

Photo COURSE

Capturing Light & Color

Chapter 5

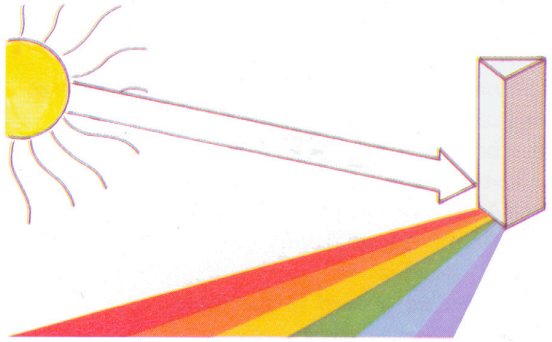


5.1 The Color of Subjects

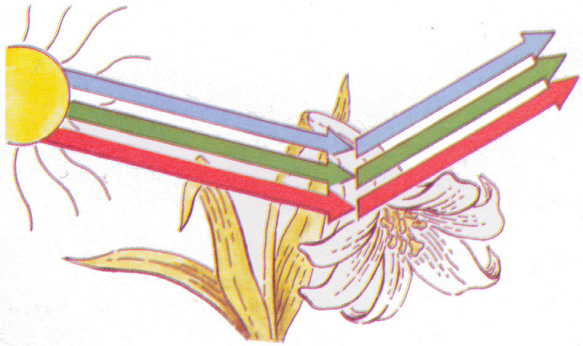
Animation

All of the colors we see around us and capture in our photographs come from reflected light. What makes each of millions of colors we can see different from one another is which colors a subject absorbs or reflects. For example, a green subject reflects only the green wavelengths of light and absorbs all others. A subject appears white if it reflects most of the wavelengths that strike it, and appears black if it reflects almost none. Inks in color prints also selectively absorb and reflect certain wavelengths of light and so reproduce the colors captured from the scene.

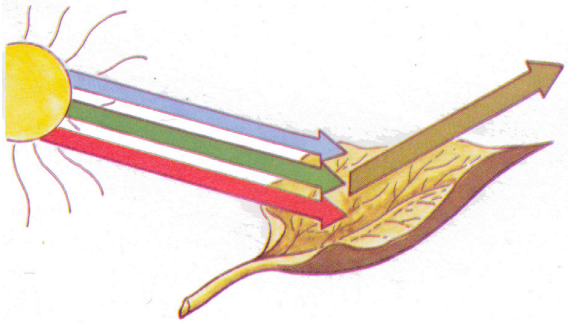




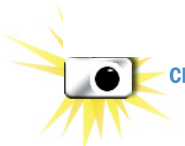
◄ Although light from the sun appears colorless or "white," it actually contains a range of colors similar to a rainbow. You can see these colors using a prism to separate them out.



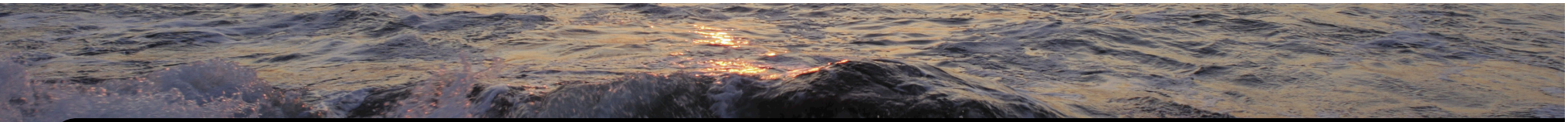
◄ White objects reflect most of the wavelengths of light that strike them. Black objects reflect almost none of them.



◄ A green object reflects only those wavelengths that create the visual effect of green. The object absorbs the other wavelengths in the light.



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5.2 The Color of Sources

The colors reflected from a subject are affected by the color of the light source illuminating it. Although light from the sun at different times of the day and from different kinds of light bulbs look much the same to us, they actually contain different mixtures of colors that affect the color of any scene they illuminate. For example, a white building will take on a red cast when illuminated by a red sunset. The color of the light is specified by its *color temperature* in degrees Kelvin.



➤ To find out exactly what the color temperature of a light source is, you use a color meter like this one from Gossen.

Color Temperature	Type of Light
12,000 K and higher	Clear skylight in open shade, snow
10,000 K	Hazy skylight in open shade
7000 K	Overcast sky
6600 K	
5900-6000 K	Electronic flash
5500 K	Midday
4100 K	
3750 K	
3600 K	
3500 K	Photolamp
3400 K	
3200 K	Sunset, sunrise
3100 K	
3000 K	
2900 K	100 watt tungsten bulb
2800 K	
1900 K	Candlelight, firelight

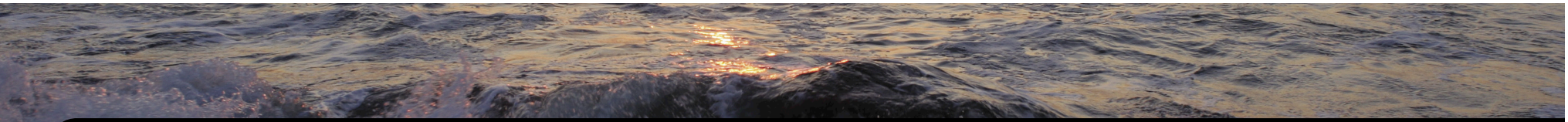
➤ As color temperature increases it moves through the colors red, orange, yellow, white, and blue white in that order.



➤ To ensure that the colors in your images don't have a color cast, include a gray card in at least one of the shots. You can then remove color casts from this card in Photoshop and all of the other colors in the image will adjust accordingly. You can then apply the same changes to all other photographs shot under the same light.



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5.3 White Balance

Your camera's white balance system removes color casts that would otherwise be created by the color of the light source. It's purpose is to capture images with colors that look like they were shot at midday. For example, the fluorescent setting removes the greenish cast created by fluorescent lamps and the tungsten setting removes the warmer, more reddish cast created by tungsten lights. The choices usually include the following:

• *Auto* works in a wide variety of lighting conditions and is the default setting. On less expensive cameras, it may be the only setting available.

• *Manual* lets you set white balance while aiming the camera at a piece of white paper or gray card, under the same light you'll be using to take the picture. This is often the best setting to use when other settings don't give you the results you expect.

• *Artificial light settings* normally include Flash, Fluorescent, and Incandescent or Tungsten.

• *Natural light settings* include Cloudy, Shade, and Daylight.



➤ One way to eliminate white balance problems is to use flash since it has the same color temperature as daylight.



➤ In film photography, color casts were removed by your choice of film or filters placed over the lens.



➤ Typical white balance icons (clockwise from top) are auto (AWB), manual, flash, fluorescent, tungsten, cloudy, shade, and daylight.



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5.4 White Balance, con't.

Animation

White balance settings can have a dramatic effect on the colors in your images. In most cases you select a setting to capture more accurate colors, but you can also use them creatively.



▲ These three photos were all taken under the same light but with the white balance setting changed from Tungsten (left), to Fluorescent (middle), and then to Auto (right).



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5.5 White Balance, con't.



This subject was illuminated with tungsten light but white balance was set to Daylight. This gives the subject a warm look. Many people like the warm tone in photos taken indoors, and this is one way to capture it.



Under the same tungsten lighting the Auto or Tungsten white balance setting removes the warm cast and captures the colors as if they were shot at midday.

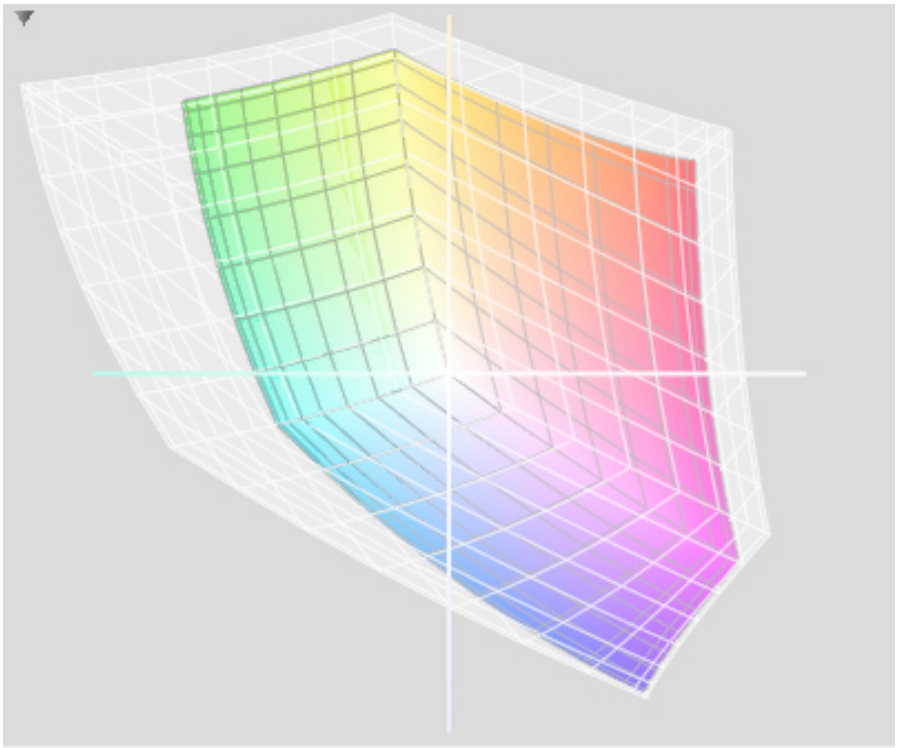


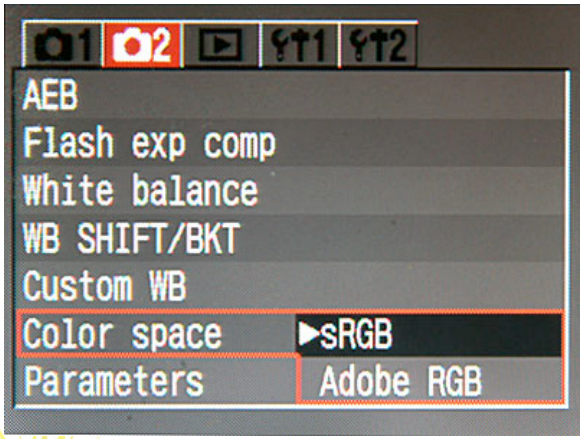
These two photos are of the same subject under the same light using auto white balance on two different cameras. Both the gray background and yellow colors differ significantly. This shows that you can't always count on auto white balance.

5.6 Color Management—Color Spaces

Animation

White balance determines how colors are distributed in an image but some cameras also let you change the *color space* and that affects the number of colors you can capture. On most cameras the default space is sRGB which is suitable for images that will be displayed on a monitor. However, if you plan on editing your images and making high-quality prints, the alternative Adobe RGB color space is a better choice. It captures a much wider range of colors—called a *color gamut*. The only drawback of Adobe RGB images is that when displayed on a monitor that hasn't been calibrated for it, colors are subdued. However, you can use a program such as Photoshop to convert images from Adobe RGB to sRGB without any loss in quality. Or better yet, you can calibrate your monitor.



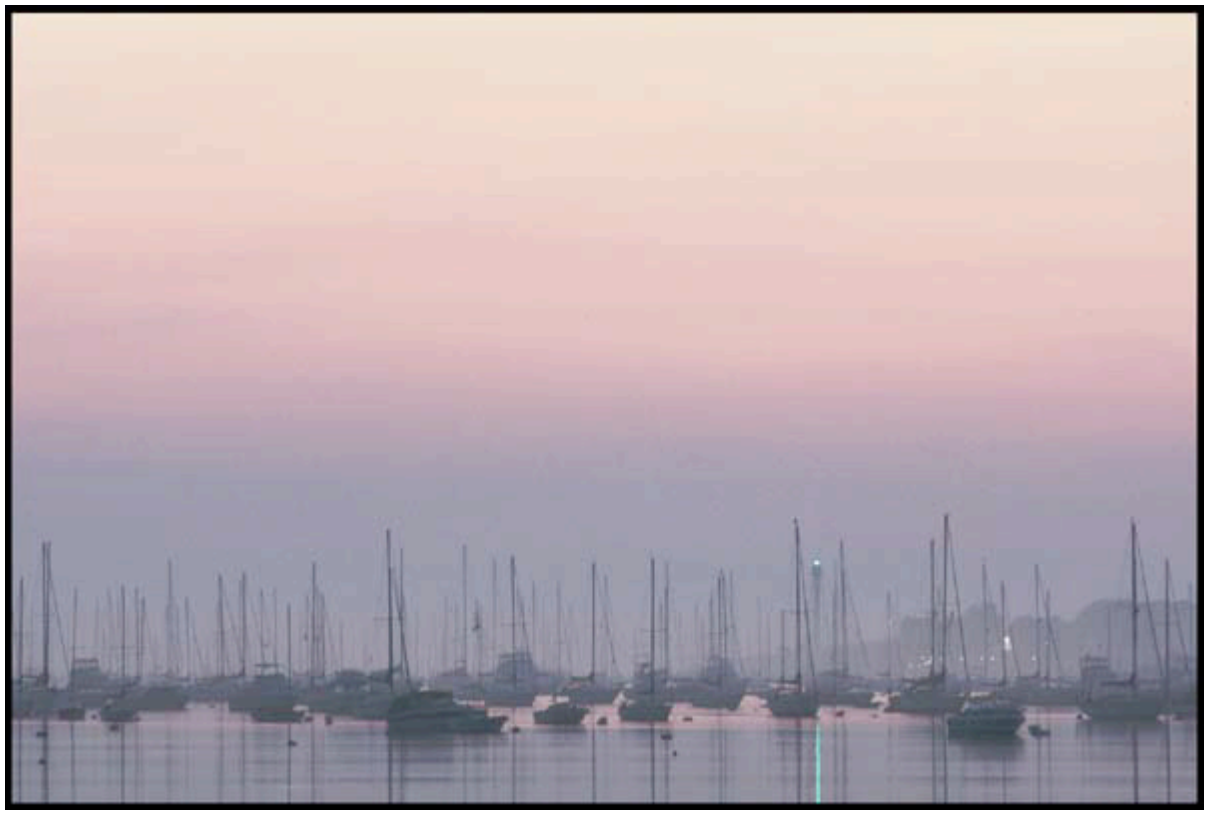


➤ Some cameras let you change the color space used for the pictures you are going to be taking.

➤ One reason colors change when moved between devices is because the devices use different color spaces. For example, the sRGB color space used by most cameras and shown here in color has a much smaller gamut than the Adobe RGB color space shown here in white.

5.7 White Balance and Time of Day

One thing photography does is make you aware of the ever-changing quality of light. This heightened awareness is one of the great joys of photography—even when not carrying a camera.



▲ Just before dawn and at dusk, colors often appear muted or monochromatic. During these hours, when the light is relatively dim, you may have to use a long exposure time.



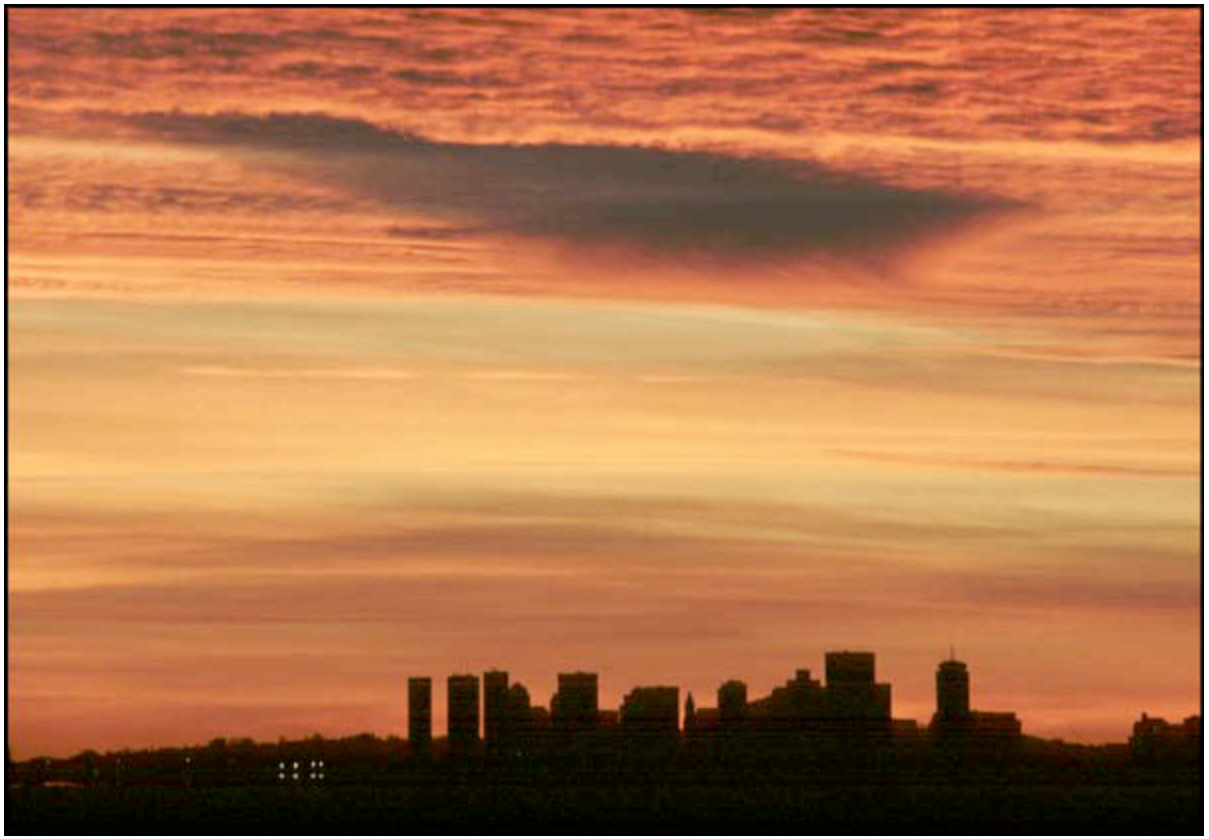
▲ Here the same beach setting was photographed on an early morning with an overcast sky (top) and then again in the late afternoon with bright sun (bottom). The differences are dramatic.



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5.8 Sunsets and Sunrises as the Subject

Sunsets and sunrises are relatively easy to photograph because the exposure is not as critical as it is with some other scenes. Underexposure just darkens the scene and overexposure just lightens it. This is a good place to use autoexposure bracketing.



▲ Sunrises and sunsets by themselves aren't always interesting. It's objects in the foreground, such as a skyline, or unusual atmospheric effects such as this dark cloud, that give them some punch. Here the sun has already set, but this is a great time to photograph.



▲ A long-focal-length lens enlarges the disk of the sun so that it becomes a more important part of the picture. Foreground objects silhouetted against the bright sky, or backlit by the sun, can also add interest.

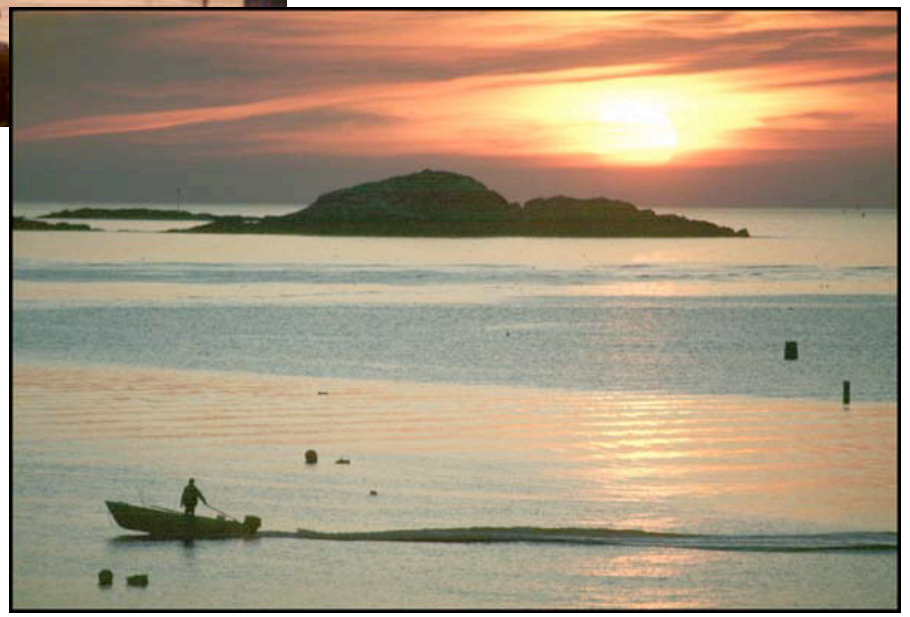
5.9 Sunsets and Sunrises—As the Subject



➤ The sun often takes on a flattened appearance as it rises above the horizon. When partially obscured and softened by haze, its warm, red glow illuminates the foreground.

Warning!

Never look at the bright sun through the viewfinder. You can seriously damage your eyes.



➤ With the bright disk of the sun included in a sunset or sunrise, your picture may be underexposed and too dark unless you increase exposure 1 or 2 stops.

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5.10 Sunsets and Sunrises—As the Light Source

It's tempting to take all of your photos of a rising or setting sun, but it often pays to turn around. The rich, warm light changes the colors of everything it hits. This is a magic time to capture images that will really stand out. Colors take on a warm, soft glow that can't be found at any other time of the day.



➤ The rising sun strikes a windmill in Lamar, Kansas.



➤ The rising sun casts a warm glow over this South Carolina marsh.



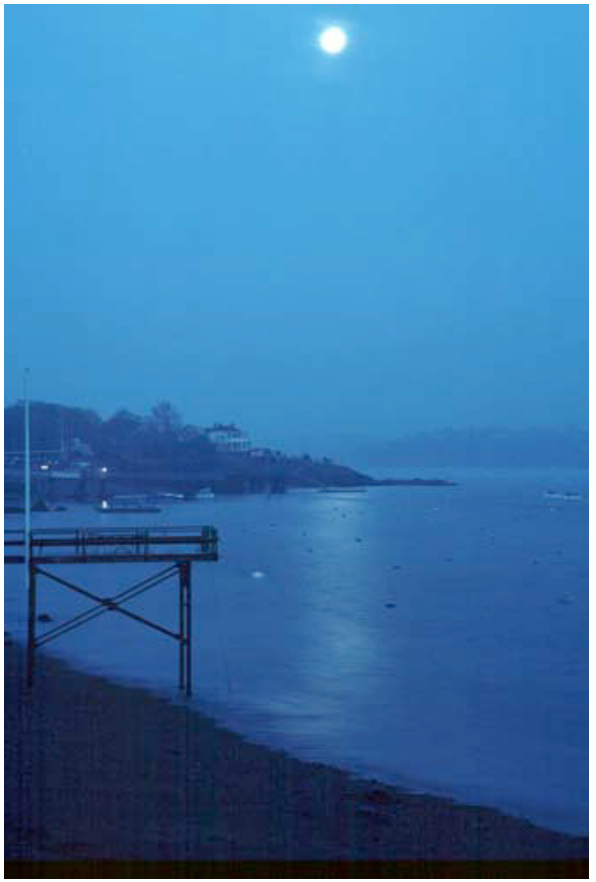
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5.11 Moonsets and Moonrises

Capturing the moon as it sets or rises makes it look larger because it's close to objects on the horizon that have a known scale. As with sunsets, it helps to show the moon in context.



Here the moon sets behind Marblehead's Abbot Hall—the historic building where the famed "Spirit of '76" painting hangs. Light from the rising sun can be seen reflected in many of the town's windows.



The moon makes any scene look better and it looks especially good with water in the foreground to reflect its light.



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5.12 Weather—Snow

Snow makes almost every scene more attractive, or at least different. The secret to getting good photos in this, or any other weather, is to get out of the house. Another "secret" is to use exposure compensation to lighten the scene.



▲ This scene was photographed just after sunrise on the morning after a storm that kept almost everyone housebound.



▲ Snow covered scenes are not only beautiful to look at, they make great photographs.



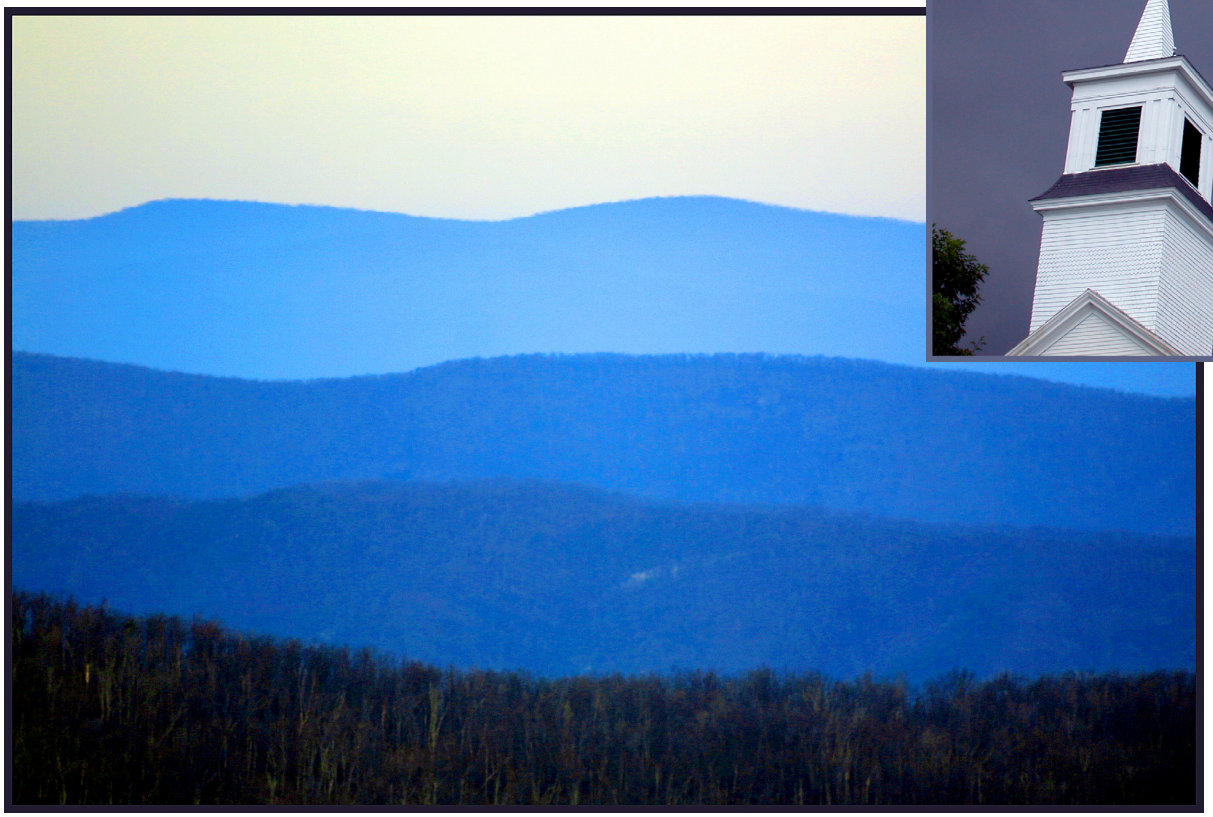
▲ Photographing from a sheltered spot, in this case a car, lets you capture falling snow without getting it on the lens.

5.13 Weather—Haze, Mist and Clouds

Haze, mist and clouds all have one thing in common—they soften and change the light. There is almost no better time to be photographing then when these are around.

➤ As a storm moves in, a break in the dark clouds adds some interest to the scene.





➤ In light haze, distant subjects become increasingly more blue as in this scene in the Blue Ridge Mountains.



➤ A light fog subdues colors and softens objects in the background.

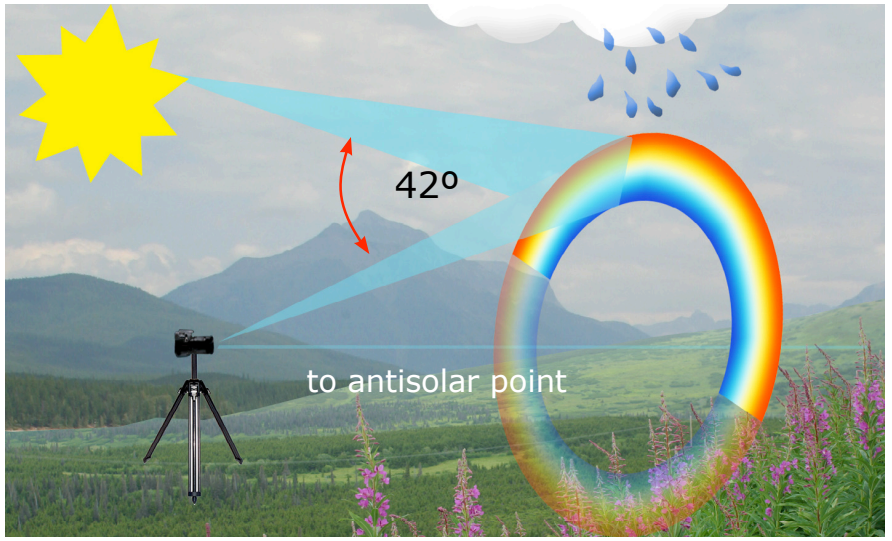
5.14 Weather—Rainbows

Rainbows can often be found as rainstorms clear. All it takes are raindrops in the air and the sun behind you.



➧ Rainbows can be found anywhere there is bright sun and water droplets. Here one forms in an agricultural sprinkler system in Eastern Washington state. You often see the same effect with lawn sprinklers.

One of the things that makes professional cameras so expensive are the seals that protect them from rain and mist. They are less likely to be damaged by foul weather photography.



➧ To photograph a rainbow, it helps to anticipate it. As a storm passes or clears, stand with your back to the sun and imagine a line from the sun passing through your eye, through the Earth, and out into space. (This is called the antisolar point.) A rainbow forms a complete circle around this imaginary line, although from ground level, part of it is below the horizon. A line drawn from your eye to the top of the rainbow forms a 42-degree angle with the imaginary line from the sun through your eye. (If there is a secondary rainbow, it forms an angle of 51 degrees.) Because these angles determine the position of the rainbow in the sky, it will sink as the sun rises and rise as the sun sinks. At midday, the entire rainbow, not just the bottom, will be below the horizon where you can't see it.

5.15 Weather—Rainbows



▲ Weather that creates rainbows often creates other dramatic lighting effects. Here the sky has darkened and taken on an orange glow.



▲ From a plane you can sometimes see all 360 degrees of a rainbow. Here you see a section of one photographed through an airliner window. To the right of the brighter primary rainbow is a dimmer secondary one.

5.16 White Balance and Mixed Lighting

There are times when perfect color balance can't be achieved in a photo. This is especially true when parts of the scene are illuminated by different light sources. White balance can be adjusted for one source but not for all.

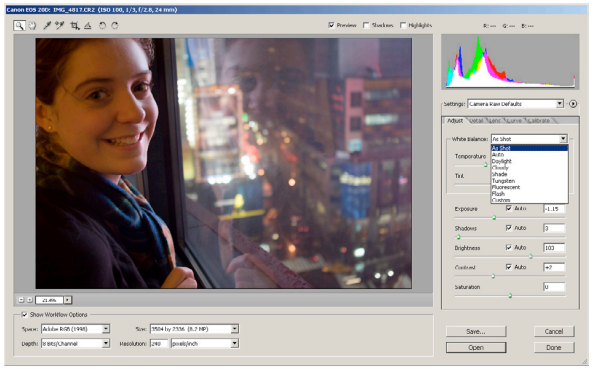


▲ This person is illuminated by the red flares he is lighting in Marblehead's annual July 4th harbor illumination.



▲ The white balance in this shot at Fenway Park in Boston is fine except where the faces are illuminated by a second source—light reflecting from the red seats.

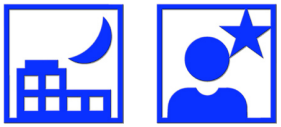
➤ If you use the RAW format to capture images you can set white balance later and experiment with various settings.



5.17 Photographing at Night

You can photograph many different things outdoors at night. Light sources (street lights, automobile lights, neon signs, or fires) or brightly lit areas (illuminated buildings or areas under street lights) will dominate pictures at night because they stand out strongly against darker backgrounds. Plan to use these bright areas as the dominant part of your picture. A tripod will support your camera during long exposures and prevent blur caused by camera motion during the time the shutter is open.





▲ Many cameras have night landscape and night portrait modes for taking photos at night.

◀ Urban areas are full of bright lights that can be used to illuminate nighttime scenes.



▲ Just after sunset or before sunrise there is a balance between natural and artificial light so the background doesn't go completely black.

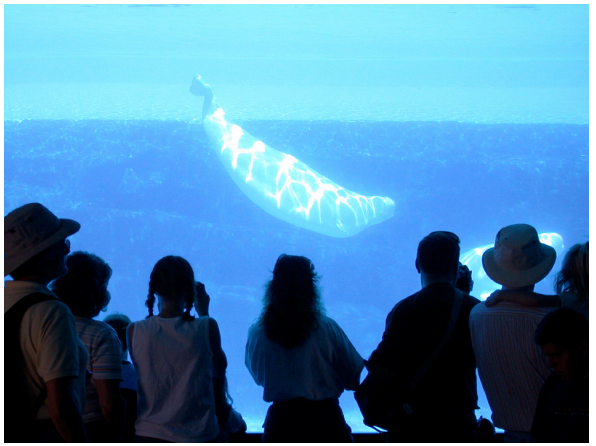


▲ A few cameras have an infrared mode that captures photos in complete darkness.

5.18 The Direction of Light—Backlighting

Backlighting puts the side of the subject facing the camera in shade. Automatic exposure tends to expose the background correctly, leaving the main foreground subject too dark. You can use this effect creatively or add exposure to lighten the subject.

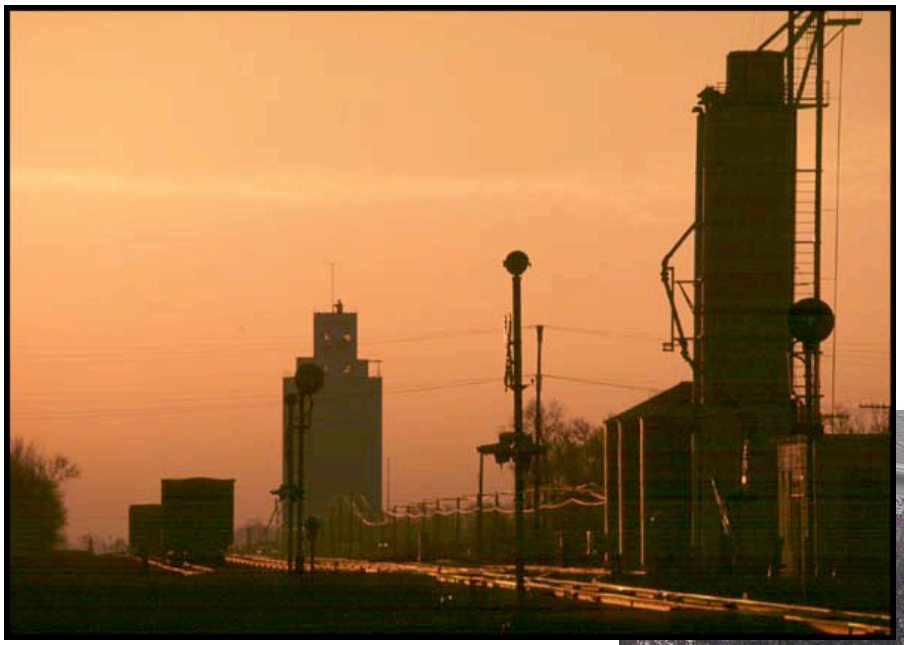






▲ All of these photos are classic backlit scenes although none actually contains the light source. Instead foreground subjects are black because the camera exposed for the brighter background.

5.19 The Direction of Light—Backlighting, con't.



➤ Here the bright morning sunrise was hidden behind a grain elevator so the image wouldn't be overexposed. The result is that the grain elevators are silhouetted against a colorful sky.



➤ Sometimes a backlit foreground subject creates an interesting void in a photo. Here a tilted basketball backboard creates a black hole in an otherwise well-exposed photo.

5.20 The Direction of Light—Backlighting, con't

The difference between frontlighting and backlighting can be dramatic and offer creative possibilities.



▼ These two photos were taken just a few feet apart in the Mojave Desert. They show the same palm tree and Cholla from different sides—one front lit (right) and one backlit (below).





▲ Cholla is covered with spines that become edge lit when the light is behind the plant. The same thing happens with hair.

5.21 Photographing Light Sources

Many light sources are too bright to photograph or just aren't interesting. One of the major exceptions is neon. Exposure can be a problem so this is a great place to bracket so you have choices later.



▲ When it's dark out, there is often too much contrast between the neon and the background. It's hard, if not impossible, to get the perfect exposure.

➤ Neon is often reflected in glass or on shiny surfaces. These may be more interesting than the subject itself.





▲ Photographing just after sunset captures more detail in the areas away from the neon.

5.22 The Quality of Light—Diffuse

Diffused light bounces onto the subject from several directions, lowering contrast. Contrast, in turn, affects the brilliance of colors, the amount of texture and detail, and other visual characteristics. In diffused light, colors tend to be softer and textures are also softened because shadow edges are indistinct.



▲ In diffuse light there are no burned out highlights or detailess shadows. The light is everywhere.





▲ Two photos taken on an overcast Florida beach one morning show how diffuse light is free of dark shadows. The colors are muted and contrast is softened.

5.23 The Quality of Light—Direct

Direct light comes from a point source, such as the sun on a clear day. Direct light produces relatively high contrast between bright highlights and dark shadows that crisply outline details. In direct light you may have to choose whether you want highlights or shadows to be correctly rendered because image sensors can accurately record only a limited range of contrast between light and dark areas.





▲ Direct light has a high contrast with areas facing the sun very light and those in the shadows very dark.

◀ Direct light casts hard shadows.