Photographic Basics

Camera Basics

Like most activities, photography is a set of skills you must learn and practice in order to become good at it. So remember the old saying, "Practice makes perfect."

Holding a Camera

When shooting with a 35mm camera, your left hand supports the camera while your right hand controls it. To get the most support and to balance the camera, your left forearm should be straight up and down, in line with the camera, with your left hand cradling the lens. Focus the camera with your left hand (if it is a manual focus camera), leaving your right hand free to change shutter speeds, advance the film, cock the shutter, and press the shutter release.

Holding the camera body by each side and switching back and forth with the right hand to focus and shoot the picture is not recommended. It increases your chances of blurred pictures because it's easy to move the camera during the exposure.

Fig. 3-3. The left hand supports the camera, while the right hand controls the camera.

Fig. 3-4. Elbows should be held close to the body.

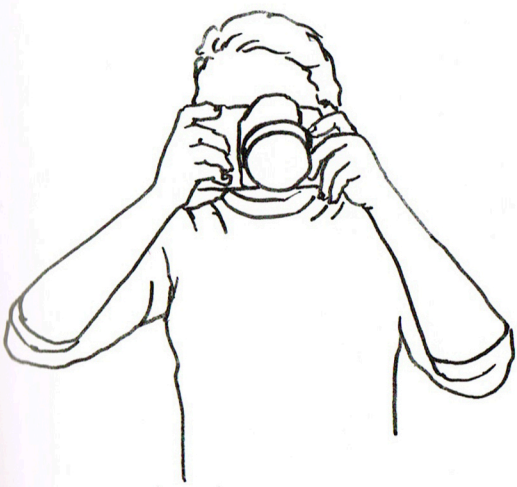

Fig. 3-5. Holding the camera body by the sides with your elbows sticking out makes it hard to hold the camera steady.

Fig. 3-6. When held this way, big, heavy lenses unbalance the camera and tend to tilt it forward.

Elements of Exposure

Exposure refers to how much light is allowed to hit the film, or the imaging chip in a digital camera, when you take a photograph. Three things control exposure: the amount of light the camera allows in (f-stop), the length of time the light is allowed into the camera (shutter speed), and the film's sensitivity to light (film speed).

You can increase or decrease any of these elements as long as you compensate by changing one of the others. For example, you can use a slower shutter speed (increase the length of time) if you choose a smaller f-stop (reduce the amount of light). The idea is to maintain a total amount of exposure. Then you'll have a negative that is easy to print and contains enough "information" to render both detailed highlights and shadows in the finished print.

Exposure is measured in increments called **stops**. Each whole stop is calculated in terms of halving and doubling. Increasing an exposure by one whole stop will double the total amount of light that reaches the film. Decreasing an exposure by one whole stop will cut the original amount of light in half. Each of the three variables of exposure, f-stops, shutter speeds, and film speed, can all be measured in stops.

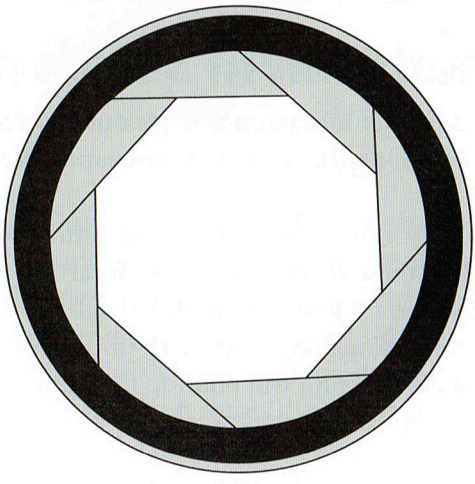

Fig. 3-7. Lens opened up to f/2.

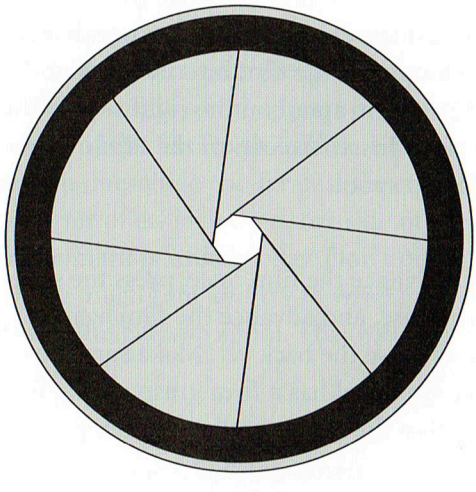

Fig. 3-8. Lens stopped down to f/11.

LARGE OPENING								SMALL OPENING		
Smaller Depth of Field								Greater Depth of Field		
f/1.4	f/2	f/2.8	f/4	f/5.6	f/8	f/11	f/16	f/22	f/32	f/64

Fig. 3-9. F-Stop Scale. The smaller the number, the bigger the opening or aperture in the lens. The bigger the number, the smaller the aperture.

F-stops

F-stops control the amount of light that passes through the lens. This is done by changing the diameter of the lens's aperture, or hole, a circular diaphragm made up of small overlapping metal or plastic blades. More light passes through the lens when the aperture is opened all the way, and less light passes through when the aperture is closed down.

Each f-stop number indicates a standard amount of light. So, f/8 on a 24mm lens lets through the same amount of light as f/8 on a 500mm lens. The numbers are set up so that there is a difference of one stop between each whole f-stop number in the progression. Smaller numbers let in more light. Bigger numbers let in less. F/8 lets in twice as much light as f/11, and f/16 lets in half as much light as f/11.

Depth of field is a function of f-stops. **Depth of field** refers to how much of the scene is in focus, both in front of and behind the subject or at whatever point the lens is focused. The smaller the aperture or opening, the larger the number of the f-stop, and the greater the depth of field you have in the image. The bigger the aperture, the smaller the number of the f-stop, and the less depth of field you get. Depth of field is an important part of every image, and learning how to use it will take your photographs to a new level.

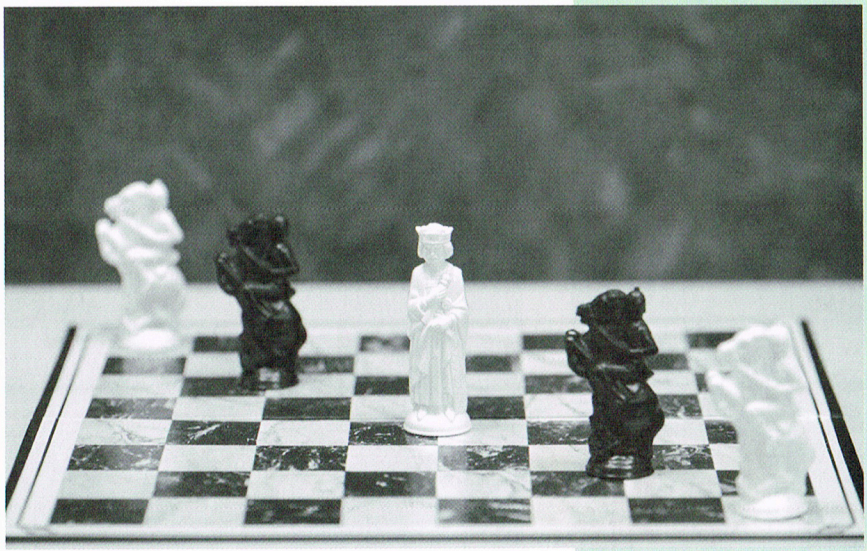

Fig. 3-10. The camera is focused on the middle chess piece, the only object in focus when the lens is set to f/2.

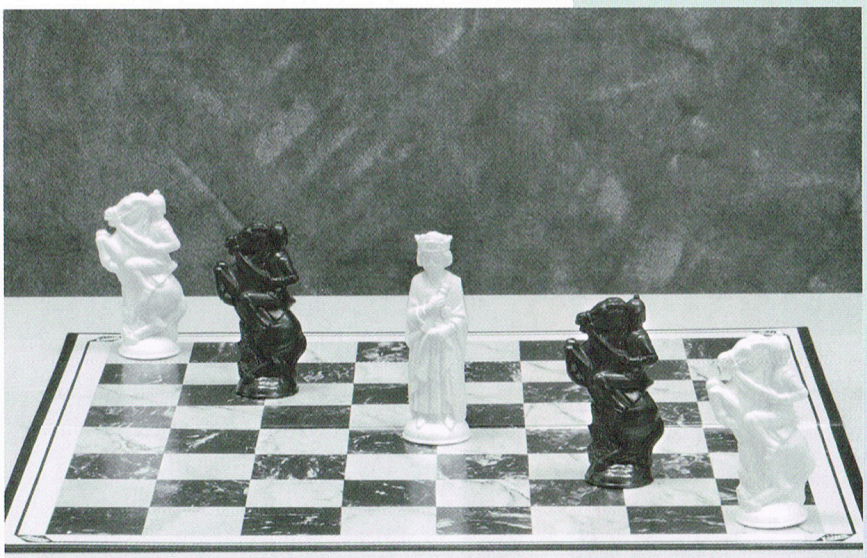

Fig. 3-11. With the lens set to f/22, all of the chess pieces are in focus.

Note It The "f" in an f-stop refers to the focal length of a lens. The slash (/) indicates division. This means that an f-stop refers to the focal ratio. So, in the case of f/8 on a 50mm lens, it means 50mm is divided by 8 (50mm/8). You can now carry out the division: 50mm/8 = 6.25mm, which is the physical diameter of the aperture opening of f/8 in a 50mm lens. This works the same for all f-stops on all lenses.

Shutter Speeds

Shutter speeds control the amount of time that light is allowed to hit the film or imaging chip. The time of exposure can be as short as 1/8000 of a second, or as long as many hours. It depends on the lighting conditions, the film speed, and the f-stop used in the lens.

Just like f-stops, whole shutter speeds are spaced one stop apart in the sequence found in cameras. That means that a shutter speed of 1/60 lets in twice as much light as 1/125, and half as much light as 1/30. Remember that the shorter the duration, the less light gets through to the film. The longer the duration, the more light is allowed to the film.

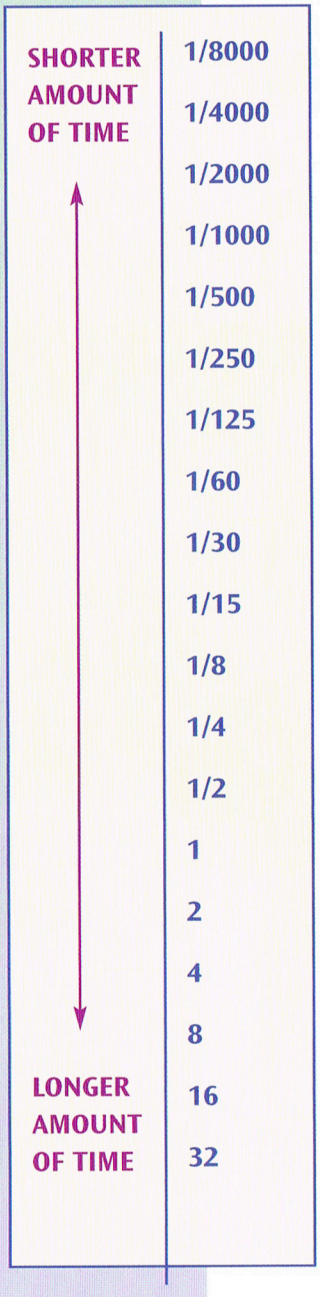

Fig. 3-12. Shutter Speeds. All the fractions, like 1/60, represent a portion of one second, so 1/60 really means 1/60 of a second.

On most cameras there is also a "B" setting that stands for Bulb. Originally, this setting was for using flash bulbs: the shutter was opened, the flash bulb went off, and the shutter was closed. When the Bulb setting is activated, the shutter stays open as long as the shutter release is held down. It closes when the shutter release is let go. The Bulb setting is used for very long exposures.

Motion and time are vital parts of any photograph, and shutter speeds control the perception of motion. The faster the shutter speed, the more frozen or static the subject and action will appear. The slower the shutter speed, the more the subject is allowed to move during the exposure, resulting in blurring and streaking. So, if you are trying to capture every tensed muscle in a runner sprinting toward the finish line, use a fast shutter speed. If you want to turn the sparkling droplets of a waterfall into a mass of soft white cotton candy, use a slower shutter speed.

Camera Movement

Another kind of motion can show up in photographs: camera movement. When you use shutter speeds slower than 1/60 of a second and hand hold the camera, there is a chance that the camera will move during the exposure. It's impossible for people to hold absolutely still when making an exposure and it doesn't take much movement to blur a picture. If small highlights in the image are oblong and look smeared or streaked, then the camera moved during the exposure. Use a tripod to avoid this effect.

Fig. 3-13. Look closely at the letter "C" on the door. It appears smeared or streaked. What caused this to happen?

Fig. 3-14. With a fast shutter speed (1/2000 of a second), the falling water is frozen into individual drops and bubbles. What mood does this create?

Fig. 3-15. A slower shutter speed (1/15 second) blends all the drops of water into streams of white. How is the mood here different from the previous image?

Film Speeds

Film speeds are the third exposure variable and they refer to a film's sensitivity to light, or how much light is needed for a good exposure. Every film has an ISO number (International Standards Organization) that indicates how sensitive the film is to light. The lower the number, the less sensitive it is, and the more light it needs to make a good exposure. This is called a slow film. The higher the number, the less light it needs to make an exposure. This is called a fast film.

Similar to shutter speeds and f-stops, film speeds can be figured in whole increments that are one stop apart in sensitivity. So, to make a good photograph, 100 ISO film needs twice as much light as 200 ISO film, and 400 ISO film needs half as much as 200 ISO film, given the same lighting conditions.

If you are shooting sports and action, go with a fast film. If you want to shoot pictures of flowers and perhaps portraits, landscapes, or still lifes, go with a slower film that can capture all the colors, details, and resolution that you need.

SLOW FILM SPEEDS																				FAST FILM SPEEDS
25	32	40	**50**	64	80	**100**	125	160	**200**	250	320	**400**	500	640	**800**	1000	1250	**1600**	2000	2500	**3200**

Fig. 3-16. ISO Film Speeds. Doubling an ISO number increases its light sensitivity by one stop. Lowering an ISO number by half decreases its sensitivity by one stop. Each of these ISO numbers is an increment of one-third of a stop.

Fig. 3-17. The coarser silver grains of a fast film produce a grainier image with less fine detail.

Fig. 3-18. The smaller silver grains of this slow film capture higher resolution and finer details.

Putting It All Together

Changing one of these three variables—f-stop, shutter speed, or film speed—will force you to change at least one of the other two variables. In the top image, 100 ISO film was used, and the main question was whether to freeze the water or let it blur. Opening up the lens's aperture to f/4 gave a shutter speed of 1/250 of a second, which was enough to freeze the waterfalls.

In the middle image, a slower shutter speed with the aperture stopped down to f/16, slowed the shutter down to 1/15 of a second. This blurred the movement of the water, but the depth of field was increased, so more of the scene was in focus.

In the bottom image, a different film was used—an 800 ISO film. With the change in ISO, the f-stop of f/16 was kept the same, but the shutter speed was increased to 1/125 of a second. This change was enough to freeze most of the water's movement, while maintaining the same depth of field. In all three exposures, the three variables—f-stop, shutter speed, and film speed—changed, but the amount of exposure was the same.

Try It Set your camera to manual exposure mode. Use a tripod to make sure the camera doesn't move. Set the shutter speed to 1/60 of a second and adjust the f-stop to get a good exposure, according to the camera's light meter. If necessary, refer to the camera's manual for using the built-in light meter. Now change the shutter speed to a different setting, either faster or slower than before. Then adjust the f-stop to compensate for it. How do the settings change?

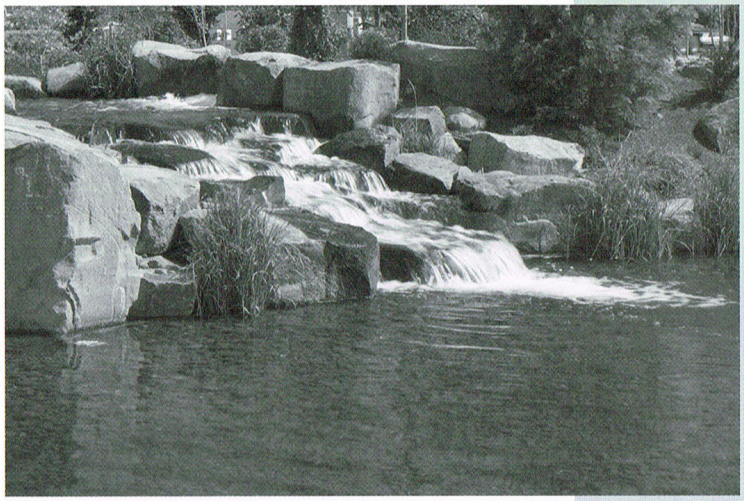

Fig. 3-19. ***Top:*** **Exposure used: f/4 at 1/250 of a second, 100 ISO.** ***Middle:*** **Exposure used: F16 at 1/15 of a second, 100 ISO.** ***Bottom:*** **Exposure used: f/16 at 1/125 of a second, 800 ISO.**

Fig. 3-30. The difference between the light and dark values in this image was greater than the film could handle. Keeping detail in the white bark made most of the scene too dark.

Sunny Days

Sunny days can be difficult for photography. Direct sunlight creates strong highlights and shadows, and increases the contrast range of a scene, often beyond a film's capabilities.

Black-and-white and color negative films can handle up to seven stops of contrast. That means that the difference between the darkest and brightest parts of the scene is a range of seven f-stops. Slide films can handle a difference of five stops. Depending on the setting and the lighting conditions, the contrast range in some scenes on a sunny day can be as much as 15 stops, far beyond what films can capture.

In bright, sunny conditions, you may have to decide whether the light or the dark portion of the scene is the most important, and set the appropriate exposure. No matter what you do, in some situations you will lose either the highlight or shadow end, or both, of the contrast range.

Low Light

In very low-light conditions, contrast can be minimal and it can be hard to see well enough to focus. Fast lenses, like a 50mm, f/1.4 lens, are essential for seeing and focusing in low light, but even with the right equipment, you may not know whether your photograph is successful until you develop the film. With slow shutter speeds, use a tripod to avoid camera motion blur. Fast films are also useful in this situation.

Fig. 3-31. The entire image is blurred from camera movement because of the low light level and a slow shutter speed. One solution for this problem is to use a tripod.

Overcast Days

Overcast conditions provide indirect lighting, with no deep shadows or bright highlights. The lighting is even and flat. The contrast of the scene also tends to be low, so colors are muted. Professional photographers know this is one of the best times to photograph. You can compensate for the lower contrast by increasing the contrast in the printing (see the Handbook, page 275).

Fig. 3-32. Printed normally, this image has a limited range of tones, low contrast, and not much visual impact.

Fig. 3-33. Using a higher contrast filter for this print increased its contrast. The lights and darks were forced apart, making a more dramatic print.