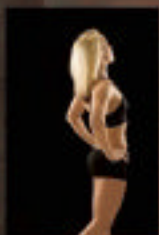# ABCs of
Beautiful Light

A Complete Course in Lighting for Photographers

Rosanne Olson, author of *This Is Who I Am: Our Beauty in All Shapes and Sizes*

ABCs of
Beautiful Light

A Complete Course in Lighting for Photographers

Rosanne Olson

Dedication

This book is dedicated to my mentor and friend, Brian Lanker (1947–2011), who hired me for my first job at *The Register-Guard* in Eugene, Oregon. His sense of light was an inspiration to me. To my husband, Ted McMahon, whose support for me and my work means everything. And to my many students who have taught me so much.

Thank you for your inspiration and input:

- Gregory Heisler, from whom I took my first lighting class almost thirty years ago.
- Brandon Heiss of Westcott, Dion Baker, and Bill Seymour of Glazer's Camera for their input.
- Bill Finger, fellow teacher.
- Meryl Alcabes, former student and reader of this book.
- And a special thanks to my assistant Gail Smith who patiently helped prepare and organize the many photos and releases for this book.

Check out Amherst Media's blogs at: http://portrait-photographer.blogspot.com/
http://weddingphotographer-amherstmedia.blogspot.com/

Table of Contents

About the Author

*R*osanne Olson is a portrait and fine-art photographer who holds a master's degree in journalism from the University of Oregon. Her diverse photography background ranges from newspaper and editorial photography to commercial jobs, including ad campaigns for the New York City Ballet, Seattle Symphony, Seattle Opera, Children's Hospital (Seattle), and Swedish Medical Center.

Rosanne's work has been featured in various publications, such as *Photo District News, View Camera, Lens Work,* and *Communication Arts*. In 2008, she authored a book about women and body image titled *This Is Who I Am: Our Beauty in All Shapes and Sizes* (Artisan Books).

She has also won numerous awards, including nine times in *Communication Arts* annuals and more than a dozen times in *Graphis* photo annuals. In 2013, she won a PX3 award (Paris) for her newest fine art series, entitled *Rapture*.

Rosanne has taught courses and workshops on lighting, portraiture, and creativity at Photo Center Northwest, Santa Fe Workshops, Photo Plus Expo, the WPPI national convention, various high schools and universities, and in her Seattle studio.

There are many ways to approach the art of teaching photography, and especially lighting. Rosanne brings an undergraduate degree in science to her teaching. Her approach is to instill curiosity and a sense of inquiry in her students. Through this book you will learn to understand light and its effects. You will never look at a photograph or painting in the same way after you learn about light. Everything is lit by one source or another. The questions are: what and how? That is what this book is designed to teach you. To learn more about Rosanne Olson, please visit www.rosanneolson.com.

Introduction

We are surrounded by light every moment of every day—light that washes over the streets on a summer morning, neon signs that beckon from stores and filling stations, yellowish field lights that illuminate an evening football game. Whether it's headlights, candlelight, moonlight, or incandescent light, all visible light emanates from a part of the electromagnetic spectrum that photographers work with on a daily basis.

It takes practice, practice, practice to perfect the skills and train your eye to see the subtleties of light.

For the artist, photographer, cinematographer, and lighting designer, light is everything. We are profoundly affected by the color, position and quality of a light source. Once we learn to master lighting, it becomes a tool by which we tell our stories. When we tell our stories well, we reach people deeply. That is the power of light.

In this book, you will learn lighting principles for photography, video, and art in general. This includes how the angles and heights of your light sources affect your pictures. For example, a photograph lit by a source that is at a low angle will have a completely different feel from one lit by a high-angled source. You will learn to work with light modifiers to change the quality of your

A Little Story

Years ago, fresh out of graduate school, I was hired as a photographer at *The Register-Guard* in Eugene, Oregon, by Pulitzer Prize–winning photographer Brian Lanker, who was head of the photo department. At that time, I owned one camera and two lenses (a 35mm and 85mm). They had gotten me through my master's degree project, a series about children with cancer, photographed on black & white film with existing light only. But now I was in a whole new world.

At the *R-G*, I was plunged into a modern newspaper that used big photos, in color, in beautifully designed layouts. The newspaper had a studio with giant strobe lights that no one really knew how to use. There was no flash meter, Polaroid, or modifiers.

When I received my first food assignment—a story about *liver*—I realized I had a lot to learn, and fast! I contacted a food photographer for help (keep the light height low, he advised), but the use of artificial lights seemed so daunting. Then I signed up for a workshop in California with Gregory Heisler. That, for me, was a life-changing week. I learned about the power of light and what could be done with just one or two lights. From there, I went back and started to experiment. Greg's class instilled a life-long love of the power of light. That love of light is what I want to share with all who read this book.

light and how you can control light to create a feeling of depth and dimension.

The lessons are divided into sections that take the photographer through a logical sequence of instruction. I have used this method in my classes for many years and the results (and reviews) from my students tell me that this works.

We begin with the most accessible: natural light. We then move on to artificial continuous light, strobe, mixing ambient light with strobes and, finally, to dedicated flash. You will learn about hard light versus soft light, how to achieve texture, how to use light to help people look younger or thinner or more powerful, and how to create beautiful lighting for portraits outdoors.

ABCs of Beautiful Light leads you step-by-step, using graphics and demonstrations. Included are assignments that relate to the information in the book. You can work at your own pace and level and you can journey through this book more than once. I recommend starting with an inexpensive mannequin head to learn the basics. When you are comfortable with your skills, move on to real people. Learning about light is like learning a new language. It takes practice, practice, practice to perfect the skills and train your eye to see the subtleties of light.

▼ This portrait of singer Jessie Marquez was made using a combination of ambient light and strobe light, which will be addressed later in the book.

1. The Groundwork

Photography:
A Blend of Art and Science

Photography is everywhere in our lives: our families' treasured black & white images, our smart phones, digital point-and-shoot cameras, and professional cameras. Photographs allow us to record our personal histories from birth to death. Photography is art. Photography is science. The wonderful thing about photography is how it makes us *alive* to every aspect of our lives.

You, reading this book, are more deeply interested in photography than the average person. Photographers today need to learn not only about cameras, lenses, storytelling, and light, but also about techniques to manage the digital files created with every exposure—so we can work with them, file them, find them, and make use of our images in the future. Just as you must prepare the soil to grow a garden, you must develop skills that will allow your photography to flourish.

Below are some topics I want to introduce you to before we proceed with lighting. Some of you may already understand exposure and some of you may have a way of managing your files, but I find that many people live in a world of photo chaos. That may work in the short term; in the long term, however, it's better to get informed

A Note to All Who Enter . . .

This book is densely packed with information. If this is new material for you, please read it slowly section by section. Take time to absorb the lessons and practice the assignments so the material will sink deeply into your practice of photography. When you have mastered one section, then move on to the next. Enjoy the process!

For those who are familiar with the basics, you can skim (not *skip*) chapter 1. Otherwise, begin here. It never hurts to start at the beginning, again and again.

and get organized. Take at least a preliminary look at this section and then, as you delve more deeply into your photography, you can revisit it.

Your Camera

The best way to learn about lighting is with a digital camera for the immediate feedback it provides. There is a wide selection of digital cameras out there from very sophisticated point-and-shoot cameras to high-quality "prosumer" cameras that have interchangeable lenses, to professional cameras with all the bells and whistles you could ask for. It is not necessary

▶ Miranda Weese was photographed for a New York City Ballet ad campaign. The location was a spiral staircase in a building near Wall Street in New York City. I used a strobe with a grid on it from a high angle to create a theatrical feeling—as if she were basking in stage light after a performance, surrounded by roses. The rest of the shot was lit with ambient light, some of which came from the windows at the top left of the frame.

to have the most expensive equipment to learn about light, but better is often better.

Most cameras have some kind of exposure compensation. The controls are readily available on some cameras or, for others, hidden in the menu settings. Basic exposure compensation controls will allow you to manipulate your continuous-light exposures to some extent. However, for the lessons on strobe, it is important to have a camera on which you can adjust your shutter speed and aperture settings. If you do not have such a camera, do what you can with the equipment you have and use this book to learn about light as far as it will take you. Later, when you are ready, invest in a higher-quality camera.

The Vocabulary

When we discuss lighting, we will use vocabulary that may be new to you—terms that make it easier to communicate about light. These are listed in the "Terms to Know" sections (like the one below). You'll see these accompanying many sections of the text. Over time, these words will become part of your normal photographic vocabulary, if they aren't already. (*Note:* Keep in mind that some terms vary from region to region and from industry to industry— or even from photographer to photographer. This does not mean the name is incorrect. Just add the variations to your repertoire.)

Terms to Know

aperture
The diaphragm opening that allows light to strike a camera's image sensor. Changes in aperture diameter are expressed in stops (or f/stops).

shutter speed
A measurement of how long the camera's shutter stays open, allowing light to strike a camera's image sensor. Changes in shutter speed duration are expressed in stops.

stop (or f/stop)
A unit of change in the aperture (f/stop) or shutter-speed setting. Each 1-stop change either halves or doubles the light entering the camera.

Aperture and Shutter Speed 101

Light enters the camera through an adjustable diaphragm called the aperture. The larger the aperture, the more light is allowed to enter. Ironically (or so it seems at first) the aperture settings with the smaller numbers, such as f/2.8 or f/4 are really larger openings than f/11 or f/16. This is because the f/number is really an expression of a fraction. Just as $\frac{1}{4}$ cup of liquid contains more liquid than $\frac{1}{8}$ cup, f/4 is a *bigger* opening than f/8.

| f/2.8 | f/4 | f/5.6 | f/8 | f/11 | f/16 | f/22 |
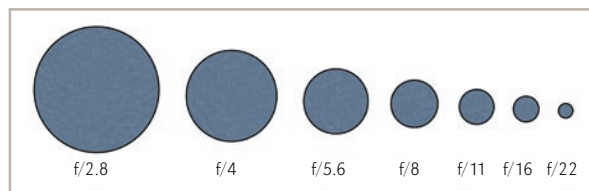
▲ The relationship of aperture sizes.

For each aperture setting, the adjacent aperture on your lens allows either half or twice the amount of light into the camera. For example, an aperture of f/5.6 admits twice as much light as f/8 and half as much as f/4. This is very important when you begin learning to control light ratios.

The same is true for shutter speeds, which control the amount of *time* light is allowed to enter the camera. The shutter speed to the right or left (one step up or down) will allow either half the amount of light or twice the amount of light to enter the camera.

A Reciprocal Relationship

Let's consider an example. An aperture setting of f/5.6 paired with a shutter speed of $\frac{1}{125}$ second would allow X amount of light to enter the camera. Changing to a shutter speed of $\frac{1}{60}$ second would allow twice as much light (2X) to enter, because the exposure duration is twice as long. At the same aperture, changing from the $\frac{1}{125}$ second

setting to a shutter speed of $^1/_{250}$ second would admit half the light (0.5X).

Aperture and shutter speed are inextricably linked in a reciprocal relationship. To keep the same exposure when you open your aperture 1 stop (*e.g.,* from f/5.6 to f/4) to allow more light, you must compensate by shortening your shutter speed 1 stop (*e.g.,* from $^1/_{125}$ second to $^1/_{250}$ second). Opening the aperture 1 stop doubles the amount of light entering your lens, while reducing the shutter speed 1 stop halves it. Likewise, if you open your aperture 2 stops, your shutter speed must be shortened by an equal amount (2 stops) to maintain the same exposure.

When photographers refer to the word "stop" (rather than f/stop) they are likely talking about the exposure in general. To increase the exposure, you can open up the aperture (larger f/stop) or slow the shutter speed (adding more time). Each 1-stop change (either in exposure time or aperture size) either halves or doubles the light

entering the camera. We often refer to changing the exposure as changing the "stops." This is a shorthand way to describe more or less exposure. For example: "open up 1 stop" means to increase the exposure. "Stop down" means to decrease the exposure. In either case, the "stop" could refer to a change in shutter speed or aperture, unless specifically stated.

Aperture and Shutter Speed as Creative Controls

There are creative repercussions to changing the aperture and/or shutter speed because the aperture setting controls the depth of field in your image, while the shutter speed setting affects the freezing or blurring of motion.

Increasing the depth of field by choosing a smaller aperture will mean that more of the image is in focus. Maybe that's not what you want. Even if it is, maintaining the desired exposure with a very small aperture may require

▼ Shallow depth of field, both close-up on the flower and backed off on the chair with roses.

choosing a very long shutter speed—and that can result in camera blur or subject blur. Then what?

These are choices a photographer must make all the time. If you don't want camera blur, you can raise the ISO or you can use a tripod. Or, in some cases, you can use strobe lights (flash) on your subject. That comes later in the book.

Balancing All the Exposure Controls

Three components work together as three pillars of what makes a photographic exposure:

1. ISO setting (this affects how sensitive your digital sensor is to light)
2. Aperture (f/stop)
3. Shutter speed

The ISO (which stands for International Standards Organization) refers to the sensitivity of your camera's digital sensor. ISO is similar to the ASA (American Standards Organization) rating for film. The lower the ASA, the finer the

Terms to Know

depth of field
The area between the nearest and farthest points from the camera that are sharply focused in the image. Depth of field is controlled by the aperture setting; larger apertures produce shallower depths of field; smaller apertures produce broader depths of field.

camera/subject blur
Lack of focus caused by camera/subject movement, particularly during exposures made at longer shutter speeds.

ISO
A measure of the image sensor's sensitivity to light. High ISO settings record light more quickly, making them suited to low-light photography; however, they also yield more noise. Low ISO settings record light more slowly but with less noise, making them the best option for situations with more abundant lighting.

noise
An image-degrading speckled effect that becomes more pronounced at high ISO settings.

A "Fast" Lens

A lens is termed "fast" when it has a very large maximum aperture diameter. Some photographers use a portrait lens that offers a maximum aperture of f/1.2 This wide opening produces a very shallow depth of field and makes it possible to use a faster shutter speed than with a lens that has a smaller maximum aperture (such as f/4.5).

grain of the film. The same is true with the ISO and the digital sensor. The lower the ISO rating, the less "noise" (grain) there will be on your image. Cameras vary in their ability to handle high ISOs, with newer professional cameras able to use high ISOs with comparatively less noise.

The decision about which ISO to use is based on what you want your outcome to be. Let's say you are photographing an indoor music performance. If you are in a low light situation but need a higher shutter speed to avoid blur, you have two choices: you can open up your f/stop for more light. Or you can increase your ISO. The ISO works similarly to the shutter speed and the aperture in that each increase in the rating doubles the sensitivity to light. And each decrease halves the sensitivity to light. For example, moving your ISO from 100 to 200 would be similar to slowing your shutter speed by one stop (from $1/125$ second to $1/60$ second, for example). Both would give you one more stop of light to work with. In general, it is best to work at lower ISO settings to avoid noise.

Once the ISO is set, based on the level of light you have to work with, then the shutter speed and the aperture will be in an intimate dance with each other, balancing one another for the correct exposure.

If depth of field is the most important thing for your image (for example, if you want to isolate the subject against a blurred background), you need to decide what your aperture needs to be to achieve that. Once that is done, you can choose the shutter speed required to balance the amount of light that enters the camera to produce the desired exposure.

If shutter speed is paramount (maybe you are photographing a race and want to freeze the action), then your aperture will be used to balance the shutter speed for the proper exposure. You will also want to make shutter speed a consideration when hand-holding your camera. At slow shutter speeds, camera movement can reduce image sharpness. A general rule of thumb is that you can safely hand-hold your camera when using a shutter speed no longer than 1/focal length of your lens. Therefore, if you are shooting with a 200mm lens, you can safely use it at a shutter speed of $^1/_{200}$ second (or faster). If you are shooting with a 24mm lens, you can safely use it at $^1/_{30}$ second (or faster). Some people insist that you should not hand-hold at all below $^1/_{60}$ second, but this technique has worked for me many times. If you do use your camera at slower shutter speeds, I recommend that you brace your arms against your body to make sure you don't have camera shake at these borderline-safe shutter speeds.

Focal Length and Depth of Field

The extent of the depth of field relates not only to the aperture setting but also to the focal length of the lens and how close you are to the subject.

For example, you can use a macro lens to photograph the dew on a flower, throwing the background into a blur of color. And you can use the same lens at the same aperture to take a photograph of a person standing in a field of flowers. The person will be in focus and the flowers around the subject might blur into semi-softness, but not nearly as much as when you are very close up.

An image taken with a wide angle lens will have more depth of field (more in focus) at f/5.6 than the same composition taken with a telephoto lens at f/5.6. So the focal length of your lens plays a large part in how much is in focus at a given aperture.

If you need a faster shutter speed but can't open the aperture farther (or don't want the reduced depth of field a wider aperture produces), you can raise the camera's ISO setting to get the desired exposure level.

Metering 101

We'll look at metering in quite a bit of detail later in the book—in several chapters, in fact. For now, just keep in mind that your camera's built-in meter is designed to think that everything is middle gray (18 percent gray). If you try to photograph a white piece of paper, a snowy

Assignment 1: Reciprocal Relationships

To some of you, this material is old hat and you know it well, but many beginning photographers do not. Learning how (and why) your exposure works is critical to learning about lighting. Take some time to study and explore how your camera works and, in particular, the relationships between shutter speed and aperture. Create a diagram of what the reciprocal shutter speeds would be from f/2.8 to f/22 using a basic exposure of f/8 at $^1/_{250}$ second.

Assignment 2: Light Scene, Dark Scene

Part 1: A Light Scene. Using a tripod, photograph a very light scene using natural light; this could be a person dressed in white against a white background or a piece of crumpled white paper on a white surface. With your camera set in the manual mode, adjust your aperture/shutter speed to match what your camera's meter indicates as the appropriate exposure. Take a photograph. Then, without moving your camera or the subject, do a series of additional exposures with longer shutter speeds or wider apertures. Try overexposing these by $^1/_3$ stop, $^2/_3$ stop, and then 1 stop. Compare your results.

Part 2: A Dark Scene. Repeat the above experiment using the opposite parameters; photograph a dark subject in a dark environment. Allow your camera to give you a reading and take an image based on it. Then, create a series in which you underexpose by $^1/_3$ stop, $^2/_3$ stop, and then 1 stop. Compare your results.

Terms to Know

middle gray
A neutral tonal value that reflects 18 percent of the light striking it. Reflected-light meters are calibrated to this value. Also called 18 percent gray.

histogram
A graphic representation of the tones in an image, ranging from pure black on the left to pure white on the right.

---

scene, or a model with very fair skin, the camera's meter will give you an exposure that is somewhat underexposed (a tad gray). The opposite is also true. If you photograph a dark scene, the camera's meter will give you an exposure that is somewhat overexposed (a tad gray, as well).

Understanding this principle will help you become aware of the camera's metering tendencies and make the appropriate adjustments. To expose correctly for a high-key (white) scene, you need to boost your exposure a bit (open up your aperture or slow down your shutter speed). In a low-key (dark) scene, you need to reduce your exposure a bit (close the aperture or increase the shutter speed).

Metering for high- and low-key scenes can easily be done with an incident hand meter, rather than your camera's reflected light meter. We'll look at how these are used in chapter 3.

The Histogram

Most digital cameras have the ability to display a histogram, a visual graph that shows the distribution of tones in your exposure—from pure black at the far left, to middle gray in the center, to pure white at the far right. When you expose your image, the preview might look fine on your LCD screen but checking the histogram can give you more objective information. (*Note:* Often, you can even program the camera so the histogram pops up for a few seconds after you make each exposure.)

If you find that the tones on the histogram are bumping up against the left edge of the scale, your image will not have detail in the shadows. If you find that the tones are bumping up against the right side of the scale, your image will not have detail in the highlights. A rule of thumb is to "expose for the right" of the histogram (shifting the overall tones toward the highlights)—but not *so* far to the right that your lightest tones have no detail. Slight overexposure of middle or darker tones can be corrected when you upload your RAW files. However, very bright tones that bump into the far right edge of the histogram will not be

underexposure

shadow   middle gray   highlight

normal exposure

shadow   middle gray   highlight

overexposure

shadow   middle gray   highlight
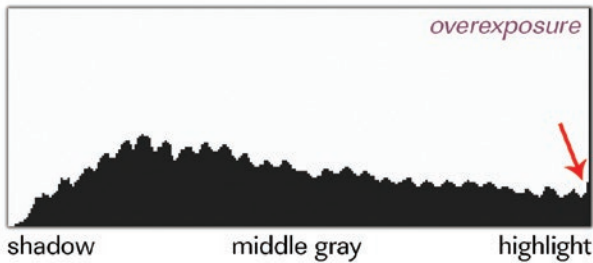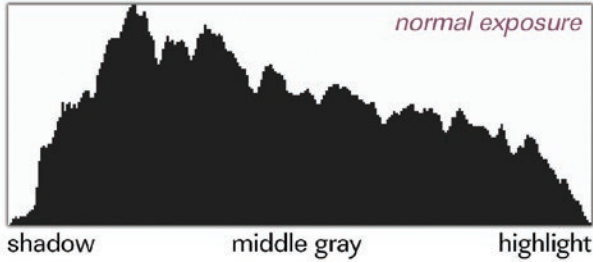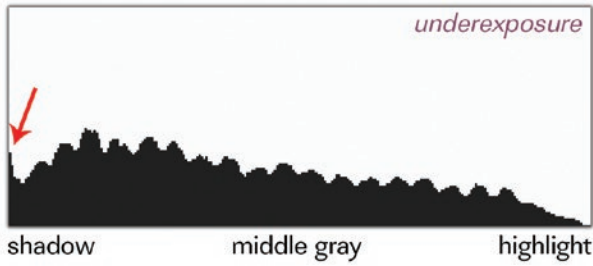
▲ Checking the histogram for your image is a quick way to evaluate the exposure level.

retrievable when you process your files, nor will very dark tones that bump into the far left side of the histogram.

Color Balance

Different light sources produce different colors of light. Tungsten light is orange. Fluorescent light tends toward green (depending on the generation of the lights). The human brain has a built-in color-corrector that neutralizes these colors for us in our daily lives. Our cameras are smart— but not *that* smart (at least not yet). So you, the photographer, need to help out by setting the color balance on your camera to match the light source you are working with. You should do this whether you are shooting RAW or JPEG. (More on file formats in the next section.)

For example, when shooting with tungsten light, you can set your camera's color balance to tungsten, which applies a blue filtration to your images. Blue, being the complement of orange, neutralizes the orange color of the tungsten light.

If the colors in your image are critical, such as for a clothing client where accurate color is a necessity, use a color checker (XRite® makes good ones) or a white or gray card. When the subject is lit and ready to be photographed, place the white/ gray card or color checker in the setting and make

▼ The color balance settings on your camera help compensate for shifts in your light sources, ensuring better color fidelity in your images.

AWB   **Automatic**
Camera balances lightest part of frame to white.

Sunlight
Camera adds subtle warm tones.

Cloudy
Camera adds moderate warm tones.

Shade
Camera adds stronger warm tones.

Tungsten
Camera adds blue tones.

Fluorescent
Camera adds orange tones.

Custom
Camera balances photographer-selected area to white.

High-Contrast Scenes

Sometimes we find situations where the range of tones in the scene/subject is greater than the 5-stop capability of the camera. For example, if you are photographing someone in the shade with a bright background behind them, the range of exposure (from darkest shadow to brightest highlight) will be greater than 5 stops.

There are a couple of solutions to this. One is to use a tripod and make two photos; one with an exposure that captures the person's face, and a second one that correctly exposes the background. These can be combined in post-processing. The other technique, which will be addressed later in this book, is to learn to use fill flash in an outdoor setting—a very powerful and useful way to deal with the extreme range of light. See chapter 7 for more on that approach.

Terms to Know

color wheel
The visual spectrum's continuum of colors, arranged in a circle with complementary colors located directly opposite each other.

complementary colors

Color wheel.

complementary color (or complement)
Colors opposite each other on the color wheel. When combined, these colors tend to neutralize each other.

one photograph, You can then use the eyedropper tool in postproduction to sample the white or color and adjust all the related images accordingly.

In a daylight (or studio strobe) situation, I prefer to set my camera's color balance to daylight or cloudy day (for a slightly warmer look) rather than automatic 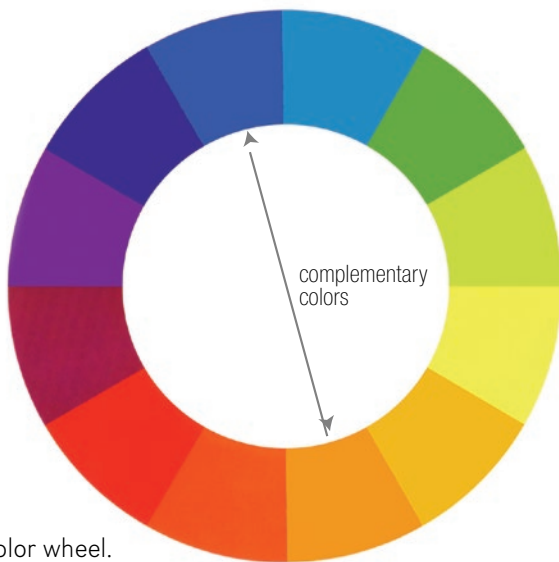white balance (AWB) because the AWB can shift subtly when the subject's clothing changes. For example, when doing a portrait of someone wearing red, the AWB would adjust the color balance slightly to accommodate the color. This might affect the skin tones. If the same subject were wearing green, the camera would adjust in another way and produce different skin tones. This can be corrected in postproduction, but it is easy to set the camera to something other than AWB so that shifts won't occur.

File Format: RAW *vs.* JPEC

When I teach classes, I often meet students who work only with JPEGs. When I tell them that serious photographers shoot RAW format, they wonder why. Here's my brief explanation: your RAW photographic files are like uncooked eggs. They are full of potential. That egg can be made into bread, cookies, a frittata, etc. On the other hand, a JPEG file is like a hard-boiled egg. Its potential is limited. Get the basic idea? Now, let's look at a more detailed explanation.

JPEG files are not flexible in the way the RAW files are. They are a sort of "hardened" version of your image and cannot be significantly altered after shooting without affecting the quality of the image. So what *is* good about JPEGs? They are cross-platform files, which means that they can be used on both Mac and PC. If you need to send an image over the Internet, a JPEG is a good type to use. (And remember, you can always create JPEG files from RAW files—but not vice versa.)
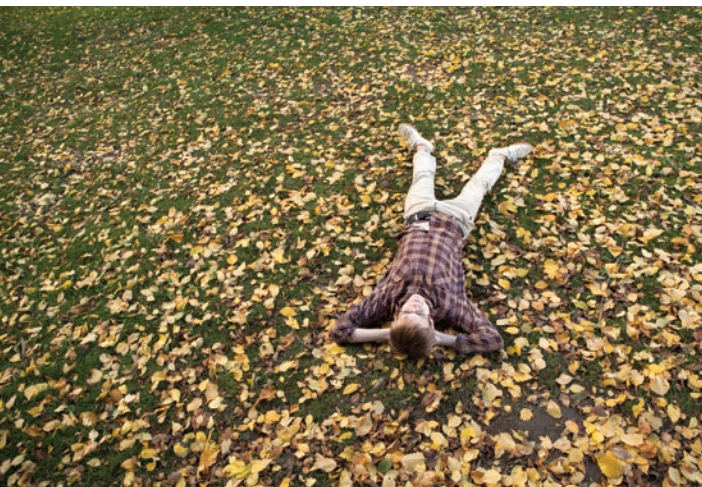
▲ There is a significant difference between these two images. The left image was shot on the "cloudy day" setting and the image on the right was shot on the AWB setting. The "cloudy day" setting was much more faithful to the scene and the intent.

When photographed in RAW, the data from the image sensor is only minimally processed in the camera and not yet ready for printing. Therefore, RAW files require special camera-specific conversion software to open the images on your computer (there are many of these types of software; Nikon and Canon each have their own). Once open, the images can be cropped and adjusted in Photoshop or other programs (such as Lightroom or Aperture) and then converted to either TIFF or JPEG files for printing and storage. Are there drawbacks? RAW files are much bigger than JPEG, so storage can be an issue.

For the beginning photographer who doesn't yet want to invest in the software needed to handle RAW files, it is fine to begin your lighting study using JPEGs—with the idea that it is a temporary measure.

Digital Negative Files

As I've described, most professional photographers use RAW file formats because they are flexible and offer more creative control than JPEG files. However, each camera brand and model has its own proprietary RAW format. For example, Nikon uses .NEF files, while Canon uses .CRW files. As the years go by, technology will change and the equipment or software that could once read a proprietary digital RAW file may become obsolete.

With this in mind, Adobe developed the DNG (digital negative) file, a format that allows RAW files from various cameras to be converted to an open standard, allowing access to those original files in the future. Adobe provides a free Adobe DNG converter for both Mac OS and Windows, which will translate RAW files from many of today's cameras. Converting RAW files to DNG

RAW + JPEG

Some photographers shoot RAW and JPEG files at the same time, but my approach is to just shoot RAW. After I upload my images into Lightroom, the selected RAW files can quickly and easily be converted into JPEGs that have the look I want. I would never send out a JPEG without editing to make sure it represents my best efforts.
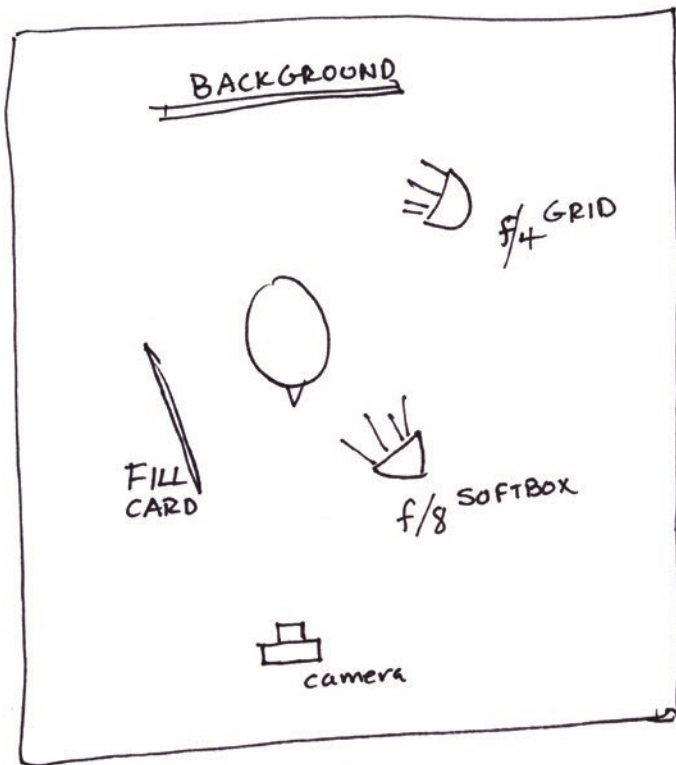
▲ Hand-drawn notes about a lighting setup.

Terms to Know

RAW
An image file format containing unprocessed data from the camera's image sensor. RAW files are very large and require special software to access. However, they can be edited extensively in postproduction without loss of image quality.

JPEG
An image file format containing processed and compressed data. JPEG files are highly portable among computer applications/platforms, but cannot be significantly altered without degrading the image quality.

DNG
An archival file format for RAW files, designed to increase compatibility and ensure file access despite changing technologies.

metadata
Information embedded in an image file. This generally describes how, when, and by whom it was created, but it may also be expanded to include other data sets. In Photoshop, a file's metadata can be viewed by going to File > File Info.

---

is an important step in my approach to file management, which we'll look at in more detail later in this chapter.

Notes and Diagrams

When learning to light, it is helpful to create notes and diagrams of your setups. These can be produced by hand (see sample to the left) or with computer programs. The notes will help you remember what you have done so you can learn from your successes and mistakes. I recommend making a "book" (either digital or in a three-ring binder) of your lighting assignments accompanied by sketches of the lighting used and other notes. I also ask my students to collect tear sheets from magazines with lighting that is similar to what they are trying to achieve in their practice. Developing this habit helps increase your awareness of different types of lighting.

File Management

Though it might be tempting to skip over the following methods for managing files, I recommend that you develop consistent file management techniques. It may seem tedious at first, and there is definitely a learning curve—but in the end, this information is something that will simplify your life and help organize your work so you can find it in the future.

Date-Based Numbering

When working digitally, it is important to have a file-labeling system so you can keep track of your images. This can be automated in various software programs, including Adobe Bridge, Lightroom, and Aperture.

Most professional photographers use a date-based numbering system. For my own work, I use a date-based job number, followed by a

three-digit *image* number (sequentially applied by the computer), which then is followed by a name (such as "Jones"). For example, if I were numbering a series taken on January 12, 2015, the date-based number would read: 150112. That is 15 (year) 01 (month) and 12 (day). This would be followed by a three-digit number that is unique for each individual image. Finally, the subject's name ("Jones," for example) would be added, giving me a file name that looks like this:

<div align="center">150112_001_Jones</div>

The three digits between the date and the name will change automatically with every image up to 999 (you can go higher if you use four-digit numbering). This way, every image in every job will have a unique number. If you photograph multiple subjects within the same job number, such as a wedding, you can easily put the additional names in the metadata.

If I decide to save a version of the image with special retouching, I might add a final version number to it, such as:

<div align="center">150112_001_2_Jones</div>

In my office, after numbering and editing, we burn a copy of the edited images as DNG files (digital negative files; see page 17) to a CD or DVD that we store with each job folder. (You can also back these up to an exterior storage system.) We also save all finished, retouched files.

Creating a Library

As years go by, it becomes difficult to keep track of all the images we photograph. It is a good idea to create a plan early on for a system to organize them. It is much easier to start *now* (no matter

how long you have been photographing) than to wade through years of images at a later date. There are multiple ways to create a library (or libraries).

In my studio, I have more than one way to access my images—mostly because other systems came into existence after I started my first library. They are each useful in different ways, but if you can at least find *one* option to work for you, you will thank yourself later.

It is much easier to start now (no matter how long you have been photographing) than to wade through years of images at a later date.

Approach 1: Basic File Organization. The way I began my first library was to create small groups of selected images (or "selects") from each job. I saved these selects from each job as small (2MB) JPEG files in the RGB color space and placed them in a folder named for the year they were taken. At the end of the year, we had all the small selects for that year listed chronologically in one folder. Then we created a new folder for the coming year and started filing new selects to that. (*Note:* The large files from each job were also burned to a disc for archiving.) Using this system, it is easy to visually search for an image in these job folders because of the name at the end of each job number. The small JPEGs can also easily be accessed for teaching, presentations, contests, web portfolios, etc. The downside of having *just* this method is that there is no way to search for images or collections in the sophisticated ways that are made possible by the two following strategies.

Approach 2: Asset Management Software.
Another way to manage images is through software specifically designed to track and search images, such as Portfolio Extensis. With this software, you can keep track of the history of
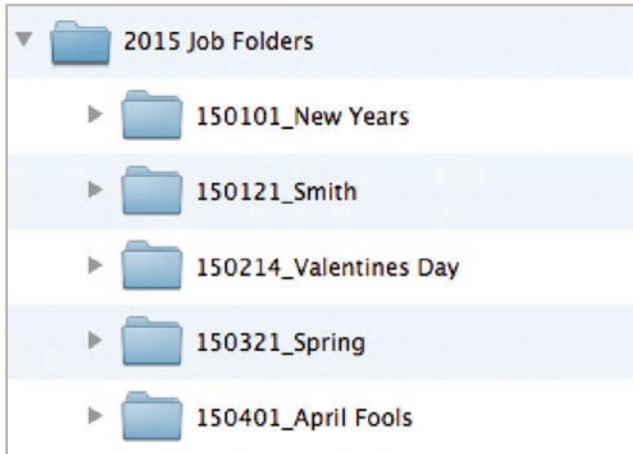
▲ The main folder holds a chronological sequence of jobs, each in their own folder.
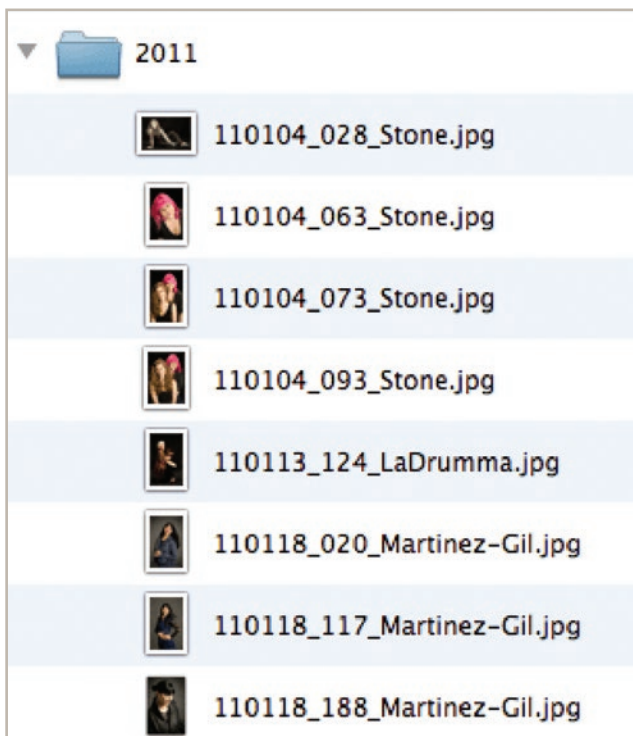
▲ The Library Selects folder is specific to each year and contains only small JPEGs of the select images.

each image—including whether or not it is with a stock agency, whether it is model-released, what limitations there are in using it, etc. There are multiple ways to access the images through the software's search features, such as date, job name, subject name, key words ("still-life" or "travel," for example). Even with this high-tech software, the images must be stored as actual image files in an organized fashion as described in the above section.

Approach 3: Asset Management Software with Editing Capabilities. A third way to keep track of your images is to use a file-management software system like Adobe's Lightroom or Apple's Aperture. These programs allow the photographer to create libraries and collections, organizing images and metadata. The images that appear in the software are linked to the actual image folders stored elsewhere on your computer. If you move an image or folder, it will no longer be linked. Lightroom and Aperture allow you to create collections of images taken from various jobs, such as "clouds" or "water" or "still-life." You can also use keywords to sort images.

Whatever method you use, creating a consistent naming system and a library will make your life easier as you proceed.

Archiving

It is not possible to keep all of the large RAW files on the computer for years because the data adds up. At the conclusion of every job, we throw away images we know we definitely don't need (such as eye-blinks and bloopers). The remaining images are saved as large files and burned to a disc as DNG (digital negative) files. The CDs (or DVDs) of saved images are tracked using software called Disc Library (www.obviousmatter.com). If we are looking for a specific job, we can enter the

name of the client, the job number, or the subject into the search engine and quickly locate the numbered CD or DVD.

Backing Up Your Files

When everything was in negative or slide form, photographers kept file cabinets ordered numerically or alphabetically so they could retrieve images. But with computers, we depend on our hard drives to store our images. If you are foolish, you will trust that your hard drive will never fail, that your computer will never be stolen, that your office will never burn, or that your laptop will never disappear. While lady luck sometimes smiles on those who never back up, she smiles mostly on people who have backups. In my office, we back up all our data to a portable hard drive. Each week that hard drive is rotated with a second hard drive, which is stored off-site (in case of theft or fire).

Monitor Calibration

Have you ever gone shopping for a new television? If so, you likely noticed that one screen's color is not necessarily the same as another's. The same is true for computer screens. If you are trying to do work that is predictable (and professional), you need to calibrate your monitor so that what you see on your screen is going to match what you might see on another calibrated screen. And, most importantly, so you can print images that come out looking like they do on your screen.

Monitor calibration is best done with an external device that rests on your screen for the few minutes it takes to calibrate. The device communicates to software that calibrates your screen. Some calibration systems include: SpectraCal's CalPC, ColorVision Spyder 3 Pro, The ColorVision Color Plus, Monaco Systems

MonacoOPTIX, and Gretag Macbeth's Eye-One Display.

If you are not at a point where you want to purchase a professional system just yet, the Mac OSX system includes a visual calibration software (find it under Preferences > Display > Color > Calibration). You can also try Wiki-how's directions on how to calibrate your monitor in a relatively low-tech way.

After your monitor is calibrated and you know that the image you are looking at is how you want your printed image to look, it is important to select the appropriate profile for the paper on which you plan to print. The correct paper profile for your printer (which you can find online by looking up your paper brand and type) combined with your calibrated monitor will get you close to how your image should look.

This is especially important if you are turning your image files over to a professional printer. If you have calibrated your monitor, you will get a far better and more predictable result than if you don't calibrate.

2. The Importance of Design

*A*lthough this book is dedicated to teaching photographers about lighting, an understanding of what makes a photograph compelling is worth considering. Often, we are drawn to an image without knowing exactly why. If you take time to analyze it, you will likely find some of the following concepts at work:

Camera angle   Lens selection
Depth of field   Line
Color   Texture
Pattern   Rule of Thirds
Framing

When you look at an image, think about what keeps your eye in the photo or keeps you coming back. Often, there is a subtle circular movement of lines or limbs that keep us looking—or color, or a graceful line. With good composition, use of line, placement of the subject, and use of light, the photographer guides the viewer's eye.

Spend time with art books and photography books looking at what makes some images successful and some less successful. Recognizing the elements of lens choice, angle of view, and design will lead to more compelling images. If you keep these concepts in mind when practicing the more advanced lighting exercises in this book, you will more than double the return on your efforts and might even end up with images for your portfolio. Not all successful images adhere to the "rules," but understanding them helps to ensure more dynamic results.

The Rule of Thirds

One of the most frequently mentioned rules of composition in art and photography is called the Rule of Thirds. Basically, what this means (in the most broad sense) is that the subject is not smack-dab in the center of the frame. Imagine dropping
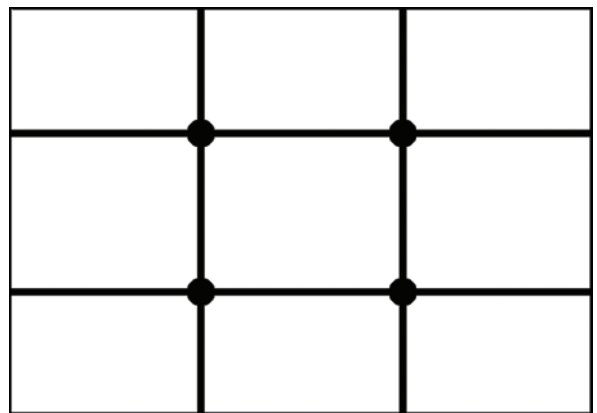
▲ This image shows the Rule of Thirds at work, with the head and shoulders placed in the upper left of the photo. The lines of the legs and arm guide the eye toward the face.

▲ Another example of the Rule of Thirds at work.

a tic-tac-toe grid onto your image, dividing it into three vertical columns and three horizontal columns. Any point at which the lines intersect is a possible landing place for the key part of your composition.

Camera Angle

Don't be afraid to get down on your knees—or even lower— to make your photographs more effective. When I work with children, I often photograph from their level, rather than looking down at them from the height of an adult. On the other hand, sometimes I get up on a ladder for a top-down look. When working with any subject, try a variety of camera heights. It will give your client or the art director more options.

▼ Here are three shots from three different angles. Identify which one is shot from a high angle, which from a medium height and which is photographed from ground level.

Depth of Field

Consciously selecting the depth of field through aperture selection and lens choice (see chapter 1) allows you to control what the viewer experiences. With the narrow band of focus in a shallow depth of field, you can direct the viewer's eye exactly where you want it to go. Special lenses are available for DSLR cameras that can be tilted for a selective focus, giving the photographer even more control over the composition. Even if you are blurring the background with your shallow depth of field, however, you must still pay attention to the other elements of design that work to make your photograph compelling.

Lens Selection

Choosing the right lens is a key factor in telling the story you want to tell. A telephoto lens at a shallow depth of field can help isolate your subject from the background. A medium focal length (around 70–100mm) is great for

▲ Two images of fences showing shallow depth of field *(left)* and extensive deep depth of field *(right)*. In both of these images, note how the line of the fence draws your gaze into the image.

▶ An example of selective focus. The defocused bottom of the image makes it look as if the model is leaving the ground.

portraiture because you can work closely with your subject at that focal length. A wide-angle helps reveal the scene, which is especially useful in travel photography. The various focal lengths are all a little different in what they do and some are better than others for certain subjects. For example, if all you have is a wide-angle lens for portraiture, you have to be aware of how features or limbs can become unintentionally exaggerated. If you have only one lens to choose from, my pick would be a 24–70mm zoom (or thereabouts). It offers a useful range of focal lengths for both for travel and portraiture.

◄ *(top)* I created this close portrait using a telephoto lens with a shallow depth of field.

◄ *(center)* Here's the same scene and subject photographed with a 70mm lens.

◄ *(bottom)* Now, we see an even wider view of this model on a city sidewalk. It was shot with a 24mm lens.

Terms to Know

composition
The placement and prominence of primary and secondary subjects, lines, shapes, colors, and tonalities in a photograph.

focal length
A value, expressed in millimeters, that describes the subject magnification and angle of view of lens. Longer focal lengths have greater subject magnification and narrower angles of view. Shorts focal lengths have less subject magnification and wider angles of view. Focal length also impacts depth of field (see page 24).

▲ Color and pattern can be effective tools for creating images that grab the viewer.

▶ Unusual framing can produce effective images.

Color and Pattern

As viewers, we love to be surprised by color and pattern. We can use a touch of color to add surprise or drama to an image. Just a hint of a complementary color will keep us looking at the photograph as our eyes and brain explore the image. Patterns also engage us, as in the photo of the puzzle pieces. When shot with a shallow depth of field, the shapes draw us into the photo as if to solve the puzzle.

Framing

You don't have to show the whole subject within the confines of the photographic frame. Play with artful cropping or framing of the image in-camera. I cropped the image above to include only half the face and then combined it with an image of the girl's mother, which was cropped from the opposite side.

Assignment 3: Identify Key Elements

Select some images you like from magazines, books (don't tear them out—you can photograph them or photocopy them), or the Internet. Study the compositional components in each image, identifying the key elements at work. What makes the image effective? Is it the lens selection or camera position? Is it composed according to the Rule of Thirds? Did the photographer use color, lines, or framing to control your gaze? How does the use of depth of field affect the presentation?

3. The Language of Light

*T*hese days, nearly everyone has a camera. However, few photographers or artists innately understand the nuances of lighting without the help of a mentor or a class. For some, working solely with natural light can make for a whole career. That's all well and good—but knowing how to use light in its myriad forms is like having a full palette of colors to paint with. The knowledge will free you to be as creative as you want to be.

There is so much to learn about various types of lighting, one can easily spend years mastering techniques. However, many lessons apply to *all* light—whether you are working only with natural light, only with strobes, or with combined light sources. The following information applies to lighting in general, no matter the source.

What All Light Has in Common

All light consists of photons that, when they strike an object, reflect off of it, allowing us to see

blue surface   red surface   black surface   white surface
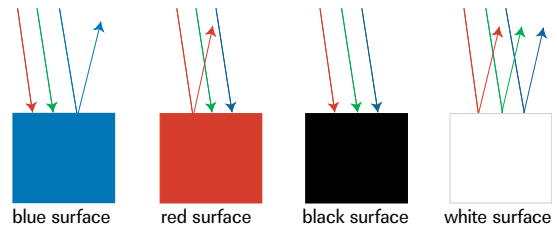
▲ Light is what creates our sense of color and tonality. When light strikes a blue object, the blue wavelengths are reflected and the others are absorbed. When light strikes a red object, the red wavelengths are reflected and the others are absorbed. When light rays strike a black object, nothing is reflected; all the rays are absorbed. When light rays strike a white object, all the light wavelengths are reflected; none are absorbed.

that object. Objects that are white reflect more light and dark objects absorb more light. Objects that are red reflect red while absorbing the other colors of the spectrum. All light travels in a straight line and all light reflects off objects in an angle that equals the angle at which it strikes the object. This becomes important when we study reflected light, otherwise known as fill light, in this book.

Mood and Emotional Impact

Learning to light means learning to control the mood of the photograph and what you want to say with your images in a wide range of situations from a studio portrait session to photographing in an old factory. Photographers, artists and
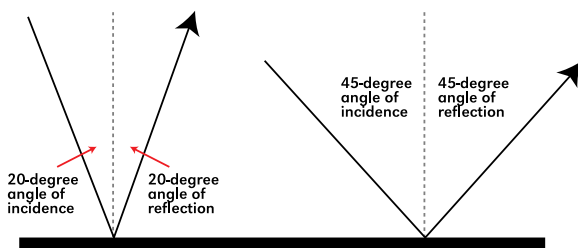

Terms to Know

angle of incidence
The angle at which light strikes a surface. This is equal and opposite the angle of reflection.

angle of reflection
The angle at which light bounces off a surface. This is equal and opposite the angle of incidence.

45-degree angle of incidence   45-degree angle of reflection

20-degree angle of incidence   20-degree angle of reflection

filmmakers will tell you that there are many kinds of light to tell many stories, which is what this book is about.

One can use light artfully to create an image that illustrates a mood or concept—especially useful in editorial and advertising work, but also in portraiture, wedding, entertainment and corporate photography. With proper lighting techniques, one can create a memorable photograph in otherwise uncomplementary light.

In photography, we learn to modify or shape the light by using light modifiers or shapers, scrims, flags, gobos, fill cards, filters, and gels, which will be discussed later.

The Light Spectrum

Light is part of the same electromagnetic spectrum as radio waves, microwaves, and X-rays. They are all forms of wave energy. The part that we humans see is called the visible light spectrum. It ranges from short (violet) to long (red) waves.

In photography, we measure light color in terms of degrees Kelvin (K), so the color of a light source is often referred to as its "color

▼ The spectrum of light with coordinating color temperature ratings in degrees Kelvin.
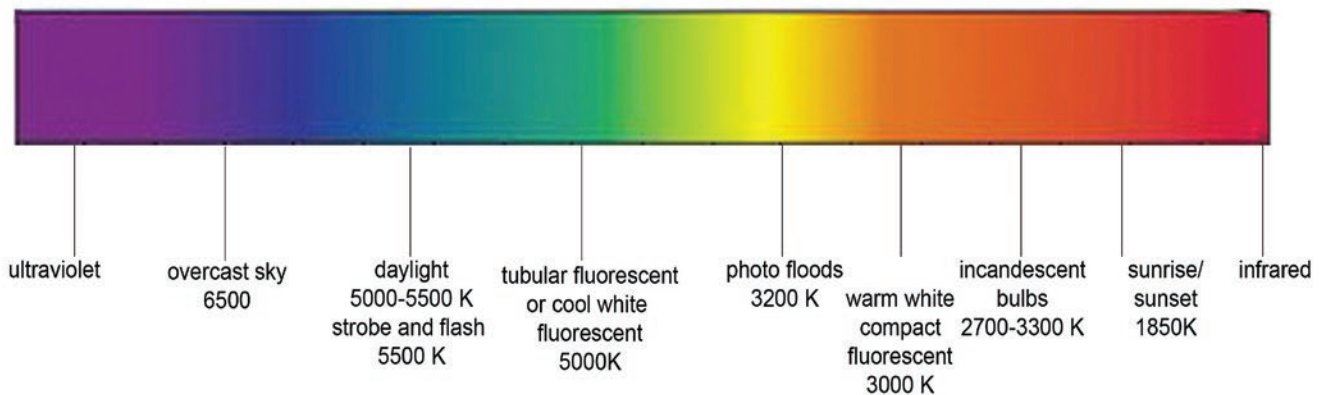
Warm or Cool? High or Low?

The higher the degrees Kelvin (shorter waves), the "cooler" the light appears to the eye and the emotions. For example, daylight appears "cooler" (whiter) than tungsten—even though the daylight color temperature reading is higher. Tungsten light appears "warmer" (more orange), but it has a lower color temperature rating. One way to remember that is to think of the phrase "white hot." When something is white hot, it is hotter than "red hot." Thus, white (daylight) is a higher temperature than tungsten, even though it's warmer-looking in comparison.

ultraviolet

overcast sky 6500

daylight 5000-5500 K strobe and flash 5500 K

tubular fluorescent or cool white fluorescent 5000K

photo floods 3200 K

warm white compact fluorescent 3000 K

incandescent bulbs 2700-3300 K

sunrise/ sunset 1850K

infrared

Assignment 5:
How White Is White?

Explore the colors of continuous light sources. With your camera's white balance set to daylight, photograph a piece of white paper (so it fills your frame) using various light sources—daylight, tungsten light, fluorescent light (various types), halogen, etc. Label each shot carefully so you know what you are looking at; you can photograph your note pad with the notes or write on the paper you are photographing. Evaluate how the changing light sources affect the color of the "white" paper.

temperature." Daylight and daylight-balanced artificial light sources fall into the 5000–5500K range. Photoflood lights (tungsten) are around 3200–3400K. Sunset, even redder than tungsten light, comes in at about 1850K.

The color of the light sources used is particularly important when combining strobe or flash (approximately 5500K) with sources that have different color temperatures. Filmmakers and architectural photographers, in particular, are masters of using various colors of light to create mood in their images. Subtle use of color in an image can create an atmosphere that invites the viewer to linger. We will cover this in more detail as we go along.

Light Height and Direction
Light is everywhere. But even though it may seem that we are bathing in light, most light sources have a direction and a height. For example, sun shines from the east in the morning, directly overhead at noon, and from the west at sunset. If a room is lit by window light, there is also a direction to that light. A basement window will provide a higher window light source, while an attic window may provide a lower window light source. As one begins to observe light and shadow, it is useful to have some strategies for describing the three-dimensional aspect of how an image is lit.

The Circle of Possibilities
Visualize peering down at your subject from the ceiling, looking at the subject, the light source, and the position of the camera all in one view. For the sake of describing light, imagine a big circle with compass-like bearings around your subject. The camera would be at zero degrees. A light behind the subject, directed toward the subject, would be at 180 degrees (backlight). Sidelight
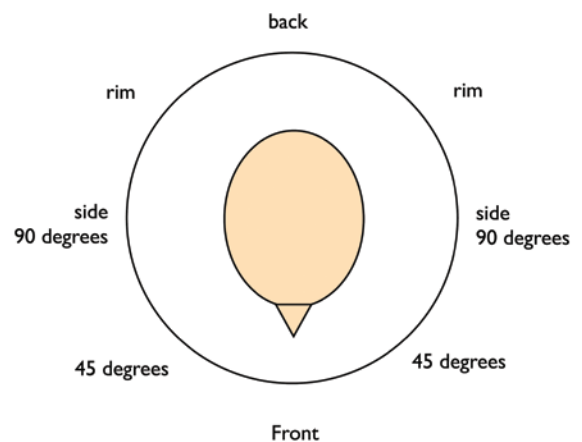
▲ A light can be placed anywhere around the Circle of Possibilities. Its position relative to the subject will, in part, determine the look it produces.

would be 90 degrees. This is the Circle of Possibilities of light positions for learning about light placement.

Everything's Relative

Keep in mind that the effect of a light position is dependent on the relationship of the light to the subject and to the camera. If one of those changes, for example if you alter the camera position, then the direction of the light will be different relative to your new view of the subject.

Split Light, Rim Light, and Profile Light— Without Moving the Light. If you have a subject facing the camera with the light at the side-light (90 degree) position, the light you see is split lighting. If you rotate the camera so that the light is more behind the subject, you will have a profile view that is rim lit. Likewise, the light-subject-camera relationship will change when the subject moves. Let's return to the split-light position with the subject facing the camera. Now instead of moving the camera, imagine rotating the subject into a profile view facing the light. It's a totally different look. (And if you didn't turn the face quite so far, you'd have a version of short lighting, which we'll talk about in the next section!)

▼ With the subject facing the camera, a light at a 90 degree angle produces split lighting.

▼ If you turn the subject so the face is in profile, the same light position creates a totally different look.

▼ Moving around the back of the model, to the rim light position, gives another look.
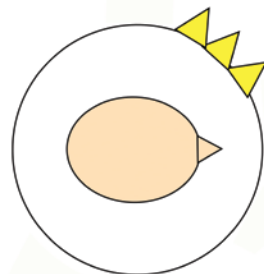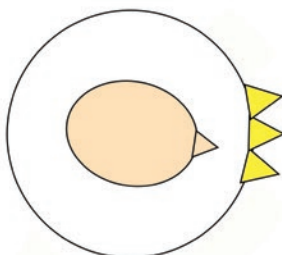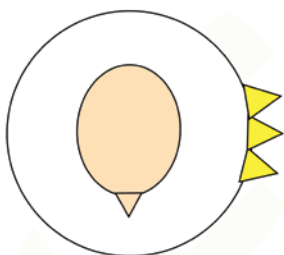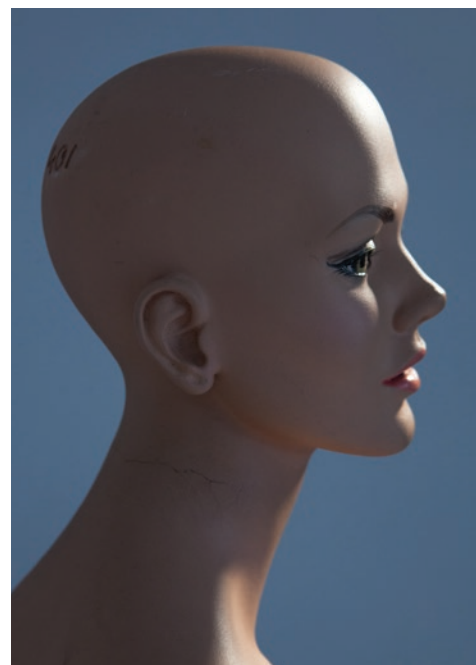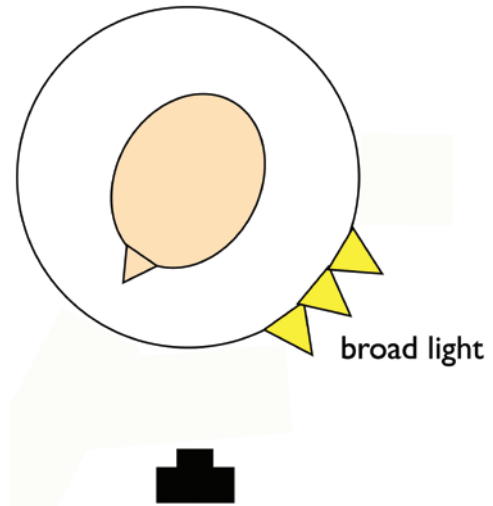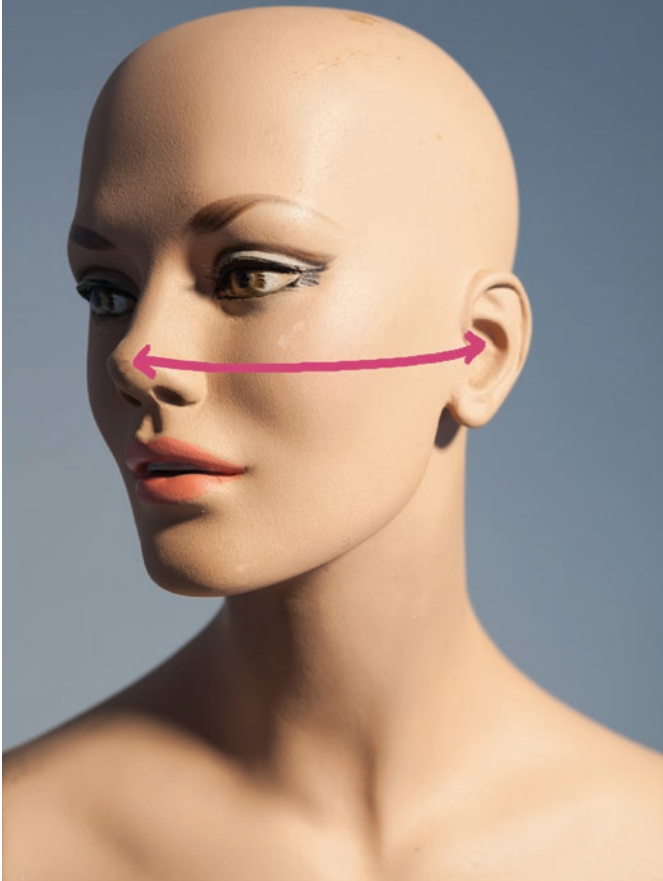
◄▲ Turning the head away from a light source will give you broad light, which means it lights the area from the nose to the ear.
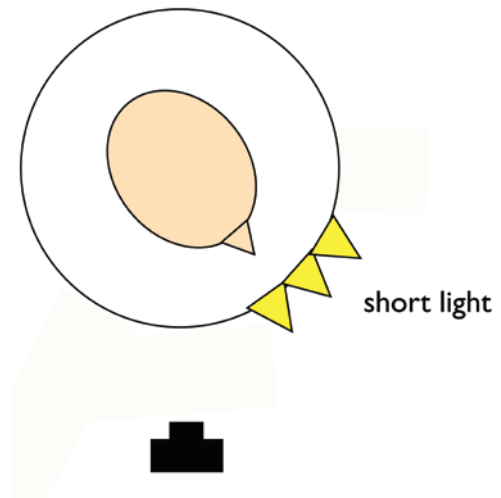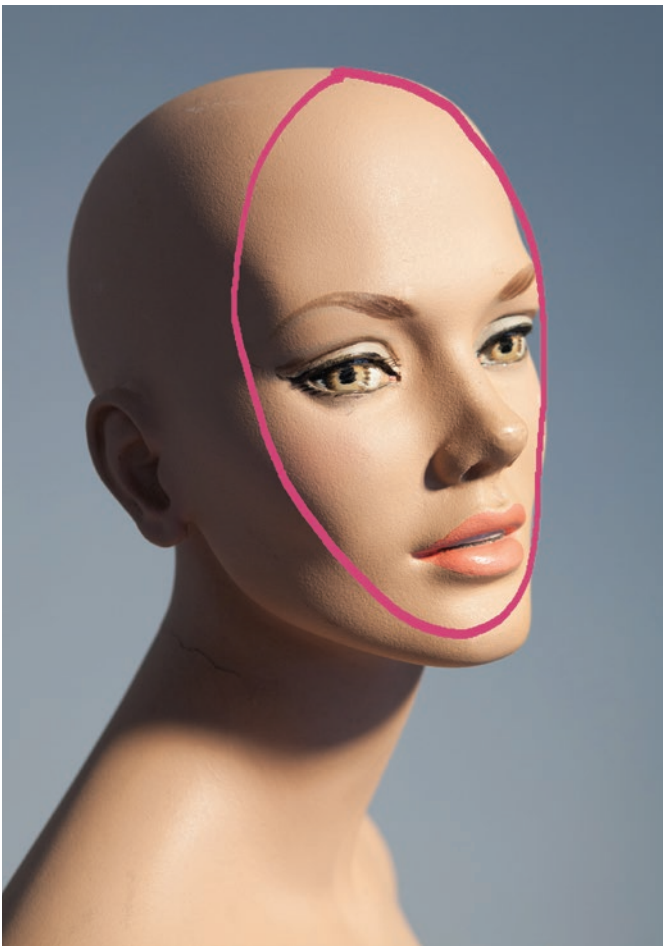
◄▲ Turning the head toward a light source will give you short light, which lights the oval of the face.
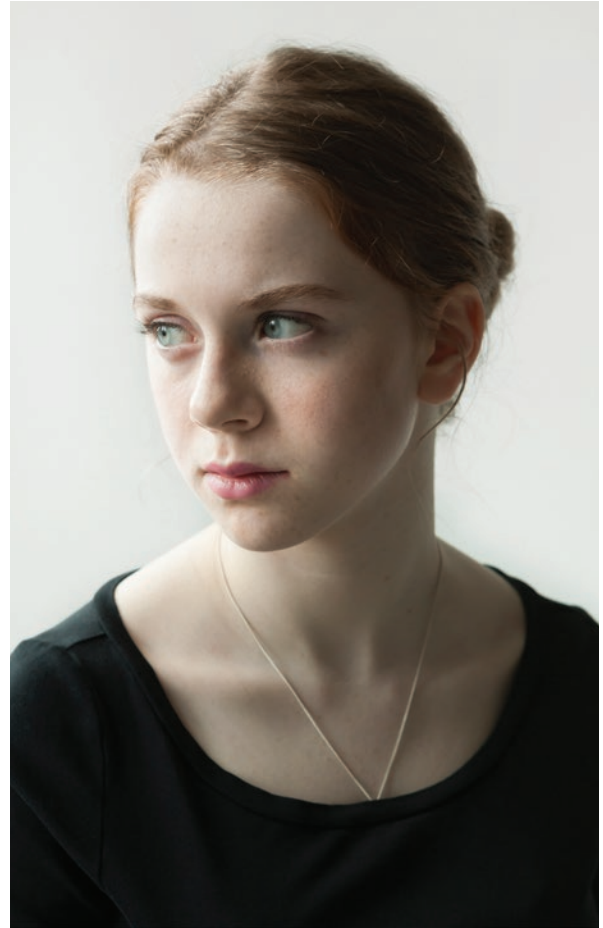
▲ Here is what these two lighting effects look like, side by side, on a real person.

Broad Light and Short Light. If the subject's face will be photographed at an angle to the camera, this results in a broader view of the side of the face that is closer to the camera and a shorter view of the side of the face that is farther from the camera.

To further explain, when the light illuminates the more visible side of the face (nose to ear), the effect is called broad lighting. This has an effect of making the subject look a bit wider, since the face is illuminated from the nose to the ear. In some circumstances, broad lighting will make the subject appear heavier or more powerful.

When the light illuminates the less visible side of the face, the effect is called short lighting. The light fills the oval of the face while the cheek-to-ear area falls into shadow. This is often used in portraiture to make the subject look thinner.

> **Terms to Know**
>
> **broad light**
> Lighting that illuminates the wider side of the face (nose to ear) when the subject's face is turned somewhat away from the light.
>
> **short light**
> Lighting that illuminates the oval the face (eyes, nose, mouth, and chin) when the subject's face is turned toward the light.

▲ Butterfly lighting is produced when the light falls on the subject from directly in front of (and above) them.

▲ Loop lighting is produced when the light falls on the subject from a shallow angle in front of (and above) them.

▲ As the light moves to a slightly greater angle, Rembrandt lighting (with its characteristic triangle highlight on the shadow-side cheek) is produced.
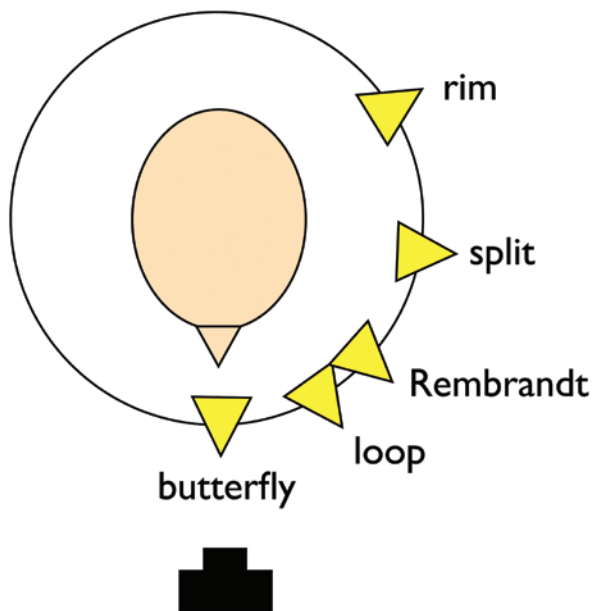
▲ It's useful to have names that immediately describe the position of the light relative a subject's face.

Name That Light Position

Assigning names to those light positions will help us discuss light as we move 360 degrees around the Circle of Possibilities. Again, keep in mind that the effect of a light position is dependent on the relationship of the light to the subject and to the camera. If one of those changes (for example, if you move your camera position), then the direction of the light has changed in relation to the subject.

Butterfly Lighting. The word "butterfly" comes from the shape of the shadow below the nose when the subject is lit from the front. The light has to be positioned slightly forward of the face (toward the camera) to bring out the butterfly-shaped shadow.

Loop Lighting. As we move the light a little to the side of the subject, around the Circle

▲ Moved to a position directly beside the subject, the light falling from a 90 degree angle illuminates only one side of the face—so the effect is called split lighting.
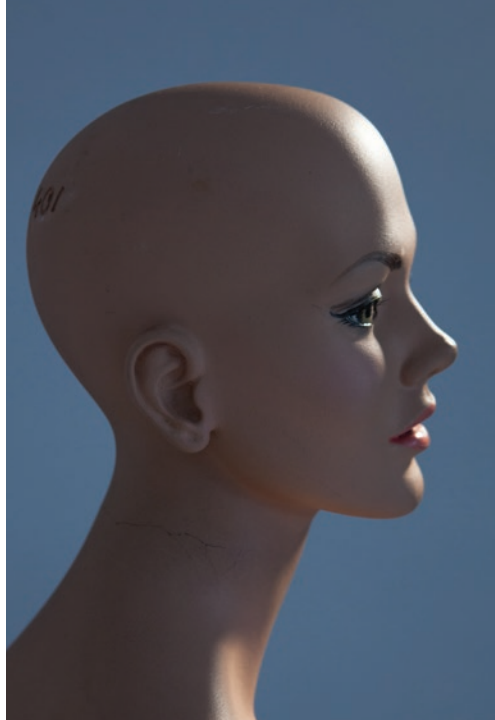
▲ Rim lighting produces an appealing outline of the edge of the subject's profile.

Assigning names to those light positions will help us discuss light as we move 360 degrees around the Circle of Possibilities.

of Possibilities, loop lighting is created. This is named for the small loop-shaped shadow produced below and slightly to the side of the nose. Comparing loop lighting to Rembrandt lighting, you can see that the nose shadow is smaller and does not extend to touch the shadow on the cheek.

Rembrandt Lighting. Rembrandt lighting is the classic lighting style used in Old Masters paintings. The light is somewhat high and placed at about the midpoint (45 degrees) between the front- and side-light positions. The key to identifying Rembrandt lighting is the closed triangular highlight on the shadow-side cheek. This is created by a nose shadow that now extends to touch the shadow on the cheek (contrast this with the nose shadow in loop lighting).

Side/Split Lighting. Placing the light at a 90 degree angle to the subject yields split lighting, a dramatic effect that illuminates one half of the face and leaves the other in shadow. It has a rather ominous emotional quality if used without any fill on the shadow side.

Rim Lighting. When the light is moved to the position between side and backlight, it can create a beautiful outline of light on the subject in profile to the camera. If the subject faces the camera, the rim light defines the shape of the head.

Rim light is especially useful when you need to separate a subject from a dark background. Take care not to get lens flare when working with the light in this position, however. Sometimes, elevating the camera and pointing it slightly downward can prevent this problem.

Customize the Look

When I work with a subject, I adjust the position of the lights in response to the subject's personality, facial features, and what we are trying to achieve—such as the desire to create more drama or less. I encourage photographers to explore lighting that is most effective for any given situation. What works for one subject may not work for someone else.

Light Height

The height of the light has a tremendous impact on the psychological meaning of the image. Light from a low angle will look somewhat sinister, whereas light from directly overhead will produce darkened eye-sockets that make the subject look depressed or tired. That is not to say that these looks are necessarily *wrong*. They can be very effective when used with intention to create a specific feeling.

To describe the light height, I use the image of a clock. A light that is positioned level with the eyes would be at 9:00 or 3:00. In the natural world, light at this height would occur just at sunrise and sunset. Light that is positioned directly under a model, shining up, would be said to be at 6:00. In nature, light does not really go below the horizon line (unless it's from a campfire—or reflected upward by water or some other reflective surface). That makes light originating from the 6:00 position feel unnatural, so cinematographers often use it to set the mood in scenes that have a sinister aspect to them.
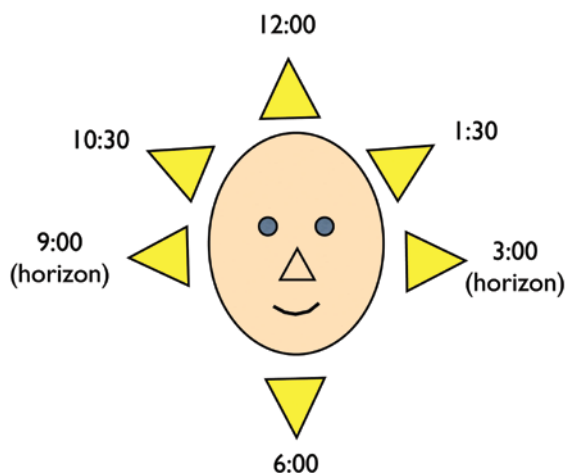
▲ I use the idea of a clock to describe the height of the light relative to the subject.

Light Creates Meaning

Here is an example of the power of light positioning to create meaning. In the photo on the left, describe how the model looks. What is her personality or state of mind? In the photo on the right, what is your feeling about her? How has it changed from the other photo? The difference in the two images is just the head position. The light has remained the same.
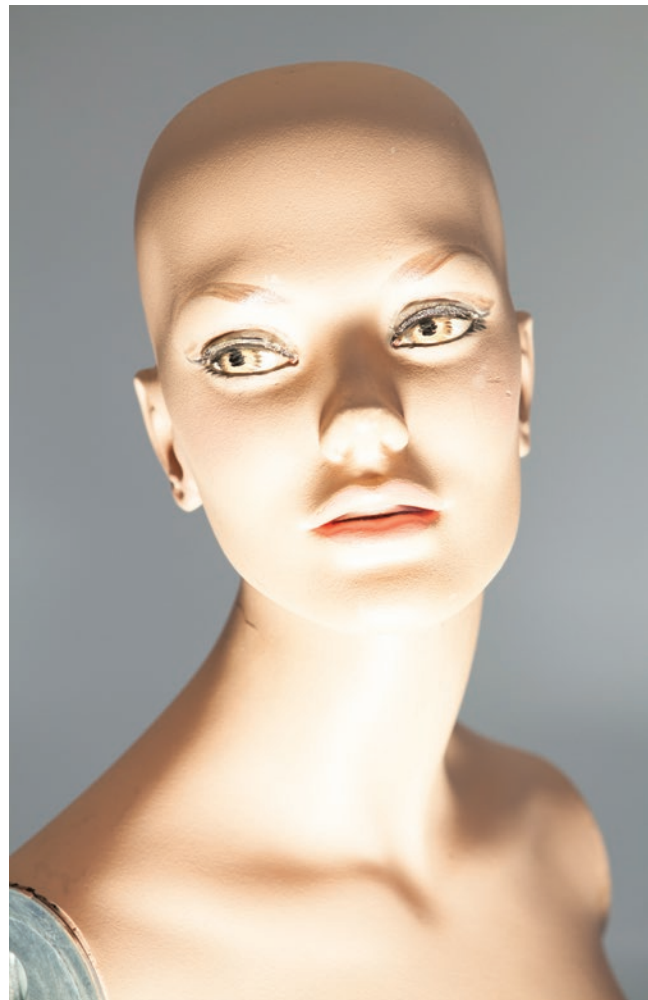
▲ Examples of the light positioned at 12:00 (*left*) and 6:00 (*right*).
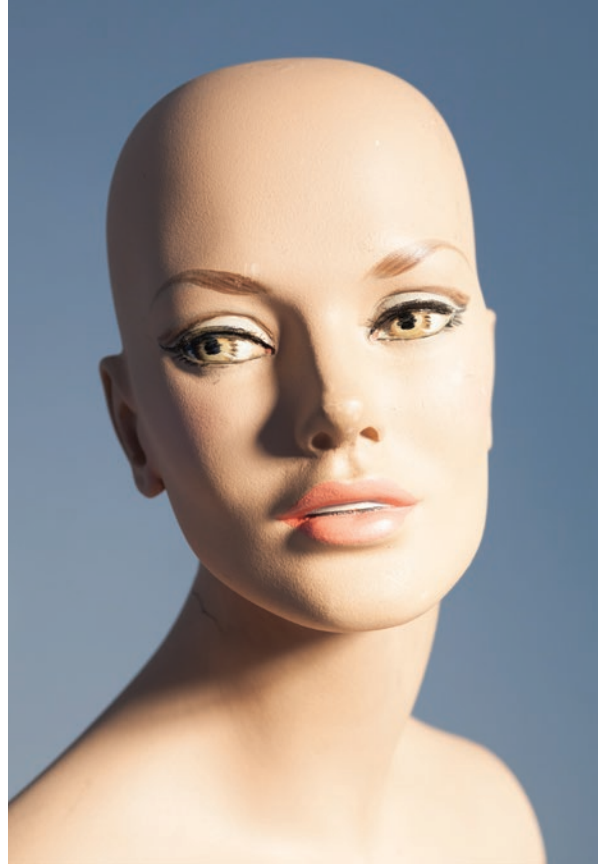
▲ Two examples of loop lighting created at higher (1:30) and lower (3:00) positions. Note the change in the position of the nose shadow.

Light at the 12:00 position (like the noon sun), can be unflattering—as we saw on page 37 ("Light Creates Meaning"). However, you can make the most of it by tipping the model's head up. Or, have the subject lie on the ground looking up toward the light; this is a great way to make pleasing portraits in a difficult lighting situation, if it is appropriate for your subject.

In general, flattering light for portraits originates from a height of about 10:30 or 1:30 on the Arc of Light Height. Experiment with this, noting what happens to the nose shadow as you move the light up or down.

Light Distance

So far we've looked at light positions on the horizontal axis (the Circle of Possibilities) and the vertical axis (the Arc of Light Height). There's another factor we need to explore, however: the *distance* of the light to the subject. Think of a headlight beam and how the light spreads out from the bulb as reaches into the darkness. Close up, it seems bright—but the light dims quickly as its photons spread out. Using the Inverse Square Law (more on this later), we can predict this falloff of light relative to a distance traveled. What you most need to know about the law is

basically this: light coming out of a source falls off *quickly*. As we'll see in the following section ("Light Quality"), distance also has a role in determining the overall look of the lighting.

Light Quality

While we're thinking about the distance of our light sources relative to our subjects, let's take a look at light quality. As you'll see, the distance of the light to the subject affects more than the exposure (the amount of light) on the subject. It also impacts the overall look of the light.

With soft light, shadows have a more gradual, smooth transition from highlight to shadow.

As you observe lighting in magazines and books, note the appearance of the shadows and especially note the size of the catchlights in the eye. Large, diffused lights (such as a big softbox or a big window with indirect light rather than direct sunlight) will produce big catchlights. They also produce soft-edged shadows on the subject. Small, undiffused lights (such as the direct sun, direct flash, or direct strobe light) produce small catchlights and hard-edged shadows. The two types of light produce completely different effects. Let's discuss these in more detail.

Shadow Edge Transfer

Hard light and soft light differ in what is called the "shadow edge transfer." This is the span over which the highlight area transitions to the shadow area. With hard light, the change from light to shadow is more abrupt—hard-edged and defined—which gives the subject a contrasty look. If used with skill, this kind of light can

make for a compelling portrait. With soft light, shadows have a more gradual, smooth transition from highlight to shadow. Soft light makes for beautiful, quiet portraits. The shadows with this light are very soft. Both hard light and soft light can be manipulated by using light modifiers and fill light.

Size Relative to the Subject

One of the controlling factors in determining the quality of light is the size of the light relative to the subject. The sun, for example, is a huge light source—over 860,00 miles in diameter. However, the fact that it is also 93 million miles away makes it very small relative to a subject here on Earth. As a result, direct sun produces a very hard,

▲ These images depict hard light (*left*) and soft light (*right*). Note the difference in the nose shadows.
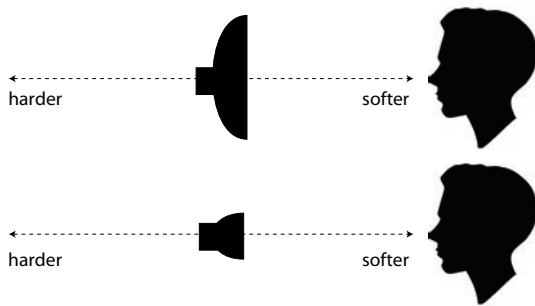
▲ The size of the light source relative to the subject is a controlling factor in determining the quality of light.

Assignment 8: Explore Hard and Soft Light Using a Ball

Photograph a shiny plastic ball or balloon in direct sunlight and then on a cloudy day. You can make your own "clouds" by holding a white bed sheet between the sun and the ball. Note the reflections on the ball and the transition of light from highlight to shadow. See the pink ball examples on page 83.

contrasty quality of light. On a cloudy day, on the other hand, the direct sun is diffused; the clouds effectively bring the source much closer to earth—like a giant softbox.

The same principle is true when working with light modifiers. A light source (of any size) that is close to a subject appears softer than the same light source moved farther away, because the source moved farther away is relatively smaller in size. This is an important consideration when it comes to exposure (as we discussed in the previous section). If you have a choice of dialing down the power on your light source or moving it farther back, you need to be aware that moving it will make it look somewhat harder.

Light Modifiers and Shapers

A modifier is something that alters the quality (not necessarily the color) of the light source. A shaper is something that allows you to adjust the breadth and shape the light's beam. If you are using strobe, dedicated flash, or some continuous light sources, there are many modifiers and light shapers available. The choice of modifier depends on what you, the photographer, are trying to communicate.

We will examine modifiers and shapers in more detail when we get to the section on strobes. You can look ahead to chapter 5 to see photos of the various modifiers that are used in lighting—things like the basic reflector, barn doors, beauty dishes, grids, octabanks, softboxes, snoots, strip lights, and umbrellas. For continuous light sources (such as window light), you can adjust the light with scrims, flags, bounce cards, and reflectors. Just to get a sense of what can be achieved with light modifiers, let's take a look at a couple common ones: scrims and gobos.

Scrims

Scrims, used to diffuse light, come in various sizes and are used in lighting situations where it is not possible to otherwise dim or soften the light. They can be used in combination with other modifiers, such as softboxes (further softening the light), and can be gradated by stacking one on the other in an overlapping manner.

Scrims can be made from just about any translucent material—a panel of gauzy fabric (also called a "silk"), white translucent plastic, screen (such as window screen), vellum, or even

▼ On the left, we see the subject with no scrim. In the center, we see the effect of adding a scrim. The image on the right shows the scrim in place. This collapsible scrim is made of plastic tubing covered by a translucent sheet of fabric.

paper. Silks and the frames that hold them can be found at various sources online, or you can create a frame of PVC tubing and cover it with sheer curtains or white bed sheets. (*Note:* Choose a heat-resistant material if using hot lights.)

Gobos, Cookies, and Flags

Gobos (short for "go-between" or "go-between-optic") are devices placed in front of the light to cast a patterned shadow on the subject and/or background. Gobos can create patterns of Venetian blinds, leaves, text, etc. They can be used in all forms of photography, from video to still, with continuous lights and with strobes. Metal or glass gobos are heat-resistant, so they won't melt in front of a hot light source. Gobos are often used for theatrical lighting but can be used in still photography as well.

Cookies (shorthand for "cucalorus") are panels, usually made of wood or Styrofoam, into which shapes or patterns are cut. Like gobos, they are also used in front of the light—but at a distance. Placing them farther in front of the light creates a soft, de-focused pattern. In video or filmmaking, the cookie can be moved slightly to suggest, for example, moving leaves.

Flags, too, go in between the light and the subject. Rather than casting a patterned shadow, however, they are used to block larger areas of light, narrowing the field of light on a subject or preventing flare. Flags are generally pieces of white or black Styrofoam, board, or fabric, but other materials can be used as well.

Light Stands and Booms

When adding lights and light modifiers to a scene, you'll need some way to position them. This is where light stands come in. Light stands are available in different heights and styles. Some are collapsible and portable; others, called

◄ Two samples of gobos projected onto a backdrop.

▶ This image, shot for the Westin Hotels, was lit with three types of light: a softbox with a strobe, the tungsten wall sconces, and a tungsten-balanced hot light with a gobo patterned like leaves (as shown in the gobo illustration) The effect of the "leaves" is subtle, but I wanted just a slight implication of a light coming from outside, through the leaves, to add a bit of intrigue to the image.

◄ *(top)* A basic light stand.

◄ *(bottom)* A C-stand with a C-arm (holding a neutral density gel).

C-stands, are heavy and not so collapsible—but they are very sturdy. A light stand holds your light for you, of course, but it also serves as something to which you can clamp scrims and fill cards.

If the stands are sturdy, they can also support arms (called C-arms) that provide a horizontal support to which you can attach cards or gels. On C-stands, you can even attach a boom—a much larger horizontal support used to support an overhead light source.

▲ Correctly folding a light stand eludes most beginners. For this reason, I have included images of the incorrect (*left*) and then the correct way (*right*) to fold a light stand. When folded, it should collapse completely for packing.

Stabilize with Sandbags

It is a good idea to put a sandbag on the base of your light stand so it won't tip over in a breeze or in a darkened studio. A sandbag is imperative when working with a top-heavy C-arm and especially with a boom.

Catchlights:
Key to the Universe of Lighting

Now that we have looked at light and shadow, position and height, and options for modifying light, let's talk about catchlights, a topic we hinted at in a previous section ("Light Quality" on page 39).

Catchlights are bright reflections of a light source on any reflective surface. This includes buttons, glass, glossy lipstick, and—most of all—the eyes. Once you learn about which light modifier creates a certain catchlight shape (we'll look at this in chapter 5), you can combine that with your knowledge of shadows (hard or soft, and what direction they fall) to figure out how an image is lit. If you make a practice of evaluating images in magazines, books, movies,

▲ This image clearly shows the edge of a rectangular softbox in the subject's eye. Studying catchlights will teach you a lot about lighting.

and paintings, you will increase your sensitivity to light. Just as if mastering a language, you will be able to work with more skill and nuance in your own work.

But first, let's go back in time, before the invention of photography. If you open an art history book or go to a museum, you can see how, for hundreds of years, artists have used light sources in their paintings to create drama and enhance storytelling. Take, for example, the artist Michelangelo Caravaggio, who lived in Italy in the late 1500s. He was famous for using single light sources to create very dramatic lighting. The

shadows are deep with clear edges. It may seem surprising how just one light source can make such a compelling image.

Another example is Johannes Vermeer, a Dutch painter who painted in the early 1600s and whose works are depictions of the Dutch middle class, often painted in rooms lit by window light. His images are much different than Caravaggio's—softer with less contrast between light and shadow.

A modern painter who uses light beautifully in the way of the Old Masters is Koo Schadler from New Hampshire, who specializes in egg tempera painting. Lighting—including both the quality of light and the position of light—is very important to her. Look at this image she painted (below) and note the quality of light and shadow. Where is the light positioned? What would you speculate she used to light the image? Compare the painting to the photograph she created as a reference for the painting.

When looking at paintings, observe the catchlights in the reflective surfaces. Catchlights are incredibly important to painters. Imagine the painter long ago painting by lantern or sunlight, undiffused or softened by clouds or white fabric. Observe how the artist used the light source position and color for dramatic effect to create a sense of story. After evaluating the size, shape,

◄ *Girl with Lock and Key* © Koo Schadler. Egg tempera, on true gesso panel, finished with oil. (See more of her paintings at www.kooschadler.com)

▼ This is a photograph by Schadler. She worked from it when making her painting. Photograph © Koo Schadler.
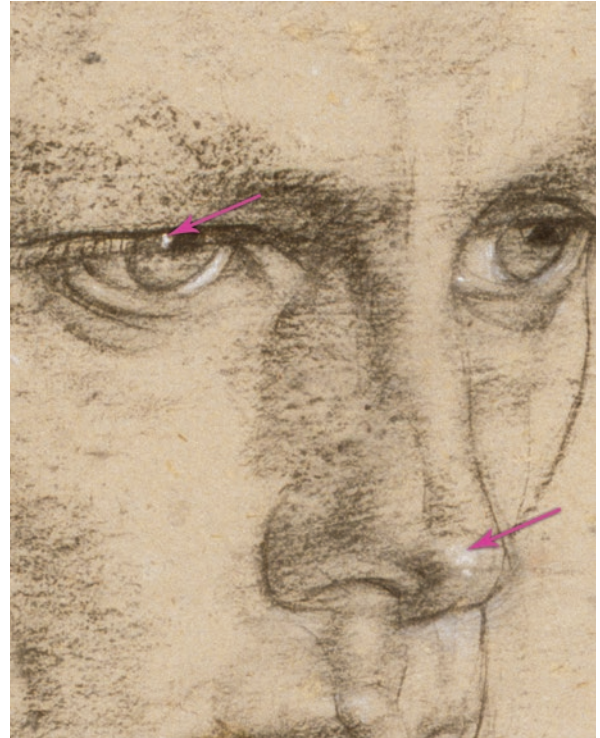
▲ Note the highlights, the shadows and the catchlights in the eyes of Fechin's wonderful portrait. Artwork courtesy of the Frye Art Museum, Seattle.

and position of the catchlights, analyze the shadows. Where do they fall? Are they hard or soft? They give even more clues as to the height, direction, and quality of the light in relation to the subject.

For another example, look at the above drawing by Nicolai Fechin (1881–1955), a Russian artist who moved to the United States in 1923. Fechin has a wonderful feel for light and shadow in his work. If you examine the drawing, what do you see? Is the light hard or soft? Where are the catchlights? What is the direction of light? Fechin's work has a sense of light and shadow whether it is a fine drawing, such as the one above, or a more abstract painting.

If you explore the Internet, you will find more work by Fechin. I also suggest you look at work by artists like Artemesia Gentelischi, Rembrandt van Rijn, Winslow Homer, and Andy Warhol (to name just a few). The more time you spend studying this work, the more sensitive you will become to nuances of lighting everywhere—in paintings, art books, magazines, and movies. As you become more observant you can apply what you learn to your own photography.

Assignment 9:
Analyze Catchlights

Collect images of six paintings from art history books or the Internet, then analyze the catchlights and the position of light in each. Make an overhead sketch of where you imagine the light source to be.

▲ On the left, we see an image photographed at what the reflected-light meter suggested (f/8); it looks a bit dirty. On the right, we see the same image with a better exposure (f/5.6).

◀ A reflected-light meter would likely overexpose this image (as seen on the left), diluting the dark mood.

Metering and Meters

We touched on metering in a previous chapter, but now let's examine it in more detail, looking more extensively at the meters themselves and the options they give us. There are two basic types of meters: meters that measure the light *reflected from* a subject (reflected-light meters) and meters that measure the light *falling on* a subject (incident-light meters). There are advantages and disadvantages to each.

Reflected-Light Meters

Reflected-light meters, such as the one in your camera, are designed to give an average reading that works for most (but not all) scenarios. That average is calculated based on middle gray (18 percent gray). However, if your scene/subject's tonality is not middle gray—say, a snowy field or a subject in dark clothing against a black background—the reflected-light meter can trick your camera (and you) into under- or overexposing a subject. When metering a white subject, you'll get a reading that will make it look gray instead of white (the image will be underexposed). The opposite happens when photographing something very dark. Again, the camera wants to make it gray and will give you a reading that results in an overexposed image.

Terms to Know

reflected-light meter
A light meter that measures the amount of light reflected from a scene or subject. This provides a calculated reading dependent on the tonality and coloration of the scene/subject. Your camera's meter is a reflected-light meter.

incident-light meter
A light meter that measures the amount of light falling on a scene or subject. This provides an accurate reading independent of the tonality or coloration of the scene/subject.

gray card
A middle-gray card that serves as an exposure metering target for more accurate results with a reflected-light meter.

Gray Cards. In some cases, you can get around this tendency for the meter to over- or underexpose by using a gray card. Just place that card (which really *is* middle gray) in your non-middle-gray scene, being careful to keep it in the same light as the subject. (*Note:* There is a tendency to tip the card skyward, which will give you a false reading.) Then, meter the light reflected by the card.

Experience. Another way to arrive at the right exposure for your subject is simply through experience. If you know that the subject has a lot of white in it, you may want to open your aperture ⅔ (or more stops) to compensate—or close down your aperture by the same amount for a dark subject.

Metering Modes. Your camera's built-in reflected-light meter offers several options to help you get more accurate exposures. The icons in the camera's menu depict the following choices:

1. **Evaluative/Matrix Metering.** This is a sophisticated all-around metering mode that evaluates a grid of multiple points for color and brightness. It is good for portraits, for off-center subjects, and for situations with backlighting. When the backlighting is very bright or the subject is high- or low-key, you will need to adjust the exposure. This is the default metering mode on most cameras and especially useful when shooting in program (P), aperture priority (Av), or shutter speed priority (Tv).

2. **Partial Metering.** Partial metering is useful if you have a subject in the foreground and a brighter background, as with a backlit subject. It's also helpful for portraits and localizing part of a scene for metering. Partial metering is similar to spot metering but covers more territory, about 8 to 10 percent of the viewfinder. If using this, one must understand the effects of high- or low-key subjects so exposure adjustments can be made.

3. **Spot Metering.** Spot metering measures just a small area (about 3.5 percent) in the center of the frame. This is useful when trying to precisely base your exposure on a small, selective area.

4. **Center-Weighted Average Metering.** This mode lies somewhere between the evaluative and partial metering modes. It is weighted for the center and averaged for the rest of the scene, so it works best when the subject is in the center and for evenly lit scenes. It analyzes reflected light but without the multi-point analysis that the evaluative mode provides, so the photographer has to make exposure compensation adjustments when necessary.
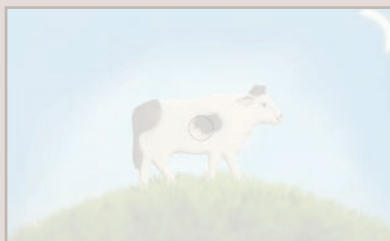
▲ Evaluative/matrix metering covers the whole scene.
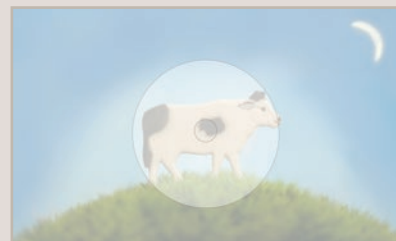
▲ Partial metering.
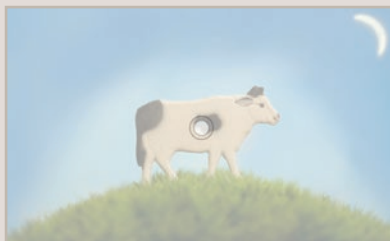
▲ Spot metering.
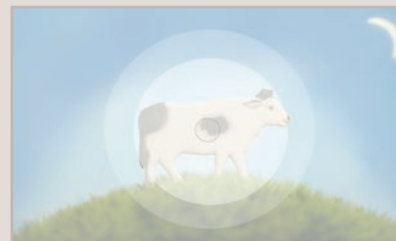
▲ Center-weighted metering.

Incident-Light Meters

The incident-light meter is a hand-held meter that measures the light *falling on* the subject As a result, it will not be fooled by the brightness or darkness of a particular scene.

Photographers often use incident meters to get a sense of the difference between the light and shadow tones in an image.

Functions. There are various brands of hand-held meters, most of which are quite simple to use. Some meters allow you to do both incident metering by using the white dome on the meter *and* reflected light metering, similar to your camera's meter, by removing the white dome. Most people use the incident capability of the hand-held meter to measure the light falling on the subject. Most modern incident-light meters also have built-in flash meters and some even have wireless strobe triggers, so they serve multiple functions. We will delve into metering for strobe lights in chapter 5.

Positioning. The art to using the incident-light meter is knowing where to position it to take the reading. If you are metering for an outdoor portrait, the meter can be fooled by tipping it up to the sky—the same way a gray card will give you an underexposed reading if you tip it to the sky.

Photographers often use incident meters to get a sense of the difference between the light and shadow tones in an image. For example, imagine you are photographing a subject lit by a window. If you meter on the side away from the window (the shadow side), you will get one reading. If you meter on the side illuminated by the window, you will get another reading. The difference between these two exposures is called the light ratio—we'll look at this concept in the next section.

Another option is to hold the meter in the middle, with the white dome facing the camera, to get an averaged reading of the two sides. Each reading will yield a different result. The exposure you choose to use depends on what you want the outcome to be.

Light Ratios

When setting up a lighting situation, whether with natural or artificial light, the light source

◄ A meter held in front of subject for an average reading between highlight and shadow.
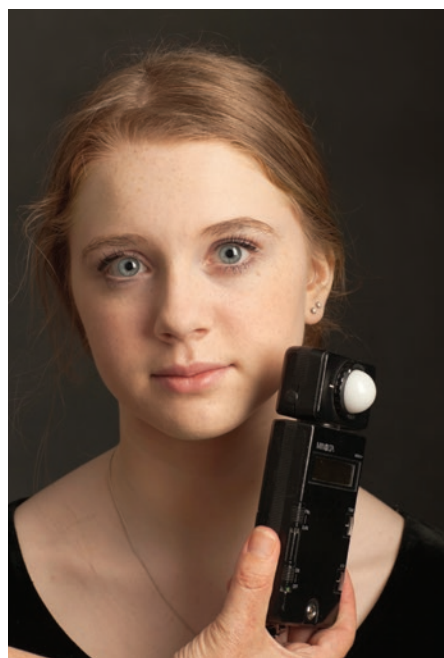
◄ A meter reading of the key light. Be sure not to block the light with your body or arm when doing this reading. A meter reading of the shadow side would be similar.

that creates the main pattern of light and shadow on the subject is known as the key light (or the main light). If you look back at the section on light positions (see pages 34–35), the light we were maneuvering to produce butterfly, loop, and Rembrandt lighting was the key light. The key light is the light against which any other light sources in the scene are measured.

Depending on what type of modifier is used (scrim, softbox, grid, etc.), the edges of the light can be either hard or soft. But for all sources, whether hard or soft, there will always be a highlight side and a shadow on the opposite side. The difference between the amount of light on the key-light side and the amount of light on the shadow side is called the light ratio.

One can visually evaluate a light ratio. Or, if you want to be more scientific and accurate, measure it with a hand-held meter. To do this, train your key light (window light, hot light, or strobe) on your subject. First, meter the brighter side. Then, meter the shadow side, placing the meter so that you avoid getting spillover from the key light. Compare the two readings.

If the meter reads f/8 on the key-light side and f/5.6 on the shadow side, that information tells you that the key-light side has twice as much light as the shadow side (remember, each 1-stop change in exposure doubles the amount of light; refer back to page 10 if you need clarification on this). Therefore, the ratio is 2:1. If the meter reads f/8 on the key-light side and the shadow side reads f/4, the key-light side has four times as much light as the shadow side; the ratio is 4:1. As a rule of thumb, for beauty light and babies, a more open (lower) ratio is recommended (such as 1:1, 2:1 or 3:1). When working with more dramatic personalities, feel free to use a more dramatic ratio, such as 8:1 or even 16:1.

The Interplay of Light and Shadow

Let's discuss this important aspect of lighting in some detail. First of all, light is a form of language. We communicate through the presence (or absence) of light and shadow. Light and shadow help create a sense of volume or three-dimensionality. Sometimes, photographers add too much light to the shadow side of the image, taking away the shadow. But just as there is yin and yang to life, a morning and a night, shadow is an important element in photography and painting. Knowing how to manipulate it is critical to creating an image that tells the story *you* want to tell.

Terms to Know

key light
The light source that creates the primary pattern of light and shadow on a subject. Also called the main light.

fill light
A light source added to brighten (but not eliminate) the shadows produced by the key light.

light ratio
A numeric description of the difference in the amount of light on the key-light side of the subject in comparison to the shadow side of the subject.

▲ An 8:1 ratio (f/8 for the key light and f/2.8 on the shadow).
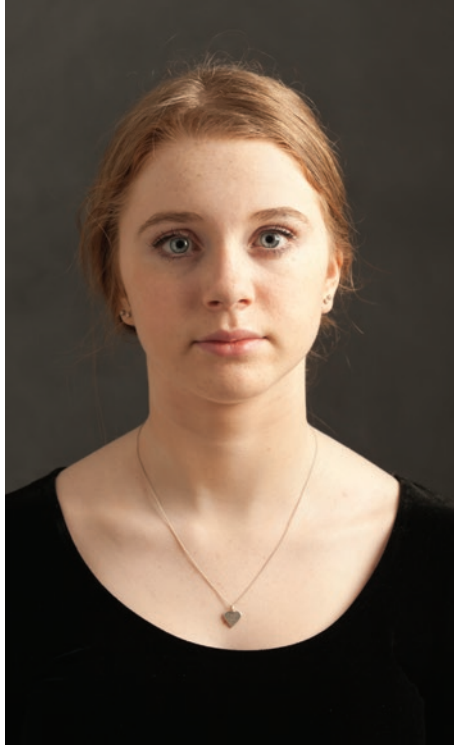
▲ A 4:1 ratio (f/8 for the key light f/4 on the shadow).
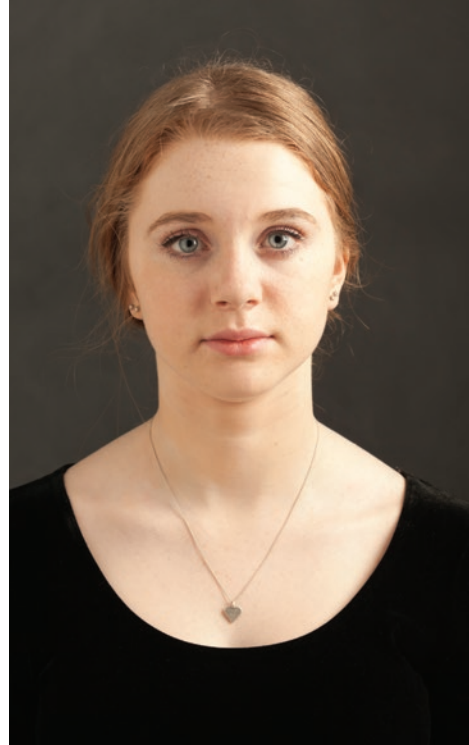
▲ A 2:1 ratio (f/8 for key light and f/5.6 on the shadow). Note that the light on her face is almost even.

Here's what is important to understand: when you meter the highlight and shadow sides of the subject to determine the ratio, *you are simply getting information*. These meter readings help you understand the relationship or *ratio* of light to dark. You do not necessarily have to change your camera settings based on the readings. If you do want to add light to reduce the ratio, you can easily do so with a fill card (more about that in the next section).

Quite honestly, it is not critical to do ratio readings. It is useful practice for photographers seeking to better understand the effects of light and shadow—but with a little experience, you will begin to innately know what ratio you want just by looking.

I recommend using a fill card (reflector) as a means of reflecting light from the source into the shadow area. See the next section for more specifics about how to use fill.

The Art of Fill Light

A portrait can be beautifully lit with only one light. When it is necessary to add light on the shadow side of the subject to reduce the light ratio, most professional photographers use a fill card (or reflector) rather than a second light

<div style="background:yellow">

Assignment 11:
Understand Light Ratios

Calculate the light ratios (such as 4:1) for the following:

Key-light side reading: f/8 / Shadow-side reading: f/4
Key-light side reading: f/16 / Shadow-side reading: f/5.6
Key-light side reading: f/11 / Shadow-side reading: f/2.8
Key-light side reading: f/22 / Shadow-side reading: f/5.6

</div>

► *(top)* When photographing babies and kids, it helps to use a broad source with a lower light ratio. That way, your subjects have more freedom to move around rather than being assigned to an exact place on the set.

► *(bottom)* This dramatic portrait is a result of using a very high light ratio in the range of 8:1.

source. This is because adding a second light source for fill produces a second catchlight in the eye, which can read as a little unnatural to hearts and minds naturally attuned to a world lit with one source—the sun. Opening up the shadows on the subject with a reflector or bounce card creates a more natural effect. (*Note:* If you do have a second light, save it to use as a hair light, a kicker light, or a background light—all of which will be introduced later in the book.)

Using fill light is an art unto itself. Fill cards or reflectors come in various shapes and sizes, such as collapsible light discs or rectangular sheets. Some reflectors are white on one side and silver or gold on the other. (*Note:* I lean away from using metallic silver and gold reflectors as they tend to fill with a hard light that can easily be misused). A very inexpensive and useful way to add fill is with a piece of white foam core.

To begin your study of using fill light, I recommend clamping a 32x40-inch piece of standard white foam core to a light stand with an A-clamp. Place this on the shadow side of your subject, adjusting it to catch the light from the key source and bounce it back onto the shadow side of the subject. The axiom to remember is one we looked at on page 28: the angle of incidence equals the angle of reflection.
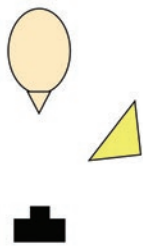
▲ Split light on the subject (shadow reading f/2.8, key light reading f/8.5).
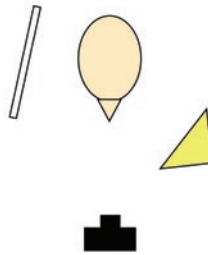
▲ Bringing in the fill card directly opposite the key light fills the shadow side (neck, jaw) but leaves a "valley of darkness" on the front of the face.
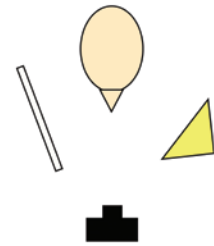
▲ The fill card was moved around toward the front of the subject for a rounded look that eliminated the "valley of darkness."

The art lies in the fine points of positioning the fill light. It is important to realize that the fill card *becomes* a light source when you use it to bounce light. When learning to use reflected fill, photographers often position the card too low or tip it up so it sends light upward, accentuating the bottom of the jaw instead of the side of the face.

It is also important to consider the distance of the fill source. The closer the card is to the subject (and thus the key light source), the more light it will bring to the shadow area. If you place it close enough, you can achieve almost a 1:1 lighting ratio. As you back it off, the fill diminishes and the shadow becomes more prevalent.

Here are some examples of manipulating lighting ratios with a single light source and a fill card (in this case, using foam core).

1. **Set the Key Light.** Position the key light on the subject to create Rembrandt, loop, or split lighting.
2. **Add Fill.** Bring in a fill card on the opposite side. You will notice that a fill card placed directly opposite the main source will indeed fill the shadow but it will also leave what I call a "valley of darkness" on the face rather than a beautifully rounded quality of light. This is where the nuance of fill comes in.
3. **Finesse the Fill.** To create a more rounded fill light (with no "valley of darkness") move the fill card slowly around to the front so it picks up the feathered light of the main source. It will continue to reflect light back onto the subject as you bring

it more forward. You will end up with a beautifully rounded fill light. If you then back it off, away from the subject, you will have more control over the light ratio.

Inverse Square Law

We touched on this subject in chapter 3, but now that you understand metering, let's go back and look at how the distance of the light to the subject affects the exposure. Again, think of a headlight beam and how the light spreads out from the bulb as it reaches into the darkness. Close up, it seems bright—but the light dims quickly as its photons spread out. Using the Inverse Square Law, we can predict this falloff of light relative to a distance traveled.

Let's say you have a subject that is 1 foot from a source with a meter reading of f/22. If you move the subject to a position 2 feet from the light (doubling the distance from the source), the amount of light would not be cut in half (from f/22 to f/16) as you might expect. Instead, you be cutting the light to *one-quarter* (f/11) of its previous intensity on the subject.

Here's how to calculate this change in intensity using the Inverse Square Law. First, you square the change in the distance between the light source and the subject. In this case, you doubled (2X) the distance; squaring that (2x2) gives you a value of 4. The inverse of four is ¹/₄. This tells us that, at twice the distance, the light has only *25 percent* of the intensity it did at the original distance. That is a lot of light loss in a small distance.

Now, let's say you move the subject even farther—putting them 4 feet from the source. Now you have quadrupled (4X) the distance; squaring that (4x4) gives you a value of 16. Inversing that, you can see that the amount of light would be ¹/₁₆ the original. If you put this in terms of a percentage of light, that means you're down to 6 percent of the original value.

You can see from the chart below that once the light has traveled a certain distance (4X the original), the rate of falloff diminishes rapidly. Returning to our example with a light 1 foot from the subject, the falloff of light between 5 feet and 10 feet would be only 3 percent—whereas between 1 and 2 feet it was 75 percent!

	Base	Intensity reduction with chance in distance								
distance	1x	2x	3x	4x	5x	6x	7x	8x	9x	10x
fractional	$\frac{1}{1}$	$\frac{1}{4}$	$\frac{1}{9}$	$\frac{1}{16}$	$\frac{1}{25}$	$\frac{1}{36}$	$\frac{1}{49}$	$\frac{1}{64}$	$\frac{1}{81}$	$\frac{1}{100}$
percentage	100%	25%	11%	6%	4%	3%	2%	2%	1%	1%

There are numerous scenarios where this information can be put to good use. For example, if you have a subject close to the light source (1 foot, for example) and a background 8 feet behind them, the light on the subject will be strong ($\frac{1}{1}$) while the light on the backdrop will be much dimmer—$\frac{1}{64}$ the amount of light. As a result, the backdrop may appear to not be lit at all.

If you then moved the subject closer to the background, so the subject and background were both receiving $\frac{1}{64}$ of the light, both the background and subject would be lit the same. (Of course, you would also need to adjust your camera settings for the proper exposure.) By moving your subject closer to or farther from the source, you can light or not light the background with the same light.

Here's another scenario. Imagine you are photographing three people who are staggered from front to back. Subject A is posed 1 foot from the light and subject C is 3 feet from it. As a result, there is a huge difference in the amount of light on the subjects—it drops by nearly 90 percent from subject A to subject C! A solution would be to move the light back from *all* the subjects so they are posed within a broader swath of more even light. If subject A is posed 7 feet from the light and subject C is 9 feet from it, there will only be a 1 percent difference in the amount of light on them.

▼ The same window was used to create both of these images. Shooting with continuous light (like window light) is a good place to start learning about lighting—and it's the subject of our next chapter.

4. Continuous Light

Now, after exploring the concepts of light direction, light height, metering, ratio, fill, and catchlights that are applicable to all kinds of light, we are ready to delve into the practice of lighting. There are two kinds of light we will be discussing in this book: *continuous light* and *flash.*

Continuous light: the sun and the moon, light in the office, lights at home, the light of a campfire, a flash light, neon lights, LED lights, etc. Continuous light is a steady stream of photons measured by time (shutter speed) and volume (aperture). Continuous light can be produced artificially or can occur naturally.

What is wonderful about working with continuous light is what you see is what you get.

Flash is what you find in your camera flash or the studio power packs. It is a burst of intense light released in a fraction of a second. Flash generated by power packs is normally used in a studio, but it can also be taken on location (with a generator, battery-pack or small speedlights). On location, flash can be combined with continuous light for powerful and dramatic lighting effects (which will be discussed later in this book).

What is wonderful about working with continuous light is what you see is what you get. So continuous light is a great way to begin to learn about lighting.

Continuous NATURAL Light

The beautiful thing about daylight is that it is costs nothing and can be found everywhere (at least during daylight hours). That means you can shoot without lugging around a lot of heavy lighting equipment—just a tripod and fill card should do the job.

Working Outdoors

The color of natural light (daylight) varies. Morning light tends to be cooler in color than evening light, especially in the summer when there are lingering red sunsets enhanced by smog, forest fires, etc.

Outdoors, the quality of light depends on the height of the sun in the sky. In that regard, early morning and late afternoon would produce a more flattering light. Overhead light (such as high noon) tends to produce unflattering, hard shadows, though there are ways to deal with it, such as having your subject lie on the ground and look up at the sky (for a version of front light if you photograph from overhead). In most cases, when the sun is at a low angle, the subject can be positioned to create front light, back light, side light, etc. The quality of the light is also affected by clouds, which may diffuse the light as a large softbox in the sky or, if the clouds are thick, create a dull heaviness.

Working with light outdoors may seem pretty straightforward, but there are many ways to improve outdoor light with subject positioning.

For example, with the sun low in the sky, you can rotate yourself and your subject to use side light, back light, front light, broad light, short light, loop or Rembrandt light. If the light is too contrasty, you can sometimes bring in a fill card

to achieve beautifully lit and nuanced portraits, similar to what you would do in a studio setting where you have complete control of the lights. Or you can soften strong light with a scrim.

One of my favorite ways to photograph outdoors is to work late in the day (or early in the morning) so I can get a backlit situation. With backlight, the subject doesn't have to look directly into the sun. I then add a fill card to light the face with bounced light. One thing to be aware of is that the bounced light can be very hard for the subject to look at, so being sensitive to this will help your subject. Also, if the light is very low, you may get flare from the sun. This can be avoided by changing your angle slightly, using a lens hood, or having someone hold a card (called a "flag") above your lens to block out the direct sun.

When working outdoors with natural light only (as opposed to a combination of strobe and natural light, where there are more options),

◀▼ If flare is an issue, you can use pieces of foam core to flag the light. Sometimes, a little flare adds some interest to the image, so experiment with that when the opportunity arises.

▲ The photo of the woman with the hat (*left*) was backlit. A fill card was used to gently bounce light back onto her face. The woman with the green blanket (*right*) was facing the late afternoon sun.

you need to be aware of what kind of light is falling on the subject and what kind of light is falling on the background. If you have shade on a subject, but the background is in sun, you will likely have either an underexposed subject with a normal background or a normally exposed subject with an overexposed background. Using fill cards can help bring more light to the subject, but it is probably best to find a situation with more balanced lighting on both the subject and background—at least until you learn how to add

strobes to balance your lighting (we'll look at that later in this book).

Window Light

Interior window light also provides many options for beautiful split (side), short, broad, and back lighting. If the light from a window is indirect, like that from a north-facing window, it is like using a giant softbox. If the light from a window is direct, such as that from a west-facing window in the afternoon, it can provide strong, hard light with dramatic shadows. Strong window light can be modified with a sheer curtain or other type of scrim. Alternatively, you can use the direct light as a backlight source and add a fill card to bounce light onto the subject.

Stabilize Your Fill Card

If you are working alone outdoors, fill cards can easily become airborne. A sandbag is useful to stabilize your light stand. Or you can secure a heavy camera bag on the bottom of the light stand and clamp the reflector or fill card with two (not one) A-clamps. Or use an assistant.

◄ (*left*) Split light from a window.

◄ (*right*) Split light with fill.

◄ (*left*) Short light from a window.

◄ (*right*) Short light with fill.

◄ (*left*) Broad light from a window.

◄ (*right*) Broad light with fill.

► A photograph taken with window light.
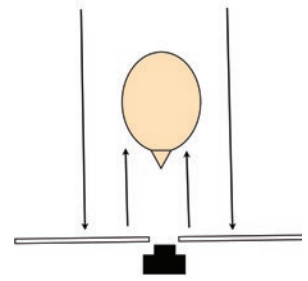
◄ This photograph was made using backlight from a window above and behind the women. I used two 4x8-foot sheets of foam core to bounce the light onto their faces. The sheets of foam core, supported by light stands, were placed very close together on either side of the camera—with just enough room for my lens in between them. This created a wall of white light to bounce back on my subjects.

The height of the window is also something to pay attention to. If you are in an attic and the light source is a low window, you will have to be aware of where your light source lands on your subject. If it is too low, it can give an odd up-lighting or ghoulish effect.

Although working with daylight is relatively simple, it becomes even more versatile when you add fill cards (reflectors), in the same manner as you would use them outdoors or in the studio.

Although working with daylight is relatively simple, it becomes even more versatile when you add fill cards

Assignment 13: Practice with Window Light

Using a tripod and a mannequin head (or a real person, if they hold still), light your subject with window light. Do a sequence of images, leaving your camera in the same spot but rotating the subject to get side (split), short, and broad light.

Camera Controls for Creative Use of Continuous Light

Working with continuous light allows the flexibility to use both shutter speed and aperture to determine exposure. Often, if doing portraiture, a photographer will choose a shallow depth of field, throwing the background out of focus in order to isolate the subject. If light levels are too low, it is easy to increase the ISO so the shutter speed remains high enough to prevent blur due to camera movement.

Aperture

The choice of aperture for a continuous light portrait depends on the length of the lens (the longer the lens, the shallower the relative depth of field), the situation (a subject in motion will make focus more difficult when using a shallow depth of field), and whether there is more than one person in the portrait, which might require more depth of field. As noted above, portrait photographers often choose a shallow depth of field to throw the background out of focus and isolate the subject.

Shutter Speed

The choice of shutter speed can be a tool for the opposite effect: blur. Slow shutter speeds allow for an exploration of movement, the results of which can range from amusing to stunning. On the other hand, a fast shutter speed can be used to stop motion. Many photographers who shoot athletic events use fast shutter speeds to stop the action, such as $1/500$ or $1/1000$ second.

▶ Two images from a series of photographs for the Seattle Symphony created using a slow shutter speed and (with the clarinets) camera shake to capture the energy of music.

Assignment 14: Natural Light Projects (Beginner Level)

Part 1: Outdoor Lighting. With your camera on a tripod, photograph a series of mannequin-head "portraits" that demonstrate an understanding of front, short, broad, side (split), and back light. I suggest that you use early morning or late afternoon light for this assignment. With the exception of the front light, do one shot with fill (positioned fairly close) and a second shot without fill. (*Note:* It is easier to do the fill shot first and then whisk it away for your second, unfilled shot.) Take notes with sketches and/or photograph small note cards in each image to indicate what you have done. Create overhead diagrams of your lighting.

Part 2: Indoor Lighting. Photograph a mannequin head using soft window light (such as north light). Position your model close to the window and yourself adjacent to the same wall so you are shooting down the wall toward the window that lights your subject. Explore how the model looks side lit (split light), looking directly at camera. Do this with and without fill. Try turning the head toward the window to produce short lighting, then turn it away from the window to produce broad lighting. Again, do these setups with and without fill. Create an overhead diagram of your lighting setup for each shot.

Part 3: Image Study. Collect tear sheets from magazines, images photographed from books, or photographs printed from the Internet that show some of the above natural lighting scenarios. Look for the catchlights in the eyes as your main clue, as well as the shadows on the nose, chin, and clothing. Start a digital or hard-copy collection of your images.

Assignment 15: Natural Light Projects (Advanced Level)

Part 1: A Portrait Series. Using a real person, create a series of portraits. Try to create interesting, well-lit images—paying attention to the skin (does it need powder?), hair, and clothing in addition to the lighting. Also, pay attention to your composition, depth of field, etc. Do your photographs with and without fill. Approach this assignment as if you were creating images for a real portrait job. Use front light, back light, etc. to create a variety of well-composed, well-lit portraits that would work well in your portfolio. Create overhead diagrams of your lighting.

Part 2: Stillness and Motion in One Image. Find an interior location lit with natural light (such as a school hallway or an art gallery) where you can use a slow shutter speed. Place your subject in a seated or standing pose. Using a tripod, photograph them at a slow shutter speed while others are walking past or moving around, capturing both the sharply focused subject and the sense of movement around them.

Part 3: Still Life. Some photographers prefer not to work with people. If that is you, then try working with a still life. Using no more than a few simple props, such as fruit or books (nothing fuzzy and no shiny metal at this point), create a well-composed still life. (It may be helpful to look at some art history books for ideas.) Place your still-life objects on a surface, such as a small table, that can be turned to vary the lighting from the daylight source. Try shooting with and without fill. Observe how the drama and meaning change as your light changes. Make overhead sketches of your setups.

Part 4: Tear Sheets. Collect tear sheets that demonstrates some of the lighting scenarios that inspire your work.

Part 5: Inspirations. Look up the portraiture and still-life work of the very versatile Irving Penn. Who inspires *you?* Study the work of other photographers who inspire you and your aesthetic.

▲ Examples of pan shots photographed at $^1/_{25}$ second (*left*) and the same situation at $^1/_{500}$ second (*right*). Which do you think is more effective?

Another way to capture motion is with a "pan" shot. By using a slow shutter speed while tracking the movement of a runner or vehicle moving parallel to the plane of your camera, you can blur the background while keeping the subject sharp. The choice of shutter speed for a pan shot depends on the relative speed of the subject.

The key to a successful pan shot in which the background is perfectly blurred and the subject is sharp is to start moving the camera with the subject before depressing the shutter release so you are basically moving at the same pace as the subject. Keep the camera steady by bracing it with your elbows against your body—or use a monopod/tripod with a panning head to keep the camera level.

Rules of Thumb

For a shallow depth of field portrait:
  f/1.2 to f/4
For scenic shots: f/8 to f/22
For a pan shot of a runner: $^1/_4$ to $^1/_{15}$ second
For a stop-action shot of a person:
  $^1/_{250}$ to $^1/_{1000}$ second

Continuous ARTIFICIAL Light

Continuous artificial light is a huge subject. In this book we will divide it into three parts to make it easier to understand:

1. **Ambient artificial light.** This is existing light found in homes, offices, schools, etc.
2. **Continuous photographic light sources.** These include hot lights, daylight balanced fluorescent lights, and LEDs designed for professional photography.
3. **Continuous light combined with strobes.** This is one of the most exciting and powerful aspects of working with light, which will be covered later in this book.

Ambient Artificial Light

Just as we are surrounded by natural light, our worlds are also lit by a rainbow of artificial lights—the tungsten lights in our homes; various types of fluorescent lights in factories, malls, schools, and office buildings; sodium vapor lights that illuminate our parking lots; and even the neon lights on Broadway.

Each of these light sources falls into a different and potentially exciting place on the color

spectrum. Neon lights can be blue, yellow, red, or green. Tungsten and quartz-halogen sources

appear orange when photographed at a daylight color balance. Sodium vapor lights are yellowish-green. Fluorescent lights can produce a pale greenish cast or (for more modern lights) can be daylight balanced.

In some circumstances, we have no choice but to use existing artificial light with no opportunity to improve the light as it presents itself. Knowing how to adapt to existing light situations is a useful skill for any photographer or videographer. And learning how to improve them is the key to making good photographs with all kinds of light.

What About That Color?

One of the most basic things that can be done about working with artificial continuous light is to adjust the camera's color balance setting to match the color of the predominant light source. For example, if the primary light source is tungsten, you would set your camera's color balance to the tungsten setting. This applies a blue correction to the orange light. Blue is the complement to orange, so it neutralizes the color of the tungsten light (refer back to page 16 for more on this). Fluorescent lights—especially the older ones in factories, stores, and schools—produce a greenish cast. To compensate, use the fluorescent setting on the camera to neutralize the green cast. (The color can be further refined

My goal was to create a series of images that looked like Old Master paintings to celebrate the 95th anniversary of the symphony. All of the photographs were done with tungsten-balanced hot lights using a daylight setting (daylight-balanced film). In this case the film, a grainy Agfa 1000, added to the painterly feel of the image. The tungsten light added an overall warmth.

Assignment 16: Light and Color

Part 1: Color and Natural Light. Photograph a white sheet of paper in natural light using the different color balance settings on the camera (such as daylight, tungsten, cloudy day, and fluorescent). Keep in mind that the white will fool your meter into underexposing the image, so you will need to adjust your exposure settings accordingly. Take careful notes about which image was created at which setting.

Part 2: Color and Artificial Light. With your camera on the daylight white-balance setting, take a piece of white paper to various locations and photograph it under tungsten, fluorescent, and other types of lighting. Make sure you keep your exposure of the paper the same for each lighting situation. In other words, if you overexpose by 1 stop for your first image, then do the same for each of the subsequent shots.

Terms to Know

fluorescent light
A continuous light source in which mercury vapor gas fluoresces as voltage passes through it. Most fluorescent lights have a greenish color cast; however, newer bulbs may be daylight balanced.

quartz-halogen light
A continuous light source containing a tungsten filament in a quartz casing filled with a halogen gas. Quartz-halogen lights have an orange color cast.

sodium vapor light
A continuous light source containing ionized sodium gas. Sodium vapor lights have a yellow/green color cast.

tungsten light
A continuous incandescent light source that uses tungsten as a filament. Tungsten lights have an orange color cast.

or adjusted when processing the RAW images on the computer.) Many modern fluorescent lights have a daylight color balance and may not need color correction.

Photographic Light Sources

The continuous light sources designed for photography fall into three basic categories: hot lights (halogen or tungsten), daylight-balanced fluorescent lights, and LED sources. Hot lights are often used for portraiture and architectural lighting. LED sources, which are daylight balanced (or may have adjustable color), are often used for video and are now being adapted for still photography.

Hot Lights. Hot lights are called hot because they *are*. Equipped with halogen or quartz-halogen bulbs (a form of tungsten light), they produce clean, beautiful lighting that can be bounced onto a white board to make it softer. Because they are hot, they can't be used with softboxes, but some can be used with heat resistant umbrellas. You can use color-correcting gels with hot lights, provided you keep them far enough from the lamp to avoid a fire. (More about gels coming up.) In addition to being good light sources for portrait photography, hot lights can be used for beautiful still-life and architectural images.

There are various brands of hot lights, ranging from inexpensive models to ones that are quite costly. They can generally be rented at camera

▲ Mini-Mole fresnel light with barn doors.

▲ Mole Richardson Baby Soft light with grid.

rental stores or from suppliers of movie lights. Mole Richardson and Arri are two name brands that are well-known to people in the movie industry. Another light, one that many are familiar with, is the Tota-Lite. It is a compact, collapsible light that uses a halogen bulb. Tota-Lites produce a hard, broad light that can be useful to bounce into the ceiling or an umbrella to light a room. They are not as easily controlled as some other sources, but with some creative use of modifiers or flagging they can be useful.

Daylight-Balanced Fluorescent. Daylight-balanced fluorescent sources come in a variety of types. Some have daylight-balanced bulbs housed in a softbox. Others, like those in the Kino Flo systems, have long, straight tubes. The fixtures may consist of a single bulb, or they may have multiple bulbs—up to five or six, with the option of having some or all of the lights illuminated.

The Bell-Shaped Reflector

For the beginning photographer, a bell-shaped reflector with a single bulb (a tungsten bulb or daylight fluorescent bulb) can be an affordable option for portrait or still-life lighting. When using the bell-shaped reflector, you can apply some of the techniques discussed earlier—such as using a scrim or fill card to diffuse, bounce, and otherwise modify your source (though you must be careful of the heat the hot lights produce). The challenge, aside from managing the quality of your light, is juggling color. As you become more discerning about your lighting, you can invest in higher quality daylight-balanced fluorescent softboxes, tubes, and other sources.

▲ A Spiderlite TD6 in a softbox and also showing the daylight fluorescent bulbs.

The advantage of these daylight-balanced fluorescent sources is that they produce a beautiful soft light and practically no heat (as opposed to hot lights). They can easily be used in combination with ambient light or by themselves. One thing I love about them is that they make it easy to shoot at wide apertures for a very shallow depth of field. One of the disadvantages is that they are more bulky to transport than smaller flash units.

LED Lights. LED lights are continuous sources that are becoming increasingly popular for use in still photography. Previously used mostly for video, manufacturers are making them available to still photographers—along with all the modifiers needed for precise control.

Color: Mixing It Up

The varied colors of continuous artificial light sources can be used creatively, alone or in combination with other sources, to create a sense of mood or to tell a story. For example, you can add a tungsten light to a daylight situation. Since daylight is cooler in color (blue) in comparison to tungsten light, adding a tungsten light source will appear warm (orange) on your camera's daylight setting. The juxtaposition of the cooler daylight with the warmer tungsten can make for a compelling image. Combining various light sources is often used in architectural photography wherein an interior is lit with warmer accents (tungsten lamps, fire in the fireplace) while the cooler daylight spills in through the windows.

Assignment 17:
Research and Replication

Part 1: Research. Look for work by the following photographers: Irving Penn, George Hurrell, and Yousuf Karsh. Select one photograph from each photographer and create a lighting diagram showing how you think the image was lit.

Part 2: Replication. Find a model and replicate the images you selected in part 1 of this assignment. Try to match the pose, the lighting, and the feel of each photograph.

Adding Gels

You can also alter the color of any light source by using color gels or color filters. Color gels are available (from suppliers like Lee Filters and Rosco) in a rainbow of colors, as small sheets or by the roll. Some gels are more commonly used than others.

Orange Gels. Orange gels (sometimes called CTOs for "color temperature orange") are used to add warmth to an image. Given that orange and blue are complementary colors, the orange gel will convert the cool color of a daylight source to a warmer tonality—closer to tungsten. Like other gels, they come in a range of color intensities, adding various degrees of color change. A full CTO provides a full tungsten correction to a daylight source; a $\frac{1}{2}$ CTO provides half that much orange tonality; a $\frac{1}{4}$ CTO offers just a hint of color, etc. If you want to warm up a source such as a daylight-balanced fluorescent light (see previous section), you could select a $\frac{1}{4}$ CTO gel to hang over your light. Of course you can make adjustments of color in your RAW files, but the gels are very useful if you want to create a relative difference in an image, such as warming the light on the subject while letting the background remain cooler in color.

Blue Gels. Blue gels (called CTBs, short for "color temperature blue") have the opposite effect. They are used to neutralize the warmth of a tungsten light toward a cooler daylight direction. A full CTB would correct an orange tungsten light to a daylight balance. They also come in degrees of correction, similar to the CTO gels.

Neutral Density Gels. Neutral density gels are grayish gels that reduce the total output of a light without changing the color. They come in a range of densities and are very useful to help to control the output of light to make it just what you want it to be.

Tough Plus Green Gels. Tough Plus Green is a green gel that is used to change a daylight light source (strobe or dedicated flash, in particular) to a color that matches some of the older fluorescent lights. We will delve into this more in the strobe section.

Still-Life Photography with Continuous Light

Still-life photography is a great opportunity to bring different sources together to create mood. With continuous light, you can easily control the depth of field and more readily observe the effect of adding or subtracting light. When doing this kind of work, keep the camera on a tripod so you can easily see the changes that occur when you adjust the lighting.

Be Careful with Hot Lights!

If you are working with hot lights, you must place the color gel far enough in front of your light (attached to a separate light stand with a clamp for example) that the gel won't melt or catch on fire.

Terms to Know

CTO
An orange gel or filter used to make a daylight-balanced source warmer, more like a tungsten source.

CTB
A blue gel that is used to make a tungsten light source more closely resemble daylight.

Tough Plus Green
A green gel that is used to change a daylight-balanced light source (strobe or dedicated flash in particular) to a color that matches some of the older fluorescent lights.

neutral density
A gray gel used to cut light intensity without altering its color.

▲ A still-life of plums shot with natural light only.

▶ (*top*) A still-life of plums photographed using tungsten light and natural light. Tungsten light added warmth to the image.

▶ (*bottom*) The set, with a window and a tungsten light on the left of the set. You can see the effect of the gobo on the background.

If using a window light to create the basic light for a still-life, try adding fill cards just as you would if doing a portrait. Then, to add mood, try placing a little tungsten light to bring warmth to the image. You can even get creative with small light sources (such as flashlights) and small pieces of reflective material (such as aluminum foil, bits of mirror, and foam core) to bounce light onto specific areas of the image.

Still-life images are more effective if you use backlight or side light rather than front light, which produces a rather bland result. Think of how a landscape looks on a beautiful late afternoon; the backlight and side light help create a sense of dimensionality that is lacking at other times of the day. This same concept applies to still-life photography. Your job as a photographer is to tell a compelling tale with your images, so take the time to explore the light that will help you create that sense of story.

Assignment 18: Still-Life Experiment

With your camera on a tripod, create a still-life using three objects (such as fruit) or three shapes (such as a cylinder, cube, and pyramid). Use soft window light as your key light source. Illuminate your still life from the side and use subtle fill from the side opposite the window. Then add a hot light—even a desk lamp will do—from the same side as the window and from about the same height. The tungsten light will provide a warm, more sunny feel in contrast to the cool daylight. You can play with the light by placing some shapes in front of it (such as Venetian blinds or pieces of foam core) to break it up. As you work, you can also experiment with adding bits of light to the shadow side by using small shards of mirror or aluminum foil off-camera.

Assignment 19:
Painting with Light

You will need to do this at night or in a dark room. Place your camera on a tripod. Focus on your subject at about f/8 or so and then turn your focus to manual so it won't change after you turn out the light. Set your camera on a long exposure—30 seconds or more. Then turn off the room light, press down your shutter release button and proceed to "paint" your subject with the light of your flashlight. You can add gels as you work. Once you have completed your "painting," review the image on your camera and decide if you need to raise your ISO or change your exposure time. Have fun with this!

Assignment 20:
Portraits and Motion

You can get some interesting effects by having your subject move while photographing them with a continuous light source. Experiment with creating a studio portrait of a person using slow shutter speeds ranging from $\frac{1}{2}$ second to $\frac{1}{8}$ second. The speed of your subject's movement will make a difference, as will the length of the shutter speed. Use a tripod for this series.

Alternatively, you can move your camera while your subject holds still. For this experiment, I recommend mounting your camera on a tripod. Then, focus on your subject. Lock the focus so it won't shift while moving the camera. With the tripod head loosened, move your camera during the exposure. Compare your results.

Have Fun with Continuous Light

Working with light can be magical. With continuous light, you can utilize both your shutter speed and your aperture to get the exposure you want. You can work at a slow shutter speed for blur or a wide aperture for shallow depth of field. One of the more fun things to do with continuous light is to play with flashlights, especially a LED flashlight—but others will work as well (for example, a red laser light). You can even put gels on your LED light or flashlight to get different colors. If you use both an LED and tungsten-bulb flashlight, you will get an idea of how different their colors are.

One of the more fun things to do with continuous light is to play with flashlights . . .

Terms to Know

painting with light
Using a small light source to selectively illuminate parts of a scene or subject during a long exposure in a dark environment.

5. Strobe Light (Flash)

When photographers speak of light, we discuss two basic types: continuous light and flash. So far, we've discussed continuous light, which we experience as a steady stream of light (photons) controlled by adjusting the camera's aperture and/or the shutter speed.

What is flash? And how does it differ from continuous light?

What Is Strobe?

Strobe light is an intense burst of light from a gas-filled tube located in the flash head. The flash tube is filled with an inert gas called xenon that produces a color spectrum similar to daylight. When one depresses the camera's shutter, several things happen:

1. A signal is sent to the power pack (either by a sync cord or a wireless transmitter), to which the lights are attached.
2. The power pack, which contains capacitors that store energy, then discharges a high voltage of electricity that travels up to the flash head and ionizes the gas in the flash tube.
3. This produces an intense burst of light.

There are primarily two different kinds of flash units available. One is the power pack into which you can plug multiple heads. Power packs are generally plugged into an electrical outlet or generator but some can be battery-operated. The other is the monolight, a self-contained flash unit unto itself.

A power pack allows you to control the output of one to four heads from the central unit. The disadvantage is that the length of the cords limits how far the strobe heads can travel from the power pack. On these units, note that the plug from the strobe head that attaches to the power pack is fragile. It has pins inside that correspond to openings in the power pack plug receptacle. I ask my students to treat the plugs like fresh eggs. Don't drop them or it may jar the pins loose. That can cause your power pack to short out. That, in turn, will cost a fair amount of money to repair.

With monolights, each light is a self-contained unit. If you are photographing in a smaller space, either type of light will work. If you are trying to light a larger space, the monolights will be advantageous because no cords to the power packs are necessary. Both power packs and monolights will work together (they have infrared sensors) when you trigger them from the camera.

On these units, note that the plug from the strobe head that attaches to the power pack is fragile.

▲ A strobe head with a protective glass covering over the flash tube.

▲ An example of a power pack, in this case a Profoto 7b.

▲ A monolight, which is a self-contained strobe unit and head all in one.

Be Careful!

When changing the modeling light or the flash tube, be sure to wear cotton gloves. The natural acids on your fingertips can compromise the bulbs and reduce their life expectancy.

▲ The circular flash tube with modeling light in the center.

Terms to Know

power pack
A capacitor-containing unit to which individual strobe heads are connected and from which they draw their power.

head
An individual strobe unit.

monolight
A self-contained strobe head with a built-in capacitor allowing it to be directly powered (without a power pack).

modeling light
A continuous light source that allows you to preview the effect of the strobe burst.

Modeling Light

In addition to the flash tube there is a second light in the flash head called a modeling light. This light, usually a 100–250 watt halogen light, is designed to help preview the light that the strobe will emit on the subject. The modeling light provides a continuous light source with a tungsten color balance. The modeling light is a low enough wattage that it won't affect your flash image unless you are shooting at a very slow shutter speed. Actually, combining flash with slow shutter speed can make for some interesting combinations: The daylight balanced flash will stop movement and the slow shutter speed will record movement as blur, created by the tungsten modeling light.

Because the strobe light is a quick and intense burst of light, the modeling light, in most circumstances, can remain illuminated while working with strobes .Why? Normally, when working with strobes, the ISO is low (*e.g.,* 100), the shutter speed is high (*e.g.,* $^1/_{125}$ second) and the aperture is small (*e.g.,* f/11) so the input from the tungsten modeling light will not record on the digital sensor. There are exceptions to this which we will explore later.

Why Use Strobe Lights?

Strobe lights are often used by professional photographers because they produce a consistent daylight balanced light. They are compact and relatively easy to transport. They are able to stop movement, even if using a slower shutter speed. It is possible to use a variety of modifiers and gels to get the "look" or quality of light that you want. You can adjust the power of each head so you can light your subject and background separately and with different levels of light output for a very refined result.

How Strobe Differs From Continuous Light

Both strobes and some continuous light sources use modifiers to shape the light. Some daylight fluorescent continuous sources have the option of softboxes, umbrellas, beauty dishes, parabolic modifiers, etc. The same is true for strobes, though strobes have even more modifiers or light shapers to choose from. (*Note:* Hot lights, because of the heat factor, do not have the same options, although there are some).

► This image was taken at f/11, using a long shutter speed of 1 second. It's an example of pairing flash with a slow shutter speed to allow the modeling light to illuminate part of the image.

Very important (*please pay attention here*): What makes continuous light and strobe light different from each other is the fact that continuous light is controlled by a combination of the aperture *and* the shutter speed. If you want a shallower depth of field (for example, f/4 instead of f/8) you can compensate for the change in aperture by balancing the exposure against your shutter-speed reading. The aperture and

shutter speed are in a reciprocal relationship, which means that when one goes up, the other goes down to balance it. For example, if photographing someone at f/8 at $^1/_{15}$ second, the equivalent reading at f/5.6 (more light) would be $^1/_{30}$ second (less light) and the equivalent reading at f/4 would be $^1/_{60}$ second, etc. In other words, to create a correct exposure, the length of time (shutter speed) and volume of light (aperture) must balance each other.

▲ The larger the aperture, the more light will be allowed to enter.
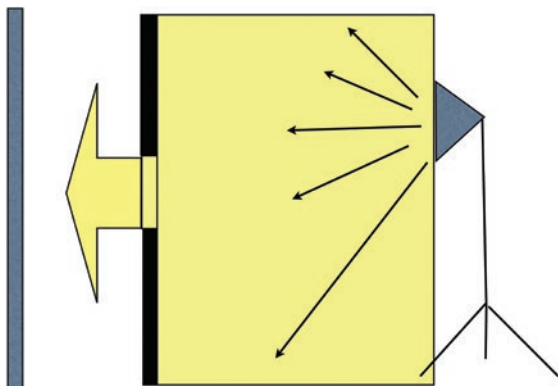
▲ At f/4, more light enters the lens.
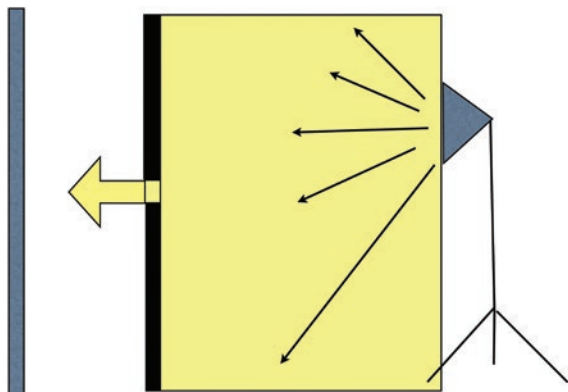
▲ At f/16, less light enters the lens.

Strobes work differently. This is something that often confounds beginning students, so take time to understand these concepts: With strobes, the correct exposure for the amount of light emitted by a power pack is controlled in two primary ways.

1. The settings on the power pack which increase or decrease flash output. This helps to control the general output but it still needs fine-tuning with your aperture to achieve the look you want.

2. The aperture (*not* the shutter speed). Thus, it is different than working with continuous light. The size of the aperture (f/4, f/8, f/16, etc.) is the mechanism that manages the amount of strobe light entering your lens. The shutter speed doesn't really affect exposure when you meter for your strobes until later, when we learn to mix strobe light with continuous light. To help understand this, imagine that the light emitted from a strobe head is actually a bucket of light. If you toss this bucket of light toward your camera, it all arrives at once. The way to control the amount of light that reaches your sensor is to open or close your aperture. The bigger your aperture, the more light will reach your sensor and vice versa.

Shutter Speed and Flash: Sync Speed

When working with flash, even though the exposure is primarily determined by the aperture, the shutter speed is also very important. Why?

Let's step back for a minute to understand how the camera works. Your digital sensor (or film) is exposed by two curtains that travel in a

curtain	curtain	curtain	curtain	curtain
1/200	1/250	1/320	1/400	1/500	1/640
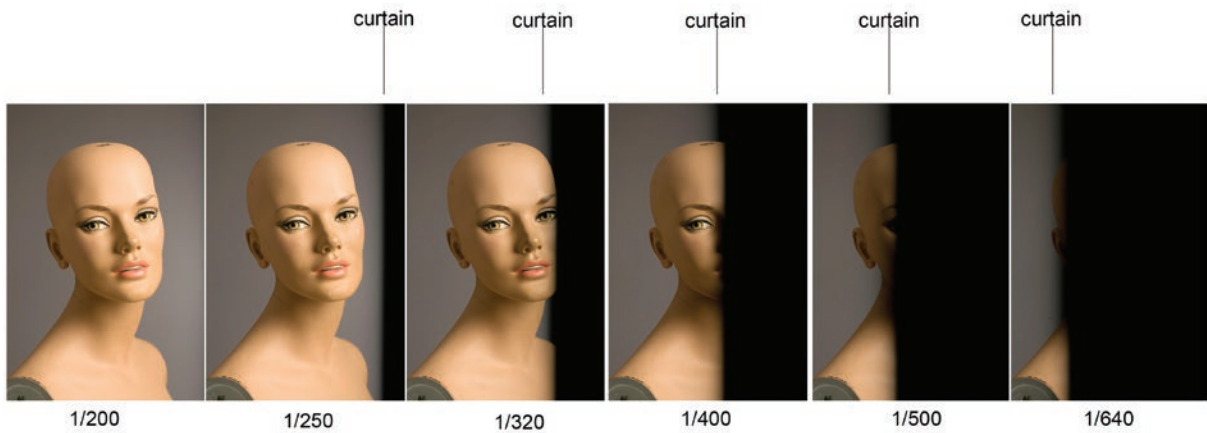
▲ The sync speed on my Canon camera is $^1/_{200}$ second. At any shutter speed slower than $^1/_{200}$ second, the curtains are wide open, exposing the entire digital sensor. At any shutter speed above $^1/_{200}$ second, the curtain obscures part of the image.

synchronized manner across the sensor. If you are photographing at $^1/_{1000}$ second, the two curtains move in tandem across the sensor revealing only a small opening to the light as they travel across the digital sensor.

When you have a slower shutter speed, such as $^1/_{250}$ second, the curtains are farther apart, but are still traveling in tandem across the film or sensor, thus covering part of the sensor as they travel rapidly across it.

When photographing with a flash, the digital sensor needs to be completely exposed to light.

In other words, the curtains must be wide open, as in a theater, to expose the whole sensor. The shutter speed at which this happens is called the *sync speed*.

Thus, the sync speed is the highest shutter speed at which the curtain is wide open to expose the entire digital sensor to light. In most

Shutter Types

Most of today's digital cameras (by Canon, Nikon, etc.) employ a focal-plane shutter, with two curtains moving in tandem that allow light to pass through to the sensor for a set amount of time. Some cameras (by Hasselblad, for example) feature a leaf shutter, comprised of overlapping metal leaves that function like a diaphragm. Those cameras do not have same the sync speed limitations of models with a focal plane shutter.

Terms to Know

sync speed
On cameras with a focal-plane shutter, the shortest shutter speed at which both shutter curtains are simultaneously clear of the image sensor, allowing it to be exposed by the short burst of light from a flash/strobe.

focal-plane shutter
A system with two curtains moving in tandem that allow light to pass through to the sensor for a set amount of time (determined by the shutter speed).

leaf shutter
A system with overlapping metal leaves that open to allow light to pass through to the sensor for a set amount of time (determined by the shutter speed).

Assignment 21: Sync Speed

With a mannequin head, doll, or real person (who will hold *very* still) create a series of photographs with a strobe light. Start at a shutter speed setting of $^1/_{30}$ second and go upward until you reach $^1/_{1000}$ second. Evaluate your results. It's always best to use a tripod to effectively compare your images.

A Quick Review

The keys to creating appropriate exposures with strobe are:

1. Don't exceed your camera's sync speed.
2. Set your aperture to the correct setting to manage the amount of light emitted from the flash.

digital cameras that shutter speed is around $^1/_{200}$ second but can be slightly higher or lower. Check your owner's manual or the Internet for more information.

Why is sync speed important? If your shutter speed is higher than your sync speed, such as $^1/_{500}$ second, then the curtains traveling across the film plane will clip part of the image because they have not fully opened during the exposure. The image on page 77 shows what happens as the curtain crosses the digital sensor with flash at various shutter speeds.

Flash Duration

The intense burst of light from a strobe is very brief; how long it lasts is called the flash duration. Different brands of strobes have different flash durations. Some are extremely fast (approximately $^1/_{12,000}$ second); others are relatively slow (down to $^1/_{100}$ second). As you reduce the power on the power pack, the flash duration slows even more (again, it varies with different types of power packs).

Flash duration is important. Here's why: if you are photographing something that moves very quickly, such as indoor sports or a splash of liquid, your flash duration essentially *becomes* your shutter speed—it's what freezes the action. Therefore, a slow flash duration may cause the image to be blurry because the flash is too slow to stop the motion. Another problem can occur if the flash duration is longer than your shutter speed; when that happens, your image will be incompletely exposed or unevenly lit because the shutter will have closed before the flash was done firing.

Thus, when you invest in equipment, the flash duration is one of several important characteristics to be considered. The choice may be partly determined by your budget—but try to plan for what kind of photography you want to do.

Recycle Time

If you try to take a flash photo before the power pack's capacitors have completely recharged, the light output will be diminished and your image may be underexposed. Recycle times vary from manufacturer to manufacturer, so this is another characteristic to explore before purchasing strobes. Please note that if the strobes are set at lower output, such as $^1/_2$ or $^1/_4$ power, it

---

Terms to Know

flash duration
The length of time (measured in fractions of second) over which a burst of light from a flash/strobe occurs.

recycle time
The amount of time required for a power pack's capacitors to recharge after a flash burst is emitted.

takes less time to recharge the power pack, so the recycle time will be shorter. This is useful if you are photographing a subject who is dancing or moving around a lot during the shoot, making the ability to shoot quickly an important asset.

Triggering the Flash

In order to correctly expose the frame, the flash of light needs to be perfectly synchronized with the movement of the camera's shutter. It must fire the moment you press the camera's shutter release. There are a few ways to make this happen.

Sync Cords

A sync cord is a long, thin cable that plugs into your camera on one end and into the power pack on the other. This provides a direct connection to the power pack, firing the flash when you depress the shutter.

Optical Sensors

Optical sensors are wireless devices that activate the power pack from a transmitter located on the camera. They require no batteries and are relatively inexpensive. However, you must be in visual communication (within line of sight) with the power pack's optical receiver. This means you can't shoot around corners. Optical sensors are also not very useful outdoors in bright light, as the sun can erroneously trigger the sensor and fire the flash.

Radio Transmitters/Receivers

These systems consist of a transmitter on your camera's hot shoe and a receiver plugged into the sync port of your power pack. The advantage of using them is that you *can* shoot around corners. You can also work without worry outdoors, as they won't be affected by

bright sunlight. Additionally, you can program whichever radio channel you want to use—so if you are in a situation (like a sports arena) with multiple photographers, you can find a channel on your radio transmitter that will trigger only *your* strobes. They do require AA batteries. Radio transmitters are becoming increasingly affordable, and there are a number of brands available, including Pocket Wizard and RadioPopper models.

Strobe Modifiers: The Basics

Back in chapter 3, you were introduced to the idea of the direction of light (the Circle of Possibilities) and the height of light (the Arc of Light Height). You also know that the shape of a light source will reflect in any reflective surface (especially the eyes), producing a catchlight. Each modifier produces its own shape and type of shadow (hard or soft, depending on

Optical sensors are also not very useful outdoors in bright light, as the sun can erroneously trigger the sensor and fire the flash.

Multiple Power Packs

If you end up working with more than one power pack—whether it's with a sync cord or a wireless trigger—pressing the shutter release will activate the first light which will, in turn, activate the others because they each have infrared sensors. This is, of course, happens at the incredibly fast speed of light (186,000 miles per second).

▲ Barn doors are adjustable flaps that fit on the front of the reflector.

▲ The beauty dish has a disc in front of the light that causes the strobe to bounce back into the wide dish, creating a beautiful, clean light. It is a great compromise between hard and soft and a light that is often used for beauty lighting.

the modifier). Knowing this will help you decipher the lighting in every photograph, movie, and painting you encounter from now on. Some common modifiers are listed below in alphabetical order; we'll examine images created using them in the next section.

Barn Doors

These hinged doors (or "flags") attach as a unit to a standard reflector. They can be used to narrow the beam of light, direct the light, and prevent flare.

Beauty Dish

A beauty dish is a wide bowl with a reflective white interior. There is a disc in front of the flashtube that redirects light back from the

▲ A strobe with a grid on the front of the reflector.

▲ A grid with the light firing.

tube to the white interior and then back to the subject. This makes the light much softer than light from the direct flash. A beauty dish produces a clean, soft look that is popular for lighting the face in fashion photography and portraiture.

Grids

Grids consist of mesh that directs the light into a more focused beam. They come in varying degrees of "spread," rated in degrees. A 30-degree grid (wider openings in the grid) produces a broader light spread than a 10-degree grid

Ring Lights

A ring light is officially a light, rather than a modifier, though it works as both. It is a strobe light that surrounds the lens of the camera. It produces a donut-shaped catchlight in the eye because of its on-axis position. This is a more advanced and specialized light and something to be addressed later when basic lighting techniques have been mastered. We will not focus on the ring light in this book other than to mention it—but if you see donut-shaped catchlights in an image, you will know what created them.

(smaller openings in the grid). Grids produce a hard, sharp shadow with high contrast that can be very dramatic.

Octabanks

Octabanks are a combination of the umbrella and the softbox (discussed later in this section). They are generally quite large (around 5 feet) but can be collapsed for travel. In some, the light from the flash fires directly through one or two baffles and then out the front fabric to produce a very large, soft lighting effect on the subject. With other octabank modifiers, the reverse happens; the light is bounced back into the depths of the modifier and then reflected back to light the subject. (*Note:* There are other options that fall somewhere in between umbrellas and softboxes.)

Snoots

A snoot is a funnel-shaped modifier that narrows the light to a small shape with hard shadows.

Softboxes

Softboxes are collapsible boxes (usually rectangular) that generally range in size from 18 to 60 inches—but they can be even larger. The light, placed inside the back of the box, travels from the flash head through a translucent front panel—or, in some cases, through a baffle to help diffuse the light and then out through a front panel. This diffusion makes the light from a softbox quite soft and excellent for portraiture.

► (*top*) The octabank in this photo is more than 4 feet in diameter.

► (*center*) A snoot focuses the light to a small circle.

► (*bottom*) A medium-sized softbox.

The straight edges of the box also allow for good edge control, more so than with a beauty dish or umbrella. For even more controlled focus, you can purchase grids for some brands of softboxes. (*Note:* Because the light is placed inside the fabric modifier, where heat cannot readily escape, softboxes *cannot* be used with hot lights.)

Strip Lights

A strip light is similar to a softbox except that it is narrower. It can be used as a kicker light on the subject from behind, or as a narrow version of the softbox for portrait lighting. You can purchase a grid for the strip light to help focus the light even more.

Umbrellas

An umbrella is the light modifier that most new photographers are first introduced to. Umbrellas come in various sizes and also in either white or a black/white (or silver) combination, with the black outside cover useful to prevent flare from light hitting the lens. The white or silver umbrellas can be used to bounce light and the white can be used to shoot through for a softer light.

Because umbrellas produce a wide broadcast of light and lack the edge control that one can get with other sources such as a softbox, they are best used to light groups or backgrounds although they can be used for general portrait purposes if you don't have a softbox. Another version of

◄ (*top*) A strip light is narrower than a softbox. It is more often used as a kicker than as a key light source.

◄ (*bottom*) A medium-sized umbrella provides a good deal of light spread.

an umbrella is a softbox-umbrella (for example, Photek) that combines a ten-paneled umbrella with a soft white cover. It has more edge control than a traditional umbrella and thus works well for portraiture.

Light Modifiers in Action

Here is a glossy little pink ball lit with a variety of light sources so you can see the effects. In each image, the ball was lit from a single light source positioned in a side (90-degree) position. Look at the size and shape of the catchlight. The grid light has a very small catchlight and its corresponding shadow is sharp and well-defined. With the beauty dish, the shadow is relatively apparent but softer. With the softbox and octabank, the shadows are even softer. (Flip to the end of this chapter to see a similar sequence of images with a human subject.)

I recommend that you study every photograph you encounter and try to determine the shape of the light source and the kind of shadow produced by that source. Light tells an amazing story on every reflective surface!

▶ Grid, 90 degree side position.

▶ Softbox, 90 degree side position.

▶ Octabank, 90 degree side position.

▶ Beauty dish, 90 degree side position.

▶ Umbrella, 90 degree side position.

grid

softbox

octabank

beauty dish

umbrella
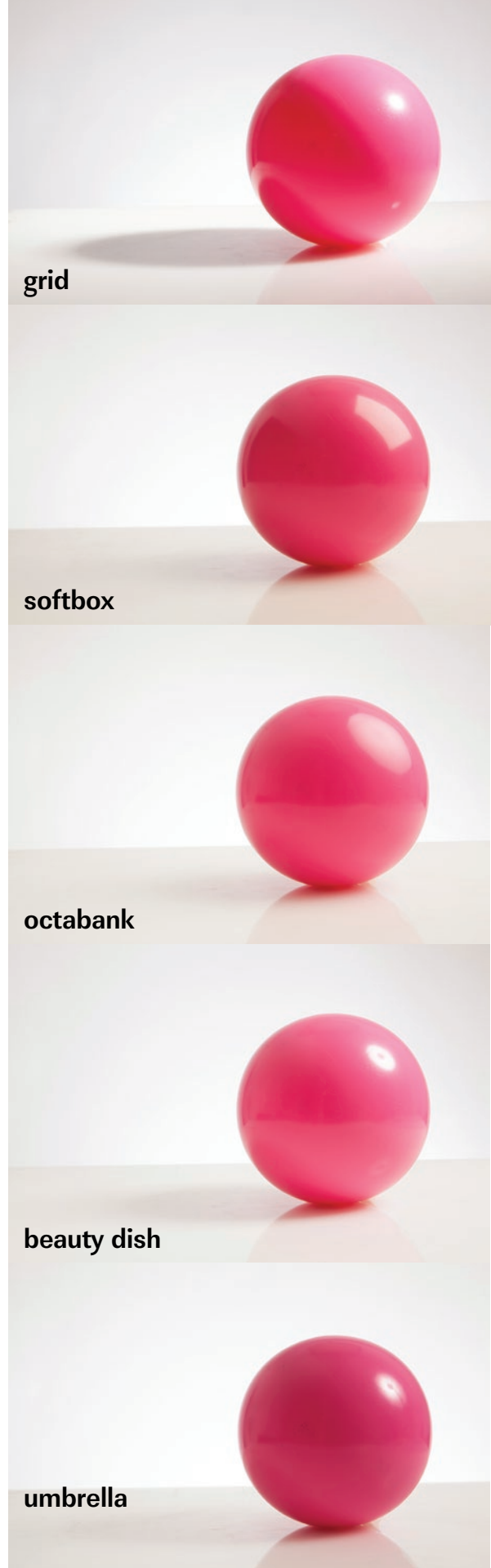
Light Modifiers in Portraits

Let's look at a series of sample portraits created with different modifiers, including a close-up of the different catchlight created by each modifier.

▲ The grid on a standard reflector as it lights the face from the front.

▲ The large octabank as it lights the face from a 45-degree angle.

▲ The large octabank as it lights the face from the front. Note the photographer in the catchlight.

▲ The beauty dish as it lights the face from about a 45-degree angle, producing loop lighting.
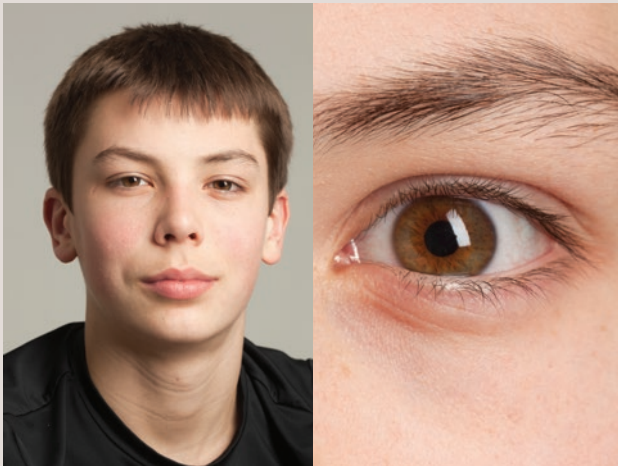

▲ The beauty dish as it lights the face from the front. Note the changed position of the catchlights from the previous image. In the catchlight, note the small disc in the middle of the beauty dish.

▲ A rectangular softbox in a horizontal position.

A rectangular softbox in a vertical position.

▲ Compare the effect of this strip light to the softbox and note the shape difference in the catchlight.

▲ Note the catchlight produced by an umbrella—you can even see the spokes!

Watch the Background

If you are working close to the background, your strobe on the subject will also light the background. If you want your background separated from your foreground subject, bring the light and subject forward, away from the background and/or use a large foam core panel (a flag) to block light from the background. This is especially important if you want to add a light to the background separately from your key light (the one on your subject). Lighting the backdrop will be covered in chapter 6.

The ABCs of Working with Strobes

If you're new to working with power packs, the equipment can seem a little intimidating. In some cases, there is a sequence of events you should learn to follow in order to protect the equipment—and also yourself. Most power packs have their instructions written in the handbooks that accompany them. But for general purposes, here is a sequence that you can follow:

Beginning Sequence

1. Place the strobe head on a light stand.
2. Add a modifier (softbox, etc.).
3. Insert the strobe plug securely into the power pack.
4. Plug the power pack into a wall socket.
5. Determine the power configuration for your strobe head.
6. Manage the cords (coil and/or tape them)

so you don't trip on them while working. As needed, use sand bags to stabilize your light stands.

7. Light your subject.
8. Meter and do a test shot.

To Change or Add a Light

1. Turn the power pack off.
2. Press the "test" button to dump the excess electricity.
3. Remove the strobe plug and/or add others.
4. Turn the power pack back on.
5. Fire with the test button.
6. Re-meter your lights and subject.
7. Take a test shot.

When You Are Finished

1. Turn off the power pack.
2. Press the "test" button to dump the excess electricity.
3. Unplug the heads and let them cool down.
4. Neatly coil the cords. *Do not* wind the cords around the strobe head or let them hang so they put stress on the connection to the head. Instead, hang the coil on a knob of the light stand until you are ready to put it away. When winding cords, do not force them; work with their natural direction. They will last longer that way.

Assignment 22:
Work with Modifiers

In the studio, position your subject about 8 feet from the backdrop. Place one light fairly close to the subject, positioning the flash head in a 45-degree position (midway between front and side) at a height of about 10:30 or 1:30.

Shoot a series of images using a standard metal reflector, a grid on the standard reflector, bounced light from a white or silver umbrella, a shoot-through umbrella, and a softbox. These modifiers are suggested because they are often available to classes and beginning photographers. If you have more modifiers, continue with an octabank and a beauty dish.

Take notes and compare the results. Note the difference in the quality of light (hard/soft) and note the different catchlights in the eyes.

6. Working in the Studio

*T*here are many places to begin with a portrait—or any photograph you intend to light. I begin by imagining what I want to convey about the subject I am about to photograph. Do I want a light or a dark background? Or a hand-painted one? What kind of story am I telling? What is the emotional context?

Backdrop Setup

To set up the backdrop or seamless paper, I use a backdrop stand with a cross bar. Slide the tube of seamless paper onto the cross bar, then place the crossbar on the backdrop stands. Roll out the paper onto the floor about 8–12 feet in front of the vertical backdrop, leaving a slight curve as it moves from the vertical orientation (down from the roll) to the horizontal one (on the floor). Clamp the paper at the tube with an A-clamp so it will not roll, then tape the front and side edges to the floor to hold the paper in place.

Another method is to rig a pulley system on the ceiling, hooked to a wooden dowel onto which you slide the backdrop roll. With ropes attached to the ends of the dowel, lower the backdrop to a height at which you can reach it. Pull out to the length of paper you want, plus the additional amount you need to allow for the vertical rise. Then clamp the edge of the roll so it won't continue to unroll and hoist the seamless to the ceiling. Secure the rope on wall brackets, then pull out the excess and secure it to the floor using gaffer's tape or small sandbags.

Backdrop Height and Length

The required backdrop height will depend on the subject you are photographing; raise it to a height that will accommodate the height of the subjects. If you are photographing in a home or garage, you might not get the backdrop up as high as you'd like, so having a seated subject will help. Also, if you are just doing a head shot (so the floor will not show), the backdrop doesn't need to extend all the way to where your subject is sitting. If, however, you are photographing the whole person (or babies on the backdrop), you certainly need to have it rolled out past where they will be.

How to Light the Backdrop

Once you have set up your backdrop, the next decision is how to light it. What follows are some suggestions for lighting and explanations of how to use your lights to create the looks you want.

Keep It Clean!

If the subjects need to stand on the backdrop, I usually put a piece of scrap backdrop or an old piece of foam core where they will be standing so as not to dirty the backdrop before shooting photos. Remove it when you are ready to photograph.

Terms to Know

seamless paper
A large roll of smooth, heavy paper used as a photographic backdrop in studio settings.

Metering

When metering in the studio, it's a good idea to isolate the readings for each light so you know exactly what you are getting and can adjust each strobe accordingly. (You can either attach the sync cord to the meter to trigger the flash or set the meter on a cordless setting.)

You are creating a relationship between the light on the subject and the light on the backdrop.

To meter the backdrop, it helps to turn your key light away to ensure there is no spill light from it on the backdrop. Then, hold your flash meter up against the backdrop so it can read the light falling on it (don't block the light with your body or arm). If you are lighting the backdrop from both sides, put your hand on one side of the meter to prevent light from the opposite side from hitting it so you can get a "clean" reading. Then do the same with the opposite light so you can get a pretty good sense of the balance between the two lights.

One caution here. After taking your "pure" meter readings and moving the key light back into position on the subject, you may find that you are washing out the lighting effect you created on the background. There are a few things you can do to prevent this overlap:

1. Turn the key light into a skimming position (see pages 80 and 100 for more).
2. Use a flag to block the key light from falling on the backdrop.
3. Move the subject and key light forward to put more distance between them and the backdrop.

The Key Light/Background Light Relationship

Basically, when you light a backdrop, you are creating a relationship between the light on the subject (the key light) and the light on the backdrop. With any shade of backdrop, the degree of lightness or darkness will depend on how much light falls *on the backdrop* as compared to how much light falls *on the subject* from the key light.

For example, let's say your subject is lit at f/8. If the light on your backdrop also reads f/8, your backdrop will appear to the camera as it does

▲ This backdrop was lit with two umbrellas at the same f/stop as the model's face, in this case, f/8.5. Because the key and background readings are the same, the backdrop "reads" as the color it is—in this case, white.

▲ In this image, the gray backdrop received no light, so it appears black. The key light (f/8.5) did not reach the backdrop.

▲ In this image, the key light was at f/8.5 and the gray backdrop was also at f/8.5.
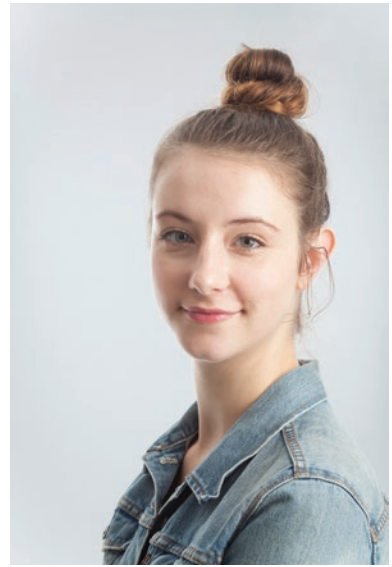
▲ The key light was at f/8.5. The gray backdrop was lit at f/22, 2.5 stops brighter than in the previous shot. The background now appears white and there is a little kickback on the side of her face.

to the eye in normal light. This means that if you want a white backdrop to appear white, it must receive the same amount of light from the background light as the subject does from the key light. So if the key light reads f/8, the light falling on a white seamless must also read f/8. The same concept is true for a gray background. If you light it with the same amount of light as your key light, the background will appear the same tone of gray as it does to the eye.

Now here is where it gets interesting. Let's use the gray background as an example. If you light the backdrop at the same exposure level as the key light on the subject, then the background will appear the gray of its color. If your background reads 1 stop (or more) above the key light, the backdrop will be a lighter shade of gray. If you make the background light 2 stops brighter than the key light, it will begin to look white.

The reverse is also true. If the light on the background is *decreased* so that it is 1 stop less light than the key light—then the backdrop will appear darker compared to the key. As you decrease the light on the gray backdrop, it will appear black.

The Key Light on the Backdrop (Or Not)

Depending on how close your subject is to the background and the direction of your key light, you may have to deal with the shadow of the subject (created by the key light) falling on the background. If this is something you want, that's fine. Incorporating the shadow into your image

---

Terms to Know

kickback
Light that bounces onto your subject from the background.

as a graphic part of the photograph can be very effective.

If, however, it is something you want to avoid, you can:

1. Move your subject, key light, and camera away from the backdrop.
2. Stay in the same place but bring your *light* forward of the subject (away from the backdrop) and turn it so it skims across the subject. This is a way to illuminate the subject without casting a shadow on the backdrop. It is a useful technique when working in a small space. (More about skimming/feathering light later in this chapter.) As you turn your light to skim it across the subject, less light will fall on the background; this will result in a change in tone.
3. Place a flag between the key light and the background to try to eliminate the shadow.

Key Light Plus One Background Light

A pool of light on your backdrop is a great technique for portraits; it helps guide the eye to the subject by creating a lighter center with darker edges. Creating this effect is quite simple. Place your strobe head on a light stand off to one side of the set, directing it toward a point on the backdrop centered at approximately the height where your subject will be seated.

To control the broadcast of light, you will need a standard reflector with a grid. I generally use a medium coarseness to allow for a gentle gradation of light from the lightest point to the darkest. If your subject is seated, or not moving around too much, you can direct the hot spot of the light to a specific place behind their head or shoulders.

If you want a pool of light on the backdrop behind the shoulders, adjust the strobe output so the aperture reading on the backdrop *at a point level to the shoulders* equals that of the key light. If you want a darker pool of light, you might meter so the amount of is light relatively less than the key light, turn down the power or reposition the light so it meters less relative to the key light.

Key Light Plus Two Background Lights

Umbrellas are an easy way to create a broad, even light across a background. Position your umbrellas on either side of the backdrop at 45-degree angles. The light from each should overlap in the middle of the backdrop. If you are bouncing light from white (*i.e.,* not black-covered)

▼ On the left is a portrait created using a background light on the backdrop. In this case, the reading on the face was f/8 and the reading on the background was f/5.6, so there was 1 stop more light on the face than on the background. The background light, directed more toward the middle and lower part of the image, serves to separate the subject from the backdrop. Compare this to the image on the right, which was shot without a background light.

umbrellas, you may get some kickback on your subject from the light coming through the umbrella. To avoid this, you may need to set up some flags to keep the light from the umbrellas from hitting the lens. (*Note:* You can also use two softboxes to light the background, but most beginning photographers don't have a plethora of softboxes. Umbrellas work just fine.)

Set your light sources so you get a consistent reading across the whole backdrop from left to right. As mentioned above, use your hand at the edge of the meter to block the lights one at a time (and isolate the light you are metering) so you get a sense of what each light is putting out. Adjust them so they will be as even as possible. Then do a reading of the combined sources.

Again, if you are working with a white seamless and want your background to appear white, your meter reading for the backdrop should be equal to or slightly more than your key light. If you go too much above two stops, you may start to get kickback from the reflected light on the subject.

If you want a darker background, adjust your strobes so they are a stop or more below your key light.

If you want a darker background, adjust your strobes so they are a stop or more below your key light. Or take them away completely. You will quickly see how you can get a full range of white to dark gray with just one background depending on the light falling on it.

The same basic idea works for a gray background. If you light your background to equal your key light, it will be gray. The more light you add, the more white it will appear. Reduced light on the background will bring it to
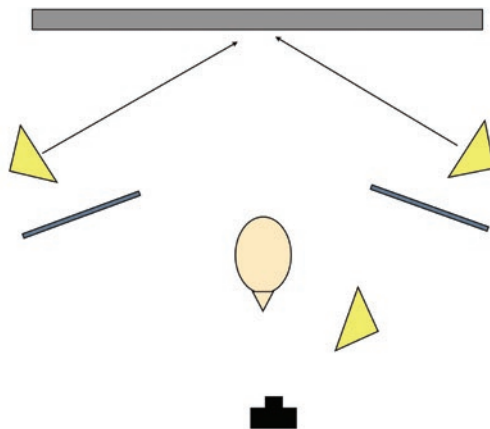
▲ In this diagram, you can see two lights on the background. There are two flags to prevent the light sources from kicking back on the subject.

nearly black. In this way you have a lot of control over how the background looks *if* your main light is not hitting it.

Strobes, Gels, and Color

Use of colored gels (or filters) with strobes seems to have trends. Years ago it was popular to use magenta or red gels in a photo. Then they faded into oblivion. Lately I have seen exciting use of gels for some wild results in portraiture. If you want a brightly colored background that has extraordinary depth of color, select the color of background you want, such as yellow, and add the same colored gel to the light. The depth of color will be enhanced that way. You can then experiment with gels of various colors on your hair lights and even your subject. Enjoy the process of experimentation. In the next chapter, we will delve more deeply into how to juggle color on location with the use of gels and filtration.

How to Paint a Backdrop

Painting your own backdrop is a relatively economical way to tailor your background to

your own taste, though there is a bit of a learning curve. Not all painted backdrops are successful at first.

A painted backdrop can bring a unique and personal touch to your photography. You can purchase backdrops or you can create your own using the directions below.

▲ A swatch of colors from a paint store gives ideas about combinations that might work together.

1. Get your supplies in order. You will need:

- Muslin from a theater-supply store. I'd choose a piece that's 9 or 10 feet wide by about 18 feet long. You may want to experiment first on a smaller size, though.
- Scenic paints from a theater-supply store. I usually buy white, plus a trio of colors that are related—colors you'd see on the same paint chip panel. The paints are water soluble, so they can be diluted. I usually buy pints. Suggested colors: white, black, raw umber, burnt umber.

- Sea sponges (one for each color).
- Cheesecloth or rags.
- Painter's plastic drop cloths (one or two).
- Cardboard or plastic gallon buckets.
- Paint stir sticks.

2. Tape the plastic drop cloth to a smooth floor surface, such as in a garage, basement, or studio. Stretch it tightly. Use gaffer's tape to hold it down so it is wrinkle-free.

3. Tape the muslin over the plastic so it is also taut and wrinkle-free. It is best if it overlaps

▶ You can purchase backdrops or you can create your own.

the plastic a bit. If the plastic is bigger than the muslin, trim the plastic so it is the same size or slightly smaller.

4. Spray the backdrop with water so it will shrink and tighten. This step takes a few hours.

5. Coat the muslin with a *thin* layer of white; if the paint is too thick, the backdrop will crack or the paint will puddle underneath it. The white base gives the backdrop a "glow" behind the other colors. Let it dry completely.

6. Dilute your three colors in the cardboard or plastic gallon buckets (available at paint stores).

7. Use sponges to apply the paint. Use cheesecloth or rags to swipe out the paint. Work from top to bottom quickly, so the paint will blend. Leave a slightly lighter area in the upper one-third center of the backdrop. Use the white for blending and accents.

8. Allow the muslin to dry completely. Then, carefully roll it up (painted side in) on a cardboard tube. Seamless tubes are good for this, even if there is still paper in the tube.

Lighting the Subject

We've talked a lot about lighting the background—but that's just the beginning of

▲ The subject was lit with a softbox. The hair light was a softbox positioned on a boom above the subject.

the decision-making process when designing an image. That's especially true when it comes to portraiture. In this section we'll look at the choices that need to be made when deciding how to light the subject.

Key Light

Is the person an older woman who might benefit from softer light? Or an older man who might not mind seeing the character lines a hard source enhances? Or is the subject a younger person with an unlined face who can tolerate harder lighting? Is it a romantic photo? Or a hard-driving athlete? Is it someone who can hold relatively still for very precise technical lighting? Or is it a photo of a toddler who is just learning about the freedom of walking (across the set)? If there are children

Terms to Know

hair light
In portraiture, a light positioned above and slightly behind the subject to add highlights on the top of the hair. This improves separation when photographing a dark-haired subject on a dark backdrop.

rim/edge light
A light source directed toward the subject from behind, usually at about 45 degree angle, to create a bright, narrow highlight on the edge of their form.

kicker light
A light source directed toward the subject from behind, usually between the 45 and 90 degree positions, to create a wider brush of highlight on the edge of their form.

involved, I might want to create a more broadly lit area so they have room to move around without compromising the exposure.

Deciding what you want to convey is the first step. If you want softer light, choose a softbox. If you want to light a large area, choose an octabank or umbrella (though be careful with the umbrella; it tends to spill a lot of light and will light your backdrop as well as your subject unless you take care not to let that happen). If you want a harder look, use a beauty dish—or for *very* hard light, a grid on a standard reflector. It all depends on what you want your starting point to be. As you're working, don't be afraid to try another modifier if you find that your light is not doing the job you want.

I generally set up the lights and meter them before my subject arrives. I won't necessarily use those exact setups for the shoot, but at least I will have a ballpark idea of a starting point.

Fill Light

I usually use a white foam core board for my fill in the studio. I don't actually put it in place until I have started working with my subject. However, I have it ready to go, clamped to a light stand and set off to the side. I also have a black sheet of foam core on hand in case I want to subtract light (making the shadow side darker).

Hair Light

Many beautiful portraits are done without a hair light. It all depends on your style and preferences—and what you prefer may differ from one shoot to the next. Hair lights can be positioned above and slightly behind the subject or in a back rim position. You can use various modifiers for the hair light. A standard reflector with a grid on it will produce a hard rim light. A white shoot-through umbrella or softbox will

Don't be afraid to try another modifier if you find that your light is not doing the job you want.

create a soft, gentle light. If you are working with a white backdrop, you probably won't need a hair light. If you have a person with dark hair whom you are photographing against a dark backdrop, a hair light will help to create separation.

When setting the hair light exposure, experiment with settings that are equal to your key light or a stop (or so) brighter. For example,

▶ In both frames, the model was lit with a key light at f/8.5. The background light was a reflector with a grid to control the pool of light. The background reading just behind the model's shoulders was about f/4. For the image on the right, I added a hair light. This light, a grid, was positioned at about 45 degrees between back and side light. The hair light was 1 stop brighter (f/11.5) than the key light (f/8.5)

◄ For these images, rim light was created by two grids positioned at about 45 degree angles behind the subject. In the photo on the right, a piece of foam core blocked the light from the lens, cutting the flare.

► An example of a portrait created using kicker lights.

if your key light is at f/8, you may try a range of f/8 to f/11 for the hair light, depending on the subject's hair color and how you want it to look. Be careful when positioning the hair light; if you point it directly into the lens it will create flare.

Rim/Edge Lights

Rim lights are positioned in back of the subject at about 45 degrees between back and side. The way I define rim light is as a hard light that produces an edge of light around the hair, profile,

cheek, etc. Rim light is like a hair light, except it might be on both sides of the subject (as in the accompanying illustration). It is easy to get lens flare with rim light, so you may need to use a flag—or you may like it with flare.

Kicker Lights

Kicker lights produce defining highlights along the periphery of your subject. Strip lights are often used, but carefully placed grids also make good kicker lights. How do these differ from rim
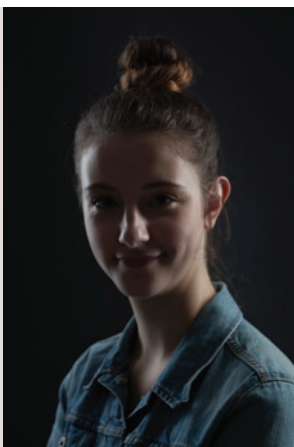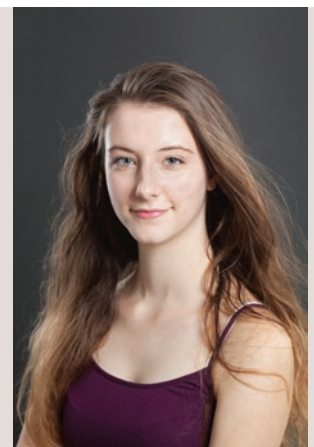

▲ Strip lights positioned just shy of a 90 degree angle, slightly behind the subject, lit the sides of the model's face.

▲ A softbox was added to light the face, pulled forward in a "skimming" position. The key light was at f/8, while the kicker strip lights were at f/11.
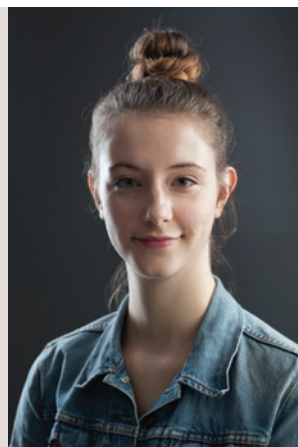
▲ Here, the softbox was moved to a side light position for more drama on the face.

▲ For this look, I changed from a softbox to a beauty dish for the key light. The beauty dish was at f/10 while the strip lights stayed at f/11.

lights or back lights? Generally, kicker lights are positioned a bit closer to the 90 degree position on the Circle of Possibilities; rim and back lights are positioned a bit farther back. As a result of this positioning, the kicker gives a broader stroke of light than the rim or edge light. The idea is to create almost a brush of light along the periphery of your subject. In terms of exposure, a good place to start is with the kicker lights at the same reading as your main light. If you want a more pronounced effect, you can reduce your key light or increase the kicker lights.

Working with Multiple Lights

Once you learn how to work with a key light and modifiers to control the hardness or softness of the light, you are ready to branch out into the world of multiple lights. There are names assigned to using multiple lights such as "three point lighting" or "four point lighting," but the basic idea is that you are using light to create a dimensionality in your image. The main thing to remember when using multiple lights is this: *Every light you add is in a relationship with your key light.* Your key light is the queen bee. The others are there to serve her, to create mood.

How It Works

First, establish the key light look you want (*i.e.,* softbox, beauty dish, etc). Then gradually build your lighting by placing lights strategically in places either on your backdrop, on your subject, in a studio or a room, or even outdoors (more about that in the next section). This could mean a simple backdrop light in addition to the key light. Or kicker lights on your subject. Or a hair light. Or lights around a room. It is up to you, to decide how many lights, what colors, how bright, from what direction, etc. My approach has always been to keep things simple so that the lighting doesn't overtake the purpose of the shoot: working magic with your subject!

Every light should have a purpose to serve the photograph, not just be added because you can. I usually build my lighting by starting with the main light, then the fill (most often a fill card), and then adding the background light, then the hair light. Outside of the studio, I do the same thing, with lights placed with purpose to light the background or room.

To these added lights you can add neutral density gels to dim them, colored gels to add color (more on gels and color to come). You may be able to use just one power pack if you can configure the lights so you like the light you are getting.

Every light should have a purpose to serve the photograph, not just be added because you can.

If you end up working with more than one power pack, whether working with a sync cord or a wireless trigger, when you depress the shutter release you activate the first light which will, in turn, activate the others.

You will be limited by the number of strobe heads and power packs or dedicated flash units you have. I recommend starting with two lights. You can easily use two lights with one power pack. If you are able to separate the lights on the power pack by using the power pack's configuration options, you can separately adjust the amount of light going through each head. Or use monolights, which are controlled separately.

If you are unable to make the power as low as you want or the ratio of lights different enough, you can use neutral density gels to help vary the

output of a flash head. They come in a range of f/stops of light absorption and can decrease the light level without changing the color. You can also combine them with colored gels.

When setting up multiple lights, it is useful to have flash meter. To obtain isolated readings for each flash head, use your hand to prevent the flashes from the other heads from influencing the meter reading you are trying to get with the flash head you are metering. Sometimes it is helpful to turn the others off or swing them in another direction to get a clean meter reading.

If you have a photo shoot planned, it is a good idea to set up your lighting and test it ahead of

Assignment 23: Multiple Light Setups

To do this study, find or make a cube. It can be a wooden box or a cardboard one, like a gift box you might find at a home store. Paint your box a medium gray color, approximately the color of the 18 percent gray card. Place it on a black surface, positioning it in a broad light relationship to the camera (see illustrations below). The backdrop should be gray and positioned far enough behind the box that it will not getting any spill from the key light—it should actually appear almost black in the first two images. Shooting from a tripod, begin to work on the following four lighting setups. Create diagrams of each setup as you go.
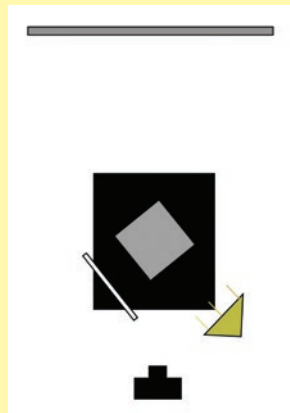
1. One Light (One Point Lighting)
Set up a key light to illuminate one side of the box (the longer side in this setup). The key-light side of the cube should record as the 18 percent gray it is in real life. Use no fill—and make sure that the environment you are in does not cast back a lot of fill (such as white walls).

2. Two Lights (Two Point Lighting)
Keep the key light in place and add a fill card. The fill card should allow for about a 4:1 ratio (see chapter 3 if you need a refresher on lighting ratios). The key-light side of the cube should still record as the 18 percent gray it is in real life. The shadow side, with the fill card as light source, should be much darker but not black.

3. Three Lights (Three Point Lighting)
Keeping the key light and fill card in place, add a hair light from behind and over the top of the cube. It can be approximately 1 stop brighter than the key light. Avoid flare either by positioning the light carefully or placing a gobo card.

4. Four Lights (Four Point Lighting)
Keeping the key, fill, and hair light sources in place, add a background light. Meter the light so that the middle of the box (visualized from the background position) receives the same amount of light as the key light provides to the flat surface of the box.
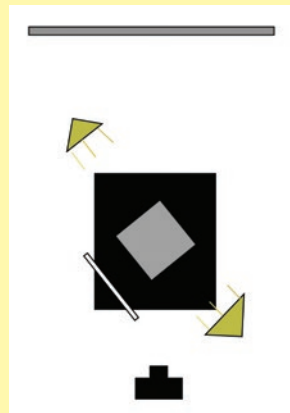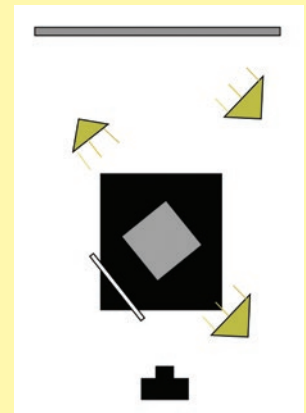
▼ One point lighting.

▼ Two point lighting.

▼ Three point lighting.

▼ Four point lighting

time. You can always refine it once your subjects arrive but at least you will have most of the kinks worked out. Professional photographers call this "pre-lighting."

Skimming the Light

A key light source is often pointed directly at the subject, but there is another way to position it—a way we alluded to when looking for methods to keep spill from the key light off the backdrop. A very helpful technique in lighting is skimming the light (also called "feathering"). This is accomplished by placing a light source forward of the subject (closer to the photographer) but pointed sideways so it skims across the subject with just a hint of an angle toward your subject. This is especially useful for lighting groups and working in small spaces when you don't want your key light to light the background. It is also very helpful when photographing people with reflective eyeglasses.
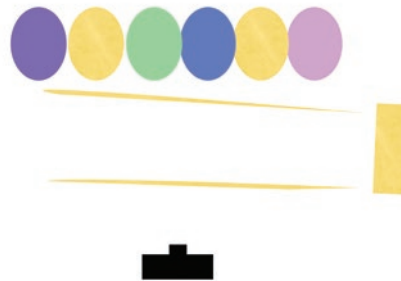
▼ ▶ A group portrait created with simple skimming lighting with an octabank.

How It Works

When light comes out of your light source modifier (such as a softbox), it does not necessarily flow out in a sharply delineated line. The edges of the light softly feather outward. So rather than pointing the light directly at the subject, the feathered edges of the light can be used to illuminate your subject.

Light a Group Portrait with Skimming (Feathered) Light

When asked to photograph a group, many photographers' first instinct is to set up lights everywhere—left, right, behind, and in front. Relax! It's not that difficult. You don't need a lot of lights to make a well-lit group portrait. In fact, you really need only *one* (and possibly a second light for the background). Of course, you can make it as complicated as you like—but my belief is that the simpler the lighting, the more time, energy, and focus you have for your subjects.

Here is how a group can be lit with ease. Take the key light (a softbox or umbrella—or, if you are outdoors, a basic, unadorned reflector) and direct it so it points *across* the group rather than *at* the group. Aim it at the farthest person in the group. Make sure that your subjects' heads do not cast shadows onto each other. As long as you keep the group set up in a way that they are all at about equal distances from the camera, you won't need a lot of depth of field for this—which also means you won't need hugely powerful power packs. If you need fill, add a sheet of white foam core on the shadow side of the image. You can finesse the card forward so the fill is more "rounded" as discussed in chapter 3.

Terms to Know

skimming
Directing the key light source just past the subject, so they are lit by the diffuse edge of the light rather than the more intense core of the beam. Also called feathering.

Assignment 24: Group Portrait

1. Collect six examples of group shots with posing you like.
2. Set up a group of five or six people. Bring in a few chairs to help position them so they are not all in a straight, boring line. Position a strobe light at the far right or left of the group and direct it toward the opposite side (just a slight bit off parallel). Work with the group to make sure that no one blocks the light. If you need some fill, add a bounce card on the shadow side.

7. Mixing Strobe with Ambient

Now you have learned about working with continuous light and also with strobe light. Bringing them together is one of the most exciting aspects of lighting. Professional photographers frequently use a combination of strobe and continuous light when shooting everything from portraits to sports to weddings. When you look at magazines or books and see an image with a dramatic sky and beautiful light on the subject, it is likely a good example of this combination of light sources.

Two Exposures, One Image

As we embark on how this works, remember these two guidelines when combining strobe with ambient light:

1. Aperture controls the strobe (flash) exposure.
2. Shutter speed controls the ambient (continuous light) exposure in combination with the aperture setting used for the strobe exposure.

Using your shutter speed, you can bring the ambient light source into the photo at whatever level you like. That may include outdoor light, room light, a hot light in the studio, a flashlight, neon lights, or even candlelight. When you combine strobe lighting with continuous lighting you are basically taking two photos at the same time. The first is the subject image, lit by the strobe (controlled by the aperture). The second is the background image, lit by ambient or continuous light controlled by the shutter speed in conjunction with the aperture.

How It Works
Find the Ambient Light

Let's say you decide to do a portrait outdoors. You'll want to scout a place that will allow for good use of the ambient light. Often, late afternoon or dusk is ideal. It works well to shoot from a low angle so the sky becomes a predominant part of your image—that is where you will create the drama. What *doesn't* work well is a location with a lot of dark trees and little opportunity for including ambient light.

Position/Modify the Strobe

Position your strobe at a height and angle to light the subject effectively. The choice of modifier may be dictated by the circumstance. For example, is wind a factor? If so, you may choose a modifier that is less likely to get knocked about by the wind. In some cases, that may mean using a standard reflector. If you have an assistant, he or she can help hold your light stand to keep it from toppling. You can also use a sandbag—or even your camera bag—as ballast.

Balance the Exposure

There are two approaches to mixing strobe and ambient light. The first is a step-by-step process (A). The second is a quick and dirty approach (B).

A. Step-by-Step

Take your strobe outdoors (a portable, battery-operated strobe is best or use a long extension cord). Set up the light. Meter as follows:

1. Take an *ambient* light reading at least 2 stops below your sync speed (for example, if your sync speed is $^1/_{200}$ second, take your reading at $^1/_{60}$ second.) Determine your f/stop at that shutter speed. Let's say f/16 at $^1/_{60}$ second for your ambient light reading.

2. Set up your strobe light in about the 45-degree position for good light on the subject. Or use a side light position. Get ready to meter your subject for the strobe light

3. Now here's a trick: To eliminate most of the ambient light from your meter reading (so you get a more accurate strobe reading) turn the shutter speed dial on the meter so the shutter speed is the same as your sync speed (some meters won't work for strobe metering above $^1/_{250}$ second). Take a meter reading of your strobe light at this shutter speed, using either your sync or wireless transmitters. This will determine the *aperture*. Temporarily raising the shutter speed for the reading helps get a more accurate reading of the strobe light.

4. Then set your camera controls to that aperture reading and your original shutter

▶ **Image 1**—The subject's face was protected from the sunlight by a scrim. When the face was exposed properly using ambient light only ($^1/_{15}$ second at f/16 with no strobe), the sky became very light. **Image 2**—Adding strobe helped fill in the image, but there was still no drama in the sky ($^1/_{15}$ second at f/16 with the strobe at f/16). **Image 3**—Cutting the shutter speed (ambient light exposure) by 1 stop darkened the sky ($^1/_{30}$ second at f/16 with the strobe at f/16). **Image 4**—With the ambient light reduced by two stops, the sky was very dramatic ($^1/_{60}$ second at f/16 with the strobe at f/16). **Image 5**—This is the same exposure as in the previous image—but with the strobe removed, the subject became a silhouette ($^1/_{60}$ second at f/16, no strobe).

image 1

image 2

image 3

image 4

image 5

speed (say $^1/_{60}$ second, if that's what your meter indicated in step one, for ambient light).

5. Now take three sequential photographs: one at your f/stop (for example f/16) at the first shutter speed ($^1/_{60}$ second), one at the same f/stop at one shutter speed faster ($^1/_{125}$ second), and a third at a shutter speed one stop faster ($^1/_{200}$ or $^1/_{250}$ second). Each of these shutter speeds should be *below* your sync speed. For each image, the sky will have a different degree of drama. Add a CTO to warm up the light if you like.

B. Quick and Dirty

Do a quick exposure that is 2 stops underexposed (must be at or below your camera's sync speed). You subject will be silhouetted. Adjust your

▼ At dusk, the ambient exposure was f/5.6 at 1 second. The strobe (with a beauty dish) was at f/5.6 to match the aperture of the ambient light reading.

▶ Miranda Weese (of the New York City Ballet) was photographed on a rainy day. Using strobe in combination with the ambient light made for a dramatic image, despite the weather.

strobe output to match the aperture reading, then make your photograph. Voilà!

Rainy Days

Another good use for this technique is if it is raining outside. If you can place your subject under shelter, say a porch, you can light your subject and use the shutter speed control to vary the look of the background. That's the approach I used when photographing Miranda Weese for the New York City Ballet (facing page). The weather was terrible that day, pouring rain, so we photographed her under a portico. I lit her with a strobe light, adding a $^1/_3$ CTO gel to warm up the light. I used a slow shutter speed to allow the ambient light to illuminate the background—and I had her move her skirt to blur it a bit.

Overcoming Sun

Working on a sunny day can be tricky, because the sun and strobe will be competing to light your

subject. One way to handle it is to place a flag (foam core) or a translucent scrim in position to block the sunlight from the subject—either clamp it to a light stand or have someone hold it. This effectively puts your subject in shade. Then, light the now-shaded subject with your strobe in the same way as described previously. Another option is to place your subject in the shade of a porch (or the shadow of a building) so you can light them with the strobe and still get the sky for your background.

Concepts of Color with Mixed Lighting

Mixing strobe light and ambient light is a wonderful opportunity to play with color. It may seem complex at first, but once you get the hang of it, this is a powerful way of working with light.

Here is the basic concept: Strobe lights are daylight balanced. If you shoot with a daylight setting on your camera (or cloudy day), the light will look pretty normal on your subject. When you add the ambient light, through the use of your shutter speed, the color of the ambient light will depend on the setting you are in. As we discussed earlier: faster shutter speeds (below sync speed) darken the ambient light. Slower shutter speeds lighten the ambient light. If your ambient light source also happens to be daylight balanced (say, window light), it will also look pretty normal when you shoot at the daylight

◄ (*top*) Direct sun on the subject's nose was unflattering.

◄ (*center*) A scrim was set up to shade the model.

◄ (*bottom*) The scrim created even lighting on the model, then the model was lit with a strobe.

setting on your camera. However, not all ambient light sources are daylight balanced—in fact, they range widely in their color balance (refer back to chapter 4 for more on this). If you photograph at the daylight setting but have tungsten lighting on the background, the background will appear more orange than it did to your eyes (although the colors on the subject, lit by flash, will still look normal).

Evening Light

When you set up a portrait outdoors in the early evening, just as the sun is beginning to set, the light in the sky will be warmer (more orange) than midday light. If you use your daylight-balanced strobe to light the subject, the light on your subject will be a bit cool (blue) in comparison. To compensate for this, I usually add a $1/4$ or $1/2$ CTO (orange) correction to my strobe—

▲ I used a CTO gel on the strobe to camera left to get a sense that the late afternoon sun was lighting the subject. The sky was underexposed for a deeper color.

just to warm up the light a bit. This makes it look more like the person is actually lit by the sky.

To further enhance the realism, I position the strobe at a lower height than usual—9:30 or 3:30 on the Arc of Light). This helps make the light look as if it is emanating from the setting sun. I also like to keep my camera relatively low so I get a lot of sky in the photograph. This look is made even more dramatic by reducing the shutter speed a couple of stops to underexpose the sky.

Gels and Exposure

When adding a gel to your strobe, keep in mind that it will absorb a small amount of light. You may have to make slight adjustments to your settings to maintain the desired exposure.

Fluorescent Light

Fluorescent lights, especially older model bulbs, emit a greenish color cast. If you want to create a strobe-lit portrait in an interior environment where the majority of the light is fluorescent, the idea would be to try to color balance the strobe light to the fluorescent light. (If you don't, your subject will look normal but the background will be a shade of green.) This is done by adding a green gel (like a Tough Plus Green; see page 70) to the strobe light. With the filter in place, both sources will produce a similar color of light. Then, you can neutralize the green in *both* sources simultaneously by changing the camera's color balance setting to fluorescent. This applies a correction to the whole scene you

▲ This image was created in a clinic with fluorescent lighting. To correct it, I added a green gel to my flash and set the camera's color balance to fluorescent, which filtered out the greenish tint of the flash and ambient sources.

are photographing, neutralizing the greenish (magenta and green are complementary colors; see chapter 3). Voilà! You have a photo that looks completely normal.

Creative Use of Color

You can also play with your camera's color balance settings in other ways. For example, try setting your camera's color balance to tungsten while working outdoors. This will make the overall photograph look very cool or bluish. Then, add a CTO gel to the strobe light. This will make subject look normal, but the background will remain bluish. Try using a 2 CTO correction (more or less) to add even more warmth to the

Assignment 25:
Fluorescent Light and Strobe

Find an old factory or schoolroom lit solely by fluorescent light. With your camera on a tripod, set up a portrait using your strobe and a shutter speed long enough to bring in the ambient light on the background. Try one image at the camera's daylight color balance setting (with no color correction on the strobe). Try a second image at the same color balance setting, but add a Tough Plus Green gel on the strobe. Then, try a third image with the camera's color balance setting changed to fluorescent.

Terms to Know

color meter
An optical instrument used to measure the relative intensities of red, green, and blue light reflected by a subject or emitted by a light source.

They're Not All Green

Some modern fluorescent lights are more neutral (daylight balanced) than the older model fluorescent lights that were strongly green. You can eyeball this on your camera or you can use a color meter to evaluate the situation.

Assignment 26:
Daylight and Tungsten

In an outdoor setting, with your camera on a tripod, set up a portrait with the color balance set to tungsten. If you take a test shot with the ambient light only, the whole image will appear blue. Place an uncorrected strobe and take one photograph. Add a 1 CTO gel to the strobe for a second image, and then a 2 CTO (you can just double up the 1 CTO) for a third. There will be an exposure adjustment when you add the CTO gels because they absorb some of the strobe's light, so you will need to juggle that with your ambient light reading. The best thing to do is increase the strobe power so you don't have to alter your aperture, which would affect the ambient exposure.

subject. Remember that the CTO gels will absorb some of the strobe light, as much as one or two stops depending on the gel, so you will need to:

1. Open your aperture (in which case you will have to adjust your shutter speed to balance the exposure).

or

2. Add more power to your flash to adjust for the diminished light output, in which case you can leave your shutter speed as is.

▶ (*top*) This photograph was shot with strobe and ambient light using the camera's cloudy day color balance setting.

▶ (*bottom*) Here, I shot with the tungsten color balance setting. The strobe was gelled with 2 CTO to compensate for the blue cast created by the tungsten setting. Since the model was lit by the strobe but the rest of the environment was not, her coloring is more normal than the cool color of the trees behind her.

Front- and Rear-Curtain Flash Sync

When combining flash and ambient light, there are two scenarios for the point at which the strobe fires. The first, called front curtain, is when you press the shutter release and the flash fires right away while the rest of the ambient light exposure happens after the flash fires. The second way is called second or rear curtain. This is when you press the shutter release and the flash occurs at the *end* of the ambient exposure.

One may ask: what difference does it make? Well, here's an example of how it works. If you are photographing a car at night, using a long shutter

◄ When the flash fires at the beginning of the exposure (front-curtain sync), the car blurs throughout the rest of the exposure, making it look as if it is going backwards.

◄ When the flash fires at the end of the exposure (rear-curtain sync), the blurred ambient light exposure takes place first. When the flash fires, it looks as if the blur is *behind* the car. As a result, the car seems to be going forward rather than backward.

speed to get the moving car lights, if you use the front curtain setting, your flash will freeze the car and then the ambient light of the car's lights will trail across the image as long as the shutter is open. It will look as if the car is backing up rather than going forward.

If, on the other hand, your place the curtain in the rear sync mode, the exposure will take first place and the flash will fire at the end. This will make the car look as if it is going forward instead of backward.

The only difference in the two completely different appearances is that the setting for first or rear curtain sync was changed on your camera.

This can be done through the "custom settings" on your camera (see the manual). It can also be set up on some dedicated flash units.

Assignment 27: Front- or Rear-Curtain Sync

Enlist someone to drive a car and go to a quiet street at dusk. The car's headlights should be turned on. Set up your tripod, light the car with a strobe, and use a slow shutter speed to expose the moving car. Try one shot at the front-curtain sync setting and another at rear-curtain sync setting.

Assignment 28: Strobe Plus Flashlight

Set your camera for a long exposure (such as 30 seconds) and work in darkness with a combination of strobe and flashlight. To do this, light your model with the strobe and do a test shot for exposure. Then, turn off the modeling light so it won't become part of the ambient light exposure. (For this exercise, it's helpful to have someone either operate the flashlight or trip the shutter for you.) While you are just out of frame, trigger the strobe light. Then, begin "drawing" around your subject with the flashlight until the shutter closes. It will take a few experiments to get this right. A key to making this work is to position the strobe so it doesn't light the background, which you can achieve by placing the light in a "skimming" position (see chapter 6). Having a dark background will make the flashlight drawing stand out more. (*Note:* Focus on the subject in the light, then set your lens to manual focus so it won't try to focus in the dark. Just make sure your model stays still and within in the range of focus.)

Assignment 29: Strobes Plus Studio Hot Lights

You can treat this in a similar way to working outside. Start by lighting the background with continuous lights. Then, light the subject with a strobe. Keep the light from the strobe off the background so that it doesn't wash away the effects of the hot light (you can do this by distance, by using a skimming light position, or by setting up a flag). If you are working with a tungsten light on the background, add a CTO gel to the strobe to unify the color. At the appropriate color balance setting, shoot a sequence of portraits, changing the shutter speeds to allow more or less continuous light to register on the background. Note that when using a very slow shutter speed, the light from the modeling light will appear in the image. Explore this, as well. You may prefer to turn off the modeling light.

8. Dedicated Flash

A dedicated flash (meaning a small flash unit designed to communicate with your particular camera) is, in many ways, similar to a studio strobe: it emits a burst of light to illuminate the subject. As with strobe, you can use flash plus ambient light combinations to create beautifully lit photographs. Dedicated flashes (such as Canon Speedlites or Nikon Speedlights) are often used by wedding photographers and news photographers but more and more photographers choose them because, though not as powerful, they are much less cumbersome on location than the studio strobes.

Dedicated flash and studio strobe are similar in that they both produce a flash from a xenon-filled tube. But instead of the relatively large circular tube of the studio strobe, the flash unit has a small, straight tube that emits a very hard light unless it is softened, bounced, or modified (by an umbrella, for example).

As with studio strobe, there are various modifiers available for the flash, including softboxes, specifically made for the small flash units. And, as with all light, the direction and height of the light will help you create well-lit images *if* you take the flash off of the camera's hot shoe! As with all light, direct light from the axis of the camera creates a flat image. But if the flash is moved off the camera—even by a little—it creates a more three-dimensional image.

How Dedicated Flash Works

Dedicated flash is like a small computer that works in conjunction with your camera's computer. It is connected to your camera by hot shoe or by a special TTL extension cord designed for your flash/camera combo. It can also be triggered wirelessly with specialized triggers designed for TTL metering. Or it can be operated manually with wireless triggers that are *not* designed for TTL capability.

The flash can be used manually or you can use it on the TTL (meaning "through the lens") metering technology: ETTL (ETTL II for Canon or ITTL for Nikon). It can also be used in conjunction with other dedicated flash units. (*Note:* Older cameras may not be compatible with newer flash units and vice versa. In fact, using an older flash on your new DSLR could cause damage, so please check with your camera dealer or the manufacturer for compatibility information.)

Each camera make and model differs slightly as to how its controls are set up (here is where

Terms to Know

dedicated flash
A small flash unit designed to communicate with the software in a particular camera brand/model.

TTL flash
An exposure strategy that allows the flash and camera to quickly calculate the correct exposure for a scene subject by firing a test burst of light and metering it through the lens (thus, TTL).

manual flash
An exposure strategy that requires the photographer to determine and set the desired output settings on the flash and exposure settings on the camera.

▲ The flash menu on a point-and-shoot camera.

you consult your user's manual or one of several great textbooks dedicated entirely to small flash). But the big picture is shared by most dedicated flash systems. There are two main ways that these small flash units are used:

Manual Flash

In this scenario the photographer makes all of the decisions about how the subject is exposed. Working with dedicated flash in the manual mode is similar to working with studio strobes. The photographer uses the hand-held flash meter to determine what aperture setting to use. The photographer then decides if he/she needs more or less light and then adjusts the flash output (or aperture) accordingly. As with strobes, the shutter speed must be at the sync speed or below (there is an exception to this which we will cover later). If you want to include ambient light in your photo, then adjusting the shutter speed plays a key role in what the image looks like. The camera's controls are usually used in manual when the flash is used in manual but can be used in the aperture priority mode (which I personally prefer to shutter speed priority). *Note:* I do not recommend using the P mode on your camera but instead learn to make your own educated choices about your light with M, Av, and Tv.

ETTL Flash

The ETTL (evaluative through the lens) mode allows the camera to make decisions about how to expose. When you focus on your subject, your flash will emit an infrared light to assist in focusing, especially in low light, Then, in the instant at which you depress the shutter, two things happen:

1. First, your flash unit emits a low level pre-flash that bounces off the subject and back to the camera in the millisecond before the shutter opens and before the actual flash fires. When the camera receives the information from the pre-flash, it calculates how much light it needs for a correct exposure—which is communicated to the flash. All this in a split second.

2. If you work with the flash in the ITTL or ETTL mode, you are letting the camera and flash help you with the decision-making. If you don't like what you see, you can then adjust the amount of ambient light or the amount of flash output with settings on the flash or on the camera. You can actually work with your flash in the TTL mode either in an automated mode (such as aperture priority) or in the manual mode.

Automatic Metering Modes (Such as Av or Tv)

If you work in the camera's automatic metering modes of Av (aperture priority) and Tv (shutter speed priority) with your dedicated flash, you have a couple of options available to help make the images that you visualize. What happens with these modes is that the camera is basically using

the ambient light as its main light and the flash is filling in to complete the image. You can control both the amount of ambient light (exposure compensation) and the flash output (flash exposure compensation).

Flash Exposure Compensation

Flash exposure compensation (FEC) gives you the ability to quickly increase or decrease the flash output. Flash exposure compensation can be accomplished in a variety of ways. On some higher-end cameras, there is a FEC button on the camera that you can use to increase or decrease the flash output. Or (on some cameras) the FEC is in the camera menu. Or you can increase or decrease the flash output on the flash itself.

Ambient Exposure Compensation

If you are working in Av (aperture priority), the exposure compensation will allow you to change the shutter speed to get the ambient light look you want. Or, if you are in Tv (shutter speed priority), you can adjust the aperture. Note that you must stay at your sync speed or below unless you have activated your high speed synchronization flash capability (more about that on page 116). I prefer to work in the aperture priority when in the TTL mode because I like to control the depth of field.

On the Canon, the exposure compensation can be accessed by depressing the shutter halfway.

▲ Canon's exposure compensation on the heads-up screen on top of the camera. The flash exposure compensation (FEC) button is above—second from the right with the little "flash" icon. Pushing the FEC button brings up another scale that depicts increased or decreased flash output.

▲ A Nikon with a pop-up flash. The flash exposure compensation button is on the side of the camera, as indicated by the arrow. The settings are displayed on the heads-up screen on top of the camera.

This activates the scale on the LCD panel on top of the camera (the heads-up display) where you can see how much you are over- or underexposing the ambient light. Use your Quick Control dial to adjust the shutter speed up or down while in the aperture priority mode. Nikon has a +/- button on its cameras for adjusting the ambient exposure.

Terms to Know

exposure compensation (EC)
When shooting in automatic modes, a control that lets you adjust the ambient light exposure.

flash exposure compensation (FEC)
When shooting in automatic modes, a control that lets you adjust the flash exposure.

flash exposure lock (FEL)
A control that lets you lock in the TTL flash exposure setting, then recompose the image before shooting.

Flash Exposure Lock

FEL locks the correct flash setting for any part of the scene that you want correctly exposed. Let's say you want to photograph someone but want them to be way off-center in the frame. FEL allows you to aim the viewfinder at the part of the subject you want to be exposed correctly. Press the FEL button on the camera (it may have different names on different cameras), recompose with your subject off-center as you had intended and press the shutter. What happens is that the flash will fire a "pre-flash" at your subject, store the information briefly as you recompose and then emit the correct amount of flash when you depress the shutter. This must be done each time you take a photo using the FEL.

Getting Your Flash Off-Camera

The key to using flash (or strobe) is to get it off the camera axis. There are multiple ways:

1. Use a dedicated extension cord that allows for TTL exposures.
2. Use a radio trigger that allows the flash to be positioned wherever you like, even behind doors, glass, etc. There are two types: dumb and smart. The smart ones (such as Pocket Wizard's Mini TT1 and Flex TT5) can be used with the TTL capabilities of the camera. Others that are non-TTL must be used with manual metering. Radio transmitters can be used around corners. They are not line-of sight and thus more versatile (and more expensive, but getting less and less so). Wireless trigger manufacturers include Pocket Wizard, Radio Poppers, and some systems new from China. Canon makes a radio transmitter for its new 600 series Speedlite.

▲ Dedicated flash used on-camera.

▲ Dedicated flash off-camera in the 45-degree position.

3. Use the pop-up flash on the camera as a "master" to trigger an off-camera flash. This is a line-of-sight method so the flash units must "see" the trigger light on the camera through correct positioning.
4. Use a separate flash unit as a master/commander to control the remote flashes.
5. Use optical slaves. Canon makes a model that will trigger the flash in a TTL mode. The slave is line-of-sight and also can be triggered (by accident) by the sun.

Multiple Lights

You can set up multiple flashes units (called slaves or remote units) to light an event, individual, or group—just as you can with strobes. They

can be gelled, bounced, and/or modified. They can be used as background lights, hair lights, etc. If you set up dedicated remote flash units in an environment (such as a wedding) you can program each flash independently for just the right output. They can be set up in manual and/or TTL. Because they work on line of sight (unless you use radio transmitters on them), they need to be set up in a manner so they can "see" each other. A useful way to set up multiple lights at an event would be to set up the background lights on manual so their output is consistent and then use ETTL/ITTL to expose your subject(s).

When the remote units are set up, they can be assigned "groups" such as Group A, Group B, Group C. Each group can have one or more light (usually not more than three) and each group can be dialed to a certain output. So, for example, you could use one group for background, one for hair light, one for key light, etc.

The lights are triggered by a "commander" or "master." This is a little easier with Nikon cameras than with Canon. On some newer models, Nikon's Creative Light System allows the pop-up flash to work as a "master." Canon offers this capability with the 7D (and perhaps more by the time this book is printed). The Canon 580EXII flash can be programmed to serve as a commander to trigger the other lights.

High Speed Synchronization

High-end flash units offer high speed sync, a very useful feature when shooting in bright light or

with shallow depth of field, in which case the shutter speed might be above the sync speed ($1/500$ or $1/1000$ second, for example).

How Does It Work?

Normally when working with flash, one needs to keep the shutter speed set at the sync speed or below (this was discussed in the chapter on strobes) so the digital sensor is completely open to receiving the burst of light. This is true with both dedicated flash and strobes. However, with dedicated flash, the high speed sync emits light not in a single burst but in a pulse of light that essentially pulsates the whole time the curtain travels across the digital sensor, thus exposing the image in a series of bursts over the duration of the shutter speed (incredibly quickly). With a traditional flash, you would see only part of the image illuminated, but with the high speed flash, the entire image is illuminated because the flash fires multiple pulses of light, so the light is almost like a continuous light. The disadvantage of the high-speed flash is that it uses a lot more battery power than if using the flash normally.

This high speed sync is an incredible advantage if you want to work with a shallow depth of field outdoors. With a normal flash you might be at f/16 at $1/60$ second but with high speed flash you could shoot at f/4 at $1/1000$ second.

Hypersync

The term hypersync refers to the ability to use higher-than-sync speeds with your dedicated flash with certain radio triggers, such as PocketWizard's Mini TT1 or Flex TT5. These specialized triggers allow high-speed sync similar to what you might get in the Nikon or Canon high-end flash units with the advantage that they are radio controlled rather than line-of-sight.

▲ Model lit with dedicated flash with Photoflex softbox.

▲ Model lit using dedicated flash with Rogue Flashbender.

▲ Model lit using dedicated flash with homemade fill card.

▲ Model lit using dedicated flash with umbrella.

They can also be used with a limited number of specially designed power packs.

Modifiers

There are many modifiers available for dedicated flash. They include attachments that spread the light to make it softer, domes that diffuse the light, softboxes, umbrellas and more. Spend some time on some of the popular sites, such as Strobist, to get some ideas. Manufacturers who make modifiers for dedicated flash include: Gary Fong, Lumiquest, Photoflex, Rogue, and Westcott. In the above demonstrations, note the

▲ Model lit using dedicated flash with Westcott Apollo umbrella/softbox.

shadow quality (hard or soft) on the model's face and on the backdrop behind the model.

Bounce Flash

Because I teach a wide range of students from adults (usually with reasonable income) to high school and college students (usually with little money), I am always looking for ways to create beautiful light inexpensively. One of my favorite techniques is to use a piece of foam core positioned on a light stand (or human light stand). With the flash *on* the camera, rotate the flash about halfway to two-thirds backward so the light fills the foam core panel. This panel, if positioned correctly, will produce a beautiful, big light on the subject.

◄ For the larger image, the light was created using a large piece of foam core as a reflector for dedicated flash. The smaller companion image shows the setup with no flash added.

Assignment 30: Dedicated Flash with a Bounce Card

Using a dedicated flash *on* your camera, position a piece of foam core board on a light stand as if to illuminate your subject from a 45 degree angle, at about a 10:00 or 2:00 height. Then position your flash so it lights the foam core as fully as possible. Photograph your subject using the light bounced into the foam core. Adjust the ambient light to your taste. Do one image with the foam core "light." Then shoot one at the same exposure setting but with no added light.

Assignment 31: Dedicated Flash with Modifiers

Do your own study of various light modifiers, from home-made to those you might have on hand, including an umbrella and some smaller modifiers. What suits your style? What would you choose to use when photographing an event? And what would you use for a portrait session? You may like harder light or a softer effect, so it is a matter of becoming aware of your personal style.

9. Working with Portrait Subjects

*N*ow the time has come. You have learned a lot about lighting—the importance of the quality of light, the height, the angle, the color. You have practiced on a patient mannequin head. It's time to move on to creating meaningful portraits of real people.

Determine Your Intent

A portrait can be many things. It can be created in the studio with a backdrop. It can be done by window light—or combined sources of window light and tungsten. It can be photographed outdoors with strobe lights using the sky as background. As the photographer, it's your job to figure out what you are trying to say with the portrait. Is it for an editorial story about the person? Is it a personal portrait for an individual or a family? Is it for a health and beauty client? Is it a senior portrait?

Understand the Subject

Before I ever bring out my camera, I spend some time talking to my portrait subjects. I learn about who they are, what makes them happy, and what is important to them. I like to have this conversation in person because it not only gives me a chance to listen and connect, it also lets me observe the person's face, smile, laughter, and gestures. This meeting goes a long way toward developing a good starting point for the photography session.

Assignment 32:
Practice with Portraits

The following are some portrait ideas you can work on with friends—or with models who might need some images of themselves. The concepts are designed to get you thinking about the stories you can create with light.

1. **A Musician's CD Cover**. Photograph a musician (or a model) for an album cover. The music is moody and dramatic. The name of the album is *Goodbye Foolish Dreams*. Remember that it has to crop square for the CD cover. You can do it in the studio or outdoors. Use a strobe or dedicated flash if doing it outdoors.
2. **A Magazine Article**. Illustrate a story about starting school in the fall. The image must fit on a vertical 8.5x11-inch page and have room for headline type. Photograph the session in a hallway or classroom. Use flash or studio strobe with a long exposure to bring in the ambient light.
3. **A Newspaper Article in the Travel Section**. Illustrate a travel article, called "Road Trip," about a person who travels around the United States in their car. Shoot at dusk using dedicated flash with rear-curtain sync. The image will be horizontal with room for type to be dropped in over it.
4. **An Expressive Portrait**. Do a quiet portrait of a person that expresses something about them. Do they like music? Poetry? Dance? Cooking? Use either window light or strobe with the key light positioned somewhere between 45 degrees and the side.
5. **A Self-Portrait**. Interpret your inner self in a self-portrait.

Prepare, But Be Flexible

Generally, from preliminary conversations or research, I will have sketched out some ideas as starting points. I may have the studio set up to accommodate what I am thinking about doing. However, I am always open to changing things if need be. That is why it is good to be as versed in as many aspects of lighting as possible—so you can make decisions and then make changes in the direction you need to go.

Working with Reflective Objects

While I am now primarily a portrait photographer, I have worked on many assignments that involved photographing products and other still-life subjects—as illustrations for stories when I worked in the newspaper business or as a pieces for editorial clients. Some of the most challenging still-life subjects are those with reflective surfaces, like wine glasses. To create smooth lighting on these surfaces, a large light modifier works much better than a small one. (No grids or umbrellas—at least for the light sources that might be in front of the subject.) Indirect lighting works well, so you can use your foam core to bounce large swaths of light. Also, creating rim light with your softboxes and then bouncing that back (as in reflected back or rim light) can add beautiful accents. You will find many tutorials on-line for photographing glass (or jewelry), so my advice is to explore. If you have gotten this far in the book, you have the knowledge to take on whatever you want. Below is a demo I set up for one of my classes.

◄▼ In the setup shot, you can see that the key light source was a softbox placed in the rim/kicker light position. It bounced light into fill cards placed on either side of the camera, creating a smooth lighting effect on the bottle. The golden light on the background was "painted" on the gray backdrop with a tungsten flashlight during a long exposure (with the modeling lights off).

10. Preparation

*P*rofessional and serious amateur photographers prepare for their photo shoots like pilots prepare for a flight. Batteries? Check. Charger? Check. Extension cords? Check. Media cards? Check. There is nothing worse than getting to a photo shoot and finding that you are missing that essential piece of equipment. It is a good idea to have backups for some of your most important equipment, such as the camera or flashes. Below is an example of a packing checklist. You can create your own based on your equipment and needs.

Checklist

- —— Layouts
- —— Job file
- —— Casting sheets
- —— Model and agency contact info
- —— Contact info for all crew
- —— Contact info for client
- —— Model releases
- —— Property releases
- —— Directions/maps

Camera and Metering
- —— DSLR cameras (2)
- —— Light meter
- —— Media cards

Lenses
- —— 25-70mm lens
- —— 85mm lens
- —— 100 mm macro lens
- —— 70-200 mm lens

Computer
- —— Laptop
- —— Power cord
- —— iPad
- —— iPhone
- —— Tether cord

Lights
- —— Power packs
- —— Battery-operated power packs
- —— Pocket Wizards
- —— Strobe heads
- —— Extension cords for heads
- —— Dedicated flash
- —— Hot lights

Modifiers/Stands
- —— Light stands
- —— C-stands
- —— C-arms
- —— Boom
- —— Umbrellas

- —— Softbox
- —— Octabank
- —— Snoot
- —— Grids
- —— Barn doors
- —— Sand bags
- —— Tripod
- —— Foam core panels
- —— Light discs
- —— Neutral density gels
- —— CTO gels
- —— Tough Plus Green gels

Other Gear
- —— Extension cords for electrical
- —— Triplers for extension cords
- —— Tool kit (including scissors)
- —— Caffer's tape
- —— A-clamps
- —— Mini A-clamps

Notes for Teachers

This book is presented in the sequence I use for my full lighting course. Assignments I give to my students are in categories as follows:

1. Natural light
2. Continuous artificial light
3. Strobe
4. Mixing strobe and continuous light
5. Dedicated flash

I have included a variety of assignments in the book from which you may pick and choose—or feel free to create your own. The main thing I try to do is promote a sense of curiosity. When introducing equipment, I teach the importance of care and respect for the equipment but try not to induce fear of using it. So I spend a fair amount of hands-on time in the studio making sure everyone is comfortable.

I ask my students to create a "Book of Lighting" as a final project. This accounts for 30 to 40 percent of their grade. This book, presented in a three-ring binder with chapters based on each category of lighting, contains printouts of images created for each assignment, accompanied by drawings to illustrate the lighting.

I also request an essay for each assignment that discusses what they were attempting to do and what they learned. Finally, they are asked to include one or more tear sheets or Internet printouts showing the kind of lighting found in the assignment they are working on (for example, window light). The tear sheets must be labeled with the type of light they illustrate.

These books are a lot of work for both the student and the teacher, so I ask that they bring the book to class partway through the term so I can evaluate their progress—and also so that students can inspire each other. When grading, I do not evaluate the accuracy of each assignment because that has already been graded with the individual assignments. I grade on the thought put into the essays, organization, neatness, correctly labeled tear sheets, and the book's ability to teach someone else about lighting.

The "Book of Lighting" is something that students can refer to in months or years to come to refresh what they learned in class. Students who do these books in my classes comment on how useful the process was to them in their education, in spite of the amount of work.

Another thing I find useful is to ask students to assist each other on their assignments. Being put in a role of teaching another student (and learning from each other) helps solidify concepts. It not only helps students to learn, it also helps create camaraderie in the class.

As I say to my students, "Good lighting to you." I hope this book will be of help. I would love to hear from you.

Resources

Manufacturers

Bowen . . . . www.bowensusa.com

Gary Fong . . . . www.garyfongestore.com

Lee . . . . .www.leefilters.com

Photoflex . . . . www.photoflex.com

PocketWizard . . . . .www.pocketwizard.com

Profoto . . . . .www.profoto.com

Rogue . . . . .www.rogueflash.com

Rosco . . . . .www.rosco.com

Westcott . . . . www.fjwestcott.com

Additional Reading

Strobist . . . . www.strobist.blogspot.com

Index

Professional HDR Photography

Mark Chen shows how to achieve brilliant detail and color with high dynamic range shooting and post–production. *$27.95 list, 7.5x10, 128p, 250 color images, order no. 1994.*

Beautiful Beach Portraits

Mary Fisk-Taylor and Jamie Hayes take you behind the scenes on the creation of their most popular images, showing you how each was conceived and created. *$27.95 list, 7.5x10, 128p, 180 color images, order no. 2025.*

Photographing Families

Tammy Warnock and Lou Jacobs Jr. demonstrate the lighting and posing skills needed to create professional-quality portraits of families and children. *$27.95 list, 7.5x10, 128p, 180 color images, order no. 1997.*

One Wedding

Brett Florens takes you, hour by hour, through the photography process for one entire wedding—from the engagement portraits, to the reception, and beyond! *$27.95 list, 7.5x10, 128p, 375 color images, order no. 2015.*

We're Engaged!

Acclaimed photographers and photo instructors Bob and Dawn Davis reveal their secrets for creating vibrant and joyful portraits of the happy couple. *$27.95 list, 7.5x10, 128p, 180 color images, order no. 2024.*
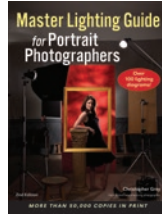
Master Lighting Guide for Portrait Photographers, *2nd ed.*

Christopher Grey shows you how to master traditional lighting styles and use creative modifications to maximize your results. *$27.95 list, 7.5x10, 160p, 350 color images, order no. 1998.*

The Beautiful Wedding

Tracy Dorr guides you through the process of photographing the authentic moments and emotions that make every wedding beautiful. *$27.95 list, 7.5x10, 128p, 180 color images, order no. 2020.*
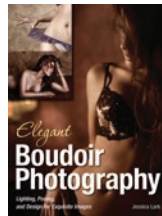
Elegant Boudoir Photography

Jessica Lark takes you through every step of the boudoir photography process, showing you how to work with clients and design images that are more engaging. *$27.95 list, 7.5x10, 128p, 230 color images, order no. 2014.*

Set the Scene

With techniques and images from nearly a dozen top pros, Tracy Dorr shows you how using props can inspire you to design more creative and customized portraits. *$27.95 list, 7.5x10, 128p, 320 color images, order no. 1999.*
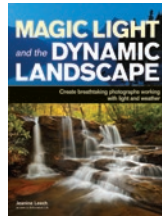
Magic Light and the Dynamic Landscape

Jeanine Leech helps you produce outstanding images of any scene, using time of day, weather, composition, and more. *$27.95 list, 7.5x10, 128p, 300 color images, order no. 2022.*

Sultry, Sweet, or Sassy

Kay Eskridge shows you the lighting and posing techniques needed to bring out the beauty and personality of your glamour portrait subjects. *$27.95 list, 7.5x10, 128p,180 color images, order no. 2023.*

### Shoot to Thrill

Acclaimed photographer Michael Mowbray shows how speedlights can rise to any photographic challenge—in the studio or on location. *$27.95 list, 7.5x10, 128p, 220 color images, order no. 2011.*

Classic Family Portraits

Ed Pedi walks you through the process of designing images that will stand the test of time. With these classic approaches, photos become instant heirlooms. *$27.95 list, 7.5x10, 128p, 180 color images, order no. 2010.*
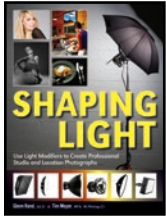
Shaping Light

Glenn Rand and Tim Meyer explore the critical role of light modifiers in producing professional images of any subject, ensuring smart decisions at every turn. *$27.95 list, 7.5x10, 128p, 200 color images, order no. 2012.*
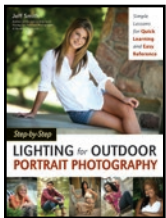
Step-by-Step Lighting for Outdoor Portrait Photography

Jeff Smith brings his no-nonsense approach to outdoor lighting, showing how to produce great portraits all day long. *$27.95 list, 7.5x10, 128p, 275 color images, order no. 2009.*

Photograph the Face

Acclaimed photographer and photo-educator Jeff Smith cuts to the core of great portraits: making the subject's face look its very best. *$27.95 list, 7.5x10, 128p, 275 color images, order no. 2019.*

The Right Light

Working with couples, families, and kids, Krista Smith shows how natural light can bring out the best in every subject—and produce highly marketable images. *$27.95 list, 7.5x10, 128p, 250 color images, order no. 2018.*

Dream Weddings

Celebrated wedding photographer Neal Urban shows you how to capture more powerful and dramatic images at every phase of the wedding photography process. *$27.95 list, 7.5x10, 128p, 190 color images, order no. 1996.*

Light a Model

Billy Pegram shows you how to create edgy looks with lighting, designing images of models (or other photo subjects) with a high-impact editorial style. *$27.95 list, 7.5x10, 128p, 190 color images, order no. 2016.*

Backdrops and Backgrounds
A PORTRAIT PHOTOGRAPHER'S GUIDE

Ryan Klos' book shows you how to select, light, and modify man-made and natural backdrops to create standout portraits. *$29.95 list, 7.5x10, 160p, 220 color images, order no. 1976.*

Nikon® Speedlight® Handbook

Stephanie Zettl gets down and dirty with this dynamic lighting system, showing you how to maximize your results in the studio or on location. *$34.95 list, 7.5x10, 160p, 300 color images, order no. 1959.*

Lighting Essentials

Don Giannatti's subject-centric approach to lighting will teach you how to make confident lighting choices and flawlessly execute images that match your creative vision. *$19.95 list, 8.5x11, 128p, 240 color images, index, order no. 1947.*