

YOUR **ESSENTIAL** GUIDE TO CREATING YOUR **BEST EVER** PHOTOS

Digital Photography *Techniques*

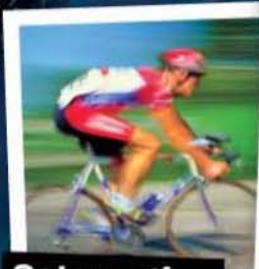
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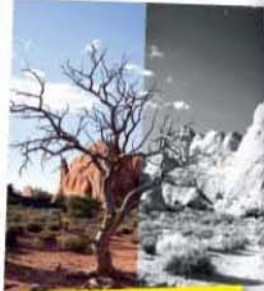
Master Your **DSLR**

Understand exposure, metering, aperture, shutter speed, flash, white balance and much more

Learn how to ...



**Get creative
with shutter
speeds**



**Create great
B&W photos**



**Master
exposure
techniques**



**Transform your
pics with HDR**



**Use filters
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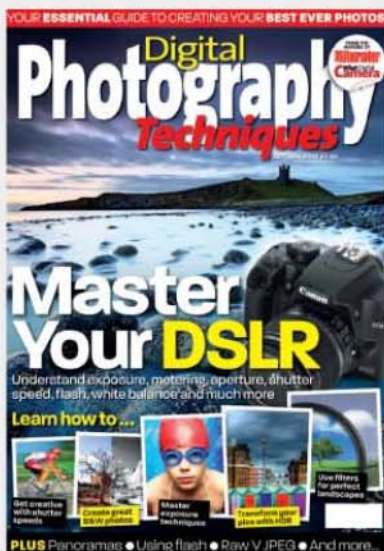
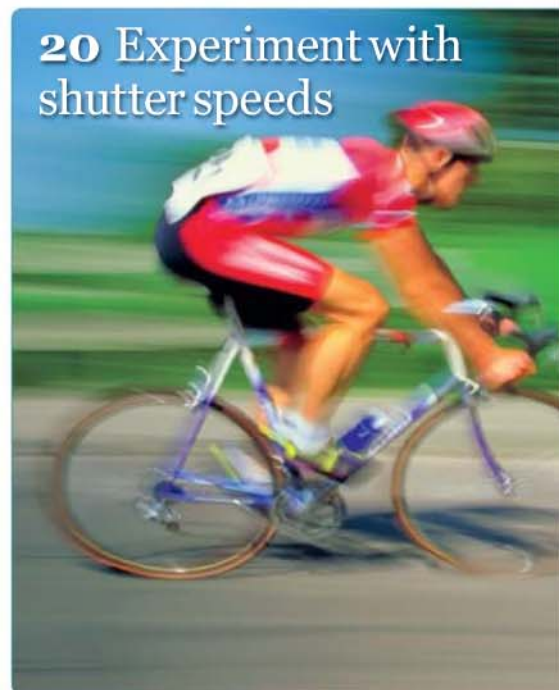
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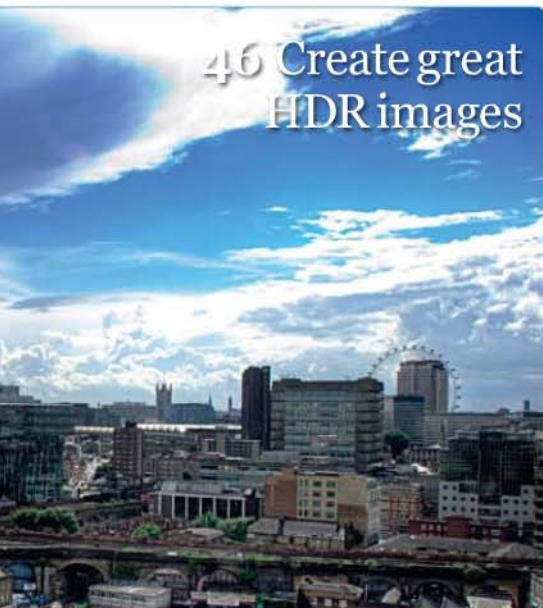
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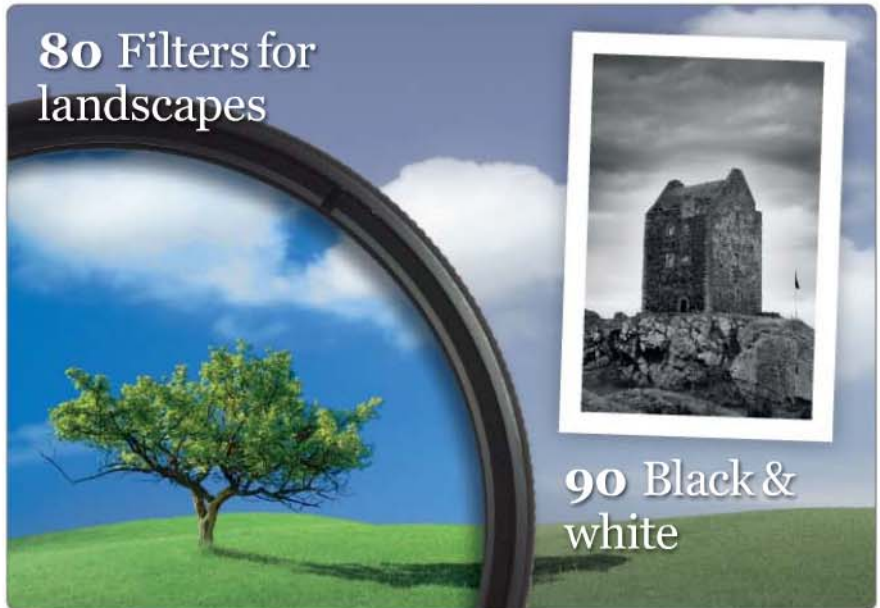
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Getting it right: dawn landscapes



Neil Benvie

Visualise

Successful landscape photographs are often the result of previsualisation – of looking at an ordinary scene and imaging how it could be transformed into something special. This view of the River South Esk from the Bridge of Dun in Angus is normally quite unremarkable, but it was transformed early one winter's morn.

Animation

Whether it is a person moving across a landscape, swaying trees or rushing water, animation adds the first layer of extra interest to an image. Life in a photograph attracts attention in a way that inanimate objects fail to. These mute swans, occupying a 'harmonious point' in the composition, reinforced the mood of tranquillity.

TOP SHOT

Don't sleep in. Learn how to capture better dawn images

The checklist

- Check out the location at a more sociable hour of the day and consult a compass to work out where the sun will rise.
- Make sure you have plenty of depth of field to ensure all the details are sharp.
- Use the Daylight white balance setting to preserve the colour cast by the rising sun.
- With low light, a tripod is essential for avoiding blurred shots. If you include moving elements such as these swans, however, the shutter speed needs to be fast enough to freeze them, so you may need to boost the sensitivity setting.
- The texture of a high sensitivity image can enhance the atmosphere of misty scenes like this one.

Viewpoint

A high viewpoint allowed the swans and the whole of the river to feature – something that couldn't be done from water level. Perspective has been enhanced by the converging lines formed by the river banks, encouraging the viewer to look beyond the swans. And the exposure was set to ensure that all the detail was saved on the swans, the bankside vegetation being of less interest.

Colour

The blue sky behind the photographer is reflected by the pale swans, setting up a subtle but insistent contrast with the warm hues all around. In physical terms, red is an advancing colour that excites the viewer; blues, in contrast, recede and are calming.

Light

During the middle of the day this scene, even with swans, is pretty unexciting. Descriptive, direct sunlight makes clear statements about objects, but fails to create any atmosphere or ambiguity. Shooting east ensured the colour of both the sky and water dominated the scene.

Take control of your camera



Mastering Exposure

Understanding exposure is key to great photography, so here's the low down...

It is commonly stated that the most important aspect of photography is light. It is what makes an exposure, and is what the camera reads and then translates into an image.

Developing an understanding of light, and its interpretation, is probably the best foundation on which to build the rest of your camera know-how. Here, we take a closer look at light and how it works to make an exposure, as well as the key features and controls on your camera that will help you in tricky exposure situations.

How cameras measure light

The word exposure refers to a controlled amount of light that is exposed to the film or sensor to record an image. The camera's job is to balance the amount of light entering the lens with the sensitivity of the sensor, to achieve a fair representation of what we saw with our eyes. This may sound easy, but our eyes are far

more sensitive to the range of light than the sensor in a camera is, because we can balance out high-contrast subjects and see detail in shadow and highlight areas to a much greater degree than any camera can.

A well-exposed image contains detail from the shadows right through into the highlights. Too much exposure and the image will appear too light, with delicate highlight details disappearing into a pure white mass. But too little and the image will appear dark, with shadow details turning pure black.

Cameras contain three features to control exposure: the shutter speed, the aperture and the ISO setting. The shutter speed determines the length of time that light is passed through to the sensor. The aperture works like the iris in our eyes, opening to let more light in and closing to restrict its flow. The ISO controls the sensitivity of the sensor – in low light, you can increase the ISO to make the sensor more sensitive to light (which in turn, enables faster

shutter speeds and minimises the risk of camera shake).

Determining the correct exposure is also about recording a scene or subject in the way you want it to appear in the final image (which may or may not be the way it appeared to the eye at the time). You may decide that you want a dark, moody effect, or a clean, bright one. Deciding what the important element in a scene is and setting an exposure that will record that focal point correctly puts you in creative control of your images.

Exposure functions



BRACKETING
Allows you to shoot additional shots either side of your chosen exposure to ensure you get it right



METERING
Matrix metering is good all round, centreweighted is ideal for portraits, and spot metering for subjects that are off centre



EXPOSURE COMPENSATION
When shooting a very bright or dark subject this control is useful to ensure correct exposure



AE/EXPOSURE LOCK

AE lock is useful for metering off-centred subjects. You can take your light reading from a specific part of the image before locking the exposure and reframing your subject. This ensures you are metering for your subject as opposed to the background



THE MID-GREY RULE

You can predict situations that will fool the camera's lightmeter and adjust the exposure settings to compensate. Lightmeters are designed to find the average exposure and, while this works most of the time and results in an accurately exposed image, certain situations can fool a camera into recording a scene inaccurately. When you point your lens at a scene, the meter averages the various colours, tones and level of brightness to a mid-grey. For the most part, the shutter speed and aperture recommended by the camera are based on reproducing this mid-grey tone. Light and dark subjects may cause problems though.

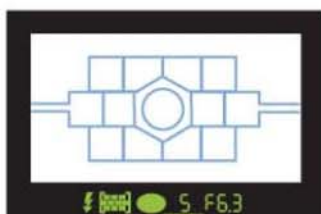
Metering system

The majority of DSLRs give you the choice of three metering systems: evaluative (also known as matrix, or multi-pattern), centreweighted and spot metering. Evaluative is the most popular for general-purpose photography, as it measures the light in many sectors of the frame to identify the overall exposure. Evaluative metering is still prone to error, but owing to the many areas that it measures from, it is a good, general metering system.

Centreweighted metering places the greatest emphasis on the central area. This is the preference of many portrait photographers because it bases the

majority of the exposure on the subject.

Spot metering works in a similar way to centreweighted, but uses an even smaller percentage of the frame to meter from – often a 1° circle in the centre of the frame. This gives you a greater degree of accuracy when the main subject contrasts in tone with its surroundings. By taking a precise reading from a specific area of the frame, such as a face, you can use this as the basis for the overall exposure – and avoid the camera taking the background into consideration, as it would with evaluative and, to a lesser extent, centreweighted metering.



Take control of your camera

BACK LIGHTING

A portrait taken in front of a window with a great view in the background sounds like a good scenario for a great photograph. However, the contrast range between your subject and the background is likely to be too great for the sensor to handle.

If the camera's meter is influenced by the background, the subject will be too dark, maybe even a silhouette.

To get a correct exposure on the face you'll need to take a selective light reading, though of course all the background detail will then be overexposed.

The only way to balance the two is to increase the light level on the face (using either reflectors, or flash) to more closely match the background level.

BRACKETING

Bracketing allows you to shoot additional exposures either side of your first reading, giving you a greater chance of obtaining an optimum exposure. The camera calculates the extra exposures based on your initial reading and by what increment you wish to bracket your shot by. It then takes a series of exposures at the different settings in quick succession.



Exposure compensation

In the auto modes, this control lets you override the exposure the camera has chosen (perhaps because you think it will have been fooled by the background). Add positive compensation when the subject is darker than the background, and negative compensation when it is brighter.

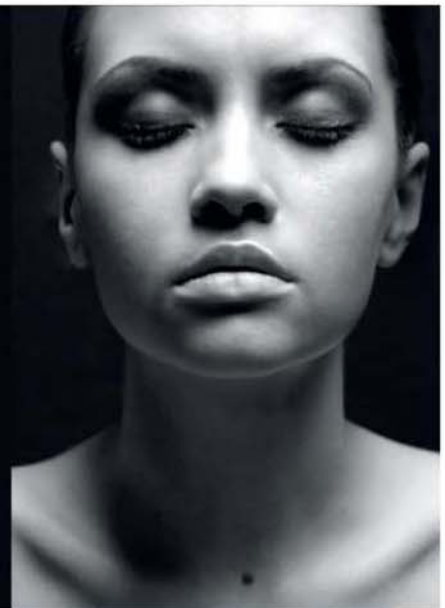
The amount of compensation needed varies according to conditions, so you may need to experiment a little.



Tricky metering:

Dark subjects

Lightmeters are programmed to pick an exposure that will record the scene as a mid-grey. Most scenes contain a mix of light and dark areas so this 'average' usually works, but there are some circumstances where it won't. With subjects that are mostly dark, the camera will try to lighten it to a mid-grey. Knowing this, you'll have to override the camera to give the sensor less light than the camera wants to provide. The amount will vary depending on the tones in the scene.



Tricky metering:

Light subjects

Lighter-than-average scenes are a problem too. Examples include shots typically taken on holidays, such as beach shots or snow scenes, which contain large areas of brightness. Leaving the camera to its own devices will result in muddy, underexposed pictures as the camera tries to turn the beach or snow mid-grey. You'll need to add more exposure than the camera suggests. Again, the amount will vary according to the circumstances.





Mode dial

LANDSCAPE MODE

Here the camera sets a small aperture and other parameters that lend themselves to good landscape images

PORTRAIT MODE

The camera chooses parameters suitable for good portraits, including wide apertures

AUTO MODE

Beginners will want to head here. The camera does everything and trusts the user with nothing

PROGRAM MODE

The next step up from Auto, you can override some of the camera's choices

APERTURE PRIORITY

You choose the aperture you want, and the camera picks the right shutter speed to go with it

SHUTTER PRIORITY

You choose the shutter speed, the camera matches it with the appropriate aperture

MANUAL MODE

You control both shutter speed and aperture, so you can set the exposure yourself

LOWLIGHT MODE

An ISO boost, and an exposure that balances the flash with the ambient light

ACTION MODE

Fast shutter speeds, continuous drive and servo focusing will help you catch the action

MACRO MODE

For close-ups head here. A small aperture is among the camera's priorities in this mode

SCENE MODE

Yes, Landscape, Portrait, and the others are scene modes, and on some cameras they'd be in here too. On this Olympus E-500, modes exist for lots of special subjects

Apertures and shutter speeds

How your pictures are affected

Why does it matter what aperture or shutter speed is used to take a picture, as long as the exposure is correct? Well, it's because they have a direct influence upon how the picture looks. As well as controlling how much light enters the camera, the aperture also has an effect on the zone of focus in the picture. The smaller the aperture, the greater the area of sharpness in front of and behind the point you focus on. The wider it is, the blurrier the areas surrounding your focus point will be. A slow shutter speed records movement as a blur (the slower the speed, the blurrier the subject) while a fast shutter speed freezes fast action so that it looks stationary.

Take control of your camera

Exposure modes

Don't panic – you don't need to learn all the apertures and shutter speeds off by heart (though doing so would be useful). Modern DSLRs can control both of these elements for you automatically. The trouble is, although you'll get a fair record of what you saw, if you leave everything to the camera then you're not in creative control of your pictures, your camera is. While the Program and Auto modes are useful for quick snaps, the sooner you can graduate to the more creative modes, the sooner you'll be able to impose your own vision on your pictures. Your camera will then become an artist's tool rather than simply a recording instrument. Here is a look at the modes found on a typical digital SLR.



Auto mode

In this 'mother knows best' mode, the camera makes all the decisions about what exposure to set. You can't override it in any way, and your only input is to press the shutter at the right time.



Program mode

Superficially, this is the same as Auto, except that if you don't agree with the settings the camera has chosen, there is some scope to override them. You can, for example, choose to add flash or change the particular shutter speed/aperture combination to obtain more depth of field than the camera had set. This makes it an ideal mode for the slightly more knowledgeable user.



Aperture priority

This mode asks you to choose which aperture you want and the camera then matches it with the shutter speed that will provide, in its opinion, a correct exposure. This is probably the most popular mode with experienced photographers, since taking control over the aperture enables them to determine the most fundamental aspect of the composition: how much of it is rendered in focus.



Shutter priority

In this mode you get to choose which shutter speed you want to use; the camera then selects the aperture required for the correct exposure. This is ideal for action photography where you want to control how sharp or blurred your moving subject will be recorded. It can also be useful in lower light conditions where you don't want to go below a hand-holdable shutter speed.



Manual

The camera tells you what exposure it thinks you should give, and it's up to you how you use that information. Unlike the priority modes, where the exposure adjusts for changing light conditions, in Manual it won't, so you'll need to be aware of light levels. Manual is ideal for situations where exposure needs to be constant, such as shooting panoramas that you'll want to stitch together later.

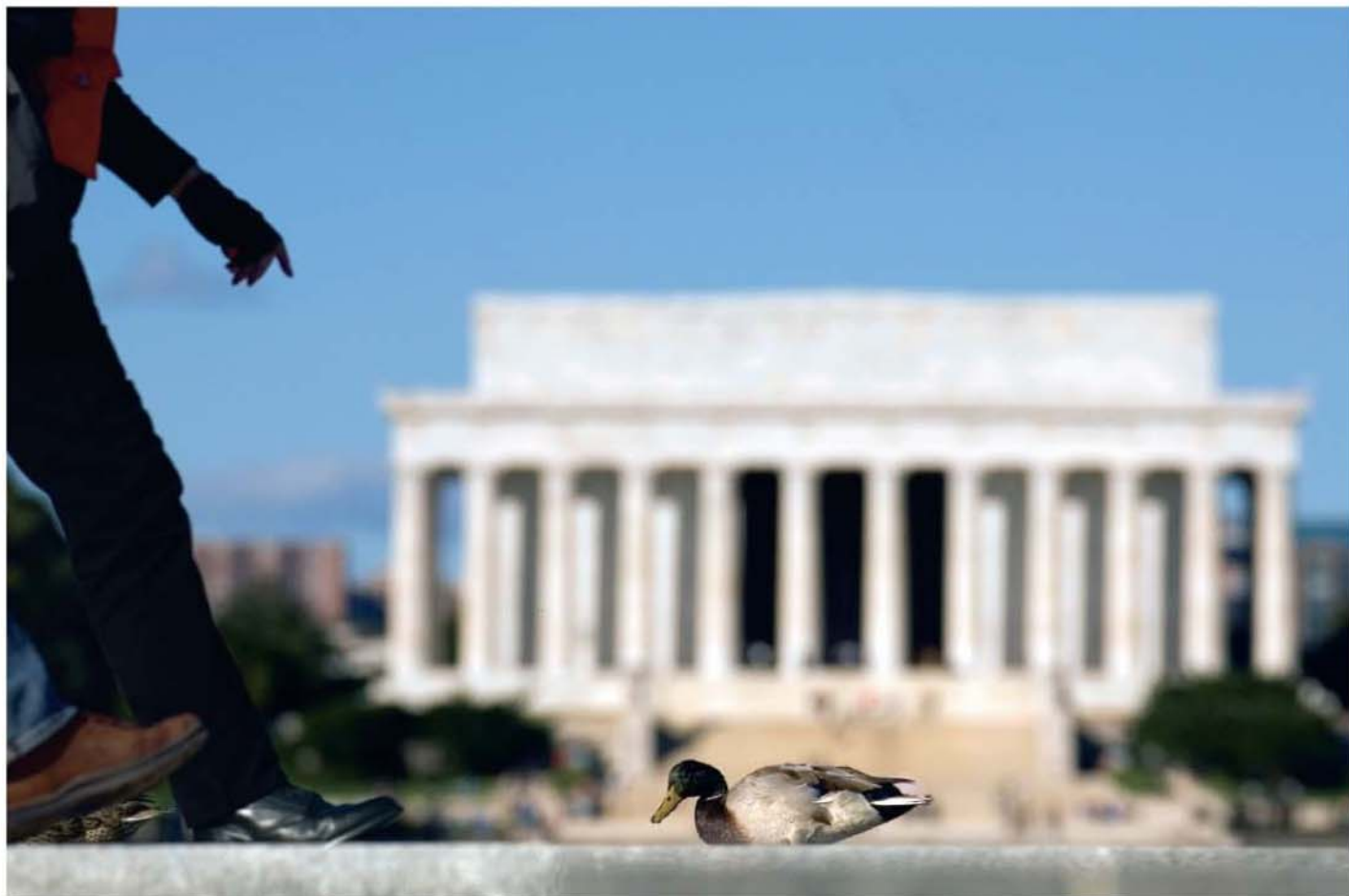


Scene/subject modes

Most digital cameras offer a selection of scene modes. By telling the camera what you're photographing, it can choose the parameters to match. Shooting a portrait? Then a wide aperture will be useful. Scene modes can also adjust the white balance, sharpness levels and so on, to suit the subject too. They're a good stepping stone from Auto, but you'll get more fine control from the priority modes.



SIGMA



OUR WORLD

Liz O. Baylen: Born in 1979. Graduated from Ohio University's School of Visual Communications in 2001 and began working for The Washington Times. She has covered assignments around the world and was selected as a finalist for the Pulitzer Prize while with The Washington Times. Most recently, her images have appeared in The New York Times and Los Angeles Times.

Photo data: SIGMA APO 120-400mm F4.5-5.6 DG OS HSM, 1/2500 second at f5.6.

LIZ O. BAYLEN SHOOTS THE WORLD WITH A SIGMA LENS.

Even landscapes like the Lincoln Memorial can be seen in a playful light.

A duck settles on the reflecting pool in front of the Lincoln Memorial. This amusing moment was captured by a telephoto zoom lens that incorporates Sigma's original OS (Optical Stabiliser) function. Sigma has introduced two new OS telezoom lenses compatible with digital SLR cameras. These lenses are primarily designed for extreme telephoto work but reveal their additional strength when taking close-up shots. SLD (Special Low Dispersion) coated glass effectively corrects chromatic aberrations and Super Multi-Layer Coating reduces flare and ghosting. The HSM (Hyper Sonic Motor) provides silent, responsive autofocus action and full-time manual focus override.

● Available for: Sigma, Nikon and Canon cameras

Two telephoto zoom lenses incorporating Sigma's original Optical Stabiliser function.

SIGMA APO 120-400mm F4.5-5.6 DG OS HSM / SIGMA APO 150-500mm F5-6.3 DG OS HSM

for
DIGITAL



APO 120-400mm
F4.5-5.6 DG OS
HSM/AF: Case, matched
lens hood, shoulder
strap, and tripod adaptor
(TS-31) included.

APO 150-500mm
F5-6.3 DG OS HSM/AF:
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Take **control** of your camera

Mastering **Apertures**

Thought aperture was just an exposure tool? Think again – it's so much more important to your pictures than that



That little adjustable hole in your lens is much more than just an exposure tool and offers a variety of ways to improve your pictures.

The aperture is situated in the lens between the front and rear elements. A series of (usually) eight or nine metal blades, in a circular array called the diaphragm, actually make up the aperture. The adjustable hole in the middle of the diaphragm is the aperture itself, and its size is controlled by a command dial on the camera body, or automatically in programmed modes. The selected aperture is then shown in the camera viewfinder and typically on an LCD screen on the camera's body. Older lenses have an aperture ring on the lens barrel with a series of engravings

showing the aperture value, known as an f-stop. The ring is turned to achieve the desired setting.

The two main camera settings that allow you to control the size of the aperture are the Manual and Aperture Priority modes, the latter indicated as A or Av on your mode dial. For the most part, the Aperture Priority mode is the best to use as it allows you to concentrate on the aperture, while the camera automatically sets the shutter speed.

So what does the aperture actually do? The primary function is to work with the shutter speed to provide the optimum exposure for your image, but it is important to remember that the two work reciprocally – that is,

adjusting the shutter speed or aperture by a stop will either halve or double the amount of light reaching the sensor, depending on the direction of adjustment.

The second, and probably the most important creative use of the aperture, is to adjust the depth of field. Depth of field determines the amount of sharpness there is in an image, or how much of the image is in focus. It is depth of field control that allows us to capture landscapes that are pin-sharp from front to back, or to take a focused portrait with an out-of-focus background. In other words, the aperture is a key part in determining how the final image will look, offering an endless means of creatively enhancing your images.

How aperture works

MANUAL MODE

This allows you to set both the aperture and shutter speed and is useful in tricky light situations, or if you use some older lenses



APERTURE PRIORITY AE

The most useful mode for aperture control. You choose the aperture and the camera automatically sets the shutter speed



SHUTTER SPEED READOUT

Displays the shutter speed selected



APERTURE READOUT

Displays the aperture selected. This information is also viewable in the camera's viewfinder



The diaphragm is a set of interlocked blades that open and close to increase or reduce the size of the aperture. We choose this size by a system known as 'f-numbers' or 'f-stops', a value set by a mathematical formula dividing the lens' focal length by the diameter of the aperture. The f-stop system can be confusing to beginners, as the higher the number, the smaller the aperture – so f/2.8 is a large aperture, while f/16 is a small one. Each full aperture measurement represents a doubling or halving of the exposure. So, for example, moving from f/8 to f/5.6 (small to larger) doubles the amount of light reaching the

sensor, while f/8 to f/11 (small to smaller) halves it. Modern lenses offer half-stop or even third-stop increments for more precision.

The aperture works with the lens optics to focus and direct the light waves from the subject to the sensor. A smaller aperture concentrates these light waves to a series of small points of light, while a wide aperture produces discs of unfocused light on the sensor. In this way, a large aperture produces a fuzzier image either side of the focus point (narrow depth of field) while a small aperture produces a sharper overall image (deeper depth of field).

‘The aperture works with the lens optics to focus and direct the light onto the sensor’

APERTURE SIZES

Reducing the aperture size is often called 'stopping-down', while increasing the size is referred to as 'opening-up'.



Take control of your camera

DEPTH OF FIELD

Even when a small aperture is used, when you are this close to your subject the depth of field is very narrow



DEPTH OF FIELD PREVIEW

The image we see in the viewfinder is at maximum aperture, so it is difficult to assess the degree of sharpness throughout the scene. Therefore, most cameras have a depth of field preview button. It's usually located on the front of the camera, near the lens mount, though it varies depending on model. Pressing the button closes the aperture to the selected value and allows you to see the image at the correct aperture. The image in the viewfinder will go darker as less light enters the lens, but you can then scan the scene and see which areas of the image are sharp.

DEPTH OF FIELD

Depth of field is the commonly used term to describe how much of an image is in focus, and is predominantly determined by the size of the camera's aperture.

This effect can easily be explained and replicated by just looking around you. If you focus your vision on an object near to you, it is sharp, but objects in your peripheral vision are not. However, if you look at a subject in the middle or far distance – say, the view over your garden – the whole scene tends to look sharper overall.

Photography does the same thing, but it is more pronounced, principally because you are capturing a three-dimensional subject on a two-dimensional medium.

The degree of sharpness in an image depends on a number of correlated factors: the focal length of the lens, the focus distance and the aperture. While there are a host of formulae and equations to aid you in determining this (see *Hyperfocal distance*, right), for most people, the easiest way to learn is by experimenting; photography is about creativity as much as it is about science.

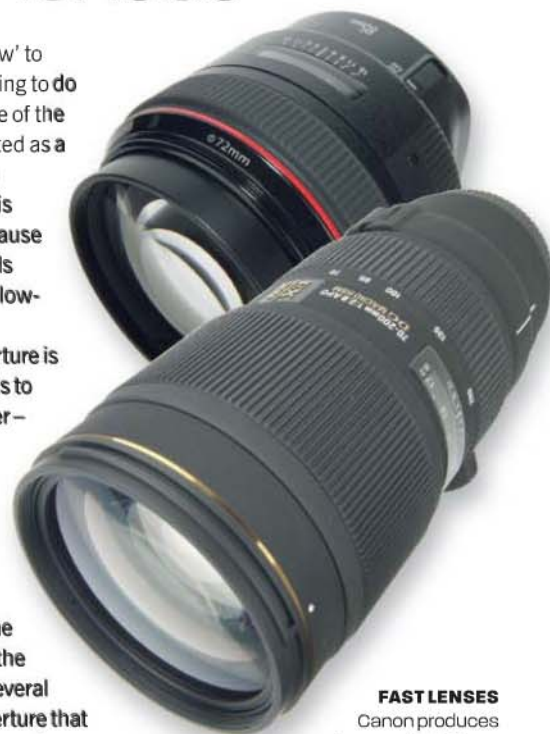


Fast or slow lenses

You may often hear the terms 'fast' or 'slow' to describe a lens or aperture. This has nothing to do with the speed of operation, but to the size of the maximum possible aperture (usually quoted as a suffix to the name of a lens). A lens with a maximum aperture of $f/1.4$, for example, is 'faster' than a similar lens with $f/2.8$. Because the aperture is larger, faster shutter speeds can be used, which is especially useful in low-light conditions.

Another practical benefit of a larger aperture is that the extra light that enters the lens leads to brighter viewing on the camera's viewfinder – again, useful in low-light conditions.

Zoom lenses often quote two maximum apertures, for example, 18-70mm $f/2.8-4$. This means that the maximum aperture at the 18mm end is $f/2.8$, while the maximum aperture at 70mm is $f/4$. In reality, the actual hole is the same size but the added focal length (and the maths) changes the f-number. There are several lenses available with a fixed maximum aperture that doesn't change throughout the focal range, such as Sigma's 70-200mm $f/2.8$ lens. These lenses are usually expensive though, and because of the large optics needed to perform the trick, quite heavy as well.



FAST LENSES

Canon produces the excellent 85mm $f/1.2$ lens shown here, while Sigma's 70-200mm $f/2.8$ lens has a continuous maximum aperture of $f/2.8$.

Hyperfocal distance

The hyperfocal distance technique is used mainly in landscape photography for ensuring optimal depth of field at any given aperture. It denotes the best point of focus where everything from approximately half that distance to infinity is in focus.

Each lens and aperture combination has a different hyperfocal distance, so, for example, there is a different optimal point of

focus for a 28mm lens at $f/5.6$ than there is at an aperture of $f/11$.

Older lenses have an engraved distance scale on the barrel with hyperfocal distance indicators, but these are often lacking on modern lenses. However, there are a range of depth of field calculators on the internet that can be used. The table below provides a rough guide.

Hyperfocal distances

	$f/2.8$	$f/4$	$f/5.6$	$f/8$	$f/11$	$f/16$
18mm	4.6	3.3	2.3	1.6	1.2	0.8
24mm	8.2	5.8	4	2	2	1.5
28mm	11.2	7.8	5.6	3.9	2.8	2
35mm	17.5	12.2	8.8	6.1	4.5	3
50mm	35	25	17.9	12.5	9	6.3
70mm	70	49	35	24.5	17.8	12.3
85mm	103	72	51.6	36	26.3	18
135mm	260	182	130	91	66	45.5
200mm	571	400	285	200	145	100

The table shows the hyperfocal distance in metres for commonly used focal lengths with cameras with an APS-C sensor (Nikon, Pentax, Sony and Canon). Just find your lens/aperture combination and focus on that point.

Take control of your camera

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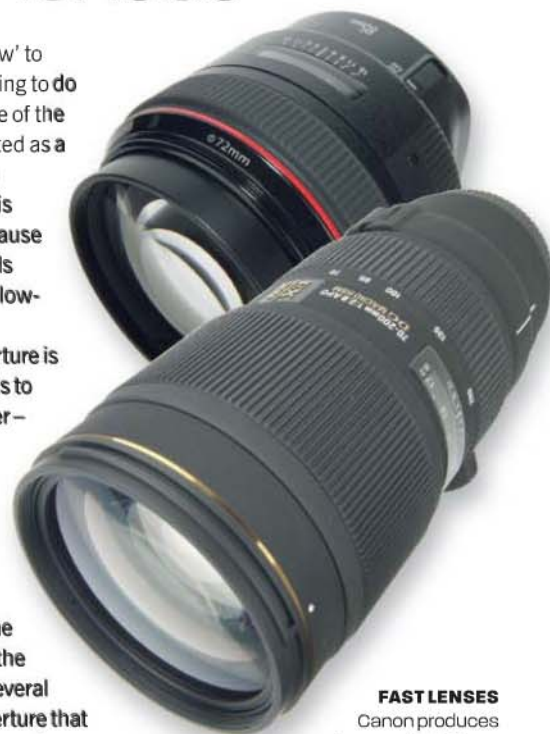


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You may often hear the terms 'fast' or 'slow' to describe a lens or aperture. This has nothing to do with the speed of operation, but to the size of the maximum possible aperture (usually quoted as a suffix to the name of a lens). A lens with a maximum aperture of $f/1.4$, for example, is 'faster' than a similar lens with $f/2.8$. Because the aperture is larger, faster shutter speeds can be used, which is especially useful in low-light conditions.

Another practical benefit of a larger aperture is that the extra light that enters the lens leads to brighter viewing on the camera's viewfinder – again, useful in low-light conditions.

Zoom lenses often quote two maximum apertures, for example, 18-70mm $f/2.8-4$. This means that the maximum aperture at the 18mm end is $f/2.8$, while the maximum aperture at 70mm is $f/4$. In reality, the actual hole is the same size but the added focal length (and the maths) changes the f-number. There are several lenses available with a fixed maximum aperture that doesn't change throughout the focal range, such as Sigma's 70-200mm $f/2.8$ lens. These lenses are usually expensive though, and because of the large optics needed to perform the trick, quite heavy as well.



FAST LENSES

Canon produces the excellent 85mm $f/1.2$ lens shown here, while Sigma's 70-200mm $f/2.8$ lens has a continuous maximum aperture of $f/2.8$.

Hyperfocal distance

The hyperfocal distance technique is used mainly in landscape photography for ensuring optimal depth of field at any given aperture. It denotes the best point of focus where everything from approximately half that distance to infinity is in focus.

Each lens and aperture combination has a different hyperfocal distance, so, for example, there is a different optimal point of

focus for a 28mm lens at $f/5.6$ than there is at an aperture of $f/11$.

Older lenses have an engraved distance scale on the barrel with hyperfocal distance indicators, but these are often lacking on modern lenses. However, there are a range of depth of field calculators on the internet that can be used. The table below provides a rough guide.

Hyperfocal distances

	$f/2.8$	$f/4$	$f/5.6$	$f/8$	$f/11$	$f/16$
18mm	4.6	3.3	2.3	1.6	1.2	0.8
24mm	8.2	5.8	4	2	2	1.5
28mm	11.2	7.8	5.6	3.9	2.8	2
35mm	17.5	12.2	8.8	6.1	4.5	3
50mm	35	25	17.9	12.5	9	6.3
70mm	70	49	35	24.5	17.8	12.3
85mm	103	72	51.6	36	26.3	18
135mm	260	182	130	91	66	45.5
200mm	571	400	285	200	145	100

The table shows the hyperfocal distance in metres for commonly used focal lengths with cameras with an APS-C sensor (Nikon, Pentax, Sony and Canon). Just find your lens/aperture combination and focus on that point.

Create a realistic **Shallow depth of field**

One of the consequences of the comparatively small sensor sizes of most digital cameras (in comparison to a 35mm film frame) is that they tend to produce photos where the subject matter is sharp from the foreground into the distance. For landscape and architecture photographers this can be an advantage, but when it comes to shooting flowers, this can mean the brilliant bloom in the foreground gets lost. Restricting the sharpness in the frame to

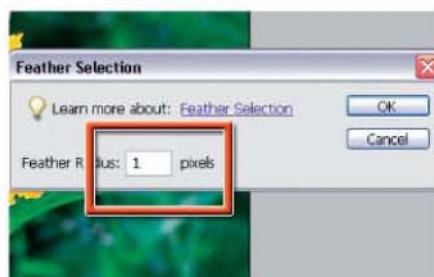
just the foreground flower will help make it stand out from its surroundings. Known as depth of field, controlling which parts of your photos are sharp and which are blurry is traditionally achieved at the time of capture. As digital users have a hard time producing the effect, they turn to post-capture editing.

Here we use Photoshop Elements to recreate and exaggerate the shallow depth of field effect.



Blur a selection

Photoshop Elements offers a variety of blur filters that are capable of making sharp parts of the picture less so. Grouped under the Filter>Blur menu, some of these options are not suitable for our technique as they provide one-button results with no control over the amount of blur being applied. These include Average, Blur and Blur More. Also unsuitable are the Smart, Motion and Radial Blur filters, as they produce blur results based on maintaining the sharpness of edges and recreating blur caused by camera or subject motion. This leaves the Gaussian Blur option, which contains both a Radius slider to control the blur amount and a preview area to preview the effect. Simply applying the filter to the image blurs all the content of the photo, so here we use a selection to restrict the blur effect to only those areas that need to be changed.



1 After opening the image, carefully make a selection of the area of the photo that you want to remain sharp. The quality of this selection is directly related to the quality of the results, so take your time. You may need to use a variety of selection tools to achieve a good result. Add a slight feather (Select>Feather) of one pixel to the selection to soften the edge.



2 Add some sharpening to the selected area with the Adjust Sharpness or Unsharp Mask filter (located in the Enhance menu in Elements 6, or the Filter menu in other versions). This helps contrast with the blurred background. Now reverse the selection (Select>Inverse) and apply the Gaussian Blur filter. With the preview option selected, adjust the Radius until you are happy. Click OK to apply.



3 One problem with this simple approach is that the noise or grain structure of the original image is smoothed by the blurring action. So to disguise this fact, add a little texture to the whole photo to balance the blurred and non-blurred areas. With the image viewed at 100%, select Filter>Noise>Add Noise and adjust the Amount slider until the texture is rebuilt in the blurred areas.



Shallow depth of field is useful for isolating subjects from their backgrounds and adding impact

Take **control** of your camera

Mastering

Shutter speeds

The choice of shutter speed has a profound effect on the way that moving subjects are recorded. Find out how to unleash their full potential

There are those who say that the only true exposure tool in photography is the shutter. Exposure could be defined as the length of time that film or a digital sensor is exposed to light. The aperture determines how much light is let in during that exposure. Of course, broader photographic theory explains that exposure is a combination of aperture and shutter speed.

So what exactly is the shutter, and what does 'shutter speed' mean? The shutter is a gate inside the camera body between the sensor and mirror. It can usually be seen when the lens is detached from the body and the mirror raised.

The shutter consists of a front and rear metal curtain. It's operated by the shutter release button, often lazily referred to as the shutter

button or even just the shutter – which can be confusing. When the button is pressed, the front curtain begins to move to expose the image, closely followed by the second, or rear curtain in the same direction. This creates a gap, which travels at a constant speed across the sensor, to expose the entire frame. Shutter speed refers to the amount of time the shutter is open, between the first and second curtain, thus exposing the image. Typically, these speeds are very short – fractions of a second – and so they are expressed as fractions, such as 1/60sec, 1/500sec and so on. Occasionally, you may need to make longer exposures of several seconds, or even minutes. The smaller the fraction, the shorter the exposure. So for a

1sec exposure, the first curtain opens fully and, a second later, the second curtain follows it to close the shutter.

Just like the aperture, each 'stop' between shutter speeds – selected via an on-camera dial – doubles or halves the exposure, so 1/125sec is half the time of 1/60sec, reducing the exposure by 1EV (or one stop). Similarly, 1/30sec is double the time of 1/60sec, so the exposure is increased by 1EV. Modern cameras also have half or third stop increments, ensuring more accurate exposure.

The length of time the shutter remains open has an effect on the image. Short (or fast) shutter speeds stop action mid-track, while long (or slow) shutter speeds may blur any movement.

Shutter speeds and lenses

The focal length of the lens you're using is important when determining shutter speed in order to avoid camera shake. Camera shake is a motion blur effect caused by a combination of camera movement and slow shutter speed.

As a rule of thumb, the slowest shutter speed you can use will have a denominator roughly the same as that of the lens focal length. In digital terms, the 35mm film equivalent focal length should be used. Therefore, a 50mm lens with a 35mm equivalent focal length of 75mm (1.5x magnification) requires a shutter speed of 1/75sec or faster. For most users, this will equate to around 1/60 to 1/125sec, depending on how many coffees you've had. That may sound like a joke, but in fact caffeine and other stimulants can have an effect on camera shake. It can be avoided by using a support such as a tripod, or even resting your body against a wall, raising the camera's ISO, or opening the aperture. Some lenses come with image stabilisation built in.



MODE DIAL

The best mode to choose is shutter priority, marked as S or Tv (for Time Value). Alternatively, manual (M) allows control of both shutter speed and aperture

COMMAND DIAL

Situated at the back or near the shutter release button, the command dial can be used to choose the speed we wish to use



LCD SCREEN

Amongst the information displayed on the screen is the shutter speed. Usually, only the denominator figure is shown (125 = 1/125sec)

SHUTTER RELEASE BUTTON

Aside from operating the shutter mechanism, this button also activates the camera's focus, metering and white balance



Fast shutter speeds

The reciprocal effect of aperture and shutter means that as you open the aperture, the shutter time gets shorter, or the 'speed' becomes 'faster'. For average, everyday shooting with standard zooms, a speed over 1/60-1/125sec will prevent camera shake. However, as the shutter speed goes past

1/500sec, you can then start to take advantage of the faster shutter speeds' ability to 'freeze' action. Entry-level to mid-level DSLRs offer a maximum shutter speed of about 1/4000sec, while professional cameras, such as the Nikon D2x, offer speeds as high as 1/8000sec. For high-speed or

sports photography, this is really useful, should you really need to catch the detail of Lewis Hamilton's McLaren. Of course, this also requires either wide apertures, bright lighting conditions or an adjustment to the camera's ISO speed – or a combination of all three – to make using these speeds possible.

Take **control** of your camera

Shutter speed and motion

This sequence shows how the shutter speed you choose affects the way the camera records moving subjects. Remember, though, that the precise effect will depend on various factors, including the speed of the subject.

For everyday subjects, faster shutter speeds

have little effect on the picture's look, with 1/500sec and above freezing fast-moving objects. Most people do not need the fastest speeds other than to allow wide apertures, though specialised photography such as ballistics testing do.



Slow shutter speeds

Long exposures, or slow shutter speeds, can be used to tremendous effect, but you need to hold the camera steady. Ideally, this should be done by putting the camera on a tripod or monopod, but you can place the camera on a table and use books, coasters or something similar to raise the lens.

Most people have seen pictures of waterfalls with blurred water or Piccadilly Circus with car trails. These pictures are easy to take – just use a combination of small apertures and long shutter speeds of 1sec or more. Digital SLRs usually offer a range of speeds of up to 30secs.

Shutter priority is the best mode to use to shoot these types of pictures. It allows you to set the shutter speed, while the camera decides the appropriate aperture.

If there are a lot of highlights in the shot, such as the neon signs of Piccadilly, for example, then be sure to meter carefully. If in doubt, take several shots at different apertures, otherwise known as bracketing.

See pages 28-29 for more tips on low light photography.





PANNING

A common shutter technique is that of panning. If you are shooting a racing car, for example, using a fast shutter speed of 1/1000sec, then you will get a frozen, motionless-looking car in front of a pin-sharp background. However, use a slower shutter speed of 1/60sec, and you'll get a blurred car as it travels too fast to record sharply on the sensor.

Panning involves following the car with the camera and pressing the shutter release button at the same time, so the car stays reasonably sharp but the movement of the camera blurs the background. This takes some practice, especially with fast-moving subjects, but it adds drama to the image, and creates a sense of movement and speed.

Flash and shutter speeds



Camera specifications often quote an X-sync speed. This is the fastest shutter speed possible with which a flashgun will work. The sync speed is typically set at around 1/60 to 1/250sec, although higher speeds can be used with dedicated hi-speed flash units.

The X-sync shutter speed is determined as the point when the shutter is fully open and the camera sends a charge to the flash to fire. The

burst from a flashgun is typically much shorter than the time the shutter is open, but there is an optimal point when the shutter is fully open. If the shutter speed is too fast for the flash, the image will not be fully exposed to the flash burst and areas of the image will receive no light, so black lines appear in the final image. Slower shutter speeds can be used to exploit the ambient or background light.



The 'B' setting

There may be times when 30 seconds isn't long enough, and you need to keep the shutter open for several minutes, especially if you're a fan of night-time photography. Many DSLRs have a setting called Bulb (B), which will keep the shutter open for as long as you keep the shutter release button depressed. The term comes from the old bulb-type cable releases, which squeezed a shot of air down a tube to the shutter release button to press it. With modern cameras, a cable release is still recommended, as even on a tripod you could move the camera during the long exposure if you were to handle it directly.



Image noise

Long exposures on film are susceptible to a problem called reciprocity failure, where the 1EV aperture/shutter reciprocal relationship ceases to work after a certain slow shutter speed, causing underexposure and colour casts. Digital cameras don't have this problem, but longer exposures can increase the signal to noise ratio in one or more of the colour channels, causing unpleasant artefacts. Most DSLRs have a built-in long exposure noise reduction filter hidden somewhere in the menu, which usually adds a small amount of blur to the offending channel. The amount is usually set by the camera manufacturer, though some people prefer to use PC-based noise reduction software for more controllable results. The reason for this is that the blur added by the camera's system can sometimes decrease the overall image sharpness.



ND filters

There may be times when the light is so bright that, even with the smallest aperture, you can't extend the shutter to the time you need for the effect you require. In this case, a neutral density (ND) filter can be used. Essentially, an ND filter is like a pair of sunglasses for your lens – a piece of darkened glass or gelatin is placed over the lens and reduces the amount of light entering the optic. ND filters are available over a wide range of densities, up to 8EV. The filters can usually be doubled up to increase the effect.

Neutral density filters affect the brightness of the viewfinder, so you may have to compose and focus before you place it over your lens, especially if you are using higher density filters.

Take control of your camera

Mastering ISO speeds

Affecting both image noise and shutter speed, your camera's ISO setting is worth a closer look



The basis for proper exposure of your images depends on shutter, aperture and one final key ingredient – the sensitivity of the sensor in your camera to light. Without knowing this, the camera can't begin to measure an accurate reading or provide a true exposure.

This sensitivity is set in the factory and is commonly known as the ISO speed, a standard originally set for the photographic film industry and adopted by digital camera manufacturers.

In fact, the ISO in a digital camera is really

an equivalent of the old film standard, with the sensor only truly having one sensitivity. All the other ISO speeds are produced by amplifying the signal from the sensor through the processor.

While this makes digital cameras very useful and adaptable, it can also produce detrimental effects – notably by increasing image noise, which often shows up as speckles in the image. But this is nothing new – the silver halide of film also produces 'grainier' images as higher ISO

speeds are used. One of the key differences between film and digital photography is that with digital cameras you can rate individual shots at whatever ISO suits the conditions you are shooting in, whereas with film you have to buy a whole roll sensitised to a specific speed. Just like with film, however, an understanding of how ISO settings on a camera work, and how to use it to our advantage, is vital to producing well-exposed and high-quality images in the right light levels and environments.

ISO and exposure

Getting the ISO setting correct is as integral to your exposures as the shutter speed and the aperture. Get it wrong and the images could suffer from camera shake, underexposure or heightened noise.

For the most part, in the UK, a bright summer day allows a low setting of ISO 100, which will give you a 'camera shake free'

shutter speed of around 1/125sec and an aperture f/8 to ensure sharpness. In poorer lighting conditions you may need to raise the ISO setting to 200 or 400.

And, as light levels drop even further, or when you go indoors, the ISO can be raised to allow faster shutter speeds and smaller apertures to be used accordingly.



ISO selection

As well as full one-stop increments, you can select 1/3- or 1/2-stop values. Using the Auto setting lets the camera do the work.

Fast access

As ISO is one of the key controls on your camera, there is usually a fast access button to allow you to make quick changes, rather than go through the menu.

ISO and low light

The average shutter speed necessary for handholding a non-stabilised camera with a standard zoom lens needs to be over 1/60sec for the majority of people. If this can't be achieved due to low light, you have three options: use a tripod, choose a wider aperture or raise the sensitivity setting.

If, for example, your meter reading is 1/30sec at f/8 and you want to keep the aperture as it is, then you need to use a camera support or to raise the ISO setting. A tripod or monopod isn't always practical, so in many cases the only option is to raise the sensitivity.

Like the reciprocal rule of aperture and shutter speeds, the same is true of ISO. Raising the sensitivity from ISO 100 to 200 doubles the exposure, so that the previous meter reading will now allow an exposure of 1/60sec at f/8 – much better for a handheld shot. Doubling it again to ISO 400 (another 1EV increase) further enhances your chances of a steady, well-exposed shot by providing an exposure of 1/125sec at f/8.

This is especially useful in low-light situations like during the winter months, when light levels are a far cry from that perfect June day.



ISO

How does digital ISO differ from film?

Film ISO

Back in the mists of time, photographers used films that were rated by the ASA (American Standards Association) system, in which the numerical rating doubled with each doubling of sensitivity. This became the basis for the ISO (International Organisation for Standardisation) standard, which came into effect in 1987.

Traditional film technology depends on the light-gathering power of silver halide, with larger silver grains allowing higher ISO speeds. Faster, more sensitive films produce 'grainier' images.

Technological developments have produced ever faster films with less obvious grain. The general-purpose daylight film of the 1920s and 30s was around 20 ASA. By the 1970s it was ISO 100, but by the end of the 1990s it was ISO 400, all with little discernible difference in grain size.

Digital ISO

When digital cameras appeared in the 1980s it was decided to keep sensitivity standards as close as possible to those of film to allow for an easy transition. Digital ISO is not, however, achieved by using larger pixels (like film uses larger silver grains), and sensors don't display the same characteristic curves as film when under or overexposed.

Digital sensitivity is increased in a couple of ways, primarily by a simple amplification of the signal from the sensor. A process known as bit-shifting, which uses mathematical rather than analogue amplification, is also applied. Many cameras use a combination of both.

The increase in sensitivity gained by raising the ISO setting results in more image noise, not larger sized grain.

Sensor and processor technology is forever improving. Sensors allowing settings up to ISO 3200 are now possible – producing noise that would match that of ISO 400 or even ISO 800 just a few years ago. As the technology matures, we can expect to see further noise reductions and higher ISO settings.

Take control of your camera

Noise

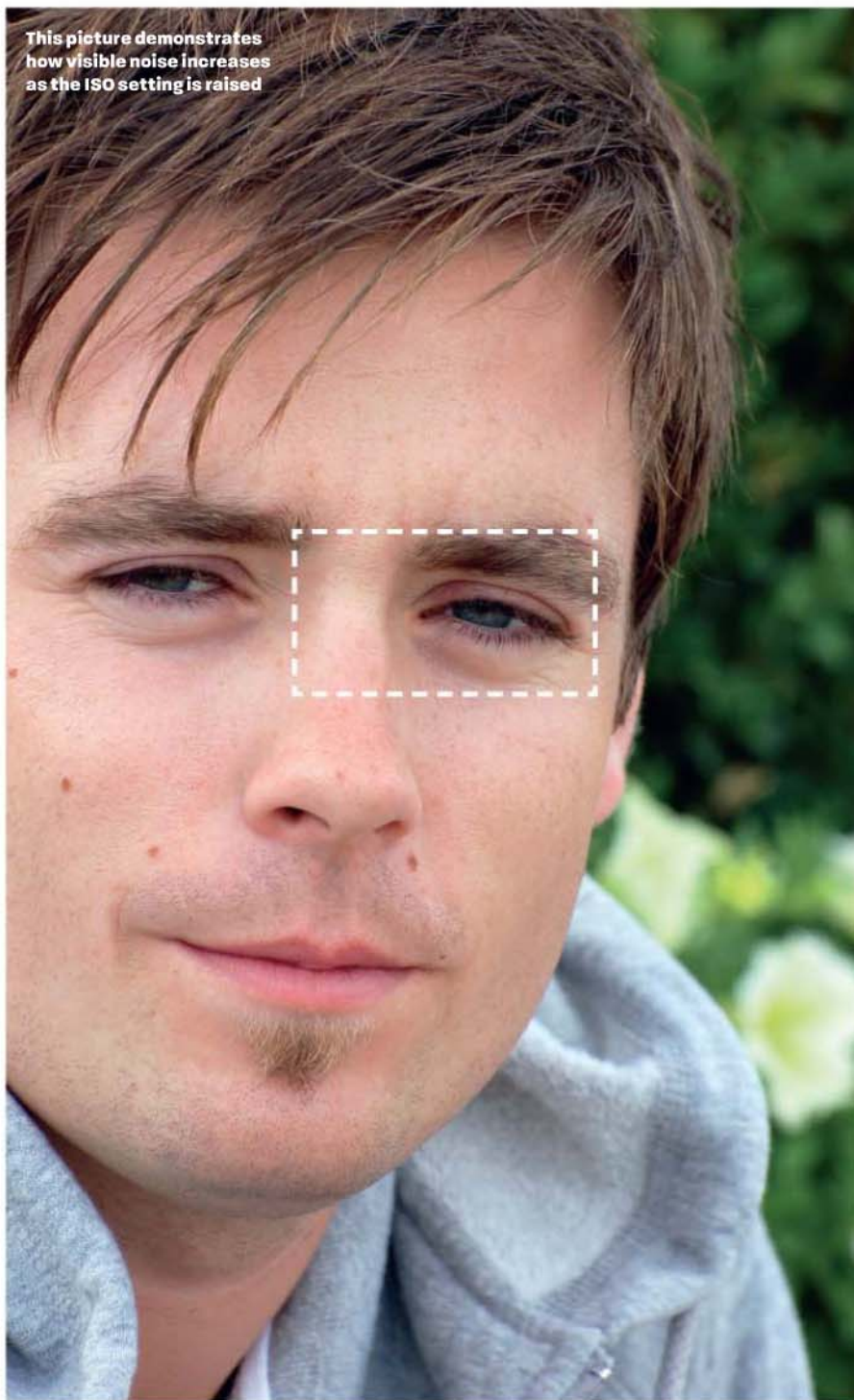
Noise is to sensors what grain is to film. Just as with film, when the ISO setting is raised, image quality becomes increasingly affected by noise, which usually appears as coarse speckles. Its minimisation is a common goal of camera designers and photographers alike.

There are two main types of noise: luminance (monochromatic) and the more obtrusive chroma noise, which is typically displayed as

multi-coloured speckles. Noise is most visible in areas of uniform tone, such as skies, and especially in underexposed shadow areas.

Not only does visible noise increase with ISO sensitivity, it may also increase as pixel size decreases, which is why cramming too many pixels onto a small sensor can be detrimental to image quality, and why camera choice should not be based on pixel count alone.

This picture demonstrates how visible noise increases as the ISO setting is raised



ISO and long lenses

Longer lenses are also more prone to camera shake, and the rule of thumb is that to ensure sharp pictures, the shutter speed should be at least as high as the focal length in use. So if you are shooting at 200mm, you ideally need a shutter speed of at least 1/250sec to prevent camera shake. If longer lenses force you to use smaller apertures, but at the same time you need to use faster shutter speeds to counter the risk of camera shake (unless you're shooting static subjects and are able to use a tripod), there may be only one solution: raise the ISO. So, with that 200mm lens, if your meter is reading at 1/125, then you need to double the ISO (raise it by one stop) – from ISO 200 to 400, for example.

Of course, modern developments in image stabilisation – either optical or camera-based – will affect the base figures in these scenarios, but the principle remains the same and so is worth remembering.

ISO 200



ISO 800



ISO 1600





ISO 400

ISO and action

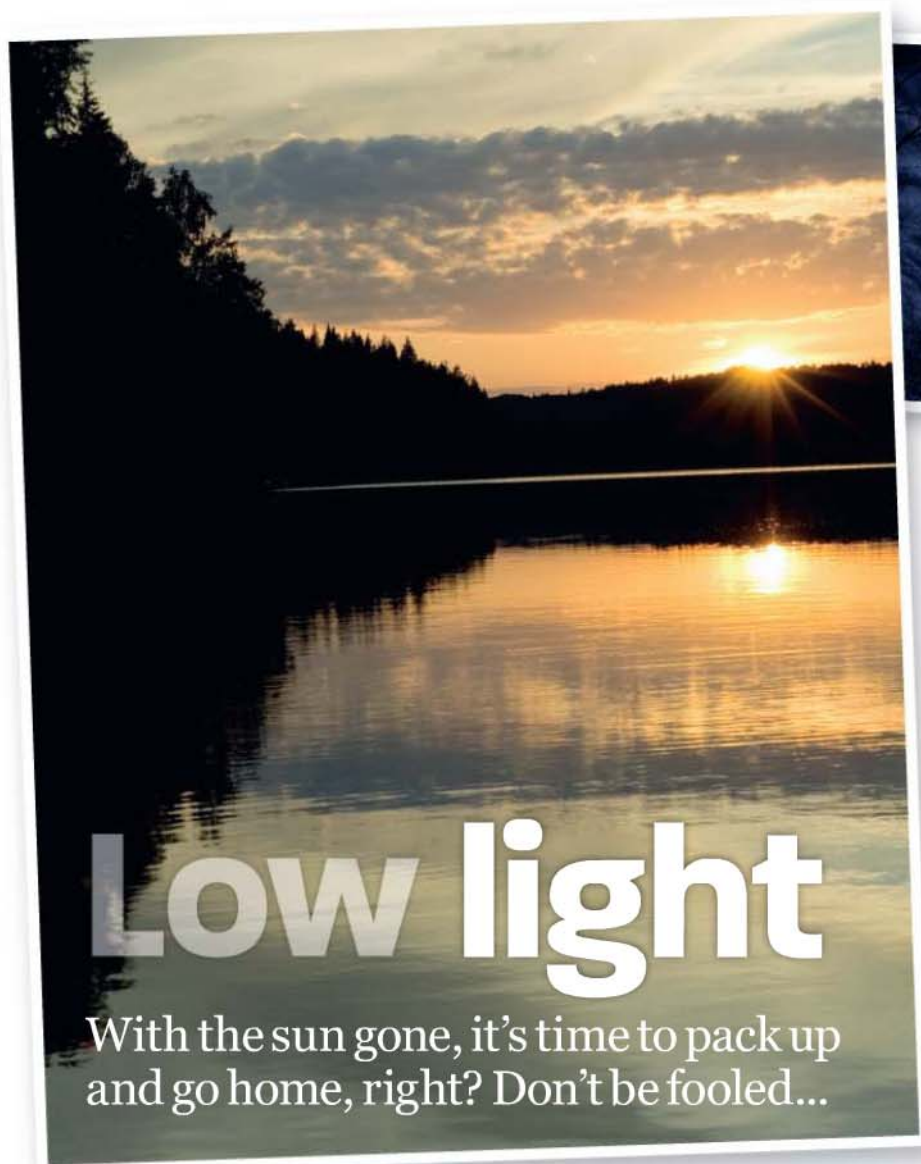
Imagine a combination of the previous scenarios – you're using a long lens and the light is low. Even worse, your subject is moving quickly – or as quick as middle-aged five-a-side footballers can run on a Thursday evening in November.

This is the perfect opportunity to raise your ISO. Increasing the sensitivity will allow two

things: the use of a smaller aperture to ensure depth-of-field and sharpness, and a fast shutter speed to freeze the action and eliminate camera shake.

In fact, even on a bright day it may be worth raising the ISO just to allow faster shutter speeds of around 1/500sec, to freeze any action happening in front of your lens.





you want to photograph under low-light conditions regularly, invest in a cable release that can be locked in the open position. Couple the remote release with a small stopwatch and a torch, and you are ready for executing the long exposure times necessary for creating moonlit images.

Time and motion

When most people think of shooting cityscapes at night, they envisage images full of the twisting light streaks of speeding cars, as shooting in low light requires longer shutter speeds than we use in daylight. Longer shutter speeds mean moving objects are not frozen in the frame but are recorded as streaks flowing through the photo. The speed of the movement, the position of the subject and the length of exposure all contribute to the effect.

Controlling the movement

Long exposures provide us with a unique opportunity. Designing how the photo will look when so much of the picture's impact is based on moving subjects can be tricky, however. The three-way combination of shutter speed, aperture and ISO determine the way the movement is recorded. For images with less blur, use a higher ISO (400, 800 or 1600) and lower f-stop values (f/2, f/2.8 or f/4). These settings will enable faster shutter speeds that will, in turn, help freeze the motion. Alternatively, longer exposure

As the sun dips below the horizon, plenty of subjects begin to present themselves to the keen-eyed photographer, providing ample opportunity for flexing your photographic skills. Here, we show you how to capture firework displays and use shutter speeds to their full creative potential.

Metering at night

As the meters contained in most digital cameras are designed to work within the shutter speed range of the camera, few models can be used to measure exposure beyond 30 seconds or so.

In order to solve this problem, try metering the scene with the lens at the widest aperture first. Note down the settings and then extrapolate the required exposure for a smaller aperture setting.

For example, a setting of 30 seconds at f/2 is the same as 60 seconds at f/2.8, 120 seconds at f/4, 240 seconds at f/5.6 and 480 seconds at f/8. Don't forget to double the exposure time for every full aperture setting change.

The serious night-shooter can obtain more accurate results using a sensitive handheld meter. The best models are very sensitive and, after measuring the available light, provide a range of shutter and aperture combinations that you can use with the scene. If your budget doesn't run to this level, then the best option is to make a test exposure and use a 'best guess' shutter and aperture combination. Check the resultant image, and re-shoot if necessary.

Exposures beyond your camera's longest shutter speed

To obtain exposures longer than the maximum setting for your camera, you will need to switch to the 'Bulb' mode and use a sturdy tripod.

This shutter speed setting keeps the shutter open while the shutter button is depressed. Once the button is released the shutter closes. It is very difficult, if not almost impossible, to keep the camera steady while holding the shutter button down for minutes at a time, so if

EXPOSURES

STARTING EXPOSURES FOR LOW-LIGHT SHOOTING SCENARIOS (AT ISO 400):

Brightly lit street scene – 1/60sec @ f/4

City skyline at night – 1sec @ f/2.8

City skyline just after sunset –

1/60sec @ f/5.6

Campfire – 1/60sec @ f/4

Fireworks against dark sky –

1sec @ f/11

Landscape with full moon – 8secs @ f/2

times will produce more streaks and more blur. To obtain the slowest shutter speeds, employ higher f-stop values (f/11, f/16 or f/22) and at the same time use lower ISO settings (50, 100 or 200).

White balance

Unlike with film, when the colour balance is customised towards either daylight or tungsten light sources, digital white balance systems can adapt to a range of differently coloured lighting conditions. In normal 'daylight' shooting conditions, selecting the Auto option for your white balance system will generally provide consistently good (neutral) results, but when it comes to recording the colours of mixed light sources, neutrality is not what we are looking for. A better way of working is to select the Daylight setting for your night images. This way, the camera will not try to remove the cast caused by the various light sources in the photo.

Shooting fireworks

If recording colour is your thing, then firework demonstrations provide a great opportunity to flex your low-light shooting muscles. Capturing these brilliant explosions of colour and light is not as hit and miss as it may at first appear. This is especially true for digital photographers, as the results of our efforts can easily be reviewed on the spot via the monitor on the back of the camera.

The explosion of a firework takes place during a period of a few seconds. There is the initial thump or sound of the mortar as the shell is launched skywards. This is followed by the first explosion, maybe a series of smaller bursts and a host of trails of twinkling light. To ensure that you capture the full effect, you need to use a long exposure.

Start by setting your camera on a tripod and point it to the general location in the sky where the first few bursts occur. Be careful when including complex backgrounds or well-lit structures in the frame, because these may distract from the fireworks themselves and affect exposure times. This said, judiciously positioned horizon detail does provide a sense of scale for your images, so analyse the environment and take a few test shots before making up your mind.

Manual focus and manual shutter release

When shooting fireworks in particular, it is important to turn off the autofocus mechanism and manually focus the lens into the distance. For most situations the 'infinity' setting works fine, but it also pays to check this focus setting

Right Use a tripod with long exposures to keep the image sharp, or handhold the camera to introduce deliberate blur

with the first couple of photos and adjust where necessary. If you are capturing a street scene with detail in the foreground, use the distance scale on the top of the lens (if it has one) to ensure that important subject areas are sharp. Next, attach a cable release to the camera. If you don't have one of these, set the shutter speed to 4secs (this is a starting point and can be altered later when you review your first few shots).

Now that you are set up, simply open the shutter when you next hear the thump of the mortar and keep the shutter open for the full length of the burst, releasing the button only when the last few trails die away.



1/2 sec @ f/22 handheld



1/250sec @ f/22



With practice you can capture a sequence of explosions in one long exposure

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Raw **V** JPEG

Do you shoot JPEGs but feel guilty about it? Or shoot raw but wonder if you're wasting your time? Do you even know what we're talking about? Then read on...



RAW **V** JPEG

The overwhelming majority of the world's digital photographs have file names that end with the suffix 'jpg'. This means that they were either taken, or subsequently processed and saved as, a JPEG (pronounced jay-peg) file. Most casual digital camera owners may not even be aware there is any other kind of format, but if you own a higher-end compact or any digital SLR, and delve into the image quality menu, you'll see there's an alternative: the raw file.

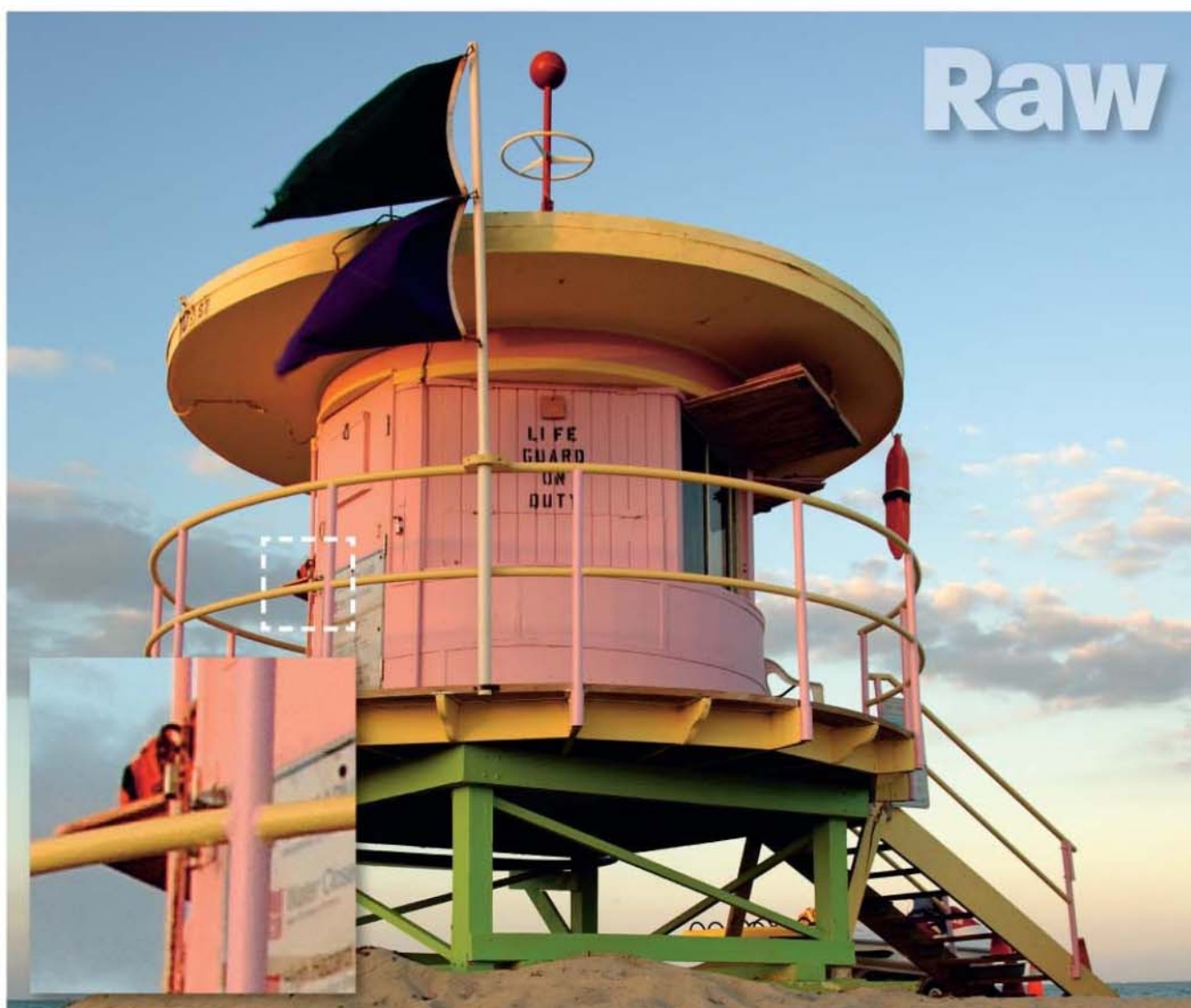
In JPEG mode, the camera takes the information collected by the sensor and 'processes' it into a recognisable, colour-corrected, sharpened photograph that you can print straight out of the camera. In doing so, it also attempts to make the file as small as possible so that it takes up less space on your memory card. It does this by condensing and throwing away some of the data. A raw file, on the other hand, is the 'raw' data from the sensor, unprocessed by the camera. Raw files are bigger than JPEGs so take up more space on the card and, unlike JPEGs, can't be opened on the PC, except by special raw-processing software, or plug-in.

Conventional wisdom dictates that for ultimate control and image quality, using the raw mode is the best option. Indeed, there is a lot of snobbery about the subject, with some

purists suggesting that raw is for pros and 'serious' photographers, while JPEGs are for happy snappers. However, many photographers still prefer, for the sake of convenience, to stick with the more user-friendly JPEG format – though many of us feel guilty for choosing what some see as a lazy and inferior way to work.

But is this true? Is raw really that different from JPEG? What are the pros and cons of each format, and can anyone really tell the difference in the end anyway?

That's what we aim to find out here. We'll discuss the merits and drawbacks of each format – and look at identical images taken in both – before inspecting them in their out-of-the-camera form and after image-editing in Adobe Photoshop. ➔



Raw files are often referred to as the 'digital negative', as they are composed of the original data captured by the sensor, having bypassed many of the camera's processing functions.

Contrary to some preconceptions, they are often compressed slightly, though using lossless compression, so all the data is intact. Typically, this results in a closed file size around half that of an open file, so an 18MB image becomes 9MB. This is much bigger than the average JPEG, so they take longer to write to the card, to download, and to open, and of course you get fewer of them on a card. Their slower write times also make them less suitable for burst shooting situations such as fast action.

Raw files are not supported by most image-editing programs in their native format, so must either be converted before use, or processed using dedicated raw

processing software, which may be that supplied with the camera, or a third-party program. Since raw files are not yet standardised, software must be compatible with your particular camera. One solution to the cross-compatibility issue is Adobe's DNG format, an open raw format that has been adopted by manufacturers such as Leica, Panasonic and Hasselblad.

Since no processing has been applied in-camera, raw files generally look poor on first opening and require more work to produce an acceptable result than JPEGs do. However, once this has been done, they have the potential to look better. Since more data is contained within a raw file, it's possible to retain more highlight and shadow detail, and even to adjust the exposure and white balance after the fact, if you feel you didn't choose the optimum settings at the time.

Raw pros and cons

- ✓ Most raw files are 16-bit, so contain a greater dynamic range than an 8-bit JPEG
- ✓ You get the full range of data from the sensor. None is discarded
- ✓ Your raw conversions are done on a computer (with a bigger and better processor than that in your camera)
- ✓ You can change your mind about white balance, exposure and some other settings after you have taken the picture
- ✗ Raw files are bigger than JPEGs, so have longer read/write times and fewer shots
- ✗ They must be processed on a computer before they're usable (so you can't use them straight out of the camera)
- ✗ They can't be viewed by family or friends unless they have a suitable raw converter
- ✗ Raw files must be converted to TIFF, PSD, JPEG or another file format before they can be printed

JPEG



The name JPEG is short for Joint Photographic Experts Group and was set in the early days of digital imaging as a file format that could be read by any digital image display device.

Even before the advent of digital cameras as we now know them, photographers and designers were sharing JPEGs across computer platforms and on the internet.

JPEGs are processed in-camera, setting white balance, exposure, sharpening, colour and contrast, among other things. Unless the user has overridden the default settings in the menu, these presets are determined by the firmware programmed into the camera by the manufacturer.

JPEGs are also compressed by the camera to make them smaller, making them quicker to save to memory and enabling you to squeeze more pictures onto a card. The compression used by JPEG is

'lossy' – that is, some information is destroyed in the compression. For example, when the processor recognises large expanses of similar colour (such as sky) it may choose an average of the pixels that make up the colour to represent the entire area, discarding some of the subtle hues originally captured. There will usually be a choice of compression settings – the lower the compression the better the quality, but the larger the file. Higher compression produces smaller files, but poorer images.

Of course, you can also save images as JPEGs on the computer, and it's quite possible that even if you shoot in raw mode, the picture will end up as a JPEG eventually, especially if it's going to be emailed or posted on a website. If used in this way, resizing may be necessary as most JPEGs converted straight from raw files will be too large (one exception is stock libraries).

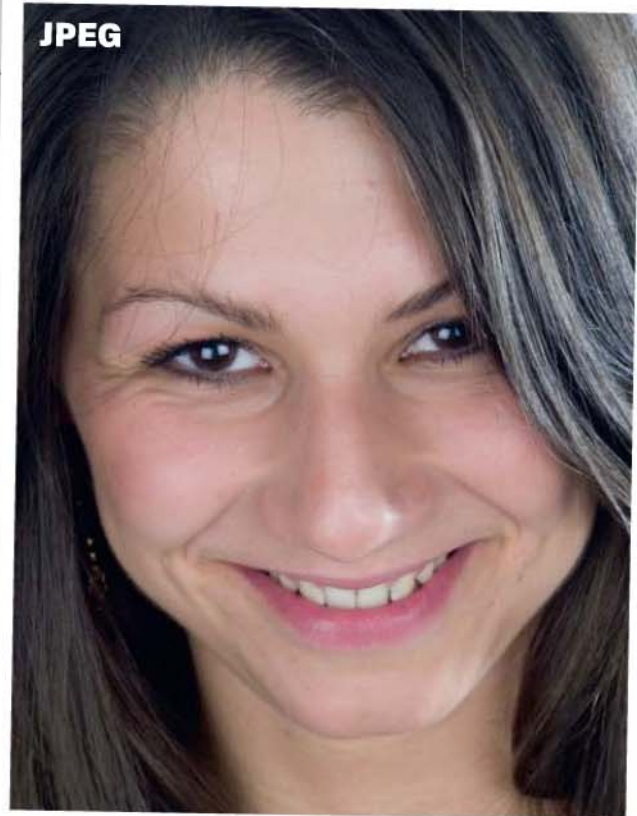
JPEG pros and cons

- ✓ JPEGs are a 'universal' file format and can be viewed on almost any computer
- ✓ JPEGs are much smaller than raw or TIFF files, so you can get more on a card
- ✓ They write to memory more quickly, so are better for burst shooting
- ✓ Most people find good JPEGs almost indistinguishable from raw or TIFF files
- ✓ JPEGs require much less effort to get good results than raw files. Typically, you can get a good print straight out of the camera, or with minimal enhancements
- ✓ JPEGs can be easily emailed or uploaded to a website
- ✗ In processing, some of the data is discarded, so overall there is less information in the pictures
- ✗ Settings such as exposure and white balance are fixed in the processing and can't be changed so readily afterwards

Raw



JPEG



Comparing raw with JPEG

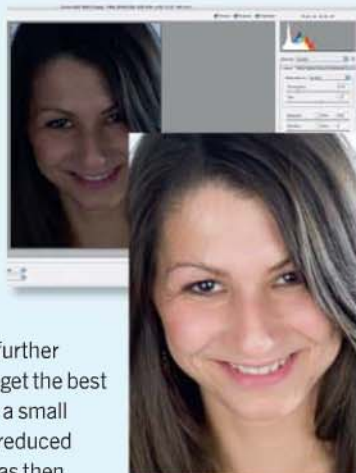
We followed identical raw and JPEG images through a typical workflow

Straight out of the camera

Looking at these studio portraits, taken on a Canon EOS 400D, the raw file is rather dark, while the JPEG appears well corrected, though not quite perfect. The raw file is less sharp than the JPEG too, which is to be expected as the camera sharpens images when it processes them into JPEGs. Clearly, at this stage, the raw image needs some work to get it to its best.

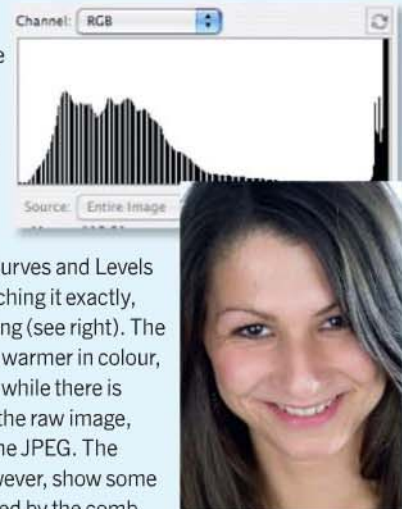
CORRECTING THE RAW FILE

Once the raw image is processed, there is a subtle but noticeable difference between the two files. The image was processed in Adobe Camera Raw (ACR), using the set of sliders on the right of the interface (see top right). Even just checking the 'Auto' boxes made a big difference, but further adjustments were made to get the best image we could. We added a small amount of sharpening and reduced noise slightly. The image was then saved as a 16-bit TIFF file to be opened in Photoshop (see right). If we had wanted to, we could also have used these controls to reduce or boost the saturation, colour and so on to add creative effects to the image.



CORRECTING THE JPEG FILE

While the straight JPEG is probably fine for general-purpose printing or use on a website, we decided to try to match the tonality of the raw version, using a combination of the Curves and Levels tools. While not matching it exactly, the results are pleasing (see right). The raw file is marginally warmer in colour, sharpness is similar, while there is slightly less noise in the raw image, when compared to the JPEG. The histogram does, however, show some loss of tones, indicated by the comb effect (see above) where pixels are missing. Similarly, the document size has changed from 18MB to 16.7MB (a 7% loss of data).





Raw



JPEG

Resizing

There may be times when you want to resize your image, perhaps for printing to large formats. Using raw files in ACR, there is a small menu that will do this within the plug-in before you convert your image to TIFF.

We resized the JPEG using the Image Size menu in Photoshop (the most popular method), though third-party options are also available.

The raw file definitely coped better with upscaling. The JPEG suffered from more noise, loss of detail and increased contrast, with subtle tonal shifts, especially in the upper registers of the highlights, losing detail.



Raw

JPEG

Fixing exposure error

How do raw and JPEG files cope with exposure error? To find out, we made a sequence of shots at varying exposures, then tried to correct them in Photoshop.

Underexposure

In digital photography, it is usually easier to rescue an underexposed image than an overexposed one. Raw files are especially easy to correct in Photoshop using the Adobe Camera Raw plug-in. Here, the Auto Correction has done a good job, and only a few tweaks were required to finish the job.

COMPRESSION AND DETAIL

Modern cameras' JPEG algorithms and sensor combinations seem pretty good. On the images, using a combination of Canon, Nikon and Olympus cameras, we found little evidence of detail loss in JPEGs when used at the best quality setting. This can usually be seen in details such as brickwork and grassy areas, which traditionally lose detail as the JPEG processing struggles to differentiate between detail and colour.

Even images that were under-exposed by five stops (-5EV) could be rescued (see right), although with some increase in noise levels.

JPEGs are less flexible, with the limit at around -2EV before image degradation spoils the image. As you can see, at -5EV the colour is poor and much of the shadow detail has been lost (see right).

Overexposure

Overexposing poses more problems for both JPEG and raw files than underexposure does as, once lost, highlight detail cannot easily be regained.

In ACR, raw images overexposed by two stops can be rescued, with only a minor loss of highlight detail (see right). Incidentally, the highlight rescue function in Adobe Photoshop Lightroom does a good job here.

JPEGs are, again, more problematic. Even at +2EV, highlight detail is completely blown and can't be rescued at all. Images can still be improved at a push, if you don't mind having high-contrast images with no sky (see right).



Raw (-5EV)

JPEG (-5EV)

Raw (+2EV)

JPEG (+2EV)

THE VERDICT

Images from raw files are only as good as the photographer's willingness to make the effort to get the best out of them. While it's undoubtedly the supreme format for ultimate image quality, it's not for everyone, or even for all photos. Its main downside is the speed of use – not only do cameras record raw files more slowly than JPEG, they also demand more time on the PC. You could argue that the raw workflow requires about two to three times more work for a quality gain of, maybe, 10% – if you can quantify such things. If you

think that 10% is worth the extra effort, then go for it.

If not, modern DSLRs produce very good print/web-ready JPEGs which come very close to prints from raw. So if you don't fancy the extra work that raw entails, don't feel guilty about shooting in high-quality JPEG mode, because if you're careful, the difference is quite subtle. You can enjoy the extra time you'll have on your hands by going out and taking more photos, rather than sitting in front of your PC.

There is, of course, a third way and one that would seem to offer the best compromise. Select the raw plus high quality JPEG option on your camera, which gives you both formats simultaneously – even if it's just for those important shots. This does take up more space on the card, but media is cheap, and you can delete the dross later. That way you'll get the convenience of the JPEGs with a raw back-up should you want to go back and play with an image at a later date.

Take **control** of your camera



Mastering **White balance**

Unwanted colour casts? Time to get to grips with your camera's white balance controls

Light comes in many colours, from the blue tint of a winter morning to the golden glow of a summer evening, from the green cold glare of a neon tube or the warming yellow of a bedside light. Our eyes may not pick up the subtleties of the light's colour, but you can be sure that your camera's sensor will.

In days of yore, when dragons roamed the Earth and maidens were an endangered species, photographers used daylight- or

tungsten-balanced colour film. The variations of light colour, or colour temperature, were controlled with filters or by introducing artificial lighting sources such as flash.

The advent of digital cameras brought with them a new feature – white balance (WB) control – a way of electronically measuring and correcting the colour of the light entering the lens to reduce unnatural colour casts.

For the majority of users, the simplest way

to control white balance is to set it to Auto and let the camera do the work. For the most part, this is fine, especially as white balance systems have become increasingly accurate, particularly when dealing with multiple lighting sources. For ultimate control and optimum results, however, an understanding of the other settings, as well as manual control, will increase your creative resources and freedom.

White balance in your camera

Depending on your camera model, there are two ways to access the white balance, either through the menu or via a fast access function button on the camera's exterior.

The most commonly used white balance setting is Auto, but there's also a selection of presets for specific lighting conditions. Common settings include Daylight, Cloud, Shade, Tungsten and Fluorescent. Some models have others, so consult your camera's manual for more details.

Typically, the white balance is applied after the image is taken, when the camera is processing the image. In simple terms, the processor analyses the image and, using white point information, corrects any colour casts that affect the whites. This information is stored with the image, so that when the JPEG is opened the image is colour corrected. With raw files, this information is stored with the image and can be easily changed in a raw conversion application on your computer.

Auto

This uses an automated system to assess the lighting conditions

PRESET

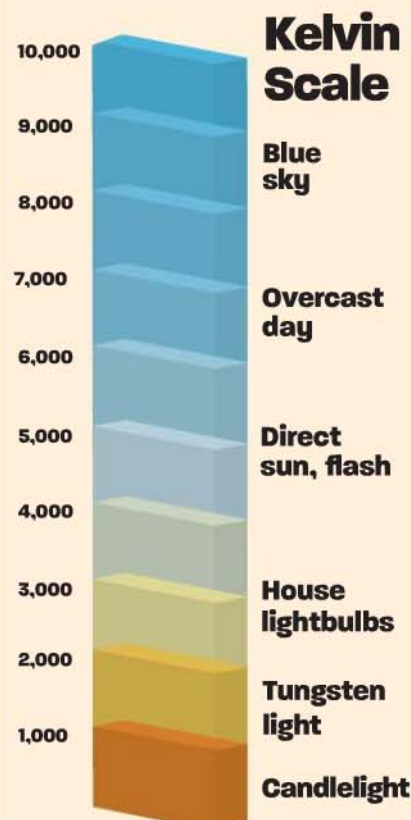
These include Fluorescent, Cloudy and Sunlight settings



TEMPERATURE

The colour of visible light is measured on the Kelvin scale, using the notation 'K', after the 19th century British scientist William Thomson, 1st Baron Kelvin. Colour temperature is determined by comparing the chromaticity with a theoretical black-body radiator (in physics, this is an object that absorbs all electromagnetic radiation that falls on it). The colour temperature of differing light sources is based on the surface temperature of that black-body radiator. However, some light sources such as fluorescent lamps do not emit radiation in the form of a black-body curve, so a different standard known as colour

correlated temperature is applied to correlate the perceived colour to that of the Kelvin scale. The diagram below indicates where common light sources fall on the Kelvin scale.



Auto white balance

For the most part, 99% of people use Auto WB for 99% of their shots and, 99% of the time, they are pleased with the results. The camera does a pretty good job of it, so why bother to set it manually? Especially when using raw format, any errors or minor tweaks can be easily changed (see page 39).

For JPEGs though, that 1% that can go wrong can be more problematic, as it is more difficult to apply a global correction to correct colour casts, especially for those untrained in colour correction. Not only that, but data in the file may be destroyed using traditional pixel-based editing software such as Photoshop.



Take **control** of your camera

White balance presets

The preset white balance settings measure the colour temperature in narrower parameters, according to the type of lighting you determine. A tungsten light, for example, has a colour temperature of around 2,800K, though variations such as other ambient light, the bulb's age and its power may also come into play and affect the final result.

Mixed lighting may also fool the white balance of your camera. For example, if you're shooting a subject next to a window with a tungsten lamp nearby, you can choose which light source to balance for. A daylight setting produces natural ambient colour, while the tungsten setting filters the yellow, so the daylight will appear much bluer.



Manual white balance

Most DSLRs allow you to measure the scene and adjust the white balance to your own preference in a manual WB mode. The quickest way to do this is to take a picture of a white or grey object in the scene, such as a wall or tablecloth, and view the preview on your LCD screen. From there you can assess the colour and either take another or save the setting if the white is as good as you want it to be. Alternatively, your camera may let you adjust the white balance using the Kelvin scale.

There are accessories that help to accurately fix WB in the scene, such as the Expodisc and Lastolite's XpoBalance.



Extreme mixed lights

Rock concerts and theatres use strong coloured lights that constantly change colour, so you may want to set your preset accordingly. Manually measuring the light is too slow, and Auto WB may filter much of the atmosphere. Using the Daylight setting will record the colour much as the eye sees it, so bold blue, green and red lights will remain true to the way you remember them.

CAMERA RAW

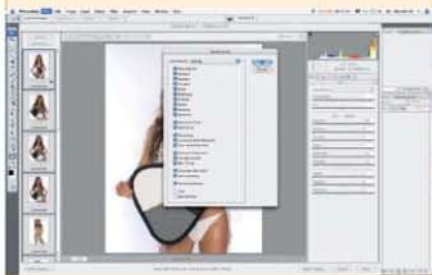
When you begin a shoot, include a white or grey card in the scene for the first shot or two. This will provide the reference point for the white balance eyedropper.



1 Open your images as a batch in Adobe Camera Raw (ACR) either using Adobe Bridge or the File > Open command. The images will open in the ACR window, with the first image in the main pane, and the others in a filmstrip at the side. Choose the WB eyedropper tool (in the latest version this is in the top-left corner of the ACR window).



2 Select an area that should be neutral grey or white. The software knows the colour values of these colours, so will automatically correct the colour globally (over the entire image). For this image, we used Lastolite's XpoBalance tool. There will be a slight difference in the results whether you choose white or grey, so pick the area that gives you the most pleasing results.



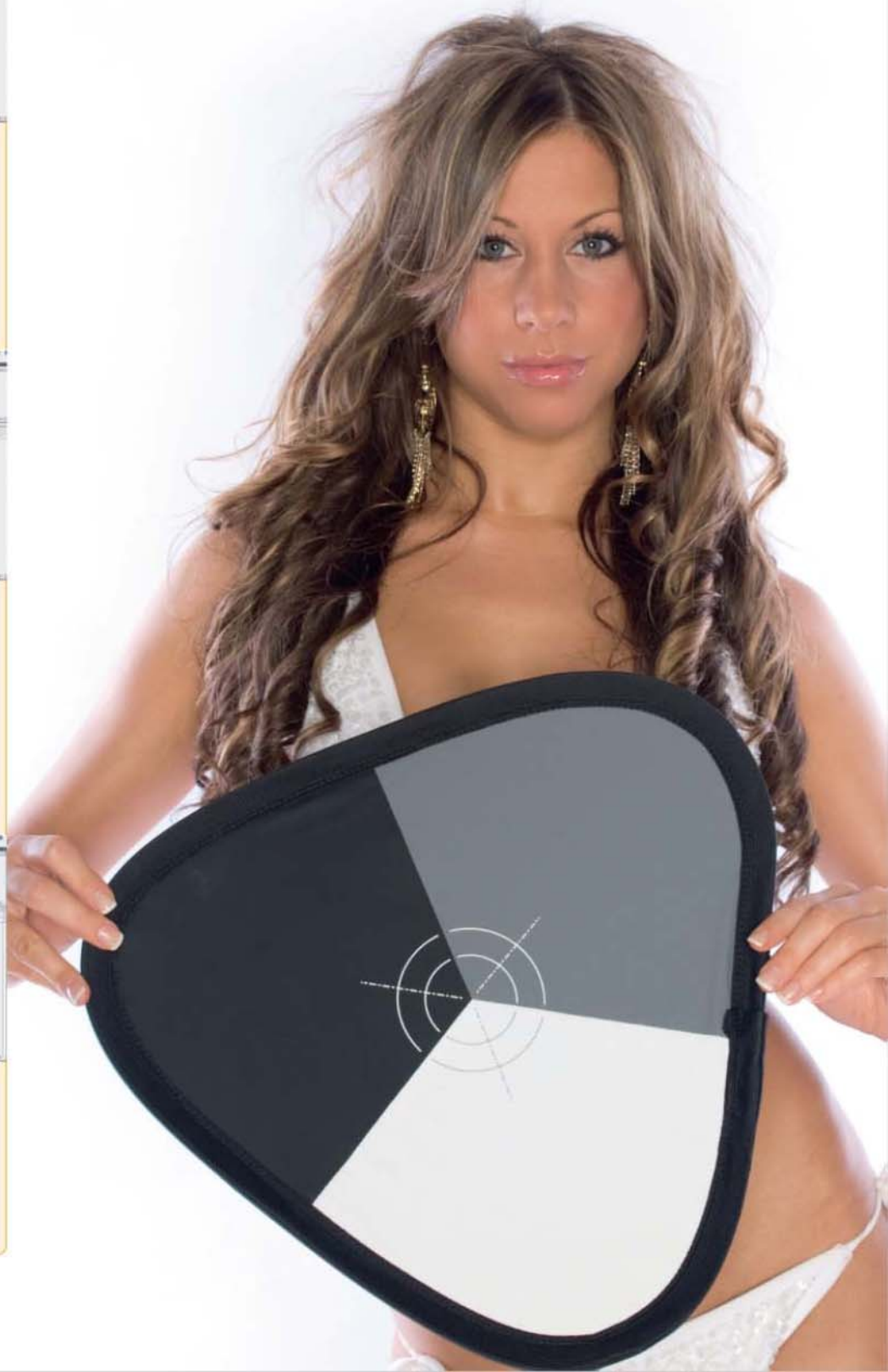
3 As long as you are shooting with the same lighting you can click the 'Select All' button and synchronise those corrections with all the other images in your batch, saving you much time in applying your corrections to every image individually.

White balance and raw

An advantage of shooting raw files is that you can adjust and change the white balance very accurately using Adobe Camera Raw, Lightroom or another raw processing software. Not only can you choose from a list of preset white balance settings, just as you do with your camera, but you can fine-tune the colour using a slider tool based on the Kelvin scale. This is

perfect if you want to warm up or cool down an image. It also allows you to correct an image should you accidentally use the wrong WB setting in-camera.

Alternatively, there's an eyedropper tool that you can use to select a neutral white or grey in the image, and the software will automatically correct the colour cast.



Getting it right: portraits



Props

Using this tree as a prop has not only added a useful compositional element, but has also served the practical purpose of giving the model something to lean against.

Focus

The most important thing in a portrait is to keep the eyes sharply in focus. This is because the eyes reveal so much of the emotion that the subject is feeling. Lock your focus on the eyes and then recompose your image as you wish to frame it.

Depth of field

By using a wide aperture, such as $f/2.8$ or $f/5.6$, you can create a shallow depth of field. In this way you can focus the attention of the viewer on to the subject and away from distracting elements in the background.



Backlighting

The natural backlight created by having the sun behind the subject works to outline the person and create an almost 3-D quality to the image. This allows you to expose for the background and, using fill-in flash, you can still get good detail in your subject without harsh shadows.

Composition

There are no absolutes in regard to composition, but it is worth considering the rule of thirds. This places the subject at thirds within the image, in order to lead the eye of the viewer through the picture and create a pleasing dynamic.

Location

Finding a quiet location that lends itself to posing the subject is an important early decision. You can source this in advance of the shoot, so that you can make the most of your time with the subject at the location.

TOP SHOT

Follow these pointers for a perfect outdoor portrait

The checklist

- Choose a location that lends itself to the shoot; avoid busy backgrounds that might detract from the subject.
- Make sure you have a shallow depth of field; this will keep the viewer's eye on the subject.
- Control your lighting conditions and take a flash or reflector along as backup. Check the weather forecast for the day, so you are prepared for each possibility.
- Try a range of poses and experiment with different angles. Keep talking to your subject if possible; if you tell them you are happy with the shots you are getting, it will encourage them and avoid any awkward silences.
- Think about your composition. Try using the rule of thirds to compose the image, or use colour to lead the eye into the picture.

CAMERA SET UP

Set your AF and drive mode to single shot, your white balance to daylight, and ISO to 100 (assuming you have good daylight). Use aperture priority and select a large aperture between f/2.8 and f/5.6 to blur the background. Take your point of focus from your subject's eyes and reframe your shot each time. Take your exposure from your subject if you are not using a flashgun; if you're using fill-in flash, take the light reading from the background. Be careful not to go over the camera's flash sync speed. Choose an above normal focal length.

Take **control** of your camera

Mastering **Metering** modes

If you want to trip the light fantastic and really get a grasp of exposure, knowing your metering will help you make the grade



Exposure is one of the fundamental ingredients of a good photograph – get this wrong and it can feel like you're banging your head against a brick wall. Fear not, however, as every DSLR has a set of options that will help determine the correct exposure and give you the picture you want. These are the metering modes.

Metering determines how much light is needed to capture an image and how long the shutter remains open, and there are three main

methods to choose from: evaluative (or multi-zone), centreweighted, and spot metering.

But always remember, there's no such thing as a perfect exposure. What seems right to you may not receive the approval of someone else. But that's one of the great things about photography – beauty is in the eye of the beholder, and there are endless opportunities to be creative. Join us for the next few pages and we'll show you how.

Metering modes in your camera

Depending on the model of camera, there are normally two ways to set up your metering mode, either in the menu or, more commonly on newer DSLRs, via a switch on the body of the camera. Each mode can be used for specific situations.



Meter mode button

This allows you to select the metering mode – evaluative, centreweighted, or spot



Meter mode

A graphic displays the selected mode



Exposure compensation

This graphic displays the EV value of the selected compensation of bracketing

Evaluative metering

Evaluative metering uses a number of specific points across the frames (the number varies between cameras and manufacturers), and produces an average of all the zones to give the correct exposure value. It takes into account such factors as the focusing point in use, subject size, position, distance, overall lighting level, and colour, and usually uses a database of thousands of exposures to

evaluate the type of lighting and subject.

Evaluative metering can deliver exceptional photographs in various lighting conditions, and is most useful for general subjects without large shadow or extremely bright areas. It's also good for action photography.

For the majority of people this will be the only metering mode they will ever use – it's reliable and covers most situations.



Evaluative metering splits the frame into zones and produces an average exposure from each

METERING

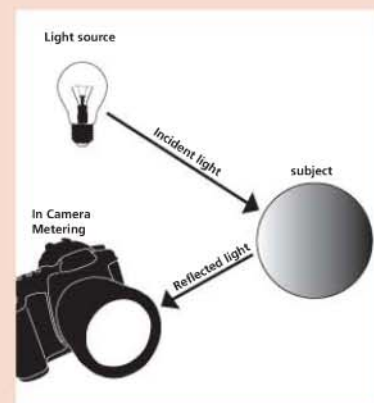
Knowing how your camera measures light is crucial if you want to achieve consistent and accurate exposures. But how does the camera actually meter the scene?

All cameras have a fundamental flaw in that they can only measure reflected light – that is the light that is reflected from the subject. This means the best they can do is guess how much light is hitting the subject (incident light). If all objects reflected the same percentage of incident light this would not be a problem, but they don't, and they vary considerably.

Incident light can be measured by the use of a light meter, which takes a reading from the subject's position, usually while pointing back to the camera. Reflected light, on the other hand, is the light from a light source, such as the sun, bouncing back off an object.

For this reason, in-camera metering is standardised based on the luminance of light that would be reflected from an object appearing as middle grey. If the camera is aimed directly at any object lighter or darker than middle grey, then the camera's meter will incorrectly calculate the light level and under or overexpose respectively.

Because most subjects contain a combination of highlights, shadows and midtones, the exposure will usually average everything out to produce a good image. However, understanding the process and assessing the scene to be shot will allow you to produce better images and more consistent exposures.



Above: Incident and reflected light

Take **control** of your camera

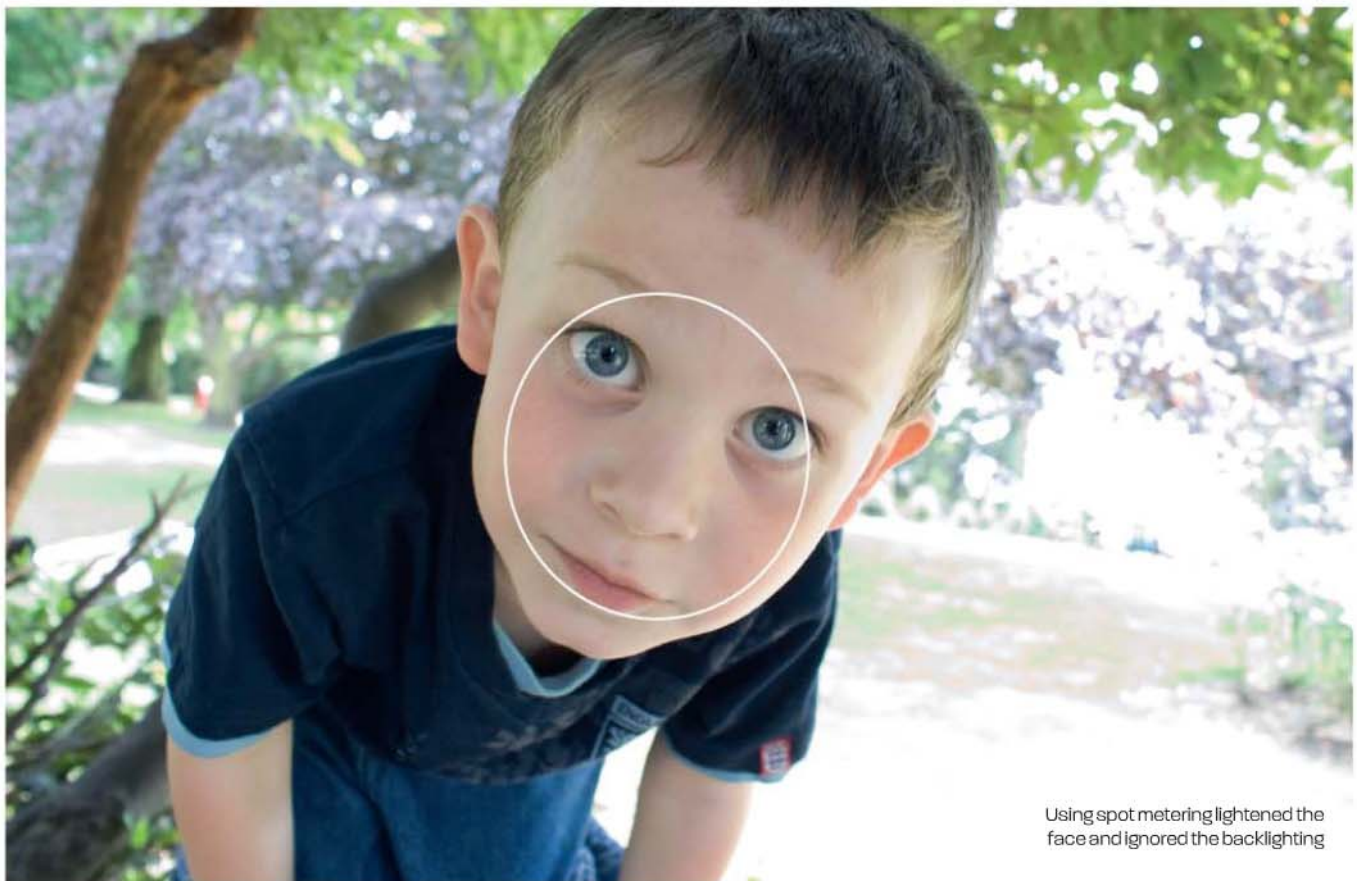
Centre weighted

This setting produces an average over the scene, but places emphasis on the centre area (typically 70%) and 30% of the outside area.

Cameras of the past used this metering technique with their built-in meters, and it works very well for portraits.

Centraweighted metering is better suited to compositions that aren't too contrasty, and is less influenced by a small area of extreme brightness or shadow within the metering area. This setting is useful when your main subject covers a large portion of the image.

Right: Centraweighted metering is good for images with a wide range of midtones



Using spot metering lightened the face and ignored the backlighting

Spot metering

Spot, or partial, metering is where a small, central spot of the subject or scene is metered. In some cameras, such as the Nikon D300, you can adjust the size of the spot yourself. This usually ranges from 6-13mm, and can vary in coverage from anything between 1% and 3% of the whole image, and even up to 7%.

Spot metering is used in difficult lighting, such as with backlit subjects or when you need a specific area to be correctly exposed.

Out of all three metering options (spot, evaluative and centraweighted), the spot metering mode is especially good when shooting high-contrast scenes. It can produce

great images and can be incorporated into a shot via the exposure lock setting. This will take a spot reading of a particular area in the photograph, then give you the opportunity to re-compose the image. This is the option to go for with close-up photography, where you require a precise measurement.

Exposure compensation

Exposure compensation is a method of fine-tuning the exposure of a scene by compensating for overly bright or dark areas. For example, if you are taking a picture of a white piece of paper, your camera will make it grey. To make it white, you'll need to overexpose it. For black paper you would go in the opposite direction and underexpose it. Typically, the extremes of black and white need up to 2EV to reproduce them correctly.



Exposure bracketing

With exposure bracketing you take three to five pictures – the first image is your 'as metered' picture, with the others incrementally under and overexposed. Preset the exposure differences (for example, one stop over and under) and then choose the correct exposure. Bracketing is a good way to learn how your meter behaves with certain subjects, and ensures you get at least one good picture.

Grey card

This piece of kit that is great for helping to get the exposure right. The card provides the meter with its perfect reference point – a mid-grey, which is the exposure the meter 'thinks' it wants to produce.

If you don't have a grey card to hand, you can take a meter reading from a path, tree bark, even the palm of your hand – anything of an average midtone. Using spot metering and the AE lock method will allow you to take a reading and recompose the image however you like.



EXPOSURE LOCK

The exposure lock (AE lock) on a camera works pretty much the way it sounds – when activated, it locks the camera's exposure settings so you can compose the picture any way you like and press the shutter at your leisure. For example, if you want a landscape photo to have a perfectly blue sky, lock the exposure in the sky, then compose and take your picture. However, it isn't a fail-safe method of ensuring everything in the picture is exposed correctly. Though one part may be perfectly exposed, other parts of the image may suffer, especially if the lighting is radically different throughout the image.



Take **control** of your camera

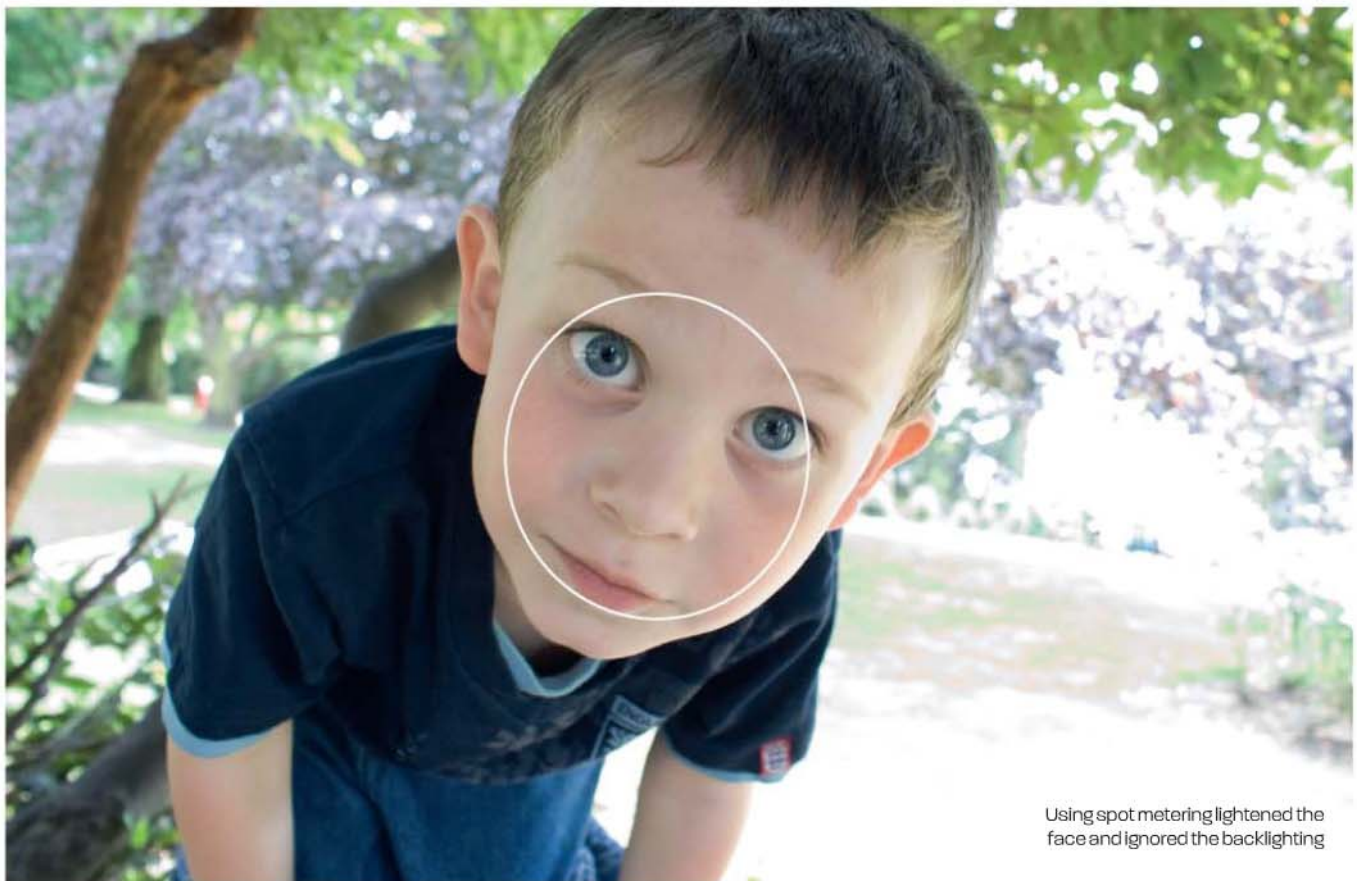
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Grey card

This piece of kit that is great for helping to get the exposure right. The card provides the meter with its perfect reference point – a mid-grey, which is the exposure the meter 'thinks' it wants to produce.

If you don't have a grey card to hand, you can take a meter reading from a path, tree bark, even the palm of your hand – anything of an average midtone. Using spot metering and the AE lock method will allow you to take a reading and recompose the image however you like.



EXPOSURE LOCK

The exposure lock (AE lock) on a camera works pretty much the way it sounds – when activated, it locks the camera's exposure settings so you can compose the picture any way you like and press the shutter at your leisure. For example, if you want a landscape photo to have a perfectly blue sky, lock the exposure in the sky, then compose and take your picture. However, it isn't a fail-safe method of ensuring everything in the picture is exposed correctly. Though one part may be perfectly exposed, other parts of the image may suffer, especially if the lighting is radically different throughout the image.



How to shoot...

HDR photography

Ever taken a once-in-a-lifetime shot, only to get it home and realise that the impact has been lost in translation? Maybe HDR is the solution...



The world of digital photography is one that is constantly evolving, with new and diverse techniques and treatments emerging in relation to what you can do with your images.

One of the latest and most popular of these techniques is HDR, or 'High Dynamic Range', processing. Nearly a quarter of a million images on image-sharing site Flickr now possess the tag 'HDR', and top-notch examples of the technique are creeping more and more into the modern photographer's repertoire.

As with most new techniques, HDR can seem intimidating at first, with the initial steps to creating top-quality HDR images being the hardest. However, DPT is here to help make these steps easier...

So what exactly is HDR? And how can you use it to get more from your digital photography? DPT investigates...





As can be seen by the examples on these pages and the plethora of images creeping into the photographic community, HDR is an unarguably eye-catching technique. However, it serves more than just an artistic purpose: it can be used as a practical tool to improve your photography.

The HDR technique allows the photographer to display the full dynamic range of an image, allowing detail otherwise lost in shadows and highlights to be revealed. It also allows a wider range of tonal details that, while visible to the eye, are unable to be captured through a single exposed image, which is likely to have blown out highlights and murky shadows.

The practical implications of the HDR technique are best illustrated by the following example. Imagine taking a photo from the inside of a room and attempting to get both an accurate representation of both the room and, say, the fantastic view out of the window despite difficult lighting.

Capturing such a scene using a single exposure would be almost impossible due to the huge difference in brightness levels between

‘The HDR technique is a practical tool to improve your photography’

the inside of the room and the sunny outside. Much the same would be the case if you were shooting shadowy architecture, for example.

The beauty of HDR photography is that such a problem is easily surmounted due to the ability to blend and tone map several exposures of the same scene, taken with different exposure settings to record both highlight and shadow detail. In the instance of the room, you can maintain the details of the interior while also showing the view through the windows.

While HDR might present you with a whole new range of post-production challenges and tools for image manipulation, it is important to remember that the fundamentals of photography are still as important as ever.

After all, while HDR has the ability to transform a good picture into an excellent one, it isn't a miracle cure for a bad picture, though it is often misused as such, with horrific consequences! Alongside the reminder to

consider the basics of photography, there are a few helpful things to bear in mind.

Composition and the ‘basics’

One of the most important ingredients of a good picture is composition, and this is also true of HDR images. Try to think of the areas that are going to be emphasised that may previously have been hidden or overlooked, such as the shadowy areas in architecture. Also, don't be afraid to include more of a cloudy sky in landscape images, as tone mapping will bring out the clouds to such an extent that they may subsequently become an unexpected and eye-pleasing focal point of the image.

Low and wideangle shots can also benefit greatly from HDR processing. Much the same as with conventional shooting, always look for a perspective beyond the norm to transform your images.





WHAT IS HDR?

Dynamic range is defined as the ratio between the brightest and the darkest areas of a scene. Therefore, when referring to a 'high' dynamic range, we are concerned with the ability to display a wider range of bright and dark areas than is possible in standard digital photography, or a limited dynamic range image. In essence, it is the ability to display details in shadows and highlights otherwise lost in a conventional image.

The process of the High Dynamic Range imaging technique manages to overcome the restrictions of the limited dynamic range of conventional digital cameras by utilising both exposure blending and tone mapping techniques in tandem, using either recent versions of Photoshop CS or specialist software packages.

'It is the ability to display details otherwise lost'

The idea is to take several images of the same subject at different exposures, either manually or by utilising AEB (automatic exposure bracketing), and then merge them together. The results are often striking, yet the technique is beset on all sides with potential problems in production, making it a technique that takes a lot of practice to perfect. The number of different exposures needed can vary, so don't be afraid to experiment when shooting.



Above: The three images created using AEB



Above: The final result

HDR software

Three tools to have you HDR-ing in no time



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Photomatix is generally considered to be the most capable introduction to HDR processing and is available for a full free trial, with only the restriction of a few watermarks on finalised images.



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www.adobe.com/uk

Photoshop is

fantastic to use as a separate manipulation tool for both pre- and post-HDR creation, with both Camera Raw and standard Photoshop image tools. It also has a more basic option to convert to HDR.



FDR TOOLS
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www.fdrtools.com

One of the cheaper options in HDR development, FDR tools (Full Dynamic Range) is praised in the HDR community and offers a broad range of tweaks and creation tools for HDR images.

How to shoot...

When to use it?

The HDR technique can be applied to a whole host of settings and subjects. However, there are several genres to which the technique lends itself in particular...

Landscapes (Right)

One of the most popular subjects for the HDR post-processing treatment is landscapes. The ability to handle the dynamic data throughout a landscape shot is a huge benefit when shooting a scene where the sky and foreground necessitate different exposures. In the shot to the right, for example, detail on the far mountains and highlights on the clouds would have been lost without accurate HDR processing. For excellent results, try to get out there when either the sun is setting or there's a storm brewing!



Image: Jeff Olaw (www.flickr.com/photos/jeffolaw/)

Architecture

Managing to reveal both the fine highlights and what lurks in the crevices of buildings is a real benefit of the technique, as is the effect on subtle lighting. Next time you're at church on a Sunday or pop out for a pint, consider taking your tripod and bracketing a few images.

Portrait/Still life (Far right)

While portraiture and still life images may not be the most conventional of subjects for an HDR treatment, the effect can be remarkable. Subjects shot in difficult or moody lighting often create the best results.

Interiors (Below)

Gaining the correct exposure for both the interior and the exterior of a room is nigh on impossible without a sophisticated lighting set-up, yet is easily achieved with HDR. Historic buildings are perfect subjects.



Image: Marco Ventura (www.flickr.com/photos/scaletic/)



Image: Christian Vanterten (www.flickr.com/photos/vanterten/)

‘You gain the maximum amount of dynamic data’

Bracketing and data maximising

While it is possible to create a type of HDR image from a single raw file, to gain the true HDR with minimal noise, it is best to shoot multiple exposures using the AEB or bracketing function built into most cameras, or to simply shoot a range of exposures manually in conjunction with a tripod. The reasoning behind AEB functions is to expose one image correctly and then over and underexpose two more by a selected number of stops. In doing so, you gain the maximum amount of dynamic data from your subject, and will in turn have more image data to play with at the processing stage.

As shooting HDR is concerned with keeping

and displaying as much image information as possible, it is a good idea to shoot the composite exposures in raw before converting them to TIFFs. Much the same as including several bracketed exposures, the uncompressed raw file will contain more image information and will benefit your final image. Whilst it may result in a slightly longer workflow due to the demands placed upon the post-processing capabilities of your computer, the end results will be more than worthwhile.

There is a lot of debate about how many exposures you need to combine in your finished image, with numbers of composite shots from two to 16 all producing fantastic images. However, the general consensus is that in areas of higher contrast you'll need a higher number of exposures, and vice versa. Most cameras have the ability to capture at least three images in AEB mode, and for the majority of scenes that'll be enough to capture the full dynamic range. It's often an idea to experiment with the number of exposures and the range of \pm EV values and see what suits.

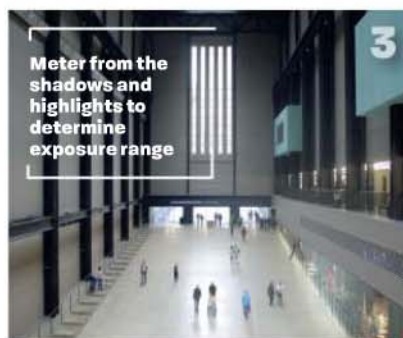
How to shoot an HDR image

There are many ways by which you can obtain good raw material for HDR processing. Here are a few top tips...

1 Minimising camera shake and movement is essential when looking to get a crystal-clear HDR image. Set up your camera on a sturdy tripod and shoot either bracketed images or manually, using a remote cable release or the self-timer.

2 Where camera settings are concerned, try to shoot in raw at all times. This will allow you to both perform any minor tweaks needed at a later date and will also capture the maximum amount of image data for your final image.

3 To determine what range of exposures to use, set the camera to auto and meter for both the lightest and the darkest areas of the proposed shot, then set the camera to the middle of the two and shoot the required images in either AEB or manually.



HDR IN PHOTOSHOP CS3

ACHIEVE HDR RESULTS WITHOUT THE SPECIALIST SOFTWARE!



For those of you who already have Photoshop CS2 or CS3, it isn't essential for you to indulge in a specialist item of HDR software quite yet. Photoshop allows you to achieve excellent results with its 'Merge to HDR' feature

1. You can find the 'Merge to HDR' option by clicking on File>Automate>Merge to HDR. You'll then be required to select the images you're looking to merge before clicking OK.

2. The next window to appear is the HDR viewing window. This gives you the option to view the amount of dynamic range introduced from each exposure, and allows you to delete any as desired. When done, click OK.

3. The image will now be in 32-bit format. To edit the image, convert it down to 16-bit by clicking on Image>Mode>16-bit. In doing so, you will be presented with four choices of HDR conversion:

EXPOSURE AND GAMMA – This will allow you to toggle the brightness and contrast of the HDR image, but subtle tweaks are best

HIGHLIGHT COMPRESSION – An automatic tool that compresses the luminance values to fall into the 16-bit image file, with no toggling needed due to it being automatic

EQUALIZE HISTOGRAM – Another automatic tool that compresses the HDR dynamic range yet preserves contrast

LOCAL ADAPTATION – This option adjusts the tonality of the HDR by calculating areas of brightness and correcting as necessary

These are all quite intricate conversion options, so it's best to just see which one suits your image through practising. Once finished, click OK and complete final adjustments in Photoshop.



Create an HDR image with Photomatix

So you've followed our tips and got your fantastic, and literal, raw material together poised for the HDR treatment. Now it's time to put your masterpiece together. Here goes...



1 If you've taken your images in raw format, the first step is to get them converted into images to blend and map. Open the files up in a raw processor, such as Adobe Camera Raw, and save them as either TIFFs or JPEGs. TIFFs are preferable if you have the space and the processing capabilities, owing to the extra image data they store.



2 Open up your chosen HDR software. For this tutorial, we'll be using Photomatix as it is commonly believed to be the most capable HDR processing software. Once the software has loaded, the first step towards generating an image is just two clicks away. Select HDR from the toolbar, and then click Generate on the drop-down menu.



3 Now select your range of bracketed exposures by browsing the folder in which they are saved and click OK. You'll be taken to an Alignment and Curve Options window. Now check Assume Standard Tone Curve and Align Source Images. Once that's done, simply click OK to start the HDR generating process rolling.

4 This step is where the magic really happens. The image you see in this window will be pretty horrible looking, so we'll have to start tone mapping and playing with all of the settings described in the tone mapping box. Once you're happy with the basic HDR overlook of the image, click OK and save it as a TIFF file.



5 Open up your HDR processed image in Photoshop and complete the finishing touches, such as manipulation of Curves and Levels as you would a normal image, to create your HDR masterpiece. These finishing touches are important to an HDR image, and can really set the image off. Have a play and see what suits the scene.



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Focusing is an integral part of any camera operation. Whether you are using a basic point-and-shoot model, or something that enables you to fine-tune your focusing, picking the right mode and getting the sharpness where you want it is the difference between a poor image and a stunning one.

For many people, focusing is something that is regarded as a given, but, as **with all** photography techniques, it is not quite that straightforward. There are other things to bear in mind, not least the many creative ways in which focusing can be used **to change** a picture. *Digital Photography Techniques* is here to guide and assist you.



Focusing modes in your camera

Most consumer digital cameras have more than one focusing mode. The two main ones are autofocus and manual focus.



Autofocus

At its simplest, when using autofocus mode, focus is locked when the shutter-release button is pressed halfway. The LCD screen or electronic viewfinder indicates when – and sometimes where – focus is locked. A visual indicator in the viewfinder confirms when focus is achieved, and this will change colour. Alternatively, you may hear a beep when focus has been reached.

There are various types of autofocus:

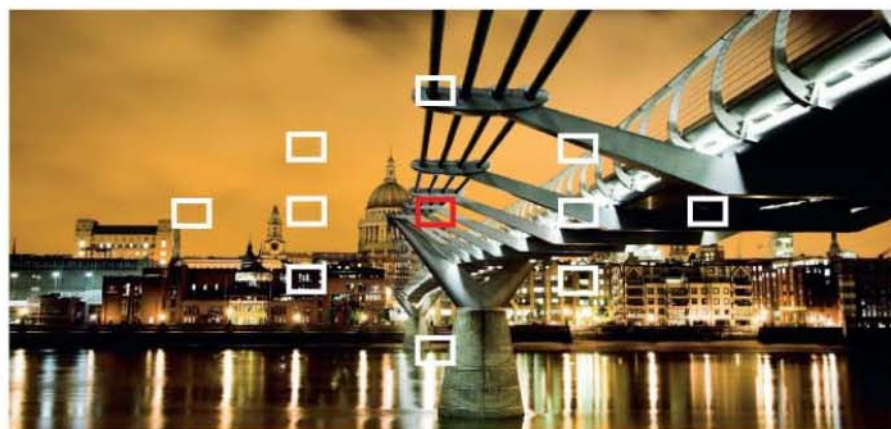
Single-area AF

With single-area AF, the camera focuses on a

subject in a particular area of the screen, depending on which AF point is selected – usually the central point. Once the focus has been set, it stays locked at that distance until the shutter button is released, even if the subject moves in the meantime.

Continuous AF

In this mode the camera continually focuses on the subject, so it's useful when shooting moving objects. It also enables the camera to track the subject, even with the finger on the shutter.



AUTOFOCUS

How does autofocus work

Autofocus is the mode on a camera that instructs the lens to focus on a subject. First, however, the camera has to collate enough information for it to be able to create a sharp image.

A typical autofocus sensor uses a charge-coupled device (CCD). This provides input to algorithms (step-by-step guides to calculations) that compute the contrast of the actual picture elements. The CCD is typically a strip of 100-200 pixels and, as the light from the scene penetrates this strip, the microprocessor analyses the values from each pixel, assessing the difference in intensity among the adjacent pixels. If the scene is out of focus, adjacent pixels have very similar intensities. This being the case, the microprocessor will then move the lens elements to see whether the intensity between the adjacent pixels has got better or worse. The microprocessor will then search for the point where there is maximum intensity difference between adjacent pixels and decide on that as the best point of focus.

This method of focus must have light and subject contrast to do its job. If you try to take a picture of a blank wall, for example, the camera has no adjacent pixels to compare and therefore won't be able to focus.

Most types of autofocus look for contrast on horizontal areas of the AF points, but more cameras today have the ability to assess contrast on the horizontal and the vertical, known as 'cross-type' autofocus.

Subjects need contrast to attain focus



Take control of your camera



Predictive autofocus

If it's constant focus that you require on a moving subject, then continuous AF will maintain that focus. However, it is not always accurate for taking a sharply focused picture, as there is a short time lag between when the shutter is pressed and when the picture is actually taken. This is referred to as the release time lag. The way to solve the problem is through Predictive Focus Tracking System, a feature on many DSLRs. This method forecasts the position of the subject at the moment the image is captured based on the measurement of the subject's movement, and shifts the lens elements accordingly. In essence, it detects the subject's speed of motion by taking the release time lag into consideration.

This option is effective for taking pictures of an object moving at a constant speed towards the camera, but it does not provide maximum focusing performance for a subject that abruptly changes direction, or one with low contrast moving randomly. To focus accurately on such a subject, the autofocus system must accumulate more data on the subject's movement using multiple focus areas – as mentioned earlier – so that an appropriate judgment can be made.



Multi-area autofocus

Nowadays, camera technology gives increased control to the user over the picture they are taking. Multi-area, or multi-spot, focusing is an example of this. A set of points seen through the viewfinder allow the user to focus on specific areas. Some cameras may have as little as three AF points in the viewfinder. Others, such as Canon, contain 45 selectable

AF points, while Nikon's new system pushes that even further to 51. With this method, the camera automatically focuses using one or more points, with the focus positions changing according to the position of the subject being photographed. The user has the option to let the camera automatically decide which point to focus on, or manually select it themselves.

Manual focusing

This method was the original method of focusing before autofocus. By rotating the focus ring, which moves the lens elements, the user achieves focus. This method is particularly useful for close-ups, or for low-light situations, where the autofocus fails.

As the lens is focused, the image in the viewfinder will become clearer. Often a central split image in the centre of the viewfinder will enable finer detail to be focused.

Some cameras allow the user to fine-tune the focusing manually while in the AF mode.



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Hasselblad Polaroid 100	Exc++	£58
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Exc++	Very Light Use
Exc++	Above Average
Exc++	Signs of Use
Exc	Obvious Signs of Use
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Take **control** of your camera



Mastering **Focal** lengths

Have you ever wondered how it's possible to take a picture of a far-away tree, yet have the subject fill the entire frame, despite it's distance from you and your camera?

Or how a picture can be taken close to a subject, yet include a whole host of things either side of it? Stay with us and we'll tell you all you need to know.

In the world of photography, the focal length describes the distance in millimetres between the lens and the image it forms on the sensor (or film) when it is sharply focused at infinity – that is, the farthest possible distance. This distance determines the angle of view – how much the lens sees – which controls what portion of the scene will be captured. And this portion in turn is dependent on the size of the sensor (or film). The lens' focal length determines the magnification, that is, the size of the image that the lens forms. And to achieve the pictures you want, you have to employ lenses with different focal lengths – but more on that later.

It might sound a bit complicated to start with, but there really isn't anything to be scared of when it comes to defining lens focal lengths and their relationship with your photographs



How does it work?

When a ray of light passes from a less dense to a more dense medium (such as from air to glass) it slows down. If it strikes the glass surface at an angle, it is also bent a little, and this is called refraction. When it passes back into air, it speeds up again, and is again refracted if the surface is at an angle.

Therefore, a curved piece of glass will focus a parallel beam of light (arriving perpendicular to the lens, along its axis) to a point. The interesting thing happens when the light rays are parallel to each other, but not parallel to the axis through the centre of the lens. This same lens will also focus these, but to a point above, below, or beside the focal point for rays along the axis. All these points of focus of parallel rays form the focal plane of the lens. So, put the sensor at this focal plane, and you've now used the lens to concentrate the light on the sensor.

Focal length is fairly easy to understand with a lens that has a single element, but most camera lenses are made up of lots of separate individual elements. These compound lenses have an effective distance from the image plane, somewhere among all the elements and groups, and the further away from the image plane that is, the longer the focal length. So, when you focus on something closer than infinity, and the lens is moved further away from the sensor (film), the lens will get longer.

This is not the case for all lenses; indeed, many have fixed focal lengths that cannot be adjusted. This means that technically a 400mm fixed-focus lens should be 400mm long. But, if you were to get a ruler out, you would see that this is not the case. This is because all the individual glass inside the lens makes it behave as if it is longer than it is.

Different compound lenses house varying characteristics, such as the angles at which they refract and disperse light, which ultimately affects image quality



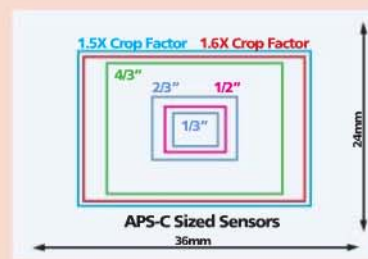
FOCAL LENGTH EQUIVALENTS

In terms of today's DSLRs, most sensors have the APS-C-sized format, smaller than that of a 35mm (full) frame. This results in a magnification of a lens' focal length, the value of which is determined by the sensor's size in comparison to a standard full frame. Manufacturers refer to this magnification as a 'crop factor' – or, how much of the image is cropped due to the smaller sensor.

The APS-C format, measuring around 24x16mm, is smaller than a full-frame sensor by a factor of 1.5x. Therefore, the focal length of a lens must also be multiplied by this amount to arrive at its effective (35mm equivalent) focal length. So, a 28mm lens becomes a 42mm lens, a 50mm lens become a 75mm lens and so on. The APS-C format does vary slightly according to different manufacturers, with Canon's APS-C sensor at a factor of 1.6x and Sigma's at 1.7x, but in any case, it's simply this figure that needs to be multiplied by the focal length to arrive at its effective length.

Manufacturers have accounted for this by adapting their lenses. As the traditional wideangle lens used to have a focal length of around 28mm, most kit lenses start from 18mm in order to meet it ($18 \times 1.5 = 27\text{mm}$). For the Four Thirds format, the 2x multiplication factor means that Olympus's kit lenses start at 14mm. The smaller sensor size means that lenses designed specifically for digital cameras are both lighter and smaller than their 35mm equivalents.

Full-frame 35mm sensor



A comparison of the different size sensors. While the full-frame format is fixed at 36x24mm, the APS-C format comes in slightly different sizes

The sensor size

Rather than having the historical 36x24mm recording area of 35mm film, the image sensors in most cameras are smaller. This means that the equivalent focal length of digital camera lenses is numerically longer (more telephoto) than their film equivalents. For example, a 50mm lens, having an angle of view of about 47°, is considered to be a normal lens for a 35mm film camera, that is, it produces an image that through the human

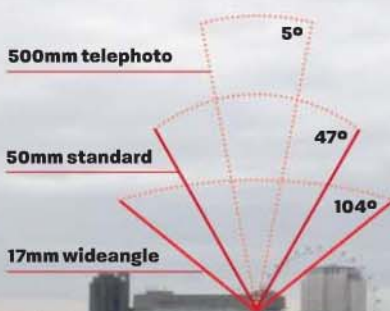
eye would be recognised as normal, not distorted in any way. So for a digital camera with a sensor that is smaller than the customary 36x24mm recording area, the lens will in effect become more telephoto, creating a smaller angle of view. As digital photography has progressed, so more companies have made DSLRs with full-frame sensors that are the same size as 35mm film, making their angle of view the same as that of film cameras.

Take **control** of your camera

The focal length rule

You can work out how focal length will dictate the pictures you can take by memorising the following rule. As the focal length of a lens increases, its angle of view decreases because the magnification increases, which results in the object becoming larger in size.

Focal length affects perceptual perspective too. As the focal length and magnification of a lens increases, the image appears more compressed, resulting in less visual distinction and separation between the foreground, middle ground, and background.



What lens should I use?

There is a plethora of lenses out there for the budding photographer, as you'll no doubt discover. You'll need to choose one that's suitable for the type of photography you practice, but when it comes to specifics, here are a few pointers on what lens is best for what scenario.



Standard

On full-frame DSLRs, standard lenses fall between 40mm and 55mm, though 50mm is the accepted norm. Closest to the field of view of the human eye, standard lenses offer an undistorted perspective and are often used for flattering portraits. The closest equivalent for APS-C-sized sensors is a 35mm lens. Most DSLRs come with a standard zoom, which spans from moderate wideangle to short telephoto. Consumer lenses tend to have a lower maximum aperture.



Wideangle

With shorter focal lengths and wider angles of view than standard lenses, wideangle lenses are employed by landscape and reportage specialists. Remember you'll need a shorter focal length on many DSLRs to get the equivalent field of view if you don't have a full-frame sensor. There are plenty of wideangle lenses available, from 8mm 'fisheye' lenses to 28mm optics. Wide zooms are increasingly popular and effective.



Macro

If you've ever wondered how photographers fill the frame with small subjects such as petals and insects, the answer is the humble macro lens. Allowing for 1:1 (life-size) reproduction and focusing from as close as 2in, true macro lenses are specifically constructed for close-up photography. They are commonly available in focal lengths between 50mm and 180mm. The macro lens is not restricted to purely close-up photography, though, and many photographers employ their services for portraiture as well.



Telephoto

Any lens that weighs in with a focal length in excess of 50mm is said to be a telephoto lens.

Traditionally, short telephotos (between 70mm and 120mm) are ideal for portrait photography, but that 50mm standard lens you used on your old film camera offers the equivalent angle of view to a 75mm lens (in 35mm terms), so is now an ideal lens for portraiture. Longer focal lengths (between 135mm and 300mm and above) are perfect for sports and wildlife photography.



Getting it right: flowers and gardens

TOP SHOT

Follow top garden photographer Clive Nichols' tips to improve your macro photography

The checklist

SHOOT AT THE RIGHT TIME

Get up early to make the most of the dawn light.

USE A REFLECTOR

Gardens often have dark corners where the light doesn't reach, so use a reflector to bounce sunlight back onto the subject and lift the colours.

MACRO MATTERS

A long macro lens, such as a 200mm, will allow close-ups without getting too close to the subject.

OPEN UP OR CLOSE DOWN

Use wide apertures for close-ups and small apertures for full garden shots.

THINK ABOUT COLOUR

Use a colour wheel to help select contrasting or complementary colours.

KEEP IT STEADY

A good tripod is one of the most useful and long-lasting pieces of kit you can buy.

Blurred background

Using the widest aperture will throw the background out of focus and blur unwanted background elements. This enables the main subject to stand out, rather than fight for attention with other eye-grabbing flowers.

Diffused lighting

Soft, diffused lighting ensures even coverage and helps keep contrast to a minimum, reducing deep shadows and burnt-out highlights. Adjust your camera's white balance to its cloudy or overcast setting to ensure accurate colour balance. A small reflector can be useful for bouncing light onto a subject.

Shallow depth of field

Aside from the blurred background, a very narrow depth of field concentrates interest on a very specific area, in this case the central stamen of the flower, while the gradual blurring leads the eye.





Multi selection blur
Simulating camera DOF effects

Bold colours

Yellow and purple are complementary colours; use a colour wheel to see which colours are complementary and which are harmonious. Complementary colours are directly opposite on a colour wheel and provide striking contrast, as here. Harmonious colours, on the other hand, are adjacent to the flower colour and share a more balanced tonal palette.

Exposure

Some colours need more or less exposure than others to record accurately, especially when they're set against an opposing colour. Check your camera's LCD and histogram to ensure accuracy. It's well worth using a grey card to achieve an accurate exposure.

Crop

Tight cropping helps keep interest on the main subject. Moving back may lead to a nice group shot, but concentrating on a single flower is often more dynamic.

Take **control** of your camera

Mastering **Built-in flash**

Thought your built-in flash was just for low light? Find out how you can use it creatively whatever the situation

When the going gets dark, the built-in flash gets going. Unless you've got a top-of-the-range pro camera in the Nikon or Canon range, the chances are that your camera features a built-in flash. Always situated on top of the camera body, and small and low-powered, this addition comes into its own when the lighting gets tricky or you'd like to add a bit more sparkle to your images.

There are two ways in which the built-in flash can be used: by letting the camera dictate when it comes into play or by manually operating it, thereby using it when it suits you. You can do this by either physically popping the flash up, or altering the settings so that in certain light, the flash will pop up and fire. Here, we take you through the uses of built-in flash so that you can find out what all the fuss is about.



Flash modes explained

Depending on what flash mode you select, the camera controls its flash system – this applies whether it's built-in or external. The modes are controlled either via the button on your camera or, with some models, through the flash set-up menu in the camera's main settings. These modes also control the way that the flash

interacts with your exposure system. For example, if your camera's exposure system determines that it is too dark, and your flash mode is set to auto, your camera will automatically be commanded to pop up the flash and fire it.

The standard modes include:



AUTO: This option automatically fires the flash when it's dark or the light level is low. It's a convenient setting for most shooting situations



ANYTIME FLASH (FILL FLASH): With this mode selected, the flash fires every time a picture is taken. This can be utilised when there is a bright light source behind your subject – if that back light is too bright, then the actual subject would be too dark



SLOW SHUTTER FLASH: By picking this option, you can combine a long shutter speed with the flash operation. It's best used for night portraits, where the flash lights up the person and the long shutter records the night or city lights, which in turn will create a more natural effect

AUTO



ANYTIME FLASH WITH RED EYE REDUCTION: This is designed to reduce any potential red eye problems by firing off a series of small flashes before the main exposure



FLASH CANCEL: This forces the flash off so that it won't fire, even if it feels it is necessary. You may need to adjust your ISO or exposure settings to compensate for this

RED EYE AND REMOVAL

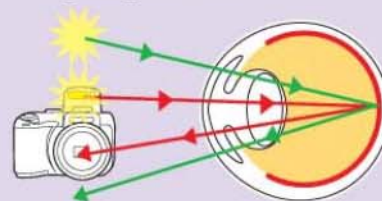
Unfortunately, this handy light source has its shortcomings too. In portraiture, for example, it is easy to get 'red eye' with every shot. The reason behind this is that these small flash units give illumination that is fired 'flat on' at the subject, therefore producing images that have unnatural looking lighting



effects. It is exacerbated by the flash unit being located very close to the lens. When you look at someone's face, the pupil in the centre of each eye appears naturally black. In actual fact, the light-sensitive retina at the back of the eye is pink, but is too recessed and shaded to appear coloured under normal lighting conditions. But when you fire a flash at someone, it easily lights up that part of the retina. Camera designers have gone to great lengths to minimise the defect by locating the flash further from the lens. Another approach is to try and give one or more flickering 'pre-flashes' just before flashing at full power with the shutter. This is done to make the eyes of whoever you are photographing react by narrowing their pupil size, which in turn results in a reduction in the occurrence of red eye.

In addition to these techniques, you can minimise red eye by angling the camera to avoid straight-on portraits. But the best approach of all, if your camera accepts an add-on flashgun, is to 'bounce' the light and avoid red eye altogether.

Light reflects off the back of the eye straight into the lens



PC socket

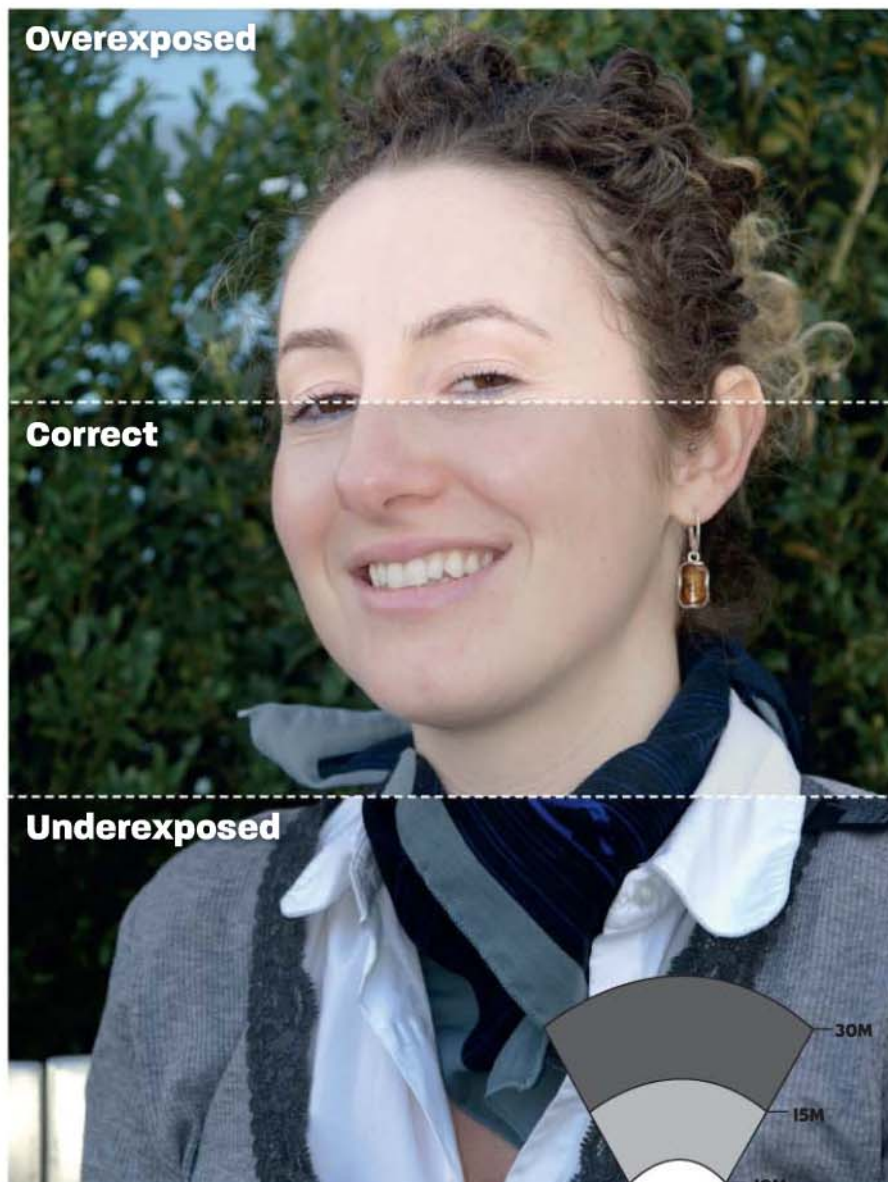
In this instance, PC doesn't stand for personal computer, but Prontor Compur, who made shutter mechanisms for cameras and originally designed and devised a system for triggering a flash unit at the same time as a camera shutter. Its industry standard compact electrical socket, which connects the camera to a flash

using a cable, is called a PC socket. Without one of these, should you want to use an external flash, you would need something like a hotshoe flash adaptor incorporating its own PC socket, or a cordless slave system where the camera's own flash unit fires the external flash using an optical trigger.

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Take control of your camera

Controlling flash exposure



Overexposed

Correct

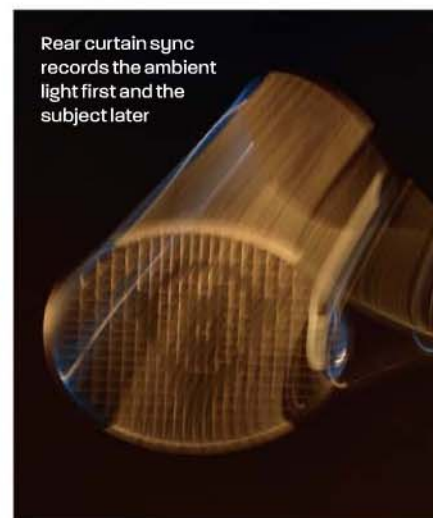
Underexposed

FLASH EXPOSURE COMPENSATION

With some cameras, you can exercise control over the flash. One such way is through flash exposure compensation, which lets you manually adjust the intensity of the flash without changing the camera's aperture or shutter speed. This is an ideal way to balance flash and natural light when using fill flash and to correctly expose scenes or subjects that are darker or lighter than normal. This option can be used in conjunction with regular exposure compensation.

GUIDE NUMBERS

One of the key aspects of using a flash is the Guide Number (GN). This figure is often used to indicate the power of the flash, and is based on ISO 100 and a lens focal length of 50mm. In terms of a built-in flash's GN, they are fairly standard and usually amount to around 10-14m. This is OK for subjects reasonably close to the camera, but when it comes to covering larger groups, they are not powerful enough to provide effective fill.



Rear curtain sync records the ambient light first and the subject later

Front and rear curtain sync

The cameras of yesteryear had just one flash option: the sync speed. Today's cameras give the option of front and rear curtain synchronisation. Essentially, the flash can be fired either during the front curtain's opening or that of the second curtain. This can have dramatic effects on the images when used in combination with slow shutter speeds – known as slow sync.

When it comes to front curtain sync, the front curtain (sometimes known as 1st) will record the subject first, then the trails as the flash fires quickly in the exposure cycle. With rear curtain (2nd) sync, the flash fires later in the exposure, so the ambient light is recorded first, then the flashed subject, so the trails are behind the movement of the subject rather than in front of it.



Front curtain sync records the subject first

Shutter speeds and aperture

Flash is closely aligned to the shutter speed and, more specifically, the duration of the exposure. Camera specifications often quote an x-sync speed. This is the fastest shutter speed possible with which the flash will work. The sync speed is usually set at around 1/60-1/250sec, although higher speeds can be used with dedicated off-camera flashguns. The x-sync shutter speed is determined as the point when the shutter is fully open and the camera sends a charge to the flash to fire. The burst from a flash is typically shorter than the time the shutter is open, but there is an optimal point when the shutter is fully open.

The aperture controls how much light reaches the sensor. Close the aperture (larger f-number) for less flash exposure, open it (smaller f-number) for greater flash exposure.

The combination of flash and a fast shutter speed has enabled the action to be captured sharply



Daylight fill flash

It doesn't matter if the sun is shining or if you have a lot of light, there's always an opportunity to use the flash. In one instance, there's actually more reason to use it. If there is harsh, direct sunlight, harsh shadows will form across peoples' faces and, by using a flash, these shadows can be removed. Fill-in flash will also help to add saturation to the image, especially if balanced well with the ambient light. Alternatively, by adjusting your exposure, you can under and overexpose the background for creative effect.



Fill-in flash has balanced with the sunlight for an accurate exposure

Take **control** of your camera

Mastering

Menus

Delving into your camera's menus can seriously improve your photography. Give it a try

The menus are the heart of the digital controls, allowing you to set up and customise your camera and your images. From basic tools such as setting the time and date, to changing colour modes and altering the overall look of your images, the menus provide a whole host of options to make the camera perform in exactly the way that's right for you.

Menus on different brands and models vary, so we'll talk about generic or common modes and features that are found on most models. For more specific information consult your camera's manual.



The Set-up menu

Before you even begin to take pictures, the camera needs to be set up properly to make it work effectively. New cameras are set to

factory defaults, which will let you take pictures straightaway, but there are still a few alterations you may wish to make.



Time and date

When you turn on your camera for the first time, it will flash up a screen asking you to set the current date and time. This is actually an important step, because when you later search for images the date is recorded within the metadata. This will allow you to search for pictures quickly, or act as useful memory joggers. You'd be surprised by how useful this

is, and not only when your Aunt Mabel asks when a certain picture was taken.

In the Set-up menu, select Time and date and set it to the current time and date (obviously!). The camera will also give you format options such as the order of the data, 12-hour or 24-hour clock and so on. Select your own preference.



FORMATTING

While a memory card can normally be used immediately, it's often a good idea to format it first. This wipes the memory and sets up the best compatibility with your camera. Because computer data isn't stored linearly like it is on tape, the memory can become fragmented and, as you use and re-use your card, it can become inefficient. Regularly formatting your memory cards keeps them in best condition.

Be aware, though, that any info on the card will be deleted during formatting.



FILE NAMES/FOLDER

Many cameras will allow you to select folders, or create new folders on your card, in which to store your images. This can be especially useful if you have a high-capacity card and are shooting different subjects. You could, for example, create 'work' and 'family' folders. When you download your images, you can then quickly find and download the specific folder you want.

Some cameras also allow you to set your own image name, rather than the cumbersome 'DSC_021562'-type naming conventions. A rather slow alphabetical or 'qwerty'-type menu screen lets you customise your prefix using the four-way control and set button. You can also set the way the files are numbered, and reset the numbers back to zero if you want.



Take control of your camera

JPEG SIZE AND QUALITY

Most cameras give you the option to choose the quality of your JPEGs. Because the JPEG file is compressed – that is, some information is discarded in order to save space – a certain amount of quality from the final image can be lost. For best results you should use the top level, which, depending on which camera you have, may be called fine, best, or marked by a number of stars. This is especially important if you need to preserve fine details and subtleties of tonality in your images.

Lower-quality files increase the amount of compression so they should really only be used in an emergency, or if you need to email the files or post them to the web, or when best quality is simply not required.

The size of the image can usually be chosen as full-resolution images – 10MP, for example – though smaller resolution files are also available, such as 5MP, 2MP and 1MP. Again, for best quality work, choose the maximum resolution, as the lower resolutions don't use all of the pixels on the sensor. Smaller-resolution files are useful if you're taking pictures for snapshots or posting to the web, such as eBay, as you don't need the highest quality and the files will be quicker to process, resize and upload.

It's worth remembering that larger file sizes and finer quality JPEGs use up more space on your media card.



Function menu

A more recent feature of DSLRs is the Function button, allowing quick access to features that were previously buried in the menu.

The Function button will typically allow you to access and change the ISO, white balance and flash mode more directly, although different cameras do have less or more comprehensive systems.

Right: The Function button opens a fast access menu for common camera settings



Raw+JPEG

The file format is one of the most fundamental controls, and affects final image quality. Raw files are often called digital negatives, as they contain the pure digital data, with little processing by the camera. While they offer the best quality, they require the photographer to process the images on the PC, so are not the best option for quick snaps or for beginners. The larger file size of raw images also reduces the camera's shooting speeds.

JPEG is often the most preferred format. These files are processed by the camera, with

white balance, sharpness, exposure and colour balances all being corrected to some extent by the camera. JPEGs are the most commonly used file formats on the web and by printers, so they are ideal for sharing and can be used for direct printing to home inkjets from the camera.

There is often an option to record raw+JPEG, giving you the best of both worlds, but with slower recording and shooting speeds.

See pages 31-37 for more information on these two file formats.

Setting control function

One of the most useful ways to personalise your camera is to change the function of the exterior controls. This is especially useful if you are new to the system – such as switching from Canon to Nikon – and you want your new camera to behave similarly to the system you're used to.

In the custom menu, you will find numerous items that let you change the function of the

controls on your camera, such as command dials. You can usually nominate some exterior buttons for quick access to features that you often use, such as nominating an AE lock or AF lock button. Exposure compensation factors can be chosen, such as whether to operate in one-third or half-stop increments, while you may want to bracket over five frames or three frames.



LCD ADJUSTMENTS

At default, your LCD screen may not be accurate, so it's worth spending a few minutes adjusting the brightness and contrast to show your images at their best. While it is almost impossible to calibrate your LCD accurately, in such a way as you can on a PC monitor, it is possible to get a better view. Some cameras, such as the new Pentax K20D, even let you adjust the colour. A good way to adjust your screen is to take a photo and copy it to your PC. Open it, then view the same image on your camera. Adjust the LCD brightness until it looks as close to the image on your PC as possible.



Colour space



There's a choice of colour spaces available to you in the menu, which lets you set the colour profile of your image so other applications can correctly match the colours. Adobe RGB is the best for work that requires post-processing in Photoshop, because the range of colour, or gamut, is wider.

Images for the web or direct printing should be taken in sRGB because this is the standard for those media.

Take control of your camera

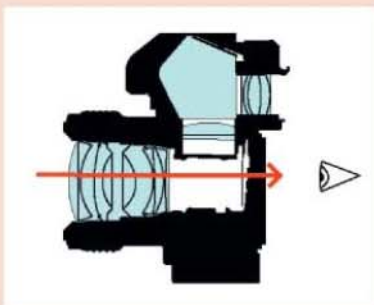
LIVE VIEW

The latest technology to make waves in the camera community – a live view of the image to be photographed on the LCD – is a given on compact cameras but has traditionally been harder to achieve on DSLRs. This is because the viewing system and, notably, the camera's mirror, blocked off the feed to the sensor. The new system requires the mirror to be lifted and the shutter opened to allow a video feed from the sensor to the monitor to take effect.



The result is that the photographer has the option of Live View or viewfinder use, but not both. In order to take the picture, the shutter has to close again, then reopen and close for the exposure, and then reopen once more to return to Live View. The system is therefore suitable only for a few certain circumstances rather than everyday photography.

Live View was first developed by Olympus and Panasonic on their respective E-330 and L-1 models, but it's taken a couple of years for it to become a more mainstream function. Now Canon, Nikon, Sony, Pentax and Samsung all have Live View modes available on selective cameras.



Most systems lift the mirror to provide a feed from the sensor

The LCD monitor

Now, of course, the LCD is an integral part of the camera, allowing access to menus, shooting information, image previews and even live video feeds of the subject. While you cannot always rely on the image it displays to confirm that you have a good exposure, most cameras feature a histogram view and highlight/shadow warnings that keep you fully informed.



HIGHLIGHT/SHADOW WARNING TOOL

A quicker visual tool than the histogram (see below) is the highlight/shadow warning tool. This adds a flashing coloured patch in areas of underexposure and overexposure – often red for the highlights and blue for the shadows.

If you have a lot of flashing red skies, for example, you know that they will be blown out in the final image, so you need to adjust your exposure to compensate by reducing it by a stop or two. You can always brighten the midtones on the PC post-capture.

The histogram

While preview mode is useful as a visual aid, the ambient light or brightness of the screen doesn't always accurately reflect the image's true exposure. For this you need to use the histogram, usually available by pressing the info button, or similar on the camera.

The histogram is an electronic graphical representation of the exposure over the 256 levels of the image. The left of the graph covers the shadows, the middle the midtones and the right the highlights. For an average

subject, the chart should show detail across the full tonal range. If the graph is bunched up to the left, the image is likely to be underexposed, while to the right signals overexposure. If there are peaks at the edges of the chart, left or right, the highlights or shadows are likely to be clipped – that is, beyond the sensor's ability to record them. If this occurs, shoot again and adjust the exposure. Particularly high- or low-key images will produce a more bunched-up histogram.



The histogram is bunched to the left, which indicates underexposure



The histogram is grouped in the middle, showing detail across the full tonal range



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Digital Photography for beginners

The Foundation in Digital Photography teaches you how to use your digital camera. You will learn:

- Viewpoint and composition
- How to use your camera's program modes
- All about lenses
- Sharpening your image
- Formatting, sizing & printing
- ISO, flash, exposure & white balance setting
- Basic image editing

Course level: beginner

Digital Photography intermediate

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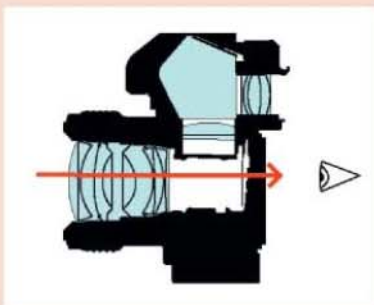
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Take **control** of your camera

Mastering

Image parameters

Find out how to use your camera's image parameters to stamp your personality onto your images...

DSLR menus are an area that, if used properly, will fuel your creativity and allow you to personalise your pictures however you wish.

Film photographers use a variety of films to achieve certain looks. This can be as simple as choosing colour or black & white, though more experienced photographers may

choose specific films for their particular characteristics. Some may opt for the warmth and slight magenta tones of Fujichrome Velvia or the colour accuracy of Kodak Ektachrome. In any case, most photographers use specific films for landscapes, another for portraits and another for documentary.

Black & white films also offer the same choice – the fine grain of Ilford Delta or the gritty look of Kodak Tri-X, for instance. On top of that, different developers can alter the tonal range and acutance of the film, while a multitude of printing techniques, papers and toners can further enhance the image and give it more life.

In the digital age, much of that individuality, skill and knowledge is being lost, replaced instead by sensor characteristics, image editing software and the on-board image parameters that we'll explore now.



Contrast

Contrast describes the difference in brightness between highlights and shadows, and all the tones in-between, across an image. High-contrast images usually have extreme differences from very black blacks to very white whites. Low-contrast images have soft whites and plenty of detail in the shadow. The midtones are also affected, with less gradation

between tones in high-contrast images and more in low-contrast images.

Digital cameras are set by default to replicate the colours and tones that the human eye can see, so contrast looks, by default, pretty normal. However, the angle and brightness of the sun, for example, can lead to scenes of high contrast, with

highlights blowing out and shadows becoming very deep. By reducing the contrast in the contrast submenu, we can adjust the image to appear more natural. Similarly we can boost the contrast in flatly-lit images.

Creatively, adding contrast will add more 'punch' to an image, while reducing it will give an image a softer look.



High



Default

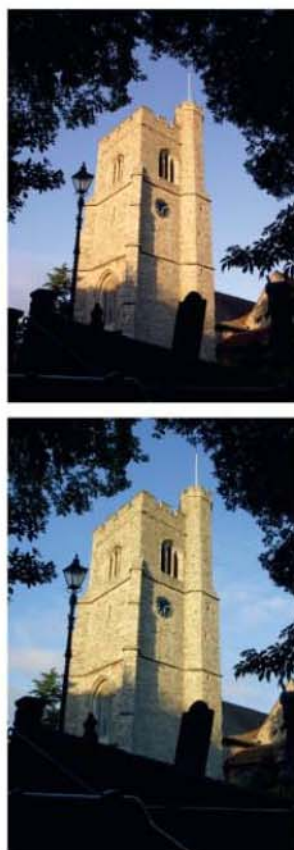
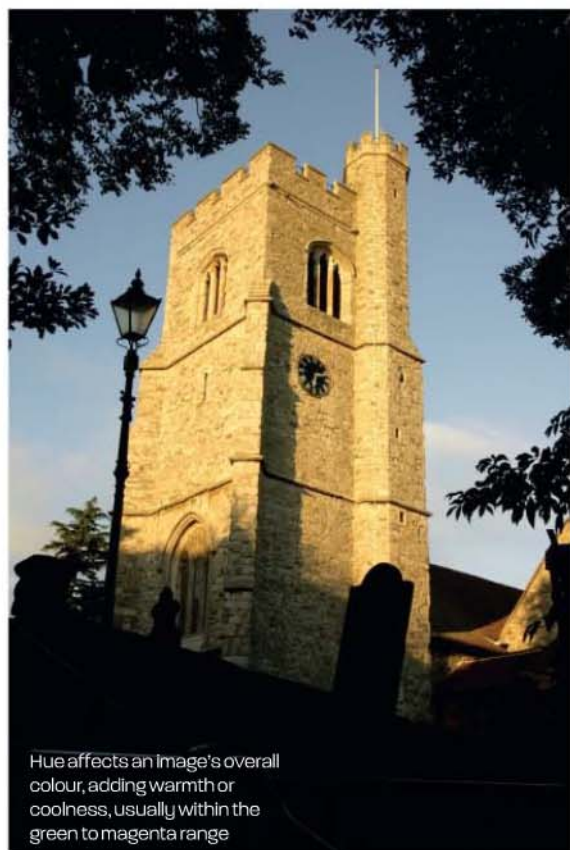


Low

Above: These images show the effects of changing contrast from default to the extremes of high contrast and low contrast

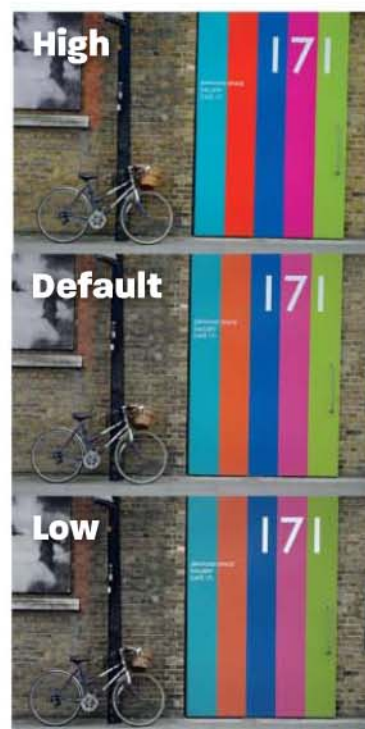
Hue

Some cameras feature a hue control that allows you to change the overall colour balance towards a particular colour tone, or hue. For example, you can make the images look slightly bluer (or cold), a little more magenta (warm) or green. This can be useful not only for adding creative elements to your photography, but also if, for instance, a dominant colour in the image is affecting the overall colour balance (based on the white balance metering).



SATURATION

As with image contrast, digital cameras are designed to replicate the world as accurately as possible. By increasing saturation you increase the intensity of the colour, while reducing saturation gives a flatter, softer feel. Extremely high saturation can give images an almost pop-art feel, while the reverse results in an old-fashioned, faded look.



Take **control** of your camera



Normal



Medium



Maximum

Sharpness

We have become used to seeing images that look absolutely pin sharp, when in actual fact the world is a little bit more blurry. Look at something close up and everything behind the object is slightly blurred. In fact, it's unlikely the edges of whatever you're looking at are as sharp in reality as they are in your images. Try taking a picture of your computer monitor, and then compare that picture with the edge of

your monitor in real life – the likelihood is that the photograph has a more defined edge. Sharpness works by increasing the contrast between pixels, especially at subject edges, making the edges appear more defined and the images therefore sharper.

Be careful when using the sharpening tool, as overdoing it may lead to white lines, or halos, around edges within an image.

BRINGING IT ALL TOGETHER

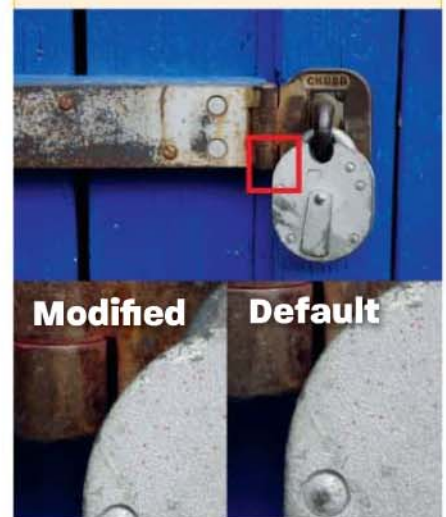
By using one or a combination of the four controls (contrast, hue, saturation and sharpness), you can achieve many of the effects in-camera that you may add in post-production. The images can then go straight to your website or printer without you spending time on the PC. You can also give your images a unique, personal style.

Many of a camera's presets are a combination of these four controls and most cameras will allow you to change the individual settings within each preset. Most cameras also offer custom areas to create and save your own settings.

Each camera manufacturer has its own naming convention – Canon's Picture Style and Nikon's Colour Mode, for example – but they all essentially perform the same function. Check your manual for specific information for your camera model.

Scene or subject-based modes work in much the same way, using a combination of these settings that are sympathetic to the subject, while also selecting the correct aperture, shutter and metering combination.

But remember, the parameters you set cannot easily be changed once the JPEG image is taken, and trying to remedy poorly chosen options afterwards in Photoshop is a one-way ticket to Frustrationville. The exception to this is with raw images, which will allow you to post-process all you want from the original, unmodified files.



Modified

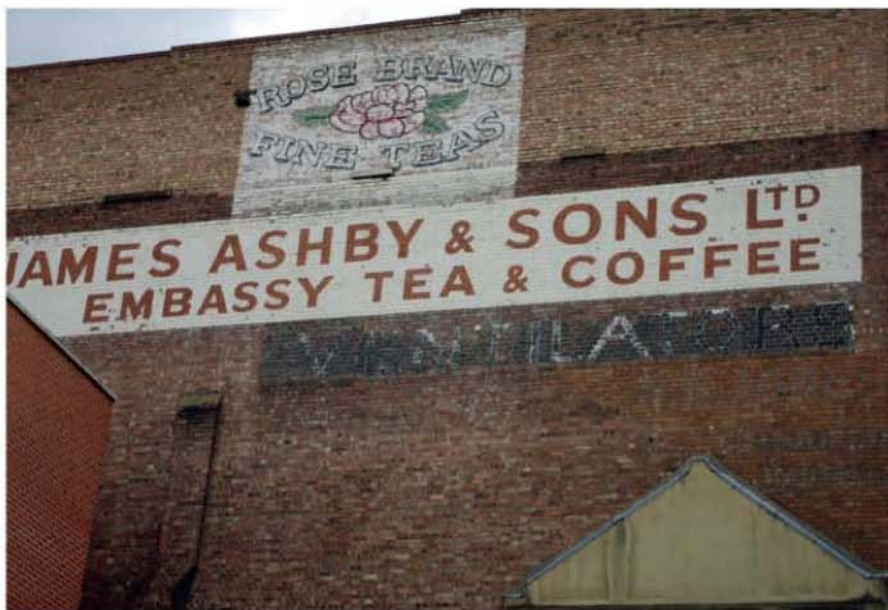
Default

Monochrome and toning

Among the colour settings you'll find a black & white, or monochrome, setting. Simply put, this removes all the colour from your images to leave you with a black & white image. Some cameras have other enhancements, such as

digital filters. The yellow, orange and red filters will darken the sky to varying degrees, by filtering out those colours (which intensifies blues and makes clouds stand out), while the green filter will turn foliage white.

You may also have some toning options, the most common being a sepia effect, which adds a brown tint to the image, replicating toned prints of the 19th century. Some cameras offer blue, red and purple toning as well.



Above: A basic colour image can be turned into a monochrome image (top right) or even toned to a vintage-look sepia (bottom right)

Dynamic range

Most cameras now offer some form of dynamic range extension. Digital camera sensors are less sensitive to the varying tones and brightness than negative film, and are less able to cope with extreme areas of light and dark. There have been several solutions put forward to remedy this during the years, beginning with

Fujifilm's HR sensor, which featured a second set of photosites to capture highlight detail more accurately. Sony and Nikon offered firmware and software solutions that work in a similar way to the Highlight/Shadow feature of Photoshop, essentially adding a curve to the image to lift midtone and shadows from

backlit, contrasty subjects. This tool is still being refined, however, with Nikon recently adding it as a shooting feature rather than a post-processing type. Other manufacturers are also adding similar functions to their products, with Pentax and Olympus incorporating it into their latest DSLRs.



Above: Dynamic range features allow you to open up shadow and highlight detail – especially useful when shooting against the sun

Getting it right: autumn landscapes

TOP SHOT

Here's why this best-selling landscape shot by Jeremy Walker works so well

The checklist

PRE-VISUALISE THE SCENE

In landscape photography, it's essential to be able to have a sense of how a scene will record once photographed. Without this ability, Jeremy may well have walked on past this one.

USE A TRIPOD

Landscapes benefit from a slow, considered approach. Walk around the subject to be sure of selecting the best viewpoint and lighting and, once found, set the camera on a tripod. Not only will this enable you to fine-tune your composition, but it will also allow you to use a small aperture for maximum depth of field while achieving optimum image sharpness.

SEE THINGS DIFFERENTLY

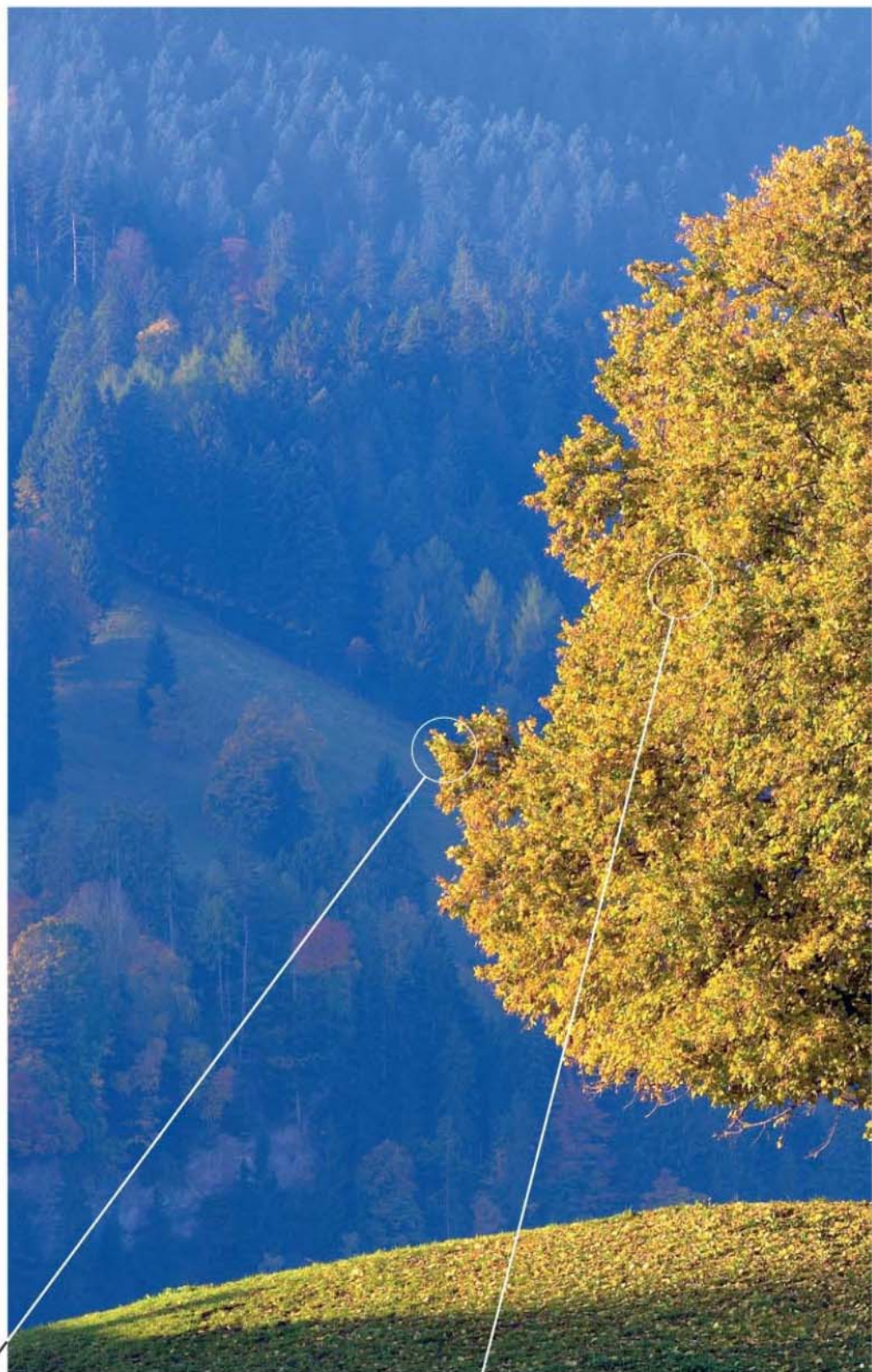
While the standard kit lens lets you get good shots in most situations, it's worth investing in a wideangle or telephoto lens. These enable you to look at the world in a different way and find pictorial opportunities you wouldn't otherwise see. Don't just rely on lenses for this, though. Experiment with low and high viewpoints, and don't forget to turn the camera to portrait format to see what this offers.

Great use of colour

The contrast between the bright yellow of the tree and the deep blue of the background was created by the fact that the tree was lit by sun while the background was in shadow. The result is a landscape with enormous impact in which the lone tree really stands out.

Superb lighting

Jeremy found this scene early in the morning when the sun was low and striking the tree from the side. This has created a strong contrast between those areas lit by the sun and those in shadow, which brings the scene to life and provides a great sense of atmosphere.





Harmonious composition

Jeremy used a telephoto lens to isolate the tree from its background, and placed it in the centre of the frame to create an appealing symmetrical composition.

Sharpness

As well as using a sturdy tripod and cable release, Jeremy's choice of a Nikkor 80-200mm f/2.8 zoom lens (at 200mm) ensured sharp detail in what could otherwise have resulted in a big green mess.

Perfect exposure

High-contrast lighting can play havoc with exposure meters, as they struggle to retain detail in both highlight and shadow areas. Shooting in raw mode and exposing for the sunlit half of the tree allowed Jeremy to retain full detail in the shadows.

Improve your shots

Essential

Filters for landscapes

There are two filters that every landscape photographer really should have in their gadget bag. Step forward the polariser and ND grad filter...

Filters can loosely be divided into coloured (chromatic) and others such as polarisers and neutral density graduated filters, which modify the light. Most of the coloured ones can be replicated with more control in post-processing, so you really only need to use them if you wish to go straight from camera to print. Even then, your camera's white balance can replace some of them.

Polarisers and grads, on the other hand, are still as important to the creation of great landscapes as ever.

Types of filter

Round or square, glass or resin – filters come in differing forms. Glass versions are round and cater specifically for a set lens diameter, with the better ones being coated. While step down adaptor rings can be used to attach round filters to smaller diameter lenses, they're not as universally compatible as square resin ones.

It's debatable whether there's any difference in quality between modern resin filters and glass ones. Indeed, many pro

landscape photographers swear by Lee (resin) filters. Arguably the most important factor related to a resin filter's quality is its condition. Being made of softer material, they're more easily scratched, which can reduce detail.

Nevertheless, the advantages of resin filters are their cheaper price and flexibility. Using inexpensive adaptor rings and a holder, it's easy to fit filters to most lenses. Cokin currently produces four systems to cater for most conceivable diameters: the A Series, P Series, Z-pro Series and the X-pro Series.

Polarisers

The most essential filter of them all

If you only ever buy one filter for your camera, make it a polariser. This is the one filter that has yet to be replicated digitally, and is just as useful now as it has ever been.

With the help of a polariser, pale blue skies can become saturated almost to an inky black and obscuring glare can often be removed completely from water and other shiny surfaces. It's also an effective neutral density filter, absorbing around two stops of light – ideal when longer shutter speeds are needed.



POLARISERS IN ACTION

These pictures illustrate the benefits of using a polariser. See how in the main image (below) the sky has been made a deeper blue and the grass greener. Meanwhile, in the shot of the car, the reduction in the reflections on the shiny bodywork has made the red paintwork richer. You can also see more clearly through the windscreen.



With polariser

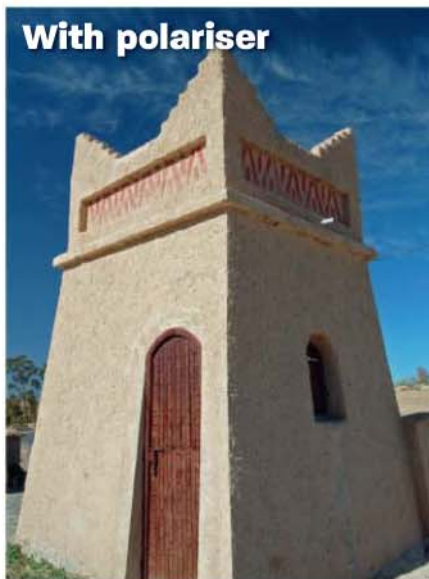


Without polariser



Without polariser

With polariser



Without polariser

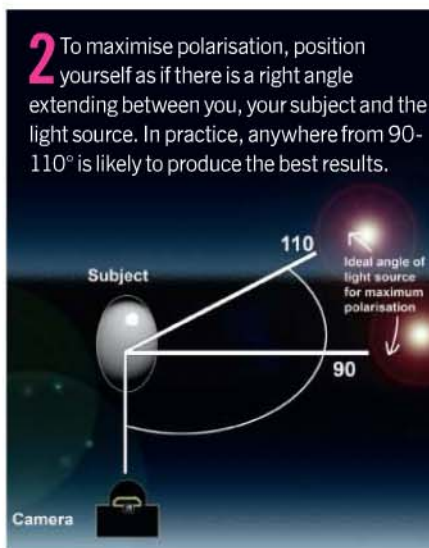


Tips for using polarisers

1 With a two-stop light-absorbing factor, you may want to compose your scene before adding the polariser. If you are using multiple filters, the polariser should always be furthest from the lens, so that it can't alter the light

from the other filters. Consider using a tripod, which will guard against camera shake and free up your hands. To avoid frustration, lenses with rotating front elements should be focused manually so as not to alter the filter's position.

2 To maximise polarisation, position yourself as if there is a right angle extending between you, your subject and the light source. In practice, anywhere from 90-110° is likely to produce the best results.



3 While viewing, rotate the filter slowly. Keep an eye out for any changes that occur in reflections or with colour saturation.



4 Exposure is best calculated using the camera's TTL meter, as it will take into account changes made by the filter. You can also use a handheld meter and deduct the filter's light-absorbing factor (about 2EV).

Improve your shots

ND grads

Sky too light? Then turn to the dark side – of your ND grad filter!

Except at night or on the odd thundery occasion, the sky is almost always brighter than the land. At certain times of day, often when the sun is low, the difference can go way beyond what a single exposure is able to capture, and there are other instances when the sky is overcast and filled with highly reflective and featureless cloud. In both these circumstances you can make a big difference to your results by reaching for that other essential landscape photographer's filter – the neutral density graduated filter (or 'ND grad', for short).

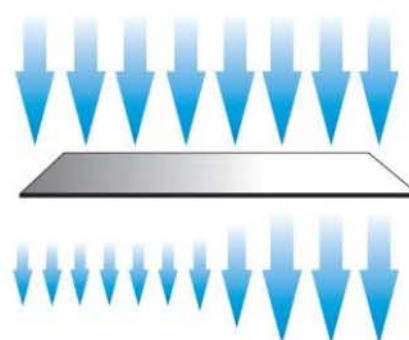
How do they work?

Grads are half clear and half covered with a

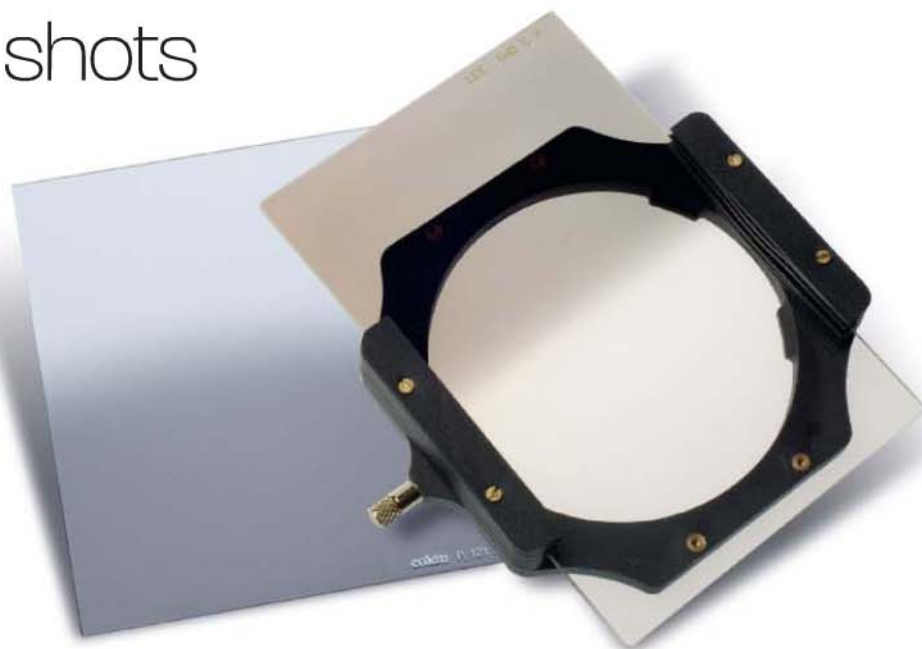
light-blocking tint. As the name implies, this is distributed in subtly decreasing density from the top to the middle, where it becomes clear. Neutral density grads are similar to polarisers in that they block light, but do not introduce colour. Coloured grads, on the other hand, change the picture's hues as well as blocking light. (These can also be useful in some circumstances, to enhance a scene, but are often misused).

Coloured grads

Coloured grads are amongst the most creative and enjoyable of filters to use. For instance, poor skies can benefit enormously from the addition of a tobacco or mauve tint. There's no



reason why grads can't be combined either. By choosing two opposing colours, one from the warm half of the palette and one from the cool, images of great individuality can be formed.



Without grad

With ND grad

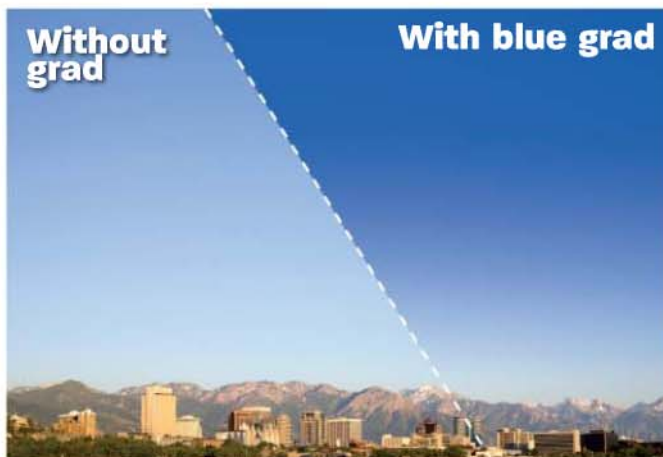


GRADS IN ACTION

Neutral density grads are useful for retaining detail in a pale sky that would otherwise be burnt out by overexposure. They can also make a blue sky darker. Grad filters also come in other colours to add a tint to one half of the image (usually the sky). Neutral density filters come in solid, ungraduated form too, to reduce exposure evenly across the frame (for when you need to use longer shutter speeds).

Without grad

With blue grad



Tips for using grads

1 Initially, leave the filter off and set your camera to manual mode. Compose your image and use the meter to determine the exposure of the darker half of the scene (usually the land), metering from a midtone.

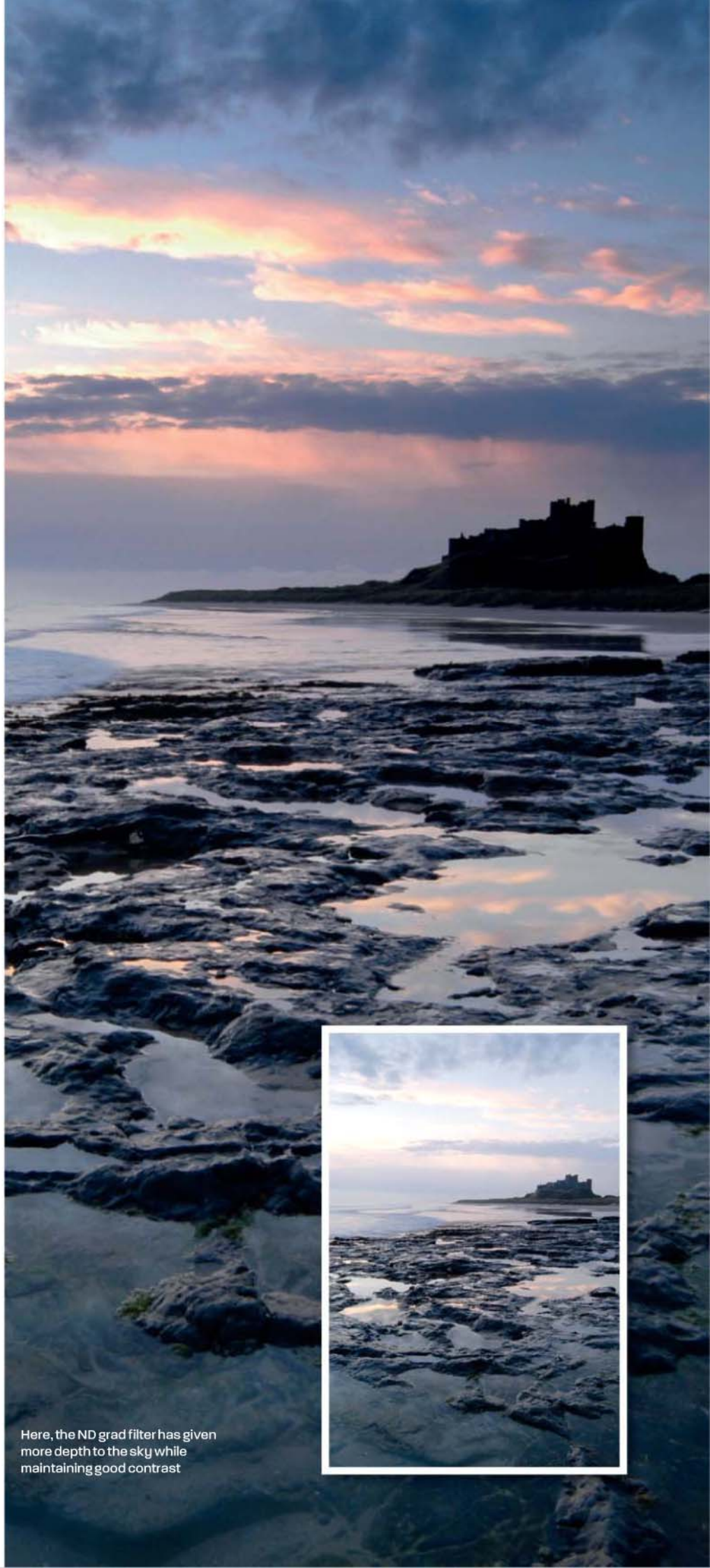


2 Staying with your chosen aperture, take an average reading from the area of sky that will feature in your photo. To reduce contrast, exclude the sun or limit its impact by positioning it behind an object.

3 It's likely you'll have recorded two quite different shutter speeds: one for the sky and a longer one for the land. To create a well-balanced image, both figures ideally need be similar. Work out how many stops difference there is between your two speeds; for example, $1/60\text{sec}$ to $1/125\text{sec}$ is one stop; $1/60\text{sec}$ to $1/250\text{sec}$ is two, and so on. If the shortfall is one stop, you need a x2 ND grad; for two stops, a x4; and three stops, a x8.

4 If your lens is of the type whose front element rotates during focusing, you should focus first before attaching the filter, then switch to manual focusing to stop it from moving. Insert the filter into the holder and, looking through the viewfinder, carefully slide the filter up or down until the graduated portion covers the sky, but doesn't darken the land. If your camera is equipped with a depth of field preview button, you can use it to get a better idea of where the zone of gradation comes into play.

5 Now dial in your previously deduced exposure settings. Remember, this was the exposure for the darker portion of the scene – the ND grad will take care of the lighter half. Check the frame for flare, shading the lens with your hand if you find any, and take the shot.



Here, the ND grad filter has given more depth to the sky while maintaining good contrast

Create a stunning

Panorama



Creating wide-format pictures is easier than you may think. There's no need for specialised wide-format equipment – all you need is your camera, a tripod, some carefully photographed sequences of images and a little time spent with your image-editing program before you start producing amazing panoramic pictures.

After shooting, load the source images into the Photomerge feature in Photoshop Elements (File>New>Create Photomerge Panorama). When launching Photomerge you must first locate and load your source files using the Browse button and dialogue. After loading the files, click OK to commence loading, matching and stitching the image pieces. As part of the opening process, raw and 16-bit files will be converted to eight bits per channel. Photomerge is generally able to identify the overlapping images and blend them in the editing workspace. A few of the source files might not be automatically placed, but these pictures can be manually moved into position later.

The Select Image tool is used to move source images around the composition or to place unmatched pieces. The Use Perspective option, together with the Set Vanishing Point tool, manipulates the perspective of your panorama. The first image that is positioned in the Composition area is the base image (light green border), which determines the perspective of all other image parts (red border). To change the base image, click on another image part with the Set Vanishing Point tool. To correct some of the 'bow tie'-like distortion that can occur when using these tools, check the Cylindrical Mapping option in the Composition area of the dialogue. You can't use the perspective correction tools for images with an angle of view greater than 120°, so ensure these options are turned off.

The final panorama can be completed by clicking OK in the Photomerge dialogue box.

SHOOTING CORRECTLY

It is helpful to use a tripod for capturing the sequence, and even better to use a tripod head that uses the lens' 'nodal point' as the pivot when you are rotating the camera. If shooting handheld, try rotating the camera around the lens rather than pivoting around your body, and use longer focal lengths rather than wideangle settings. Adjust the following before starting.

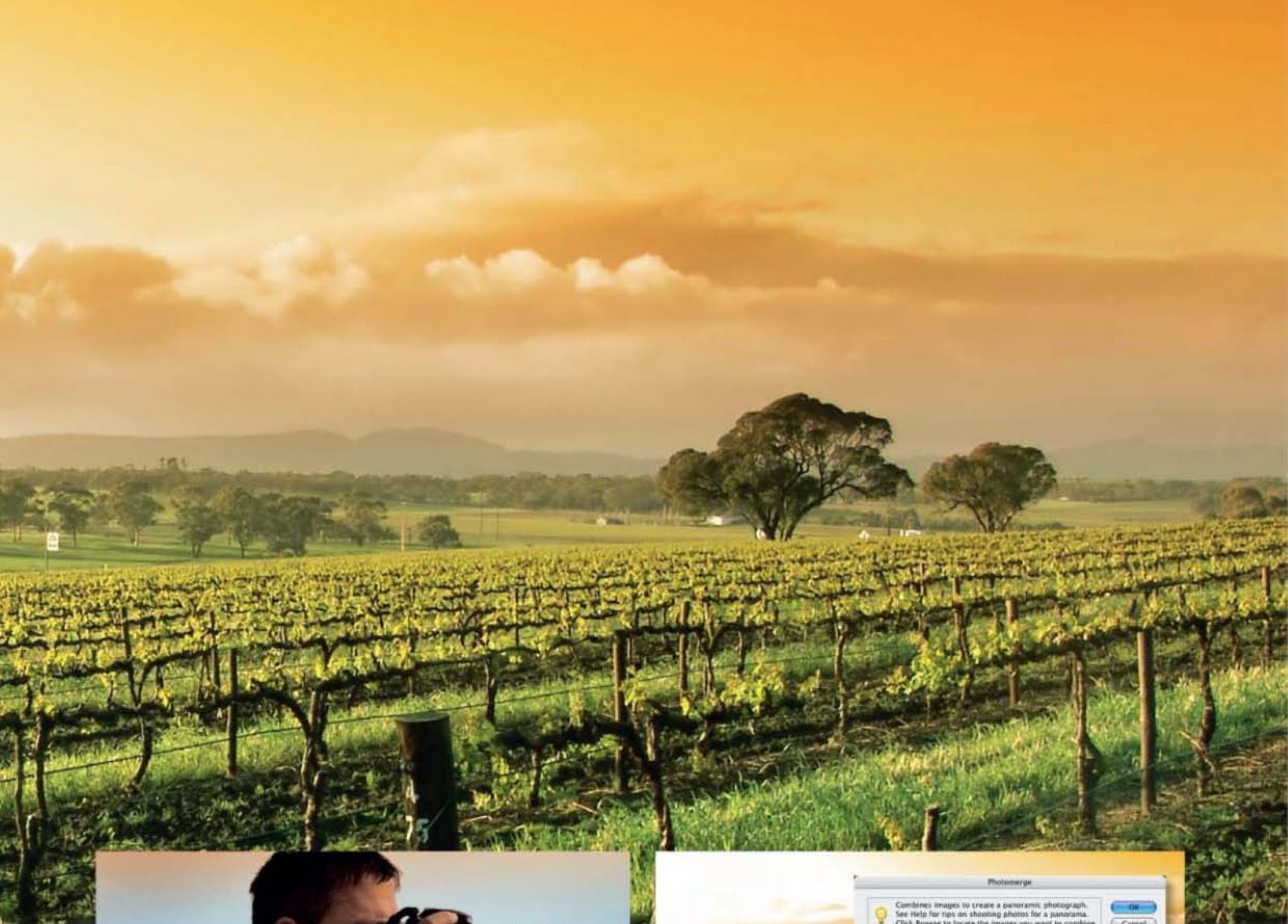
FOCUS Switch the camera to manual focus.

EXPOSURE METER READINGS can change dramatically from shot to shot, so set the exposure mode to manual.

WHITE BALANCE Adjust WB manually to suit the predominant light.

ZOOM Don't change zoom settings while shooting the sequence or, when you stitch them, the edges won't match. If your camera has a Panorama shooting mode, select that. It fixes the exposure, focus, WB and contrast for the sequence.





1 If shooting handheld, pivot around the camera rather than your waist. Adjust zoom and focus to suit both near and far subjects. Turn off AF and switch to manual exposure and white balance. Attach a remote cable or use the self-timer to trip the shutter. Take the first shot, then rotate the camera ensuring an even overlap (20 to 50%) for the next shot. Continue for the sequence.

2 In Elements' Standard Editor workspace select File>New>Photomerge Panorama. The Photomerge dialogue will appear. Press the Browse button and then locate and select the source pictures. Click Open in the Browse window to transfer the styles back to the Photomerge dialogue. Press OK. The Photomerge workspace will open and attempt to organise your overlapping pictures.



3 Photomerge is generally able to identify and blend the overlapping images. Pictures that can't be placed will be moved to the slide table area at the top of the screen. Ensure the Snap to Image is selected (right-hand side of workspace) then drag them from the top into the workspace. For skewed images, click on the Rotate Image tool and drag the source image to pivot it into position.

4 Select the Advanced Blending option to help minimise exposure differences between photos. If the vista covers less than 120°, you can also select the Perspective option which uses a single photo as a base image and adjusts the perspective of the other pictures to fit. When Photomerge has finished, you'll be left with a single layer document. Fine-tune the final image with standard contrast and colour changes.

Improve your shots

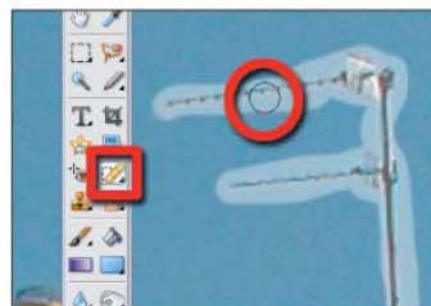
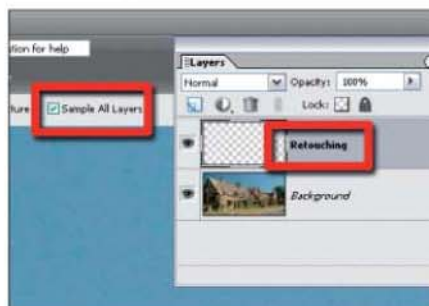
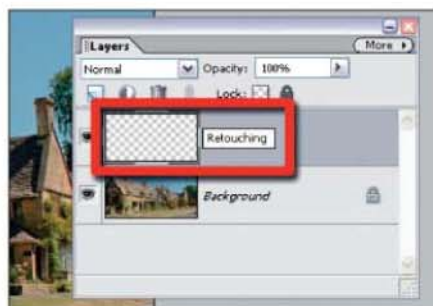
How to refine your pictures

Great photographs are often produced by filtering out unwanted information from the frame, using careful composition or by waiting patiently until the conditions are just right. Unfortunately, in some circumstances, no amount of patience or skilful framing is able to remove some problem areas in a picture. It

may be the scaffolding around the famous monument, or the appearance of unwanted spectators in the foreground of a beautiful vista, but the effect is still the same: a less than perfect result.

This is when the art of digital retouching comes to the fore. Both Photoshop and

Photoshop Elements contain several powerful tools that you can use to recreate the vision that you saw through the camera, but were unable to capture. Here, we put these tools to work to refine a typical British street scene, adding some grass, removing TV aerials and security alarms and generally tidying up the picture.



1 Start the correction process by creating a new blank layer (Layer>New>Layer) above the background layer. Double-click on the layer's name in the Layers palette and rename the layer 'Retouching'. In order to work non-destructively whenever possible, we will try to keep all the retouching changes to this layer.

2 To remove the aerials from the chimney stacks, first click the 'Retouching' layer in the Layers palette to make it active. Select the Spot Healing Brush tool, then choose Sample All Layers in the tool's options bar. This will enable the brush to sample from the background layer while painting onto the 'Retouching' layer.

3 Click and drag the brush over the aerials in a painting motion. Be sure to cover all parts of the aerial before letting go of the mouse button. The brush uses the colour, texture and detail surrounding the tip as reference when retouching. If unwanted detail is included select Edit>Undo Spot Healing Brush.

CLONE STAMP

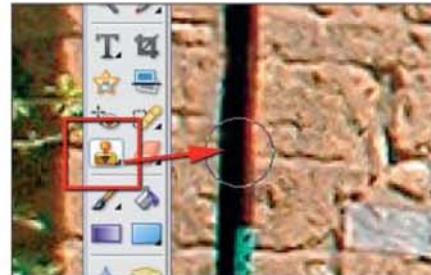
This works by sampling an area and pasting its characteristics over a blemish. After finding the area for repair, locate areas of similar tone, texture and colour. Now sample this second area by pressing the Alt/Opt key and clicking with the mouse. Then click and drag the mouse to paint over the blemish.



4 One way to restrict the sampling of the surrounding areas is to draw a selection around the area to be repaired. Make sure that you exclude any parts of the picture that are contaminating the results. In this case, the chimney stack is excluded from the selection. Now reapply the Spot Healing Brush inside the selection. The same tool can be used for removing the concrete from the grass verge at the front of the photo.



5 To remove the signs from the lamp post, we need to use the Clone Stamp tool. Select the tool, then ensure the Sample All Layers setting is active in the tool's options bar. Hold down the Alt key and click to mark the part of the post above the sign as the sample point. Move to the sign area and click the mouse key to paint over the sign. If the sampled area doesn't quite match the background, undo the change, resample and paint.



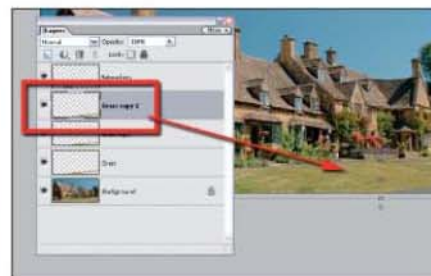
After



6 Removing the security alarm from the side of the roof dormer window can also be achieved with the Clone Stamp tool. This time, the sample point is targeted on the clear wall on the dormer to the left of the security alarm. This area of the photo has the same lighting as the area to be repaired. Once the sample is selected, the brush tip is positioned over the dormer wall and the alarm box painted out.



7 To magically grow some grass over the road area, we need to use more drastic measures. Target the background layer and make a rough selection of the grass. Feather the selection (Select>Feather) by three pixels to soften the edge, and copy it to memory (Edit>Copy). Paste the grass section as a new layer (Edit>Paste) and drag it into position over the road. Repeat the process until no road is no longer visible.



THE HEALING BRUSH

The Healing Brush is also a two-step process. After selecting the tool, hold down the Alt/Option key and click a clear area to use as the sample for the healing. This action is the same as you would take when using the Clone Stamp tool to select a sample point. Now move to the area to be repaired and click-drag the cursor over it. The Healing Brush will use the tones, textures and colour of the sampled area to paint over the blemish.

The Spot version of the Healing Brush removes the sampling step from the process. To use the brush just select the feature, adjust the brush tip size and harness, and then click onto the blemish. Almost magically the brush analyses the surrounding texture, colour and tones and uses this as a basis for painting over the problem area. Click-dragging the Spot Healing Brush tool across marks, hairs, streaks or cracks will remove them too.



8 When using copied layers to cover unwanted picture parts, sometimes the repeating elements show up as a visible pattern, alerting the viewer to the fact that editing has occurred. To help disguise this, use the Spot Healing Brush to paint over areas of obvious patterning.



How to correct Verticals

It's a fact of life that when you take pictures with a wide angle lens, you affect the perspective of the resultant image.

In urban areas, this will typically lead to buildings leaning backwards, with all the vertical lines sloping inwards from the ground to make a trapezoid. Whilst this may excite some of the more avant-garde architects, it can spoil the natural appearance of our pictures.

Luckily, Adobe Photoshop and Photoshop Elements have a couple of

digital spirit levels in their toolbox to solve the problem.

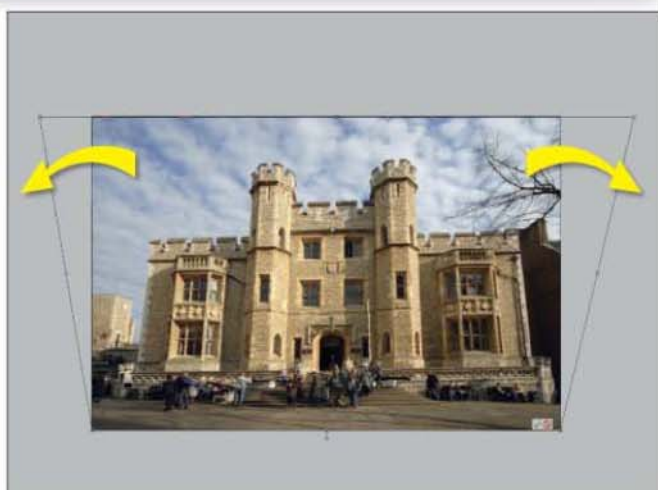
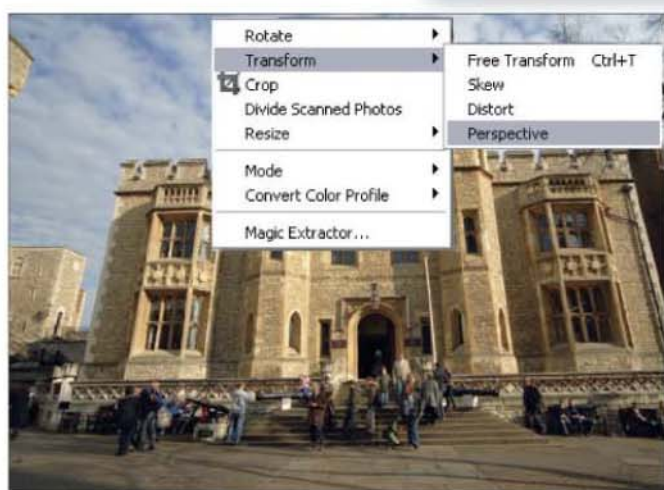
Elements in particular is useful for this, with a dedicated perspective tool in the Transform menu, which can quickly and easily pull the distorted shape back into line. This works best with images that are symmetrical and shot straight on.

If you want to correct buildings that are shot at a more diagonal angle, then the Skew tool, again in the Transform menu, is the way to go.



Perspective tool

The perspective tool is designed to correct verticals that converge symmetrically and will correct both sides of the frame simultaneously



1 Begin by making a layer from the background (Layer>Layer from Background). Select Image>Transform>Perspective from the menu. A black line with grab points in the centres and corners will surround the image.

2 Use your mouse to grab the top left or right corner point, and pull the lines away from the image edges. The perspective tool will match the movement on the opposite side of the image and the vertical lines within the image will straighten out. Keep an eye on the verticals by aligning them with the edge of the image box. When you're happy with the correction press Return. You may have to crop within the image to tidy it up a little.

Before



TOP TIP

Life is easier if you minimise the degree of distortion at capture. If possible, use lenses with a focal length over 35mm, which may entail moving further away from the subject to fit it in.

You can also try to find a high viewpoint to shoot from, if possible, and keep the camera back parallel to the building. It is helpful to secure the camera to a tripod and use a hotshoe-mounted spirit level to ensure it is on an even keel.

If architecture is your thing, invest in a shift lens, which allows correction in-camera. They are expensive, however, so consider how much use you'll get from it.

After



Skew tool

The skew tool enables asymmetrical perspective corrections – ideal if you were shooting slightly to one side of the centre of the building



1 Begin by making a layer from the background (Layer>Layer from Background). Select Image>Transform>Skew from the menu. The black line and grab points will appear. These points are independent of each other, which means that you are able to make subtle adjustments on all four image edges.



2 Pull the points away from the image edge to correct the verticals on one side of the image. Then adjust the other side.

Experiment with small corrections in order to fine-tune the vertical alignments. The central grab point can be used to tilt and shift the central areas of the image – again, try small adjustments to keep it looking natural. Depending on the angles of the image, you may have to move the points up and down, to 'skew' the image into a natural perspective.

When you're satisfied with the correction press Return. You may have to crop the image slightly to remove unwanted transparency grids caused by the skewing.

CONVERGING VERTICALS ... AND HOW TO ENJOY THEM

If you can't avoid converging verticals, then sometimes the best solution is to exaggerate them. Fit your widest angle lens, get in close from a low perspective, and tilt the camera to your heart's content. Explore different angles and viewpoints, and try rotating the camera to see the effect. This shot, from a corner of the White Tower in the Tower of London, emphasises its invincibility.



Improve your shots

Simple steps...

Colour to black & white

Here are three easy ways to convert your colour images to black & white using Photoshop Elements

Despite the origins of the black & white photograph, producing greyscale images in the age of digital photography is definitely not an 'old school' activity. The sheer power and beauty of a well-produced monochrome image means that this style of photography is as popular as ever. In fact, producing black & white pictures digitally provides us with more choices and more power

to customise and fine-tune these images than ever was the case when film was king.

To give you some idea of the possibilities, we take the same image and convert it to greyscale in three different ways using Photoshop Elements 5. All the techniques have their own strengths and weaknesses. Try them all and find your favourite.



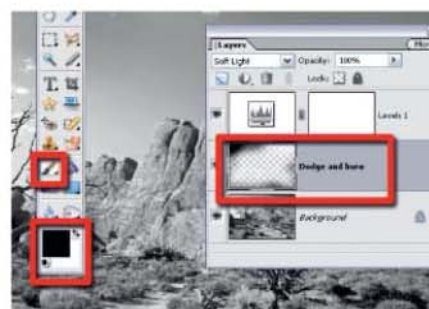
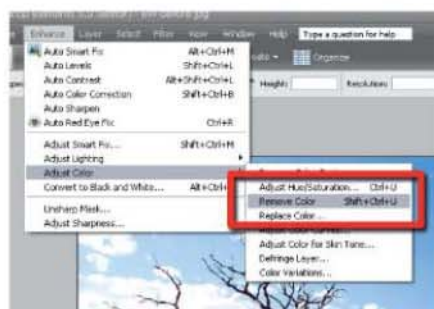
Hue/saturation method



Photoshop Elements uses the term 'saturation' to refer to the strength of the colours in a picture. Increasing saturation makes the colours in a picture more vivid; decreasing saturation makes the hues weaker. The program employs the Hue/Saturation control (Enhance>Adjust Color>Hue Saturation) to adjust the colour's strength. If the Saturation

slider is moved all the way to the left (to a setting of -100) then all colour is removed from the picture. You are effectively left with a greyscale image that is still an RGB file. This means that even though the photo no longer contains any colour, the colour mode it is stored in can still support colour. So if you want to try a little digital hand colouring, or experiment with

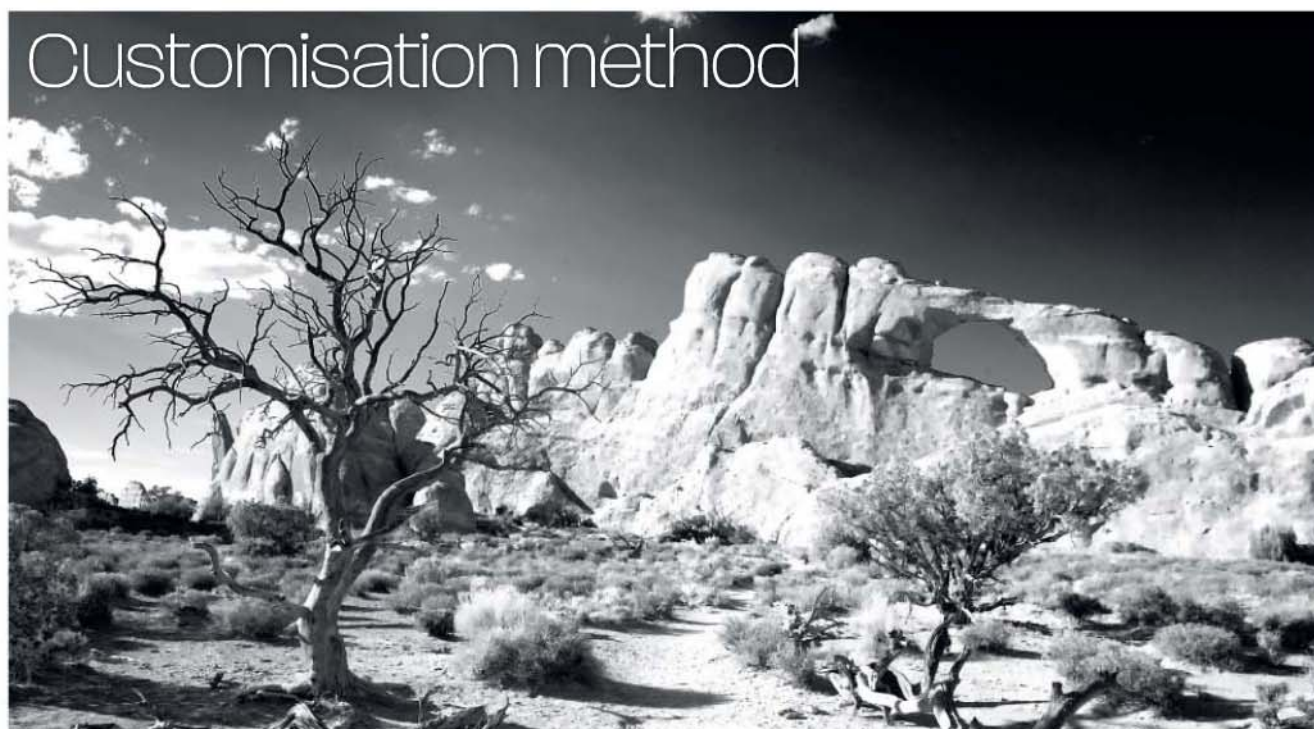
pictures that contain monochrome as well as colour components, then this is the technique for you. Be warned though, once your picture is desaturated the colour is lost forever and so it is always a good idea to use layers, making a background copy first. Or alternatively, save a copy of the colour version of the image before proceeding to change the file.



1 The easiest way to remove the colour from a photo is to select the Hue/Saturation control from the Adjust Color heading in the Enhance menu and drag the Saturation slider all the way to the left (-100). Alternatively, you could use the Enhance>Adjust Color>Remove Color option, which produces the same results as moving the Saturation slider in the Hue/Saturation feature.

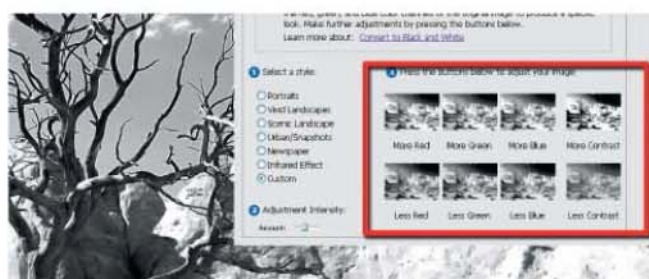
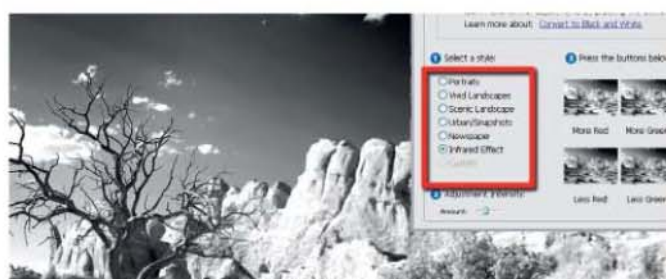
2 Such simple conversion techniques often need a little tweaking afterwards in order to balance the tones. Start adding in a Levels adjustment layer above the image layer. Drag the black and white input sliders towards the centre to add contrast (or the output sliders inwards to reduce contrast). Moving the midtone input slider to the right will darken the photo, and moving it to the left will lighten it.

3 Finally, add some drama to the picture by selectively lightening and darkening parts of the image using the Dodge and Burn tools. For a non-destructive alternative, add a new blank layer above the image layer and change the Blend Mode to Soft Light. Then use a white soft-edged brush to lighten areas and a black soft-edged brush to burn in detail.



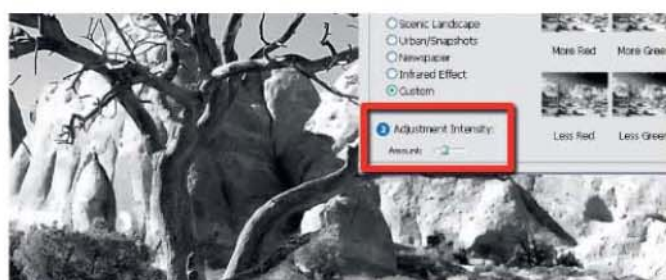
Elements 5 contains a Convert to Black and White feature that allows you to customise the way colour areas are mapped to grey during conversion. The dialogue consists of large before and after previews, six conversion presets based on popular subject types, an Amount slider

that controls the strength of the changes, and eight thumbnail buttons for fine-tuning. This enables more sophisticated conversions by allowing you to adjust which colours (red, green or blue) feature more prominently in the final result.



1 With the colour image open in the Full Edit workspace, go to Enhance>Convert to Black and White. Click through the different conversion styles, checking the After preview for a suitable result.

2 To customise the conversion, select a conversion style that is closest to your desired result, then fine-tune by clicking one of the adjustment buttons – more blue/less blue, and so on. For a more dramatic effect, click the opposite of another option – less/more red.

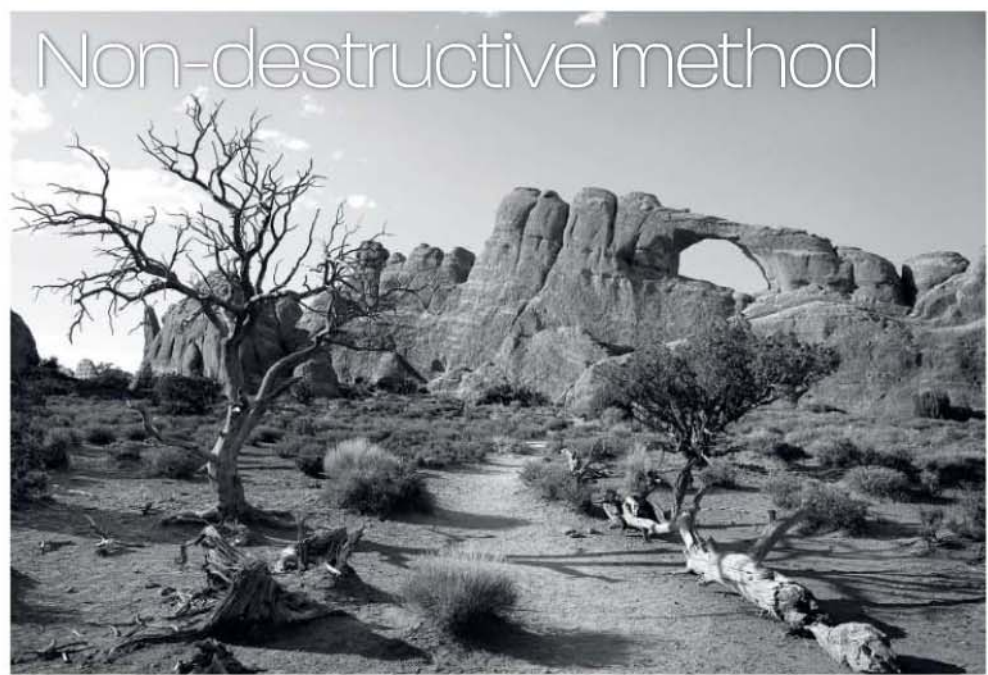


3 Where the changes made with each click of an adjustment button are too great, use the Adjustment Intensity slider (found at the bottom left of the dialogue). Move the slider left for smaller increments of change, and right for more dramatic effects. Click OK to apply the conversion, Reset to remove current settings or Cancel to quit.

4 To balance out the resulting tones in the converted image, add a new blank layer. Change the layer's blend mode to Soft Light and label the layer 'Dodge and Burn'. Darken parts of the image by painting on the layer with a black soft-edged brush. To lighten parts, switch the colour to white before painting over the chosen area.

TOP TIP

The bwconvert.txt file located in the C:\Program Files\Adobe\Photoshop Elements 5.0\Required folder sets the values for the presets in the Convert to Black and White feature. This file can be easily edited if a user wants to have their own conversion preset values. Of course, we highly recommend backing up the installed version of the file so that you can easily restore the settings to the default values.



This technique is based upon a custom conversion process created by Russell Brown from Adobe. It uses the Adjustment Layers technology in Photoshop Elements as a way to both convert the colour image to black & white (desaturate) and also

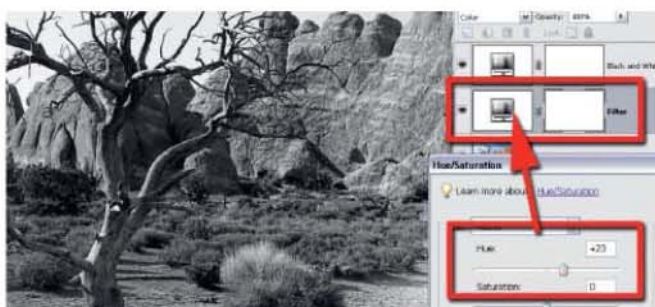
to control how the colours are represented in the greyscale. Like a lot of Russell's techniques, it leaves the original image unchanged in the background, and hence this style of image enhancing is called non-destructive editing.



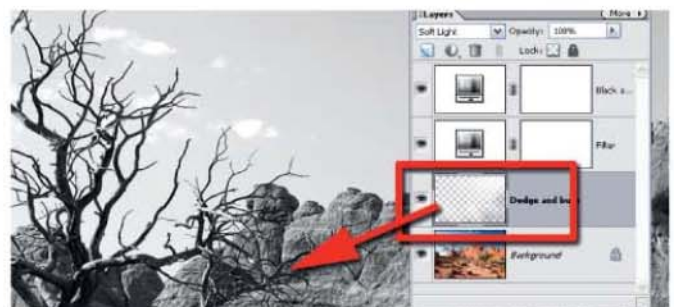
1 Create a new Hue/Saturation adjustment layer above your background. Don't make any changes to the default settings for this layer. Set the mode of the adjustment layer to Color. Label this layer 'Filter'.



2 Make a second Hue/Saturation layer above the Filter layer and alter the settings so Saturation is -100. Call this layer 'Black & White' conversion. The mono image now on screen is what we would expect if we had desaturated the coloured original.



3 Next, double-click on the layer thumbnail in the Filter layer and move the Hue slider. This changes the way that the colour values are translated to black & white. Similarly, if you move the Saturation slider you can emphasise particular parts of the image.



4 Finally, introduce some dodging and burning by adding a blank layer above the background layer. Change the Blend mode of this layer to Soft Light and then burn in using a black soft-edged brush, or dodge using a white soft-edged brush.

Improve your shots

Top tips

Our ten top tips for great black & white photos



1 Shoot in raw mode

Shoot in raw mode to preserve the maximum amount of image data. Raw files offer a far greater range of tones than JPEGs do, and they don't suffer the further loss of data from the in-camera processing (sharpening, contrast/colour adjustment, and so on) that JPEGs go through.

2 Customise your conversions

Converting your image to greyscale, or desaturating it via the Hue/Saturation control, are the obvious ways of creating a mono version, but these methods do not produce such high quality, controllable results. Use one of the alternative methods on the previous pages instead.

4 Better mono prints

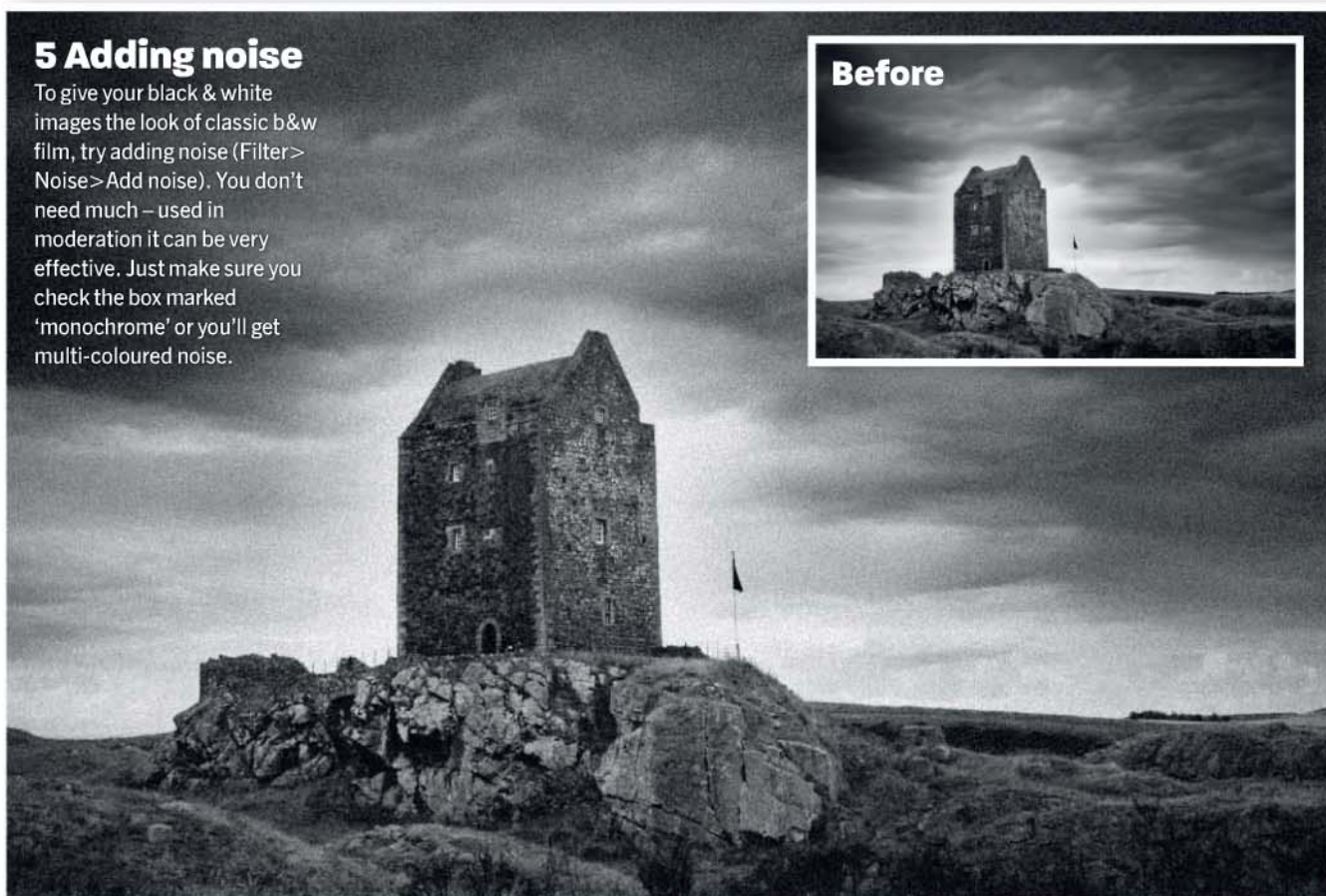
Not all inkjet printers are equal when it comes to getting good black & white prints. Colour inkjet printers have to combine their colour inks to produce the grey tones, which can often lead to subtle hints of colours coming through. Some printers have methods to deal with this problem, though. Epson, for example, has a technology called the Advanced Black and White mode – ABW – which uses its black and grey inks before it starts using the coloured inks, to give a better greyscale. Some HP printers, meanwhile, enable the user to replace the entire colour cartridge with one that contains shades of black ink, for great quality mono prints.

3 Shoot in colour, convert later

Unless you want to get black & white prints straight from the media card, it's best to shoot in colour and do your mono conversions using software such as Photoshop Elements afterwards. This gives you much more control over the final result. If you do want to produce in-camera b&w, some cameras enable you to make a mono duplicate of your colour file. In Nikon DSLRs, this feature is accessed via the camera's retouch menu. This is in addition to the greyscale mode where you actually shoot in black & white.

5 Adding noise

To give your black & white images the look of classic b&w film, try adding noise (Filter > Noise > Add noise). You don't need much – used in moderation it can be very effective. Just make sure you check the box marked 'monochrome' or you'll get multi-coloured noise.



6 Go sepia

Mono pictures don't have to be just grey. Try adding a coloured tint such as the ever-popular sepia, for a warm, nostalgic feel. The quickest way to do this is to select Colour Balance and add +30 red and -20 yellow. This is just a starting point – adjust the colour sliders until you get the effect you want.



7 Use DxO FilmPack

If you really want to get the look of film – and perhaps not just any film, but a specific film – DxO FilmPack is a great way to do this. It's a software plug-in that enables you to replicate many common film types in quite convincing style. Go on, give your shots that Tri-X or HP5 look – you know you want to. Visit www.dxo.com for more details.

9 Use the best mono printer

If you're really serious about high-quality b&w prints you'll need to invest in a high-end printer using pigment-based inks. These produce deep, rich blacks and are ideal for use with textured fine art papers. Most of these printers can print sizes up to A3. Though they cost a bit more than dye-based consumer printers, for exhibition-quality work they're worth the investment.

10 Experiment with paper

The range of papers that you can use for digital black & white printing now rivals or exceeds those that existed for the darkroom process. Many of the papers add texture to create an artistic, individual feel. Others contain lower acidity and so are more archival for the longevity of your prints. Experiment to find one you like. Some manufacturers produce sampler packs that include a range of their products for you to try.



8 Profile your printer and calibrate your monitor

For the most accurate mono prints from normal inkjet printers, it's best to profile your printer to ensure that the colour accuracy is as good as it can be. Printer profiling is a dark art which can be expensive, but there are some cheaper solutions. Some specialist papers come with their own profiles. You'll also need to calibrate your monitor and there are a few ways you can do this. The first is through Adobe gamma, which is free as part of Photoshop, but a more accurate method is to buy a monitor calibrator. These attach to the monitor and read a series of light emissions from the display. Models such as the Colorvision Spyder 2 Express, Pantone Huey and Gretag Macbeth can be bought for between £50 and £70.



TOP SHOT

Follow our tips to give your b&w photos impact

The checklist

PRE-VISUALISE

Try to pre-visualise your image and the tones you plan to give certain items before making an exposure. If you can imagine your composition in black & white, it will increase your chances of producing good images.

TIME OF DAY TO SHOOT

Make the most of morning and evening light for interesting lighting conditions.

TAKE A TRIPOD

Taking the time to get your images right is a discipline that is only helped by using a tripod. A considered view will give you better images.

TRY USING FILTERS

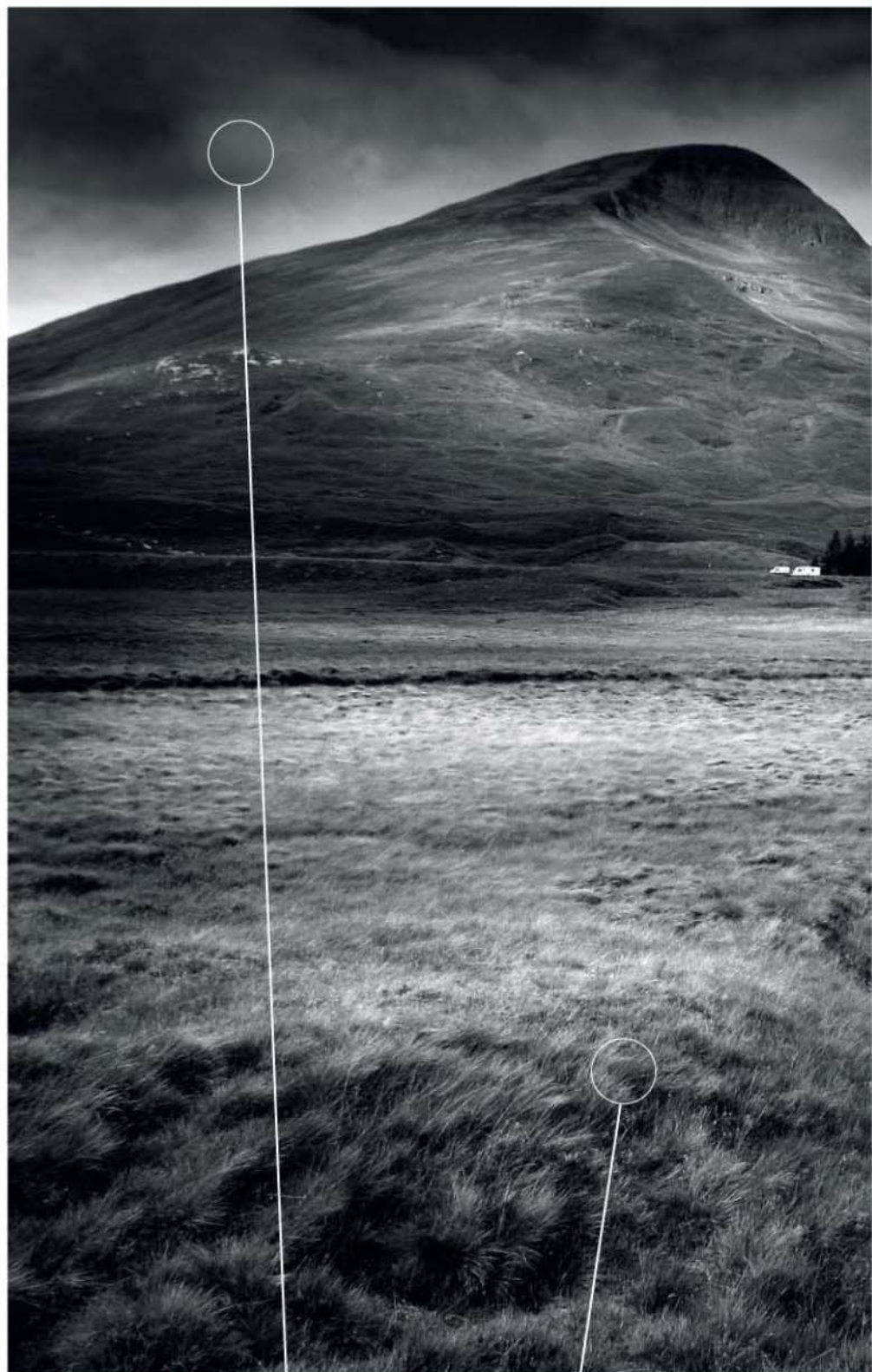
Take a range of filters to give you some tools to experiment with, and which can potentially help you to deal with tricky lighting conditions.

LIGHT READINGS

Try taking these from a range of subjects within the scene. Using the spot meter function of the camera's lightmeter will allow you to take readings of specific areas.

SHOOTING WITH WATER

Try using a variety of shutter speeds to give your images a different feel and look. Longer exposures blur the movement and make water look more serene. Short exposures freeze the action.



Dramatic skyline

You can increase the dramatic look of clouds by using filters, such as yellow, orange and red. An alternative is to use Photoshop to add atmosphere and enhance the mood (see pages 90-95 for more information).

Exposure

Take the time to study your scene and consider all the different elements within it as tones. In this way, you can start to pre-visualise your final image, and compose and expose the shot accordingly.



Foreground

Placing a point of interest in the foreground can lead the eye of the viewer through the image. Here, the photographer has used the meandering waterway to achieve this effect.

Depth of field

Consider whether you want a shallow or wide depth of field. With the former, you can focus the viewer's attention on certain aspects of the picture. A wide depth of field will give you detail throughout the image, keeping the whole composition sharp.



Organising your photographs

Getting the most from your images is as much an exercise in organisation as it is in production techniques. A little organisation can really help you to make the most of your pics. Thankfully, most image-editing software now also includes management features designed to make this organisation painless and efficient.

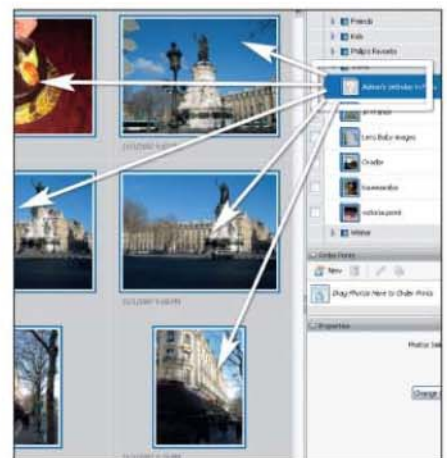
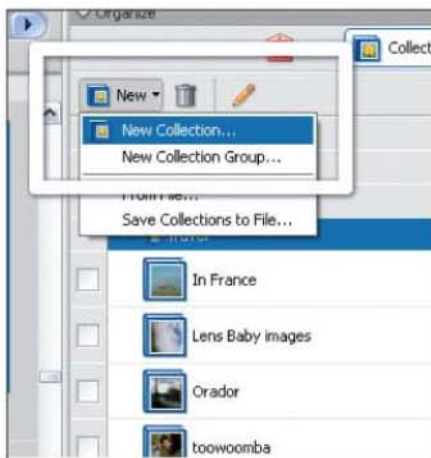
For Photoshop users, most picture management occurs via the program's sister software Bridge, whereas Photoshop Elements users get to sort their photos in the Organizer workspace. Here, we take a look at some of the essential techniques that you can use to make the most of all those carefully captured shots.

Using collections

A Collection is one way in which you can order and sort your photos. After creating a Collection, drag selected images from the Photo Browser to the Collection Pane, or vice versa, where they can be used to make a new Photo Creation project, or displayed using the Photo Review feature. Photos from the Organizer workspace can be added directly to any Collection by right-clicking and selecting Add to Collection from the pop-up menu.

Unlike working with tags, pictures grouped in a Collection are numbered and can be sequenced. You can reorder photos in a Collection by dragging and dropping, and the same photo can be a part of several different Collections.

When adding your photos to a Collection, you aren't duplicating these photos but rather adding them to a visual list of the group's contents. In this way, only one copy of the photo is stored on the computer.



1 To make a new collection, click on the New button in the Collections pane and select the New Collection menu item.

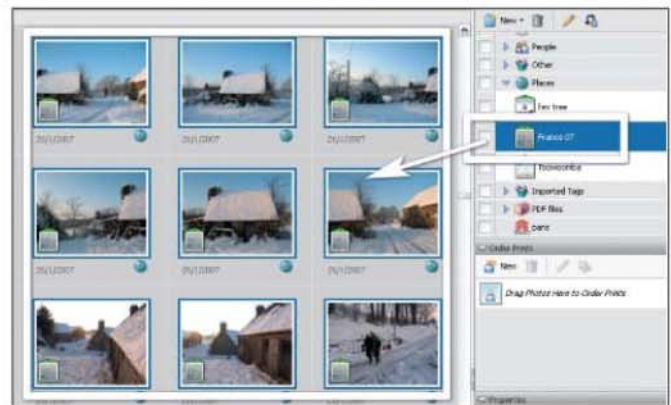
2 In the Create Collection dialogue, choose the group that the new Collection will belong to, add the name and include any explanations for that group. Click OK.

3 Select the photos to be included in the Collection in the Organizer, and drag them to the Collection heading in the Collections pane.

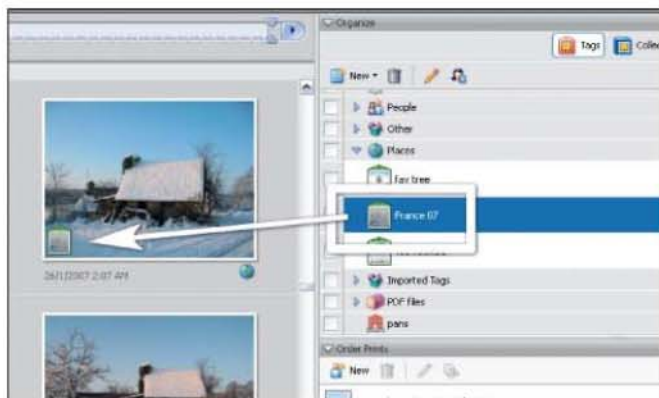
Tagging

Many photographers and stock libraries sort their images based on individual descriptive keywords. In Photoshop Elements, keywords are added to your photos in the form of tags. The Tags pane stores the tags, provides an easy drag-and-drop approach to tagging selected photos, and sits to the right of the main thumbnail area in the Organizer workspace.

Tags are applied to a picture by selecting and dragging them from the pane onto the thumbnail or, alternatively, the thumbnail can be dragged directly onto the Tags pane. Multiple tags can be attached to a single picture by multi-selecting the tags first, and then dragging them onto the appropriate thumbnail. Once the tags have been applied, you can display just the images with an associated tag by double-clicking on the tag entry in the Tags pane.



2 To add a single tag to multiple thumbnails, multi-select the thumbnails of the images, and then drag the tag from the Tags pane onto one of the selected thumbnails.



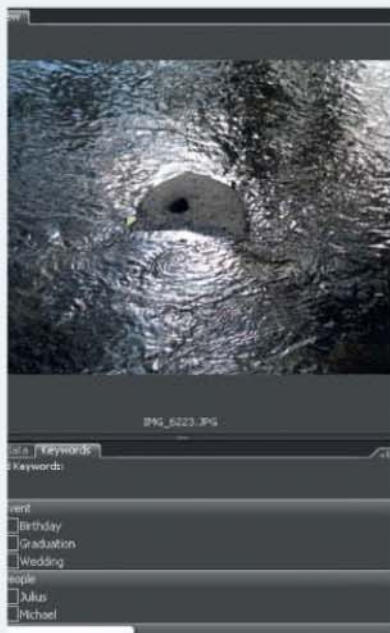
1 To add a tag to a single image, click and drag the tag from the Tags pane to the thumbnail image in the Organizer workspace.



3 To create a new tag, select the New Tag option from the New button menu at the top of the Tags pane. In the File Tag dialogue that is displayed, select a category for the tag, add in a name and include any explanatory notes.

IN PHOTOSHOP/BRIDGE

In place of tags, Photoshop uses keywords that can be accessed in Bridge via the Keyword panel or with the File Info dialogue in Photoshop.



Collections

The Collection option in Bridge is essentially the results of a saved search. To create a Collection, use the Find dialogue (Edit>Find) to establish search criteria and then click the Save as a Collection option. This opens a file browser where you can nominate where the Collection entry is kept. To display the Collection later, just double-click this entry.





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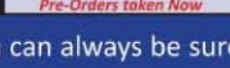


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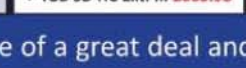
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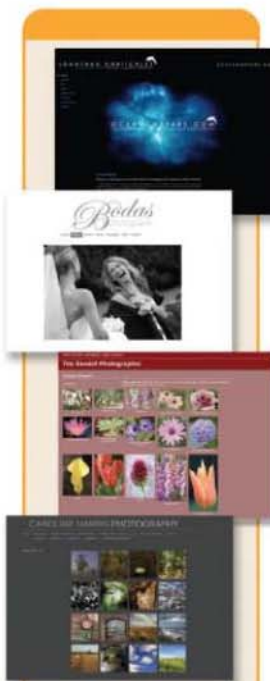
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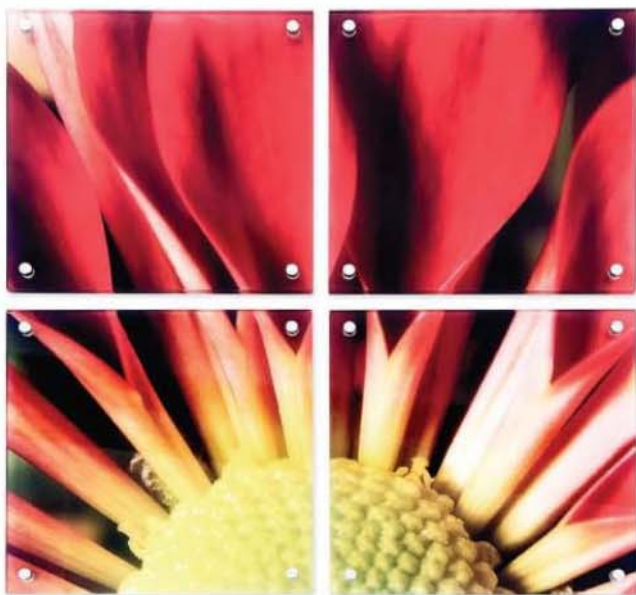
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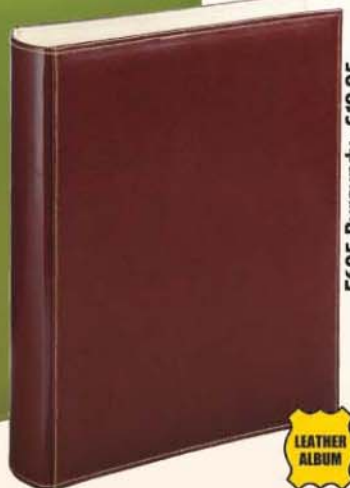
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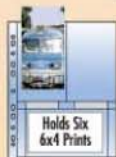
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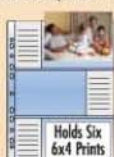
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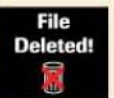
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