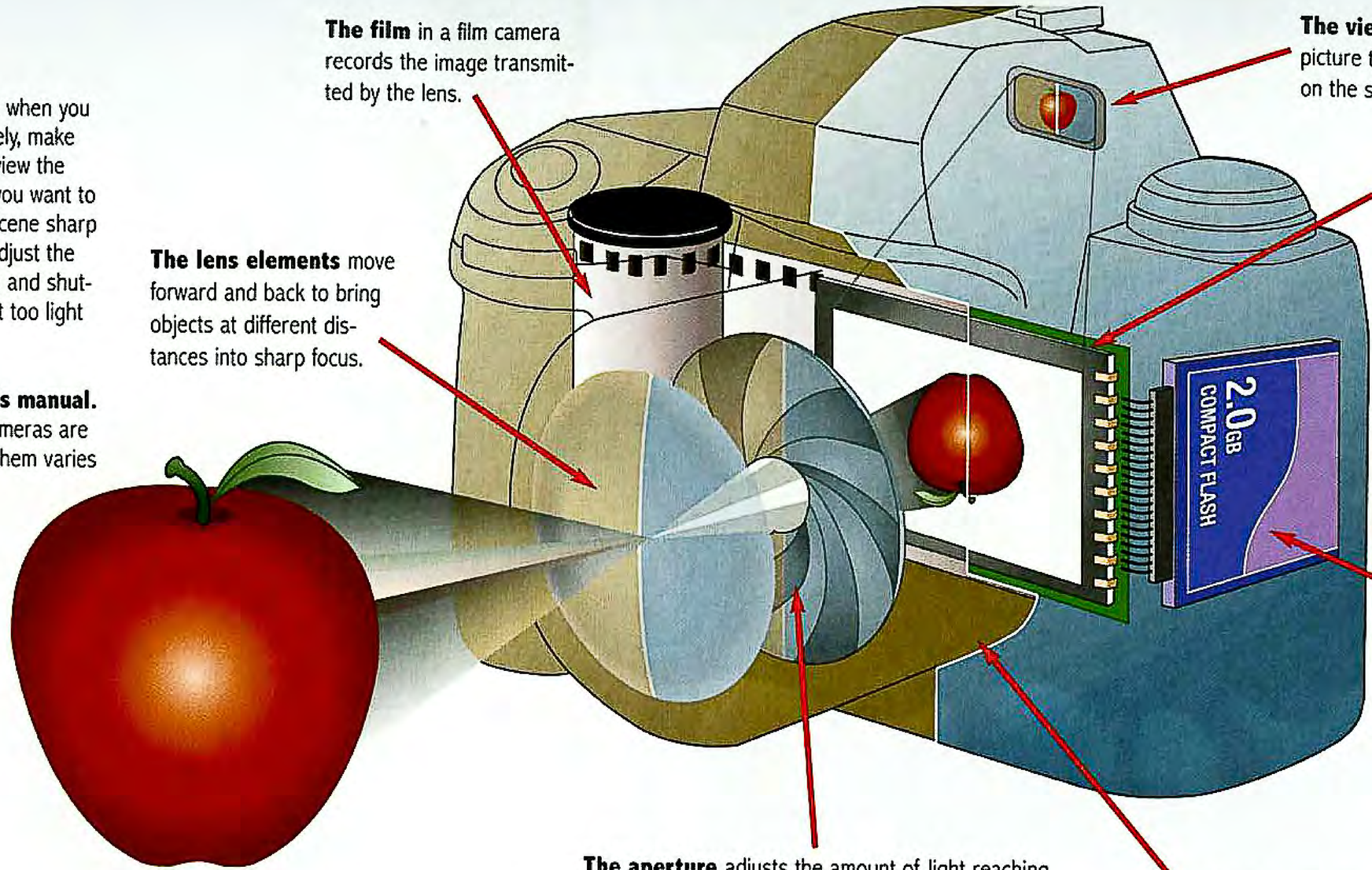
A camera's main functions when you take a picture (or more precisely, make an exposure) are to help you view the scene so you can select what you want to photograph, focus to get the scene sharp where you want it to be, and adjust the exposure (the aperture setting and shutter speed) so the picture is not too light or too dark.

Read your camera's owner's manual. The basic adjustments of all cameras are the same but the way you set them varies considerably.



The film in a film camera records the image transmitted by the lens.

The viewfinder shows the picture that the lens focuses on the sensor or film.

The lens elements move forward and back to bring objects at different distances into sharp focus.

The sensor in a digital camera converts the light from the lens into electrical signals that are sent to the memory card.

The memory card in a digital camera stores electronic images until they can, for example, be printed or transferred to a computer or other storage device. Images can be deleted at any time.

The aperture adjusts the amount of light reaching the film or sensor. A large opening allows the most light to pass through the lens. The smallest opening lets in the least amount of light.

The shutter opens and closes to control the length of time that light strikes the light-sensitive surface.

Data panel displays ISO, shutter speed and aperture settings, number of exposures remaining, and other information.

Mode dial to set manual or one of several choices of automatic operation.

Memory card (inside the camera) stores the image.

LCD monitor displays stored images and menus for camera settings.

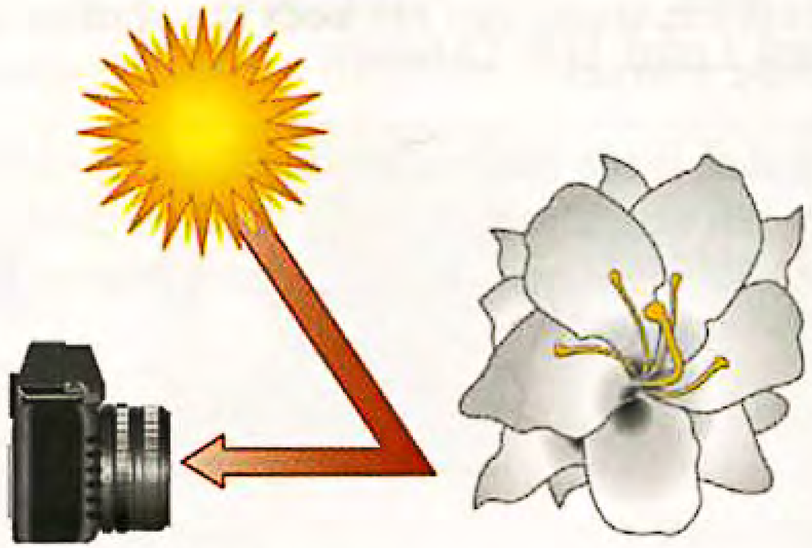
DIGITAL CAMERA

An array of controls on this single-lens reflex digital camera *lets you make settings manually or automatically, and view (and delete if you wish) the photograph you have just made or any others on its memory card.*

Aperture size

Shutter speed

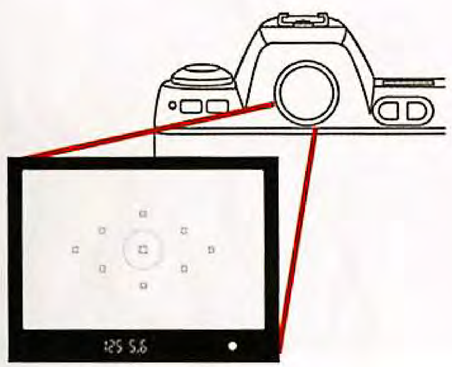
ISO setting or film speed



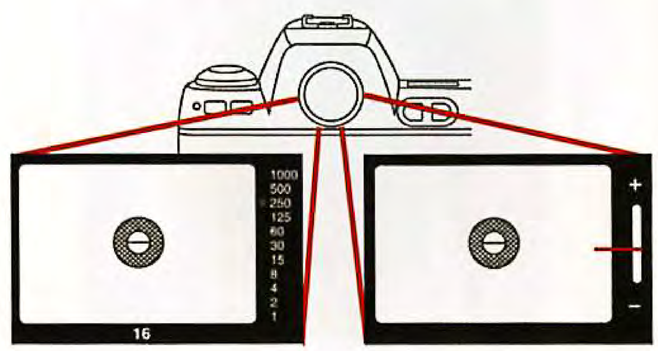
Brightness of subject

EXPOSURE READOUT

Exposure readout about the shutter speed and aperture appears in the viewfinder of most cameras, often along with other information. Here, the viewfinder of a digital camera displays 1/125 sec shutter speed, f/5.6 aperture.



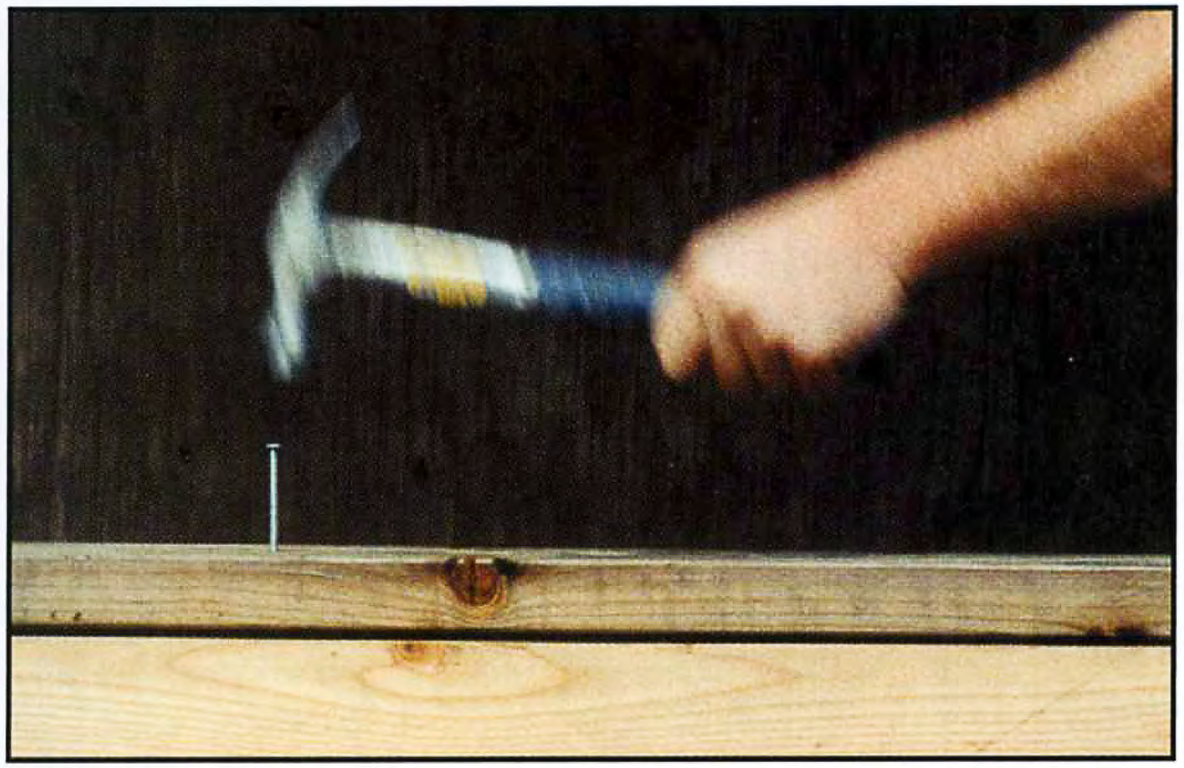
Some older film cameras use a needle-centering display (below right) instead of showing aperture and shutter speed (below left). You change the shutter speed and/or the aperture until the needle centers between + (overexposure) and – (underexposure).



An LCD data panel appears on many cameras, displaying shutter speed and aperture settings (here, 1/500 sec shutter speed, f/5.6 aperture), plus other information. On digital cameras, there is usually also a larger color display for menus and pictures. Make sure you know where the essential exposure information is shown on your camera.

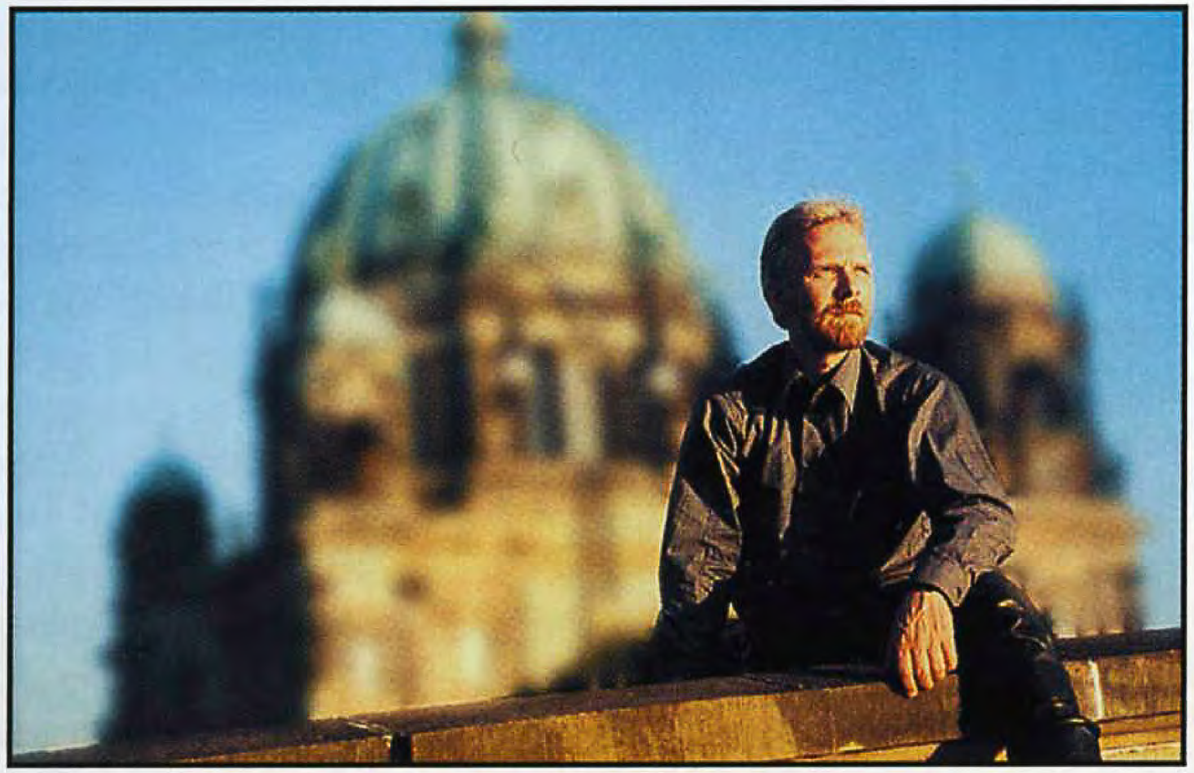
Exposure OK
Overexposure
Underexposure

Slow shutter speed



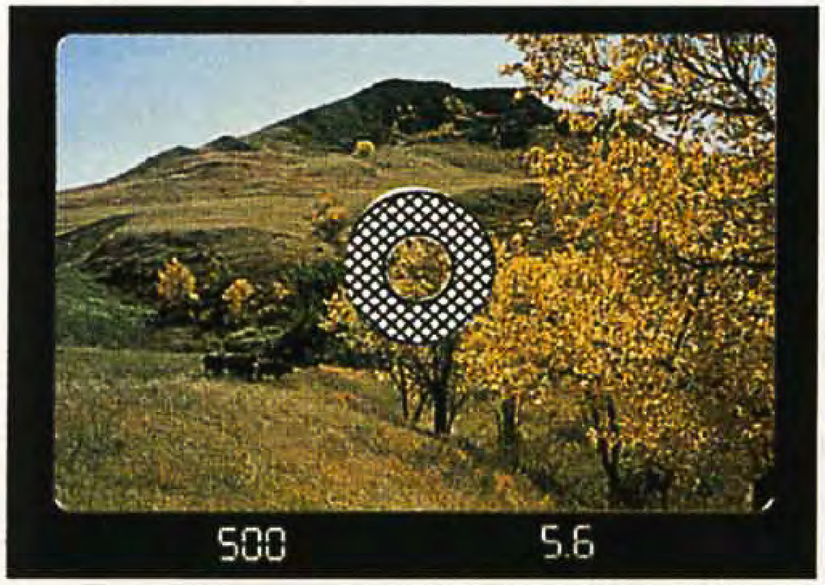
Fast shutter speed

Large aperture opening



Small aperture opening

WHERE SHUTTER SPEED SETTINGS ARE DISPLAYED ON VARIOUS CAMERAS



In the camera's viewfinder

On the shutter-speed dial

In the data-panel readout

DIRECTION OF A MOVING OBJECT AFFECTS THE AMOUNT OF BLUR

1/30 second

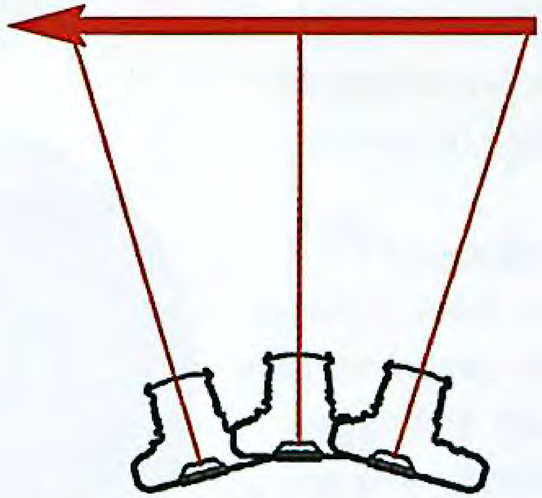
1/500 second

When a subject is traveling parallel to the plane of the film or sensor, *considerable movement is likely to be recorded on the film. The subject will be blurred, unless the shutter speed is fast.*

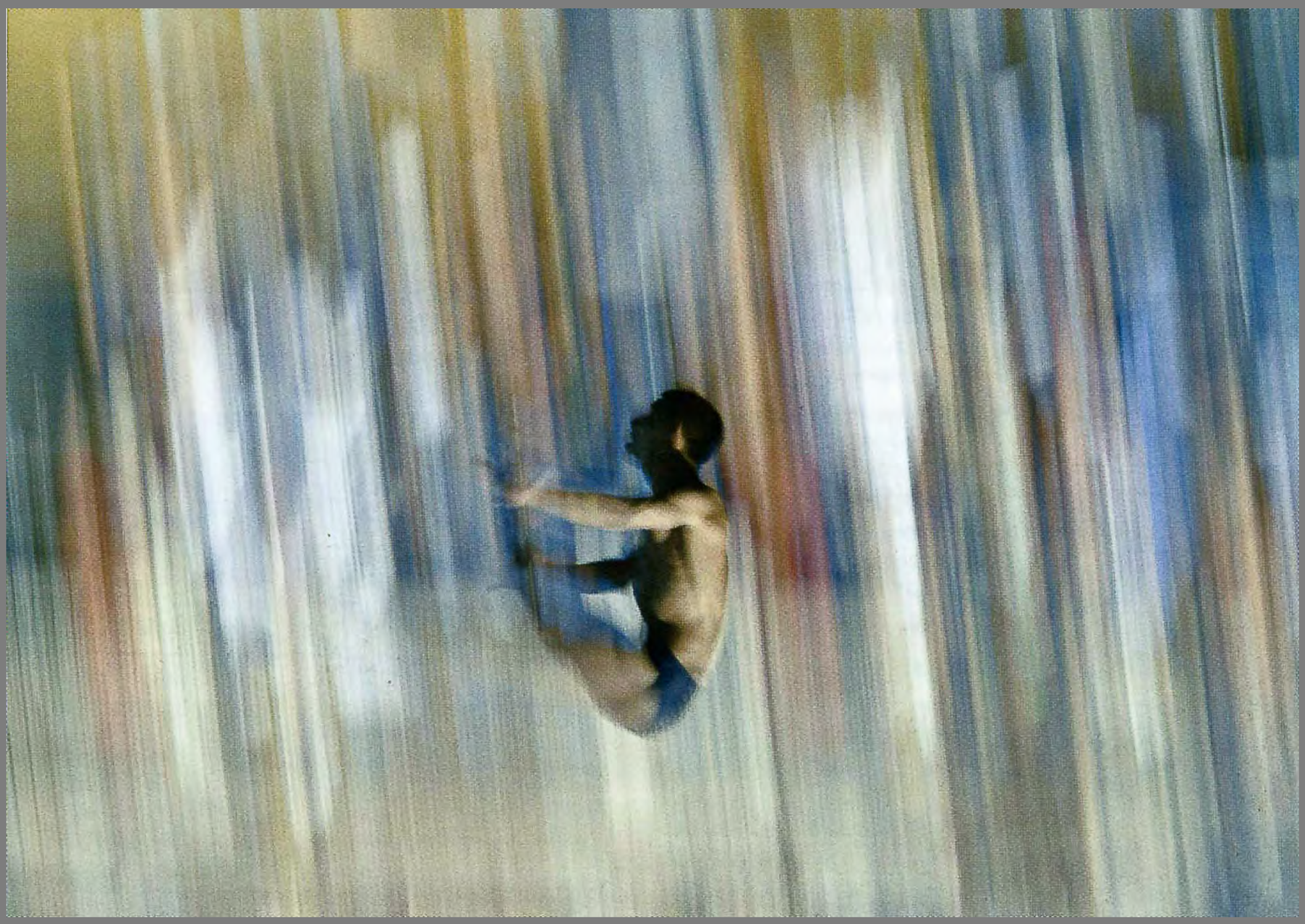
1/30 second

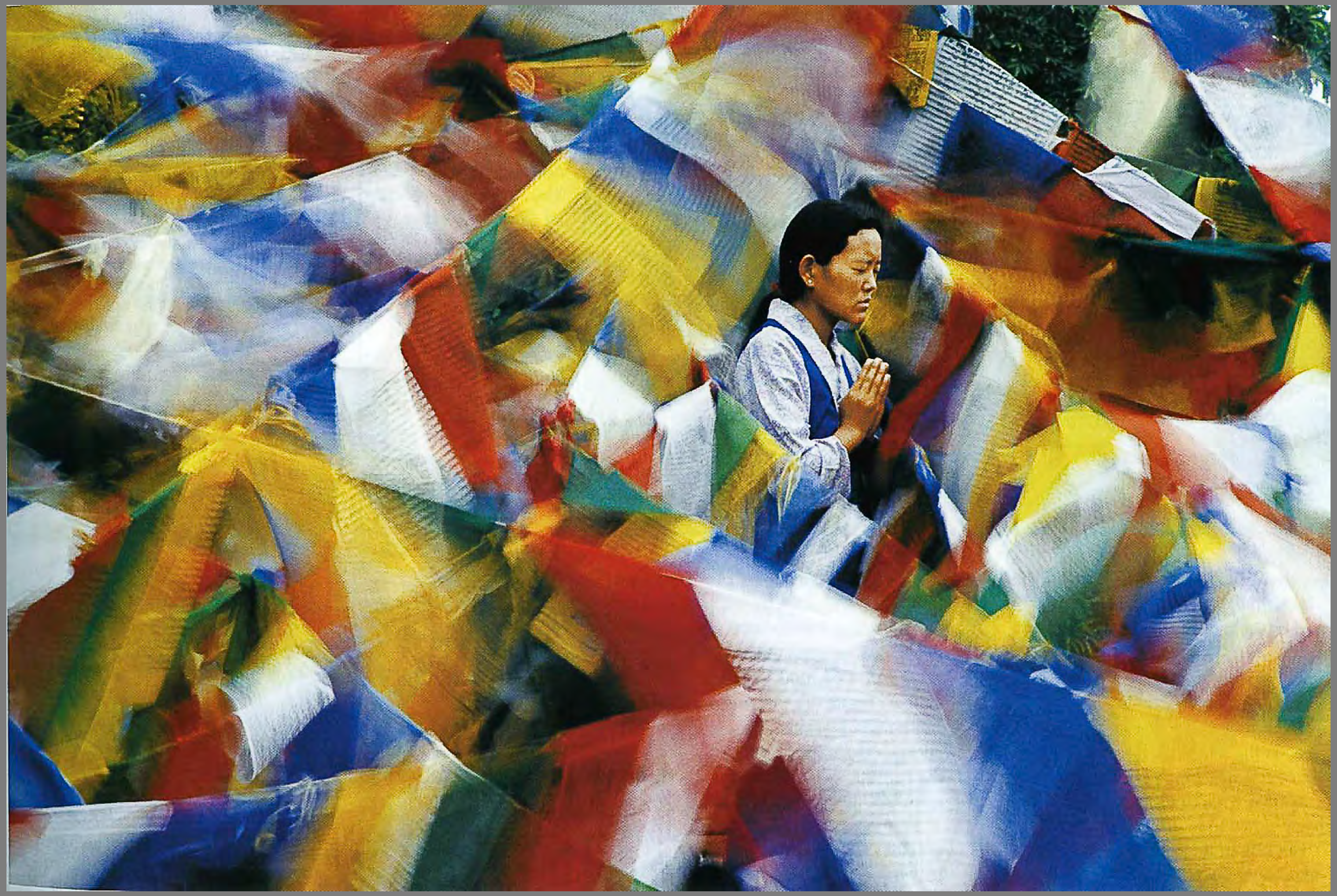
1/30 second, camera panned

If the subject is moving directly toward or away from the camera, *no sideways movement is recorded so a minimum of blur is produced, even at a relatively slow shutter speed.*



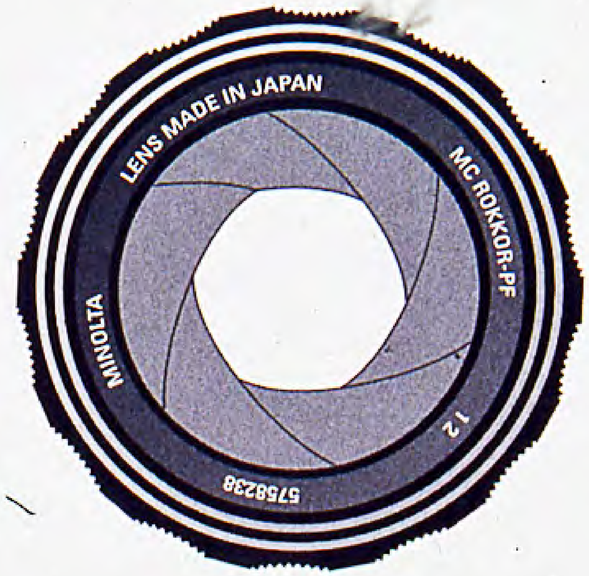
During panning, the camera is moved in the same direction as the subject. *The result is a sharp subject and a blurred background.*



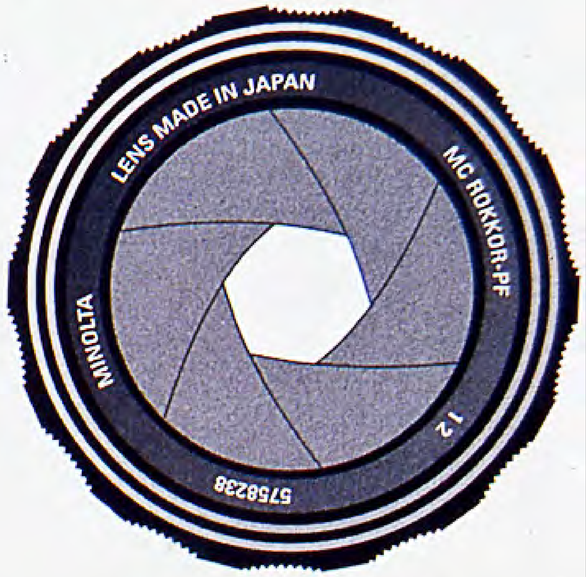


f/2

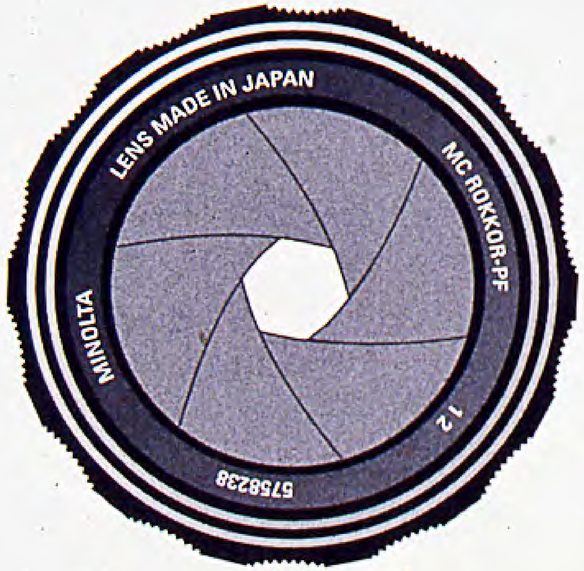
f/2.8



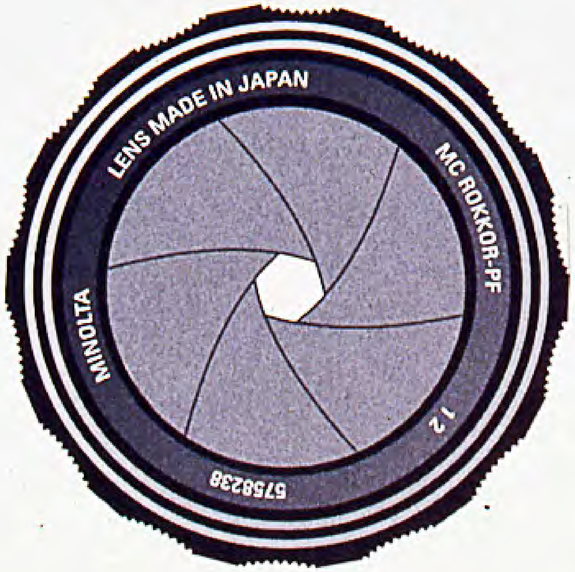
f/4



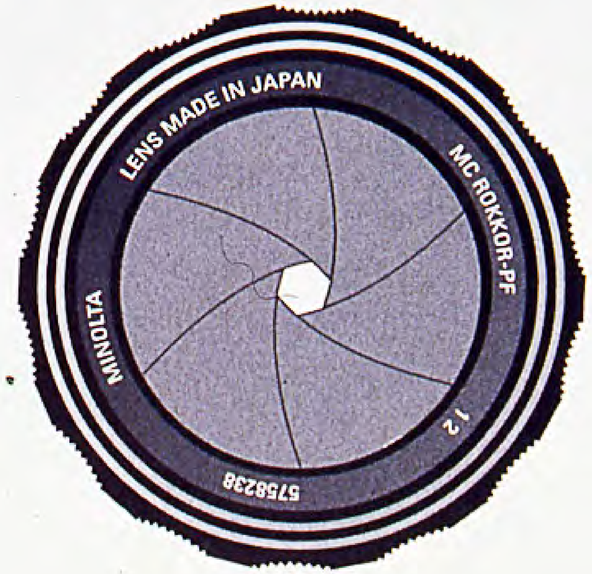
f/5.6



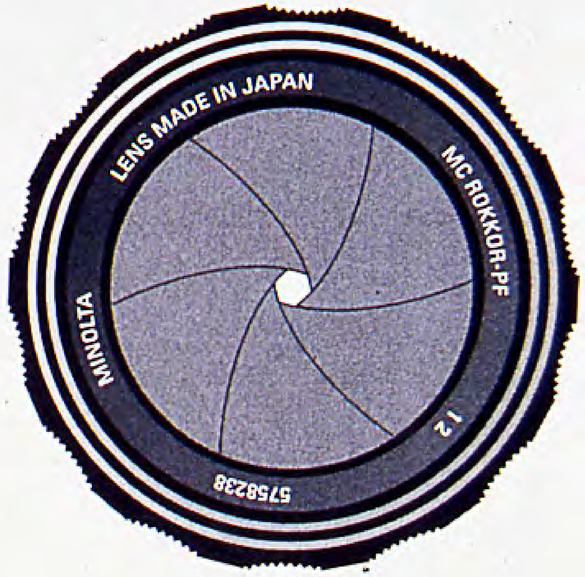
f/8



f/11



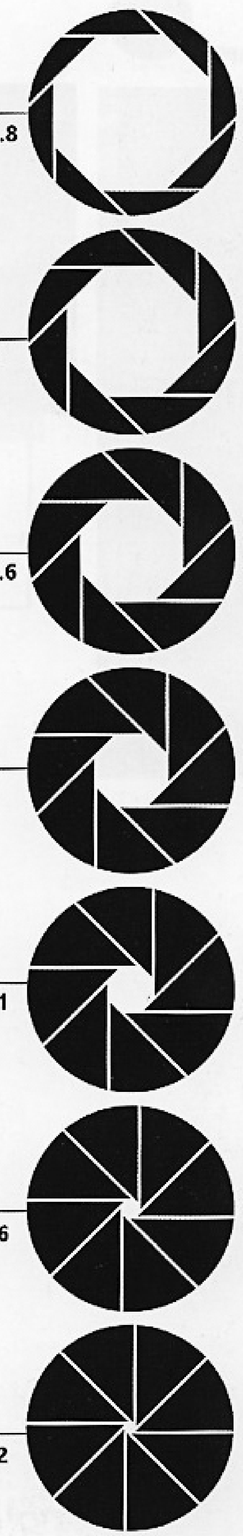
f/16



f/22

The size of the lens opening—the aperture or f-stop—controls the amount of light that passes through the lens. The lens shown here has apertures from f/2.8 to f/22. Each setting is one stop from the next; that is, each lets in twice as much light as the next smaller opening, half as much light as the next larger opening.

The higher the f-stop number, the smaller the lens opening and the less light that is let in. On this lens, f/2.8 is the largest opening and lets in the most light. As the numbers get bigger (4, 5.6, 8), the aperture size gets smaller and the amount of light admitted decreases.



NOTE: *Some lens barrels no longer display the apertures as shown above. Rather than twisting a ring on the lens to set the aperture, you dial in the setting on the camera body. Regardless of how you change the aperture, though, you are still changing the size of the lens opening and thus the intensity of light that strikes your film or sensor.*

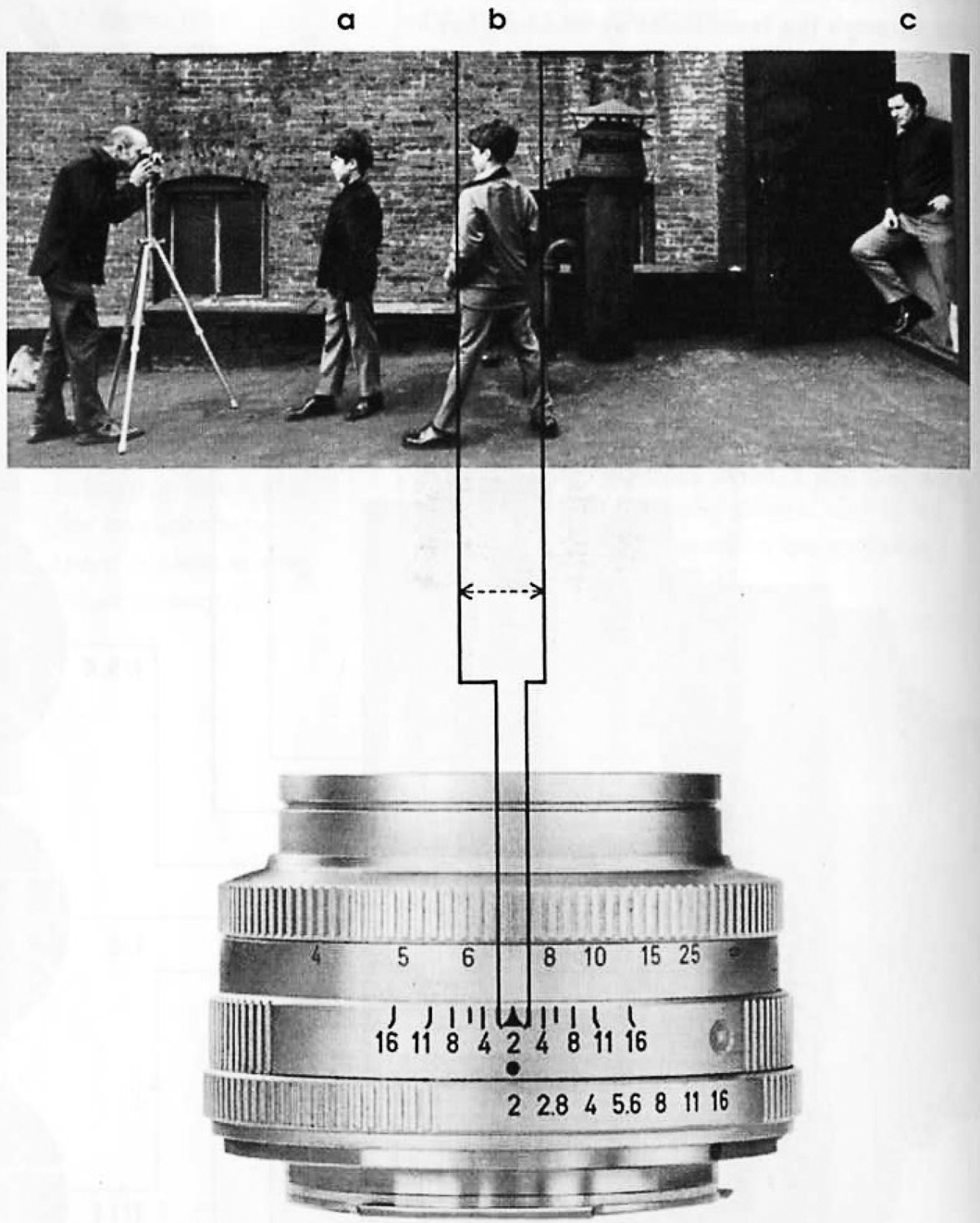
WHERE APERTURE SETTINGS ARE DISPLAYED ON VARIOUS CAMERAS

In the camera's viewfinder

In the data-panel readout

On the lens barrel

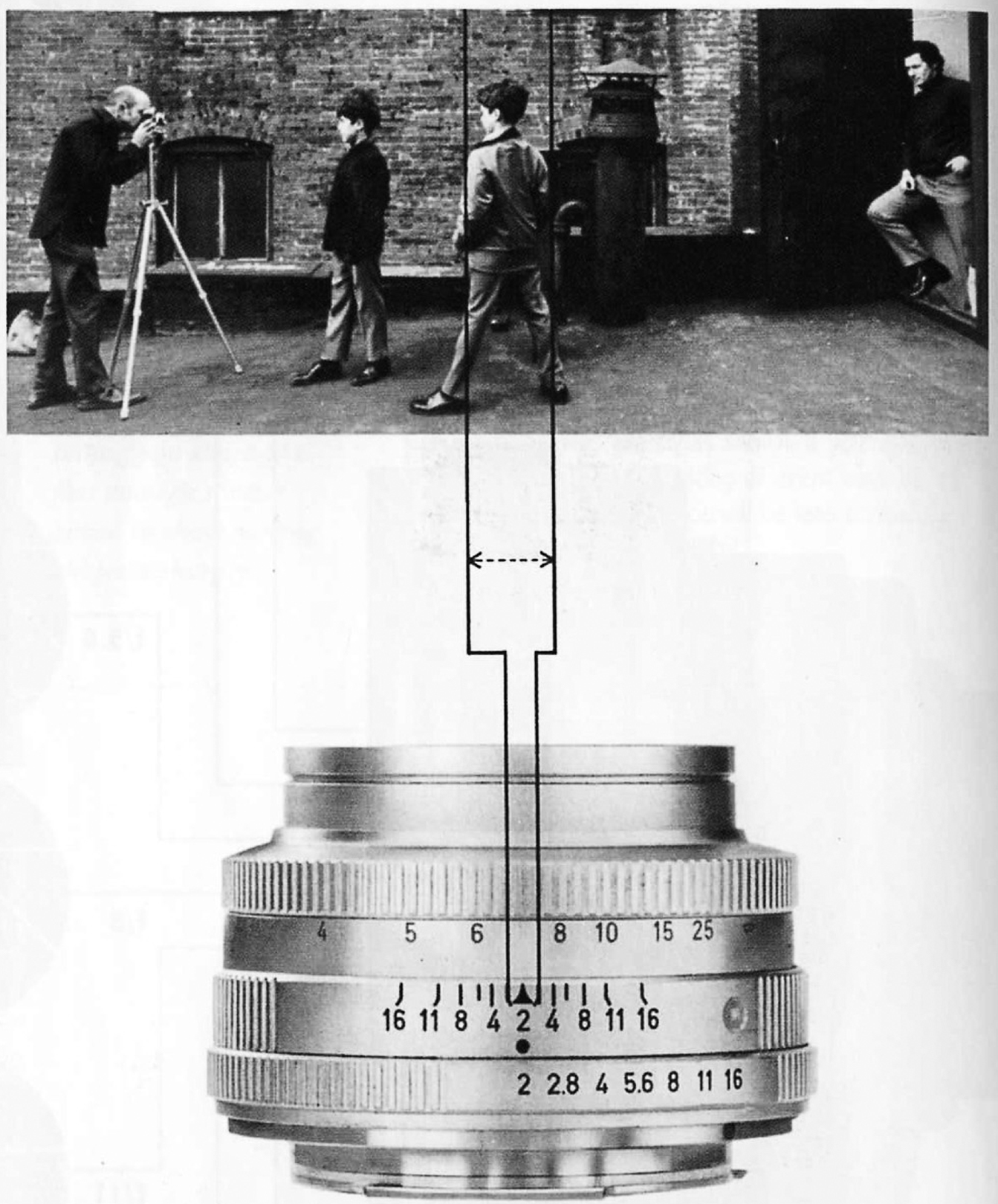
LARGE APERTURE, LESS DEPTH OF FIELD

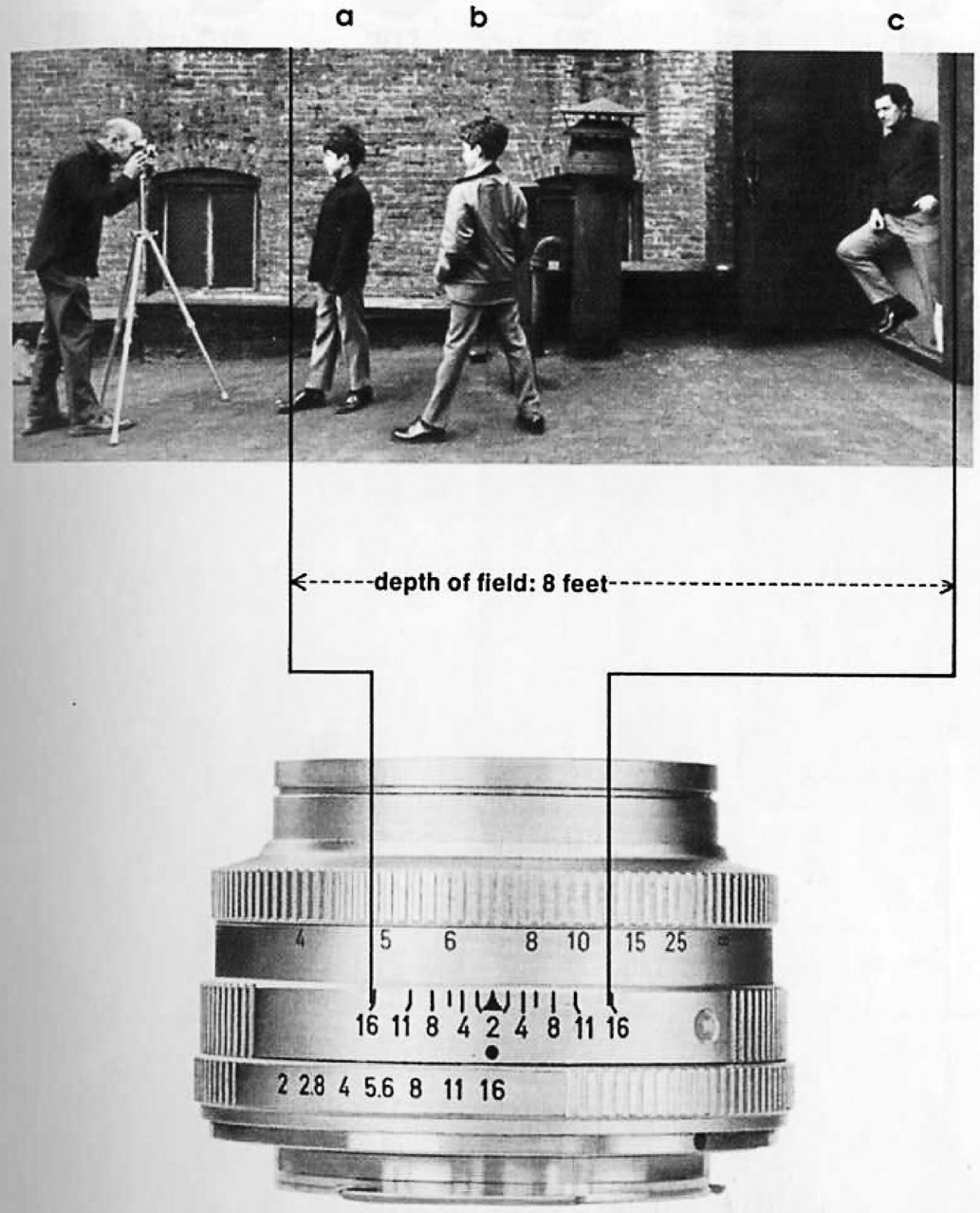


The smaller the aperture size, the more that a scene will be sharp from near to far. As the aperture is stopped down and gets smaller, more of the background and foreground in a given scene becomes sharp. The area of acceptable sharpness in a picture is known as the depth of field.

The two larger photographs shown on these pages were taken under identical conditions but with different aperture settings. In the photograph above, the diaphragm was opened to its widest aperture

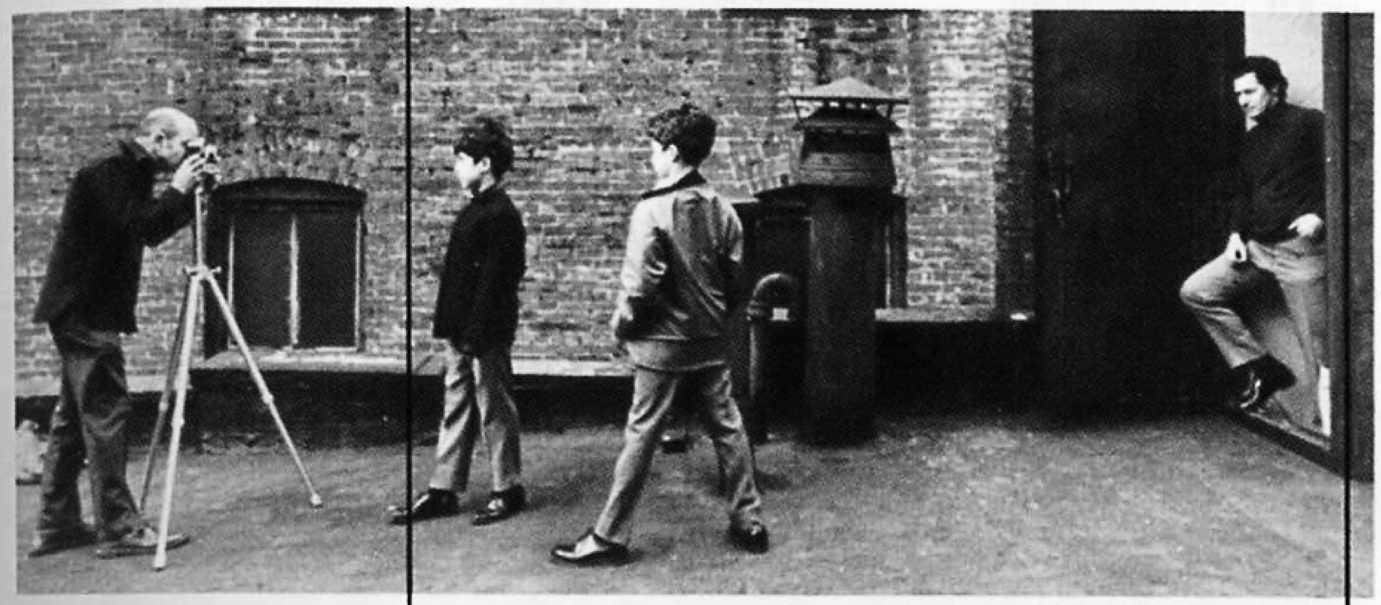
LARGE APERTURE, LESS DEPTH OF FIELD

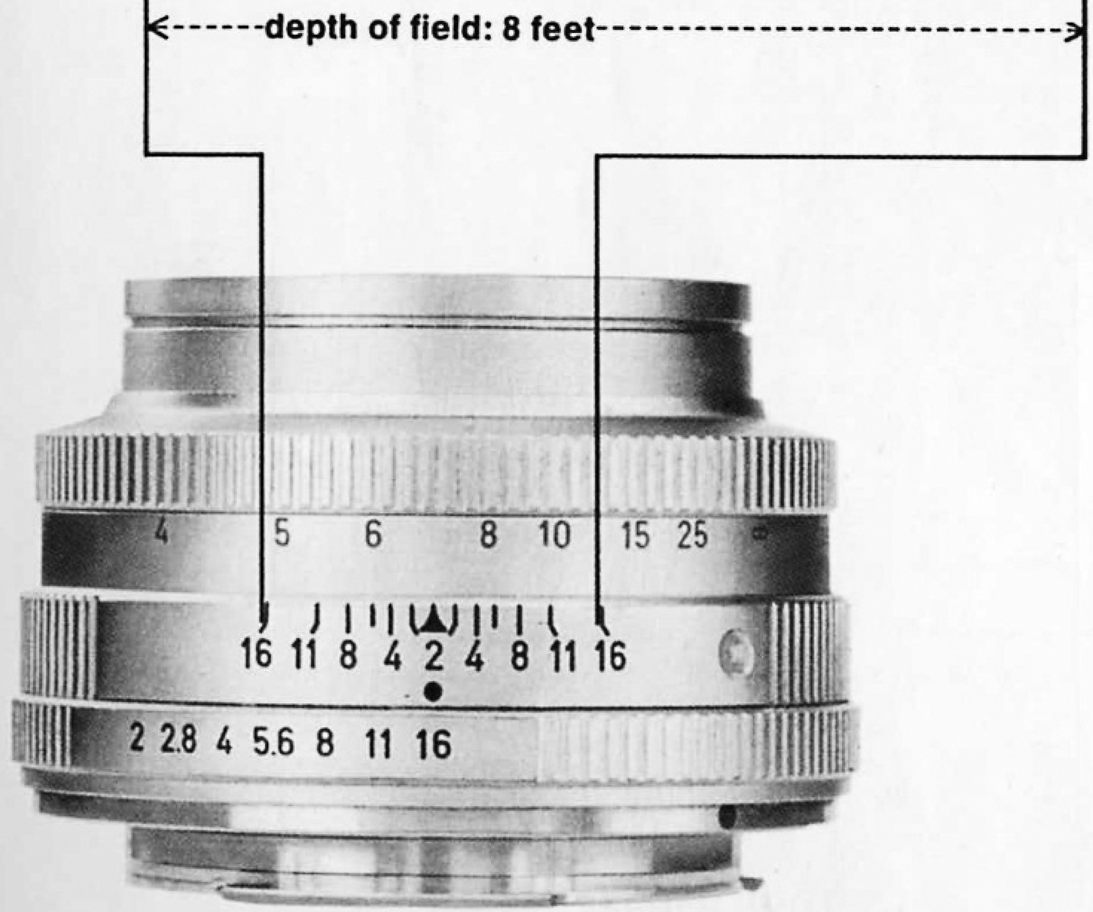

a
b
c
4 5 6 8 10 15 25
16 11 8 4 2 4 8 11 16
2 2.8 4 5.6 8 11 16



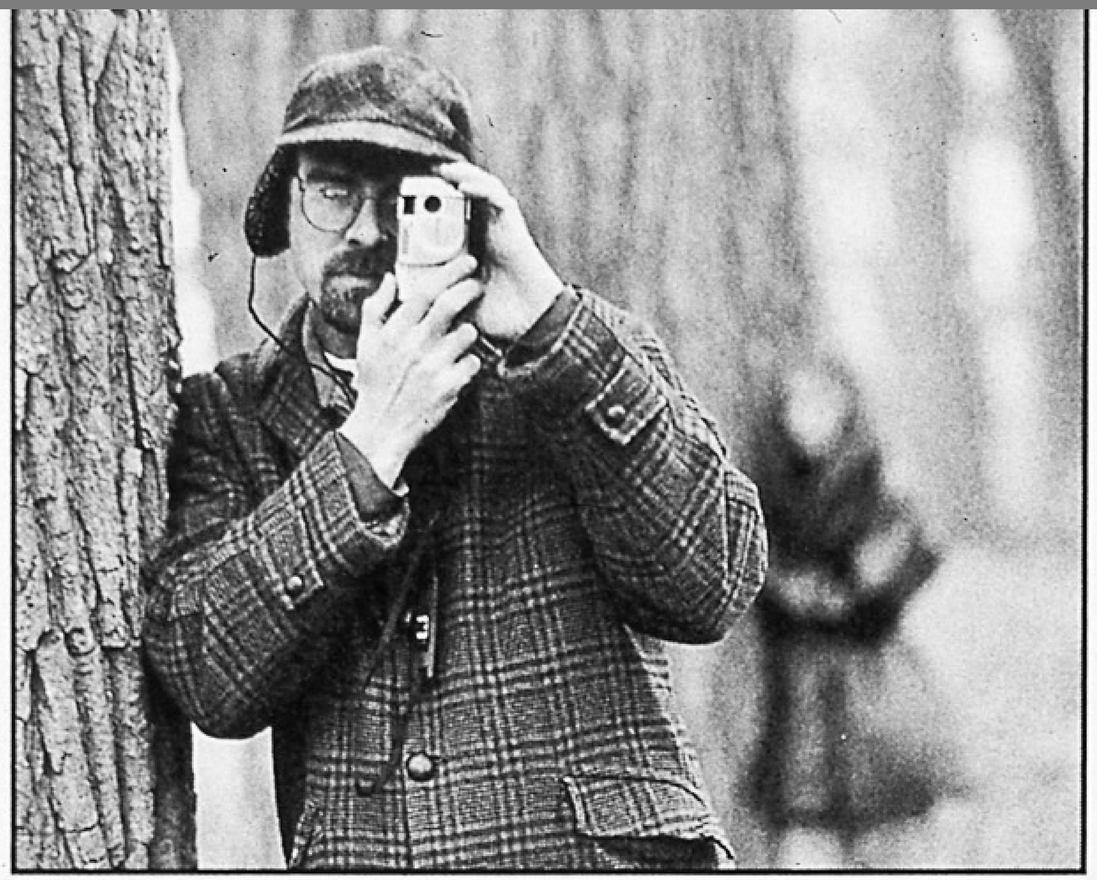
SMALL APERTURE, MORE DEPTH OF FIELD

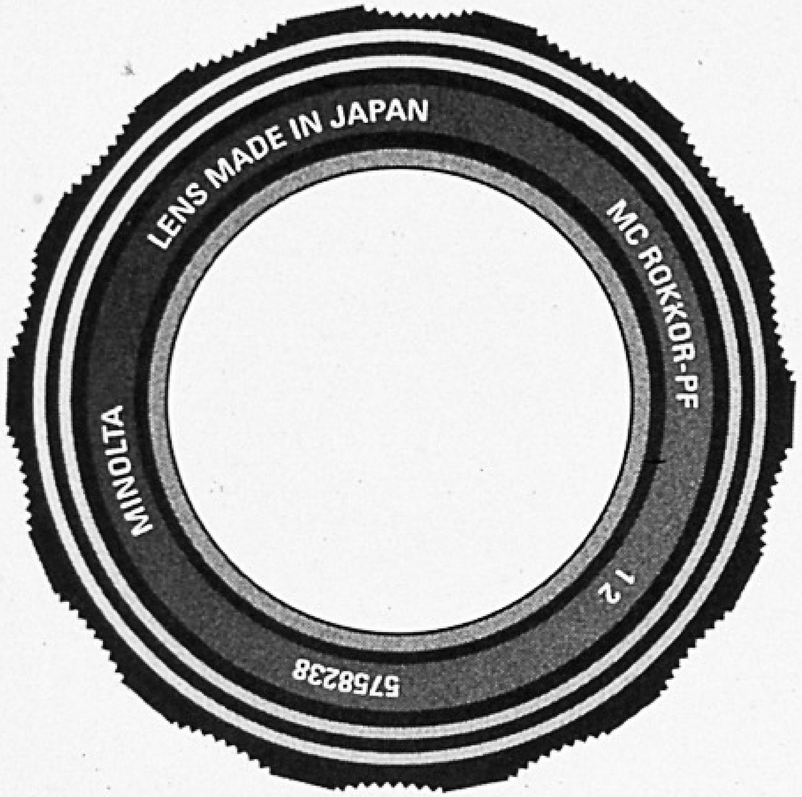
Looking through the widest aperture also means you see the scene with the least possible depth of field. Some cameras provide a depth-of-field preview button that stops down the lens so that the viewfinder image shows the depth of field at the aperture you have selected. However, stopping down the lens reduces the brightness of the viewfinder image. In dim light or at a very small aperture, that image may become too dark to be seen clearly. but


a
b
c

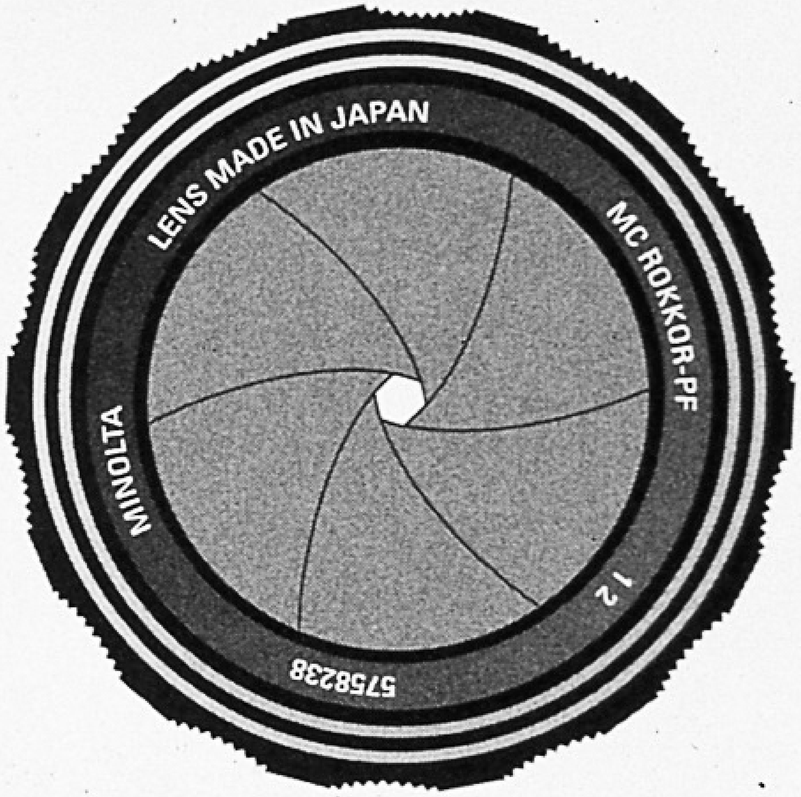

depth of field: 8 feet
4 5 6 8 10 15 25 ∞
16 11 8 4 2 4 8 11 16
2 2.8 4 5.6 8 11 16

SMALL APERTURE, MORE DEPTH OF FIELD



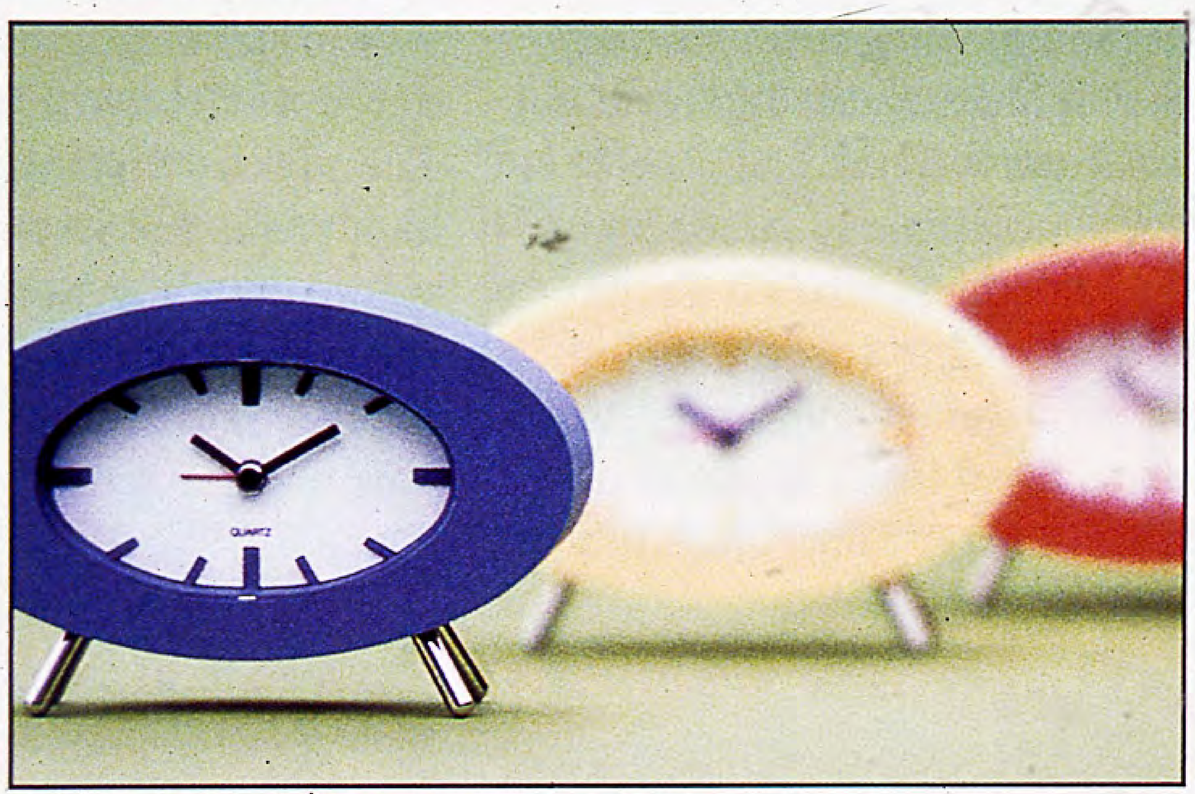

LENS MADE IN JAPAN
MC ROKKOR-PF
MINOLTA
1 2
5758238

f/2


LENS MADE IN JAPAN
MC ROKKOR-PF
MINOLTA
1 2
5758238

f/22

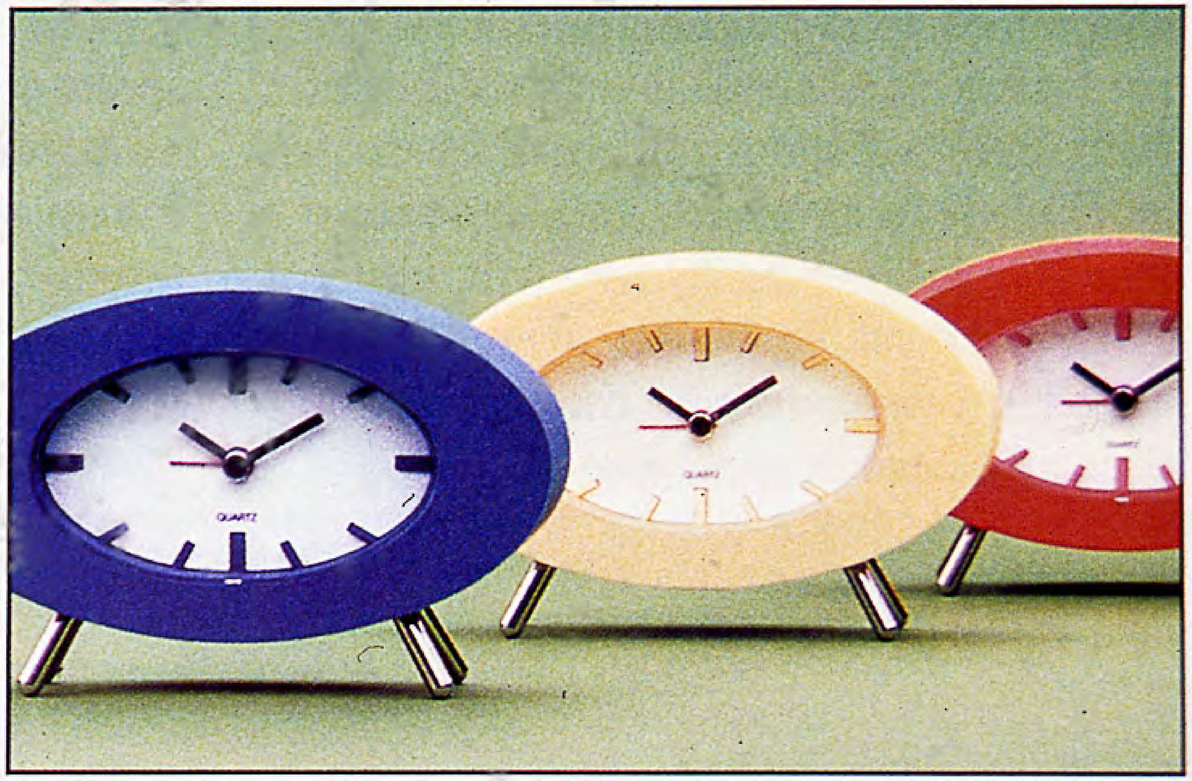
LESS DEPTH OF FIELD



Wider aperture

f/2

MORE DEPTH OF FIELD



Smaller aperture

f/16

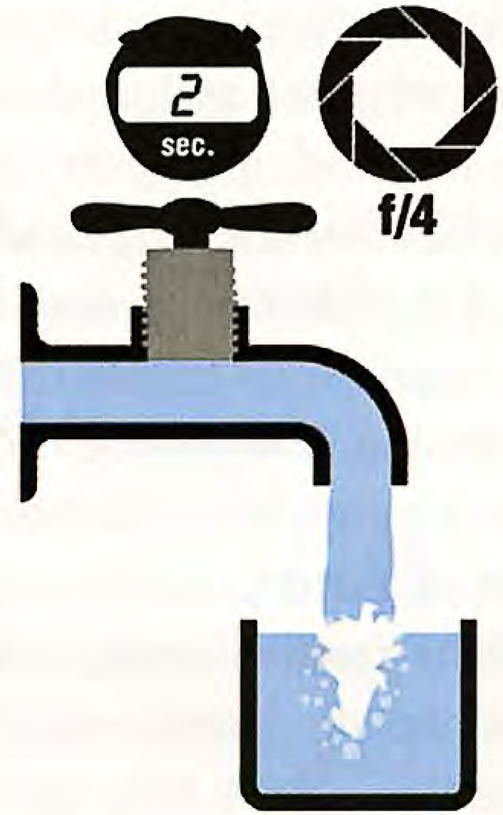
A BUCKET OF LIGHT

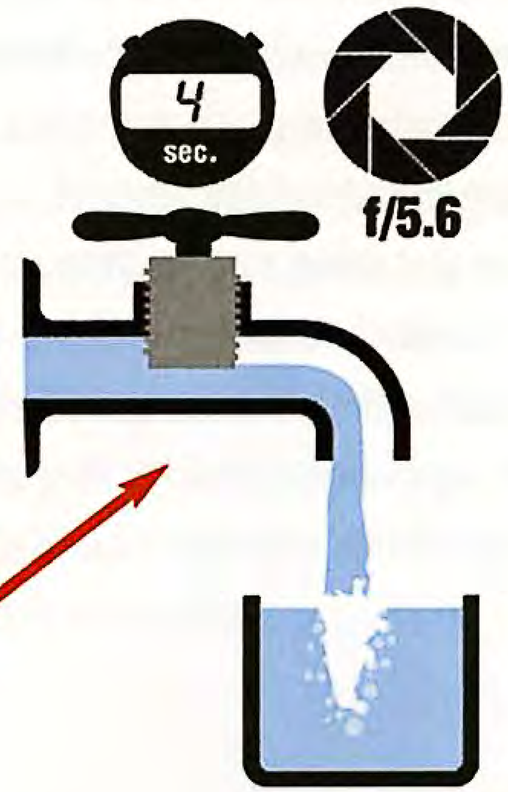
The quantity of light that reaches the film or sensor inside a camera depends on both aperture size (f-stop) and exposure time (shutter speed).

How long does it take to fill a bucket with water flowing from a faucet? That depends on how wide the faucet is open and how long the water flows. If the wide-open faucet fills the bucket in 2 seconds, then the same bucket will be filled in 4 seconds from a half-open faucet. But regardless of how long it takes to fill the bucket, the bucket always holds the same amount of water.

Film and digital sensors are like these buckets. To be properly filled with light (exposed), each always requires the same amount—the same number of "gallons"—of light.

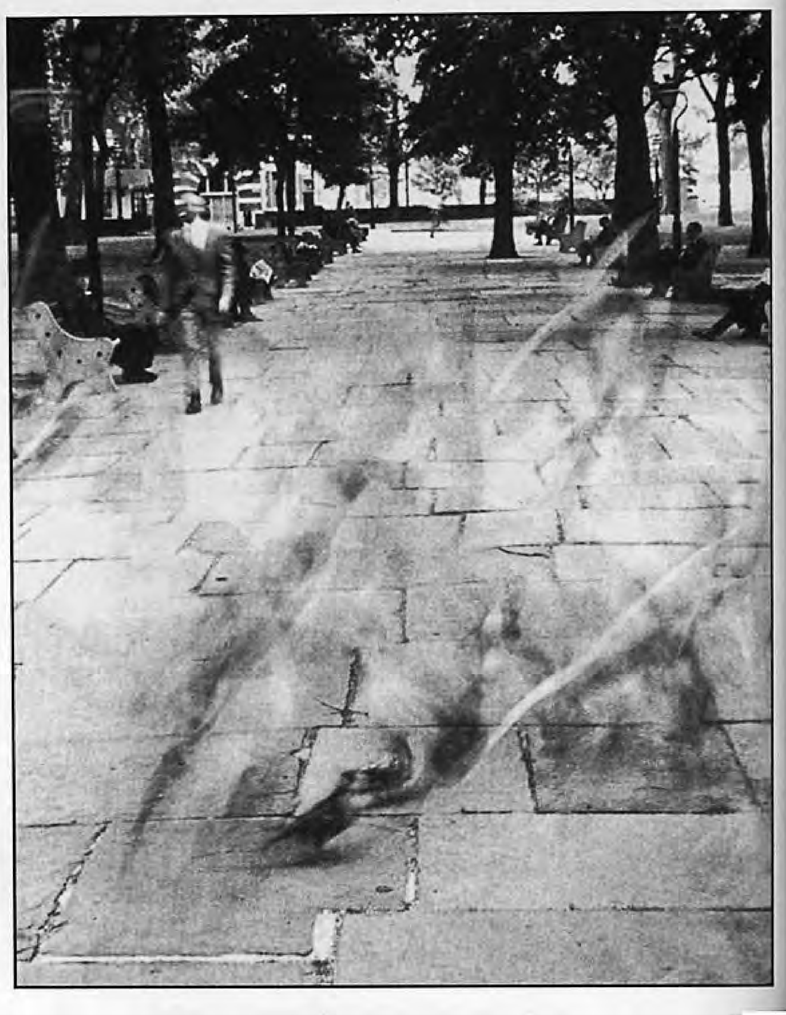
If the correct exposure for a scene is 2 sec at f/4, you get the same total amount of exposure with twice the length of time (next slower shutter speed) and half the amount of light (next smaller aperture)—4 sec at f/5.6.

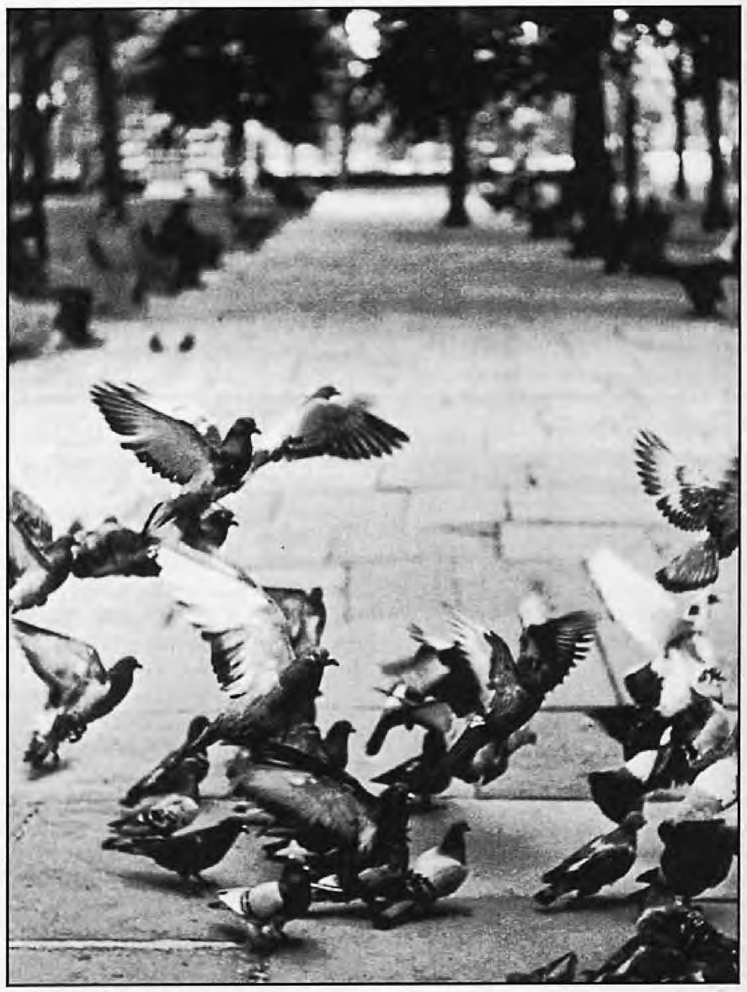




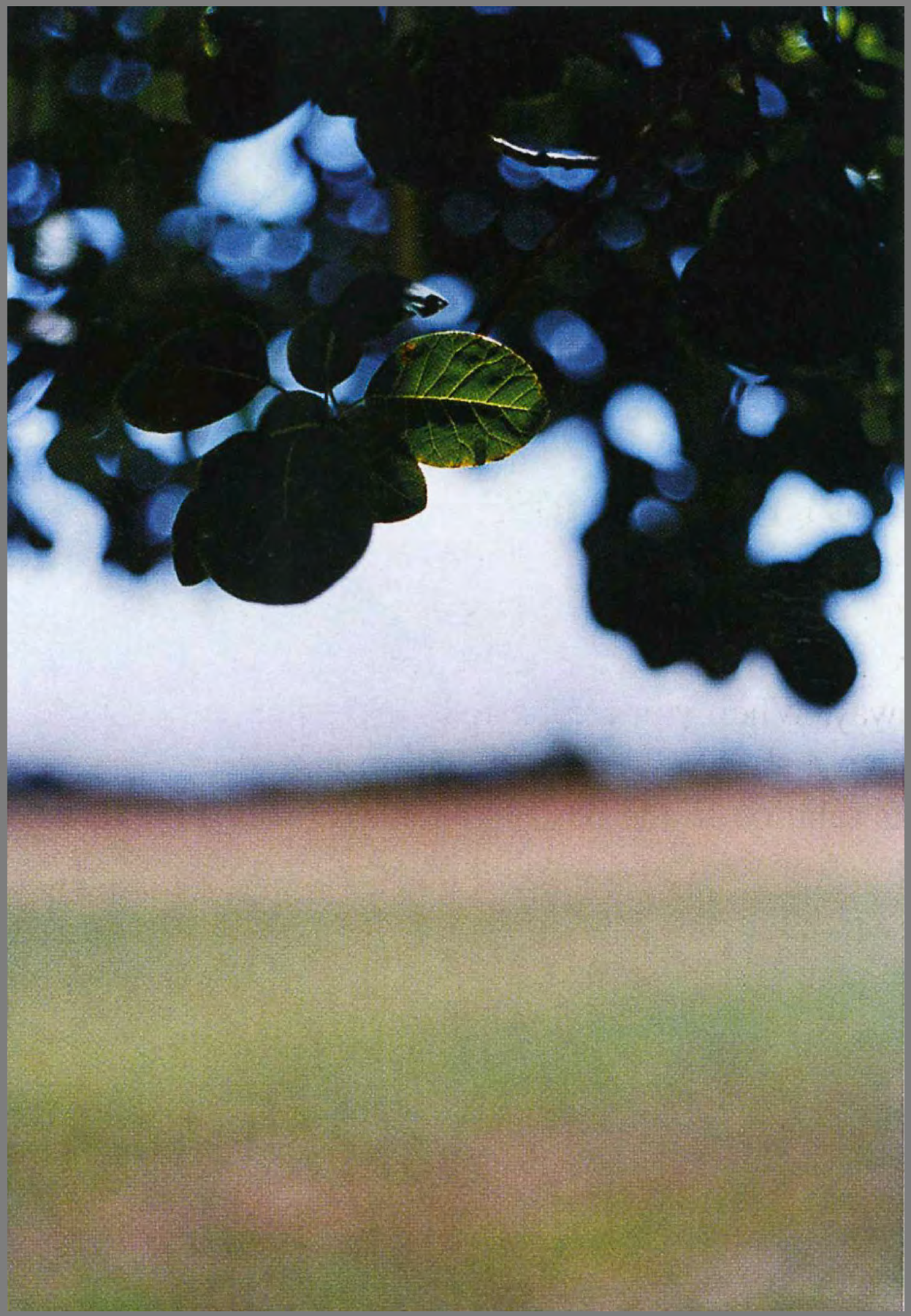
Compared to the top illustration, the same amount of water is delivered when half the volume of water runs for twice the length of time.

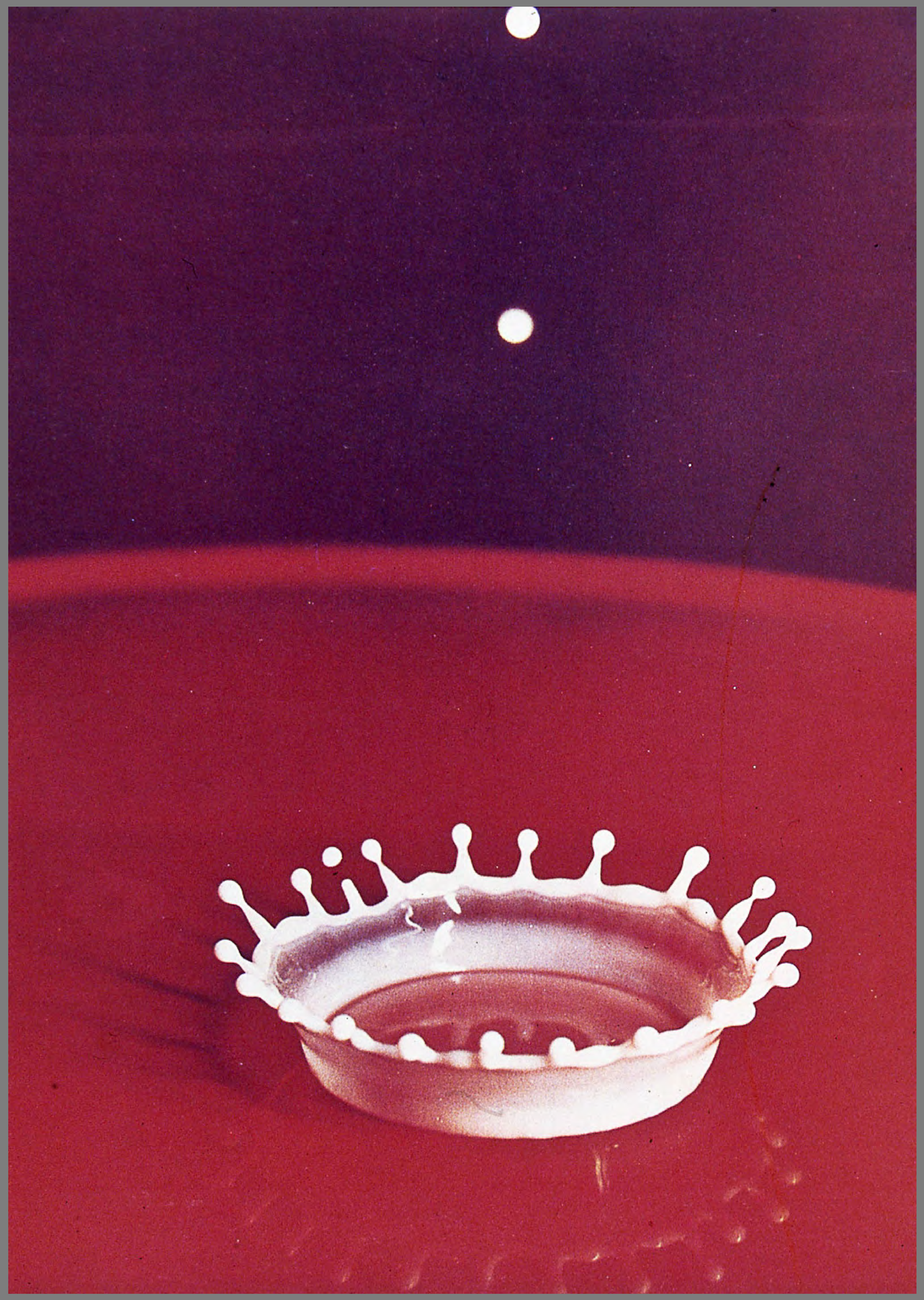
Equivalent exposures. *Each combination here of f-stop and shutter speed produces the equivalent exposure (lets in the same amount of light) but produces differences in depth of field and motion.*





Ships
Mens





MARATHON

TACO BELL

3.28 © Toni Hafkenscheid. *Train Snaking Through Mountain*, from the series *HO*, 2001.