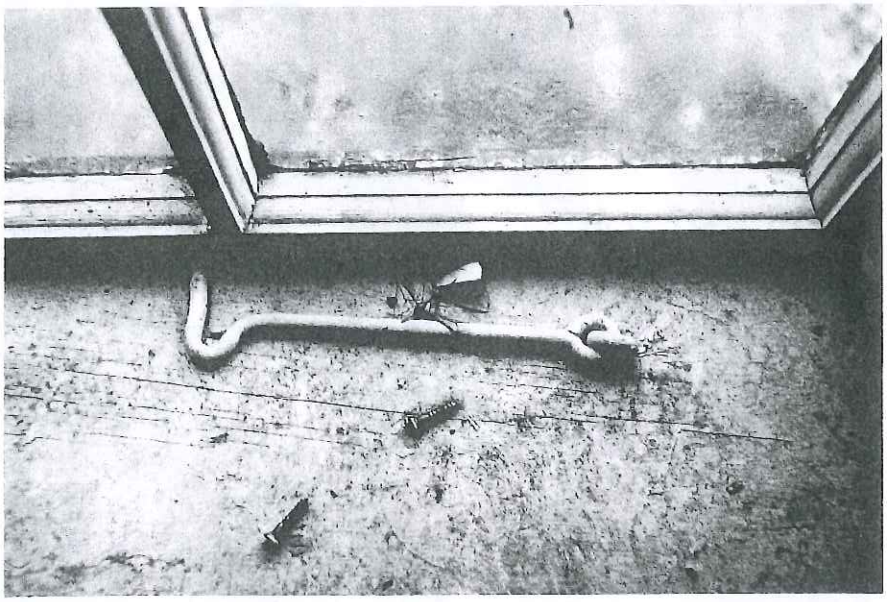
chapter 9 Light

You don't really have much control over the compositional elements we've discussed so far: line, texture and shape. For the most part, they're just "out there" in the world, waiting for you to notice them. You can change their positions within the frame of your viewfinder, by moving forward or back, or to one side or the other. You can make one element more dominant than the others, and you can edit out distractions. Outside of that, however, you don't generally have any real control over them.

The next three elements (light, motion and perspective) are more "interactive"—they allow (and may require) more choice on your part. They are, of course, also "out there" waiting for you, just like line, texture and shape. But there's an important difference.

You can choose whether to accept the light that's "given" to you—or you can change it. You can, if you choose, make daylight look like midnight, and vice versa. More subtly, you can choose whether an object that's in shadow will simply be darker than its surroundings or utterly invisible. In fact, you have to choose. Following the recommendation of your light meter is a choice, especially since you must decide what source of light the meter is reading.



The soft, indirect light of open shade is more subtle and moody than straight sunlight. It tends to convey a pleasant, rather dreamy, thoughtful or wistful quality. This is the sort of neutral gray tone a light meter assumes you want. (Student photograph.)

CONTROLLING EXPOSURE

You have now used the "point of departure" setting for several photo assignments. If you've followed instructions carefully, you should already be producing consistently good results. It has probably occurred to you, however, that you can't count on the sun to provide enough light for this setting to be correct all the time. You may already have missed some good shots because the light wasn't bright enough. It's time to start putting your camera's aperture ring to work.

Before we do that, we'll need to review shutter speed as well, to gain an understanding of how aperture and shutter speed work together.

Set your camera at the point of departure setting. Your aperture ring will be on f/16, and your shutter speed dial will be set at 125.

Change the aperture setting to

Bright sunlight is best suited to cheerful "ordinary life" photographs . . . though it can be used to suggest that ordinary life is pretty strange. (Student photograph by Dick Waghorne.)

f/11. You have just doubled the amount of light that would enter the camera if you clicked the shutter. Remember that increasing the aperture by one "stop" always doubles the size of the lens opening. (Also remember that a lower number indicates a larger opening.)

Now change the shutter speed to 250. Since 1/250 of a second is half as much time as 1/125, the amount of light reaching the film has just been cut in half. So you're back at the point of departure exposure again. In other words, so far as the amount of light is concerned, f/11 at 250 will produce the same exposure as f/16 at 125.

These two settings will *not* produce exactly the same photograph. Both

Indirect light also tends to be the most flattering for portraits. It minimizes blemishes and encourages a relaxed, open expression. (Student photograph by Marciano Pitargue, Jr.)

the depth of field and the visible motion in the photograph will be slightly different, as will be explained later on. The amount of light in each photograph, however, *will* be the same.

Set your camera on the point of departure setting again: f/16 at 125. Now change your shutter speed to 500. What aperture will give you an exposure that matches f/16 at 125? Adjust the aperture ring to this f-stop.

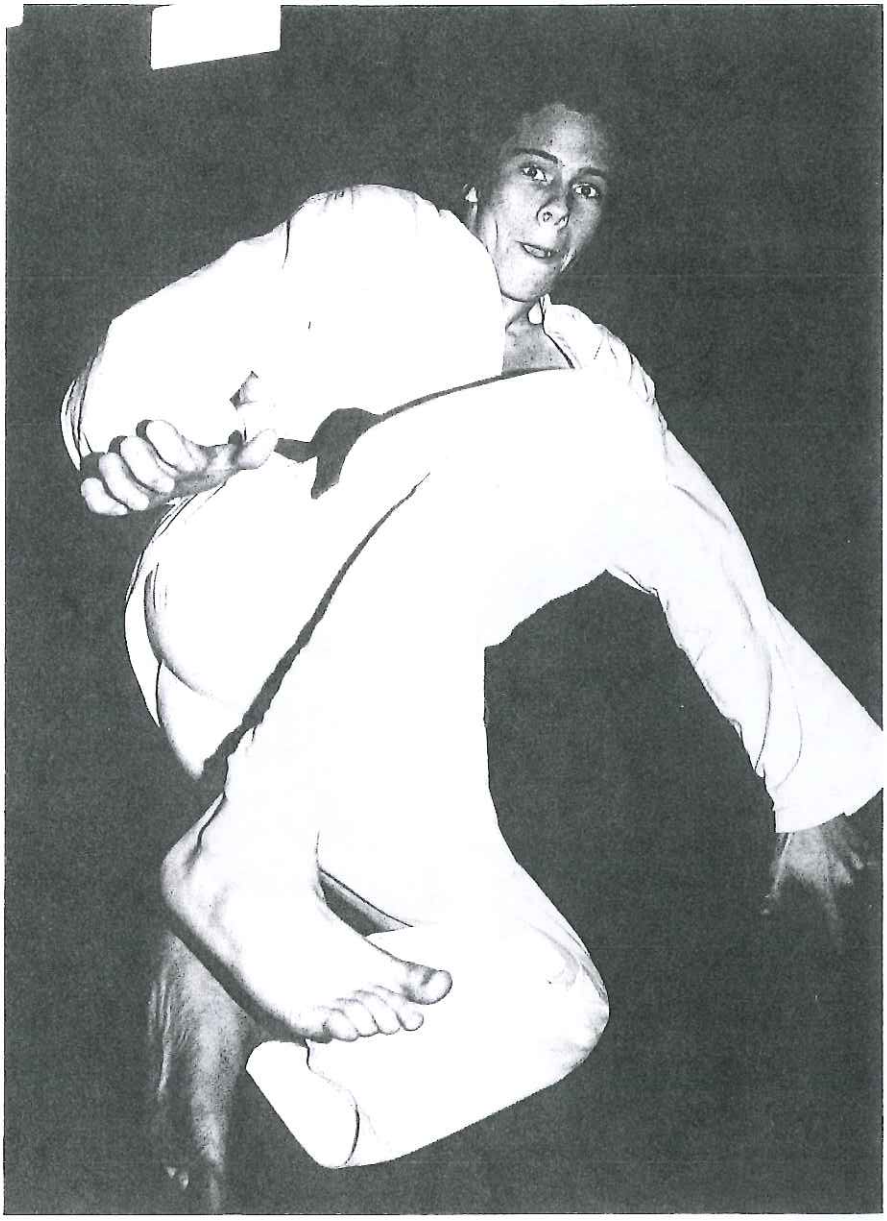
What aperture will give you twice as much light as f/16 at 125? Again, adjust the aperture ring to this f-stop.

What aperture will give you half as much light as f/16 at 125? If you've ended up with your aperture ring at f/11 (with your shutter speed still at 500), then you're getting the idea. An aperture of f/8 and a shutter speed of 1/500 of a second will match f/16 at 125. An aperture of f/5.6 at 500 will give twice as much light, and f/11 will give half as much.

As you've been going through this exercise, you may have noticed that the aperture ring clicked twice every time you moved from one aperture to another. If so, the first click indicates a **half-stop**, a lens opening halfway between two standard apertures.

If, for example, you started at f/16 at 125 and opened the lens half a stop, you would be letting 50 percent more light into the camera. The resulting photograph would be lighter, but not twice as light. Half-stops are very useful for fine tuning an exposure.

An unlighted subject against a light background produces a very graphic silhouette. With luck and skill, the shape of the figure will convey all the basic information needed to make sense of the image. (Student photograph by Mark Bissel.)



A well-lit subject conveys additional information—in this case, primarily facial expression and three-dimensional shape. (Student photograph by Melanie Fernandez.)

INFORMATION & MOOD

By now you know that light is what makes a photograph possible. Without light bouncing off of objects and into your lens, you wouldn't be able to photograph anything—or see anything. Beyond this, though, light has two primary photographic functions: It provides information and it influences mood.

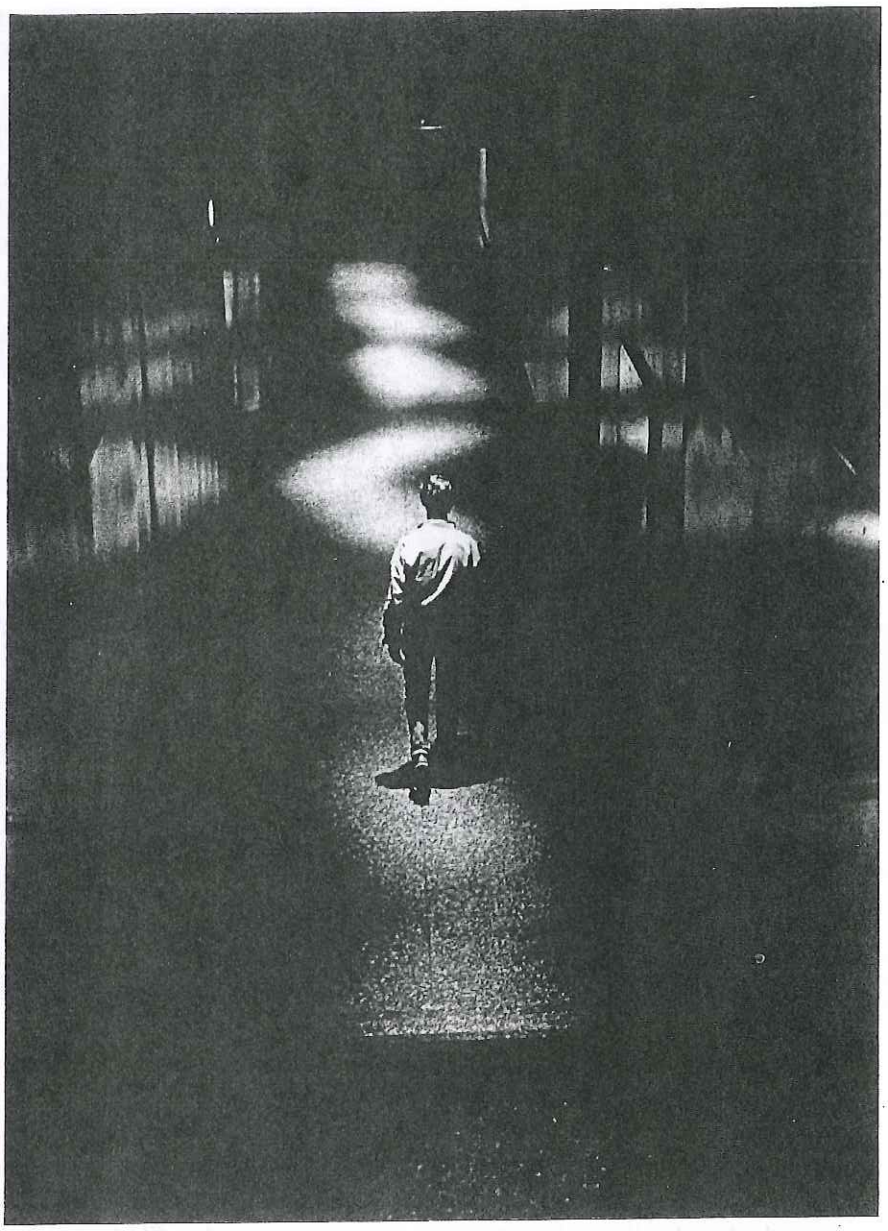
Information is facts. Your eyes convey facts to your brain, which the brain then translates into understanding. "That is a building." "That is a person." "The person looks larger than the building." "Aha!" says the brain. "The person is standing in front of the building." That, more or less, is how visual information works.

But it gets more complicated than that. Variations in brightness and shadow, the intensity of textures, the way in which shading may exaggerate shape, and other factors all contribute to our visual perceptions of things. And they are all influenced by light.

For example, compare the two photographs of a person kicking at the camera. The first is a **silhouette.** Because there is far less light on the subject than on the background, the subject appears black. How much information does the photograph provide about the person in it?

Now look at the second "kick" photograph. How much information does this photograph provide? As you can see, the two photographs are similar in content and composition—but very different in lighting.

In extreme cases, light may determine whether a photograph is confusing or clear. More commonly, the way you handle light may make the difference between immediate and delayed recognition of what some-



Low-light tends to be very somber, even sinister. It is difficult to use, since the subject must be placed in exactly the right spot in order to be visible. Used well, however, it can be highly dramatic. (Student photograph by Chris Jacobs.)

thing is or what it means. This, in turn, may make the difference between a strong emotional response or none, between sustained interest or boredom.

Mood is another vital ingredient provided by light. We tend to respond to lighting in much the same way as we respond to weather. Bright light, like a sunny day, tends to make us feel cheerful, relaxed. If the light is harsh, however, as it is on a bright hazy day, the mood will tend to be stark and unfriendly. Soft light, like mist, tends to make us nostalgic, wistful, dreamy. Darkness, like night or an approaching storm, makes us feel worried, frightened, serious.

You can use these natural reactions to heighten the effect of a photograph. By filling a photograph with a lot of darkness and shadows, you'll increase the impact of such "dark" emotions as fear and foreboding. By filling it with bright light, you'll increase the sense of well-being.

Sometimes, however, you'll want contradictions in your photographs: a sad face or scene in bright light, or a cheerful one in shadows. This is another way that light can be useful, by "playing against" the prevailing tone of a subject. Though such contradictory impressions may create confusion, if they are handled well that confusion itself will be interesting. The viewer will want to figure out what's going on.

To apply light effectively you must keep information and mood in balance with each other. If you concentrate too much on information and choose lighting that is bright throughout the frame, your photograph may lack emotional impact.

On the other hand, it is equally possible to emphasize mood so much that the photograph loses its ability to convey information. You've probably seen photographs in which, for example, people's faces are lost in shadow. It may be moody, but it also tends to be annoying.

Fortunately, you have two chances to modify the light in a photograph: when you shoot it and when you print it. While you're shooting, you may choose an exposure that is based on either the highlights (brightest areas) or shadows (darkest areas), or for a mid-range of grays ("average" areas).

Imagine that you are photographing someone who's wearing a white shirt and a dark jacket. If you expose

By intentionally reducing the light entering the camera, dramatic climatic effects can be enhanced, adding mood and impact. (Student photograph.)

for the highlights, then all the details in the white shirt will be clear, but some shadow detail—such as the texture of the jacket—may be lost. If, on the other hand, you expose for the shadows, the jacket will look great, but the white shirt may disappear.

The reason for this is **film latitude.** Every kind of film is sensitive to a specific range of light. Very few films can handle all the variations in lighting that our eyes can see. In black-and-white photography, this limitation is most evident when you're trying to capture a wide range of grays. If the lightest and darkest grays are so different in value that they exceed the film's range, or latitude, then you have to compromise. (Review value, if necessary, in Chapter 4.)

This is where the second chance to modify light comes in. When you shoot the photograph, you can choose to stress one part of the value range. Then, when you print it, you can re-adjust the balance—but only to a certain extent. If certain information (such as the texture of the shirt or jacket) did not get recorded by the film, there's nothing you can do to bring it back.

The safest approach to exposure, therefore, is to aim for the middle: **average gray.** This is exactly what a light meter does. Any light meter, whether built into a camera or hand-held, assumes that the average light in any scene is predominantly gray. (Note: If you're using a hand-held light meter, refer to the Appendix. The rest of this section deals with in-camera meters.)

FOCAL POINT: Light Meters

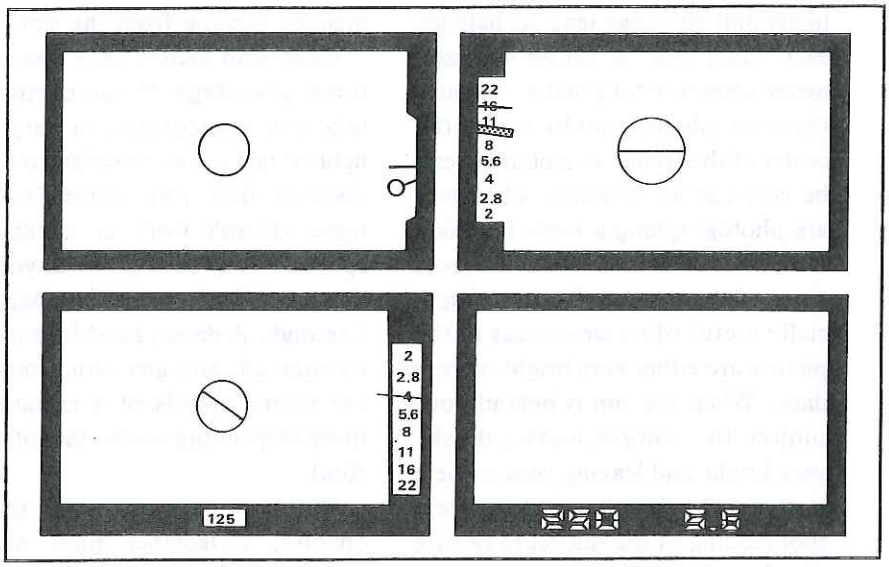
If your camera is less than 15 years old, then you will almost certainly be using a light meter that is built into your camera (internal). If your camera is not equipped with a built-in meter, then you will need to use a hand-held model.

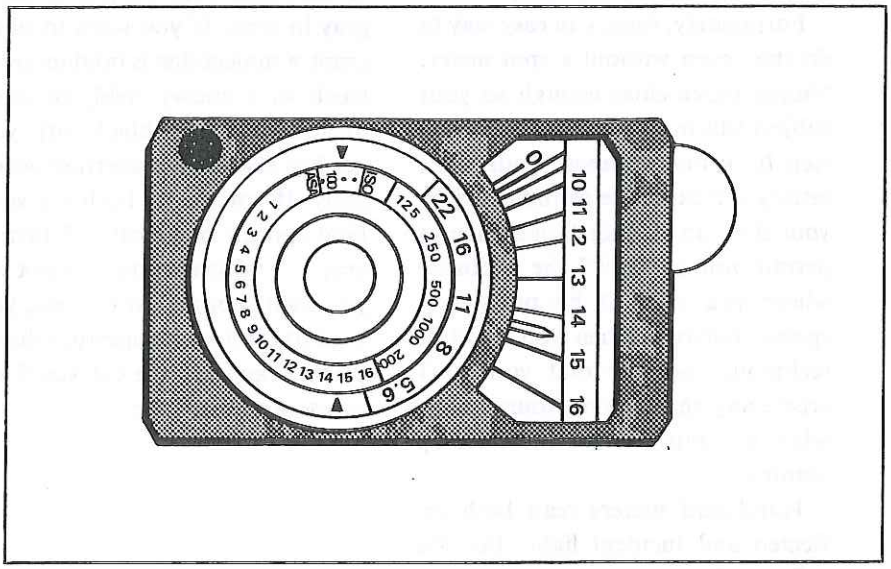
Depending on the brand and model, you may be informed of the light reading by a needle that moves up and down, a series of lights, or a numerical display showing the current recommended aperture. With only a little practice, you should be able to respond to your camera's light meter and achieve the effect you want quickly and accurately.

Before you can do this, however, you'll need to know what the light meter is actually trying to tell you. A light meter may "read" either **incident** or **reflected** light. Incident light is the light that is generally available in a given lighting situation. Imagine, for example, a black cat sitting in a white chair in an evenly lit room. The incident light reading will be the same for both. That means the amount of light on the cat is the same as the amount on the chair. Reflected light is the light that actually enters the camera. This is the light that is *reflected* by a given subject. If your meter is measuring reflected light, it will give a much higher reading for the white chair than for the black cat. This is because the chair, being brighter, will reflect far more light.

Light meters that are built into cameras measure only reflected light—the light that enters the camera's lens. There are two kinds of reflectance meters: averaging meters and spot meters. An averaging meter gives you the average light reading for a large area. A spot meter focuses in on a small area. Some cameras are equipped with a switch that lets you choose either kind of meter. Most, however, compromise by giving you a "center-weighted average" reading. This means that the light meter averages the light throughout the image area, but pays special attention to the center of the frame. (The center is often indicated by a circle of some kind.) If the image area is generally bright, but dark at the center of the frame, a center-weighted averaging meter will indicate a larger aperture than an ordinary averaging meter would. If you aimed a spot meter at the dark area at the center of the frame, the reading would be lower still.

Most of the time, an averaging meter works adequately, since high-





lights and shadows tend to balance each other out. A center-weighted meter usually works better, because the main subject tends to be near the center of the frame. A spot meter can be very useful, however, when you are photographing a scene in which the light is quite different in different parts of the picture. It can be especially useful when large areas of the picture are either very bright or very dark. When the sun is behind your subject, for example, making the sky very bright and leaving your subject in shadow, you will need to make a spot reading of the subject to be sure that it is correctly exposed.

Fortunately, there's an easy way to do this, even without a spot-meter. Simply move close enough so your subject fills most of the frame. Then step back and compose your shot, setting the exposure as indicated by your close-up reading. Some cameras permit you to "lock" the exposure where you want it by pressing a special button. When you use this technique, be sure that you don't create any shadows on your subject when you move in for the close-up reading.

Hand-held meters read both reflected and incident light. For the reflected light reading, you aim the meter's lens at your subject, just as you would with a built-in meter. For the incident reading, you place a translucent cover over the meter's lens, stand near your subject and aim the meter toward your camera or toward the light source. If you're shooting outdoors in even light (either all sunny or all cloudy, for example), you can obtain an all-purpose average reading by taking an incident reading from the sun.

Hand-held meters have one additional advantage. If you attempt to take any photographs in very low light (at night, for example), you may discover that your camera's light meter doesn't work at all shutter speeds. It may shut off when you get down to 1/8 of a second, perhaps, or 2 seconds. A decent hand-held meter, by contrast, will give you a reading for shutter speeds of 4 minutes or more (depending on the ISO of your film).

One final point: as noted in this chapter, reflectance light meters assume that your subject is neutral gray in tone. If you want to photograph a subject that is brighter overall (such as a snowy field) or darker overall (such as a black cat), you'll need to change the aperture accordingly. If you don't, both the snowy field and the black cat will turn out gray . . . which is probably not what you want. For the snow scene, you'll need to use a larger aperture than indicated, and for the cat you'll need to use a smaller one.

USING A LIGHT METER

The specific gray that a light meter assumes you want is one that reflects only about 18% of the light it receives from the sun. (Pure white reflects close to 100%; pure black close to 0%.) This figure—"18% gray"—has been scientifically calculated to represent average lighting for most scenes.

So, if the average light reaching the light meter is darker than an 18% gray, the light meter will recommend a larger aperture or a slower shutter speed, to let more light in. If the average light reaching the meter is brighter than an 18% gray, the meter will call for a smaller aperture or faster speed, to let less light in.

Nine times out of ten, this is precisely the kind of advice you want. The light meter will recommend the camera setting you'd choose yourself, if you took the time to figure it out.

Ah, but what about that one time out of ten when the light meter's advice is *not* what you want? Suppose you're photographing someone who is standing between you and the sun. Because the sunlight is coming right at you, it is very bright. Unless the person is filling up most of the frame, your light meter will react to the bright sunlight and urge you to select a very small aperture or a very fast speed. What will it do to your photograph?

By letting only a little light into the camera (just enough so the sunlight shows up as a nice gray), the person you intended to photograph will look like a black blob. This is probably not the effect you hoped for.

Here's another example: You're photographing a black cat on a black

couch. The average light in the scene is quite a bit darker than an 18% gray. Your light meter will tell you to use a very large aperture, or a slow shutter speed, or both. The result? A washed-out looking gray cat on a gray couch.

None of this means that a light meter is a bad thing. A light meter is a great tool. Its primary drawback is that it wants to make everything gray. Knowing this can help you use it more effectively. If you're shooting under tricky lighting conditions (any conditions in which precision is important), take a meter reading off something that is close to an 18% gray, and set your camera accordingly. Your blacks will be black, and your whites will be white. If you want to make the photograph darker or lighter than "normal," you can then adjust your aperture or shutter speed accordingly. If, for example, you decide that you'd like the whole scene to appear darker than it actually is, you can take a reading for an 18% gray and then decrease the aperture by one or two stops.

Fine, but how are you supposed to find a sample of 18% gray when you need it? You can buy a **18% gray card** that is scientifically produced to be exactly 18% gray. Or you can use the gray card you already have: the palm of your hand. Whether you're black, white, hispanic or oriental, you can obtain an acceptably accurate mid-range reading simply by holding the palm of your hand in the light and aiming a meter at it.

When you do this, be sure that the lighting on your palm is the same as the lighting on the subject of your photograph. Your hand should be held so that the light strikes your palm at the same angle as it strikes your subject. Don't let the camera cast a shadow on your palm. Also be sure to hold your camera close enough to ensure that other light is not confusing the reading. Most modern cameras have **center-weighted averaging** meters. This means that they read light from several points around the image area, but give more importance to the reading at the center. Therefore, your palm should fill most of the image area, and should especially cover the center.

(Note: To increase the precision of your "palm readings," compare them to readings from a gray card. Place it in open shade and take a light meter reading from it. Be sure that the card fills your view-finder. Then

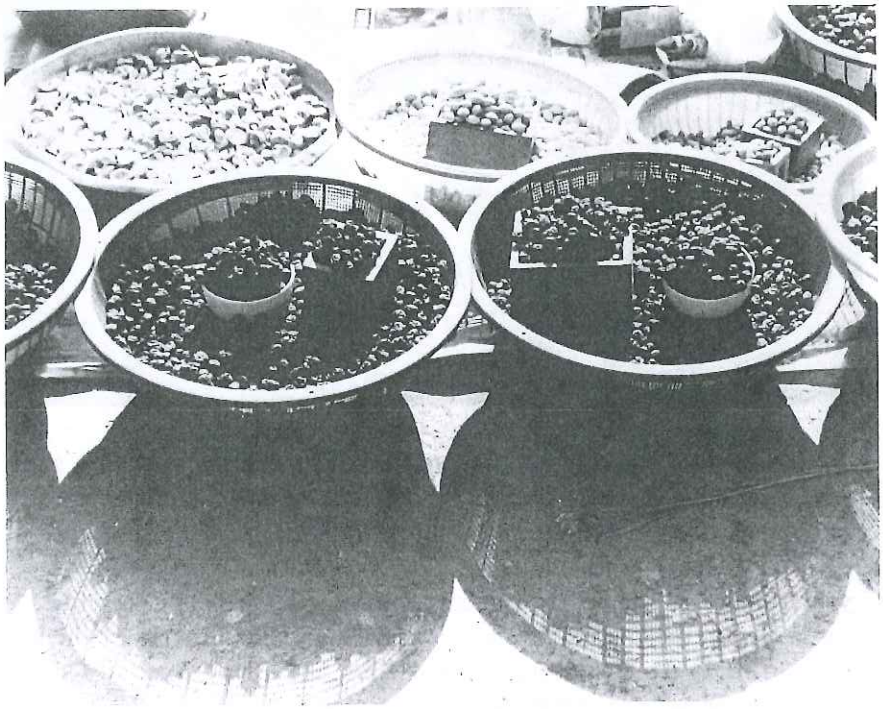
By metering off the subject's face, rather than averaging the entire scene, a rich black context was produced for this striking portrait. (Student photograph.)

If you don't want a silhouette when shooting a subject against a bright sky, it is essential to meter the subject . . . not the sky. This is the sort of shot that automatic cameras tend to mess up. (Student photograph by Steve Gates.)

take a reading from your palm in the same light. The difference between the two readings indicates how far your palm varies from an 18% gray. You should add or subtract this amount whenever you take a reading off your palm. For example, if the gray card reading was f/5.6 and the reading for your palm was f/4, then you should always open your lens up one stop more than indicated by a "palm reading.")

There are more sophisticated theories and techniques for obtaining ideal lighting, but this one is certainly the easiest. Most of the time, it'll do just fine.

Another common way to avoid the pitfalls of a faulty light reading is called **bracketing.** When you bracket a shot, you shoot several frames at different exposures. By doing this, you are simply improving the chances of getting a correctly exposed image. If, for example, your light meter called for f/8 at 125, you might bracket by shooting one frame at that setting, plus one at f/5.6 and one at f/11. Or you might shoot five frames within that three-stop range, using the half-stop settings on your aperture ring. You can also bracket by adjusting the shutter speed. For example, f/8 at 60, 125 and 250.



Shadows, produced by angled light, help to "anchor" objects solidly as well as adding visual interest. (Student photograph by Joshua Noble.)

OTHER FUNCTIONS OF LIGHT

Light has some additional functions that it shares with other compositional elements. Like line, light can

promote rhythm. Alternating bands of light and shadow, for example, or isolated spots of light surrounded by darkness may create very strong and interesting visual rhythms.

Similarly, light and shadow can reproduce or enhance many of the effects of shape. Even a small object can appear quite massive if it produces a large shadow.

In addition, the shadow of an object often indicates how that object relates to its environment. Test this yourself. Close one eye and look down at your foot. (By closing one eye, you're losing depth perception, and seeing things the way the camera sees them.) Now lift your foot off the floor. Can you convince yourself that it is still touching the floor? If you can't, it's probably because the shadow cast by your foot is providing clear relational information: it is showing you the relative positions of your foot and the floor.

Try this in several lighting situations, viewing your lifted foot from several angles. (You can alter the lighting without moving by using a notebook to shade your whole foot.) Experiment until your foot looks like it is still touching the floor. Then continue experimenting until no amount of imagination can fool you—until the relation between your foot and the floor is unmistakable.

DEPTH OF FIELD

There's one other way that light affects relation: depth of field. As we discussed in Chapter 2, depth of field is the range of distance that is in acceptable focus at one time. If you have small, or "narrow," depth of field, whatever you have focused on (the **focal point**) may be the only thing in focus. If, instead, you have

The depth of field in this photograph is sufficient to provide a clear visual context for the elderly farmer. Notice how the old tin cans in the foreground and the woodstove in the background contribute to the photograph's effectiveness. (Student photograph by Robert Lewis.)

FOCAL POINT: Depth of Field

To understand how depth of field works, it is important to understand how focusing works. What determines whether or not a subject is clearly focused?

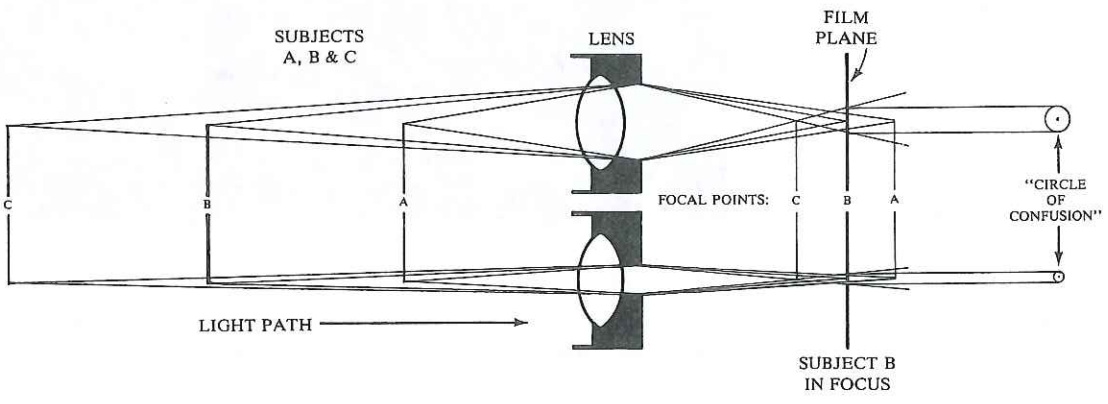
Let's say you're photographing an apple. Rays of light from the sun are constantly bouncing off that apple in all directions. When you click the shutter of your camera, you allow some of those rays to travel through the lens to the film inside the camera. The rays of light react with the film to produce an image of the apple composed of a series of "points"—or dots of light. Ideally, a point of light striking the apple would reproduce as an identical point of light on the film. In reality, it is more of a circle. If this circle is 1/200 of an inch in diameter, it will appear to be a sharply focused point to the human eye. If most of the circles that make up the image of an apple are larger than that, the image will appear fuzzy.

When you focus the lens, you are increasing and decreasing the size of these circles on the film plane. Light from one point of the apple spreads out to fill the lens and then tapers back to a point (see diagram), making the shape of a cone. When the subject is in focus, the tip of that cone is right at the film plane. When the subject is out of focus, the cone comes to a point in front of or behind the film plane.

Now, how does depth of field fit in with all this? Since the light spreads to the edges of the lens opening, the base of the cone of light is as wide as the aperture. The width of the base of the cone determines the angle at which the light will travel toward the film plane. If the aperture is large, the light will come to a point more gradually than it will if the aperture is small. The same degree of error in focus will produce a more out-of-focus image with the large aperture because the circle produced by each point of unfocused light will be larger. With the smallest apertures, a considerable range of focal error will still convey a crisp image. If you examine the diagram carefully, you'll see how narrowing the cone of light produces this result.

So, if you have focused accurately on the apple and are using a small aperture, the cone of light will probably be narrow enough for the banana behind the apple and the orange in front of it to also appear to be in focus. If you are using a large aperture, both the banana and the orange are likely to be represented by oversized circles and, therefore, to appear fuzzy.

That, in essence, is how depth of field works. (Aren't you glad you asked?)



long, or "wide," depth of field, then objects behind and in front of the focal point will also be in focus.

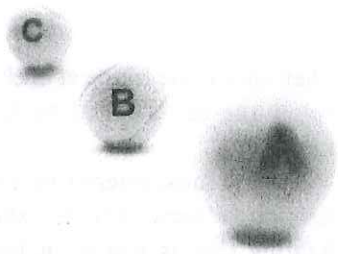
Depth of field is primarily determined by two factors: the aperture and the focal length of the lens. Since aperture concerns light, we'll deal with its effect on depth of field in this section. Focal length is discussed in more detail in Chapter 11.

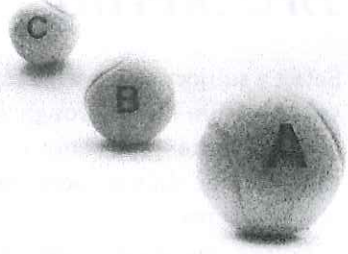
For now, just bear in mind that depth of field decreases as focal length increases. In other words, if you set a 50mm and a 100mm lens at the same aperture and focus them on a subject at the same distance, the depth of field will be greater with the 50mm lens. Objects in the foreground and background will be in focus for the 50mm lens that are out of focus for the 100mm lens.

Aperture, as you'll recall, is the size of the opening through which light enters the camera. A smaller aperture, like a shorter lens, increases depth of field. For a partial explanation of why this is so, consult "Focal Point: Depth of Field." Fortunately, you don't really need to understand the reasons for this fact in order to make use of it.

With a small aperture, therefore, the range of *acceptable* focus will extend beyond whatever is in *precise* focus. Only one exact distance will be 100% focused. (This distance is called the focal point.) However, objects in the foreground and background will seem to be in focus as well. As the aperture of the lens *increases,* this range of acceptable focus (depth of field) *decreases.*

The distance between the focal point and the camera also affects depth of field. The greater this distance is, the greater the depth of field will be. For example, a standard 50mm lens set at f/8 and focused at 6 feet will have a depth of field from 5 to 7 feet. The same lens at the same aperture, focused at 20 feet, will also have a depth of field from 10 to 30 feet. In the first case, relatively close to the camera, the depth of field extends only 2 feet. In the second case, at a greater distance, it extends 20 feet. If you focus on something 2 feet away, the depth of field will only be about 1 inch.





You may, of course, *want* less depth of field. This brings us to how depth of field "works" in a photograph.

Two objects in a photograph that are both in focus will seem close together, because that's the way you're used to seeing things. Your eyes provide you with very selective focusing, so two objects that aren't close together are not both in focus at the same time. Your brain expects a photograph to work the same way.

Depth of field; therefore, can do two useful things in a photograph. First, it can convey the impression of depth. As you may recall, a photograph is a two-dimensional image of three-dimensional objects. It needs all the help it can get to *seem* three-dimensional. By reproducing some objects in focus and some out of focus (imitating normal vision), depth of field helps to create the illusion of a three-dimensional image.

Depth of field can also tell the eye where to look, and help it tell different objects apart. You've probably seen photographs in which a tree seems to be growing out of someone's head. That's one common result of too much depth of field.

Used creatively, limited depth of field helps to single out one object or one part of an object. The viewer's eye automatically aims for what is in focus. If that also happens to be the primary subject of the photograph—the thing the photographer *wanted* us all to notice—then the photograph is likely to attract interest and attention.

Too much depth of field can have another undesirable effect. By bringing too many images to the viewer's attention, the emotional or aesthetic impact of the primary subject may be watered down or destroyed. Instead of concentrating on one subject, the eye will get busy checking out all the others.

Sometimes, of course, that's precisely the response you want. A photograph of a bustling city, for example, may best capture the bustle by having many details in focus. With a photograph of a single rosebud, on the other hand, you'll probably want to be more selective.

EXERCISE

Bracketing

Select a subject with a wide range of values—from black through various grays to white—and shoot it several times, at one shutter speed, but several apertures.

Before shooting, take a light reading of some part of the subject that is in the mid-range of grays (or meter off your palm).

Shoot one frame at the setting recommended by your meter, then shoot another at each f-stop above it, while keeping the same shutter speed. Then shoot one frame at each f-stop below the one selected by the light meter.

For the most interesting range of lighting effects, try to shoot in lighting that is just a bit less than broad daylight. Your meter reading should be around f/8 at a shutter speed between 250 and 60.

You should produce at least two different exposures of a single subject to be critiqued. However, you may want to try the same procedure on several subjects to find one that produces the most interesting variations. If you use only one subject, try to find several angles to shoot it from, so you can compare effects. Different angles will produce the most variety when the subject is dramatically lit. This means that your subject needs to receive some direct light, and that you'll want to shoot early or late in the day.

Student photographs by Marc McCoy.

A skillfully handled blurred motion shot can convey a sense of being caught up in the action. (Student photograph by Sheri Allen.)