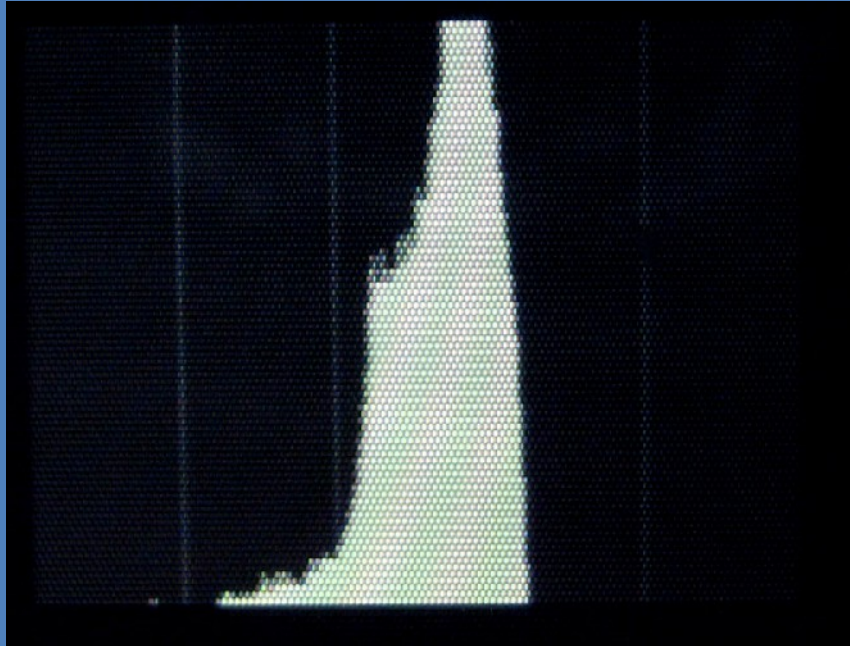


- The histogram of the image above will have high contrast as the wider the histogram, the higher the range of tones.
- Will this create a good image? It depends on the image
- Note that Black and white pictures usually look better with higher contrast

Contrast II

- In particular the question you have to ask is :
- What am I losing with the clipping of this highlight
- If the photograph was a picture of a bride, with veil, the this highlight most probably would refer to the veil or dress. In such a picture, you want to preserve this detail.
- If the picture was an image that had clouds, then I would expect that some white detail would burn out and I would deem this histogram OK

Contrast III



- The image above is a low contrast or low tonal image.
- Is this a problem? Only if contrast is important in the photo.
- I would expect that a photo of one coloured object (e.g. a red flower pot) would produce a histogram like this

Expose to the right (for RAW)

You may ask, what can I do anyway?

Well here's what; For several seasons

(CCDs are Linear, if for example we can display 5 stops and we are recording a 12-bit image, then we have 4096 discrete levels. As each stop is a doubling

Band 1 = 2048 levels

Band 2 = 1024 levels

Band 3 = 512 levels

Band 2 = 256 levels

Band 1 = 128 levels)

Basically, more levels of tones can be recorded at the brighter levels, than at the darker ones

So Expose to the right of the histogram, without clipping Highlights (use Highlight alert if necessary) and correct later in Photoshop.

This will guarantee maximum use of the dynamic range and also minimise effects of noise (S/N Ratio) and posterisation

Photoshop

- You can see the histogram of an image if you select:
Window-> Histogram
- In the wing menu (Right hand side, looks like play on CD player), open and select “expanded view”
- By default this is on RGB, in a future tutorial, we will use this to examine the separate colours in the histograms
- You will also see the histograms when you go to the levels adjustment

Example 1

- In this example most of the tones are in Shadows
The histogram will show most of the tones in the shadows, with the light producing a small band in the highlights
- Lets see...

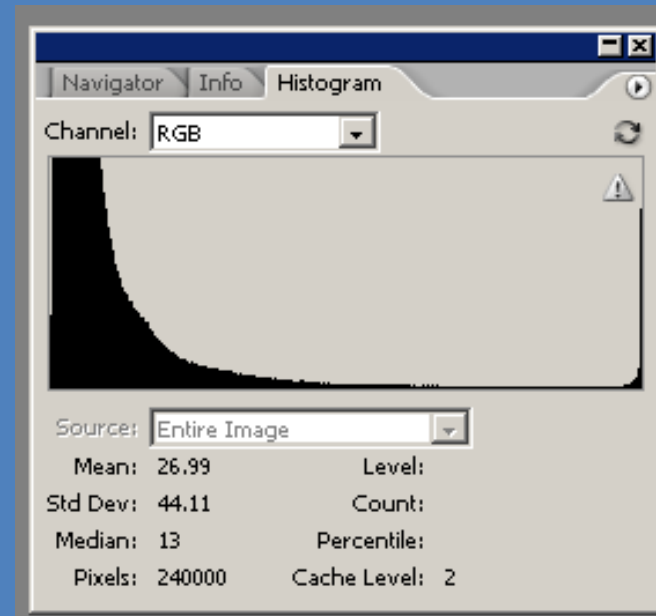


Example 1

From our earlier discussions, you might think that this histogram is telling us to expose for longer.

Incidentally, using exposure compensation (+/-) is usually the easiest way to adjust exposure, which works in all modes except automatic and manual

All our detail is in the shadows, which for this image is where we want it



Example 2

In this example, the mist in the morning is the important aspect of the picture.

Although not a great image, without the mist it would have nothing.

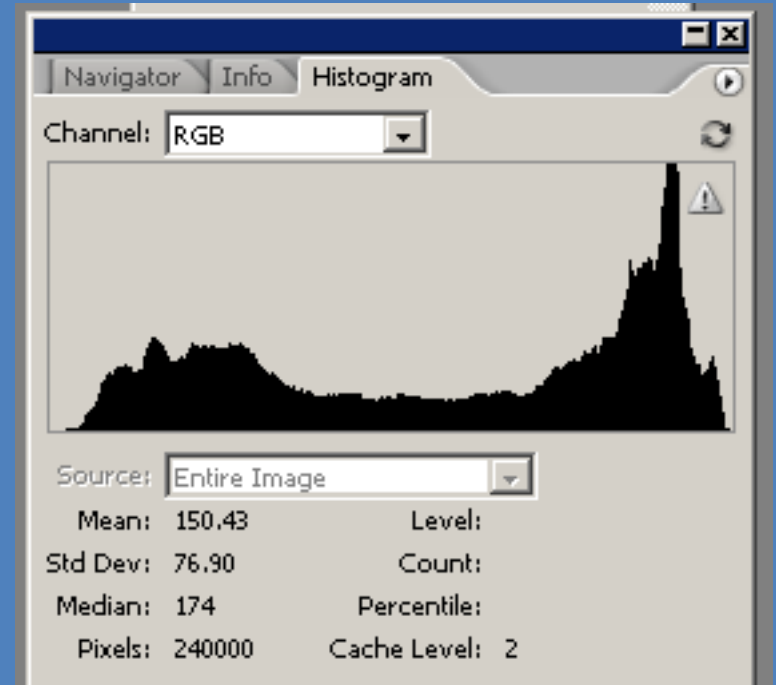
Therefore, I would expect not only to see the histogram stacked against the right, but I also want to see that it is not clipped here, or I will lose it...



Example 2

As we can see, I have made sure that the highlights are not cut-off

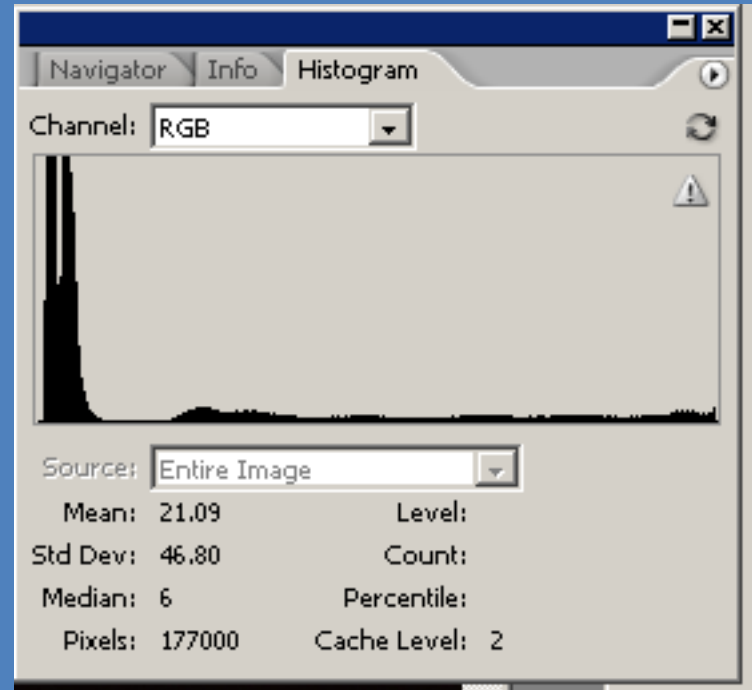
Note: however that if there was a bright sky, as with later in the day, I would expect some clipping to occur



Example 3



Example 3



Summary

- There are no right or wrong histograms
- Where possible, expose to the right
- You should use the histogram to tell you more about the image and its exposure
- Whenever the chance arises before a shoot, take sample images and know what to expect in the histogram