Let There Be Light

Who hasn't taken photos in which friends and family look like they have a strange illness — what else could explain that jaundiced or sometimes feverish skin tones? And you probably have pictures in which the subject has dark raccoon-like shadows under the eyes, nose, and chin.

The common thread in these situations is light — its color, direction, quality, and intensity. To solve these kinds of problems, you need to understand the basic characteristics of light and how you can use light to your advantage. The more you learn about light, the more able you'll be to transform your pictures from mundane snapshots into showstoppers.

It helps to think of light as a painter thinks about a color palette. You can use the qualities of light to set the mood; control the viewer's emotional response to the subject; reveal or subdue the subject's shape, form, texture, and detail; and render scene colors as vibrant or subdued.

Color Hues

Few people think of light as having color until the color becomes obvious, such as at sunrise and sunset when the sun's low angle causes light to pass through more of the earth's atmosphere creating visible and often dramatic color. But regardless of the time of day, natural light has color, and each color of sunlight renders subjects differently. Likewise, household bulbs, candlelight, flashlight, and electronic flash have distinctive colors.

The human eye automatically adjusts to the changing colors of light so that white appears white regardless of the type of light we view it in. Digital image sensors are not, however, as adaptable as the human eye. When the Digital Rebel is set to
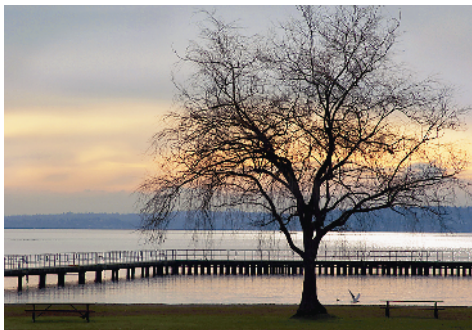
4.1 This image was taken during late afternoon as the sun created a golden glow across the sky.

Daylight, it renders color in a scene most accurately in the light at noon on a sunny, cloudless day. At the same setting, it does not render color as accurately at sunset or sunrise because the temperature of light has changed.

Different times of day and light sources have different temperatures. Light temperature is measured on the Kelvin scale and is expressed in degrees K. So for the Digital Rebel to render color accurately, the white balance setting has to match the specific light in the scene.

When learning about color temperatures, keep in mind this general principle: the higher the color temperature, the cooler (or more blue) the light; the lower the color temperature, the warmer (or more yellow/red) the light.

Table 4.1 shows Kelvin scale ranges for a sunny, cloudless day. These are, of course, general measures. The color temperature of natural light is affected by atmospheric conditions such as pollution and clouds. An overcast day shifts the color of light toward the cool end of the scale, measuring between 6,000 and 7,000 degrees K.

XT

Due to the warmer setting for sunset on the EOS Digital Rebel XT, you may want to use AWB for sunset photos, or you can use WB SHIFT/BKT and shift toward magenta.

Cross-Reference

If you use RAW capture, you can adjust the color temperature precisely using Canon's Digital Photo Professional RAW conversion program. See Chapter 7 for details on using this program.

Color Temperature isn't Atmospheric Temperature

Unlike air temperature that is measured by degrees Fahrenheit (or Celsius), light temperature is based on the spectrum of colors that is radiated when a black body is heated. Visualize heating an iron bar. As the bar is heated, it glows red. As the heat intensifies, the metal changes to yellow, and, with even more heat, it glows blue-white. In this spectrum of light, color moves from red to blue as the temperature increases.

This becomes confusing because we think of "red hot" as being significantly warmer than someone who has turned "blue" by being exposed to cold temperatures. But in the world of color temperature, blue is, in fact, a much higher temperature than red. That also means that the color temperature at Noon on a clear day is warmer (bluer) than the color temperature during a fiery red sunset. And the reason that you care about this is because it affects the color accuracy of your pictures.

Table 4.1
Selected Light Color Temperatures

Time of Day	Range in Degrees Kelvin	Digital Rebel Setting and Approximate Corresponding Temperature
Sunrise	3,100-4,300	Auto (AWB): 3,000 to 7,000
Midday	5,000-7,000	Daylight: 5,200
Overcast or cloudy sky	6,000 & 8,000	Cloudy, twilight, sunset: 6,000
Sunset	2,500-3,100	AWB or Cloudy, twilight, sunset: 6,000

On the Digital Rebel, setting the white-balances tells the camera the general range of color temperature of the light so that it can render white as white in the final image. The more faithful you are in setting the correct white-balance setting, the less color correction you'll have to do on the computer.

The "Color" of Light

Like an artist's palette, the color temperature of natural light changes throughout the day. By knowing the predominant color temperature shifts throughout the day, you can adjust settings (or use WB SHIFT/BKT on the Digital Rebel XT) to ensure accurate color, to enhance the predominant color, and, of course, to use color creatively to create striking photos.

Sunrise

In predawn hours, the cobalt and purple hues of the night sky predominate. But as the sun inches over the horizon, the landscape begins to reflect the warm gold and red hues of the low-angled sunlight. During this time of day, the green color of grass, tree leaves, and other foliage colors are enhanced, while earth tones take on a cool

hue. Landscape, fashion, and portrait photographers often use the light available during and immediately after sunrise.

AWB is a good general white-balance setting to use. If you are shooting RAW images, you can also adjust the color temperature precisely in Canon's Digital Photo Professional RAW conversion program. See Chapter 7 for details on using this program. This is also a great time to use Auto Exposure Bracketing (AEB) set to 1/2 or a full stop.

Midday

During midday hours, the warm and cool colors of light equalize to create a light the human eye sees as white or neutral. On a cloudless day, midday light is often considered too harsh and contrasty for many types of photography, such as portraiture. However, midday light is effective for photographing images of graphic shadow patterns, flower petals and plant leaves made translucent against the sun, and for images of natural and man-made structures.

For midday pictures, use the Daylight white-balance setting on the Digital Rebel. If you take portraits during this time of day, it's a good idea to use the built-in flash or an

4.2 A chilly fall morning shows the warm color beginning to emerge over the mountaintops at sunrise.

accessory flash to fill dark shadows. With the Digital Rebel XT, you can set Flash Exposure Compensation in 1/3- or 1/2-stop increments to get just the right amount of fill light using either the built-in or an accessory Speedlite.

Sunset

During the time just before, during, and just following sunset, the warmest and most intense color of natural light occurs. The predominantly red, yellow, and gold light creates vibrant colors, while the low angle of the sun creates soft contrasts that define and enhance textures and shapes. Sunset colors create rich landscape, cityscape, and wildlife photographs.

For sunset pictures, AWB is a good general white-balance setting to use on the Digital Rebel. If you are shooting RAW images, you can also adjust the color temperature precisely in Canon's Digital Photo Professional RAW conversion program.

Cross-Reference *See Chapter 7 for details on using Digital Photo Professional program.*

Diffused light

On overcast or foggy days, the light is diffused and tends toward the cool side of the color temperature scale. Diffusion spreads light over a larger area making it softer, and it usually reduces or eliminates shadows. Light can be diffused by clouds; an overcast sky; atmospheric conditions including fog, mist, dust, pollution, and haze; or objects such as awnings or shade from trees or vegetation.

4.3 Low-angled sunlight provided beautiful backlighting for this fall farm scene.

Even in bright light, you can create a diffuse light by using a *scrim*, which is a panel of cloth, such as thin muslin or other fabric, stretched tightly across a frame. The scrim is held between the light source (the sun or a studio or household light) and the subject to diffuse the light.

Diffused light creates saturated color, highlights that are more subdued than in open light, and shadows that are softer. Diffuse light is excellent light for portraits.

Because overcast and cloudy conditions commonly are between 6,000 and 8,000 degrees K, the Cloudy, twilight, sunset white-balance setting on the Digital Rebel is a good choice for overcast conditions. For cloudy conditions, AWB is a good choice.

Electronic flash

Most on-camera electronic flashes are balanced for the neutral color of midday light, or 5,500 to 6,000 degrees K. Because the light from an electronic flash is neutral, in the correct intensities it reproduces colors accurately.

Flash is obviously useful in low-light situations, but it is also handy outdoors where fill-flash eliminates shadow areas caused by strong top lighting and provides detail in shadow areas for backlit subjects.

On the Digital Rebel, the Flash white-balance setting, which is set to 6,000 K, is the best option, and it reproduces colors with high accuracy.

Tungsten light

Tungsten is the light commonly found in household lights and lamps. This light is warmer than daylight and produces a yellow/orange cast in photos that, in some cases, is valued for the warm feeling it lends to images.

Setting the Digital Rebel to the Tungsten white-balance setting retains a hint of the warmth of tungsten light while rendering colors which have high accuracy. If you want to retain a hint of the warmth of tungsten light, use white-balance bracketing on either camera.

Fluorescent and other light

Commonly found in office and public places, fluorescent light ranges from a yellow to a blue-green hue. Fluorescent light produces a green cast in photos when the white-balance is set to Daylight or Auto.

4.4 A combination of sunshine and fog creates a sense of depth in this image.

Other types of lighting include mercury-vapor and sodium-vapor lights found in public arenas and auditoriums that have a green/yellow cast in unfiltered/uncorrected photos. It's a good idea to set a custom white-balance on the Digital Rebel in this type of light.

Under fluorescent light, set the camera to the White fluorescent light setting (approximately 4,000K). In stadiums, parking lots and other colors, you may want to set a custom white balance or use AWB.

Light from fire and candles creates a red/orange/yellow cast. In most cases, the color cast is warm and inviting and can be modified to suit your taste on the computer.

Metering Light

Your camera's reflective light meter sees only gray. Objects that you see as "neutral" gray, an even mix of black and white, reflect 18 percent of the light falling on them and absorb the rest of the light. In a black-and-white world, objects that you see as white reflect 72 to 90 percent of the light and absorb the remainder. Objects that you see as black absorb virtually all of the light. All other colors map to a percentage or shade, of gray. Intermediate percentages between black and white reflect and absorb different amounts of light.

In color scenes, the light and dark values of color correspond to the swatches of gray on the grayscale. A shade of red, for example, has a corresponding shade of gray on a grayscale. The lighter the shade, the more light it reflects.

The Digital Rebel's reflective light meter (which measures light that is reflected back to the camera from the subject) assumes that everything is 18 percent gray. The meter expects to see an average scene, one that contains a balance of dark and light tones. In average scenes, the camera's meter produces an accurate rendition of what the human eye sees. However, in scenes with large expanses of snow, white sand, and black objects you often get pictures with gray snow or gray graduation gowns that should have been black.

Colored surfaces reflect some color onto nearby objects. For example, if you photograph a person sitting in the grass, green is reflected into the subject. The closer the subject is to the grass, the more green will be reflected in the subject's face. Similarly, photographing a subject under an awning or near a colored wall also results in that color reflecting onto the subject. The amount of reflectance depends on the proximity of the subject to the color and the intensity of the color.

So, you must be aware not only of the color of the primary light, but also of surrounding structures that reflect onto the subject. Reflected color, of course, can make it difficult to get correct color in the image. To avoid or minimize corrections, it's best to move the subject away from the surface that is reflecting onto the subject.

What Is the Best Light?

Photographers often describe light as harsh or soft. Harsh light creates shadows with well-defined edges. Soft light creates shadows with soft edges. There are traditional uses for each type of light. Understanding the
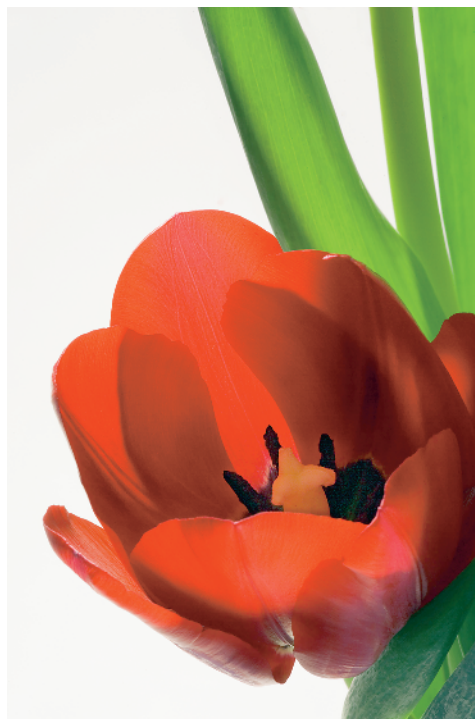
4.5 Hard light illuminated the transparent petals of the tulips emphasizing their rich color.

effect of each type of light before you begin shooting is the key to using both types of light, and variations in between, effectively.

Hard/harsh light

Hard light is created when a distant light source produces a concentrated spotlight effect—for example, light from the sun in a cloudless sky at midday, an electronic flash, or a bare light bulb. Hard light creates dark, sharp-edged shadows as well as a loss of detail in highlights and shadows.

For example, portraits taken in harsh overhead light create dark, unattractive shadows under the eyes, nose, and chin. This type light is also called contrasty light. Contrast is measured by the difference in exposure

readings (f-stops) between highlight and shadow areas. The greater the difference, the higher the contrast. Because hard light is contrasty, it produces well-defined textures and bright colors. Hard light is best suited for subjects with simple shapes and bold colors.

To soften hard light, you can add or modify light on the subject by using a fill flash or a reflector to bounce more light into shadow areas. In addition, you can move the subject to a shady area, or place a scrim (diffusion panel) between the light and the subject. For landscape photos, you can use a graduated neutral density filter to help compensate for the difference in contrast between the darker foreground and brighter sky.

Soft light

Soft light is created when clouds or other atmospheric conditions diffuse a light source, such as the sun. Diffusion not only reduces the intensity (quantity) of light, but

it also spreads the light over a larger area (quality). In soft light, shadow edges soften and transition gradually, texture definition is less distinct, colors are less vibrant than in harsh light, detail is apparent in both highlights and shadow areas of the picture, and overall contrast is reduced.

When working in soft light, consider using a telephoto lens and/or a flash to help create separation between the subject and the background. While soft light is usually well suited for portraits and macro shots, it is less than ideal for travel and landscape photography. In these cases, look for strong, details and bold colors, and avoid including an overcast sky in the photo.

Directional light

Whether natural or artificial, the direction of light can determine the shadows in the scene. Dark shadows on a subject's face under the eyes, nose, and chin result from hard, top light. You can use both the type and direction of light to reveal or hide detail, add or reduce texture and volume, and help create the mood of the image.

Front lighting

Front lighting is light that strikes the subject straight on. This lighting approach produces a flat effect with little texture detail, and with shadows behind the subject, as seen in many snapshots taken with an on-camera flash.

Side lighting

Side lighting places the main light to the side of and at the same height as the subject. One side of the subject is brightly lit, and the other side in medium or deep shadow, depending on the lighting setup. While this technique is often effective for portraits of men, it is usually considered unflattering for portraits of women.

4.6 Diffused light created pleasing soft light for this portrait.

4.7 Dappled backlighting creates interesting patterns in this image.

However, a variation of side lighting is *high-side lighting*, a classic portrait lighting technique where a light is placed to the side and higher than the subject.

Top lighting

Top lighting, as the term implies, is light illuminating the subject from the top, such as you'd find at midday on a sunny, cloudless day. This lighting produces strong, deep shadows. While this lighting direction is suitable for some subjects, it is usually not appropriate for portraits unless fill light is added using a flash or reflector.

However, a variation on top lighting is *butterfly lighting*, a technique popularized by classic Hollywood starlet portraits. Butterfly lighting uses high, front, top light to create a symmetrical, butterfly-like shadow under the nose.

Backlighting

Backlighting is light that is positioned behind the subject. This technique creates a classic silhouette, and depending on the angle, can also create a thin halo of light that outlines the subject's form. While a silhouette can be dramatic, the contrast obliterates details in both the background and subject unless a fill flash is used.

In addition, backlighting often produces lens flare displayed as bright, repeating spots, or shapes in the image. Flare can also show up in the image as a dull haze or unwanted rainbow-like colors. To avoid lens flare, use a lens hood to help prevent stray light from striking the lens, or change your shooting position.

Tip *While you may not be able to control the light, especially natural outdoor light, consider these items that may improve your shot:*

- *Move the subject*
- *Change your position*
- *Use a reflector or scrim*
- *Use a filter or change white-balance settings to balance color for or enhance the light*
- *Wait for better light or a light color that enhances the subject or message of the picture*