Master Guide
FOR PROFESSIONAL PHOTOGRAPHERS

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PREFACE

When you look at the progress made in the field of photography from its humble beginnings in 1839 to the ever-changing digital technology of today, you can't help but be amazed. Today, the predominant method of image capture is digital, cameras are smaller than ever, the price of good equipment has dropped dramatically, and our cameras can now make many important decisions for us. As a result, more and more novices are creating better and better images.

Of course, even leaps and bounds in technology will not replace a solid knowledge of the art and science of photography. An understanding of how aperture and shutter speed changes affect exposure, how highlight and shadow can be used to sculpt your subject's face, or how to arrange the elements of your image to hold the viewer's attention and evoke an emotional response requires the photographer's input, his personal artistic vision and creative approach. While technology might help us create better images, only the professional photographer can create images that clients will pay for.

This book provides the technical foundation you need to make the transition to a career as a professional photographer. With information on cameras and lenses, lighting and exposure, posing and composition, and post-capture essentials, plus an appendix on the importance of becoming a Certified Professional Photographer, you'll learn the rules that govern good image capture and gain the solid footing you need to embark on a successful career.

1. IMAGE CAPTURE

Digital imaging is the predominant capture method used by photographers today. Still, a discussion of film photography has its place in this book (after all, some photographers still swear by its use). Before we move on to discuss digital cameras and the basics of digital capture, then, we'll pay homage to film capture and take a look at the film cameras traditionally used by professional photographers.

Film

Film is the light-sensitive plastic substance used in a camera to record a photographic image. An image is created when light reacts with the silver halide crystals on the film. The following are some characteristics to keep in mind when selecting film.

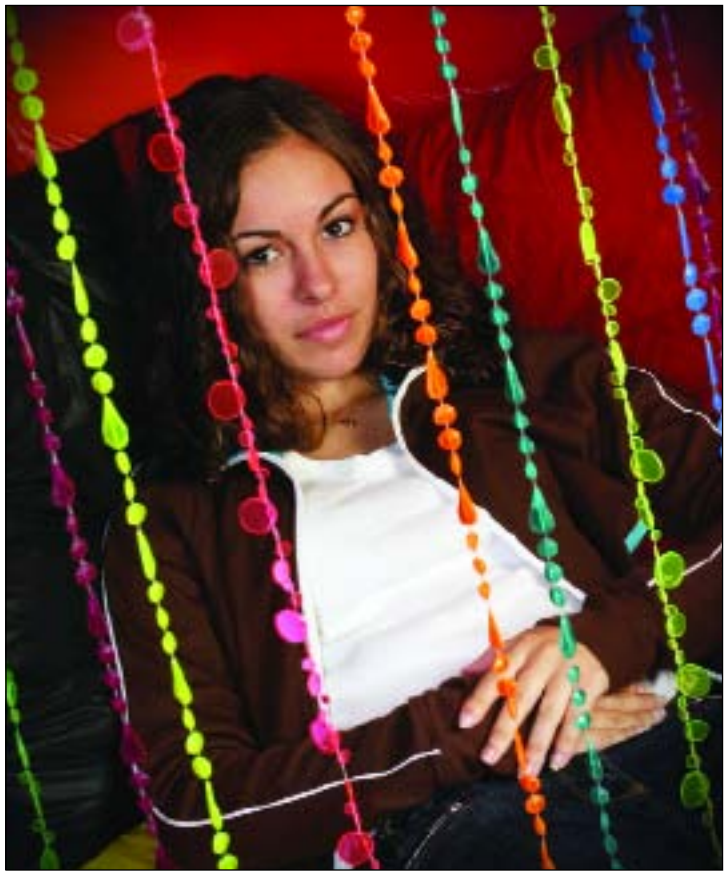
Negative vs. Positive. Film is divided into two types: negative (print) and positive (chrome, slide) film. Film is available in several sizes and formats with the most popular being 35mm, 120/220, and 4x5-inch sheet film.

Negative film produces a negative upon exposure to light through a camera. (In other words, the tones recorded are opposite those that we actually see in the subject with our eyes.) This type of film is also referred to as print film because you generally need to make a print from the negative to adequately see and enjoy the image. There are a wide variety of color and black & white negative films on the market.

Digital imaging is the predominant capture method used by photographers today.

When a positive, or "transparency," film is used, on the other hand, the positive image is produced right on the film in the camera. The resulting images can be viewed via a projector, or the images can be printed onto photographic paper. Most transparency films are made for color photography.

Color Balance. Different types of film are produced to record colors accurately under different types of lighting. The types of lighting are differentiated based on their color temperatures (see sidebar). There are two basic color balances available. Daylight film, balanced for use with light sources of about 5500 degrees Kelvin, produces accurate color when the scene is illuminated with normal daylight or electronic flash. Tungsten film (also known as Type A) is balanced for use with light sources with a color temperature of



Photographic images are created using a variety of light sources—from sunlight (top left), to studio strobe lighting (top right), to mixed lighting (left). When accurate colors are desired, the photographer must select a film (or choose a digital camera white balance setting) that matches the lighting. Photographs by Lisa Farnholz (top left), Rob Ledwedge (top right), and Michael Ayers (left).

3200 to 3400 degrees Kelvin. It produces acceptable color when your subject is illuminated with ordinary household bulbs. For more on this topic, see chapter 4.

Black & White Film. When selecting a black & white film, color temperature is irrelevant since the film records only shades of gray. Black & white film comes in a variety of film speeds up to ISO 3200 (see pages 10–11).

35MM FILM

"35mm film" refers to the actual size of the film frame itself. It is approximately 1x1½ inches.

COLOR TEMPERATURE

The light that we see is comprised of seven distinct colors: red, orange, yellow, green, blue, indigo, and violet. The human eye does a good job of balancing these colors, so colors look the same to us whether they are under reddish light (like at sunset), yellowish light (like a household lamp), or greenish light (like most fluourescents). Film and digital image sensors, on the other hand, do not adapt as readily.

Therefore, it is important to evaluate the color of the light before shooting to ensure accurate color results. The color of a light source is described as its color temperature.

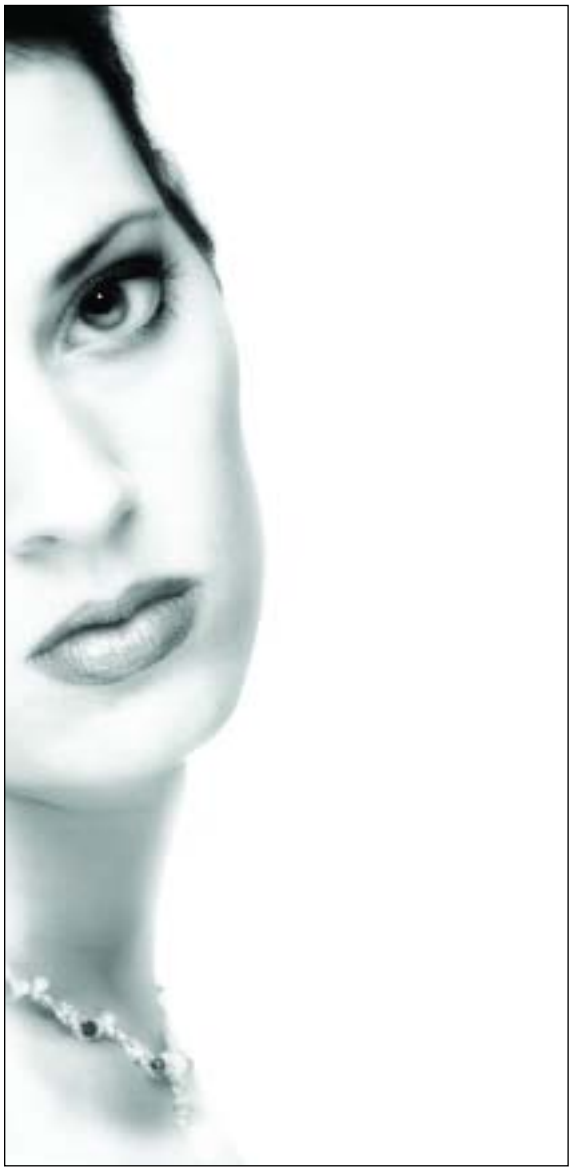
"White" light is the starting point for color temperature and measures about 5500 degrees Kelvin. Therefore, daylight film is balanced to precisely this color temperature. As the sun rises or sets, the color of its light gets warmer, which is noted as a lower temperature (as unintuitive as that may be!). Temperatures higher than 5500 degrees Kelvin indicate a light balance that is cooler, or more blue.

When the color balance of the medium used to capture the image matches the color temperature of the light, the colors in the image will be rendered as the eye sees them.

Over the years, Kodak and other manufacturers have made several specialty emulsions of black & white film for specific photographic applications. Black & white film was the only option for photographers until the very first color transparency films appeared in the 1940s. Color negative film did not become readily available until the late 1960s.

Different black & white films record colors in different ways. Panchromatic film is sensitive to all of the colors in the visible spectrum, making it the most commonly used type of black & white film. Because this type of film is slightly more sensitive to blues than other colors, however, blue tones in a scene (such as the sky) can record lighter than expected. This can be corrected using filters (see chapter 5). Orthochromatic (ortho) film is sensitive to the blue and green but not the red wavelengths of the visible spectrum.

Black & white portraits have a clean, simple feel that makes them timeless. Photograph by Patrick Rice.



Black & white is a popular choice for images ranging from portraits to landscapes. Photographs by Rick Ferro (left) and Rob Ledwedge (right).

It is mainly used for copy and graphic arts work. Lithographic (litho) film is a type of very high-contrast film used in the printing industry.

Chromogenic black & white film is another popular choice for photographers. Because it is composed of dyes rather than silver, it can be developed and printed in the same chemistry used to process color negative film. Today, this type of processing is typically cheaper and more readily available than traditional black & white processing (see page 12).

Anti-Halation. Many films are made with an anti-halation layer. An anti-halation layer is a light-absorbing layer between the photographic emulsion and the film backing. It is used to prevent stray light from reaching the light-sensitive area of the film.

Film Speed. The ISO value of a film (also called the film speed) describes how sensitive the film is to light. Each full change in the ISO either halves or doubles the light sensitivity of the film (i.e., a film with an ISO rating of 400 is twice as sensitive to light as a film with an ISO of 200).

DX CODING

Many films, especially 35mm, have what is called DX coding to help the photographer avoid mistakes when setting the ISO on their camera. This coding instantly tells the camera the speed of the film being loaded.

Films with high ISO values (called "fast" films) require less light to create an acceptable exposure. However, they also produce more grain (a speckled pattern that appears in the negative and the resultant print) and a reduction in sharpness, saturation, detail, and color accuracy. These films are best in low-light situations and when you need to stop the action in a scene.

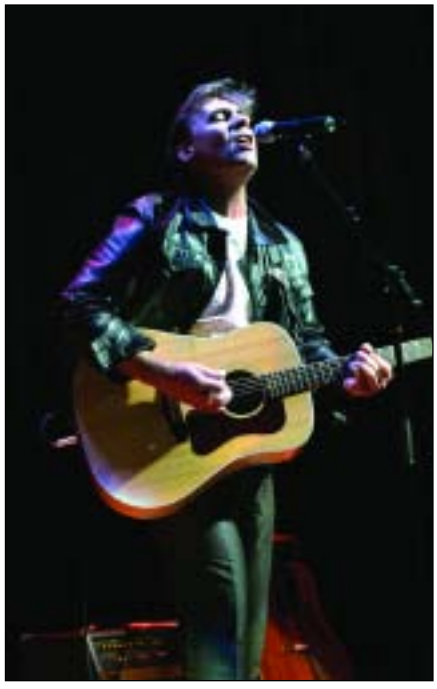
Films with low ISO values (called "slow" films) require more light to produce a good exposure, but they also produce images with less grain and better sharpness. Slow films are good for big enlargements because they have less grain.

Reciprocity. Though the specifics of ensuring a good exposure won't be covered until chapter 3, it is important to take note of a phenomenon called reciprocity in this section. Film reciprocity refers to the reduction in effective film speed when using very long exposures—usually one second or longer. This reduction in film speed results in underexposed images unless you compensate for it by increasing your exposure. The longer the exposure of the image, the more you will need to increase your exposures. With all long exposure photos, you should bracket your exposures to ensure acceptable results.

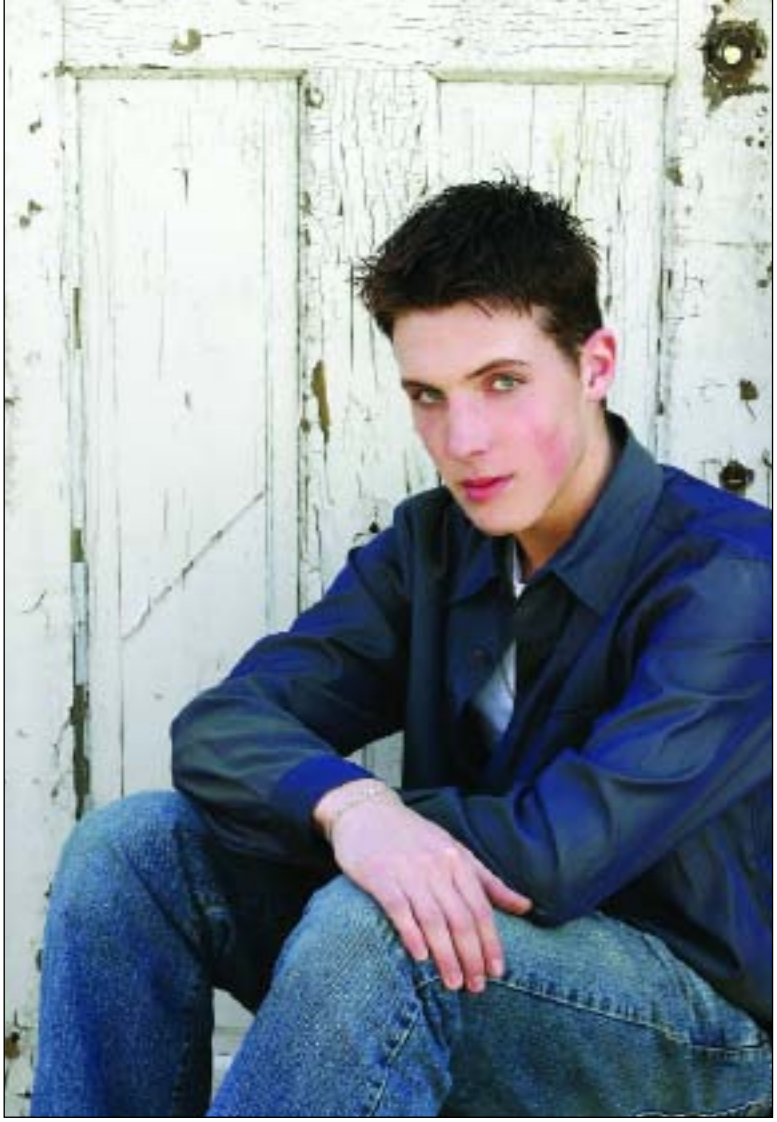
Another consideration when producing very long exposures is the increase in image contrast due to the fact that the increased exposure time has more impact on the highlights in the scene than on the shadow areas. This increase in contrast is usually dealt with in the printing process.

The reciprocity effect is easier to manage with black & white film than with color film. With color film, each color layer will respond differently to very long exposures, and the entire color balance of the image will be affected. This color shift can be prevented by using the proper color correction (CC) filter over the camera lens at the time the exposure is made (see chapter 5).

Storage. Film should be stored in a cool and dry place away from direct sunlight. All film has an expiration date stamped on the box, but storing film in the refrigerator will render it usable long past the expiration date (and



In low-light situations, higher ISOs are often used—especially when flash cannot be used or would be impractical. Photographs by Patrick Rice (left) and Michael Ayers (above).



Whether they are film or digital, images must be carefully processed and printed to ensure professional-quality results. Photographs by Barbara Rice.

storing it in the freezer will extend its life indefinitely). I visited the Eastman Kodak facility in Rochester, New York, and had the opportunity to walk into one of the huge film freezers. I was able to get some "expired" films that were no longer in production. Each exposed and processed perfectly. (*Note:* Cooled or frozen films must be allowed to reach the ambient temperature before shooting to prevent excess humidity in the camera.)

Processing. While it goes beyond the scope of this book to provide complete instruction on developing film and printing images, the following is a basic overview. For more detailed information, you may wish to consult a specialized volume such as *Into Your Darkroom Step-by-Step* by Dennis P. Curtin (Amherst Media, 1991).

The first step in developing film is to determine the developer that will be used. For color negative film, this will generally be C41 chemistry. For black & white negative film, it will typically be an all-purpose black & white developer. Transparency film is generally processed in E6 chemistry.

COLOR LABS: A BRIEF HISTORY

Until the late 1960s, photographers either developed and printed their own pictures or sent them to Eastman Kodak for printing. Because of the complicated process required to produce color prints, however, some entrepreneurs soon discovered there was a market for photo-finishing services among both professional and amateur photographers. This is how the color processing lab was born. Before long, department stores and drug stores recognized the growing popularity of color photography and began developing and printing color film for consumers. Today, the revolution continues, and most of these establishments are now printing from digital files.

Once selected, the developer's reference chart for the specific film can be used to determine the proper development time and temperature.

Next, the exposed film is opened in a darkroom or film changing bag and loaded onto a film developing reel. This reel is then placed into the developing tank, and the light-proof lid is closed. The film developer is added to the tank and left in for the duration of time specified. During this process, the tank must be agitated at regular intervals to move the processing fluids over the photographic film.

After the developing time is complete, the developer is dumped out of the tank and stop bath is poured in. Generally, this is left in the tank for 30 seconds and agitated continuously.

The stop bath is then poured out and the fixer (a chemical solution that makes the emulsion of film or paper no longer sensitive to light) is added. The active ingredient in the fixes, sodium hyposulfate or sodium thiosulfate, dissolves the unused and unexposed silver halide crystals. After film or paper is treated with a fixing agent, only the developed silver image will remain.

At this point, a washing aid solution can be used to shorten the amount of time needed for washing the film. After this, the film is washed in the tank using a continuous water source from a faucet or hose. (Another optional but recommended step is to treat the film with a wetting agent like Kodak Photo-Flo. Photo-Flo is good at preventing water spots on your film.)

Finally, the film reel is removed from the tank. The film is unwound from the reel and hung to dry. A film drying cabinet is very helpful in speeding up this process and keeping the film away from airborne dust while it is still wet.

Photographers have numerous ways to manipulate the processing of their film for optimum results. For example, an activator can be added to improve the development process. Developing time can be changed for specific pur-

While many enhancements can be made to images in the traditional darkroom, the advent of digital imaging has dramatically increased the creative options—and decreased the time required to create them. Photographs courtesy of Visualizations Photography.

Whether you shot the image on film or captured it digitally, image-editing software can help you to produce the flawless look today's clients demand. Photograph by Monte Zucker.

poses. For instance, overdevelopment (allowing the film to develop for longer than recommended) can be used as a method to get better results from images you know were underexposed at the time of shooting.

Digital Images from Film. If you've captured a film image that you wish to archive as a digital file (or to digitally enhance), then you can create a high-resolution scan of your film image, be it a print or a negative. For more information on the steps required to achieve a good scan, see *The Practical Guide to Digital Imaging* by Michelle Perkins (Amherst Media, 2005).

Film Cameras

35mm Cameras: Point & Shoot vs. SLR. 35mm cameras are the most common camera format, accepting 35mm film in print and slide formats.

Fixed-lens 35mm cameras, called point & shoot cameras, come equipped with either a single focal length lens (usually a moderate wide-angle lens) or a zoom lens. These are highly portable and can be easily carried to almost any event. While these cameras produce relatively good images, the single-lens reflex camera (SLR) provides serious amateurs and professionals with the shooting versatility they need to get the best-possible pictures.

Using an SLR offers several advantages. First, the subject is viewed via a mirror that is situated behind the lens. When the exposure is made, the mir-

ror flips up and out of the way. As a result, the image is both previewed and shot through the same lens, eliminating potential framing problems that can occur with other preview methods. SLRs also allow for the use of a wide variety of lenses, allowing for different image effects. Finally, unlike most point & shoots, using an SLR allows you to manually set the camera's exposure and focus (in addition to selecting from the numerous other shooting modes available on recent models).

35mm cameras have really changed over the years. Starting with the very simple and dependable 35mm cameras of the 1950s and 1960s, photographers received excellent results with this small-format film source. In the 1970s, 35mm SLR camera manufacturers began to introduce better metering systems and automatic functions (including autoexposure, automatic metering, automatic film loading, and early autofocus).

The next major breakthrough was the invention of true autofocus technology. While the first autofocus cameras would not always precisely focus the camera, these focusing systems continue to improve. Today's 35mm SLRs are very sophisticated, and their focusing systems are very accurate. In fact, the autofocus on most cameras is probably better than the photographer's own vision! For more on autofocus, see page 43.

View Cameras. View cameras, while less often used today than in years past, offer some appealing features. First, the large size of the film utilized

Knowing how to use the manual focus and exposure settings on your camera greatly increases your creative potential. Photograph by Dennis Orchard.

When the film plane of a camera is positioned at an angle to the subject, distortion is created. This is particularly evident in architectural photos, where the parallel lines of the actual building appear to converge in the image. This can be avoided with a view camera by using the camera's swings and tilts to keep the film plane parallel to the subject. As these images demonstrate, however, this distortion can actually be used effectively to create strong diagonal lines and powerful compositions. Photographs by Drew Smith.

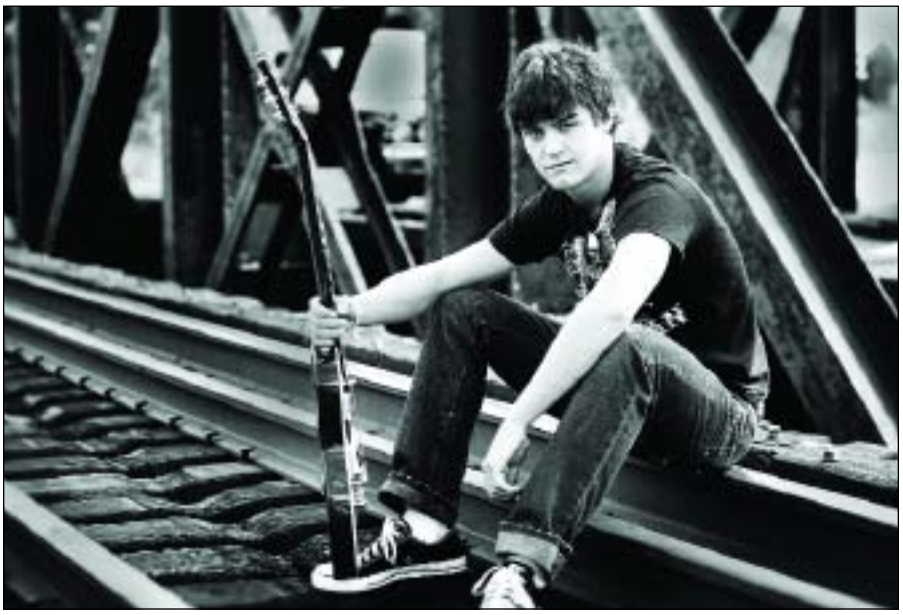
by a view camera allows for outstanding quality in big enlargements. Some view cameras can be fitted with a Polaroid film back, a 120-film back, or a 4x5-, 5x7-, or 8x10-inch sheet film holder. Today, we even have digital backs for view cameras.

Additionally, view cameras feature swings and tilts, meaning that the lens and film plane can be moved independently from each other—up, down, sideways, and back and forth. This allows the photographer to increase or decrease the depth of field, alter perspective, and reduce subject distortion. For example, when recording a tall building, a photographer with any other type of camera will need to tilt the camera up toward the building. As a result, the film plane will be at an angle to the plane of the building. Because the film is closer to the building at the bottom than at the top, the parallel vertical lines of the building will converge in the resulting image, narrowing toward the top of the frame. With a view camera, the film plane can be kept perfectly parallel to the building, while only the lens is tilted up to frame the intended shot. As a result, view cameras can maintain nice straight vertical lines in a way that other cameras cannot.

When using a view camera, the photographer previews the image on a ground glass, which shows the subject upside down and backwards. Many view cameras are fitted with a focusing cloth, a black piece of fabric that cov-

ers the back of the camera and the photographer's head to block out light and make it easier for the photographer to sharply focus the picture on the ground glass.

Medium Format Cameras. Medium format cameras generally accept 2¼-inch film in 120 or 220 rolls. While the 2¼-inch film size is a fixed dimension, different models of medium format cameras produce different frame sizes—2¼x2¼ (6x6cm), 2¼x2¾ (6x7cm), 2¼x1⅝-inch (6x4.5cm), and other sizes with panoramic cameras. Medium format cameras were the cameras of choice for wedding and portrait photographers before the digital age. Today, you can get digital backs for medium format cameras with sensors 48 megapixels or larger.



Medium format cameras were once the mainstay of professional wedding and portrait photography. Today, smaller, 35mm-type digital models are quickly becoming the standard. Photographs by Rick Ferro (top) and Chris Nelson (bottom).

Today, digital cameras are being used by photographers in every conceivable situation—from wedding and portrait photography, to commercial and fine-art imaging. Photograph by Charlene Rule.

Medium format cameras are available as single-lens reflex (SLR) and twin-lens reflex (TLR) cameras. Like SLRs, TLRs can have interchangeable lenses. With a TLR, however, the photographer previews the images through one lens, and the photograph is taken with the other lens. This has an interesting advantage: since there is no mirror to flip up during the exposure of the film, the photographer using a TLR can see the exposure while it is made. This enables the photographer to watch to see if the subject's eyes are open and also to see if the flash fired with the shutter. Because the position of the taking lens is offset from the position of the preview lens, however, framing problems (especially in close-up images) can be an issue.

RESOLUTION

The image resolution needed for web use is 72ppi. For printing, it is 240–300ppi. Image resolution can be adjusted after the shoot using image-editing software.

Digital Cameras

Today, there are literally dozens of professional digital cameras for the photographer to choose from. Where do you begin in making a selection? The easiest way to make an informed decision is to identify the features that are most important to you and the type of photography that you will use your digital camera for. It is important to remember that one single digital camera may not fulfill all of your photography needs. The following are some features to keep in mind.

Megapixels and Resolution. Resolution refers to the maximum number of individual picture elements (pixels) that the camera's sensor can capture. A megapixel is simply a million pixels. The more pixels your camera has, the more detail it can capture in each photograph. The more detail you have, the more you can enlarge a picture before it becomes "grainy" and starts to look out of focus. Today's professional digital cameras range from 3 to 18 megapixels in 35mm cameras and 48 megapixels and beyond for medium format camera backs.

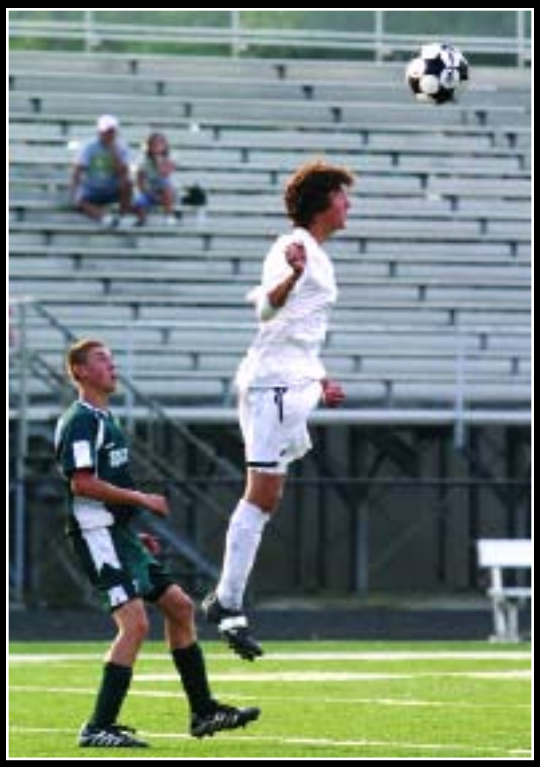
While having more megapixels available is generally better than having less, the best determination of camera quality is made by examining the maximum enlargement possible from an image file. Any of the professional 35mm digital cameras available can make very acceptable prints up to 24x30 inches. The only time the use of a larger megapixel camera is noticeable is on very large prints or when the subjects are very small in the photograph. Larger sensors provide more detail, allowing for larger magnification before artifacts are apparent.

What resolution you need depends on the work that you do. For example, if you shoot a number of large family groups and routinely sell 20x24-, 30x40-, or 40x60-inch images to the client, you will need a digital camera with a large file size, preferably 12 megapixels or higher. However, those same cameras may not be the best choice for photographing a high-school football or basketball game. For these types of events, file size is less important, because the maximum image size you may be expected to provide is usually 8x10 inches or smaller. Speed is of far greater importance in these cases.

COLOR VS. BLACK & WHITE CAPTURE

Though some digital cameras have a black & white capture setting, I would strongly recommend capturing all of your images in color. With color capture, you can create a variety of digital imaging enhancements—from toning, to selective handcoloring, to conversion to black & white in Adobe Photoshop—with excellent results.

Using digital image-editing software, photographs captured in color can easily be converted into portraits with an elegant handcolored look. Photograph by Penney Adams.



In sports photography, which is all about capturing the peak action of the subjects, high burst rates are more critical than high resolutions. Photographs by Rob Ledwedge (top left and right) and Robert Williams (left).

In early digital models, shutter lag was a problem. With today's cameras, capturing the peak action in high-speed situations is less complicated. Photograph by Jesse Josleyn.

POLAROIDS

In 1944, Edwin Land, owner of the Polaroid Land company, invented instant film. Instant film consists of a gelatin coated paper, negative emulsion, and processing chemicals that are either sandwiched in layers or applied by the camera to the paper as it is ejected. Instant films were popular with both consumers and professionals because of their ability to produce a print of what the camera just photographed in about sixty seconds. Manufacturers designed medium and large-format Polaroid backs for their professional cameras to help photographers produce accurate images for their clients.

Burst Rate. If speed is critical, you'll want to consider models with high burst rates—cameras that can capture several frames per second for a few seconds before needing to stop and render all of the images. These are ideal for sporting events and even for wedding photographers who enjoy shooting several frame sequences in order to capture that perfect moment for the bride and groom.

Shutter Lag. In the last few years, most of the camera manufacturers have solved many of the problems that plagued earlier digital cameras. Shutter lag (the time between pressing the shutter button and when the camera actually records the image) is no longer a problem with most professional digital cameras. The Fuji professional digital cameras are slower than the Nikons and Canons but are usually manageable. Most of the Olympus cameras and the older Nikon 950, 990, and 995 cameras that we use for infrared imaging (see chapter 5) have some shutter delay, but you can learn through experience to be aware of this problem when taking pictures.

CCD vs. CMOS Sensors. In digital cameras, images are captured on electronic sensors rather than on film. There are two popular types of sensors in most of today's digital cameras: CCD and CMOS. The first sensors produced tiny images—only 320x240 pixels—but pixel density has steadily increased over the years.

CCD (Charge-Coupled Device). CCD sensors use an array of photodiodes, arranged in a grid pattern, to convert light into electronic signals. All CCD cameras use interpolation to create images. For example, a 3-megapixel dig-

Like sports photographers, wedding shooters often rely on their camera's speed to help capture the moment. Photographs by Travis Hill (left) and Chris Nelson (right).

All digital cameras use image sensors to convert light into image data. How this process is executed, however, varies slightly depending on the camera's design. Photographs by Dennis Orchard.

ital camera only has 750,000 red, 750,000 blue, and 1.5 million green pixels, but the camera's on-board processor generates a 3-million pixel color image by interpolating the data from each neighboring pixel.

CMOS (Complementary Metal Oxide Semiconductor). CMOS sensors have some advantages over CCD-type sensors. First, they use only a fraction of the power required by CCDs, making them a great feature in battery-powered cameras. Additionally, CMOS sensors are made using the same techniques and equipment as more familiar CMOS circuits like CPUs and RAM, so they cost less to produce than CCDs, which require specialized fabrication equipment.

Like CCDs, CMOS sensors use an array of photodiodes to convert light into electronic signals. The weak electronic charge generated by the photodiode is stored in a small capacitor. The major difference between CCDs and CMOS sensors is in the way these stored charges are converted into a usable signal. A CCD sensor scans its pixels consecutively. As it does so, the stored charges from each row are actually shifted down to the next row. At the bottom of the array, the charges in the final row are output in a serial stream. The voltage levels of each pixel in the serial stream are maximized by an on-chip amplifier prior to output and sent to either an external or internal

DON'T REINVEST

With the innovations of the past couple of years, it doesn't make that much difference whether your camera uses a CCD or CMOS sensor. Canon, Nikon, and Fuji are all manufacturing great digital cameras that produce outstanding files for the working professional photographer. While there are differences in the two technologies, the sensor is not necessarily a deciding factor when choosing a camera. My recommendation is quite simple. If you already own 35mm camera lenses on the Canon platform, then choose one of the Canon digital cameras. If you own 35mm lenses on the Nikon platform, then choose the Nikon or Fuji digital camera bodies. The key is to not have to reinvest in new lenses. This will save you thousands of dollars, and you will get great digital files regardless of which sensor your camera utilizes.

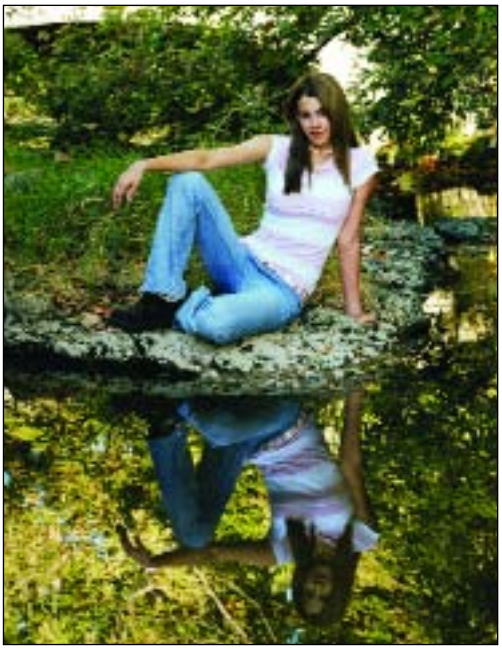
analog-to-digital converter (ADC), where the signals are converted into an array of bytes that makes up the image.

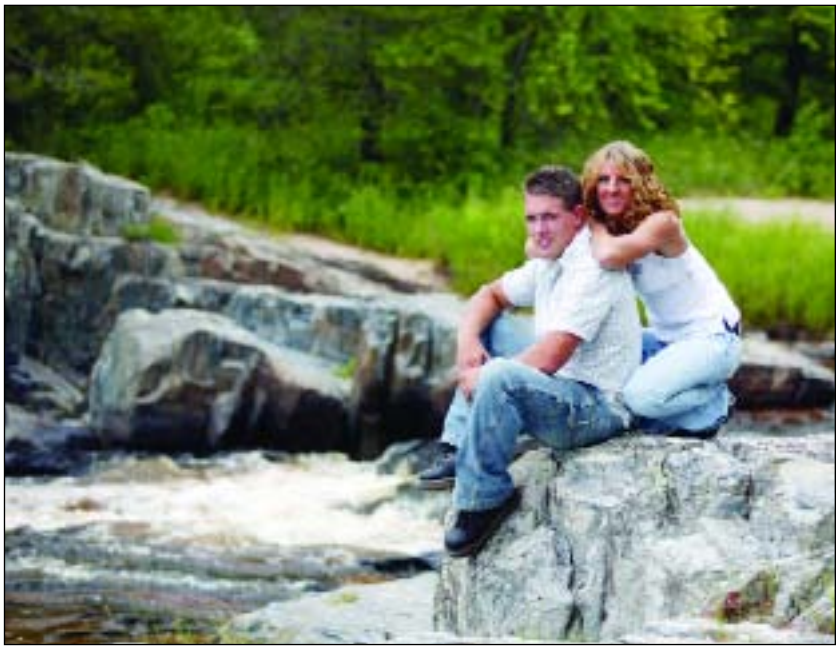
Each pixel in a CMOS sensor, on the other hand, has its own amplifier circuit, so the signal amplification is performed prior to the image being scanned. The resulting signal is strong enough to be used without any further processing. Unlike CCDs, CMOS sensors often contain additional image-processing circuitry (including ADC and JPEG compression processors) directly on the chip, making it easier and faster to retrieve and process the picture information. This results in a lower number of chips per camera, increased reliability, reduced power consumption, and a more compact design.

Until the introduction of the first Canon CMOS professional camera, the Canon D30, CMOS sensors were generally regarded as a low-cost, low-quality alterative to CCD sensors and were typically found in inexpensive digital cameras. A major problem in older CMOS sensors was that some pixels often had more or less sensitivity than their neighboring pixels. This unevenness translated into noise. Canon solved the noise problem in the D30 by scanning the sensor twice—once before the shutter opened, and again while the shutter was open. The "dark" image was then electronically subtracted from the exposed image, which virtually eliminated the noise.

Digital Storage Media. Once an image is captured by the image sensor, the data is stored on the camera's storage media. The most popular are microdrives and CompactFlash (CF) cards.

Whether it is designed around a CCD or CMOS image sensor, you can expect to get high-quality results with any professional digital camera. Photographs by Chris Nelson (left) and Rob Ledwedge (right).





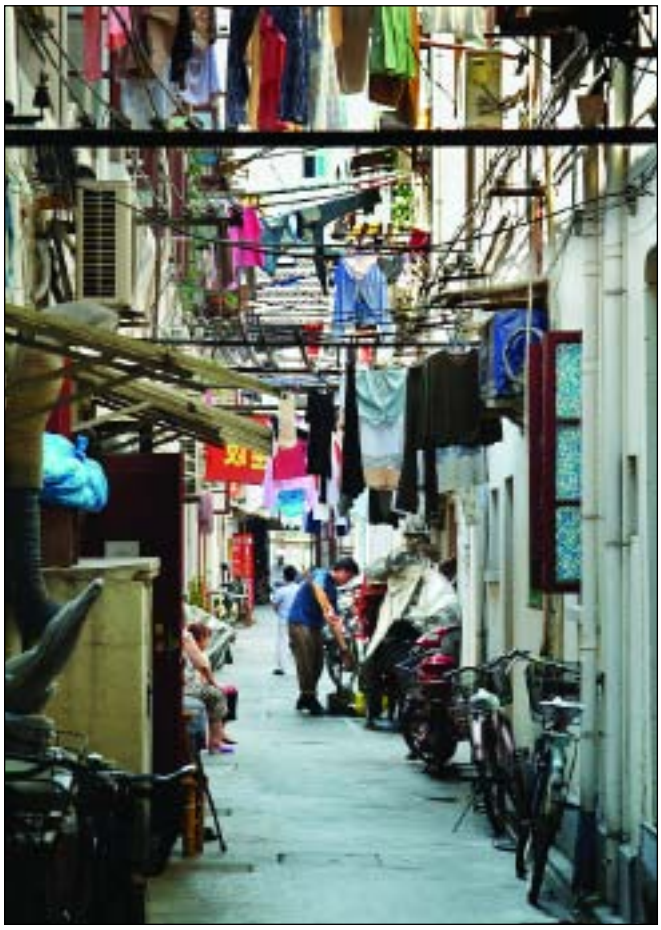
Microdrives. Microdrives came on the market very early in the evolution of digital imaging. Their advantages were their large storage capacity and fast read and write speeds in the camera and computer. They were also very inexpensive compared to the CF and SmartMedia cards. The major disadvantage of microdrives is that they are miniature computer hard drives that have moving parts enclosed in the housing. This presents two distinct problems. First, if a microdrive is dropped, it is possible that it may never work again, and the photographer could lose every image on the microdrive at the time. This has happened to a number of photographers. The second problem is that a microdrive, being a computer hard drive, can crash just like any computer hard drive. These factors present a considerable risk for the professional portrait or wedding photographer.

CompactFlash Cards. CF cards are solid-state circuits. With no moving parts to break, these cards are practically indestructible! I have met three photographers who have left CF cards in the pockets of their trousers and

HOW DIGITAL CAMERAS CREATE COLOR

CCD and CMOS sensors are sensitive only to the amount of light striking them, not to the color of the light. To create color, a mosaic filter called a Bayer filter is used. These filters feature a checkerboard pattern of alternating rows of color (red, green, and blue). Specialized algorithms then convert the mosaic of separate colors into an image.

When you're in the moment, the last thing you want to do is stop to switch memory cards. Therefore, it makes sense to work with larger memory cards and minimize the number of card changes that need to be made. In some cases (say, just before an important event at a wedding), you may want to switch to a fresh card just to be sure you won't need to stop shooting in the middle of the event. Photographs courtesy of Drew Smith (left) and Visualizations Photography (right).



CompactFlash cards are very durable, making them great for wedding photography and other situations where your equipment is constantly being moved around. Photograph by Michael Ayers.

sent them through the washing machine and dryer without harming the card or the images recorded on it. CF cards were initially very expensive, had limited storage capacity, and very slow read and write speeds. This has all changed. The prices of CF cards have dropped dramatically—so much so that they are usually less expensive than microdrives of the same storage size. Additionally, the storage capacity for CF cards has actually surpassed that of microdrives. Lexar Media and SanDisk offer 1-, 2-, 4-, and 8-gigabyte CF cards for professional photographers. These large-capacity cards can store hundreds of files and can be used with the latest high-resolution cameras. Finally, the read and write speeds of professional CF cards have also surpassed that of microdrives, making them extremely efficient to use.

Card Readers. A card reader is a computer interface accessory that enables the computer to read data from digital media cards. These are built into many newer computers or can be added to a computer through a USB connection.

Image File Formats. A file format is the "language" in which a digital image is written. There are three main formats of concern to photographers.

TIFF (.tif). The TIFF file format employs a "lossless" compression called LZW, which means that when the file is compressed, no image data is thrown out. While this ensures better image quality, it also means that the files are not compressed as much as JPEG files. Compared to a JPEG file,

The file format you select will depend on your final intent for the image (i.e., how much you intend to enlarge it), as well as your shooting needs. You might select JPEG for photojournalistic portraits that include motion (left) but switch to the RAW mode for a posed studio portrait where time is less critical (right). Photographs by Ken Holida.

therefore, an image saved as a TIFF file will take up much more space on your memory card and will use up more of your computer's memory. Also, when an image is captured in the TIFF format, the camera makes certain automatic image adjustments (unlike with RAW files, where these can be applied selectively by the photographer after the shoot).

JPEG (.jpg). The JPEG file format employs a "lossy" compression algorithm, which means that data is thrown away in order to minimize the file size and cannot be recovered at a later time. The benefit of this format is its much smaller file sizes. This means the camera can process each file more quickly (i.e., you can shoot faster) and the memory card can hold more images (i.e., you can shoot more images before having to switch the card out). Like TIFF images, JPEGs are subject to some automatic in-camera image adjustments.

RAW (.raw). When you shoot in your camera's RAW mode, no contrast, sharpness, saturation, or color balance adjustments are applied to your image by the camera. Instead, these changes can be applied to individual files (or groups of files) after the shoot. This allows for maximum flexibility. Additionally, images recorded in the RAW mode are not compressed. This means that all the data captured by the images sensor is preserved, resulting in maximum image quality. However, these uncompressed files are big, requiring more time to process in the camera and more space on your memory card (and, later, on your computer). While opening and processing RAW camera files used to require special software, Photoshop now comes with the software needed to work with these files.

ISO Ratings. One of the real advantages of digital photography is the ability to choose and change ISO speeds at will. With film, you are virtually stuck with the film as rated by the manufacturer. When you want to change to a different ISO film, you have to use all of the film in the camera and then switch rolls (or, with some cameras, switch film backs). This is not the case

with digital. With digital photography, you can change the ISO setting from shot to shot, allowing you to optimize your camera settings for whatever lighting conditions you encounter. Outdoors on a bright day, you may choose a low ISO rating of 100 or 200. Indoors with flash, you may set the ISO to 400. If flash photography is not desired or possible, you can change the ISO to 1600 and beyond. The photographer has complete control and flexibility.

As you increase the ISO rating on your digital camera, the camera becomes more light sensitive. In other words, you can take photographs in lower light situations. However, just like film, as the ISO rating goes up, so

RAW OR JPEG? BY MICHAEL AYERS

"Do you shoot in RAW or JPEG mode?" The answer, for me, is both. Most people believe that RAW mode gives you the best images and JPEG is best used for quick and easy snapshots. The truth is, both modes have their advantages and disadvantages.

RAW mode allows the user to produce the highest resolution image. Also, with many high-end digital cameras, an image captured in RAW mode and overexposed by even a full stop can be brought back to the correct exposure. This "safety net" is one of the biggest advantages of RAW mode, since some photo opportunities are gone for good once the moment has passed.

However, JPEG still has some advantages. First, in most cameras, the JPEG mode has a quicker acquisition time, thus allowing the photographer to be ready for the next big moment. Second, with the smaller file size you can get more images on a CompactFlash card or microdrive. Third, you can get a great enlargement with a JPEG. Fourth, most labs cannot process a RAW file (you have to convert the image to JPEG before sending it to the lab, which means an extra step in the process). A JPEG image, on the other hand, usually needs no conversion for a lab to process it.

In recent tests I have conducted I have seen the same quality in the final print from both RAW and JPEG files. The key here is obviously correct exposure on the front end and a good lab on the back end. It is also important that you know what your end product is going to be. For me it is pretty simple. Few if any clients will order a 20x30-inch wall portrait of the best man giving a toast. A JPEG will easily give you a 16x20-inch print, so shooting this type of image in JPEG is a good call. If you know the end product will be a 30x40-inch print (say, for a formal portrait of the bride and groom) or you need that "safety net" for exposure, then RAW mode may be your best choice.

Photographers encounter a variety of lighting situations. With digital, you can set your ISO individually for each shot. Photographs by Rick Ferro (left) and Travis Hill (above).

does grain in the final image. This can sometimes be seen as a creative effect, sort of Monet-like in quality, but is more often considered a problem in an image. When using a high ISO is your only option (such as a very dark church), digital grain can also be reduced with programs like Applied Science Fiction's Digital GEM Photoshop plug-in.

Viewfinders and LCDs. Digital cameras allow users to use the viewfinder, the small window on the back of the camera, to compose their images, as is done with film cameras. They also feature LCD (liquid crystal display) monitors that allow you to review your images post-capture—or share them with your clients. The viewfinder is also your means of interacting with the camera. You can use the menus displayed on the monitor, in concert with your camera's buttons or dials, to select the desired settings. (*Note:* Digital point & shoot cameras, unlike SLRs, also allow you to use the LCD to compose your images.)

Flash Photography. In many photographic situations, there is not enough ambient light to record the image the desired way. In these cases, the photographer will need a portable flash unit or studio lights to properly illuminate their subject. Both Canon and Nikon have introduced specific flash units designed to be used with their digital cameras. These dedicated portable strobes optimize all of the camera's features and allow for total integration of features and performance. For example, with Canon digital cameras, when using their 580 EX flashes, the camera can have flash synchronization from 30 seconds up to $\frac{1}{8000}$ second. If you use a non-Canon flash, the flash synchronization is from 30 seconds to only $\frac{1}{250}$ second.

Don't let a dead battery stop you from capturing an amazing image—be sure to pack extras for all your cameras. Photograph by Dennis Orchard.

The instant feedback of digital allows you to instantly check the accuracy of your exposure, focusing, and composition. Photograph by Dennis Orchard.

Photographers can certainly still use their third-party strobe units (e.g., Metz, Quantum, Lumedyne, Vivitar, etc.) with their digital cameras. However, there is a remote possibility that you can short out your camera when doing so. Strobe units that are matched to the camera produce a regulated amount of voltage into the camera through the camera's hot shoe. Third-party strobe units may produce variable amounts of voltage and burn up the electronics in the camera. To avoid this problem, you can use a product called a safe sync, which regulates the voltage from the portable flash and prevents a power surge. These units cost about $60, fit right on top of the hot shoe mount on the camera, and have a PC cord plug on them. (*Note:* If you fire your flash equipment or studio strobes via radio slaves, you do not have to be concerned with this problem since the radio slave generates a very low voltage current.)

Batteries. Professional digital cameras typically run on rechargeable batteries (although some can also be plugged in for shooting in the studio). The battery life you can expect varies from camera to camera and will depend greatly on how you shoot. One thing is for sure though: you'll need extra batteries and you'll need to make sure they are charged before every shoot. If you carry one or more backup cameras (which is always a good idea) on your assignments, or if you work with an assistant who also shoots, be sure to have backup batteries for these cameras as well. Dead batteries can leave you dead in the water.

MOIRÉ

With some digital cameras, when you photograph a subject whose clothing features a regular pattern of stitching or weaving, a strange pattern of stripes and/or colors unrelated to the original pattern in the subject may appear in the shot. This is referred to as a moiré effect. A moiré pattern is a two-dimensional "beat" captured by the camera as a result of the interaction between the regular pattern on the subject and the regular pattern of the CCD pickup element in some digital cameras. Moiré patterns only affect digital cameras and do not occur with film cameras. This is because there is no regular pattern in the distribution of light-sensitive material on film.

2. LENSES

A lens is a piece of precisely shaped optical glass. Camera lenses contain multiple pieces of this optical glass used in sequence to focus the light reflected from a scene or subject onto the recording medium (be it film or a digital sensor) with maximum sharpness and minimal distortion. Point & shoot cameras typically have a fixed (permanent) lens; SLRs can accept a variety of interchangeable lenses.

Qualities of Lenses

Focal Length. Lenses are described according to their focal length or range of focal lengths. The focal length of the lens (measured in millimeters [mm]) determines the way that the scene is recorded, both in terms of the angle of view and the perspective relationship between the subject and the background.

Normal Lenses. A normal lens is one that approximates the angle of view we see with our eyes. The focal length measurement for a normal lens, however, will change depending upon the film/sensor size being used. A normal lens on a 35mm camera is a 50mm lens, while a normal lens on a medium

Normal and telephoto lenses are common choices for portrait photography (although telephotos are generally preferred, as noted on page 33). Photograph by Chris Nelson.

format camera is an 80mm lens. For digital cameras, see the sidebar to the right. Normal lenses are generally very sharp and very fast.

Wide-Angle Lenses. Wide-angle lenses are sometimes referred to as short lenses because they have focal lengths shorter than a normal lens. These lenses provide a wider field of view than the human eye can see. This makes them ideal for photographing large groups, recording vast landscapes, or working in tight spaces. Inexpensive 35mm single-use cameras are often equipped with such lenses.

Telephoto Lenses. A telephoto lens is a lens with a focal length longer than a normal lens. Telephoto lenses (also called long lenses) provide greater image magnification than a normal lens, allowing the photographer to record subjects from a greater distance. This is useful when you simply cannot get as close to the subject as you would like (such as at a sporting event), when getting closer would be undesirable (such as when taking candid shots

FOCAL-LENGTH FACTORS

On digital cameras, where the size of the image sensor varies from model to model but is typically smaller than a 35mm film frame, focal lengths are often given in 35mm equivalents. To understand how the lens will actually function, then, you must know the value of the focal-length factor for the camera on which the lens will be used. Typically, this is in the 1.3x to 1.6x range. For example, if you were using a 50mm lens on a camera with a 1.5x focal-length factor, the lens would actually provide an angle of view and perspective equivalent to a 75mm lens (50 x 1.5 = 75) on a 35mm camera. As you can see, because the image sensor on a digital camera is smaller than a 35mm film frame, a 50mm (or any other) lens will provide results that are slightly more telephoto. This is not because the lens really magnified the subject, but rather because the sensor is smaller and, therefore, records a smaller portion of the scene.

Wide-angle lenses are frequently used to capture the majesty of a vast landscape. Photograph by Bob Knuff.

Telephoto lenses are a great choice when it's not possible to get close to your subjects. Photograph by Drew Smith.

at a wedding), or when approaching the subject would be dangerous (when photographing wild animals, for instance).

For portraiture, most photographers use telephoto lenses. These telephoto lenses provide a compression of the subject and background that is very flattering. Telephoto lenses also have a shallower depth of field, which keeps the backgrounds less in focus and less distracting. In the days of medium format cameras and lenses, a photographer would generally use a 150mm or 180mm lens for portrait work. With 35mm film cameras and lenses, the recommended focal length for portraiture is 135mm.

With digital cameras, as noted on the facing page, the correct lens for portraiture depends on the magnification of the digital camera. Let's look at an example. If your camera has a 1.6x magnification factor, the lens has an effective focal length that is 60 percent greater than the focal length listed by the manufacturer. In other words, when used with this camera, a 100mm lens would be effectively a 160mm lens. A 90mm lens would function as a 135mm lens on this camera. These moderate telephoto focal lengths would, therefore, make either of these lenses a good choice when creating a portrait.

Prime Lenses vs. Zoom Lenses. Prime lenses are lenses with only one focal length. While these are considered by many photographers to produce superior results, other professionals swear by zoom lenses—lenses that feature multiple focal lengths. These lenses feature internal glass elements that move in relation to each other and thus change the image size being rendered. This allows photographers to go from a close-up to a full-length image very quickly, without changing the lens. Note that the rules used to determine the effective focal length of a lens on a digital camera apply to both prime and zoom lenses (see facing page).

Perspective. Perspective refers to the relative size and depth of objects within a scene. This is controlled by the lens-to-subject distance.

For instance, with a wide-angle lens, objects very close to the lens appear to be stretched to unnaturally large dimensions. This effect can be creatively utilized by photographers to achieve dramatic images that emphasize the importance of the object.

Using a zoom lens allows photographers to go from a close-up to a full-length image very quickly, and without changing the lens. Photographs by Ed Vullo.

Telephoto lenses, used at a great distance from the subject, will create a perspective error called the telephoto effect. The telephoto effect compresses subjects in a scene and makes them appear very close to each other when in reality they are not. This effect can also be utilized for creative impact.

Maximum Aperture. Lenses are also rated according to their maximum apertures. This is the width of the opening in the lens (described as an f-stop [f/]) that allows light to strike the film/sensor. Most normal lenses have maximum apertures of f/2.8, f/2.0, f/1.8, or f/1.4.

The camera's aperture setting controls the amount of depth of field in a photograph. Depth of field is the area between the nearest and the farthest points from the camera that are acceptably sharp in the image. The smaller the aperture, the more depth of field in the photograph. Also, with smaller apertures, more of the background of the image remains in focus. Though

HANDHOLDING

The rule of thumb for being able to handhold a lens is use the shutter speed that is the closest inverse to the focal length of the lens. For example, if you are using a 50mm lens, you should be able to handhold the camera to approximately $^1/_{50}$ (the closest setting on most cameras will be $^1/_{60}$ second). If you are using longer focal length lenses, the minimum shutter speed will increase accordingly. For instance, you should not hand hold a 300mm lens at shutter speeds slower than $^1/_{300}$ second.

it may seem counterintuitive, there is actually an *inverse* relationship between the size of the aperture and the number used to represent it. For example, an aperture setting of f/16 is *smaller* than one of f/2.5.

The maximum aperture also has an affect on exposure. When a lens offers a very wide maximum aperture, it is considered "fast" because using a wide aperture allows the photographer to use a quicker shutter speed. This makes it easier to create low-light images, shoot handheld photographs, and freeze fast action in the frame. For more on exposure, see chapter 3.

Zoom lenses, it should be noted, have either a fixed maximum aperture or floating maximum aperture. A fixed maximum aperture means that the aperture will stay the same regardless of the focal length chosen. A floating aperture means that the maximum aperture will decrease as the focal length increases. With some less expensive zoom lenses, this can be a change of 2–3 stops.

Close-up Photography

When photographing small subjects, it's often desirable to get closer than your regular lens will allow you to focus. When that happens, the following tools can be useful.

Teleconverters. A teleconverter is a secondary lens that is placed between the lens and the camera body to increase the focal length of the lens (mak-

Zoom lenses work well for wedding photography, where great shots are appearing at different distances all around you. Photographs by Patrick Rice.

Photographing tiny subjects often requires you to get closer than your regular lens will allow. Photograph by Michael Ayers.

ing it enlarge the subject more). These are sometimes referred to as doublers because they usually have a 2x designation (i.e., they double the focal length), but teleconverters can also be purchased for some cameras at 3x magnification. The downside of teleconverters is that they can cause a loss of image sharpness. In addition, all teleconverters reduce the light that reaches the lens or sensor. A 2x teleconverter, for instance, will lose 2 stops of light from the lens's maximum aperture. In other words, a 200mm f/2.8 lens will effectively function as a 200mm f/5.6 lens.

Macro Lenses. Macro lenses are specifically designed for taking close-up photos. These lenses have specially designed lens barrels that can be extended farther than a normal lens. By extending the lens barrel, you can focus closer than a normal lens would allow. In addition, all macro lenses are designed to reduce aberrations that are normally associated with focusing in very close to an object. Macro lenses provide edge-to-edge sharpness at very close distances.

Close-up Lenses. Close-up lenses, sometimes referred to as close-up filters, are inexpensive lenses that are fitted to the front of a regular camera lens. These lenses magnify the focal length of the lens and tend to produce sharp images only when used with small apertures. They also produce images with a very shallow depth of field.

Extension Tubes and Bellows. Extension tubes and bellows are hollow devices that are mounted in between the camera body and the lens. By extending the lens farther from the film/sensor, these devices allow you to focus in closer to the subject. The closer you move the lens to the subject, the larger it will be recorded on the film/sensor.

Most extension tubes are metal rings of designated sizes that are placed between the camera and lens. The rings are available in graduated sizes, and each provides a specific magnification. Extension tubes can be attached to each other to increase the magnification effect of the tubes.

Bellows are flexible extension devices that can extend the distance between the camera body and the lens at various lengths. Because bellows are adjustable, they are far more versatile than extension tubes. Bellows are generally more expensive than extension tunes.

Both extension tubes and bellows allow for great close-up images. They can provide high-quality, larger-than-life images of a subject.

Close-up photos often feature an extremely reduced depth of field. This can make your tiny subject pop out dramatically from a very soft background, as seen in this image. Photograph by Debora Woodward.

Specialized Lenses

The Fisheye Lens. The fisheye camera lens, an extreme wide-angle lens, is one of the most intriguing of all lenses used in photography. Some fisheye lenses can record 180 degrees of the scene, giving the impression that all objects in the scene curve around the center. It is this distortion of reality that has elevated fisheye lens photography to an art form in recent years.

The biggest problem with fisheye lenses is that they can sometimes see too much of what you are photographing. In fact, the most common mistake made with a fisheye lens is getting people who are standing off to the side of your camera position in the picture. Most people are not accustomed to the extremely wide field of view of the fisheye lens and will think they are out of the way when, in reality, they are not. Therefore, it is imperative that you scan the perimeter of the frame to eliminate distractions.

Lens flare from the sun is another common problem with fisheye lenses. Because of the extreme angle of view of a fisheye lens, it is very easy to include the sun in your photographs.

Perspective Control Lenses. Perspective control (PC) lenses, also called shift lenses, are popular with commercial photographers, who need to control the perspectives of objects in a scene. These lenses can straighten vertical lines so that tall objects do not appear to lean toward the center of the

When using a fisheye lens, placing your subjects in the center of the frame will keep them from appearing distorted. In this image (facing page), notice how the car and landscape curve around to encircle the bride and groom. This is the effect created by the fisheye lens. With any other lens, these lines would be straight diagonals. Photograph by Dennis Orchard.

The Lensbaby provides only a pinpoint area of focus in the picture, with a smooth blur over the rest of the frame. With the right subject, it can create an extremely effective image. Photograph courtesy of LisaSmithStudios.com.

In portraiture, a shallow depth of field (top) can be used to subdue the background and keep the focus on the subjects. A wider depth of field (bottom) keeps the background more sharp, allowing it to play a greater role in the photograph. Photographs by Chris Nelson.

image. PC lenses operate somewhat like a view camera and have some shift capability. These lenses have a built-in bellows system, and the front element of the lens can be shifted up or down by turning the lens control knobs.

Lensbaby. Photographer Craig Strong invented a specialized lens that he calls the Lensbaby. The Lensbaby mounts on your camera like any other lens but provides a pinpoint area of focus in the picture. This inexpensive lens allows for the manual control of lens tilts and swings (like a view camera) and creates a "sweet spot" of focus while the rest of the image appears to be affected by motion blur. Plastic invertible aperture rings allow you to change the effective aperture.

Focusing

As a camera lens focuses, the lens barrel rotates to the position at which rays of light from the lens converge to form a sharp image on the film/sensor.

SELECTIVE FOCUS

A person viewing a photograph tends to look at the area of a photograph that is in focus before they see anything that is out of focus. Therefore, focus can be used to direct the viewer to the particular portion of the photograph that the photographer deems the most important.

While image-editing software includes filters to enhance the sharpness of digital images, these are definitely no substitute for careful and accurate focusing when shooting. Proper focus is critical to a successful image.

The closer an object is to the lens, the farther the lens has to be from the film/sensor to achieve sharp focus. All lenses focus sharply at a single point in the distance. This is called the plane of critical focus. Anything at that distance from the lens will be sharply focused, while objects closer and farther from that point will be less sharp. This is not to say that those objects won't appear *acceptably* sharp, they just won't be completely sharp. The acceptably sharp area of a photograph is referred to as the depth of field. How great an area this spans will be determined by the aperture (see page 46) and the lens selection (see pages 31–35).

Manual Focus. On a manual focus camera (or with a camera set to the manual focus mode), the photographer rotates the lens barrel until he achieves a sharp image.

When using manual focus, it can be helpful to use a procedure called zone focusing. Zone focusing means setting the lens at the distance that you think your subject is at and relying on the aperture's depth of field to maintain acceptable sharpness in the photograph. With manual focus cameras, I routinely zone focus while taking photographs at wedding receptions. In these very dimly lit situations, it is sometimes difficult to see the subjects well

Accurate focusing can be tricky with subjects that are in motion, but it's critical to producing professional-quality images. Photograph by Dennis Orchard.

enough to focus the camera, so zone focusing makes it easier to get sharp pictures of people dancing. I employ this technique even with my modern digital cameras when there is not sufficient light for the digital SLR's focusing system to lock focus quickly enough.

Many photographers employ a diopter to help them manually focus their camera. This is a supplemental lens that fits over (or is built into) the camera's eyepiece for vision correction. Many modern cameras include diopters that can be dialed in to best match the photographer's vision. I can always tell when another photographer at my studio has used my camera—I'll pick

More expensive cameras allow the photographer to move the focusing spot around the viewfinder. This makes it easier to focus on the off-center subjects included in most effective compositions. Photographs by Barbara Rice (top) and Debora Woodward (bottom).

Today's autofocus cameras include sophisticated systems that even allow you to track the motion of a moving subject. Photograph by Dennis Orchard.

up the camera to photograph a subject and the focus will lock, but the image will appear somewhat blurry. That's when I realize that the diopter setting has been changed. Once I adjust the diopter back to my setting, everything appears sharp again.

Autofocus. When you press the shutter button on your autofocus camera, it will focus on the spot that the focusing target area strikes. In less expensive cameras, the focus spot is directly in the middle of the viewfinder. More expensive cameras allow the photographer to move the focusing spot around the viewfinder to easily create differing compositions. Better cameras with superior autofocus technology will also focus more quickly than inferior cameras.

Cameras can be equipped with active or passive autofocusing systems (some cameras feature both). Active autofocus measures the distance to the subject by bouncing an infrared beam of light or high-frequency sound waves off of it. In a passive autofocus system, a computer analysis is made by the camera to determine the subject's distance. A camera with a passive focusing system will have trouble focusing accurately in low-light situations and in low-contrast scenes. The camera "fishes" for focus, with the lens moving back and forth, attempting to lock onto a focus point.

Lens Flare

Lens flare is characterized by a reduction in contrast and, often, strings of geometric highlights across the frame. It occurs when a very bright light source (such as the sun) is recorded in the image or its light rays are directly striking the front of the lens. Under these conditions, non–image forming light scatters and is reflected inside the lens and/or camera.

Lens flare isn't always a bad thing. As this image from Dennis Orchard demonstrates, in the hands of a master photographer, it can be used to great effect!

Adjusting your camera position or using UV-coated lenses and filters can help to eliminate or reduce the effect. Better yet, use a lens shade to keep stray light away from the lens. Keep in mind that different lens shades are designed to work with different lenses. Long telephoto lenses, for example, generally have long lens shades. Wide-angle lenses, on the other hand, require a very wide and thin lens shade to prevent vignetting. (This occurs when the lens shade is recorded in the corners of the photograph. This generally results in a darkening of the corners matching the shape of the lens shade.) Lens shades are especially important with digital photography, because the scattering of stray light on the lens and sensor will diminish the overall quality of the file.

Lens Cleaning

Some photographers are notorious for never cleaning their lenses. However, the presence of dirt, dust, smudges, and fingerprints on the lens will deteriorate the quality of the image. This is even more important with digital photography. Dirt and smudges degrade digital image quality and can be seen as dark spots in your image files. Make it a habit to clean your lenses regularly, and always keep a lens cloth on hand.

3. EXPOSURE AND METERING

When you take a picture, getting deep, saturated black tones with detail, bright whites with detail, and good, accurate color is important. If an image is overexposed (your camera lets in too much light), the image may be washed out and the highlights (the brightest areas of the scene) will lack detail. When there is not enough light striking the film or image sensor, the image will be underexposed and the shadow areas (darkest parts of the scene) will lack detail.

Accurate exposure is critical to producing professional-quality images. Photograph by Jesse Josleyn.

There are three main factors that determine the amount of light that is used to create the image, and whether your exposure will be acceptable. The first factor, film speed/ISO rating, was covered in chapter 1. Below, we'll look at how your aperture and shutter speed selection will affect your image.

Aperture

In the previous chapter, we described the impact of the aperture on the depth of field in the image. It is also important to note that the aperture you choose determines the amount of light that is allowed to strike the film/sensor. Therefore, the aperture setting also has an affect on the overall exposure of the image. The smaller the aperture, the less light reaches the film. The larger the aperture, the more light reaches the film. To "open up" is to increase the size of the lens aperture. It is the opposite of "stopping down."

With each full-stop change in the aperture, the amount of light striking the film/sensor is either doubled or halved. It may be helpful to review the chart below to better understand the relationship between the aperture size and the amount of light used to make the exposure.

f/2.8—Twice as much light as f/4
f/4—Half as much light as f/2.8, twice as much light as f/5.6
f/5.6—Half as much light as f/4, twice as much light as f/8
f/8—Half as much light as f/5.6, twice as much light as f/11
f/11—Half as much light as f/8, twice as much light as f/16
f/16—half as much light as f/11, twice as much light as f/22
f/22—Half as much light as f/16

Shutter Speed

The shutter speed refers to the amount of time that the camera's shutter remains open, allowing light to strike the film/sensor. The shutter speed is

APERTURE AND SHUTTER SPEED

Shutter speeds in one stop increments are: 1, $^1/_2$, $^1/_4$, $^1/_8$, $^1/_{15}$, $^1/_{30}$, $^1/_{60}$, $^1/_{125}$, $^1/_{250}$, $^1/_{500}$, $^1/_{1000}$, $^1/_{2000}$, $^1/_{4000}$, and $^1/_{8000}$ second. Most cameras drop the "1" and just show the bottom number.

Aperture settings in whole stops are: f/1.4, f/1.8, f/2.0, f/2.8, f/4.0, f/5.6, f/8.0, f/11.0, f/16.0, f/22.0, f/32.0

There is a reciprical relationship between the shutter speed and aperture setting to create equivalent exposures. For example, reducing the aperture by one stop can be compensated for increasing the shutter speed by one step.

Choosing a wider aperture lets more light into the camera. This allows you to select a faster shutter speed in order to freeze moving subjects in the frame. Photograph by Dennis Orchard.

Long shutter speeds can be used to capture moving subjects as a blur. The longer the shutter speed, the more the subjects will blur. Photograph by Patrick Rice.

usually rated in fractions of a second, though photographers sometimes use long exposures (a second or several minutes, for example) to photograph in low-light situations.

The slower the shutter speed, the greater the amount of light that reaches the film. The faster the shutter speed, the less the amount of light that reaches the film. Each full-stop change in the shutter speed means that the amount of light striking the film/sensor is doubled or halved.

Fast shutter speeds are typically used to control exposure in brightly lit situations or to freeze moving subjects. Faster shutter speeds also help to alleviate the effects of camera shake, a blurring that sometimes occurs due to camera movement when handholding the camera.

Long shutter speeds are used to allow more light into the camera in low-light situations. They can also be used to blur moving subjects, accentuating the motion as a blur across the frame. When using long shutter speeds, there is an increased risk of blurring due to camera movement. Therefore, the camera should usually be tripod-mounted or otherwise stabilized. You may even wish to use a cable release or remote to trip the shutter without touching the camera (and potentially moving it).

To further increase picture sharpness, a photographer can lock up the camera's mirror. In most SLR cameras, the photographer sees the scene through a viewfinder and mirror that allows you to see through the lens. When the shutter is triggered, the mirror flips up and out of the way to allow light to reach the film or the sensor. The movement of the mirror can cause some camera shake, which can result in an image that is less sharp.

PANNING

One way to capture a moving subject is called panning. To pan is to follow the movement of an object with the camera. This will cause the subject to look sharp, but the background will be blurred.

Light Meters

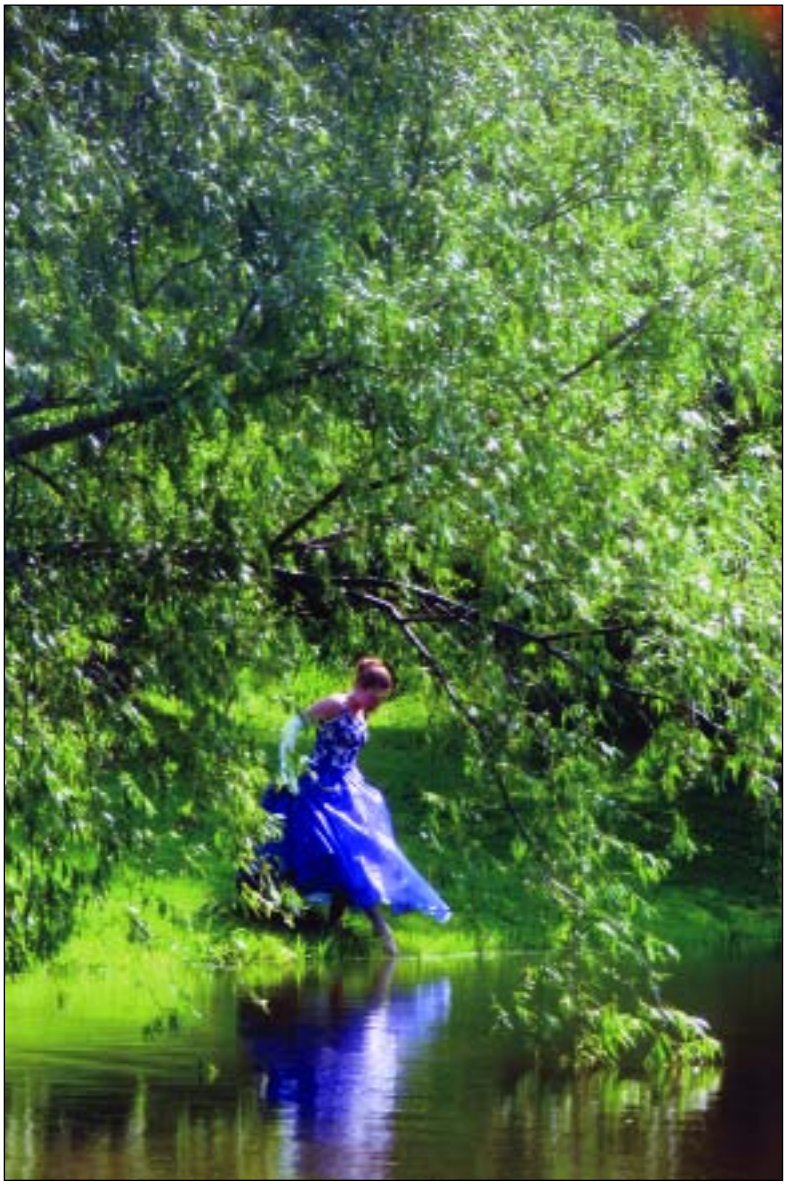
A light meter is a device that measures the light falling on a scene/subject or reflected by a scene/subject. Based on this measurement, the meter recommends a particular aperture, shutter speed, and ISO combination that will produce a well-exposed image. There are two basic types of meters for photography: reflected light meters and incident light meters.

Reflected Light Meters. All meters that are built into cameras and some handheld meters are reflected light meters. The photographer points the light-measuring portion of the meter (usually a dome on handheld meters) at the subject and measures the amount of light that is reflected from the subject.

Because this type of meter measures the light reflected from the subject, the tone and color of the area you target with the camera's meter will determine the exposure settings it provides. For example, when a camera meter targets a white area of the subject, it will determine you need less exposure than if it targets a black area of the subject.

To combat this, more advanced digital cameras measure multiple areas of the scene to provide an accurate average reading. If your camera does not offer this option, you can also improve your reflected light metering results by using a gray card. These cards, available from any photography supply store, are a solid, medium gray tone. When you place this card in the same light as your subject and meter off the card (rather than the subject), you can be assured of a proper reading.

Most reflected light meters have an angle of view of about 50 degrees, similar to a normal lens. A spot meter, however, is a reflected light meter that has a much smaller angle of view. This provides an accurate measurement of a



Because they can be used from a distance, reflected light meters are a great choice for situations where you and your subject are in separate areas that are not under the same lighting. Photograph by Chris Nelson.

Incident light meters must be placed close to the subject and pointed back toward the camera. This makes them ideal for many portrait situations—including here, where the backlighting might fool a reflected light meter. Photograph by Chris Nelson.

particular spot in the scene (for example, your subject's skin tone). Some spot meters can have as little as a 1-degree angle of view.

Incident Light Meters. Another type of meter is an incident light meter. Incident light meters measure the light falling onto the subject, so they provide an accurate reading regardless of the color or tonality of the subject. An incident light meter is held at the subject position and pointed back toward the camera. Incident light meters have a very wide angle of view, up to 180 degrees.

Other Options. Many popular handheld meters have reflected, incident, and spot metering capabilities. These meters give the photographer the most

Maintaining the delicate detail in highlight areas of your digital image requires accurate exposure metering techniques. Photograph by Barbara Rice.

flexibility to make the right metering choice depending on the subject and photographic conditions.

Some meters display an exposure value (EV) reading, which provides a choice of compatible shutter speeds and aperture settings. This allows the photographer to choose the appropriate settings depending on the subject being photographed and how much depth of field is desired in the photograph. For a fast moving subject, the photographer would want the fastest shutter speed in order to freeze the motion. This fast shutter speed would require a corresponding large lens opening to allow more light. However, if the photographer was working with a family group consisting of several people in rows, he would want a smaller lens opening for maximum depth of field. This small lens opening would require a slower shutter speed to allow more light to be recorded.

Another common type of meter in photography is a flash meter. This measures the light output from a portable flash unit or studio strobe light. An essential tool in the studio, a flash meter allows the photographer to measure each light individually and create the desired light ratio on the subject. (For more information on light ratios, see pages 76–78.)

A color temperature meter (or color meter) measures the color temperature of the light in a scene (see page 9). This is used frequently by commercial photographers to ensure that the colors in their images will be properly recorded.

Exposure Techniques

Expose for the Proper Medium. With any exposure, film or digital, it is best to be accurate. You must also keep in mind the medium you are using to create your images. With digital and transparency film, you should generally expose to preserve detail in the highlights, since these media are prone to blowing out these areas. With negative film, the opposite is true; shadows tend to block up (lose detail), so you need to expose to ensure these areas are correctly rendered.

Bracketing. If you're not sure that you've selected precisely the right camera settings, it's a good idea to bracket your exposure. This means making several exposures, some greater and some less than the calculated exposure, to ensure a good exposure. Bracketing is sometimes used when it is too costly or not possible to photograph the subject over again in the event of a problem.

Exposure Compensation. Most cameras offer a handy feature called exposure compensation. If you are shooting a scene in which the tones are predominantly light or dark (e.g., a snowman against a snow-covered landscape or a dark-gray kitten asleep on a black carpet), then you may wish to use exposure compensation to improve your odds of getting a good exposure. For primarily light-toned images, shoot the scene with an exposure

When you find that once-in-a-lifetime photo opportunity, bracketing can help ensure that you walk away with a perfect exposure. Photograph by Rob Ledwedge.

A great advantage of digital photography over film is that you can immediately check your results to ensure a proper exposure. Photograph by Barbara Rice.

compensation value of +1. For an image comprised of mostly dark tones, select an exposure compensation value of –1.

Analyzing the Exposure

A great advantage of digital photography over film is that you can immediately check your results to ensure a proper exposure. If you determine that you didn't get it right (or just want a little insurance), you can simply reshoot on the spot. There are three ways to check your exposure.

Check the LCD Screen. The simplest way to check exposure is to preview your image on the camera's LCD screen. Keep in mind, however, that different lighting conditions (e.g., bright light falling on the LCD screen) and screen brightness settings will impact how the image appears. Therefore, the LCD screen should be used only as a guide. You should not rely on it for making critical exposure evaluations.

Activate the Overexposure Indicator. Because the bright highlights in digital images are a common source of problems, many digital cameras have an overexposure indicator. When this is active, overexposed areas of the image will blink to indicate areas where the highlights are blown out. While

this does not provide you with the same detailed image information as evaluating a histogram (see below), it can come in handy when you're shooting in a hurry or when you just need to confirm a suspected problem. See your owner's manual to determine whether your camera model offers this feature.

The Histogram. The histogram is a graphic representation of all the tones in an individual image. These are plotted on a scale from 0 (black) to 255 (white), with each pixel in the image placed on the scale at a point relative to its brightness. Pixels of the same brightness are stacked on top of each other to form a line of various lengths. When all the pixels are plotted, they form a curve or a series of spikes on the bar chart.

To read a histogram, you simply need to look at the height of the histogram data over the various values in the tonal scale. In particular, you should look to ensure that the data does not extend quite to the edges of the scale or feature a large spike at either edge of the scale. This reveals, at the light end of the scale, that there are areas of pure white (i.e., white with no detail—meaning the highlights are blown out). At the dark end of the scale, it indicates that there are areas of pure black (i.e., black with no detail—

HISTOGRAMS

A histogram represents of range of tonal values in a scene from 0 (absolute black) to 255 (absolute white). Middle gray is generally considered 128.

The histogram (left) for this image (below) fills the scale from left to right but also falls just within the left and the right end points. This is a good indicator that the exposure is right on and that you have a very printable image. Photograph by Monte Zucker.

meaning the shadows are blocked up). If the histogram falls just within the left and the right end points, you have a very printable image.

If the histogram suggests a problem, you may want to check your exposure. We constantly review our histograms on every photo assignment and make adjustments as necessary. This kind of exposure control is invaluable to serious photographers.

Exposure Modes

Professional cameras offer multiple exposure modes designed to help you achieve the best-possible exposure in your images. These settings vary from camera to camera, but the following are some of the most common (and commonly used) options.

Manual Mode. Manual exposure is a nonautomatic mode of camera operation where the photographer sets both the shutter speed and aperture. This allows you to choose the shutter speed/aperture combination for the lighting conditions present, while maintaining the desired depth of field (controlled by the aperture) or action stopping/blurring (controlled by the shutter speed). Up until the 1970s, manual exposure was the only exposure mode on any camera. The manual exposure mode (usually signified with the letter *M*) is still available on modern cameras and is a popular choice with professional photographers.

Automatic Modes. Many professional cameras have automatic exposure settings available to the photographer. These exposure choices generally

Professional cameras offer multiple exposure modes designed to help you achieve the best-possible exposure—whatever the subject or setting. Photograph below by Jacob Jakuszeit. Facing page photographs by Patrick Rice (top left and right), Barbara Rice (middle left), Richard Frumkin (middle right), and Dennis Orchard (bottom).

Portrait photographers often encounter numerous lighting situations in a single session, making a mastery of exposure critical to success. Photographs courtesy of Lisa SmithStudios.com.

include full program mode, aperture priority, and shutter priority. In these modes, the camera makes some or all of the decisions regarding the camera's exposure settings.

In full program mode (usually signified with the letter *P*), the camera decides what shutter speed and aperture are needed for the exposure of the image. The program mode is correct in many cases.

In the aperture priority mode (usually signified with the letter *A*), the photographer sets the aperture and the camera automatically sets the shutter speed that will provide the correct exposure.

In the shutter priority mode (usually signified with the letter *S*), the photographer sets the shutter speed and the camera automatically selects the aperture that will provide the correct exposure.

Additional Exposure Considerations

With digital, there are a few other decisions that must be made before shooting an image. Unlike with film, these aspects of the image capture can be adjusted frame by frame, so decisions about them are typically made at the time of exposure (rather than before the shoot when selecting what type of file to load into the camera).

ISO. As discussed in chapter 1, the ISO setting determines how sensitive to light the image sensor will be. If you are working in bright light, you can select a lower setting to minimize noise. If you are working in more subdued lighting, you can select a higher setting. This will allow you to use more practical apertures and shutter speeds but will also produce more noise in the final images.

White Balance. All professional digital cameras give the photographer a selection of lighting options for matching the color balance of the camera to the light in the scene. This feature, called white balance, ensures that the images recorded will feature the most accurate possible colors.

Most cameras also have an automatic white balance setting that can be used as the default setting for any lighting situation. In the automatic white balance mode, the camera's sensor automatically chooses the best white balance setting for the lighting it detects. This works well in scenes with average colors and lighting, so it can be a huge time saver for the photographer who has to work quickly.

Using the correct white balance setting when shooting your images is much more efficient than trying to correct off-color results after the shoot. Photograph courtesy of Visualizations Photography.

Selecting the automatic white balance setting doesn't necessarily guarantee a perfect color rendition in every shooting scenario, however. For example, if you take a picture of the bride in her white gown standing next to the groom in his black tuxedo, the automatic white balance mode should provide you with a nice, white gown. However, if one of the guests who is wearing a red dress stands next to the bride, you will probably see a blue color cast in the bride's white gown. Even though you are taking the picture from the same spot, at virtually the same time of day, and under the exact same lighting conditions, the camera may try to overcompensate for all of the red it is sensing and add too much blue to the picture. In such a case, you may want to select one of the alternate settings described below.

Besides the automatic white balance setting, the photographer can set the camera to one of the specialized white balance settings—usually depicted in symbols. The symbol of the sun is for bright, sunny days. The symbol showing clouds is for cloudy, hazy, or overcast days. The symbol depicting a lightbulb is for tungsten light. The symbol depicting a fluorescent bulb is for fluorescent light. The symbol showing a lightning bolt is for flash photography. Some cameras show a symbol that depicts shade for subjects placed in shaded areas of the scene.

Many digital cameras also have a custom white balance setting where the photographer can meter a white card (or any other pure white subject in the

WALLACE EXPODISC

We use Wallace ExpoDisc's digital white balance filter to set an accurate custom white balance in tricky lighting conditions and ensure color fidelity in our images. To use it, attach or hold the filter on the front of your lens, take a reading, and set the white balance. Because the ExpoDisc collects light from 180 degrees, it effectively averages light from all the light sources in the scene. This leads to very accurate color renditions, so taking a few seconds to use it seems like a much better option than spending exponentially more time in the digital darkroom making hit-or-miss attempts at achieving color fidelity.

Using the correct white balance setting for your light source, you can produce accurate colors or intentially introduce a slight color cast to slightly warm otherwise very cool tones. Photograph by Debora Woodward.

Here, weathered boards are rendered in warm tones for an appealing portrait setting. Photograph by Leonard Hill.

identical lighting situation as the intended subject) and use that data as the standard for the scene's color balance.

More advanced digital cameras have a Kelvin (color temperature degree) setting where the photographer can manually select the exact color temperature for a particular scene using a color temperature meter (see page 9).

At times, color fidelity is a must, and using the proper white balance setting (or film) is essential. In some instances, however, mismatching the white balance setting and the light source can produce desirable results. This is a practice that our studio routinely employs when photographing at the historic Cuyahoga County Courthouse in Cleveland, Ohio. This hundred-year-old building is constructed of primarily gray marble on the inside. If you create pictures using the electronic flash or tungsten white balance settings, the building is recorded exactly the way we see it with our eyes: gray and cold. When we use the daylight white balance setting with the incandescent illumination in this building, the resulting images are much warmer and more romantic. Our brides and grooms love the look of the images made in this building and wouldn't want their images shot any other way.

4. LIGHT AND LIGHTING

Light is the single most important component of any photograph—after all, without light, there wouldn't *be* a photograph. The importance of light to photography is contained in the word itself, which literally means writing (-graph) with light (photo-). In this chapter, we'll examine some of

Whether it's natural or artificial, beautiful lighting is critical to a top-quality image. Photographs by Leonard Hill (left) and Bob Kunesh (below).

the tools and techniques that are critical to achieving professional-quality results.

Type of Light

Light can either be natural or artificial. Natural light is light that comes from the sun, whether it's the low light that filters into a shady area, the light beams that filter through a window, or direct sunlight coming from a cloudless sky. Artificial light is light that comes from any other source. This category includes but is not limited to household bulbs, televisions, neon signs, a flashlight, or a string of patio lights. Photographers use both natural and artificial light of all kinds when creating images, and often these sources are used in combination to great effect.

SPECTRUM OF LIGHT

Light is often described according to its wavelength as measured in nanometers (nm). The visible spectrum of light is from 400nm to 700nm. Light wavelengths shorter than 400nm fall into the ultraviolet range. Light wavelengths longer than 700nm fall into the infrared range.

The Behavior of Light

When light, be it natural or artificial, strikes a surface, there are four options for how it will behave; it can be transmitted, refracted, reflected, or absorbed. Understanding these options is critical to controlling light.

Light is transmitted when it passes through a substance without changing direction—such as light coming through a window.

Light is refracted when it passes through a substance and *does* change direction. Refracted light rays are bent and slowed down (think of the light through a prism, for example).

Light is reflected when it bounces back off a surface. When light strikes an uneven surface, the light is reflected in many different directions at the same time. When light strikes a very smooth surface, it bounces back at a predictable angle in a predictable direction; the angle of incidence (the angle

In the studio, light can be precisely sculpted to create flawless portraits. Photographs by Leonard Hill.

at which the light hits the surface) equals the angle of reflectance (the angle at which the light is bounced off the surface). Some surfaces, like mirrors, are such efficient reflectors that they bounce back all of the light that hits them.

When light is neither reflected nor transmitted, it is said to be absorbed. This is why black material (thick felt or velvet, for example) is often used for some backgrounds; it absorbs almost all the light that falls on it and creates a simple background with no detail.

Most subjects and surfaces reflect some of the light that strikes them and absorb the rest. This is how different colors and tones are created. For example, when light strikes a red apple, the red elements of the light are reflected back to our eyes, while the other parts of the light are absorbed. As a result, we see the apple as red. When light strikes the pages of this book, the text absorbs almost all the light so it looks black. The page around the text reflects almost all the light, so it looks white.

Characteristics of Light

Light is described according to the effect it has on a subject or scene. The terms and concepts that follow apply to both natural and artificial light.

Direction. One of the most important qualities of the light from any given source is its direction. This determines where highlights and shadows,

BOUNCE LIGHT

Bounce light is light that does not travel directly from the source light but first bounces or reflects off something before reaching the subject.

the tonalities that produce the look of a third dimension in photography, will be created on the subject. As you will see, the direction of light is usually described in relation to the subject, so moving either the light source *or the subject* can result in a change in the direction of the light. By changing the camera's perspective, you may also include more or less of the shadows and highlights created by the light.

In most cases, a light source illuminates the side of the subject closest to it and leaves its opposite side in shadow. When extremely diffuse light (see below) is used, however, the scene sometimes lacks shadow.

Light coming from in front of the subject is called front lighting. With this type of lighting, the detail in the front of the subject is well illuminated. As there may be only minimal shadow areas, however, the image may lack a dimensionality and texture. This type of lighting is used in many fashion and glamour portraits because it creates a smooth, flawless look on the skin.

Back lighting is light that comes from behind the subject and toward the camera. This type of light often leaves the front of your subject in shadow or underexposed in the final image. It can also cause the edges of a subject to appear lit (or even to seem to glow). When this effect occurs with backlighting, it is often called rim lighting.

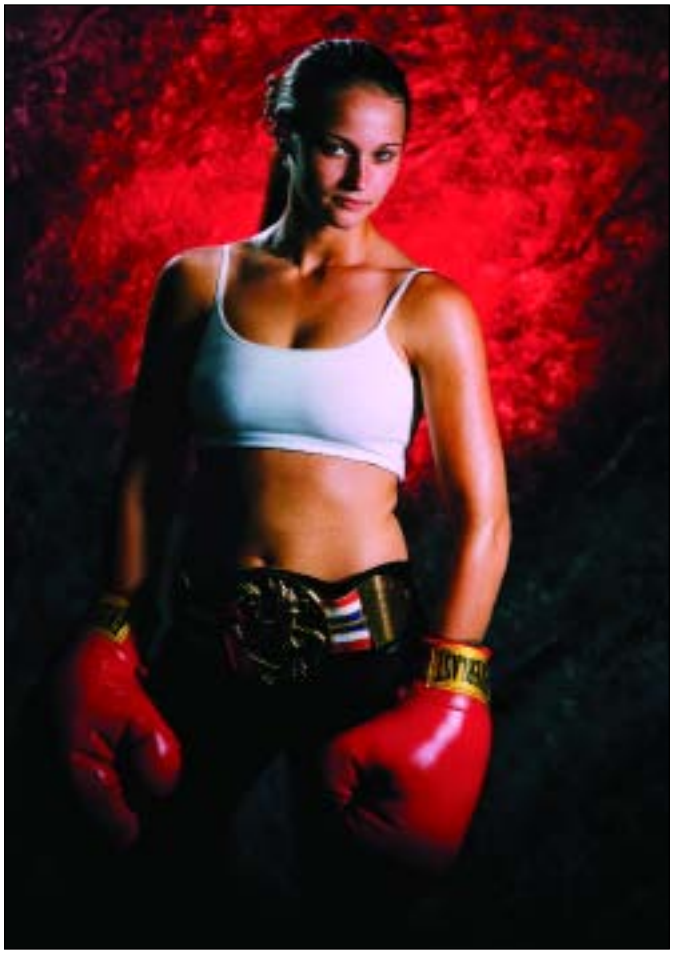
The direction of the light is sometimes very obvious (left) and sometimes much more subtle (right). Photographs by Chris Nelson (left) and Patrick Rice (right).

Side lighting, as you might suspect, originates at some angle to the left or right of the subject. This type of lighting can result in more pronounced shadows. As a result, it is common in portrait photography, where showing the shape of the subject's face is important to the image.

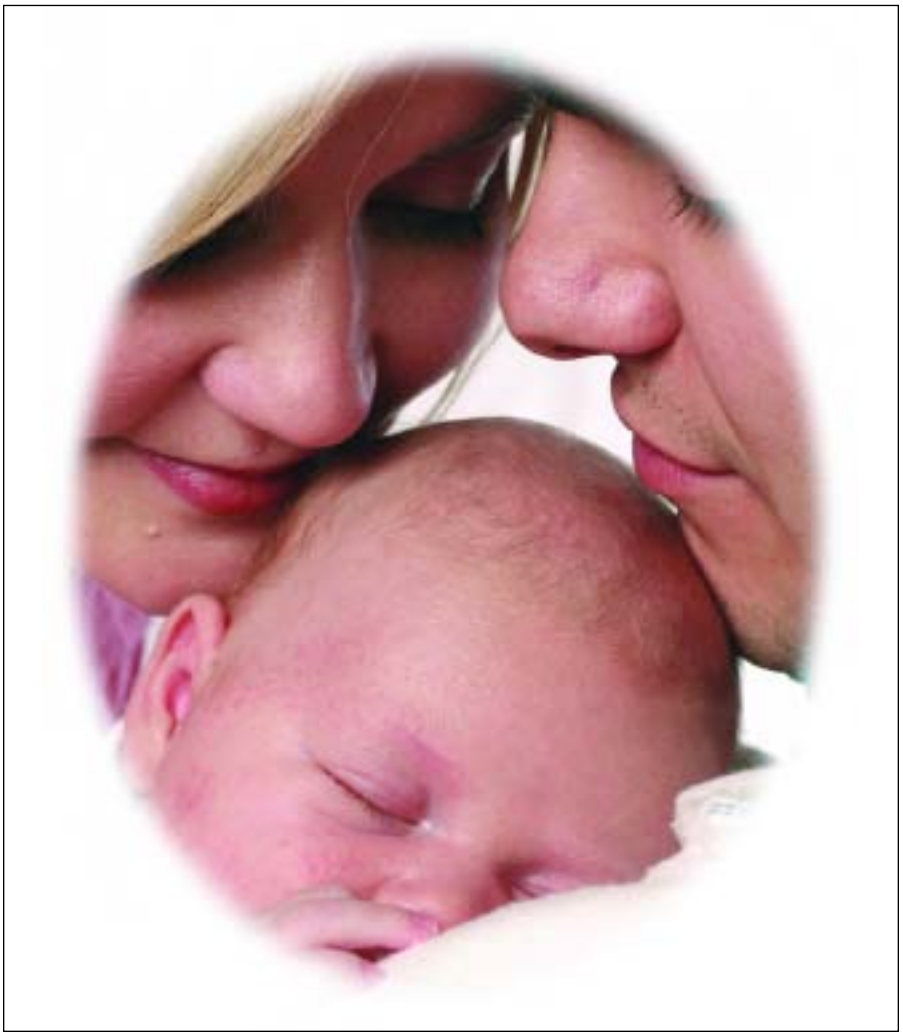
Hard or Soft. While the direction of the light determines where on a subject the highlights and shadows will fall, the quality of the light will determine how soft or well defined these shadows are. Based on this, light is described as either hard or soft. Hard light, like the light available outdoors on a bright, sunny day, produces dark, hard-edged shadows, bright colors, and bright highlights. Soft light, like that from an overcast sky, produces paler, softer shadows, or no shadows at all. The colors of objects illuminated with soft light also tend to be more subdued, or muted. For most images, soft light is the photographic ideal. While soft light is not always readily available in a given scene, hard light can be modified and made softer through the use of light modifiers. This will be covered later in this chapter.

Whether a light source is soft or hard is determined by the size of the light in relation to the subject.

Hard light is produced by sources that are small in relation to the subject. For example, think of the crisp, well-defined shadows that appear on a bright, sunny day. Of course, the sun is an immense source of light, but be-



Hard light forms deep, well-defined shadows that are perfect for this dramatic portrait of a strong young woman (left). Soft light forms lighter, more gentle shadows that suit this subject's warm smile (right). Photographs by James Williams (left) and Leonard Hill (right).



Most clients prefer soft lighting for portraits of babies and children. Photograph by Patrick Rice.

cause it is so far away, that one tiny dot of light in the sky is actually very small in relation to the subjects it illuminates here on Earth.

Soft light is produced by sources that are large in relation to the subject. Taking the example of the sun again, imagine that you are standing outside on a very overcast day. If you can see your shadow at all, it will be very pale and not very well defined (i.e., the edges will be soft and fuzzy). This is because the clouds overhead have broken up the light and scattered it across the sky. On a day like this, the entire sky is the light source—and it's *huge!* As a result, the light is soft.

When we consider artificial light, the same principles apply. If you light your subject with a relatively small source (say, a bare bulb), the light will be hard. If you move that bulb closer to the subject, the light will become softer. You can also soften the light by adding something between the source and the subject to diffuse the light. This could be a professional light modifier (like a softbox [see page 74]) or something as simple as a large white sheet held up between the subject and the light.

Conversely, if you are using a large light source (say, a large window) but don't see the crisp shadows you want, you could move your subject farther

away from the window. This will make the window smaller in relation to the subject and, therefore, the light will become harder.

Natural Light

Natural light can be used to create many appealing effects, especially in portrait photography. While studio lighting offers the ultimate in control, many photographers still prefer the simplicity of working with natural light.

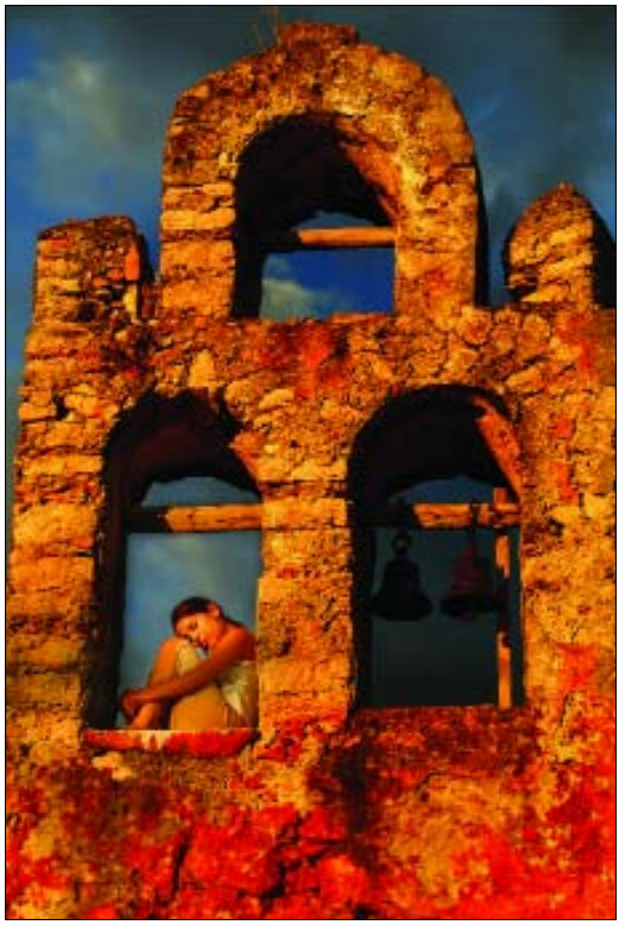
Keep in mind that, because your light sources are fixed when using natural light, you will control the effects you achieve primarily by adjusting the position of your subject in relation to the light. You can also control the light by blocking it from above or the side (using a gobo; see page 76) or by bouncing light into a shadow area (using a reflector; see page 76).

Overhead Light. When working with sunlight, it is best to avoid situations where the light strikes the subject from above. This can create unpleasant shadows on the face. This can be avoided by shooting early or late in the day, when the sun is naturally at a low angle (see below). Or, you can look for situations where the light is diffused and, if possible, blocked from over-

THE INVERSE SQUARE LAW

The Inverse Square Law states that the intensity of illumination is inversely proportional to the square of the distance between the light and the subject. This means that if the distance between the light and the subject is doubled, the amount of light reaching the subject will only be half of what it originally was.

When shooting portraits outdoors, look for situations where the overhead light is minimized. Photograph by Barbara Rice.



Just after sunrise and just before sunset, the sun is at a low angle and has a golden glow that makes it ideal for portrait photography. Photographs by Chris Nelson (left) and Debora Woodward (right).

head. The light at the edge of a clearing (with tall trees or branches overhead) is often ideal, as is the light on a porch.

Window Light. You can also use natural light indoors. Window light (or light through open doors) is often extremely flattering for portraits. Because windows tend to be large, the light is typically very soft. Windows, by their very nature, also produce light with good directional characteristics. If the light entering the window is too harsh, you can add a reflector on the shadow side of the subject to soften the shadows.

Golden Hour. When working outdoors, photographers often prefer to take advantage of the golden hour, a time when the sun is low in the sky and produces side and back lighting. The general rule is that the best light occurs from sunrise to one hour after sunrise and from one hour prior to sunset until sunset. Of course, light can be used throughout the day when the sky is overcast, the photographer is shooting in open shade, or the light is modified to produce softer light. When light is undiffused and directly overhead (e.g., midday sun), bright highlights and unflattering, hard shadows result.

Flash

On-camera flash provides a simple source of illumination for situations where there is very little natural light or where the natural light needs to be enhanced.

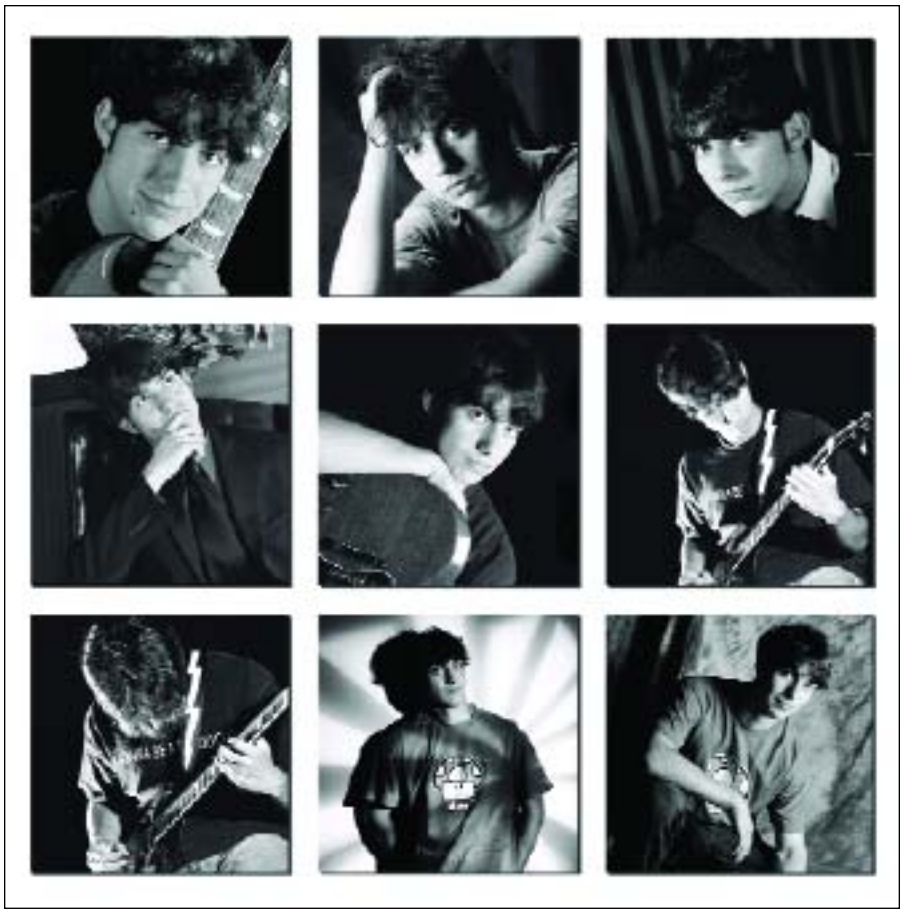
Built-in Flash. Many inexpensive cameras and some professional models have a built-in flash. This is either part of the camera assembly or it "pops up" when activated. Often referred to as "wink light" flashes, these units provide flash illumination on subjects that are fairly close to the camera (generally within 15 feet). These low-powered flash units do a very good job, but because the flash is so close to the camera lens, it is highly likely that you will get red-eye when taking pictures of people. Red-eye is a situation where the light from the flash illuminates the area in the back of the eye. Since the pupil of the eye is actually a hole, light can pass through all the way to the back. The red color that is recorded is the blood vessels just behind the eyeball. (This problem is not encountered when using accessory flash units as described on the next page.)

HIGH KEY AND LOW KEY PHOTOGRAPHY

When the overall tones in a scene are very light, the scene can be described as high key. When the overall tones in a scene are darker, the scene can be described as low key.

In high key photography, the overall brightness of the scene is typically at least 2 stops brighter than middle gray. In professional photography, the term "high key" generally refers to photographing a subject against a white background. In addition, many high key photographs feature white props and subjects dressed in white clothes. When everything in the scene is white or very light in tone, the skin tones of the subject command the viewer's attention, as this is the darkest part of the scene and the area of greatest contrast. This contrast reinforces the visual importance of the subject.

Low key imaging has been around for centuries. The paintings of many of the greatest artists of all time were low key works of art. These painters worked in low key because their subjects wore darker clothing, and many portraits were illuminated by candlelight or oil lamps. In low key photography, your background and subject's clothing should be no brighter than middle gray and preferably darker. While black is a good choice for a low key background, it does not mean that low key backgrounds cannot have patterns or scenes in them. Low key portraits tend to have a rich and warm feel to them, where high key portraits tend to be more open or airy. The relative light tones of the subject's skin against the dark surroundings attracts the viewer and reinforces the importance of the portrait subject.



Mastering studio flash techniques opens up a world of creative lighting possibilities. Photograph by Rob Ledwedge.

On-Camera Flash. For better results, many photographers prefer to use on-camera flash. These are produced by camera manufacturers as well as third-party manufacturers like Metz and Quantum.

This type of flash is connected to the camera through the hot shoe or via a sync cord. The units can be mounted directly on the camera, held by the photographer at a position off the camera, or mounted above or to the side of the camera using a flash bracket.

These flash units may be completely manual or fully automatic. Manual flash units emit the same amount of light every time they are triggered. Some have a variable power control setting. A flash meter is helpful with these units so that you can accurately measure the light output and set your camera accordingly. In the automatic modes, the camera communicates with the flash and tells it how much light to emit for a proper exposure. This is accomplished using TTL (through the lens) metering technology.

Studio Lighting

When the ultimate in control and precision is required, professional photographers rely on studio lighting.

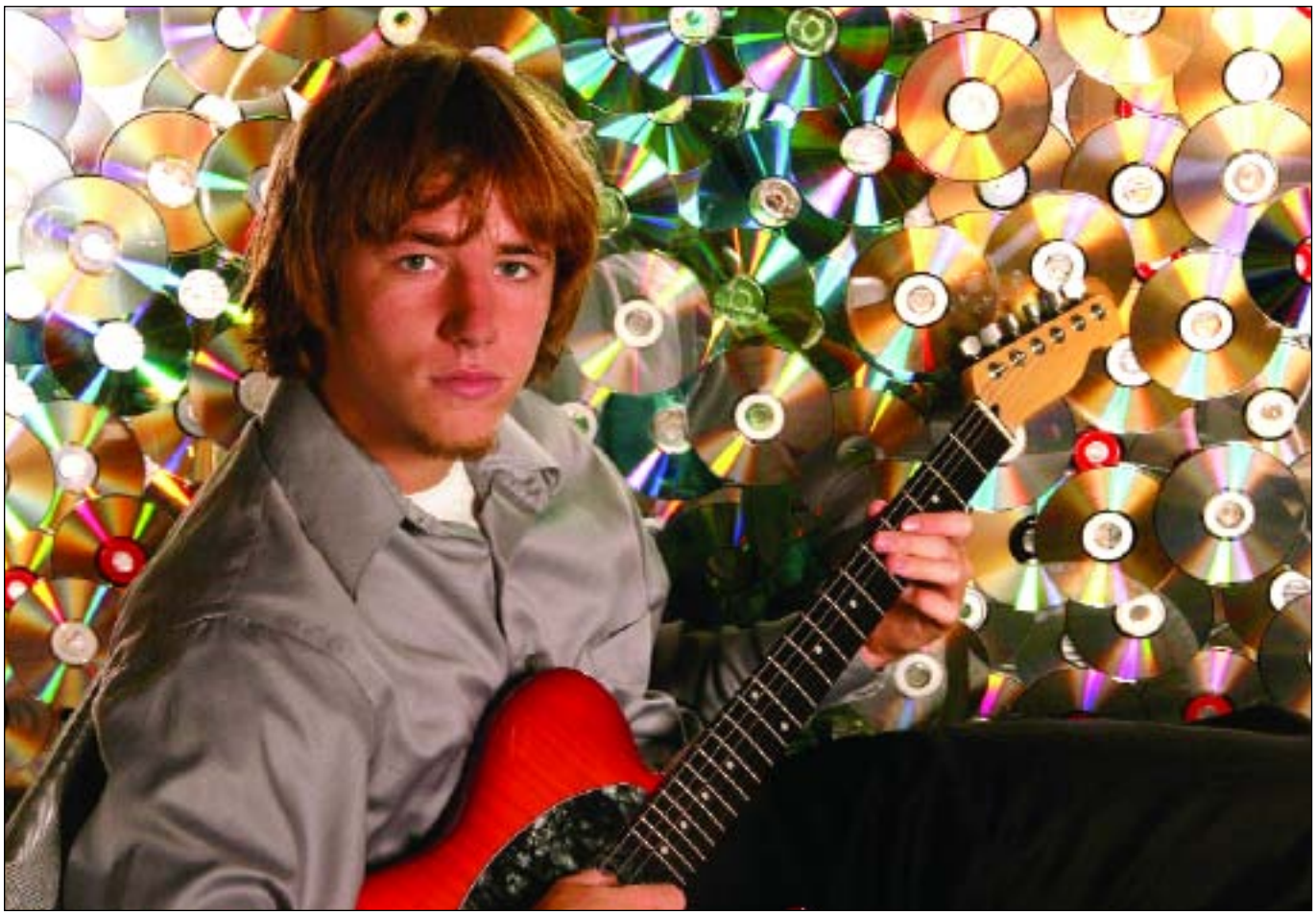
The following provides an overview of the terms and techniques you should be familiar with. For a more detailed look at this enormous topic, consult *Master Lighting Guide for Portrait Photographers* by Christopher Grey (Amherst Media, 2004).

Strobe lighting is a mainstay of studio photography. Photograph by Patrick Rice.

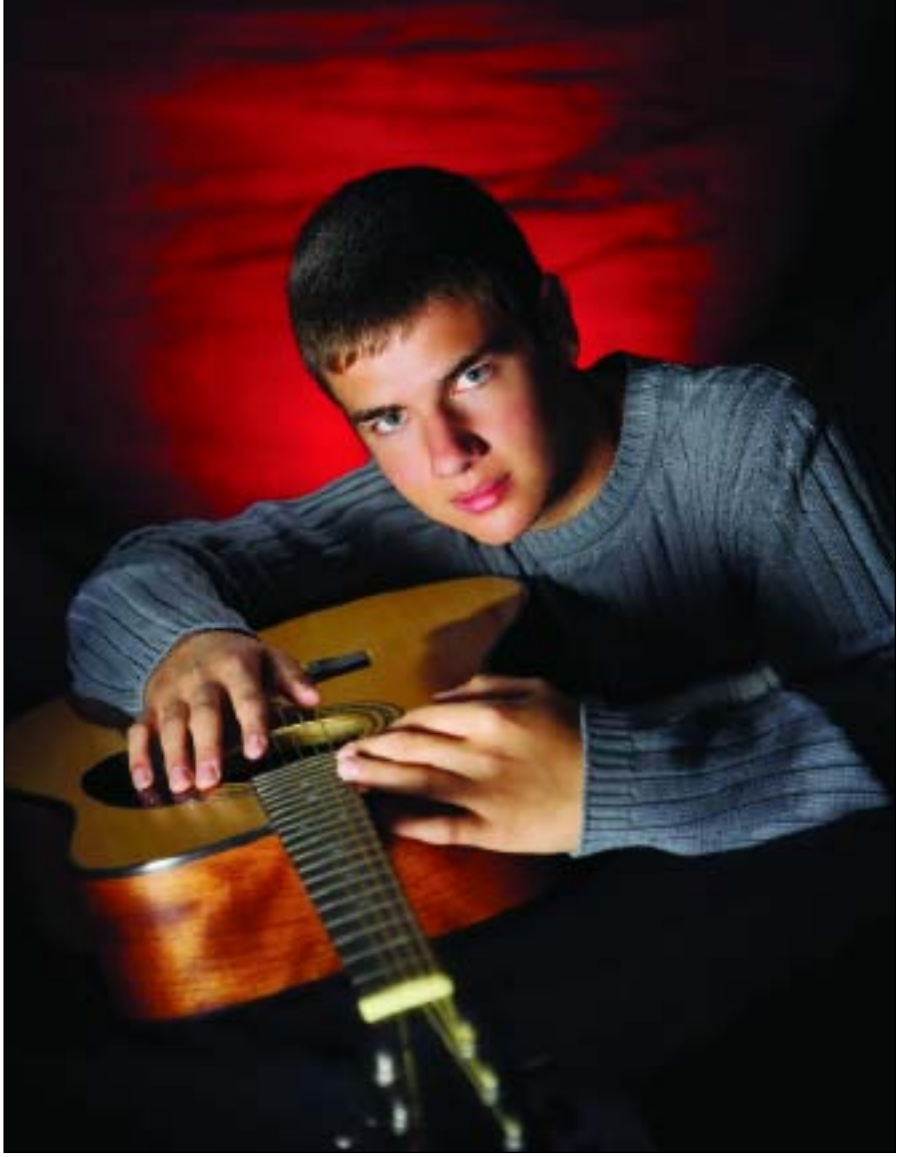
Strobes. Studio strobe lights (also known as electronic studio flashes) are the favored light source for most studio photographers. They run cool, are portable, and pair easily with daylight film (or the daylight white balance setting). There are two types of studio strobes available: monolights and power pack units. With either type, your camera communicates with the light units via a sync cord or slave unit (this will be discussed in greater detail below).

Monolights. A monolight is a self-contained light that has both the power supply and the flash head built into one complete unit. Monolights are AC powered and can usually be triggered by direct connection to the camera's flash sync, or via a slave unit that allows the strobe to be triggered remotely (i.e., without a direct physical connection to the camera). Many monolights have a built-in slave unit that will fire the flash automatically when another strobe is triggered in the studio. Separate radio slave units such as the PocketWizard or Quantum radio slaves can also be connected to the monolight and the camera to trigger the light.

Power Packs. Power pack lighting units can accept multiple flash heads, which can be adjusted independently. Studio power pack units can be either AC or DC powered. Some units will also operate on DC voltage with a car battery. This can be handy on location when you want the flexibility of a studio light system but cannot plug into an AC power source.



Strobe lighting runs cool, making the shoot more compfortable for your subject. Photograph by Patrick Rice.



In studio situations, the modeling light allows you to preview your light so the position will be just right. Photograph by James Williams.

Modeling Light. When triggered by the camera's shutter button, strobes emit a "pop" of light. Obviously, working with only this momentary burst of light would make it very difficult to place your lights in relation to the subject. Therefore, strobe units also house a modeling light, typically a 250-watt tungsten halogen bulb. This light stays on continuously to help you focus your light and see how it illuminates your subject. (Some modeling lights turn off after the strobe is fired then turn on again when the flash has recycled and is ready for use in the next shot.)

Continuous Light. Before the invention of strobe lighting, continuous light sources were the only option for studio photographers. Today they are experiencing a renewed popularity. Continuous sources have one main advantage over instantaneous ones: you see exactly the lighting effect you will get, because the light source is both the modeling light *and* the actual shooting light. There is also more light available for focusing with these sources. Additionally, since the advent of digital imaging, balancing your recording medium to the color temperature of these lights is very simple (simply set your camera's white balance appropriately, using a custom setting if needed).

Tungsten Lights. Tungsten lights for photography are like supercharged versions of regular household lights. They are available from 100 watts all the way up to 24,000 watts. Shooting with these lights requires adjusting your camera's white balance setting to tungsten, or using a tungsten-balanced film.

LIGHT PAINTING

Light painting is a technique where the photographer places the camera on a tripod and sets a long exposure then moves around the subject with a light source. Light painting can be achieved with any light source at all. A flashlight or modeling lamp from a strobe can be used to "paint" light onto the subject. More commonly, photographers use light painting by firing a portable strobe at and around a subject several times to give proper exposure to the final image.

HMI Lights (Halide Metal Iodide). HMIs take a short time to warm up and require a ballast. However, they are very bright and daylight balanced. These units tend to be very expensive.

Fluorescents. Professional photographic fluorescents, unlike tungsten lights, run very cool, which can help keep your subject more comfortable. They can be either daylight or tungsten balanced, but tend to be limited in the intensity of their illumination.

Light Modifiers. A light modifier is a device used to control the direction, focus, and quality of light of your light source. These modifiers can generally be used with either strobe or continuous light sources. Below is a description of the more common ones.

Barebulb Flash. The first "modifier" is actually the *removal* of all modifiers. On certain portable strobe units, the flash can be fired in the barebulb mode. To use a flash in the barebulb mode, simply remove the reflector to expose the flash tube. The barebulb flash emits light in 360 degrees, providing an even and natural-looking form of illumination. This is great for opening up shadow areas in a portrait and providing nice clean highlights. Some photographers even use a barebulb flash behind the subject to serve as both a backlight and background light. It is an easy and inexpensive way to provide a separation light and open up the background all at the same time.

Larger groups typically require larger light modifiers and/or multiple sources to ensure even lighting. Photograph courtesy of Visualizations Photography.

For portable flash equipment that does not have barebulb capability, you can create a variation of this type of illumination with a product called the Gary Fong Lightsphere. The lightsphere is a plastic bowl-shaped reflector with an optional dome lid. It is lightweight, easy to install and remove, and eliminates the need for a flash bracket on your camera.

Parabolic Reflectors. These bowl-shaped reflectors are the simplest type of modifier. They simply surround the lamp and direct its light onto your subject. Some bulbs are painted with a silver coating that eliminates the need for this reflector. These reflectors come in different sizes and with different finishes on the interior surfaces, allowing you to vary the effects produced.

Parabolics produce light that is bright in the center then falls off gradually toward the edges. As a result, most portrait photographers prefer to feather the light from these sources, directing the bright center of the light past the subject and allowing only the softer edge of the light to illuminate the face. This produces a softer, more even, and more flattering look.

Studio lighting gives photographers the highest-possible degree of control. Photograph by Penney Adams.

Lighting can also be used to add color and even a pattern to your background. Photographs by Barbara Rice (left) and Patrick Rice (right).

Barndoors. Barndoors are a set (or two sets) of black panels that are attached to the front of a light source and can be angled toward or away from the light to both direct light to exactly where you want it to strike and to keep stray light away from the camera lens, much like a lens hood.

Snoots. A snoot is a long tube that is attached to the front of a light source to create a narrow beam of illumination. It is used to highlight specific areas of the subject or scene.

Softboxes. A softbox, essentially a large, fabric housing for the light source, is often the light source of choice when photographers want to produce a wide, diffuse quality of light. Softboxes come in a wide variety of sizes and can feature a range of interiors that affect the quality of the light that is pro-

duced. The front diffusion panel can be flat or contain baffles to spread out the light or focus it more forward. Some softboxes feature a second, removable diffusion panel for enhanced diffusion and even softer light.

Umbrellas. As its name suggests, this is an umbrella-shaped modifier. Like the softbox, the umbrella produces a wider, more diffuse quality of light.

When using most umbrellas, the light head is pointed away from the subject and into the concave side of the umbrella. The interior of the umbrella then bounces a broad beam of light back toward the subject. Photographers may choose between umbrellas with white interiors (for white light), silver interiors (for cooler coloration), or gold reflective material for warmer tones in the image.

Some umbrellas, called shoot-through umbrellas, are positioned with the light head pointing toward the subject and through the umbrella, which is made of a translucent material. These umbrellas work very much like softboxes.

Lighting Accessories. In addition to light modifiers, there are a number of other lighting accessories that can be used to enhance your lighting effects.

Reflectors. Another way to add light to a subject is through the use of a panel called a reflector. Reflectors bounce (reflect) the illumination from a light source in another direction to add light where it is needed. Many studios use reflectors to add light to the shadow side of the subject.

Reflectors can be white, silver, or gold. White reflectors reflect the light back as white light. Silver reflectors act the same way that a white reflector does, but since the silver is a more reflective substance, they bounce more light back than a white reflector would. Gold reflectors are used to bounce a golden or warm light back onto the subject. This golden light will "warm up" a subject and give a warmer overall tone to the image.

Gobos. A gobo is a light modifier that is placed between the light source and the subject. This prevents light from reaching a particular area (or at least reduces the light on that area). This technique is also referred to as subtractive lighting.

Cookies. A "cookie" is a piece of opaque material with a pattern cut into it that is placed in front of a light source to project a dappled lighting effect on the subject or background. When the cookie is placed close to the light source, soft shadows are produced; when the cookie is positioned farther from the light source, more defined shadows result.

Gels. Gels are sheets of heat-resistant transparent material that are attached to the front of a light source to change its color.

Warming gels are particularly useful in portraiture, as they can add a golden hue to skin tones. The most popular gel for this application is the CTO (Color Temperature Orange) gel. These gels are available in a variety of strengths, and the particular strength that best suits your needs will vary from one subject to the next.

Warming gels are useful in portraiture, as they can add a golden hue to skin tones.

Gels can be employed to add color to a backdrop, making it more vibrant or better suited to your subject's clothing, for instance. They are also used to balance one light source to another. For instance, when using window light and tungsten light, the tungsten light could be fitted with a gel to eliminate its normal yellowish cast, making it a daylight-balanced source to match the light from the window.

Contrast and Light Ratios

Contrast. A highlight is a very bright spot in a scene, print, or transparency. Shadow is the area of a scene that is opposite the highlight where less light is striking or is out of range of the light source. The difference between

Contrast can be controlled while shooting, in printing, or during the image-editing process. Photographs by Patrick Rice.

the light areas and shadow areas in a scene is defined as the contrast in the scene. Contrast can be controlled when shooting the image as well as when printing it or editing it.

Shooting. Lights produce highlights (bright areas), shadows (dark areas), and midtones (areas of medium brightness). When the light source is very hard, the difference between the highlight and shadow areas is great, providing a very high-contrast scene. When the light source is very soft, the difference between highlight and shadow is much less, and the result is a lower-contrast scene. By controlling the quality of the light, therefore, you can control the contrast in the image you are creating.

Printing. Contrast can be controlled in the traditional printing process by choosing to use a high-, medium-, or low-contrast paper to print onto. This is a particular advantage when it was not possible to achieve the desired overall contrast when the photograph was created.

Editing. Contrast can also be controlled through the use of programs such as Photoshop. Photoshop allows you to adjust the contrast in a digital file using Levels, Curves, Brightness/Contrast, and several other functions. Each of these tools gives you a different way to approach the contrast in an

The light ratio in a portrait is used to describe the difference in light intensity between the shadow side of the face and highlight side of the face. With low ratios, both sides of the face may be almost equally illuminated (left). With higher ratios, one side of the face will be decidedly darker than the other (right). Photographs by Dennis Orchard.

image and allows the photographer to choose the one that will best suit the particular image.

Light Ratios. Similarly, in portrait photography, the term "light ratio" is used to describe a comparison of the illumination levels on either side of the subject's face. It can be said that the light ratio determines how much contrast you give to the lighting of the subject.

If the illumination on one side of the face is the same as the illumination on the other side of the face, the light ratio is said to be 1:1. If the illumination on one side of the face is twice as bright as that on the other side of the face, the light ratio is said to be 2:1.

To determine light ratios in a studio situation, photographers use a flash meter to measure the illumination emitted from their strobes. In other settings, light meter readings from the highlight (more illuminated) and shadow (less illuminated) sides of the face can be compared to determine the ratio.

Portrait Lighting Basics

Lights. While effective lighting setups can be created with just one light (the main light), other subjects call for two lights (the main light and fill light),

CATCHLIGHTS

A catchlight is the specular highlight, or reflection of the light source, that appears in the iris or pupil of the subject's eyes. A single catchlight in each eye is preferred to the appearance of two catchlights, which can sometimes result when a fill light is added to the lighting setup. Two catchlights can create the impression of a blank stare. Extra catchlights can often be digitally retouched out of the portrait.

or perhaps several lights—and light modifiers. We'll take a look at the role of these main players before moving to a discussion about portrait lighting styles.

Main Light. The main light (also called the key light) is the principle light used to form highlights and shadows, creating form and the appearance of a third dimension in the two-dimensional image. Outdoors, the main light source may be the sun. Indoors, the main light may be a strobe or other artificial light source. In most cases, the main light is placed in front of the subject and at least a little to the side.

Fill Light. The fill light is the second most important light in any given lighting setup. Its job is to lighten the shadows created by the main light. To do this, the photographer typically places the fill light close to the camera so the shadows the light creates fall behind the subject and are less visible to the camera. Reflectors are popular fill light sources because their effects can be instantly previewed and adjusted. As a general rule, if important shadow areas of your subject are much darker than the highlight areas, you should consider adding fill light.

Hair Light. A hair light is employed to add highlights on the subject's hair and not much else. Hair lights are generally lower-powered lights used with a snoot to direct the light only onto the subject's hair.

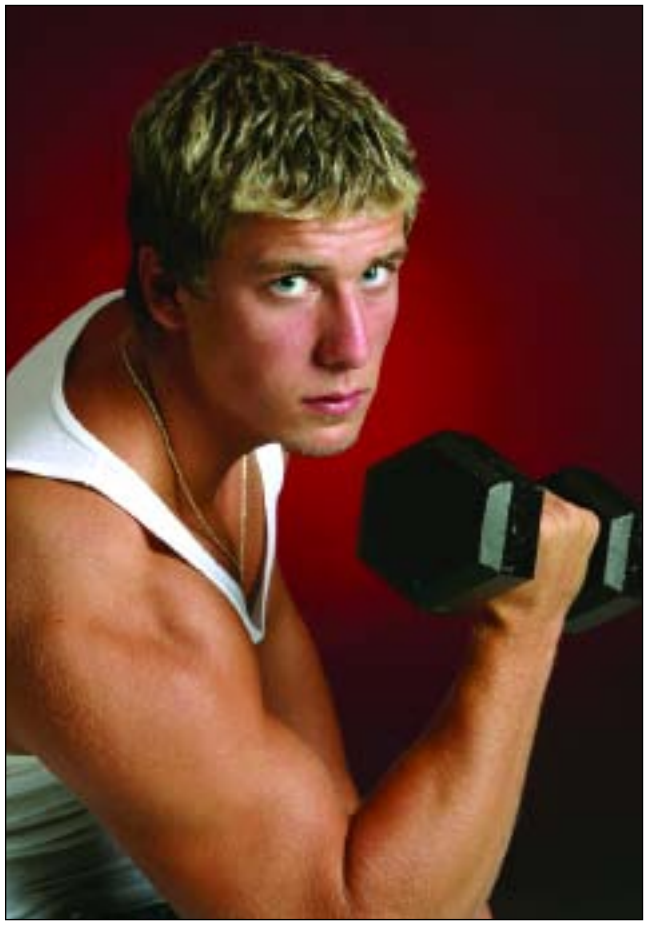
Placed above the subject, a hairlight adds shine to your subject's hair. Photograph by Leonard Hill.

Kicker Light. Kicker lights (also called accent lights) are used to add illumination to particular areas of a photograph where the photographer wants to draw the viewer's attention. Kicker lights are usually smaller lights used to brighten or "open up" areas of the portrait.

Background Light. A background light is used to ensure that the background of an image is properly exposed and to create separation between the subject and the background. This is usually placed directly behind the subject and pointed directly at the backdrop, or to the side and skimmed across the backdrop.

Basic Portrait Types. There are two basic types of portrait lighting. These are determined by the angle at which the subject's face is photographed and the side of the subject on which the main light is placed.

Broad Lighting. Broad lighting is a type of portrait lighting where the main light source illuminates the side of the face turned most



With broad lighting, the main light falls on the side of the face that is turned most toward the camera (left). With short lighting, the main light falls on the side of the face that is least visible to the camera (right). Photographs by Bernard Gratz (left) and Ken Holida (right).

toward the camera. It tends to flatten the contours of the face and produces a wider view of the face. Therefore, it is used less often than short lighting.

Short Lighting. Short lighting is a type of portrait lighting where the main light illuminates the side of the face that is turned away from the camera. Short lighting is often used to make a person with a wide face appear thinner. When used with a weak fill light, this setup can produce portraits with strong highlights and dramatic shadows.

Lighting Styles. Most portrait photographers aim to produce one of the following portrait lighting styles when creating their portraits.

Flat Lighting. Flat lighting is a type of lighting that lights both sides of the face evenly. Flat lighting is created by having a single light source attached to the camera or directly above the camera. On-camera flash creates flat lighting on a subject.

Butterfly Lighting. Butterfly lighting, also known as Paramount lighting, is a feminine lighting style that produces a butterfly-like shadow beneath the subject's nose. The lighting style emphasizes smooth skin and high cheekbones. To produce this lighting style, the main light is positioned high and directly in front of the subject. The fill light is placed directly beneath the main light, at the subject's head height. Next, the hair light is placed above and behind the subject, opposite the main light. (Care should be taken to ensure that it lights only the hair and does not skim across the subject's face.)

Finally, the background light is placed low and behind the subject to form a semicircle of light behind the subject that fades out toward the edges.

Loop Lighting. Loop lighting is a variation of butterfly lighting and is flattering for people with oval-shaped faces. To create this style of lighting, place the main light lower and a bit more to the side of the subject so that the shadow under the nose becomes a small loop on the side of the face. The fill light should be placed on the opposite side of the camera, across from the main light, and close to the camera/subject axis. It's important to ensure that the fill light does not cast a shadow on the subject. The hair light and background light should be placed as described for butterfly lighting.

Rembrandt Lighting. Also called 45-degree lighting, this portrait lighting style is characterized by its small, triangular highlight on the shadowed cheek of the subject. This is a dramatic lighting style that is often used when photographing male subjects.

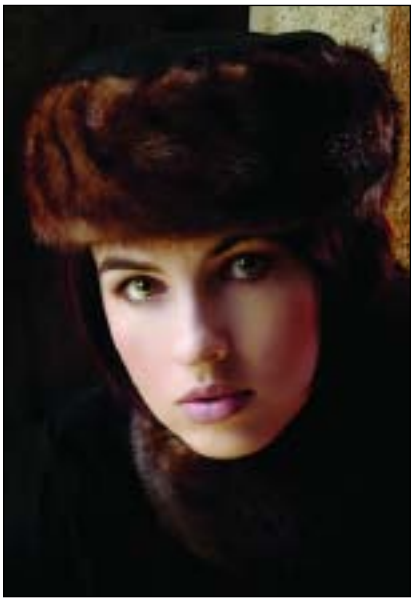
To create this lighting style, place the main light lower and farther to the right than is described in the styles outlined above. Position the hair light as described in the loop lighting description, but move it in a bit closer to produce stronger highlights in the hair. The background light should also be placed as described above. However, the kicker lights should be positioned to add brilliant highlights to the outline of the face and shoulders. (*Note:* It is important to ensure that these lights do not shine into the lens.)

Split Lighting. The term split lighting is used to describe a lighting style in which the main light illuminates only half of the face. It's a dramatic lighting style that can be used to narrow wide faces or wide features and can be softened slightly when a weak fill is introduced.

To create this lighting style, move the main light lower and farther to the side of the subject than it is used in the other lighting style descriptions. Sometimes, the light may even be placed slightly behind the subject. This placement may be necessary when the subject is turned far from the camera.

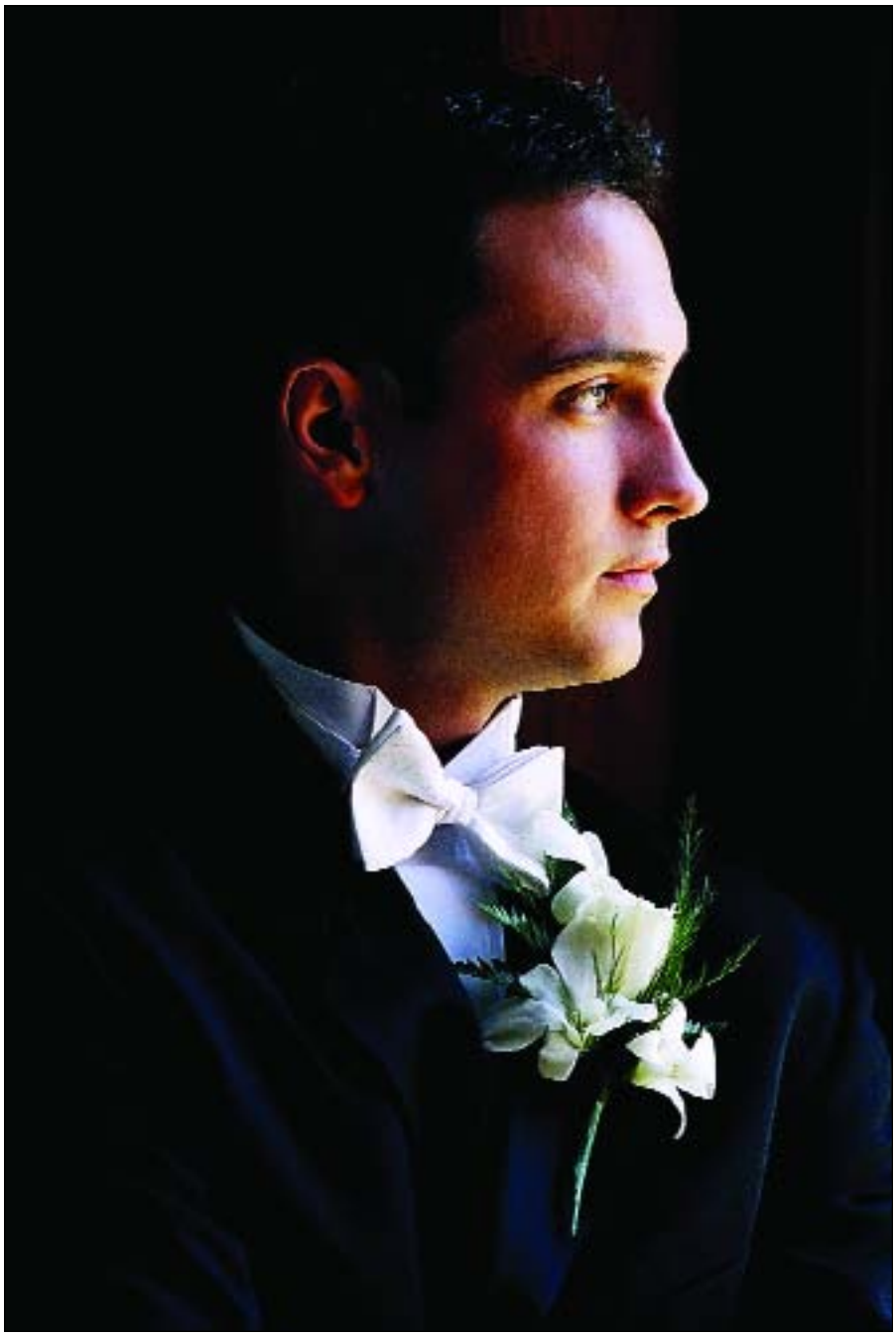
Butterfly lighting (left) creates gentle, even lighting that emphasizes smooth skin and high cheekbones. Photograph by Leonard Hill.

In loop lighting (center), the shadow under the nose becomes a small loop on the side of the face. Photograph by Rob Ledwedge.



In Rembrandt lighting (right), a characteristic triangle of light appears on the subject's shadow-side cheek. Photograph by Rick Ferro.

Profile Lighting. Also referred to as rim lighting, this dramatic lighting style is used to emphasize a subject's elegant features. In this portrait style, the subject is turned 90 degrees from the lens. The main light is placed behind the subject to illuminate the center of the profile while highlighting the edge of the face, as well as the hair and neck. The fill light is positioned on the same side of the subject as the main light, and a reflector is added opposite the main light to fill in the shadows. The background light is placed as described earlier. In this setup, the addition of a hair light is optional, but it can be used on the reflector side of the subject for enhanced tonal separation from the background.



In this profile portrait, the light is in front of and slightly behind the subject. This highlights the shape of the profile while allowing much of the rest of the figure to fall into shadow. Photograph by James Williams.

5. FILTERS

Photographic filters are devices that are placed in front of the camera lens to, in some way, transform the light that enters the lens before it hits the film or image sensor. Software filters are programs that are designed, in some cases, to mimic the effects of photographic filters, and in other cases to provide other creative effects. The following overview will provide you with a working knowledge of filters and their more common applications. For a complete, detailed study of filters, you may wish to consult *Professional Filter Techniques for Digital Photographers* by Stan Sholik (Amherst Media, 2007).

Photographic Filter Basics

You may find that some types of photographic filters better suit your photographic specialty than others. Many portrait photographers rely on a selection of softening and diffusion filters and warming filters. Photographers who specialize in landscape and nature photography often carry skylight, polarizing, and close-up filters in their camera bags.

Many portrait photographers rely on a selection of diffusion and warming filters.

Materials. Filters are made from four materials: gelatin, polyester, resin, and glass. Each type has its own advantages and disadvantages. For all filters, keep in mind that anything you place between your lens and the subject introduces the possibility of image degradation. Therefore, it pays to invest in high-quality, professional-grade filters if you are looking for the best-possible results.

Gelatin. Gelatin filters are the most widely available but also the most delicate. Because of their precise manufacturing, they are the least likely to degrade image quality.

Polyester. These filters, which are much more durable, are rapidly replacing gelatin filters. They are available in a range of types and are reasonably priced.

Resin. Unlike gelatin and polyester filters, resin filters don't need to be one solid color—they can have gradations of color and many other characteristics. They are lightweight and durable.

Glass. Like lenses, better glass filters have antireflection coatings that minimize degradation. Some also include an anti-scratch coating for added durability. This makes them a good choice for filters you will leave on your cam-

Many photographers leave a UV or sunlight filter on their camera at all times to protect the front surface of the lens. This is especially a good idea when working outdoors or on location. Photograph by Leonard Hill.

era all the time, such as a UV (ultraviolet reducing) or skylight (ultraviolet reducing and warming) filter (see below).

Types. There are two types of filters: those that attach to the lens of the camera with a screw mount and those that drop into a filter holder attached to the front of the camera. If you own a limited number of lenses that all take the same size filter or if you plan on just using one type of filter, then screw-in filters are the way to go. These are durable and convenient. For most people, however, the flexibility of a drop-in system makes it the best choice.

Filter Factors. Many filters work by absorbing a portion of the visible spectrum of light. Therefore, you must often increase your exposure when using them. As a result, filters have "filter factor" numbers on them, telling you how much the exposure should be increased to compensate for the loss of light due to the use of the filter. A filter factor of 1 requires no exposure adjustment, a filter factor of 2 requires a one-stop (1x) adjustment, and a filter factor of 4 requires a two-stop (2x) exposure increase. If you are using your SLR's built-in light meter to meter the scene through the lens, you

don't need to worry about filter factors; the meter will account for the filter in its reading.

Types of Photographic Filters

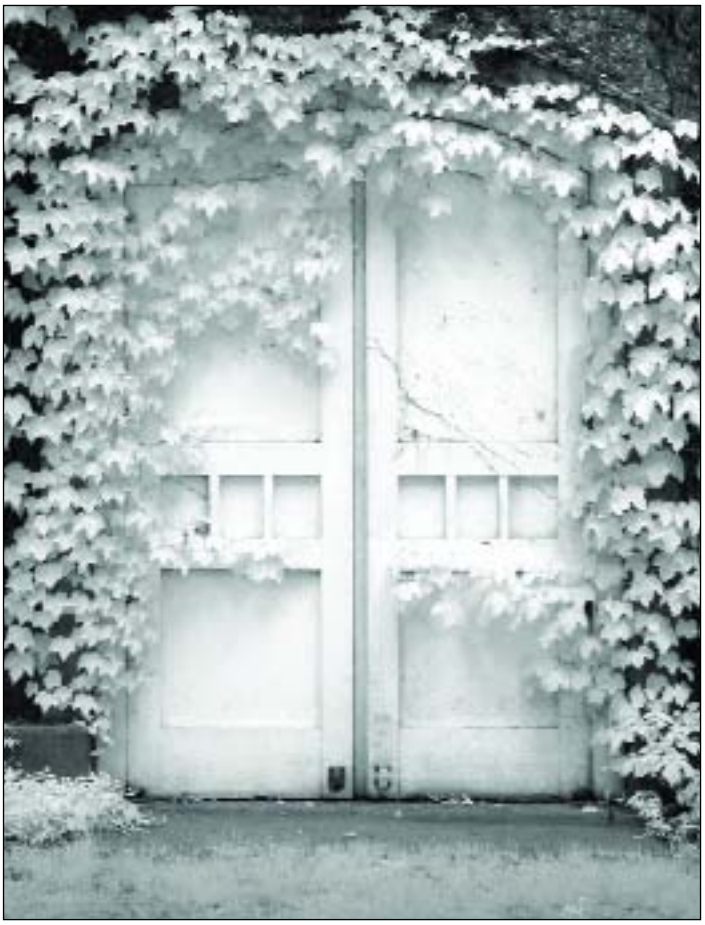
Lens Protection. There are two filters, the UV filter and the skylight (1A) filter, that can be left on at all times to protect the lens from damage while handling the camera. While the skylight filter has a slight warming effect on the scene, the UV filter does not affect the color rendition of your final image.

Color Conversion. A color conversion filter is a color filter that is used to convert the color temperature of the light entering the camera to match a film or a digital camera's white balance setting. These filters are generally blue or amber in color. The blue filters are in the 80 series of filters, and the amber filters are in the 85 series of filters. The blue series of filters raise the color temperature by blocking warmer wavelengths of light, and the amber series lowers the color temperature by blocking cooler wavelengths of light.

Color Compensating. Color compensating filters are used when you want to increase or decrease the presence of a color in the scene. These filters are available in red, green, blue, cyan, magenta, and yellow (the primary additive or subtractive colors). Photographers can choose filters in a variety of densities to impart both small and large changes to the image. The color and strength of a color compensating filter is designated by CC/density/color. For example, a CC20M filter is a magenta color compensating filter with a .20 density. Photographers commonly use color compensating filters to enhance the mood in a photograph. Other uses are to properly color balance a scene under fluorescent or mercury vapor illumination.

Infrared. Though it had its start in the scientific community, today infrared imaging is used by professional photographers to create otherworldly images that offer viewers an unexpected and pleasing view of the world

Infrared photography can create images with an otherworldly look. Photograph by Patrick Rice.



In infrared, skin tones tend to lighten and blemishes are reduced. Green foliage also appears white, taking on a dreamlike appearance. Photographs by Patrick Rice.

around them. Infrared "sees" things much differently than we do. Skin tones tend to lighten and blemishes are reduced. Fabrics often render in unexpected tones (especially synthetic ones). Green foliage appears white, taking on a dreamlike, snowy appearance that is one of the most aesthetically pleasing reasons for infrared imaging. The blue sky may appear jet black and dotted with bright white, glowing clouds.

These images can be created either on film or digitally. Infrared film is available from several manufacturers and each brand will produce its own unique look. If you choose to shoot digitally, you will need to select a camera that is sensitive to infrared light, or one that has been modified to be made sensitive to infrared (for more on this, see my book *Digital Infrared Photography* [Amherst Media, 2006]). There are many advantages to shooting digitally. First, because we cannot see infrared light, predicting its effects is difficult. Therefore, being able to instantly review your images on the camera's LCD screen is invaluable. Additionally, infrared film is both expensive and difficult to work with (it must be kept cold, and absolute darkness is required when loading and unloading).

There are two primary types of filters used when creating infrared images: the #25 red filter and the opaque filter. Both filters are used to reduce the amount of visible light that reaches the film or image sensor, allowing the infrared light to play a greater role in the exposure. The red filter blocks only

some of the visible light and produces a more subtle infrared look. Opaque filters cut off all visible light and only allow the invisible infrared rays of light to pass and strike the film/sensor. This produces a more dramatic infrared look.

Neutral Density. There are times when photographers may want to make an exposure using a wider aperture or slower shutter speed than is possible in the lighting scenario. In this case, neutral density filters, which uniformly block all wavelengths of light, can be used to decrease the overall amount of light reaching the film/sensor. These filters, available in a wide variety of strengths, can make it possible to use the desired exposure settings.

Polarizing. Polarizing filters block light waves that vibrate from particular angles to the lens in order to reduce reflections from nonmetallic surfaces such as glass or water. Polarizing filters can also be used to darken skies and intensify colors in a scene. There are two types of polarizing filters: linear and circular. With modern digital SLRs, linear polarizing filters can interfere with the camera's metering and autofocus systems. Therefore, you should select a circular polarizing filter if you use this type of camera.

Diffusion. Diffusion filters are designed to slightly blur the details in the image. A slight soft-focus effect is often useful in portraits, as it helps to downplay fine lines and wrinkles. Some filters in this category produce a softening across the entire image. Other types blur select portions of the image, allowing for sharp focus in other image areas.

Close-up. Close-up filters are actually close-up lenses, since they don't affect the spectrum of light passing through them. These filters extend the close-focusing distance of the lens to which they are attached. They come

Diffusion, whether created digitally or with traditional photographic filters, helps to soften the skin and create more flattering portraits. Photograph courtesy of Visualizations Photography.

in a range of strengths from 0 to 10; the higher the number, the greater the magnification.

Digital Filters

Today, photographers can use both photographic filters and digital filters to enhance their images. This provides a greater degree of control than ever before.

Digital filters can be used to create a wide range of effects. Some duplicate those that can be created with traditional filters. The effects of warming filters and diffusion filters, for example, are easily replicated using the filters that come with Adobe Photoshop and most other image-editing programs. In fact, these software filters offer even more control, since you can precisely adjust the degree to which the effect is applied and even apply it selectively to only parts of the image. Another advantage of using digital filters is that most allow you to save the settings you like, so you can apply them again and again to achieve the identical effect in a series of images. You can even use batch processing and actions to quickly apply filters to large groups of images.

Digital filters allow photographers to create looks that go far beyond the effects of photographic filters. Photograph by Bob Kunesh.

Digital filters can also be used to create some effects that have no correlate in traditional photographic filters. Photoshop, for instance, includes filters that allow you to transform your images into pen and ink sketches, watercolors, or even stained glass. You can also produce embossed looks, solarization, or wave effects with the click of a button. These are looks that would be difficult, if not impossible, to create using traditional photographic processes. For more on this type of filters, see chapter 5.

There are, on the other hand, some photographic filters that can't be replicated digitally. The effect of polarizing filters can, in part, be replicated by filters that intensify colors and darken skies, but no digital filter can instantly remove the reflections from water the way a photographic polarizing filter can. While you can also enlarge your image digitally, Photoshop does not take the place of close-up filters for shooting small subjects.

For most photographers, both traditional photographic filters and digital filters play some role in their work. The best way to learn what filters best suit your style is to do some experimenting with the wide range of options available.

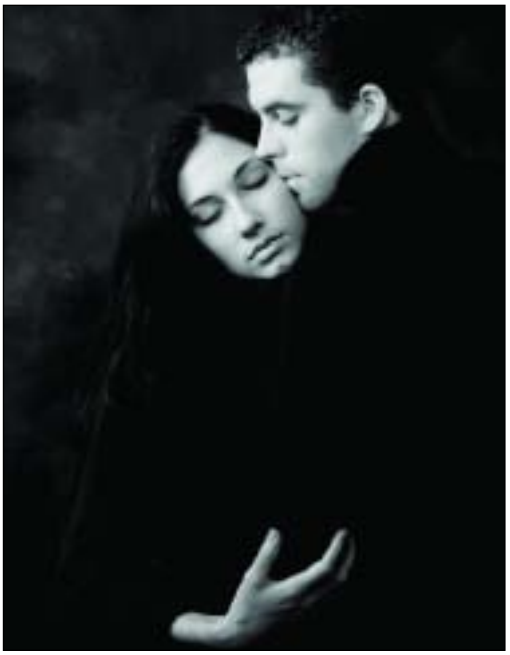
6. COMPOSITION

Composition is the effective arrangement of all of the visual elements that fall within the frame of the final image. In this chapter, we'll look at some compositional strategies that will help you ensure a stronger, better-crafted image.

Center of Interest

In creating your image, you want to have one and only one primary center of interest. The main subject should be the thing that catches your eye. (The exception to the rule is when you wish to emphasize the arrangement of lines, shapes, and colors that make up an image, rather than a main subject.) To accomplish this, you must ensure that the other compositional elements within the four borders of your image lead the viewer's eye back to your subject. They must never direct the viewer's gaze out of the photograph or away from the main subject. The following are two key elements to consider.

Contrast. Areas of high contrast attract the viewer's eye and should be evaluated carefully to ensure that they do not draw the viewer's eyes away



In the first image (left), the couple's faces are the lightest element in a dark frame, so your eyes are immediately drawn to them. In the second shot, the dark-toned subjects stand out perfectly from the white background. Photographs by Rick Ferro (left) and Leonard Hill (right).

from the subject. In a low key photograph the area of highest contrast is the *lightest* part of the image. In a high key photograph the area of highest contrast is the *darkest* part of the image.

Consider, for example, a picture of a bride in a white dress against a solid background of dark green trees and foliage. The bride in her light-colored gown will, appropriately, be the area of highest contrast and the part of the image to which your eye is drawn. Now imagine that there is a bright sky area over the treetops—suddenly the bride will compete for attention in the frame. The same thing happens when breaks in the tress allow little bright spots of sky to show through the foliage. Details like these can destroy the impact of an otherwise carefully composed image.

Notice how the fence (top) and pews (above) lead your eyes right to the subject of the image. Photograph by Bob Kunesh (top) and Monte Zucker (above).

Leading Lines. Leading lines that draw your eye in toward the subject(s) can greatly enhance the composition of an image. Paths, walkways, fence posts, etc., are leading lines that are often found in successful photographs. Inside churches, the pews lead from both the left and the right to the center of the image where the subject is usually placed. The human eye naturally follows lines toward where they lead. Understanding this and utilizing this technique will result in more effective photographs.

In the Western world, we read from left to right. We subconsciously "read" photographs in the same way. Therefore, leading lines that bring the viewer from the left side of the image over to a main subject on the right can greatly enhance the impact of the photograph.

Subject Placement

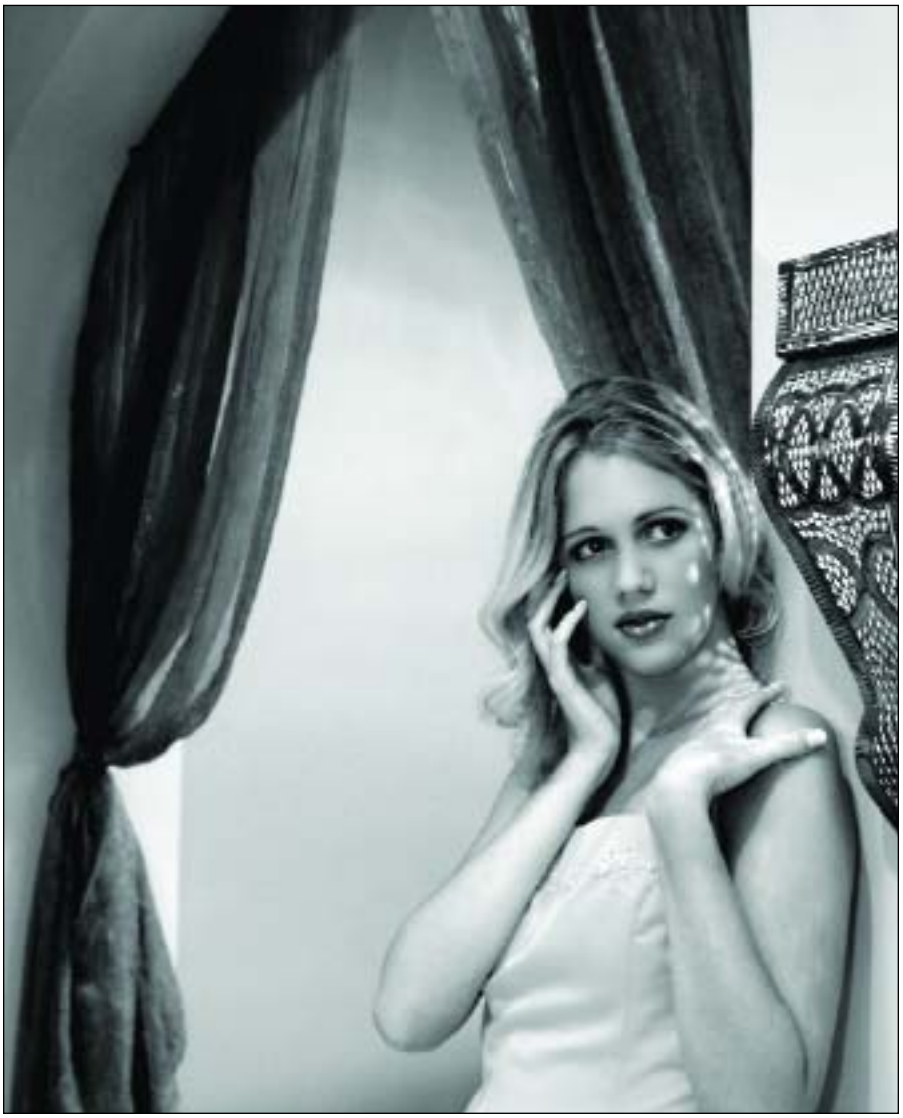
Viewers typically regard more favorably those images where the main subject is positioned off center. This type of composition creates a "flow," a natural arrangement of elements that draws your eye through the frame and toward the main subject (never out of the frame or away from the main subject).

To create such an image, many photographers employ the Rule of Thirds or Bakker's Saddle (also called the Golden Triangle).

Rule of Thirds. To compose an image according to the Rule of Thirds, imagine that the frame is dissected by two horizontal and two vertical lines (this should appear much like a tic-tac-toe board). Your main subject should be placed in one of the points where these lines intersect. These points of intersection are referred to as power points because they are natural centers of visual attraction. By placing your subject at one of these power points, your images will be more compositionally pleasing. For close-up portraits, such as head shots, the main subject of your image (and the feature that should be placed according to these rules) is the person's eyes. For portraits that show more of the body, the subject is the face as a whole.

Because we read text from left to right, the strongest power point in the image is generally the one at the lower right. Since the eye rests comfortably here, many photographers place their subjects at this point. Your subject can, however, be successfully placed at any of the intersections.

This image, composed according to the Rule of Thirds, shows a subject placed at the lower-right power point. Photograph by Rick Ferro.



Bakker's Saddle. Bakker's Saddle is named for the outstanding photographer and instructor, Gerhard Bakker. It is a compositional rule to help photographers with the placement of the main subject in their images. The Bakker's Saddle is created by drawing a diagonal line from the top-left corner of the image to the bottom-right corner of the image. A 90-degree perpendicular line is then drawn from that diagonal to the upper-right corner of the image. The main subject of the photograph should rest in the "saddle" created by the intersection of two lines. It cradles the subject in a natural and harmonious way.

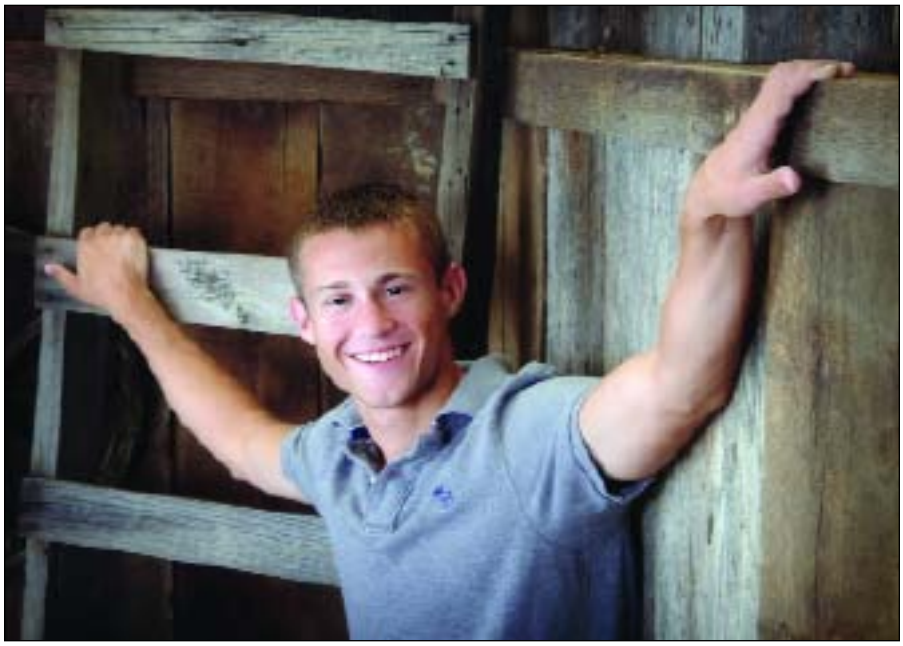
Centering. Centering your subject is usually considered a mistake. However, there are a few circumstances in which centering your subject create a more powerful composition. First, centering is appropriate when the subject is symmetrical. With a symmetrical subject, centering creates a bull's-eye effect that draws the viewer's eyes right into the center of the image and doesn't let them go. Architectural studies that include a person or persons should also be centered for proper balance. Centered compostions are also preferred when the photographer utilizes a fisheye lens to create the image. Because of the nearly 180-degree field of view of most fisheye lenses, the subject looks best when placed in the middle of the composition.

THE SUBJECT'S GAZE

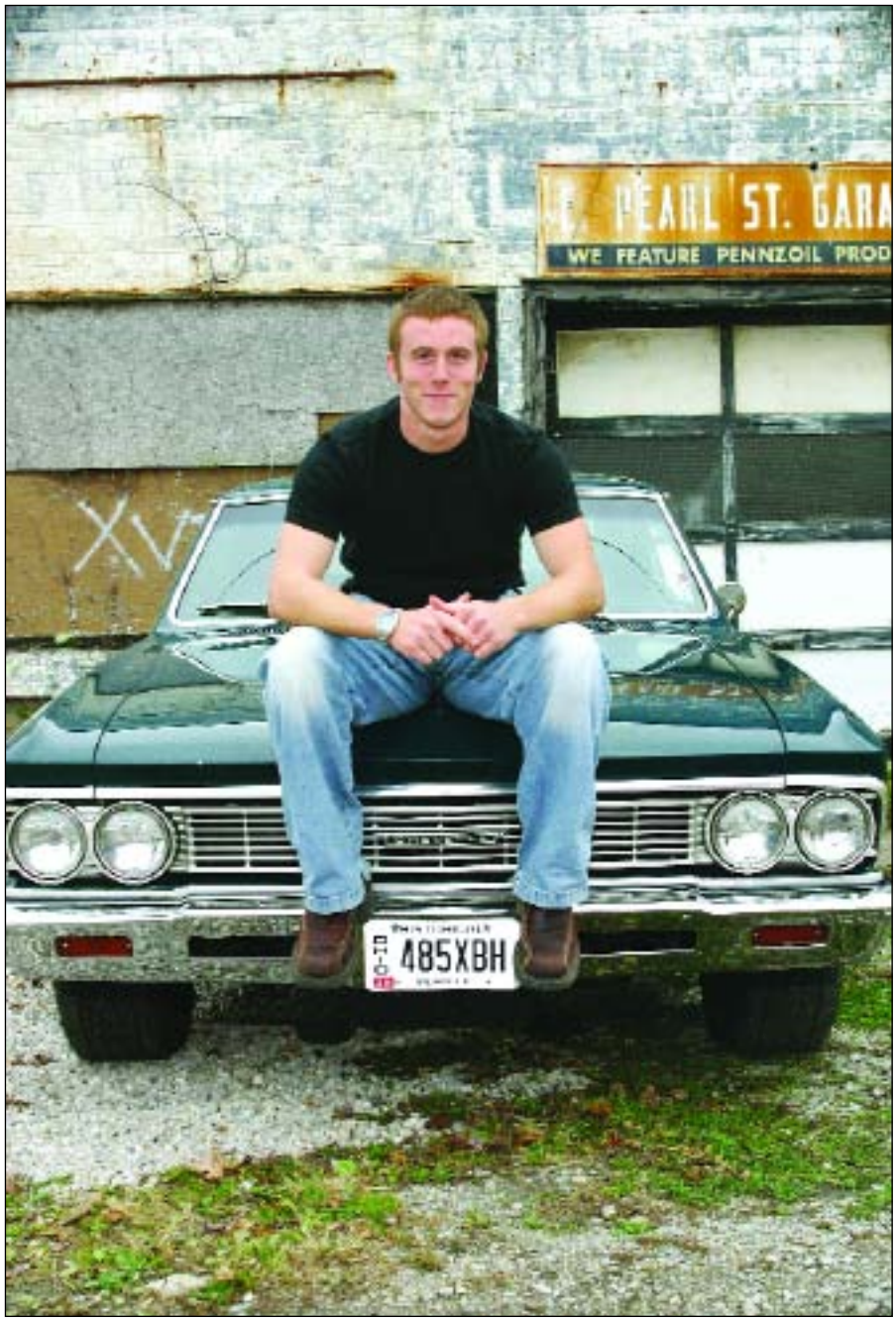
When your subject is not looking directly back at the camera, the viewer tends to follow the subject's eyes in the direction that they are looking. If the subject is looking to the right side of the photograph, the viewer enters the image from the left of the subject and then continues to follow the subject's gaze out of the photograph. When we reverse or flip the image, the subject is looking to the left side of the photograph. Now, the viewers enter the image from the left and travel up to the subject, but the subject's gaze leads them back to the left where they began; this presentation creates a visual "loop" that encourages the viewer's eyes to linger on the photo.

Common Problems in Composition

Distracting Elements. In addition to placing the subject of your photo in a powerful position in the frame, you can also improve your compositions by eliminating distracting elements. Distracting elements are anything in a pho-



Here, the subject's eyes are placed at the intersection of two lines drawn in Bakker's Saddle. Photograph by Leonard Hill.



The straight-on framing of the car, paired with the subject's symmetrical pose and direct look, make this centered composition very effective. Photograph by Ken Holida.

tographic image that draws attention away from the main subject in the photograph.

Things that look unnatural or out of place (e.g., telephone poles, high tension wires, street signs, etc.) are distracting elements. Objects that are in a dramatically different color or in a different key can be distracting as well. In a low key (darker) image, light colors and objects will draw the viewer's attention. If those areas are not part of the main subject, they are distracting to the viewer. In a high key (light) image, dark areas do the same thing.

Hotspots and light traps (bright areas amidst dark tones) are common distracting elements and should be eliminated by retouching or cropped out of the composition in order to not distract from the main subject.

Crooked Horizons. It is important that you maintain straight horizon lines in your images. A crooked horizon is distracting. This problem is especially pronounced in scenes that include the ocean in the background. If the horizon is crooked, it looks like the water is going to pour out of the photograph.

A crooked horizon in a print can be straightened by measuring from the horizon line to the edge of the print at both ends of the photograph and cutting the image down to the same dimension from each end. After you have established the new straight horizon line, simply trim the rest of the print back to a rectangle through the use of a carpenter's square, and you will have a print with a corrected horizon.

In digital images, the horizon can be leveled by using Photoshop's Crop or Transform tools to carry out the steps outlined above.

Crooked Vertical Lines. Crooked vertical lines can be a distraction in your images. They are caused by not shooting directly toward the vertical subject, but rather shooting from a slight angle (either up or down).

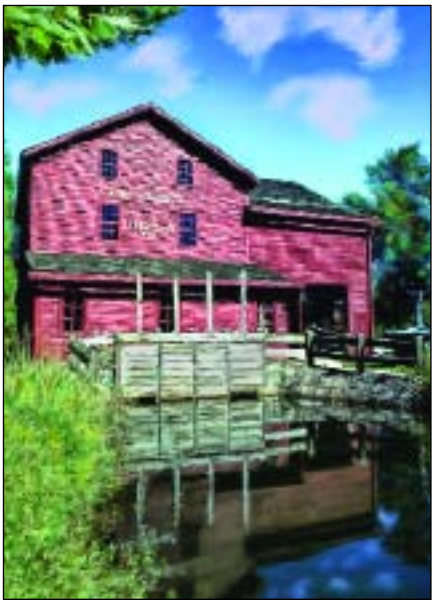
Some camera lenses are more likely than others to distort the vertical lines in an image. Less expensive or inferior wide-angle lenses in particular tend

When the horizon appears in your image, make sure that it is perfectly horizontal. Photograph by Charlene Rule.

to create crooked verticals. Perspective control lenses can be employed to eliminate these crooked verticals. These lenses work in the same way as a view camera (see chapter 1).

Sometimes it simply isn't possible to keep your lens parallel with the vertical lines in a scene. However, through software programs like Photoshop (and some plug-ins for this program), you can now digitally fix crooked vertical lines.

Dividing Horizontal Lines. Successful prints usually do not have dividing horizontal lines that cross directly through the center of the image. It is important to try to place horizontal lines in either the lower third or upper third of the finished print. This technique gives the print better balance and keeps it from having a bisected appearance (i.e., looking as though there are separate upper and lower images). In the compositional Rule of Thirds, we place important subjects in one of the intersecting points of the tic-tac-toe board that you can imagine sits atop every image. Any prominent horizontal lines in the image should ride along either the top or bottom horizontal line of that tic-tac-toe board.



In architectural images, the sides of the building should appear straight and perfectly vertical. Photograph by Charlene Rule.

When your image contains subjects in motion, leaving some space in front of them produces a more effective composition. Here, the strolling subjects have plenty of room to (in the viewer's mind) meander across the beach. If the same couple had been composed at the far left of the frame, they would appear to be walking right out of the image! Photograph by Patrick Rice.

In addition, you should avoid composing images so that horizontal lines divide or cut through your main subject. Instead, try to place the subject under or considerably above any horizontal line in the image. When shooting, this can be achieved by changing your perspective in relation to the subject. As you lower your perspective (camera position), you will raise the subject up into the top of the image, far above the horizon line. As you raise your perspective, you will lower the subject toward the bottom of the image, thus composing them beneath the horizon line. Either option gives a more visually pleasing appearance to your photograph.

Improving Composition After the Shoot

In the excitement or stress of the shoot, or just due to the realities of the location or subject, it's inevitable that not every composition will be perfect. Fortunately, digital imaging gives us some recourse.

Cropping. Often, you can improve the image by cutting out any problem elements. Review each image carefully and evaluate whether the composition supports your message about the subject and its relation to the background against which you photographed it. Are there distracting elements that need to be removed? Are there leading lines that draw your eye away from the subject? Is there dead space that contributes nothing to the image? You may want to experiment with different ways of cropping out any elements you feel need to be eliminated.

Retouching. Sometimes, distractions in an image can't be cropped out. While retouching out problems can sometimes be time consuming, it may be worth it to save a particularly good shot. Bright spots showing through gaps in foliage are easy to eliminate using the Clone tool in Photoshop, as are many other simple distractions (like light switches on a wall). Another easily remedied compositional problem is crooked horizons, which can be corrected in seconds using Photoshop's Transform or Crop tools.

7. POSING

In most photographs, the posing of the subjects is vitally important. Many times, a photographer will have a great-looking couple in a "fabulous location" but will fail to pose them properly. As a result, the image will not be successful (or at least not as successful as it might have been). For the best-possible portraits, keep the following points in mind during every session or shoot.

Start with the Subject

To be effective, a subject's pose must be both believable and flattering. The qualities that will contribute to this goal will depend on your subject. For example, you would not pose a bride on her wedding day in the same way as you would pose a football player in his uniform. Similarly, you would not pose a woman in a formal evening gown in the same way that you would pose her for a professional portrait to be used in her job as a police officer, or in a beauty shot created for her husband. In each case, however, the qualities you would seek when deciding on the pose would be the same; the pose must be believable and flattering.

Comfort

One of the most important elements of any pose is the comfort of the subject. Unless you are photographing a professional model, an uncomfortable pose will almost always result in your subject not looking his or her best. Comfortable seating that allows for an upright posture, standing poses in which the weight is on the back foot and the knees are slightly bent, and some floor poses designed with the subject's comfort in mind are all good starting points for an effective pose.

The Head and Shoulders

Most professional photographers ensure that their subjects' shoulders are turned at an angle to the camera. Posing the client's shoulders head-on to the camera results in a static image that increases the apparent width of the body. By creating angles in the portrait, we create a more flattering and dynamic image. (There are exceptions to the rule: if your client is exception-

A TRIANGULAR BASE

For the best results when composing a head-and-shoulders portrait, have your subject position their arms slightly away from the sides of their body. This creates a wider, more triangular base for the portrait.

Often, the subject's attire will help you determine the best type of pose. For a young woman in casual clothes, a relaxed pose works well (top). For a subject in her dance attire, something more graceful and refined will fit the bill (bottom). Photographs by Chris Nelson.

ally thin, or you wish to draw attention to their mass, as you would when photographing a football player, a square-to-the-camera presentation may be in order.)

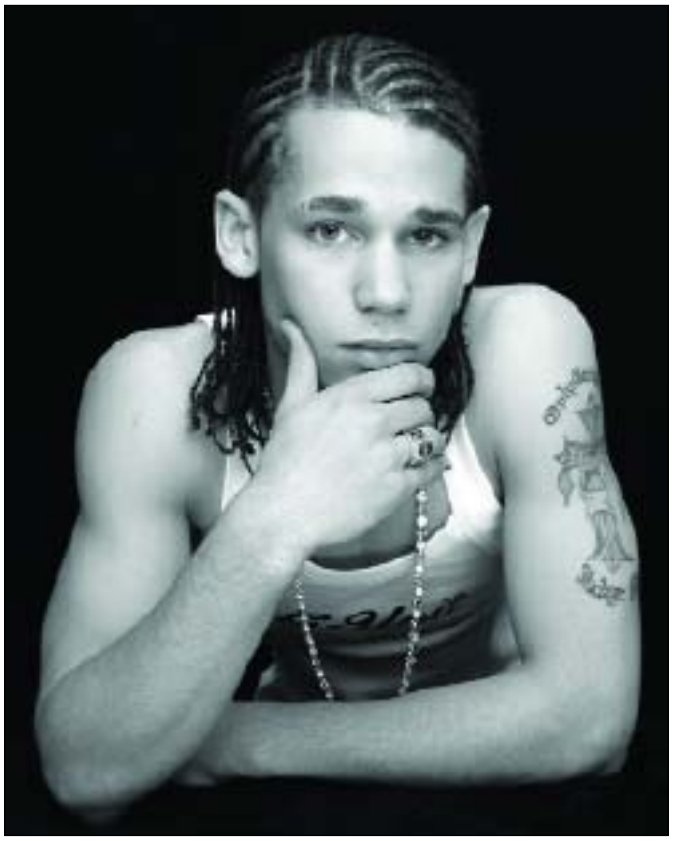
Head Positions

We have already established that the shoulders should be turned at an angle to the camera for the most flattering portraits. This forms the desired base for any of the three main head positions: the seven-eighths view, the three-quarter view, and the profile view.

Facial Views. *The Seven-Eights View.* In this head position, the subject is looking just slightly away from the camera. Although both of the subject's ears are visible in this position, one side of the face is more fully shown than the other.

The Three-Quarters View. In this presentation, the far ear is not visible, and the side of the face closer to the camera is significantly more visible than the far side of the face. This presentation can make the eye farthest from the camera appear slightly smaller. Therefore, pose your subject so that their smaller eye is closer to the camera.

The Profile View. To create this pose, have your client turn his head away from the camera until the far eye and eyelashes are no longer visible from the camera position (about



In the seven-eighths view (left), the subject is looking just slightly away from the camera. Both of the subject's ears are visible in this position. In the three-quarters view (right), the subject's head is turned a bit farther from the camera and the far ear is not visible. Photographs by Leonard Hill (left) and Rob Ledwedge (right).

90 degrees from the lens). This pose is often used to emphasize a subject's elegant features.

Head Tilt. Also, tilting the subject's head slightly, no matter the pose, creates an implied diagonal line from one eye to the other. This simple change can enhance every portrait. Traditionally, the female subject's head is tipped slightly toward the shoulder nearest the camera, and the male subject's head is tipped slightly toward the far shoulder. However, this is not a hard-and-fast rule. The overall appearance of the subject and the lighting setup may dictate a different approach.

Chin Height. Finally, be sure that your client's chin is positioned neither too low or too high, as one extreme can create an impression of haughtiness and the other, a lack of self-esteem.

Posing the Hands and Feet

Hands. Posing the hands can be a challenge. Because they are typically closer to the camera than the subject's face, they often appear bigger than normal. Using a slightly longer than normal lens can help to prevent this problem. It may be more difficult to achieve sharp focus on both the hands and face with such a lens, but it is critical that the face is sharply focused; a slight softening of the hands in the image is far less objectionable.

When posing the hands, it is a good idea to present them at an angle to the camera, as a straight-on view can result in a distorted view of the hands and fingers. It is better to present the side of the hand to the camera than to

BREAKING THE RULES

The rules described in this chapter have historically been used to produce good portraits and, as such, can be reliably used for most every session. Once you learn the rules, you'll also develop a sense of when a particular rule should be broken. Sometimes, breaking the rules can result in a portrait that sends a unique and powerful message to the viewer.

show the back of the hand. The former view affords a more natural, flowing line and discourages distortion. Additionally, be sure that the client's fingers are slightly separated. Otherwise, the hand may appear as a mass of skin tones and may draw the viewer's attention to the area. The wrist should be slightly bent to ensure a more dynamic and relaxed presentation.

Though rules can often be broken to good effect, it's traditionally thought that a man's hands should exhibit strength in the portrait, and a woman's hands should appear graceful.

Feet. The perspective problem outlined above also applies to your subject's feet. To avoid making the subject's feet look shorter and wider, take care to ensure that they are not pointed directly into the lens. For standing poses, the client should avoid evenly distributing their weight on both feet. With one foot slightly behind the other, their weight resting primarily on the back foot, and the knee of their front leg slightly bent, the subject will be more comfortable.

While the feet may not be visible in the final portrait, correct positioning will have a positive effect on the overall pose. With a good foundation for the pose, the client is more comfortable and will be better able to remain in the finished pose.

When they are visible in a portrait, the hands are usually best seen in a side view. Photograph by Rick Ferro.

Three-Quarter and Full-Length Poses

Three-Quarter Poses. When composing a three-quarter pose, you should take into consideration all the guidelines for posing discussed this far. Additionally, since more of the body is visible to the viewer, some thought must go into the posing of these areas.

The three-quarter view shows the client from their head to somewhere below the waist. It is best that the bottom of the frame falls at about midthigh or just below the knee. Composing the image so that the frame cuts through the knee (or any other joint) tends to create an unsettling impression. As mentioned above, it is best to pose standing clients with their weight on the foot farthest from the camera, and a slight bend in the front knee.

In standing poses, avoid presenting the client with their arms simply hanging at their sides. Men may be effectively posed with their arms folded across their chest, with the hands in a side view as they gently grasp his biceps. There should be a small space between his arms and chest, as this provides a slightly slimmer, more flattering presentation. Women can be successfully posed with one hand on their hip. The other arm should be very slightly bent, with the wrist bent and a side view of the hand presented to the camera.

If the subject is seated, a cross-legged pose can be effective. Remember to leave a slight space between the back of the leg and the chair to provide the most slimming, flattering view. When posing a seated female client, it's a good idea to have the calf of the leg closest to the camera tucked slightly behind the back leg. This reduces the apparent size of the legs.

Full-Length Poses. A full-length portrait, as the name implies, affords a complete, head-to-toe view of the subject. As described above, each of the areas of the body should be posed to present a flattering view of the subject. Throughout this book you will find a variety of images that feature full-length poses. Study these and use them to inspire your own work.

Group Portraits

All of the rules outlined in this chapter apply to posing the individuals in a group portrait. The bottom line is, each subject in the group portrait should look his best, and each pose should stand on its own to produce a compositionally sound, attractive image.

When posing two or more people, you should seek to stagger the head heights in the portrait. For instance, a tall man might be seated on a posing stool with his fiancée standing by his side. If his eyes fall at a level that is approximately even with her mouth, you have achieved a good height differential. On the other hand, extreme differences in height are to be avoided. By slightly staggering the head heights, you can ensure that the viewer's eyes

When posing two or more people, you should seek to stagger the head heights in the portrait. Photographs by Mark Bohland (left) and Michael Ayers (right).

Group portraits don't have to be stiff and stuffy. Here, the natural poses and casual (but coordinated) clothing make for a fun portrait that's full of life. Photograph by Leonard Hill.

will move easily from one subject's face to the next, giving the portrait a dynamic feel.

When posing three or more clients, you should seek to create a uniform distance between subjects, as leaving more space between one grouping than another will detract from the cohesive feeling you are seeking to create. A small corporate group might require more space than a tight-knit family group, who might be positioned close enough together to touch.

When photographing groups, the clothing choices are of special concern. Many photographers suggest a uniform approach. For instance, a small corporate group might wear their yellow polos shirts and khaki pants. A family of four might be asked to wear dark jeans and white t-shirts for a cohesive look.

For more information on posing groups, see *Group Portrait Photography Handbook* (2nd ed., Amherst Media, 2005) by Bill Hurter.

8. AFTER THE SHOOT

As experienced photographers know, the shoot is actually just the beginning of the image-creation process. Especially in the digital age, most photographers spend more time *after* the shoot retouching, enhancing, archiving, proofing, and printing their images than they did creating the shots in the first place. In this chapter, we'll explore some of the critical steps that take place after the shoot, beginning with techniques for perfecting your images in Photoshop and wrapping up with a look at designing an efficient digital workflow.

Photoshop Techniques

Color and Contrast Correction. While it would be nice if all the images we captured contained exactly the colors and contrast we'd like to see, it's just not always the case. (The following information on color and contrast correction is excerpted from the book *Color Correction and Enhancement with Adobe® Photoshop®* by Michelle Perkins [Amherst Media, 2004] and is used with the author's permission.)

The natural tendency when beginning to correct the color and contrast of an image is to open it and start pressing buttons, clicking and dragging, etc. Doing this, however, is sort of like taking a picture without bothering to compose it—only once in a blue moon will you happen to achieve the best results. As with most things, developing a good plan of action before diving into an activity will minimize frustration and enhance your odds of success.

As with most things, developing a good plan of action will enhance your odds of success.

Once you've opened your image in Photoshop, you have two valuable tools at your disposal for evaluating it: your eyes and the Eyedropper tool. Your eyes provide more subjective results, while the Eyedropper tool provides results that are totally objective. The Eyedropper tool samples colors, allowing you to see the color value of pixels (displayed in the Info palette) as you evaluate an image. Moving this over your image, you can use the readings in the Info palette to look for problems in the following areas.

Evaluating Images. One common problem that can make both black & white and color photos look less than perfect is the absence of a deep, rich

If the bride wore a white dress, it should look white (not ivory or some other pale shade) in her photos. Photography by Tony Zimcosky.

black and a bright, sparkling white. For most images, achieving pleasing overall color requires the use of the full range of possible tones from black (or very near black) to white (or very near white). Our eyes adjust to see this full range of colors in almost every scene we view around us, so if a photo lacks it we immediately feel that the image looks flat or dull. So, ask yourself: Are the darkest areas in this photo dark enough? Are the lightest areas in this photo light enough? Keep in mind, some images may have one problem or the other, some may have both, and some may have no problem at all in this area.

If windows are the eyes to the soul of a person, neutral tones are often the key to learning what's going on under the skin of a digital image. If the neutral tones have a color cast, chances are that the rest of the image does too.

A good place to start is with the whites. Keep in mind, the whites you evaluate should be areas of pure (or very close to pure) white—like a catchlight, a cloud, a white bridal gown, etc. Although we often refer to the "whites" of the eyes or to people's teeth as being white, they rarely are. Once you've identified an area to evaluate, examine it closely for any slight shifts in color—what looks at first glance to be white often turns out on closer inspection to be faintly yellow, or blue, or pink.

Like whites, grays that should be neutral in tone (not bluish gray or reddish gray) can reveal overall color casts. Here, the selection of an area to evaluate is much more subjective, though. Paved streets (in most areas) tend to be a reasonably neutral gray. Sometimes clothes and other fabrics are neutral gray (and this can be either light or dark). Shadows on white walls or backdrops are also fairly neutral gray areas.

If there are areas in your photo that you know should be neutral gray (or close to it), use the Eyedropper tool and the Info palette to evaluate how close they actually are to neutral.

As humans, we are accustomed to seeing human skin tones all around us every day. Therefore, we all notice it pretty quickly when a skin tone just doesn't look right. We notice problems especially quickly in photos of people we know personally or see on a regular basis. Yet, from time to time, we all see images of people who unintentionally look jaundiced, or seasick, or like they've spent too much time in the sun.

There are a few reasons for this. First, skin tones vary widely from person to person and can change dramatically depending on the lighting, activity level, exposure to sun, and even the person's emotional state. Second, skin tones are also finely detailed and feature hundreds of shades of color rather than a few unified tones. Third, even subtle problems can be very obvious to viewers. While you can get away with the grass being a little off-color, it's harder for viewers to overlook skin tones that miss the mark.

Setting Your Goals. Now that you've examined your image carefully and (hopefully) made a few notes on things you'd like to see changed, it's time to set your goals for the image. This might seem obvious—you want it to look "right," right? Determining what is "right," however, requires you to make an important decision: should the color match the subject or scene as it was, or should the color be changed to enhance the scene or subject?

In some cases, this decision is made for you. If your image shows a product where the color needs to be correctly reflected, any "enhancements" won't be appreciated. In most other cases, there will be some creative leeway—and often improvements will make the image much more desirable.

Some of the choices you can make to enhance the color in your images will produce subtle (but much appreciated) results. For example, most women will appreciate the smoothing effect of making their skin tones slightly lighter than they actually are, especially when this helps to open up shadows and conceal texture. (In fashion magazines, you'll see the skin tones are often extremely light for this reason.) The skin should not, however, look too pink. For portraits of children and babies, on the other hand, people tend to prefer a look that is slightly lighter and more rosy than in a grown-up portrait.

Should the color match the subject or scene as it was or be changed to enhance it?

Make the Corrections. When it comes to making color and contrast corrections, Photoshop offers a multitude of options. Teaching you how to use each and every one of these would require an entire book—and countless books *have* been written on the subject. Understanding how to use these tools (such as the Levels, Curves, Selective Color, and Hue/Saturation commands) is key to building a successful workflow. So, invest in a good book or take a workshop, then spend some time using these tools on your own images. Train your mind and your eye to identify problems and devise the most efficient solutions.

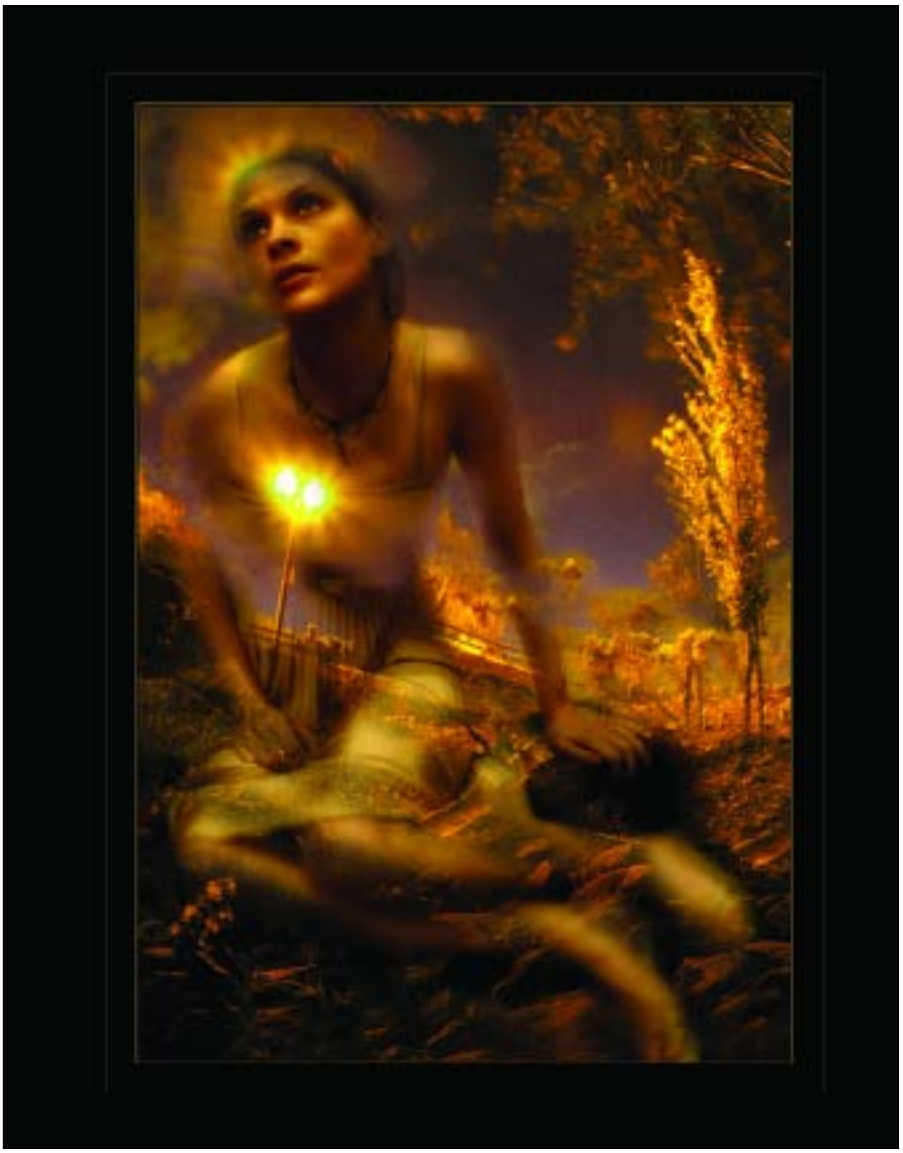
Make Additional Enhancements. Once you've gotten the color and contrast in the image the way you want it, you can consider adding additional enhancements, such as retouching, artistic filter effects, and more.

Retouching. Virtually all images of people will need at least some degree of retouching. Digital portraits are often so sharp that they actually show *too much* detail—things like pores, very fine lines, and tiny discolorations that people definitely *don't* want to see in their images. In Photoshop, the Clone Stamp tool and Healing Brush can be used to conceal small problem areas. The Gaussian Blur filter can also be lightly applied to add overall softness to

the skin. For best results, apply this on a duplicate of the background layer, then use the Eraser tool on the softened duplicate layer to reveal the sharp data on the underlying image layer.

Artistic Filter Effects. In addition to those filters that come packaged with Photoshop, literally thousands of third-party filters are available. These small accessory programs can be installed on your computer to add new and exciting effects. In our studio, we have absolutely fallen in love with Nik Software's easy-to-use plug-ins, and we utilize them often to create a number of interesting effects in our images.

Monday Morning from Nik Software's Color Efex! line is a studio favorite. This filter creates a soft and very moody rendition of the image and allows you to fine-tune the results if necessary. The Pastel filter replicates the traditional look of pastel artwork with amazing accuracy. The Sunshine filter can add punch to a flat, low-contrast image. These are just a few of the many filters that are included with each plug-in set. I am sure that each photographer will discover different ways to use these plug-ins to enhance their photography.



Filters can be used to add artistic effects to your images. Photograph courtesy of Lisa SmithStudios.com.

Converting a Color Image to Black & White. Unlike film shooters, digital photographers do not have to decide whether an image should be color or black & white at the time of capture. The photographer can now make these decisions after the shoot with no discernable loss in the quality of the final photograph. This provides a tremendous advantage to photographers in any field of interest. Although some cameras have a black & white setting, I would strongly recommend not using that setting and capturing the image in color. This way, you have not limited the possible applications and modifications of the image like you would if the image were digitally recorded in black & white.

One method for converting your images to black & white is to use Nik Software's B/W Conversion, a versatile filter that creates a black & white conversion by applying digital versions of traditional photographic filters used in black & white photog-

raphy. Adjustments are made to the image using three slider controls: Brightness, Filter Strength, and Spectrum. As the name implies, the Brightness slider allows the photographer to make small or large adjustments to the brightness level of the converted black & white image. This adjustment is necessary when the chosen filter darkens the image too much. The Filter Strength slider defines the degree to which the filter will affect the final black & white image. The Spectrum slider defines the color of the filter you are using with the black & white conversion. As in conventional black & white photography, using a color filter changes how objects in the scene appear. The entire color spectrum is available with this filter, so you can customize your results to achieve the very best image.

The following additional black & white conversion techniques are from *Traditional Photographic Effects with Adobe Photoshop* by Michelle Perkins [Amherst Media, 2002].

With any conversion to black & white, you'll have the best results if the image is good to begin with—accurately color balanced with good contrast and detail in the highlights and shadows. You'll be happiest when you select photos to "transform" that have a strong design and don't rely primarily on color for their impact. Obviously, this is not always possible (you may have a color photo that looks best in color but must be used in a black & white newspaper). In this event, using the techniques described will be especially important for creating the best-possible results.

Once you have color corrected your image and have achieved a good tonal range and contrast, you are ready to convert the image to black & white. The simplest method is to change the color mode of the image to Grayscale (Image>Mode>Grayscale). This method, however, will not usual-

With digital photography, you can shoot all your images in color, then selectively convert them to black & white after the shoot. Photograph by Patrick Rice.

Subjects with graphic shapes are ideal candidates for presentation in black & white. Photograph by Rob Ledwedge.

ly produce the best-possible results, but they can often be acceptable—especially if you tweak them by slightly bumping up the contrast and brightening the midtones.

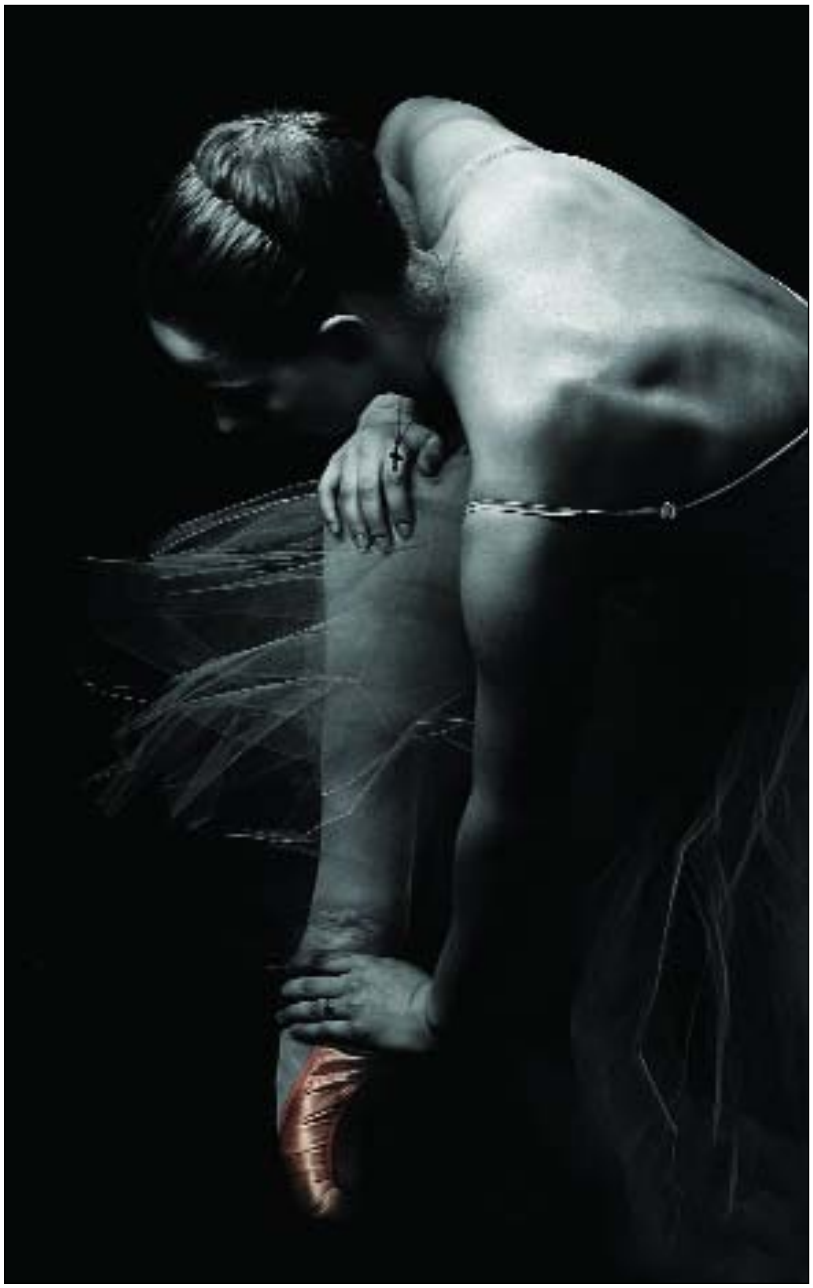
Better results can be achieved using the Lab color conversion method. Converting a color image to black & white using this method produces a crisp image with very little grain and deep blacks.

1. Open an RGB image. If there are any layers in the image, flatten them.
2. Go to Image>Mode>Lab color.
3. In the Channels palette (Window>Channels), click on the Lightness channel to change your image to black & white.
4. Drag the "a" channel into the trash can at the bottom of the palette (leaving this in place isn't a problem, but it will create an unneeded alpha channel).
5. Go to Image>Mode>Grayscale, then Image>Mode>RGB Color. (You cannot convert directly to RGB Color from Lab color.)
6. If you like, you can still review the histogram in the Levels dialog box to ensure the tones are represented in the best way.

Going to Image>Adjustments>Desaturate is a quick way to convert a color image to black & white. However, it results in slightly more grain than the Lab Color method and produces slightly flatter results. It's still a useful operation, since you can apply the change to a layer (unlike with the Lab Color method).

Digital Handcoloring. With traditional handcoloring, it was sometimes difficult to accurately re-create the color that appeared in the original photograph. The areas of the photograph that could be changed were limited. For instance, the dark-gray areas of a black & white image could not be colored easily; the color would barely show through, if at all. With digital, however, the process of adding subtle or vibrant color to any area of a black & white image has never been easier. Like most tasks, handcoloring in Photoshop can be accomplished in several ways. The following are two common methods. Both are adapted from *Traditional Photographic Effects with Adobe Photoshop* by Michelle Perkins [Amherst Media, 2002]. Please consult this book for a more complete look at this topic.

Handcoloring your images can be done quickly and easily in Photoshop. One method for accomplishing this involves using layers, a method that allows you to precisely control the degree of color you add to your image and the placement of that color.



Digital handcoloring can add an elegant touch to a black & white image. Photograph by Rob Ledwedge.

1. Begin with an image in the RGB Color mode (Image>Mode>RGB Color). If you want to add handcolored effects to the *color* image, proceed to step 2. For the more traditional look of handcoloring on a black & white image, go to Image>Adjustments>Desaturate to create a black & white image in the RGB Color mode.
2. Create a new layer (Layer>New>Layer) and set it to the Color mode using the pull-down menu at the top of the Layers palette.
3. Double click on the foreground color swatch to activate the Color Picker. Select the color you want and hit OK to set it as the foreground color. This is the color your painting tools will apply. You may switch it as often as you like.
4. With your color selected, return to the new layer you created in your image. Click on this layer in the Layers palette to activate it, and make sure that it is set to the Color mode.
5. Select the Brush tool and whatever size/hardness brush you like, and begin painting. Because you have set the layer mode to Color, the color you apply with the brush will allow the detail of the underlying photo to show through.
6. If you're a little sloppy, use the Eraser tool (set to 100 percent in the Options menu) to remove the color from anywhere you didn't mean to put it. Using the Zoom tool to magnify these areas will help you work as precisely as possible.
7. If you want to add more than one color, you may wish to use more than one layer, all set to the Color mode.
8. When you've completed your "handcoloring," the image may be either completely or partially colored. With everything done, you can flatten the image and save it as you like.

Image desaturation can also be combined with layers to produce a hand-colored look in seconds—or, with a little refinement, to avoid having to select colors to handcolor with. This technique works only if you are starting with a color image.

1. Begin with a color image in the RGB Color or CMYK Color mode.
2. Duplicate the background layer by dragging it onto the duplication icon at the bottom of the Layers palette.
3. Desaturate the background copy by going to Image>Adjustments> Desaturate. The image will turn black & white, but by reducing the opacity of the desaturated layer you can allow the colors from the underlying photo to show through as much or as little as you like. Allowing a bit of color to show through creates a very nice look.
4. To add a few extra pops of color to the image, use the Eraser tool to reveal the underlying color photo. Adjust the opacity of the Eraser to allow as much color to show through as you like.

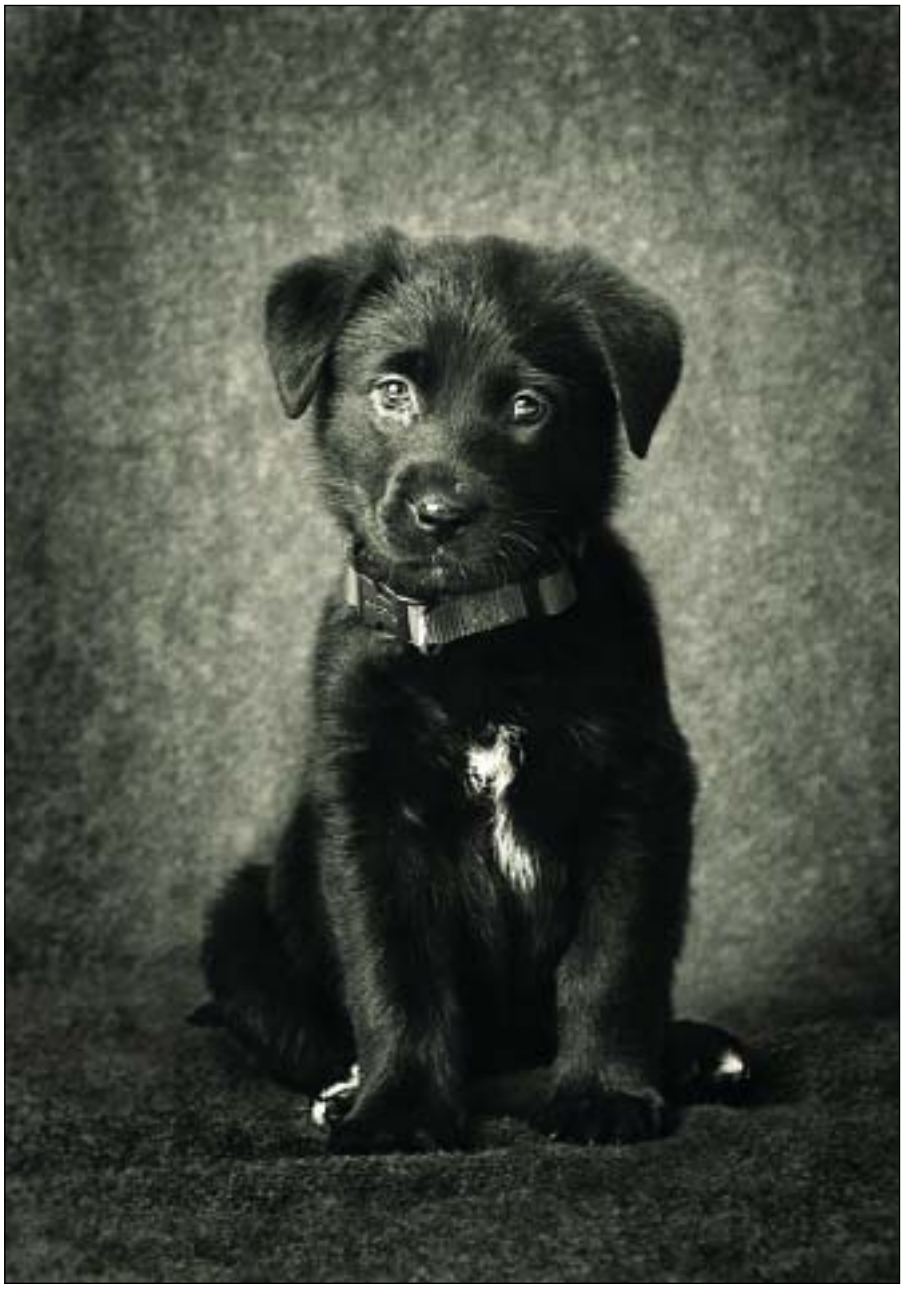
Toning Photographs. Sepia toning by traditional means produced beautiful images, but the process was anything but pleasant. I don't think I'll ever be able to erase the memory of the rotten-egg smell of the chemicals. This alone would prevent me from doing any traditional sepia toning or offering

Digital sepia toning produces a classic look that is much simpler to create than when using traditional methods and materials. Photograph by Dennis Orchard.

it to my clients. In fact, I experimented with other ways of achieving a brown tone in a black & white print. Most consumers can't tell the difference between a true sepia-tone print and any other print with a brown cast to it, so I typically made a pot of black coffee and filled a print tray with it. I then dropped my black & white images into the liquid and stained the entire print brown. Although I got away with "cheating," I knew that the images never looked like real sepia prints. The digital darkroom has changed this.

Photoshop allows you to use a sepia action, which is accessed via the actions palette, the Hue/Saturation feature, or a Photo Filter Adjustment Layer. With any of these techniques, sepia toning is both fast and efficient, and I believe the artistic digital black & white printmaker has even more creative control than he ever had in the past.

We have begun creating color-toned images for many of our portrait clients. In many of today's fashion magazines, you will see images that are monotone with a single "extreme" color. These striking and unusual photographs immediately grab your attention. I create this look by using my digital darkroom, Photoshop.



Toning is combined with vignetting (darkening at the edges of the image) in this charming portrait. Photograph by Drew Smith.

To begin, I open my black & white image in Photoshop, then go to Image>Adjustments>Curves. The default Channel setting is RGB. By clicking on the arrow to the right of the Channels field, you can access each of the three channels separately. By selecting the Red channel, for example, you can make adjustments to that individual channel. With the Red channel selected, you will achieve a red-toned image by pulling up on the curve; when the curve is bent downward, a cyan hue will be achieved. The degree of the toning is controlled by the amount that the curve is altered.

The following is another technique for making this conversion. It is excerpted from *Traditional Photographic Effects with Adobe Photoshop* by Michelle Perkins [Amherst Media, 2002].

1. Begin with a digital image in the RGB Color mode.
2. Open the Hue/Saturation dialog box (Image>Adjustments>Hue/Saturation). Click on the Colorize box and be sure to activate the Preview box as well.
3. Adjust the sliders to create whatever color (hue) and intensity of color (saturation) you like. Adjusting the lightness slider will adjust the overall lightness of the image, which you can also do as you see fit.
4. When you get the look you want, hit OK to apply the effect.

Toned images are popular with today's clients; they like the look, want to make a statement with their pictures, and want their photos to be unique. This toning technique allows us to give these clients an unusual product without having to shoot any differently—it's all done post-capture.

Photoshop Actions. Using actions is one of the easiest and most powerful ways to make your workflow more efficient. In the following section by photographer Michael Bell, we get a look at the basics.

Actions are a powerful tool in Photoshop, allowing you to "script" a series of changes to an image and replay these changes on any image at the touch of a button. This works well for tasks where you need to do the same thing to many images. In the example that follows, you'll see how I create and use an action to make a basic image adjustment, convert my JPEG-format captures to TIFF files, and save these files in a new folder. Why should you convert to the TIFF format? Resaving images as JPEGs means that you will be losing additional data due to compression each time you save. Remember, JPEG is a "lossy" compression scheme, meaning that to save as a JPEG, the computer compares the data in the file and determines what data can be "thrown away" to reduce the file size. Then, the computer will "make up" the missing data when the file is opened. Doing so once, you lose data. Doing so again means you lose more of the data the computer has already determined to be good data, when it "throws away" more data to compress the file. Therefore, once I open a JPEG, I do not resave the file as a JPEG unless I really have to. I do, of course, retain the original JPEG files in a separate folder so that I can always come back to them if I should need the original file again.

Actions are a powerful tool, allowing you to "script" a series of changes to an image.

Before creating this action, I go to Window>File Browser and rotate my images as needed. To do this yourself, select the thumbnail view for the desired image in the File Browser (if more than one needs to be rotated, just press the Shift key and click on as many files as you want). Then, hit Control + [to rotate the images to the left (counterclockwise) or Control +] to rotate the images to the right (clockwise). Photoshop only rotates the thumbnails until you open the files, then it opens and rotates the files. With this step complete, I close the File Browser.

The next step is to record the action. I go to the actions palette and select New Action from the pull-down menu at the top right of the palette. I name

the action and hit the record button (the round button) at the bottom of the palette. From this point on, any change I make will be recorded.

I prefer to record an action to do more than one thing. For example, I open one image, change the image size and resolution, and sometimes test the Auto Color or the Auto Levels (they don't always work, but in some cases they are close). Then I go to File>Save As and select the TIFF file format, and save the image into a new folder, not back into the JPEG folder.

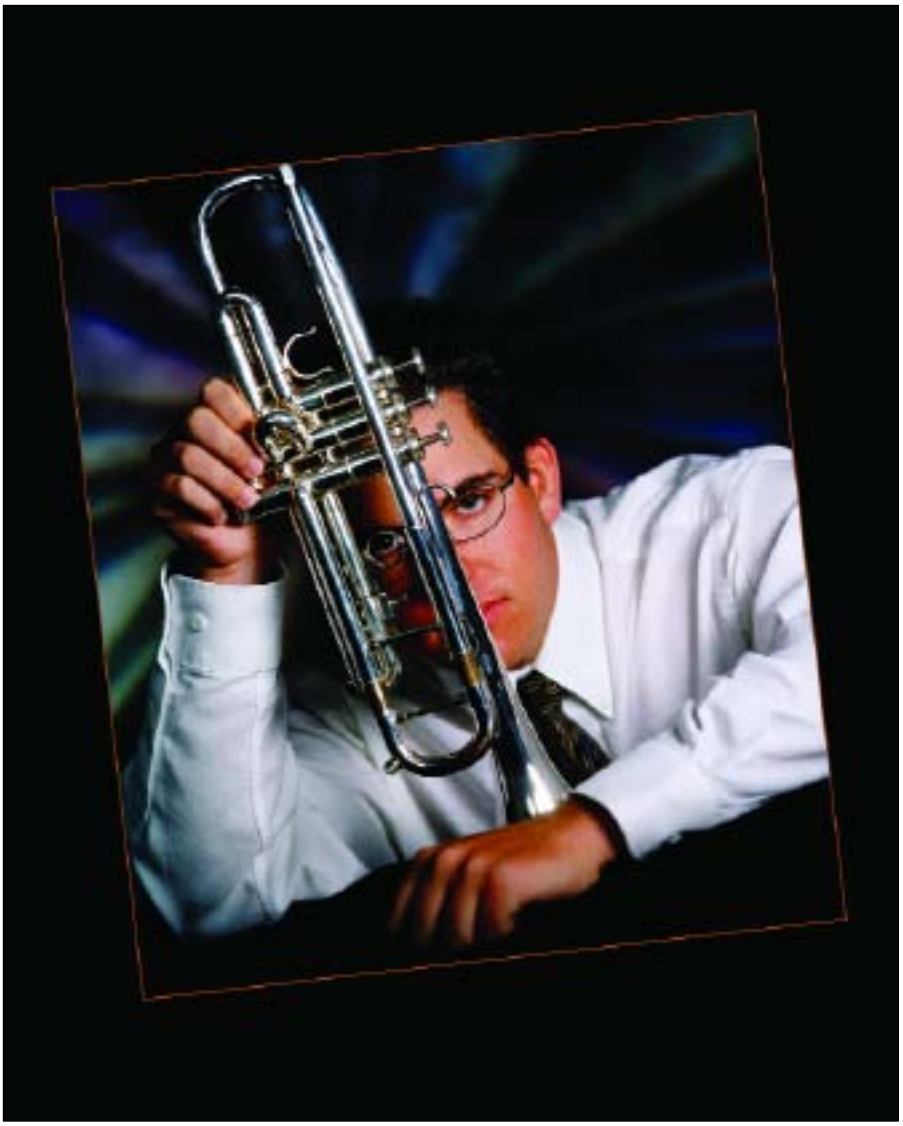
Having completed these steps, I close the image and then press the square button at the bottom of the actions palette to stop recording.

To play the action, I open another JPEG file, select the newly created action from the actions palette, and hit play (the triangular button). Photoshop will rotate the file as specified in the File Browser, and the action will adjust the file, save it as a TIFF, then close it.

Once the action is working, I go to File>Automate>Batch. With the following settings in place, this will cause Photoshop to open each of the images and apply the newly created action. At the top of the dialog box, I select my new action. Then I go to Source Folder, click on Choose, and point the way to the folder containing the JPEGs. For the Destination Folder, I click on Choose and point the way to the new folder where I want to store the resulting TIFF files. For file naming, I select Document Name + Extension and make sure Stop for Errors is selected. That's it—I just click OK, and I'm finished.

When you've completed the above steps on your own images, you can go out for a Coke. If the JPEG folder has fifty images, Photoshop will run all of them and then stop. There is nothing to limit you as to how many files you can open, unless you run out of RAM. Photoshop should still try to

By creating an action to apply the sepia-tone effect you like, you can ensure quick results that will always match from image to image. Photograph courtesy of Visualizations Photography.



Developing an efficient digital workflow allows you to spend your time where it counts: with clients and in the camera room! Photograph by James Williams.

open the files, even in this event, but it will be slow.

To make Photoshop run better, go to Edit>Preferences>Memory & Image Cache and set the Cache Levels to 4, unclick Use Cache for Histograms (this means that Photoshop will create histograms only when it needs them, not every time you open a file and use RAM). I set the percentage of RAM for Photoshop at 85 percent. If you do a lot of multitasking (with many programs open at once), then 85 percent is good; if you only run Photoshop and nothing else at the same time, you can set this up to 95 percent and speed up Photoshop.

You also should be logged on to Windows XP or Windows 2000 Professional as a Power User, not as the Administrator. When you are logged on as the Administrator, Windows loads a lot of behind-the-scenes programs the administrator usually needs, but those programs hog RAM and slow down both Windows and Photoshop.

Digital Workflow

Digital workflow includes all of the steps required in the photographic process—from capture, to enhancement, to output. Because most digital shooters handle the image storage, some digital retouching or color correction, and sometimes even output, workflow can seem a daunting task for beginners and pros alike. The following are some guidelines for implementing an efficient and effective digital workflow strategy that will allow you to free up some of your time for your first love, creating images.

Image Storage. Our studio employs very simple digital workflow procedures. Our images are written onto CF cards as they are captured. After the session, the uncorrected files are written to a CD or DVD (the files are stored exactly as they were captured in the camera). The CD or DVD is labeled with the subject's/client's name, the date, and the photographer's name. (We use a special marking pen designed specifically for writing on CDs that eliminates the possibility of the ink bleeding into the data and corrupting the files.)

STORAGE

A CD holds about 700MB of information.
A DVD holds about 4.7G of information.

In addition, we back up all of our image files by copying them to a removable hard drive. Using a removable drive is important because it can be moved from computer to computer. Many photographers I know even take their removable hard drive home at the end of the day; this way, if the files at the studio are lost due to theft, fire, or flooding, there is a safety net.

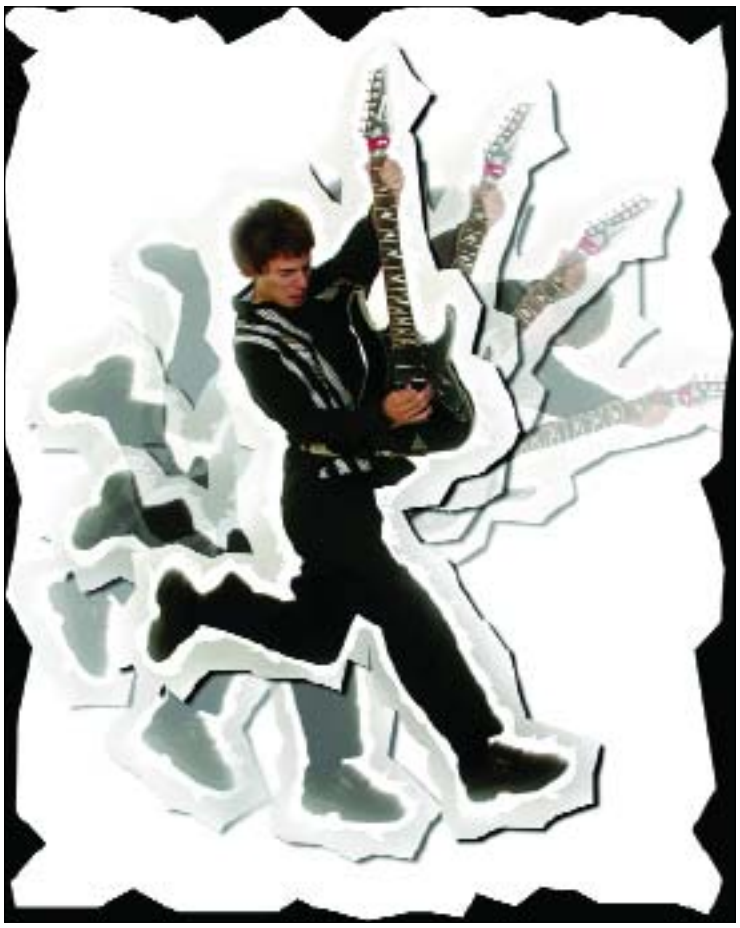
ADVANTAGES OF DIGITAL

The ability to create backup files when working digitally is a clear benefit. With film, the rolls could be lost or damaged in transit to the lab. The negatives could be lost or damaged once they arrived at the lab as well. Also, with film, the same negatives are used over and over throughout the process; while duplicate negatives can be made, at least some loss of quality inevitably results.

Proofing. *Slideshows.* To show our clients their images immediately after the session, we load the CF card into our card reader and open the images using Fuji StudioMaster Pro. This software allows us to quickly rotate every image, then show the client a slideshow of their entire session. We can even use this versatile software to compare images on the screen and help them choose the best shots. Their orders can be placed right on the spot. This saves us considerable time and money and helps to expedite the ordering process.

Paper Proofs. We only create paper proofs if the client is willing to pay a $250 deposit to take the photos out of the studio. To produce paper proofs, we open the unretouched images CD or DVD, make changes and corrections to the image files, and save them to a second disc. The original CD or DVD is never altered and never leaves the studio. The disc of retouched

With digital imaging, the only limit is your imagination. Photographs by Rob Ledwedge (left) and courtesy of LisaSmithStudios.com (right).



and/or corrected files is sent to the color lab, and the paper proofs are printed. When the proofs are delivered to the studio, the proofing CD or DVD is placed in the client file along with the unretouched image CD or DVD as a backup.

When orders are placed from the images, another CD or DVD is written with the changes and corrections made to the images. This third CD or DVD is sent to the lab and the necessary enlargements are printed. Once returned, this CD or DVD is also placed with the client file. We now have a permanent history of each image presented to the client.

At our studio, the computers used to work on the clients' image files are *not* hooked up to the Internet. This way, we never have to worry that a computer virus will damage or destroy irreplaceable client image files. Too many times photographers have found their images impacted by a computer virus or worm.

Retouching and Color Management. One of the biggest challenges digital photographers face is producing images that will reliably print correctly (in terms of their color and contrast) and feature a consistent look in terms of retouching.

Too often, photographers spend so much time in front of the computer (instead of behind the camera) that they essentially eat up all of their profits. Instead, consider delegating some image-editing tasks to a qualified member of your staff.

Consider delegating some image-editing tasks to a qualified member of your staff.

You should also strive to create a consistent, standardized method of post-processing so that the results achieved will be identical, regardless of who in your studio makes the adjustments. For instance, instead of allowing each image retoucher to apply a sepia effect in their own way, set up an action that all retouchers will use on all images to be presented in sepia. Not only will this provide consistent results, it will also expedite the retouching process.

Lab or In-House Printing? Digital output is probably the biggest area of concern for today's buyers of photography. As digital imaging evolved, two unique problems occurred with regard to digital output. First, many early digital cameras had too small a file size to make adequate quality enlargements. Both consumers and photographers were trying to enlarge digital images beyond the point of acceptability, resulting in pixelation. The second early problem with digital output was the quality of the printers that were available to both professionals and consumers. The inks on early inkjet printers were not true to the color in the scene, and the papers that the prints were created on did not last. In other words, the images might fade or shift colors over time. Digital output turned many people off to digital imaging.

Today, this is all changed. First of all, it is not necessary for the professional photographer to print any of his own digital images. Just about every professional color lab now accepts digital files and makes prints on Kodak or Fuji photographic paper. Moreover, these labs use the same machines, in many cases, to print either film or digital files. This is a very important selling point

Watch other photographers' work and look for ideas that will help you create more salable images for your clients. Photographs courtesy of Visualizations Photography (top left), Robert Williams (above), and Bob Kunesh.

when we discuss digital imaging with our clients. Some clients have the misunderstanding that their digital prints will not last. This is due in part to experiences with early inkjet prints and in part to misinformation from publications and photographers. Once our clients know that, whether their images are captured on film or digitally, the same Fuji Frontier Printer will generate their photographs and print them on the same Fuji Crystal Archive paper, they are much more comfortable with the fact that we are a digital studio.

Printing it Yourself. Many studios, including ours, use in-house printers for specific applications. When you calculate the cost of ink cartridges, paper, waste, and time, however, the prints that we make in-house cost more than sending the files to the lab for prints. In addition, professional color labs are more consistent in color and density than most photographers will be in-house. I have known several photographers who have attempted to print some of a bride and groom's 8x10-inch prints themselves on their inkjet printer, only to have the couple reject the images for lack of quality when compared to a lab print. As with any photographic print, the real test is when they are compared to another print from the same event that was printed on a different machine or paper.

There are a variety of printers available at a variety of price points. A few of these options are outlined below.

Inkjet Printers. New-generation inkjet printers are capable of making high-quality prints. Although I have met photographers who print their own 4x5-inch or 4x6-inch proofs on these printers, this is not a cost-effective option. Many of the larger discount and department stores can produce proofs from a Fuji Frontier Printer on Fuji Crystal Archive paper at a cost of about $.20 each with turnaround times from one hour to next day. Professional color labs have also become more competitively priced in the area of digital proofing. As a result, your color lab can produce your proofs for far less money than you can yourself.

In our studio, we have used the Epson line of printers for many years. The reproduction quality of their printers is very impressive, and the printers themselves just keep getting better. Sometimes a client needs an image "right now," and these printers are perfect in that application. Also, if we miss an image from an order, we can print the photograph ourselves rather than send the file back to the lab for an enlargement and hold up the production process. Every studio should have one of these inexpensive printers to help them out in similar situations.

Creating high-quality prints is critical to satisfying your clients. Photograph courtesy of LisaSmithStudios.com.

Dye-Sublimation Printers. Dye-sublimation (dye-sub) printers heat dry colorants to a gas state then transfer them to a paper where they solidify. The inks are topped with a coating that makes these images more archival than inkjet prints (of course, the improved appearance and durability of the prints come at a cost: both the printers and the inks they require cost more than an inkjet printer).

We use a small dye-sub printer to produce quick digital prints at wedding receptions. We select one digital image from the wedding day and print three copies of it, then place each print inside a folder with our studio logo imprinted on it. We then present these portrait miniatures to the bride and groom and each set of parents during the dinner. Their reaction is always one of amazement and appreciation. The images are passed around the room from guest to guest, which certainly helps us to secure future clients. Our cost is about $1 per print and $.50 per image—and the positive public relations value is certainly well worth the modest investment!

APPENDIX

PHOTOGRAPHIC EXAMS AND CERTIFICATION

You've read through all of the chapters of this book and now have a solid understanding of the basics of photography—from cameras and lenses, to composition, to lighting, exposure, and metering, to digital post-production and output. How can you take the next step in becoming a professional photographer?

There are literally hundreds of thousands, maybe even millions, of individuals who profess to be "professional" photographers. Completing the Professional Photographers of America's Certified Professional Photographer program helps you to stand out from your peers. PPA certification is the only nationally recognized credential for professional photographers. With recent changes to the program, PPA has set objective standards for job knowledge and performance that will enhance the program in both the eyes of consumers and of imaging professionals. Professional credentials are one of the few ways that the public can differentiate between photographers. Let's face it, photography is an unregulated industry. Anyone with a camera can claim to be a professional photographer. Buy a camera, get some business cards printed, maybe create a simple website—now you're a professional photographer. Certification helps to separate you from the masses.

Photographers benefit from the PPA Certification program both as a gauge of their professional competence and as a tool for marketing their services. Once you become PPA Certified, you'll receive promotional materials, as well as PPA Certified listings in both PPA's member directory and their "Find a Photographer" search engine.

The following text, available on the website http://certifiedphotographer.com at the time of this writing, describes the many benefits, in PPA's words, of earning your certification.

> Certification is the most common, well-known, and respected professional credential. Clients seek out credentialed professionals, and people recognize certification as a sign that you are an authority in your field. So it makes sense for you to be a Certified Professional Photographer to better market yourself to your clientele. Here are some specific ways certification can help you in your business.
>
> *Get Folks in the Door.* Before you can show a consumer your portfolio or sell them on your services, you have to get them into your studio. With hundreds, sometimes thousands, of photographers advertising in a market, this is not always an easy task. Advertising as a Certified Professional Photographer is one way to distinguish yourself from the masses. Certification gives clients a concrete business reason to put you on their short list. It's a third-party validation of your expertise, and that speaks volumes to clients about your skill.
>
> *Justify Your Prices.* The digital era has made it much easier for inexperienced part-time and fly-by-night photographers to throw their hat into the ring, undercutting professionals with rock-bottom

ABOUT PPA

The PPA is the world's largest not-for-profit association for professional photographers and boasts over 14,000 members worldwide. The association's goals include providing education and a sense of community, business discounts, and business and personal protection for photographers everwhere. For more information, visit www.ppa.com.

prices. Certification is an easy way to help consumers understand and appreciate your level of experience and talent.

Don't be afraid to explain to consumers how difficult it is to get this credential. You had to pass a very difficult written examination, and a scrutinizing panel evaluated your work. Additionally, let them know you have to recertify every five years. This ensures that Certified Professional Photographers are keeping their quality, skills, and knowledge up-to-date. Ask potential clients how much they really know about your competitor's work. If he turns out to be a bad photographer, a lot of time and money will have been wasted. In the long run, it's often cheaper to choose someone they know is qualified.

It's a Great Tiebreaker. It would be nice if every customer who looked at your work was immediately convinced to hire you, but that's not realistic. Consumers can be indecisive when all the photographers they've interviewed take beautiful shots, have similar prices, and seem like nice people. In many instances, certification can be a deal clincher. Most consumers aren't experts on photography, and they don't know how to select the most qualified photographer. So stack the deck in your favor by providing them with an expert opinion on your knowledge and skills. As a Certified Professional Photographer, you have passed a written photography exam and a panel of experts have reviewed your images and judged you qualified. Can your competition say that?

This site provides a wealth of information, including the certification application, exam dates and test specifications, image review guidelines, and more. You can learn more about membership in the Professional Photographers of America and read more about other topics of interest to photographers by visiting the association's website at www.ppa.com.

What's Involved?

There are three important steps you must take to become a PPA Certified Professional Photographer.

Application. First, you must fill out an application. Within three years of the date your application is filed, you must take the written exam and submit your images for review by a panel of judges. (At the time of this writing, there was a $100 fee required when filing the application for certification.)

Image Submission. Image reviews are held four times per year. The photographer must present twenty images for review by the certification panel. These twenty photographs must be compiled from twenty real job assignments, created within twenty four month's of the date of the image submission. No two assignments entered for image review may contain the same subject. Images must be submitted as prints or on DVD and should reflect in proportion the kind of work that is typically provided to clients. For more information on the specifics of presenting the images and other pertinent image review guidelines, go to http://certifiedphotographer.com.

Most consumers don't know how to select the most qualified photographer.

The Written Exam. PPA's written exam currently tests photographers' knowledge in six areas. Listed below are the fields of knowledge and the percentage of the test that is comprised of questions from that area of expertise. (*Test Information Disclaimer:* The information in this text is current as of the time of this writing. Changes with the PPA Certification exam and/or the exam process can happen at any meeting of the PPA Certification Committee.)

- camera, lenses, and attachments (15 percent)
- composition and design (17 percent)
- digital post-production (13 percent)
- exposure and meters (20 percent)
- film, digital capture, and output (15 percent)
- lighting (20 percent)

All PPA Certification written exams are now created specifically for the candidate. As a member of the PPA, you choose your photographic specialties to reflect the type of photography you perform. Your exam is prepared in advance, is preprinted with your name on the exam packet and answer sheet, and is sent to the proctor to be properly administered. Only PPA Certification

staff, committee members, and state liaisons can proctor the PPA Certification written exam.

The PPA follows a very strict guideline for the distribution and handling of the PPA Certification written exams. This exam packet is sent sealed from the PPA, and the seal is not broken until the candidate begins the exam in the presence of the proctor. No scrap paper is provided, so the candidate can write on the exam booklet itself. The answer sheet is scannable; therefore, the bubbles on the answer sheet must be completely filled in using a number 2 pencil. There is also an exam survey for the candidate to complete for feedback to the Certification Committee. At the completion of the exam, the candidate should place the exam booklet, answer sheet, and the survey back into the envelope. The proctor should then place the packet seal sticker on the envelope in the presence of the candidate.

The PPA follows strict guidelines for the distribution and handling of written exams.

The proctor must fill out a Certification Examination Report Form, which lists how many exams were sent, how many exams were returned, the date, the proctor's name and address, the number of examinees, the length of time the examinees needed to complete the exam, any additional comments, and the proctor's signature. The proctor should return all materials to the PPA in the enclosed Federal Express packaging.

Preparation

While some photographers have gone into the certification exam "cold turkey" and passed, I strongly advise against this approach. Even a little preparation will go a long way in helping you be successful. I passed the PPA Certification exam in 1988. Without formal training in photography and having been out of college for eight years, my approach was to read everything I could that I thought might be relevant to the exam. The test was a lot different (and more difficult) back then. There were several questions on the history of photography, view camera techniques, and both black & white and color processing. I remember purchasing a Calumet Combo view camera and learning how to use it just so I could complete the questions related to view cameras on the test. All of this has changed. Although the test is not perfect, the PPA Certification Committee has worked diligently to make the test more relevant for today's working professional photographer. In fact, I was serving on this committee the year we removed the history questions from the exam.

How to Approach a Multiple-Choice Test

Many individuals who take multiple-choice tests score lower than they should because they spend too much time on questions they find difficult, leaving insufficient time to complete the exam. Remember, you only have two hours to complete the test.

Don't be overwhelmed by questions that you can't answer. One trick is to follow this testing procedure.

1. Answer any easy questions immediately.
2. On your exam booklet, write a "+" sign next to any question that you think you can solve but will need to spend some time on.
3. On your exam booklet, write a "–" sign next to any question you do not feel you can answer.

After you have answered all of the questions you found easy, go back to those questions you designated with a "+" and begin working on them. If you finish all of them, attempt to answer the questions that you designated with a "–" sign. Sometimes these questions may seem impossible at first, but you may gain confidence in your answer later on.

Also, when you first read through the questions, cross out the answers that you are certain are not correct for those items you marked with a "+" or "–". This is commonly referred to as the elimination method of taking an exam. Even if you do not answer the question on the first read through, the elimination method will save you time when you come back to the question later on.

An instructor will frequently take a line from the curriculum textbook and change or add a word to completely change the meaning of a question. Often, for instance, the synonym of a familiar term may be used, and failing to understand the less-common term could result in confusion and incorrect answers. The main reason these questions are included is to catch the person who is merely memorizing information from a textbook.

Also, persons who have taken the test several times may glance at a question, not realizing it appears subtly different from previous tests, and may therefore incorrectly answer the question.

Errors of this kind are referred to as misreads. To avoid misreads, circle what it is that you must answer in a question. By looking at what was circled, you will be able to quickly understand the heart of the question and eliminate obviously incorrect answers.

I want to share just a couple of closing thoughts regarding taking multiple-choice tests to help you with the experience. Don't get stuck on one problem. Some examinees waste far too much time racking their brain on a particular question and then feel rushed to get through the rest of the exam. Know when to skip a question, and use the coding system described above to mark questions that will require more time. Being in a hurry will usually result in careless mistakes. When taking tests that have a test booklet and separate answer sheet, be certain you are filling in the bubble that corresponds with the question you are answering.

Once you have completed the exam, be sure that you have filled in a bubble for each question. If you are forced to guess, you have a 25 percent chance of getting the answer right. If you don't answer at all, you can be 100 percent certain to get that question wrong. Make sure that you did not mark two answers for any single question. If you erased an answer and changed your mind, be sure that you completely erase the unwanted answer. The computer that scans your answer sheet could read a partially filled-in bubble as an answer and will signify an incorrect response if more than one answer is detected.

Promoting Your Certification Credentials

Once you have met all of the requirements to receive your accreditation as a Certified Professional Photographer you will be sent an achievement certificate that is suitable for framing. You can purchase one of several frame options for your certificate directly from PPA (www.ppa.com/files/public/cert-frames.pdf) or can purchase a frame on your own. Either way, you need to make sure that this certificate is prominently displayed in your studio where your clients will see it. The personal satisfaction of achieving PPA Certification is certainly important, but you should promote this accomplishment to all clients.

You will also receive some 1-inch PPA Certification stickers, a window decal, and some PPA Certification brochures that you can provide to prospective clients. We apply the stickers to the corner of the letters we send to prospective clients and include the certification brochure in each mailing. The window decal is prominently displayed on our studio's door.

Most consumers don't know how to select the most qualified photographer.

There are other ways that you can let your customers know that you're certified. You can purchase a PPA Certification lapel pin from the association for a small fee (currently $15.00; we wear these pins on our tuxedo jackets when we photograph weddings) and can also sport a logo on your attire. PPA once offered polo shirts with the PPA Certification logo on them. As of this writing, they are no longer doing that, but that may change in the future. I have several of these polos and wear one to the studio when I go in to work. Even if these shirts are not available through the PPA, you can bring the logo to any custom embroidery shop so that it can be scanned and stitched onto a shirt or other item of your choosing.

AUTHOR AND CONTRIBUTORS

About the Author

Patrick Rice holds a Bachelors of Science Degree from Cleveland State University, the Professional Photographers of America (PPA) Master of Photography and Photographic Craftsman Degrees, as well as all five levels of Wedding and Portrait Photographers International (WPPI) Masters Degree. He holds the designation of Certified Professional Photographer from PPA and the Professional Photographers of Ohio (PPO) and has received the Advanced Medallion Award from the Ohio Certified Professional Photographers Commission. In 2000, he received the Honorary Accolade of Lifetime Photographic Excellence from WPPI. In addition, he was selected to receive the Photography Leadership Award from the International Photographic Council at the United Nations in New York City. In 2004, Patrick received the PPA National Award for service to professional photography. Patrick has presented programs at both the PPA and WPPI annual conventions and he has authored the following books: *Infrared Wedding Photography* (2000), *The Professional Photographer's Guide to Success in Print Competition* (2003), *Professional Digital Imaging for Wedding and Portrait Photographers* (2004), *Professional Techniques for Black & White Digital Photography* (2005), *Digital Infrared Photography* (2005), and *Digital Portrait Photography of Teens and Seniors* (2005), all from Amherst Media.

Contributors

Penney Adams—Penney graduated with honors from the Dawson Institute of Photography in Montreal, Canada, and has photographed families, weddings, and other events throughout the United States, Canada, and Italy. In addition to being the owner and operator of Adler House Photography, she has been honored to serve on the Board of Directors for PPO and the Professional Photographers of Central Ohio. As a member of PPO, Penney was honored to receive the Ohio Fuji Masterpiece Award twice.

Michael Ayers—The recipient of two Master of Photography degrees and the United Nations Leadership Award, Michael has made a career of giving back to the photographic industry. He has invented album designs and construction concepts, authored countless articles and books, and has lectured to more than 40,000 photographers worldwide. To view samples of his work, visit his website at www.TheAyers.com.

Michael Bell—Michael Bell received his Master of Photography and Photographic Craftsman degrees in 1998, and was the first photographer to receive both degrees simultaneously. He received his Certified Professional Photographer status from PPA. Mike has also achieved great success in print competition, with two of his prints having been accepted into PPA's Loan Collection. His work has been featured in *Rangefinder* and *Storytellers.*

Mark Bohland—Mark is a professional photographer from Mansfield, Ohio. He has earned his Certified Professional Photographer and Photographic Craftsman degrees from PPA and is only a couple of merits from receiving his Master of Photography degree from PPA. His award-winning images have been included in the PPA Loan Collection.

Lisa Farnholz—Lisa is a PPA Master Photographer and Certified Professional Photographer who specializes in children's photography. Her images have won numerous awards in PPA competitions and inclusion in the PPA Loan Collection.

Rick Ferro—Rick holds a Master of Photography and Photographic Craftsman degree from PPA and is one of the nation's leading wedding photographers. In 1993, Walt Disney World approached him to create a wedding photography department. Rick became senior wedding photographer—and Disney World became the world's most sought-after wedding destination. Rick went on to serve as a photographer for ABC's *Weddings of a Lifetime* and for weddings on *Live with Regis & Kathy Lee.* He is the author of *Wedding*

Photography: Creative Techniques for Lighting, Posing, and Marketing (3rd ed., 2005) and coauthor of *Wedding Photography with Adobe® Photoshop®* (2003), both from Amherst Media.

Richard Frumkin—Richard's professional photographic career began while he was in college. He was a staff photographer at the University of Cincinnati where he worked on the school newspaper and magazines. At the university, his study of photography helped him to secure assignments as a photojournalist with the Cincinnati *Enquirer*. Rick worked for several leading wedding photography studios before joining Rice Photography. Rick has won several awards for his images.

Bernard Gratz—Bernard owns Portraits by Bernard in Dover, Ohio. A professional photographer for over thirty years, he holds the Photographic Craftsman degree from PPA and has served as a councillor to that association. Bernard is a past president of the Akron Society of Professional Photographers, has served on PPO's board of trustees for more than twenty years, and is a past chairman of PPO.

Leonard Hill, Jr., PPA Cert., CPP—Leonard is an award-winning photographer from Zanesville, Ohio. He is actively involved in both the PPO and the Professional Photographers of Central Ohio. In addition to his photographic artistry, Leonard is an expert at website design; he designed the website for PPO as well as numerous sites for other professional phtographers.

Travis Hill—Travis holds PPA's Master of Photography and Photographic Craftsman degrees and was one of the association's youngest recipients of these honors. He also holds the Accolade of Lifetime Photographic Achievement from WPPI. He has earned the degree of Certified Professional Photographer from both PPA and PPO. He was a speaker at the PPA Annual Convention in 1999 and WPPI in 2003 and has lectured to audiences both large and small across the country. His images have been selected for inclusion in the PPA Loan book, PPA Gallery book, and the WPPI Annual editions. Travis is coauthor of *Infrared Wedding Photography* (2000), by Amherst Media.

Ken Holida—Ken is a professional portrait and wedding photographer from Willard, Ohio. He holds the designation of Certified Professional Photographer from both the PPO and PPA. He also holds the Master of Photography degree from PPA. Ken is very active in professional associations; he serves as a PPA Council Delegate from Ohio and is a Past President of PPO.

Jacob Jakuszeit—Jacob has been in love with photography for many years. This passion for imaging led him to Rice Photography, where he has worked as a wedding photographer for the past five years. Having photographed his first wedding solo at age sixteen, Jacob's images have earned him awards in many photographic competitions. His grasp of digital imaging and photojournalistic style make him a great image-maker.

Jesse Josleyn, Master Photographer, CR., M.E.I., C.P.P., A.S.P.—Jesse and his wife Patty own and operate a small studio in northwestern Indiana. They specialize in senior class photography, portraits, fine art prints, digital composites, and print restorations. To view samples of their work, you can visit their studio at JosleynPhotography.com.

Bob Knuff—Bob is a professional photographer with over forty years' experience in the industry. He holds the Master of Photography, Photographic Craftsman, and Certified Professional Photographer degrees from PPA. He has served on the board of trustees of PPO and has earned their Certified Professional Photographer degree. He has also served as president of the Triangle Professional Photographers Association.

Robert Kunesh—Robert is a retired graphic arts teacher (1961–1991) who began his professional photography career in 1967 as founder of Bob Kunesh Photography and later as cofounder of Studio K Photography in 1986. Now retired from the studio, he continues to work as a consultant, speaker, and freelance photographer. In his forty years as a professional photographer, he has earned the degrees of Master Photographer, Craftsman, and Master of Electronic Imaging. He has also achieved many awards, such as PPA's Photographer of the Year Award for 2004 and 2005. He has received the prestigious Kodak Gallery and Fuji Masterpiece Awards. His images have appeared in over twenty books and more than a dozen magazines.

Rob Ledwedge—Rob is a professional photographer and studio owner from Ohio whose work spans many genres. He makes his living photographing weddings, graduations, and other family milestones, but also enjoys architectural and fine-art photography. In 2004, his work was honored in a gallery exhibition at Tiffin University.

Chris Nelson—Chris is a professional photographer and studio owner who has shot everything from advertising, to weddings, to glamour. He holds a BA from the University of Wisconsin and has earned Accolades of Photographic Mastery and Outstanding Photographic Achievement from WPPI. His glamour images have earned merits from WPPI and PPA.

Dennis Orchard—Dennis is an award-winning photographer from Great Britain. He has been a speaker and an award winner at WPPI conventions and print competitions. He is a member of the British Guild of Portrait and Wedding Photographers.

Michelle Perkins—Michelle is a writer and digital photo retoucher specializing in wedding, portrait, and architectural imaging. She has written for *PC Photo* and is a regular contributor to *Rangefinder*. She is the author of *Beginner's Guide to*

Adobe® Photoshop® (3rd ed., 2006), *Color Correction and Enhancement with Adobe® Photoshop®* (2004), and *Professional Portrait Lighting: Techniques and Images from Master Photographers* (2006), all available from Amherst Media.

Barbara Rice—Barbara received her formal photographic education from the Rhode Island School of Photography and has gone on to earn numerous professional degrees, including PPA's Master of Photography and Photographic Craftsman degrees. She holds the Accolade of Lifetime Photographic Excellence and Honorary Accolade of Lifetime Photographic Excellence Degrees from WPPI. Her creative wedding albums have received the Fuji Masterpiece Award, and one was accepted into the PPA Loan Collection. Barbara is a coauthor of *Infrared Wedding Photography* (2000) by Amherst Media.

Charlene Rule—Charlene started her photography business at the age of eighteen by shooting her first wedding. Since then she has done almost every type of photography, from food, to commercial, to school, to fine art. She is a member of the Michiana Professional Photographers, Propfessional Photographers of Indiana, and vice president of the Photographer's Guild of Goshen. She has won eight Silver Star Awards, the William Lattimer Award, two Court of Gold Awards, and Third Place People's Choice, all since 2004.

Drew Smith—Drew is an award-winning professional photographer with over twenty years experience. He holds the designation of Certified Professional Photographer from the Professional Photographers of Ohio and his images have received numerous merits in PPA photographic competitions.

Lisa Smith—Lisa is an award-winning photographer and studio owner from San Diego, California. She is a member of the Digital Art Guild, San Diego; the La Jolla Art Association; PPA; and WPPI; and her photographs have appeared in numerous photography publications. For more information, visit her at her website at www.LisaSmithStudios.com.

Visualizations Photography, Inc.—In May of 1999, a dream became reality for Aaron and Joanna Patterson when they opened Visualizations Photography. The main focus of the business was portrait photography, and the studio placed an emphasis on capturing the expressions and moments that would be cherished for a lifetime. Since 2002, the couple has added Kent State University graduates Amanda Flavelle, Ashley Trainer, and Ryan Smas to their staff. Together, these five photographers have made Visualizations one of the largest all-digital portrait studios in Ohio. All of the studio's photographers are certified through the state of Ohio and are constantly challenging themselves with national and regional print competitions.

Edward Vullo—Edward Vullo's career in wedding photography began when he was stationed in Germany with the U.S. Air Force and members of his group asked him to photograph their wedding. Photography continued to be a hobby until he was encouraged by an established wedding photographer to start charging a fee for his developing abilities. Eventually, he took a chance and pursued wedding photography full time. He took on associates and was soon booking over 100 weddings a year. Today, Edward owns Foremost Photography, in Parma, Ohio.

James Williams—James is a professional photographer from Champion, Ohio, with over twenty years' experience. He has earned the designation of Certified Professional Photographer from both PPA and PPO. In addition, James is the recipient of the Accolade of Photographic Mastery degree from WPPI. He is active in several photographic associations and has served as president of SONOPP.

Robert Williams—Robert runs Robert Williams Photography in Tallmadge, Ohio. His portrait and wedding images have won several awards in local, state, and national competitions. He holds a Master of Photography degree from PPA. He has also earned the Certified Professional Photographer degree and Advanced Award Medallion from PPO. Robert is a past chairman of the Ohio Certified Professional Photographers Commission and a past president of PPO.

Debora Woodward—Deb is an award-winning photographer and studio owner from North Webster, Indiana. She opened her studio, Swan Shores, in 2004, after two decades of developing her skills as a photographer. Her passion is photographic artistry. She specializes in senior portraiture, weddings, and nature photography. She is a member of the Goshen Photographers Guild and of Professional Photographers of Indiana. Though new to the field of professional photography, Deb shoots 100 percent digitally, providing exciting artistic options to her quickly growing client base.

Anthony Zimcosky—Anthony (Tony) Zimcosky is a native of Cleveland, Ohio, who has worked at Rice Photography for over seventeen years. His work has won numerous awards in print competitions.

Monte Zucker—Monte is a world-famous photographer who has received every award the industry offers. In 2003, the United Nations honored him as Portrait Photographer of the Year. He has also received WPPI's Lifetime Achievement Award. He feels that his most special honor is the fact that his popularity with photographers of all ages is continually growing.

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