



ULTIMATE FIELD GUIDE TO PHOTO GRAPHY

National Geographic Photography Basics

Digital photography has surpassed film photography in popularity in recent years, a fact that has relegated some amateur and professional film cameras to the unlikely task of becoming a paperweight. In the art world, however, film cameras are coveted. The lesson is simple: choose the tools that you need to get the results you want.

Just a couple of years ago a professional would have chosen from a vast array of film camera types—single lens reflexes, twin lens reflexes, rangefinders, and view cameras to name a few—when selecting the tools of his or her trade. Now, with the advent of digital technology and digital software, the serious photographer can, for the most part, rely on a digital single-lens reflex camera, or D-SLR.

A D-SLR is an incredibly advanced and refined tool that still offers the all-important ability, as in film version cameras, to view your subject through the same lens that records the image onto your sensor. This is achieved via a mirror and a pentaprism so that what you see is what you get (often referred to as WYSIWYG). It is hard to imagine that every time you press the shutter to take a picture, a mirror between the rear of the lens and the image sensor flips out of the way, the camera shutter opens, and the sensor is exposed for the required time. Meanwhile, the camera's microprocessor is writing the multitude of information the image sensor has recorded to the camera's memory card. This is incredible in itself. Now consider how incredible are the cameras used by sport and press photographers, which manage this at eight frames a second!

For all intents and purposes, there are two types of D-SLR cameras. The first is a traditional-looking camera roughly based on the 35mm film camera bodies that preceded it. Photographers who would normally use both medium- and large-format professional cameras are discovering that in some instances the modern high-end D-SLR provides superior image quality when compared to the scan that was possible from their film. (The "format" of a camera refers to the size of the negative of film

cameras and the size of the image sensor in digital cameras. Large format refers to cameras with a 4 inch by 5 inch negative and larger, whereas medium refers to cameras between 35mm and large format.) Previous users of high-end film compacts and rangefinder cameras are also gravitating toward the more advanced functionality and image quality provided by the D-SLR. At the time of this writing, manufacturers such as Leica and Epson are close to producing a digital replacement for the rangefinder, but high-end digital compacts and D-SLRs are currently filling this void.

The second type of D-SLR is based on the medium-format SLR. Some models consist merely of a digital back on a medium-format film system camera, whereas a few manufacturers are producing large D-SLRs using the largest CCDs. These cameras tend to be used for pictures that require the highest image resolution, such as landscape and still life.

Once you have your new camera, you should keep in mind that the camera essentially houses a miniature computer. Keep your camera software/firmware up to date. The camera manufacturers continuously tune and fine-tune the firmware that runs your camera. Updates can be downloaded from the support section of the manufacturer's website and the instructions to install them into your camera will be found in your instruction manual. Copying the firmware file to a memory card normally does this. Once the memory card is in your camera, use the camera's menu to upload the firmware to your camera. As soon as you buy your camera, check to make sure that you have the latest firmware.

Bear in mind that this is new technology that is continuously evolving and improving. Just as it is with computers, as soon as you buy a new model and are familiar with using it, a newer one will be on the market.

SENSORS

The image sensor in a digital camera replaces the film. There are two main types of sensors used in D-SLR cam-

TIP:

Here are a few places where you can visit many different camera manufacturers to learn about their cameras and equipment when you are researching sensors:

- Your local camera shop
- Photo Plus Expo, NYC, in October
- B & H Photo, NYC
- Photo Marketing Association Sneak Peek, in Florida in February
- www.dpreview.com

eras. They are the CMOS (Complementary Metal Oxide Semiconductor) and the CCD (Charge Coupled Device).

Both sensors have their particular idiosyncrasies, and they have various characteristics that should be taken into account when purchasing. So it's important to look at some example files and research the characteristics of the system you intend to purchase.

When professional photographers are choosing and purchasing a camera system, they like to shoot some comparison test shots with the cameras they're considering. Where possible, emulate this practice. Check the files in the image-editing software on your computer. Make sure both cameras are tested with all in-camera sharpening turned off to allow for a fair comparison. A camera technician at your local store can show you how to do this.

Some sensor/camera combinations are particularly good for low light when using a sensor sensitivity of 400 ISO or higher, while others are fantastic in full natural light and terrible when used with a high ISO sensor sensitivity. Check the amount of "noise" or "grain" at a higher ISO. Do your research well and choose a suitable sensor for the type of photography you're most interested in.

Whereas in the era of film you would have bought your camera and decided on the type of film required at

a later stage, now you have to make this important decision at the outset. It's not just about the file size your intended camera is capable of. For instance, if the sensor is less sharp than the alternative camera, or the color characteristics less favorable, you could be unhappy with your choice. Some D-SLRs have in-camera sharpening to compensate for anti-aliasing filters, the main source of "unsharpness."

Initially you wouldn't think that the physical size of the image sensor would be a factor to consider, since the quality of the file would seem to be the governing factor. However, the smallest sensors on a D-SLR are 18mm x 13.5mm, compared to the format of a traditional 35mm film camera, which is 24mm x 36mm. In this case, a 50mm lens, which on a film camera would constitute a standard lens, becomes a 100mm short telephoto.

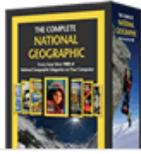
This initially may seem to be an advantage, since you won't need long telephotos. But there is an issue with wide angles. A 15mm is an extreme wide angle with a 35mm film camera. With a small sensor, this is only a slightly wide angle, equivalent to a 30mm lens on a 35mm film camera in some digital cameras. Some manufacturers are addressing this and are beginning to produce special lenses specifically for digital bodies, such as the extraordinary Olympus Zuiko Digital ED 7-14mm f/4.0.

WHAT TYPE OF LENS DO I NEED?

Now that you've bought your new D-SLR camera and are starting to come to terms with its operation, you might well be thinking about buying another lens.

When you purchased the camera it more than likely came with a zoom lens; something like a 28-80mm is the usual offering with new cameras, and this is a good lens with which to start.

But if you feel like you need something different, what do you look for? There are many types of lenses available, and to know which lens you should buy you need to



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know what you want to photograph with it. Lenses come in all shapes and sizes—a bit like a family—and they all have specific characteristics. Here is a breakdown of the different lens types and some of their applications.

There are three basic types of lenses:

- wide-angle
- standard
- telephoto

A lens belongs in a particular category based on its focal length.

- 50mm is the traditional focal length for a standard lens.
- Less than 50mm is considered a wide-angle lens.
- Greater than 50mm is considered to be a telephoto lens.
- Lenses beyond about 300mm are known as super telephoto

Standard Lenses

The standard lens (50mm) gives an angle of view of between 45 and 55 degrees, which is approximately the same as that of the human eye. Because of this it produces an image with a natural look; it photographs things in a manner that is as near as possible to the way we would see the same subject.

Because these lenses photograph subjects in the same way as we see things, they produce pictures that tend to look “normal” and, thus, have a wide application as a general-purpose lens.

Wide-Angle Lenses

With so many wide-angle lenses available ranging in focal lengths from 8mm to 35mm, the choice is huge and can be quite confusing. Basically, the wider the lens, the more specialized its use.

Super-wide lenses can distort the image and have a limited, if valuable, use. I would suggest that either a 24mm or a 28mm lens—the more common types of wide-angle—would be a good choice to purchase as a starter lens.

The 35mm wide-angle lens is often used as a standard lens because although the focal length is slightly less than the 50mm of the standard lens, the difference is not huge. It can give the photographer the advantage of extra depth of field, a real benefit for news photographers, who shoot where space is often limited and for whom the more of the picture in focus, the better.

Because the angle of view of the wide-angle lens is much greater than that of the telephoto or standard lens, it's obviously the lens to use where there's limited space or the subject is large. Taking the family picture at Christmas when 30 of your relatives have arrived at your place would be impossible unless you lived in a very large house—or you had a wide-angle lens to take the shot.

Landscape photography is another area where wide-angle lenses are very useful. Using a wide-angle offers the ability to get close to your main subject to make it more prominent in the frame while keeping as much of the background in focus as you want.

Telephoto Lenses

We all know that a long telephoto lens can bring the subject right into the heart of the picture; objects that appear to be miles away when shot with a standard lens appear to be only feet in front of the photographer when shot with a telephoto lens. This is why all the photographers at a football match or soccer game use telephoto lenses to capture the action.

Telephoto lenses have many more uses than just sports photography. The narrow angle of acceptance and the extra magnification allow the photographer to foreshorten the distance between himself and the point of interest of the picture. The lens allows you to capture a smaller portion of the scene so that your subject is not lost. This effect makes telephoto lenses particularly suited to landscape photography when you are trying to isolate details in a rather large area.

The longer focal length of a telephoto lens means that it has much less depth of field than a wide-angle or even



A fisheye lens can offer a chance to make unusual images.

a standard lens. This effect can be used to “drop out” or blur backgrounds to create a sharp, clear subject without the confusion of a busy background.

You must take this factor into account when using a telephoto to shoot landscape pictures, where it’s often best to have as much of the picture in focus as possible. This often requires long shutter speeds and small apertures to create greater depth of field. A tripod will be necessary to hold the camera perfectly still.

A short telephoto lens—90mm, 110mm, or 135mm—is ideal for portraiture. It allows the photographer to maintain a comfortable distance from the subject while still allowing use of the limited depth of field to avoid confusing backgrounds.

Zoom Lens or Fixed Focal Length

As zoom lenses have become better, their popularity has grown. A few years ago a zoom lens could not match the quality of a fixed focal-length lens and was seen as

a cheaper alternative to buying a number of fixed focal-length lenses.

This situation has rapidly changed, and some of the sharpest and fastest lenses now available are zoom lenses. The zoom lens allows the photographer to carry less equipment, since a single zoom lens will often replace two or even three normal lenses. A top-quality zoom lens is expensive and will often cost the equivalent of the two or three fixed-focal-length lenses it replaces.

If you have a choice between a constant-aperture zoom lens versus a variable-aperture zoom lens, choose the constant one. The reason is simple: Your aperture remains the same as you zoom, so your exposure can remain the same. With a variable zoom lens, the aperture can close down as much as one f-stop. For example, if you zoom from 28mm to 135mm and you started with $f/3.5$, you may end up with $f/5.6$. The way to combat this is to stop down anyway so you are not affected. Or better yet, spend more money for a constant-aperture zoom lens.

Macro Lenses

If you have a desire to photograph insects, close-ups of flowers, or any other small objects, then the macro lens might be what you need.

Usually available in 35mm, 50 or 60mm, or 100 or 105mm focal lengths, these lenses are similar to normal lenses in that they can focus to infinity, but they are designed to focus at extremely short distances. They are used for extreme close-up photography.

Coins, stamps, or any other small objects are ideal subjects for a macro lens. And because it can focus at a distance as well, the macro lens can also be used as a standard lens. The addition of extension rings that fit between the lens and the camera can make this lens capable of even more extreme close-up photography.

Finally, there are macro zoom lenses in this category that can produce an image of an object at a 1:3 ratio. Sometimes these lenses can even give life-size reproductions on the film or on the sensor.

Fisheye Lenses

Called a fisheye lens because it produces images that look like a fish's eye, this lens is extremely wide angle. It can produce an angle of view of 180 degrees and either a circular or a full-frame image that is very distorted at the edges. Because this is the only type of image it can produce, it is obviously limited in use.

Shift Lenses

Shift lenses are expensive, but if you like photographing tall buildings, you'll find a use for this type of lens.

Using a standard lens, the camera has to be tilted backward to fit the top of the building into the frame. This produces an image in which the building appears to be falling backward, and all the vertical lines converge at the top of the picture, a consequence of the film or image-sensor plane not being kept parallel to the subject.

A shift lens allows the camera to remain straight and parallel to the building and uses moving front lens ele-

ments to enable the entire building to be in the frame. You do this by sliding up the front portion of the lens to include the top of the building so you don't have to point the camera up. The use of a shift lens will stop the vertical lines from coming together while still giving the impression of looking up at the building.

The tilt-shift lens has been used by tabletop photographers and portraitists alike lately to create interesting images. The tilt feature allows photographers to control sharpness and blur in unexpected ways.

Split Field Lens

This lens consists of a semicircular close-up lens in a rotating mount that attaches to the front of a lens and allows it to produce images in which the close-up foreground image and distant objects in the background are both in sharp focus.

Teleconverters

Teleconverters are clever optical devices that fit between the camera body and the lens and increase the effective focal length of the lens. Most teleconverters come in either a 1.4x or a 2x version. A 2x converter will turn a 200mm lens into a 400mm lens, although it will also reduce maximum aperture, and thus the light reaching the film, by two stops. A 1.4x converter will reduce maximum aperture by one stop, necessitating slower shutter speeds or a higher ISO setting. This is a good option for expanding your range of telephoto lenses, but be sure to buy the best teleconverter that you can afford.

PERSPECTIVE

The control of perspective is the ability to use your camera and lenses to control the relationship between the background and foreground of your pictures.

When you're using a wide-angle lens, the background appears much farther away from your subject than it actually is. With a standard lens, the background appears the same distance away as it does with the naked eye. When

CHECKLIST FOR D-SLR PHOTOGRAPHY

The following is a checklist to help you remember all the technical aspects of your photography that need to be kept in mind. Your new camera is a highly sophisticated piece of equipment; this list should help you avoid simple mistakes while you become familiar with it.

- Have you charged your batteries? Before every outing, charge your battery. Most digital cameras have rechargeable batteries. In the early days you will be checking almost every image on the LCD screen on the back of your camera, and this is what runs the camera battery down more than anything else. In fact, to start with, buy a spare battery.
- Have you formatted your memory card? Before every shoot, and after you download or print your pictures, always, always format your memory card. As with all technical equipment, failure is always possible. You can lose pictures. However, you can minimize this risk with good housekeeping. Format your card in the camera's menu before every use and after you confirm you have downloaded your pictures.
- Do you have enough memory in your cards? One of the plus points of the pre-digital era was the ability to pick up a new roll of film in almost every corner shop. The cards included with most digital cameras today have a very small capacity for pictures. You will inevitably need to purchase additional, more spacious cards. Make sure you buy enough for that trip to the Caribbean or some other exotic location like Alaska where you may not be able to find suitable cards while you're traveling.
- Have you cleaned your image sensor? If you like to change lenses often, there is a chance that dust attracted to your image sensor will result in black specks or hairs appearing on your image files. This is especially likely if you forget to turn off your camera before changing the lens. If the sensor is not cleaned carefully, it can be damaged. Check the manufacturer's website to see what they recommend. One way to avoid having to clean the sensor all the time is to keep the lens mount facing down when changing lenses. This way, any airborne debris is less likely to settle on the sensor.
- Have you set your sensor sensitivity (ISO)? It's best to use as low an ISO as possible because higher ISO settings produce more "noise" (undesirable visible grain). The general rule is: The lower the ISO, the better the quality (if the shooting circumstances permit it).
- Have you set your color/white balance? We will be going into this later in more depth, but at this stage make sure that your camera is set on auto-white balance, as in most cases this will produce an acceptable result.
- Have you set the right file type—JPEG, RAW, or TIFF? We'll be addressing this subject later on. For now, make sure your camera is set to produce the largest/highest quality JPEG possible. It is absolutely pointless to shoot on smaller JPEG settings, since doing so defeats the purpose of using a high-quality camera.



using a telephoto lens, the background appears closer. It should also be mentioned that on a wide-angle lens your angle of acceptance is much greater than on a standard or telephoto lens where your angle of acceptance is much less. This means that with a wide-angle lens, you can sometimes surprise yourself with how much you've included in your picture. On the other hand, using a telephoto lens, your subject is more prominent and less of the background is included within your frame.

So, by varying your lenses, and therefore your perspective, you can use the background to complement your pictures or isolate your subject as you require. As I mentioned in an earlier chapter, experiment by shooting a variety of pictures of the same subject with different focal length lenses to help you understand how different focal lengths affect perspective. Remember to move backward and forward in relation to your subject to keep it the same size in all the frames and at all the different focal lengths.

EXPOSING YOUR PICTURES

First, I will define the three basic photographic terms you will need to know. Then we can learn in greater detail about each one.

Exposure

Exposure is the amount of light, controlled by aperture and shutter speed, that reaches the image sensor.

F-stops

F-stops are the measure of the size of the opening, or aperture, in the lens. Remember, the larger the f-stop number, the smaller the aperture. The smaller the f-stop number, the larger the aperture and the more light the lens will let through to the image sensor.

Shutter Speeds

Shutter speed is the measure of the duration or length of time that the shutter stays open. The longer the shutter

stays open, the more light will be allowed to reach the image sensor. Faster shutter speeds "freeze" the action and often require more light and a larger aperture (smaller f-stop number). Slower shutter speeds enable pictures to be taken in lower light with a smaller aperture (larger f-stop number).

Before we can achieve the correct exposure it is important to know what a correctly exposed image looks like. A correctly exposed digital picture is a file that shows a full range of tones, from deep shadows to bright highlights, with detail across the entire image. You should see some detail in the dark shadow areas while at the same time retaining detail in the brighter highlight areas. Providing you get this, you can decide afterwards whether you actually need the full tonal range to appear when you print the image. If you don't ensure that you have the full tonal range from the start, there is little you can do about it later.

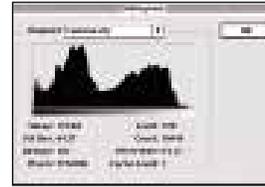
This last point is more crucial when shooting in JPEG format. When shooting in RAW mode, getting the right exposure is a more forgiving process than it is when you shoot color negative film because you can correct the color in your computer later.

CONTROLLING LIGHT

To register a fully-toned image on your digital camera sensor, you must allow the correct amount of light to reach the digital sensor. The three factors that control the path of light are sensor sensitivity (ISO), shutter speed, and aperture.

Sensor Sensitivity

When film was dominant, exposure was an incredibly important subject. The digital era has brought us light-years forward because we can now see the result of our settings instantly. Just as with film cameras, the D-SLR takes into account the brightness of the subject, the contrast, the color of the picture, and the area focused. When set for automatic exposure, the camera calculates all this and much more instantly.



A perfect exposure looks like a mountain range in the histogram.



An overexposed image appears as a valley in the histogram.



An underexposed image has extreme peaks on one side of the histogram.

I guess you'll have realized by now that I'm a fan of automatic exposure, providing that you review your pictures on the LCD screen on the back of your digital camera as you shoot. If you are a newcomer to photography, there are many other different aspects that have to be considered before you take each picture. How do I frame the

picture? Is it in focus? What is the background like? Until all these elements start to become second nature, it's wise to leave your camera on auto-exposure. This will give you one less thing to worry about while you concentrate on all the others. Then slowly, as you become more technically proficient and have learned to hold the camera the right

way, you'll start to appreciate the small adjustments that are possible on your camera to perfect exposure.

On most D-SLRs and high-end compact digital cameras, you have the option of overriding your automatic exposure and setting the exposure manually. This is where we begin to play with the camera's settings. We will learn not only to expose correctly but to overexpose and underexpose deliberately.

Film photography requires you to change films if you want to change the ISO setting. Digital photography, on the other hand, allows you to shoot a group of pictures, or even a single picture, at one ISO setting, then change the ISO setting on the same memory card and keep shooting. You can change the ISO as often as you like.

Shutter speeds

Here are some basic tips about shutter speeds to begin:

- To stop a racing car, or someone riding a bicycle, start with 1/1000 second.
- For everyday pictures such as portraits and views, use speeds of 1/60 second to 1/250 second.
- If the light is really bad, try not to go below 1/60 second. If you must, hold your camera very still and don't expect to freeze any action.

Aperture (f-stop)

Here are some basic tips about f-stops:

- As a general rule, $f/5.6$ gives a little bit of depth of field, provided the lens focal length isn't too long, and is still wide enough to enable high shutter speeds.
- If it gets really dark, don't be afraid to open your aperture to its maximum aperture, for example, $f/2$.
- If you need loads of depth of field, or you want a slow shutter speed, stop down to $f/11$ (when using a short lens) or $f/16$.

If your picture looks a little bit lighter or darker than it should, take another, having adjusted the exposure. You can make your image lighter by increasing your exposure, or darker by decreasing it.

EXPOSURE COMPENSATION SETTING

If you find that your images consistently look better by underexposing by one stop, or by overexposing by half a stop, then use the exposure compensation setting to build this factor into the camera's light metering. This facility enables you to under- or overexpose by up to three f-stops or full shutter speeds. This is normally indicated on your camera by a scale from +3 to -3 with either half or third stop increments. Once you set it, the camera will usually maintain the adjustment until you change it. Most professional photographers I know use the exposure compensation feature to fine-tune the meter of their camera.

Take lots of different versions of each picture. When you have time and the subject permits, vary your exposures so you don't miss an important shot. Check the images on your computer screen and delete all the bad ones before you show anyone your work.

Automatic Exposure (AE) Modes

On most digital cameras you'll find a variety of exposure modes, typically referred to as:

- aperture priority AE(Av)
- shutter priority AE(Tv)
- program AE (P)
- manual (M)

Aperture Priority

The aperture priority mode enables you to set the f-stop (aperture) and the camera will then adjust the shutter speed to give the correct exposure. This mode is particularly useful in low-light conditions, where you want to set the brightest, widest f-stop in order to get the highest shutter speed and the minimum amount of movement. If more depth of field is needed, you can use a small f-stop to get as much of your picture in focus as possible.

Shutter Priority

Using the shutter priority mode, you can set the shutter speed, and the camera selects the f-stop (aperture) to give



In the diagram below, each combination of lens aperture and shutter speed produces the same exposure, or lets the same amount of light into the camera.

the correct exposure. This can be especially useful when you're shooting action pictures and you want to freeze the motion by setting a high shutter speed. By the same token, if you were photographing a waterfall and you wanted the water to blur, you could set a slow shutter speed and the aperture would adjust accordingly. It goes without saying that both modes assume you have enough light to expose your pictures within the range of shutter speeds and apertures you're using.

Program

This setting leaves all the decision-making to the camera. The camera sets a combination of shutter speed and aperture so you don't have to think about exposure at all. In some cameras this may be set up as subject programs such as "portrait," "sports," or "landscape." Be careful

though. If there's not enough (or too much) light to achieve the effect you're after, your camera won't be able to work miracles. Even on this setting, check the LCD to make sure you are getting the images you want. And remember that you can still use autoexposure compensation to override the camera's decision.

Manual

This mode enables you to manually set the shutter speed and the aperture independently of each other, referring either to the camera's built-in meter or to a handheld meter. Professionals tend to use manual exposure and handheld light meters. This allows them to take multiple meter readings in various points of the subject frame. In this method the photographer has total control over the pictorial effects that various shutter speed and aperture

TIP:

The sunny f/16 Rule:

If you are attempting to make a landscape photograph without a tripod, inverse the ISO in selecting your shutter speed, i.e., with a 200 ISO you would select 1/200 second at f/16.

combinations can achieve. When film was dominant, this method tended to be the exclusive realm of the professional or the advanced amateur. Today, the immediate feedback of digital photography allows you to shoot a test frame, have a look, make a slight adjustment, have another little look, and get your exposure right.

Most advanced D-SLR cameras have an autobracket setting. This clever little feature sets the camera to take three pictures automatically, in rapid succession: one at the “correct exposure,” one overexposed, and one underexposed. I find this very useful when working quickly because I know it will give me a choice of exposures after the fact. By setting the camera to shoot one picture at the “correct” exposure—as the camera sees it—and two frames perhaps one f-stop either side, I’ll always end up with one frame that I consider to be the perfect exposure. You can change the increments of the brackets so that they are 1/3, 1/2, or 2/3 stop to either side of the “correct” exposure, depending on the camera model. On most cameras this facility works on all the automatic settings and in manual mode.

METERING PATTERNS

Most advanced D-SLR cameras, along with the automatic exposure modes, have some additional settings that can affect your exposure. The default setting on most D-SLR cameras and point-and-shoot-cameras is multisegment metering. (Nikon calls it matrix metering, Canon, evaluative.) This method of metering divides the image into a number of smaller areas in which the microprocessors of the camera meter the light. The camera then combines these readings with the aperture and shutter speed and produces a near

perfect result in almost all cases. I would suggest you leave your camera set on matrix/evaluative metering and switch temporarily to spot metering when the situation calls for it.

Spot Metering

Spot metering is a really good setting when shooting manually. The reading is taken from a very small section in the center of the frame, sometimes as little as one percent of the total image. This is very useful, for instance, if you’re sitting in a separate light from the person you wish to photograph. Say you are sitting outside a cafe in the shade of an umbrella. You see your friend has arrived and she is standing in a shaft of sunlight. In order to expose a picture of her correctly, use spot metering. You need to set the camera to expose for the sunlight around her, not the shade around you.

Center-weighted Metering

Center-weighted metering is more biased toward the center of the frame. Less attention is paid to the corners and edges. Personally, I don’t have a use for this function except on some cameras in which automatic flash is more reliable on this setting. Other photographers like it because this kind of metering tends to underexpose the photograph, which worked well with slide film once and, likewise, digital. As always, experiment to find the best combination of settings for your camera.

Handheld Meter

This is an exotic accessory for the digital photographer and is really only necessary for a professional working with additional lighting or strobes. A handheld meter today is often a combination of an exposure meter and a flash meter, and is generally used as an incident light meter. This means that the meter measures the light falling on the subject rather than the light reflected off the subject, the way your camera does its metering. This highly accurate and precise instrument is used by holding the meter in front

of the subject with its white dome pointing towards your camera. You take the reading and transfer these settings to your camera while your camera is set in the manual mode. This system does not take into account the color or density of your subject and produces settings suitable for a mid-toned, average subject. The main use for this meter in the digital world is when using supplementary strobes/flashes. It has the ability to measure the brightness/intensity of a non-dedicated studio flash, a capability that is not found in the meter in the camera. This tool is essential when setting up complicated shots with studio-type lighting.

UNDERSTANDING HISTOGRAMS

As you've heard before, one of the best things about digital cameras is the ability to review your images on the back of your camera. When I harp on about checking the exposure on your LCD screen, sometimes I hear this: "You silly old fool. In the sunlight I can hardly see the screen. How can I possibly judge my exposure?" Most D-SLRs have the facility to display a histogram on the camera LCD screen. Whereas 99 percent of photographers think a histogram is some sort of family tree, it is in fact a fairly simple bar chart. The chart illustrates how the pixels in an image are distributed by graphing the number of pixels at each color intensity level. This shows you whether the image contains enough detail in the shadows (shown on the left side of the histogram), mid-tones (shown in the middle), and highlights (shown on the right side) to create good overall exposure.

As you get used to viewing histograms, you'll find them a great tool for checking and double-checking your photographs, especially in adverse lighting conditions. Knowing what sort of histogram a well-exposed image produces eliminates the chances of being fooled by an LCD screen that is not set to the correct brightness.

If the histogram looks all right, it doesn't matter whether the image looks light or dark on the screen. The truth is in the histogram.

A good exercise is to take some pictures of a subject with a full range of colors and tones. Set your camera to manual exposure and expose one frame as the meter suggests. Then take the same picture in a range of frames at half or one-third stop increments, from three stops under to three stops over. Look at the histograms of these pictures to learn how to read and understand them, taking into account how the chart varies with under- and overexposure. Very, very crudely speaking— and I may get criticized for simplifying to this degree— you're looking for a mountain range in your histogram window that starts at one edge, finishes at the other edge, and reaches toward the top of the histogram frame. Obviously, since every picture has different content, your mountain ranges will vary.

AUTOFOCUS

Most beginning photographers leave their autofocus function on the factory-default setting of "on all the time," like most of the other settings on their digital cameras.

To start with, and as you learn, this is just where you should leave this setting. Only when you've mastered the other functions and facilities of your camera should you begin to tinker with these options.

Like most settings on your D-SLR, autofocus should really be referred to as automated, rather than automatic. There are many options within the menus of your camera to fine-tune the focusing. I can't stress enough the importance of gradually learning how to use these and all the functions of your camera as you progress. Using this automated (as opposed to manual) mode does not in any way mean that you're taking the easy option. If anything, you're proving that you are a master of technology and that all that hard-earned cash spent on your new advanced digital camera has not been wasted.

Perhaps the first autofocus function found on high-end cameras that you should learn to use right from the start is commonly known as "one-shot" or "single servo." Use this in cases where you want to compose your picture when



the subject is off-center. In your viewfinder there will be either cross hairs or AF (autofocus) points to signify the point on which the camera focuses. Point your camera directly at the subject so that the AF point is aimed at the part of your picture that you wish to be the primary point of focus. By using this one-shot/single servo mode, the autofocus is activated as you initially depress the shutter. It will then lock into place as the camera focuses on the point you've chosen. Holding down the button halfway to hold the focus, you may then recompose your picture perfectly, allowing better composition. Be aware this feature is totally unsuitable for moving subjects, because once locked in, the focus does not move until you press the shutter. Every picture you shoot will, of course, need refocusing.

There are some scenes that are unreliable in the autofocus function. They are:

- Snowy scenes
- Wide-open blue skies
- Very low light
- Extremely backlit or reflective subjects

When the camera is unable to focus on any point against the snow or blue sky, for example, set the one-shot function, lock the focus on something a similar distance from the primary subject, and then recompose your picture.

Another function, which in use is in some way similar to one-shot, is commonly known as back-button focusing. In this mode, you enable one of the function buttons on the back of your D-SLR to activate the focusing. So before you shoot, and in fact while you shoot, you can enable and disable the focusing at will. On some advanced D-SLRs when you combine this with the ability to manually select one of the many focal points, you're using the camera's autofocus system to its full potential.

Once you've started to master your camera, there are many more settings that you can learn to use within the

autofocus menus. These vary a lot from manufacturer to manufacturer and take into account many different factors, sometimes even the type of picture and color of the intended photograph. So you'll need to refer to your camera instruction manual, which I'm absolutely sure you'll have taken the time to read by now. No doubt you'll need to read it again and again!

The only occasion on which I would recommend manual focus is when you are photographing through netting or similar screening. When photographing soccer, for example, shooting from behind the goal through the netting can give a dynamic and graphic effect. This situation will usually foil all autofocus cameras. Switch off your autofocus when taking this kind of shot. This would apply equally to taking pictures of animals behind cages at the zoo.

DEPTH OF FIELD

Depth of field is the distance between the nearest and the farthest objects in an image judged to be in acceptable focus. The focal length and the aperture of the lens you're using and your focused distance govern your depth of field. The longer the focal length, the less the depth of field. The shorter the focal length, the more depth of field. The smaller the aperture, the greater the depth of field, other things being equal. In layman's terms, telephoto lenses have less depth of field than wide-angle lenses, and a more powerful telephoto lens gives less depth of field. It also follows that extremely wide-angle lenses provide the most depth of field.

When you see a beautiful landscape photograph hanging on a wall in a gallery, it was very likely was shot on a very small aperture (large *f*/stop number) to get as much depth of field as possible. Even on a sunny day, using the smallest aperture may require a rather long shutter speed and may therefore require the use of a tripod.

This can create a dilemma. For instance, you would ideally want to use a high shutter speed for shooting

action photographs. Yet the subject is traveling at speed, so a small aperture would give you more of the subject in focus, thus making it easier to get the picture sharp. Some people would just use a higher sensitivity for their sensor, thus enabling higher shutter speeds and lower apertures. But this comes at a price—and perhaps the most expensive price when it comes to photography—the all-important quality of the image. The sad fact is that as you increase the sensitivity of your sensor, the image quality can decrease. (Camera manufacturers are improving greatly in their high-ISO performance as we write this.)

So now it's decision time: You can't have everything, so you have to choose what is most important to you. Even on the brightest day of the year, with the sun on the subject, if using 100 ISO, your exposure at 1/1000 second would be $f/5.6$. This would not give you much depth of field on a long telephoto lens. And if you were photographing floodlit football, you would really be in trouble. A typical exposure setting would be 1/500 second at $f/2.8$ at 800 ISO.

When you would like as much depth of field as possible, remember that the depth of field extends farther behind the point of focus than in front of it. If you focus one third into your subject, you will know that the depth of field will extend by equal amounts before and after the point of focus. Some lenses have depth-of-field markings showing approximately how much depth of field is available at a given aperture. To give a crude example: with a 20mm lens set to $f/11$ and the focus set approximately 5 feet into the picture, your depth of field will extend from 2 1/2 feet to infinity. Using a 400mm lens set at $f/4$, your depth of field with the focus set at approximately 30 feet would be less than a foot.

Remember that you can use depth of field creatively by using a wide-open aperture to isolate your subject. Your subject will stand out sharply as the rest of the image surrounding it remains pleasantly blurred. Equally, with a

wide-angle lens and a small aperture, almost everything in your picture can be sharp, enabling you to fill the frame and isolate your subject in the foreground while keeping a sense of place with a sharp background. To sum up, the smaller the f-stop, the more depth of field you will get. But always remember to use a shutter speed that is suitable for your subject.

COMPOSITION

Unfortunately, when it comes to framing your pictures, there is no auto-composition button to come to your rescue, so this is one skill that you really will have to master.

This section is about developing an “eye” for a picture. Photography is about seeing something pictorial and recording it in an interesting and graphic way. If the subject doesn't have the content to begin with, you can't mysteriously add it. If the colors and shapes of the subject don't complement each other, guidelines will not help you. They are there to help you make the most of what you see and photograph. Unless you are constantly looking and thinking, you will not get great pictures.

To compose your pictures properly, in very simple terms, is to produce a pleasing picture. This is easily achieved in most cases. Sometimes it may be as simple as turning the camera vertically to take the picture as opposed to the more commonly used landscape, or horizontal, format.

The important thing is to really think about your picture and not get too bogged down in technical details. This may sound hypocritical, as the bulk of this book deals with the technical aspects of digital photography, but it's essential to understand that the technical side is there to enable you to express your creativity. Unless you fully grasp the basics of composition, no matter how technically advanced you become, your pictures will always be lacking.

To start with, be bold and fill the viewfinder with your subject. If the subject is predominantly upright, shoot

the picture vertically. If your subject lends itself to a horizontal picture, shoot it in a landscape format. In the early days of your photography, when you review your pictures at the end of the day you will be surprised to find that the subjects are much smaller in the frame than you expected. You must make sure that when you look through the viewfinder you are looking at *everything that is in the viewfinder*. Take into account what's around your subject and ask yourself if it contributes to the picture you are trying to make.

One of the advantages of the compact digital camera, which is lacking on nearly all D-SLRs, is the ability to use the LCD screen on the rear of your camera as a viewfinder. I find that people tend to frame their pictures far better when using the LCD, because they tend to look at the whole picture. The LCD is so small that your eye cannot wander around the frame. When you're looking through a normal eye-level viewfinder, it's easier for your eyes to wander and, therefore, not consider the frame as a whole.

As you start to shoot more pictures and you become more accustomed to filling the frame, start making use of your zoom lens (which most digital cameras now come with) and zoom in on your subject. Don't be afraid to shoot, for example, an extreme close-up of your friend, or your baby, or a flower.

When you shoot close-up portraits, try experimenting with your framing. Your subject doesn't always have to be in the center of the frame and looking directly at the camera. Perhaps when photographing, say, your daughter, it may be more pleasing to compose the picture with her on the left or right looking into the center of the picture. Now that you are beginning to frame your portraits, you have started to compose your pictures well.

Since the time of Leonardo da Vinci, budding artists have had the rule of thirds drummed into them at art school. I personally find rules extremely boring, but I grudgingly admit that this one is actually very useful to photographers.

Look through your viewfinder and mentally divide the screen into three horizontal and three vertical sections, like a tic-tac-toe grid. The points where the lines intersect are the places that your eye naturally seeks out when looking at a photograph. It's logical, therefore, that you should try to position your subject near one of these four focal points. When photographing a landscape, it's also good compositional practice to place the horizon or skyline on one of these imaginary lines. At this point we must also mention that it's important to keep your horizon straight. Failing to do so is the most common mistake when starting out. It's a real disappointment to see a photograph in which the skyline runs downhill.

Changing the angle from which you take a picture can hugely transform it. For small subjects, such as pets and babies, try to get down on their level. Lie down and look up at your one-year-old child's first steps for a far more interesting picture. A tight portrait of your bulldog asleep on the rug is far better photographed if you are lying down on the same level. Choosing a dynamic viewpoint can help your photography and accentuate your pictures. Don't be afraid to be radical and stand directly above the sleeping dog. This may or may not give a more interesting viewpoint; the point is to keep experimenting and looking to find the most dynamic picture.

I know I sound like Polly the parrot, but keep reviewing your images on the LCD screen on the back of your digital camera. A good tip for cameras with an LCD screen that can be used as a viewfinder—if it's the sort with a hinged, adjustable screen—is to hold the camera on the floor or above your head to gain a more dramatic viewpoint and view the image using your LCD to control your composition. This way you can sometimes achieve a viewpoint that wouldn't be possible if you had to compose a picture through your normal viewfinder. The less agile you are, the more useful this can be.

If your frame contains visible or long, continuous lines, such as roads, rivers, fences, buildings, etc., take

advantage of these lines when composing your image to lead your eye into the main subject of the picture. This works particularly well when the lines originate from the bottom corners of your photographs. A winding road, for example, leads to the old church you are photographing, or the Great Wall of China starts in the bottom corner of your frame and then leads the eye into the center of the picture.

One last word on color in your composition. It's pointless to try to apply any rules to this; it's up to you as the photographer to see and appreciate color and the aesthetics of different combinations. Colors can give a warm or cold feeling to a picture, reflecting our preconceived views on color. A winter scene can be enhanced by the use of blue in the picture to give that chilly feeling, for example, or a red beach umbrella on golden sand can evoke the feeling of warmth. Although it's not usually possible to add colors to your photographs, be aware of color as you're looking to make that award-winning picture.

COLOR BALANCE

On most digital cameras today, photographers tend to use the auto white balance (AWB) setting. For most subjects, this is fine. In some cases, however, it's better to use some of the preset WB settings, such as sunlight, shady, fluorescent, or tungsten lighting, and match them to the existing lighting. With advanced digital cameras, you also have the facility to set a manual white balance. This is achieved by photographing a neutral gray card, using one of the options of the camera. The camera then makes an adjustment to give very accurate color. Where the light is constant, this is the best way to achieve perfect color balance with mixed or difficult lighting.

A good trick I use frequently is to set the degrees Kelvin (a measurement of color) in the camera slightly warmer than the light at the time. For instance, on a normal sunny afternoon, the correct color temperature would be 5,500 degrees Kelvin. I set my camera at 6,000 degrees

TIP:

Your virtual viewfinder:

A very good way of comprehending composition is to form a rectangular frame (your very own virtual viewfinder) with your hands by linking your index fingers to your thumbs. Hold your frame at arm's length for that telephoto look, or close to your face for the wide-angle effect. You will find that by eliminating the superfluous information from your view, you will see it more the way your camera will photograph it. This may sound absurd—all you can always look through your viewfinder—but just try it.

Kelvin, which makes the camera think the light is cooler than it really is. This gives me a pleasing, slightly warmer effect similar to shooting Fuji Velvia film.

Many of today's cameras measure the color balance through the lens. As with through-the-lens automatic exposure metering, if the subject is a predominant color or density, the camera's automatic exposure or color balance tries to achieve a neutral effect and can be fooled. So if you were photographing a red Ferrari against a red wall when shooting on auto white balance, the camera would try to make your picture less red. Obviously, this isn't good. In the same way, if you shot a snowman in the snow on automatic exposure, the camera would underexpose the subject.

You can preset your color balance to get a more desirable picture. You can do this by:

- Making a manual color balance reading with the camera
- Using a color temperature meter and then entering the reading
- Using your experience and entering the color balance in degrees Kelvin manually

To sum up color balance:

- In 90 percent of cases, auto white balance, like auto exposure, produces great results.

- In unusual or mixed lighting conditions, or with subjects of one predominant color, try to manually set your color balance.
- Don't be afraid to warm your pictures up slightly by manually setting a cooler color balance than called for by the light.
- If you are using an advanced camera and shooting in RAW, many of the color balance adjustments can be made on the computer after you've taken the picture. However, don't be lazy and rely on this to avoid making the correct settings. The more accurately you adjust your camera settings, the better the final result.

THE IMPORTANCE OF BACKGROUND

One of the most common mistakes made by amateur photographers is not thinking enough about the background. When I'm taking pictures, one of the most important elements I consider is what the background of my picture is going to be. After all, no picture can be a "great" picture without a complementary background. This does not mean always getting a neutral background, although that can be a good start. The background should not distract from the main subject of the picture, be it an action picture, portrait, or even a landscape. In many cases, it can be used to complement or add to the picture content.

Just changing the angle of the picture slightly can help a lot. For instance, if you are photographing someone outside on a sunny day and the background choices are dreadful, duck down low and photograph against the best—and my favorite—background in the world: the blue sky. Equally, if the weather is bad, many great portraits have been photographed against a cloudy, dark, moody sky.

Sometimes, when the background isn't great, a good trick is to use a telephoto lens and shoot at the widest aperture. This puts your background extremely out of focus and helps your subject stand out. Also, since a telephoto lens has a smaller angle of acceptance, this allows you to be more selective with your background.

Let's consider a familiar scenario to illustrate the importance of the background. You are taking a photograph of the bride at her wedding. By framing the church in the background, you can turn a straight, boring portrait into a much better photograph. In this case, the background is complementing the picture, not distracting or overpowering it. You must be careful not to let the background take over the picture. Remember what you're setting out to photograph and use what's around the subject to help with your composition and framing.

It almost goes without saying that background awareness is one of the essential elements of well-composed photography. Some really good portraits are helped by the pitch-black background on which they are photographed. Some fantastic still life pictures are enhanced by the completely clear, white background on which the subject has been placed.

Finally, here are a few points to bear in mind when you photograph your next family outing:

- *Always, always, always* think about what's in the background.
- When taking a photograph of your sister in New York, don't have a skyscraper growing out of her head.
- Don't photograph your brother at the Grand Canyon with the horizon coming out of his ears.
- When photographing your father fishing, frame the picture with the lake in the background—not the car parked next to the lake.
- When photographing your aunt at her birthday party, make sure that the illuminated exit sign in the restaurant is not distracting your eye from the cake.
- When photographing your son's first football match, choose a position with the green woodland, not the ugly sports hall, behind the action picture you intend to take.
- When sneaking a picture of your friend sunbathing on the beach, wait until the man walking his dog behind her has gone.

FLASH PHOTOGRAPHY

At this point I should be completely honest with you: I usually don't like flash photography. I like to use any natural light that's available and manipulate the subject to achieve the affect I'm after. There are occasions where using flash is a useful technique, and there are a few things we need to know about the best ways to use flash.

Flash on Camera

We've all seen plenty of examples of how not to use flash—pictures in which the subject is lined up against a wall and the flash casts a huge ugly shadow that overpowers the shot. If the flash is built into the camera, it's often hard to avoid this situation, but there are a few simple tricks that may help.

Move the subject away from the background; the farther away from a surface on which a shadow can be seen, the better the result will be. The distance between the subject and the shadow will determine not only the size of the shadow but also the hardness of the edges, so the greater the distance, the softer and less obvious the shadow will be.

On some occasions where it's not possible to achieve this separation of subject and background, a shadow behind your subject is unavoidable, and the best you can do at these times is to make the shadow as unobtrusive as possible. Take the picture from an angle that will project the shadow behind the subject's head rather than behind the face, or use Bounce Flash.

Bouncing the Flash

By redirecting the light from your flash you can reflect it, or bounce it, off another surface to change the angle and quality of the light reaching your subject. The effect of bouncing the light produces a less directional, less harsh light that will result in a much softer effect with fewer shadows.

A simple piece of white card can be used to change the angle of the light from your flash by placing it on

the back of the flash unit and extending it past the face of the flash. Adjust the angle of the flash unit to direct the light in the required direction—usually off a neutral wall or ceiling—and then onto the subject.

Diffusing the Flash

One of the biggest problems with on-camera flash is the hard light that is produced; hard light, as we have previously discussed, creates hard shadows that produce unattractive pictures.

We can combat this problem by diffusing or softening the light produced by the flash with a proprietary flash diffuser, or we can make our own. This is as simple as placing a white handkerchief or some tissue paper in front of the flash. The light passing through the handkerchief or tissues will be spread out, or diffused, producing fewer shadows and a softer look, making even your great-aunt's wrinkles look less noticeable.

CORRECTLY EXPOSED FOREGROUND, BLACK BACKGROUND

Another bad flash scenario we've all experienced is the "bright foreground, black background," where the subject is correctly exposed but the background is completely underexposed and pitch black. A friend of mine has a complete album of pictures like this. "This is Margaret in Paris," and "This is Margaret in Rome," etc. All the pictures look the same—shots of Margaret with black backgrounds.

The cause is simple: the shutter speed is too fast. The flash will produce enough light to expose the subject correctly, but the shutter is opening and closing too quickly to allow any of the ambient light of the background to be captured.

Setting the shutter to a much lower setting will help alleviate the problem. The flash will "freeze" the subject while the longer duration of the shutter will allow more of the ambient light to pass through the lens. Capturing ambient light allows more of the background to be seen in the photograph.

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Shutter speeds as slow as 1/8 of a second or even slower can be used, though if you don't want to risk blurring of the ambient-lit portions of the scene, you should brace the camera (e.g. with a tripod). Experiment, and see what results you can produce. If it doesn't work the first time, delete the image and try again using a different shutter speed.

Portable Flash

Even if your new digital camera has a built-in flash it's worth considering buying an extra flash. This will give you much more flexibility when it comes to flash photography. There are too many of these units on the market to mention them all here, but a good quality flash unit is worth the money spent.

Many of the larger camera manufacturers produce their own flash units, and if you buy one that is the same brand as your camera you won't go too far wrong. A flash unit that is dedicated to a particular camera offers the full range of through-the-lens functions and wireless/multi-flash capabilities. Having an extra flash unit gives you many more options when it comes to creating different lighting situations.

Few D-SLR cameras have a flash sync plug, relying instead on an attachment, or "hot shoe," on top of the camera to connect the flash to the camera. This is a convenient way of connecting your portable flash to the camera, but it also limits what you can do with the flash.

I like a flash that can be removed from the camera and placed to the side of the subject to produce a highlight, or placed in other positions to create different lighting effects. If your camera does not have a sync plug—the plug that connects the flash to the camera via a cable—there are other ways that the flash can be operated away from the camera. There are devices that fit onto the hot shoe of the camera and can then be connected via a cable or sync lead to an off-camera flash.

There is also a small inexpensive device called a slave unit. This electronic device is activated by the firing of a

flash. Connected to the external flash unit, it fires that flash when triggered by the flash from another unit.

If your camera is one with a built-in flash, then this flash can be used to trigger another one equipped with a slave unit. This allows the use of a second source of lighting placed almost anywhere you want it. Most brand-name manufacturers now build this wireless capability into their flash systems, providing full automation without the need for cables.

Used in this manner the off-camera flash can provide a highlight, or key lighting, that adds an extra depth to your picture. Placed behind the subject, it will highlight the subject's hair beautifully.

Fill Flash

Although I live in England, there are still times when the sun can cause problems when I'm taking portraits outdoors.

On the rare occasions when the sun shines, the brightness can cause pictures to have too large a variation between highlights and shadows. The pictures can have uneven lighting. If we expose for the highlights, the shadows will be black and contain no detail. This is when we need to use fill flash.

Fill flash is simply using a flash to provide more light in the shadows. This technique produces an evenly lit image where the highlights are more balanced with the shadows.

To use fill flash, we must first know at what speed our D-SLR camera synchronizes with the flash. If the flash is not synchronized, it will have little effect.

Most D-SLR cameras have a sync speed of 1/60 second, although some more expensive cameras have a sync speed of 1/250 second. The relatively slow speeds used by most cameras to synchronize with the flash mean that to achieve a correct exposure we need to set CCD sensitivity to a much lower ISO rating or the entire image will be overexposed.

Once the shutter speed has been set at the correct sync speed, the next step is to take an overall exposure reading.

Let's say we get a reading of 1/60 second at f/11 at 100 ISO; all we need to do now is set the flash to the appropriate distance setting and the power to f/8 (one stop less than overall exposure reading). This will produce enough power to "fill" the shadows, but will not completely remove them.

BLACK AND WHITE

Most digital cameras have the functionality to allow you to shoot your pictures in black and white. While this is an option, I would suggest that you capture your images in color and convert them to black and white later in your computer using a proprietary imaging software. This not only gives you the option of reproducing your images in either color or black and white, but I have found that capturing the image in color and converting it later produces better detail in the shadows than it would in an image captured initially in black and white. Please refer to Chapter Five where we will go into the reasons why and how to manage it.

QUALITY OF LIGHT

People often ask me, "What is the best time to take photos?"

This is a question that doesn't really have one answer; there are many opinions. However, I do believe that being able to identify what lighting conditions will prevail at different times of day—and how to use these different lighting conditions—is one of the great skills in photography.

The optimal times for photography are usually late in the afternoon or early in the morning. Even though the position of the sun is low in the sky during both times of day, the process of photosynthesis creates a very different color palette in each. Photosynthesis is the chemical process that keeps leaves and grass green in reaction to the sun. But particles of dust in the air also react to the sunlight, becoming a darker color rather than invisible, as they are in the morning.

Early morning light is a very clean, white light that provides crisp vibrant colors. Late afternoon or early evening brings a warmer, softer light. And the low angle of the sun in both situations casts long, strong shadows. The nature of the late afternoon light—a warm soft light, diffused and softened—makes it an ideal time to shoot against the light. Placing the sun behind your subject and using a reflector or a little fill flash, you can produce portraits with a surrounding golden glow that gives an almost ethereal effect.

A good way to discover for yourself the effect of light at different times of day is to go to a local scenic spot in the early morning and shoot some pictures. Take the exact same picture at midday, and then again in the evening. Compare the pictures and you will see for yourself how the light changes at different times of day.

My least favorite time of the day for shooting is mid-day. The sun is at its highest so it creates deep, sharp shadows that you need to control. Again, fill flash or a couple of reflectors can help manage the shadows created by high, harsh light.

Wet and overcast days can also make for visually arresting images if used well. A rocky coastline with crashing waves can be spectacular with menacing, cloudy, gray skies as a backdrop. A person looking through a rain-streaked window can evoke many different feelings. Immediately after a thunderstorm, I love the light that streaks through the blackened clouds as they move away. Those streaks of light can illuminate the landscape like large spotlights.

Light is essential for photography, and learning how light behaves at different times of day, and indeed, at different times of the year, is a skill that one must master to be a successful photographer.

Here are some basic tips, in summary:

- In the early morning, when the sun is still low in the sky, the light is clean and white. This is a good time for landscape photography because the extra length

of the shadows adds a three-dimensional effect to your pictures.

- At high noon, when the sun is directly above, the shadows are short and deep and the light can be very contrasty. Portrait photography is especially difficult because you must employ a fill flash or reflectors to soften the effect of the shadows.
- Late afternoon brings a warm diffused light with long soft shadows. It is an ideal time of day for most kinds of photography.
- Light is dynamic. Plan your photography around the light if possible. If you see a picture but the light is too harsh, wait an hour to see if conditions improve. They probably will, and so will your picture.
- “Good” weather doesn’t necessarily equate to good light. Overcast days soften light nicely and reduce its contrast while storms can create rare, surreal effects that can transform an otherwise normal scene.

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The advertisement features a row of five DVD cases on the left, including titles like 'MESA' and 'WILDLIFE'. On the right is a larger 5-DVD set box set titled 'BEST OF NATIONAL GEOGRAPHIC CHANNEL COLLECTION'. The background is a blue gradient with a white border.

JODI COBB



*A brothel in Tel Aviv,
Israel, 2002*

His story begins with a blurb in the *Washington Post* about the passage of the Victims of Trafficking and Violence Protection Act of 2000. Jodi Cobb read it and wondered if any stories had been done on the illegal trade of trafficking humans. She contacted organizations such as The Protection Project affiliated with Johns Hopkins University. She contacted people at the State Department. She read reports issued by committees at the United Nations. She read Kevin Bales's book *Disposable People: New Slavery in the Global Economy*. In the end, she realized there wasn't a picture story that told the entire truth: 27 million people in the world are slaves.

"I knew it was going to be a very difficult story because it was invisible," says Cobb who spent a year on the project. She started in India and Nepal, where she felt she could make pictures. There she already knew of brothels where women worked and places that employed children. She had located enslaved families who worked to pay off debts incurred by unfair lending practices.

From there she traveled to nine other countries to photograph as many of the three sides of the narrative as she could: the different kinds of enslaved workers, the people who enslaved them, and the people who worked to free the slaves. In Israel she had only four days to work. In Bosnia, she ate lunch with a man known to be very dangerous.

She risked reprisal on the streets of Mumbai for using her camera outside the brothels. She cried sometimes while she worked. "I was either in fear or in tears while I was shooting," says Cobb.

"It was the worst of human nature—and the best—in that story," she continues. "For every evil guy there was some brave person trying to help."

It is safe to say that "21st Century Slaves," the 24-page story that *National Geographic* magazine published in September 2003, is the pinnacle of a career that has blossomed from her early days as a staff photographer at the *News Journal* in Wilmington, Delaware. After a two-year stint as a freelance photographer, Cobb joined the staff of *National Geographic* magazine in 1977. Since then she has researched and photographed 25 stories, covering subjects as wide open as "London" or "The Enigma of Beauty." But she also specializes in opening the doors to closed worlds, as she did in her story "The Women of Saudi Arabia," or in her highly acclaimed 1995 book, *Geisha: The Life, the Voices, the Art*.

To learn more, go to www.nationalgeographic.com. Or take a class with Jodi. She regularly teaches at the Photography at the Summit workshop in Jackson Hole, Wyoming.