

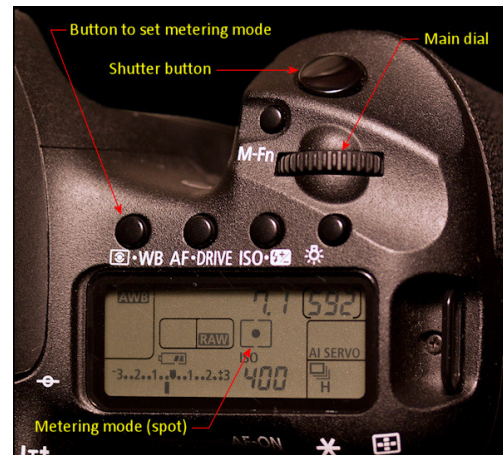
Exposure Part 3: Metering Modes – Bob Young

Part 3 will begin the review of the mechanics of exposure. In this section we will look at how the exposure meter knows which parts of the image are important in determining the correct exposure. Most point and shoot cameras may not have the functions which we will discuss here, but understanding the principles will nevertheless be of benefit to you in improving the quality of your images.

The majority of DSLR cameras will offer 3 or 4 metering options. Nikon has the multi-segment matrix, centre-weighted and spot methods. Canon has the evaluative, centre-weighted, partial and spot. (Partial and spot operate in much the same manner). In general terms the Nikon and Canon options operate in a similar manner. For the purpose of this discussion, I will talk in generic terms and where there are differences between the two manufacturers we can address them at the appropriate time.

How to set the exposure metering mode:

On the Canon EOS 7D, the metering mode is set by pressing the **<[.] • WB>** Button and then turning the Main Dial (within 6 seconds). The setting is displayed in the LCD Panel. That button also sets the White Balance if the Quick Control Dial on the back of the camera is turned. The Main Dial is really called that by Canon, even though it looks more like a minor wheel.



On the Nikon D2x, the process is simpler. The selector button is located on the side of the prism housing adjacent to the LCD screen. Simply press and turn.



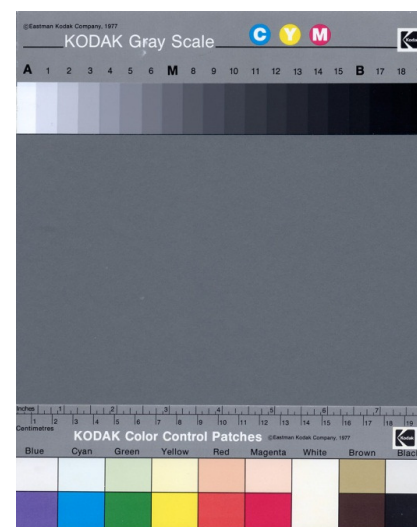
So how do exposure meters work?

In its most basic form, the exposure meter considers that every-time you take an exposure meter reading you are pointing your meter at a scene which contains roughly equal areas of bright tones, mid-tones and shadows. It will then evaluate the tonal range and calculate an exposure setting based on the average luminosity of the image.

If we look at my 'grey card', we can see that the grey scale across the top of the card is correctly exposed with all 19 segments from pure white to pure black being clearly delineated.

In black and white photography, the exposure meter would evaluate the exposure required for each of these segments and then average the result; producing an 'average' exposure.

Similarly, in colour photography, the exposure value for each of the light and dark segments such as in the colour patches at the bottom of the card, would be evaluated and averaged.



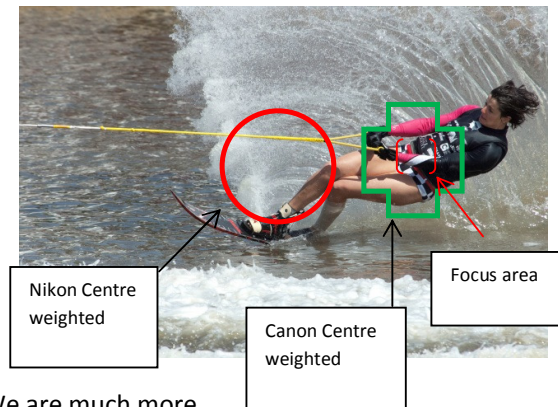
Incidentally, the average colour of these patches is the mid grey tone in the centre area of the card.

When the exposure meter was incorporated into the camera, it would evaluate the entire image in order to produce an average exposure setting.

These early meters suffered from a number of problems.

If there was a predominance of dark or light values, the image would be under or over exposed; also it assumed that all areas of the image were equally important. For these reasons, it is unlikely that you will find a simple 'averaging' meter in a modern camera, although the operation of the "spot" metering mode in Nikons is very similar.

The first major improvement, in the built-in or 'Thru-the-lense' (TTL) exposure meter, was the development of the 'centre-weighted' metering mode. As the name suggests, the meter now gave greater emphasis to the tonal values in the centre of the image. This considerably reduced the number of exposure 'errors', particularly when the foreground or background was considerably darker or lighter than the main subject. In the cheapest point and shoot cameras, centre-weighted metering may be the only option. Most DSLRs include the centre-weighted option, which is popular with many photographers when photographing portraits and backlit subjects. In the Nikon cameras, we still have the problem that the metering area is fixed in the centre of the image. If our main subject is off centre in the image, then the meter may well be evaluating unimportant areas in the foreground or background. Canon has attempted to overcome this problem by binding the exposure area to the focus area; so if we move the focus area away from the centre of the image, the exposure meter zone will follow. This effect is illustrated in the image of the skier. When the focus area was moved to the centre-right position, the metering zone on the Nikon remained in the centre position where the exposure would be influenced by the large white area of the spray, but the Canon moved the exposure area to coincide with the active focus area. We are much more likely to get the correct exposure value now as there is a good range of tones within the exposure area.



Almost all modern DSLRs feature some form of advanced computer aided exposure metering. In the Nikons, it is known as 3D Colour Matrix; or Evaluative in the Canon range. Lenses have also changed noticeably in recent times. They are computer controlled and feed back information such as the aperture setting, focus distance and focal length for use in calculating the correct exposure. The Nikon D2x manual says *"camera uses 3D color matrix metering II for natural results even when frame is dominated by bright (white or yellow) or dark (black or dark green) colors."*

By obtaining this additional information from its internal computers, along with the information we supply such as ISO setting, White Balance and the exposure mode, the accuracy of the exposure meter has never been better. But there is still one major problem; the computer cannot determine the 'look' of the image which we seek to achieve. One of the latest developments is the 'face recognition' software and the inclusion of more sampling points in determining the correct exposure (Nikon uses a 1005 pixel sensor to evaluate information from all areas of the image). This certainly increases the accuracy of establishing the correct exposure value, but as we discussed in the part 2, there can be many combinations of shutter, aperture and ISO settings which will result in the correct exposure.

In part 4, we will look at using the spot metering mode and manual exposure techniques. This discussion will lead us into a more detailed look at how we decide on which or the many correct exposure settings we will select for our image. But before we get to that discussion, we need to further our understanding of how our camera operates, and we will concentrate on the Matrix/Evaluative and centre-weighted methods.

Many 'experts' on the internet declare that centre-weighted exposure is "yesterday's man" and has been surpassed by the matrix and evaluative methods; and should be dropped from our vocabulary. But is that true? Remember that matrix evaluates the whole image and evaluative does almost the same. So, even the advanced 3D Colour Matrix mode will still be evaluating all of the bright sky in the background when you photograph birds in flight overhead. Using the centre-weighted option will reduce the amount of the bright sky being evaluated and thus improve the accuracy of the exposure value.

According to the Nikon Manual, many professional photographers still regard the centre-weighted metering as THE option for classical portraiture: it allows you to calculate the exposure based on just the most important part of the portrait – the face. And this works exceedingly well as the tonal value of the Caucasian skin tone is equivalent to the mid-grey tone which the meter uses to evaluate the correct exposure.

One reason that many photographers chose to go with Nikon as opposed to Canon digital equipment (or vice versa) was because they could still use their existing 35mm lenses. While this still remains true, the newer exposure metering modes are not always compatible with the older lenses. If you are using non-CPU lenses with the latest Nikon cameras, you will find that the lack of feedback from the lens means that the new technology can only be partially implemented. In some cases, you can only use your old lens if you use centre-weighted metering.

There is another very important consideration in favour of the centre-weighted option: *"Matrix metering will not produce desired results with autoexposure lock (95) or exposure compensation (97)"* (Nikon D2x manual). We will discuss the use of the exposure lock and exposure compensation in Part 5, but I include this quote here as you will learn over the coming months that auto-exposure lock and exposure compensation are about to become your new best friends.

While centre-weighted metering will continue to have its uses, there is no doubt that the more advanced matrix and evaluative options will be used for the majority of your images. Under 'normal' conditions, the majority of photographers would be more likely to use Matrix or Evaluative metering almost exclusively. This is recommended for beginning photographers using modern cameras and lenses.

How to take a meter reading:

In part 4 we will look at using hand-held meters, but for now we will concentrate on using the TTL meter built into your camera.

The first thing we must understand is that the meter reads the light that is reflected from the subject; it does not measure the light level which is falling on the subject (incident light). So even though we might have 2 cards being illuminated by the same light source, the meter reading can differ greatly depending on the reflectance of the individual cards. For example, a white card is highly reflective and its exposure value would be considerably different from that of a black card which reflects very little light. So where should we take our meter reading to ensure that we get the correct exposure?

Well, there is no simple one-answer-suits-all. But since at this time in our study, we are concentrating on the basics, our discussion is based on the matrix or evaluative methods. Earlier we said that the exposure meter expects that you will be pointing it at a subject which contains equal amounts of light and dark areas – an average scene. And our metering mode is going to evaluate the whole of the image that we see in the viewfinder if we use the Nikon, and only slightly less if we use a Canon. OK, now we can forget everything else around us, because if you don't see it in the viewfinder it doesn't count. If the sky is not in the viewfinder we don't have to worry about it – it cannot affect the calculation.

Ok, I guess you know all about the theory relating to the effect of distance of the subject from the light source and that the further away the subject gets, the less intense is the light that is being reflected – NO? That's good, because unless you are doing macro photography, flash or studio lighting, it won't help you at all. Almost of all of your photography as a bird photographer will be using a single light source - the sun - and the sun is so far away that a few meters here or there will make no difference at all. So the first part of the answer is that it doesn't matter so long as there is an average tonal range visible in the viewfinder. But if it was that simple I wouldn't be writing this tutorial and you wouldn't be interested in reading it.

Let us consider some examples.

In this image there are 2 ways we could proceed. We could zoom in tightly on the bird and since it is basically equal parts of black and white we would get an accurate exposure. Alternatively, we could zoom out and allow the foliage in the background to figure in the calculation. Would there be a change in the exposure value? YES.

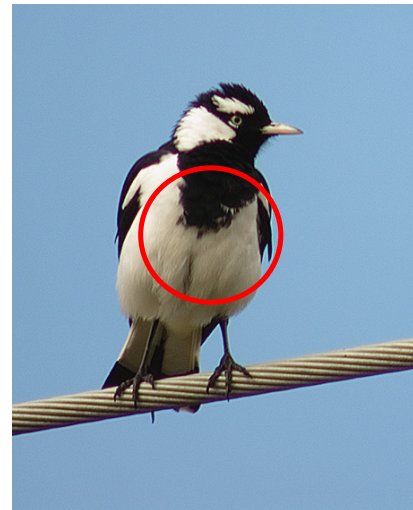
The observant photographer will notice that the bird is being lit by direct sunlight while the rest of the tree is in shade (notice the branch is blown out just where the bird is sitting). Since most of the background will also be in shade, metering on the whole image would have resulted in the bird being overexposed. One thing that we have to remember when photographing birds in trees is that even though we may be standing in full sun, the bird will often be shaded by the leaves as the sun shines on the top of the leaves and the bird is generally underneath the leaves.



We will discuss other ways to cope with this situation in later parts, but for now you can use the exposure locking method we discussed in Part 2. Zoom in tightly on the bird and press the shutter button half way. Hold it at this level as you zoom out and recompose your image, then press right down on the button to release the shutter – if you release the pressure on the shutter while recomposing you will have reset the exposure meter to evaluate the full image. It may be worth checking your user manual – the Nikon D2x allows you to select an option to keep the exposure locked until the shutter button is pressed a second time, meaning that you don't have to keep the pressure on the release button while you recompose. You will find this option in the menu options (c2—AE-L/AF-L).

In the second image -where is the light coming from? The bird is backlit and the breast and belly are in shade. We could use the same techniques as in the previous example or we could change to Centre-weighted which would concentrate on the area of the image indicated by the red circle.

An advantage of using centre-weighted metering in this image is that we would not have to zoom in, take and hold an exposure reading and then recompose the image. When photographing birds, the time taken in zooming in and out just might be the difference between capturing the image of the bird and ending up with a nice photograph of just the electricity cable!



(Perhaps Anthea would like to explain in her Birds of the Last Newsletter which of these is the male and which is the female and how to tell them apart)

Our final example will test your equipment: extreme light and dark patches and with the bird in shade. Matrix or evaluative methods will do a reasonable job, but I found with my camera that it was trying to get the tree trunks and branches properly exposed at the expense of the bird. With advanced techniques we can easily overcome this problem, but at this stage of our tutorials, we haven't progressed that far; and we are looking for solutions which can be implemented on the type of equipment available to most beginning photographers.



Bracketing is such a solution and is also frequently used by professional photographers in tricky lighting situations. Bracketing simply means that we will take a sequence of images where half are deliberately underexposed and the other half over exposed and pick the best image. The best part about this technique is that it is available on most compact and DSLR cameras and is virtually foolproof.

All you have to do is to decide on how many images you want to include in the sequence and the amount of the exposure variation. The number of images must be an uneven number because we want one image being the exposure recommended by the camera and then an equal number of underexposed and overexposed images. I normally use a total of 5 images and I set the variation to 1 stop; this gives a sequence of -2, -1, 0, +1, +2. If I find that the difference between the images is too coarse, I can reshoot the sequence using a variation of 2/3 or 1/3 stop. In the example below, my selection would have been the "-1/3rd" image in the bottom line. If you wish you can then delete the other images to save space on your memory card.

The process cannot be simpler. On the Nikon, hold down the BKT (Bracket) button and turn the main command wheel to set









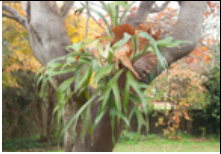








BKT Button
Sub-Command wheel
Main Command wheel



Number of frames Variation value

the number of images. While still holding down the BKT button, turn the sub-command wheel to set the variation to either $1/3^{\text{rd}}$, $2/3^{\text{rd}}$ or 1 stop. All is now set. If you set the number of images to 5, then press the shutter release button 5 times to take the set of 5 images. The camera will automatically change the exposure settings for you. The following are the results of my tests:

Set 1 – 5 frames with exposure variation of 1 stop				
				
-2	-1	0	+1	+2
Set 2 – 5 frames with exposure variation of $2/3^{\text{rd}}$ stop				
				
$-1 \frac{1}{3}^{\text{rd}}$	$-2/3^{\text{rd}}$	0	$+2/3^{\text{rd}}$	$+1 \frac{1}{3}^{\text{rd}}$
Set 3 – 5 frames with exposure variation of $1/3^{\text{rd}}$ stop				
				
$-2/3^{\text{rd}}$	$-1/3^{\text{rd}}$	0	$+1/3^{\text{rd}}$	$+2/3^{\text{rd}}$

Summary:

In the first 3 parts, we have discussed the options which are commonly available on all but the basic point and shoot cameras. None of these options require you to understand complex formulas or involve the need to acquire additional equipment – they all work in “Auto” mode or one of the semi – auto modes such as Aperture Priority or Shutter Priority which we discussed in part 2.

Importantly you now have the knowledge to add control and creativity to your photography. You can control depth of field, illusion of movement and cope with different lighting conditions. You know how to instruct your camera to automatically adjust the exposure settings for you to give your better portraits, landscapes and sports photos. You have learnt some of the techniques that will help you to obtain rich and vibrant colours which result from a properly exposed image.

In Part 4 we will start to explore the advanced exposure techniques. Before then, I urge you to practice, practice and practice some more – that is how you will improve; there are no shortcuts.

I wish to thank Geoff Ross (<http://www.geoffrossphotography.com>) and John Stirling for their assistance with the discussion relating to the operation of their Canon cameras.

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