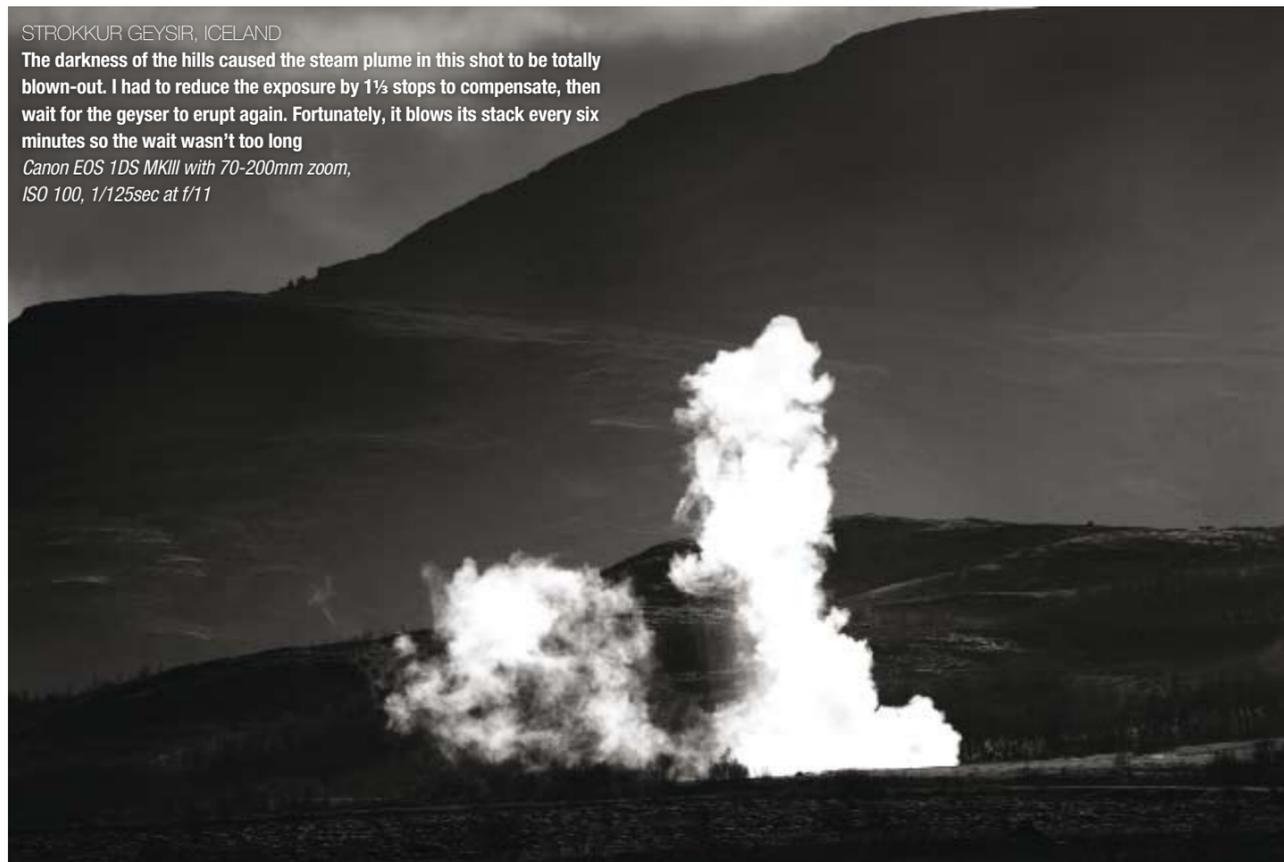


STROKKUR GEYSIR, ICELAND

The darkness of the hills caused the steam plume in this shot to be totally blown-out. I had to reduce the exposure by 1½ stops to compensate, then wait for the geyser to erupt again. Fortunately, it blows its stack every six minutes so the wait wasn't too long

Canon EOS 1DS MKIII with 70-200mm zoom, ISO 100, 1/125sec at f/11



HOW TO

MASTER EXPOSURE

If optimum print quality is your goal, you need to start out with a well-exposed digital file. **Lee Frost** tells you how it's done

All pictures © Lee Frost

This digital photography lark is easy, right? It doesn't matter if you get the horizon a bit wonky because you can straighten it up later, and if the composition's boring, you just crop it. Same with exposure. Who cares if an image is too light or too dark – Photoshop will have that sorted in a jiffy...

I used to hear the same sort of stuff said about black & white film and darkroom printing – a composition could always be improved during printing, and it didn't matter if you mucked-up the exposure when taking a shot because

you could correct it later.

Funny thing is, the photographers who emerged from their darkroom with the most striking prints never needed to resort to those measures because they made sure they got everything right in-camera – including the exposure.

The same applies today, in this digital age. Yes, you can rescue a badly-exposed image if you really need to – we all make mistakes – but that should be your last resort, not first.

If you want your digital black & white images to be at the top of their game, exposure and metering is one area where you need to be

in control. It sounds like a tall order, but actually nothing could be further from the truth.

Metering patterns and exposure modes

The first fact to acknowledge is that the metering system in your digital SLR is, quite simply, amazing.

The technology that bursts into life when you point your camera at something is phenomenal, measuring light levels in dozens of zones around the frame, comparing the results to pre-programmed models to try to recognise the type of scene or subject you're shooting, then setting the

exposure accordingly – all in a fraction of a second.

Result? Perfectly exposed images in probably 98% of situations. Things that used to send traditional centre-weighted metering into a tizzy, like light or dark backgrounds or bright sky, are no longer cause for concern and usually your camera will come up with the goods all on its own.

For this reason, I always use the multi-zone metering pattern in my digital SLRs. In Canon cameras it's known as evaluative metering while Nikon call theirs matrix metering.

Manufacturers still insist on including centre-weighted

metering in just about all digital SLRs, as well as spot metering and partial metering, but I see no point. Centre-weighted is too basic and prone to error, and while spot and partial can be useful in experienced hands, unless you do a lot of photography in tricky lighting – such as in theatres or music venues, where your subjects are brightly lit against dark backgrounds – you're unlikely to ever need it. Stick with whatever multi-zone metering pattern your camera has and you're more than halfway there.

In terms of exposure modes, I always leave my DSLR set to aperture priority (AE) as it allows me to select the aperture I want to use, so I can control depth of field, while the camera sets the shutter speed required to give correct exposure.

Some photographers insist on setting their digital camera to manual exposure mode, believing the metering works differently and is somehow more accurate. Unfortunately, it doesn't and it isn't. The only difference is that in manual mode you have to set both the aperture and the shutter speed using the dials on your camera, instead of just setting the aperture (in aperture priority mode) or the shutter speed (in shutter priority mode) or neither (in program mode).



HAVANA, CUBA

I often use my DSLR as a lightmeter, taking a test shot to check the exposure. Any compensation is quickly applied, and I know that any further shots taken in the same situation will be correctly exposed
Canon EOS 1DS MKIII with 17-40mm zoom, ISO 400, 1/320sec at f/7.1

There's also a downside to using manual mode. If the light levels change, or you point the camera somewhere else, you must remember to change the exposure or you'll

probably end up under or over-exposing. In any other exposure mode, the exposure is changed automatically as the light levels or camera position change, so you're less likely to make a mistake. I spent years using manual exposure mode because I had no choice – my main cameras lacked integral metering – and it became second nature. But now I don't have to use it, I'd never go back. I see no benefit in making life difficult for the sake of it.

Ultimately, the metering

patterns and exposure modes you use are down to personal preference, but for me, evaluative metering and aperture priority are all I need in any situation.

I haven't used a handheld meter since the day I turned digital – I don't even own one any more. Old tricky-light metering techniques like tilting the camera down to exclude the sky (or using a grey card, or pointing the camera at a mid tone in the scene) are no longer necessary. All I do now is compose the shot, set the aperture I want, let the camera set the shutter speed and fire away.

If I'm using filters, they're put on the lens before a meter reading is taken so the filter factors are compensated for automatically. That includes ND grads. It was always recommended to take a meter reading and set it using manual exposure mode without a grad filter on the lens because the ND part of the filter tended to fool the camera's centre-weighted metering and cause >

SHINGYER, BHUTAN

In situations where I need to use a neutral density grad filter, I always meter with it on the lens as it evens out the contrast in the scene and makes it easier for the camera to provide an accurate exposure

Canon EOS 1DS MKIII with 70-200mm zoom, ISO 200, 1/320sec at f/6.3



overexposure. But multi-zone metering takes ND grads in its stride. In fact, it's actually better to position the grad on the lens before taking a multi-zone meter reading because by doing so you're evening-out the contrast between the top and bottom halves of the frame so the metering system has an easier job of calculating correct exposure.

It also means you can use aperture priority mode rather than manual, so if the light levels change while you're shooting with a grad filter on the lens the camera will automatically change the exposure to compensate.

Advanced exposure

Okay, so the metering in your DSLR is going to give you well-exposed images 98% of the time with no help or input from you. That's not a bad batting average, and you might not worry about the other 2%.

But just be aware that if you do you'll be missing out on some great images, because it's that tiny 2% of situations where the most dramatic and rewarding photo opportunities are to be found.

Fortunately, with a digital camera you have a useful ally in the form of that fantastic screen on the back. Immediately after



TRINIDAD, CUBA

There ain't a camera in the world that could correctly expose a scene like this without a helping hand, though if you don't manage to get it bang on, you do have the benefit of digital technology to fall back on
Canon EOS 1DS MKIII with 70-200mm zoom, ISO 400, 1 second at f/16

taking a shot you can hit the play button and see your effort on the preview screen. If it looks too light or too dark, all you do is use the exposure compensation facility to increase or reduce the exposure and re-shoot. What could be easier than that?

The downside of relying solely

on your camera's preview screen to assess exposure is that it may not be giving you a realistic representation of the image. In bright sunlight, for example, your camera's preview screen isn't so easy to see, so you may be tempted to increase the exposure to make the image look brighter.

More common is that the camera's screen brightness has been set to maximum or minimum by mistake, or left on auto so it fluctuates with changing light levels. Exposures are falsely increased or reduced based on what you see on that screen.

I've had photographers on my workshops scratching their heads because no matter how much exposure compensation they dial in, the image still looks too light or dark on the preview screen. Almost without exception, the screen brightness is set far too high or low, but as soon as it's set back to the central point (zero), the problem goes away.

If you keep all the images you've shot on the memory card, including those you think are badly exposed, then all is not lost because among them may be one that's perfectly exposed. Many photographers delete as they go to reduce the number of images they have to wade through later, in which case the images they keep because they think they're correct may not be.

So, check your screen brightness now, turn off the auto setting and manually set it to the central point!

Understanding histograms

A far more accurate way to assess and optimise the exposure of a shot is not using the preview image at all, but the histogram.

If you press the play button to call up an image on your

WANGDUE PHODRANG, BHUTAN

In situations where the light is tricky but you need to work fast, it's reassuring to know that your camera's metering system can be relied upon. I swear by Canon evaluative metering – combined with aperture priority mode it's unbeatable
Canon EOS 1DS MKIII with 24-70mm zoom, ISO 1600, 1/80sec at f/2.8



THE BLUE LAGOON, ICELAND

There's a high risk of underexposure when a scene or subject consists mainly of light tones. Underexposure is far less preferable than overexposure when shooting digitally as it creates problems with noise and posterisation, so make sure you correct it using your camera's exposure compensation facility
Canon EOS 1DS MKIII with 70-200mm zoom, ISO 200, 1/320sec at f/9



camera's screen, then press the info button, a graph will appear on the screen alongside a smaller version of the preview image. That graph is the histogram, and it's the key to exposure perfection.

The histogram shows you the distribution of tones in a digital image from the darkest shadows (on the far left) to the brightest highlights (on the far right). This is a powerful tool for assessing exposure because it gives you an accurate indication of what has been recorded by the camera's sensor and isn't influenced by outside sources like the preview screen can be.

The basic rule with digital photography is to make sure the tones in an image fall within the extremes of the histogram, so one reason to check it is to ensure that's the case.

If those tones are pushed over to the left side that's usually an indication of underexposure (or an image that comprises mainly dark tones) and if the tones actually collide with the far left of the histogram that tells you that some shadows have been clipped, which means they will come out black with no detail to recover.

As with black & white negative film, recording shadow detail is important, so if the shadows are clipped, the solution is to increase the exposure by 1/3 stop using your camera's exposure compensation facility. If you do this, re-shoot then check the histogram, you'll see that the graph has shifted to the right a little and hopefully there's no longer any shadow clipping. If there is, increase the exposure by another 1/3 stop, reshoot and re-check. Repeat again if necessary.

At the other extreme, if the tone graph is pushed over to the

right side of the histogram that's usually a sign of overexposure (or an image that comprises mainly light tones – such as a snow scene). If the tone graph collides with the far right of the histogram

that tells you the highlights have been clipped and that the brightest highlights will record as white, with no detail or tone to recover. To correct this you can reduce the exposure and reshoot. Again,

do it in 1/3 stop increments until there is no highlight clipping.

There is a setting in your camera's menu that allows you to enable or disable a Highlight Warning. When enabled, any highlights that have been clipped will flash white then black on the preview image to alert you to overexposure. I use this feature when shooting in contrasty conditions.

Tiny flashing areas are no cause for concern and can be ignored, but large areas need to be dealt with – either by reducing the exposure or, if the overexposure is in the sky, by using a stronger ND grad.

If you make sure that neither the shadows nor the highlights are clipped then you'll have an acceptable digital file to work with. However, to achieve optimum image quality you can use the histogram in a more controlled way.

Exposing to the right

The histogram is a graphical representation of the sensor >

GANGTEY, BHUTAN

A bright background like this is almost certain to cause underexposure of the main subject, but dialling in +1 stop of exposure compensation is usually enough to solve the problem on the spot
Canon EOS 5D MKII with 70-200mm zoom, ISO 2500, 1/500sec at f/4



in your digital camera and the distribution of tones in an image.

Assume the dynamic range of the sensor is around five stops from the darkest tones to the lightest. That number is increasing as technology advances, but it doesn't change the theory behind how to expose an image based on the histogram.

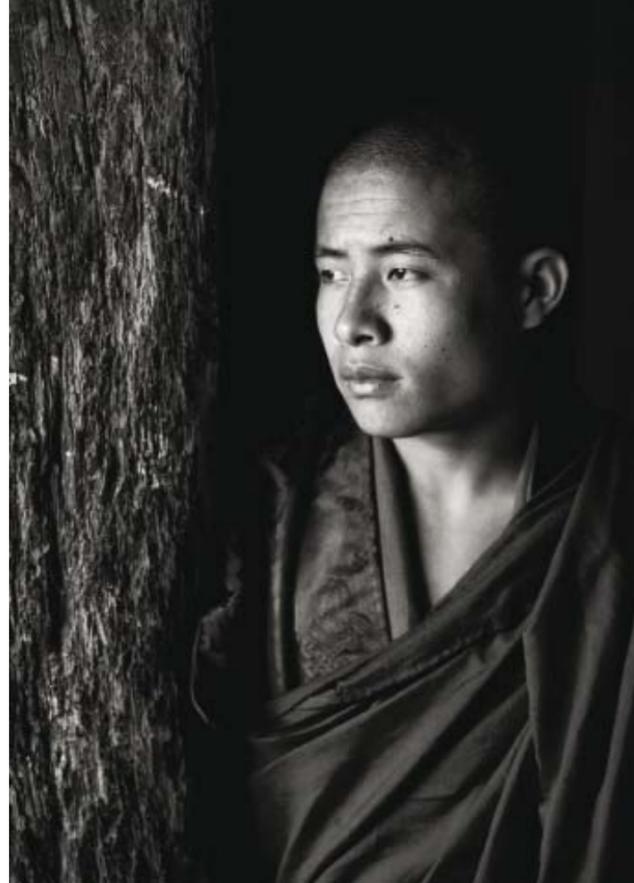
The histogram on many digital cameras is actually divided into five bands of equal width, so you could say that each band represents one stop of the dynamic range.

It's natural to assume that

TAMSHING, BHUTAN

A scene like this, which comprises mainly dark tones, is likely to be overexposed by your camera. However, providing that overexposure doesn't result in blown highlights you can correct it when you process your Raw files

Canon EOS 1DS with 70-200mm zoom, ISO 1600, 1/160sec at f/4



the tonal values your camera's sensor are capable of recording are evenly divided across that five-stop range. However, digital sensors are linear devices, so that's not the case. Instead, 50% of the tonal values are recorded in the brightest stop of the histogram, half as many again in the second stop, half as many again in the third stop and so on.

Most DSLRs record Raw images in 12-bit and a 12-bit image is capable of recording 4096 tonal values. These are distributed across the histogram as follows:

FIRST STOP	2048 tonal values
SECOND STOP	1024 tonal values
THIRD STOP	512 tonal values
FOURTH STOP	256 tonal values
FIFTH STOP	128 tonal values

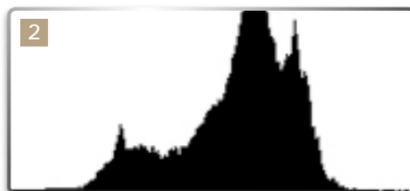
Exposing to the right is a technique that involves giving as much exposure as you can to an image to push part of the



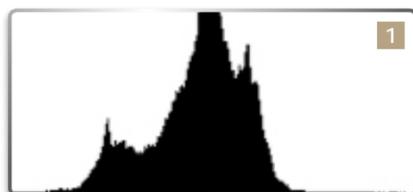
These histograms show how exposing to the right works.

Scenes and subjects that consist primarily of light tones have a tendency to underexpose, resulting in fewer tonal values being recorded.

Exposing to the right overcomes this and produces better Raw files to work on.



Increasing the exposure shifts the tones over to the right a little, so more tonal values are recorded



Here you can see that most of the image tones are concentrated in the left half where the least tonal value is recorded by the camera's sensor



To achieve optimum image quality, the exposure can be increased even more, so the histogram shifts further to the right but there's no highlight clipping

histogram into that important 20% band over on the right side where most of the tonal values are to be found, but without clipping the highlights. By doing so, you maximise the number of tonal values in the image so that noise and posterisation in the shadow areas is reduced or eliminated.

To use the exposing to the right technique you must shoot in Raw capture mode rather than Jpeg. Images recorded this way tend to look overexposed and wishy-washy when viewed on your camera's preview screen or downloaded to a computer, but all you do is adjust the exposure and contrast using the relevant sliders in your Raw converter to rectify this and produce a perfectly exposed image.

I process my Raw files using Adobe Camera Raw in Photoshop CS5 and adjust exposure with the tone curve sliders. This is not the same as rescuing a badly-exposed image – you're optimising image quality by exploiting technology, rather like using the zone system to

produce a perfect negative.

The worst thing you can do with a digital image is underexpose it, because doing so means the histogram will be pushed over to the left side where there are far fewer tonal values and when you lighten the image to correct this exposure error you end up with noise in the shadow areas.

Implementing this technique needn't involve a drastic change

in the way you shoot. Just compose the shot as normal, fit any filters to your lens that you intend to use, then take a shot and check the histogram.

If the tonal graph is centred, as it would be for a normal image, or biased to the left, dial in +1/3 stop using your camera's exposure compensation facility, take another shot and check the histogram again. You'll see that the histogram has shifted to the

right. If necessary, dial in +2/3rd stop and shoot again. Repeat until the highlight warning starts to flash on the preview image, telling you the highlights have been clipped. Once that happens you've taken the exposure a little too far. Delete that frame and use the previous one.

You don't have to stick to this technique religiously – I certainly don't. Providing you produce an image where the histogram falls between the two extremes and doesn't clip either side then you'll have a decent file to work with. But if optimum image quality is your goal and you want to squeeze the very best out of your camera's digital sensor, exposing to the right is the way to go. **B+W**

CREATIVE INTERPRETATION

A great benefit of shooting in Raw capture mode and exposing to the right is that you produce digital files that contain as much data as possible, so you can then interpret those files as you please.

Think of your Raw files as digital negatives, providing the raw ingredients you need to produce successful images. The final image doesn't have to look like the original scene – you can go dark and sombre or light and dreamy if you choose. But if you have a good file to work with in the first place, it gives you more creative options without making big sacrifices to image quality.

This is no different to film photographers making an effort to produce well-exposed, well-developed negatives but then interpreting them in the darkroom by varying the contrast grade, changing the exposure, dodging and burning the image and so on.