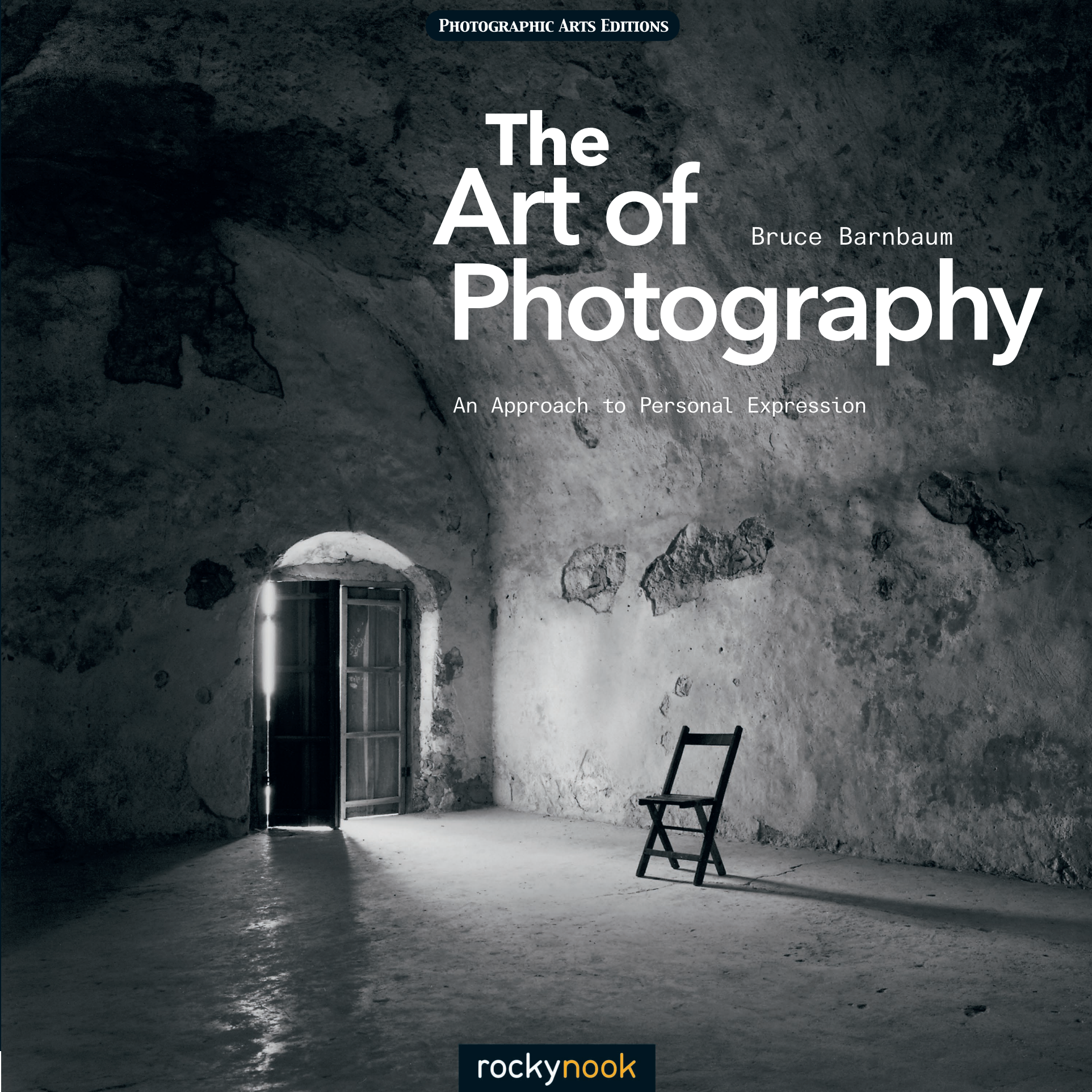
Photographic Arts Editions

The Art of Photography

Bruce Barnbaum

An Approach to Personal Expression



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PHOTOGRAPHIC ARTS EDITIONS

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This book is printed on acid-free paper.

To my mother and the memory of my father.
For as long as I can remember
they both encouraged me to teach.

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CHAPTER 1

Communication Through Photography

PHOTOGRAPHY IS A FORM of non-verbal communication. At its best, a photograph conveys a thought from one person, the photographer, to another, the viewer. In this respect, photography is similar to other forms of artistic, nonverbal communication such as painting, sculpture, and music. A Beethoven symphony says something to its listeners; a Rembrandt painting speaks to its viewers; a Michelangelo statue communicates with its admirers. Beethoven, Rembrandt, and Michelangelo are no longer available to explain the meaning behind their works, but their presence is unnecessary. Communication is achieved without them.

Photography can be equally communicative. To me, the word *photograph* has a far deeper meaning than it has in everyday usage. A true photograph possesses a universal quality that transcends immediate involvement with the subject or events of the photograph. I can look at portraits by Arnold Newman or Diane Arbus and feel as if I know the people photographed, even though I never met them. I can see landscapes by Ansel Adams, Edward Weston, or Paul Caponigro and feel the awesomeness of the mountain wall, the delicacy of the tiny flowers, or the mystery of the foggy forest, though I never stood where the tripods were placed. I can see a street photograph by Henri Cartier-Bresson and feel the elation of his "decisive moment", captured forever, though I was not beside him when it occurred. I can even see a tree by Jerry Uelsmann floating in space and feel the surrealistic tingle that surrounds the image. I can do this because the artist has successfully conveyed a message to me. The photograph says it all. Nothing else is needed.

◄ ***Figure 1–1: What Was ... What Is***
An ancient Western Red Cedar tree, thirteen feet in diameter, in the rainforest of Washington's North Cascade Mountains, cut down a century ago, has been replaced by dozens of tall, skinny trees, which together contain less wood (board feet) than the single cedar contained. None of the new trees are Western Red Cedars. There are no ferns, shrubs, or mosses on the ground, so the replaced forest can support no wildlife. Timber companies say, "there are more trees in America than ever before", and they're right; yet it is an utterly deceptive claim. It's a dead forest; a tree farm. The photograph, near my home, was designed to show the damage of industrial clearcutting, euphemistically called "harvesting". No other art form can make such a statement as powerfully as photography.

■ *Photography is a form of nonverbal communication.*

A meaningful photograph—a successful photograph—does one of several things. It allows, or forces, the viewer to see something that he has looked at many times without really seeing; it shows him something he has never previously encountered; or, it raises questions—perhaps ambiguous or unanswerable—that create mysteries, doubts, or uncertainties. In other words, it expands our vision and our thoughts. It extends our horizons. It evokes awe, wonder, amusement, compassion, horror, or any of a thousand responses. It sheds new light on our world, raises questions about our world, or creates its own world.

Beyond that, the inherent "realism" of a photograph—the very aspect that attracts millions of people to 35mm cameras and to everyday digital snapshooting—bestows a pertinence to photography that makes it stand apart from all other art forms. At the turn of the century, Lewis Hine bridged the gap between social justice and artistic photography with his studies of children in factories, and the work led directly to the enactment of humane child labor laws. In the 1930s and 1940s, Ansel Adams, Edward Weston, and a host of others raised public consciousness of the environment through their landscape photographs. A number of national parks, state parks, and designated wilderness areas were created based largely on the power of the photography. During the Depression years, Margaret Bourke-White, Walker Evans, Dorothea Lange, and others used their artistry to bring the Dust Bowl conditions home to the American public. Used well, photography can be the most pertinent of all art forms (figure 1–1).

To create a meaningful statement—a pertinent photograph—the photographer must gain an insight into the world (real or created) that goes far beyond the casual "once-over" given to items or events of lesser personal importance. The photographer must grow to deeply understand the world, its broad overall sweep and its subtle nuances. This intimate knowledge produces the insight required to photograph a subject at the most effective moment and in the most discerning manner, conveying the essence of its strength or the depth of its innermost meaning. This applies to all fields of photography.

How does a photographer proceed to create this meaningful statement and communicate emotion to others through photography? This is a complex question that has no clear answers, yet it is the critical question which every photographer of serious intent must ask and attempt to answer at each stage of his or her career.

I believe the answer to that question revolves around both personal and practical considerations. On the personal, internal side are two questions:

1. What are your interests?
2. How do you respond to your interests?

The second question points you in the direction of how you want to express yourself, and even how you want others to respond to your imagery. On the practical, external side are questions of design and composition, exposure, lighting, camera equipment, darkroom and digital techniques, presentation of the final photograph, and other related considerations that turn the concept into a reality.

We will start with the first of the two personal, internal questions. What are your interests? Only you can answer that question. But it is critically important to do so, for if you are to engage in meaningful photography you must concentrate your serious efforts on those areas of greatest interest to you. Not only that, but you must also concentrate on areas where you have strong personal opinions.

Allow me to explain my meaning by analogy. Did you ever try to say something worthwhile (in ordinary conversation) about any subject you found uninteresting, or about which you had no opinions? *It's impossible!* You have nothing to say because you have little interest in it. In general, that doesn't stop most people from talking. Just as people talk about things

of no real interest to them, they also take pictures of things that have no real interest to them, and the results are uniformly boring.

But let's go farther with this analogy. Take any great orator—say, Winston Churchill or Martin Luther King—and ask them to give an impassioned speech on quilting, for example. They couldn't do it! They'd have nothing to say. It isn't their topic, their passion. They need to be on their topic to display their greatest oratorical and persuasive skills. The great photographers know what interests them and what bores them. They also recognize their strengths and their weaknesses. They stick to their interests and their strengths. They may experiment regularly in other areas to enlarge their interest range and improve their weaknesses—and you should, too—but they do not confuse experimentation with incisive expression.

Weston did not photograph transient, split-second events; Newman did not photograph landscapes. Uelsmann does not photograph unfortunate members of our society; Arbus did not print multiple images for surrealistic effect. Each one concentrated on his or her areas of greatest interest and ability. It is possible that any one of them could do some fine work in another field, but it would probably not be as consistent or as powerful. They, and the other great photographers, have wisely worked within the limits of their greatest strengths.

Enthusiasm

The first thing to look for in determining your interests is enthusiasm. I cannot overemphasize the importance of enthusiasm. I once heard that three human ingredients will combine to produce success in any field of endeavor: enthusiasm, talent, and hard work, and that a person can be successful with only two of those attributes as long as one of the two is enthusiasm! I agree. Photographically, for me, enthusiasm manifests itself as an immediate emotional response to a scene. Essentially, if the scene excites me visually, I will photograph it (or at least, I will take a hard second look to see if it is worth photographing). It is purely subjective. This positive emotional response is extremely important to me. Without it, I have no spontaneity and my photographs are labored efforts. With it, photography becomes pure joy.

Enthusiasm also manifests itself as a desire to continue working even when you're tired. Your enthusiasm, your excitement, often overcomes your fatigue, allowing you to continue on effectively as fatigue melts away. On backpacking trips, I've often continued to photograph long after the others settled down at the end of the day simply because I was so stimulated by my surroundings. Once in 1976 on a Sierra Club trip, we finally arrived at our campsite after a long, difficult hike. Everyone was exhausted. But while dinner was cooking, I climbed a nearby ridge to see Mt. Clarence King (elevation 12,950 feet) in the late evening light. It was like a fugue of granite (figure 1–2). I called to the group below to come see this amazing mountain, but even without backpacks or camera equipment, none did. I was the only one to see that sight!

■ *I've worked in the darkroom until 3, 4, or 5 a.m. These are not things you do for money, but for love.*

Likewise, I've worked in the darkroom until 3, 4, or 5 a.m. on new imagery because the next negative looked like it had great possibilities and I wanted to see if I could get a great print. In essence, I just couldn't wait until tomorrow to work on it. These are not things you do for money, but for love.

In the field, if I don't feel an immediate response to a scene, I look for something else. I never force myself to shoot just for the sake of shooting or to break an impasse. Some photographers advocate shooting something, anything, just to get you moving under those circumstances. That's pure nonsense. Why waste time on useless junk when you know in advance that it's useless junk? Snapping the shutter or pressing the cable release is not an athletic act, so I don't have to warm up doing it, and you shouldn't either.

▲ ***Figure 1–2:***
Mt. Clarence King
This grand crescendo of granite rises lyrically as evening light brings out each ridge, each buttress. I used a red filter to cut through any haze (though no haze was apparent), and to enhance the clouds by darkening the blue sky.

But once I get that spurt of adrenalin, I work hard to find the best camera position, use the most appropriate lens, choose filters for optimum effect, take light meter readings, and expose the image with great care using the optimum aperture and shutter speed. All of these things are important and require thought and effort. The initial response is spontaneous, but the effort that follows is not!

I believe this approach is valid for photographers at any level of expertise, from beginners to the most advanced. When you find something of importance, it will be apparent. It will be compelling. You will feel it instantly! You won't have to ask yourself if it interests you, or if you are enthusiastic about photographing it. If you don't feel that spontaneous motivation, you will have no desire to communicate what you feel. (I think the prime motivation for most snapshots is either the knowledge that someone else wants you to take the picture, or your own desire to take it to show where you have been. Neither of these motivations are concerned with personal

interpretation or with personal expression, and neither have that internally compelling aspect.)

It has long struck me that people who attempt creative work of any type—scientific, artistic, or otherwise—without feeling any enthusiasm for that work have no chance at success. Enthusiasm is not something you can create. Either you have it or you don't! True enough, you can grow more interested and enthusiastic about something, but you can't really force that to happen, either. If you have no enthusiasm for an endeavor, drop it and try something else. If you are enthusiastic, pursue it! Just be honest with yourself when you evaluate your level of enthusiasm.

Ask what you are drawn to, what intrigues you. Most likely you will take your best photographs in the fields that interest you when you have no camera in hand. If you are deeply interested in people—to the point of wanting to know them thoroughly, what really makes them tick—it's likely that portraiture will be your best area. If you want to know more about people than their façades, it would follow that, with camera in hand, you will dig deeper and uncover the "real" person.

Are you excited by passing events, or by action-filled events, such as sports? Are you fascinated by the corner auto accident, the nearby fire, the dignitary passing through town today? If so, you may be inclined to photojournalism or "street photography." The latter term encompasses a wide cross section of candid photography that was elevated to an art form by Henri Cartier-Bresson, Weegee, and others. The approach differs greatly from formal portraits in that the subject matter is usually unrehearsed and often unexpected. This type of photography (which is certainly a form of documentary photography at its best) is geared to those who seek the unexpected and transitory.

Consider a further aspect of this pursuit: the most incisive efforts in this realm often don't concentrate on the event per se, but rather on the event's effect on the observers or participants. In many cases, emphasis on human reaction and interaction reveals more about human nature—and about our world—than the occurrence itself. Straight photojournalism is all too often involved with the event, and only on rare occasions rises to the insightful commentary that transcends mere recording to become true art.

Are you stimulated by pure design, or by color arrangements? Perhaps abstraction is suited for you. Brett Weston was a prime example of a classically oriented photographer using the "straight silver print" and abstraction applied to almost any subject matter. Experimental pursuits such as multiple exposures, photomontage, double- and multiple- printing, solarization, non-silver methods, the nearly infinite digital opportunities for subtle or radical manipulations, and any other conceivable approach is fair game in this realm. The only restraint is your lack of imagination or your unwillingness to experiment.

■ *It has long struck me that people who attempt creative work of any type without feeling any enthusiasm for that work have no chance at success.*

Perhaps your interests lie elsewhere. Analyze them. If you cannot define your interests, try your hand at a number of these alternatives and see which appeal to you most and which least.

I have evaluated my interests, and it may prove instructive to see what I have found. Today I photograph a wide variety of subjects, but I started from a more limited base. Initially nature was my sole interest. Slowly my interests grew to include architectural subjects and then branched out widely within both of those broad subject areas, while making forays into other areas. As Frederick Sommer once said, "Subject matter is subject that matters!" I realized that there was no reason to limit myself unnecessarily.

My initial interest in nature was all-inclusive. I was (and still am) drawn to trees, mountains, open fields, pounding rivers, tiny dewdrops at sunrise, and millions of other natural phenomena. I am fascinated by weather patterns and the violence of storms, the interaction of weather with landforms, and the serenity of undisturbed calm. Geology excites me, and I feel awed by the forces that create mountains and canyons.

◀ ***Figure 1–3: Ghost Aspen Forest***
Soft, hazy sunlight made this photograph possible. Bright sun would have been too harsh for the delicate tones I sought. The bleached branch at the lower right maintains the lines and movement of the diagonal trees. The rippled reflections were more interesting to me than a mirror reflection would have been because they reflect only the vertical trees, not the diagonals.

All of these phenomena appear in my photographs along with my interpretations, my awe, my excitement. Without a camera I would still exult in them. With a camera I can convey my thoughts about them. Then others can respond to my thoughts, my interpretations, my excitement.

In 1976, near Yosemite National Park, I came across a grove of aspen trees killed by flooding from a beaver dam. The pattern of dead trees was remarkable, but the bright sunlight was too harsh to allow a photograph. However, my observations of cloud patterns that day indicated to me that a storm was coming within a day or two, and if I could return the next day I could obtain a photograph under hazy sun or soft, overcast lighting. As expected, by noon the next day a layer of thin clouds—the immediate precursor of the storm—softened the light and I made my exposure. My interest in weather helped me make the photograph (figure 1–3).

A strange-looking landscape and my interest in natural history drew me to take a series of short hikes—once or twice a day—in late 1978 and early 1979 through an extensive area of the Santa Monica Mountains in southern California that had been burned by a chaparral fire. Starting two weeks after the fire, my walks took me to unusual vistas, through the velvety blackness of mountains and valleys, and, in time, through the spectacle of rebirth as the region burst into life again (figure 1–4). I chose ten of the photographs made during that four-month period for a limited edition portfolio titled "Aftermath". The photography ended up as a major project, but it began as a sideline to my interest in the natural history of the region under special conditions.

In 1978, I began photographing a fascinating set of narrow, winding sandstone canyons in northern Arizona and southern Utah, the slit canyons, and my lifelong interest and educational background in mathematics and physics has greatly colored my interpretation of them. I view their sweeping curves as those of galaxies and other celestial bodies in the process of formation. The lines and the interactions of forms strike me as visual representations of gravitational and electromagnetic lines of force that pull the dust and gases of space together to form planets, stars, and entire galaxies, or the subatomic forces that hold atoms and nuclei together. To me, a

► ***Figure 1–4: Raccoon Tracks***
The cracked mud of a drying streambed held the paw prints of a raccoon, the first sign of life I saw in the burned landscape, bringing tears to my eyes. It was a joyous indication that some of the local residents had survived the fire.

walk through those canyons is a walk through billions of years of evolving space-time, and I have tried to convey that vision through my photographs (figure 1–5).

Over time, I recognized that many of the same facets of nature that intrigue me are also present in architecture. Architecture can be awesome and uplifting; it can supply fascinating abstractions and marvelous lines and patterns. It often can be photographed without the need for supplementary lighting, and in that respect it is much like nature and landscape photography. Turning my attention to manmade structures was an inevitable expansion of my interests.

After ten years of commissions in commercial architectural photography, my first major effort at architectural subjects for my own interpretation came in 1980 and 1981: the cathedrals of England. Prior to my first cathedral encounter, I would have had an aversion to photographing religious structures; it's just not my bag. But upon seeing them for the first time, I was awestruck by their grandeur. My deep love of classical music crystallized my interpretation of their architectural forms as music—as harmonies and counterpoints, rhythms and melodies—captured in stone. I also saw the architecture in mathematical terms, as allegories on infinity, where nearby columns and vaults framed distant ones, which in turn framed still more distant ones in a seemingly endless array. I altered my flexible itinerary to see as many cathedrals as I could during my two-week visit, then returned in 1981 for five more weeks of exploring, photographing, and exulting in these magnificent monuments of civilization (figure 1–6).

As time went by, my interest in architecture—specifically, in large commercial buildings—led to a continuing study of downtown areas in major cities. This series, too, draws on my mathematical background, for I am drawn to the geometrical relationships among the buildings and the confusion of space caused by the visual interactions of several buildings at once. I find this aspect of my urban studies appealing (figure 1–7).

But my response to modern urban structures has another side, too. Unlike my positive reaction to cathedral architecture, I dislike the architecture of all but a very few commercial buildings. They are cold, austere, impersonal, and basically ugly. I feel that these giant downtown filing cabinets are built for function with little thought given to aesthetics. To me, they are the corporate world's strongest statement of its disinterest in humanity and its outright contempt of nature. I have attempted to convey those feelings through my compositions of their stark geometries.

Over the years, my work has grown increasingly abstract. It has become bolder and more subtle at the same time: bolder in form, more subtle in technique. My subject matter will likely expand in the future; I will look further into those

▲ ***Figure 1–5: Hollows and Points, Peach Canyon***
I see the gracefully sweeping lines of the slit canyons as metaphors of cosmic forces made visible, as if we could see gravitational or electromagnetic lines of force. If we could see those forces between heavenly bodies (stars, galaxies, planets, etc.), rather than seeing the heavenly bodies themselves, they may well look like this. I feel that this photograph contains particularly elegant and enigmatic examples of this effect, with sculptured lines so lyrical that it would make a Michelangelo or Henry Moore jealous with envy.

► ***Figure 1–6: Nave From North Choir Aisle, Ely Cathedral***
A series of compound columns, arches, and vaults frame the distant portions of the cathedral, with still more arches and columns, indicating even more around the bend. Indeed there are more. The unity of forms amidst the complexity of the architecture is a vivid example of Goethe's statement that, "Architecture is frozen music". This is also an example of positive/negative space in which the nearby columns and archways form the positive space, and the distant nave the negative space.

◀ ***Figure 1–7: Chicago, 1986***
Seven different modern skyscrapers huddle together in downtown Chicago, creating interesting interactions within the geometric sterility of each. Somehow these giant urban file cabinets can become visually interesting when viewed in relation to one another.

subjects that I looked at in the past, bringing out new insights that I missed the first time. Such growth and change is necessary for any artist, or stagnation and artistic senility set in.

I have come to recognize a very surprising fact: subject matter ultimately becomes secondary to the artist's seeing, vision, and overall philosophy of life and of photography. There is a one-to-one equality between the artist and his art. A photographer's way of seeing is a reflection of his entire life's attitude, no matter what the subject matter may be. Only Edward Weston could have made Edward Weston's photographs; only W. Eugene Smith could have made W. Eugene Smith's photographs; etc. This is true because each great photographer has a unique way of seeing that is consistent throughout the artist's entire body of work.

It would be of value to you as a serious photographer to delve into the question of why your interests lie where they do, and why they may be changing. Such evaluation is part of getting to know yourself better and understanding your interests more fully. It's part of successful communication. Start with your areas of highest interest and stick with them. Don't worry about being too narrow or about expanding. You will expand to other areas when you are compelled internally to do so—when something inside you forces you to make a particular photograph that is so very different from all your others.

Judging Your Own Personal Response

The second of the two personal considerations is more difficult. How do you respond to your interests and how do you wish to convey your thoughts photographically? This is a more deeply personal question than "What interests you?" It requires not only knowing *what* interests you, but also just *how* it affects you.

In the examples of my own work just discussed, I attempted to express a bit of this second consideration. The slit canyons interested me in a very specific way—as cosmic analogies, or as analogies to force fields—and my imagery is based on conveying that impression to others. Similarly, the cathedrals struck me as grand, musical, and infinite in their marvelous forms. Again, I tried to emphasize those qualities in my imagery. I did not simply conclude, "These things are interesting!" and begin to shoot, but rather I responded to the specific ways that I found them to be interesting. I approached them

in an effort to express my strongest feelings about them photographically.

The next time you are photographing, think about your reaction to the subject. Are you trying to make a flattering portrait of someone you find unattractive or downright ugly? Unless you are taking a typical studio portrait (the "tilt your head and smile" type) you would do well to follow your own instincts. Does the subject strike you as cunning? If so, bring out that aspect. Is he or she sensitive and appealing to you? If so, try to show it in your portrait. Is the outdoor market colorful and carnival-like or is it filthy and disgusting? Emphasize the aspect that strikes you most strongly. Don't try to bring out what others expect or want; emphasize *your* point of view! You may upset a few people initially, but soon they will begin to recognize the honesty as well as the strength and conviction of your imagery. But in order to do that, you first have to determine what your point of view actually is. It is not always easy to do so, because you may be struck by conflicting impressions, but it is essential to recognize such conflicts and choose the impression that is strongest.

A hypothetical example may be valuable. As I wander through the canyons of the Kings River in Kings Canyon National Park, I am awed by the towering granite cliffs and pounding cascades. Yet I am also struck by the softness and serenity of the grassy meadows and sun-streaked forests.

If I were to make just one photograph of the area, I would choose the aspect I wished to accentuate: its overall awesomeness or its more detailed serenity. I doubt that I could successfully convey both in one photograph. Am I more strongly drawn to the spectacular or the serene? I would study the cliffs and cascades to determine if they truly are as spectacular as I first perceived them to be. And are the forests and meadows as serene? Am I looking for the spectacular, let's say, and straining to find an example when none actually exists? In other words, am I stretching too far for a photograph? I must make proper assessments of these questions in order to produce a meaningful image that can communicate my feelings.

As soon as I determine *what* I am responding to most strongly, and *how* I am responding, I must concentrate on emphasizing all the elements that strengthen that response, while eliminating (or minimizing) all those that weaken it. Basically, I am responding to the mood the scene evokes in me, and I must determine how I wish to convey that mood through my photography. The feeling my photograph evokes is my editorial comment on the scene. If the response is what I intended, I have communicated my thoughts successfully. If the response is the opposite of my intent, I may be disappointed but subsequently come to feel that the interpretation has some validity. It may even open up new insights to me. However, if my photograph evokes nothing in others, I have failed miserably.

■ *As soon as I determine what I am responding to most strongly, and how I am responding, I must concentrate on emphasizing all the elements that strengthen that response, while eliminating those that weaken it.*

In the future, I may look at the same scene and work toward conveying a different thought. Why? Because of changes in my own perception as time goes by. My interpretation will change. My "seeing" will be different. My goals will be different.

You, too, will doubtless change over time, as will your approach to photography. But if you are like me, you will find that these changes will not invalidate your successful earlier efforts. A fine photograph will survive the test of time. Beethoven would not have written his first, second, or third symphonies in the same manner *after* completing the final six, but that does not invalidate the earlier scores.

Though your perceptions will change, it is of utmost importance to be in touch with them at all times. Your perceptions and your internal reactions set the direction for your photography, your visual commentary. Get yourself in tune with those reactions. In other words, get to know yourself. But one word of caution: don't analyze yourself to death. There is a reasonable limit to introspection. Before getting hung up on it, start communicating by making some photographs.

Successful communication of your message is the essence of creative photography. Reporting the scene is shirking your responsibility; interpreting the scene is accepting the challenge. Though the scene may or may not be your creation, the photograph always is! So don't just stop with the things you saw; add your comments, feelings, and opinions. Put them all into the photograph. Express your point of view. Argue for your position. Convince the viewer of the validity of your conclusions.

Understand what you want to say!
Understand how you want to say it!
Then say it without compromise!
Now you are thinking in terms of creative photography!

■ *Most artists are not so much searching for the truth, but searching for a proper method of expressing the truth as they see it.*

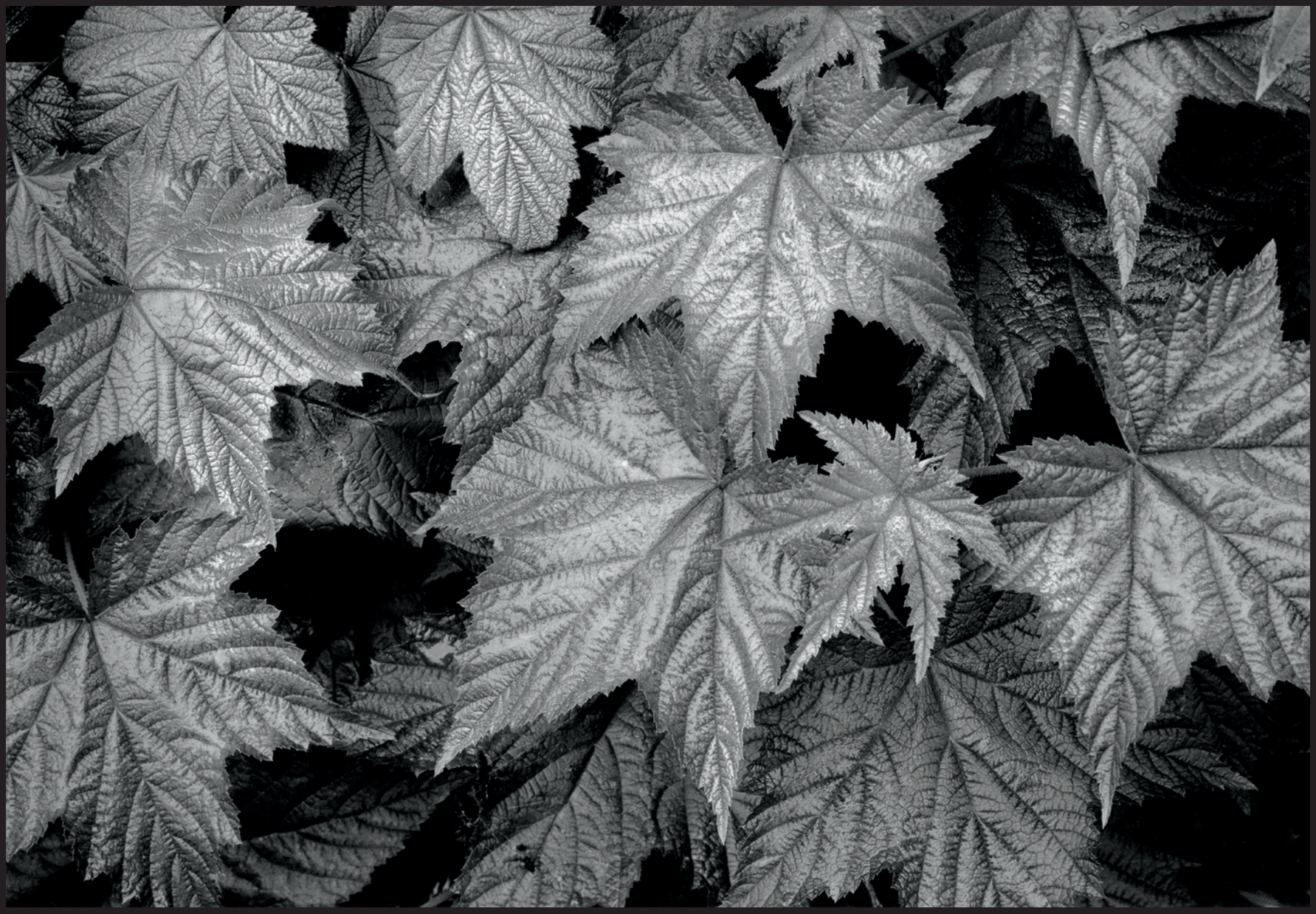
Of course there are those who will say that an artist is searching for the truth, and it is foolish to be so adamantly positive about your approach. There is some validity to this objection, but in general, I think the idea of "searching for the truth" is a highly romanticized notion. I believe that each artist, like everyone else, has strong views about the world: what it is, what it should be, and how it could be improved. As such, I think that most artists are not so much searching for the truth, but searching for a proper method of expressing the truth *as they see it*. It should be manifestly obvious that Lewis Hine was not searching for the truth, but *revealing* the grim truth of conditions in factories employing child labor. Similarly, Ansel Adams was not searching for the truth in his nature photography, but expressing the truth about the beauty and grandeur of nature as he saw it.

The list can go on and on, but the point should be clear. Even if we go back in time long before the start of photography, we see similar examples of artists expressing the truth rather than searching for it. Michelangelo depicted prominent local officials as being cast into Hell in some of his famous murals, a bold comment for which he suffered mightily. Other prominent artists, composers, and writers have been equally bold in their truthful statements.

Beyond that, there is no such thing in our complex world as "the truth," but rather many, many truths, some of which conflict with others, and some of which contradict others. Thus the truth is elusive at best, and nonexistent at worst. Each of the subjects I have photographed, for example, has revealed different aspects of the world that I have found worthy of commentary. If my photographs have not revealed the truth, at least they have attempted to express my point of view about each of those subjects. I can only hope they provide interest, meaning, and insight to others.

◄ ***Figure 1–8: Grass and Juniper Wood***

Blue grama grass, rarely more the five inches tall, grows on the near-desert soils of Utah, usually with a crescent-shaped tuft at the top. I found this one with a full ringlet. As high winds shook it wildly, I pulled it up for later photography. Within a few steps I found a small piece of juniper wood with a cleft, to serve as a pedestal for the grass. I knew exactly what I wanted to do with these objects. Two days later, when the wind died down, I stacked two ice chests in front of my truck where I was camping, put the grass in the wood cleft, placed it atop the ice chest, and focused my 4 × 5 camera. I then laid the black side of my focusing cloth on the hood of the truck, hanging down over the grill to serve as the background.



CHAPTER 2

What is Composition?

BEFORE MOVING ON, it would be worthwhile to study your photographs slowly while considering the questions posed in the first chapter, in order to better evaluate your own work. I feel that such an evaluation is extremely valuable and should be done periodically. Assuming that you have already done so, questions arise as to the most effective methods of conveying your thoughts photographically. The most effective technique, it turns out, varies from scene to scene and from artist to artist. No overall rule can be made. Indeed, art is devoid of rules.

One statement can be made concerning any artistic effort: it must possess good composition. Whether the subject is a fine portrait, a panoramic landscape, a slum alley, a studio tabletop arrangement, or anything else, only with good composition will it achieve meaning and importance. (In fact, this can be extended to all other art forms, including visual and nonvisual forms. After all, even music requires good composition!)

But, you may ask, what is good composition? What, in fact, is composition? The term is constantly used, seldom defined or discussed, rarely understood, yet never questioned. Try to define *composition,* and you will see how difficult it is.

My dictionary defines it as "an arrangement of the parts of a work of art so as to form a unified, harmonious whole". This is an excellent beginning. "A unified, harmonious whole." That is the key phrase. If photography is your means of self-expression, then composition must be the vehicle with which you express yourself clearly, concisely, and smoothly. Composition is the means of bringing viewers into your photograph and holding their attention long enough to read your commentary and define their own feelings.

◀ **Figure 2–1: Leaves, Big 4 Mountain Trail, Washington**
Trailside leaves produce a rhythmic mix of metallic forms, interspersed with deep black holes (the spaces between the leaves) that have interesting shapes themselves, serving as negative space to the positive space of the leaves. There is no center of interest. Rather, there is a pattern, keeping the eye moving within the image.

► ***Figure 2–2: Oak Tree, Sapelo Island***
The immense oak tree is clearly the center of interest. Background trees form a rhythmic counterpoint.

We will delve into the dictionary definition more deeply, but first we need a short physiological description of the human visual process in order to apply the definition to photography.

How the Human Eye Sees

The eye does not see whole vistas at once. It views the world in small chunks, then puts the pieces together to form the complete picture. The angle of sharp vision is extremely small, only about three radial degrees. To see for yourself what this means, try the following: Hold your arm straight out with your hand bent upward and your fingers spread (as if your palm were held against a wall in front of you). You are looking at the back of your hand at arm's length. Now, look at your thumbnail. As you do so, you will see that your little finger is out of focus! You will have to move your eyes in order to see your little finger sharply. Yet it is not very far from your thumb, even with your fingers spread. In fact, all of your other fingers are out of focus as well, indicating the limits of sharp vision.

With the eye able to see only small bits sharply at any moment, it must move about speedily to view the entire scene. It does not do so in an organized fashion like a TV scanner.

◄ ***Figure 2–3: Trees in Fog, Cambria***
The subject here is fog. The distant treetop barely seen in the lower left corner of the image becomes the surprise of the image. Without it, the tree trunks in fog would still have an appealing rhythm, but the surprise makes the image more interesting.

Instead, it darts about randomly, up and down, side to side, picking out bits and pieces here and there, and sending these tidbits back to the brain at a furious pace. The brain processes this random data and puts it all together, like a mosaic or a jigsaw puzzle. While studying the scene the eye stops momentarily at prominent objects and sees them with real clarity, filling in the rest in a rather fuzzy manner. Thus, the eye does not perceive the whole scene with uniform sharpness or interest.

We all see this way. Researchers have proven it and confirmed it more than once. It is a physiological fact. You can't fight it!

With this in mind, let's return to the discussion of composition and define it as follows: *Good composition is the artist's way of directing the viewer's vision in a planned, de-randomized fashion.*

When a photograph is well composed, viewers first see the elements that the artist wants them to see most prominently and remember longest. Next, they notice the elements of secondary importance, and finally the elements of subordinate interest. With good composition, the artist leads viewers through the photograph in a controlled manner. There is nothing haphazard about seeing a photograph. Composition

■ *With good composition the artist leads the viewer through the photograph in a controlled manner.*

is the artist's way of bringing order into a non-ordered world. In essence, this is what the dictionary definition calls for.

This definition helps explain why a magnificent scene often fails to translate into a fine photograph. The scene may be quite complex. The eye accepts this, darting about and selecting the most important bits of information, then filling in the rest. But a photograph or any other work of visual art must organize that information. If it fails to do so, the viewer's eye roams about aimlessly, unable to find the artist's statement because there is none. The scene has not been *composed,* but merely *selected*. The photograph is not a work of art, but merely a recording of the scene with one critical defect: it lacks the *presence* of the real scene.

There is a very real difference between "seeing" and "photographic seeing". An individual may recognize and appreciate an interesting scene, but may not be able to organize it into an effective photograph. Only those individuals who can create a worthwhile image out of a scene can be said to "see photographically". Understanding composition and applying it separates the artists from the snapshooters.

There are two aspects of good composition that are of prime importance. The concept of a *unified thought* is one; *simplicity* is the other. The two are strongly interrelated.

Unified Thought

The term "unified thought" comes from the dictionary definition of composition referred to earlier as "a unified, harmonious whole". It means that all the elements of the photograph work together, i.e., a central concept underlies the photograph. This concept often translates to the somewhat narrower concept of a center of interest. Let me differentiate between a center of interest and a unified thought through the use of two examples (figures 2–2 and 2–3).

The first photograph shows a spreading tree at the edge of an open field (figure 2–2). An effective photograph of this old giant could have been made by isolating it against the sky rather than by placing it against a background of similar trees. Even against a background of similar trees, it is so dominant as to clearly draw your attention, with the background trees obviously subordinate. Such isolation or obvious dominance focuses the viewer's attention on the tree. It is clear that the tree is the subject under consideration and the thing to be studied. It is the center of interest.

Suppose, however, that the subject is fog. How do you photograph fog, and how do you convey the mood of a foggy day? One way, perhaps, would be to find a group of trees or other objects receding into the fog. None of the trees would stand out as the center of interest, and in fact, no single tree would be especially important (except in the relationship of its form to that of other trees). Fog, however, is the *unifying thought*. The fog itself may not be visible, for it is white (or gray) and rather formless, but its presence would be made apparent by the trees fading away into it (figure 2–3).

If you concentrate on a unifying thought, your photographs will be cohesive. It is the visual equivalent of speaking on a topic without rambling aimlessly. Just beware of allowing the definition of a "unified thought" to become too broad. It's easy to say, "The countryside is the unifying thought" as justification for shooting everything in sight!

Simplicity

For the beginner, simplicity is a necessity. The simpler the composition, the more likely he or she is to maintain control and direct the viewer's attention to the important elements. It is equally true for the intermediate or advanced photographer, though with increased experience and sophistication he or she is able to simplify and control progressively more complex

situations. This is true of painters and sculptors as well as photographers—and of all other visual artists. It is even true of composers, with the modification that the concept applies to listeners rather than viewers.

The importance of simplicity cannot be stressed too strongly. Over the years, I have observed that most unsuccessful photographs fail because they are too complicated (assuming that they are technically competent, of course) rather than too simple. The photographer is unable to elucidate his thoughts clearly and concisely, and the resulting photograph illustrates his uncertainty and lack of direction. In some cases, this may produce exactly the desired effect, but in most cases it will not.

Look at your own prints and ask yourself what your goal was in each one. Can you distill the answer down to a clear comment? Try it. Put the book down and analyze several of your photographs as if they were someone else's work. Try to be objective. A rambling answer to the key question usually indicates a photograph filled with ambiguity. Is it clear, concise, and basically simple, or is it complicated, unclear, confused, or just unimportant? Then again, are you actively trying to express ambivalence or ambiguity, or trying to create complexity or confusion? If so, you may need to alter your approach significantly to best achieve your goals. Be aware of your intent, and state it simply and clearly, even if your intended statement is, "I am confused!" That may seem contradictory at first reading, but it is not.

At the start of this chapter, I suggested looking through your prints slowly while considering the thoughts in chapter 1. I am doing the same thing again here. While this may seem redundant, I urge you to try it. If you have committed yourself to take the time to read this book, make your commitment worthwhile by relating what you read to your own photography. This process will also help you tune in to a better understanding of yourself, your goals, and your methods.

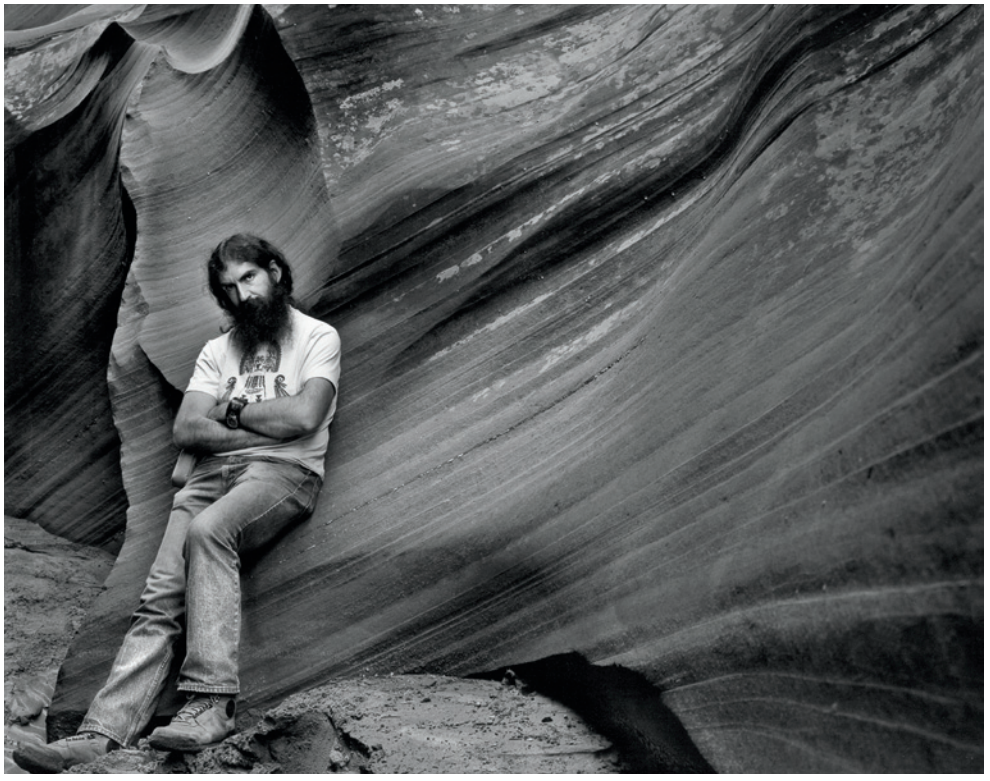
Expressing Your Own Point of View

Implicit in this questioning is the deeper question of whether or not your own point of view is visible. Without a point of view, there will always be ambiguity in the image that cannot be overcome by simplicity and unity alone. School graduation portraits are perfect examples. There is no commentary or point of view by the photographer. Each student marches in, puts on the appropriate robes, poses properly, and marches out. The photographer does not know the student, has no time to acquaint himself or herself with the student, and has no interest in the student, anyway. The result, predictably, is of no great moment. It's a face. It's simple and unified, but artistically lacking.

On a more sophisticated level, an attempt at enlightening portraiture will fail unless there is some rapport between the photographer and the subject (and if not rapport, at least some meaningful contact or strong prior feelings). The photographer should know the subject, have some interest in and some opinions about the subject, and try to convey those elements of the subject's personality that strike him or her most strongly. In some cases, the photographer must rely heavily on initial impressions, for it is not often possible to spend sufficient time with subjects to know them thoroughly.

Lack of sufficient time is typical of all fields of photography. Henri Cartier-Bresson did not spend weeks on a particular street prior to photographing an event there. Yousuf Karsh was unable to spend days with Winston Churchill before making his famous portrait. Ansel Adams tells of working with exceptional haste when photographing "Moonrise Over Hernandez". A quick impression is often the only one a photographer can gain of his subject, and thus his perceptions and definitions must be quick and precise.

Surprisingly, this is true even if the subject is supposedly non-moving, such as a landscape, because the lighting and other conditions always change—sometimes with astonishing



▲ ***Figure 2–4: Stu Levy in Waterholes Canyon***
Stu is a good friend, a wonderful physician, a penetrating thinker, and a fine photographer. During a workshop we co-instructed, I asked to do his portrait. I wanted to show him in an environmental setting that suits him as much as his medical office.

quickness! A landscape is an ever-changing situation, and the photographer can rarely analyze the scene leisurely; but he or she must analyze it nonetheless. If you can quickly define your own reaction, determine how you want to convey that reaction, and go about composing the photograph with simplicity and unity of thought, you have a good chance of communicating your thoughts successfully.

Edward Weston defined good composition as "the strongest way of seeing". Some people dislike that definition because it doesn't give a handle on how to compose. Yet it is a remarkable definition. It specifically avoids rules of composition and purposely relates composition to seeing. It talks about "strength of seeing", or in other words, the art of creating a strong visual statement. I believe that Weston would fully agree that simplicity and unity go a long way toward imparting strength to a photograph.

Simplicity vs. Complexity

Other thoughts run quite contrary to those just discussed, and it would be worthwhile to air them, if only briefly. A good deal of contemporary thought claims that today's world is complex, dissonant, fragmented, and brutal. Since art mirrors society, it would be remiss and even absurd to renounce these elements in favor of outdated concepts of simplicity and harmony. Just as ambiguity may be better expressed by contrary principles, so too should these aspects of life.

Such thoughts point to a radically different approach, and surely a valid one. It is not my approach, but it may be yours. It depends largely on your point of view, and to a lesser degree on your subject matter. Personally, I feel that a visual representation of even the most complex, confusing, and inharmonious subject should possess inherent simplicity and unity to achieve maximum effect—just as an incisive statement has greater impact than a long, rambling speech. To depict discord and complexity by means of still more discord and complexity strikes me as useless, for it merely declares the world a mess without shedding any light on it.

Furthermore, those elements which are certainly an unfortunate part of today's world are not new at all. They have always been there. When was civilization not plagued by hatred, cruelty, war, contradictions, insurmountable problems, and unexpected disasters? Art can illuminate this perplexing and imperfect world by isolating portions of it in an understandable way. Simplicity and unity appeal to me as the most easily understood approach and the one possessing the greatest impact. Yet I must add that this approach is valid for me in most cases, but not all.

I feel that some amount of dissonance, complexity, or ambiguity can be meaningful or tolerable, but that in undiluted doses they serve no enlightening purpose. Then again, is art supposed to be enlightening? Perhaps. Perhaps not. I feel it should be, but your conclusion is a matter of personal choice.

► ***Figure 2–5: Camouflage***
This is perhaps, the closest thing I've produced to a Jackson Pollack painting. Can you decipher what it is? Did you see it immediately, or did it take some time?

The question itself brings us to the most basic of all questions concerning art: "What is art?" An attempt to answer that question can be as elusive as grabbing a cloud. Despite the near impossibility of articulating a sensible answer, we can rely on the fact that every person has his or her own opinions, his or her strong likes and dislikes, and his or her own limits. It always boils down to the often-expressed phrase, "I don't know what's good, but I know what I like!" I feel that art should provide satisfying visual distillations of real or imagined worlds. For me, unity and simplicity are satisfying, whereas confusion and dissonance are relatively dissatisfying. (See chapter 15, "Photographic Realism, Abstraction, and Art" for further discussion of this issue.)

Another thought concerns the concept of simplicity alone and challenges its esteemed position rather effectively. This concept maintains that complexity is not only important, but also essential to any great work of art. By way of illustration, Beethoven's Ninth Symphony is regarded as a greater work than "Twinkle, Twinkle Little Star" primarily because of its greater complexity, despite the fact that the latter is a rather "perfect" and pleasant tune. I endorse this thought completely.

That may seem to contradict some of the thoughts in the previous pages of this chapter, but the apparent contradiction can be easily explained. The Ninth Symphony is indeed highly complex, but Beethoven's consummate mastery of music kept it under control at all times. A lesser composer could not have achieved such control. Beethoven harnessed the complexity and the dynamics. In a similar fashion, a photographer with a mastery of the medium can control greater complexity than a beginner. By striving for simplicity, the beginner can produce worthwhile photographs at the outset and then work toward gaining control over ever more complex compositions as his understanding of the medium—and his confidence in himself—grows. In doing so, he or she will probably create ever more meaningful images. I feel that complexity is essential to great art, but that it must be controlled.

A final thought that I want to consider is the concept of almost uncontrolled complexity as a core of artistic expression. Consider the paintings of Jackson Pollock, who is highly regarded among art critics. His paintings cannot be considered simple, though they can be viewed as unified in that the eye repeatedly finds the same elements as it travels through them. Scientific analysis of his paintings indicates that there may be an underlying fractal character to them—meaning that as you view smaller and smaller sections of the painting, you continue to find similar structures. This is fascinating from both a scientific and artistic aspect. Yet I must admit, Pollock's paintings say nothing to me. I find them messy, formless, and utterly lacking in interest. I disagree with most of the critics, but that's my right. You have to make up your own mind on such issues.

I have several photographs that are not easily seen or comprehended at first. One that I title "Camouflage" is almost like a Jackson Pollock painting, intended to have the objects of interest hidden from view (figure 2–5). Another, "The Beggar Woman" (figure 2–6), features a center of interest that is so

small (the woman sitting and begging at the cathedral doorway) that the viewer hardly notices her at first. But once noticed, she immediately becomes the center of interest.

I have brought up these points so you can think about them, incorporate them when appropriate to your way of seeing and thinking, and discard them when inappropriate. This process should become part of your own philosophical approach to photography. Photography is not simply the act of picking up a camera, pointing it at something, and pressing the shutter. It is a process of thoughtful consideration of your own point of view overlaid upon the scene. It requires creative thinking, which is not easy. The ideas expressed here are simply a means of stimulating further thought and creativity on your part.

▼ ***Figure 2–6: The Beggar Woman***

From inside the Cathedral in Oaxaca, Mexico, I saw the beggar sitting on the stone entryway beyond the frosted etched glass panels. While heart-wrenching, there was a compositional unity created by the strong lines of the light pouring into the cathedral. Yet the beggar is the center of interest, but you don't see her initially. She's too small to be seen immediately. Once discovered, the image takes on a different character.

CHAPTER 3

Elements of Composition

IF COMPOSITION IS THE MEANS OF LEADING VIEWERS through your photograph and holding them there until they see your message, there must be methods of composing to achieve maximum strength in your imagery. There are indeed such methods, and they can be put to use by identifying and understanding the elements of composition.

The following is a list of the many elements of composition. We will discuss them and consider how they can be used to enhance a photograph.

- Light
- Color
- Contrast and Tone
- Line
- Form
- Pattern
- Balance
- Movement
- Positive/Negative Space
- Texture
- Camera Position
- Focal Length
- Depth of Field
- Shutter Speed

◄ ***Figure 3–1 : Lay Brothers' Refectory, Fountains Abbey***
This subject presented a perplexing dilemma: do I lower contrast to retain interior detail, or maintain contrast and lose outside detail? I chose the latter, eliminating the manicured bushes outside. The center of interest is this 100+ yard long refectory used by the nonecclesiastical workers (the lay brothers) who worked there. Although your eye goes directly to the blank white opening in the distance due to the draw of perspective, it is surely not the center of interest.

There are two key considerations tying all of these elements together and making them all real which must be included as well:

1. Involvement with the scene
2. Relationships

Light and color will be discussed separately in later chapters, for these two elements are so important that they deserve special attention. For readers who are primarily interested in color, the following discussion is still important; the concepts apply to color just as much as they apply to black-and-white.

Contrast and Tone

These two subjects are so closely intertwined that it would be nearly impossible to separate them. Every scene has its own inherent contrast range, but it can be increased, decreased, or maintained in black-and-white photography. Methods of contrast control are explained in chapters 8 and 9. At this point, suffice it to say that surprisingly large—effectively, limitless—alterations can be made in the contrast level in black-and-white using film (figure 3–1). Contrast control is also possible in color, but to a more limited extent through traditional film methods. Contrast in both black-and-white and color is also exceptional using digital methods.

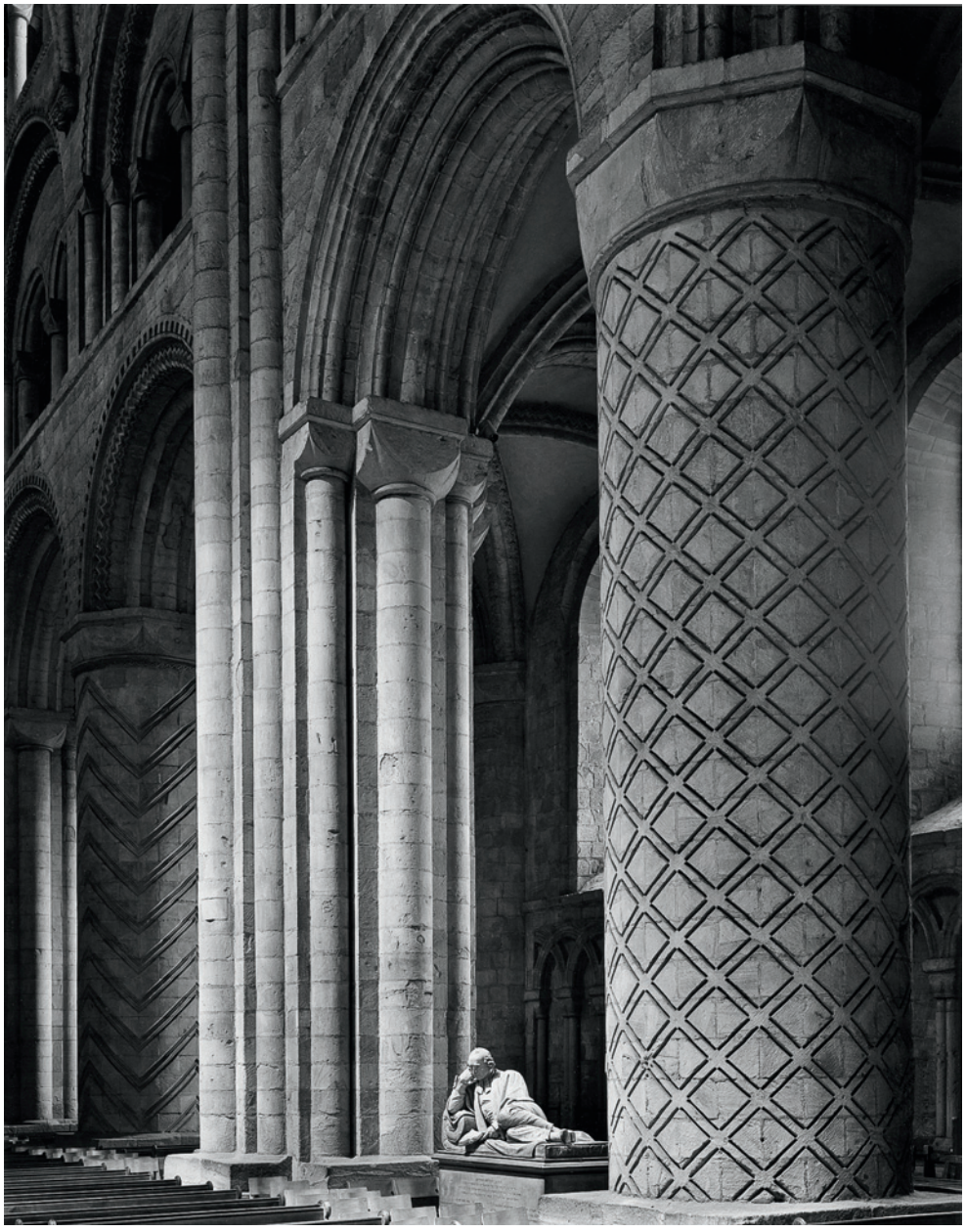
Contrast is not a true element of composition but rather a technique that derives its importance from the way the eye and brain work together to see the world. In the previous chapter, we learned that the eye jumps randomly from one key area in the scene to another, filling in the spaces of lesser importance in a rather fuzzy manner. In general, the eye jumps immediately to the point of the scene possessing the highest contrast. White against dark gray or black is extraordinarily powerful. Black against light gray or white is equally strong. Light gray against a darker or midtone gray will not attract the eye as immediately, nor will a dark gray against a midtone or light gray. The knowing artist employs these devices as desired, going with stronger contrasts for impact and softer contrasts for subtlety.

High contrast gives photographs "snap" and excitement; low contrast usually imparts a gentler mood. Each one has its place, and each has a great effect on the final mood of the image, no matter what the subject matter may be.

Contrast is determined not so much by the range of tones, but by the way they relate to one another. Transitional midtones soften the contrast of a print that possesses both deep blacks and brilliant whites, making it a medium contrast print. A print lacking either extreme may appear quite high in contrast if the darkest grays are placed next to the lightest grays. This high contrast effect will be heightened if midtones are absent elsewhere in the image.

It will come as a surprise, but in fact there is no relationship between the tonal range of an image and the contrast of that image. To illustrate this apparent contradiction, suppose you expose a sheet of enlarging paper under the enlarger to white light (with no negative in the enlarger), but first you cover the paper with heavy black cardboard. Then you slowly pull the cardboard across the paper, turning off the enlarger just before the paper is fully revealed. When you develop that sheet of paper, it will run the full gray scale from black (at one end) to white (at the other end) with all midtones in between. Though the print has a full tonal scale, it has no contrast whatsoever! The reason is that contrast implies a juxtaposition of different tones, but every spot on that print is adjacent to a tone that is exactly alike or imperceptibly lighter or darker.

If, on the other hand, a small object (a penny, let's say) were placed on the enlarging paper on the side that was first revealed when the cardboard was slowly withdrawn, there would be a blank white circle surrounded by black and very deep grays. Though the tonal range remains the same, the print



► ***Figure 3–2: Statue and Nave Columns, Durham Cathedral***
The dark tones convey the mood—the overall darkness—of Durham Cathedral. The statue of lexicographer Samuel Johnson shows a man who was quite alive, though contemplative, yet a brooding, somber quality dominates the image.

now has high contrast. If the penny were placed in the middle of the enlarging paper, its white circle would be surrounded by medium grays, giving the print moderate contrast, but again the same tonal range. If the penny were placed at the other end of the enlarging paper, the white circle would be surrounded by very light gray or white tonalities, and contrast would be very low. But the tonal range still remains the same. So image contrast depends on tonal juxtapositions, not on tonal range. An image that goes from white to black may still have an overall "muddy" appearance. Some prints without either a pure white or maximum black have great "snap" and contrast. While tonal range and contrast are often related, exceptions abound.

A print may be high key (with lighter tones predominating), low key (with darker tones predominating), or mixed. Are the moods similar in a high key or a low key print? Most likely there will be a wide emotional gulf between them. Two photographs from my English cathedral studies (figures 3–2 and 3–3) illustrate several points about contrast and overall tone. Though the images are quite similar in content, and even somewhat similar in design, the print from Durham has deeper overall tones and higher contrast (though the tonal range of the two images is nearly equal—they both go from white to black). To me, it also has a more brooding tone, while the image from Hereford allows more hope and optimism—despite the fact that the statue at Durham depicts a man reading, and quite alive, while the one at Hereford depicts a dead knight.

Does this mean that dark tones invoke somber moods and light tones invoke greater optimism? Not necessarily, but I suggest they point in those directions more often than not. This is not stated as a rule (always avoid rules because they fail too often), but as a generalization: it tends to be true quite frequently. When you give it a bit of thought, you realize that our everyday language almost equates the two: we speak of a "sunny mood", of a "dark, somber mood", of a person with a "bright, sunny disposition", and of an ominous mood as "dark clouds gathering". This should be understood, because it translates in a photograph to a significant part of our visual language in conveying our feelings. Overall, high key prints tend to impart a more positive, optimistic mood, whereas low key prints tend to be more somber, sometimes even pessimistic.

Photographs often are hurt by inappropriate contrast or tone that conflicts with the intended mood. I believe the

◄ ***Figure 3–3: Tomb of an Unknown Knight, Hereford Cathedral***
Middle and light gray tonalities dominate this image, as sunlight pours through the unseen windows at the left. Despite the foreground tomb of a dead knight, this image conveys greater optimism than the one from Durham Cathedral. The lighter tonalities may be the reason for this difference.

problem can be blamed in part on the unwritten "rule" that states all photographs must have a pure white, a pure black, and tones in between (except in the case of graphic black-and-white photographs, in which case the midtones can be dropped). Not only should this rule remain unwritten, but ignored as well. Two examples will help illustrate this point.

"Sunlight, Capitol Park, Sacramento" (figure 3–4) is the first example. As I set up my camera on the steps of the California State Capitol Building looking into the arboretum that morning, I felt that everything in the scene was filled with light—as if each tree, each blade of grass, each leaf was a source of light. There seemed to be no darkness anywhere. I wanted my image to mirror that feeling of brilliant light and glare. The tones range from white to middle grays; there is no black, and none is needed. I feel that dark tones would be decidedly inappropriate. They would compromise the mood of the morning. Conveying the mood is far more important than complying with that arbitrary rule.

Another photographer standing in that same spot may have experienced a feeling of brilliance, and that feeling may have been translated into a very different image. I have often seen photographs of sunlight pouring through trees in which the trees are silhouetted. That type of rendition would have been perfectly valid and could have been used here, but only by someone who responded differently to the feeling of light.

The second example is drawn from England. "Gatehouse, Lanercost Priory" (figure 3–5) has no whites and hardly a light gray. It was photographed at dusk with a misty rain falling. In the fading light, it required a 30-second exposure. Though it was a gloomy time, it did not impart a depressing mood.

When I first printed the image, I was concerned about the lack of whites (not because of the way it looked, but because I had never made a print without whites or very light grays). So I tried printing it in different ways. First, I attempted higher contrast in order to obtain lighter grays while maintaining the dark tones. Then I printed it lighter in tone overall. Neither version conveyed the feeling I had in mind. I returned to my original print of the image, realizing that for the mood I wished to convey—quiet, calm, contemplative—white or light gray was undesirable.

A well-conceived high key print usually conveys a feeling of enveloping light and overall airiness, and perhaps a degree of optimism. The creative photographer can sometimes use the same tones to convey a somber mood, however. I have seen

▲ ***Figure 3–4: Sunlight, Capitol Park, Sacramento***
The darkest portions of this print are barely middle gray. Dark tonalities would have been inappropriate; they would have negated the feeling of light suffusing the scene as morning fog gave way to sunlight. The unwritten rule that prints must have a pure white and a pure black should be ignored, as should all rules dealing with art and personal expression.

► ***Figure 3–5: Gatehouse, Lanercost Priory***
The lightest portion of this image, the sky at the horizon, does not approach white or even a very light gray. At dusk, beneath heavy overcast skies and a light drizzle, detail in the gatehouse and tree was barely visible. Bright tonalities would have been inappropriate. As in "Sunlight Capitol Park" (figure 3–4), the rule that a black and a white are both needed is ignored.

such effects, and I feel that each photographer should discover when, where, and how they could be achieved.

Can a low key print impart a feeling of openness and optimism? Ansel Adams's "Moonrise Over Hernandez" is dominated by deep tones, yet the print overflows with brilliance and optimism. His print is highlighted by gleaming whites and light tones in the moon, the clouds, and even the tiny hamlet in the foreground. Could the inherent optimism have been achieved without the brilliant light tones and without the high overall contrast?

In general, deep tones tend to convey strength and stability, and sometimes pessimism, mystery, and somber moods. High contrast imparts brilliance and drama while low contrast imparts quiet. Of course, these statements are true *in general!* With skill, the creative artist can turn these generalizations around effectively, in a way that enhances the effect because of its unexpected character.

Many photographers, beginners in particular, overemphasize high contrast in most of their prints. Rich blacks and gleaming whites usually cause people to have an immediate positive reaction to prints because of their eye-catching nature, but often after that initial impact the viewer is left with empty feelings concerning the content of the image. Unfortunately, the beginner is encouraged by the initial reaction and continues printing with excessive contrast, often with tonalities that are too deep. I cannot count the number of times I have seen student prints at workshops that were printed unnecessarily dark and brooding in an effort to impart dramatic or mysterious effects, only to end up as prints that were unnecessarily dark and brooding! This seems to be a common trap for beginners (myself included) who wish to become an instant Ansel Adams, Brett Weston, or Yousuf Karsh. Only those who are analytical and objective enough to look past the reaction of others to their own reactions can recognize that a more subtle approach may improve many images. Some do require low contrast. And some really require high contrast. It is always better to match the tonalities and contrast level to the desired mood rather than to a standard printing formula.

What about the midtones, the middle grays? These are often the tones that are hardest to deal with because they can be amazingly boring when used incorrectly. Middle gray, just by its very name, seems to elicit yawns. But consider that those tones can also be middle *silver!* When the middle grays begin to glow as middle silvers, the photographer has truly achieved something extraordinary.

Subtlety and brilliance in printing comes from all tonal ranges. Too often the midtones are skipped over as mere transitional elements between the "important" black and white tones, but they can be the heart of the image. In portraits, the midtones can convey the character behind the face with richness and authority. Usually it is not the blacks or whites that carry a portrait, but the midtones which show the smoothness or cragginess of the skin, every pore of the cheeks and nose, and the curves or angularities of the features. Jay Dusard, with whom I have worked for years, is the ultimate master of turning the middle grays into *middle silvers*. From a distance, many of his prints seem subdued, sometimes even muddy in character, but on closer inspection those tones tend to glow with an internal richness. He tends to have shimmering midtones throughout his imagery, both portraits and landscapes.

Midtones are equally important in landscapes, studio setups, still lifes, product and architectural photographs, and every other conceivable subject matter. In a real sense, the midtones need the greatest care of all because they can be the death of a print. They can also give the print its most subtle characteristics.

You can alter the tonalities of any scene to most effectively express yourself. You can print any image lighter or darker than a literal rendition. This involves the concept of visualizing the final print as you stand there looking at the scene, a concept that will be explored in depth in the next chapter. The print is your creation, and you are free to do whatever you want with your own creation. But always beware of the enticing trap of pushing too hard in an attempt to create a mood, for it will often end up as an artificial mood. Get in tune with your honest feelings and work toward conveying them with the most appropriate tones and contrasts. You will get your strongest photographs with the honest approach.

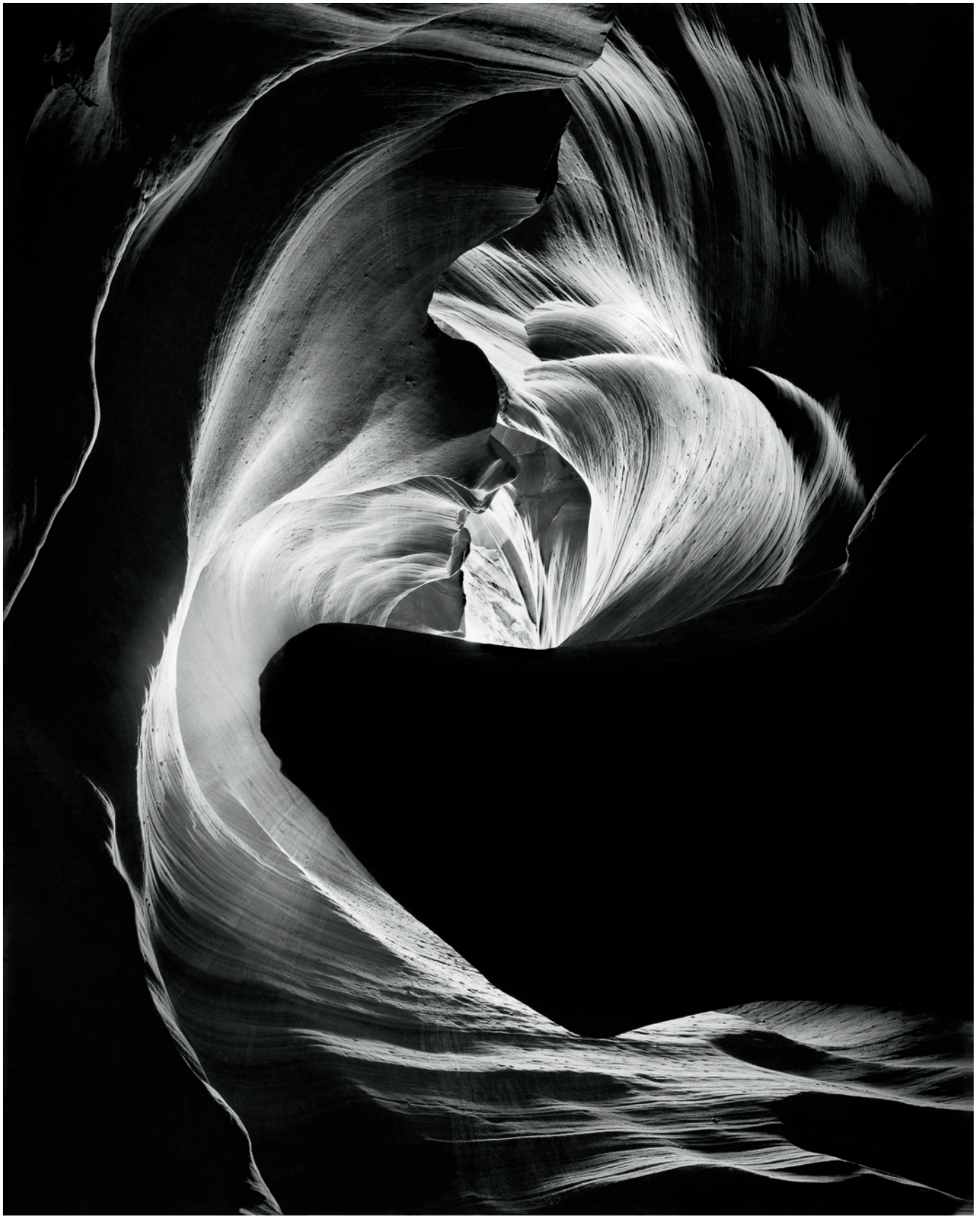
Line

■ *When the middle grays begin to glow as middle silvers, the photographer has truly achieved something extraordinary.*

After contrast and tone, which largely set the mood of the image, we come to line, which is possibly the strongest element of composition. Lines are compelling pulls for the eye, as artists learned in the Renaissance when perspective was first discovered. It was quickly seen that the eye follows a perspective line into the distance as if there were no choice. In essence, there is no choice! The eye will follow a line from beginning to end unless it becomes so convoluted that it is no longer a simple line.

Diagonal lines have powerful compositional effects because of their inherent instability. They create tension. They are not stabilized in either a standing (vertical) position or a reclining (horizontal) position. In effect, diagonal lines are in the process of falling, which gives them powerful dynamics. Both vertical and horizontal lines possess a reduced feeling of dynamics but a heightened feeling of permanence or stability (or even a static feeling, if used in an uninspired manner). Curved lines, too, can be very dynamic or quite relaxed. Tight curves tend to carry more drama than wide, sweeping curves.

Of course, these tendencies must be considered in combination with other compositional elements. Dominant diagonal lines in a low contrast print may appear to be less dynamic than horizontal or vertical lines in a high contrast print. As each element of composition unfolds in this discussion, it must be considered in relationship with the others (more about this toward the end of this chapter), and ultimately in context with the subject to make real sense. The value of understanding the elements of composition in their pure,



► ***Figure 3–6: Circular Chimney, Antelope Canyon***
This was my first slit canyon photograph. I did not see it as a canyon of eroded sandstone, but as a floating site in space-time surrounded by cosmic forces. The central black form (a black hole, perhaps?) is surrounded by tightly curved bright lines that grow dimmer as they move away from the center of the image. The eye is immediately drawn toward the central area because of its high contrast, and then spirals outward from there.

▲ ***Figure 3–7 – Fallen Sequoias***
The fallen giant creates a strong movement from lower left to upper right, with the branches in the lower right corner mirroring that angle. Remove the fallen sequoia, and the scene has stately grandeur but is not dynamic. The brightest portion of the print has just a bit of tonality to it, revealing fog; the darkest portion is just as black as the deepest black in "Circular Chimney, Antelope Canyon", yet the image is not high contrast because the tonal extremes do not come in contact. Much of the image is dominated by middle gray tonalities. Contrast is not determined by the range of tonalities, but by their juxtapositions.

abstract form is to ultimately match them with the subject and strengthen the statement you are trying to make.

Two examples will help illustrate the points made so far. "Circular Chimney, Antelope Canyon" (figure 3–6) directs the eye to the center of the image, where contrast is greatest; the deepest blacks come directly in contact with the brightest whites, and the curving lines are tightest. From there, the eye spirals rapidly outward from the high-contrast, inner curves toward the lower-contrast, outer curves. The combination of high contrast and curved lines makes this image very dynamic.

"Fallen Sequoias" (figure 3–7) is dominated by the strong diagonal of the fallen tree and its repeated angle in the cluster of branches at the lower right corner that contrasts with the standing trees behind. In this image, the standard associations of vertical and diagonal lines hold true. Remove the diagonal fallen tree and logs, and the photograph becomes one of a primeval forest in fog, strong and permanent, but surely not dynamic.

There is nearly a full tonal range in the print, but it does not have high contrast. The standing trees recede gently into the enveloping fog (which is light gray, not pure white), while light and middle grays dominate the image—except for the upper part of the fallen tree and the branches below, which attain dark grays and blacks. This serves to add three-dimensionality to the image and impart a sense of presence.

Do straight or curved lines have the same emotional feel as jagged lines with pointed edges? Surely not. Do sweeping curves have the same emotional feel as a series of vertical, straight lines? Again, no. Try to fit various types of subject matter into the abstract line structures just mentioned to see how the line structures you envision work with the subject matter. (This can, of course, include curved lines as well as straight lines.)

There are no rules for the emotional connotations of any specific type of line. In conjunction with the subject and other compositional elements, such as contrast and tone, lines can help determine the overall mood of a photograph. In portraiture, often the slight turn of a head can change a straight, stern facial line into a softer, mellower line—and vice versa. Carefully placed and controlled lighting, either harsh or soft, can further accentuate either effect. So the astute portrait photographer thoughtfully controls the angle of the head in relation to the lens of the camera, where and how the hands are placed, the clothing that is worn, where lighting is placed, and the type of lighting used (whether ambient or artificial) to help convey his or her feelings about the person in the portrait.

Be aware of strong lines that pull the eye out of a photograph. Perspective lines, in particular, can often be the culprits, for the eye will follow the line to the edge of the photograph and beyond. Before you know it, you have lost the viewer. Surely you want to hold your viewer's attention, so strong lines must be carefully controlled.

On the other hand, beware of reading lines into a photograph when they exist too faintly or not at all. A photograph often turns out poorly because the photographer overestimated the continuity of lines, particularly when the alleged line ran through several objects, such as a plant and its shadow. Reading weak lines into a photograph is much like reading nonexistent moods into a photograph: it never works.

One other subtlety of line structure should be noted: not every line has to be a continuum, like the vertical trunks or diagonal log of "Fallen Sequoias", or the sweeping curves of "Circular Chimney, Antelope Canyon". Some lines can consist of a sequence of forms that closely relate to one another. In such cases, the eye will create an unseen line as in the "connect the dots" drawings we played with as children. Sometimes such lines can be very fascinating, indeed. They can also create problems. For example, a series of forms might not relate to one another in a scene because they are of different colors. However, if they are translated into gray tonalities in a black-and-white photograph, they suddenly relate to one another

◄ ***Figure 3–8: The Louvre, Dusk***
The dominating forms in this image are the clean triangles of the pyramid (the entry to the museum) and the shapes created by the walkways. These forms also provide a visual counterpoint to the ornate architecture of the old palace. The print is toned to brown to subtly enhance its mood at dusk. (Note the setting sun through the pyramid's glass.)

quite strongly. In some cases, the line may prove to be highly beneficial to the composition, but in other cases it may seriously distract the viewer from the photographer's intended vision.

Form

Simple geometric forms—triangles, circles, rectangles, etc.—create strong designs. Repeated use of these forms and variations of them can add further strength to compositions, especially if there are variations among them in size, tonality, color, texture, or orientation. Of course, forms don't have to be geometrically simple to be eye-catching when repeated. The forms can be oddly shaped, but seen repeatedly they become visually attractive... so much so that they may become the most visually attractive aspect of the image.

Some photographers tend to build their compositions out of an array of forms (or shapes, if you prefer that term), somewhat like a mosaic or a jigsaw puzzle. Jay Dusard tends to organize his image space in this manner. Dusard often uses small forms pieced together in a complex and intricate manner. Other photographers may use larger puzzle pieces. I often find it difficult to build with forms, so my prints generally have strong lines dominating the composition, though there are exceptions.

All photographs have both lines and forms in them (the edge of anything is a line, and the thing itself is a form), but

some photographs are clearly dominated by lines while others are dominated by forms (figure 3–8). From these clear distinctions they tend to grade into one another. Is one type inherently stronger than the other? The answer is surely a matter of opinion. I feel that line-dominated images are more assertive than form-dominated images; a line is a dynamic visual attractant, forcing the eye to move along it, while a form causes the eye to stop while studying it. Line-dominated images have greater flow and motion to them. Furthermore, it strikes me that form-dominated images move the eye about in jumps, forcing it to hop from form to form and piece the image together afterwards, whereas line-dominated images move the eye about in smoother, faster sweeps. I have no scientific evidence to prove these observations, but they seem correct to my way of seeing and thinking. Your feelings about my observations may indicate an inclination on your part to one type of composition or the other.

Line, Form, Contrast, and Emotion

Before continuing with the other elements of composition, let's pause for a moment to consider the ramifications of lines, forms, and contrasts on the emotional content of an image. This is of the utmost importance because even the most technically perfect print is meaningless without emotion.

First, imagine two photographs in which the first is dominated by strong whites and deep, rich blacks while the second is characterized by middle gray tonalities. The first photograph will be more active. It will jump out at you. The second will be quieter, more muted, and more passive in feel.

Next, imagine two photographs in which the first is filled with jagged lines and hard-edged forms while the second has curved lines and softly interacting forms. The first photograph of this pair will immediately grab your eye, while the second will have a quieter, more passive mood.

Now, let's combine these qualities to explore the extremes. A photograph with jagged lines, hard-edged forms, and strong blacks and whites will have a raucous, wild, frenetic feel, perhaps even a sense of being out of control. One with curved lines and softly interacting gray tonalities will be relaxing, quiet, and perhaps run the risk of being boring.

This tells us that jagged lines are far more active than curved lines, which themselves are more relaxed. High contrast is far more active than low contrast. Middle gray tonalities impart the quietest, most relaxed mood of all. So jagged, sharp lines or even tightly curving, twisted lines combined with high contrast will be intensely active and highly charged. Gently curved lines along with softly modulating tonalities will impart a quiet, relaxed mood.

I cannot overemphasize the importance of these tonal and line issues because they form the basis of a universal language understood by people worldwide. It doesn't matter if you're from Manhattan, France, Botswana, Russia, the Australian outback, China, or Brazil—you'll read these combinations of line, form, and contrast the same way. It is, in fact, the only universal language on earth, which adds immeasurably to its power and communicative ability.

Any thinking photographer will use this universal language to his or her advantage. If you want a quiet, reverential mood, you'll do well to work with curved lines, rounded forms, and subdued contrast. For example, if you want to convey the warm, soft qualities of a person in a portrait, diffused indoor or outdoor light would serve your purpose. But if you want to convey harsher qualities, spotlighting or strong sunlight—highlighting every wrinkle and crag—would be the lighting of choice. Soft light, gray tones, and pastel colors on rounded hills impart the feeling of a gentle, pleasant, livable landscape, whereas strong sidelight on sharp, craggy rock spires imparts excitement and adventure, perhaps even a feeling of foreboding.

Years ago a student at a workshop presented images made at a Japanese Buddhist monastery. I asked him what mood or feelings he had while at the monastery. He said, "Bruce, it was the most peaceful place I've ever been." Though his compositions were beautiful, I focused on the harsh, high contrast tonalities he employed in his printing. They negated the peaceful mood. We discussed this at length, prompting him to say, "Nobody ever talked about this previously." He agreed that the high contrast detracted significantly, and that he simply needed to reprint the negatives at a lower contrast level to successfully convey the mood that the monastery evoked.

My experience with students over the years is that there is a tendency—in fact, an overwhelming pull—to drift toward high contrast. The reason seems to be a desire to produce a "rich" print, an exciting print, an eye-catching print, a dramatic print. But maybe what you really want is a quiet, contemplative mood, one that makes the viewer sit down and think rather than jump up and shout. High contrast fights that mood; sharp-edged forms fight that mood.

You'll do better to create a *mood* rather than to produce blacks and whites simply for the sake of showing the world that you can produce blacks and whites.

Pattern

Repeated use of lines or forms is the start of pattern. The vertical trunks of a grove of aspen trees may set up a visual pattern, while the horizontal lines of their shadows set up a second pattern in counterpoint to the first. A photograph of this group of trees and shadows is a good example of a photograph that is held together by a "unified thought" rather than a center of interest. The viewer's eye is not drawn to any one tree (or its shadow) but to the pattern of trees. If one of those trees were removed, the pattern would still exist. In essence, nothing would have changed. Variations in both the vertical and horizontal lines—verticals due to separations between trees as well as their distance from the camera, and horizontals due to irregularities of shadows on the ground—would add further interest to the image.

This is but one example; there are an infinite number of others. Many of my studies of English cathedrals feature a seemingly infinite array of columns and arches from the immediate foreground to the distant background, which set up a pattern of forms and textures that allows the viewer to translate qualities, such as texture, from the closest columns to those in the distance (figure 3–1). The tonal variations in the columns, arches, and shadows set up an interesting interplay within the patterns. Figure 3–9 shows an example of a pattern in nature, not one created by man.

Such variation is the key to interest in the pattern. Repetition can be strong to a point, but then it can rapidly degenerate into tedium. Studio still lifes offer great opportunities to create wonderful patterns and variations because the photographer can arrange things precisely as he desires. Landscapes tend to be a bit more arbitrary; you cannot rearrange things, but you can use camera placement and lens focal length effectively to organize the scene into a pleasing pattern.

William Garnett, the noted aerial photographer, once found an ideal situation that lent itself to monotony of pattern as "the strongest way of seeing". He made a series of aerial photographs of a sprawling housing tract near Los Angeles before, during, and after construction. The photographs are blatantly monotonous, perhaps as much as the housing tract itself, which looks like something out of an old Monopoly game. The monotony is the strength of the photographs because it so perfectly captures the utter dullness of mid-twentieth century suburbia. The fourth photograph that completes the series includes not only the tract in question, but also the entire urban sprawl of Los Angeles as seen from a point southeast of the city. The sameness seems to spread without end. It is magnificently dull!

► ***Figure 3–9: Thrusts, Westgard Pass***
Eastern California rock columns create a visual rhythm with no apparent scale discernible. The metallic sheen produces a rich tonal palette not often found in nature.

This is an important example because it shows that even a seemingly strict "rule" (such as "strive for variation within patterns") *always* has an exception. The only worthwhile rule is: avoid rules!

Balance

Balance means equality between the left and right halves of a photograph. This can translate into tonal balance or subject/interest balance. Just like a child's seesaw, in which a heavy object near the fulcrum balances a light object at the other end, an important object near the center of the image "balances" objects near the opposite edge. Dark tones on one half of the image are balanced by dark tones on the other half. An important object, either large or small, placed near the edge of a photograph without a comparably important object on the opposite side creates a distinctly unbalanced photograph.

Imbalance of either tonality or subject interest often creates tension within the viewer, while balanced compositions are more relaxing, more comfortable. Do you want all of your photographs to be comfortable? I don't. Sometimes I want to create a degree of tension through imbalance. Some

photographers strive for imbalance regularly in order to create a feeling of strain or discomfort.

The simplest way to achieve balance is through symmetry, but unless symmetrical compositions are handled deftly they can be terribly boring. Asymmetrical balance is more difficult but usually more exciting. Balance, like the other elements of composition, should be carefully considered so as to be compatible with the desired mood. If you wish to create a strange, mysterious, or disquieting feeling, imbalance may be more effective than balance. Consider this along with the thoughts about lines, forms, and contrasts to help create a mood in your imagery. In addition to the underlying feeling of excitement or relaxation imparted by lines, forms, and contrasts, balance or imbalance can help create comfort or discomfort. The combination can be very powerful indeed.

What about top/bottom balance or top/bottom imbalance of tonality or subject? This is not a problem. The word "balance" implies a left/right equality; "imbalance", a left/right inequality. In figure 3–10, *all* of the real interest is in the bottom half of the photograph, with the top half solidly black. Tonal or subject imbalance seems to be quite apparent and often disconcerting if it occurs in a left/right orientation, but hardly noticeable when it occurs in a top/bottom orientation. Maybe it's just the fallout from the fact that our bodies, faces, etc. have left/right symmetry but not top/bottom symmetry. I believe that we simply notice differences far more in the left/right direction than the up/down direction.

Movement

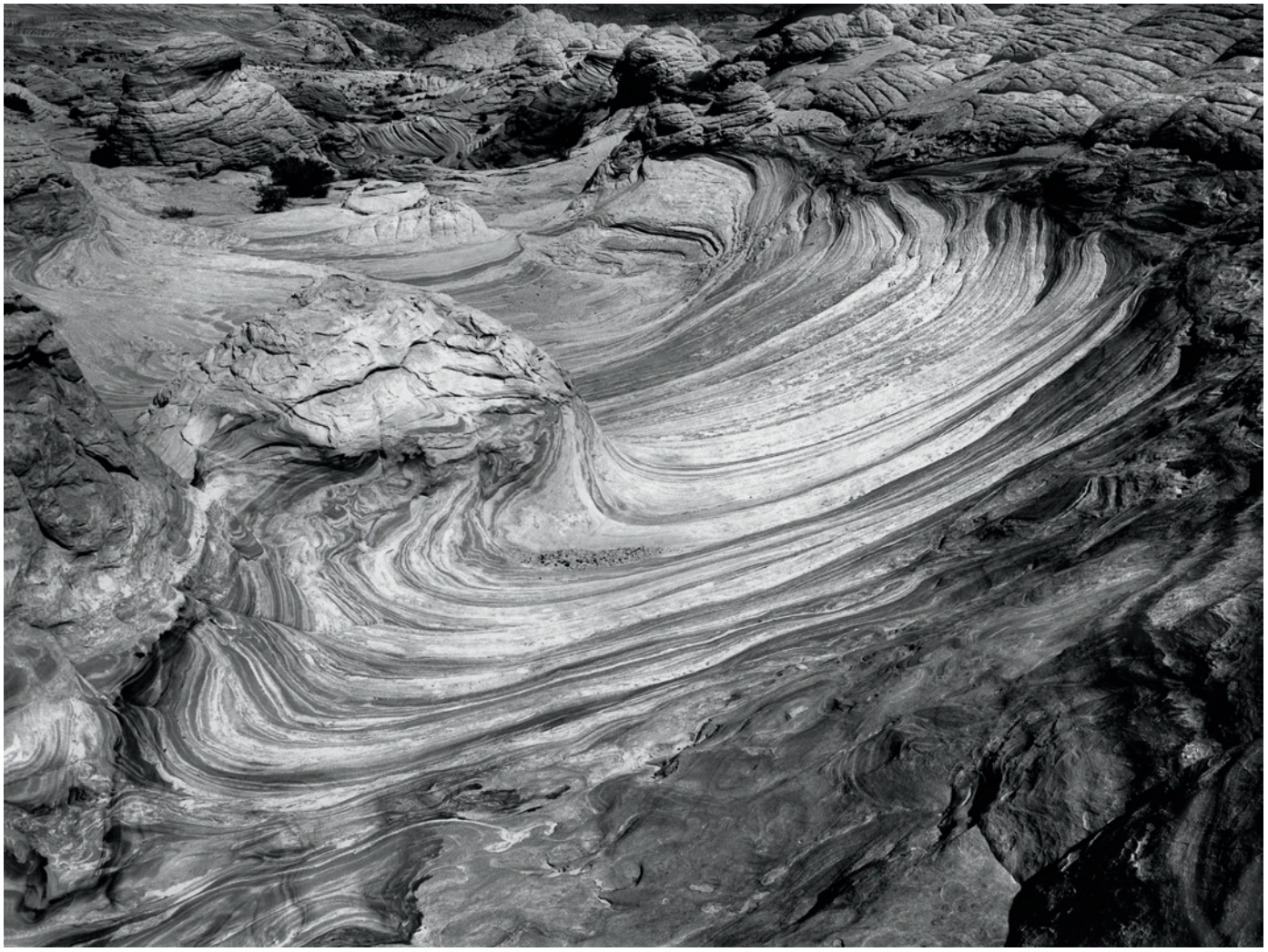
The way in which the eye moves through a photograph—along the succession of lines, forms, contrasts, and objects—defines the movement of the photograph. In many of my slit canyon photographs, the movement occurs in a circular, almost spiral fashion, whereas in many of my forest studies the movement comprises up/down verticals along the trunks of the trees. The great conifer forests of the Pacific Northwest consist of noble, straight trees that convey a feeling of stability and strength, whereas the oak forests of the Southeast have intricate, curved forms that convey a range of feelings from wild abandon to gentleness. Movement causes excitement, and the stronger the movement, the greater the excitement.

In "Circular Chimney, Antelope Canyon" (figure 3–6), the movement occurs in a circular, almost spiral fashion. In "Fallen Sequoias" (figure 3–7), the movement is strongly upward and to the right, along the trunk of the fallen giant. The same upward, rightward movement is seen in figure 3–9. In "Liquid Land, Utah" (figure 3–11), the movement radiates outward like a pinwheel from the left center. The image almost seems to be in motion, which is true of the land itself. Movement causes excitement, and the stronger the movement, the greater the excitement.

Movement and balance are interrelated. If movement is from right-to-left, for example, greater weight can be placed on the right to maintain balance, for the leftward movement counterbalances the imbalance on the right. Movement can also be used to create imbalance and tension, and with it a greater degree of excitement.

In the past, I demanded movement in most of my own work, yet my attitude toward the importance of movement has changed as I have seen more and more fine photographs that stand on their own without a strong directional flow. Perhaps this change of attitude paved the way for my studies of urban centers throughout the United States and Canada. These images rely on the static, cold architecture that now dominates our urban environments. For the most part, the images from this series avoid movement and instead search for geometric patterns. Lack of movement does not imply lack of quality. Movement, like contrast and tone, must be compatible with the mood of a print.

▲ ***Figure 3–10: Hills and Clouds, Central California***
All of the interest in the image is in the lower half, as the sky is pure black. A top/bottom imbalance is not bothersome, but a left/right imbalance is indeed bothersome. Tonal imbalances can create uncertainty and disorientation, but apparently only left/right imbalances can do this.



◄ ***Figure 3–11: Liquid Land, Utah***
Parts of Utah are like outer space: unearthly and seemingly in motion. It almost appears as though the land is spiraling outward from the central rock. Such formations are found nowhere else on earth, and they deserve the strongest possible protection.

Positive/Negative Space

The light and dark areas in the scene before your eyes, and those same areas in your photographs, are the so-called positive and negative spaces. For the moment, the positive spaces may be thought of as rocks in a stream and the negative spaces as the flowing stream. Does the stream flow? If not, are the interactions between the positive and negative spaces exciting or dull? Are the forms of the positive and negative spaces elegant or inelegant? Are the flow lines interestingly patterned, or static, disconnected, or broken? An easy way to check is to squint your eyes and blur the image (or, if you wear glasses, take them off) so you see only the major forms but not the finer details. Then ask yourself those questions. The general forms and patterns of the interactions are extremely important in the overall design of your photograph.

Also, while the image is blurred, see if the overall effect of the tonal interactions is satisfying or dissatisfying to you. We often get so involved in the details of an image that we fail to see its overall forms and patterns, or the interactions of the positive and negative spaces.

Do the positive and negative spaces balance? This is not to ask whether the image is 50 percent light and 50 percent dark, but rather how the positive or negative spaces on one side or corner compare to the other. Look to see how balanced or unbalanced the photograph may be in terms of positive/negative space (figure 2–1).

Also, be aware of the fact that negative space can be bright as well as dark. As a simple example, if you look at the interior of a room with distant windows that open onto a bright, blank exterior, the window areas are negative spaces within the image. Looking back to figure 1–6, you'll see that the near columns and arches are the positive spaces, and the distant nave is the negative space.

Brett Weston is renowned for his use of positive/negative space. He often employed brilliant forms set against a glowing black background. The success of his photographs rests on the interplay of tonalities, as well as the wonderful forms of both the brilliant foreground object(s) and the black background areas. Without the lyrical forms that are so apparent in Weston's work, the positive/negative interactions would likely come across as little more than excess contrast, but he turns them into elements of rich, flowing design.

Texture

Texture is often overlooked as an element of composition. It can be a most compelling visual treat. Whether it is the roughness of rock, the fluidity of water, the smoothness or cragginess of skin, the sheen of a metallic object, the soft modulations of clouds, or any of an infinite number of other textures, their detailed delineation will immeasurably enhance any photograph (figure 3–12).

Often, two elements within a photograph lie side-by-side with similar tonal values and only textural differences to distinguish them. In nature, a boulder pressed against a tree trunk could be such an example. Textural differences may well be enough to hold the viewer's attention to a study of nature.

Edward Weston was a foremost exponent of texture. Many of his famous nudes on sand and his rocks at Point Lobos are studies of textures and forms. His unexcelled still lifes, too, are remarkable studies of texture, form, and light. Photographers often underestimate the importance of texture, but in the hands of a master like Weston it becomes a prime element of fine art.

Textures are rarely assertive elements. They must be sought and dealt with carefully and thoughtfully. Used effectively, they can be impressive elements of composition. They can also have the strength to hold a viewer to the photograph as he studies the rendition of textures in their most revealing details. As noted on the first page of this book, the inherent realism of photography is one of its greatest strengths, and studies of texture placed within a well-conceived image can impart surprising strength.

The noted photographer Frederick Sommer cautions that textural studies alone fall flat. He points out that texture is a surface quality, and that if the photograph fails to delve beneath the surface, to uncover inner truths, or ask probing questions, we end up with a print as superficial as the texture. Texture for texture's sake shows little more than technical competence, but texture used to help bring out a deeper message, a more insightful image, can add realism and pertinence to a photographic statement.

A good photograph is a visual statement, and all the elements of composition are simply the tools used to strengthen it. No compositional element has meaning by itself. Each must be employed in concert with the others to contribute to the unified thought discussed in chapter 2. Toward the end of this chapter, I will discuss this idea further under the subheading "Relationships".

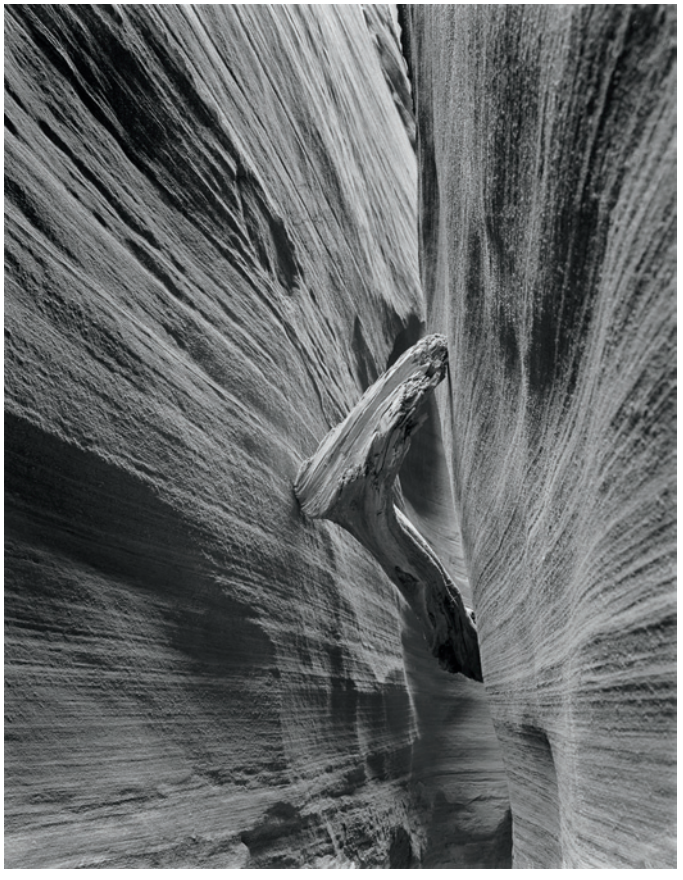
Camera Position

Camera placement is critical for bringing out the most in compositional elements. Sometimes a change of camera position by mere inches makes the difference between an ordinary and

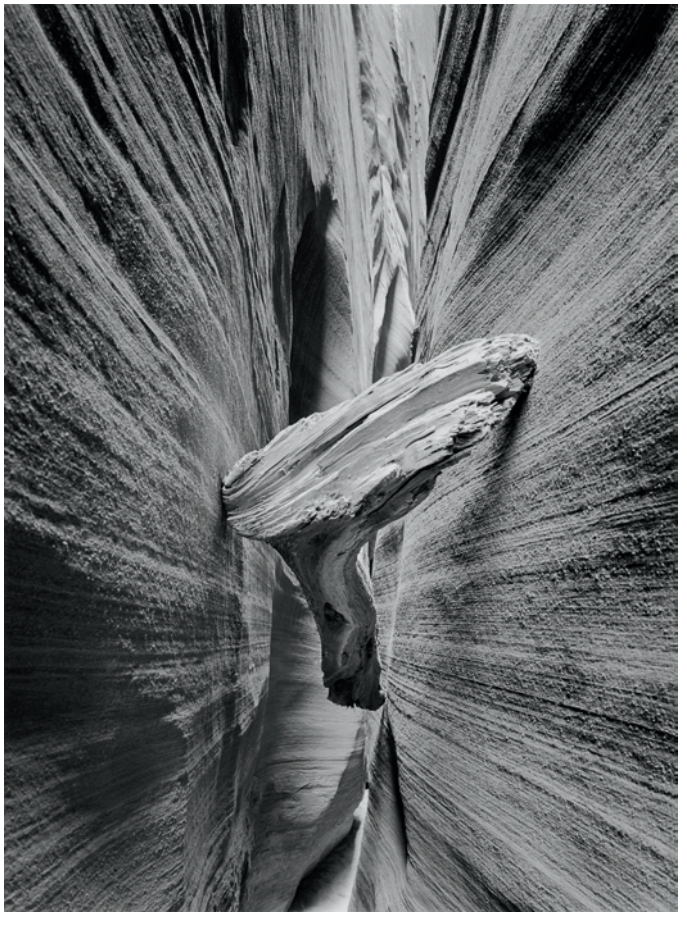
◄ ***Figure 3–12: Rocks, Pebble Beach***
The smooth, reflective rock textures stand out sharply against the background of small pebbles. There is an overall movement from the lower right to the upper left created by the rippled lines on the foreground rock. The wet rocks reflected a clear, pre-sunrise sky. After sunrise, brilliant specular highlights and deep shadows made the scene virtually impossible to photograph.

a great photograph. Careful positioning can reveal patterns that were otherwise missing, or create a more interesting interaction between foreground and background objects (figures 3–13 and 3–14). At times, unwanted background objects can be obscured behind important foreground objects with clever camera placement. Precise placement can also be used to create a continuity of lines or forms, which would not exist otherwise.

During my studies of English cathedrals in 1980 and 1981, I repeatedly used precise camera positioning to bring out the most lyrical interactions between the curve of a foreground arch and the multiple curves of ceiling vaulting in the background. Often my camera was positioned to block out distractions within the cathedral, such as electronic loudspeakers hung on columns, or visitor signs. Many of my compositions were the result of time-consuming studies of camera positions that would effectively reveal the harmonious interactions of the stone tracery in the foreground with the arches and tracery in the middle ground and background. Not only was it a thoroughly enjoyable effort, but in the process I became intimately aware of the exquisite craftsmanship and genius of invention on the part of the stonemasons who created those masterpieces. For me, virtually all the distractions were modern additions; the original architecture was astoundingly harmonious.



▲ ***Figure 3–13: Branch and Canyon Walls, Unnamed Canyon***
I felt a dynamic photograph could be made by crawling under this cottonwood branch that was wedged between the slit canyon's walls. During the 10-minute exposure, I realized the real dynamic was missing: the low camera position was wrong (figure 3–14).



▲ ***Figure 3–14: Log Between Walls, Unnamed Canyon***
Moving the camera to eye level and a foot closer to the branch created greater dynamism. That was my goal. The log explodes toward the viewer, confronting the viewer directly. The only difference between the two images is camera position.

Camera position is particularly critical when dealing with obstacles in three-dimensional space. Placing the camera in a specific location in space may reveal (or create) a particularly pleasing, surprising, or poetic relationship between foreground objects and background objects. Camera position may create interesting patterns or relationships of forms or lines that simply don't exist from any other location in space. When this occurs, you must be in exactly the right spot, not just close to it. Too many people always shoot from eye level, simply because that's where they see the world as they pass through it. They rarely investigate the view from waist or knee level, to the left or to the right of their line of travel, or any other unusual point of view, which may prove to be much more exciting or visually compelling.

I want to re-emphasize a thought expressed in chapter 1. When you encounter a scene that grabs you—one that has a special magic, that makes you want to shoot it immediately—it is imperative that you respond instantly and spontaneously to that impulse. That doesn't mean that you instantly *shoot* the scene, but rather that you immediately *investigate* it. Take the time to refine your seeing and improve the composition. Avoid the urge to look and snap; instead, investigate and photograph. Those few seconds or minutes spent in refining your seeing will not diminish your spontaneity, and they will surely

enhance your imagery. See if the composition would be stronger two inches or two feet to the left or right, higher or lower. Check whether the lines, forms, and patterns are more exciting if you step to one side or the other. You do not have to check through the lens. Put the camera down and check without it. After all, you initially spotted the scene without your eye glued to the viewfinder or ground glass. Move to the left or right, squat down or stand on your toes, edge forward slightly or back a bit. Where is the composition strongest? When you find it, place the camera there and make your exposure.

Of course, if you're shooting with a standard or digital SLR, don't hesitate! Shoot now; then, assuming you have the time, refine the camera position, the seeing, and even your thinking for a second, better shot. If you are using a small, handheld camera rather than a large, tripod-mounted camera, you are probably after the immediate action rather than the "perfect" composition. With motor drive or digital cameras you can snap off a series of exposures rapidly, then leisurely pick out the best of the group later. This can be of tremendous value for transient, passing events when you may not have a second chance at composition. Even with motor drive or digital camera, there is a possibility you can improve on the first series by moving slightly to your left or right, forward or back, up or down, before reeling off a few more frames. By doing this often enough, you will slowly evolve into the type of photographer who almost automatically sees the strongest compositional structure as you bring the camera to your eye.

For studio compositions, the subjects as well as the camera can be moved. Place the subject and camera carefully for your initial analysis and composition, then proceed to rearrange the setup—both the scene you intend to photograph and the position of lights (as well as the type of lights used). Move the camera until you achieve the strongest possible composition. The closer you are to your subject, the more critical camera placement becomes.

In a panoramic landscape, it is often inconsequential if the camera is moved a foot or two in any direction (unless, of course, the distant panorama includes nearby elements that relate to the distant ones in essential ways). However, such movement can prove pivotal in architectural or portrait photography, and fractions of an inch may be critical in tabletop or any other closeup photography. They certainly proved critical in my cathedral and slit canyon images.

Because camera position is so important, I have developed a method of searching for the right location and placing my tripod with real precision. When I feel that a scene is worthwhile, I carefully look at it from numerous possible camera positions—an inch or two forward, up and to the right, back and down, etc.—until I find the best possible location for the camera. All this is done with my camera in its case and my tripod in hand. As soon as I determine the best position, I hold the tripod head at my chin and drop its legs down to the ground. When the camera is placed on the tripod, it will be just where my eye was. All too often I see photographers put their cameras on tripods and *then* search for the best location. That approach does not work as well.

■ *When you encounter a scene that grabs you, it is imperative that you respond instantly and spontaneously to that impulse. That doesn't mean you instantly shoot the scene, but that you immediately* investigate *it.*

Focal Length of Lens and Cropping

Camera position must be considered in conjunction with the focal length of the lens used to expose the photograph. Together, the two determine the perspective of the image.

Long focal length lenses (telephoto or similar lenses) tend to compress space, crowding objects together that may be separated in reality. Short focal length lenses (wide-angle lenses) tend to exaggerate space, separating objects that may be close together in reality. Clever use of these effects can produce exciting images that most people may never see in reality. The choice of lens, along with the type of lighting that

■ *I always try to compose full frame, but I recognize that doesn't always work. If I feel an image can be improved by cropping any portion of it, I don't hesitate to crop.*

either exists naturally or that you create artificially can dramatically alter the spatial characteristics of a scene.

If all lenses were infinitely sharp and films were grainless, or if there were an infinite number of pixels on camera sensors, we could easily get by with one wide-angle lens and just crop to the image we really want! That would give us plenty of time to comfortably determine how to approach every image. Unfortunately, we do not have that luxury, so we must burden ourselves with heavy equipment and make decisions on the spot. A key question is this: what should be included in the image, and what should be excluded? Once your decision is made, use the lens that includes what you want, and little, if any, excess.

What about the excess? My approach is to always try to compose full frame, but also to recognize that that doesn't always work. If I feel an image can be improved by cropping (i.e., removing) any portion of it, I don't hesitate. Sometimes the best image lies between focal lengths of lenses that I am carrying; in that case I use the shorter lens, which includes all of the pertinent imagery plus some excess, then remove the excess. My next longer lens might eliminate an important element of the image.

Sometimes my camera format is wrong for the image: I may find a long, narrow image of real interest within a 4 × 5 format, or a square image of great power within a 35mm format. In either case, there is no reason to include the whole image when a portion of it is considerably stronger. There is no reason to be a slave to any particular camera format. God did not create the world in 35mm format, or 2 ¼ format, or 4 × 5 format! Sometimes after composing full frame, I may discover later that a far stronger image lies within a particular portion of the frame. In such cases, I crop. No problem. It's legal.

Some photographers always feel compelled to present full frame images. If you can compose full frame as powerfully and as often as Cartier-Bresson did, then do it! But I don't advise it. Suppose, for example, that you find a camera position that creates a magical relationship between a foreground and a background object, but it includes some major or minor distraction (or even useless, excess information) along one edge. If you print full frame, you get the great relationship, but you're stuck with the junk on the edge. If you move the camera just a bit, you may be able to eliminate the junk, but the primary relationship isn't as compelling. What do you do? I advise you to shoot from the best position and crop rather than compromise by either including the distraction or losing the compelling relationship. Remember Edward Weston's statement, "Good composition is the strongest way of seeing." An insistence on shooting full frame images may compromise that strength.

Depth of Field

Depth of field and shutter speed (to be discussed next) are the two elements of composition unique to photography. (Camera position is somewhat analogous to a painter choosing a "viewer's position" for a painting.) A photographer has the option of bringing virtually everything into sharp focus by closing down the lens to its minimum aperture (i.e., f/22, f/32, f/45, etc.); or, of limiting sharp focus to one plane by opening up the lens to its maximum aperture (i.e., f/2, f/2.8, f/4, f/5.6, etc.) and allowing objects in front of the plane and behind it to fade out of focus. I rarely resort to limited depth of field, though I have on rare occasions (figure 3–15). In general, I tend to prefer imagery that allows the viewer to peruse the scene and get information out of every part of it, but I don't make a rule of that. Limited depth of field can be employed brilliantly.

A lens focuses the image at a fixed distance from the camera, somewhere between the closest possible plane of focus and infinity. By closing down the aperture, you have the option of bringing more than the initial plane of focus into true sharpness. (At maximum aperture, sharpness falls off rapidly

in front of and behind the plane of focus.) If you want to attain sharpness throughout the image, and the scene includes objects relatively close to the camera as well as quite far away, it is best to focus approximately ⅓ of the distance from the closest object to the farthest one. This is known as the hyperfocal distance. Then close down the aperture to the minimum opening. As the aperture closes down from its maximum setting, sharpness increases both in front of the plane of focus and behind it, but not equally. Depth of field (i.e., sharpness in front of and behind the initial plane of focus) increases from the original plane of focus roughly half as fast toward the camera as it increases away from the camera. That explains the reason for initially focusing ⅓ of the way into the scene.

If you focus on the farthest object and then close the aperture, you gain no benefit from increased sharpness behind the farthest object because there are no more distant objects! If you focus on the closest object and close the aperture, you gain no benefit from increased sharpness in front of that object because there is nothing in front of that object, either! By focusing on a plane approximately ⅓ of the distance between the two, you may be able to get all objects into sharp focus as you close the aperture down toward the minimum setting.

There are limits to increased sharpness with smaller apertures. As apertures get progressively smaller, diffraction sets in. Diffraction is the bending of light waves due to the small aperture, which makes the sharpest possible focus progressively less sharp (even at the initial plane of focus) as apertures decrease. At some very small apertures, nothing is really sharp while your depth of field increases... or, to put it another way, everything is "almost sharp" but not truly sharp. This is an especially vexing problem with digital cameras; diffraction interacts with digital sensors in ways that can decrease overall sharpness so much that everything becomes quite unsharp at small apertures. It's important to understand how your equipment works—and how each lens responds—at small aperture settings.

▲ ***Figure 3–15: Corn Lily Curls***
I'm drawn to corn lilies (false hellebore) like bears to honey. Their forms resemble those of slit canyon walls. Allowing the background to softly echo and oppose the foreground forms, with much out of focus, makes an effective portrait of this plant.

With large format cameras that feature movable parts, you can change the plane of sharp focus from one that is parallel to the film and lens planes (which are parallel in fixed cameras) to one at an angle. For example, by using tilts and swings properly you can focus on a receding plane, such as a road going off to the horizon, and obtain complete sharpness from the nearest point to the horizon line at maximum aperture. By using these camera movements, you can obtain the best compromise plane of sharp focus before closing the aperture down, at which time the depth of field increases perpendicular to the plane of sharp focus, both above and below the initial plane: ⅓ above the plane for every ⅔ below the plane. It is often possible to obtain full sharpness with large format cameras when it would be impossible otherwise. Numerous source books fully discuss the use of these movements, but instruction from an experienced large format user is the best way to learn them.

Sometimes you may want to have objects fade out of sharpness. Perhaps you want a flower in sharp focus close to the camera with distant objects appearing blurred. In that case, simply focus on the flower and close the aperture just

enough to get its various parts into sharpness. Everything else will turn into soft-edged blurs that may be thoroughly out of focus and indistinguishable.

I have heard of painters lamenting their inability to create the soft edges and subtle gradations of tonality or color that are the hallmark of soft-focus photographs. Soft focus can be a striking effect, indeed, when well executed. But it must be employed with the greatest care and understanding of its unique effect. Unfortunately the soft-focus aspect of photography is rarely used well despite the fact that it is so frequently employed. Too often, limited depth of field is used as a cover-up to mask unwanted background distractions rather than as a compositional device to create unity among forms and tones. This is especially common in 35mm photography and less so in larger formats. Evidently, many photographers feel a blurred distraction in the background is acceptable whereas a sharply defined distraction is unacceptable. Both are distractions, and both are unacceptable.

Shutter Speed

Shutter speed can be chosen to create a variety of effects. Photographs of moving objects, such as a flowing river, have astonishingly different visual and emotional impacts depending on shutter speed. With a fast shutter speed of ⅟₅₀₀ second, the individual drops in a small cascade may show up clearly. At ½ second, they disappear and are replaced by soft, flowing lines from level to level in the cascade.

At ⅟₅₀₀ second, the tonalities and even the textures of water and rocks may merge. At ½ second, the flowing lines of the moving water differentiate it from the stationary rocks. There may be other situations in which variations of shutter speed are the only effective way to separate objects.

Years ago, Wynn Bullock produced a series of time studies of the ebbing and flowing of the ocean surf on the Pacific coast. The exposures were several minutes in length, allowing the waves to move in and out many times. The effect is surrealistic. Objects that were alternately covered and revealed lie isolated, looking like apparitions surrounded by clouds of dry ice. In viewing these photographs, I was led to deep philosophical questions about the nature of reality. Is reality the scene as it would have appeared at ⅟₅₀₀-second shutter speed? Would reality have been 1 second? Or is reality the lengthy rendition that Bullock revealed? Wherever reality fell for me, my questioning of it while studying Bullock's prints expanded my world and my thinking. His images extended my horizons. To me, that is the essence of creative photography. His method was unconventionally long shutter speeds. Simple enough, but it took a great deal of insight.

Anything that moves within the image area can be altered via long exposures (moving water, clouds, vehicles on a road, people walking across a plaza, etc.). Drawing on the idea of Bullock's images of moving water, I tried to apply the idea to clouds. In figure 3–16, I put a three-stop neutral density filter on my camera to prevent overexposure; then I made a 15-second exposure of fast moving and newly forming clouds at this exceptional summit in the Canadian Rockies. The long shutter speed conveys the impression of tumultuous activity in the atmosphere, exactly my intent in making the photograph.

Most of the time photographers are concerned about eliminating movement in their images. Landscape photographers may wait a long time for a breeze to stop so that leaves, grass, or branches stop moving. Portrait photographers try to make sure that their subjects do not blink or move and harm the image. Surely this is appropriate at times, but there may be more latitude for movement during the exposure than some photographers allow. We have all seen photography in which moving cars are blurred streaks, or experimental photographs in which movement is incorporated into the image. With film cameras, the look of the image cannot be determined until the negative or transparency is developed. With digital cameras, it

◄ ***Figure 3–16: Clouds at Mt. Rundle***
At sunrise, clouds were flying rapidly over the western slope of Mt. Rundle while others were being created off the eastern cliff face. A three-stop neutral density filter and a small lens aperture allowed a 15-second exposure, producing an image my eyes never saw.

can be seen almost instantly. It may be worthwhile to experiment with shutter speeds and open yourself up to visual experiences that can be attained photographically, such as Bullock's extended surf exposures, but that cannot be seen with the eye.

Sometimes movement can create a surprising departure from reality as we perceive it. Try photographing a tree at 1-second shutter speed (or longer) on a windy day as a gust sweeps through the branches. The branches and leaves may appear as a series of swirled lines, but the lower trunk may appear sharp and unmoving. It could prove to be an opening for other creative thoughts.

Relationships

We have now run through all the elements of composition (except light and color, which are covered in chapters 5 and 6). We have looked at them as individual entities separate from one another, but we have briefly mentioned them in relation to the others. In reality, compositions invariably combine these elements to create the total visual effect. They cannot be considered as isolated entities in practical usage.

Lines interact with other lines and forms, within and without patterns. Textures play off one another. Lines radiating out of forms create balance or imbalance; forms relate with other forms to create movement, depth, and variation of

■ *The relationships within an image become the essence of a fine photograph.*

pattern. Tonal variations superimposed over lines, forms, and textures create visual interest.

Of course, in well-crafted photographs these elements (lines, forms, etc.) are not abstract things but real things (tree trunks, faces, clouds, buildings, shadows, etc.). A good artist relates real things to one another as abstract elements to see if they work together successfully, or if they fail.

Let's look again at "Fallen Sequoias" (figure 3–7) as an example of a photograph that works successfully for me. In making the photograph, I walked all around the cluster of standing and fallen trees before choosing my camera position. From that location, the line of the dominant, diagonal sequoia tree was effectively echoed by a clump of fallen branches lying diagonally in the lower right corner. That relationship created a wonderful dynamic in opposition to the stately vertical lines of the standing giants. Lighter lines (trees in the background receding into the fog) and the lines of the small dead tree on the right (vertical trunk and horizontal branches) lend variety and tonal interest to the near uniformity of the vertical trees. All of these things, taken together, make the image work for me.

Always consider the elements of composition in combination. To me, the essence of photography—of all art—is in the relationships that are created. A musical note is meaningless unless combined with others. Rhythms, harmonies, timbres, and other aspects of musical composition must be added before a musical work emerges. The same is true of photography. A line, by itself, is not a photograph, nor is a texture. Balance or imbalance implies a relationship between at least two elements. Photography flowers when relationships exist, when they are made evident either subtly or boldly.

■ *Photographers look for relationships; snapshooters look for "things".*

Just as the sciences advance by finding relationships within their realm of endeavor—and sometimes beyond it—photography and the other visual arts become most meaningful when they relate objects and forms to the viewing public in ways that have never been shown previously.

I cannot overemphasize the importance of this statement. When a photograph includes a bunch of things but shows no compelling relationships among them, it simply fails. It doesn't matter if you walked 15 miles and nearly killed yourself to get the image; if it has no interesting visual relationships, it fails.

All too often a photograph fails because it is strictly an "object" photograph: an isolated object of visual interest. The object exhibits no interesting relationship to anything else in the photograph, and the remainder of the image is strictly background. With rare exceptions, such photographs are mere documentation of objects; lacking internal relationships, they fail artistically.

Even if there is a central object of overwhelming importance, a photograph of it is usually enhanced when it can be related, however subtly, to other elements in the image space. Visual relationships spawn visual harmonies and impart heightened interest. Most photographers start out with an overriding concern with subject matter. As time goes on and they become more sophisticated, their emphasis turns more toward studies of light and form and the wonderful relationships that exist among the elements of the scene—even in the context of a particular type of subject matter that intrigues them.

This does not imply that you should avoid relationships of "things" in your images. The relationships between objects in any scene are of primary importance, but they will become even stronger if they not only relate in terms of object relationships, but also in terms of visual relationships brought about by lines, forms, colors, lighting, etc.

Involvement with the Scene

Just as you must consider the relationships between the various elements of composition, you surely must also consider your basic interest in the scene. In my case, I could possibly put together a well-composed photograph if I think strictly in terms of the elements of composition; but what meaning would it have? Probably none. It surely would not excite me if I have no real interest in the subject.

Nature and the landscape initially pulled me into photography. My interests expanded to architectural objects quite early in my career. Along the way I have periodically done portraits, delved into multiple negative imagery, experimented with fragmented, cubist images, and worked with toning and chemical coloration of images, which increasingly fascinated me, then abruptly lost its fascination. Where I will go in the future is anyone's guess. My main interest is the interrelationships of light and form to create visual dynamism. I find my most pleasing subjects in nature and architecture. I naturally gravitate to those areas, and not surprisingly, I feel that I make my strongest statements there. But I try not to be static in my approach, no matter what I'm photographing.

Yet there are areas I have not delved into and never expect to because they have no interest for me. The abstract details of walls that Aaron Siskind did so well do not move me enough to want to photograph them. The grotesque cadavers and flabby women of Joel Peter Witkin actively repulse me. Whether I like or dislike the subject matter, I will not attempt to produce meaningful work with it if I am not moved by it. At best, I could produce a good but meaningless composition, much like a grammatically perfect speech that says nothing. My photograph would have no internal conviction, and I seriously doubt that it would stir much of a reaction in anyone else. It shouldn't, in fact!

All this relates to the ideas presented in chapter 1 about understanding what interests you and how you respond to those interests, and then conveying your thoughts through a photograph. Unless you have that gut-level involvement, you'll probably *take pictures* but you won't *make photographs*.

If photography is truly a non-verbal form of communication (as stated in the opening sentence of this book), then the best way to fully understand the importance of subject matter in photography is to relate it to the importance of subject matter in verbal communication. Think of great orators, like Winston Churchill and Martin Luther King, and their astounding ability to put their thoughts together in beautifully crafted words. They speak with authority, knowledge, and beauty about the issues that involve them and consume their daily lives and thoughts. But ask them to make a speech about long-distance swimming, and they would be tongue-tied. They have no involvement in the subject matter and no understanding of it, so they would have nothing of importance, insight, or beauty to say. This holds true for photography as well. If you have no interest, involvement, or understanding with what you're photographing, your photographs will not be of interest to anyone else. They can't be because you have nothing to say.

In my workshops, I ask students the following question when reviewing their work: "What are you trying to say, and what are you trying to communicate in the work you're showing us here?" The reason for the question is to force students to express the relationship they feel to their subject matter. In essence, I encourage students to focus more deeply on their own interests, for unless you know yourself well you'll always be groping around for subjects to shoot. You will produce little of interest until you find your area of interest.

Rules, Formulas, and Other Problems and Pitfalls

Before ending this chapter, I'd like to examine several pitfalls that can ruin potentially fine photographs. The first—and worst—is looking for, or following, "rules" of composition. Rules are foolish, arbitrary, mindless things that raise you quickly to a level of acceptable mediocrity, then prevent you from progressing further. Several of the most well-known rules—the rule of thirds, the rule of avoiding a horizon in the center of an image, the rule of having an image read from left to right, the rule of not placing the center of interest in the center of the image, and so many others—are undesirable constraints with no validity. (Just look at Ansel Adams's "Moonrise over Hernandez" to see how many rules are broken.) Again, heed Edward Weston's words that "Good composition is the strongest way of seeing." If your composition happens to adhere to rules, fine! If it happens to break rules, fine! Forget the rules; just make always strong images.

Related to following rules is the common pitfall of following formulas. As an example, if you successfully increased contrast on a softly lit cloudy day, does that always indicate that you should increase contrast on a softly lit sunny day? Of course not! Sometimes it works; sometimes it doesn't! If you dramatically enhanced contrast by using a red filter on a sunny day with deep blue sky and puffy white clouds, should you always use a red filter on that kind of day? Of course not! Sometimes it works; sometimes it doesn't! Your goals may change from day to day—even under similar circumstances—and changing conditions may force a change in your approach. Avoid rules. Avoid formulas. Look at each individual case on its own merits.

Another common problem is the inadvertent inclusion of distracting areas or objects in an image. As photographers, we often get so involved with the object of prime importance that we fail to see distractions that intrude into the frame. How often have you seen pictures of spectacular landscapes marred by such things as power lines in an upper corner or a yellow trash can in a lower corner? Or pictures where the top of a camper-trailer peeks into the bottom of the frame below the waterfall? Or pictures of a friend or relative with a distant tree or phone pole appearing to come right out of the top of his or her head?

These annoyances can be avoided by studying the composition for just a few seconds before tripping the shutter. Run your eyes around the edge of the image—all four sides—to see if there are intrusions that pull your eye from the important areas. I have dubbed this "border patrol". See if there are strong contrasts or bright objects at the edges or corners of the viewfinder or ground glass that may prove distracting. You may be able to crop them out, or you may be able to deal with them effectively in printing, but beware of them when exposing your image. In many cases, simply turning your camera to the left or right, up or down, just a degree or two can eliminate the problem.

Study the whole frame to see what percentage of it is visually interesting. If the frame is filled with unnecessary or distracting elements, eliminate them entirely or at least reduce them significantly. If you cannot reduce these distractions, just enjoy the scene and make a "mental image" of it. You may be attracted to the distant mountain with its mantle of gleaming snow, but it may be 30 miles away and even your longest lens will take in too much of the landscape in front of that peak. *You* may still want the picture, but when you show it to others—people who weren't at your side when you took the shot, and who are responding only to the photograph—they may not react as positively as you expect because you fail to show them anything exciting. You are showing them an expanse of flat land with a little spot of white in the center where that distant mountain stands.

A good memory is better than a bad photograph any day! Discipline yourself to put the camera away without taking the

picture. This is also true for standard and digital SLRs. One of the greatest pitfalls of being able to work quickly is snapping off far too many exposures. It can be almost addictive. But it's rarely productive. Putting the camera away without making a photograph is often the hardest thing to do. Most people seem to have an uncontrollable need to take a picture once they pull out the camera. It's like drug addiction. They quiver and shake if they put the camera away without first pressing that little button on the top. Once they press that button, all is well. It matters little that the image is awful, it was taken and that's what counts!

Of course, that's not what counts. What counts is saying something meaningful, producing something with impact and insight. Millions of people each year take pictures in places of outstanding natural beauty and show them to friends and relatives afterwards. And they say, "You really should have been there." It's undoubtedly a true statement, because the snapshots fail to tell you anything. It was a beautiful scene, to be sure, but not a well-conceived photograph. These snapshots are constantly taken by people with no understanding of the elements of composition that form the basis of a real photograph.

Blurred objects are another pitfall to watch out for. When shooting with 35mm or digital cameras, stop the shutter down to the f/stop at which the picture will be taken just to see if there are any blurred or unseen objects close to the lens that could become fuzzy intrusions once the shutter automatically stops down to the pre-set aperture. This may occur in a forest, for example, where there are cross branches everywhere. As you position your camera, the branch that is inches from the lens and unseen at f/2 becomes an ugly blur at f/16.

The human eye's three-degree angle of sharp vision makes it easy to overlook the distractions that are in the frame, away from points of high interest. You must be aware of the entire picture space in order to direct the viewer's attention to the important areas, not to the distractions. The distractions can often be avoided before the photograph is exposed, but rarely afterwards. Look for such distractions as much as you look for the good compositional interactions because they represent weaknesses in your image. Every good photograph reduces the weaknesses while accentuating the strengths; the finest photographs eliminate the weaknesses entirely.

Sometimes a simple cropping of the final image is all that is needed. Photographers who work digitally or in the darkroom regularly crop their images, but many 35mm slide shooters seem to abhor that concept with a passion. To them there is a pervasive religious feeling that God created the world in 35mm format and nothing should be allowed to violate that sacrosanct shape. Today, however, some of that thinking has thankfully been overcome by those who scan original film transparencies for digital printing, and then they seem more amenable to cropping the scanned image. That's a real step forward. If cropping strengthens the image, crop it! There is no reason to avoid a long, narrow composition or a square format if it enhances the total effect. You may even want to break all the rules by considering a non-rectangular format!

One final technique of composition that is blatantly misused (to the point of abuse!) is the technique of "framing" the photograph. Its misuse can best be explained by example: a distant range of mountains is set in the center of the frame, and along the left edge is a massive, nearby tree trunk, with one branch of the tree hanging in the sky over the mountains. To most people this type of composition is wonderful. To my way of thinking it is atrocious!

Why? Because the dark tree has no tonal, object, or form relationship to anything else in the photograph. If you look at it from a purely compositional point of view, a heavy line or form (the tree) stands at the edge of a lighter form (the mountains), but the two do not interact in any way. True enough, both the tree and the mountains are natural objects, but rarely is there even one other tree in sight that could start to form a compositional relationship. The tree relates no more to the

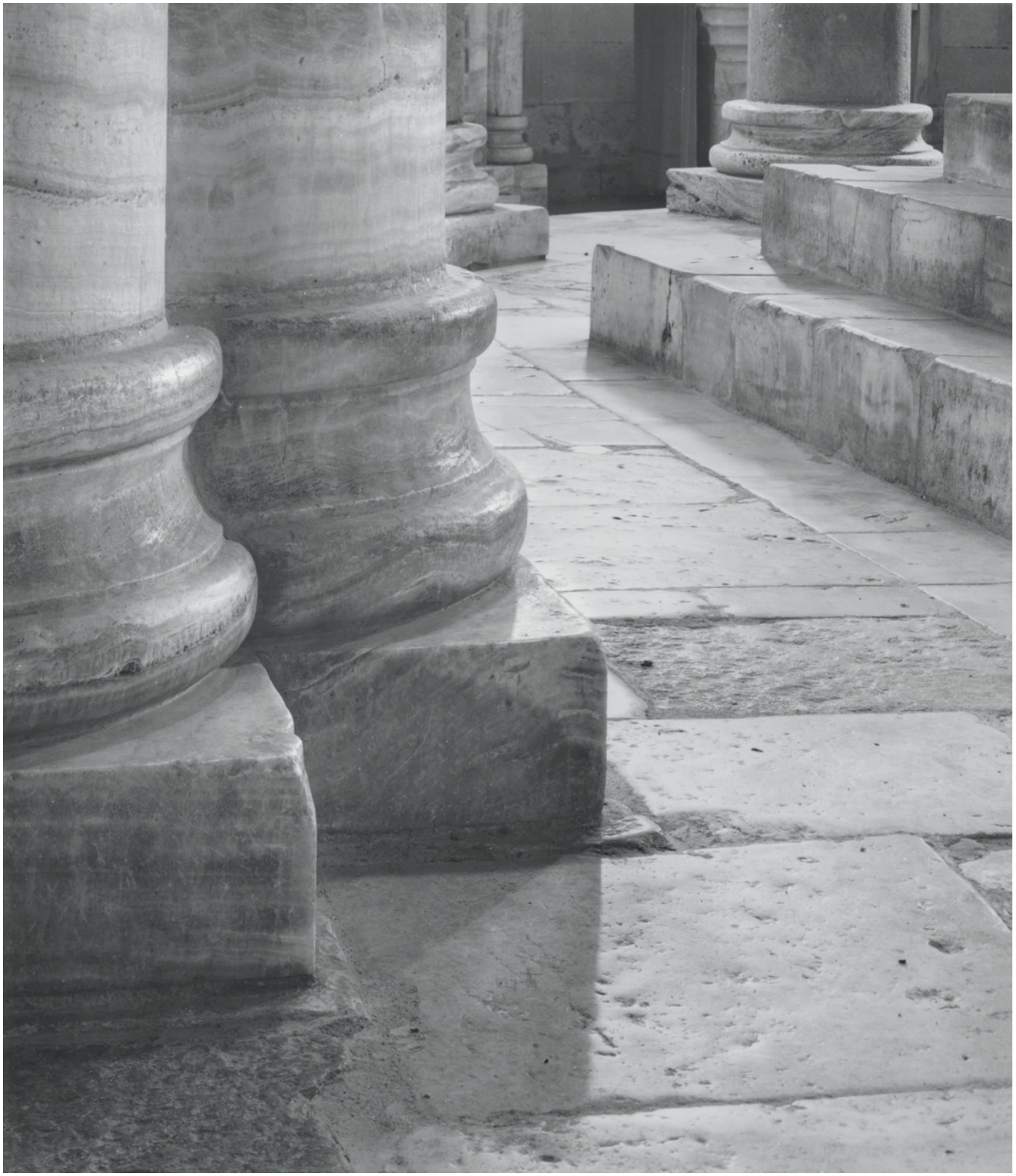
■ *The human eye's three-degree angle of sharp vision makes it easy to overlook the distractions within the frame, away from points of high interest. Beware of that tendency.*

mountains than a lamp post would. Furthermore, there is nothing aesthetically pleasing about cutting off the image with the dark mass of the tree trunk. Unfortunately, this wretched misuse of compositional technique is so widely seen that most people accept it and many even love it. I strongly urge you to avoid it!

Generally, framing is used in an attempt to create an impression of depth and "presence", yet framing of that type is meaningful only in the *scene,* not in the *photograph.* The intent may be good, but the method used to achieve it is inappropriate. It is the perfect example of the difference between merely "seeing" and "photographic seeing".

Framing a scene can be highly effective if the framing element relates to the scene in terms of object, or tone, or both. A tree along the left edge could relate to a forest of other trees. An abandoned piece of mining machinery seen through the doorway of the mine entrance could be appealing, if not compelling. Examples of effective framing abound. They should be used. But use them when they have compositional integrity with other elements in the frame. Unify the photograph with elements that interact logically, not with objects that disrupt the overall composition.

► ***Figure 3–17: Abazio St, Antimo, Italy***
The marble floors, columns, and walls of this small monastery in north-central Italy seemed almost translucent in the midday light. I wanted to concentrate on the overwhelming feeling of light throughout the space, while imparting a feeling of translucency to the marble.



CHAPTER 4

Visualization

THE CONCEPT OF PHOTOGRAPHY as a form of nonverbal communication is a philosophical one. But it's a very important truth, based on the fact that we all show our pictures to others and we all want to get a response. That alone proves it is indeed a form of communication.

The meaning of composition and its specific elements are theoretical. Both are forerunners of actual photography. They form the foundation for fine photography—and for all visual art—and they must be understood by all creative photographers.

The actual making of a photograph starts with visualization, which is comprised of four steps:

1. Photographic looking and seeing (two very different things)
2. Composing an image
3. Envisioning the final print
4. Planning a complete strategy to attain the final print

Let's look at each of these steps in turn and then we'll look at some alternative approaches.

◀ ***Figure 4–1: Machu Picchu in the Mist***
The Inca understood spectacular landscapes, locating major centers in awesome settings, but none comparable to Machu Picchu. My intent was to highlight the mystical scenery with little more than a reference to the structural remains for context.

Step 1: Photographic Looking and Seeing

Visualization starts with looking and seeing—in-depth looking and seeing, rather than the casual perusal that we all do in our everyday lives. We go about our daily tasks in a routine manner, allowing visual input to slide in and out of our eyes and brain. It is not important to note every detail about a doorway in order to walk through it without smashing your shoulder on the doorjamb. If we stopped to analyze our visual input at all times, we would never accomplish anything. But when we turn to the effort required of photography, our seeing must be much more thorough and intense. In photography, we accomplish nothing unless we analyze everything. We must search for those elements that can be put together to form a photograph.

A corollary to this is that when you look for things to photograph, you start to see everything more intensely. You and your eyes are not just wandering aimlessly, for if you randomly look without carefully inspecting and thinking you see nothing and learn nothing. Photography requires work. The work begins with careful looking, analyzing and thinking. Soon you start to see things in areas you would have overlooked previously. Of course, when you put these "overlooked" items into a photograph, you have to make that photograph compelling enough that the viewer wants to stop to look at it! Let's face it; if your photograph is as easily overlooked as the items themselves, you've accomplished nothing.

You'll find it important not only to look carefully, but also to draw on your interests to provide deeper, more personal meaning to what you see. I feel that this combination of elements has given me greater appreciation of my surroundings and has led to photographs I may not have made otherwise. My experience is not unique. Yours will probably be similar if you follow your interests.

"Looking" is one thing; "seeing" is quite another. Two people can look at the same thing and one will see a great deal while the other sees nothing. (Of course the person *sees* something, but finds no *meaning*.) Just as an experienced detective can inspect a crime scene and find numerous clues that the average person would overlook, so the perceptive photographer can see compositions where others look, but see none. The difference between seeing and not seeing is *insight*. Insight is the element that separates the detective from the layman, the great photographers from the ordinary ones. Whenever you gain further understanding and insight into the subject matter you're photographing, you'll make photographs that progressively penetrate deeper into the essence of that subject. Furthermore, as you gain insight into your own areas of interest (i.e., *what* excites you, *why* it excites you, *how* it excites you), you'll discover new areas to photograph—perhaps not immediately, but in due time.

Of course, much of this is inevitable. I don't know a landscape photographer who doesn't learn about geology, natural history, weather patterns and other things related to the landscape. Portrait photographers gain insight into people and how to work with them more effectively as time goes by. The same is true of photographers in every other specialty. Look at the astounding work of Henri Cartier-Bresson to see how he gained insight into events as they unfolded, developing an uncanny ability to snap the shutter at "the decisive moment". With increased insight, you'll be able to analyze a situation more quickly to determine whether it's worth pursuing and how to best approach it.

Step 2: Composing an Image

Once you've decided to make a photograph, you proceed to the second step of visualization: composing the image. At this stage you choose your camera position and lens focal length (see chapters 2 and 3). You determine whether the image is strongest where you have the camera, or whether you can

strengthen the visual relationships by moving it to the left or right, up or down, or forward or backward a few inches or several feet.

Consider several things while studying the scene. First, how well do the objects relate to one another compositionally—their overall balance, the relationship between positive and negative spaces, and the thrust or movement of forms and lines within the composition? Do the objects have cohesive forms, or is one or more objects distinctly different and out of character? That may be precisely what you want, but always be aware of what you want as opposed to what you actually have! For color photography, look at the objects as abstract masses and analyze their color balance and the blending of colors within the composition. (This will be fully discussed in chapter 6.) For black-and-white photography, consider the gray tonalities and their relationships. Beware of tonal mergers, especially those that may not be apparent to the eye in a colorful scene.

Second, in both color and black-and-white, search for distractions in the foreground and background. Look for "dead areas" where nothing is happening compositionally to enhance the image. Reduce and eliminate those problem areas wherever possible. As the noted American painter and teacher Robert Henri said, "The eye should not be led to where there is nothing to see."

Third, envision the contrasts of the final print and see if your desired tonalities are even possible under the existing circumstances. It is rare that the scene—and the lighting on it—gives you exactly what you wish to show in your envisioned print. You may want to brighten one area or darken others. These alterations may be possible. If you're aware of the shortcomings while you stand behind the camera, you can begin to formulate a plan to cope with them in the exposure and development of the negative and in the printing of that negative.

For example, in 2009 I made my first trip to Peru and the storied Inca ruins at Machu Picchu. Though I had seen many photographs of it, and thought I knew what to expect, I was stunned by the reality—or shall I say the *unreality*—of it. My first photograph there was intended to show the almost dreamlike quality of the setting: mountains upon mountains upon mountains, mostly hidden in the mists of the Western Amazon cloud forest. But contrast was low in those distant mists, so I had to envision how I could enhance that low contrast while revealing a bit of the Inca ruins—just enough to put them in context—and then allude to the remarkable setting that appeared like an apparition (figure 4–1). A full discussion of the technical steps needed to properly expose a film negative or a digital capture and then enhance the contrast is found in chapters 8–11.

Analyze the light on the scene, seeing how it is at the moment versus how it could be if it were perfect for your intentions (chapter 5). In other words, is it highlighting exactly the things you want highlighted, and is it doing so in the intensity you would prefer? Outdoors, where you likely cannot control the light, see if unfavorable lighting conditions can become favorable (e.g., if passing clouds might move to locations that would improve the relationships of light and shadow). Indoors, where you may have complete control of the location of lights, the type of lights (e.g., diffuse, direct, reflected, spotlights, floodlights, flash, etc.), and their intensity, you must optimize the lighting to suit your purpose.

Also determine whether any filters can enhance the image (see chapter 7 for a complete discussion of filters). Filters are valuable tools that can alter the tonal balance between items of various colors in a black-and-white photograph. Digitally, you can alter relationships between colored objects later via channels in Photoshop. Try to be aware of how you can accomplish that while you're behind the camera, for that's a critical part of visualization. In traditional color photography, filters can either retain or alter the color balance that you want for

■ *As the noted American painter and teacher Robert Henri said, "The eye should not be led to where there is nothing to see."*

the overall scene. But color balance can be altered greatly during printing, both traditionally and digitally.

Finally, select the optimum aperture and shutter speed to give you the depth of field you want, along with the ability to stop or blur any motion in the scene. These considerations must be made carefully to obtain a proper exposure for your negative, transparency, or digital capture.

All of these issues must be solved while you're behind the camera. You can't alter the camera position or the lighting after you've left the scene. You have to determine right there on the spot whether or not they're working for you.

Step 3: Envisioning the Final Print

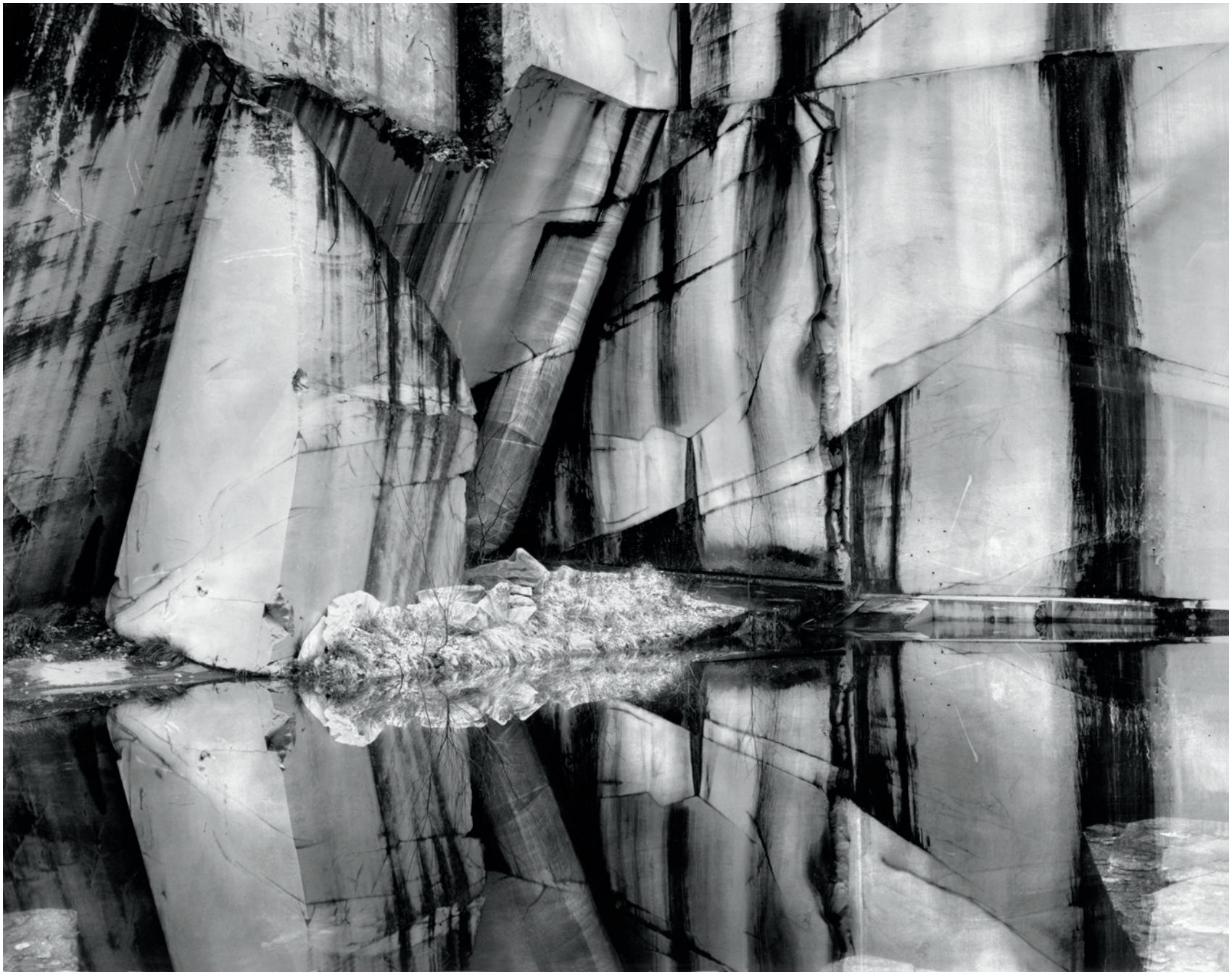
It should be obvious from the title of this subsection, as well as the writing that precedes it, that these steps are done simultaneously rather than in succession. For example, Step 2 depends on envisioning the final print in order to determine if a filter will enhance the image, or what type and intensity of light is best for your purposes, or if contrast needs to be increased, decreased, or remain the same. (See chapters 8, 9, and 11 for discussions of contrast control.)

It turns out that the most difficult part of visualization is envisioning the final print you wish to make while looking at the scene—i.e., translating the scene into the photograph. Unless you made a tabletop model to photograph, it's highly unlikely that you created the scene in front of your camera; yet, you are always the creator of the photograph. The scene is three-dimensional; your photograph is two-dimensional (even though it alludes to three-dimensionality). The scene has color in it; your photograph may be black-and-white. If so, you may want to increase or decrease the inherent contrast of the scene. You may want to darken or lighten portions of the image in relationship to other portions. If you're working in color, you may want to alter the contrast, light/dark relationships, and the overall hue of the scene, as well as intensify or subdue the color saturation.

There are profound differences between the actual scene and your image. In fact, the differences are considerably more profound because your response to the scene also depends on nonvisual sensory input—sounds, smells, temperatures, breezes, and the feel of things near you, as well as your state of health and your state of mind. These things are not visual, yet they all contribute to your reaction. So how can you possibly distill all this sensory input into an 8 × 10, 11 × 14, or 16 × 20 two-dimensional image with any hope of capturing the original? In a very real sense, it cannot be done! The photograph is distinctly different from the scene, and as a result it is foolish to attempt to "capture the scene". Instead, attempt to *convey the mood* that the scene impresses upon you.

Be aware of the fact that even our language tends to confuse us about the profound differences between the scene and the photograph. For example, we often look at a photograph and hear, "That's my son Billy playing football" or "That's the cabin where we stayed at Grand Canyon". Of course, it's *not* Billy, but a snapshot of Billy, and it's *not* the cabin, but a picture of the cabin. Thus, our very words tend to confuse the photograph and the scene. Beware of this trap! Do not confuse the two! (See figure 4–2, which is *not* the Arni Marble Quarry in the mountains of northern Italy, but a *photograph* of it as I envisioned it in April 2001.)

We must be able to distill from the scene those elements that can translate to a visual image capable of conveying the desired mood. This involves the elements of composition discussed in the previous chapter, along with the elements of understanding of your own viewpoint discussed in chapter 1. By combining your perceptions of the scene with your reactions to it, then using the tools of photography to present your interpretation to the viewer, you may be able to convey the mood you actually felt. You may even be able to heighten that mood.



▲ ***Figure 4–2: Arni Marble Quarry***
The mirror reflection transformed the 500-year-old quarry—perhaps the source of some of Michelangelo's greatest statues—into a kaleidoscope. Without the reflection, the photograph would have lacked the explosive force. To produce the effect, the reflection is printed at significantly higher contrast and much lighter than it would have been without darkroom manipulation. This is not the scene I saw, but one I created through exposure, development, and printing.

■ *While you're behind the camera—standing at the scene—you're thinking about how to print that photograph.*

As it turns out, most people are stuck at the level of "reproducing" or "being true to" the scene. True photographers go well beyond the scene, using it as a springboard for their own creative/interpretive goals. If your goal is to capture nothing more than what you've seen, your opportunities for creativity are limited. Those who take pictures without looking at the compositional elements or thinking about the final print (or those who shoot because the husband or wife said that we really *should* have a shot of this!) are just taking snapshots. Rarely do passing tourists think about lighting, or how the light will change in another hour or tomorrow morning. Rarely do they consider the underlying elements of composition. Usually, the motivation is to shoot now because they won't be there later, so "better get it now!" Too often that attitude leads to exceptionally boring snapshots.

I suggest that it's better to have a good memory of a wonderful scene than a bad photograph of it, which will eventually become your memory of it. If you're willing, able, and desirous of going beyond the scene, your creative potential is unlimited. Not only can you show the viewer what is important to you, you also can create whole new worlds. Minor White said, "We photograph something for two reasons: for what it is, and for what *else* it is." Those are words to live by.

Creative photographers realize that conditions may not be ripe for an effective photograph even while they enjoy the most magnificent scenes. Ansel Adams did not photograph Yosemite Valley every time he was there, though I am sure he marveled at it each time. He photographed when extraordinary conditions made it *photographically meaningful.*

Step 4: Planning a Strategy for a Final Print

The final step of visualization is planning a strategy for achieving your final print. This involves determining your optimal exposure and development of the transparency, negative or digital capture, along with the method of printing it to achieve your goals. *This means, in essence, that while you're behind the camera—standing at the scene—you're thinking about how to print that photograph in the traditional or digital darkroom.* (The technical aspects of these considerations are found in chapters 8–11.)

At first, the notion of thinking about the printing process while standing behind the camera may strike you as distinctly odd, or maybe even distinctly impossible. In fact, it's essential. You've done much of the work already: you decided to set up your camera at a specific point in space and aimed it in a specific direction with a carefully chosen focal length lens. You may have put a filter on that lens to help achieve your desired image. You chose an exposure (i.e., a combination of aperture and shutter speed) to properly record the image and determined how to develop that negative (for black-and-white film). Digitally, you may have made more than one exposure for full capture, so you must think of how to combine them into the final image. So the only remaining decision is how you'll print it. Once you learn to do that, you'll be mapping out a complete strategy from beginning to end for achieving the image you want. You'll be integrating the whole process rather than doing it piecemeal.

This is how art is done. It's impossible to imagine Bach, Beethoven, Brahms, or Shostakovich writing random notes for a major composition without a rather complete feel for the entire work. It would be equally impossible to imagine Dante, Shakespeare, Dickens, or Twain starting any major book or play without a complete idea of where the writing is going and how it will get there. Did Michelangelo start hacking away at a hunk of marble without envisioning a final product? Do you think Rembrandt, Van Gogh, Cezanne, Picasso, or O'Keeffe started dabbing paint on a canvas in the upper right corner, then continuing toward the lower left corner arbitrarily, or do you think each of them had a very complete idea of the finished painting right from the start? The answer is obvious. So,

in the same way, it's up to you to work through the entire process in your mind to avoid making bad decisions that could derail the whole process.

Let me give a simple example and briefly outline both a traditional film approach and a digital approach. Suppose you're looking at a landscape with brilliant cumulous clouds towering above. The ground (i.e., the landscape below the huge clouds) may be an area of low contrast, but the clouds are extremely bright. If you're shooting film and recognize while you're behind the camera that you can darken the clouds by "burning" them when printing (i.e., giving them more exposure under the enlarger), then you don't have to worry about the contrast when you expose and develop the negative. But if you simply look at the full contrast range without giving thought to the printing stage, you might decide to lower the overall contrast to encompass the brightness of the clouds—which would have the unfortunate effect of making the low contrast on the ground even lower. This would give you a rather "muddy" print. That's not what you want.

When you think about printing while standing behind the camera, it creates a feedback loop that helps you determine your best exposure and development at the scene. If you're shooting digital, you may need multiple exposures: one for the darker ground and perhaps several for the brilliant clouds. Later, you can layer these exposures and work on the local contrast of each portion on the computer (chapter 11).

If you study the scene for compositional elements while simultaneously projecting forward to the final print, even while swooning over the scene, you can avoid the trap of making "record shots" (snapshots that simply tell everyone, "I was here"). When you think in terms of the final print right from the beginning, your percentage of successful exposures will rise dramatically. Without such foresight, you are simply exposing for the scene and hoping for a photograph. You'll be lucky to get one!

Always keep in mind that *you* control the final print. As you begin to comprehend the extent of that control, you will see not only good scenes that can translate into fine photographs, but also ordinary scenes that can serve as a basis of equally fine photographs. Photography is a creative endeavor. The final print is *your* creation. Do not limit yourself to *capturing* the scene as you see it; start to think in terms of *interpreting* the scene and creating a work of art, a personal statement.

How Your Eye Differs from Your Camera

In chapter 2, I detailed how scientific studies prove that the eye sees only a small area sharply and that it jumps around a scene, seeking the important parts and filling in the rest rather casually. That scientific underpinning leads to my definition of good composition as the artist's method of "de-randomizing the eye's motion" through an image.

Let's delve deeper into the consequences of the eye seeing only small areas sharply while jumping around a scene. As the eye looks at a bright area, the pupil tends to close down quickly in order to allow you to see it without being blown away by the brightness. Then the brain turns down the brightness still more so that it doesn't overwhelm you. When you glance at a dark area, your pupil dilates—or opens up—to allow you to see into that dark hole. Again, your brain helps open up that dark area so you can see it better. In other words, you look at any scene through multiple apertures.

But when you set the aperture for your camera, you expose the entire scene at one preset aperture. That's quite different from the way your eyes see. So don't be fooled. Your eyes do not see the scene the same way that a camera sees it. In fact, your eyes can and *will* fool you. Recognizing the differences can help, but the fact is that much experience is necessary to overcome them. Even then, there will be times that you'll be fooled. That's why it's important to use a light meter with

traditional photography or study the histogram with digital photography—the "truth tellers"—to give you factual data about the true light levels and relationships of light within a scene. Sometimes the information the meter or histogram gives you will be astonishing, telling you that something is not nearly as bright as you think it is, or that it's much brighter than you'd thought. Knowing the true brightness level of various objects will also give you important clues about the problems you may face later in printing the image to your satisfaction.

Alternative Approaches

The approach detailed above of envisioning the final print while standing behind the camera, and creating a strategy for achieving it, is known as "previsualization". I stated above that this is how art is done. But it turns out that there are variations and other approaches.

A different form of previsualization is regularly used in street photography. You may find a location that looks good to you, so you set up your camera, waiting for some unexpected action to take place in that setting. In essence, you've chosen a stage setting and you're waiting for the actors to show up, but you don't know who they are or what they'll be doing when they arrive. André Kertész, Henri Cartier-Bresson, Sebastiao Salgado, Mary Ellen Mark, and Craig Richards often rely upon this form of previsualized surprise.

Previsualization can be augmented by postvisualization. Discovery by postvisualization (or "postrationalization" as some have dubbed it) can take two forms. First is the discovery of a previously unseen quality in a print, one that makes its presence known only after the print is seen. A prime example is Paul Caponigro's study of an apple, titled "New York, 1963". Originally intended to be a photographic tone poem of the texture of a common apple, Caponigro saw in his first prints a pattern of white dots on the apple's skin—and ambient light reflected off the skin—that reminded him of astronomical photographs. Seeing the unexpected quality, Caponigro printed the image darker and more contrasty to pursue his new vision more effectively. The final print truly evokes a feeling of intergalactic space. Only careful scrutiny reveals the apple as the basis of this remarkable print.

Finding an unexpected quality in a previsualized photograph can be a real surprise, but it occurs periodically. If it happens to you, pursue it, because you may discover whole new worlds. Everyone has heard of scientific discoveries made because of an error in an experiment. The same thing can happen in photography if you consider the unexpected as an opportunity and ride the consequences through. In this type of postvisualization, there can be a realization that the print evokes a feeling different from—or even opposed to—your original intent. As with Caponigro, further thought may prove that the newly discovered statement is worthwhile, and a new approach to printing may further strengthen the altered concept.

The second form of postvisualization is more familiar: the unexpected discovery that cropping, or another alteration of the previsualized print, strengthens the intended statement. This is different from an *expected* cropping made necessary because you don't have the precise focal length lens you need, or because the aspect ratio of length to width is different from that of your camera (e.g., you have a square format camera but you want a 4 × 5 image, or vice-versa). This form of postvisualization should be regularly practiced by all photographers.

Another form of postvisualization is the one used by Jerry Uelsmann. He starts by shooting whatever strikes him as interesting without analyzing why it interests him, what he wants to say about it, or how he wants the final print to look. Later, he combines these images to build a final image from components of the original photographs. Sometimes he may incorporate four, five, six or more negatives to build his final

image, which usually has a decidedly surreal quality. This approach relies heavily on editing or experimentation or both, and it regularly opens unexpected avenues—a rare occurrence in photography that relies on previsualization alone.

Uelsmann's surrealism is, appropriately enough, an unusual combination of postvisualization and previsualization—in that order! He photographs anything of casual interest to him with no forethought to the final result. Later he searches through his contact proofs for potential combinations that can produce unusual, bizarre, or decidedly surrealistic effects. At that point he starts to previsualize a final image to be cobbled together from combinations of the proof prints. It is indeed an unusual approach, and undoubtedly an exhilarating one, for Uelsmann has no idea what the final result will be when he exposes a negative. He doesn't even know if the thing photographed will ever become part of one of his photographs.

Postvisualization is a prime ingredient of photomontage, in which a number of photographs (in combination, perhaps, with other visual art forms) are meshed together to form a final work. Multiple exposures, on the other hand, generally rely on previsualization and advanced planning. Rarely is an unintentional double exposure effective, though there are some spectacular examples of such fortuitous errors.

The conclusion of all this is twofold. First, numerous methods of arriving at the final print are valid. Second, the comments about communication near the end of chapter 1 take on added importance. Whether the final print is a product of pre- or postvisualization, or a combination of the two, your goal is to elicit a response from the viewer. It is disheartening to show a print that evokes no response other than boredom. Even a strong response that is the opposite of your intent may be better than nothing. For example, imagine the feeling that Caponigro might experience if, after altering his apple print to evoke a feeling of cosmic space, the first viewer glanced at it and exclaimed, "What a wonderful apple!"

▼ ***Figure 4–3: The Sawtooth, Cottonwood Canyon***
Cottonwood Canyon in Southern Utah is a geological and visual wonder with new and different surprises popping out throughout its length. Severe cropping eliminated unnecessary sky and foreground brush from the full 4x5 negative, focusing attention on the spectacular set of uplifts forming the Sawtooth. This is how I initially envisioned the image.

CHAPTER 5

Light

THE IMPORTANCE OF LIGHT IN PHOTOGRAPHY cannot be overemphasized. Light, in fact, is the central issue. The word *photography* was coined by William Henry Fox Talbot when he made the first negative/positive image in 1839. It was an amalgam of two Greek words, *photo* (light) and *graphy* (to draw). Fox Talbot saw photography as a means of "drawing with light".

The only thing recorded by film and sensors is light. They have no understanding of subject matter. Film and sensors do not recognize faces, trees, buildings, sunsets, etc. They only recognize levels of light. A sharp lens focuses those levels of light on specific areas of the film plane or sensor. Neither film nor sensors recognize lines, forms, relationships among them, or any of the other elements of composition. You have to recognize those things, select them in the viewfinder, and make your exposure to maximize them. The film or sensor then records the light levels it is exposed to for the length of time the shutter is open.

Light is the essence of photography. Knowledgeable photographers realize that they are not photographing objects, but rather light and the way it delineates objects or is emitted by them. Photography is the study of light, the perception of light, and the interpretation of light. Lines, forms, and shapes appear because of the way light reveals those various compositional elements, not solely because of the forms themselves.

Light must be used as a means of directing the viewer's eye as you, the photographer, want the viewer's eye to be directed. In chapter 2 we discussed how the eye jumps to the brightest or most contrasty areas first. This physiological fact indicates that light alone can be used more effectively than lines or forms—or any

◀ ***Figure 5–1: Sequoias and Sunburst***
Mid-morning, with a touch of fog hanging in the air, I photographed directly toward the sun with the huge sequoia tree blocking it from the lens. The ample exposure retained full detail on the backlit trees and in the huge root ball. The unrivaled brightness range of film allowed me to hold detail everywhere, from the deepest shadows to the brightest highlights.

► ***Figure 5–2: Silver Sunlit Dunes***
Axis light—sun directly behind the camera—is difficult to work with because it tends to flatten the scene. Here, mid-morning axis light produced a pewter-like sheen on the Death Valley dunes, with sensuous forms coming to the fore.

other element of composition—to direct the eye. In fact, light is the most important element of composition because it determines form.

Light is so important that it is necessary to become an expert in every aspect of light, from its bold qualities to its subtle nuances. When you are engaged in composing a photograph, there are two considerations about light that should be of prime concern to you. The first is how light distributes itself on the ground glass, viewing screen, or LCD. Look at the light and dark areas, light and dark spots, light and dark lines, etc., to see if they attract the eye toward important elements or insignificant elements within the composition. In doing so, identify the brightest of the light areas and the darkest of the dark areas—in other words, the areas that stand out the most. Those are the areas that will draw the eye most forcefully.

You must also understand the type of light (also known as the "quality of light") available to you, and see if it is the type of light you want for the mood you're attempting to convey. Is it strong sunlight on a perfectly clear day, hazy sunlight, overcast light, or foggy light? Is it overhead midday light, sunrise light, or low, directional sunset light? Is it backlight (coming directly toward you) or axis light (coming from directly behind you) (figures 5–1 and 5–2)? Is it ambient lighting from sources you can control, such as spotlights, floodlights, or light boxes? Is it indoor light from a window or from overhead lights or lamps? Whatever it is, you must determine whether

it is compatible with the desired mood. If you're outdoors, you can wait for the light to change to something better for your purposes; if you're indoors, you can probably change the light at will. Don't waste film or useless digital captures until the desired changes occur.

Don't confuse *quality* of light with *quantity* of light. Most non-photographers equate good light with an abundance of light. They're wrong. As any good photographer knows, you can keep the shutter open for long periods of time when the light is dim, or you can have extremely short shutter speeds when the light is excessively bright. So you can control the *quantity* of light under almost all circumstances. But you may not be able to control the direction, color, sharpness, or diffusion of light in all cases, and those are the things that fall under the category of *quality* of light. If you want strong cross lighting from the sun to bring out the crags in a mountain, but it's an overcast or hazy day, you'd be better off enjoying the view of the mountain than photographing it. If you want strong cross lighting to bring out the crags in a person's face, but you have only soft room light rather than a sharp spotlight to work with, you should walk away from that photograph as well. Only when the quality of light you want and the light you *actually have* coincide can you make the photograph you want.

Therefore, it is necessary to understand how these qualities of light can be modified photographically. By first recognizing the qualities of light as they exist, and then understanding how they can be maintained, intensified, or subdued, you place yourself in firm artistic control. You also place yourself in the position of determining a strategy to achieve your goals. Just as a painter controls what goes on the canvas, a photographer must control what goes onto the camera's sensor or photographic emulsion first, and onto the final print in the end.

Looking at Light

The perceptive photographer *first* looks at the distribution of light within the frame, and *then* looks at the objects—the things—in the picture. Of course, you're first drawn to a scene because of the *objects,* but once you grab the camera, you must stop thinking in terms of objects and concentrate on *light*. If the light alone draws the eye to the proper objects—the ones you want to emphasize—the composition may be very strong. (Remember that good composition is the art of directing the viewer toward the most important elements of the photograph.)

■ *Most non-photographers equate good light with an abundance of light. They're wrong.*

Furthermore, the light should serve to hold viewers within the photograph rather than catapult them away from it. It's so easy to get caught up in subject matter (the "things" within the picture) that you fail to notice that the brightest area is the upper left corner or the right edge. An oversight like this can undermine the photograph entirely. It's possible that there is a valid reason to place the brightest area in the upper left corner or the right edge or any other location within the image (after all, there are no compositional rules in photography), but you should be aware of it and do it deliberately with a purpose in mind. Accidental compositions are rarely successful.

■ *You're first drawn to any scene because of the objects, but once you grab the camera, you must stop thinking in terms of objects, and concentrate on light.*

Not only should you study where the brightest lights are distributed throughout the image area, but also see how bright they are in relationship to other areas—and, conversely, how the darkest portions of the scene compare to other areas. Can you work with those areas? Can you keep them in play? Or are they so far out of line that they can't be worked with, no matter how hard you try? Some of the answers come from basic sound thinking, some of them from experience. You'll have to try and fail a few times—and learn from those failures—to know the limits of what you can and cannot do. Furthermore, as your technical skills improve (either traditional or digital), you'll expand the range of what you can work with.

Don't be heavy-handed in your use of light. It's wise, for example, to fight the urge to place the brightest area at, or near, the center of every composition. Such repetitive compositions quickly become boring and they indicate an inclination to "play it safe" artistically. You can play it safe for only so long before viewers lose interest or patience. It's not a good idea to compose according to a predetermined formula, but rather to judge each photograph according to its unique circumstances. For example, it may be powerful to direct the eye to a corner of the image by clever placement of light. Sometimes such unusual and risky lighting can be immensely effective. Above all, you must fully recognize the overriding importance of light and its placement within each composition.

Exercises in Learning to See Light More Accurately

Here's a good exercise to improve your understanding and perception of light. Whenever you think of it—driving to work, sitting at the office, out with friends—quickly frame a scene and determine the brightest and darkest spot within the frame. This may seem trivial at first. It isn't. As you continue with the exercise, you will start to see things you missed at first. While stopped at a red light on your way to work, you might frame a scene that includes cars, buildings, street signs, and other common urban objects. Immediately, you note that the painted white line on the street is the brightest thing, but further study shows that the glint of sunlight off a car's bumper is far brighter. Similar surprises may occur on the dark end of the scale. The black asphalt of the road may initially seem to be the darkest thing in the scene, but the open end of a ventilation duct on the side of a building may prove to be far darker.

As you continue with this simple exercise, you sharpen your seeing immensely. You then realize that you are seeing every aspect of a scene much more intensely. If you have a 1° spot meter with you to check your perceptions, that will help a great deal. For example, you'll be amazed to see how sunlit black asphalt on the street turns out to be amazingly bright, even though you perceive it to be black.

Next, you can speculate about what would happen under other lighting conditions. On a cloudy day, there would be no glint of light off the bumper. What would be brightest object in the scene under those circumstances? As you peruse the scene for the answer, you start to envision it under alternate conditions. You begin to understand how different lighting would affect the scene.

If you are out photographing, you can begin to envision how the scene would look under altered conditions as well as under the circumstances at hand. You may determine that the photograph would be better if it were made under other conditions. An hour's wait would put the sun lower in the sky and perhaps produce an enhanced effect. It may turn out that cloudy conditions would be best of all. If you determine that conditions are not optimal, you may be able to wait for them to improve. If you aren't sure, make an exposure under existing conditions and again under the desired conditions, and then compare the two to determine which works best for your purpose. Along the way, you will learn a great deal about light and about your response to various types of light.

Light Determines Form

Look carefully to see how light affects lines, forms, and the relationships between objects in a scene. You'll see that light is the determining factor. As an example, start with a single tree that has two branches, one above the other. Let's suppose it's a dead tree or a deciduous tree in winter, i.e., a tree with no leaves. The branches are smooth and clean. What's the difference in appearance between the two branches at noon on a sunny day versus noon on an overcast day?

▲ ***Figure 5–3: Live Oak Forest, Sapelo Island***
A thin, overcast cloud cover evened out the light on the live oak trees, bent like well-manicured bonsai. Sunlight would have created a patchwork of light and dark splotches. Soft light allowed each trunk, branch, and leaf to stand out unbroken and undisturbed by shadows from higher limbs. I had full control of contrast through negative exposure and development and printing techniques, but I could not have altered the light had it been patchy.

On a sunny day, the upper branch may cast its shadow across the lower one, but the upper branch may be fully lit by sunlight. Both branches are physically continuous, of course, but the lower branch appears *photographically discontinuous* because of the shadow that interrupts its tonal continuity. It's sunlit at one end, suddenly dark in the center, then sunlit beyond the shadow. For photographic purposes, it is effectively broken into three distinct sections. The upper branch has no such tonal discontinuity, so it is both photographically continuous and physically continuous.

On a cloudy day, however, where no shadows are cast, both branches are photographically continuous and physically continuous. There are no tonal breaks along their entire lengths. This shows how light alone can alter the form of an object for photographic purposes. In fact, from a photographer's point of view, light determines the form of those two branches. On a cloudy day, the branches are photographically and physically continuous, but on a sunny day the lower branch is no longer photographically continuous, even though it is just as continuous physically.

■ *Light determines form.*

There are also other subtle differences. On the sunny day, the sunlit upper portion of each branch is extremely bright, then there is a sharp tonal jump to the shadowed lower portion of each branch. Yet on a cloudy day the brightness on the upper branch gradually grades to a slightly darker bottom. Thus, a cross-section of the branch on a sunny day could just as well be that of a diamond-shaped object as a circle, but on the cloudy day, the soft gradation of light reveals that it is indeed a circle.

This simple example tells you that when you get behind the camera you have to look at light rather than at subject matter. "Photographic seeing" is very different from "everyday seeing". In everyday seeing, there are two branches coming out of the trunk that are physically continuous. In photographic seeing, you recognize that on a sunny day the lower branch appears as three separate pieces; the two end pieces relate to one another, but the shadowed piece in the center does not relate to either of them.

Now visualize a whole forest of trees under sunny or cloudy conditions. On a cloudy day, each trunk and limb is physically and photographically continuous. This means that as you follow each branch from beginning to end, there are no abrupt tonal changes along its entire length. But on a sunny day, spots of light break up each trunk, limb, and branch into patches of light and dark. Visually, the spots of light on one trunk relate more to the spots of light on other trunks than they do to the rest of the trunk that is shaded. As a result, the visual continuity of each trunk, limb, or branch is lost.

A photograph of the forest under such spotty conditions may look more like a pizza than a forest. The photographic situation no longer parallels the physical situation. The physical lines and forms of the forest are the same under cloudy or sunny conditions, but from the point of view of photography, everything has changed. Continuity has been lost. Light alone has made the difference. Light determines form (figure 5–3).

Can you photograph a forest on a sunny day with any semblance of success, or is it just something that inevitably leads to failure? Of course you can, but you have to see (i.e., understand) exactly what the light is doing. One of the key strategies that I employ is backlighting, or photographing directly toward the sun, thus looking at the shaded side of the trees. With the sun coming toward me, the trees in front of me are completely in shade, with those slightly off to the sides are just edged by sunlight. This tends to make everything far more cohesive and controllable (figures 5–1 and 5–4). But, you might ask, won't the contrast be excessive, making it impossible to photograph? No, not a bit, as figures 5–1 and 5–4 attest. (See chapters 8, 9, and 11 to understand how to control such light.)

However, I also caution against using this suggestion of backlighting as a formula or rule to employ on sunny days. Backlighting is one strategy I employ in a forest on bright, sunny days, but it's not the only one. What I recommend is

▲ ***Plate 5–4: Altamaha Cypress Swamp, Sunrise***
Using the same basic approach to bright, harsh sunlight in a forest as in figure 5–1, I aimed my camera directly toward the sun, using a foreground tree to block it out. On a very cold December morning, with fog steaming up from the sunlit swamp, I placed the darkest shadows high on the exposure scale. This allowed me to convey the magical feeling of light emanating from everything in the scene.

◄ ***Figure 5–5: Dance of the Corn Lily***
Made in late afternoon under the shadow of a nearby mountain, this image captured a ballet-like feeling in the twisting corn lily leaves and a protective or warm feeling in the leaf sheltering them. No shadows broke up the graceful forms, allowing uninterrupted visibility.

looking carefully at the light and the forms as you walk through a forest, because all the right things may converge at some point to make an unlikely situation occur—such as an opening that allows cross light to shine on a group of trees exactly where you need it. Don't discount that possibility, for it can happen.

It has been my observation over 35 years of teaching that most beginners—as well as many experienced photographers—look at objects, not light. Furthermore, most photographers tend to avoid soft, even light because of their belief that such light produces flat, bland photographs. This common perception is simply untrue. Soft light eliminates sudden breaks of tonality, but contrast can always be increased via a variety of photographic controls. Especially in close-up scenes, soft light is often the only usable light, for it is the only one that can be fully controlled (figure 5–5). Soft light implies continuity of form, but it does not imply or impose blandness.

Just as the lines of branches are disrupted by strong directional lighting (such as sunlight), shapes of objects can be similarly altered. Consider an architectural subject like a modern office building. Its straight, clean, rectangular facade can be changed by the shadow of a nearby building falling diagonally across it. Instead of a rectangular array of windows, there could be two triangular areas of windows: one shaded, one sunlit. Physically, the building is still rectangular; photographically, it is a pair of triangles (figure 5–6). As always, this is not necessarily undesirable or wrong. This effect may be your intent. Just be aware of the effect created by the light, so you can use it for your interpretive ends. As stated near the beginning of this chapter, observe how the light is distributed before looking at the physical entity of the building.

As you grow to notice the visual changes objects assume under varied lighting conditions, you will become aware of how each type of light affects your feelings about an object. It is surprising how much more deeply you will understand the essence of things by studying the light that falls upon each one. You will discover changes of meaning with every change in lighting. This will reveal ways to interpret those objects most appropriately for the message you wish to convey.

Types of Lighting/Quality of Light

You can best understand light by categorizing the infinite variety of lighting into a few distinct types. Directional and nondirectional light can be the two major categories. Let's see how to work with both of them outdoors and indoors, starting with outdoor lighting.

Outdoors, sunny weather provides directional light, as do dawn and dusk light from the east or west. Yet there is a difference between sunlight and dawn or dusk light (before sunrise or after sunset), both of which are devoid of the deep shadows associated with sunlit conditions. Overcast weather provides nondirectional light, though early morning or late afternoon hazy (shadowless) clouds may be softly directional. Directional light can be broken down into cross lighting (light directed from the side), axis lighting (light from behind the camera), and backlighting (light from behind the subject). Each of these categories merges gradually into the next, but each has its own unique character, its own quality.

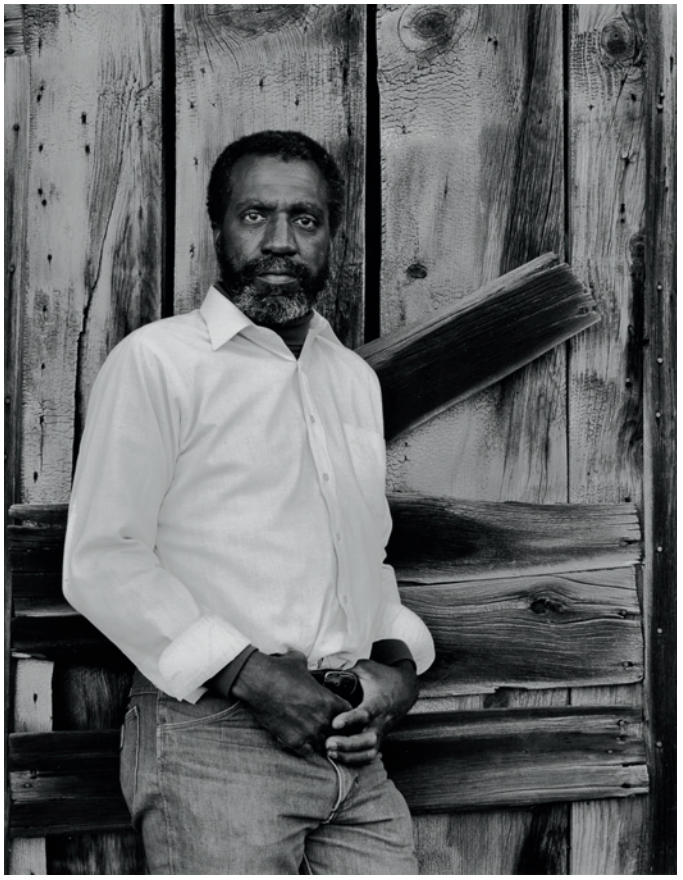
For any outdoor photograph, it is worthwhile to quickly compare the current lighting situation versus other possibilities, in order to envision how the same scene may differ and perhaps improve under alternate conditions. Under partly cloudy conditions, see if spotty sunlight highlights the important areas of the scene, or if a change in the cloud positions would better highlight those areas. If so, wait for the desired situation (and hope that it will occur!). It may be worthwhile to make several exposures as conditions change, subsequently choosing the best of the lot as your photograph. On the other hand, additional thought may indicate that full sunlight or full shade would better reveal the scene. If so, save yourself some useless exposures and return when better conditions prevail.

Consider, for example, the various types of lighting on a panoramic mountain landscape. Under clouds, the mountains could be a mass of mid-gray tones with little delineation of internal structure, while the cloudy sky—the source of light—would be a nearly featureless light gray. It may prove to be a dreadfully dull photograph, despite the spectacular mountains.

With axis light and a deep blue sky, the mountains may appear brighter than the sky. But lacking shadows, the crags and crevices of the mountains would be invisible. The scene could still be photographically dull. Backlighting could make the peaks stand out in silhouette against the bright sky, but again, the slopes and buttresses below could be featureless, with no light and no life photographically. Strong cross lighting could bring out each pinnacle and buttress in bold relief, and the photograph could begin to have real excitement and vibrancy.

But consider, too, the lighting not only on the distant mountains, but on the foreground as well. Do the foreground forms relate to the mountains, and does the lighting on the foreground enhance the core of the scene photographically?

◄ ***Figure 5–6: Thanksgiving Square, Dallas***
Amidst the Dallas skyscrapers, this spiral monument was edge-lit by the sun. A diagonal shadow across the building behind the monument (which came from a building to the right, out of the frame) created compositional interest, far better than if everything had been in sunlight or shade. Note the tones of the monument against those of the buildings behind.



◀ ***Figure 5–7: Reginald McCoy***
On a bright sunny day at the ghost town of Bodie, California, I photographed Dr. McCoy. We chose the shaded side of a building, at a wall with especially strong wood textures. Under the soft light, I was able to retain the textures of the wood, Reggie's face, and his shirt.

Do the supportive foreground elements—the nearby trees and low hills, the farmlands, the city buildings, etc.—add to the scene or detract? Does the lighting throughout the scene blend nicely, or does it conflict? Do you want a smooth blending, or would a lighting conflict serve you better?

Partly cloudy conditions could produce additional possibilities as well as additional problems. Selected patches of sunlight could highlight some of the more spectacular aspects of the mountains, directing the eye to them immediately. Yet a spot of bright sunlight at the edge of the frame or on an unimportant foreground area could pull the eye away from the main body of the photograph. Under rapidly changing outdoor conditions, be aware of the effect of each change and be prepared to shoot when conditions meet your desires. This requires a combination of patience, awareness, and quickness.

Consider a portrait under the same variety of outdoor lighting conditions. Under midday overcast or in open shade, the subject's face and body would be evenly lit. There would be a wonderful smoothness and softness. This type of light hides nothing and is a very "revealing" light for portraiture as well as close-ups of nature (figure 5–7). Under bright midday sun, there could be deep shadows under the nose and in the hollows of the eyes. This could be either a major problem or a very effective light for the appropriate subject.

Axis lighting could be quite beautiful, with the center of the face brightest and a fall-off of brightness on either side. But there could be a harshness that makes it appear a bit chalky, unless handled deftly. Edward Weston used axis light with great success for many of his nudes. Cross lighting could pose problems, for the sunlit side of the face may be excessively bright compared to the shadowed side; or, the shadowed side could lose detail in the dark grays and blacks, while the sharp demarcation line between the sunlit and shadowed sides could be highly distracting. It could, however, have an intriguing abstract quality that may well suit your purpose. (Always consider the creative possibilities that "wrong" lighting may produce.) Soft cross lighting, perhaps just after sunset, could impart a luminosity, smoothness, and dimensionality unmatched by any other form of outdoor light. The brighter side of the face would not overwhelm the darker side with light, and there would be no sharp shadow line between the two sides.

For any other subject matter in outdoor settings, consider the same variety of lighting possibilities and try to mesh your perception of the scene to the effect that each type of light will have on it. Look at the photographs presented in this book for examples of soft, directionless lighting (figure 3–7, "Fallen Sequoias"); soft, directional lighting (figure 1–3, "Ghost Aspen Forest"); cross lighting (figure 1–2, "Mt. Clarence King"); backlighting (figure 3–4, "Sunlight, Capitol Park, Sacramento"); and axis lighting (figure 5–2, "Silver Sunlit Dunes"). Axis lighting is rarely used in landscape photography because it often yields flat, uninteresting imagery, but every rule has its exception. While it may to difficult to find a compelling landscape under axis lighting, it is not impossible.

When you begin thinking about how light can affect a scene, or about how the scene in front of your eyes can change under different lighting, you will no longer be thinking in terms of recording a scene, but rather in terms of interpreting a scene. You will no longer be showing merely what you saw, but how you reacted to it. You will no longer be *reporting* on

scenes; instead, you will be *commenting* on them. In short, you will be using photography as a means of personal expression.

Indoor lighting is similar in its basic categories. It can be soft or harsh, directional or nondirectional. The major difference is that you generally control the light, whereas outdoors you are usually at the mercy of nature. In indoor lighting situations you can control the intensity of light, the direction of light, the combinations of light, and, in general, most aspects of light to best achieve your goals. Furthermore, controlled lighting is unchanging as long as you choose to maintain it. (Outdoors, it often changes as you prepare for the photograph, and that can be extremely frustrating!)

Direct floodlights or spotlights provide harsh, directional light. Light boxes or bounced light off reflectors, walls, or ceilings provide soft, directional light or soft, nondirectional light. Combinations of direct and reflected light can be used to create virtually any lighting effect imaginable, and a wide variety of equipment is available for such purposes. Let's proceed with the assumption that your only limitation is imagination, not equipment.

With that in mind, now let's be specific about the interpretive aspects of light. Suppose your subject is an old man with rough, craggy skin. How would he appear in strong cross light? The wrinkles and crags, the moles and warts, would stand out glaringly. High-contrast cross light would further accentuate the effect. He could be made to appear quite sinister and menacing. Soft, enveloping light would have an entirely different effect. All features and blemishes would be softened; he could be portrayed as a vastly different type of person.

This understanding will allow you to convey the character of the man as you perceive it. You cannot change the man's face, but you can alter the lighting on it indoors, or wait for the desired light outdoors; your choice of light is an interpretive choice. Coupling this with the expression on his face, his position, your choice of camera lens, and your distance from him will give the viewer a perception of the man. He could easily be depicted as kindly and benevolent, or as disagreeable and malevolent. While there are many things that add up to the final depiction of character, lighting is certainly one of the most important.

Not only are the directionality and the harshness or softness of light pivotal to a character study, but also the amount of light has emotional connotations. Subdued, soft light creates a very different mood from soft but bright light. Subdued light can convey a mood of loneliness and isolation, whereas brighter light can convey a feeling of openness, accessibility, and, perhaps, friendliness. All of these things must be considered if you are to engage in photography that goes beyond typical studio portraits and expresses your perception of the subject's character.

You may or may not be able to control the intensity of light, but you can control the amount of light hitting the film or sensor during the exposure. Thus you can interpret light quite differently from the light you encounter. A dimly lit subject (human, architectural, still life, etc.) can be made light and airy, if desired, by a long exposure or open aperture. A brightly lit subject can be made dim by a short exposure or closed aperture, or both. With experience, you will begin to see opportunities for manipulating light and interpreting scenes that an untrained observer would never imagine.

The several examples of lighting discussed to this point indicate possible benefits of harsh light over soft light and vice versa, and of cloudy conditions over sunny conditions and vice versa. Most important is the understanding that no lighting situation is inherently good or bad. Some types of light are perfect for some scenes but poor for others, and even these may change as your specific needs and goals change. For certain purposes, you may wish to have bright sun in a forest scene or overcast in a mountain scene. You must recognize the lighting and its effect on the subject matter, then try to create a photograph that reflects that mood and perhaps even enhances it. Lighting may be the element that most profoundly

determines the mood of your photograph. Good lighting alone cannot make a great photograph, but inappropriate light will surely destroy one.

There is no such thing as "the best time" to photograph. Outdoor photographs can be made at sunrise, midday, afternoon, sunset, dusk, and even at night. Cloudy weather, sunny weather, fog, or any other natural lighting can offer optimum conditions for specific scenes. Anyone who feels that the hours between 10:00 a.m. and 4:00 p.m. are photographically useless is locked into preconceived ideas about "acceptable" and "unacceptable" photographs. As soon as you start to look for and think about the unlimited possibilities each type of lighting offers—about close-range subjects, abstractions, lines, forms and textures, and, in general, about things *photographic* instead of things *scenic*—you can find ample reason to keep the camera out at any time.

Light as Seen by the Eye and by Film or Sensors, and the Inverse Square Law

Finally, you must learn a disheartening fact: the light that the eye/brain combination sees, and the light that film or digital sensors see, is often quite different. This was discussed in the previous chapter, but it's so important that it bears repeating. There are additional aspects to be considered as well. As the eye peruses a scene, moving from bright areas to dim areas, the iris of the eye (its aperture) contracts and dilates to compensate for the changing light levels. This tends to soften the contrasts and blend the discontinuities of the scene, making it more understandable and acceptable. The eye/brain sees each part of a scene at a different aperture—a larger aperture for dark areas, a smaller aperture for light areas, and a still smaller aperture for the brightest area. Film and sensors, on the other hand, see the entire scene at the preset aperture you choose. There is no mechanism like the eye/brain combination to smooth the rough edges, i.e., to subdue the harsh bright spots or brighten the darkest areas. The camera is an optical robot lacking the human ability to see under an incredibly varied range of light levels.

The problem is disconcerting in both indoor and outdoor situations. Indoors, we must deal with the "inverse square law", which states that as the distance from the light source (open window, lamp, floodlight, spotlight, reflector, etc.) to the subject increases, the amount of light decreases in proportion to the inverse square of the distance between the two (figure 5–8). In practical terms, this means that if three subjects are placed one foot, two feet, and three feet from a light source, the second subject receives only one-fourth the light of the first ($\frac{1}{2}^2 = 1/(2 \times 2) = \frac{1}{4}$) and the third subject receives only one-ninth the light of the first ($\frac{1}{3}^2 = 1/(3 \times 3) = \frac{1}{9}$).

As the eye scans the scene, the iris progressively opens as the light decreases. The brain further equalizes the differences, so we note only slight changes in light levels. We do not see the full extent of the decrease from the first to the third subject. The film or sensor, however, sees it as it truly is, for it sees everything at the aperture that has been set. (The specifics of this issue are discussed at the end of chapter 8.)

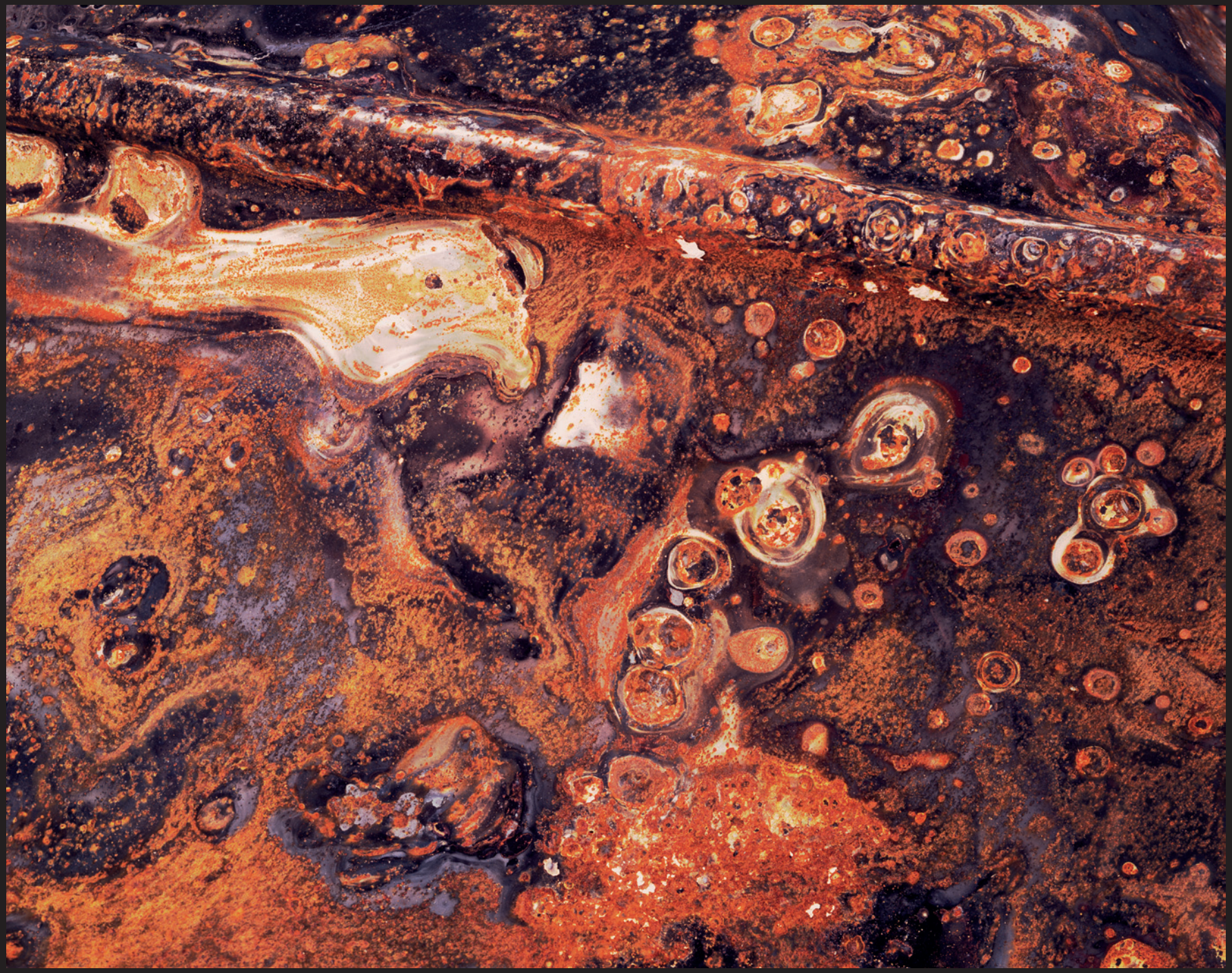
Outdoors, the inverse square law does not apply (because the sun is so far away), but another problem arises. The light of the sky is considerably brighter than the light on the land, especially on cloudy, overcast days. A magnificent scene may end up as a photograph with a disappointingly dark lower half and a surprisingly bright sky. It may be close to blank white in the print. Careful light meter readings or histogram displays will indicate the potential problem. The eye, in concert with the brain, is a wonder of practical deception that helps us get through life by smoothing over problems like these.

There are even times when the eye/brain combination actively deceives us because of its lifelong experience. You can try the following experiment to prove it to yourself: have two people stand next to a doorway, with one outside in sunlight

◀ ***Figure 5–8: Chair and Shadow, Convento San Miguel***
An enormous structure, built shortly after the Spanish conquest, stands in the tiny village of Maní in Mexico's Yucatan Peninsula. It is a church, a ruin, a school, a convent, and a town center. When I saw the wooden folding chair in a large side room, in the light of an open door, I imagined a story unfolding: Pablo Casals had just finished playing one of Bach's "Suites for Cello" and had walked out the open door. The music was still echoing off the walls. It was magic. The inverse square law of light created a serious lighting imbalance. To overcome it, I dodged the wall's darker right half, then burned the wall nearest the door.

and the other just inside in shadow. The person outside must wear a very dark shirt (preferably black), and the one inside must wear a very light shirt (preferably white). Let's assume the shirts are made of the same material, so they have the same surface reflectivity. Now see which shirt appears lighter to you. You know the white shirt is lighter, but in the shadow it receives far less light. If you are like 99 percent of the people who try this, the white shirt will truly appear lighter, but meter readings will always show that the black shirt in sunlight is the lighter one. The eye/brain combination has learned to overcome the fact that the black shirt in sunlight is brighter than the white shirt in shadow, because experience has taught us that the white shirt is lighter than the black shirt!

Film and sensors can never match this human ability, so you have to learn to see the way they see. You must begin to recognize amounts of light as they actually are, not as experience tells you they "should be". You must begin to see continuities and discontinuities of lines and forms caused by light, as well as changes in scenes that result from altered lighting. This is the heart of the difference between "seeing" and "photographic seeing". The photographer has to learn how to see the light! It will prove to be a lifetime study.



CHAPTER 6

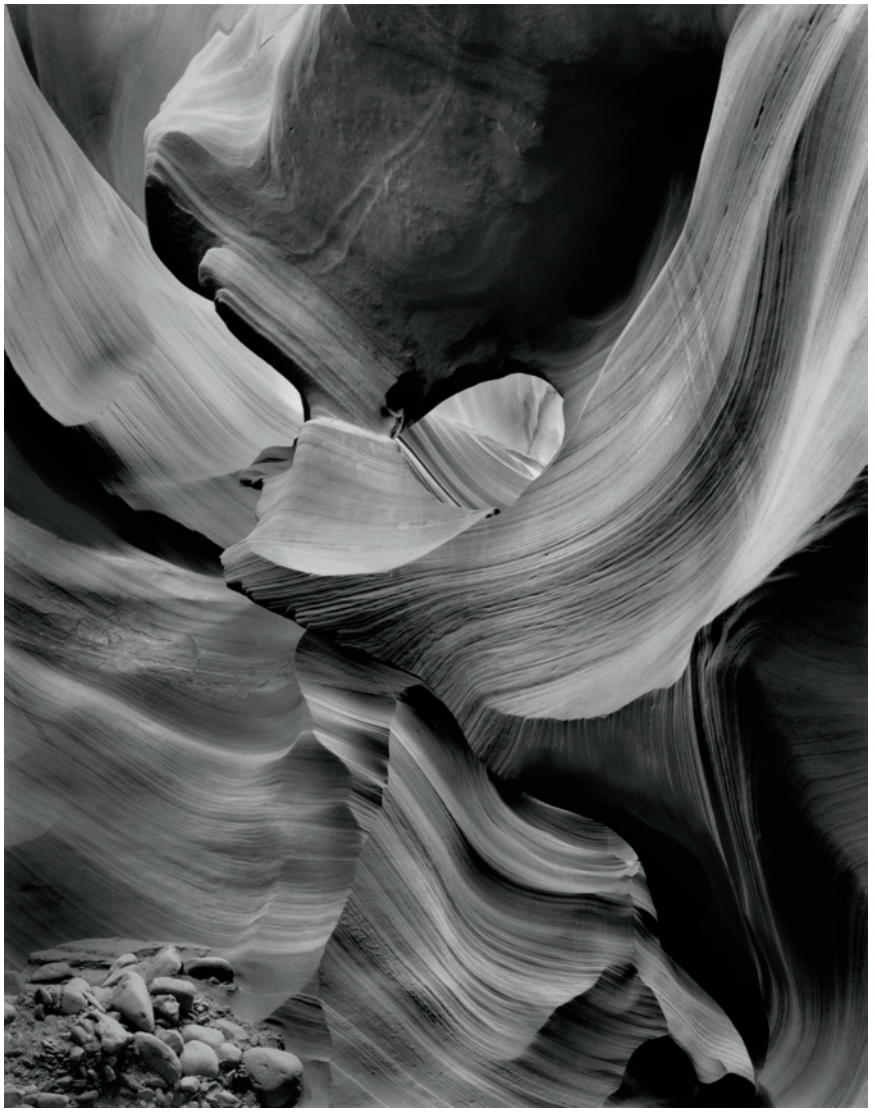
Color

THE FIRST FIVE CHAPTERS DISCUSS a variety of practical and philosophical topics, all applicable to both black-and-white and color. In chapter 3, I specifically delayed a discussion of color as an element of composition due to its exceptional importance. This chapter deals with the profound compositional considerations that color brings to photography, and also with some specific considerations of color as applied to both traditional and digital approaches.

I feel that color photographs and black-and-white photographs are essentially two different media. I approach them differently, I see them differently, and my goals are different in each. To me, the emotional connotations as well as some of the compositional elements involved with color have no analogy in black-and-white. Rarely can I photograph the same scene successfully in both media—so rarely, in fact, that I now choose between color and black-and-white *before* making an exposure. In past years I often shot a scene both ways, but since I was never equally satisfied with the results, I have discarded the dual approach. I consider this a form of discipline that requires me to be fully in tune with my feelings about the scene and my thoughts about expressing those feelings (figure 6–1).

The benefit of this procedure is that I can concentrate fully on the choice I make, rather than giving partial thought to both color and black-and-white exposures. I do allow an exception, however: if I encounter unusual conditions that I feel allow both color and black-and-white exposures of real significance, then I may consider exposing the scene both ways. One example would be a relatively dark location that requires a long exposure (several minutes), which could alter the true colors of the scene due to the film's reciprocity failure (more on

◀ ***Figure 6–1: Burnt, Corroded Metal***
The devastating Agoura-Malibu and Mandeville Canyon fires occurred on the same day in 1978, burning 30,000 acres in 24 hours. In the Mandeville Canyon fire area, an old, corroded metal shed, now burnt, had amazing colors. Despite looking like a Hubble Telescope cosmic photograph, it's just junk on the ground.



▲ ***Figures 6–2a and 6–2b: The Keyhole, Lower Antelope Canyon***
This is one of the few photographs I have successfully made in both color and black-and-white. After exposing the black-and-white negative, I noticed overtones of colors that were barely visible to the eye—in particular, the blue-purple tinges that are reflections of skylight off the canyon walls. Realizing that color film could materially enhance those colors, I exposed a single transparency as an experiment. It worked. The two images, though compositionally identical, carry very different messages.

◄ ***Figure 6–3: Sheep Flock, Tuscany***
The green color is almost monochrome, but necessary because of its emerald-like intensity (step aside, Ireland!). The riparian foliage creates an interesting shape, providing the compositional interest. The sheep flock in the upper left adds an unexpected surprise.

reciprocity failure in chapter 9). Another reason to photograph a scene in both color and black-and-white would be a purposefully altered coloration that brings a new reality to the scene, or an unusual effect in black-and-white that makes it a vastly different image from its color counterpart. Sometimes, of course, the image simply has merit for both approaches, but I've never yet seen it have the same feeling both ways. And sometimes I simply can't determine which way I like it better, so I do both (figures 6–2a and 6–2b). But I limit those exceptions quite severely.

I base my choice of black-and-white or color primarily on the importance—or the lack of importance—of color in the photograph. I feel that for a color photograph to be successful, color itself must be a central element. There must be something compelling about the colors, about the relationships among the colors, about the intensities of the colors, and about their placement within the scene that makes them essential to the photograph. On the other hand, if color is merely present in the scene—*as it always is*—without lending needed support, and if it can be eliminated without losing the compositional essence of the image, then my choice is black-and-white. This does not mean that the color has to be intense or brilliant for it to be important—it can, in fact, be subdued or nearly monochrome—*but it must be important!* (figure 6–3.) Sometimes the compositional elements of black-and-white are so compelling that the presence of color actually detracts from them, in which case I also choose black-and-white.

◄ *Figure 6–4: In the Cabinet*
Can you tell what the subject matter is? This is an example of an abstract color photograph in which the colors can be anything you want them to be, similar to figure 6–1.

■ *I have to make a candid admission: if my mindset is to look more intently for either color or black-and-white, I tend to overlook strong possibilities of the other without even being aware of it. In other words, if I'm thinking in terms of black-and-white, I may pass up a good color composition simply because I'm "thinking black-and-white". Conversely, if I'm somewhat fixated on color, I may pass up a good black-and-white opportunity. To put it another way, I find what I'm looking for and completely miss what I'm not seeking. While this may not be surprising, it helps illuminate just how narrowly the human mind can focus. This, of course, is the subject matter for a Ph. D. dissertation, not a discussion here, but it may be worth thinking about when you're in the field doing your own work.*

In years past, I looked upon color primarily as a medium of beauty, and black-and-white as a medium of drama. There was always a degree of overlap in my mind, for I have seen plenty of dramatic color photographs and beautiful black-and-white photographs. I won't attempt to define either beauty or drama—it's always been basically a gut feeling for me—and your own definitions will suit you better than mine. My perceptions of drama in black-and-white or beauty in color were simply generalizations that I found to be true in a majority of cases.

I no longer maintain that dichotomy of thinking about the two media. I have come to more fully understand the control that can be exercised over color, especially with today's extraordinary digital controls. That, combined with the enormous emotional changes wrought by even subtle variations of color, has changed my attitude.

Yet it should also be recognized that the degree of control acceptable in color is probably not as great as in black-and-white because color is one step closer to reality and cannot be altered as easily. When dealing with realistic images such as human skin, the sky, foliage, etc., there can be wide variation in black-and-white, but these types of subject matter must be rendered within narrow limits in color or they simply appear "off". In some cases, "off-colors" create a tension or imbalance that can have a profound emotional impact, but these effects must be used with great care so as not to be perceived simply as bad color.

Pure color abstraction, on the other hand, allows any variation from realistic colors. When you're in the realm of pure abstraction, who cares if the greens are pink or the blues are orange (figure 6–4)? Here we are dealing with color as an element of composition alone, and the only considerations are the relationships, intensities, and balances of colors. (See chapter 15 for more thoughts on abstraction and art.)

The Color Wheel and Color Sphere

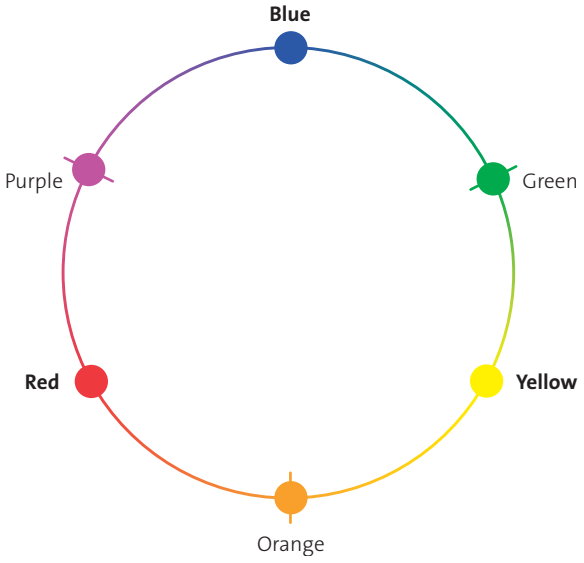
Let's begin the study of color composition with some basic definitions. Colors can be grouped into families by the color wheel, a circle on which the three primary pigment colors are separated by 120 degrees. (There are other primary colors based on light rather than pigment, but a discussion of them is unnecessary for our purposes here. Most people understand pigments better than light, and that will serve our purposes quite effectively.)

Between each primary is the color created by mixing the adjacent primaries. A "color family" is any set of colors on the circle within a pie-shaped wedge cut from it. Colors opposite those in the wedge are simply called "color opposites".

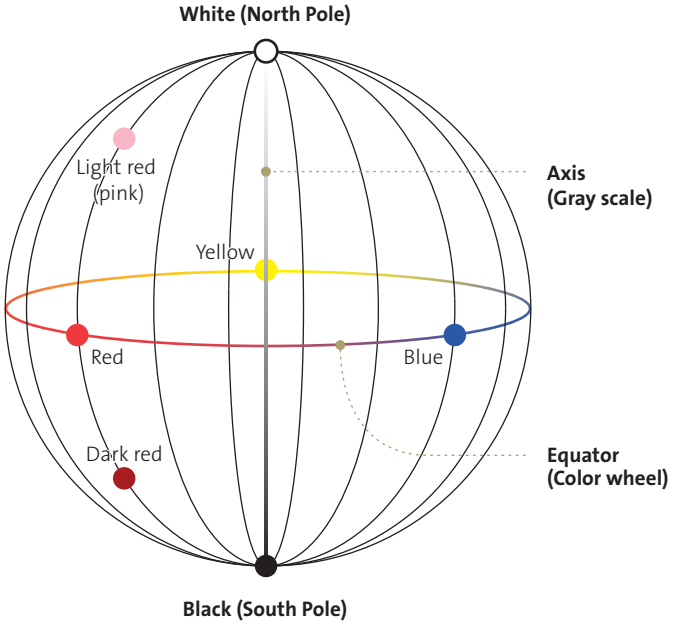
Understanding the color wheel helps you decide which filter to use when exposing a black-and-white negative (chapter 7). It will also be a great help as you decide how to alter color balance for the effect you want in a color photograph (chapter 10). Together with the color sphere, as shown here, the color wheel will help you understand how the use of related or opposite colors can create mood and emotion in your images.

So, let's expand the concept of the color wheel to that of the color sphere. The color sphere is a sphere like the earth with the color wheel as its equator. The north pole is pure white and the south pole is pure black, while the axis between the poles is the gray scale from black to white. As you move along the surface of the sphere from any color on the equator northward to the pole (along a longitude line, as the case may be), the color becomes progressively lighter until it merges with pure white at the pole. Moving southward, it grows progressively darker until it merges with black at the south pole. As you travel from any point on the surface, where colors are most

▼ *Diagram 6.1: The Color Wheel*



▼ *Diagram 6.2: The Color Sphere*



saturated (pure hue), directly inward toward the axis (at the same latitude) the color becomes progressively less saturated, "grayer," and colorless until it becomes its own gray tonal equivalent at the axis. It should be apparent that the color sphere contains all colors and tones on its surface or within its interior.

The eye will jump toward an opposite color within a composition just as quickly as it will jump to a white within dominant dark tones, or black within dominant light tones in a black-and-white photograph.

On the sphere, as on the wheel, a family of related colors corresponds to a wedge-shaped piece cut out from the surface to the axis, as you would section an apple or an orange. Opposite colors or opposite families of colors are simply wedges cut from the opposite side of the central axis.

Color Composition

With an understanding of the color wheel and sphere, let's look at the issues to consider when creating color photographs. All of the compositional considerations discussed in chapter 3—line, form, pattern, balance, movement, etc.—apply to color as well as black-and-white. Color adds a dimension to the elements of composition that has no black-and-white equivalent.

Lines of color are just as attracting to the eye in a color photograph as tonal lines in black-and-white photography. The intensities of related colors and their placement within the frame must be considered with care and sensitivity in order to make the photograph say what you want it to say. The degree of saturation of the colors along with their depth of hue (e.g., whether they are dark and highly saturated, high key and pastel, or relatively midway between the two extremes) makes an immense difference to the overall character of the photograph.

Furthermore, the eye will jump toward an opposite color within a composition just as quickly as it will jump to a white within dominant dark tones, or a black within dominant light tones in a black-and-white photograph. For example, if you photographed green foliage in a forest, but there was a cardinal perched on one of the branches, the viewer's eye would immediately dart to that spot of intense red amidst the sea of green. The bird and the foliage may be exactly the same tone in a black-and-white image, but color separates them dramatically. The dramatic power of an opposite color, and its location within a composition, must be one of your prime considerations when you begin composing a color photograph. If you want a quiet, subtle mood, a sharp color contrast may be too powerful, too overwhelming. But if you're looking for drama, it may be exactly what you want.

Let's consider another hypothetical example. Suppose there is an area of red in the lower right of the image (not necessarily the cardinal, but any red object). Are there other reds, perhaps reds of less intense saturation, or alternatively red-oranges, magentas, or other similar colors within the image that relate to the red object in the lower right? If not, can such a color relationship be arranged, perhaps by changing the camera position? Is it desirable to have that solitary red object stand alone, unrelated to any other color in the frame? What element of composition ties the lower right area to the rest of the scene? In other words, does it relate compositionally to the rest of the image?

Unless a related form of a different color (or several such related forms) exists, or a strong line leads from that lower right area to elsewhere in the image, that corner of the photograph will be heavily imbalanced. It will not relate visually to the rest of the image, but rather stand apart and draw your eye strongly to it. Of course this may be your intent, but you should be aware of this effect. It can create either a powerful contrast or a harmful distraction.

Too many color compositions include unfortunate distractions because they were attractive to the eye at the scene. The simple expedient of turning the camera so the object is farther away from the corner or edge can relieve the imbalance and improve the image, but only if the elements around it add

visual interest and work well in relationship to it. Sometimes a small spot of a related color elsewhere in the image sets up a powerful visual relationship that is enough to balance it successfully.

Camera position can change a random array of colors into an organized composition with interesting lines, patterns, color placements, and color relationships. Resist the urge to quickly shoot a scene that has pleasing colors. Instead, see where your camera can be placed to move the eye around related colors in a directed fashion, or reveal a subtle pattern or visual rhythm not seen from any other viewpoint.

In 2004, as I hiked along the Escalante River, I found a fallen juniper tree with wonderful patterns in the wood. From one exacting viewpoint, a marvelous pinwheel form emerged that brought out the superb coloration and became an abstract painting (figure 6–5). For studio compositions and often for close-ups, objects can be moved relative to one another to enhance color relationships. But whether the composition is indoors or outdoors, arranged or found, colors, line, and light can (and should!) be used to direct the viewer's eye.

Repetitions and subtle echoes of color throughout an image set up visual rhythms. They help tie the image together as a unified whole. They must be sought and considered from the start. Too often color is included in a photograph simply because it's there, without adequate consideration given to its placement within the scene. You may not be able to rearrange the objects and their colors, but a change in camera position can alter their relative positions with respect to one another and may be sufficient to bring about greater compositional interest (figure 6–6).

The eye will follow a series of color-related objects in the same way that it follows a series of related forms in black-and-white. Just as related forms of the same tonality—or even different tonalities—can produce interesting visual rhythms in a black-and-white composition, related forms of different colors—or of different but related hues or saturation levels of the same color—can produce exciting visual rhythms in color photographs. Such visual rhythms should be sought out or exploited whenever you find them, for they are so visually revealing and appealing. These are the things that can open up new vistas to the viewer, who may have subliminally seen such relationships in passing without ever stopping to really notice or think about them. Now, you're pointing them out! The viewer instantly sees what he or she has never consciously seen or thought about previously. You're expanding the viewer's horizons. That's an achievement, and it shows that you have the eye to notice such things and bring them to the fore.

Positive/negative space, discussed in chapter 3 as the interplay between light and dark areas of the image, has an interesting extension in color. Not only will light and dark areas create positive/negative interactions, but alterations of color may do it equally well. One family of colors interacting with a contrasting family of colors may set up a fascinating positive/negative interaction. If the two families are opposites (e.g., blue and orange or red and green), the interplay can be vibrant and scintillating; if the two families are closer together, it can be quiet and subtle.

▲ ***Figure 6–5: Juniper Pinwheel***
This is a truly abstract form that could accommodate a wide range of colors. Yet the colors that were actually present could hardly be improved upon, so I made no effort to change them. Only from this camera position did the pinwheel form come across so boldly.

▲ ***Figure 6–6: Autumn Aspens, Late Afternoon, Sierra Nevada Mountains*** *Yellow golds dominate this image, yet subtle variations into browns (toward the bottom) and greens (toward the top) create a visual flow. It's the light streaming around the trees and the strong shadows that create the movement. Kodak Ektachrome 64T film held the high contrast of the scene so that the near side of the trees retains a wonderful glow, despite being shaded.*

Colors can be used effectively to balance an image. A relatively small color-saturated object—royal blue, fire engine red, etc.—toward the edge of an image can balance larger objects on the other side that are not as deeply saturated. This is the teeter-totter analogy of a small child at one end balancing a huge man on the other side of the fulcrum, but close to the fulcrum. Conversely, of course, a color placed toward the extreme edge or corner can unbalance an image, and that can be used effectively if that's your intent. Yet those colors may not stand out as equivalent gray tones in a black-and-white image, and therefore may be compositionally meaningless in black-and-white.

The most important thing to recognize is that composition must be controlled in a color photograph. Painters have complete control over color—the overall palette, the color intensities, placements on the canvas, harmonies and contrasts between them, and all other aspects of color composition—and photographers should exercise the same degree of control. The photographic controls discussed above and the elements of composition discussed in chapter 3 contribute to that end.

Color and Emotion

As you think about the color sphere, consider color families and how they can augment mood. Reds, yellows, and closely related colors are known as "warm" colors; blues, greens, and related colors are known as "cool" colors. The reasons for this terminology are rather clear. Millions of years of evolution have taught us that fire, sunlight, and a host of other things that are warm in temperature are associated with reds, yellows, oranges, and the like (figure 6–7). We have also come to associate water, ice, thick vegetation, and other cool things with blues, greens, and related colors.

People respond emotionally and physically to warm and cool colors. Artistic depictions of landscapes or still lifes dominated by cool colors actually impart a feeling of lowered temperature; those dominated by warm colors have the opposite effect. Portraits dominated by warm tones may subtly convey a feeling of personal warmth, charm, or friendliness; a similar portrait dominated by cool colors may depict aloofness or other related characteristics. Furthermore, people often become agitated or nervous when surrounded by bright reds, pinks, and oranges. We grow relaxed and restful among darker warm colors and so-called earth colors, and even thoughtful among cool colors. This explains why fast food restaurants decorate in bright pinks and oranges to move people through quickly, whereas plush restaurants use deep reds and browns under soft, subdued lighting to keep people seated in a cozy atmosphere. Libraries and other public buildings use beiges and soft blues and greens to help promote quiet.

With these thoughts in mind, you can begin to consider appropriate color as an emotional boost for your photographs. You can heighten mood in the desired direction through clever use of color and its available controls. First, the objects that you photograph have colors—warm or cool, intense or subdued, monochrome or varied—that should be compatible with the mood you wish to convey. In addition, the light under

◄ ***Figure 6–7: View from the Center of the Earth, Buckskin Gulch***
If the earth were to split open, this might be what you would see at its center. That's what I thought on a backpacking trip through Buckskin Gulch when I encountered this scene. The glowing reds give the impression of intense heat. It was stupendous, almost frightening, but magnetically attractive at the same time.

which you are shooting has inherent color. Depending on whether you're shooting digitally or with film, this can make quite a difference.

If you're using traditional approaches, you'll find that the film's response to the color of ambient light can dramatically alter the overall color and mood. Your choice of film can prove to be an asset or a detriment to your goals. Every color film has a characteristic color balance. Some are stronger in the warm colors but weaker in the cool colors (i.e., the warm colors are pure and rich; the cool colors are somewhat grayed and dull). Others are stronger in the cool colors. Finally, color balance with film can be altered with filters (see more about this in chapter 7).

Digitally, you can set the white balance on your camera to compensate for most ambient lighting conditions, but there still may be situations that require post-processing adjustments. You can go from RAW or JPEG files directly to the computer using the powerful tools of Photoshop or other such image editing applications. It's easy to alter whatever hues and balances you've captured to correspond more closely to the feeling you want to convey. But I advise using such adjustments sparingly and with great subtlety. Too often the temptation is to saturate colors to neon levels or overbalance them toward the warm or cool tones, and then the look becomes exaggerated and contrived. When technique overpowers the image, all is lost.

Every film has its own unique palette—i.e., a combination of color balance and inherent contrast—which will be discussed fully in the next section. Similarly, every digital sensor has its own response to light and color. I strongly urge you to compare several color films or sensors in an unbiased manner before settling on one as your sole medium. Since color is highly subjective, it's best not to rely on the recommendations of others; instead, determine for yourself what is most appropriate for your needs.

When you're using color negative materials, the negative is never the final product but rather the halfway point between the exposure and the print. Color balance can be altered and improved during printing. Transparencies can be the final product, and they can also be made into prints, either by direct positive printing or via an internegative onto negative print material. Digitally, you can go from the RAW or JPEG files directly to the computer using the powerful tools of Lightroom, Photoshop, or other such applications. With film, color correction can be done at the printing stage in the same way as with negatives, in which case initial color balance is of lesser concern. However, the closer you come to the balance you want in the original material, the better chance you have of obtaining your desired balance in the final print.

Color Contrast and Tone

Along with color balance, another feature of color film must be considered in order to fully evaluate the film's characteristics: its contrast. To do this properly, first distinguish between color contrast and tonal contrast. The two may be related or not, depending on the situation. For example, leaf green and fire engine red possess high color contrast (they are on opposite sides of the color sphere) but low tonal contrast because both translate to medium gray. On the other hand, light blue and deep red have high color contrast as well as high tonal contrast, since the deep red translates to dark gray while the light blue translates to light gray. Light blue and dark blue have no real color contrast but only tonal contrast, and for this reason they stand apart.

High color contrast occurs when color opposites are placed against one another; low contrast occurs when related colors are juxtaposed. Pastels within a family possess the lowest color contrast of all, while deep-toned opposites have high contrast. Yellow placed against orange, brown (which is

basically dark orange), or light green is seen as low contrast, but against blue it exhibits higher contrast. Taxicab yellow placed against royal blue or deep purple will pop your eyes out with contrast.

Needless to say, each level of contrast possesses a different degree of emotional impact. High contrast has snap and pizzazz; low contrast has subtlety. Just as the eye jumps to light and contrast in a black-and-white photograph, it jumps to high color contrast in a color photograph. Just as tonal contrast can control the mood of a black-and-white print, color contrast can control the mood of a color photograph.

Color negative film is lower in tonal contrast than transparency film, with very few exceptions, and can be expected to yield lower contrast prints than ones derived from transparencies. Differences in color contrast levels can create greater emotional swings than you might expect without seeing comparisons. Digitally, all image capture is in color, and you can extend the range of the sensors with multiple exposures to go further into highlights and deeper into shadows. Then you can later merge the multiple exposures to form the final image (learn more about this in chapter 11). To my eye, there can be an unnatural, neon look to digital imagery, unless it is handled with extreme care. Today, subtlety seems to be missing far too often.

I feel that it is wise to test several films to see the differences in color balance, degree of color saturation, and contrast level. First, shoot the same subjects under the same conditions with each film to make direct comparisons of their characteristics. Then do it with different types of subject matter under different lighting conditions (such as strong sunlight and shadow, soft overcast, controlled indoor lighting, etc.) to see if some films might be preferable under specific conditions. You will not only gain a better understanding of your materials, but also a greater insight into your interpretive goals.

Neither the degree of color saturation nor the inherent contrast of color film can be significantly altered in development (as contrast can be altered in black-and-white) unless you develop your own negatives or transparencies and learn some highly sophisticated means of contrast control. Most photographers use commercial labs for processing, and contrast control methods are not available at most labs. Thus, the only way to alter color saturation or contrast is by changing from one film to another. Color balance, on the other hand, can be altered by filters. Therefore in choosing a film—or several films—for your purposes, it would be wise to place greater emphasis on saturation and contrast than on color balance; while you can't control the first two, you can control the latter.

Choosing A Color Film

Most traditional film users choose a color film based on color balance, ignoring contrast completely. I believe this is an incorrect approach. Though it may seem strange at first, your choice of color film should be based on its black-and-white characteristic: contrast. The reason is simply that you maintain more options by choosing your film based on contrast levels rather than on color balance. You can still control the color balance with filters during shooting, and you can modify it further during printing, but you can't alter the contrast level because it's inherent in the film. Color films do not have the contrast control that black-and-white films have (chapter 9). Just as I have stressed up to this point—and shall continue to stress throughout this book—I try to make choices based on maximizing my control of the medium. I suggest you do that, too. It is my opinion that basing your choice of color film on contrast rather than color balance maximizes your control.

Color negative films also exhibit wide differences in color rendition, but as stated earlier, they all tend to have lower contrast and therefore greater tonal range than most transparency films. Some photographers find it difficult to judge the quality of a color negative, especially with the strong orange

■ *There is an inherent logic to the degree of contrast that can be accepted, just as there is with the degree of color saturation. If you go too far, it simply looks contrived, cartoonish, and absurd.*

cast they all possess. But you get used to it with experience. With the longer tonal scale, color negatives provide greater leeway in exposure and greater flexibility in printing than transparency films. Direct comparisons of the respective characteristics of the two are somewhat difficult to make because characteristics of the paper they are printed on must be part of the analysis. Some excellent negative materials are incompatible with certain papers and quite compatible with others, so you might dislike a wonderful negative material only because you tested it on the wrong printing paper!

It takes time and effort to find the proper combination of negative and paper for your needs, but then, how important are your prints to you? You'll find that some of the "subtle" color differences are not at all subtle in emotional impact, and by understanding the differences among materials you'll gain greater control over your color work.

Color Digital Methods

Digital technology provides extraordinary color control. Starting with the digital capture, or with the scan of a film exposure either from a transparency or a negative, you can alter the hue and color saturation of the scene—or even portions of the scene—to suit your needs. Contrast can be increased or decreased as well. The image can be adjusted to nudge the mood of the image one way or the other through careful manipulation of color. Today most color images are made digitally. Whether the images start with digital capture or a scan, all of the final processing is accomplished digitally.

Digital methods have a great advantage not available with traditional color methods: scenes of high contrast can be photographed twice, with one exposure for the shadow area and another for the highlights. Then the two exposures can be "layered", thus increasing the usable range over that of a color film transparency. In fact, three exposures can be layered as well: one for shadows, one for midtones, and one for highlights. (Actually, any number of exposures can be layered—more about this in chapter 11.) The final print may rival the eye's ability to encompass the full range of contrast in the scene. This offers tremendous advantages for color photography. (In black-and-white, where film has extraordinary latitude and can be controlled to astounding degrees in development and printing, digital offers no such advantage.)

On the other end of the contrast range, unacceptably low contrast can be increased easily using applications such as Photoshop. Thus, contrast levels are easily controllable once you understand how to employ the appropriate tools. However, there is an inherent logic to the degree of contrast that can be accepted, just as there is with the degree of color saturation. If you go too far, it simply looks contrived, cartoonish, and absurd. I recommend staying within logical limits. This may seem like unnecessary advice, but color abuse is pervasive with the advent of digital methods where everything can be jacked up to grotesque levels.

Color saturation presents a different set of problems entirely. As stated above, all too often color saturation is undesirably high in digital images. Part of the reason lies in the capture, where there is a clear increase in saturation beyond what the eye perceives. (Of course, this can happen with film too, as in figure 6–2a where film greatly enhanced the visible color during an extended length exposure. Yet that was an unusual situation, not normally encountered.)

This initial characteristic is made even stronger by most people's desire to have colors that border on (or go well into) the neon range. The ability to increase saturation is apparently extraordinarily addictive, proving irresistible to most printers. This is a problem that I call the "Dr. Strangelove Effect". Printers need to control their baser instincts instead of spiraling down to the greatest color saturation in print after print. Sometimes a pastel is what you really want. Sometimes subtle colors convey the right mood. As Jay Dusard once noted

during a workshop review of color images, "Not all photographs have to look like a professional football jersey."

However, used sensibly and subtly, the digital approach to color can offer tremendous rewards and exhibit remarkable visual power. The problem is not with the digital means, which afford all the control anyone could ask for. It's in controlling you! Sometimes you may want the viewer to sit down and think rather than jump up and shout. In fact, subtle, subdued colors have their place (look at the subtlety in Japanese or Chinese paintings to see the strength of well-chosen pastels).

Another Photoshop tool that is often overused is the sharpening tool. The sharpening tool is a variation on a traditional tool known as the soft mask or the contrast reduction mask (see the masking discussion in chapter 10). It's nice to have sharp images, but the problem is that all too often the sharpening tool is used too heavily and a thin black line becomes visible at the edge of objects throughout the image. Sometimes, when grossly overused, it becomes a *thick* black line that is grotesquely obvious and bothersome, yet the photographer remains oblivious to this distraction. Once again, my advice is to use the tool subtly.

Light and Color Control

Another method of control in outdoor, natural light involves recognizing changes in the quality of light during the day. Scenes under midday light can have a cold, austere appearance, while similar scenes at sunrise or sunset can glow with warmth (figures 6–8 and 6–9). The color of sunlight changes rapidly during the first and last half hour of the day, while almost no color shift takes place during the rest of the day—only the sun's direction changes. Enhancing early or late warm tones with a film that inherently enhances warm tones, or subduing it with films that enhance cooler tones, or altering the hue subtly on the computer, can help put your vision into your photographs. By the same token, you can intensify midday colors digitally or with films that tend toward cooler tones, or warm them up a bit with warmer-toned films.

Consider the following example. Sand dunes in the middle of the day usually possess soft lines, low contrast, and rather bland beige colors (except for a few renowned ones with quite wonderful colors). As such, they have little emotional impact from their color. But the same dunes at sunrise or sunset can be alive with reds and oranges, and their shadows give them greater tonal contrast as well. If you are seeking higher emotional impact, shoot near sunrise or sunset. If you want to heighten the mood still more, use a warm, contrasty film. If you like warm colors but want a softer rendition, use a lower contrast film and/or one that is stronger in cool colors. If you want a quieter mood, shoot during the midday hours, remembering that changes in color balance or contrast among films can edge the image one way or another emotionally. Digitally, of course, you can increase or decrease saturation, hue, color balance, and contrast quite easily on the computer, giving you remarkable options beyond those of film.

It's important to be aware of the fact that all daylight films are balanced for sunlight and they display a heavy blue tone on overcast days or in shadow areas. This blue shift may be perfect for a few subjects, but harmful for most. This blue cast can be neutralized by filters (see chapter 7). Only if you are aware of the color shift can you work with it to your advantage (figures 6–10a and b, 6–11a and b, and 6–12a and b).

In the same way, indoor color film is balanced for tungsten light of a specific color temperature. If a different type of tungsten bulb is used, the color balance will be altered—usually in a detrimental fashion, but sometimes beneficially, if you know which way the colors will shift. In any studio situation, you can alter the lighting as well as the film, and you can filter either one for maximum control. There is no need to wait for conditions to change, as you often must in outdoor situations. Beware of the effect of fluorescent light; everything takes on a

► ***Figure 6–8: Mt. Lone Pine and Sierra Wave Cloud***
Taken at sunrise as a dramatic cloud swept over the rugged Sierra summit, this photograph displays the warm coloration characteristic of early morning and late evening light. The same scene photographed during the midday hours would have had a cold, blue-gray color throughout. Color is dramatically different during the first few minutes and final few minutes of the day.

► ***Figure 6–9: Sierra Nevada Mountains and Alabama Hills***
Taken from a location close to that of figure 6–8, but at midday, this image displays a color balance that has changed to cooler, bluer hues. It's surely a truer rendition of the actual colors of the scene, but the colors of sunrise and sunset can't be overlooked.

▲ ***Figures 6–10a and 6–10b: Snow Cups, Sierra Nevada Mountains***
These two photographs were made minutes apart in the same location, figure 6–10a under sunlit conditions and figure 6–10b as a cloud passed over the scene. These images show subtle but important differences in the film's color balance. Figure 6–10b (in shade) exhibits a colder blue tone in both the melting snow and granite rocks on the high slopes. That color balance strikes me as more appropriate to convey the feeling of cold, as opposed to the yellower, warmer rendition in sunlight.

strong green cast which can be corrected only with heavy filtration.

The foregoing discussion has involved issues during the day, but what about nighttime color photography? In urban areas, contrast created by the inverse square law where streetlights and other point sources produce extremely spotty, contrasty situations is difficult to overcome. One clever way to overcome this is to shoot well after sunset (or before sunrise) but with enough dusk or dawn light to even out the spotty lighting. Away from point sources, moonlight photography can be quite successful. Generally, light levels will be too low for your meter to respond, but you can experiment with exposure times under full moon, half moon, or quarter moon lighting. Once you lock in the necessary times for such lighting—always requiring extended exposures—you can open up a whole new area of photography that you had previously never considered (figure 6–13).

In-camera digital sensors can detect the color balance of light and correct white balance extremely effectively, obviating serious problems that film encounters regularly. This is a great advantage for color digital work. But then again, there can be exceptions such as the following.

Not long after World War II, portraitist Arnold Newman was commissioned to photograph Alfred Krupp of Germany, the industrial baron and Nazi arms supplier. Newman was Jewish. He managed to get Krupp to pose for him on a small platform raised above the spreading floor of his factory, with the assembly lines below as a background. Fluorescent lights

▲ ***Figures 6–11a and 6–11b: Red Mountain Heather, Sierra Nevada Mountains***
Figure 6–11a was made under sunlit conditions, figure 6-11b under cloudy conditions. These two photographs show the same sun vs. shade color shifts that we see on the snow cups (figures 6–10a and b). Which is more appropriate? To me, it's a toss-up. I see no clear winner despite their obvious differences.

flooded the factory, and Newman augmented them with auxiliary lighting placed below Krupp's face and almost behind him. He did not filter to correct the fluorescent color shift. Because the two of them were high above the factory floor, nobody else saw what was happening, and Krupp himself had no knowledge of photographic processes. The resulting portrait shows a ghastly, green-faced monster with ominous shadows crossing his face diagonally from below—the devil incarnate. Newman knew what he wanted and he understood his material. The powerful effect might have been far more difficult to achieve digitally due to effective white balance sensors. But I must also admit that the black-and-white version of this portrait is, to my mind, even more effective simply because the sick green color is missing. To me, that color goes overboard and pushes the envelope too far.

Subjectivity and Mood of Color

Color renditions of every film and digital sensor are different. Papers vary as well. Which combination is best is a matter of purely subjective judgment. My favorites may prove to be those you dislike most. By working with these variables over long periods of time, you become familiar with their characteristics—their strengths and weaknesses—and learn to exploit their advantages while minimizing their shortcomings.

As an example, I have always disliked Polaroid color print film. In my opinion, the colors are erratic and muted. Yet Marie Cosindas has produced a large body of outstanding color Polaroid portraits and still lifes. By working with the inherent characteristics of the film, she has produced images that can be likened to paintings of the Baroque and Romantic periods. She

▲ ***Figures 6–12a and 6–12b: Forest Trail, North Cascade Mountains***
Figure 6–12a, digitally captured, was made in the early evening under cloudy skies, giving it an overall blue cast. Using basic global Photoshop adjustments—hue, saturation, and contrast curves—figure 6–12b shows how I brought in the colors that my eyes saw at the scene (note the path). I made no attempt to aggrandize the colors or saturate them needlessly, but rather to show the scene realistically.

often dresses her subjects in lavish costumes, uses flowers or ornate objects for embellishment, and tends toward darker tones to create a lush and intense mood. Often one brilliant color stands out against the prevailing deeper tones. In the hands of many photographers the results could prove outlandish or absurd, but in hers they are magical. Much of the credit must be given to her painstaking patience in learning the characteristics of the material.

Cosindas' prints eloquently point out an aspect of color work that often escapes color photographers: it is not necessary to have the entire color spectrum in each photograph. In fact, it can often be destructive. Color harmonies—colors of a single family—can help create unity in a color composition, and color contrast can help create high drama.

Intensity of hue is also of major importance in creating a color photograph. Just as in black-and-white, lighter colors tend to impart a brighter mood while darker colors tend to impart a richer, more serious, or even somber mood. A slight exposure decrease can intensify colors and mood simultaneously; a slight exposure increase can do the opposite. Needless to say, large exposure changes can ruin an image by washing it out at the upper end of the scale or muddying it at the lower end. Subtle changes, however, can have a remarkable effect on overall mood.

Control of color balance, intensity of hue, and contrast levels are major means of creating expressive color photographs. Not all photographs require garish or overly saturated colors, though the fad today is to saturate all colors. Sometimes monochrome or near-monochrome renditions can be extremely effective. At other times, a subdued color palette with one contrasting color can have tremendous strength. Use of subtle coloration, *when appropriate,* or saturated coloration, *when appropriate,* conveys a command of the medium and a personal insight that the discerning viewer will appreciate.

In Summary

Color photography requires at least as much thought as black-and-white photography; perhaps more. Color is an element of composition, and a dominating one, at that. It is also a potent determinant of mood. Color balance, color placement, color harmony or contrast, color intensity, and appropriateness of color must all be carefully considered along with lighting, balance, lines, forms, textures, and all of the other elements of composition when making a color photograph. When printing color, compatibility of the original film with the print material must be considered in order to obtain the proper look of the final image. If photography is to be used as an expressive extension of your own thoughts, each of these elements must be chosen with care.

I have long felt that it may be easier to make an acceptable color photograph than a black-and-white photograph, but it may be even more difficult to make an outstanding one. Because color is instantly recognizable and is therefore more accessible to the average person, it's easy to make pleasant images. But because color is so accessible, it's hard to break away from a documentary image to one that is personally expressive: too often the scene dominates over the mood, the feeling, or the interpretation. To create an image in color that is truly expressive—one that breaks away from the scene—requires a great deal of thought and dedication, as well as rapport with and deep understanding of the subject. None of this comes easily, but when it is achieved, the results can be breathtaking.

◀ ***Figure 6–13: Star Tracks, Sierra Nevada Mountains***
On a backpacking trip in 1976 to Sequoia National Park, I made an exposure of over three hours starting well after dark, but with a quarter moon setting during the first half hour. At this 11,000-foot elevation, the moon provided sufficient light for the immediate foreground. With the camera aimed toward Polaris (the North Star), the remainder of the exposure simply captured star trails without any subsequent exposure on the land. I could have left the shutter open longer to get even longer star trails, but I was afraid of oversleeping and ruining the exposure with too much dawn light.

CHAPTER 7

Filters

THE TWO PREVIOUS CHAPTERS ON LIGHT AND COLOR lay the groundwork for this chapter. More must be added before a complete understanding of filters can be achieved.

First, let's look at light from a technical point of view without getting overly technical or mathematical about it. Visible light is a small portion of the electromagnetic spectrum (EM for short). The entire EM spectrum includes other forms of invisible radiation, such as infrared light, ultraviolet light, X-rays, gamma rays, and radio waves. Within the small portion of the EM spectrum that is visible to our eyes, there is also a spectrum (or range) of radiation levels, and we see that spectrum as colors of the visible spectrum—the colors of the rainbow, if you will. Most people are aware of Newton's experiment of refracting light through a prism and breaking white light into its component parts, the visible spectrum.

All visible objects are visible only because they radiate light from their surfaces. The reflected or emitted light is made up of some, or all, parts of the visible spectrum. Few natural or manmade objects emit or reflect light from only one portion of the spectrum to the exclusion of other portions. The spectrum of light from a red rose, for example, includes small contributions from blue, orange, violet, and even green and yellow, as well as the dominant contribution of red. Yet the rose appears to be pure red. The blue sky is not highly saturated with blue; the percentage of blue in its spectrum is lower than the percentage of red in the rose. Though the sky's dominant contribution is from the blue portion of the spectrum, other colors are present in surprisingly high amounts.

◀ ***Figure 7–1: Mt. Samson and Peaks of the Canadian Rockies***
This photograph was made with a telephoto lens and two filters: a #12 deep yellow filter and a polarizing filter. With sunlight coming in through the hazy sky from the right, the polarizer helped separate the tonalities of the sky from those of the clouds by darkening the blue sky, which exhibits polarized light. It had little effect on the lower portions of the scene. The deep yellow filter further separated the tones of the sky and clouds without darkening the forested lower slopes. A #25 red filter would have created even greater cloud/sky separations but could have blacked out the trees. Thus the yellow filter was a better choice. Yet when I made the print, I dodged the forest throughout the basic exposure, then burned the top two-thirds considerably, then did an enormous amount of additional burning on the top third.

Here we have two facts of great importance to start our discussion of filters:

1. White light is a combination of all colors.
2. Most objects radiate significant amounts of all colors of the spectrum.

It must also be mentioned that few digital photographers use filters, relying instead on software to do the work later in image manipulation, particularly for black-and-white work. Black-and-white filters can be used with digital cameras, but for numerous reasons it makes little sense to do so. The digital approach here is completely different, relying on the three color channels of the original capture to process the image—or even different parts of the image to different percentages of the three channels. This would be the rough equivalent of filtering each part of the image in isolation, without concern for any damage that filtration may cause to other parts of the image. This can prove to be a great advantage if done properly and subtly.

For color digital images, the channels can be manipulated to different percentages in various parts of the image to achieve an optimum color balance in each portion of the photograph. This can be done with one or more software packages that allow such manipulation. These digital approaches are worth learning fully, and applying sensibly, for the highest quality color image making.

Now let's begin the discussion of filters, recognizing that the discussion applies primarily to film. Yet the thoughts behind these tools are valuable to learn, even for those shooting digital. Their application is universal.

Black-and-White Filters

All black-and-white photographic filters (yellow, orange, red, green, and blue) allow light waves to pass through that are the same color as the filter itself. Other colors are impeded to a greater or lesser extent depending on two things: the strength or depth of hue of the filter and the "oppositeness" of the color of the light wave from the filter. Thus, a red filter allows red light to pass through unimpeded, but it impedes yellow, green, blue, and other colors to varying degrees, depending on how close they lie to red on the color sphere (diagram 6.2).

In black-and-white, all colors are seen in terms of their gray equivalents on the axis of the color sphere. When two objects of different colors have the same gray tonal value, it may be difficult to separate them in black-and-white. The classic example of the red apple and green leaves comes to mind. There is no problem separating them in color, but in black-and-white they both translate to a middle gray tonality. Textural differences help separate them, but only through filters can their tonal values be changed to create a visual separation of the tones.

Let's say you use a red filter during exposure of the red apple and green leaves. The predominant red rays of the apple pass through the filter, but the predominant green rays of the leaves are stopped. Because the green rays are stopped, they don't reach the negative and the leaves appear darker on the final print. The leaves don't become black, however, because other colors reflect off their surfaces, and those colors pass through the filter to sensitize the negative. Some of the colors reflected off the apple are stopped by the filter, but at a far smaller percentage than those radiating off the leaves. Thus, the apple appears lighter and the leaves darker. If a green filter were used, the opposite effect would occur: the apple would be darker and the leaves lighter.

Which filter would be most appropriate? This question brings us into the realm of interpretation and creativity. The

green filter is the more "realistic" choice because the darkened apple appears heavier. Psychologically, we ascribe greater physical weight to dark objects. The green filter would be more in keeping with this fact, while the red filter would oppose it. Of course, there may be a good reason to purposely fight the natural, comfortable feeling. You may want to create a feeling of strangeness or a slight off balance. It's a matter of individual preference and creativity.

When you understand what various filters do, you can use them as interpretive and expressive tools. This is crucial for creative photography. Full knowledge of your equipment is immaterial unless you use it to further your interpretive goals. And, of course, you cannot further your goals unless you first define them.

If two filters have the same color, the darker or deeper filter is the stronger one, and allows a smaller percentage of other colors to pass through it. Thus, a deep red filter allows little but red radiation to pass through and blocks a greater portion of other colors than a medium red filter. A yellow filter, which is lighter-hued than red, allows substantial amounts of colors other than yellow to pass through. For example, the #12 yellow (or "minus blue") filter cuts out blue light almost completely. For this reason, the deeper-hued filters are considered stronger filters, as they have a more pronounced effect on the relative intensities of light passing through them.

All filters require an increase in exposure to compensate for the amount of light being stopped. Stronger filters require substantial increases in exposure. This exposure increase is known as the "filter factor". A #25 red filter, for instance, requires a three-stop exposure increase over the unfiltered exposure because only ⅛ of the light hitting the filter passes through it! Ignoring the filter factor can result in a disastrous underexposure.

Because the red filter prevents ⅞, or 87.5 percent, of the light that hits it from passing through (on average), it does not truly lighten reds within the scene as most people think. Rather, it darkens everything. But because you open up three stops, you compensate for the overall decrease in light. The red portion of the spectrum is not stopped by the filter, so red objects are selectively lightened in comparison to other objects. An object that is pure red (i.e., that emits only red rays of light) is not affected by the filter because its rays pass through unimpeded; but because you open up three stops to compensate for the filter, it is brightened by that amount. An object that is pure green (i.e., that emits only green rays of light) is totally stopped by the red filter and reads as black no matter how much you increase the exposure! The only reason that a green leaf appears at all is that it emits colors other than green that do pass through the filter to the negative.

A yellow filter requires only a ½ or 1 stop exposure increase, as it is weaker than a red filter. It should be pointed out that even with the appropriate filter factor for correct exposure, a red filter will darken blue far more than a yellow filter because it impedes blue more thoroughly than the weaker yellow filter.

The filter factor is correct only if the scene contains a broad spectrum of color. For example, if a scene is dominated by red and a red filter is used, little exposure increase is necessary because all red wavelengths would pass through the filter unimpeded. However, if a red filter is used on a scene that is dominated by green, an exposure increase of more than three stops would be necessary because a high percentage of the wavelengths would be stopped by the filter. Thus, the filter factor represents a starting point for the average scene. It must be increased or decreased as appropriate if the scene diverges greatly from the theoretical standard.

Examples with a Hypothetical Landscape

Walk with me into an idyllic landscape and consider the effect of various filters on it. The foreground is a rolling pasture of luxuriant green grass with a background of low hills and

■ *Full knowledge of your equipment is immaterial unless you use it to further your interpretive goals. And you cannot further your goals unless you first define them.*

distant mountains. A red barn is off to one side, large orange poppies dot the foreground grass, and a deep blue sky with fleecy white clouds tops the scene. It is a hypothetical scene that possesses just about every color, so playing with filters can be an interesting exercise. Following are some of the possible effects of using (or not using) filters on such as seen:

- Using no filter with any of the common panchromatic films (which have a higher sensitivity to blue light than our own eyes), the sky would come out as light gray. The clouds would not stand out strongly against the light tonalities of the sky, and the distant mountains would also be rather light due to the bluish atmospheric haze—however slight that haze may appear—and therefore would not be terribly outstanding. The barn would be dark, as would the grass, while the poppies would stand out as light gray dots.
- With a light yellow filter (#8 or K2), the sky would be darkened to the gray value that your eye would tend to expect. The clouds would be more visible against the darker gray, and the distant mountains would also be somewhat more visible due to the reduction in blue haze. The grass would be slightly lightened and the poppies would be lightened even more, while the barn would be slightly darkened, separating it somewhat from the grass tones. A deeper #12 yellow filter would darken the sky considerably, making the clouds pop out more strongly. Again, the grass would be lightened to about the same extent as with the K2 filter, but the poppies would be made even a bit brighter against the grass. The barn would be darker than with the K2 filter.
- A #21 orange filter would darken the sky considerably, bringing out the clouds quite strongly, and the mountains would also be darkened. The orange poppies would be nearly white against darkened grass, and the barn would be slightly lighter than the grass.
- A #25 red filter would turn the sky dramatically dark. The white clouds would jump out boldly, and the mountains would be even more visible, as atmospheric haze would be cut to a minimum. The orange poppies would be quite light, but the grass would be even darker than with an orange filter—so the contrast between the two would remain about the same as it is with the orange filter. The red barn, however, would appear quite light, and if it were a newly painted, bright red, it could be rendered nearly white! If it were a typically dark red barn, weathered and unpainted for many years, it would still be lightened significantly. A somewhat less intense #23 red filter would slightly subdue each of these effects; an even stronger #29 red filter could dramatically intensify them.

Before looking into the effect of green and blue filters on the scene (and you are certainly permitted to think about them before reading on!) consider the most appropriate filter among those discussed. Recall the general mood of the scene, which is one of vivid colors and crispness, yet one of peace and restfulness. The red filter would be too strong for me because it overdramatizes the scene and the mood. I would want my gray tonalities to be rich and brilliant, but not so sharply rich and brilliant. Without any filter, the photograph would be rather bland, lacking the required crispness that I feel the scene deserves. Thus, for me, it comes down to a choice between the yellow and orange filters. I will make my choice, you make yours!

Back to the remaining filters:

- A green filter would slightly darken the sky, about as much as the K2 filter, but it would lighten the grass and darken the poppies. The barn would be darkened considerably, which could be interesting. However, the effect it would have on the grass and poppies would be highly unpleasant to me, and I would avoid its use.

- A blue filter, in my opinion, would be utterly inappropriate, for it would turn the sky almost white and do much the same for the mountains. The clouds would effectively disappear. The barn would be dark gray, while the grass and poppies would be nearly equivalent mid-gray tonalities. That is not the effect I would seek.

Those are my opinions about the desirability of each filter in a hypothetical scene. You may prefer one of the other effects, perhaps even the last one that I rejected so thoroughly. You may wish to concentrate your vision on only a small portion of the scene, rather than the full panorama, and use a different filter to alter its qualities. Your approach could be perfectly wonderful and could show great insight. There is no "right way". There are many things to consider, and they should all be considered.

Keep in mind the fact that all black-and-white filters perform two tasks: they make their own color (as well as closely related colors) relatively lighter, and they turn other colors darker. (Actually, they *only* darken colors away from themselves on the color wheel—progressively more for colors toward the opposite side of the color wheel from that of the filter.)

Both effects must be considered on all parts of the scene and all elements of the photograph before the exposure is made. Too often the careless photographer considers only the prime purpose of the filter, without considering its side effects on other areas of the photograph. You may commonly find the most appropriate filter to be a compromise choice. The best filter for one purpose—the primary purpose—may be decidedly harmful to other aspects of the image, whereas a filter that is not quite as effective for the primary purpose could be either neutral or helpful to secondary effects (figure 7–1).

Filters are important aids in black-and-white because the effects they produce cannot be duplicated by even the most intricate darkroom maneuvers. Imagine trying to photograph the hypothetical scene of the previous example without a filter, and then in the darkroom attempting to darken the sky without darkening the clouds, or brightening each poppy without brightening the grass! It would be a miserable task, indeed.

Contrast Control with Filters

At the same time that filters alter the relative tonalities of objects based on their colors, they also change contrast between objects. They can actually alter the composition by directing the viewer's eye toward objects or areas that are accentuated and away from those areas subdued by filtration. Thus, they are important compositional tools. A #25 red filter increases contrast in a landscape because it cuts through the blue atmospheric haze, even when the air seems crystal clear. A #12 deep yellow filter has a similar, but milder, effect because it also cuts through blue haze very effectively (figures 7–2a and 7–2b). I consider the effect that filters may have whenever I set up my camera for a photograph, even though I may use them in only a small percentage of instances. I feel that landscapes can benefit most from thoughtful filtration because colors are so unsaturated in nature, and therefore have a tendency to be rather gray under soft lighting. With filters, tonal variations may be separated with clarity.

Not only can filters be used to separate tones, but they can also be used to bring diverse tones closer together—as the green filter brought the grass and poppies together in the hypothetical example above. Jay Dusard often uses filters in this manner, separating the tonalities later in a very different manner during negative development. There may be times when a darker or lighter color can be intrusive or disruptive to a composition, and it can be better blended with its surroundings through filtration.

An example drawn from my experiences in the Utah/Arizona canyon country helps explain this idea. The dominant features of the landscape in that area are the enormous sandstone cliff faces. Some cliffs that are nearly white in color have visible horizontal lines of various red/purple hues caused by the stratification of ancient dunes or clay deposits. They also have dark, vertical eroded crevices caused by water pouring down the cliffs. Photographing these cliffs with a green filter further darkens the horizontal streaks, making them the dominant feature. A red filter, however, lightens the horizontal streaks almost to the point of tonal merger with the rest of the cliff. When the horizontal streaks nearly disappear, the vertical eroded crevices become the dominant feature. Thus, the choice of filter can potentially change the dominant line structure of the image from vertical to horizontal!

Just as with any other aspect of photography, no two photographers will have the same approach. This is the meaning of personal expression, and it is as it should be! The important thing is to use your tools with understanding and with a purpose in mind. Filters can be exceptionally useful tools.

Digital Filtration for Black-and-White

The approach that digital photography takes to filtration is quite different. Using a digital camera, all photographs can be—and most logically are—initially made in color. The color is rendered through three separate channels: red, green, and blue (RGB). Later, at the computer, the image can be broken down into each of those channels, allowing you to choose one channel or percentages of all three channels for the final photograph. Furthermore, the image can be broken down into sections so that different percentages of the channels can be used in different portions of the print. This process can be the rough equivalent of filtering one portion of the image with the most appropriate filter for that section alone (perhaps a red filter for a sky with billowing clouds) and another portion of the image with a different filter (perhaps a green filter for the grasses and trees). It can be tedious, of course, but it allows for extreme control.

With traditional photography, it would be possible (though highly impractical) to make two exposures in the field with different filters, then print one portion of the final image using the negative that benefits from the first filter and the remainder of the image from the negative that benefits from the other filter. Pin registration of the two negatives (chapter 10) would be required.

If the initial image is made on film and then scanned later for digital purposes, the scanned image is also broken into three channels—allowing the same considerations as outlined above. However, if the initial image is a color transparency, keep in mind that the range of contrast encompassed by transparency film falls far short of a black-and-white negative. Two transparencies may be made (one for highlights and one for shadows), or even three (highlights, mid-tones, and shadows) may be exposed to cover a wider contrast range. The most advantageous selection of percentages of each channel can then be made for each part of the image. Of course, with this technique the complexity can become enormous, but it can be done. Please keep in mind that tedium is one thing and fine art is another. How many people think that Michelangelo, Shakespeare, or Beethoven avoided doing their utmost because it was too tedious?

◄▲ ***Figures 7–2a and 7–2b: Basin Mountain, Approaching Storm***

Figure 7–2a is a straight print, showing how much brighter the sky is than the foreground and middle ground of the scene. We tend not to see this tonal disparity because when we look around a scene, the eye automatically opens and closes its own aperture (the iris) to compensate for brighter and darker portions, and the brain further smoothes out the differences. The camera sees the entire scene at one aperture, often with surprising results.

With a good deal of manipulation in the darkroom, figure 7–2b shows how the tonal imbalance is corrected by darkening the upper portion of the image, then by subtly darkening the edges to direct the eye toward the center, Basin Mountain. The manipulated image is far closer to the way I saw the scene than the straight print.

■ *If people respond favorably to one of my prints, I want them to think that they could have produced the same photograph if only they had been in the right place at the right time. I don't want any of my manipulations to be obvious.*

If the initial color image is made on negative film, which has a far greater contrast range than color transparencies (a range that virtually equals black-and-white negatives), the three-channel breakdown can be applied to the scanned negative. Different scanners, however, have different responses to the orange cast of the color negative, so a great deal of manipulation may be required to get the effect you want. Through careful calibration of your scanner, computer, and printer (or a commercial printer, if you're using one), you can overcome most, or all, of the potential problems caused by the negative's orange cast.

For more specific information about filtration via digital means, I recommend consulting other books devoted to that topic.

Infrared Film and Filters

Infrared black-and-white film sees more than the visible spectrum that the eye sees. It goes on into the infrared portion of the EM spectrum, immediately beyond red. Using infrared film can allow the creative photographer some interesting departures from reality. A variety of filters can be used with infrared film to accentuate or subdue the effect that this film imparts.

An infrared filter completely blocks out all visible light, allowing the film to record only the infrared component that is transmitted to the film. Use of such filters with infrared film creates some eye-popping images, both with portraits and landscapes. In portraits, skin tones are rendered in especially milky and unusual tonalities; in landscapes, sunlit foliage often appears blazingly white, as do clouds, while blue skies are rendered intensely black. An infrared filter accentuates this effect to the greatest extent. Of course, since the filter blocks out all visible light, you'll see nothing if you look through it; it's as opaque to your eye as a dark slide is for 4 × 5 film holders! But it allows infrared rays to penetrate through.

A #29 dark red filter allows some of the visible light onto the film, creating a nearly complete infrared effect; a #25 red filter allows still more of the visible spectrum through, yet the infrared effect is still quite strong. Going to weaker filters—such as #21 orange, #12 deep yellow, or #8 (K2) light yellow—allows progressively more visible light through to the film, and progressively more subtle infrared effects. As the infrared effect becomes more subtle, the viewer may be unaware that infrared film was used. The leaves on deciduous trees may appear to be bright, perhaps brighter than normal, but almost subliminally so.

I tend to like the effect of infrared film used with the weaker filters or no filter at all. It removes the bludgeon approach that makes it obvious that I'm dealing with infrared film. In general, I want my techniques to be so subtle that they are transparent. If people respond favorably to my prints, I want them to think that they could have produced the same photograph if only they had been in the right place at the right time. I don't want any of my manipulations—either in exposing the negative or in printing it—to be obvious. In the same way, I don't want the materials I use to be the issue of interest; I want the image itself to be the issue. So, the strong infrared effects that you get with infrared or deep red filters are generally much too blatant for my sensibilities. Viewers immediately say, "Aha, infrared film!" They are more aware of the film used than the image produced, and I feel that it generally detracts from the intended message.

Filters for Color Images

Filtration for color is not as pronounced as that for black-and-white, but the emotional impact of its subtleties can be every bit as great. Color filtration is limited to altering the color balance in the scene. In addition, filters can be used to change the balance of indoor film to outdoor film or vice versa

▲ ***Figures 7–3a and 7–3b: Aspen Group, Sierra Nevada Mountains***
Photographed in the late afternoon under the shade of a nearby ridge, figure 7–3a takes on a mild yet distinct blue cast. For figure 7–3b, I used a CC10Y yellow color correction filter to neutralize the shift toward blue, giving the image a more natural feel..

(chapter 6). An 85B filter with a ⅔ stop filter factor converts indoor transparency film to outdoor color balance. An 80A filter with a 2 stop filter factor converts outdoor film to indoor balance for tungsten lights with a color temperature of 3200 degrees. An 80B filter with a 1⅓ stop filter factor converts outdoor film to indoor balance for tungsten lights with a color temperature of 3400 degrees.

For general color correction, the prime tools are color correction (CC) filters. They are available in several colors—red, magenta, blue, cyan, yellow, and green—and varying intensities of hue in each of the colors. They are nicely color coded by both color and hue intensity as follows: after the letters CC, a number signifies the intensity of the hue and a final letter indicates the color of the filter. Thus, magenta filters come in CC05M, CC10M, CC20M, CC30M, etc., in which two CC05M filters equal one CC10M. Similarly for green, two CC10Gs equal one CC20G. Filters can be combined to reach any desired filtration level and combination. Thus, if you need 25 units of yellow and magenta for filtration, add CC20M + CC05M to CC20Y + CC05Y.

My experience with CC filters shows that for every 25 units of filtration, there is a filter factor of ½ stop, so the 25M + 25Y combination would necessitate a 1 stop filter factor (i.e., open up your exposure one full stop after metering the scene when using those two filters in combination). A full explanation of this procedure can be found in chapters 8 and 9.

CC filters are available as thin gels, somewhat like thick cellophane sheets, which are placed in front of the lens like any other filter. The filters alter the color balance of the scene, shifting it toward the color of the filter just as if they were cellophane sheets—except the filter's shift is quite subtle.

In the previous chapter, I pointed out that outdoor color film tends to shift toward blue in the shadows or under cloudy conditions. This can be an advantage at times, but it can be harmful as well. Color correction filters can neutralize this blue shift (figures 7–3a and 7–3b). My own experience shows

◀ ***Figure 7–4: Shiva the Dancer, Paria Canyon***
In this deep canyon of Northern Arizona, I combined CC10M and CC05Y filters to warm the scene. The major emphasis was on warming the walls and tree trunk to prevent a blue cast.

that a combination of CC10M and CC05Y, or alternately, CC10Y and CC05M, returns the color shift to the colors I see. If I want to subtly emphasize yellows or greens in the transparency, I use the CC10Y + CC05M combination, but if I want to bring out warmer tones, I tend to use the CC10M + CC05Y combination. I have used the two combinations often when photographing the deep, red-walled canyons of Utah and Arizona (figure 7–4).

CC filters can be used not only to neutralize unwanted color shifts, but also to enhance moods by enriching colors. Suppose you have a composition dominated by green leaves, but they are rather dull in color. A combination of yellow and green CC filters could lighten and enliven the colors. In a similar way, slight amounts of red CC filtration could warm skin tones for portraits—or, you could do a variation on Newman's portrait of Krupp by using a green CC filter for a more macabre look! Only the slightest amounts of filtration (CC05 or CC10) should be used, or the results may look too contrived.

It takes some time, and a good feel for mood, to learn how to effectively use CC filters, but the emotional shifts they can create are quite remarkable. The emotional connotations of slight color variations have extraordinary impact. CC filters should be an indispensible part of any serious color photographer's tool kit.

An abundance of other filters can be used for color filtration. The most well known are the haze, skylight, and ultraviolet (UV) filters, which correct for the blue cast of ultraviolet light in bright sun or high altitudes. Film responds strongly to UV light. Since the eye compensates and we tend not to see the blue shift, these correction filters can be very valuable in reducing the blue.

Many people place a filter permanently on the lens, feeling that the correction is proper and that the filter affords protection from damage in case of an accident. This strikes me as a strange approach. First, permanent use of a filter reduces options for later filtration. Second, if the film looks better with the filter on permanently, it may indicate that you should seek another film with a more pleasing color balance. Finally, if you need protection from lens damage, it may indicate that you are too careless and should change your habits, pronto!

One final note on color filtration: CC filters can be combined in extremely high levels to correct for the green shift of fluorescent lighting. However, there are many different types of fluorescent lights, and each requires its own filtration packet. You can write to Kodak or Fuji and obtain their booklet explaining fluorescent filtration. As an example, the appropriate filtration for old Ektachrome or current Fujichrome indoor 4 × 5 transparency film is CC50M + CC60Y for "cool white" fluorescent, with a filter factor of 2 stops. This is a great amount of filtration, but since it does negate the unpleasant green shift associated with fluorescent lighting, it's worth using.

Many digital cameras avoid this issue entirely with an automatic white balance feature that recognizes fluorescent lighting and rebalances color for it. On some cameras, you have to do it manually. Either way, it's a valuable feature, one that removes a lot of guesswork and discolored images that can be the bane of traditional color films. Of course, fluorescent lighting is never a problem with black-and-white film because it sees only light levels, not colors.

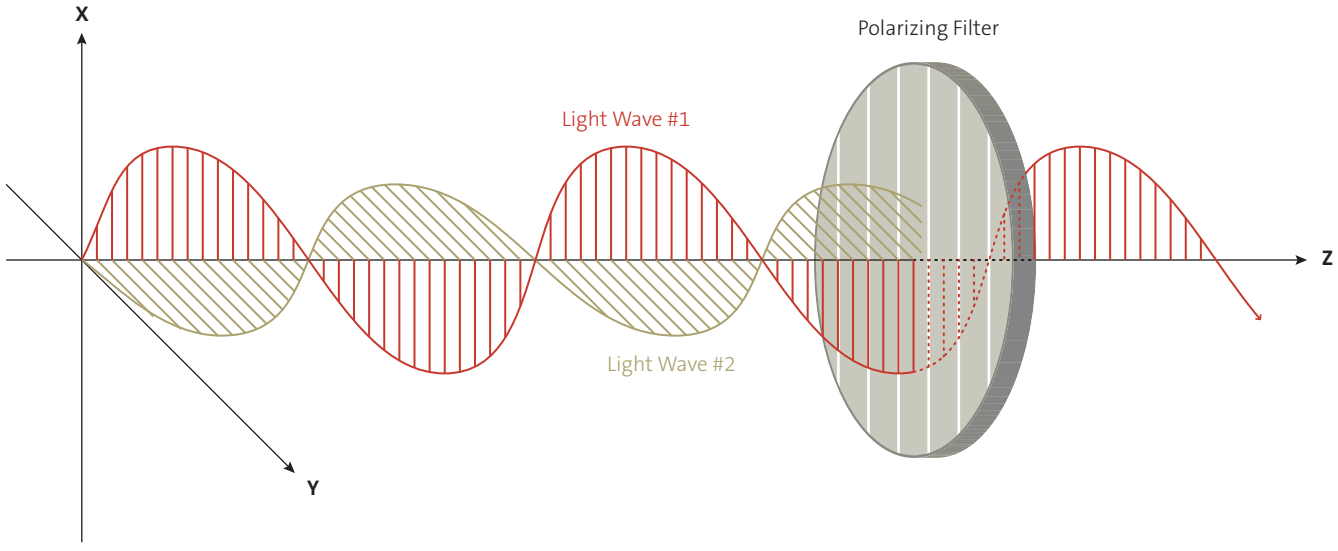
Neutral Density and Polarizing Filters

Two types of filters are useful for both black-and-white (including infrared) and color photography: neutral density and polarizing filters. The neutral density filter essentially amounts to putting sunglasses on your camera. It cuts the amount of light entering the lens equally from all parts of the visible spectrum. It does not alter color balance, nor does it selectively block specific color wavelengths while allowing others to pass unimpeded. Its purpose is to force longer exposures.

Neutral density filters allow anything from slight exposure increases (1-stop neutral density filters) to extreme exposure increases (10-stop neutral density filters). This may seem like a strange approach considering today's emphasis on faster films and lenses (i.e., lenses with wider maximum apertures), but it does have wonderful uses. Consider the example of Wynne Bullock's extended time studies cited in chapter 3. I don't know whether Bullock's exposures were made at dawn or dusk under low light levels, or whether he artificially created long exposures at midday through the use of neutral density filters, but the effect is magical. It could not have been done with standard exposures.

Most photography today emphasizes stopped motion; but if you are interested in exploring the effects that motion can produce under long exposures, neutral density filters are mandatory. They can be expressive and creative tools with more applications than most photographers realize (figure 3–16).

The polarizing filter (or polarizer) is a neutral density filter with a 2-stop filter factor. Beyond that, it reduces glare, which



◀ ***Diagram 7.1: The Polarizer—How It Works***
Two light waves travel along the Z-axis from left to right. Light wave #1 is in the X-Z plane (the vertical plane), perpendicular to the Y-axis. Light wave #2 is in the Y-Z plane (the horizontal plane) perpendicular to the X-axis. The "pickets" of the polarizer are aligned parallel to the X-axis (i.e., vertically). Light wave #1 passes through the filter. Light wave #2 is stopped, for its angle of orientation is 90 degrees to that of the filter.

is highly polarized light. In order to understand what a polarizer does, we must first understand what polarized light is. Again, we must become somewhat technical, but not very much so.

For our purposes, we can say that light propagates as waves from its source (the objects in the scene) to the receptor (your eye, the camera lens, etc.). If you drew a straight line through space from the source to the receptor, there would be millions or billions of light waves traveling along that line. Each individual wave would be oriented at a slightly different angle to the direction of travel. Most objects emit or reflect nonpolarized light, in which approximately equal numbers of waves are oriented at any given angle to the direction of travel. Some objects emit or reflect polarized light, in which most waves are oriented in one plane perpendicular to the direction of travel. If we drew a coordinate system in space, with X, Y, and Z axes at 90 degrees to one another, and polarized light traveled along the Z-axis from left to right, there would be a predominance of waves in the X-Z plane (i.e., the vertical plane) compared to the Y-Z plane (i.e., the horizontal plane).

In a sense, the polarizer acts as a visual "picket fence", allowing only waves oriented in the same direction as the pickets to pass through the filter. Therefore, if the pickets are parallel to the X-axis, waves in the X-Z plane pass through while those in the Y-Z plane are stopped. If the polarizer is turned 90 degrees so that the pickets are parallel to the Y-axis, then waves oriented in the X-Z plane are stopped and those in the Y-Z plane pass through. Those at intermediate angles pass through in direct proportion to their closeness to the angle of the pickets.

Objects exhibiting polarization (i.e., objects reflecting polarized light) can be made slightly lighter or much darker than other objects not exhibiting polarization simply by turning the polarizer. All good polarizers can be rotated while mounted on the lens. When the polarizer is turned to correspond to the polarization angle of the incoming light (i.e., the angle at which most of the light rays are oriented), the object emitting or reflecting the polarized light is hardly affected. When the polarizer is then rotated 90 degrees, most of the rays of the polarized object are blocked, and it turns quite dark. A second nonpolarized object, however, has the same portion of its light blocked by the polarizer at any angle to which the polarizer is rotated.

Skylight is polarized, as are window and water surface reflections. Lesser-known objects that reflect polarized light include the thick leathery leaves of live oak trees. When the camera is aimed at a landscape that includes sky and clouds, the polarizer can make the sky lighter or darker compared to the clouds because clouds don't show polarization. The effect of the polarizer can be seen as you look through the lens and slowly turn the filter. You can clearly see the sky grow darker and then lighter as the filter is rotated. The clouds become more or less pronounced as the sky darkens and lightens around them. This is why I used a polarizing filter along with a #12 deep yellow filter when photographing figure 7–1, "Mt. Samson and Peaks of the Canadian Rockies". The two filters together helped separate the tonalities of the sky from the clouds, but they had little effect on the rest of the image. I've employed that combination of filters at other times as well.

When looking at the surface of water, rotating the polarizer can effectively reduce or even eliminate surface reflections at certain angles and allow objects beneath the surface to be seen clearly. You can watch the reflections disappear while subsurface objects become visible as you stand behind the lens rotating the filter. As you continue to rotate the filter, you will reach a point of minimum surface reflection and maximum subsurface visibility. Beyond that point, the relationships will reverse until you reach maximum reflection and minimum subsurface visibility.

The polarizer, like the neutral density filter, can be used in combination with any CC filter or black-and-white filter because it has no color shift. I have often used a polarizer in

combination with a red, orange, or yellow filter in black-and-white primarily to accentuate clouds against a blue sky for heightened drama, but for other purposes as well.

Problems Associated with Polarizers

A polarizer has one oddity when used on the sky: it works to maximum effect at 90 degrees to the direction of the sun. When lined up with the sun, it has no polarizing effect whatsoever. Thus, if the sun is directly behind or in front of you, the polarizer is nothing more than a 2-stop neutral density filter. But if the sun is to your left or right by 90 degrees, the sky can be dramatically affected by the polarizer.

There is a hidden danger here. If your photograph includes a portion of the sky 90 degrees to the angle of the sun, and substantial portions of the sky at other angles, the polarizer can make the sky appear very uneven. The portion of the sky at right angles to the sun will be greatly darkened, while other parts will be darkened far less. If the photograph is made with a wide angle lens, the unevenness can be excessive and very distracting.

Another danger is that the polarizer can be misused by rotating it to its *maximum* polarizing angle. When this angle is used for color slides of dramatic landscapes and cloudscapes, the polarizer can make the sky oppressively blue-black. The viewer becomes more aware of the polarizer than either the scene or the photograph. In a similar fashion, maximum reduction of reflective glare off windows or water surfaces can effectively eliminate the substance of the window or the water itself. In some cases this may be desirable, but in most cases an intermediate angle of rotation allows the reflective surface to be visible as well as the objects behind or under it. With sky and clouds, the *optimum* angle is often less than the *maximum* polarizing angle. Overuse of the polarizer is more objectionable in color than in black-and-white because of the closeness of color to reality. Moderation is mandatory for effective use of this tool.

I learned about the seductive effect of the polarizer the hard way. I was photographing a color scene in the rolling, oak-covered grasslands of California near San Luis Obispo in the early 1970s. The leaves on the live oak trees were quite reflective and bright, the grasslands were covered with spring wildflowers, and the blue sky had streaked white clouds. I used a polarizer to accentuate the contrasts and colors. At the nonpolarizing angle, the filter simply darkened the entire scene. But as I rotated it, the clouds began to pop out from the blue sky and the leaves on the oaks became progressively greener. I finally reached the maximum angle of polarization and was giddy with how colorful everything had become. It turned out that the resulting transparency was a complete dud! By eliminating the reflection off the leaves, I lost all the feeling of light and life—effectively turning the trees into blobs of deep color, as if they were painted. Somewhere between the nonpolarizing angle and the maximum polarizing angle I could have moderately accentuated the clouds against the sky, while at the same time retaining some of the brilliant light off the leaves and moderately enhancing their color saturation. It was a lesson learned.

It is easy—perhaps compelling—to gravitate toward the *maximum* polarizing angle because its effect can be intoxicating. Each increment in dramatic effect gains acceptability, making the next one acceptable and desirable as well. Always keep in mind the fact that believability can be pushed somewhat beyond reality—into a realm bordering on "super-reality", heightened impact, and increased drama—but pushing too far creates a decidedly unreal and obviously contrived photograph.

■ *A polarizer can be misused by rotating it to its maximum polarizing angle. When this angle is used for color slides of dramatic landscapes and cloudscapes, the polarizer can make the sky oppressively blue-black.*

CHAPTER 8

The Zone System of Exposure for Film

THE NEXT FOUR CHAPTERS deal with the practical aspects of making a photograph. Chapters 8 through 10 deal with traditional film exposure and printing. Chapter 8 explains exposure of the film negative or transparency for optimum effect. Chapter 9 explains development of the black-and-white negative for creative, personal interpretative purposes. Chapters 8 and 9 are so closely tied together that it is difficult to separate them effectively without leaving a temporary gap. The gap is tied together early in chapter 9, so please read on until the explanation is complete.

(Note: development of color negatives and transparencies is not explored because there is so little leeway in the process. Information about doing your own color processing can be obtained from the manufacturers.)

Chapter 10 discusses methods of printing both black-and-white and color film in the traditional darkroom to express your vision in the most personal manner. Chapter 11 concentrates on the digital workflow from image capture to printing. I recommend that everyone read all four chapters, even if your approach is strictly film or digital, because they provide important insights into how the photographic process unfolds. Such knowledge is never useless.

In the 1940s, Fred Archer and Ansel Adams first developed the zone system of exposure as a means of making an exposure in a scientifically accurate manner. It is fully applicable to both black-and-white and color. The explanation that follows is expressed in terms of black-and-white tonalities; for readers interested exclusively in color, please think in terms of how these tonalities translate into colors on the color sphere (chapter 6). After the explanation is complete in terms

◀ ***Figure 8–1a: Negative of Stairway to Cittá Alta, Bergamo, Italy***
This is the look of a typical negative under common lighting conditions. You can see density on the negative throughout the image, with no area so dense that it is impossible—or even very difficult—to print.

of black-and-white, the chapter concludes with specifics on how the zone system applies directly to color.

I'll explain the first part of the zone system—exposure of the film—by meshing two concepts: first, how film reacts to incoming light when the shutter is open; and second, how light meters give an exposure reading.

A Brief Overview

There are only two things that can be done with a negative or transparency. First, it can be exposed; second, it can be developed. *That's it!* There's nothing more to it.

When you expose film, you can use greater or lesser amounts of exposure. That's the limit of your control (except for changes brought about by filtration, which can alter the relative brightness of objects). In the next chapter, you'll see that when you develop black-and-white film, you can reduce the scene's inherent contrast (by reducing the normal development time); maintain it (by developing for the normal development time); or increase it (by extending the normal development time). Development of color film will not be explored, since it does not allow significant changes in contrast.

Film's Response to Light: Building the Zone System

What happens to a negative when it is exposed to light? The camera lens focuses light from the scene onto the film, and it is sensitized in proportion to the amount of light that hits it. Those areas receiving the most light are sensitized to the greatest extent; those receiving the least light are sensitized to the least extent. Later, when the negative is developed, the areas sensitized to the greatest extent become the darkest, or "densest", portions of the negative; the areas least sensitized become the lightest, or "thinnest", portions of the negative.

Some portions of the negative may receive so little light that they are not sensitized at all. The unexposed edges of the film fall into this category, as do all portions of the film within the exposed area that are "below threshold", i.e., areas that show no density in the developed negative except for the negative material itself, the so-called "film base fog" density. We will call all such subthreshold areas Zone 0.

There may be an area within the image space receiving just enough light to produce visible density in the developed negative, the so-called "threshold level". We will call this developed density Zone 1. Zone 1 is an easily perceptible density, yet very thin. If you look at a portion of a negative and have to scratch your chin wondering whether or not there is density, we won't consider it Zone 1. Only if the density is obvious, although light (thin), will we call it Zone 1.

If we were to double that exposure, the same area would receive twice the sensitization and the developed negative would show greater density. In a "normally" developed negative, we will call the density of that area Zone 2. (This is the temporary gap in the explanation referred to at the start of this chapter; the exact definition of "normal development" will be explained in chapter 9. Here, it's not critical to be specific about the term, so please read on.)

Now, if we again double the exposure, the Zone 2 area would receive double the sensitization, which we call Zone 3 sensitization, followed by greater density in the developed negative. Continuing to double the exposure, we obtain Zones 4, 5, 6, 7, and onward. Each successive zone represents a doubling of exposure from the previous zone and a corresponding increase in developed density (figure 8–1a).

Of course, since each zone above the Zone 1 threshold represents a doubling of exposure, those zones can be reached by successively doubling the amount of light within the scene while using the same exposure. Thus, we can obtain

progressively higher zones either by doubling exposures via the lens apertures (the f/stops) or shutter speed, or by doubling the ambient light levels.

Zone 1 density—the threshold density—is the same on all negatives. It is always thin but easily perceived. Since all higher zones are obtained by successively doubling either exposure or light levels, Zone 2 density is the same on all negatives, as is Zone 3 density, Zone 4 density, Zone 5 density, and so on. Keep this in mind: *Zone densities are the same for all negatives*.

You can continue doubling the exposure, thereby increasing the negative density of the developed negative—but there is a limit. Eventually you'll reach a density level that cannot be increased; the negative will "max out." It turns out that on nearly all black-and-white films, the maximum density usually goes up to Zone 16 or even 18! Most photographers think it goes only to Zone 10, but in fact, it goes well beyond that. Zone 10 is just above the halfway mark on the density scale. When you fully comprehend how much the negative can encompass and learn how to control that immense range (which will become clear in the next two chapters), you can then appreciate how extraordinarily flexible and powerful photography can be.

Translating Negative Densities to Print Tonalities

Negative densities mean nothing until a print is made. What happens to those densities when they are printed, when the negative is placed in the enlarger and exposed onto a normal grade enlarging paper?

We begin this determination by defining a "standard exposure". A standard exposure is the minimum length of exposure time through the enlarger required to achieve a maximum black from the Zone 0 portion of the negative. Suppose we require a 20-second exposure of the negative under the enlarger to achieve a maximum black on your enlarging paper from Zone 0 (i.e., the clearest portion of the negative). Any exposure greater than 20 seconds will produce a black that is no blacker; anything less fails to achieve maximum black. At best, any exposure less than 20 seconds will yield a very dark gray, but not black. Using the 20-second exposure on a normal contrast paper (generally a grade 2 paper or a mid-contrast level on variable contrast paper), you get the table shown below.

■ *On nearly all black-and-white films, the maximum density is achieved high into the teens: usually it goes up to about Zone 16 or even 18! Most photographers think it goes only to about Zone 10, but in fact, it goes well beyond that.*

At first glance the table seems to indicate that Zone 1 has no real meaning, since it is essentially as black as Zone 0 in the print. But remember, Zone 1 represents the amount of light needed to sensitize the film just enough to produce visible density when the negative is developed, i.e., the threshold exposure. From this level of exposure, we begin the doubling of exposures (or light levels) to obtain the successive zones. For this reason, Zone 1 is especially important—though it is essentially unimportant for printing purposes. Because it has so little density, it blocks almost none of the light coming from the enlarger, so it prints virtually as black as Zone 0.

Surprisingly, the print reaches pure white by Zone 9, although the negative continues to show separations up to Zones 15, 16, 17, and even 18 (beyond the table)! These extremely dense zones will print as pure white in a "straight print," but they are very usable. (A straight print is one with a single exposure; no additional exposure, known as "burning", is used on any portion of the image.) In chapter 9 you'll see how those zones can be controlled in development, and in chapter 10 you'll see further methods of making the higher zones visible, meaningful, and essential in the print. They should not be excluded from consideration in exposure. Those zones are part of the zone system, and you'll soon see how to fully use them. At that point, your artistic and creative potential will rocket upward immeasurably (figure 8–1b).

For now, however, we will confine ourselves to the range of printable values in a straight print, Zones 0 to 9. I have mentioned several times that by doubling the exposure, you can

jump from one zone to the next higher one; but how do you double the exposure? Simple! A quick glance at your camera shows that the shutter speeds are (in fractions of a second) 1, ½, ¼, ⅛, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, and perhaps 1/1000. Each speed is half the exposure of the previous one. If you go the other way, each is twice the speed of the previous one. Thus, if your exposure is 1/60 second, you double the exposure by going to 1/30 second. If your exposure is ¼ second, you double it by going to ½ second. So the camera's shutter speeds tie in immediately with the zones.

There is another way to open up or close down a zone: by closing the aperture (i.e., the opening) of the lens. Look at the aperture settings, also known as the f/stops. They are f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22, and perhaps f/32, f/45, and f/64.

◀ ***Figure 8–1b: Stairway to Cittá Alta, Bergamo, Italy***
The photograph contains a full range of tonalities from black to white, yet there appear to be no jarring contrasts. There are small amounts of dodging and burning, but no extensive alterations.

▼ ***Diagram 8.1:***
Negative density and print tonal scale

Negative Density and Print Tonal Scale		
THE NEGATIVE	ZONES	THE PRINT
"	"	"
" 12	13	
Double the exposure of Zone 11	12	Paper Base white
Double the exposure of Zone 10	11	Paper Base white
Double the exposure of Zone 9	10	Paper Base white
Double the exposure of Zone 8	9	Paper Base white
Double the exposure of Zone 7	8	Very light gray—no visible textures, but tonally darker than pure white
Double the exposure of Zone 6	7	Light gray—clearly visible light textures
Double the exposure of Zone 5	6	Medium light gray
Double the exposure of Zone 4	5	Medium gray—the 18% gray card
Double the exposure of Zone 3	4	Medium dark gray
Double the exposure of Zone 2	3	Dark gray—clearly visible textures
Double the exposure of Zone 1	2	Very dark gray—no visible textures, but tonally lighter than black
First obvious density	1	Black (no real difference from Zone 0)
No density—film base fog	0	Maximum black

Each of these numbers represents a halving of the aperture from the previous setting. Thus, f/5.6 admits half the light that f/4 admits. F/16 allows only half the light through the lens that f/11 allows. The higher the number, the smaller the aperture and the less light passes through the lens. Again, the camera and the zone system work together in harmony

The other confusion comes from the fact that the f/stop number is actually a ratio of the lens opening to the focal length of the lens, so we are really dealing with an inverse amount, or ¼, ⅛, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, etc. This is how we end up with the rule, "The bigger the number, the smaller the hole," i.e., the larger the f/stop number, the smaller the aperture.

The two methods of doubling or halving the exposure, via aperture or shutter speed, point out a very important relationship: *one zone is equal to one stop*. When you "open up a stop—for example from f/11 to f/8—you are at the same time giving one zone more exposure. In the same way, when you change the shutter speed from, say, 1/125 second to 1/60 second, you are also "opening up one stop" or giving one stop greater exposure.

Now that you know what the zones are and how you can jump from one to another with your camera, set that information aside for a while as we look at the workings of the light meter. By combining the knowledge of the zones with an understanding of the light meter, the zone system becomes immediately clear.

■ *As a brief technical aside, it is worth explaining aperture numbers, which seem so arbitrary and senseless at first. The formula for the area of a circle is $A=\pi r^2$, where A is the area of the circle, r is its radius, and $\pi=3.14159$. If you square each of the aperture numbers (i.e., multiply it by itself) and plug them into the formula as r^2, they form a simple geometric progression: 4, 8, 16, 32, 64, 128, 256, 512, etc., so that each opening is half or double the previous one.*

The Light Meter—How it Works

■ *All gray meters do the same thing: they average light within the viewing angle of the meter and give you a reading of the proper exposure for Zone 5*. That is the only thing they do!

In order to fully understand the light meter, let's refer to it by a different name for awhile. The name "light meter" is a bit confusing. We'll call it a "gray meter" because its only function is to tell the proper exposure for medium gray, or Zone 5. *All* gray meters do the same thing: they average light within the viewing angle of the meter and give you a reading of the proper exposure for Zone 5. *That is the only thing they do!*

The gray meter has no idea what it's pointed towards. It could be a dark coat in a hallway, a field of snow under bright sun, a person's face under overcast skies, or anything else you can think of. All it knows is the amount of light that impinges on its light-sensitive cells. Since it has no idea what it's looking at, it cannot give the *proper* exposure for the item, so it gives the *Zone 5 exposure!* For this reason, it should logically be called a gray meter.

Zone 5 may be just the right exposure for many things—perhaps a person's face under overcast skies (though it seems a bit too dark to me)—but it surely is *not* the proper exposure for sunlit snow! The difference between you and the gray meter is that you can think! Recognizing that the meter *always* gives a Zone 5 reading, you can supply your knowledge of the tonal scale to determine the *proper* exposure.

Let's take the case of sunlit snow. If the snow has modulations—small hills and valleys—and perhaps even some shadows, you may want it somewhere between Zone 7 (easily seen light gray textures) and Zone 8 (very light gray, almost white—no real textures). Even though snow is white, you probably want to avoid a blank white area lacking in detail. Suppose the gray meter reads f/16 @ 1/250 second exposure. Of course that exposure would yield medium gray (Zone 5) snow! So, how do you get from the *metered* reading to the *desired* reading?

Start with the metered reading and first double the exposure by opening up one stop, which is the equivalent of increasing the exposure by one zone. From f/16 @ 1/250 second, you can go to f/16 @ 1/125, which doubles the exposure and places the snow in Zone 6. (Remember that 1/125 second is twice as long as 1/250 second.) Alternatively, you could change the aperture instead of the shutter speed and achieve Zone 6 with a setting of f/11 @ 1/250 second.

Next, double the exposure again to place the snow in Zone 7. From f/16 @ 1/125 second, you can go to f/16 @ 1/60 second, again using the shutter speed to double the exposure. (By changing the aperture you can achieve the same thing, going from f/16 @ 1/125 second to f/11 @ 1/125 second.) If you want to go to Zone 8, you can again change either the aperture or shutter speed to move up another zone on the scale.

Each doubling of the exposure makes the snow one zone lighter in tone. You can even go a half tone lighter by using the aperture setting between the f/stops shown on the camera. Thus, to place the snow in Zone 7 ½, go from the Zone 7 setting of f/16 @ 1/60 second to a point halfway between f/16 and f/11 @ 1/60 second. With this exposure setting, the snow will come out at Zone 7 ½, and it will show very light textures without being blank white.

With this example, you have learned how to expose negatives using the zone system. The critical point to remember is that *the gray meter always gives a Zone 5 reading*. You must open the aperture or increase the shutter speed if you want lighter tones than Zone 5. You must close down the aperture or decrease the shutter speed if you want tones darker than Zone 5. Then, by maintaining a mental image of the tonal value of each zone, you can determine exactly how much to open up or close down to obtain your desired exposure.

It may be confusing at first to realize that when you are standing in front of a bright object (such as sunlit snow), you must open up the lens to make it bright. It seems logically correct to close down the aperture from your meter reading because the object is so bright, but the opposite is true. You always start from the Zone 5, medium gray meter reading, and *if you want your subject to have tones lighter than Zone 5 you*

must give it additional exposure above the meter reading to make it light. Similarly, starting with the Zone 5 medium gray meter reading, *if you want your subject to have darker tones than Zone 5, you must give it less exposure than the meter reading to make it dark*. Just as you must interpret the scene rather than merely "shoot" it to make your point of view visible, you must also control the negative densities. You can do so if you recognize that your starting point is always medium gray, the exposure that the gray meter *always* gives you!

Review of Negative Exposure Procedure

Let's quickly review the procedure for obtaining a proper exposure. *In a sense, you must start at the end, jump to the beginning, then work back to the end*. It works this way: when you see something you want to photograph, first decide the tonalities you want in the final print *(that is the end point!)*. Then take your meter reading, which always gives you a Zone 5 exposure *(that is the starting point!)*. Then decide how many stops (i.e., zones) you must open up or close down to reach the desired tones *(that is working back toward the end point!)*.

This tells you that the use of the zone system is integrally tied together with previsualization, for you must be able to visualize the way you want the final print to look in order to follow this procedure. Most of the time, if you follow your light meter (the gray meter) blindly, you'll probably come out relatively close to the proper exposure because the eye is somewhat of a gray meter also. After all, you see things almost equally well outdoors or indoors, even though the light levels are very far apart. This is due to the fact that the eye and brain compensate wonderfully within a very wide range of brightness levels—in other words, you average out the light levels, just like the meter does. But when you encounter an exceptional situation such as the sunlit snow, following the gray meter can be disastrous. You will end up with Zone 5 snow! Therefore, keep in mind that the gray meter is a dumb robot. It is your tool, and it gives you a starting point—middle gray—a point of departure. It is up to you to depart with intelligence.

Consider another example, along with several variations, to help solidify these ideas. Suppose you travel to Hawaii and are standing on a field of black lava rock on a cloudy day. You decide you want to photograph the rock. First, look at it and decide what tonal values you want it to have. Using a mental picture of the zone scale, you might choose an average tone of about Zone 3 ½, so that the textures are quite dark yet easily seen.

Next, take a meter reading with your gray meter. Suppose the meter reads f/5.6 @ ⅓₀ second. Of course, if you use that shutter speed and aperture, you will get Zone 5 (medium gray) textures. So, if you stop down one stop (i.e., one zone), either by cutting the shutter speed in half or closing down the aperture one stop, you will get Zone 4 textures.

This time, let's leave the shutter speed at ⅓₀ and close the aperture down to f/8. Then stop down another ½ stop to a point between f/8 and f/11. That puts you at Zone 3 ½. (Remember, you can always place the aperture at intermediate points between listed settings. However, the shutter speed must be on a listed setting; otherwise, it won't open or it will make a choice between the two nearby speeds.)

In this example, you cut down on the exposure from the meter reading in order to make the object (the lava rock) appear as dark in the print as it did to your eye. You started with the Zone 5 reading and closed down 1 ½ zones to Zone 3 ½. Suppose the field of lava rock also includes a bush with delicate, lacy branches that sway gently in the breeze. If you want to arrest the movement of those branches, ⅓₀ second may not be a short enough exposure, but ⅙₀ second may. In this case, close down the shutter speed from ⅓₀ second to ⅙₀ second and compensate for the loss of one zone by opening up the aperture from the halfway point between f/8 and f/11 to the halfway point between f/5.6 and f/8. The total exposure will be the

■ *The zone system is a method of precise exposure, and that precision can be applied to literal interpretations or to vast departures from reality. It is a remarkably useful and flexible system of exposure for creative photographers.*

same, but the faster shutter speed may stop the motion of the bush, as you desired. You can always use this reciprocal relationship (i.e., ½ × 2 = 1) between f/stops and shutter speeds to gain the optimum exposure for your purposes.

Now, suppose there is no wind and you want maximum depth of field. Smaller apertures (i.e., the higher f/stop numbers) yield greater depth of field, and the setting between f/8 and f/11 may not yield sharpness from the immediate foreground to distant areas. If you stop down to a point halfway between f/11 and f/16, and compensate for the loss of one zone by increasing the shutter speed from 1/30 second to 1/15 second, you may get just what you want. Now you have achieved your goals of getting the rock texture at Zone 3½ while obtaining great depth of field.

As in the first example, you start by defining the tonalities you want to have in the print. Then you meter the scene with your gray meter to determine what exposure will yield a Zone 5 result. Then you change the metered exposure by the amount needed to go from Zone 5 to your desired exposure. It's really quite simple! It's also very exact, and that's the chief attraction of the zone system. By using it carefully, you can get *precisely* the exposure you want.

Using the Zone System to Depart from Reality

Although the two examples just presented show how to obtain a literal rendition of the objects photographed, the zone system can be employed perfectly well in creative departures from reality—ones that may present your interpretation more effectively. Suppose, for instance, that you want to present the tones of the lava rock in a high key (i.e., light-toned) rendition of Zones 6, 7, and 8. Perhaps you feel that a section of rock is sharded, with jagged edges that remind you of broken glass or crystal, and you want to render it as such. This would not be a literal rendition of the scene, but a fascinating transformation of it to something abstract or unreal, perhaps even surreal.

The method of obtaining this interpretation is exactly the same as for the literal rendition. First, determine the tone *you want* (*the end point;* in this case, Zones 6, 7, and 8). Then take the meter reading *(the starting point),* which is f/5.6 @ 1/30 second. This time, however, you want to make the tones *lighter* than the gray meter's Zone 5 reading by an average of two zones (*working back to the end point* by using Zone 7 as the average of the three desired zones). Open up two stops via either the shutter speed or aperture. If you want to maintain depth of field and you have a tripod, then do it via shutter speed, going from 1/30 second exposure to 1/8 second (remember that doubling the shutter speed from 1/30 second exposure to 1/15 second adds one stop, and then opening from 1/15 second to 1/8 second adds another stop). Now the exposure will yield the rocks with an average Zone 7 tonality. This could produce a spectacular departure from the reality of the scene.

Since the camera is on a tripod and you have no worries about movement with a long exposure, why not also go for greater depth of field by closing down to f/8 while lengthening the shutter speed to ¼ second? ... or even going to f/11 @ ½ second? After all, the rocks won't move, nor will the camera on the tripod. But remember, if a bush is in the scene and a breeze is blowing, you may have to rethink that approach. These are the real problems of photography.

Now you can see that the zone system becomes not only a tool for "correct", literal exposure, but also a creative tool for departures from reality. So many people forget this aspect of the system despite the fact that it is one of its greatest virtues. All aspects of photography should be meshed for creativity and personal expression, and the zone system should be an integral part of that process. The zone system is a method of precise exposure, and that precision can be applied to literal interpretations or to vast departures from reality. It is a

remarkably useful and flexible system of exposure for creative photographers.

One final example will begin to expand the concept of the zone system to its full usage. When you look at a scene, you are generally concerned with several objects and several tones, not just one. The zone system explains how to relate these tones.

Suppose you want to make a portrait of a white male wearing a dark shirt. Suppose the gray meter reading of the man's face is f/11 @ 1/60 second, and the shirt reads f/8 @ 1/15 second. (The shirt is darker, thus it requires a greater exposure for a Zone 5 rendition. Brighter objects always require less overall exposure on the gray meter. Make sure you fully understand this point before going further!)

How far apart are the readings? F/8 is one zone more than f/11. 1/15 second is two stops more exposure than 1/60 second. Therefore, the man's face is three stops brighter than the shirt. If you make the exposure at the reading on the man's face, the face would be in Zone 5 and the shirt would automatically be in Zone 2. Both would be too dark. If you make the exposure at the reading on the shirt, the shirt would be in Zone 5 and the man's face would be in Zone 8. Both would be too bright.

Whatever the zone of the man's face, the shirt is three zones lower. That cannot be changed during exposure (except possibly through filtration, which we will not consider here). So, if you place the man's face at Zone 6 ½ by opening up the aperture 1 ½ stops above the meter reading on his face, then the shirt would end up at Zone 3 ½. To do this, first open up one stop from the meter reading of f/11 @ 1/60 second, to f/8 @ 1/60 second (or to f/11 @ 1/30 second, which would be the same). This places the tone of the face at Zone 6. Then open up another ½ stop to place the face in Zone 6 ½. The final exposure would be halfway between f/5.6 and f/8 @ 1/60 second. Now both the man's face and the shirt are reasonably placed for a meaningful portrait.

In chapter 9, the discussion will continue with methods of altering contrast between two objects. If a scene is too contrasty for your desires, appropriate negative exposure and subsequent development can be used to lower contrast while still maintaining detail throughout the negative. Conversely, if the scene is too flat for your purposes, appropriate exposure and development can be used to increase contrast to a more desirable level.

The Zone System for Color

In color, contrast is inherent in the film. It cannot be altered easily unless you learn very sophisticated methods of color negative or transparency development, which are beyond the scope of this book. This chapter, dealing with *exposure,* is therefore even more important for color than for black-and-white because it's the only control you have. The only contrast control you have is to change from one film to another that is inherently higher or lower in contrast.

As noted in chapter 6, most outdoor transparency films possess higher contrast than indoor transparency films or color negative films. For outdoor transparencies, one stop exposure increase or decrease will be more than one zone tonal change on the film—it may be as high as 1½ zones. This means that just two stops of exposure increase from the gray meter reading could put the average tone almost at Zone 8, just below pure white. Decreasing the metered exposure by 2 stops puts the average near Zone 2, or just above black. 2½ stops of reduced exposure yields a pure black on the most contrasty color transparencies. Even a ½ stop increase in exposure will be close to a full zone of tonal brightening. That explains why even a small exposure error on a color slide usually ruins it. For this reason, it is even more imperative to use the zone system with extreme precision for color transparencies.

Color indoor transparency film, being somewhat lower in contrast, permits more flexibility. Color negatives are even more forgiving. But remember one key point: with a negative

► ***Figure 8–2: Lofoten Islands, Norway***
Using indoor color transparency film (Kodak Ektachrome 64T), I was able to encompass the wide range of brightness in the scene, from detail in the brightly lit clouds and distant mountains to the foreground rocks and water.

you can correct an incorrect exposure within limits; but with a transparency, the slide itself is often the final product, and an incorrect exposure usually has no recourse.

Exposure of color negatives must be more precise than black-and-white negatives. When attempting to correct an overexposed color negative at the printing stage, you may encounter color shifts that alter the entire color balance. Underexposure of color negatives poses the same problems as it does with black-and-white negatives: loss of shadow detail. Once detail is lost in the negative, it cannot be regained in the print.

When I shoot color, especially transparencies, I am very precise in my use of the zone system. I meter extensively, making sure that I'm not exceeding the limits of the film, and that all colors and tones will be rendered just as I want them to be. If I miss by just a small amount, my transparency may be useless. I must know the latitude of the film, its inherent contrast level, and the light levels of every important object in the scene. If they are within the range of the film, I can make the exposure. If they are not, there's no point wasting an exposure. For instance, if two objects meter two stops apart—say, f/8 @ $\frac{1}{30}$ second and f/8 @ $\frac{1}{125}$ second—high contrast transparency film would greatly expand the spread because of its inherent high contrast. The metered difference of two stops would translate to about 3 zones. With color indoor transparency film, the difference would be just over two zones (figure 8–2). With color negative film, the difference would be at, or slightly less than, two zones.

If the scene is photographed with a high contrast color transparency film, and the brightest object is placed one stop above its metered value, it would end up at about Zone 6 ½ (because each stop represents about 1 ½ zones). The darker object would then be three zones lower, or Zone 3 ½. Thus both would be clearly visible, but the brighter one would be a very light color while the darker one would be a very deep color. With most indoor transparency films, the bright object would end up at Zone 6 and the dark object at Zone 4. Both films would show detail, but the renditions would be considerably different.

If one of the two objects were of greater importance, I would be sure to place it at the most appropriate zone placement, letting the other one end up where it may. If the brighter object were rendered as a middle tonality (Zone 5), high contrast film could be a problem for it would render the dark object at Zone 2, devoid of color and barely hinting at tonality above pure black. A transparency film of moderate contrast, on the other hand, would render the darker object at Zone 3, exhibiting both deep color and tonality.

These considerations are paramount in color exposures. Without knowledge of the film's characteristics, and without exact meter readings and careful placements of exposures, you will produce many exposures that are just enough "off" as to be useless.

With negatives, the contrast is slightly lower than with indoor transparencies. If the negative is slightly overexposed, it gains excess density that can be corrected in printing. Thus it offers two degrees of flexibility over outdoor transparency film (greater flexibility, but not necessarily greater or lesser quality). It holds contrast better and offers greater leeway of exposure. A print made from a color negative, therefore, has a very different look than one made from transparency film. Every serious color photographer should carefully consider the merits of color negative photography in comparison with the merits of transparency film, for it may prove to be more suitable for many applications.

A number of years ago, when I first started shooting 35mm color slides, I was in Yosemite Valley one afternoon while the sun was shining brilliantly on El Capitan, the enormous granite cliff near the valley entrance. I stood in the shaded forest below the awesome rock, amidst the oaks and pines. I was excited by the contrast between the brilliant granite and the dark trees, so I photographed the scene.

The slides were complete disasters! The trees were dead black; the cliff, blank white. There was no detail anywhere, and I was baffled because I followed the light meter perfectly (that was before I determined it was a gray meter!). Several years later, after learning the zone system, I was again in Yosemite Valley under similar circumstances and quickly learned the reason for the earlier failure.

The sunlit cliff was fully six stops brighter than the shaded trees. I took an average reading, which placed the cliff three stops higher than Zone 5, and the trees three stops lower. Because of the high contrast of the Kodachrome II film I was using at the time, the three stops in either direction translated into nearly five zones! El Capitan was nearly at Zone 10, while the trees were barely above Zone 0. The slides were obviously doomed to failure, or so it seemed.

Actually, something could have been done had I known both the zone system and the characteristics of the film. With the tones so far apart, I could have concentrated on the cliff, disregarding the trees entirely and allowing them to be black silhouettes (as they ultimately turned out, anyway). Had I taken a gray meter reading on the cliff alone, I then could have opened up a bit more than one stop, which would have translated into nearly two zones with the high contrast film I was using, placing the cliff just below Zone 7. Then the cliff would have been rendered in light tonalities possessing clearly visible color and texture—as it appeared to the eye—and the

black trees would have appeared as silhouetted design elements in the foreground. It could have been an effective photograph. In this case, full knowledge of the zone system and effective use of the gray meter would have overcome the film's inability to accept the full tonal range of the scene.

The Zone System and the Inverse Square Law

At the end of chapter 5, I pointed out that the inverse square law presents major problems for zone placements indoors. If objects are placed one foot, two feet, and three feet from a light source, the second object receives ¼ the amount of light of the closest one, and the third object receives only ⅑ the light of the first. The same ratios hold if the objects are placed two feet, four feet, and six feet from the light source. (The closest object receives $\frac{1}{2^2} = 1/(2 \times 2) = \frac{1}{4}$ unit of light; the second receives $\frac{1}{4^2} = 1/(4 \times 4) = \frac{1}{16}$ unit of light; the third receives $\frac{1}{6^2} = 1/(6 \times 6) = \frac{1}{36}$ unit of light. Thus the ratios remain the same.)

Suppose those objects were people, and you wanted to do a portrait of the three people sitting side by side on a couch with a lamp lighting the scene from the far right edge. As we know, successive zones represent doublings or halvings of light levels. Therefore, if the middle person receives only ¼ the light of the person on the right, he or she will be two zones lower on the scale. (One zone difference is half the light; two zones is a quarter the light, and so on.) The person on the left will be more than three zones darker. (One eighth of the light would be exactly three zones.)

As a result, if the person nearest the lamp is placed in Zone 7 (which would be an extremely light rendition of any skin tone), the one in the center will be Zone 5, and the one on the left below Zone 4! (This assumes the skin tones are the same in equal lighting.) This is a major problem for all indoor photography, and it explains the necessity for so much extra lighting in most studio photography just to balance light levels. It is also the prime reason for lower contrast of indoor transparency film.

The eye/brain combination tends to smooth over these large discrepancies in light levels, so gray meter readings are essential indoors for determining the light levels that the film will encounter. If the light source is a window in the daylight hours, the distance from the windowpane (which is, effectively, the light source) also answers to the inverse square law. This explains the difficulty of photographing with natural light indoors. The problem is increased by the fact that every part of the room does not receive direct light from the window. Some parts, such as the walls immediately around the window, receive no direct light whatsoever but only reflected light within the room. Therefore, those walls may be many zones lower than an object in front of—and very near—the window.

Methods of dealing with surprising situations like this, as well as other situations with excessively high or low contrast, are the prime focus of the next chapter.

In Summary

Knowledge of the zone system of exposure, coupled with knowledge of your film's characteristics, is the most effective means of obtaining excellent negatives or transparencies. These tools can be combined either for literal renditions of reality or for departures from reality. The important thing is that they will bring precision to your interpretation. For this reason, they are indispensable tools for creativity.

▲ ***Figure 8–3: Morgan Yazee's Corral***
Morgan Yazee is a Navajo rancher and show horse producer. I visited his ranch in 2003. Using a hand-held medium format camera (Mamiya 645), standing on the second rail of the corral fence and propping my elbows on the top rail for stability, I followed the horses around the corral, making this exposure when they briefly stopped, lining up almost like a chorus line of dancers. Using a relatively fast film—Ilford HP5, rated by Ilford at ASA 400, but at ASA 300 by me—I was able to make the photograph at 1/60 second, placing the shadowed side of the horses just above Zone 5.

CHAPTER 9

The Black-and-White Negative and Contrast Control—The Extended Zone System

ANSEL ADAMS ONCE LIKENED PHOTOGRAPHY TO MUSIC with his famous analogy, "The negative is the score; the print is the performance." The composer creates the score, including everything he or she wants; then a performer interprets the score as he or she sees fit. In photography, you are both the composer and performer. This chapter gives you the tools to make the score far richer than you may have imagined possible. Chapter 10 extends that thinking into the realm of the performance.

Chapter 9 Overview

Chapter 8 deals with proper *exposure* of the negative; this chapter deals with *developing* it to the level of contrast you want, thus giving you immense control over your imagery.

The zone system can be used not only for placing an object into any desired tonality, but also for changing contrast between objects. Since there is more than one object (or tonality) in any photograph, the moment you place one of them at the density you desire, the others automatically land as far away in density as the light meter shows. That may be either too close in density to the first object or too far away. There is no assurance that exposing one object at the appropriate density places the others at a desirable density for printing purposes. You may wish to have the other objects brighter or darker. In other words, you may wish to alter the level of contrast between the objects.

◄ ***Figure 9–1: The Queen of Maligne***
Maligne Canyon (pronounced Ma-leen) in Jasper National Park is inaccessible in the spring, summer, and autumn, as a powerful river scours the deeply cut limestone chasm. But in winter the river freezes, allowing access. At one location within the 180-foot deep canyon an underground seep hits the canyon wall just below the rim. As water runs down the inner canyon wall, it freezes, creating the enormous natural ice sculpture known as the Queen of Maligne.

By varying the length of time for negative development, contrast can be increased or decreased in the black-and-white negative. Lower zones of the negative (the thinnest or least dense portions, which become the darker portions of the print) develop fully within a few minutes, then change very little with extended development times. This tells you that the low zones (often referred to as the "shadow areas" of the scene) are determined almost exclusively by negative *exposure,* with little change occurring as a result of negative *development*.

The middle zones (roughly Zones 4, 5, 6, and 7) can be significantly altered by changes in negative development times, with each zone affected more than the previous zone. The higher zones (generally Zone 8 and higher) are greatly affected by changes in negative development times. The higher an object is placed on the zone scale at the time of exposure, the more it can be altered by changes in negative *development*.

This tells you how to "read" a negative. If your shadow areas show good density—appropriately low, with good separations between them—then your *exposure* was good. This is true because negative development has little effect on shadow areas; if they look good, it tells you that their *exposure* was on target. Low density areas are almost purely determined by your initial exposure. Once you have those densities nailed down, look at your highlights. If your highlight densities are good, then your negative *development* is good. This is true because altering negative development has such a great effect on the higher zones.

If your shadow areas are too thin or nonexistent, simply increase your *exposure*. Don't think about changing your *development time* because it will have little or no effect on the low zones. Once you get sufficient exposure for the shadow areas to have good density separations, then look at the highlights. If they are too dense, reduce your development time; if they are too thin, increase your development time. But don't change your exposure to compensate for the changes in development time because development changes do not materially affect the low zones.

The full range of the negative—Zone 0 to Zone 16–18—can then be put to use. This chapter is divided into three sections, beginning with an explanation of what happens to the negative when it is developed. The second section has examples of how to use that information for creative purposes. The last section examines the general characteristics of negative materials and developers, and the specifics of processing to make full use of the negative a reality.

Film's range is astonishing, and the creative potential inherent in fully using the "extended zone system" is immense. As in the case of the zone system for film exposure, the underlying concepts are simple. The approach here is nontechnical; though graphs are used in the explanation, they do not require mathematical sophistication on the part of the reader.

The Negative During Development

As explained in Chapter 8, every part of a negative is sensitized to the amount of light that fell on it during the exposure. This sensitized negative is known as the latent image. At the time of exposure, the negative gains a potential for density, but no actual density. Only during development does it gain density.

When the exposed negative is put into the developer, all of its parts begin to develop—i.e., to grow denser than the unexposed film base—in proportion to the degree of sensitization. The areas sensitized to the greatest extent build density at a rapid rate; those sensitized to a lesser extent build density at a slower rate. Those areas sensitized to the lowest level, Zone 1, gain density rapidly and are completely developed in a minute or two. Additional development time has no appreciable effect on Zone 1—except that extended development tends to progressively fog, or darken, the film base itself, making Zone 1 denser along with an equal density increase in all zones.

Areas sensitized above Zone 1 continue to grow in density as development continues. Once areas sensitized to Zone 2 reach that density, they gain slightly greater density with continued development—but they won't even reach Zone 2½ without excessively long development times. Once areas sensitized to Zone 3 gain that density, they can be developed nearly up to Zone 4 with increased development times. Areas sensitized to Zone 4 can be pushed beyond Zone 5 in density with extended development times.

The amount of development time needed for each zone to reach its proper density is known as the "normal development" time. How do you determine "normal development time"? By finding out how long it takes to develop any exposed zone to that exact density. For example, normal development time is the time required to develop an area placed at Zone 5 (the gray meter reading) to Zone 5 density. At the start of development, the exposed (i.e., sensitized) Zone 5 area has no density, but as development proceeds, density increases. It quickly exceeds Zone 1, and then surpasses Zones 2, 3, and 4 before finally achieving Zone 5 density. That's "normal development time" (for that combination of film and developer). If development continues beyond that point, the density will exceed Zone 6 and ultimately reach Zone 7.

But how do you identify true Zone 5 density? Let's go back to the beginning of chapter 8 where we defined standard exposure. Once you find the standard exposure, place the Zone 5 negative in the enlarger (at the same height and aperture you used to determine the standard exposure) and give it that same exposure. If it's true Zone 5 density, the print you get will be exactly the same tone as the 18 percent gray card. When you develop the Zone 5 negative for the appropriate amount of time to achieve that density, you have found the normal development time". (This fills in the temporary gap in the explanation of the zone system at the beginning of chapter 8. It may be worthwhile to reread those pages now.)

Each higher zone grows progressively denser with increased development time. The portion of the negative exposed at Zone 6 (one stop brighter than the gray meter reading) achieves Zone 6 density in the normal development time, but it can exceed Zone 8 density with greatly extended development time. Increasing the development time beyond normal not only shifts the density of each zone equally, but also expands each zone in proportion to its original placement.

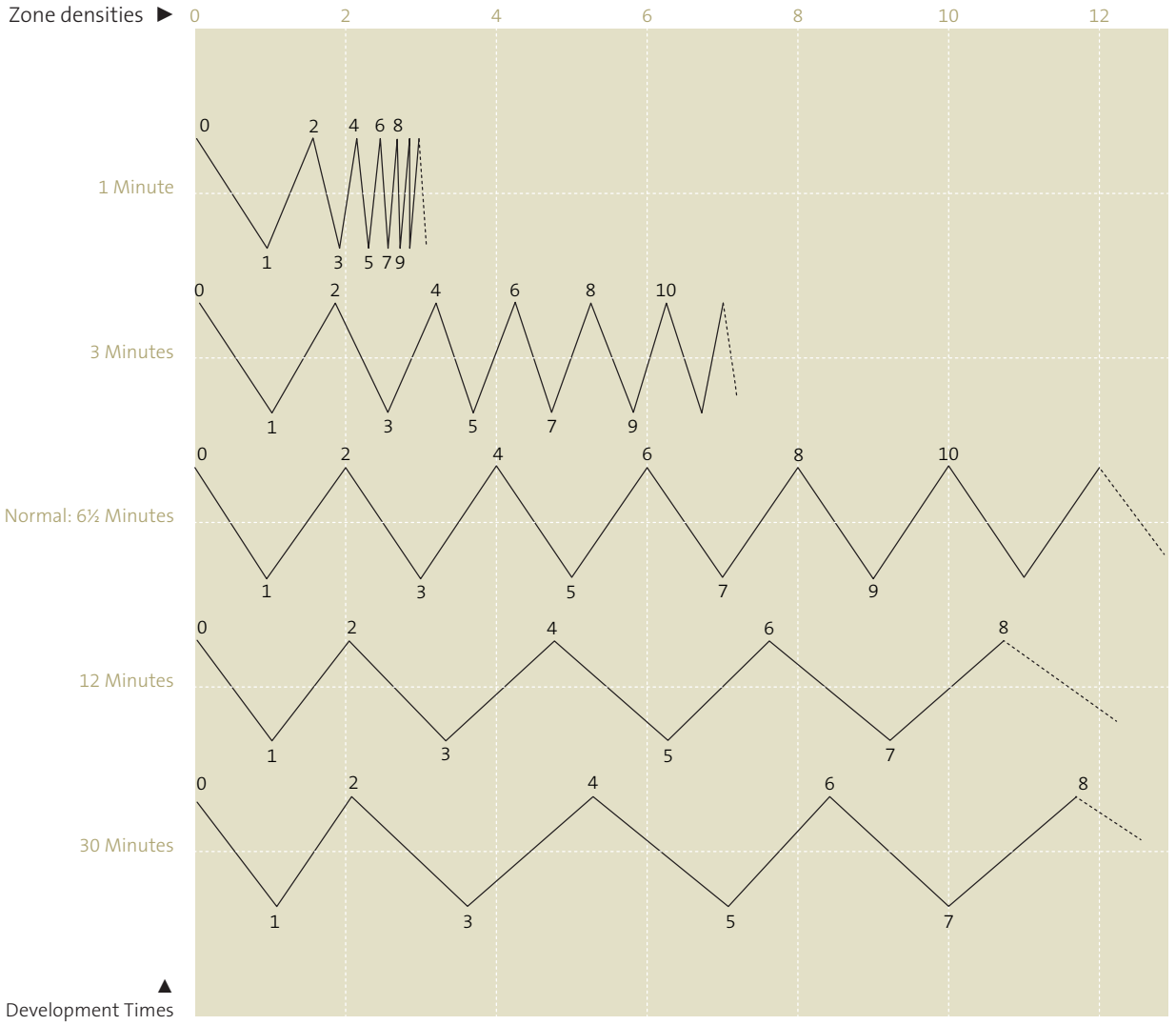
If development is terminated before the normal development time, precisely the opposite effect occurs. In that case, the density of each zone decreases in proportion to the original exposure on the zone scale. The higher zones are reduced in density more than the lower zones. Zone 1 is fixed in density no matter what development the negative is given. Those areas exposed as Zone 2 will not quite reach full Zone 2 density in less than normal development time. Zone 3, however, will begin to show significant changes, perhaps dropping to Zone 2⅔ or 2¾. Areas exposed as Zone 4 may only reach Zone 3½ if development time is cut short. Zone 5, the gray meter's average reading, may just exceed Zone 4, and Zone 6 may be just shy of Zone 5.

As you progress up the tonal scale to higher exposed densities, each is developed to a higher density than its predecessor, but each is reduced below normal density by a greater amount than its predecessor. Zone 9 may drop to Zone 7, while Zone 11 may barely exceed Zone 8 with a shortened development time.

■ *Increasing the development time beyond normal does not simply shift the density of each zone equally, but expands each in proportion to its original placement.*

The Bellows Analogy

A simple way to grasp the concept of progressively increased densities with extended development times, and progressively reduced densities with shortened development times, is to think of each successive zone as a number on the successive pleats of a camera bellows. When development begins, the bellows are crunched down completely and each zone placement has zero density. As development progresses, the bellows are slowly extended to the right from the fixed point on the left so that the pleats, or zones, separate from one another—meaning that they separate in density. The longer the development



► ***Diagram 9.1: Density Increase During Development Time—The Barnbaum Bellows Analogy***
Negative density and print tonal scale
Please note that diagram 9.1 is not a model of actual negative densities during development, but rather a schematic of what happens to densities as development proceeds. I will refer to it in the following examples to be consistent within the text, but don't expect your combination of negative and developer to yield the same results as those shown here. Yours should be close, but not exact. (See Time/Temperature Development Charts for several films in diagrams 9.6–9.9.)

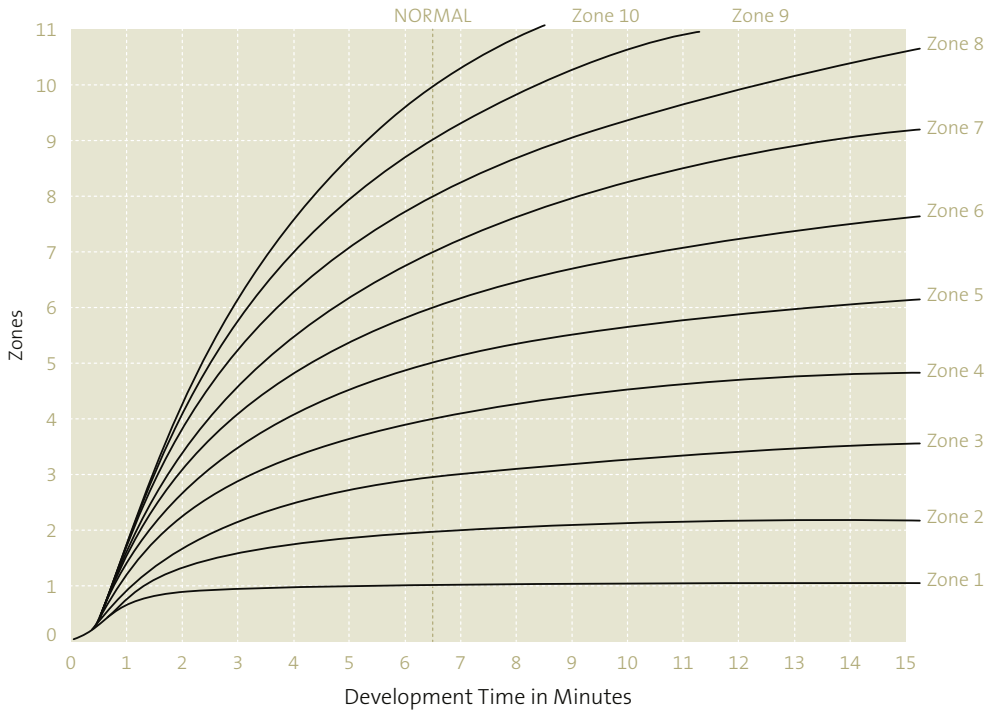
time, the further the bellows are extended to the right, and the greater the density of the higher zones up to maximum negative density (diagram 9.1).

Within the first minute of development, the zones begin to separate. At four minutes, Zone 1 is fully developed and Zone 2 is near its normal density, while the higher zones are noticeably falling short. If you choose 6½ minutes as the normal development time (my development time for Ilford HP5+ or Kodak Tri-X film in Kodak HC110 developer), you will see that the zone placements—the sensitization levels of the latent image, which are the numbers on the pleats—correspond to the developed densities. Beyond 6½ minutes, all zones except 0 and 1 continue to grow ever denser.

For example, note in the schematic representation at three minutes development time, the exposed Zone 4 reaches just above Zone 3 (a loss of nearly a full zone from its normal development density) whereas Zone 10 reaches only a bit above Zone 6, which is a loss of nearly 4 zones from normal. This shows that the higher zones lose more density than the lower zones with reduced development times. *Contrast is decreased when development times are reduced below normal.*

Conversely, with 12 minutes of development the exposed Zone 4 reaches 4⅔ density (a gain of ⅔ zone), whereas the exposed Zone 8 reaches almost Zone 11 (a gain of nearly 3 zones), and the exposed Zone 10 (beyond the chart) may go beyond Zone 14 (a gain of 4 zones). This shows that the higher zones gain more density than the lower zones with increased development times. *Contrast is increased when development times extend beyond normal.*

Another way of representing the development characteristics of the negative is via a graph (diagram 9.2), where the X-axis (the horizontal axis) represents development time in minutes and the Y-axis (the vertical axis) represents density. Each curved line represents the increase in density of an exposed zone as development proceeds. All exposed zones start the development process with no density, and density increases in proportion to the initial sensitization. At my normal development time of 6½ minutes, each exposed zone reaches its proper density. Beyond 6½ minutes, density continues to slowly increase (except for Zone 1) in proportion to the initial sensitization.



▲ ***Diagram 9.2: Zone-by-Zone Negative Development Curves*** *Diagram 9.2, like the bellows schematic, is meant to be a visual aid to the understanding of the development process, but is not meant as an exact model of any specific negative material.*

For those who have trouble understanding graphs, a brief explanation may help. Choose any one of the curved lines, such as the dark line which represents Zone 5. It begins at the lower left, like all the other lines, because it has no density at the start of development (0 minutes). As you move to the right, which represents elapsed development time, the curve rises, representing increased density. When you stop at any point along the curve, the distance from the Y-axis (the left edge) represents elapsed development time, while the height above the X-axis (the bottom) represents density. In three minutes, for example, negative density barely surpasses Zone 3. In 6½ minutes (shown as normal development time in this graph), it exactly reaches Zone 5 density. In 12 minutes, it exceeds Zone 6 density. Follow any other line to see how development proceeds with time.

Looking at diagram 9.2, if you choose any length of development time along the X-axis, then rise vertically along that time line, you will see how dense each exposed zone becomes during development. At 6½ minutes (normal development time on this graph), each exposed zone reaches its proper density. Below 6½ minutes, each exposed zone is proportionately below its normal density; above 6½ minutes, each zone is proportionately above its normal density (except Zone 1, which reaches its density quickly and stays there).

The initial jog in the curves prior to density build-up reflects the fact that the emulsion absorbs the developer before density begins to increase. This is the same phenomenon you see during printing, when the paper is placed in the developer and 10–15 seconds elapse before the image begins to appear. The process is somewhat slower for a negative, taking 15–20 seconds (maybe more) for density to manifest.

Putting Higher Zones to Work

■ *During exposure the spread of zones between two objects never changes, but it can be altered during negative development.*

Understanding negative development is very important, not only because it shows how contrast can be increased or decreased, but also because it indicates how to use the zones above Zone 9. As explained in chapter 8, in a normally developed straight print made on average contrast paper, all zones above Zone 9 print as blank white (chapter 8). For this reason, most photographers feel that the range of a negative is limited to Zones 0 through 9. Not true. Diagram 9.2 tells you that an object can be *exposed* in a higher zone and that reduced *development* can bring it back within printable range. Furthermore, if two objects are metered to be very far apart tonally—say, eight zones—they can be exposed at Zones 4 and 12 respectively; then they can be given greatly reduced development time, so that the darker object is developed to Zone 3 while the lighter object is reduced below Zone 9.

In Chapter 10 we will see how areas developed above Zone 9 can still be printed. This will further increase your use of the higher zones and greatly expand your creative potential. In this manner, you can use the full range of the negative rather than limiting yourself to the lower half.

There are two points I wish to stress here. First, enlarging papers possess a much shorter range of tonalities than negative materials. So, while a negative is capable of recording scenes of excessive contrast within its extended range, its scale may need to be compressed to fit on the shorter tonal scale of the enlarging paper. Second, while the long tonal scale of the negative is fully usable during *exposure,* it is not wise to *develop* negatives to high densities (i.e., Zones 11 and up) because those densities require excessively long exposures under the enlarger to yield tonalities. Therefore, if you encounter a scene of excessive contrast and choose to expose the brightest areas well above Zone 9 (a perfectly good approach), be sure to use less-than-normal development times in order to avoid excessive densities. Good separations will still be maintained in your negative and in the print.

During exposure, the spread of zones between two objects never changes, but it can be altered during negative development. If two objects are metered to be 5 zones apart (i.e., 5 stops), they will *always* be 5 zones apart when exposed, unless they are altered by filtration or by reciprocity failure (explained below). Depending on the exposure you make, they can be placed at Zones 2 and 7, 3 and 8, 4 and 9, 5 and 10, etc., but they're always five zones apart. The 5 zones of separation can be maintained by normal development; or, they can be brought closer together by developing the negative less than normal, known as "minus development"; or, they can be separated further by developing the negative longer than normal, known as "plus development".

Of the two ways that contrast can be altered during *exposure*—filtration or reciprocity failure—filtration is better known. Suppose two objects meter three zones apart, and the

darker object is red while the lighter one is green. A red filter will lighten the red object with respect to the green one and therefore reduce the contrast between them at exposure. A green filter will darken the red object with respect to the green one and expand the contrast between them at exposure. Filtration must be taken into account when exposing and developing the negative.

Reciprocity Failure

Reciprocity denotes the way film responds to light within the standard range of exposures, from one second down to 1/1000 second. Within that range of exposure times, the negative maintains a reciprocal relationship between light level and exposure; if you cut the amount of light in half, you can double the exposure time to maintain the same overall image. (It's a reciprocal relationship because it means that $2 \times \frac{1}{2} = 1$.) Thus, if your exposure is 1/30 second and you close the aperture from f/8 to f/11, increasing the shutter speed to 1/15 second will maintain the same overall exposure and image. Or, if your exposure is 1/30 second and the light level drops in half, expanding the shutter speed to 1/15 second will also maintain the same overall image.

For times beyond one second (encountered under dim light conditions), this reciprocal relationship breaks down, leading to reciprocity failure. If, for example, you calculate your exposure to be five seconds at f/8, but you need greater depth-of-field and close the aperture to f/11, a 10-second exposure will not give you the same overall image. It turns out that you may need to keep the shutter open 15 seconds or more to gain the same overall exposure. The reason is that beyond one second, film becomes progressively less efficient in its ability to gather light.

During a long exposure, light reflected off brighter objects is accepted by the film somewhat more efficiently than light from dimmer objects. Therefore, overall contrast increases progressively during a long exposure as the exposure time increases. My experiences in the English cathedrals (where exposure times generally ranged between 3 and 20 minutes), and in the Arizona/Utah canyons (where some exposures exceeded an hour in length, and one was fully 3½ hours) show that the contrast increase due to lengthy exposures can be substantial. Development must be altered by an appropriate amount in order to maintain the desired contrast.

Each of the sections in the tables below is labeled to indicate an approximate range of how much increase in contrast occurs as the result of a long exposure. Thus, when the increase is equivalent to an N+1 development, a development of N–1 is required to counteract it and yield overall normal development (see Time/Temperature Development Charts in diagrams 9.6 through 9.11).

Increased contrast due to reciprocity failure is a double-edged sword. If you want greater contrast in a scene, you get it automatically with longer exposures. You can force the situation in bright, flat light by using strong, neutral density filters to force long exposures that increase contrast. Furthermore, when you increase contrast via long exposures, it does not increase the film's grain—whereas if you increase contrast via long development times, grain increases.

While reciprocity failure can be beneficial, my experience is generally that increased contrast from reciprocity failure most often occurs when overall light levels are dim. In most such situations, the contrast is already quite high. In both the English cathedrals and the slit canyons, reciprocity failure saddled me with undesirable additional contrast in situations that were already excessively contrasty. (All films vary in their reciprocity failure characteristics; some, like Fuji Acros, have none up to two minutes of exposure.)

Another problem with long exposures is the fact that the gray meter does not calculate the film's reduced response to low light levels. Within the negative's normal response range

▼ *Diagram 9.3: Exposure Table for Reciprocity Failure of Tri-X Pan Film (ASA 320)*

Metered Exposure	Required Exposure	Contrast Increase
2 sec.	3 sec.	
5 sec.	8 sec.	N + ½ *
10 sec.	18 sec.	
15 sec.	30 sec.	
20 sec.	45 sec.	N + 1 *
30 sec.	75 sec.	
1 min.	3 min.	
2 min.	7½ min.	N + 1½ *
4 min.	16 min.	
10 min.	50 min.	N + 2 *
20 min.	2 hrs. 20 min.	N + 2½ *
30 min.	4 hrs.	N + 3 *

▼ *Diagram 9.4: Exposure Table for Reciprocity Failure of T-Max 100 Pan Film*

Metered Exposure	Required Exposure	Contrast Increase
2 sec.	2½ sec.	
5 sec.	7 sec.	
10 sec.	15 sec.	N + ½ *
15 sec.	24 sec	
20 sec.	35 sec.	
30 sec.	50 sec.	
1 min.	2 min.	N + 1 *
2 min.	4½ min.	
4 min.	10 min.	
10 min.	28 min.	
20 min.	65 min.	N + 1½ *
30 min.	1 hr. 50 min.	

In both tables (diagrams 9.3 and 9.4), the asterisk (*) indicates the approximate amount of contrast increase due to reciprocity failure and extended exposure. Thus, if you use Tri-X film and have a metered reading of 30 seconds, the table indicates that you must expose the negative for 75 seconds; but normal development of that negative will increase the contrast as if you had N+1 development (diagrams 9.6–9.9), so you must give the negative an N–1 to compensate for the contrast increase during the long exposure.

you can determine your exposures as explained in this chapter and the previous one; but for long exposures (beyond one second) you must factor in additional time to compensate for reciprocity failure. Then you must alter contrast in negative development to compensate for the contrast increase during exposure.

The reciprocity failure tables show the approximate exposure increase needed for extended exposures for both Tri-X and T-Max 100 films. The Tri-X table is my own personal table derived from years of practical experience (identical to Minor White's own determination 40 years earlier). Kodak's table for Tri-X is wildly incorrect. The T-Max table is based upon Kodak's numbers, which are correct but incomplete.

It's easy to interpolate between the stated times. The following example for Tri-X illustrates the proper method for using the table with the zone system. Suppose you want to place an object in Zone 7, and your gray meter gives you a five-second exposure reading. Of course, the reading places the object in Zone 5 (as always!), so first you double the exposure to 10 seconds in order to place it in Zone 6. Then you double the shutter speed to 20 seconds to place it in Zone 7. By consulting the reciprocity failure table, you determine that 20-second metering requires a 45-second exposure for Tri-X film. With T-Max 100 film, the metered 20-second reading requires a 33-second exposure.

If you're using color film, reciprocity failure can be fascinating. Color film is made up of three separate emulsions, one for each primary color. Each has its own rate of reciprocity failure, so the color balance of the film tends to shift as exposures progressively lengthen. Colors that do not exist in reality

may show up during long exposures, and some colors may be greatly enhanced, while others may be lost. Anything can happen. The effect can be wonderful or awful, but it's usually surprising. It also tends to vary with each emulsion batch, so it's never consistent from roll to roll or sheet to sheet. Reciprocity failure could open up areas of wonderful creativity for those interested in pursuing its eccentricities.

Examples of Decreasing and Increasing Contrast

As a first example, let's return to the sunlit snowfield of chapter 8. As before, you see the modulations of the snow, its hills and valleys. You want to photograph it so that those delicate tones are visible in the print. If nothing but snow is in the scene, it's easy. All you have to do is decide where to place the snow on the scale and shoot. My choice would be an average placement of Zone 7½ or 8, which would yield a range of light tones from pure white to light gray and would show the modulations.

But suppose a large, dark boulder sits in the center of the field, oriented in such a manner that it's shaded. Let's agree that the rock should be about a Zone 3 tonality, and that the snow should still be placed at about Zone 7½ or 8 on the average. Suppose the gray meter gives a reading on the snow of f/16 @ 1/250 second, while the reading on the rock is f/5.6 @ 1/60 second. How many zones separate the snow and the rock? The separation is determined by adding the differences between the two readings in both aperture and shutter speed. F/16 represents 3 stops less exposure than f/5.6 as follows: f/5.6––f/8––f/11––f/16. At the same time, 1/250 second represents 2 stops less exposure than 1/60 second as follows: 1/60––1/125––1/250.

The difference is 5 stops, or 5 zones. No matter how you expose the negative, there will be a 5-zone spread between the snow and rock, *which cannot be changed in the exposure*. It may not be wise to expose at either the metered reading on the snow or the rock; if you choose the former, the snow would come out at Zone 5 and the rock at Zone 0, while if you choose the latter, the rock would be exposed at Zone 5 and the snow at Zone 10. But you know how to place the rock at Zone 3: close down stops from the gray meter's reading on the rock. With the rock in Zone 3, the snow is automatically placed at Zone 8 on the exposure scale, and normal development brings the density of each to the desired level. (Further on I explain why I actually prefer the shadow placement to be in Zone 4 rather than Zone 3.)

Suppose, however, that the meter reading on the rock is f/4 @ 1/60 second rather than f/5.6 @ 1/60 second. Now the spread between the rock and snow is 6 zones, so that exposing the rock in Zone 3 automatically places the snow in Zone 9—too high for any texture. But since cutting the development time lowers contrast, if you place the rock in Zone 3 (which automatically places the snow in Zone 9) and develop less than normally, the higher zone drops significantly more than the lower zone. By cutting the time so that the Zone 9 exposure drops to Zone 8 (perhaps about six minutes, based on diagram 9.2), the Zone 3 exposure hardly drops at all. At most, it will drop to something above Zone 2¾. By exposing just a little higher on the scale, say Zone 3½ on the rock and 9½ on the snow, and cutting the development time a bit more, the snow can be developed to a density of Zone 8 (a drop of 1½ zones from the exposure) while the rock will drop less than ½ a zone to a point just above Zone 3. Now the spread of zones between the two objects is just what you wanted. You have achieved the precise contrast and tonalities you sought by thoughtful use of the zone system coupled with your knowledge of negative development.

Let's play with this example just a little further. Suppose you decide that the dark (Zone 3) mass of rock in the midst of the light snow is too heavy, and you want the rock lighter. First,

give the negative additional exposure, placing the rock in Zone 5, which automatically places the snow in Zone 11, given the zone spread between the two. Now, cut the development time substantially, perhaps to 4½ minutes based on the schematic. The Zone 11 exposure now is developed to a Zone 8 density, while the Zone 5 exposure ends up with a density of about 4¼. The spread of zones in the field is reduced to only 3¾ zones via clever exposure and development. The snow is the same density as before, but the rock is now 1¼ zones lighter, just what you wanted.

■ *I don't recommend adhering to the "underexpose and overdevelop" rule for increasing contrast. Underexposure severely limits your ability to increase contrast because the lower zones move very little during extended negative development.*

Both the snow and the rock are easily printable, yet notice how high your exposure placed the snow initially in Zone 11! That's 2 full zones beyond the range of the paper in a straight print, yet well within the limits of tonal separations of the negative and thus a fully usable zone. In this case, you then reduced development to bring the final density down within the range of enlarging papers. In Chapter 10, you'll learn that even denser zones can be used in printing. The important point is that you shouldn't limit yourself to exposures within the Zone 1 to Zone 9 range. Overcome your fear of putting the higher zones to use.

From this example, you can see how the common rule of "overexpose and underdevelop" has become accepted. If you want to cut contrast, start with extra exposure because density is lost in less-than-normal development. Without the extra exposure initially, you can lose valuable tonalities and textures in the lower zones.

Please note in the examples above that the decision of how to expose the negative is based on your initial determination of the tones you want in the final print (i.e., the *end point,* as noted in chapter 8). Then readings are made with the gray meter to determine the spread of tonalities (the *starting point*). Finally, exposure and development are simultaneously determined in order to arrive at the desired contrast level and overall placement for the negative.

Before going on to an example of expanded contrast, let's see what would have happened if you took an average meter reading at the scene described above and used it without thinking further. The snow would dominate the scene, while the rock would be a relatively small part of it. Therefore, the snowfield's reading would dominate the gray meter, and the overall reading of the scene (including the rock) would be only slightly lower than that of the snow without the rock. Suppose this overall reading was f/11 @ 1/250 second, or one full stop below the reading of the snow alone (it probably would not drop that much). If we used that exposure and developed normally, the snow would have a Zone 6 density and would print as a medium light gray. That would be a rather dingy rendering of snow. The rock, 6 zones lower, would be exposed as Zone 0. You would end up with a featureless black blob in a medium light gray morass. That should demonstrate the value of the zone system and the importance of learning it thoroughly!

Now let's turn to an example of expanded contrast. Suppose you are in a forest on a cloudy day and you see a leafy bush next to the base of a Douglas fir tree. The scene is beautiful, but the contrast is low. The gray meter reads the dark furrows of the bark at f/4 @ 1/15 second and the bush's reflective green leaves at f/5.6 @ 1/30 second. There is only a difference of 2 stops between the two readings, and averaging them would place the bark in Zone 4 and the leaves in Zone 6—a bit dull for me.

If you place the leaves in Zone 5 (i.e., expose the negative at the meter reading on the leaves), the bark would be exposed at Zone 3. Now you can give the negative substantially increased development. According to diagram 9.2, developing it for 15 minutes (roughly 2½ times normal), would raise Zone 3 to about Zone 3⅓ and Zone 5 to just above Zone 6⅓, increasing the spread between the leaves and bark about 1 zone. If you want still more contrast, you can print using high-contrast paper.

I don't recommend adhering to the "underexpose and overdevelop" rule for increasing contrast. Underexposure

◄ ***Figure 9–2: Slickrock and Colorado River Cliffs*** *On a cloudy day—with no shadows and no real highlights, but simply low contrast—I photographed the turret-like tops of the Navajo sandstone formations above the Colorado River. I developed the Ilford HP5 negative to maximum contrast to produce the needed snap.*

severely limits your ability to increase contrast because the lower zones move very little during extended negative development. That is evident from diagram 9.2. The lower you place them in your exposure, the less you can separate them during development. For example, if you place the bark and bush at Zones 2 and 4 respectively, the same 15 minutes of development would raise the density of the bark to just barely above Zone 2, while the Zone 4 placement would increase to just above Zone 4½. Thus, the underexposure would limit the increase in contrast to ½ zone.

However, if you expose the leaves at Zone 6 instead of Zone 5 (and therefore the bark at Zone 4 instead of Zone 3), the 15 minutes of development would raise the leaves to Zone 8 and the bark to Zone 4¾. Here, you have increased the tonal spread by almost 1¼ zones. If you exposed one zone higher, at Zones 7 and 5 respectively, the increased development time would raise the leaves to about Zone 10 and the bark to Zone 6¼, a 1¾ zone increase in contrast. Thus, the higher the initial exposure, the greater the contrast expansion through development (within reasonable limits, of course).

There are some trade-offs with this approach, to be sure. First, the negative is quite dense and therefore requires long exposures in the darkroom to achieve appropriate print tonalities. Second, the graininess of the negative increases with density. While these drawbacks must be considered, contrast has increased twice as much as with the "underexpose and overdevelop" approach. It should be noted that some of Edward Weston's most famous negatives are so dense by today's standards that they almost can be used for viewing solar eclipses! Yet they obviously produced extraordinary prints. I think too

much emphasis today is placed on producing the thinnest usable negatives, and I see little merit to that approach.

My normal contrast negatives aren't so dense that they're bulletproof, but they certainly aren't thin. If I want to greatly increase contrast, I expose at mid-densities and then overdevelop. I get a dense negative, but I also increase contrast substantially (figure 9–2). As for the graininess, it shows up only in areas of smooth tonality, such as clouds or sky or smooth skin, but not in areas of sharp modulation, such as the hypothetical tree trunk example above. I do consider whether grain will be a factor in the final print, but it's rarely a real problem. For small or medium format roll film, increased grain and density are greater problems than with larger negatives; but all things considered, I would always prefer having increased grain over a negative lacking in sufficient contrast.

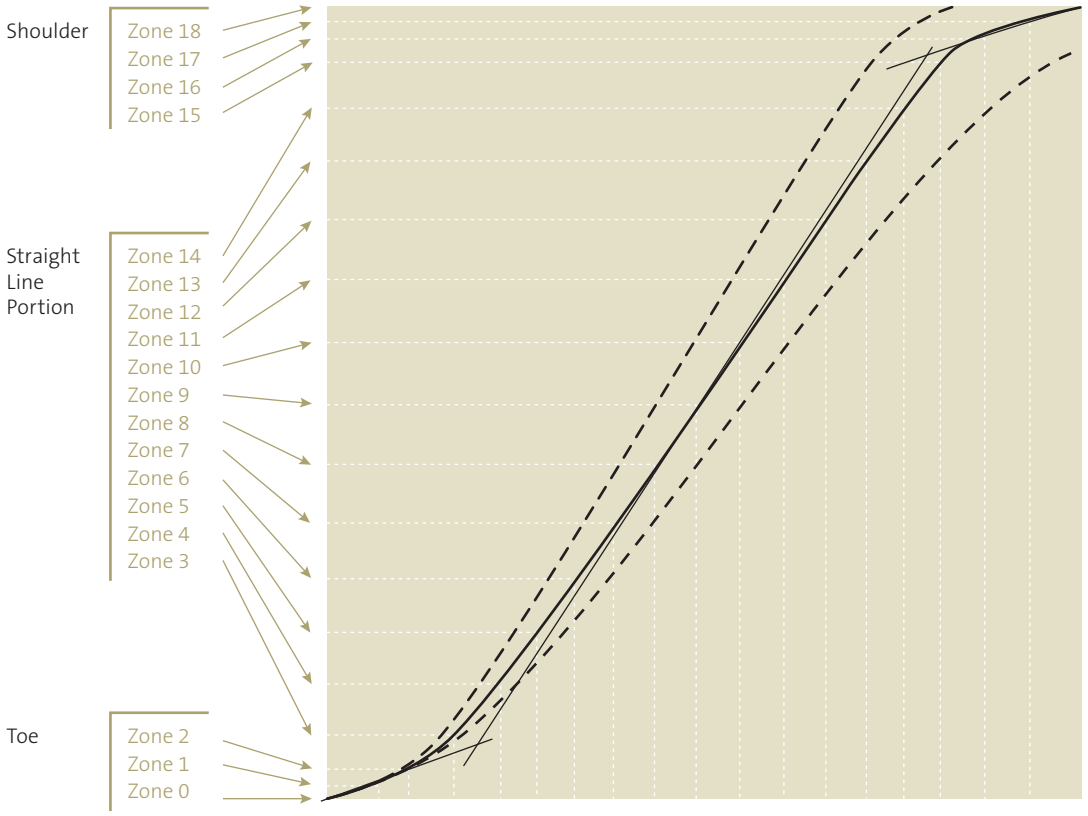
The Exposure/Density Curve and Zone 4 Shadow Placement

The most important reason to avoid thin negatives is based on the separation of tonalities in the developed negative. Zone 1 is very thin with easily perceptible density above Zone 0. Yet translated to the print, both zones appear black with no real separation of tone between them. Zone 2 shows separation from Zone 1 in the print; in fact, on the negative there is a greater density spread between Zone 2 and Zone 1 than there is between Zone 1 and Zone 0. Higher zones show even greater separation of density. Diagram 9.5 shows a common graph known as the Exposure/Density Curve, which depicts how it all works. (For the mathematically inclined, this curve is the first half of a sine wave.)

In diagram 9.5, the X-axis (the horizontal axis) represents equal increases in exposure; the Y-axis (the vertical axis) represents increases in negative density with development. The continuous line represents normal development of a typical negative. The dotted line to its left represents the curve if development time is increased; the dotted line to the right represents the curve if development time is decreased. As the curve starts from Zone 0 it rises very slowly to Zone 1, being nearly horizontal in that area. Its height above the X-axis at Zone 1 represents its very slight density. It then begins to curve upward between Zones 1 and 2, representing the greater density spread between those zones. It curves even more steeply upward between Zones 2 and 3, again representing more density spread between those two zones.

From Zone 3 upward to the mid-teens, the curve is relatively straight, indicating nearly equal separations in density between zones. Above Zone 15, the curve flattens out again, representing decreasing separations in density between zones in the densest portion of the negative. The lower portion of the curve, where separations are minimal (Zones 0 to 2 ½) is called the "toe" of the curve. The upper portion of the curve, where separations are again minimal, is known as the "shoulder" of the curve. The large middle portion, where separations are greatest, is the "straight line portion" of the curve. The straight line portion is the best part of the curve—the part where you want your densities to be—because it's where you get the most visible separations of tonalities in the print.

I strongly urge you to keep all of your exposures within the straight line portion of the curve in order to maximize tonal separations as I do. You can do this by "overexposing" your black-and-white negatives one full stop. In this way, your Zone 1 is actually Zone 2. More importantly, your Zone 3 is now Zone 4. Good, dark shadow detail and texture are often printed at Zone 3 tonalities, but Zone 3 placement puts a portion of that texture on the toe of the curve, whereas Zone 4 placement puts it all on the straight line portion of the curve, maintaining better separations. (Later, when printing the negative, give it extra exposure to bring the tone back to Zone 3.) You won't lose anything with this approach, because the valuable part of the curve for virtually all black-and-white films ranges all the



◀ *Diagram 9.5: The exposure/density curve*

way up to Zone 15 before starting to flatten out again. I don't consider this to be "overexposure," but *proper* exposure for the best possible negatives. At the upper end of the scale, it's wise to avoid exposures above Zone 15, where highlight detail may lose separation.

If you follow this approach, your negatives will tend to be a bit denser and require a bit more exposure time under the enlarger, but they will give your prints visible separations down to the deepest tones. There will be no muddying of dark tonalities above pure black.

My method of *proper* exposure is simple: cut the film's recommended ASA (the rated film speed—the faster the film, the higher the number) approximately in half, which is the equivalent of opening up one stop, then do everything else as discussed above. If you use the DIN number instead of the ASA, drop the number by one. With Tri-X sheet film listed as ASA 320, I use ASA 160; with HP5+ sheet film listed as ASA 400, I use ASA 300 (which obviously is not half the recommended ASA, but which has proven to give me ample density with that film). Some films, such as Kodak T-Max 100 or Ilford Delta 100, can be exposed at, or closer to, the manufacturer's recommended ASA. But most benefit from additional exposure.

Differences Between Photography and Sensitometry: Texture vs. Tone and Zone 4 Shadow Placement

There is a solid reason behind my recommendation of higher zone placements. Zone 1 is a critical zone for testing film because it starts the process of successively doubling exposures that creates all the other zones. But while Zone 1 is critical for *testing film* (i.e., important for *sensitometric* purposes), it's not terribly important for *photographic* purposes because it

hardly separates from Zone 0 in printing. Because your goal is to create fine *photographs,* not fine *tests,* take the route that leads to better photographs, which is to cut the manufacturer's recommended ASA in half when using most films.

In testing film, sensitometrists use step wedges. They measure small bits of featureless film density. They expose the film to varying amounts of light and develop them to see how they respond to light when developed in different developers, at different temperatures, with different agitation procedures, etc. Unfortunately, they do not look at *textures,* but only *tones*.

This is a pivotal difference. In the real world, we deal with *textures,* not *tones*. For example, when we talk about a Zone 4 exposure on the bark of a tree, we know that the Zone 4 is the *average* of the lighter and darker parts of the bark, which we see as *texture*. A Zone 4 tonality in the real world has parts that are lighter than Zone 4 and parts that are darker. In other words, there is a spread of brightness. Not so with a *tone,* which is a featureless Zone 4.

This difference becomes critical where the toe of the curve meets the straight line portion of the curve, generally about Zone 2 ½. If you place your shadow (the bark) in Zone 3, as sensitometrists recommend, the lower part of the textural spread is on the toe of the curve, where densities are crunched together with less separation. When you print that negative, the print tonalities are also crunched together. If you want deep, rich blacks, everything goes too black and you lose detail; if you want separations to show, you can't get a good, rich black.

Instead, if you place your shadows in Zone 4, or even higher, the entire spread is on the straight line portion of the curve. Your negative is denser than it would be if you placed the shadows in Zone 3, but everything separates beautifully. Then, when you print the negative, simply give it additional exposure time under the enlarger, printing it down to the average Zone 3 that you want. By placing your most important dark shadows at least in Zone 4—not the darkest things in the scene, but the darkest things that you want to see as good, dark, visible textures in the final print—you'll get a richer print every time. That's a guarantee!

Cutting the manufacturer's recommended film speed in half, or placing shadows one zone higher than normally recommended (or both!) is my simple—but overwhelmingly important—modification of the zone system for practical usage. All of my recommended methods are geared toward getting the optimum quality from your negatives and the highest quality from your prints. So, rather than placing key shadows in Zone 3, place them in Zone 4 or higher to assure that you're on the straight line portion of the curve, where density separations are greatest. (And don't worry about getting squeezed at the top because the black-and-white film response goes so high.) The idea of placing important shadows in Zone 3 is simply wrong.

Pre-Exposure—What It Is, Where It Works, Where It Fails

Pre-exposure of film is the procedure of putting a small amount of blank exposure on the film, either before or after the actual exposure, to yield greater density in the shadow areas of the final print. Some well-intentioned practitioners advocate the use of this technique. In large part, they are wrong. Pre-exposure works for positive transparencies; it has no beneficial effect for negatives, either black-and-white or color.

To understand why it fails for negatives, look at the Exposure/Density Curve again (diagram 9.5). If you add a few units of blank light to a negative via a pre-exposure, you raise the density of the lower zones by that number of units. (Of course, you raise the density of all the zones by that same amount, but the effect is progressively less noticeable as you move up the density scale. Since each successive zone doubles the light of the previous zone, initial pre-exposure makes less and less of a difference as you go up the scale.)

But while you have raised the density of the negative, you have not increased the separations, i.e., the angle of the toe of the curve. In other words, all you're doing is pushing the toe of the curve a little higher on the density scale. Creating greater density without creating greater separations is of no value in the final print. The problem on the toe of the curve is not lack of density; the real problem is lack of separations, which translates to a lack of tonal separations in the final print.

Pre-exposure works effectively for positive transparencies only, and the technique can be put to use in a very interesting way. In transparencies, the toe of the curve is already dead black (remember, three *stops* below Zone 5 is *below* Zone 2). So if you use pre-exposure to bring those extremely dark or black areas into visibility, they are already on the straight-line portion of the curve. Pre-exposing a transparency brings some dark areas into visibility with reasonable separations.

In addition, since transparency films are balanced for sunlight, shadows tend toward a blue cast. Pre-exposure to a warm color (red, orange, magenta, etc.) can neutralize the blue cast in shadow areas without materially altering the exposure or color balance in the mid-tones or highlights.

Those who promote the benefits of pre-exposure often demonstrate the effects by using Polaroid film to instantly show the difference. But Polaroid prints are positive transparencies on paper! Therefore, the technique appears to be beneficial. Even Ansel Adams touted the procedure in one of his early basic photo books. Unfortunately, he was just as wrong as everyone else in his advocacy of pre-exposure for negatives.

Developing the Exposed Negative

The time/temperature charts for negative development shown below are my personal guides for each film/developer combination. As stated above, I rate Tri-X at ASA 160 rather than the recommended ASA 320 to ensure sufficient density and separation in the shadows. For Ilford HP5+ I do much the same thing, rating the film at ASA 300 rather than the recommended 400. It has been my experience that rating films lower than the recommended times produces denser negatives that yield greater tonal separation in the shadows and a greater feeling of spatial separation in the deeper toned areas of the final print.

The greater shadow density is primarily a product of greater *exposure,* not *development*. This is often the difference between a print that is flat and one that has snap. When shadow densities are placed on the toe of the exposure/density curve, they are not materially moved by changes in development. Low placement, therefore, ensures thin shadow areas with little density difference. When the negative is printed, those densities translate into close-tone differences in the final print. They tend to print as blacks, without textural or spatial differences, or as muddy charcoal grays, also lacking textural or spatial separations. The print has a flat look—in which the the word "flat" is appropriate for two reasons. First, the image is *tonally* flat in the shadows; second, it is *spatially* flat, showing little of the illusion of three-dimensional depth that makes a photograph so compelling. You can avoid this problem by giving your negatives higher exposures.

I strongly advise you to use the time/temperature charts only as a guide and starting point. Modify them as necessary for the best results. Even if you use the same negative/developer combination, a number of variables could make your results different from mine: the water in your area, your agitation procedure, your thermometer being a degree or two different, etc. As is so often the case, a little experimentation will give you optimum results.

If you use a different negative/developer combination, you'll find that once you determine your normal development time, the percentage changes to N–, N– –, N+, and N++ are approximately the same as those on the charts—making them very useful as a starting point.

▼ ***Diagram 9.6: Time/Temperature Chart for Developing Kodak Tri-X Film (ASA 320) with Kodak HC110 Developer in Tanks*** *(for Tri-X film rated ASA 160)*

Development Time / Temp	N–3* Z7½ ► Z5	N–2* Z7 ► Z5	N–1** Z6 ► Z5	N (normal)** Z5 ► Z5	N+1** Z5 ► Z6	N+2*** Z5 ► Z7
65°F=18°C	4.25	5.25	5	7.50	12.50	10.50
68°F=20°C	3.50	4.50	4.50	6.50	10.50	8
70°F=21°C	-------	-------	4	5.50	9.50	7
72°F=22°C	-------	-------	-------	5	8.25	6
75°F=24°C	-------	-------	-------	4.50	7.25	5.25

Note: The designations such as Z5 ► Z6 indicate the exposed Zone 5 is developed to Zone 6 density.

Follow Kodak's recommendations for mixing the stock solution from concentrate, then dilute as follows. (Note the asterisks at the top of each column above):

* *1 part stock solution to 17.5 parts water. Agitate continuously for the first minute, then for the first 15 seconds of each subsequent minute.*

** *1 part stock solution to 12.5 parts water. Agitate continuously for the first minute, then for the first 15 seconds of each subsequent minute.*

*** *2 parts stock solution to 10.5 parts water. Agitate continuously throughout development.*

▼ ***Diagram 9.7: Compensating Development of Kodak Tri-X Film with Kodak HC110 Developer***
For a dramatic reduction in contrast, use the following:

C–3#	C–2 ##	C–1 ##	C ##
8	9.5	13	22

Dilute 1 part stock solution to 65 parts water. Agitate as noted below the chart. All development should be at 68°F (20°C). (Note the # signs at the top of each column above):

\# *Agitate for the first 30 seconds, then for the first 15 seconds at 1 minute, 2 minutes, 3 minutes, 4 minutes, 6 minutes, and 8 minutes.*

\#\# *Agitate continuously for the first minute, then for the first 15 seconds of each subsequent minute.*

Some Additional Comments on Diagrams 9.6 and 9.7

- In diagram 9.6, designations such as Z6 ► Z5 indicate an exposed Zone 6 will be developed to Zone 5 density. "N" is normal development, in which each zone is developed to its exposed sensitization level.
- "C" in diagram 9.7 is roughly equivalent to N–4 in the diagram 9.6 (if it existed!). Highlights are greatly reduced in contrast yet still maintain good separations. C–1, C–2, and C–3 produce still lower contrast.
- When using the compensating developer, give 2–3 stops extra exposure to the negative.
- Read the section under "Two-Solution Compensating Development for Negatives" later in this chapter for a significant improvement on this procedure.

▼ ***Diagram 9.8: Time/Temperature Chart for Developing Ilford HP5+ Film with Kodak HC110 Developer***

(for HP5+ film rated at ASA 300) Note: times and dilutions are different from Tri-X

Development Time / Temp	N–3* Z7½ ► Z5	N–2** Z7 ► Z5	N–1** Z6 ► Z5	N (normal)** Z5 ► Z5	N+1** Z5 ► Z6	N+2*** Z5 ► Z7
65°F=18°C	5	4	5	7.50	12.50	14
68°F=20°C	4.25	3.25	4.50	6.50	10.50	12
70°F=21°C	-------	-------	4	5.50	9.50	10.50
72°F=22°C	-------	-------	-------	5	8.25	9
75°F=24°C	-------	-------	-------	4.50	7.25	8

Note: The designations such as Z5 ► Z6 indicate the exposed Zone 5 is developed to Zone 6 density.

Follow Kodak's recommendations for mixing the stock solution from concentrate, then dilute as follows (note the asterisks at the top of each column above):

* *1 part stock solution to 17.5 parts water. Agitate continuously for the first minute, then for the first 15 seconds of each subsequent minute.*

** *1 part stock solution to 7.5 parts water. Agitate continuously for the first minute, then for the first 15 seconds of each subsequent minute.*

*** *2 parts stock solution to 7.5 parts water. Agitate continuously throughout development.*

▼ ***Diagram 9.9: Compensating Development of Ilford HP5+ Film with Kodak HC110 Developer***

For a dramatic reduction in contrast, use the following Compensating Development:

C–3#	C–2 ##	C–1 ##	C ##
10	11.5	15.5	22

Dilute 1 part stock solution to 45 parts water. Agitate as noted below. All development should be at 68°F (20°C). (Note the # signs at the top of each column above):

\# *Agitate for the first 30 seconds, then for the first 15 seconds at 1 minute, 2 minutes, 3 minutes, 4 minutes, 6 minutes, and 8 minutes.*

\#\# *Agitate continuously for the first minute, then for the first 15 seconds of each subsequent minute.*

▼ ***Diagram 9.10: Development of Kodak T-Max 100 Film in Kodak T-Max RS Developer***

(for T-Max 100 film rated at ASA 100):

Development	T-Max RS 1:4	T-Max RS 1:9	T-Max RS 1:19
N+2	**11**		
N+1	8	**16**	
N (normal)	6	**11.50**	24
N–1		**8.50**	18
N–2		7	**14**
N–3 = C			**15***
C–1			**12***
C–2			**9.50***

- *All development times are for 75°F (24°C).*
- *Recommended times are in* **bold**.
- *Agitation is continuous from N+2 thru N–2.*
- **From C downward, agitate for the first 30 seconds of each minute for the first three minutes, then for 15 seconds every two minutes.*
- *Give an additional exposure of 1 stop for N–2 development and 2 stops for C, C–1 and C–2.*
- *Rate your T-Max 100 at ASA 100 for use with T-Max RS.*

▼ ***Diagram 9.11: Chart for Developing Kodak T-Max 100, Kodak T-Max 400, Ilford Delta 100, or Ilford Delta 400 Film with Kodak XTOL Developer***

Development	Dilution	Agitation	Development Time
N++	1:2	Continuous	17 min.
N+	1:2	"	14 min
N	1:2	"	12 min
N–1	1:2	"	10 min
N–2	1:3	"	12 min
N–3	1:3	"	10 min

- *Processing is to be done at 75°F. (Add 10 percent to all times if temperature is 68°F)*
- *Kodak recommends using a minimum of 100 ml (3.5 oz.) of stock XTOL per 80 square inches of film (one roll of 120mm film, one roll of 35mm 36 exposures, or four 4" × 5" negatives).*

(Diagrams 9.10 and 9.11 are supplied by courtesy of Stu Levy with modifications by Bruce Barnbaum and Don Kirby.)

► ***Figure 9–3: The Slit, Antelope Canyon***
The negative received compensating development to retain as much detail as possible throughout the range—yet the brightness range of the scene still pushed the limits of the film. I allowed the darkest areas of the print to disappear in pure black, seeing their forms as so sensual that detail would have intruded. The scene was abstract; the image is meant to be abstract as well, with strong lines, forms, and contrasts.

◀ ***Figure 9–4: Choir and Organ, Wells Cathedral***
Using precisely the same negative development procedure as in figure 9–3, the print has visible detail throughout; the viewer can see every bit of intricate detail that I saw while standing at the camera.

Explanation of Compensating Development

Diagrams 9.9 and 9.11 on the complete development charts for Tri-X and HP5+ list a development procedure for greatly reduced contrast via the use of extreme dilutions of HC110. Using this procedure, the dense portions of the negative are restrained significantly compared to the thinner portions. This procedure turns HC110 into a so-called "compensating developer" in the sense that it only partially develops the very dense highlights compared to the mid-tones and shadow areas—i.e., it "compensates" for their high sensitization level during exposure.

"C" development (C for "compensating") is somewhat equivalent to N–3 of the adjacent diagram in the shadow areas, but the higher zones are reduced to lower densities than N–3 would yield. In effect, C is then equivalent to an N–3; but the unacceptably short development time necessary to produce N–3 would yield uneven results, so C proves to be a greatly improved alternative. Following the trend of the adjacent diagram, C–1, C–2, and C–3 produce progressively lower contrasts.

Compensating development depends primarily on the periods of non-agitation between the periods of agitation. Each time the negative is agitated, new developer is brought to all portions of it; but during the quiet periods, the developer exhausts itself on the dense areas while more fully developing the thinner areas, hence the name "compensating". The extra-dilute solution automatically prevents the densest portions from gaining excess density; it compensates for those areas potentially becoming too dense. Because this procedure depends on the quiet periods, it must be done by hand rather than by a mechanical, rotating drum with continuous agitation.

I learned about compensating development toward the end of 1979 and used it extensively starting with my discovery of the slit canyons of Arizona in January 1980 (figure 9–3). I then used it for my studies of the English cathedrals later that same year (figure 9–4). Thus, this purely technical procedure led to an astonishing artistic and expressive leap for me.

■ ***A Note of Caution in Using a Compensating Developer***

Due to the extreme dilution of the working solution, there is very little active developer present. Therefore, develop only a few sheets, or a maximum of one roll, at a time, otherwise the developer will be exhausted before full development is achieved. For roll film, it is wise to use a large tank (one containing several reels) with only one roll loaded onto a reel to assure a sufficient amount of developer in the tank. When I use HC110 as a compensating developer in 90 ounces of working solution (which contains only 2 ounces of HC110 stock solution, or ½ ounce of the liquid concentrate) I limit development to four 4" × 5" sheets at a time. When using N–3, I limit myself to six 4" × 5" sheets at a time.

Two-Solution Compensating Development for Negatives

After using the compensating development procedure detailed above for nearly 17 years, I developed a superior method of dramatically lowering contrast in excessively high contrast situations or in prints where I want an extremely soft look. It involves the use of two solutions of HC110: first, a solution somewhat stronger than the normal dilution for Tri-X film in HC110 (1 part stock solution to 10 parts water); and second, a "compensating" solution (2 parts stock solution to 90 parts water).

I begin development in the first solution with constant agitation for the first 45 seconds; then I allow the negative to sit unagitated for the next 45 seconds. (Total development time at this point: 1 minute, 30 seconds.) This initial development in the stronger solution quickly develops Zones 1 and 2 close to their appropriate densities as seen in the bellows analogy. (See diagram 9.1 and imagine the look of the bellows at 1½–2 minutes development time.)

At this point, I transfer the negative to the compensating solution. I agitate for the first 30 seconds, primarily to dilute the amount of developer in direct contact with the emulsion (total development time at this point: 2 minutes). The negative sits unagitated for the next full minute. (Total development at this point: 3 minutes.) From this point, I revert to my usual procedure of 15 seconds agitation at the start of each minute followed by 45 seconds of non-agitation. At 10 minutes total development time (i.e., 10 minutes from the time the negative was first placed in the first developer), the negative is removed from the developer and placed into the stop bath, followed by the fixer.

Starting this procedure in the normal development solution retains the lowest zones that would be lost with full compensating development, and tends to begin separating local contrasts in the mid and upper zones in a snappier manner. Then, before those upper zones attain too much density, the

◄ ***Figure 9–5: Slickrock and Reflecting Pool***
Looking directly into the sun, I carefully placed the camera so that the clouds closest to the sun (but not the sun itself) were seen in the pool's reflection. Contrast was excessive, from the sun and clouds to the sandstone in the foreground. When I came upon this scene in 1996, I had already evolved the two-solution compensating development, which gave me control of a greater contrast range than I could have retained with compensating development alone. This proves that every technical advance allows a further artistic advance.

negative is placed into the extremely dilute compensating solution. This clamps a lid on the upper zones, preventing them from getting too dense but giving the mid and high densities wonderful local separations. All this results from the initial "kick" of the stronger first solution (figure 9–5).

To alter the final contrast level, I simply extend or reduce the development times in the first developer (agitation and non-agitation) by a few seconds in either direction. If I want more contrast, I add five seconds of agitation followed by five seconds of non-agitation; if I want lower contrast, I reduce both the agitation and non-agitation times by about five seconds. In either case, after removing the negative from the first solution, I agitate for about 30 seconds in the compensating solution to dilute the active solution in direct contact with the emulsion. This initiates the compensating effect that prevents excessive density in the upper zones. In all cases, I maintain the overall 10-minute development time for the two solutions. You can experiment with time variations to suit your needs. I now use this procedure in place of the pure compensating development procedure found in the Time/Temperature diagrams 9.6 through 9.9.

Development Procedures for Sheet Film and Roll Film

Both sheet film and roll film must be developed uniformly, from edge-to-edge, corner-to-corner. While you may be able to overcome inappropriate negative development (i.e., too dense or slightly too thin, too contrasty or not contrasty enough), it is virtually impossible to correct uneven negative development during printing. This section explains procedures that yield evenly developed negatives.

For sheet film development, we'll look at these three common procedures:

- Hanger Development
- Tray Development
- Mechanical Drum Development

Hanger Development

In hanger development, the film is placed in metal holders, or hangers, which are immersed vertically into a large tank of developer. Agitation is accomplished by lifting the hangers completely out of the liquid, rotating them 90 degrees to the right, dropping them back into the tank, lifting and rotating them 90 degrees to the left, and repeating the procedure several times.

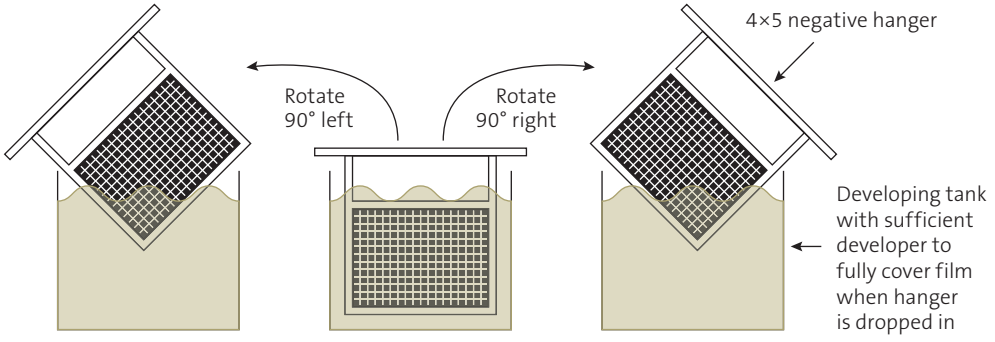
In practice, I lift the hangers up and lean them against the upper right edge of the tank while rotating to the right, and against the upper left edge of the tank while rotating to the left. This action must be continuous, and neither too fast nor too slow, or unevenness could result. *DO NOT STOP to allow the hangers to drain at the 90-degree rotation point*. Instead, reverse the motion smoothly and swiftly, like a billiard ball hitting and ricocheting off the edge of a pool table. This will insure even development.

My general procedure is to agitate continuously for the first minute, and then for each successive minute, agitate again for the first 15 seconds with the remaining 45 seconds of each minute devoid of agitation. Only with the N+2, C–3, and two-solution compensating procedures does this vary. Agitation is continuous for development of T-Max 100 developed in Kodak D-76, T-Max RS, or XTOL.

Tray Development

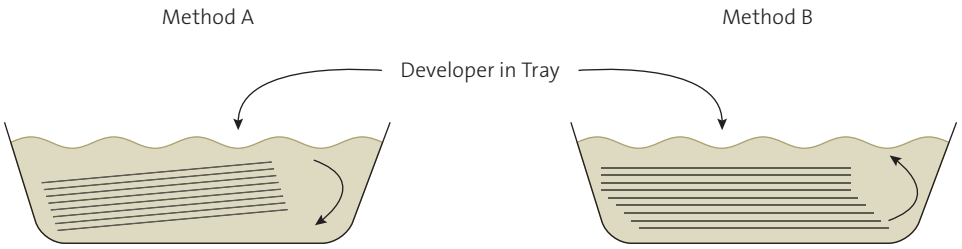
Tray development is theoretically simpler but often much more difficult to master without damaging the film during development. The procedure is to slide the film into a tray of developer one sheet at a time, stacking one sheet on top of another. Agitate by pulling out the bottom sheet and laying it on top of the stack, making sure the top sheet is then fully submerged. Repeat this simple procedure continuously.

This procedure must start with a pre-soak of the negatives, or they will stick to one another like glue. To begin, submerge the first negative in plain water for several seconds, then submerge the second for several seconds together with the first, then add the third, and so on. After all of the negatives have been submerged, run through the stack several times before transferring them to the developer. This will assure that all of



▼ ***Diagram 9.12: Agitation Procedure for Sheet Film Development in Hangers***
After dropping the hangers into the tank and banging them down several times to dislodge any air bubbles on the negatives, agitate by raising the hangers first against the left edge of the tank and rotating 90 degrees to the left, then dropping them back into the tank. Then raise them against the right wall of the tank, rotate 90 degrees to the right, and drop them back into the tank. Repeat the procedure for all agitation. Do not hesitate at the 90 degree position, but immediately return the hangers to the tank.

▼ ***Diagram 9.13: Agitation Procedure for Sheet Film Development in Trays***
There are two methods of tray development. Method A shows that by cradling the entire stack of negatives at a slight angle with one hand, the top sheet can be removed and slid under the bottom sheet of the stack. Continue the procedure without pause for the entire duration of development. Method B shows agitation by pulling the bottom sheet from the stack and placing it on top. This procedure also requires a constant shuffling motion from bottom to top from the start of development until development is complete. With practice, Method A may prove less subject to scratching.



the negatives will separate from one another and that development will begin smoothly.

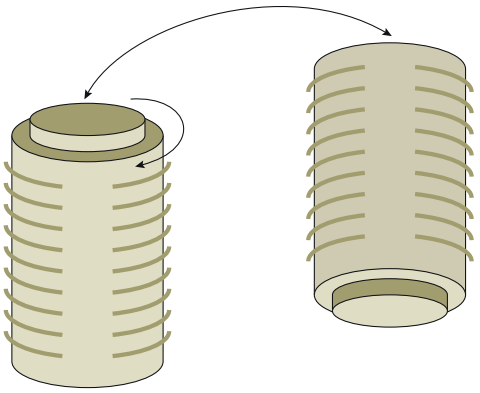
For those who have mastered this procedure, 15 to 20 negatives can be developed at a time. The pitfall is that it is very easy to scratch negatives against a sharp corner of the one above or below during agitation. Experience will overcome this initial problem.

Because agitation in trays is continuous, while in tanks it is periodic, the characteristics of the developed negative are different. In the tank, 45 seconds of unagitated "hang time" per minute slows development, so for equal development times the hanger-developed negative is less dense and contrasty than the tray-developed negative. Of course, if many negatives are developed simultaneously in trays, there is a long period of non-agitation for each negative as it slowly moves from the top of the stack to the bottom (before it is again agitated by being pulled out and placed on top). This lengthy period of non-agitation makes tray development closer to hanger development.

In the compensating procedure, periods of non-agitation are essential to create the compensating effect. During the "hang-time", the dilute developer in contact with the heavily sensitized portions of the negative is quickly exhausted; further development ceases until the next agitation brings new developer in contact with those areas. During that same hang-time, however, the thin portions of the negative cannot exhaust the developer as quickly, and they are more fully developed. This means that if you use tray development, the compensating effect is lost unless you allow periods of non-agitation.

Mechanical Drum Development

Mechanical developing procedures, such as automatic periodic agitation in nitrogen burst tanks or continuously rotating drums such as Jobo, are perfectly fine negative development methods. If you use such methods, be sure the development is



◄ ***Diagram 9.14: Agitation Procedure for Roll Film Development in Invertible Tanks***
Agitate by inverting tank fully and spinning it 90° when bringing it back to upright position.

even throughout the negative. Also be aware that continuous agitation in a mechanical processor precludes the possibility of compensating development, since non-agitation periods are mandatory for the compensating process to be effective. Use a drum processor for negative development in the normal ranges, but switch to hand development and periodic agitation to achieve the compensating effect.

Development of roll film on spiral reels should be done only in an invertible tank, not in tanks requiring agitation by spinning the reels. The only agitation that I have found to yield uniform development is a wide, upward sweep to the inverted position, and then a return sweep—like an inverted pendulum with your elbow as the fulcrum—and, perhaps, a 90° turn along the way (the 90° turn is not necessary with each inversion; I do it periodically). Spinning the tank should never be done because it creates additional agitation and density along the reels, which translates to light streaks along the edges of the print. If your prints lighten noticeably along the edges, it's a good bet that spinning the tank is to blame.

One common mistake in developing roll film is to load the reels first, place them in the tank, then pour in the developer through the small hole at the top. This is the worst way to start development! The reason is that some portions of the negative will be in contact with developer for 20–25 seconds before other portions are finally submerged, and uneven development is virtually assured. A better procedure is to remove the reels first and fill the tank with developer, and then load the film on the reels. (Of course, it helps greatly to load the reels in total darkness.) Then drop the reels into the tank, clamp on the lid, and begin agitation. Once the lid is clamped on, you can turn on the lights during the development time. Toward the end of the development time, turn off the lights, remove the lid completely, dump the developer quickly, and pour in stop bath from a nearby flask, premixed with the proper amount of liquid. Once development is stopped, you can pour out the stop bath and pour in the fixer in a leisurely fashion.

Completing Development with a Stop Bath and Fixer

For both roll and sheet film, place the negative in a stop bath for several seconds of continuous agitation to quickly stop development. Then fix it for the recommended time in the fixer. With most standard fixers (I use Kodak standard fix with hardener), 10 to 15 minutes is sufficient; excessive fixing may bleach the negative slightly. After you immerse the negatives in the fix and agitate them for two minutes or more, you can turn on the lights for inspection. A subsequent wash of 10 to 15 minutes—or five complete changes of water—makes the negative archivally permanent.

Developing negatives is not my favorite pastime, but proper development is the only way to continue the process started when you exposed the negative. There can be no substitute for a well-conceived, well-composed, well-exposed, and well-developed negative. If any of the four is given short shrift, there will be a distinct loss of quality in the final, all-important step: the well-printed photograph.

Appendix 1 contains tests for film ASA and contrast levels of your developed negative. It shows a method for determining normal contrast development for your film/developer combination, as well as other excellent tests for materials and equipment.

The Zone System and Roll Film

How can you use the zone system and contrast control procedures with roll film? To be sure, they don't work quite as well as with sheet film. All negatives on a roll are developed the same way, whereas each negative on sheet film can be developed exactly as desired.

However, several options are available for roll film. First, you can use more than one film back or camera body, designating each back or body for a different contrast development

level. By employing a sufficient number of backs, any desired development can be produced and nothing is lost. Most likely you would use only two or three backs and make small compromises. With three backs, you could use one for contrast expansion, one for normal or slightly reduced contrast, and one for compensating reduction. With two backs, you could use one for normal or reduced contrast and another for increased contrast. However many film backs you have, expose each photograph on the roll that most closely fits your needs.

If additional backs are either too expensive or unavailable for your camera, another approach may be possible. If you can unwind the film from your camera prior to complete exposure of the roll (a procedure that is possible with most 35mm cameras, but impossible with 120mm film), then carry several rolls with you at all times, each marked for different development. Whenever you encounter a scene that requires different development from the roll currently in the camera, unwind the one inside and label the frame it is on, then wind in the appropriate roll just beyond the frame last exposed (to avoid a double exposure) and shoot. If the next scene requires the previous roll again, unwind the current roll, mark the frame number on the roll or cassette, and wind in the roll you need just beyond its last exposed frame. This may be time-consuming and inconvenient, but it allows for proper development for each photograph.

However, my best suggestion involves another approach that shocks most people when they first hear it, but *it really works!* Whenever you expose a frame that is truly exciting to you—one that you *feel* will be a superb photograph—unwind the roll immediately and develop the entire roll for that particular exposure! You may want to make several variations of the exposure first. You may try different camera positions, filters, lenses, aperture and shutter speed combinations, etc., but then remove the roll! That may be a very surprising suggestion, but what do you lose? Film is the least expensive part of photography, so why compromise on a potentially great shot? I have seen people leave a roll of 20 exposures in the camera for months because the last two frames are not yet exposed. That makes no sense. Keeping film in the camera after a great exposure just to finish out the roll is equally absurd.

A second consideration may be even more important in support of this radical suggestion. Choose any great photographer—let's say Ansel Adams, for he was great and his work is so well known—and ask yourself how many truly great photographs he produced in his lifetime (50+ years of photography). 50? 100? 200? Maybe more. But that is about four per year at best! Now, with that in mind, how many *truly great* photographs do you think you actually have on that one roll? When you stop to think of it, you don't lose anything by trying this suggestion.

■ *Choose any great photographer—let's say Ansel Adams—and ask yourself how many truly great photographs he produced in his lifetime (50+ years of photography). 50? 100? 200? Maybe even more. But that is about four per year at best!*

The only other alternative is to get the best "average exposure" on every frame and develop normally, hoping that high or low contrast papers will provide enough leeway to yield a good print. (This is a poor alternative to the previous suggestion.) This is the usual approach, and while it renders contrast control useless for the negative, it does show that use of the zone system for determining the initial exposure is still very important.

Once you know the zone system, you will have no need to bracket your exposures. Bracketing is nothing more than a fudge factor for those who are unsure of what they're doing. Let me hedge on this by saying that periodically—and only on rare occasions—you may want to make more than one exposure and development because the lighting is unusual, weird, or perhaps very "different". Doing several exposures along with different developments makes sense in strange situations. You can learn from them while making at least one usable negative along the way. Except in such rare cases, a complete understanding of both the zone system and your film's characteristics should put you right on target without the need for extra exposures and time-consuming developments.

I strongly recommend that you avoid bracketing because it promotes sloppy field techniques. I'm not against making a second exposure of a negative that may be extraordinary just as a back-up in case the first is damaged, but the back-up negative should be the same good exposure as the first one.

Negative Materials and Developers

Let me note at the start that new films are constantly being introduced, old films disappear, and existing films may undergo changes. The same holds true for developers, so the information in this section may become outdated rapidly.

The commonly used panchromatic materials (i.e., Kodak Tri-X, Ilford FP-4+, HP-5+, Fuji Neopan Acros 100, and comparable films by other manufacturers) are generally developed by a selected few developers (i.e., Kodak HC110 or D-76, Edwal FG-7, Rodinal, Ilford ID-11, etc.). Kodak T-Max films or Ilford Delta films (both using T-grain technology) can be developed with Kodak T-Max or XTOL developers. Other developers may be employed for special purposes. The question often arises as to which combinations of negative materials and developers give the "best" results. There are differences, of course, and some of the combinations are better for certain purposes than others—but which?

If sharpness or smooth grain is a prime consideration, then it's best to recognize that the slower speed films have finer grain and generally better sharpness than faster films. But how do the various developers affect your images? My experience indicates that the film itself, along with the *length* of development (but not the developer per se), determines the final outcome to the greatest extent. In other words, if one of the films mentioned above were developed by each of the developers listed, it would be difficult to show that grain or sharpness varied significantly as long as the development times were approximately equal. Excessive development increases grain noticeably.

There are people who claim that certain combinations are clearly superior to others, but even after inspecting the evidence carefully, I remain unimpressed. The differences range from extremely subtle to nonexistent and are of marginal importance. Furthermore, a very fine grain film may have finer grain than a coarser grained film no matter what developer is used to process either one.

There are other, more important, considerations regarding film/developer combinations. First, which combination yields the greatest detail in both highlights and shadows? Some film/developer combinations show great separation of shadow tonalities but little separation in highlights. Other combinations show good highlight separation but little shadow separation. I haven't tried all of the combinations (after all, I'm a photographer, not a lab technician), nor have I tried all of the films or developers separately. Generally, I shoot 4 × 5 sheet film and occasionally 2 ¼ × 1 ⅝. Long ago I settled on Tri-X film for my sheet film and Ilford Pan F, FP4+, and HP5+ for roll film (for increased, normal, and decreased contrast respectively). The results have been excellent, with each of the films yielding smooth tonalities and fine grain. I use HC110 as my prime developer because I find that it produces good highlight and shadow separation. I develop the T-Max 100 in T-Max RS or XTOL.

Whatever you choose as your film/developer combination should be based on your goals as a photographer. If high speed film is necessary for your photography, avoid testing low ASA/DIN films. If fine grain is critical to your imagery, stay away from high speed films; they are noticeably grainier. A little testing will show you which film/developer combination yields the best highlight and shadow details for your purposes.

Testing is a means to an end, and the "end" is the best possible photographs you can make. Don't waste your time testing and retesting, refining and further refining your test

results. There is a difference between photographers and sensitometrists. If you are a photographer, start making real exposures for expressive photographs after some initial testing. Any modifications of your test results can be made during the "real" shooting.

Another consideration is contrast control. Which combinations allow the greatest flexibility for expansion or contraction of contrast? In general, most of Kodak's standard or T-grain films are quite good in contrast flexibility, though Plus-X film lacks expansion capability to such an appalling extent that I avoid it completely. More development fogs Plus-X overall, increasing density greatly without increasing contrast appreciably. All Ilford films seem to have wonderful contrast control characteristics, and their gradations of tonality are beautifully smooth—better, in fact, than the equivalent Kodak films. But Ilford HP5+ becomes excessively grainy with increased development, though it is quite smooth and fine-grained with reduced development.

Be aware of a strange quirk in Kodak's marketing: it produces several distinctly different films named Tri-X. A quick clue to the fact that the films are different is that sheet film Tri-X is rated at ASA 320, whereas roll film Tri-X is rated at ASA 400 (and the roll film Tri-X Pan Professional is rated at ASA 320). Why Kodak gives these different films identical names is strange indeed.

Concerning developers, each one has its proponents, but I find some of the arguments arcane and immaterial. Whether one developer produces a finer edge demarcation when measured on an optical bench is immaterial because we all look at photographs with our eyes, not with a microscopic caliper! Of material importance is the separation of tonalities in highlights, mid-tones, and shadows, the effect of the developer on film speed, its characteristics in contrast expansion and contraction, and its ease of use.

For example, I have found that using Kodak HC110 to develop either HP5+ or Tri-X, according to the time/temperature charts, separates tones quite nicely throughout the entire spectrum. It produces noticeable grain during expanded development (particularly with HP5+) but extremely fine-grained negatives with the compensating procedure. It's easy to use because it's a liquid concentrate which can be quickly diluted. It also lasts a long time in the bottle without noticeable deterioration, even as it turns dark brown (but there is a limit). It suits my purposes well. I feel that these are the important considerations, and I recommend that you judge your choice primarily on the same considerations.

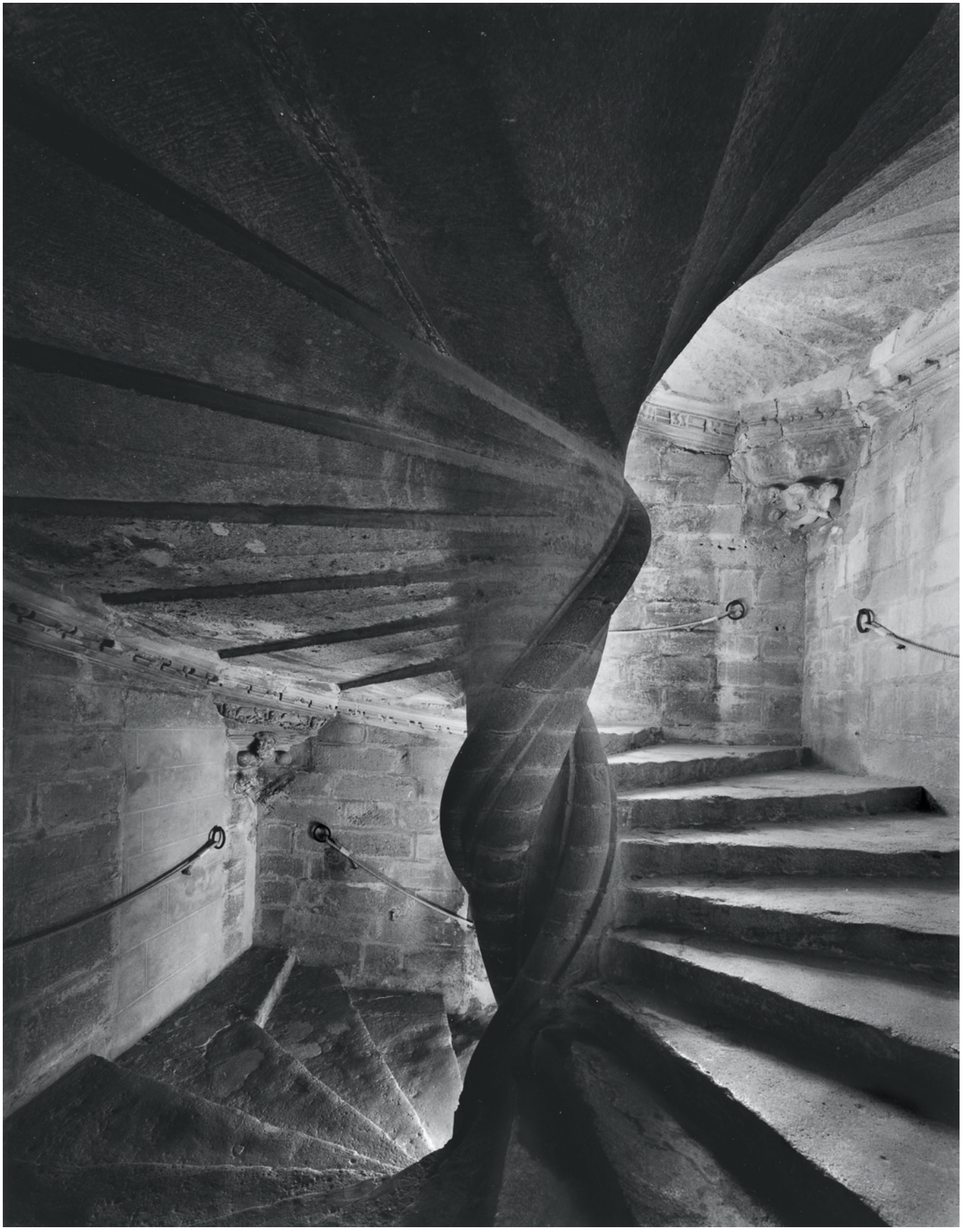
Testing and experimentation will uncover combinations that are best for you. My choice may or may not be your choice. The important thing is that you are satisfied with your own combinations. Your goals are surely different from mine, and your final combinations may be different to enable you to best achieve your goals. I stated my film and developer combinations as examples, not as recommendations, as I have done with other examples throughout this book. Please accept them as such.

In addition to the commonly used negative materials and developers discussed above, there is an abundance of materials for specialized purposes. Orthochromatic film is sensitive to a narrow segment of the visible spectrum (the blue wavelengths) and can be used to great advantage. Blue objects, such as the sky, are rendered very light, while red objects are very dark. The uncommon tonal renditions created by this film can be very intriguing.

Infrared film can yield truly bizarre images, and with care and subtlety on the photographer's part they can go beyond the superficial realm of stark, almost shocking impact to become quite creative and insightful. As with so many other tools, most people use this film sporadically for special effects and immediate impact rather than delving into its expressive possibilities. If you are interested in these or other specialized films, I suggest you work with them over long periods of time,

as if you were nurturing plants in your garden. Cultivate them and gradually get to know them, and what they can do for you.

Not only are there specialized films, but also specialized developers for them. They can be used with panchromatic, orthochromatic, or infrared films, yielding some very exciting and unusual results. This is purely in the realm of creative experimentation, and you will have to discover the possibilities yourself. I suggest obtaining data books and brochures from Kodak, Ilford, and the other manufacturers to get basic information before charging ahead blindly. Such books will offer information concerning the characteristics of the various materials and give you a starting point for your experiments. The rest is up to you!



◄ ***Figure 9–6: Eclairé***
The four story spiral stairway at Chateau Lourmarin, in Provence, France, is a true work of art in masonry, much like an Escher drawing, looking almost the same upside-down. Its contrast is excessive, with window light at various levels providing the only illumination. I used my widest angle lens to adequately encompass and convey its magnificence, and a two-solution compensating development for the exposed negative.

CHAPTER 10

The Print

ASIDE FROM YOUR CHOICE OF SUBJECT MATTER, printing a negative in the darkroom is possibly the most personal aspect of photography. Every photographer has his or her own special way of approaching darkroom work, and few photographers avail themselves of the opportunity to watch others work in the darkroom. For this reason, I shall approach this chapter in a very personal manner, detailing the materials and methods I use in making a print. I don't suggest that my approach is the only way to go about darkroom work, nor is it necessarily the best way—but it is surely my way, and it has proven successful for me. I suggest that you consider each of my methods for possible inclusion in your own approach, with your own personal modifications.

Many of the techniques that I regularly employ in the field and in the darkroom started as suggestions from other photographers. I often modified their procedures to suit me. I've even invented new techniques. I try to maintain an open, flexible approach, trying new procedures or materials whenever they seem to have merit for my purposes. If you can adopt an open approach, this chapter will prove more meaningful to you, whether you're at the beginner or advanced level.

The chapter will begin with an overview of materials, because their characteristics are so integrally tied to my methods. From there, it will proceed to methods of printing—using both standard and advanced techniques—then to completion of the process through archival processing (i.e., the production of a permanent image). The discussion will first focus on black-and-white procedures, then on color. I wish to make clear that some of the methods explained in black-and-white

◄ ***Figure 10–1: Rocks and Receding Wave***
I exposed this negative in 1978 and unsuccessfully tried cropping and printing it a few times before giving up. In 2006, I rediscovered the negative and realized that the upper right, which appeared blank white on the contact proof, simply needed burning to bring out necessary detail. So, after nearly 30 years, I finally printed it. The glowing, flowing, abstract forms that I encountered three decades ago have finally come to light. With easy access to any negative I've ever exposed, I can print at any time. This is a great advantage of negatives, which stay the same forever, as opposed to digital files which may not be easily accessible as technology changes.

are fully applicable to color, and vice versa. So I urge readers with an interest in only one or the other to read the entire chapter.

Black-and-White Enlarging Papers

I find that images possessing substantial areas of white printed on neutral or slightly warm-toned papers appear more brilliant than those printed on cold-toned, bluer papers.

What is the best enlarging paper? Today there are fewer options due to the rapid emergence of digital photography, but there are still excellent products available. I've used many papers over the years, and today's products are as good or better than ever. As I write this book, my favorite papers are Adox MCC110 and Ilford Multicontrast Warmtone. Both are variable contrast papers. They both have great brilliance, wide latitude in contrast range, and rich glossy surfaces (not high gloss like drugstore prints, but semigloss with a slight texture). They can be processed to full archival longevity and can be bleached and toned easily. There are other papers available as well, including several by Oriental Seagull, Kentmere, Ilford, and others. So there are plenty from which to choose.

Products are constantly being introduced, removed, and altered by all manufacturers, so any discussion of products becomes dated rather quickly. However, new products may possess many of the characteristics of older, discontinued products. Let's look at several important paper characteristics more carefully.

There is a subtlety concerning paper color that deserves real scrutiny. Papers with cold, bluish whites always seem to have less brilliance in broad highlight areas than papers with warmer, yellower whites. It's an interesting and unusual phenomenon that has intrigued me for some time. I believe I have identified the reason. Let's investigate a concrete example to understand it.

Suppose you look at an image made in winter of a sunlit snowfield. It would seem that the colder (blue) white paper would convey the feeling more appropriately than a warmer (yellower) white. Surprisingly, it's the other way around. My explanation is that the human eye responds more strongly to the yellow-white than to the blue-white. This is due to the well-known fact that the human eye responds more strongly to the yellow portion of the spectrum than to the blue portion. After all, we can see light blue, medium blue, and dark blue, but we cannot even comprehend dark yellow. Yellow *always* appears bright to our eyes, and that carries over to the subtle print coloration. I find that images possessing substantial areas of white printed on neutral or slightly warm papers appear more brilliant than those printed on cold-toned, bluer papers. But when a highlight is isolated and surrounded by mid-gray or darker tones, the color seems immaterial; any paper appears equally brilliant.

Developing characteristics are also important, for there are subtle differences between the image quality of a fully developed print and one that has been pulled from the developer a bit too soon. Most fiber base papers develop slowly over long periods of time, with increasingly rich blacks and more subtle mid-tones resulting from extended development times. Variable contrast papers appear to develop more quickly, but gain subtle highlight gradations with extended development. The reason for this characteristic in variable contrast papers is that their two emulsions—one low contrast and one high contrast—don't always develop at the same rate of speed. The high contrast emulsion often develops more quickly, giving the appearance that complete development occurs rapidly; but as the low contrast emulsion develops, the subtle highlight and mid-tone gradations become more apparent. Of course, the low contrast emulsion adds to the richness and the subtleties within the mid-tone and darkest areas of the print as well. So if you rush your development, or pull the paper out of the developer early, you'll lose much of the richness of the image.

One final word about papers in general: double weight paper is more durable than single weight paper. That is obvious,

but it also means that in the long run, double weight paper is probably cheaper and less frustrating, for fewer prints are damaged during development and subsequent handling. Also, because it can endure rougher handling, double weight paper can be worked on in the developer, with hand rubbing of specific areas to enrich blacks or bring out the most subtle highlight gradations. I don't know of a single fine art photographer who uses single weight paper over double weight (or "premium weight"), and there's an important lesson in that fact!

Variable Contrast vs. Graded Papers

The greatest change that I have encountered in traditional photography came between 1990 and 2000 with the widespread production of high quality variable contrast papers (also known as multicontrast papers). It amounted to nothing less than a revolution in photographic possibilities. Today, even after carefully watching digital processes improve over the years, I am still convinced that a good gelatin silver print is unmatched by any inkjet or other digitally created image. That's the reason I continue to work with traditional processes in black-and-white. (Besides, the traditional darkroom is also my sanctuary, where I can block out the world while I engage in my creative dreams.)

I used to print all of my images on graded paper, but I completely switched to variable contrast papers by 1995. Variable contrast papers exhibit whites that are every bit as white as any graded paper and blacks that are equally rich and brilliant. Thus, they are equal to graded papers in overall tonal quality. Beyond that, there are two advantages to variable contrast paper. The first is a reduction in your need to stockpile vast amounts of paper, since each sheet can be printed to any desired contrast level. Second, you can print an image with one level of contrast in one area and another level in another area, smoothly meshing the two (or more) contrast levels with careful burning and dodging (see below for more information on this topic).

The contrast level of a variable contrast paper depends on the color of light that hits the paper. The color—and therefore the contrast level—is changed by placing filters below the enlarging lens or above the negative inside the enlarger (which is the preferred method because it doesn't interfere with the optical qualities of the lens). Many enlargers are made with filters built into the system, allowing a continuous increase or decrease in contrast from the highest level (maximum magenta or blue) to the lowest level (maximum yellow or green). Thus each portion of a print can be exposed to your desired contrast, offering a remarkable level of flexibility never achievable with graded papers.

The way it works is relatively simple to understand. All variable contrast papers contain two emulsions: high contrast and low contrast. Magenta light activates the high contrast emulsion to the greatest extent and the low contrast emulsion to the least extent. Yellow filtration activates the low contrast emulsion to the greatest extent and the high contrast emulsion to the least extent. Thus, by varying the amount of magenta or yellow filtration, you can control the contrast level of the paper. There is never a reason to use yellow and magenta filtration together, for one serves to negate the other, but doing so does lengthen the exposure under the enlarger due to the neutral density effect of two filters being used simultaneously (more on this below).

Today, anything that can be done with graded paper can be done with variable contrast paper simply by setting its contrast level to the equivalent of the graded paper. Of course, many of the prints I make can still be done equally well on graded paper because the entire image is printed at one contrast level. Some images are simply easier to print—and often are superior in overall quality—on a variable contrast paper. But a few are possible *only* on variable contrast paper. Because I try to maximize my options in all areas of my photographic

endeavors, variable contrast papers have become my logical choice and I strongly recommend them for all printers. The discussion that follows is based largely on variable contrast papers, but everything still applies to graded papers, except where the added flexibility of variable contrast papers come into play.

Fiber Base Papers vs. Resin Coated (RC) Papers

Fiber base silver gelatin papers offer the ultimate in quality and longevity. They are the gold standard by which any paper is measured, including digital papers of any sort. Resin coated (RC) papers were developed for those who need to get prints quickly, have them dry almost immediately, and lay flat on the table without mounting. They were perfect for newspaper use, for example, but now digital processes are even faster; the prime purpose of RC has been superceded in a span of about 20 years.

RC papers have improved significantly since they first hit the market. Initially, images appeared to be a bit fogged and the papers had a short lifespan, lasting no more than 10 years before the plastic base began to crumble, taking the images with it. But great strides have been made over the years in image quality and longevity. However, RC papers still lack the last step of brilliance and are still not as permanent as fiber base papers. They are unlikely to ever reach the quality level of fiber base papers.

Another problem with RC papers is that they develop fully within 60 to 90 seconds. Additional development has no effect on the image. As a result, exposure alone determines the image. This means that development is purely a mechanical process, and the print lacks the subtle variations of tonality that make a fine fiber base print shimmer.

I use fiber base papers exclusively. I see no reason to compromise on quality at any stage of the artistic process, especially the all-important final step: the finished print.

Black-and-White Paper Developers

There are a number of developers available, and each has different properties. The most popular packaged developer is Kodak Dektol, and for good reason. It develops papers to high levels of richness and contrast, and it has a long shelf life once mixed. Kodak's Selectol-Soft, which is warmer in tone and much lower in contrast, is also quite popular and has some important qualities that will be discussed below. Ilford's Ilfobrom developer is similar to Dektol in quality, but slightly colder in tone and even a bit higher in contrast. It, too, is excellent. Other developers abound, and experimenting with them (using, perhaps, Dektol as a standard of comparison) will help you determine which is best for your general use. I'll use Dektol as the standard throughout the ensuing discussion because of its high quality and widespread use. Some developers bring out a warmer tone in papers, whether they are initially warm tone, neutral tone, or cold tone papers. These are worth working with to achieve your desired look. Ultimately you may want to use various combinations for different types of prints.

With graded papers I regularly used two developers, Selectol-Soft and Dektol. Selectol-Soft developed the paper to a contrast level lower than a full grade below Dektol. By starting development in the softer developer, then switching to the harder developer, I was able to control the inherent contrast of the print depending on the length of time in each developer. Now, with variable contrast paper, I just use Dektol, altering the contrast level via filtration built into my enlarger.

In addition to the pre-packaged developers mentioned above, there are formulas for mixing your own developers available from a variety of sources. I won't delve into these

here. If you're interested, there are books available about the formulas. I believe that the pre-packaged materials possess all the variety of the formulas, and they are far easier to prepare.

Making Contact Proof Prints

My first step in printing is to make a contact proof of every negative so that I can see what I have on paper and get a good indication of how to print any negative of interest. Making contact proofs is far more important than most printers realize. For me, it's critically important; it should be for you, as well. I have contact proofs of all my negatives; these serve as a catalog of my entire history of photography. My contact proof prints are intentionally low in contrast so I can see detail everywhere, even if I later choose to allow some of the detail to disappear in the final print. At the contact print stage of the printing process I'm looking for information, not "punch". I study each contact proof for the possibilities I envisioned at the scene, and even visualize new possibilities while studying the proof.

To make my contact proofs, I place two sheets of 8" × 10" enlarging paper on top of a thick foam pad under my enlarger and place four 4" × 5" negatives on each sheet of paper. I cover the entire setup with a ¼"-thick sheet of glass. This arrangement ensures perfect contact between the negative and paper emulsions. The entire arrangement is directly under the enlarger, which is set to a contrast level of 60 units of yellow filtration—roughly equivalent to a #½ or #1 filter (the filtration may vary depending on the paper used). The eight negatives normally vary in density; often there are considerable differences in density among them. So I expose the entire set to the amount of exposure needed to get a good proof of the thinnest of the eight negatives. Of course there may be several negatives within the set that have the same relatively low overall density.

After making that exposure, I place 4" × 5" sheets of cardboard on top of the glass over each of the thinnest negatives. Then I give additional exposure to the next densest negative(s) in the group, then cover that negative with cardboard. I continue giving additional exposure to successively denser negatives until I finally expose the densest one fully. Then I develop both sheets of paper to yield eight proof prints. If any of the proofs comes up too light or too dark to be of value, I simply proof it again in the next set of eight negatives with a more appropriate exposure (maybe even a third or fourth time). Eventually I discard all the useless ones and keep only the good ones.

If I'm proofing 120 roll film, I cut the roll into several segments (five 2¼ × 1⅝ frames per segment, or four 2¼ × 2¼ frames per segment) and use the same procedure with cardboard cut to 2¼ × 1⅝ or 2¼ × 2¼ for density variation. If you use a different size 120mm film (such as 6 × 9 cm or 6 × 7 cm), cut the roll appropriately to proof the entire roll on the sheet of 8" × 10" paper.

I then develop the contact prints for the usual five minutes in Dektol diluted 1:5. This yields a low contrast proof with excellent detail for all but the most high contrast negatives. It doesn't give me a "snappy" print, but it gives me the maximum amount of information about what is on the negative and shows me how it would look in a straight print. That's all I want: information!

I process the proof sheets, fully dry them, then flatten them in a dry mounting press. I number them all to correspond to my negative number system, which allows me to retrieve any contact print and negative later. Then I study the proofs individually before printing any of the negatives. This may appear to be a time-consuming approach for those who want to get a number of great prints quickly, but it certainly saves time and paper in the darkroom later. By the time I decide which are the most important negatives to print, I also

■ *Making contact proofs is far more important than most printers realize. For me, it's critically important; it should be for you, as well. I have contact proofs of all my negatives, and these serve as a catalog of my entire history of photography.*

have a rather clear idea of how I wish to print them, including any burning or dodging or other techniques.

Often I have an idle 25 minutes or even an hour of time, which is not enough for a productive printing session in the darkroom. But those minutes can be extremely valuable for further evaluating contact proofs, not only to determine which images are really worth printing, but also how each image can/should be cropped, the proper contrast level for the final print, and for determining a basic printing strategy. Furthermore, those images rejected as good prospects can be reviewed again days, months, or years later. I've gone through that process and, many years later, as I looked at those old contact proofs, I found real gems hidden among those I had long ago rejected. Apparently I've been ahead of myself at times, making exposures in the field that I only began to appreciate years later. Having the contact proofs allows me such review; having no contact proofs would have prevented later evaluation of my work. And, of course, I can immediately access any negative I've ever exposed for printing in the darkroom (figure 10–1).

Preliminary Work Toward a Final Print

The first thing I look for is a good image from the entire negative. If it disappoints me, I look at the possibility of cropping the photograph to obtain a good image. Though I try to compose the photograph to utilize every square millimeter of negative area, I will crop without hesitation if it can improve the print.

I use two small 5" × 5" cropping L's for my purpose, searching the proof for distracting elements along the edges or undesirable areas that could lower the quality of the final print. Then I move the cropping L's around to see if I can effectively eliminate the unwanted portions. If I find an effective crop, I mark it off in ink directly on the proof print. If I find a second potential crop of equal value, I mark that one off in ink as well. If I have second thoughts about anything I've marked, I can remove the ink by swabbing denatured alcohol directly on the proof print with a cotton swab. This has no adverse affect on the emulsion.

A contact print of a negative has roughly the same contrast level as the negative projected onto enlarging paper from a diffusion enlarger (but not a condenser enlarger, which would have significantly higher contrast). Thus the low contrast proof I make is closely equivalent to a variable contrast paper printed at 60 units of yellow filtration when projected from the enlarger. If the proof looks good, it tells me that about 60 units of yellow filtration is the logical choice for enlarging the negative. If the proof looks a bit flat, I think about decreasing the amount of yellow filtration, thus increasing the contrast level, perhaps even to zero units of yellow (i.e., "white light"), or going beyond white light into the realm of magenta filtration, which further increases the contrast of the paper.

The "muddier" the contact proof looks, the more magenta filtration I feed into the enlarger, up to its maximum level (170 units of magenta on my LPL enlarger). On the other hand, if the contrast in the contact proof looks too harsh, I dial in progressively higher amounts of yellow filtration to lower the inherent contrast. I never use magenta and yellow filtration simultaneously because they cancel out one another and serve as neutral density filtration, lengthening exposure times.

I start out by printing 8" × 10" prints, even if the final print will be 11" × 14" or 16" × 20". It's far less expensive to experiment with printing an image on 8" × 10" paper than on larger sheets. The 8" × 10" prints can always be used for publication prints, even if I have no intention of mounting them, so they are not merely learning devices.

Make Test Prints, Not Test Strips

I don't make test strips because I find them confusing. They show too small an area (usually) and cannot give much information if the final image has a variety of tonalities and contrasts. Based on the contrast level of the contact proof, I simply guess at the contrast grade of the enlarged print, recognizing that different parts may require different contrast levels. I also guess at the length of exposure needed based on the amount of light projected from the enlarger down to the easel. Then I proceed to make an 8" × 10" print (extrapolating from the contact proof that I have been studying), which I develop in Dektol (diluted approximately 1:4 or 1:5) for about five minutes. My approach works for me, but it may not for you at first. So let's get you started on a good track to making prints efficiently.

Some printers start their process by making test strips. Let me explain more fully why I don't make test strips. My experience teaching workshops indicates to me that most photographers don't make the best use of test strips and don't approach them correctly. Most photographers choose a section of the image that could yield useful information, then make eight to ten exposures on that narrow strip of paper, strategically placed at that chosen location, with each exposure generally three to four seconds. The developed test strip usually has two or three segments that are far too light to be usable, two or three that yield useful information, and three or four that are far too dark. This represents an unthinking approach to test strips. Let me suggest a far more useful approach—one that turns test strips into a thinking process rather than a mindless one.

I recommend a test *print* rather than a test *strip*. If you're about to make an 8" × 10" print, use the full 8" × 10" sheet as a test rather than a skinny test strip. Here's how to do it: first, based on your study of the contact proof, choose the contrast level that you think the print will require. If the contact proof has good contrast, start with about 60 units of yellow filtration. If the proof seems a bit low in contrast, reduce the yellow filtration to 40 or 30 units, thereby increasing the contrast a bit. If the proof seems slightly muddy, remove all yellow filtration or consider going into a small amount of magenta filtration (after removing all of the yellow filtration, of course). If the proof seems quite muddy, go to 50 or 70 units of magenta. If it looks *really* muddy, go all the way to the top, maybe 170 units of magenta. Make your test print with that filtration dialed in, or with that filter placed in the enlarger or under the lens.

Next, study the amount of light falling on the easel or on the back of the sheet of paper you use for focusing (with the contrast filtration in), and *guess* at the correct length of exposure. In doing this, you are actually trying to correlate the amount of light to the length of exposure. If you have a dense negative, you may want to have the aperture nearly wide open to get a reasonable amount of light on the easel; if you have a thin negative, you may need to stop down several stops to get a reasonable amount of light. Try to get the amount of light that you think will yield an exposure in the range of 12 to 18 seconds, if possible.

Stop down to a seemingly reasonable amount of light hitting the easel (i.e., not so bright that you know an exposure will be too short, and not so dark that you can't see the image clearly on the easel). Guess at your exposure and set the timer to exactly half of your guess. Suppose you stop down several stops and guess that your exposure will be 15 seconds. Then set your timer for exactly half of that, i.e., 7½ seconds. Now make a three-part test print: cover about ⅔ of the print with heavy cardboard and expose ⅓ of it for 7½ seconds. Then move the cardboard to expose ⅔ of the enlarging paper and expose that for 7½ seconds. Finally, remove the cardboard entirely and expose the entire sheet another 7½ seconds. The first third gets 3 × 7½ = 22½ seconds. The middle third gets 2 × 7½ = 15 seconds, your initial guess. The final third gets 7½ seconds. This way your "guess exposure" is in the middle. One side gets 50 percent

► ***Figure 10–2a: Proof Print of Rocks and Receding Wave***
The proof print made at 60 units of yellow light gives me usable detail everywhere (except the far upper right corner, which remains blank white). It tells me that I need to raise contrast to get the glow on the rocks, indicating that when I increase contrast, the upper right corner will need additional exposure to bring out detail there.

► ***Figure 10–2b: Three-Part Test Print of Rocks and Receding Wave***
To make a three-part test print, guess your expected exposure at the contrast level you have chosen in advance. Set the timer for ½ that guess. Then make three exposures across the print to get the major tonal areas into each of the sections. Note that all three sections contain rock, moving water, and pebbles. The "guess" was 15 seconds at the chosen aperture, so the three sections received 7½, 15, and 22½ seconds of exposure respectively.

In the 15-second exposure the rocks are too dark. The foamy water in the left center looks good at 22½ seconds of exposure. This indicates that a basic exposure of 13 or 14 seconds may be appropriate for the rocks, but that the water has to be burned to 22½ seconds or more to gain detail on the foam. A review of figure 10–1 shows the final print compared to the basic proof print (figure 10–2a), with additional printing information coming from the three-part test print.

A better proof would have given the right side the 22½-second exposure and the left side the 7½-second exposure, yielding more information about the additional exposure needed on the upper right.

less than your guess; the other side gets 50 percent more than your guess (figures 10–2a and 10–2b).

You can segment the three-part test print horizontally, vertically, or diagonally, or fan out from a point. The important thing is to get highlights and shadows into each of the three sections so you can truly evaluate how to choose a reasonable exposure for the full print.

If you're way off in your guess, try it again until your guess is about right. No problem. Once you've guessed about right, work on that print until it's refined and you're used to seeing that level of light on the easel. Then, when you start working on the next negative, you'll look for roughly the same amount of light hitting the easel, guess correctly, and look for that amount of light the next time around. This way, you'll begin to see the relationship between the amount of light hitting the easel and the length of exposure you need for the print you want. In other words, you're thinking about what you're doing, rather than just mindlessly making test strips.

I suspect that if you do this several times, your guesses will become quite accurate. In time, you may be able to dispense with the test print entirely, as I do, but that's up to you and your level of confidence. Don't worry about negatives of varying

density. For a dense negative, keep the aperture more open to get the needed amount of light onto the easel; if it's a thin negative, close down several more stops.

Also, once you're in the ballpark with a good basic exposure, you can check the contrast level again within the three sections before making your first full print. If contrast within the best section of the three seems a bit too low or too high, alter it for the first print you make. After all, why not make all the changes needed before wasting time and money on prints that won't be very good?

After years of printing, not only do I skip the test print entirely (simply because I can usually guess the exposure time fairly accurately), but I also go further with my initial print because I study the contact proof print extremely carefully. Careful study of the proof print gives me a very good idea of how much contrast the final print needs, but it tells me much more. If a specific area of a proof print is quite light, I may have to burn it to maintain detail. When I increase contrast for the final print, I'll have to burn that area progressively more because it will be even brighter as contrast increases. So a careful study of the proof not only tells me if an area needs burning, but also how much I have to burn. In a similar manner, studying the proof print gives me a great deal of information about where I have to dodge the negative during the basic exposure, and roughly how much dodging is needed.

Combining all this information gives me the following:

- The contact proof tells me the level of contrast I need for my print, so I can set my dichroic head filtration for the contrast I need.
- The contact proof tells me where I have to burn and dodge, and as I increase or decrease contrast, it indicates how much I have to burn or dodge each area.
- The level of light hitting the easel when the filtration is dialed in tells me the necessary length of exposure at the chosen aperture.

Now I have a pretty good idea of how to print the negative. My first print of any new negative is an educated guess at the proper contrast, the length of the exposure, and the burning and dodging needed. So I go for it! I make my first print as if I've printed it for years, including all the burning and dodging I think I'll need right from the start. I fully develop that print, then evaluate it carefully after I get it into the fixing bath and inspect it under white lights.

There have been instances in which I hit it right on target on the very first try. Most of the time, I'm a bit off, but I'm generally close enough to make a few minor adjustments to get much closer to the print I want on my second try. Further refinements may extend the process to three or four or more tries before I get the print exactly the way I want it (and, of course, future printings may bring additional improvements to the image). Sometimes, I'm way off on my first set of guesses, but careful comparisons between the contact proof print, the first enlarged print, and my desires for a final print, give me a great deal of insight for a second print that's usually close to the print I want to have. From that stage, it's just a question of further refinements.

Concerning aperture, please ignore those who argue that all negatives should be enlarged at two or three stops below maximum aperture on your enlarging lens to yield maximum sharpness. Technically, those arguments are correct. Neither the wide open (full aperture) nor the fully stopped down (minimum aperture) lens is as sharp as the mid-range openings. While that's technically true, in practical terms it's meaningless. The sharpness difference at various apertures may be visible on a super-enlarged optical bench, but it isn't visible to the naked eye at any enlargement that you or I will ever make. Don't worry about any supposed lack of sharpness as you stop down, because you'll never see the difference. Choose the aperture that makes sense for the print you're making: you don't want an exposure that lasts several minutes (because it's tiring), and you don't want one that's just a few seconds long

(because you lack control over the final result). Something in the middle makes logical sense.

The only aperture I generally avoid is maximum aperture, not because of sharpness considerations but simply because it projects significantly more light toward the center than the edges and corners. I stop down at least one full f/stop to achieve an even level of light across the easel. In time, you'll recognize that if you want a lighter (high key) print, you'll choose a shorter exposure or a more closed aperture; if you want a darker (low key) print, you'll choose a longer exposure or a more open aperture (more on this issue below).

Doing test prints rather than test strips gives you a wealth of information and sharpens your view of the negative right from the start. You'll begin to see the relationship between the negative and the print you want. It helps your understanding of the entire photographic process. You'll get to your final print quicker this way, and your final print will be better! Start thinking from the beginning! Follow the advice that American painter Robert Henri gave to his students in the late 1800s and early 1900s, "Intellect should be used as a tool."

Two-Solution Development for Graded and Variable Contrast Papers

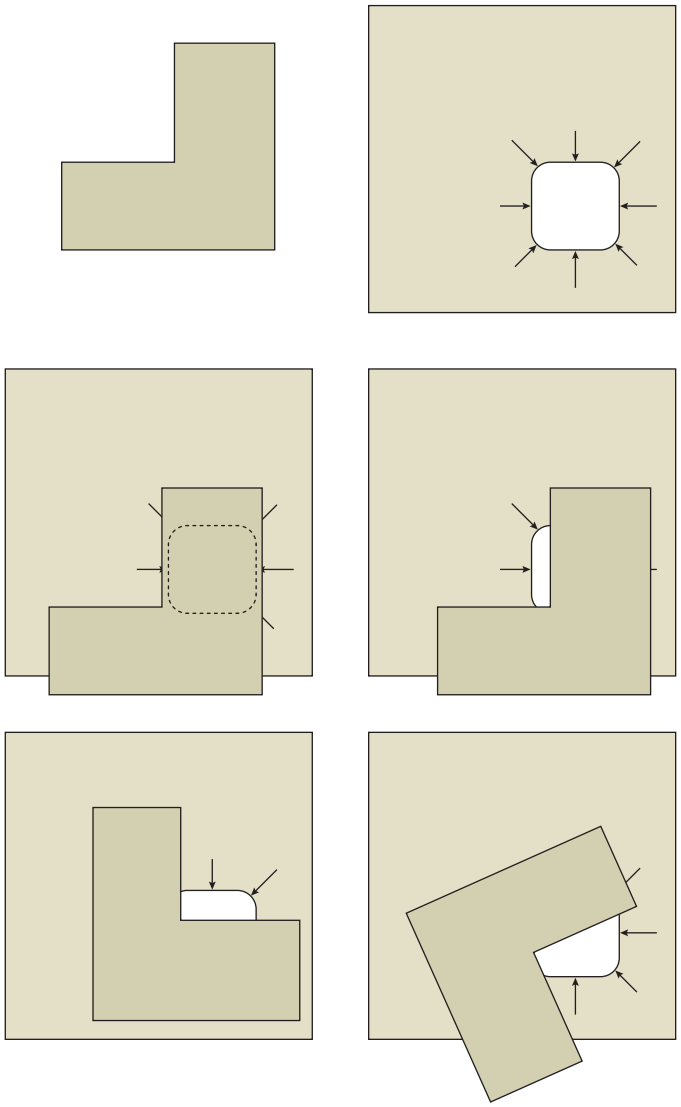
Graded papers come in distinct contrast levels, generally 1, 2, 3, and 4 (sometimes 5), with each grade progressively higher in contrast. To obtain intermediate contrast levels, you can use two developers in sequence—first, a low contrast developer like Kodak Selectol-Soft which develops any grade of paper more than a full grade lower in contrast; and then a second, higher contrast developer, like Kodak Dektol.

Here's how it works. If you want to get the equivalent of Grade 2½, use a Grade 3 paper but start the development in Selectol-Soft, effectively developing it slightly lower in contrast than a Grade 2 paper. Part way through, move the paper into Dektol and finish the development like a true Grade 3 paper. If the print is in the first developer for a short time and in the second for a longer time, you can achieve Grade 2.9. If it's in the first developer for a long time and in the second developer for a short time, you can get Grade 2.1. Starting with the higher contrast grade paper and varying the time in each developer allows you to get any contrast level between the two grades. Be aware, though, that Selectol-Soft also slows the paper, so the greater percentage of time in it, the more initial exposure you'll need.

If you use variable contrast papers with numbered filters below the enlarging lens (or even above the negative), the only way to achieve subtle variations between half-grade filter levels is by using two developers, just as with graded papers. If you have an enlarger with continuous variation of contrast levels, it may seem that using more than one developer is unnecessary; but this is not the case. Extending the thinking detailed above from graded to variable contrast papers, two developers can be employed to subtly alter the contrast curve of a paper. Because Selectol-Soft alters the characteristic curve of the paper (increasing highlight separations and decreasing shadow separations) while lowering overall contrast, you may achieve a print more to your liking by dialing in higher contrast filtration, then softening the contrast in Selectol-Soft developer. By doing this, you can achieve subtle tonal changes in the highlights and shadows that cannot be achieved with any other method. It's worth pursuing in an effort to achieve the highest quality prints you can produce.

Dodging and Burning

Dodging and burning are essential techniques in making most prints. Dodging is the procedure of blocking light from the enlarger to selected areas of the print during part of the basic exposure. When light is withheld, the area is made



◀ ***Diagram 10.1:***
Two pieces of cardboard are needed for this precise burning tool: an L-shaped card (as shown in the diagram at top left), and a square card with a hole cut in its lower right corner and with arrows drawn that point toward the hole (top right in diagram).

To start, place the L-shaped card atop the square one, cover the hole completely (see left center), and hold both cards under the enlarging lens so the enlarging paper is not exposed when the enlarger is turned on. Both cards should have a white surface on the upper side to allow the projected image from the enlarger to be easily visible; the underside of each should be black to minimize the light reflection onto the enlarging paper.

Turn on the enlarger light. The arrows on the lower card indicate the location of the hole when the L-shaped card covers it. With the negative image visible on the cards—and the hole still covered by the L-shaped card—move them as a unit to the location where the hole is at the point of desired burning. (The arrows on the lower card will easily show the proper location.) Then slide the L-shaped card away from the hole at the desired location—and in the optimum shape—for burning (right center and bottom in the diagram). As shown, you may need to rotate the L-shaped card for best results. The size and shape of the opening can be controlled during burning by moving the L-shaped card around the hole while moving the lower card over the enlarging paper.

The same two-card system can be used for flashing (see figure 10.2).

lighter, so dodging lightens an area. Burning is the procedure of giving extra exposure to selected areas of the print, thus making those areas darker.

For dodging, I use small pieces of cardboard cut into geometric shapes (rectangles, circles, squares, ellipses), each taped to the end of a hanger wire. I hold the wire at one end beyond the projected negative image and block light from the enlarging paper with the appropriately shaped cardboard. If dodging is required in a larger area, say the lower third of the print, I use a large piece of cardboard with a straight or curved edge. If dodging is needed along an edge or at a corner, I may use my hands and fingers—sometimes running them back and forth along the edge and often following contours of shapes along the edge as if I were playing scales on the piano.

For burning, I use cardboard sheets with straight edges or with gentle convex or concave curves. To burn interior sections of a print, I cut rounded holes at key locations (near one corner, in the center, midway along an edge, etc.) so I can burn areas of the print along the edges, in the center, near corners, etc., as I please. Whether I'm burning or dodging, I keep the

cardboard in constant motion to soften the edge of the manipulated area, allowing it to smoothly mesh with the unaltered adjacent area.

My dodging and burning cardboards are all black mat board with the reverse side white. This allows me to see the projected negative on the white (top) side, while the black (lower) side absorbs light reflected upward from the enlarging paper. For burning, I can alter the size and shape of the hole in the cardboard by holding a second, L-shaped piece of cardboard over it and opening up only part of the pre-cut hole. In this way, I can burn oddly configured areas, even down to narrow slits when necessary. I accomplish this by holding one cardboard atop the other, using the upper one to cover the hole of the lower one (diagram 10.1). Then I turn on the enlarger, holding the two cardboards under the lens so that no light hits the paper. The negative image is visible on the cardboard's white top side, allowing me to position the hole precisely over the area to be burned (still holding the second cardboard over the hole, so the enlarging paper is still not exposed). Then I slowly uncover part—or all—of the hole by sliding the upper cardboard across the opening, allowing light to go through the hole in the appropriate shape. Both cards must be kept in constant motion in order to smoothly mesh the tonalities of the burned area with its surroundings. As soon as I burn the area for the desired length of time, I close the hole again and turn off the enlarger light.

I always make sure that the dodging or burning is not apparent, no matter how extensive it may be, by keeping the dodging or burning tools (hands or cardboards) moving during the exposure to produce smooth, undetectable gradations between manipulated and unmanipulated areas. Too often, a printer darkens a stormy sky for dramatic effect but burns the upper portion of the mountains, trees, or church steeple along with the sky. This obviously represents sloppy technique. Furthermore, too much darkening of the sky may look artificial and phony, not dramatic. The light depicted in a print should be logical. If it isn't, it simply appears contrived. When manipulation is visible, people see poor technique rather than the visual statement of the image.

One might ask how much burning or dodging is acceptable in a print. The answer is: as much as is necessary to direct the viewer's attention (perhaps I should say, "as much as is necessary to *force* the viewer's attention"). However, even if the dodged or burned areas mesh smoothly with the adjacent areas, the manipulation should not be so great that the altered areas appear artificially or unnaturally light or dark. The image must possess coherence, logic, and a realistic feeling of light. There is a logic to light that cannot be violated. *That* is the only constraint.

This must be done with cunning and subtlety, but not with timidity. I have printed negatives that require as much as 500–1000 percent additional burning of selected areas beyond the basic exposure. The goal is to bring out all the desired detail and mold the light in a way that strengthens the composition wherever possible. Burning or dodging can also be used to add snap to selected areas. There are, of course, any number of reasons for burning or dodging. Use them, but use them sensibly for your goals.

Integrating the Entire Process: Visualization, Exposure, Development, and Printing

When I stand behind the camera composing the scene, I consider camera position, lens focal length, filtration, negative exposure, and development. I also think ahead to the darkroom possibilities of burning and dodging, and I have a strong feeling of the size I'll print the final image for display purposes. This allows me to fully integrate the entire photographic process and maximize my interpretive capabilities. This is also part of the process fully discussed in chapter 4, "Visualization", which may be worth rereading at this point. In

▲► ***Figures 10–3a and 10–3b: Approaching the Rocky Mountains***

Figure 10–3a shows the straight proof print. Figure 10–3b shows the final print in which the sky and ground are printed separately, as if they were two separate negatives. The sky alone is exposed first for 35 seconds at a contrast level lower than the proof print (80 units of yellow), with additional burning in the upper portion to bring out cloud detail. Then the lower (ground) portion is exposed at 70 units of magenta for just 13 seconds, enough to give it strong tonalities. The jagged summits of the northern Montana Rockies can be seen just above the grasslands.

visualizing the final print, I try to see the steps needed to get there, and darkroom considerations are key among them.

As a simple example, suppose a landscape has low contrast separations within the land itself and the sky above is much brighter and also low contrast. Previous chapters on negative exposure and development may indicate that the obvious approach is to give ample exposure for the darker land within the frame, followed by reduced development of the exposed negative to bring the highlight densities (i.e., the bright sky) down to an easily printable range.

But by thinking ahead to the darkroom possibilities and fully integrating the process, I may decide to maintain overall contrast in the negative through normal development, or even *increase* contrast through extended negative development, then burn the sky extensively during printing. In this way I bring the tones of the sky down to my desired level, but in the process I maintain or increase the contrast in the land while also maintaining or increasing contrast in the sky. This produces a print that is alive throughout rather than one that has tonal separations throughout (figures 10–3a and 10–3b).

The print may be more difficult to make using this approach, but it will be a more exciting, snappier print. By thinking ahead to the simple technique of burning a portion of the negative during the printing stage (i.e., giving a portion of the negative—the sky in this case—additional exposure under the enlarger), I can choose a different exposure/development regime than I would have without fully integrating the process by thinking ahead.

The same is true of dodging a portion of a print. If I consider areas of a scene that can be exposed and developed with an eye toward dodging (perhaps a deep shadow area possessing

▲► ***Figures 10–4a and 10–4b: Mushrooms, Yosemite Valley***
In figure 10–4a, the mushrooms dominate the image because of their placement and size, but the granite rocks—especially the one below the mushrooms—distract attention. Neither the light beige mushrooms nor the gray granite rocks would have responded to filtration. Darkroom printing was the only option to enhance the image. For figure 10–4b, I raised the contrast level to 50 units of magenta, printing the image substantially darker overall while dodging the tops of the two large fungi throughout the basic exposure. Then I burned the rocks, with special attention to the bright rock at the bottom. The mushrooms glow, yet the background retains detail.

interesting and compositionally desirable detail), I may approach my exposure and development differently.

If you employ this type of thinking, it will extend your use of the zone system into higher negative densities that you may have previously avoided, or into areas that you felt didn't exist! Such thinking greatly expands your interpretive and artistic possibilities, and frees you from constraints that you might put on yourself.

I see no advantage to a straight print (i.e., one with no darkroom manipulation, such as dodging or burning) unless the tonal values of the scene miraculously fall into the perfect array of tonalities everywhere. Such perfection rarely occurs, so darkroom manipulation is almost always necessary. Ansel Adams knew this, for nearly all of his prints were burned or dodged, some quite heavily. I know this, as most of my prints are manipulated as necessary. I recommend that all photographers recognize this and use the tools available in the darkroom for their creative and artistic needs.

Burning can be done to darken highlight areas, mid-tone areas, or dark areas. Dodging can be done in any tonal area as well. The only consideration is this: what is needed to make the print look as good as it can look? When you decide what is needed, apply the technique. It's an available, legitimate, creative technique, so use it. Remember, too, that the eye views the scene at many apertures as it scans from bright to dark areas, while the camera sees all areas at the single pre-chosen aperture. So burning or dodging may prove to be the only way to bring the image back to the way you saw it. Where is the manipulation—in your initial viewing of the scene or in your printing? It could be either one, or both! Who cares? The scene

isn't yours, but the print is always yours! So do what is needed. Every good photographer should recognize this.

How many photographers—beginners and advanced—have encountered the following situation in the darkroom? You print a landscape negative that includes a big, puffy, white cumulus cloud. The cloud, towering above the land, ends up blank white in the print. So you make another print, giving lots more exposure to the sky and cloud. Suddenly the cloud has rich tones within it. This tells you that the portions of the negative that printed blank white in the first print (i.e., with densities of Zone 9 or above) contained excellent, usable detail! In other words, without realizing it, you have already exposed and developed negatives that contained densities above Zone 9, and you have printed them successfully!

So you have already used much of the information that I've covered in this book. Now you fully understand it, so it won't remain an obstacle to your thinking in the future. The higher zones are valuable, usable, and easily accessible. Don't shy away from them, especially since you've already used them. This should break down your fear of the "extended zone system".

Burning or dodging can bring out the compositional unity sought when the exposure was made. For example, I have a photograph of several enormous mushrooms draped over rocks at the base of a dead tree (see figures 10–4a and 10–4b). The granite rocks were lighter than the mushrooms. Without darkroom manipulation, the rocks would compete with the mushrooms for attention and become distracting elements in the final print.

To achieve my desired print, I dodged the center of the mushrooms during the basic exposure to lighten them considerably while still retaining detail and texture. Then I burned everything around the mushrooms—even the bottoms of the mushrooms—except the tree trunk, which was already dark. I used a cardboard with a hole near the edge and rotated the hole around the outer edge of the mushrooms. I gave the rocks particular emphasis by laying one or two cardboards atop the hole to shape it like the rocks and then burning each rock successively. Ultimately the rocks were lowered in tone to deep, rich grays (Zones 2–5), while the assorted twigs, leaves, pine needles, and dirt had similar deep values.

Now the mushrooms appear to glow with light, and the viewer's attention is drawn to them without distraction from the surrounding objects. The burning around the mushrooms amounts to nearly 300 percent additional exposure beyond the basic exposure. But the centers of the mushrooms were dodged during the basic exposure, so the surrounding areas actually received about 500 percent more exposure than the centers of the mushrooms. The darkroom manipulations are not apparent in the final print (though they are dramatic when compared with the straight print). It is not an overstatement to say that the compositional unity of this print was largely created in the darkroom.

The options you have in the darkroom include dodging and burning, contrast level of paper, two-solution contrast control, and your choice of paper. Each option deserves careful thought. The goal is to achieve a print that enhances the effect you desire. Some prints should sparkle; they should glow. They should be alive with light and luminosity. Others should be subdued and quiet, yet still glow with soft light. The contrast level must be chosen with the mood of the final print in mind. Some prints require high contrast; some demand low contrast. Some should be dominated by large, light areas; some by dark areas; and some by mid-tones. When a print appears flat, a higher contrast filter may solve the problem; but a little burning and dodging with the same contrast level may be a better solution.

Excess contrast often comes across as harsh. It may appear striking at first, but it fails the test of time. Too often, it simply flies in the face of the desired mood. Prints lacking appropriate contrast are simply dull. The question of how much contrast a print should have, how dark it should be, how light it

should be, are all subjective questions, and the answers vary from photographer to photographer. Stick to your vision, and do it your way in the darkroom.

Burning with Variable Contrast Papers

■ Flashing, reducing, *and* masking *are three additional darkroom techniques that are generally considered advanced, but this simply means most people are not familiar with them.*

Everything in the previous section applies to both graded and variable contrast papers, but variable contrast papers offer a spectacular option not available with graded papers: the ability to burn at a different contrast level from the basic exposure. To understand the importance of this, keep in mind just what high contrast and low contrast mean. High contrast implies that when shadows achieve dark gray or black tonalities, the highlights are light gray or white. Low contrast implies that when shadows achieve dark gray or black tones, highlights are deeper grays, perhaps even mid-gray tonalities. Or, viewed another way, low contrast may mean that by the time you give enough exposure to a negative to achieve subtle highlight detail, the shadow areas are still mid-tones rather than dark grays or black.

Now, suppose you made an exposure inside an old, abandoned house, and the negative included a window to the landscape outside. That exterior may be an extremely dense portion of the negative compared to the densities in the rest of the negative. If you print for desirable tonalities and contrast for the interior, the window area will likely be blank white in your print. With graded paper, if you burn the window enough to get outside landscape detail, the edge of the wall adjacent to the window will likely have a dark "halo" where your burning touched the wall. This is obvious and therefore sloppy technique.

But with variable contrast paper, you can lower the contrast level for the burning. By the time the landscape becomes visible, the edge of the wall may not be noticeably darker. This may prove to be an image that can be printed *only* through the use of variable contrast paper. Low contrast burning may allow you to attain subtle detail—or high drama—in the sky without darkening foreground items such as trees, a mountain slope, or a church steeple.

High contrast burning may be the solution to the opposite problem. Suppose you have a landscape with good contrast, but the sky is light, hazy, and lacking good tonal separations in the thin clouds. Not only can you burn the sky at higher contrast, but you may also want to initially dodge the low contrast sky partially or fully, then burn it back in completely at the higher contrast level. This is the way to mesh two or more portions of a negative at completely different contrast levels, melding them seamlessly by carefully burning and dodging where they merge.

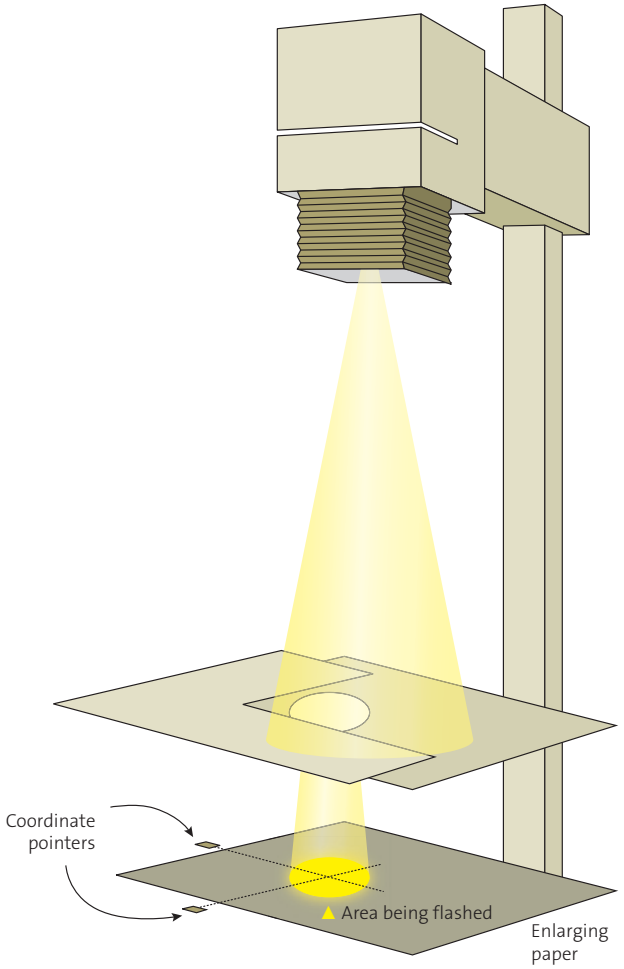
Of course, low contrast or high contrast burning can be applied just as appropriately to mid-tone or dark areas. I have emphasized its use in highlight areas just for the sake of example, but the technique can be equally effective when cleverly applied to any tonal area of a print.

Using this technique, I have been able to make prints with variable contrast papers that are simply impossible to print to my satisfaction with graded papers. It's allowed me to go even further, making images from more than one negative by finding textural similarities and merging them even when contrast levels between the negatives differ. Thus, variable contrast papers open up creative possibilities beyond those of graded papers.

Advanced Darkroom Techniques

There are three additional darkroom techniques that are generally considered advanced, which simply means that most people are not familiar with them. They are *flashing, reducing* (often referred to as "bleaching"), and *masking*. Flashing is a method of exposing the enlarging paper to a bit

of blank light prior to exposing the negative. This procedure extends the range of visible tonalities on the enlarging paper into the highest densities. Reducing is a method of chemically removing silver from the developed print, thus lightening areas of the print. Masking, which may require special registration equipment, has two different forms. One increases local contrast while reducing overall contrast. The other allows printing of bright highlight areas while protecting adjacent dark areas from any additional exposure.



◀ ***Diagram 10.2: Selective Burning or Flashing***

An L-shaped card is held atop the hole in the lower card and is used to open or close the opening, or change its shape. This two-card system can be used for both burning and flashing.

For flashing, when the negative image is focused on the easel, place cards adjacent to the easel to mark coordinates of area(s) to be flashed. After the negative exposure is completed, remove the negative and hold two cardboards with an appropriately shaped hole above the enlarging paper. Expose the paper for a predetermined length of time. This method allows flashing only in the portion of the print that requires it rather than the entire print. Some prints may require flashing of more than one area, each for a different length of time. To do this, use several sets of coordinate markers.

Flashing

In order to understand flashing, try to understand what happens to the enlarging paper when it is exposed to light from the enlarger. Light comes through all portions of a negative—even the densest portions—when the enlarger light is turned on. Yet, as we know, parts of the print are pure white when fully developed. The reason is that the enlarging paper, just like the negative, has a threshold level that must be reached before any tonality will appear. Until that threshold level of light hits the paper in any area, no density will appear in that area.

Let's say that the threshold is 10 units of light, the first tonality beyond pure white. It may take 100 units of light to make medium gray and 1,000 units or more to reach pure black. But suppose a dense highlight area of the negative allows just 4 units of light through during the basic exposure, and you want to show some detail in that highlight area.

You could burn that area a minimum of 150 percent to give it the necessary 6 additional units of light to barely achieve tonality; but the burning process will inevitably spill over into the area adjacent to the highlight, and you could get an obvious dark halo around it. For example, if the adjacent area received 100 units of light during the basic exposure, 150 percent additional burning could give it another 150 units of light, turning it into a dark gray strip around the highlight. If you burn just the center of the highlight so as to avoid the halo effect, you may miss the edge of the highlight area, producing density in the center of the highlight but not along the edges. This would be an equally unacceptable solution.

But suppose you expose the enlarging paper to 7 units of blank light through the enlarger after making your basic exposure, plus the required burning and dodging. Now the 4 units of light from the exposure through the negative plus 7 units of blank light gives you 11 total units, revealing subtle tonality in the highlight. Of course, the flash exposure adds 7 units to all parts of the print, so the adjacent area that received 100 units will now receive 107, which is hardly any

change at all. The darkest portions, formerly receiving 250 or more units, will go to 257 units, an imperceptible difference. (The same approach applies to both, but for burning, no coordinate system is needed because the negative is in the enlarger.)

You can refine the technique by flashing only the area that needs the boost rather than the entire image. First, focus the negative and find the area that requires flashing. Next, mark it off beside your easel using two cardboard arrowheads as markers of a Cartesian coordinate system (diagram 10.2). Then remove the negative and flash just the designated area, using the two-cardboard system described in the section on burning and shown in the diagram. In this way, only the area you want flashed (along with a little spillover to adjacent areas) will receive the additional blank exposure, and there will be no loss of contrast or muting of tonalities elsewhere.

How do you determine what is 7 units of light? Use the following method. With no negative in the carrier, close the lens aperture down to a minimum setting (f/22, f/32, or f/45—the smaller the better). Then make a test strip of blank light on the same grade paper as the print you are making, giving it one-second increments up to, say, 15 seconds. Then fully develop the strip. To be consistent with the discussion above, let's say that the full 15 seconds of exposure shows a gray stripe, 14 seconds a lighter gray stripe, 13 seconds still lighter, and so on down to 10 seconds, which shows the last perceptible tonality. Now you know that 10 seconds is the threshold level of 10 units of light, so 7 seconds of flash exposure gives 7 units of light.

Of course, it's a guess that the basic exposure gives us 4 units of light in the highlight. It could be 2 units or 9 units and still appear blank white in the final print. Thus, 7 units of flash exposure is also a guess, and several attempts may be necessary to determine the optimum amount of flash exposure. It may turn out that the best print involves a small amount of flash exposure after the basic exposure of the negative and some additional burning of the area. These three variables—basic exposure, burning, and flash exposure—must be juggled about to obtain the best result, but for a magnificent print, the result justifies the effort.

When I printed my negatives of English cathedrals on graded papers, I employed this technique frequently to get a full scale print of the interior architecture while maintaining detail on the stained glass. The windows, of course, are the light source for the interiors, and it's not easy to get detail on a light source. In order to achieve what I wanted, I generally used a grade of paper with sufficiently high contrast to yield a full range of tones for the interior architecture, apart from the windows. Then I flashed (and often burned as well) to bring out detail in the windows. Without flashing, the windows printed as blank holes devoid of detail, and burning, alone, put an obvious halo around them.

Without flashing, the only approach I could have taken to print the cathedral negatives on graded paper would have been to print on a low contrast paper—making the interior dark, somber, and muted—while the window served as the sole source of brilliance. That would have been a legitimate interpretation, but it's not how I saw or felt the cathedrals. Thus flashing provided a tool for me to interpret the cathedrals as I felt them.

In general, don't exceed threshold in your flashing exposure. If threshold is equaled or exceeded, the highlight area will appear gray and dull rather than improved with detail. The whitest white within the highlight area should still remain white. In the cathedral prints, I wanted the clear glass portions of the windows to be pure white, but I wanted the colored glass—and especially the lead mullions separating the panes—to be plainly visible. If I had grayed the clear glass in flashing, the window would no longer appear to be the light source, and the light quality would have been lost.

▲► ***Figures 10–5a and 10–5b: Sunburst, Fisher Towers***
In figure 10–5a, the background towers are brilliant, and the sunbeams streaming around the central tower are spectacular. However, the distant cliff wall to the left of the central tower is missing, while the blank white sky kills the image. Burning the sky at any contrast level creates problems due to the cliff, which gets too dark during burning. So, following the basic exposure, I remove the negative from the enlarger, close the aperture down to f/45, and add a two-stop neutral density filter from my enlarger. Using a convex-shaped card, I flash the sky downward from the upper corners, going well beyond threshold exposure and tapering to nothing halfway down each side, with far less flashing exposure in the center. In figure 10–5b, the gray sky tonalities are due to flashing, which is also enough to bring out the cliff wall while affecting the left edge of the cliff very little.

Flashing with Variable Contrast Papers

Variable contrast papers make flashing a rarely needed tool. Going back to printing my English cathedral studies, the task becomes far simpler with variable contrast papers rather than graded papers. The bright windows are the major problem. It is difficult to obtain detail on them while maintaining good contrast and brilliance in the rest of the interior. Using variable contrast paper I print for the interior, essentially ignoring the windows initially. I use a moderate to significant amount of magenta filtration to get the contrast level I want. Then I dial the magenta down to zero and dial up the yellow filtration to burn the windows. Burning the windows entails a bit of excess darkening of the adjacent stonework, but by burning at low contrast it is not darkened to the point that a halo appears.

If I did the burning at the same contrast level as the basic exposure, I would have the same problem that I had with graded paper. But the variable contrast allows me to burn at lower contrast levels, giving me a print almost identical to that of the graded paper print with a bit more tonal separation in the windows. This is due to burning at low contrast rather than flashing at no contrast. A further advantage of this procedure is that I don't have to remove the negative from the enlarger to complete the print. Thus, the print is marginally improved and significantly easier to print.

While flashing is rarely used with variable contrast papers, it can still be a lifesaver. One example is a photograph I made in 1996 in Utah. On an unusually humid and hazy morning, the sun was coming up behind the imposing Fisher Towers northeast of Moab. From my camera position, the sun's rays radiated out through the atmosphere, magnificently separating the near cliff and central tower from the distant cliffs and towers. But the entire sky was so much brighter than the backlit rocks that when I tried to print the image, the blank white sky killed it. Flashing saved it (figures 10–5a and 10–5b)!

I used a burning card with a broad concave edge and flashed the upper part of the image, slowly moving the card up and down the sky and even partway down into the central tower and background cliffs. Little of the flash exposure hit the imposing tower in the center of the image because of the shape of the card, but progressively more affected the areas around and above that tower. At the corners, I exceeded threshold substantially, putting a pleasant gray tone into the sky and making it appear that the light was truly emanating from behind the central tower.

The portion of the tower that was exposed to the small amount of flashing showed no appreciable effect. But I could not have done it with burning, even at the lowest possible contrast level, because even the lowest possible contrast (i.e., the highest level of yellow filtration) still has some amount of contrast, whereas flashing has zero contrast. Printing at the highest level of yellow filtration produces an image; flashing at white light yields only levels of gray tonality.

This is an unusual, but very pertinent, example. In general, the ability to burn highlights at low contrast levels (without the need to remove the negative, as flashing requires) can more easily accomplish the same effect as flashing on graded paper. In fact, burning at a low contrast level is often superior because even the lowest contrast level (i.e., a #0 or #00 filter below the lens or in the enlarger, or maximum yellow or green filtration in the enlarger) still yields *some* tonal separations, whereas the flash exposure with no negative has *no* separations. It simply boosts the separations made through the negative closer to threshold, or above threshold.

Flashing, either with graded or variable contrast papers, extends your reach into even higher negative densities. This should further free you from any fear of higher zones (those well above Zone 9), and also relax you about getting exposures above the toe of the curve and onto the straight-line portion of the curve. I regularly expose highlights at Zone 9, 10, 11, or higher, then develop the negative as needed (with full consideration of all printing options) for optimum results. Remember that you can *expose* negatives into the fully usable mid-teen zones, but you don't want to *develop* them to such high densities. However, for portions of the negative developed to Zone 9, 10, or 11, you can use burning, low contrast burning, or flashing to bring them into visibility. In the next section on masking, you'll learn yet another technique to allow use of the higher zones.

Masking

Masking involves the creation of a second negative (the "mask") from the original negative. When re-registered with the original negative, the sandwich of the two can accomplish some extraordinary tasks. Good masking may involve the use of exposure registration equipment, which is easy to use and very much worth the cost.

There are two types of masks: the first, and more widely known, is contrast reduction masking or "unsharp masking". This mask decreases overall contrast while increasing local contrast and apparent sharpness. The second type is highlight masking, which blocks out all shadow and mid-tone areas of the negative, allowing you to print highlights without darkening the other tonalities. Let's discuss them one at a time.

◄ ***Figure 10–6: Pisa, 2000***
I found it exciting to create a composition of the Leaning Tower of Pisa that is different from the millions made annually. However, the area under each arch and window would have been unpleasantly dark without the use of a mask in printing. By adding small amounts of density to each of those areas, I was able, in essence, to dodge them all simultaneously.

#1 – Contrast Reduction Masking (Unsharp Masking)

The contrast reduction mask is useful when the overall contrast of your negative is simply too much to handle, indicating that you developed it at too high a contrast level. Here, the mask is used to correct a mistake. Another use of a contrast reduction mask is when an image has multiple areas that need to be dodged simultaneously. Since we're not built like octopuses and have only two arms, multiple dodging is impossible. In this case, a mask makes the print far superior (figure 10–6).

This mask is made on low contrast negative material. Any fine grain negative material developed to low contrast (Kodak T-Max 100, Ilford Pan F, Fuji Acros Neopan, etc.) can serve the purpose. To make the mask, place the material below the original negative in a contact printing frame or under a sheet of heavy glass atop a foam rubber base, just as you'd make a contact proof. It's best to separate the two with several sheets of clear negative material (I recommend T-Max 100 because its base is so clear when fixed). This assures that the mask will have soft, unsharp edges when exposed under the enlarger. (See diagram 10.3 for the setup.)

Expose and develop the mask so that the highlight areas of the original negative (the densest areas) yield little or no density in the mask. The densest areas of the mask (exposed through the thin portions of the negative) should have low

density compared to the densest areas of the original negative. The mask is a low contrast, unsharp positive of the negative (making it look like a fuzzy, out-of-focus, low contrast contact proof).

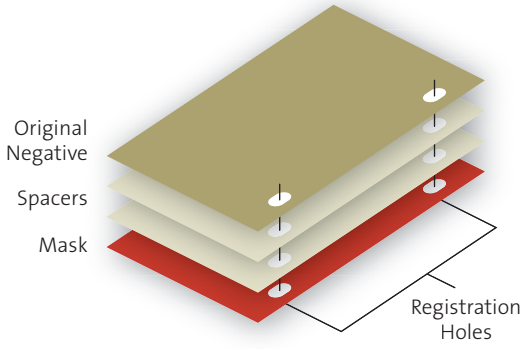
When you re-register the two, you add little or no density to the highlight densities of the negative but significant density to the shadow areas. In printing the sandwich of the negative and the mask (without the intermediate spacers used in making the mask) you normally increase the contrast you would have used for the negative alone.

Because the mask is unsharp, it tends to be smooth-toned in areas that have fine, small-scale local contrasts in the negative (hair on someone's head or beard, leaves on forest trees, etc.). It doesn't lower the *local contrast* but simply adds density to those areas, necessitating longer exposures. But it significantly lowers *overall contrast* by broadly adding density to shadow areas without adding much (if any) to highlight areas. So this explains a third use of a contrast reduction mask: reducing overall contrast while increasing local contrast, a commonly encountered problem.

If you increase the contrast level at which you print the negative (using a higher paper grade or higher contrast filtration), you can slightly increase local contrast while reducing overall contrast, or greatly increase local contrast while maintaining overall contrast.

In some cases, the alteration of local vs. overall contrast can be exceedingly valuable. In other cases, it can be destructive to the mood you wish to create. Be careful with it and use it wisely. It is a terrific tool when used selectively and intelligently.

If you are printing a negative at the highest contrast level available, contrast reduction masking is unlikely to be a benefit. Since it reduces contrast, generally necessitating higher contrast levels, it has nowhere to go. Of course you can make a mask and try it. You have nothing to lose but time and effort because the original negative is unaltered. It may turn out that



▲ *Diagram 10.3: Set-up for making contrast reducing mask*

all you needed was increased local contrast. It works best for negatives printed at low or moderate contrast levels without the mask.

It's ironic that a technique called "unsharp masking" actually increases the apparent sharpness of an image. When a negative has a sharp contrast edge, it changes abruptly from one density to another. The mask's lower densities are opposite those of the negative, and they change softly from one density to another because the mask is intentionally unsharp (diagrams 10.4a and 10.4b).

When the original negative is sandwiched with the mask, the two density curves are added together (diagram 10.5). The original negative is the dominant curve because the mask is intentionally lower in contrast and density. Notice the odd thing happening adjacent to the abrupt density edge. Just before the density of the original negative makes the quantum drop at the edge, the mask begins to increase the overall density. At the edge it suddenly drops, then slowly increases density again before leveling off. Thus, the sandwich creates imperceptibly thin light and dark lines around every contrast break, yielding an appearance of increased sharpness. Every object is outlined because of the mask.

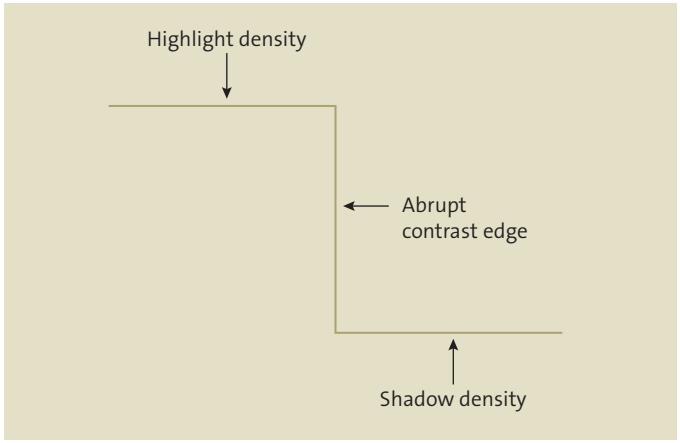
(Note: This procedure does not improve sharpness in an out-of-focus negative. It yields an appearance of increased sharpness in a negative that is already sharp.)

It's worth noting that this is the essence of the "sharpening tool" used (and often overused) in digital printing. Digitally, if you can see a black line along the edges of any sharp tonal break (i.e., a dark building against a bright sky or a sunlit aspen against a dark background, etc.), you've overused the sharpening tool. This would be like making thick light and dark lines around all tonal breaks via unsharp masking. The remedy: simply pull back on the use of the sharpening tool until it's invisible to the naked eye. Too many digital photographers fail to notice and correct this rather obvious quirk.

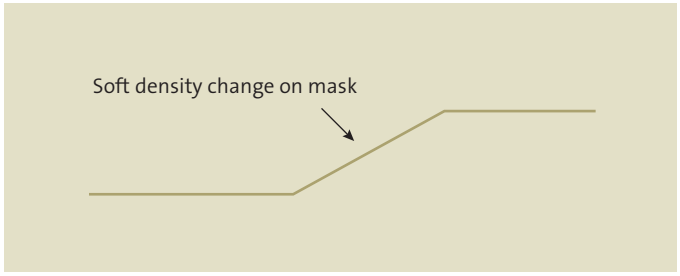
#2 – Highlight Masking

Arista-II Ortho Litho film is the best choice for a highlight mask. Place this high contrast film directly (emulsion-to-emulsion) in contact with your original negative in a contact printing frame or under heavy glass. After exposing through the negative, develop it in high contrast Arista Powder A/B Developer or Arista Premium Liquidlith A/B Developer. (Note: the entire procedure can be done under safelights because Ortho film is blue light sensitive only, so neither yellow nor red safelights affect it.) These products—and many other traditional photographic materials—are available through Freestyle Photo in Los Angeles. For more information, go to www.freestylephoto.biz/c-Black-and-White-Film-Ortho-Litho-Film.

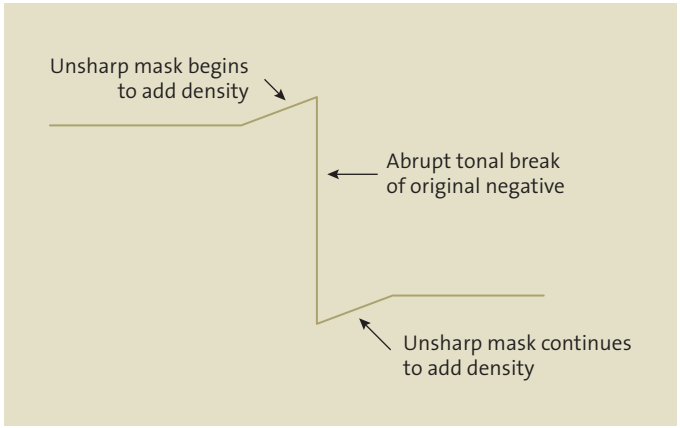
If your exposure is too low, only the thinnest shadow areas of the original negative will achieve density in the mask, and those areas will develop to extremely high densities. Giving more exposure on a second try will yield a mask with high densities in the shadow and mid-tone areas of the original negative. The highlight areas of the negative will remain clear in the mask. Be sure to follow the directions for proper development; if you quit development too soon, it won't work.



◄ *Diagram 10.4a: Negative density at contrast edge*



◄ *Diagram 10.4b: Mask density at contrast edge*



◄ *Diagram 10.5: Addition of original negative and mask*

The density developed in the mask greatly exceeds all densities of the original negative (in essence, the mask is opaque). So when the two are perfectly re-registered in your negative carrier, all mid-tone and shadow areas of the original negative are blacked out. You can now burn the highlight areas without fear of darkening the mid-tone or dark areas adjacent to them.

Let's go back to the example of the old, abandoned house with a window to the outside landscape (see the section on "Burning with Variable Contrast Papers"). When printing the negative, you can first make an exposure with no mask to get the tones you want in the interior. Then black out the interior with the mask in perfect registration, and print only the exterior through the window. With this procedure you can really get those high negative densities to work for you.

You may also want to print the exterior at lower contrast to give it a more atmospheric, distant feel. A word of caution: be careful, because this can be overdone. You can burn the sunlit exterior too much, rendering it too dark and thereby losing the look and feel of it being much brighter than the interior. In fact, if you go hog wild, you can burn the exterior so much that its tonalities nearly match the interior. It would be absurd to do that, as you would lose any sense of realism. So, while you have immense flexibility and many options, it's best to remain subtle and sensible with an eye toward tonal logic.

(In chapter 11, on the digital zone system, you'll see how you can do this with two photographic captures—one for the interior, a second for the exterior—layered together in Photoshop. It's a simple process, but here, too, the results can be utterly illogical unless some semblance of subtlety and common sense are invoked.)

Beware of another serious potential problem: the highlight mask must be perfectly registered emulsion-to-emulsion with the negative when printing. Therefore, you must use a glass negative carrier to ensure perfect contact between the negative and mask. (This is also strongly advised for unsharp masking.) Unless you're reversing the image by placing the original negative in the enlarger upside down (i.e., with its emulsion up), the highlight mask must be placed below the negative. Be sure to place a clear negative of equal thickness below the negative for the basic exposure, the one giving you the interior tonalities. If you fail to do this, you'll alter the plane of the negative for the second exposure, and you'll get a slight ghost image at the edge.

It should be apparent that masking—either contrast reduction masking or highlight masking, or both—are extraordinary tools. But like other good tools, they can be overused and abused. It was Mark Twain who said, "If the only tool you have is a hammer, it's amazing how many things look like nails." If you find yourself resorting to masking too frequently, it may indicate another underlying problem. It may be that your negatives are chronically overdeveloped, forcing you to print at low contrast levels in an effort to retain detail in extra-dense highlights. Cutting back on your negative development may solve the problem more easily and more effectively. (Of course, if the problem is underexposure, give more exposure to all your negatives in the field. That's the only real solution to that problem.)

I strongly recommend obtaining a pin registration system. Pin registration equipment for mask making includes a punch to put holes along the edge of the negative, a glass with embedded pins corresponding to the negative holes for alignment, spacers, and a negative carrier with registration pins custom made to your enlarger. At the time of publication of this book, these items can be purchased from two sources: Lynn Radeka, 1249 Brian Street, Placentia CA 92870 (phone: 1-714-993-1685, or email: lynn@radekaphotography.com) or Alistair Inglis, 4987 Dunbar Street, Vancouver, B.C. V6N 1V4, Canada (phone: 1-604-266-0260). Their systems allow your negative carrier to be removed and reinstalled in exactly the same place for perfect alignment with any number of masks. After each exposure, the carrier can be removed (under safelights, of course, because the paper is still in the enlarger!), the

current mask removed, another mask inserted, and the carrier reinserted into the enlarger for another exposure. The cost for the equipment is moderate, but the benefits are enormous, and it's only a one-time cost.

Inspection, Evaluation, and the Myth of "Dry-Down"

All of the techniques of controlling the print during exposure and into development have now been discussed: dodging, burning, flashing, masking, variable contrast printing, and two-solution development. The final advanced technique of print control, reducing (also known as bleaching), takes place after the print has been fully developed and placed into the fixing bath. Before discussing reducing, let's first work our way through chemical processing and on to the all-important inspection and evaluation of the image.

After I develop the print, I quickly transfer it to a stop bath for several seconds to terminate development. (I use glacial acetic acid for this purpose.) Next, I place it in the fixer (I use Kodak's general purpose fixer with hardener) for several seconds with continuous agitation. I then turn on an initial inspection light to view the image while still in the tray.

The intensity of this initial inspection light is far more important than most people realize. My own experience—and my experience with hundreds of students in years of workshops—is that lack of thought about the inspection light can undo all of the good printing techniques performed to this point. In fact, you need two separate inspection lights: an initial inspection light and a final inspection light. Let's discuss the initial inspection light first.

Most printers feel that any normal room light serves as a good darkroom inspection light. Wrong! Others feel that a good, bright light best shows the print for proper evaluation. Disastrously wrong! The best initial inspection light is a rather dim light—an average wattage bulb placed rather far away from the print. The reason is simple. You have been in a room lit by safelights from the time you removed the enlarging paper from the box, placed it in the easel, exposed the negative with your basic exposure plus extra burning or flashing steps, then developed the print (hopefully for at least four or five minutes), stopped it, and placed it in the fixer. Since you've been in that dim light for approximately 10 minutes, your iris is wide open to gather in the light. Then you put on a bright light. It's like walking out of a matinee into the noonday sun! If the print is actually too dark, it will look good to you. And if it's printed just right, it will look too light. A *dim* light will give you a far better feel of what the print *really* looks like.

■ *Many feel that any normal room light serves as a good darkroom inspection light. Wrong! Others feel that a good, bright light will show the print best for proper evaluation. Disastrously wrong!*

What wattage bulb should be used for the inspection light? It depends how far it's located from your fixing tray. The only criterion is this: if your finished prints consistently look too dark under normal lighting, or if they consistently lack the shadow detail under normal lighting that you saw under the inspection light, then your inspection light is too bright. Replace the bulb with a lower wattage bulb or move the light farther away. In other words, balance the way you see the print in the fixer with the way it looks when dried, mounted, and viewed under good lighting.

In fact, when I do my initial inspection, I look at the shadow detail, virtually ignoring the mid-tones or highlights. I try to lock the detail I see in my mind for later comparison with the finished, dried print under good room lighting. Adjust your initial inspection light to give you the same dark detail you see in the final print under good lighting.

After your eyes adjust to the dim initial inspection light, you can turn on a brighter light for a complete, thorough inspection of the print. I first remove the print from the fixer tray and place it on a nearly vertical sheet of white acrylic plastic, and then turn on the bright lights. This may seem to contradict the need for a dim light initially, but it does not. The reason for the dim light is to let you see the print initially as

you would see it under normal lighting when your eyes are fully adjusted. If the initial light is too bright, you will see shadow detail that is not visible in the finished print (unless you view the print in midday sunlight). The psychological importance of the initial inspection is critical, for once you see shadow detail in the print under a light that's too bright, it's hard to strike that impression from your mind. You will always end up fighting that first impression. When you see the finished print, you will attribute the loss of detail in the shadows to "dry-down". It's not dry-down, the alleged darkening of an image as it dries; it's an inspection light that's too bright!

Once the print is on the white acrylic plastic under the bright lights (i.e., good gallery-quality lighting, not intense lights), I carefully inspect the entire image, especially the highlight detail. I squeegee off the layer of liquid fix from the emulsion. That thin layer of liquid hides the subtle details in the highlights. Again, dry-down is often cited for the appearance of highlight detail in the finished print that was not visible during inspection; it's not dry-down, but failure to view the print without the layer of liquid fix obscuring highlight detail.

I urge you to try this for yourself by removing a print from the fix after carefully inspecting it in the tray. You'll notice that more detail immediately shows in the subtle highlights as the print is removed. Then put it on a vertical surface, such as white acrylic plastic. When you squeegee off the remaining liquid, still more detail appears. No more will appear after the print dries. Now hose it down with water or reimmerse it in the tray of fix, and watch those subtle highlights immediately disappear! I call this effect "wet-up!"

Although no more detail appears in the finished print than you see using good inspection techniques, the subtle highlight detail is more pronounced in the dried, finished print. I believe that the reason for this is the slight shrinkage of the print as it dries. A wet 16" × 20" print may be more than a quarter inch longer than a dried print. The developed silver grains bunch together more closely as the print dries and shrinks, so the subtle detail appears more prominently. This intensity increase in the highlights during drying is the only dry-down effect I have ever observed (I call it "shrink down"); I have not observed any new detail appearing. (Note: Adox MCC110 paper expands when wet, but strangely does not shrink back down when dry.)

Dry-down is an overused excuse for improper inspection. In fact, if there is a change to be seen, it is the other way. When a print is wet, its blacks appear richer, and they lose some of the intensity when the print dries. This is simply due to the way light scatters off the paper from a wet or dry print. (Matte papers exhibit a dramatic loss of brilliance in the blacks when they dry because of the surface qualities of the paper.) I call this effect "dry-up!"

Most papers can be inspected effectively shortly after the initial dim light is turned on, your eyes adjust, and a second inspection light is turned on. However, most variable contrast papers have a noticeable yellow-ocher cast to the paper base at first. This yellow cast makes it hard to judge the degree of brilliance of whites in the final print, especially if whites and light tones dominate the image. The yellowish cast gradually disappears in the fix, then completely disappears when the print is placed in a holding tray of water after fixing is completed; but the "whitening" of the base can take ten minutes or more. This is frustrating and time-consuming, indeed, but the ultimate brilliance of the paper justifies your wait.

One final note concerning the inspection light: don't use a light with a rheostat dimmer switch for inspection purposes. The rheostat contains two hidden problems. First, unless you have the dimmer permanently set to a fixed brightness level, you will never have the same brightness level for every print you inspect, and this inconsistency will throw your ability to judge your prints out the window. Second, as a rheostat is adjusted downward from its brightest setting, it yellows noticeably, and this, too, will make your judgment of prints more difficult. Stick with a fixed wattage bulb and determine the

proper distance of the bulb from your print for good, consistent results.

Potassium Ferricyanide Reducing (Bleaching)

After the print has been fully developed, stopped, and placed in the fix for a sufficient length of time to allow inspection, reducing (commonly known as bleaching) can begin. A liquid solution of potassium ferricyanide can be applied to portions of the image in order to reduce density by removing developed silver from the emulsion. This should be done under normal or bright lighting. My procedure is as follows: I remove the print from the fix, place it on a vertical sheet of stiff white acrylic plastic, and rinse it thoroughly to wash the fix from the print's surface. Rinsing the print is important because the fixing bath acts as a catalyst to the bleach. If potassium ferricyanide is applied directly onto the fix, it may act too fast to control.

Potassium ferricyanide is a crystalline substance that can be purchased in one pound bottles. (A bottle of this size should be enough to last for many years.) A tiny amount of the orange crystals—perhaps a quarter of a teaspoon—is dissolved in water for subsequent application as a bleaching agent. I pour the crystals into a small glass container, add about two ounces of water, and stir until all the crystals are fully dissolved. The amounts of crystals and water are not terribly important—except that the more dilute the solution is, the slower it will work, and the more concentrated, the faster. I vary the concentration to suit my working procedures. I simply dissolve the crystals until the solution assumes a yellow color—not too deep a yellow. If the bleaching solution is too strong, it works too fast for me to control. That's critical to remember, for my experience tells me that most people who have difficulty bleaching tend to mix too strong a solution.

When the print is on the vertical sheet of acrylic plastic and fully rinsed, I dip a paintbrush into the ferricyanide solution and proceed to "paint" areas of the print that I want to lighten in tone. I do this while the sheet of water from the hose rinse is running down the surface of the print to help even out the bleaching and prevent streaks. I direct a constant stream of running water onto the print just below the area I'm reducing to keep the bleach from running down and affecting other areas. When the bleach hits the stream of running water, it's immediately diluted to such a high degree that it can't bleach areas that are farther down the print. I work on one small area at a time in order to avoid streaks. Of course, I can orient the print on the vertical plastic in any direction (upside down, sideways, etc.) to avoid even the smallest amount of unintended bleaching. I "paint" for only a few seconds at a time before aiming the hose at the bleached area to rinse it thoroughly. Then I resubmerge the print in the fix.

As stated above, the fixer acts as a catalyst for the potassium ferricyanide, speeding up the bleaching action while at the same time neutralizing the bleach. By thoroughly rinsing those areas of the print where bleach has been applied before resubmerging the print in the fix, I can mute the catalyzing action. Using this procedure, only the bleach embedded in the emulsion will be catalyzed by the fix. If I fail to rinse the bleached area prior to resubmersion, the catalyzing action may be so strong that it bleaches away all existing tonalities.

After 15 or 20 seconds in the fix, all further bleaching action is completed—unless the bleach is so concentrated that a yellow stain is still visible, in which case bleaching will continue. I then remove the print from the fix, place it on the plastic sheet, and inspect it for results. If additional bleaching is desired, I repeat the process as many times as necessary to reach the desired tones. There is a limit, however, to the amount of bleach that can be applied—and the degree of lightening the print will accept—from numerous repetitions.

■ *If the bleaching solution is too strong, it will work too fast to control. That's critical to remember, for most people who have difficulty bleaching tend to mix too strong a solution.*

If overdone, the print will stain yellow and the stain cannot be removed. The limits of bleaching vary from paper to paper.

Always remember to follow these important steps:

1. Prior to applying bleach, rinse the print
2. Apply the bleach
3. Quickly rinse the bleached area again
4. Resubmerge the print in the fix
5. *Then* inspect it to see how far the bleaching has gone

■ *Reducing (bleaching) does not produce the same effect as dodging!*

If you watch the bleaching take place until densities are reduced to the desired level, then rinse and resubmerge the print in the fix, it will almost certainly go too far! Again, don't mix too strong a solution, for it can become uncontrollable if it isn't adequately diluted.

Some papers contain an additive that resists potassium ferricyanide reducer. (The additive also makes these papers resist selenium toning; see below.) If you use a paper that fails to respond to the bleach as outlined above, try using a more concentrated bleach solution, and *do not* rinse off the fix prior to applying the potassium ferricyanide. This usually overcomes the resistance. However, it's quite difficult to accomplish subtle amounts of bleaching with such papers. It's like trying to push a door that's stuck—nothing happens as you push harder until it finally gives way and you go flying through! Ilford Multigrade IV notably resists bleach and toner. Surprisingly, Ilford's Multigrade Warmtone responds well to both bleach and toner, though the same manufacturer produces both papers.

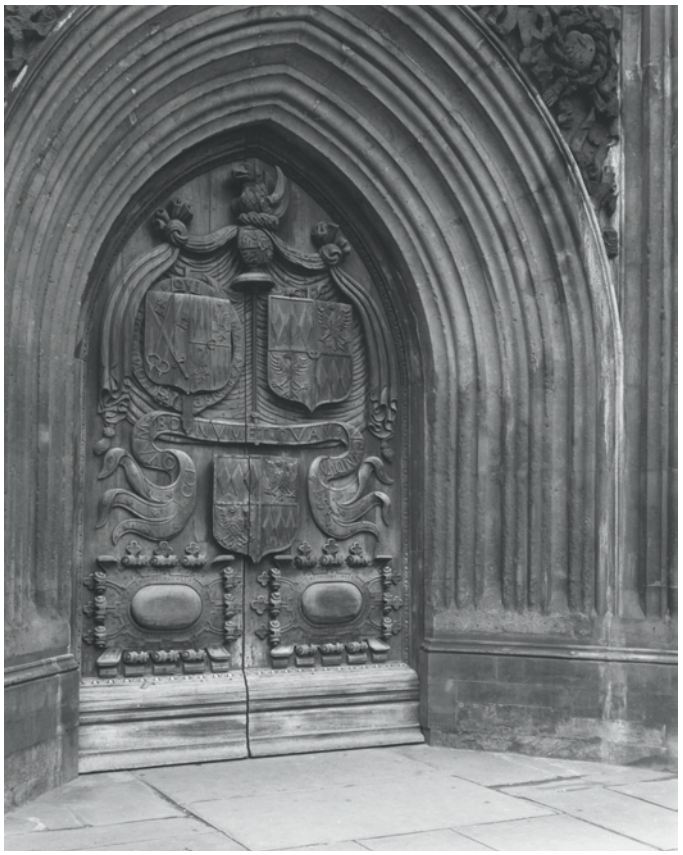
Reducing can be used under many circumstances. If an area of a print is too dark, the bleaching procedure can lighten it and even bring out unseen details in black areas. If an area of a print is too small or intricately shaped for successful dodging during exposure, the ferricyanide treatment can do the job after the print is developed. Note that brushes of any size can be used, from tiny ones for bleaching minute areas to large ones for lightening broad areas at once. When tiny, intricate areas require bleaching, it is best to squeegee the water from the print's surface, paint the bleach on the precise area that needs reducing, then rinse and proceed as usual.

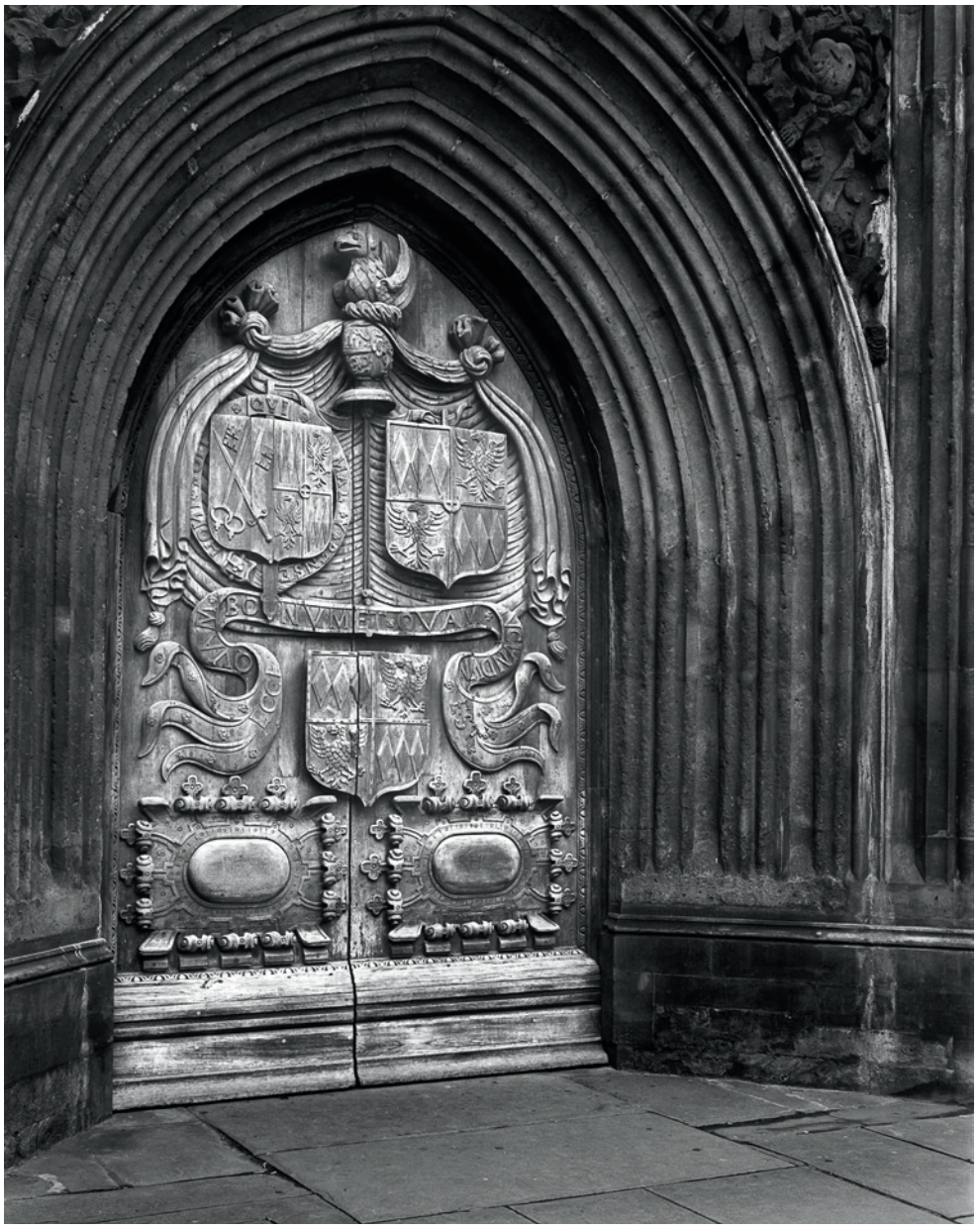
Reducing can also be used to lighten small areas throughout a print, enhancing highlights or opening up shadow detail. This is especially useful in cases when going to a higher contrast paper would make the overall print too harsh, or when a lower contrast paper would make the overall print too flat.

Potassium ferricyanide reducing increases contrast; dodging does not. Reducing removes silver *equally* from all areas bleached, whereas dodging lightens all areas *proportionately*. Let's look at what this means. Suppose an area of a print contains a range of tones from light gray (say, 30 units of exposure under the enlarger) to medium gray (say, 200 units). If the area is dodged for one third of the exposure time, the light gray area would drop to 20 units, and the dark gray would drop to 133 units. Both tones would be lighter, but the relative contrast between them would remain about the same. However, if the same area is reduced with 20 units of light (or silver) taken away, the light portion would drop to 10 units, which is the threshold of print tonality, and the dark area would drop to 180 units, or only a slight change. Contrast between the two tones would be greatly increased by ferricyanide bleaching.

Contrast increase can be a double-edged sword—beneficial in some cases and detrimental in others. Many times I have tried to salvage an image that was printed too dark, only to find that as the overall tonalities started looking good, the highlights disappeared! On the other hand, if I have a print that needs a local contrast increase, I can print it slightly too dark in that area, then bleach it back, gaining additional contrast via the procedure. To bleach areas that are rather light in tone, I dilute the bleach far more than usual to slow its action and give me greater control.

Potassium ferricyanide reducing is deceptively difficult. I have ruined many prints—particularly through excess





▲► ***Figures 10–7a and 10–7b: West Doors, Bath Abbey***
The intricately carved wooden doors attracted my attention, and to my eye they appeared lighter than the surrounding stonework. Instead, they were darker. I was fooled by the attractive door carvings (figure 10–7a). To direct the viewer to the doors, I printed for the stonework while dodging the doors throughout the exposure, then burned the sidewalk in front of the doors extensively using a concave-shaped card. At this stage, the doors were slightly lighter than the stonework. I then carefully bleached the carved doors, preventing any area from bleaching back to pure white. The bleaching gives the doors a bronzed metallic glow, thus exceeding my goal (figure 10–7b).

bleaching in the highlights. It's a fabulous tool when necessary, but I advise you to use it only when *absolutely necessary.* I use it only if I must.

Recently, I found out that if too much bleach is applied, there may be a way to correct the situation. Instead of rinsing the print and placing it back in the fixer, place it back in the developer where some of the reduced density may return to the image. Then move it to the stop bath and fixer. Not all of the density from the bleached image will return, but some of it may—and it may be enough to salvage the print.

I have several examples of extensive use of potassium ferricyanide reducing. One photograph from my English cathedral series is of the west doors at Bath Abbey, two magnificently carved wood doors set in a sandstone wall of nearly the

▲ ***Figures 10–8a and 10–8b: Boulder and Metamorphosis Wave***
This photograph was made under leaden skies in the late afternoon, revealing everything in the scene, including the deep rock hollows at the top. The upper portion has good contrast, but the lower portion is quite low in contrast (figure 10–8a).

The straight print fails to move the viewer's eye toward the rock that looks like a breaking wave behind the central boulder. To achieve that, I initially exposed only the top third of the negative through 30 units of magenta filtration, with no exposure on the lower two thirds. Then I dialed 170 units of magenta into the enlarger and exposed the lower two thirds of the image, with additional burning on the lower half, further burning in the lower third, and still more in the lower left quarter (figure 10–8b). At that point, the print was too dark and lacked overall contrast.

same color. Working hastily at the scene, I metered the doors but not the stonework; it appeared to me that the doors were slightly lighter than the adjacent stone, and I figured I could increase contrast through expanded negative development, thereby lightening them even more in relation to the stonework. But my seeing was wrong: the stone was actually slightly lighter than the wood doors, and the extended development pushed them further apart tonally, *in the wrong direction!* I wanted the viewer's eye to gravitate toward the doors, not the stonework. Frantic dodging of the doors did little more than make them slightly lighter than the masonry. So I turned to reducing.

I started by printing the entire image intentionally dark, dodging the doors throughout the exposure. Then by bleaching the doors, area-by-area (slowly, over a long period of time), I gradually brightened them and simultaneously increased their contrast.

The final print transforms the intricately carved (but tonally dull) doors into an apparent masterpiece of metallic craftsmanship. I never would have envisioned the final result prior to making the print, for I was merely seeking to make the doors the center of attention through the use of light (figures 10–7a and 10–7b).

Figures 10–7a and 10–7b are a prime example of using darkroom techniques for personal interpretation. In this case, the personal interpretation went beyond my initial goal, but I never would have started down the path to the final print if I did not have the desire to make the doors the center of attention.

The same rule that applies to burning or dodging applies to reducing a print: no matter how extensive the procedure is, it must not be apparent. Even in the example of the abbey doors, they appear to be shiny metallic doors, not the result of a contrived photographic technique.

A second extreme example—a true tour de force of bleaching—is shown in figures 10–8a, 10–8b, and 10–8c. This photograph pushes all printing methods to the limit. I printed the upper quarter of the image at 35 units of magenta filtration

◀ ***Figures 10–8c: Boulder and Metamorphosis Wave*** *The final step was to bleach the wave, the striped canyon floor, and the central boulder. This increased contrast throughout the bleached areas, drawing the viewer's attention to the "wave". However, there is no bleaching on the striped floor directly below the central boulder, thus creating an apparent shadow that was not part of the scene. The boulder appears to teeter at the edge of a precipice, adding a further level of dynamism to an already dramatic scene.*

(just a bit above average contrast) while fully blocking out any exposure on the bottom three quarters. I dialed magenta filtration to the maximum of 170 units on my LPL dichroic enlarger and exposed only the bottom three quarters of the image. Then I progressively burned further down toward the bottom of the print, all the while dodging the rock in the center, particularly its darker underside. I intentionally made the lower three quarters too dark at this stage, with the knowledge that I would later bleach large portions of that area.

It turns out that the negative has two separate areas of contrast: the upper quarter, which has fairly good contrast, and the lower three quarters, which has very low contrast. So I had to deal with those two parts separately, almost as if they were two distinct images. Of course, I had to mesh the two parts smoothly and seamlessly. With great care I bleached the wave form, the central rock, and the striped rock that forms the floor, dramatically increasing contrast of those areas.

But notice that when bleaching the striped floor, I didn't bleach the portion below the central rock (figure 10–8c). Because I did not use any bleach in that area, there appears to be a shadow below the rock, making it look like the rock is teetering at the edge of a precipice. The straight print (figure 10–8a) and the fully burned and dodged print (figure 10–8b) show no

such precipice. The bleaching adds another dynamic to an image that is already filled with dynamism.

Usually, potassium ferricyanide reducing is far less extensive and far subtler. Many of my prints have no bleaching whatsoever. Some have small touches here and there for tonal adjustments. Only a few have the extensive bleaching of these examples. Furthermore, I try to do as much as possible with appropriate contrast filtration, burning, and dodging before I turn to bleaching. But as these examples show, it's an extraordinarily powerful tool.

The bleaching procedure has no harmful effect on the permanence of the print. When you use potassium ferricyanide, always fix the print fully after reducing is completed, just as if the print had first been transferred from the stop bath to the fix. If this step is not completed, the bleached areas will not be fully fixed. For proper fixing of the image, I use two trays of fix. Both are Kodak standard fixer with hardener, packaged as a powder to be dissolved. I mix the second fix before each darkroom session and pour it into the first fix bottle at the close of each darkroom session (after dumping out the first fix). Thus, the first fix is always previously used as a second fix, and the second fix is new. The reason for two fixes is that the first actually does all the fixing (i.e., removing undeveloped silver from the emulsion) and the second removes harmful silver salts that build up in the fix and cannot be washed out later.

For several months in the mid-1990s I switched to a rapid fix, but I began observing problems caused by its use. Moderate or extensive bleaching caused yellow stains. Extended bleaching over long periods of time—even small amounts of bleaching in numerous areas scattered about the print—caused the entire print to become lighter as a result of extended immersion in the rapid fix. As soon as I returned to the standard fix, the problems disappeared. Thus, I recommend standard fixers for printing, not rapid fixers.

Final Fixing of the Image

All of my reducing and reimmersion is done using the first tray of fix. After about five minutes in the first fix if there is no bleaching, or five minutes after all potassium ferricyanide reducing is complete, I transfer the print to the second fix for another few minutes. I then rinse the prints thoroughly with a hose (just like I do prior to bleaching) and place them in a holding tray of water for the remainder of the darkroom session.

Periodically during the day, I remove a print from the holding tray and place it on my acrylic sheet for additional inspection. I may notice problems on the second or third inspection that I missed at first, and I can return to that negative and reprint it during the same session.

The first fix stabilizes the image by removing all undeveloped silver while preventing the remaining silver from staining or slowly disappearing. As it removes the undeveloped silver from each print, silver salts build up in the fixer tray. Eventually, when enough prints are developed in one printing session, the salts can build up to a saturation point, and then embed themselves into the emulsion and paper base of subsequent prints. These salts cannot be washed out in water, and they will eventually degrade the image. The second fix removes the salts. Thus, if you make only a few prints, there's no need for a second fixing tray. You'll have to make many, many prints to saturate the first fix. Light, high key prints exhaust the fixer quicker because more silver is removed.

At the end of my printing session, I pour the remaining potassium ferricyanide solution into the first tray of fix to neutralize it. I also rinse both the glass container and the brush with the fix to neutralize them. I then use a small silver recovery system to remove silver from the fix before disposing of it. As for disposing of photographic chemicals, it is surprising to learn that when developer, stop bath, and fix are all mixed together, they neutralize with a small amount of ammonia left over. Since ammonia is a perfect fertilizer, the best

place to dump it is on your lawn! Believe it or not, it will improve your lawn noticeably. The second fixing solution then becomes my first fixer in my next darkroom session, and I mix a new solution for my second fixer.

Local vs. Overall Contrast Control

One of the greatest difficulties encountered in printing is the common yet perplexing situation in which overall contrast is high but local contrast is low. For example, suppose you have a landscape with a great disparity between the darkness of the land and the brightness of the sky. Yet when you look only at the land, there is relatively low contrast; and when you look at the sky, there is low contrast between the sky and the clouds.

The problem is apparent. If you lower the contrast to accommodate the vast difference between the sky and the ground, you end up with a photograph that is easier to print but lacks punch. Both the sky and the ground are lifeless. On the other hand, if you raise the contrast to make both the ground and the sky more attractive, then the disparity between them is enormous, making it almost impossible to print.

What do you do in a situation like this? My recommendation is that virtually 100 percent of the time you're better off if you base your printing on the local contrasts. If you work with the local contrasts in order to make each of them visually interesting, you have the option of dodging the darker areas and/or burning the brighter areas to bring the two closer to one another, and therefore bring the entire print into better overall balance.

If the situation is as simple as the example in figure 10–9 (i.e., if the horizon is a horizontal, straight line) then it's easy to burn the sky after exposing the ground for the correct amount of time. Of course, with variable contrast papers you can even adjust the degree of contrast for the burn in the sky. In fact, you can expose the ground to one level of contrast while dodging the sky entirely, then burn the sky at a completely different level of contrast—adjusting the exposure given to each so as to meld the two parts into one smooth, believable, finished exposure.

▲ ***Figure 10–9: The Empty Road***
This image breaks all the rules. The sky and ground are divided in half. The edge of the road splits the lower portion in half. I wanted to create a stark, ominous image of this little-traveled road leading toward a powerful incoming storm. The sky was brighter than the ground, but burning the sky (easily done at the horizon line) was a simple fix to bring the two portions into tonal equality, imparting a foreboding feel to the composition.

But what if the dark and light portions of the print are not as easily delineated as in an image with a dark foreground, a straight horizon line, and a bright sky? It may turn out that some complicated dodging and burning, perhaps using the burning tools detailed above, can solve the problem. However, if the array of darks and lights is so complicated that it's effectively like a checkerboard, then masking may be the best approach (figure 10–6). This, in fact, is one of the chief reasons for masking in the first place: an array of light and dark areas that becomes too complicated to effectively burn and dodge with only two hands.

Another method would be to print any or all of the local areas a bit too dark, then work carefully to lighten those areas by reducing (bleaching)—thereby increasing the local contrast as bleaching does so well.

▲ ***Figure 10–10: Road to Monument Valley***
This is an enormous landscape, but the photograph has never been printed larger than 5" × 7". The reason is that the dark areas of uninteresting sagebrush on either side of the road would simply be too dominant and oppressive in a bigger print. Yet those areas look wonderful in a small print. As an aside, the road, which may appear to be dodged to make it glow, is actually burned extensively. Sunlight on the asphalt turned it astonishingly bright.

However you approach a photograph that has the disparity of high overall contrast but low local contrast, I strongly recommend doing whatever is needed to increase the local contrast as the prime consideration.

Scale

Once I've made a print that pleases me in 8" × 10", I decide what size my final display print will be. The 8" × 10" print has become increasingly important over the years, as I can scan a print that size, make a TIFF or JPEG of it, and send it out to a gallery, museum, magazine, individual, etc., for viewing, for potential purchase or publication, or for a variety of other uses, so it now goes well beyond the idea of just learning how to print the image. For display purposes, I usually have a good idea about the size of the final print as I stand behind the camera to make my exposure, since I feel it's a necessary part of visualizing the final image. Sometimes, though, I alter that initial previsualization. Size is an important consideration to me because the scale of a print materially imparts an emotional response to the image. For this reason I print each of my exhibition quality photographs in one size only. The same negative printed in 8" × 10" and 16" × 20" has a decidedly different character in each size. In general, I print *only* the size that I feel best compliments the mood I want to convey, and I don't display an image in any other size. On occasion I find an image that looks good in more than one size, but that is a rare print, indeed! Beyond that, I make even larger prints from selected 16" × 20" images, going to 20" × 24", 24" × 30", and even 30" × 40".

There are several determining factors in regard to size. Technical considerations are, of course, preeminent. If the print appears sharp as an 8" × 10" but not as an 11" × 14" (and if sharpness is important, as it usually is in my images), then 8" × 10" will be the maximum size. On the other hand, if everything is technically perfect, tonal considerations are next in importance. Sometimes an area of soft tonal modulations holds up well at 8" × 10" but becomes too diffuse or boring at 16" × 20". Other times, a dominant area of deep tones or light tones can become visually oppressive if enlarged too much.

Sheer size is another factor. The scale of the various compositional elements has great emotional impact. A sweeping compositional line may be impressive in 16" × 20" but merely pleasant in 8" × 10" or smaller. Large prints tend to have greater impact, so if I'm looking for impact I gravitate toward the larger sizes. If I want a quieter image, I tend toward the smaller sizes. Of course there are exceptions to this general rule, but most often it holds true for me.

Subject matter used to be very important to me in determining print size (a vast landscape had to be big; a tiny flower had to be small), but it plays little role anymore. The size of the image I print is based on the characteristics of the photograph alone, not on the subject (figure 10–10).

Finally, there is a subjective feel that nudges me larger or smaller as I see fit. I would be hard pressed to say anything more than, "It just *feels* right in that size!" A musical analogy

explains it best for me: some pieces of classical music are written for a string quartet and some for a symphony orchestra, and they should not be reversed. I wouldn't want to hear Beethoven's Fifth Symphony played by a string quartet. It wouldn't work! The scale of orchestration is similar to the scale of a photograph; it should be appropriate for the image.

I have heard many photographers talk about making some prints small in an effort to force people to look at them closely and carefully. This is fallacious reasoning. I have observed people looking at photographs for over forty years, and they *always* look at a photograph closely *no matter how large it is!* Perhaps they are looking to see if it's sharp, or grainy, or something else of great moment that I have yet to discern, but it never fails. Thus, a photograph of *any* size will draw the viewer close, but a small print eliminates the distant view. I feel an image should be printed to the size that best enhances the intended message: small if a small size enhances its message, large if a large size enhances it.

Whatever size I choose, I can generally employ the same burning and dodging procedures, as well as similar flashing or reducing techniques as on the 8" × 10". Sometimes the printing technique changes a bit. Sometimes it changes drastically, because the size demands a different look to maintain the tonal integrity of the image. As the emotional impact of the print changes with scale, printing may have to change to compensate for it. Some of the changes can create very surprising results.

Selenium Toning Prints

After I complete all my printing for a darkroom session and accumulate the prints in a holding tray of water, I tone them. Toning is a post-development procedure that takes place in full room lighting, and has several effects on the print. First, it alters the color of the print either greatly or subtly depending on the paper, the toner and its concentration, and the length of time the print is immersed in the toner. Second, it gives the print greater overall contrast and increased density in the blacks. Third, it gives the print greater permanence by making it less susceptible to damage from aerial contaminants, particularly acids.

I tone all my prints in Kodak's Rapid Selenium Toner. I don't use Kodak's recommended dilution, however, for I feel it's too strong, producing a red-brown color that I find terribly distracting. On the toner's label it states that the print should be thoroughly washed otherwise yellow stains may appear. I have found that warning to be correct. To avoid any yellow stains, I first place each print in Kodak's Hypo-Clearing Agent. This assures that no significant amount of fix remains on the print that can cause staining. I place one print at a time in the solution—about a minute apart—and gently rock the tray periodically. After five prints are in the tray, I remove the bottom one each time I add a new one and place it in a holding tray of water. When all the prints have been through the Hypo-Clearing wash and are in the holding tray, I proceed with toning.

I dilute seven ounces of Kodak Rapid Selenium Toner in a gallon of water. (The dilution changes with different papers; this is the dilution I use with Adox MCC 110 paper, recently released.) Then I place the first print from the holding tray into the solution and rock the tray gently for a minute, then place the next print on top of it. After another minute of agitation, another print is placed on top. After five are in the tray, I pull the bottom one out and compare its color and density with the one just placed in the solution. The toned print is altered in color—its gray-green tone is changed to gray-blue or gray-purple. Also, contrast is increased as the selenium combines chemically with the silver of the emulsion, intensifying the deep grays and blacks.

Because toning occurs slowly, it is unwise to watch a single print tone until it reaches the right color. It's like watching the hour hand of a clock: it moves, but you can't see it happening!

■ *I usually have a good idea about the size of the final print as I stand behind the camera to make my exposure since I feel it's a necessary part of visualizing the final image. The scale of a print materially imparts an emotional response to the image.*

The best thing to do is to compare a toned print with an untoned one. If my comparison shows that the print's color has not changed sufficiently, I leave the print in the solution and add another print at approximately the same one-minute interval. When the print finally reaches the desired color, I remove it, place it on my vertical plastic sheet, and hose it thoroughly with water. It then goes into another tray of fresh water. With that, I have established an assembly line timing system in which I add and remove a print every minute or so. If there are many prints to be toned, I gradually lengthen the toning time as the toner slowly exhausts itself. Of course, If I'm using several different papers during my printing session, each may respond to the toner at different rates, so I alter my procedure to account for that.

I used to mix the Rapid Selenium Toner into the Hypo-Clearing Agent, but I could use the solution only once because Hypo-Clearing Agent oxidizes rapidly, rendering it useless a day or two later. Selenium is a metal and does not deteriorate in solution. By separating the two processes, I simply dump the Hypo-Clearing Agent after each use (which represents no real environmental damage, to my knowledge) and I can now use the Rapid Selenium Toner several times. After toning is completed, I pour the solution back into a gallon bottle and cap it tightly. After several uses, the toner is quite exhausted and the clear liquid turns a bronze color, making it difficult to judge the degree to which prints are toned. After five or six uses, it must be discarded.

Because of characteristic toning differences among papers, I always begin my toning with the prints that I want to tone the longest and end with those that require shorter toning times, when the toner is a bit exhausted. I use my dilution rather than Kodak's recommendation to give only a subtle color change. I generally feel that black-and-white prints have more impact with subliminal color variations than with overt color variations. However, I have recently begun to use toning and bleaching to produce more overt coloration to black-and-white prints. (See "Toning and Chemical Coloration" below.)

I have also seen some remarkable prints that benefited from overt color shifts through toning to help create a strong mood. For the most part, though, I want only the subtlest deviations from neutral tones in my final prints. I don't like heavily colored browns, reds, or other obvious colorations. This preference is purely subjective, and you should allow your own tastes to dictate your toning desires.

Coloration of the print through toning is subjective, and my likes may be widely divergent from your likes. It's best to try a variety of toning approaches and settle on those that help convey your message most strongly.

Selenium in the toning solution combines with the silver of the emulsion to form a silver-selenium chemical bond that is more resistant to acid decay than the silver alone. Thus, selenium toning—followed by a proper washing of the print—greatly enhances the lifetime of an image. In fact, if handled properly, the print should last hundreds of years; even under strong lighting, it should not fade.

Other Toners

There are a number of other toners besides selenium. Sepia toner is the most common, giving the black-and-white print a drastic color change to warm brown-and-white. Sepia toners are two-solution processes: the first is bleach and the second is a redeveloper. When the print is immersed in the first solution, the image bleaches until it totally disappears. After a short rinse, the print is transferred to the redeveloper where the image reappears in brown tones just seconds later. The intensity of sepia toning can be moderated by the degree of the initial bleaching. If you immerse the print for only a short time in the bleach, redevelopment yields a subdued sepia effect. Experiment to suit your own taste.

Sepia toning adds almost the same degree of permanence to the print as selenium. However, it has an awful smell, much like rotten eggs. There are alternative toners that produce similar visual effects without the smell, the most notable being thio-urea or thio-carbamite.

Brown toner, as the name implies, puts a deep brown tone on prints. Using the manufacturers' recommendations, you can obtain rich brown tones; by diluting the solution far more than recommended, you can get softer, more silver-brown tones. It's worth investigating the range of tones that this toner can impart into some of your prints.

Gold toners are made by several manufacturers. Each brand imparts a very different color and unique depth to the toned print, so it's impossible to give any overall results. Some photographers use gold toner in combination with another toner (generally selenium), first toning a bit in one, then the other to get just the effect they want.

Chemical Coloration

Selenium toning followed by potassium ferricyanide bleaching turns light gray tones to soft rose-beige, while dark tones remain virtually unchanged in color. This effect may be rather pronounced with some papers but nearly imperceptible with others. The duotone coloration can be done with great subtlety and is quite beautiful with certain subjects. The procedure destabilizes the emulsion, so the print must again be fixed, rinsed, and then lightly selenium-toned once more prior to final washing to impart permanence to the image. As a sidelight, note that a color change almost always occurs if a toned print is then bleached, so don't attempt to reduce a toned print with potassium ferricyanide unless you want the color change. Such "discoloration" can become a rich source of creativity and personal expression.

Painting portions of a print with more concentrated selenium and following that with potassium ferricyanide bleach can produce a remarkable range of warm tones that are permanent when the print is fully washed. I have delved into the use of selenium toner and potassium ferricyanide to produce a range of deep browns, purplish browns, rose tones, yellows, and other variations. Using just these two chemicals, creative possibilities are virtually endless.

Creating colors in black-and-white papers through toning can go beyond the use of selenium, sepia, brown, or gold toners. Copper toners, blue toners, and others can be used—or grotesquely abused— for a variety of effects. Using a combination of toners, such as sepia or thio-urea toner together with iron-blue toner, will impart blue overtones in the shadow areas but warm browns and beiges in the highlight areas.

Chemical coloration of black-and-white prints offers creative opportunities that should not be ignored. The book *Elements of Landscape Photography* by Eddie Ephraums details numerous toning combinations. Photographer's Formulary in Condon, Montana has a remarkable catalog of photographic chemicals, including a wide range of toners.

On some of my photographs I partially bleach selected areas, then apply concentrated selenium toner to those areas prior to completion of the bleaching. I control the degree of chemical coloration depending on how much bleaching I do before and after applying the toner. If I do most of the bleaching prior to applying the toner, the color change is almost subliminal. But if I apply the toner early, the change can be quite profound. The bottom line is this: if you hear someone say, "Never bleach after toning", you may want to try it just to see what happens. Any "forbidden" procedure may open up rich creative possibilities.

Full Archival Processing of Prints

■ *Due to the poor quality of the tap water where I used to live, I added one step to this process. After squeegeeing each print, I swabbed it down with a sponge using distilled water and Photo-Flo, and then I squeegeed it off a final time. Without this final swabbing, the print dried with a bothersome film, giving it the degraded look of a print covered with a sheet of old plastic. I found that if I failed to do the final swabbing, the print could not be saved through rewetting and swabbing again. Apparently a precipitate from the water embedded itself in the emulsion and permanently degraded the image. If your prints exhibit uneven gloss or other strange surface characteristics, it may be due to subpar water in your area, and you may well consider this swabbing procedure to eliminate the problem.*

After toning, I rinse off the prints with a hose, and then place all of them into a holding tray of water. Once they are in the holding tray, I let them stay there for a minimum of five minutes with water gently running into the tray. I make three more fresh water tray changes to complete the washing, allowing the prints to soak in each tray at least 10 minutes before transferring them—one at a time—to the next. Finally, I squeegee the prints and dry them emulsion side down on large fiberglass window screens. This air-drying technique gives the prints a semigloss surface, which to me, offers the optimum in surface qualities between a glassy ferrotype surface and a dull matte surface.

I don't use a print washer, nor do I feel it necessary to do so. The purpose of washing is to progressively dilute the harmful contaminants embedded in the emulsion or fiber base (residual acids, salts, etc.) to the point that they are rendered harmless to the longevity of the image. Several fresh water tray immersions accomplish the job nicely. I tested my results with Kodak's Hypo-Eliminator Kit, and the tests showed a perfect wash. All good print washers do the same thing, but they cost more and often use more water to accomplish the same task.

However, if you are pressed for time, a good print washer is a time-saver. The only drawback to my method is the time spent moving prints one-by-one from tray to tray. (Note: Only two trays are needed. When all the prints are transferred from one tray to the next, I empty the first tray, rinse it thoroughly, and refill it to receive prints from the other tray after the appropriate length of time.)

Concerning archival permanence, I'm somewhat skeptical about the information presented to photographers for two reasons. First, tests that simulate the aging of a print may not be accurate. At best, they simulate (in a laboratory environment) what is currently believed to be a factual model of aging. They may not simulate actual aging conditions. Second, no matter how clean the final print is, it is still subject to the high acid content of the air in our modern world. If the acidic air is destroying stone monuments, it is surely doing damage to photographs, even ones protected with selenium. The only way to truly protect a print from damage is to hermetically seal it from any contact with the atmosphere. However, I do recognize that toning and complete washing surely give it greater longevity—if not permanence—than a print lacking that treatment.

Furthermore, the issue of archival permanence is overblown, and often of concern only to photographers. If we turn to painting, watercolors are highly impermanent. In 1981, after I completed photographing the English cathedrals, I was lucky enough to see the Turner watercolors displayed at the Tate Gallery in London. To my understanding, these magnificent paintings are exhibited only once every 10 years for approximately three weeks, and even then they are shown under dim lighting. The reason is that watercolors fade quickly under strong lighting. Nobody raises the issue of impermanence of these treasures, but photographers go on at great lengths about the correct methods of preserving photographs. I think it's a bit silly. I do the best I can with the information available; I suggest you do the same. Concentrate on your personal expression and your art. Let time do what it will to your vision.

In the early 1990s, David Hockney had an exhibition that included collages in mixed media. Large portions of the work included color photographs, which lack true archival permanence. At the opening, someone reportedly asked him, "How can you charge $10,000 for a work that won't last 20 years?" Hockney replied, "How much does a Porsche cost, and how long does it last?"

The processing procedures outlined throughout this chapter constitute black-and-white archival print processing. They include two fixing baths for full removal of salts from the emulsion and paper base, selenium toning for greater

resistance to environmentally induced damage, and complete washing of prints to remove all remaining acids and salts.

A quick review of my current steps toward black-and-white archival processing may be useful:

1. Use two fixing baths to remove all silver salts.
2. Fix prints for a total of seven minutes in the two standard fixers (see manufacturers' recommendations for varying this time for some fixing baths).
3. After fixing, hose rinse each print and place in a tray of water with water trickling into it.
4. Accumulate all fixed prints in the holding tray of water.
5. Bathe all prints in a hypo-clearing agent bath (to prevent staining in selenium toner).
6. Accumulate all prints in a holding tray of water.
7. Selenium tone all prints. (Other toners may be used instead of selenium.)
8. Hose rinse each print and place in a tray of water with water trickling into it.
9. Place prints in the second, third, and fourth trays with water trickling into each.
10. Squeegee each print and place on a screen (emulsion side down) for drying.

Toning, Intensifying, and Reducing Negatives

Negatives, too, can be selenium toned to increase contrast, density, and permanence. Just as selenium combines with the silver in the paper's emulsion, it combines with silver in the negative's emulsion to increase density. This process does not increase grain, an unwanted effect of all other negative intensifiers. Also, all other negative intensifiers, such as chromium intensifier, theoretically degrade the permanence of the negative; selenium treatment enhances it! I use a strong 1:1 dilution of Rapid Selenium Toner with water to intensify negatives.

Selenium treatment of negatives is performed after the processing is completed, so it can be done days, weeks, or years later. A low contrast negative can be intensified, but it works to best effect if the negative has good density to begin with. A thin negative does not offer sufficient silver to combine chemically with the selenium. Just immerse the negative in a solution of selenium and agitate for 15–20 minutes for full effect. Re-wash the negative after treatment, immerse it briefly in Photo-Flo, and hang it to dry. If agitation time is shorter and the contrast increase is insufficient, repeat the process. However, there is an upper limit to the amount of selenium that can be bonded to the existing silver in the emulsion, and therefore an upper limit on the possible contrast increase.

The increase in contrast due to selenium toning of a negative may be the equivalent of an N+ development instead of N. This has particularly important consequences for roll film users, as it extends the use of the zone system to subsequent redevelopment of the negative. Selected frames can be cut out, increased in contrast with selenium, and enlarged more effectively afterwards. It also allows for rethinking negative development in situations where it's difficult to decide on the appropriate level of contrast. You can always choose the lower contrast option, then later switch to the higher contrast approach via selenium treatment of the negative!

Potassium ferricyanide can reduce density in overly dense negatives. Interestingly, though reducing a print increases contrast to a great extent, reducing a negative (at least the Kodak Tri-X negatives I have subjected to potassium ferricyanide) seems to reduce contrast slightly. My procedure is to set up three trays: a fixer tray on the left, a water tray in the center (with a hose delivering fresh water to that tray throughout the process), and a potassium ferricyanide tray on the right. I first immerse the negative in the fixer tray for several minutes, then rinse it in the water tray, then fully immerse it

in the potassium ferricyanide solution, rocking the tray gently. Make sure the negative is fully immersed in the bleach at all times, or an unwanted tonal break will appear wherever the negative is not immersed. Then I remove it from the bleach, rinse it in the water tray, and place it back in the fix. I do this as many times as necessary to bring the overly dense negative back to more reasonable, printable densities.

The key is knowing when to stop this procedure! Always maintain ample tonal density and separations in the shadow (thin) areas of the negative. If you continue the process for too long a time, you can lose those critical shadow areas, permanently destroying the negative. At first, the changes may seem painfully slow because the negative is so dense. After you get past the grossly dense stage, watch it carefully, for the same amount of bleaching will seem to yield far greater density changes that can easily get away from you.

Cold, Neutral, and Warm Tone Papers

Another aspect of black-and-white papers that was mentioned earlier but not discussed is the inherent coloration of the paper. "Cold tone", "neutral tone", and "warm tone" papers each have their adherents. Cold tone implies a blue/white base, neutral tone implies a relatively neutral white base, and warm tone implies a yellow/white base. Some photographers print on one type of paper to the complete exclusion of others. (I use neutral and cold tone papers; Jay Dusard uses only warm tone papers). Some people feel that warm tone papers impart a pleasant, "old" look to a print. Some people prefer to print on neutral or cold tone papers and then use a sepia, brown, or heavy selenium toner to obtain a brown image—one with a different coloration from the warm tone papers.

My observations show three major differences among the papers. Warm tone papers have a warmer, yellower base than all neutral or cold tone papers. Toning does not change the base color of papers, so a toned neutral or cold tone print will not have the same overall look as one printed on warm tone paper. Warm tone papers are much, much slower to expose under the enlarger than the neutral or cold tone papers. They may require two stops of extra exposure to obtain the print you would get on a neutral or cold tone paper. This can present difficulties if your negatives are small and your enlargements are great, and/or if your negatives are very dense. Finally, some warm tone papers tend to have less contrast variation than neutral or cold tone papers.

Review of Contrast Controls

Before moving on to traditional color printing, it will be helpful to review the numerous controls discussed throughout the book for increasing and decreasing contrast. I have often seen photographers avoid subjects in the field that they feel are either too high or low in contrast, and I hope this review may embolden some to rethink the artistic possibilities of such subjects. (Also see the following section on "Infinite Contrast Control".)

In addition to the controls listed below, be aware of the fact that the light source on your enlarger affects the contrast of your print. For complete information on the differences between diffusion, condenser, and point source enlarger lights, see Appendix 2.

How to Increase Contrast

1. Filtration during negative exposure. The appropriate filter can further darken a dark area in relation to a lighter area, or brighten a light area in relation to others.
2. Long exposures and reciprocity failure effects. If the light is dim enough, the film is already in the realm of reciprocity

failure and therefore increased contrast. If the scene is bright, a strong neutral density filter—perhaps in combination with another filter—can extend exposure times into the realm of reciprocity failure.

3. Extended negative development.
4. Selenium toning of negatives.
5. High contrast grade of enlarging paper.
6. High contrast developer, such as Dektol.
7. Selective dodging or burning of the print to decrease density of highlight areas and/or increase density of shadow areas.
8. Potassium ferricyanide reducing of prints.
9. Selenium toning of prints.

How to Decrease Contrast

1. Filtration. The appropriate filter can bring divergent tones together, thus lowering contrast.
2. Reduced or compensating negative development.
3. Low contrast grade of paper.
4. Low contrast developer, such as Selectol-Soft.
5. Selective dodging or burning to increase density of highlight areas and/or decrease density of shadow areas.
6. Flashing.
7. Masking.

Infinite Contrast Control after Negative Development

Despite all the methods listed above for increasing or decreasing contrast of your negative (either an individual negative from sheet film or a single frame from a roll), the contrast level may still be either too high or too low for you to print successfully with existing papers. There is still a surprisingly simple way to either increase or decrease contrast from that of the original negative.

Suppose the negative is too low in contrast, and printing with even the highest contrast filtration yields a print lacking sufficient contrast. Start with the original negative and make a contact image on the same negative material (or any finer-grained film, e.g., T-Max to T-Max, Tri-X to Tri-X, HP5+ to Delta 100), just as you would make a contact proof print. Make sure that the original negative (placed on top, of course) is placed emulsion to emulsion with the unexposed negative. Then develop the newly exposed negative material with increased contrast. This will yield a higher contrast positive image.

Then make a second generation negative by placing the newly created positive in contact with another unexposed negative. Again increase the contrast when developing the new negative. Now you have a new negative (created via an intermediate positive) in which you increased contrast twice. Of course, the degree of contrast increase at each stage is controllable by you, so you can raise the contrast slightly or greatly via the intermediate positive and the final negative.

Since each of the images is made via a contact process, there is no loss of sharpness. You can repeat this two-step process as many times as you wish, increasing the contrast to any extent you wish, giving you infinite contrast control. Obviously, for contrast decrease, simply lower the contrast when making the intermediate positive and again in making the final negative.

Also, you may simply wish to end this process with the intermediate positive (either an increase in contrast, decrease in contrast, or no change in contrast) and then use the positive as you would use a negative, producing a negative image. This can be quite creative and extremely effective.

Color Printing

The options for color printing are more varied than for black-and-white because prints can be made from either negatives or transparencies. At the same time, color printing can be more restrictive because classical color processes offer no variable contrast options for printing from either negatives or transparencies. As noted in chapter 6, color negatives are lower in contrast than color transparencies, so the prints made from negatives have lower overall contrast and more subdued tonal and color gradations. The difficulty with color negatives is that "reading" a color negative is difficult, and comes only with years of experience. With a transparency, of course, the picture is right before your eyes and no translation is necessary.

Much of the information presented in the sections on black-and-white printing is directly applicable to the printing of color negatives. Dodging, burning, masking, and flashing are all usable techniques with color negatives. There is no color equivalent of either potassium ferricyanide reducing or toning. However, color printing allows one interesting variation on both burning and flashing: both can be done with a change in color filtration to shift the color balance of the burned area in relation to the unaffected areas. In general, this must be done with subtlety or the effect will be or appear heavy-handed. If the subject matter is abstract rather than realistic, more leeway of the color shift is acceptable. With complete abstraction, *any* color balance may be acceptable.

For years, I had used color transparencies rather than color negatives; therefore, my familiarity with color printing had been exclusively through positive-to-positive materials, specifically Ilford's Ilfochrome (previously known as Cibachrome). Recently, however, Ilford discontinued Ilfochrome. That leaves two options for printing from transparencies: (1) You can either create an internegative from the original transparency and then print traditionally from the internegative, or (2) you can scan the original transparency and then print digitally from the scanned transparency, now converted to a digital file.

Option 1: Printing Traditionally from an Internegative

Creating an internegative is simple. You just contact print the original transparency to a negative material the same way you would make a contact proof by printing directly from a negative onto paper. Make sure the transparency and internegative are emulsion to emulsion so there is no loss of sharpness in exposing the internegative. Of course, you'll have to experiment with the proper exposure for the internegative, as well as the proper development for it. Alternatively, you could have a commercial lab do the entire process, or have a commercial lab just develop the exposed internegative after you have made the exposure. (Unfortunately, even those options are becoming scarce, as the number of commercial labs has dwindled in recent years.) Then you would print the internegative, as you would proceed with any negative, using the guidelines I described earlier for black-and-white printing.

There is a problem here, however. The original transparency has a lower contrast range than a negative exposed to the same subject matter. That means a transparency has a higher inherent contrast than does a negative, and therefore it reaches the limits in both the highlights and the shadows sooner than a negative would if exposed to the same subject matter. So, if you had photographed the same scene originally with negative material, you may have obtained more information on the negative in the highlights or the shadows, or both, than you would have on the transparency, assuming the scene exceeded the range of the transparency film. You cannot get that lost information back when making an internegative from the transparency. But with care, you can maintain all the detail that exists in the original transparency, and even some

detail that was previously available for printing only via various complex masking procedures. So the making of an internegative to preserve as much detail as possible can be quite exacting, though not terribly difficult to do.

Option 2: Printing Digitally from a Scan

The other option is to scan the original transparency and then print it digitally. Producing a high-quality scan is critically important—just as making an internegative is critically important—in order to preserve every bit of information contained within the transparency for later printing. Today, I recommend scanning as the superior approach for color printing from a transparency because color digital printing offers much greater contrast control than the limited contrast control available via traditional color printing techniques.

Please note, this distinction is not an issue for black-and-white printing, since black-and-white papers already have exceptional variable contrast control. In my opinion, black-and-white digital techniques do not trump traditional approaches. Furthermore, I still feel that nothing approaches the glow and luminosity of a traditional black-and-white silver-gelatin print. This is not to debase or degrade the quality of digital black-and-white prints, many of which are quite wonderful, but they just aren't silver prints, which are still the gold standard for black-and-white photographs.

For those interested in scanning color transparencies followed by digital printing, I refer you to the next chapter of this book, and to the many books on the market (which are updated frequently) on digital printing techniques. Applications such as Adobe Lightroom and Adobe Photoshop, along with numerous others, are available for digital printing.

Selecting the Paper

The paper used impacts the look of the final print; therefore it is important to familiarize yourself with the many printing papers that are available for digital printing, some of which are designed to give specific effects to the printed image. This includes papers that range from smooth and glossy (to yield the look of a traditional color photographic print) to papers that are heavily textured (to yield the look of a painting). The array of options exceeds anything available via traditional means today, which is another reason I recommend digital approaches for obtaining the final color print.

The Final Product is what Matters

Times are changing, and it's logical to change with the times. I have watched the changes in both color and black-and-white printing approaches, and I feel comfortable staying with and recommending traditional approaches for black-and white photography, while recommending digital approaches for color photography.

My basic philosophy about this is the following: Whichever approach you choose (i.e., traditional or digital) is a perfectly good approach. Learn it thoroughly and pursue it to obtain the finest prints you can achieve. If, along the way, you become disenchanted with either the final printed image or the process used to obtain that print, try the other approach. Then, use that alternate approach to work toward obtaining the finest print you can achieve. You have to love both the process and the final result. It's difficult to proceed if you are unhappy with either of the two. Ultimately, the final product is a photographic print, and you want to present the best product you can create. It's not the process that's important—both are perfectly valid—it's the final product. Does the final print convey what you want it to convey? Does it get your point across?

In fact, is there a point that you're trying to convey, or a question you're trying to ask? These are the important questions to ask yourself. I have much more to say about these ideas in the final chapters of this book. To answer them successfully, you have to choose the process that yields the best results for you.

Scanning from Film

Scanning is the bridge that takes you from film, as a starting point for exposure, to digital methods to complete the process of image editing and printing. Many photographers today are using film for their black-and-white photography because of its ability to encompass a much higher contrast range than digital sensors can; or they shoot with color negative films, which also have a very high contrast range. They may also use color transparencies because they love the immediacy of the imagery garnered through a positive transparency. Many such photographers now complete the process digitally, using a hybrid of traditional and digital methods to obtain the final image.

Today, with the recent demise of Ilfochrome paper and chemicals, few options remain for printing color transparencies directly, so more and more photographers are turning to scanning and digital processing of transparencies. They scan the original, turn it into a digital file, and then proceed with the necessary moves to create the final image. For myself, I've exposed color transparencies for years, and now find the flexibility of digital color processing to exceed that of traditional methods, so I have been scanning original transparencies (mostly 4"×5", 6×6 cm, and 6×4.5 cm) for several years. I'll confine the following discussion to the scanning of color transparencies as a substitute for Ilfochrome printing.

Scanning itself is an art. It requires some deft handling of the original to turn it into the most useful digital file for successful completion of the final image. But it's really a game of horseshoes: if you're close enough, you've probably done a really good job. Nobody can tell you what the optimum scan may be for any transparency, or any negative, for that matter. But those who understand scanning can surely tell you when the scan is simply not a good one, or when it's unlikely to yield desirable results.

I don't want to get caught up in the specifics of hardware or software required for good scanning. But let me note that today, there are flatbed scanners selling for hundreds of dollars that scan at quality levels virtually indistinguishable from the finest drum scanners that sell for many thousands of dollars (although some experts may challenge that claim). There are also a variety of software programs for scanning, and many do an acceptable job, perhaps an exceptional job... and the differences are probably discernible only to the most knowledgeable and sophisticated of users. Perhaps in a true blind test nobody would see the differences.

As of the writing of this book, I have an Epson Perfection V750 Pro flatbed scanner and I use SilverFast software for processing. Both are common products, and together they do an excellent job.

My first recommendation for scanning is to decide initially what is likely to be the largest size you may want for the finished print. I recommend a scan of the transparency that can give you about 400 dots per inch (dpi) in that final size. You'll modify the dpi depending on the printer you use, and its optimization settings. At that degree of resolution, you cannot see the dots without a loop. So the quality is excellent. For example, if your starting point is a 4"×5" transparency, and you decide that you want to produce a 16"×20" print, then it follows that to obtain the 400 dpi print, your initial scan must be 1600 dpi. If you choose a lower dpi, the final print may lack the smoothness you wish to attain. If you go higher in dpi in your scan, you're dealing with larger files that take much longer to process and occupy far more memory on the computer. Obviously there's a trade-off here. So my choice is a practical one. If later I decide to make a larger print, I can always re-scan

the original transparency at a higher resolution, and then proceed with the same processing steps to arrive at a comparable print in the larger size. But I won't do that with every transparency so as not to get slammed with all that memory usage or all that processing time for *every* scan I perform.

Once you've chosen a sensible scanning resolution, it's important to keep in mind that the better the quality of your scan the less you will have to deal with in Lightroom, Photoshop, or any other subsequent processing. So try to get a scan that has the best possible contrast and color balance, even if the original lacks good contrast or has poor color balance. Don't put all of that off for the final processing.

Next, check the histogram to be sure that everything on the transparency will be encompassed in the scan. If portions of the histogram go beyond the right edge, you'll get blank whites in the digital file where there are subtle highlight details in the transparency, so be sure the histogram encompasses those highlights. You'll need to do the same thing for the shadows: make sure you can get everything down to the most opaque blacks before going any further.

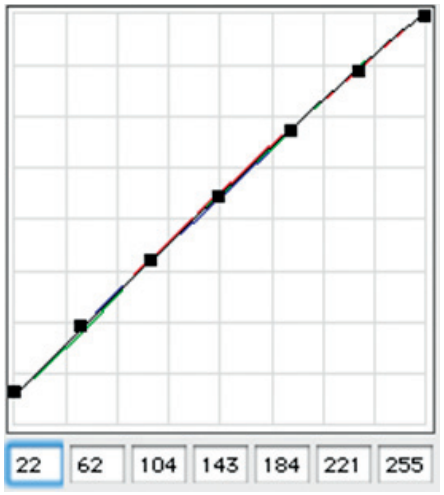
If you want really bright highlights, make sure the rightmost portion of the histogram comes close to touching the highlight marker, but still ends just to the left of the marker. You can give it a little more breathing space if you can work with somewhat lower-level highlights. Then, move the midtone marker to the left and right, seeing what those moves do to the thumbnail image. You'll quickly see where that midtone marker should be for best results. It's all done visually, and it's quick to master.

Then there are the gradation adjustment curves, which I see as all-important for scanning. My experience is that transparencies fall into several broad categories, and that each requires a specific curve to obtain a good scan as a starting point for final processing. So I'll run through the categories I've found, and share my recommendations for the types of curves that have yielded the best results for me. (There are many options in SilverFast software, some of which I have never used, but the ones I've used—primarily the scan curve—seems to me to be the most useful tool, and the one I will concentrate on in the following recommendations.)

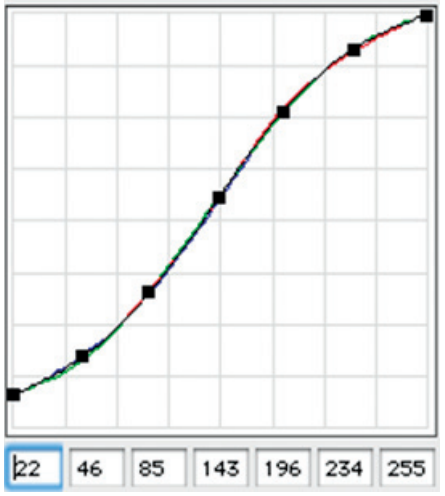
SilverFast's Gradation Curves tool allows you to adjust the gradation, contrast, shadows, and highlights, as well as overall brightness. As with Photoshop curves, you can manipulate the master or individual color channel curves in any way we choose. It's possible to manually reshape the curve for specific image requirements. In the next section we'll look at the following four basic scanning curves I work with using the SilverFast Gradation Curves tool:

- The Straight Line Curve
- The S-Curve
- The Reverse C-Curve
- The C-Curve

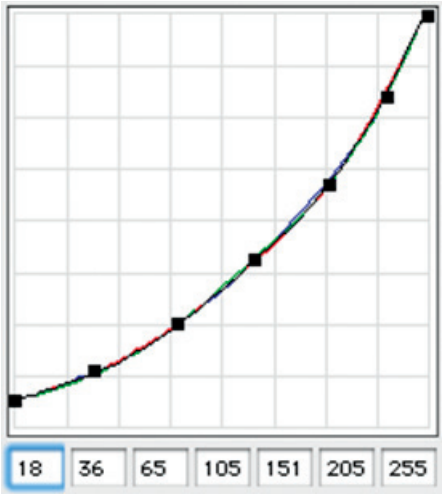
Please understand that none of the recommendations I suggest below should be taken as rules. They're not rules; they're recommendations...simply starting points to consider. There are always exceptions to any rule. As James Thurber once said, "There is no exception to the rule that every rule has an exception." If there is anything that comes close to being a rule, it's that I have found it best that all scanning curves start at the extreme upper right corner to get my highlights as bright as possible. This is the equivalent of pushing your histogram to the far right when exposing a digital capture for optimum results. This concept is thoroughly discussed in chapter 11.



▲ ***Diagram 10.6: The Straight Line Curve.*** *For the well-exposed transparency with a full tonal range, the Straight Line curve appears to be the best choice for your scan. (Note: You can see slight offsets of the different color channels, and these can be perfectly aligned or spread apart to alter color balance.)*



▲ ***Diagram 10.7: The S-Curve.*** *For the well exposed transparency that has a limited contrast range, the S-curve appears to be the best choice for your scan, for it spreads out mid-tone contrasts a bit, giving the image a little more snap.*



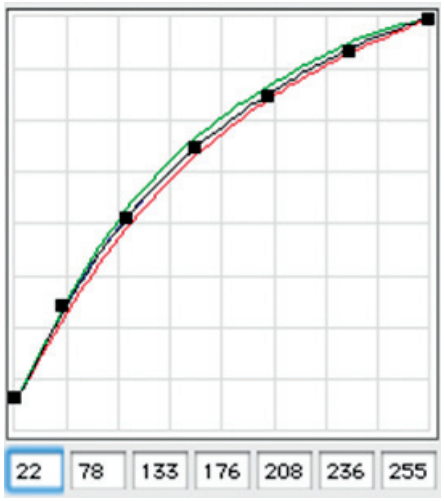
▲ ***Diagram 10.8: The Reverse C-Curve.*** *For an overexposed transparency with overly bright pastel colors and tones, the Reverse C-curve separates the close-tone highlights while also deepening and enriching the colors.*

Recommended Scanning Curves for Transparencies

The Straight Line Curve: For well-exposed transparencies that contain a full range of tonalities, I have found that a Straight Line scanning curve, starting at the extreme upper right corner,and sloping down toward the lower left at the same fixed angle throughout its length is excellent. I don't go to the extreme lower left (hmmm...maybe that's a rule!) because it may have too little information for the image editing software (i.e., Lightroom or Photoshop) to work with, but I go to a low point on the left edge of the grid above the extreme lower left corner (diagram 10.6).

The S-Curve: If the transparency is well exposed but doesn't have a large contrast range (perhaps lacking bright highlights and dark shadow areas, but instead has all mid-value tonalities), I often introduce a slight S-curve variation to the Straight Line curve, which tends to pleasantly increase mid-tone contrast. You'll have to experiment with the degree of curvature of the S-curve. Sometimes just a slight variation from the Straight Line curve is best; at other times it can be a more pronounced S-curve for greater separation of the mid-tones. With just a small amount of experimentation, you'll begin to quickly see when the straight line is best, when a slight S-curve is best, or when a pronounced S-curve best serves your purposes (diagram 10.7).

The Reverse C-Curve: For transparencies that are over-exposed—those dominated by light tonalities with few or no shadows (yet containing no blown-out, blank areas)—I have found that a Reverse C-curve is best for the scan. This is a curve somewhat in the shape of the letter "C" as viewed through a mirror. Of course, if the transparency is so overexposed that some areas are blank, you're sunk. You can't obtain detail via



▲ ***Diagram 10.9: The C-Curve.***
The C-curve spreads apart the deepest shadow details to the greatest extent, and tends to work best for an underexposed transparency, or even a well-exposed transparency dominated by dark areas. (Note: In the curve shown here, the individual color channels have been modified by lowering the red channel to a large extent and the blue channel to a lesser extent, in relation to the green channel, which was done to rebalance a transparency that had a magenta color cast to it.)

a scan where none exists in the original transparency. This overexposure is similar to clipping a digital capture, or pushing it beyond the right edge of the histogram, but by a degree that can't be recovered in Lightroom or other software programs. Again, see chapter 11 for the complete discussion of this.

Now, if detail exists everywhere in the transparency, I have found that by starting at the extreme upper right corner of the SilverFast gradation adjustment grid, the curve initially drops quickly down the right side as it slowly turns left toward the lower left, becoming ever-flatter (i.e., more horizontal) as it approaches the lower left edge. Again, I don't go to the extreme lower left corner, but to a point above that. (You'll have to decide the optimum height for yourself.) Another way of picturing a Reverse C-curve is to start with a straight line going from the extreme upper right corner toward the lower left, but gently pushing the middle of that straight line downward and to the right, as if it were a flexible strand of rubber (diagram 10.8). The Reverse C-curve separates the tonalities of those pale, overexposed highlights, giving them some needed depth and brilliance. Neither the Straight Line curve nor the S-curve can adequately do that because their initial downward slope from the upper-right corner of the grid is too flat. Further, the S-curve tends to make matters worse, since its initial slope is even flatter than a straight, sloping line. So the very scanning curve that could serve to energize a well-exposed but low-contrast transparency could be the worst choice for scanning an overexposed transparency.

Keep in mind that you may want some bright, pastel-dominated images—ones that may appear overexposed at first glance—to be exactly that: an image of soft, pastel colors and tones. This is not an overexposed transparency, but a purposely-made high-key transparency. To preserve that feel in the scan, use the Straight Line scan.

The C-Curve: I have found that a C-curve is best for gradation adjustments for transparencies that are either underexposed (yielding a lot of dark tonalities) or even ones that are well exposed where there was a lot of initial contrast in the scene and with an abundance of dark areas that still possess detail, but are nearly lost in darkness. In the C-curve, you again start the scanning curve at the extreme upper right corner of the grid, and travel leftward with only a slight downward slope to the curve, making it progressively steeper as you approach the left edge, again ending up somewhat above the extreme lower left corner. This is equivalent to pushing the Straight Line curve up and to the left from the middle. Of course, if there are areas of pure black—lacking any detail—in the original transparency, you can't create visibility in the scan. But if there are simply very dark areas with visible separations, detail can be pulled out via a good scan. I have found that this C-curve is the optimum curve for opening up the deep dark areas of the transparency to greater visibility (diagram 10.9),

with the color channel modifications explained in the next section below).

With underexposed or predominantly dark transparencies, the Straight Line curve or the S-curve fails to work well because the lower-left portion of the curve—exactly where you want to separate detail in those overwhelmingly dark areas—is too flat. So instead of separating the dark tones, those curves compress them.

These are four basic scanning curves to work with: (1) the Straight Line curve, (2) the S-curve, (3) the Reverse C-curve, and (4) the C-curve. You'll find the odd transparency here and there that may not conform to any of those four categories, but those four basic types, with minor variations for each transparency, should serve your purposes for at least 95% of your scans. There will be variations—maybe the upper half of the curve being a straight line, while the lower half is a bit of a C-curve, or a Reverse C-curve—but in general, these four basic curves tend to do the job.

Altering Curves for Off-Balance Color Transparencies

Some of my transparencies are decades old, and are noticeably faded. Some have taken on the look of an overexposed transparency even though the initial exposure had been quite wonderful. More often, the color balance has gone way off track. I have scanned many such transparencies that have now faded into a deep magenta cast. But these are often correctible via clever scanning, as in the C-curve shown in diagram 10–14 where I have offset the individual color channels. With any of the curves recommended above, I can separate the red, green, and blue channels prior to scanning, making one or two more or less pronounced. In the case of an overall magenta cast, I have found that lowering the red channel below that of the green and blue does a marvelous job of color correction in the scan itself. Sometimes, also lowering the blue a little, along with the lowering of red, eliminates the magenta cast entirely (diagram 10.14). Further tweaking of the individual color channels in the highlights, mid-tones, or shadows can give you more exacting results.

Another example of separating the color channels for scanning would be a scan of an outdoor transparency film that was exposed in shade. Outdoor film is balanced for sunlight, so it tends to go blue in shade. In scanning a transparency like that, the blue channel can be lowered compared to the green and red channels to rebalance the color. Indoor transparency film is balanced for tungsten light, and any other light (including even a window allowing daylight into the room) could throw the color off balance. Again, depending on the color shift of the imbalance, separating the color channels in making the scan can correct the imbalance to a great extent. Using the same techniques, if you want to purposely introduce an imbalance you can do it by adjusting the curves in the scan. You can even introduce specifically desired imbalances into the highlights, mid-tones, or shadows as you see fit.

With that in mind, consider the idea of raising or lowering just a portion of one of the component color channels in the scan to optimize color balance for your creative purposes.

Learning to Use Scanning Curves

My mathematical background has been invaluable in helping me understand the meaning of scanning curves because a mathematical curve has real meaning in the real world. So I was guided toward these curves just by recognizing that a steep portion of the curve will separate tonalities to a greater extent, while a more shallow portion of the slope does not. Furthermore, I recognized that I can't exceed limits—the blackest black is the darkest I can go; the whitest white is the brightest. I had to work within those limits. Everyone has to work within those limits. So there are trade-offs involved. You

simply can't expand every part of the curve. Yet, despite my mathematical insights, I still had to actually apply the curves to real transparencies to prove to myself how they work, and under which conditions the appropriate curve works best. Hence my suggestion to take a few diverse transparencies—a well-exposed one, an overexposed one, an underexposed one—and apply each of the suggested curves to each transparency to get a good feel for how they work. It's very much worth the time.

In making these recommendations, I caution you to be realistic. You can't make a silk purse out of a sow's ear no matter how good your scanning prowess may be. You can go only so far. Do not expect to make a wretched transparency into a great digital image, any more than you can make a wretched capture into a great image, or a poorly seen color transparency into a great print traditionally, no matter how great your printing skills in the darkroom may have been. Furthermore, a great *scan* doesn't mean you started with a great *composition,* or that you were working with good lighting in the field, or that you had anything of importance to say from the very beginning. A good scan is a good scan, but a good photograph starts with all the necessary ingredients discussed in the early chapters of this book along with the thoughts about creativity and imagination conveyed in the later chapters.

By contrast, a poor scan can damage or destroy the inherent qualities of a fine transparency, or the possibilities residing within an improperly exposed transparency that still may still have the makings of a fine photograph. Scanning is important, so it's a good idea to learn to do it well.

This section was meant to be simply a brief explanation of scanning and my recommendations. There is a lot more to learn about hardware and software. For more on this subject, please check out *Scanning Negatives and Slides, 2nd Edition,* by Sascha Steinhoff (Rocky Nook, Inc.).

CHAPTER 11

The Digital Zone System

THE INFORMATION ON FILM AND DARKROOM PROCEDURES in the preceding chapters is directed at giving you, the photographer, control and predictability over the final image. Although digital logic differs from that of classical (i.e., traditional) photography, the goal is the same in the digital realm: predictable, controlled results.

The discussion that follows begins with a summary of how the photosites and related filters (collectively, the sensor) inside the camera work; turns to digital exposure, referred to as "capture", and how to optimize it; and then discusses techniques to use multiple captures when the brightness range of the scene exceeds that of the sensor. This will explain how to work with virtually any brightness range to produce the best possible print quality. The digital sensor's range falls far short of that of negative film (both color and black-and-white), but with multiple captures can equal, or perhaps even exceed, that range under ideal conditions when the light remains fixed and nothing in the scene is moving. So, just as the making of a silver print cannot be separated from the properties of light-sensitive materials and their related developers, digital photography cannot be separated from the processing of the information produced by the camera's sensor and the refinement of the image in the software.

At the heart of optimum digital capture is the largely unprocessed data referred to as the "RAW" file. The RAW file consists of sensor data together with ISO, exposure, and other information (referred to as metadata), that is saved to the camera's memory card and from which a photograph can be rendered. By its nature, a RAW file is not an image and cannot be viewed directly. Rather, it is information from

◄ ***Figure 11–1: Wall and Llamas, Machu Picchu***
I was setting up my 4x5 film camera on a particularly wonderful Inca wall during a steady morning rain. Turning to get my film holder from my backpack, I saw several llamas standing behind me, apparently enjoying what I was doing. I quickly grabbed my digital camera, and made a series of captures as they roamed around, and eventually all walked past me in the direction I had originally been intending to photograph. This was one of the first in the series, where you can almost see their sense of surprise and curiosity. There are no lawn mowers on the Inca terraces at Machu Picchu, instead the llamas keep the grass trimmed.

which an editable image can be formed by a computer using software referred to as a RAW converter. (The RAW file is analogous to exposed film—the latent image—prior to chemical development. It's there, but it has no life yet and you can't see it until it's developed). The output from the RAW converter is saved in a commonly recognized image format such as Tagged Image File Format (TIFF) or Photoshop Document (PSD) (analogous at this point to the developed negative, ready for printing), and the image file can later be printed or opened and refined in an image editing program such as Adobe Lightroom (Lightroom), Adobe Photoshop (Photoshop), or Apple Aperture.

In brief, the sequence from the memory card to the print is as follows:

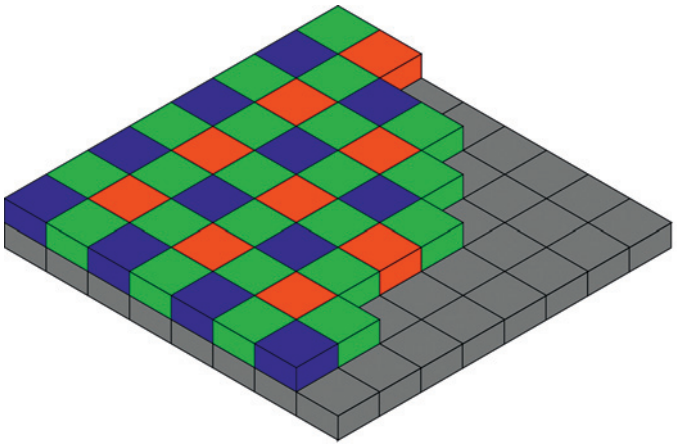
1. Import the RAW data from the memory card into a RAW conversion program.
2. Use the RAW conversion software (which may be a standalone program or may be integrated into your image editing program) to set values for global adjustments to the image (including color balance, overall contrast, the correction of aberrations, and initial sharpening); apply the adjustments and process the RAW data into an array of picture elements known as pixels with each pixel being composed of three color channels, one each for red, green and blue information; and then save the resulting file in a common image format such as TIFF or PSD.
3. In your image editing program (which may or may not be the same as your RAW conversion software), refine the image, perhaps a TIFF or PSD file, by adjusting such things as contrast, brightness, color balance, and sharpening; burning and dodging selected areas; resampling (changing the number of pixels per inch) and resizing the image for printing; and doing any number of other modifications available in your image editing program. All this is done to prepare your image for printing.

Because there are a number of excellent books on the use of specific RAW conversion and image editing programs, our goal here is to place the digital process in context, explain some fundamentals, and give you the tools to optimize your captures for the best possible prints.

Basics of Digital Capture

Let's start with the sensor output, showing how it relates to classical film processes. In the film world, the result of an exposure is the latent image recorded on film. In the digital world, the result of an exposure is electrical output from the many photosites on the camera's sensor. Although the specifics vary among manufacturers and among camera models, all digital sensors are composed of a number of photosites arranged in a geometric pattern known as an "array". Each photosite provides an electrical signal in proportion to the amount of light striking it. For the overwhelming majority of sensors, photosites are capable of measuring brightness but not color. To record the information required to produce a full color image, a single color filter is placed over each photosite, arranged in what is referred to as a color filter array (CFA), often consisting of a repeating sequence of one red, two green, and one blue filter known as a Bayer pattern. (Other arrays and color filter patterns are in the works, so we can expect CFA patterns to evolve). An illustration of an array and its CFA are shown in diagram 11.1.

At the conclusion of an exposure, the electrical signals from all of the photosites are transmitted to the camera's internal processor, where the signals are converted to binary digital data and are either given minimal processing and written to the memory card as a RAW file or they are fully processed in the camera and written to the memory card as a fully processed JPEG (Joint Photographic Experts Group) file or a TIFF file.



◀ ***Diagram 11.1:*** *Diagram of a sensor and color filter array*

Let's look into optimizing the image quality from the point of capture. Most cameras allow the photographer to select RAW, TIFF, or JPEG image quality. The choice is simple: For the highest quality, set your camera to save your captures in RAW format using the highest bit setting available. As noted, with the camera set to write to the memory card in RAW, the camera does little if any processing of the digital information and simply records the sensor information and related metadata to the memory card. In contrast, if you set your camera to write JPEG or TIFF files, the camera processes the sensor output into three grayscale images, each of which is referred to as a channel (one for each of the three primary color filters), applies a contrast curve, adjusts the color balance, makes other modifications based on the camera settings, performs edge sharpening, and saves the fully processed image to the memory card. In the case of JPEGs, the image is limited to 8 bits per color channel and is compressed in such a way that some of the image information is irretrievably lost. Any post-capture change to a JPEG or TIFF file will result in a loss of data. With a RAW file, before doing any editing of the image, the original capture information should be saved and kept available as a starting point should you wish to try a different rendering in the future (similar to keeping your original, untouched negative).

The term *bit depth,* also referred to as *color depth,* identifies the amount of color information that is associated with each pixel. Bit depth describes the number of brightness levels, or shades, that are available to describe the color of each pixel. Greater bit depth means more shades resulting in higher color fidelity, smoother and more subtle tonal gradations, and files that will withstand substantial editing without visible degradation. Let me caution, however, not to confuse bit depth with the number of pixels; pixel count is analogous to film resolution, whereas bit depth is the measure of the number of discrete tonalities each pixel can represent.

Although the JPEG and TIFF logic of the camera producing a completely processed photograph is convenient, JPEG and TIFF images contain less information than do RAW images, and the information will be progressively lost as successive edits are made. However, there are two things worth considering about JPEGS. First, the screen display on the back of your camera is a JPEG image. So, in fact, the camera always creates a JPEG image in buffer memory. However, that file is not permanently saved (unless you specifically request it saved with or without a RAW file). Second, if you're a sports photographer using JPEG, you can make your image, download it to your laptop via a wireless link, and have it to the newspaper in seconds. (Soon—if not already—you may be able to go directly from camera to newsroom, making things even faster). It's hard to beat that speed. Furthermore, if you want snapshots of your kids to send to relatives, or vacation shots to send to friends or to post on the Internet, JPEGs will do the job nicely, and will do it instantly. Again, that's hard to beat. Many cameras can be set to save both the RAW file and a JPEG from the same capture at the expense of some in-camera processing time and the use of additional memory. For this book, we're really talking about personal expression, not quick-and-dirty (or really, to be fair, quick and clean) uses of the photographic process, so from here on, we'll confine the discussion to the higher quality RAW files.

Presently, most digital single lens reflex (DSLR) cameras record RAW information as either 12- or 14-bit data. With 12-bit data, each pixel can represent more than 4,000 levels of brightness (2^{12}) in each of the 3 color channels. Fourteen-bit data can represent more than 16,000 levels of brightness (2^{14}).

By comparison, 8-bit data, such as JPEG, can represent only 256 levels per channel (2^8). To take full advantage of your camera, set your camera to record RAW files with maximum bit depth and to either not compress or use lossless compression.

To preserve all of your photographic information from capture to print, be sure to set both your RAW converter and your image processing software to work and save in a large gamut color space with a bit depth of 16 bits per channel. For example, if you are using Adobe Camera Raw (ACR) included with Photoshop, from the Image Menu select Mode and choose 16 Bits/Channel and from the Edit Menu select Color Settings and choose Adobe RGB or ProPhoto RGB from the color space drop down menu. If you are using Lightroom, which incorporates the same conversion technology as ACR, under the Lightroom Menu select Preferences, choose the External Editing tab, set the color space to Adobe RGB or ProPhoto RGB and set it to 16 Bits/Component.

Differences in the levels of information (i.e., 8 bits, or 16 bits) are significant, particularly in shadow areas. This is so because more information produces smoother tonal transitions and because changes to the image resulting from RAW conversion or post-conversion editing, including changes in white balance (to be discussed below), contrast, and brightness levels always result in the loss of data. If enough data is lost in processing, the resulting photograph will be noisy (i.e., it will exhibit undesirable grain, texture, or random color data that has no meaning), and will possibly present the abrupt changes in what should be smooth transitions (such as the sky toward the horizon) known as posterization.

Today's hardware and software almost universally support 16-bit processing. However, if your camera or software is limited to 8 bits, you can nevertheless produce fine quality photographs, but it becomes all the more important to capture as much shadow information as possible by giving the maximum exposure you can without blocking the highlights. (More on this later. Stay tuned.)

The Sensor's Useful Brightness Range

Each sensor has its inherent brightness response range (referred to as the dynamic range). The range varies from one camera model to the next and may very with ISO setting. Just as with film, the digital sensor requires a minimum level of light to register shadow values (equivalent to the exposure threshold for film). All brightness levels in the photographic subject that fall below the sensor's response threshold will be depicted as black. (This is similar to the film negative having areas exposed below threshold, having no density, and therefore supplying no information for the print. For transparency film, it's simply getting unexposed black areas). In addition, at low brightness levels (equivalent to exposures slightly above the film threshold), random electrical signals generated by the sensor and related circuitry will constitute a significant portion of the information and can be expected to appear as noise. At the highlight end of the sensor's range, above a maximum brightness level, the sensor will "clip" the highlights, that is, it will not differentiate additional brightness (equivalent to a pronounced shoulder on film) and all brightness beyond the dynamic range will appear as blank white. Clipping is analogous to overexposing transparency film to the point where the highlights are rendered as clear film base.

In the early days of DSLR cameras, the dynamic range was similar to that of most outdoor color transparency film, a range of approximately 5 f-stops. Current DSLRs have a dynamic range of as many as 10 f-stops or more using RAW capture, the camera's base ISO, and no image adjustment, thus equaling, or perhaps even exceeding Fujichrome 64T transparency film, but falling far short of the useful range of color or black-and-white negative film. The useful dynamic range may vary with the ISO setting and can be expanded to some extent in both the shadows and highlights using the shadow and highlight adjustments in the RAW converter. Determining the dynamic range of your camera is discussed in the next section.

The brightness information from each photosite is converted by the camera's circuitry from analog output to digital data, which quantifies brightness in a geometric progression. That is, the output from a photosite that receives an exposure of up to one f-stop above the threshold will contain one bit of binary data representing one of two possible responses—black or the first brightness level of red, green, or blue (depending on the color filter over the photosite) that is lighter than pure black. The output for the same photosite that receives up to 2 f-stops above the threshold will contain 2 bits of data representing any one of the next 4 lighter shades of its color. The output for the same photosite that receives up to 3 f-stops of exposure above the threshold will contain 3 bits of data representing any of the next 8 lighter shades of its color. The progression continues so that a photosite that receives an exposure within the last f-stop of the dynamic range will record any one of several thousands of shades of its color from very light to white.

The photographic importance of the geometric nature of digital output is that exposures made at the first stop or two above the threshold will contain larger tonal jumps than will an exposure of the same subject made with more exposure. With each f-stop increase in exposure, the number of tonalities doubles and soon there comes a point where neither the printer nor the human eye can distinguish between the increased number of smaller tonal steps. Additionally, as brightness increases, electronic noise becomes increasingly less visible. Thus, up to the point of clipping, more exposure results in smoother tonal transitions, better color fidelity. More exposure also provides a reserve of data with which to make major tonal modification in your RAW converter or image editing software without posterization, and produces cleaner shadows. These are all desirable results obtained at the minimal expense of maximizing your exposure.

Technical explanations aside, the practical point is this: Give as much exposure as you can without clipping the highlights. The exposed capture will result in more data and better print quality. Lastly, don't worry if your capture looks washed out on the camera display; you can easily preserve shadow detail and dial back the effect of the increased exposure using the settings in the RAW converter (to be discussed shortly).

While this isn't exactly analogous to my recommendation (maybe my demand) to expose the shadows in Zone 4 in traditional photography, it's close. In traditional (i.e., classical or film) photography, I've stressed the importance of exposing the shadows in Zone 4 to achieve better separations, even if you want them printed in Zone 3. Here, you want to push the exposure higher to get smoother, better, more detailed information. More information—particularly more shadow information, where it decreases with a lower exposure—means tonally richer images, with better gradations from one dark tone to the next. The limit to exposure is the dynamic range of the sensor. As long as you do not increase exposure to the point where the highlights are clipped, the result will be shadows with more tonalities, smoother tonal transitions, and less noise. The histogram discussed in the next section is your onboard tool for getting the exposure just right.

The importance of smooth tonal gradations cannot be overemphasized. Years ago I was shown a comparison of a classical (darkroom) print with a digital print derived from a scan of the original negative. From a distance they looked reasonably similar. But close inspection revealed disturbing artifacts in the digital print. The photograph contained dark bushes along a winding road in fog. In the straight classical print those bushes had minor tonal gradations that made sense. The digital print, however, had random blacks and grays intermixed that made no sense. It would be difficult to describe the difference, but perhaps this will suffice: If you've ever painted a wall in a room with a roller, you know how it gets spotty as the roller gets dry (that's when you dip the roller back in the paint trough for more paint). Now try to imagine vertical

strokes with a relatively dry black paint roller and horizontal strokes with a relatively dry gray roller directly atop it. That's how the bushes looked in the digital print. But that was years ago. Today, working in higher bit depth and with proper exposures, you can avoid that type of noise.

The Histogram— The Heart of the Digital Zone System

The histogram is a graphic representation of the distribution of brightness within a capture. The histogram can be displayed on the camera, in the RAW converter, and in the image-editing program. The lowest brightness level appears on the left edge and the brightest level appears on the right edge of the display. A typical histogram for a properly exposed capture appears in diagram 11.2.

▼ ***Diagram 11.2:*** *Histogram of a good exposure*

For any capture, if the endpoints of the histogram do not extend to the left and right boundaries, the brightness range of the scene is less than the camera's dynamic range. If the left edge of the histogram touches the left boundary, some of the lowest brightness levels in the scene fall below the sensor's threshold and will be recorded as empty black. If the right edge of the histogram touches the right boundary, some of the brightest portions of the scene exceed the sensor's dynamic range and will be recorded as empty white. If you reduce the exposure (i.e., use a higher shutter speed, smaller aperture, and/or lower ISO), the histogram will shift to the left; if you increase the exposure, the histogram will shift to the right.

If the brightness range of the scene is less than the camera's dynamic range (the histogram does not extend the full width of the display), it's best to increase your exposure and thereby force the histogram closer to the right edge (rather than the left edge) to take advantage of the increased amounts of information that comes with more exposure (short of clipping it at the right edge, of course).

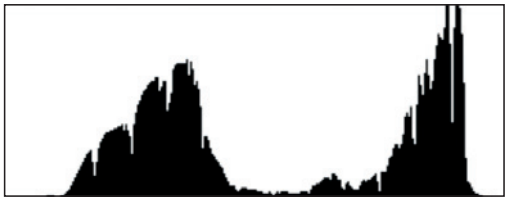
To see the histogram in action, set your camera to manual exposure. Using an aperture and shutter speed that will underexpose the scene by at least 5 stops, make a capture; increase the exposure by 1 stop and make another capture. Repeat the process 10 times and then scroll through the captures and corresponding histograms. If your first capture was sufficiently underexposed, the image display will appear black and there will be a thin trace along the left edge of the histogram. With each increase in exposure above the sensor threshold, the right edge of the histogram will move to the right. As you scroll through the captures, you will come to the point where the deepest shadows are sufficiently overexposed to be beyond the dynamic range of the sensor, the display will appear blank white, and there will be a thin trace on the right edge of the histogram.

Diagram 11.2 shows the histogram for a properly exposed capture with the highlight values approaching, but not quite touching, the right edge. This particular histogram also shows that there will be good shadow detail, as the exposure is sufficient to record information in the shadows. Note that if the scene contains specular highlights (such as sunlight glinting off of a curved chrome piece on a car), the histogram from a proper exposure will show some pixels at the right edge. Here is when the flashing overexposure/underexposure display (discussed below) is helpful in interpreting the histogram. Don't worry about those areas, since you'll want such specular reflections to be blank white. But if other highlight areas that

demand detail show up as being overexposed, reduce the exposure and make another capture.

Diagram 11.3 shows the histogram of a good exposure, and diagram 11.4 shows the histogram of the same scene with one stop less exposure. While not optimum, the exposure depicted here will likely produce an acceptable result, although the lower values can be expected to show less separation and possibly some noise.

▼ ***Diagram 11.3:*** *Histogram of another good exposure*



▼ ***Diagram 11.4:*** *Histogram for capture underexposed by one f-stop*

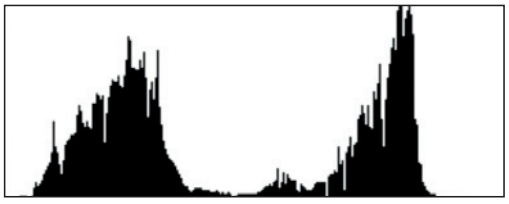
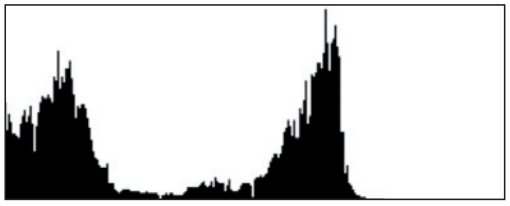


Diagram 11.5 shows the histogram of the same scene with 2 stops less exposure. The increased gap at the right edge and the bunching at the left edge indicate that the capture is now seriously underexposed. The concentration at and near the left edge tells us that the image will have blank and noisy shadows. Although a RAW converter may be able to pull out acceptable midtone and highlight values, there will be significant areas of empty black shadows and the overall image quality will be less than optimal. If the capture were made as a JPEG, and therefore as an 8-bit file, the print may show posterization. If your initial exposure shows a histogram with the right edge falling as far to the left as the one in diagram 11.5, give at least one stop more exposure and check again. You may need another half-stop... and maybe even more. Keep giving more exposure until you get the histogram as close to the right edge as possible.

Now, what happens when the brightness range exceeds the dynamic range of the sensor? Diagram 11.6 shows a histogram for such a scene. The histogram shows significant concentrations at and near both edges, which tells you that you cannot capture the entire brightness range of the scene in a single capture. Here, it would seem that you have a limited set of unpleasant choices: #1) Expose for good shadow detail by giving sufficient exposure to move the histogram away from the left edge and thereby cause additional higher values to be clipped; #2) Expose for good highlight detail by reducing exposure enough to move the histogram away from the right edge and thereby cause additional lower values to be rendered pure black; or #3) Expose for the midtones and live with empty shadows and blocked highlights.

▼ ***Diagram 11.5:*** *Histogram for capture underexposed by 2 f-stops*



▼ ***Diagram 11.6:*** *Histogram where the brightness of the scene exceeds the dynamic range of the camera*

Fortunately, these aren't the only choices. In the section below under the heading "High Dynamic Range Images—The Extended Zone System for Digital Photography", we'll see how to overcome those limitations and extend the range of the sensor by making multiple exposures at various settings and then, in the computer, integrating those several exposures into a single image. Not surprisingly, the decision of how to proceed depends on your desired interpretation of the scene. While the histogram cannot make the artistic decision, it provides you with the information with which to set the exposure to favor the shadows, the highlights, the midtones, or to make a series of captures that will record the entire brightness range of the scene.

Now that you understand the histogram, it's time to get a feel for how the histogram on your camera's display responds to changes in exposure, and in particular, increases in exposure as you approach overexposure. This time, let's capture a sequence of exposures with the camera on a tripod or placed on a tabletop. Choose as your subject an evenly lit, uniform surface such as an evenly illuminated interior wall. Place the camera a foot or so from the wall, turn off autofocus, use maximum focal length if you are using a zoom lens, and focus at infinity. The idea is to have as uniformly lit a target as possible. Take a series of captures from grossly underexposed (histogram bunched at the left edge of the display) to grossly overexposed (histogram bunched at the right edge of the display) using one-half or one-third stop increments.

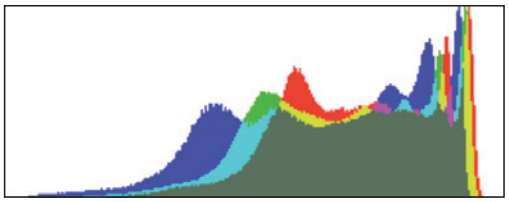
Scroll through the captures with the histogram display visible and you will quickly get a feel for your camera's dynamic range, and the amount by which the right edge of the histogram moves with each increase in exposure. The dynamic range can be estimated by counting the number of exposures (how many one-third or one-half stop exposures) it takes to have the majority of pixels move from the left edge to the right edge. Note the sensitivity of the histogram to increases in exposure as the right edge of the histogram approaches clipping. Your understanding of the relationship between changes in exposure and the response of the histogram will serve you well in quickly setting exposures in the field. So far, we have been working with the luminosity histogram, which displays the perceived brightness of the scene with color information being weighted to take into account human color perception. The luminosity histogram is usually sufficient if the final output is to be black-and-white, generally referred to as "grayscale". For more precise control, which is especially useful for high fidelity color output, you can view histograms for each of the red, green, and blue channels.

Most cameras allow the user to display the histogram for the three channels in one of a couple of formats: #1) In a three-channel composite similar to the one shown in diagram 11.7 or #2) in three distinct color channels similar to the one shown in diagram 11.8.

Both display formats convey the same information; a channel-by-channel depiction of the distribution of brightness in the capture. If your camera gives you a choice, pick the display that you find easier to read. At the risk of overselling, if you expect your final image to be rendered in color, it is best to view the three-color histograms rather than the luminosity histogram, because the overexposure—clipping—of any one of the color channels may result in a distortion of highlight colors. Even if the final image is to be rendered in black-and-white, it is helpful to capture all three channels of information for ease in making selections in your editing software and for maximum flexibility in converting the color capture into a grayscale image. Remember, every digital RAW capture contains the information from which a full color rendering can be produced, even if you intend the final product to be a black-and-white print.

Some cameras have a dedicated histogram button; other cameras permit the user to assign the histogram display to a button. If your camera has, or permits, the assignment of the histogram display to a designated button, you will save time

▼ ***Diagram 11.7:*** *Three-channel composite histogram*

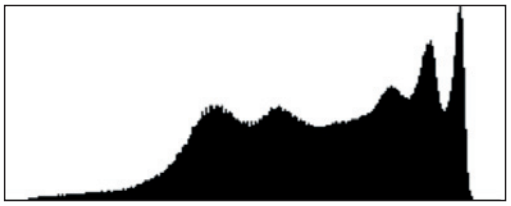


▼ ***Diagram 11.8:*** *Individual channel histograms*

Red

Green

Blue



and improve your images by making the assignment and using the histogram button to quickly review your exposures. As an additional aid, many cameras can be set to cause the display to indicate areas of underexposure and clipping by highlighting or flashing such areas in a contrasting color. The flashing display is particularly helpful when used with the histogram. If, for example, the histogram shows significant bunching at the right edge but the flashing display shows that the overexposed area is nothing but blank overcast sky, there is no advantage in reducing exposure. It's best to ignore the apparent overexposure and see if the shadows need additional exposure. If, on the other hand, the flashing area contains important detail, a reduction in exposure or multiple captures (discussed below) may be the best way to proceed.

So, let's prescribe a sensible sequence that will usually assure optimum exposure (this assumes the scene to have a brightness range within the sensor's dynamic range):

Start with a test capture at the exposure suggested by the camera.

1. Review the histogram.
2. If the histogram is now biased toward the right, you have your exposure and can make your capture. If necessary, adjust the exposure based on the histogram (i.e., give additional exposure if there is room at the right edge of the histogram, give less if the histogram indicates highlight blocking).
3. Take a new capture.
4. Recheck the histogram to see if your image is underexposed on the left or clipped on the right, and also (if your camera has this feature) view the image display to check which subthreshold areas or overexposed areas are flashing.
5. Readjust if necessary.

■ *The histogram is very useful in graphically indicating exposure, but its shape is of no artistic significance. The histogram may well indicate a perfect exposure of a perfectly horrible image.*

If your captures consistently require you to apply highlight recovery in your RAW converter, you are probably overexposing; set your camera to reduce your exposures by one-third of a stop and try a few more exposures, using the same procedure outlined above. Repeat the process until you get consistently well exposed captures. Depending on your camera's controls, it will probably be most convenient to remain in automatic exposure mode and use the overexposure/underexposure setting to bias the exposure for your current lighting and subject environment. Alternately, you can increase or decrease the exposure in manual mode. As long as the ambient lighting and scene conditions remain substantially constant, the same exposure bias should apply. Just be sure to view the histogram from time-to-time to be sure the lighting has not changed significantly. The histogram serves very much like a light meter in this respect, so use it that way.

If you intend to print in grayscale (i.e., black-and-white) you should nevertheless use RAW capture and, if possible, optimize the exposure as you would for color output. Full color high bit depth information will give you the flexibility to alter the grayscale rendering in a manner analogous to using different contrast filters when exposing film. In fact, with practice you can even go further, effectively using the equivalent of different filters for different parts of the scene. I can't tell you how often I wanted to use a red filter on the sky (perhaps to increase contrast between blue sky and clouds), and use a green or yellow filter to lighten the foliage in the foreground, but of course I couldn't do both in classical photography, so I chose the best option. Using channels, however, you can do something that's equivalent to my wishes by printing each portion of the final print emphasizing the channel you want for each location. This can be grossly overdone (please refrain from going overboard), but if done with subtlety and sensitivity, it affords a wonderful set of controls.

The histogram is calculated in real time by the camera's processor from a low resolution JPEG image, even if the camera is set to record only RAW files. Because the RAW data is recorded in high bit depth and receives only limited processing, the RAW capture is likely to contain more information in the highlights and shadows than is indicated in the histogram. All of the information contained in the RAW file can be extracted by the RAW converter discussed below.

Be aware that the histogram and, with some cameras the RAW file, may be affected by camera settings for contrast and sharpening, so you may find it desirable when working in RAW to dial down the setting for contrast and, if possible, turn off (or at least minimize) sharpening. If your camera has memory banks for retrieving camera settings, you will save time by setting one memory bank for your dialed down RAW captures, and another bank for your typical JPEG settings.

Keep in mind that while the histogram is very useful in graphically indicating exposure, its shape is of no artistic significance. The histogram may well indicate a perfect exposure of a perfectly horrible image. It simply tells you if the exposure is on target. Look to the end points for proper exposure; concentrate on compositional elements for artistic quality. Also realize that when you bias your exposures toward the right edge of the histogram, the camera display may appear washed-out. It's best to ignore that appearance. You may want to make a second, darker exposure to show you a better rendition of the final image you're after, but you'll get better results from the washed-out exposure for final processing, unless you've clipped the right edge. But even that washed-out display can be useful for examining distractions at corners and edges, and evaluating overall compositional cohesiveness. You will later fix the washed-out rendering in the RAW converter with simple adjustments.

The RAW Converter—Processing the RAW Capture

The processing of the RAW data into an editable image format such as TIFF or PSD requires a number of operations, including demosaicing (de–mosaic–ing), which is the interpolation of the brightness information from each of the photosites into pixels containing red, green, and blue color data; the modification of the linear brightness response of the sensor to correspond to the response of the human eye; the proper rendering of color by setting of the white balance and the making of color corrections through the application of a camera profile; the correction of aberrations; the removal of noise; the increasing of edge contrast, known as sharpening, to compensate for losses resulting from the projection of the image through the camera lens onto the geometric array of photosites; and lastly the saving of the processed image in a recognizable format such as TIFF or PSD. All of these operations, and more, occur in a computer program that we refer to as the RAW converter. A brief explanation of each of the processes is discussed below.

RAW converter programs go by any number of names, many of which do not include the word RAW. Among camera manufacturers, Nikon publishes *NX2;* Canon publishes *Digital Photo Professional;* Sony publishes *Image Data Converter;* and Olympus publishes *Olympus Master 2*. In addition, there are standalone conversion programs including *Adobe Camera Raw (ACR); Bibble 5 Pro,* published by Bibble Labs; *Capture One Pro,* published by Phase One A/S; *DxO Optics Pro,* published by DxO Labs; *LightZone,* published by Light Crafts; and *RAW Therapee,* published by RT Team as shareware, to name but a few. Because the structure of the RAW file differs from one camera manufacturer to the next, indeed, sometimes from one camera model to the next, and because some manufacturers encrypt their RAW files, make sure the RAW converter you choose is compatible with your camera.

Predictably, each RAW converter program has its characteristics and each program has its preferred sequence of actions referred to as a workflow. Also, as digital technology evolves, software engineers include an ever-increasing number of features in their converter software. Most software publishers offer a trial version, so you can try a few before buying. As with photographic films, enlarging papers, and developers, every RAW converter has its ardent supporters as well as its detractors. Again, as with traditional photography, you'll be best served by mastering the features of a limited body of software. For the discussion that follows, I'll use the ACR converter common to both Lightroom and Photoshop. The user interfaces and controls of other converters will be different but the fundamental principals will apply.

In summary, all RAW captures require subsequent processing outside the camera in a RAW converter. Each RAW converter has its unique user interface, controls, features, and workflow, and each will render the RAW file differently, in much the same way that different film developers will produce negatives with different characteristic curves.

While the controls for each RAW converter vary, most allow you to zoom to the pixel level, preview the results of prospective changes as you readjust the settings, and permit you to make iterative adjustments. That is, you can go back and change earlier settings based on the results of subsequent settings, and you can make any number of revisions before clicking on the Open Image button. For the preservation of the RAW capture, be sure the processed file will be saved separately from the original—you want the original RAW file to remain unaffected and the converted file to be saved in TIFF or PSD format.

▲ ***Figure 11–2a:*** *Image converted using Daylight white balance setting*

We will look at a brief summary of each of the following operations that are available in a RAW converter:

- Demosaicing
- White Balance and Camera Profiles
- Adjusting the Black Point, White Point, and Contrast
- Correcting Aberrations
- Sharpening the Capture
- Converting the Image to Black-and-White
- Output Formats and Bit Depth
- Batch Processing

Demosaicing

Demosaicing the color array is the process of filling in the incomplete color information resulting from the brightness data gathered through the CFA (color filter array). That is, the demosaicing process supplies, for each pixel, the two channels of color information not recorded through the specific photosite's color filter. The RAW converter does so by interpolating from information recorded at neighboring photosites. Because demosaicing requires the estimation of missing color information, and each converter uses a different algorithm, the color rendering of a RAW file will vary from one converter to the next. In other words, the computer fills in the red and green components for each site with a blue filter (and the corresponding channels for the other photosites) based on data from nearby photosites. The demosaicing process results in three grayscale images, one for each of the red, green, and blue color channels, which are integrated by the software into a full color photograph.

White Balance and Camera Profiles

Where the white balance of color film is set by the film's emulsion and the use of color correction filters (chapters 6 and 7), the RAW file is not color balanced. Instead, the camera's white balance setting is saved as a part of the metadata that accompanies the RAW capture and becomes the default white balance setting in the RAW converter. Importantly, as with the other setting in Adobe Camera Raw, no color correction will be made until the end of the conversion process, so you are free to change white balance settings, select intermediate color temperatures, preview the results, and change again, all without incurring any losses. This gives you immense control at any time, allowing you to change things as your seeing and thinking evolve.

In ACR, the color balance settings are controlled by the Color Temperature and Tint sliders found on the Basic tab. Figure 11–2a shows a RAW capture rendered in ACR using the As Shot color temperature. That is, ACR defaults to the camera's color temperature setting recorded in the metadata accompanying the capture, in this case the daylight setting of 5500º. If you measured the color temperature when you made the capture (a process discussed below), the measured value will become the default setting in ACR.

The ACR's White Balance drop down menu offers a number of preset color temperatures including Daylight, Cloudy,

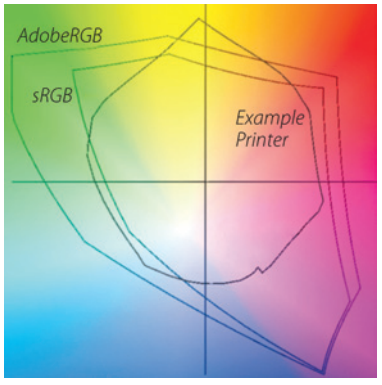
▲ ***Figure 11–2b:*** *This shows the same capture rendered using the Shade white balance setting*

Shade, and Tungsten, and you can select any value you wish by moving the Temperature and Tint sliders or by directly entering numeric values. Try the presets, move the sliders, and use the settings that render the image as you wish. As with the other settings in ACR, trying different white balance settings does alter the RAW data and is applied to the processed TIFF or Photoshop format file only when you open or save the image. When you save the converted image the file will be saved as a new file. The RAW file retains all of the information from the capture should you want to go back to your original and try other converter settings.

For images that require precise color fidelity (suppose you're photographing a 17th century painting for preservation purposes), you can first photograph a neutral gray or white target in the prevailing light. If you are using a DSLR or one of the more advanced point-and-shoot cameras, the camera will include the measured color temperature in the metadata, and the field determined color temperature will become the default white balance setting in the RAW converter.

Color temperature and balance are but two elements of the larger subject of color management—the science and art of causing each color in the scene to be rendered identically throughout the digital process. It is the goal of a color management system to cause the colors in front of the camera to be accurately rendered on your computer display, on the Internet, and on the final print. In reality, the goal cannot be achieved fully because each physical device has a limited universe of colors that it can capture, display, or print. Furthermore, reflective images (prints) have different properties than do light-transmitted images (such as computer displays and transparencies). The universe of color that any device can record or reproduce is known as its "gamut" and, in the real world, the gamut of the camera is larger than the gamut of the computer display, and the gamut of the display is different from and often larger than the gamut of an inkjet printer. Diagram 11.9 shows a graphic depiction of the gamuts of the visible spectrum,, the Adobe RGB color space, the smaller sRGB color space, and the gamut for a typical inkjet printer.

The task of maintaining color consistency across physical devices is the function of the color management system. Needless to say, the subject of color management is highly technical, and beyond the scope of the chapter. However, there is one part of color management that you should be aware of as you convert your RAW captures and that is the subject of camera profiles. Camera profiles are data tables used by the RAW conversion and image editing software to cause the computer display to render color as it appeared at the time of the capture.



◄ ***Diagram 11.9:*** *Graph of gamuts for human vision, Adobe RGB, sRGB, and a typical inkjet printer*

(Graphic created by Stephen Laskevitch.)

Camera manufactures and software vendors include profiles in their proprietary RAW converters, thereby insuring consistent color rendition across its family of cameras. ACR offers a default profile for almost all cameras and, for the ultimate in color control, allows the photographer to apply a custom profile for any specific camera and lens combination. If you are working with ACR, you can access any custom profile you may have under the Camera Calibration tab. As you work with camera profiles and white balance, keep in mind that color rendering is subjective and is therefore fair game for the exercise of artistic judgment. There are no absolutes; there are no rules. Always keep your options and goals in mind, for they're the heart of expressive photography (and, in fact, of all art).

Adjusting the Black Point, White Point, and Contrast

The response of the camera's sensor is linear, meaning that a change in brightness produces a proportional change in electrical response. Because the linear response of the sensor, without modification, produces a low-contrast, dull photograph, the RAW converter must modify the contrast to render an acceptable image. In addition, the RAW converter must set the black and white points, that is, the brightness levels which will be rendered pure black and pure white. In ACR, the settings that control what levels are to be rendered pure black, pure white and contrast are found under the Basic tab. It is generally useful to modify the settings in the order in which the sliders appear in the user interface. Here is where you can take the washed-out image that you see on your camera display and change it to get the full tonal range you want in the final print. On the Basic panel start by adjusting the Exposure, capture important highlight values using the Recovery slider thereby setting the white point, use Fill Light to lighten shadows, and Blacks to set the black point. Then proceed to the Clarity, Vibrance, and Saturation sliders for fine-tuning. Although editing the washed-out RAW capture can be postponed until you edit in Photoshop, it is generally best to get as close to the final image as early in the process as possible, and make your refinements later on.

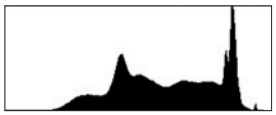
In ACR, the Exposure and Recovery sliders set the white point; the Blacks slider sets the black point. Together, the three sliders provide the pure black and pure white endpoint references from which the other tonalities are measured, however, the settings do not compel you to include pure black or pure white in your photograph. If you want to produce a high key image, increase the Exposure and Recovery settings to render the darkest portions as midtones or light tones. Don't confuse the setting of the black point with having a black in the image. ACR will set a black point, or you may well set a black point, but a high key image may still have nothing darker than a midtone gray. In other words, the black point is a reference from which other tonalities are measured, but you do not have to have any black in your image. So, setting a black point doesn't force you into having a black if you don't want one. Nor, of course, does setting a white point force you to have a white when none is desired. (See figures 3–4 and 3–5, respectively, as examples of images lacking a black or a white). Figure 11–3a shows a RAW capture and histogram converted using the ACR default settings.

The image looks too dark in figure 11–3a. Therefore, I lightened the overall appearance of the image by increasing the Exposure; the image is rendered lighter in value and the histogram will reflect the lighter rendering by moving to the right. As the histogram is driven to the right, pixels near the right edge reach the edge indicating that the brightest pixels will be rendered pure white. Conversely, decreasing the Exposure setting will darken the image and shift the histogram to the left.

While the Exposure slider shifts the entire histogram to the right, the Recovery slider controls the extreme highlights by

◀ ***Figure 11–3a:***
RAW capture converted with ACR default settings together with the histogram

◀ ***Figure 11–3b:***
RAW capture with Exposure (+0.9) and Recovery (67) adjustments together with the histogram



◀ ***Figure 11–3c:***
RAW capture with adjustments to Exposure (+0.9), Recovery (67), and Blacks (20) settings together with the histogram

Photograph courtesy of Bennett Silverman

allowing you to dial back the highest values. To fine tune the rendering of the extreme highlight values, move the Exposure slider to the right to increase overall exposure and then move the Recovery slider to the right to restore highlight details. Depending on the amount of exposure the highlights received, you may be able to recover detail in some or all of the highlights that appear in the camera's histogram display to be blocked. By working the Exposure and Recovery sliders, you can adjust the appearance of the image and, if the capture is not too badly overexposed, control which, if any, pixels will be rendered pure white.

As an aid in setting the white point, hold the Option/Alt key while moving the Exposure or the Recovery slider. The screen will appear black except for those areas that will be rendered pure white. As you move the Exposure slider to the right, more of the image will be rendered pure white and will appear on the screen. As you move the Recovery slider to the right, more of the highlights will disappear into the black screen indicating they will not be rendered pure white. Release the Option/Alt key to view the image. Again, be mindful that just because you have the control to render portions of the image as blank white, you are not required to do so and in most instances you will want only small areas of the image to be rendered pure white. Your artistic judgment should guide you in deciding which areas, if any, should be rendered pure white.

Figure 11–3b shows the result of increasing the Exposure value from the default setting of 0 to 0.9 and increasing the Recovery value from the default setting of 0 to 67 to preserve detail in the extreme highlights.

Thus far, we have addressed the lighter portions of the image; we now turn to the darker areas by setting the black point. This time move the Blacks slider to the right to render the darker portions of the image as pure black. To observe the areas that will be rendered pure black as you move the Blacks slider, hold the Option/Alt key while moving the Blacks slider. The screen will appear white except for those areas that will be rendered as pure black. Again, there is no requirement that you render large portions, or any portion, of your image pure black; use your judgment.

Figure 11–3c shows the image as adjusted with the Exposure and Recovery values used in figure 11–3b with the Blacks value increased from the default setting of 5 to 20. Note how the darker areas of the image have been lowered in value and the overall contrast of the image has been increased. The spike at the left edge of the histogram reflects the pure black pixels in the image.

Lastly, the display of your work, whether it is backlit as on a computer display or reflective as with an inkjet print, will influence the appropriate setting of the black and white points in an image. Backlit displays will reveal details in deep shadows that would be lost in an inkjet print. Similarly, highlight tonalities will appear different depending on whether they are backlit or reflective. Indeed, prints may need to be adjusted for different viewing conditions. Observation of your work under various lighting conditions will soon give you the judgment to relate the appearance on the computer display, and the numerical data from your software's color sampler, to your intended form of output. It will prove to be of great help to use the eyedropper tool in Photoshop as a densitometer to correlate the image on the screen to your output, and this will be particularly useful for printed output.

In practice, try all of the controls, observe the image as you change settings, and remember that you can keep changing the settings until you get the result you desire. In other words, play around with it. Toggle the triangles in the upper left and right hand corners of the histogram on and off to display any areas of underexposure and overexposure. See what you can and can't do. Experiment. Only when you tell the program to Open Image (or Save Image) will the settings be applied and the results be saved as a converted image.

In addition to using the Exposure, Recovery, and Blacks sliders in ACR, after you convert the RAW file you can fine tune the settings in Photoshop using either a Levels or Curves layer. To illustrate using Curves, first, create a new Curves layer: From the Layer menu select New Adjustment Layer and choose Curves. Photoshop will prompt you for a name for the new layer. Insert a descriptive name such as *Global Contrast,* and click OK. The Curves palette will open and present both the histogram and a default straight line curve. At the lower left of the histogram is a black triangle that sets the black point of the image. Moving the black triangle to the right forces darker pixels to pure black. Hold the Option/Alt key down and slide the black triangle to view the portions of the image that will be rendered pure black. Similarly, at the lower right of the histogram is a white triangle that sets the white point of the image. Moving the white triangle to the left forces brighter pixels to pure white. Hold the Option/Alt key down and slide the white triangle to view the portions of the image that will be rendered pure black. While you have the Curves layer open, you can adjust the overall appearance of the image by altering the curve.

Correcting Aberrations

The projection of the scene through your camera lens onto the photosite-CFA induces a number of undesirable effects including color fringing, vignetting, the introduction of noise, and loss of sharpness. RAW converters have a number of tools for the correcting of aberrations. Using a high quality, calibrated monitor, zooming in to 100% magnification, and having a uniformly lighted viewing environment will aid you in correcting your RAW conversions.

The uniformity of the viewing environment (i.e., the ambient lighting where you view your computer monitor) is critical, for if your ambient lighting changes throughout the day and night, you can't tell with any degree of precision what you're working with. You're playing a game with movable boundaries. So, if your monitor sits adjacent to an open window, things look quite different on a sunny day, a cloudy day, at night, or under any other set of changing conditions. If you're serious about obtaining the best possible images, you must create an environment where the lighting remains constant whenever you're working.

■ *If you're serious about obtaining the best possible images, you must create an environment where the lighting remains constant whenever you're working on your computer.*

In ACR, the Lens Corrections tab includes sliders to correct for color fringing and for lens vignetting. The Sharpening tab contains the settings for noise reduction. The Camera Calibration tab is the place to import and apply any custom camera profile you may have and to fine-tune the color rendering in each of the color channels. Move the sliders and study the results. When you have arrived at a group of settings that gives consistently good results with your camera-lens combination, you can save the settings for each tab in ACR and apply the settings automatically to any number of captures taken with the same camera and lens.

Typical of ACR, the settings are not applied until the image is processed, so you can go back and forth between settings and tabs if necessary, and your custom settings can be saved and recalled for reuse.

Sharpening the Capture

One area of image correction that deserves particular attention is that of sharpening. Each step in the process from capture to print causes a degradation in the sharpness of the image. The fix is what is referred to as sharpening and works by increasing the local contrast along the boundaries between lighter and darker portions of the image. In theory, the software finds edges (the boundaries between lighter and darker areas) and then darkens the darker side and lightens the lighter side of the edge. In practice, what Photoshop registers

as an edge may simply be an area of local contrast where you do not want to exaggerate tonal differences. To be effective, sharpening must be strong enough to carry the illusion of sharpness but not so strong as to create undesirable halos or visible outlines, introduce granularity in areas of more or less smooth tonalities, or worse yet, pucker skin tones. Not surprisingly, the difference between effective sharpening and oversharpening is often small, leading to the truism: sharpen but don't oversharpen.

Common practice is to perform sharpening in two stages. First, do a modest sharpening in the RAW converter to produce a realistic presentation with which to do your editing, and then do a second, output sharpening just before printing. Every photographer has his or her approach to sharpening and you will acquire your own.

To get started with sharpening in ACR, you will find the sharpening controls under the Detail tab. Zoom in to view the image at 100 %. To see the affect of your changes, first exaggerate the Amount setting, then refine the Radius and Detail sliders. As a rule, images with predominately fine detail (e.g., pine needles on the ground, old wood on an abandoned building, stonework inside a cathedral, etc.) often look best with a small radius setting such as 0.7–0.8, and images with areas of smooth texture (e.g., skin tones, lightly rippled water, smooth surfaces like concrete) often look best with a radius setting of 1.2–1.4.

Next adjust the Masking slider to confine the sharpening to the true edges. Increasing the masking slider restricts the sharpening to tonal differences that are more likely to be edges. If you want to view the mask as you make changes to the Masking setting, hold down the Option/Alt key and move the Masking slider. The black areas are masked and will not be sharpened; the white areas are treated as edges and will be sharpened. Finally, dial down the Amount until the overall effect is barely visible when viewed at 100 %. Use the preview checkbox to toggle between the sharpened and unsharpened versions. Refine as needed but resist any temptation to oversharpen. Depending on your camera, your computer display, and a number of other variables, you may find you need to increase or decrease the Amount. As you gain experience with different subject matter, you will acquire the judgment to sharpen any number of RAW captures of similar subject matter. You can save and recall the sharpening settings you routinely use.

The second stage of sharpening, output sharpening, should not be done until the image has been fully edited, saved as a separate file, resampled to final print size, and any layers you may have created in Photoshop have been flattened. The settings for the output sharpening depend on a number of factors including print size, image content (whether the image is made up of fine detail or broad areas of smooth tonalities), viewing distance, and the output medium (whether printed on glossy or matte paper).

Converting the Image to Black-and-White

In traditional (or classical) photography, you can use various contrast filters to cause black-and-white film to alter tonalities in the negative. Digitally, there are a number of approaches for converting the full color capture to grayscale. For example, in ACR, go to the HSL/Grayscale tab and check the Convert to Grayscale checkbox. On the image window, use the Target Adjustment Tool (use the v key as a shortcut) and drag the cursor over portions of the image. ACR will increase or decrease the percentage contribution of the color you dragged over. Alternatively, you can move the color sliders and observe the changes in the resulting grayscale image. Keep in mind that the resulting image will be saved as a grayscale image that you can convert to a three channel RGB image in Photoshop if you wish. In Lightroom you can use the On-Image adjustment tool to adjust the conversion of specific areas of the image. Using

Lightroom, in the HSL-Color-Grayscale box in the Develop module, click on the double arrow symbol to the left of the palette, place the cursor over any part of the image, press the mouse key, and move the cursor up or down. Moving up will lighten the value of the color beneath the cursor; moving down will darken the value. Make changes over other parts of the image and watch the grayscale image change.

As an alternative to converting in ACR or Lightroom, you can save the file as an RGB color file and do the conversion with a Black and White adjustment layer in Photoshop. In Photoshop, in the Layers Menu select New Adjustment Layer and choose Black and White. An Adjustment palette will open. Click on the On-Image adjustment tool (indicated by a pointing hand and a double arrow) in the upper left of the palette, go to the image, click on an area, and move the cursor left and right. Moving to the right will lighten the grayscale rendering of the color information under the cursor, moving to the left will darken it. Move to different areas and repeat until you get the rendering you want. Alternatively, or in addition to using the On-Image tool, you can work the color sliders in the Adjustment palette and observe the results. One of the features of the Black and White layer is that the layer is nondestructive; you can always revise the Black and White layer settings after you have made other adjustments. You can also make more than one Black and White adjustment layer, compare the results, and use layer masks to reveal different portions of different Black and White conversion layers. I discuss more about masking below.

Output Formats and Bit Depth

Output from the RAW converter should be saved using a file format that preserves all of your hard-earned data. The two most commonly used formats are TIFF and PSD. Although there are technical differences between the two, both will preserve all of your photographic information as long as you set the output to be saved in 16 bits/channel with the color space set to ProPhoto RGB. In ACR, the output settings are located at the bottom center of the image window.

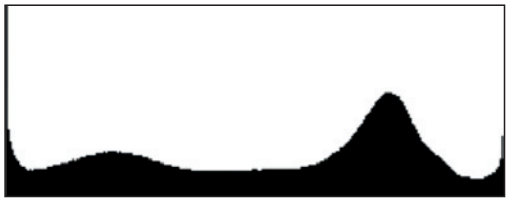
Batch Processing

To save time, RAW converters permit the batch processing of selected captures and will run in the background while you edit a different image. This means that you can apply the settings for a particular subject and lighting condition to any number of captures. To batch process in ACR, select the RAW captures you want to batch process using Command-Click (Mac)/Control-Click (PC) in Photoshop Bridge. Press Command-R (Mac)/Control-R (PC) to open ACR, click on one of the images listed on the left-hand side of the window, and fine-tune the selected capture using curves, color balance, or any of the other adjustments. When you are satisfied with the settings, press the Select All button in the upper left-hand corner of the window, then press the Synchronize button immediately below. The Synchronize panel will prompt you for a list of the adjustments you wish to apply to the other captures; the default is to apply all of the settings other than Crop, Spot Removal, and Local Adjustments. Because you selected captures of similar subjects under similar lighting conditions, you can go with the defaults unless you have a specific reason not to apply a particular setting to a capture. Press Save Images located at the bottom left. ACR will present the Save Options panel; complete the panel and click on Save. ACR will apply your settings, convert the captures, name, and save the converted files to the designated file folder.

High Dynamic Range Images—The Extended Zone System for Digital Photography

Suppose the brightness range of a scene exceeds the dynamic range of the sensor. The histogram will touch each edge as shown in diagram 11.10. This is where high dynamic range imaging comes into play.

▼ ***Diagram 11.10:*** *Another histogram where the brightness of the scene exceeds the dynamic range of the camera*



While the brightness range of the subject cannot be recorded in a single exposure, the entire range can be recorded, with full detail, in a series of captures that are later integrated into a single image. This is what is known an high dynamic range imaging (HDRI). The procedure is to first make a series of captures at various shutter speeds that, when combined, record the entire brightness range of the scene. You later combine two or more of these captures into a single photograph that has full shadow, midtone, and highlight detail.

Here's a good way to find a starting point for optimum results. Use a tripod, either a remote/cable release or the camera's self-timer, and mirror lock-up, if available, to eliminate vibration and to record all of the captures in registration. Focus any way you like (on a stationary subject) and then set the camera to manual focus to assure the camera does not change focus with successive captures. Set your camera to manual exposure mode (you don't want to change depth of field), select an aperture based on your desired depth of field, and make a test capture. Review the histogram of the test exposure and adjust the shutter speed (but don't change the aperture or refocus as changes will affect the depth of field or image magnification) so that the highlight (right) side of the histogram falls approximately one-quarter of the way from the right edge of the display. Now make your first exposure of the series.

Increase the exposure by a full stop and expose again. (Note: Generally, full stop bracketed increments are fine, though you may prefer greater or lesser steps.) Review the histogram—it will have moved to the right. Again, increase the exposure by a stop and expose again. Review the histogram again—it will have moved farther to the right. Repeat while incrementally increasing the exposure and reviewing the histogram until the shadow (left) side of the histogram enters into the display and falls approximately one-quarter of the way from the left edge of the histogram. That's it! You've now recorded the entire brightness range of the scene.

Even if you don't have a tripod, it is worth trying continuous drive and auto bracketing (where the camera automatically captures a series of shots with differing exposures). Hold the camera steady, lock your elbows in, hold your breath, and squeeze off your multiple exposures. Shorter focal length lenses and higher ISO settings will help. Pixels are free, so give it a try.

Now that you have recorded the full dynamic range, you'll combine the captures to make a final image encompassing the entire brightness range of the scene. You may not need all of the images, as there is will be significant overlap. Perhaps just two will suffice. Maybe three. Possibly more, though unlikely, and in most cases, unnecessary. There are a number of ways to combine several captures into a single image, and combining additional or different exposures will produce a different result, so if you are not satisfied with a particular combination, try different combinations.

Below, I describe four different approaches to merging multiple exposures. For approaches #1 and #2, you should

work directly from your RAW files. For approaches #3 and #4, you will need to start with TIFF or PSD files. If you plan to use any of the approaches other than the first two and have not done so, convert your RAW images into TIFF or PSD format using the converter's default settings. Save the files using names that include appropriate descriptions such as "Forest_Shadows" for the file with good shadow detail, "Forest _Midtones" for the file with the good midtones, and "Forest_Highlights" for the file with the good highlight detail. The techniques discussed below require that all of the images be of the same pixel dimensions, so work with uncropped images.

Now that the files are ready, we will look at four methods in which several captures can be combined. The choices include:

1. Using the Merge to High Dynamic Range Function in Photoshop
2. Using Two Captures and a Luminosity Selection in Photoshop
3. Using Layers in Photoshop
4. Third Party Software

1. Using the Merge to High Dynamic Range Function In Photoshop

I will first discuss Photoshop CS4 and then discuss HDR Pro found in CS5 at the end of this section. In Photoshop CS4, a high dynamic range (HDR) image is rendered in a two step process. In the first step, two or more exposures are combined into a single 32 bits/channel document using the Merge to HDR function. In the second step, the resulting 32 bits/channel file is downsampled to a 16 bits/channel and saved. The 16 bits/channel file can then be further edited in Photoshop. CS5 introduces a new feature, HDR Pro, that offers additional controls and integrates the combining of information into a 32 bits/channel file and the downsampling to 16 bits/channel into single procedure.

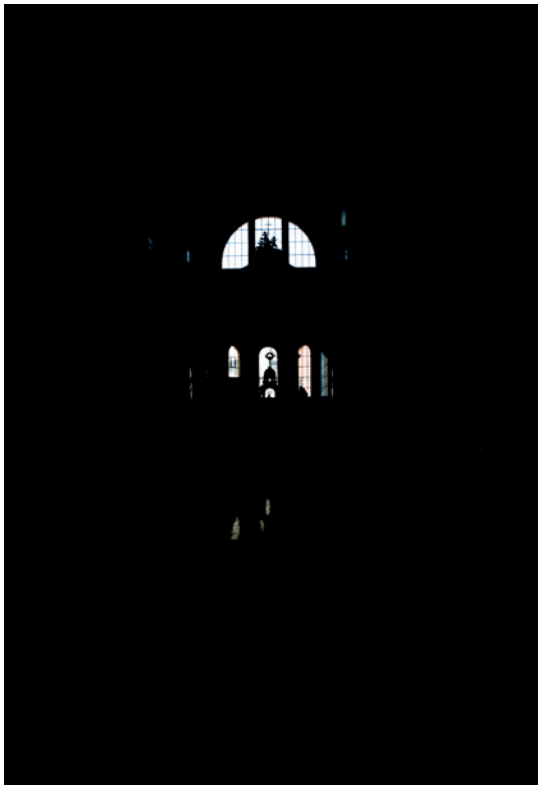
In CS4, you first combine any number of RAW captures into a single 32-bit/channel HDR image, which is so enormous that it provides a nearly open-ended numerical scale having the capacity to represent the dynamic range of any scene. In the second step, you direct Photoshop to convert the 32-bit/channel file into an editable 16-bit/channel file using one of four methods offered by Photoshop.

To accomplish the first step, merge the files; in the File Menu, select Automate and choose Merge to HDR, which will open the Merge to HDR dialogue box. In the Merge to HDR dialogue box, use Browse, select the RAW captures you wish to combine, and, if the captures were handheld, check the Attempt to Automatically Align Source Images box, and then click OK. Photoshop will load the files, perform some processing, and open another Merge to HDR dialogue box. Be sure the bit depth in the dialogue box is set to 32 Bit/Channel. The display will show an approximation of the file; don't be discouraged if the HDR approximation looks too bright and the colors appear distorted; downsampling will refine the tonalities and you will have ample data with which to make adjustments later on. Click OK and Photoshop will combine all of the data from the selected files into an HDR, 32-bit/channel file.

The 32-bit/channel file can be saved if you like, but must first be downsampled to a 16-bit/channel file in order to use most of the Photoshop tools. To downsample the 32-bit/channel file into a fully editable 16-bit/channel file, from the Image Menu select Mode and choose 16 Bits/Channel. An HDR Conversion dialogue box will open and allow you to choose one of four methods to convert to a 16-bit/channel file. Most often, the default method, Exposure and Gamma, works best, but you should experiment with the other three methods. In the Exposure and Gamma method, make changes to the Exposure and Gamma sliders; in the Local Adaptation method make changes in the Radius and Threshold sliders. Observe the display as you change methods and settings; use the result you prefer. Click OK and Photoshop will downsample to

▲ ***Figure 11–4a:***
Church interior, Reutte, Austria, exposed to record shadow detail. Note the loss of tonality in the windows and all bright architectural details.

▲ ***Figure 11–4b:***
Church interior, exposed to record midtone values. Note the loss of tonality on the windows and on the darkest interior areas.



▲ ***Figure 11–4c:***
Church interior, exposed to record detail in the extreme highlights. Only the clear bubbled glass windows, and their muntin separators, are visible.

16 bits/channel. Save the resulting 16-bit file and then edit it as you would any other image.

To illustrate this approach, and demonstrate the ability of multiple exposures to capture high dynamic range scenes, the three captures shown in figures 11–4a, b, and c were merged into the final HDR composite shown in figure 11–4d. The brightness range of the church interior was approximately 15 stops; far greater than the dynamic range of the sensor. Therefore, it was not possible to record shadow, midtone, and highlight information in a single capture. The capture in figure 11–4a was exposed to record substantial shadow detail, particularly the marquetry on the back of pews; the capture in figure 11–4b was exposed to record the predominate midtone values in the church; and the capture in figure 11–4c. was exposed to record information in the extreme highlights, including the lead muntins in the otherwise plain glass windows. The resulting HDR composite image is shown in figure 11–4d.

In Photoshop CS5, the integration of multiple exposures into a HDR 16-bit file is accomplished with the new Merge to HDR Pro function. In the File Menu, select Automate and choose Merge to HDR Pro. In the dialogue box, you can select one of four modes, selectable from the drop-down menu located at the top of the panel. The parameters applicable to the selected mode will appear in the panel. Local Adaptation offers the most control settings the greatest number of options and therefore is most likely to give you the desired rendering. But you should try each of the modes and select the one that gives you the result you prefer. In Local Adaptation mode, you

▲ ***Figure 11–4d:***
Church interior—high dynamic range composite. Combining the three exposures as described yields an image containing all desired detail, and projecting the magical brilliance of the ornate interior.

can adjust overall contrast and set the black and white points by selecting the Curves tab located in the lower right corner of the dialogue box and then working with the curve.

Be aware of the fact that there are no rules here; the correct settings are those that give you the image you want. Don't expect those settings to be the same for each image. Each one must be determined based on its own merits, which should be no surprise to you. Finally, a couple of technical points: If your capture was hand held, select the Remove Ghosts check box to compensate from any possible camera motion, and set the Mode to 16 bits to get a 16 bits/Channel file.

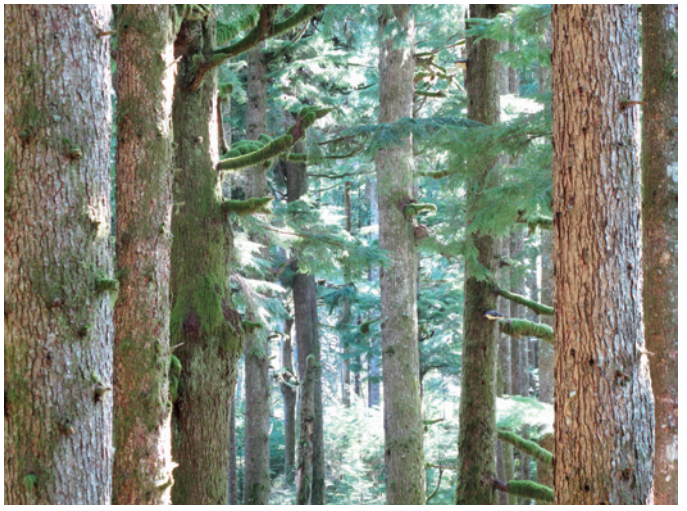
2. *Using Two Captures and a Luminosity Selection In Photoshop*

In many situations, the entire brightness range of an HDR scene can be recorded in two captures taken two or three stops apart. If the histograms of two captures fully contain detail throughout the entire brightness range (fully contained on the left; no clipping on the right), let the computer make a selection in proportion to luminosity and use the selection to paint on a layer mask. When you give the command to make a luminosity selection, Photoshop will select pixels in proportion to luminosity with white being 100% selected, perceived middle gray being 50% selected, and black not selected.

Prepare the two images in the RAW converter: refine the good highlight exposure to properly render the lighter values, and save it with a name that includes the term "Highlights" (figure 11–5a). Refine the darker values of the other capture and save it with a file name that includes the term "Shadows" (figure 11–5b).

Open the two images in Photoshop and arrange the two images so that both are visible, and be sure the Layers Palette is visible (if not, press F7). Next, make a copy of the Background in each of the images; do so by activating one of the two images and in the Layer Menu select Duplicate Layer, and then repeat the process for the other image. Now, rename the new

▲ ***Figure 11–5a:***
A highlight exposure of a Pacific northwest conifer forest on a sunny day. Made from a plateau in my own backyard, the highlight exposure retains the brightest highlight detail at the expense of dark shadow detail.



▲ ***Figure 11–5b:***
The shadow exposure of the same scene, with all highlight detail clipped, but obtaining full detail in the shadows.

Background Copy layers with the names "Highlights" and "Shadows", respectively.

It's time to move the Highlights layer to the Shadows image. To do so, select the Move Tool (v), activate the Highlights image, using the Move Tool shift-drag the Highlights image over the Shadow image, and release. The Highlights image will appear as the top layer in the Shadow image. If for some reason the Shadow appears above the Highlights layer, drag the Shadow layer down in the Layers Palette. Now that we have the two images as layers in the same photograph, save the composite as a new file with a file name that includes the word "Composite" in the title and close the Shadow file. If the captures were hand held, auto-align the layers, select all of the layers by doing a shift-click on every layer, and then from the Edit Menu select Auto-Align Layers. Photoshop will move the layers into alignment.

Now that you have both images in a single Photoshop file, the objective is to create a composite image containing shadow information from the Shadow layer and highlight information from the Highlight layer. In the steps set out in the next paragraph, you will make a luminosity selection of the Shadow layer (that is, select the brightest, and therefore overexposed, portions of the Shadow layer) and use the selection to create a mask on the Highlight layer. The luminosity mask will mask the darker (underexposed) portions of the Highlight layer, thereby allowing the good shadow detail from the Shadow layer to contribute to the composite. If this sounds confusing, try the steps below on a few images and the logic will become apparent.

Here are the steps. In the Layers Palette make the Highlights layer not visible by toggling off the eye symbol. Next, make the Shadows layer active and visible, and do a luminosity selection by pressing Command-Option-2(Mac)/Control-Alt-2(PC). Photoshop will select pixels of the Shadows layer in proportion to their luminosity; that is, Photoshop will select the overexposed and brighter portions of the Shadow layer. The marching ants on the display will outline the areas of the Shadows layer having a luminosity of 50% or more. The last step is to make the layer mask for the Highlight layer, which reveals the luminosity selection, that is, reveals the brighter portions of the Highlight layer and masks its darker portions. To make the layer mask, activate the Highlight layer and make it visible; in the Layer Menu select Layer Mask and choose Reveal Selection. Photoshop will build a layer mask that reveals

◄ ***Figure 11–5c:***
The color composite, using the methods outlined in choice #2, contains all the detail captured in the two exposures. A little further tweaking in Photoshop adjusted the relationships between highlights and shadows, with minor adjustments in color balance and saturation. The image is a pattern of tree trunks and foliage, with neither the tops nor the base of the trees showing anywhere.

◄ ***Figure 11–5d:***
Color struck me as immaterial for this image, so I converted it to black-and-white by using a Black & White adjustment layer and adjusting the sliders. The tonalities now take over, making it a stronger image, in my opinion.Your eye is carried past the three tree trunks on the left to the bright foliage and distant trees, giving a strong sense of depth, while exhibiting detail everywhere.

the lighter portions of the Highlight layer and conceals the remainder of the layer.

The result is a composite of two layers with the visibility allocated in proportion to the luminosity. You can fine-tune the relationship between the layers by reducing the opacity of the Highlights layer in the Layers Palette, and you can paint directly on the Highlight mask to modify the selection, as explained in choice #3 below. The luminosity mask is but one example of using a mask to restrict the effect of an adjustment in Photoshop to a particular portion of an image. Save the image and edit as you would any other image (figures 11–15c and 11–15d).

In the previous example we used the computer to make a selection based on luminosity. In the following section, we will discuss painting on layer masks to make and refine selections on each of several layers.

3. Using Layers In Photoshop

With this technique you will move the different exposures into a single, multi-layered Photoshop image, create opaque (black) layer masks, and by painting with white on the layer masks, select the portions of each exposure you wish to be visible in the composite image. There are a number of ways to make a composite in Photoshop; this is but one. After you do a few composites, you will understand the procedure of combining images and you can thereafter automate the process of moving the several captures into a single multi-layered composite using the Load Files into Photoshop Layers tool found in Adobe Bridge, included in Photoshop. As with most aspects of Photoshop, you can readily make modifications to the technique to serve you best. Because we will be working with layers, be sure the Layers Palette is visible throughout the process. If you do not see it, press F7 (or in the Window Menu select Layers).

Start by opening each of the TIFF or PSD files you wish to combine. As you open each image, the Layers Palette for that image will show a single layer named Background. When all of your files are open, arrange them so all are fully visible; in the Window Menu, select Arrange, choose Tile, and use your mouse to drag the images so that all are fully visible. The screen size of the images is not important. Pick the image that you think may contribute the largest area to the composite and for that image from the File Menu select Save As and save the file with a name that includes the word "Composite". We will refer to this file as the Composite. Each of the other images will be referred to as a *contributing* image.

Now, activate any contributing image and make a copy of the background layer; in the Layer Menu select Duplicate Layer. The new layer will appear as the upper layer in the Layers Palette with the default label "Background Copy" appearing to the right of the layer thumbnail; double click on the default label to select it and rename the layer using a descriptive name such as "Shadow" (for the image with good shadow detail), "Midtone" (for the image with the good midtones), and "Highlights" (for the image with good highlight detail). Repeat the sequence of making and renaming background copies for all the contributing images. At the conclusion of this step, the upper layer in the Layers Palette of each of the contributing images will be a duplicate of its Background with a descriptive name.

Next, move the newly renamed layers from the contributing images to the Composite. With each move, Photoshop will place a copy of the moved layer into the Composite as a new layer identified with the descriptive name. To move the first contributing image, click on any contributing image to activate it. In the Layers Palette, click on the newly named layer to select the layer, make sure the layer is visible (the eye symbol is displayed), and choose the Move Tool (press v or click on the crossed double arrows in the Tool Bar). Place the Move Tool over the approximate center of the contributing image, press the mouse key, hold down the shift key, drag the contributing image over the approximate center of the Composite and

release the mouse. Holding the shift key during the move will cause Photoshop to place the moved layer in perfect registration in the Composite.

Immediately after the move, a copy of the contributing image will appear as a new layer in the Composite; the Layers Palette will show the descriptive name, and because the newly moved layer is at the top of the Layers Palette, it will be the image you see on your monitor. To avoid clutter on your monitor, close the contributing file you just moved. Repeat the process of activating a contributing image, targeting the newly named layer, moving the targeted layer to the Composite using the Move tool and the shift key, and closing the contributing image until all your contributing images have been moved to the Composite. At this point only the Composite should be open.

After each move, the just-moved contributing layer will become the top layer of the Composite image and will therefore be the layer displayed by Photoshop. All the others are there; you're seeing just the top one—the last one you moved onto the composite. So you can ignore the appearance of the Composite image for now. When you have dragged all of the contributing layers to the Composite, it will contain all the images you wish to combine within the several layers. You can observe the contribution of any layer or any combination of layers by turning off layer visibility. At this point, save the Composite, making sure the Layers box in the Save dialogue box is checked to save all of the layers.

After you have built one or two composites in the manner described above, you can automate the process of integrating the captures into a single Photoshop file directly from Adobe Bridge. In Bridge, select the images you want to combine using the Command/Control key to select non-adjacent captures. When you have selected all of the captures, in Bridge from the Tools menu select Photoshop and choose Load Files into Photoshop Layers. Bridge will cause Photoshop to open a single file with each if the captures appearing as a layer. You can then name the layers and save the composite.

Once you have your multi-layered composite, if your captures were hand-held and therefore not in perfect alignment, use the Photoshop auto-alignment tool to place the layers in alignment; select all the layers by doing a shift-click on each of the layers, then, from the Edit Menu select Auto-Align Layers. Photoshop will move the layers into alignment. Save again.

Next, hide the contents of each of the layers other than the Background by adding a layer mask to each of the layers other than the Background. To hide the contents of a layer, target the layer in the Layer Palette and from the Layer Menu select Layer Mask and then choose Hide All. A layer mask thumbnail filled with black will appear to the right of the layer thumbnail. Repeat targeting layers and creating Hide All layer masks until all the contributing layers (i.e., all layers other than the Background) have been masked. At this point the Layers Palette will display black layer masks for all layers other than the Background. The screen image will show only the Background image because the black layer masks conceal the contents of all of the other layers.

It's now time to reveal the portions of each layer that you wish to contribute to the final image. For any masked layer, you reveal its contents by targeting its layer mask and painting over the image with the foreground color set to white, and you conceal the contents of a layer by first targeting (clicking on the layer mask thumbnail) and then painting on its layer mask with the foreground color set to black. In Photoshop logic, portions of a layer that are masked will remain concealed and will not become a part of the final image; those portions of the layers below that are not themselves masked will remain visible. Because you created Hide masks, all of the masks have been filled with black; you must paint with white on the mask to reveal the desired portions of each of the layers.

To begin, go to the Layers Palette, click on the layer thumbnail to make it active, be sure the layer is visible, and target the layer mask by clicking on its thumbnail. You will see that the

layer mask thumbnail has been highlighted. Visibility of each layer is controlled by the checkbox to the left of the layer thumbnail; the eye symbol indicates a layer is visible.

Select the Brush Tool (b), and use the open bracket ([) and close bracket (]) to size the brush; set the foreground color to white (press d to set the foreground and background colors to the black and white default colors; press x to toggle between black and white, and confirm that white is the foreground color), and dial down the flow rate setting located at the top of the image to approximately 20 %. Now paint directly over that portion of the image you wish the targeted layer to contribute to the final image. Repeated brush strokes will reveal more of the layer. You can paint freehand or use any combination of selection tools you wish to aid in making your selection. You can also increase or decrease the flow rate as desired. If you reveal too much, press x to switch to the foreground color to black and then paint over that portion of the image you wish to conceal. The layer mask thumbnail will show the results of your painting. To see the contribution of any particular layer, turn off the visibility of all of the layers above the subject layer and then toggle the visibility of the subject layer on and off.

Repeat the process of revealing portions of each layer by targeting a layer, making sure the layer is visible, targeting the mask for that layer, and painting. Toggle layer visibility to study the contribution of each layer and make refinements. If it appears you've revealed too much of any given layer, you can go back and paint on its layer mask with black to conceal portions of the layer and paint with white to reveal additional portions. You can change brush size by using the bracket keys and you can vary the Flow for fine control for feathering transitions. As you approach a final composite, you still can reduce the opacity of any layer; in the Layers Palette, change the opacity value. For ease in working with the several layers, you can move them up and down in the Layers Palette by simply dragging a layer to a different position in the palette.

Note that the ability to paint on layer masks, and thereby precisely select areas of the image you wish to modify, is analogous to having an unlimited number of custom shaped burning and dodging tools in the traditional darkroom. In this technique, we used layer masks here to create an HDR image. In Photoshop, layer masks can be used with every kind of adjustment layer, such as Levels, Curves, and Black and White layers to confine adjustments to a specific layer or selection.

When you are satisfied, save a copy of the composite: In the File Menu select Save As and save the Composite with a new file name. To keep your options open for future edits, do not flatten and be sure the Layers check box in the Save As dialogue box is checked. If you are pressed for disk space, you can flatten the image, but you will then be precluded from refining the selections and layer opacities. In either case, you can further edit the image as you would any Photoshop image.

4. Third Party Software

An effective way to automate the integration of multiple captures is to combine them in a third party HDR program such as Photomatix published by HDRSoft, or the stand-alone HDR PhotoStudio published by Unified Color Technologies. Trial versions are available, as are tutorials. HDR PhotoStudio features 32-bit logic that permits changes in brightness without corresponding shifts in color.

Photomatix offers several controls not available in Photoshop; but be selective in setting the Strength and Color Saturation. For more literal representations, dial down the Strength and Color Saturation controls, as exaggerating local contrast will produce a surrealistic result. As with Photoshop, combining different or additional captures will produce different results therefore try various combinations.

Practical Considerations, Cautions, and Recommendations

The ease with which you can take a series of bracketed exposures almost invites you to do so whenever your camera is tripod-mounted. I recommend doing that. It is the best way to fully capture highlight and shadow detail. You may not always use the extra captures, but this insures you for the times it is needed. For best results, use a sturdy tripod, mirror lockup (if available), and a remote/cable release or self-timer.

You can decide how many exposures you want to make automatically, and whether they should be 1 f-stop apart or less. Of course, you can always extend your automatic choice to make even more exposures when confronted with extreme contrast. I know some people who have programmed their camera to automatically make three exposures for every photograph. Some cameras have an automatic exposure bracket function that automates the making of multiple exposures such that once the base exposure has been set, all you need to do is release the shutter the requisite number of times. Keep in mind that combining just two captures made just a single stop apart (though I'd recommend 2 stops apart) can result in increased tonal separations in the lighter portions of the image.

Regardless of how you choose to integrate multiple captures, they can be used to record the full brightness range of the most contrasty of scenes. During post-capture processing, having photographic detail throughout the image will give you options for making artistic decisions on your final image.

A cautionary note is in order. You can overdo the combining of multiple exposures to the level of absurdity. Let me explain using a variation on the example in chapter 10 discussed in the "Masking" section. It is the example of photographing inside an abandoned miner's cabin, and showing both the inside and the exterior through the window opening. You don't have to find a miner's cabin to work with the same tough problem. Instead, suppose you're in a room in your home on a bright, sunny day. You set up your camera with the intent of photographing the room's interior, along with the outside through the window. There are no lights on in the room; it is lit solely by window light. Obviously there are two very different levels of light: inside the room and outside the room. Suppose you make just two exposures: one biased for good tonalities of the interior, and the second biased for good tonalities of the exterior. It should be clear from the previous discussion that you can readily combine the two captures into a single image. But the resulting composite may bear no resemblance to reality.

In reality, when you're in the room, looking at things within the room, the exterior is so bright that it almost blinds you. If you're staring out the window, the interior seems so dark that it appears almost black. A believable depiction would have good detail within the room—perhaps just a bit on the darker side, depending on how you wish to portray the scene—with the outside detail visible, but quite light...in essence, washed out a bit. All the exterior detail could be there, but it would be very high key. That would convey a more believable feel for the scene.

You can accomplish a believable feel (or any other feel) by inserting adjustment layers and layer masks, and then independently modifying the contrast and brightness of each of the two constituent images. Adjustment layers, including Levels and Curves, can be used to render the exterior capture in lower contrast high key, and use additional adjustment layers and layer masks to render the interior somewhat darker with lower contrast than you would use if you were printing the interior as a standalone image. Now you have an image that conveys a better sense of reality.

My observations are that too few people do this. Too many digital practitioners look upon these options the same way kids look at a giant toy box: "It's there, so let's go crazy!" I've seen images in which the exterior seems to be lit identically to

that of the interior. This makes no realistic sense, and is almost cartoonish. Keep your goals in mind. If you really want to create an abstraction, go for it! But if you want a sense of reality, think about the logic of light. In the actual scene, there could hardly be anything outside the window that is darker than anything inside. Maybe you can get away with a little tonal overlap, but not much.

The reason I bring up this issue is that the history of photography clearly shows that images with realism are the most powerful of all. Photography is extraordinarily good at depicting reality. This is why Jacob Riis's photographs of sweatshops in the late 1800s led to child labor laws, and W. Eugene Smith's photographs of victims of mercury poisoning in Japan awakened the entire world to the perils of industrial pollution, and Ansel Adams's photographs of the hidden interior Sierra Nevada Mountains led to the creation of Kings Canyon National Park. Photography is most powerful when it conveys a sense of reality and believability, not when it careens off into tonal or color illogic or utter silliness.

Since there are so many books written about digital editing and printing—books about Photoshop in particular—it seems unnecessary to double the size of this book while shedding no more light on the subject. Instead, let me recommend a few current books that seem to have the best advice on using Photoshop, which is still the industry standard.

For a comprehensive discussion of Photoshop, consider: *Photoshop CS5 Photographer's Handbook* by Stephen Laskevitch, Rocky Nook, 2010; *Real World Adobe Photoshop CS4 for Photographers* by Conrad Chavez and David Blatner, Peachpit Press, 2009; and *Adobe Photoshop CS4 for Photographers* by Martin Evening, Focal Press, 2009. For a thorough treatment of image sharpening, see *Real World Image Sharpening With Adobe Photoshop, Camera RAW and Lightroom,* Second Edition, by Bruce Fraser and Jeff Schewe, Peachpit Press, 2010. For an exhaustive discussion of techniques for making selections, masking, and compositing images, see *Practical HDRI–2nd Edition* by Jack Howard, Rocky Nook, 2010; *Photographic Multishot Techniques* by Juergen and Rainer Gulbins, Rocky Nook, 2009; and *Photoshop Masking & Compositing* by Katrin Eismann, New Riders, 2005.

Let me close this chapter by suggesting an idea that can be of value to black-and-white digital printers. It's the idea of making a 9-zone step tablet. I don't use anything like this for my classical printing because I've refined my inspection and evaluation of prints in the darkroom (see chapter 10), but you may find this to be of value at the computer to help correlate the image as it appears on the computer display with the tonalities of the black-and-white print.

To make the step tablet in Photoshop, open a new file (from the File Menu select New), size appropriately (say 4" × 8"), use the Rectangular Marquee Tool (m) to draw the boundaries of the tablet, select the Gradient Tool (g or Shift+g), set the colors to default (d), and draw a gradient from black to white. Then posterize the image: from the Image Menu select Adjustments and choose Posterize with levels set at 9. You can augment the step tablet by typing the ink percentage on each step using the sampling tool to determine the ink density for each step.

Print the step tablet on the same paper you use for your prints and have it available for reference as you refine your images. You can also paste the tablet onto the edge of an image you are editing for ready reference as you work. Use the sampling tool to compare values in the image to a known density in the step tablet. Note that I have intentionally avoided making recommendations for the placement of values. Objects in grayscale imagery are amenable to an almost unlimited variety of tonal renderings. Regardless of whether the process is traditional or digital, you should feel free to place values as you deem appropriate. The step tablet simply gives the digital photographer tonal references to help visualize the final image.

◄ ***Figure 11–6: Boy on Tricycle, Moho, Peru***
In the town square, just north of Lake Titicaca, I saw the Mondrianesque geometry and colors of the buildings, with the boy on the vendor's tricycle adding the extra touch to make the photograph sing. I quickly made the digital capture before anything changed.

CHAPTER 12

Presentation

A FINE PHOTOGRAPH deserves an appropriate presentation. The presentation should enhance the photograph without overwhelming or detracting from it. The frame or method of displaying the photograph should not draw attention to itself. The best presentation is understated, simple, and conservative. Showy presentations detract from the image and are needed only if the photograph is inherently weak. I feel that a fine photograph looks best when dry mounted. A dry mounted print has the structural support of the mount board, it lies perfectly flat, and it appears to have been given greater care than an unmounted print.

Corner mounted, overmatted prints have always enjoyed a degree of popularity, but I am somewhat ambivalent to them. Such prints can be made to lay reasonably flat with only a small bow or ripple; and if the mount board is damaged, the print can be easily removed and remounted on a new board. This has obvious advantages, yet I still prefer the look of a smooth, dry mounted print.

Research by the Center for Creative Photography at the University of Arizona shows that all dry mount tissue ever produced in the United States, and all dry mount tissue ever produced anywhere (with the exception of one produced for about 18 months in the 1920s in Czechoslovakia), has a neutral Ph, meaning that none of these can harm the life of the print. Furthermore, the research determined that dry mount tissue forms an impervious barrier between the mount board and the print, which means that dry mounting actually improves the life of any print mounted on a board that is not of archival quality. The hinge mounted or corner mounted print would be in direct contact with the inferior board, placing it in jeopardy of degeneration.

◀ ***Figures 12–1: Dream Distortions, Skrova***
It may be difficult—perhaps impossible—to determine what you're viewing in this image. That is intentional. Rather than thinking, "What am I looking at?" a more important question to ask yourself is, "Does the image interest or intrigue me?" If the subject is obvious, does it strike you as compelling, exciting, well-conceived? If it's not obvious, is it sufficiently interesting to hold your attention long enough for you to figure it out, or to just enjoy its mystery without seeking an answer? For any image to attract the viewer, it must be well exposed, well composed, well printed, and well presented. Previous chapters dealt with the first three issues; this chapter discusses the fourth.

On the other hand, suppose a print is dry mounted and stored under somewhat humid conditions, allowing mold to grow on the board. Then you're stuck! The board is irreparably damaged, and the print is permanently dry mounted to it. Some dry mount tissue claims to be removable when reinserted into the press at a high temperature. I'm skeptical about such claims on two grounds. First, I've never met anyone who has successfully dismounted and remounted a print; second, I wonder if the print emulsion would be damaged if the temperature were too high (though I've never found studies indicating that this is a problem).

Many digital papers lie quite flat and can be corner mounted and overmatted successfully, especially with computer-driven mat cutters (very expensive, but programmable to within one millimeter). Digital matte papers tend to lie flatter than gloss or semigloss papers, making them the prime candiates for this type of overmatting. I suggest that you research the various options before deciding which way to go with your own work, recognizing that you don't have to employ the same approach for every photograph. I still dry mount all of my work, for I feel that it finishes the photograph in the best way possible. I discuss my methods fully in the next few pages, but you may settle on a different approach.

To avoid contamination problems, it makes sense to use the finest quality museum mount boards made to archivally permanent standards, and to store them under conditions that won't allow mold to grow. Most mount boards of this quality are made of cotton fiber (so-called "rag board") and are manufactured by processes that do not utilize acids. Several manufacturers produce mount board of archival permanence from wood pulp, which is available in white and a multitude of colors. Often the stark white border of archival rag board is incompatible with the color tint of a warm-toned black-and-white photograph, or may be too harsh for a color photograph. Wood pulp products may help alleviate these problems.

For color photographs, matching the color of the mount board to a specific color in the print is virtually impossible, as well as undesirable. It's preferable to choose a color that is compatible, though not necessarily identical, to colors in the photograph. In general, the mount board's color should be somewhat muted so as to support, but not dominate, the image. There are exceptions to this rule (as there always are!), but they must be employed with a keen sense of overall design and visual impact. I prefer off-white, such as antique white, as the color for the mount or overmat of my color images. The softer white does not call attention to itself, and it's more compatible with the softer white of the color print papers (which are invariably softer than those of black-and-white papers).

For black-and-white photographs, white mount boards are universally accepted for fine art prints by galleries, museums, and collectors—virtually to the exclusion of any other color. This is a carryover from historical precedence in which the only archival mount board was the cotton fiber in pure white. Today, however, colored boards—particularly neutral gray—can be especially attractive because the brightest white of the print will not compete with the white of the mount board. The biggest stumbling block I have encountered with colored boards is lack of acceptance by galleries, museums, and collectors who are reluctant to break with tradition. I think this is shortsighted and unfortunate, because some images simply look better on colored mounts. In any case, I continue to mount on traditional white board because I would rather have viewers look at my images rather than question my choice of board. Perhaps greater flexibility will gain acceptance in time.

I feel that the presentation looks best if the texture of the mount board is compatible with the print surface. Because I prefer an air-dried gloss surface, I also prefer a smooth surface mount board—but not one with an obvious sheen, for reflectivity makes the board too glaringly bright and detracts from the image.

The size of the mount board compared to the print is also a subjective decision. A border that is too narrow is nothing more than a bothersome stripe around the print, and one that is too wide diminishes the importance of the print. I mount 16" × 20" prints on 22" × 28" board, though I prefer 24" × 28". Many galleries demand specific standard sizes for framing and display, and I am somewhat constrained by those demands. For the same reason, I mount 11" × 14" prints on 16" × 20" board, though I much prefer the proportions of 17" × 20". I mount 8" × 10" prints on 14" × 17" board (which I like very much), and all prints significantly smaller than 8" × 10" are mounted on 11" × 14" board. You may want to experiment with other sizes to suit your taste. Edward Weston used to mount his 8" × 10" contact prints on 13⅓" × 16" board—the size dictated by the fact that six such mounts could be cut with no waste from one 32" × 40" board!

Generally, the format of the print—whether horizontal or vertical—goes best with a board of similar format. Once in a while there may be a reason to mount a vertical print on a horizontal board or vice versa, but these instances are rare. In addition to compatible formats, all successful mounts I have ever seen are pleasingly centered left to right, with the print raised slightly above center. Anytime I've seen an off-center mount (usually with the print off in one corner), it has an affected, "cute" look. The emphasis should be on the photograph, and everything should be done to enhance it without calling attention to the mount or any other aspect of the presentation. When the presentation calls attention to itself, it detracts from the statement of the photograph.

Dry Mounting Prints

Dry mounting is a method of adhering the photographic print to a mount board for permanent display. It is done using a material known as dry mount tissue, a heat-sensitive glue that looks like waxed paper. When a sandwich of the print, the dry mount tissue below it, and the mount board are placed in a dry mount press (a large, flat press with heating elements), the dry mount tissue melts and glues the print to the board permanently.

The first step in mounting a print is to make the mount tissue adhere to the back. To do this properly, always preheat the print prior to tacking the dry mount tissue. This is not necessary for most color prints made on RC materials, but it's true of all fiber-based papers for black-and-white (which, of course, I recommend to the exclusion of RC-based black-and-white papers). Most fiber-based papers are not dimensionally stable; they expand when wet and contract when dried. As a result, most prints shrink slightly when heated because the heat drives out the moisture in the emulsion and paper base. If the print is not preheated before trimming, it will shrink during mounting; however, the dry mount tissue will not shrink, and a distracting, shiny line of mount tissue will be visible all around the print. It's important to note that all fiber-based prints are wavy and stiff if not heated prior to mounting, so preheating makes them more pliable and easier to work with. (RC papers are dimensionally stable and will not expand when wet or shrink when dry.)

Prior to tacking the dry mount tissue to the preheated print for trimming, carefully wipe the back of the print to remove any grit that may cause a bump in the mounted print. I do this with my hand rather than a brush because a brush often passes over a small impurity without budging it, while my hand will feel the bump, and I can then dislodge it. Then use a single stroke of the tacking iron in the center of the print, about two to three inches in length, to tack the tissue to the print. The traditional method of tacking—a large X on the back of the print—may cause ripples in the tissue at the junction of the X and result in an imperfect mount.

Once the dry mount tissue is tacked to the print, the two should be trimmed together. Trimming itself is extremely

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important, for this is your last chance to do any cropping of the image. Before trimming—and then again after trimming—check for minor edge distractions or intrusions that can be eliminated with another cut 1/32 or 1/64 of an inch in length. (Ansel Adams once remarked with his teeth clenched in mock anger, "I'd like to get my hands on the guy who invented 1/64 of an inch!") This is also the time to perform any more significant surgery, i.e., cropping. After all, it may be a stronger image at 15" × 20" than 16" × 20", or maybe at 11" × 13" rather than 11" × 14". Don't become wedded to the exact format of the purchased paper. You may even go to extremely long and narrow formats or square formats to achieve your strongest image. Don't hesitate to crop. Although I feel it's important to attempt to use the maximum area of your negative, I always advise cropping if it improves the image.

When the print is trimmed, it's ready for positioning on the mount board. Before placing the print on the board, wipe the surface free of any grit to eliminate any maddening bumps. Again, this should be done by hand, not with a brush.

Making Positioning Guides for Print Placement

To help position my print properly on the mount board, I have cut a number of positioning guides from scrap board. I have them for horizontal and vertical 16" × 20" prints, horizontal and vertical 11" × 14" prints, and so on. Sometimes I print an image slightly smaller than full frame for subtle variation of effect, as with a 14 1/2" × 18" print that is mounted on 22" × 28" board. When I do this, I use my guide for a "narrow" 16" × 20" print.

Making the guide is a bit laborious, but using it saves enormous amounts of time. Here is my procedure for making one: the width is chosen as the distance from the top of the mount board to the top of the print, while the length is the width of the mount board. My guide for a horizontal 16" × 20" print mounted on 22" × 28" board is 28 inches long and 3 1/16" inches wide, while the guide for a vertical 11" × 14" print mounted on 16" × 20" board is 16 inches long and 2 3/4 inches wide).

When cutting the guide, I must be certain that its width is uniform across its entire length, in order to ensure that the print is positioned parallel to the top edge of the mount. I place the guide atop the mount board and push both of them against a straight edge to ensure that the guide is parallel with the board. Then I position the first print against the new guide and measure carefully to make sure the sides of the print are parallel to the edges of the board. If they are, then I know the guide is properly made, and I have no reason to measure subsequent prints for parallelism. I then slide the top edge of the print along the guide until the sides of the print are equidistant from the edges of the mount board.

The print is now positioned for tacking. While holding the print in place (with the top edge firmly against the guide), I lift each lower corner of the print and tack it to the mount board with a short stroke of the tacking iron toward the corner. The first print to use the new guide for positioning is now ready for mounting, but to complete the guide, I make marks on it at the edges of the positioned print. Those two points are equidistant from the edge of the guide. I label those two points as the "0 point" (zero point) and mark off 1/16-inch intervals on both sides of those points. Each subsequent print is then placed against the guide, positioned equally from the 0 point, and immediately tacked. Positioning is a matter of seconds (diagram 12.1).

Prior to inserting the print into the mount press, inspect the surface for any grit, dust, dirt, or hair that may have fallen on the surface during the positioning process and remove it. To mount the print, place the board and its tacked print into the press and follow the instructions that come with the tissue. I use four-ply mount board as a cover sheet between the print and the upper heat platen of the press. If the pressure of your dry mount press is uniform and sufficient, and if your

temperature is uniform over the surface, you should get a perfect mount within 90 seconds to two minutes.

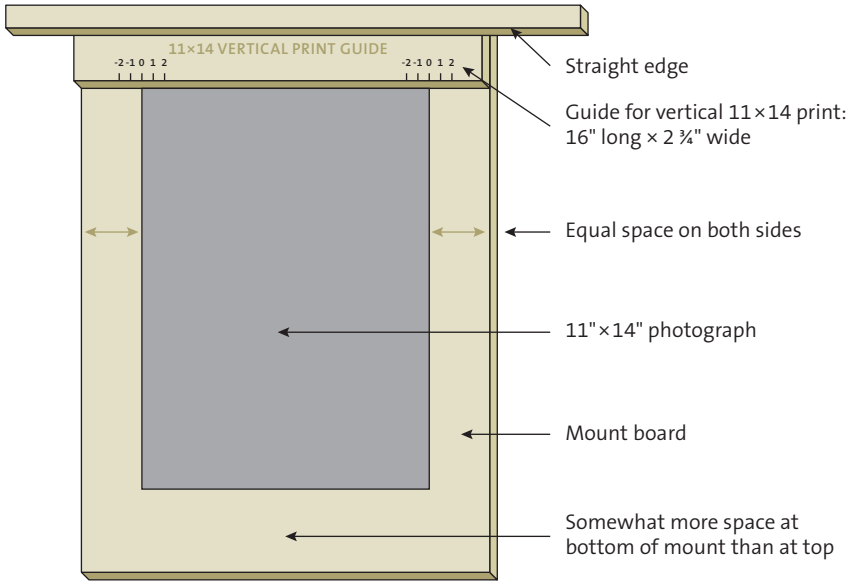
Spotting, Etching, and Correction of Defects

The mounted print must be devoid of any surface defects, including scratches, abrasions, creases, bumps (generally caused by grit particles embedded between the print and the mount board), or small craters on the surface (caused by grit particles pressed into the emulsion when the print was placed in the mount press). Such defects are extremely distracting on the otherwise smooth, flat surface. Galleries and collectors will balk at accepting prints with such defects, but more important, they should be unacceptable to you, the photographer.

If you work digitally, all spots on the print can and should be removed prior to printing. The most commonly used tool is the Photoshop clone-stamp tool, which allows you to place a nearby section of the print on top of any defect—e.g., a defect caused by dust on the camera sensor—thus removing it cleanly and completely. This is a photographic godsend that has no equal in traditional photography. But be careful: unless the replaced area is truly identical in color and/or tone to the area with the defect, it can be disturbingly apparent. The final print should be devoid of any distracting defects.

Sometimes the problems of bumps and craters can be corrected. For bumps, I have found that the gently rounded cap of a Bic ballpoint pen can be used to *gently* tap or press the grit particle down and into the mount board. I stress the word gently because if you push too hard, you'll create a wide crater that will never come out. Also, this procedure will rarely work if the embedded particle is between the print and the dry mount tissue, though it may work well if the particle is between the dry mount tissue and the mount board.

For craters, first place a drop of water (with a touch of Photo-Flo in it to break surface tension) on and around the crater, and let it fully absorb into the emulsion. Spread the droplet to a size of ¼ inch in diameter or more. This will swell the emulsion. Then, as the emulsion begins to dry and contract, repeatedly dab a tiny droplet of water *only* on the crater. This will keep it swollen as the emulsion around it contracts. Finally, let the original crater dry and contract. Unless the crater is too large or too deep, this may pull the emulsion flat and eliminate the crater. Several applications of the entire procedure may be needed if the crater is large, but it will eliminate all but the largest craters and greatly reduce the size of the largest ones as well.



▲ ***Diagram 12.1:*** *Positioning guide for mounting photographs*

There is no cure for creases in the print except to inspect the print carefully before mounting. If it's creased, tear it up, throw it away, and mount another one. Remember, you are your only quality control supervisor, and if you are satisfied showing defective prints, it's your choice!

Spotting is the method of removing white specks or spots on the print caused either by scratches on the negative or by dust and dirt during enlargement. I use Spotone as a basic spotting dye, diluted slightly with water to control its depth of tone. Spotone may be available at some photography stores, though it's now out of business; Marshall also has spotting dyes that I'm sure are just as good.

By carefully mixing several colors, you can obtain a color very close to that of your print. Use an eyedropper to measure

the amounts of each color, and make notes of the good combinations for future reference. The mix of colors depends on the paper you use and the way you tone your print, so no formula can be given. To mix the proper color, choose an unmounted print with a white border and attempt to extend a middle gray tonal area at the edge of the print into the border area. I generally start with a #3 gray, then add other colors as necessary to achieve the exact color of my print. I always mix and apply spotting dye under tungsten light rather than florescent because florescent has a discontinuous spectrum which yields incorrect color much of the time. If I can't get an exact color mix, I edge the color over to the desired color with a drop or two from another color spotting kit.

When I achieve the proper color, I apply the spotting dye with a No. 0 brush, a relatively narrow brush that comes to a very fine point. There are narrower brushes, but they don't hold enough liquid to apply for very long. Wider brushes are unsuitable for intricate work. Depending on the size of the spot, I either brush on the spotting dye gently or stipple it lightly by dabbing it onto the print with the tip of the brush. I gradually build up density to the adjacent densities surrounding the spot.

The instructions warn you not to use Spotone in conjunction with Photo-Flo. I recommend the opposite. I *always* put a drop or two of water with a small amount of Photo-Flo into the mixture to break surface tension and allow the liquid to absorb into the emulsion more thoroughly. If the liquid doesn't absorb into the emulsion, it dries on the surface and leaves a spot of excess sheen, which can be removed by light swabbing with a moistened Q-tip. This may remove some of the spotting dye, and an additional application may be needed.

Until recently, I did spotting or etching after the print was mounted so that I could work on a print that was stabilized and immovable. A print that is not mounted has a tendency to flex and pop as moisture changes, and even just breathing on the emulsion is sufficient to flex it. Inevitably, just when I hunch over the print to apply some spotting color, I exhale and the print jumps up ⅛ inch! This can easily create a black mark on the print.

However my method of applying spotting dye changed significantly in 2005 when I started printing extra-large mural prints. Of course, the size of any spot is enlarged along with the print size, and spotting large areas can be tedious and time-consuming. I found that I can very easily and successfully apply spotting dye when the print is fully washed, just before putting it on the drying screen. If the surface water is squeegeed off first, the wet print absorbs the dye remarkably well. I quickly learned that the brush must contain less spotting dye than usual or a dark mark occurs, since the wet print absorbs the dye so readily. If this happens, the print can be re-immersed in water and most of the dye will dissolve away after a few minutes. However, this method does not work well when you need narrow lines of spotting; the dye tends to spread into the adjacent area, causing a dark halo around the spot. For such spots, it's better to wait until the print is dried and mounted.

Another tip I'd like to offer is that for small white lines or small spots (usually caused by dust or hairs on either the negative or the enlarging paper), a standard #2 or #3 pencil can be very useful for spotting. Sharpen the pencil, and then rub its graphite edge on a piece of scrap paper until the point is a truly very sharp. Then use the pencil for spotting—not with the sharp tip, but with the edge of the graphite tip gently touching the print surface. If you press too hard or use the sharp point, you can indent the print surface. Then gently rub the pencil marks with either a cotton swab or the tip of your finger (make sure it's a clean swab or finger!) to smooth out the tonality. This method works amazingly well, and I use it often, especially in very light gray areas that require spotting.

Etching is used when a black dot or line mars the image. This is most often caused by a pinhole or a particle of dust or grit that was on the negative at the time of exposure, resulting

in a clear area that prints as black. I use an X-ACTO knife to gently—*very gently*—scrape at the surface of the print and wear away the emulsion (and the silver embedded in it) until the black line is reduced in density to mesh with the surroundings. I apply no pressure to the X-ACTO knife, letting its own weight be the only pressure, but simply guide the blade in a series of short, gentle scrapes. Avoid trying to dig out the black mark and gouging the print in the process.

If the black mark is excessively large, I may attempt to retouch the negative with Kodak's Opaque—a claylike substance that can be diluted with water and painted directly onto the clear area of the negative emulsion, rendering it opaque. When the negative is printed, the opaque area will print as a white spot that can be retouched with spotting dye without damaging the emulsion. What makes Opaque so attractive is that if you fail to put it on satisfactorily, you can wipe it off completely with a water-moistened Q-tip, allow the negative to dry, and try it again. You can do it incorrectly 150 times and lose nothing but time, and if you do it well the 151st time, you're done!

Print Finishing

Once the print—black-and-white or color—is spotted, etched, or hand colored, it only needs your signature. Put it on: it's your print! You should show it and be proud of it. But use restraint. Sign it lightly, not heavily so that it becomes a distraction. I use a No. 6 pencil, which is very hard. I recommend against using a No. 2 or No. 3 pencil, both of which leave a heavy signature that becomes a distracting graphic element.

I prefer signing a print on the mount board, just below the print on the right edge. Generally I place the date of the image below the print on the left edge. There are variations to this basic approach. Some photographers place the name and date together. Some just sign the print, ignoring the date as irrelevant. Few photographers sign the image on the print itself. If the print is not dry mounted, but hinge mounted at the corners and overmatted, it is best to sign the back of the print.

You may want to overmat and frame the print for viewing. Framed prints should be overmatted so that the emulsion of the print is separated from the glass. This is necessary, for alternating periods of humidity and dryness can cause the emulsion to stick to the glass and destroy the print. Glass offers protection from dust and grit damage; though reflections can be a nuisance, well placed lighting can overcome this problem to a great extent.

Please do not use non-glare glass. It places a slight fog across the entire image and slightly blurs sharpness, an effect that becomes pronounced if the print is separated from the glass. Plexiglas is a fine material to use instead of glass. It is lighter in weight and virtually impervious to breakage should the frame fall.

Framing, like mounting, is best if kept simple. It strikes me that this is a consequence of photography's inherently direct approach. Exceptions exist, of course, such as Marie Cosindas' color prints that are tastefully presented in ornate frames. But for the most part, such presentations of photography are out of character. For black-and-white photographs, metal sectional frames in brushed or polished aluminum work well; and for color photographs, finishes such as bronze are quite attractive. Plastic or plexiglass frames with thin, black borders are equally attractive. The array of possibilities abound. Just keep it simple and clean—let the photographs do the talking.

Presentation of photographs is a highly subjective matter. Don't feel compelled to follow my dictates as gospel. Nobody has a corner on the aesthetic market. There are innumerable variations of successful, tasteful presentations. Use the method that suits you best. My only caution is to avoid "arty" presentations that may garner attention, but are devoid of sophistication and are basically silly.

CHAPTER 13

Exploding Photographic Myths

DESPITE ALL THE PHOTOGRAPHY INSTRUCTION OUT THERE—and too often *because* of it—a number of patently incorrect ideas persist. These photographic myths must be laid to rest. They push photographers in the wrong direction. Let's reveal the invalidity of these commonly held beliefs.

Some myths have already been dealt with in this book. By approaching them in a somewhat different manner, and perhaps by imparting a different emphasis to them, this chapter may serve as worthwhile reinforcement. Several of the myth-breakers I will discuss are primarily geared toward traditional black-and-white photography, yet many of the concepts are extremely valuable to both traditional and digital photographers.

◄ ***Figure 13–1: Raspberry and Corn Lily***
The fascinating relationships between the wild raspberry leaves amidst the surrounding corn lily leaves caught my eye on the Iceberg Lake trail in Glacier National Park. Using my 4 × 5 camera with a 210mm lens, I aimed almost straight down, placing the raspberry leaves directly in the center of the image, making sure the edges were clean, with nothing distracting jutting in or leading the eye out. Does center placement break a well-known rule about composition? You bet it does! This chapter deals with several well-known photographic rules that deserve to be avoided, or better yet, discarded entirely.

Myth #1: The zone system gives you a negative that yields a straight print of exactly what you saw in the field, with no burning or dodging required.

This simply isn't true, but it's the most widespread misconception about the zone system. It's wrong because of the following fact: what you see and what the camera sees is quite different.

As you look at a scene, your eyes *scan* it randomly, jumping from important area to important area, seeing only small bits of the scene sharply at any moment. As your eyes jump from dark areas to bright areas, the irises open to let in more light when you look the dark areas or close down to prevent the full dose when you look at brighter areas. The brain, working in concert with the eyes, further opens up things in dark areas and closes down things in bright areas. In other words, you view every scene at multiple apertures. Without these automatic mechanisms, it could be very painful indeed to look at a bright spot after looking at a dark spot. Think of what it's like to come out of a darkened restaurant or afternoon movie into the bright sun!

The camera sees the entire scene at one aperture, the aperture you've chosen for the image. It cannot change the aperture to accommodate different parts of a scene. Thus, the camera does not allow the film or sensor to see what you see when you look at a scene. A camera is a mechanical/electronic device lacking the automatic features that allow your eyes to open up or close down. No matter how many remarkable features your camera may have, it still can't do this!

Since the camera can't see the way you see, you must learn to see the way the camera sees. You must learn when the brightness range is excessive, when it's just right, and when it's too low.

First, you have to expose the negative to get ample density and tonal detail in all areas where you want detail in your final print. With film, the zone system (especially the extended zone system—see chapter 9 and Myth #3 below) is extremely good at yielding the proper exposure to get everything on the negative with usable densities. If you're shooting digital and the range of light exceeds the sensor's capability, follow the histogram and make several exposures at various settings, which can later be merged into a single image with an extended dynamic range. Let's assume you've exposed the negative correctly to obtain ample negative density and/or tonal detail throughout. If the brightness range is excessive (i.e., if it's greater than you want it to be for the print you wish to make), cut back on your negative development to reduce the inherent contrast from that of the scene to that which you want to have on your negative. This is known as "minus development". If the brightness range is approximately what you want it to be in your final print, give the negative "normal development", which preserves the brightness (or contrast) range of the scene. If the brightness range is less than you want it to be, give the negative "plus development" to expand the contrast range of the scene. The amount of minus or plus development varies depending on how excessively contrasty or excessively flat the scene is compared to your vision of the final print. These are *artistic* decisions, not decisions based on *replicating* the scene.

I have consistently stated that it's necessary to develop the negative for the contrast range *you want to have* compared to the inherent contrast range of the scene. If a scene is high in contrast and you want even more contrast for your interpretive purposes, give the negative plus development. If a scene is relatively low in contrast and you want to soften it further, give the negative minus development. You're allowed to do it. It's legal! It's even artistically acceptable.

On the other hand, if you *always* give normal development to a negative when the range of the scene is about 5 zones, if you *always* give plus development when the range is lower than 5 zones, or if you *always* give minus development if the range is greater than 5 zones, you're doing "formula photography"

and you'll always end up with predictable, boring images. You'll rarely express yourself in a meaningful way. Your prints may be technically perfect with good blacks and good whites and all sorts of tones in between (see Myth #7), but they'll generally fall flat emotionally. You'll produce technical gems that say nothing.

Even if you've done everything right with your negative exposure and development, how often does light fall on every part of the scene exactly the way you want it to appear in the final image? Answer: very rarely! Most of the time, some shadows are too dark and some highlight areas are too bright, or vice versa. In a portrait, light may be glaring on one side of the face or on a shiny forehead, and the hair on the opposite side may be too dark. In a landscape, one hill among others may be too brightly lit with sunlight, while the others are under dark clouds, yet it is still within the tonal range of a fine straight print. All of the trees in a scene may be exactly the same brightness, yet it might look more interesting if some were lighter and some darker. For expressive purposes you want visual interest, not literal accuracy. Even in straight documentary photography, you may need some manipulations to smooth out ragged aspects of uncontrolled light.

In order to solve these problems, you'll need to dodge the areas you want lighter and burn the areas you want darker. The zone system can't make the light hit everything in amounts that always coincide with your wishes. The zone system is a powerful system, but it doesn't control the light in a scene!

Coupling that fact with the fact that the camera doesn't see the scene the way your eyes see it, it is obvious that the zone system can't be expected to yield a straight print without manipulation. In my lifetime, I've produced between 300 and 400 photographs that I would be proud to exhibit. Of those, only two are straight prints with no burning, dodging, or bleaching. Those two prints make me nervous. The next time I print either one of them, I'll dodge the upper right corner, then burn it back, just so I feel like I'm doing something useful in the darkroom!

I approach every print with the thought that manipulation is required. Most of the darkroom manipulation I perform is not to alter the print away from the scene I encountered, but to bring it back to the way I saw it. When I first peruse the scene, my eye/brain combination does much of the burning and dodging for me by adjusting the light intake (i.e., its aperture). This occurs automatically and extremely smoothly. I expect to be doing in the darkroom what my eyes already do for me at the scene (and perhaps a little bit more). The zone system can't do that for me, but it can give me a negative with solid densities and ample density separations so that I can perform those darkroom manipulations and create an emotionally charged image.

■ *Most of the darkroom manipulation I perform is not to alter the print away from the scene I encountered, but to bring it back to the way I saw it*

However, there are times when my manipulations are not intended to re-create the way my eyes saw the scene, but rather to alter it—and sometimes alter it greatly. This requires a vision in the field beyond the scene that I encounter. It requires me not only to recognize a good scene, but also to recognize a scene that has the potential for personal interpretation and creativity. There is no requirement in fine art to be true to the scene—only to be true to your artistic instincts and desires. The zone system can be used to make radical departures from reality. If I want to make a deep, dark forest scene glow in a dreamlike manner with high key tones (i.e., light gray and white tones throughout the image), I can use the zone system as a creative tool and expose the scene higher up on the zone scale than would be realistic. In a situation like this, the zone system is used specifically for an effect that is decidedly unrealistic, but one that may be extremely evocative and expressive. The zone system is a tool for creative expression just as much as it is for making straight prints.

I use the zone system for every one of my exposures, but I never expect a straight print to result from its use. That's where the darkroom comes in. The darkroom (or Lightroom or

► ***Figures 13–2a and 13–2b: Central Arches, Wells Cathedral***
When I encountered the Central Arches in Wells Cathedral in 1980, I was so overwhelmed that my project of photographing English cathedrals began instantly. Known variously as the "inverted arches" or "scissors arches", this structure was created between 1335 and 1338 as a retrofit to prevent the cathedral's central tower from collapsing. It has stood since then.

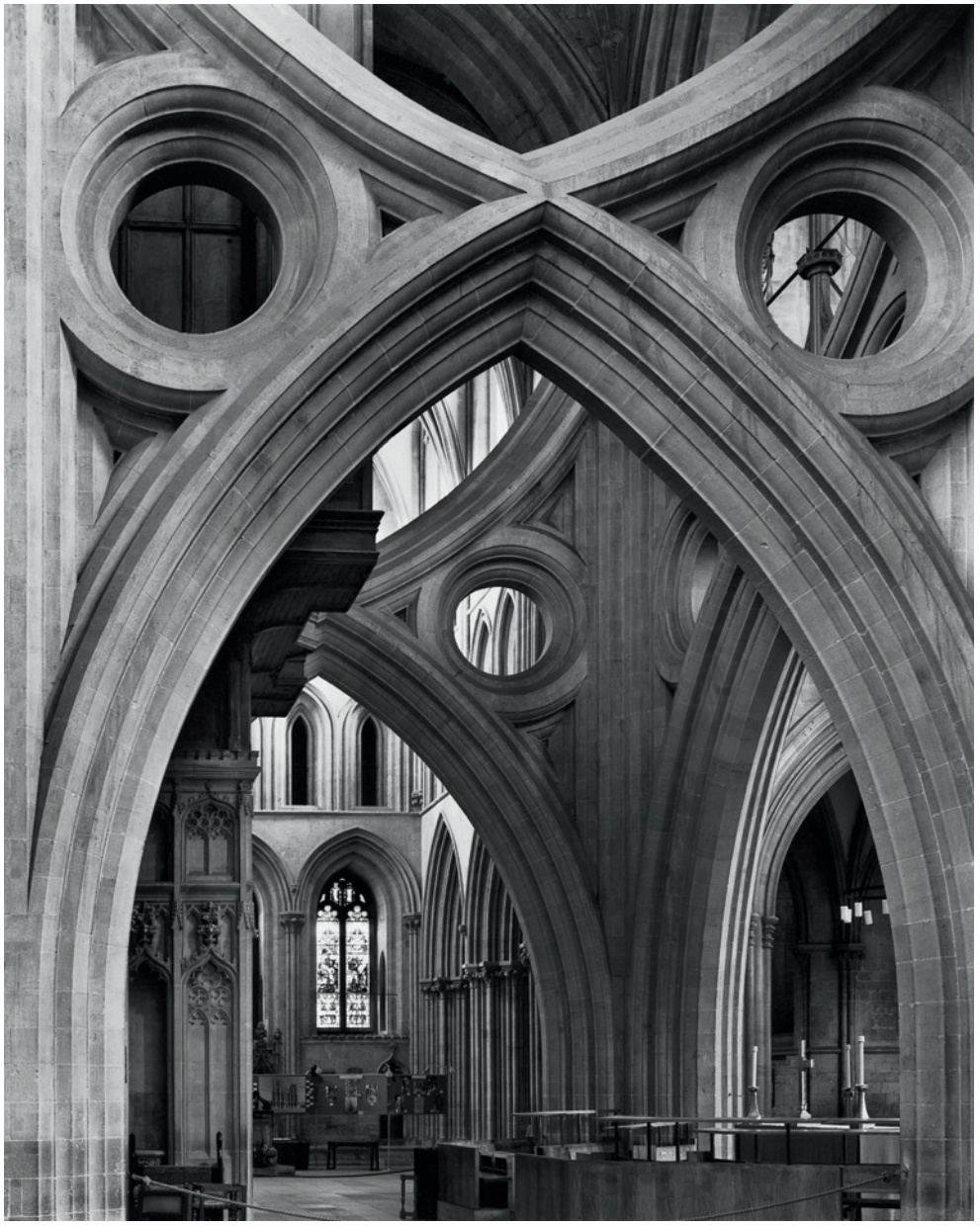
The distant window is an extreme highlight. The upper left corner, lit from an unseen window, is a secondary highlight. Distant arches in the lower right are the deepest shadows (figure 13–2a). The contrast range exceeded 10 zones, and a 15-minute exposure increased the contrast. I exposed the highlights in the mid-teens, then drastically reduced contrast with compensating development to bring the negative into a printable range. During printing, I burned the left edge and the upper quarter (with special emphasis on the extreme upper left corner), then burned the distant window at much lower contrast to bring everything back into visibility (figure 13–2b). It requires some work, but it's all there on the negative.

Photoshop) is a tool used to mold light passing through the negative, much as a sculptor molds clay, to form the image you want. If you expect to make a straight print, why have a darkroom (or computer)? Just send it to a lab and let them do it. They're just as good as you at making straight prints; they'll never be as good as you at molding the light to make the statement you want to make. If your desired statement is exactly what you saw, but the camera simply can't see it the way you saw it, you may have to manipulate it back to the way you saw it!

Myth #2: There are 10 zones in the zone system.

Photographic *papers* yield 10 zones, or doublings, of exposure from black to white. Negatives record far more than 10 zones, exceeding digital sensors in this respect (which is why digital photography may require multiple exposures to encompass the remarkable range of a single film exposure). Almost all panchromatic films cover 16–18 zones of brightness starting from threshold, i.e., the amount of light required to hit the negative material for it to be recorded.

Since enlarging papers yield only 10 zones of detail, most photographers think that exposing the negative beyond Zone 9 or 10 is useless. This is the heart of the myth. Since the



negative accepts density increases for about 8 more zones above this false ceiling, higher zones can be brought into play whenever necessary. In fact, many people already use these zones without knowing it.

For example, suppose you have a photograph of a landscape with a big, billowing cumulous cloud. When you make a straight print, the cloud may appear as a featureless white blob. That's because the density of the cloud on your negative is above Zone 9 or 10. So what do you do? You burn the sky and cloud, and soon the cloud begins to show good detail. You're actually using the portion of the negative exposed above Zone 9 or 10. You've probably done this many times without giving any thought to it and without even being scared.

Furthermore, suppose the landscape has large areas that go completely black in your print but have detail on the negative. You can dodge those areas during the darkroom exposure, allowing you to see the detail in those dark portions of the image. Thus, by dodging the dark portions of the print (i.e., the thinner portions of the negative) and burning the bright portions of the print (i.e., the denser portions of the negative), you obtain visible detail from a negative that has a substantial number of zones.

Take another example: Suppose you walk into an old, abandoned mining shack with great wood textures and shapes inside. There's a window that opens to a sunlit landscape. You expose the negative to get ample density for the interior, but the exterior is extremely dense. So you burn the hell out of the window, which gives you detail on the landscape beyond. Of course, you may get a black halo on the window frame if the burning overlaps it, or a white halo at the edge of the window if the burning doesn't go right up to it. You can avoid this by

reducing contrast in negative development. The point in this example is that by burning the window area, you add detail by using a portion of the negative with a density above Zone 9 or 10! And it didn't even faze you!

So, negatives contain very useful information above Zone 9 or 10. You may need some burning to access it, but you can get it! If you can print negatives with densities above Zone 9 or 10, why shy away from purposely exposing negatives to those higher densities? I've been doing it for more than four decades.

In my photographs of the English cathedrals, I wanted to convey a feeling of their presence. I wanted you to see everything that I saw when I stood there. The range of brightness in many of those images exceeded 8 zones, sometimes up to 10 zones. Yet I wanted detail everywhere. I knew that if I exposed the negative at Zone 2 ½ or lower, I would be on the toe of the exposure/density curve—stuck with low density separations and a very flat print (tonally flat, and dimensionally flat, as well). So I generally exposed the low values at Zone 4 or Zone 5, knowing that I would reduce the contrast during negative development by giving the negative minus development. The exposed Zone 4 would develop to a lower density, perhaps Zone 3 ¾ or so. The exposed Zone 5 would also develop to a lower density, perhaps Zone 4 ½, dropping a bit more than the exposed Zone 4 during the shortened development time. But the high zones would drop dramatically in the minus development, dropping many zones below its exposed value.

So, if I exposed the darkest areas where I wanted detail in Zone 4, the brightest areas would be exposed in Zone 12, maybe even Zone 13 or Zone 14. But that's OK. After all, the negative goes all the way up to about Zone 17. Minus development following exposure in the low teens can bring the developed density down to Zone 10 or so, making it easily accessible through burning in the final print.

I don't want to expose important detail on the toe of the curve, which is generally below Zone 2 ½, or above the shoulder of the curve, which is above Zone 15 or 15 ½ (chapter 9, diagram 9.3). Those portions of the curve flatten out and yield very poor tonal separations in the final print. But between the toe and the shoulder, i.e., on the straight line portion of the curve, the negative still gives me 13 zones of excellent separations (figures 13–2a and 13–2b).

Since 1980, I've exposed hundreds of negatives in the slit canyons of Arizona and Utah. I regularly expose the highlights in the low teens (i.e., Zones 13, 14, or 15), enabling me to get the maximum amount of detail onto my negatives below those bright highlights. Of course I reduce the development severely, reducing the highest densities of the developed negative. This allows the negative to be printable—usually with extra burning, but printable nonetheless. It's very difficult to print detail from negative densities that are up in the teens, but it's perfectly fine to expose negatives that high on the scale, then reduce those placements to printable densities during development. I simply use minus development on negatives exposed that high on the scale, usually with the two-solution compensating development detailed in chapter 9. Had I followed the misguided advice of some to expose highlights no higher than Zone 8, I could not have made many of my images in the cathedrals or the canyons (figure 13–3).

The middle of the straight line portion of the exposure/density curve is Zone 8 or 9. Most photographers avoid these zones, yet the middle of the curve is where the separations are best! I regularly expose negatives above Zone 9 or Zone 10, but I generally give "minus development" to such negatives to avoid excessive negative densities and printing times under the enlarger.

Many instructors are unaware of the remarkable range of negatives and are afraid of exposing them into the double-digit zones. Most students are afraid of such exposures because they've been taught by people who are unaware of the negative's true range. If you're avoiding higher zones (i.e. above Zone 9), you're throwing away opportunities to photograph in

◄ ***Figure 13–3: Oscillations, Antelope Canyon***
Many of my slit canyon images contain areas of non-textural black, but this one retains detail throughout because the lines and forms in the dark areas work so well with the fabulous forms in the central bright strip. My initial contact proof, made at low contrast, failed to show shadow detail, although the negative has good densities and separations throughout. Although I exposed the negative in 1984, I avoided printing it because I repeatedly looked at the contact proof, not the negative. But a look at it in 2002 told me that all the detail was there, so I finally printed it 18 years later.

places that may yield exceptional images. Don't be so narrow-minded. Break through the barrier of higher zones in your exposures. The negative has that range. Use it! When using high zones, reduce development to control them for later printing.

Why does the negative have such a long range when the paper doesn't? Interestingly, it turns out that the paper emulsion has virtually the same range! The difference is simply how you view the two items. You view a negative by transmitted light. You place a negative on a light box, and light comes through the emulsion so you can see it. When you look at a print, however, the light source is in front of it (and generally, behind you). It goes through the emulsion once on its way to the paper backing, then reflects off the backing and goes through the emulsion a second time before coming to your eye.

Instead of looking at a print with reflected light, try holding it up to a powerful light from *behind the print* (e.g., a 500-watt floodlight). You'll see detail in the deepest blacks that will astound you. Now you're seeing the paper emulsion via transmitted light, the same way you view a negative. In fact, next time you're printing in the darkroom, inspect your print under white light after you get it into the fixing tray. Look at the deep rich blacks in the print, then hold the wet print up to a bright light (with the light shining through the back of the print from behind). You'll be amazed at the range of detail within areas you thought were solid black. The paper emulsion equals the range of the negative emulsion (or, at least,

► ***Figure 13–4: Burnt Oak Silhouettes***
Photographed in thick fog just weeks after the massive 1978 Agoura-Malibu fire, the singed trees take on a cutout character with no detail on the bark. This creates a fascinating design unencumbered by textural detail.

comes impressively close to it); but because you see a print with reflected light rather than transmitted light, its range is severely reduced. Therefore, you must develop your negative to a low contrast range to encompass the paper's limitations.

This is a challenge, but it's not a problem. When the image is printed well, it looks extremely brilliant with deep blacks, glowing whites, and rich gray tones in between. You can get just what you want in a silver print from a properly exposed and developed negative. And you can do it in an extremely wide range of situations if you initially take advantage of the extraordinary range of contrast that a negative is able to handle. Don't hesitate to expose negatives into the double-digit zones.

Most photographers proceed with the *certainty* that if they expose negatives above Zone 7, they're getting into rough waters, and if they go above Zone 8, well, lord help them! Above Zone 9, forget it—everything is lost! This is patently absurd. Much of the effort I put into explaining the zone system involves getting students to unlearn the myths that are locked into their thinking. As baseball legend Satchel Paige said, "It ain't the things you don't know that hurt you; it's the things you know that just ain't so!"

There have been (and still are) well-known teachers who tell students never to expose above Zone 8. Further, they tell people only to develop "normally". They say that minus development

leads to flat prints. They're wrong. Theirs is a perfectly good approach in open, relatively even lighting situations. But it fails miserably when you get into unusual situations, such as those with extremely high or low contrast. It's an approach that limits your options. Virtually all of my photographs in the cathedrals or the canyons were exposed with highlights well into the double-digit zones, and nearly all were given minus development ... often compensating development! The prints aren't flat. They have a rich tonal palette. I've also made prints in low contrast situations, such as in fog, that also have a rich tonal palette (figure 13–4).

My approach is to expand options, not limit them. Using the full range of the negative expands options. Placing unnecessary limits on the range of the negative restricts the locations and/or lighting situations in which you can photograph.

As a final important aside, some people have the strange notion that if there are 10 zones, there must be 10 gray values. Not true. Going from one zone to the next higher zone involves a doubling of exposure (i.e., a full stop of additional exposure). But you can open up a half stop, a third of a stop, a quarter of a stop, etc., to increase exposure only slightly. Each of these choices represents a slightly different gray value. In fact, there are an infinite number of gray values, some so minutely different from the next that the eye cannot differentiate them. That's why black and-white prints can be so rich. The tonal scale is a smooth continuum, not a set of quantum jumps.

Myth #3: Shadows should be placed at Zone 3 in the zone system.

This is an idea about using the zone system that comes from the creator of the zone system himself. Ansel Adams urged photographers to place shadows in Zone 3, but I doubt that he used Zone 3 placement himself. His prints exhibit too much brilliance and illusion of spatial depth to have been given such low placement of shadows in his own negatives.

Let's look closely at the exposure/density curve (diagram 9.5) to see why Zone 3 placement is too low and why Zone 4 placement turns out to be much better. The toe of the curve is the initial, lower portion of the curve that is rather flat. This part of the curve yields very low density separations on the negative and consequently very low tonal variations on the print. So you don't want anything important on that part of the curve. (Note the emphasis on "important".)

The major part of the curve, the so-called "straight line" portion, is not flat. It rises at a steeper angle, indicating that for equal increases in exposure of the negative you get greater density separations in the developed negative than you get in the toe of the curve. Let's keep that in mind and consider what it means for a print.

Texture in any photograph is made up of small tonal variations in immediately adjacent tones. When you talk about Zone 3 texture or Zone 4 texture, you're not just talking about a Zone 3 tonality or a Zone 4 tonality; you're talking about small variations in tonality around that zone that comprise texture.

If you expose a shadow area at Zone 3, some of the densities on your negative are lower than Zone 3 and some are higher, yielding texture. They average to Zone 3. But if some of that texture is at Zone 2½ or less, it's on the toe of the curve where density separations are lower. Therefore tonal separations in the print are lowered, and the print begins to look flat. The word "flat" perfectly describes the unsatisfactory print you get. The print has the following two main flaws:

1. It is *tonally flat,* lacking in the good tonal separations that give it snap.
2. It is *dimensionally or spatially flat* because nearly identical tonalities yield prints that lack the appearance of spatial depth.

To avoid the unsatisfactory look and feel of flatness, expose the negative higher on the scale at Zone 4. With higher placement, those portions of the negative higher and lower than Zone 4 are still on the straight line portion of the curve, yielding far better tonal separations in the print.

You may object that the shadow is then too light in tone. Of course it is, but you solve that problem by printing it darker—down to your desired Zone 3—when you enlarge it. When you do that, you'll get a print with far richer tonal separations, one that exhibits far greater spatial depth. In other words, you expose and develop the negative so that the shadow densities are in the Zone 4 range, but you print it down to the Zone 3 range under the enlarger. It's that simple.

David Vestal, in an article in *Photo Techniques* (January/February 1999) said, "For detailed black stuff, I expose only one stop less than indicated." Thus, he found that he got better results when he placed shadow details in Zone 4 rather than Zone 3. Vestal also mentioned that Ansel Adams recommended Zone 3, but he himself found that "the resulting negatives are too thin". Vestal is worth reading; he has a lot of worthwhile things to say.

You may inquire, why are we always taught to place the shadows in Zone 3? Because most teachers and most magazine writers are sensitometrists, not photographers. They spend too much time testing materials and graphing them and too little time making photographs. When they look at Zone 3, they look at an exact Zone 3 tonality, not at a textured range that averages out to Zone 3. There is an immense difference between studying an exact Zone 3 tonality (lacking texture), and a Zone 3 made up of texture. The photographer's world is made of textures; the sensitometrist's world is made of tonalities. The difference is like day and night.

Sensitometrists pull out their trusty densitometers and get the perfect Zone 3 by exposing a gray card at that zone. All appears to be well and good. But when they expose a real scene with real tonal variations and real texture, their exposed Zone 3 yields closer tonal separations because the textures are made up of tones both above and below Zone 3. Some of the tones below Zone 3 dip into the toe of the curve. With a Zone 4 exposure, nothing dips into the toe of the curve, so the separations are greater. When you take a negative with Zone 4 texture and print it darker (back down to Zone 3 tonalities), you retain greater tonal separations in your print. Look again at figure 7–2b and specifically at the hill and rock area in the center, directly below the snow-covered mountain. That area was placed just above Zone 4 during negative exposure to retain maximum separations in those shadow areas, but printed significantly darker than Zone 4 to give the photograph the snap I sought. Had I placed those areas at Zone 3, I could not have maintained either the richness of tone or the feeling of depth that the image conveys.

Sensitometrists who work with step wedges and exact tones are like people who study a single musical note. Melodies, however, are made up of many notes creating a musical texture. You can't get the feel of a melody by examining a single note. Similarly, you can't get the feel of texture in a photograph by examining a single visual tonality. Sensitometrists are like piano tuners who make sure that each individual key sounds exactly right. You need them to keep the piano tuned, but you need a composer to write music and a pianist to play it. Photographers are both composers and pianists. It's wise not to learn how to play the piano from a piano tuner. It's equally wise not to learn about zone placements from a sensitometrist. I see too many sensitometric curves in photography magazines.

Photographs are not step wedges; they can be real art. They are meant to be personally expressive. They are meant to be seen by others and to move others emotionally. They are meant to communicate a thought, a mood, an experience, a moment in time, a fantasy, or any of dozens of other ideas from the artist to the viewer. They should be imbued with light and life. Exact curves and exact enlarging times won't get you

there. You've got to deviate from the densitometer readings and use different approaches from one print to the next if you want to say something.

I don't own a densitometer—never have, never will. It gives me no useful information. All I need to do is expose and develop a few negatives to tell me everything I need to know about how a film responds to light and how a developer works with that film. I know that however little or much I develop a negative—minus development, normal development, or plus development—the lowest zones look just about the same because they develop quickly and hardly get any denser after the first couple of minutes of development. The low zones tell me the speed of the film and also whether I exposed it properly. Then I look at the high zones to see how much density they have, which tells me whether I developed the negative properly. If I'm off by a little, I adjust my development procedure. Any such readjustment won't materially affect the low zones because they develop so quickly and so fully. Looking and adjusting is far better than testing.

In order to assure that I'm solidly above Zone 3 when exposing my negatives (i.e., above the toe of the curve), I generally set my film ASA considerably lower than the recommended value. For example, I shoot Kodak Tri-X rated at ASA 320, but for my purposes I rate it at 160 (a full stop lower than Kodak's recommendation). When I shoot Ilford HP5+ rated at ASA 400, I shoot it at ASA 300, a half stop lower than Ilford recommends. I do roughly the same for other films I use as well.

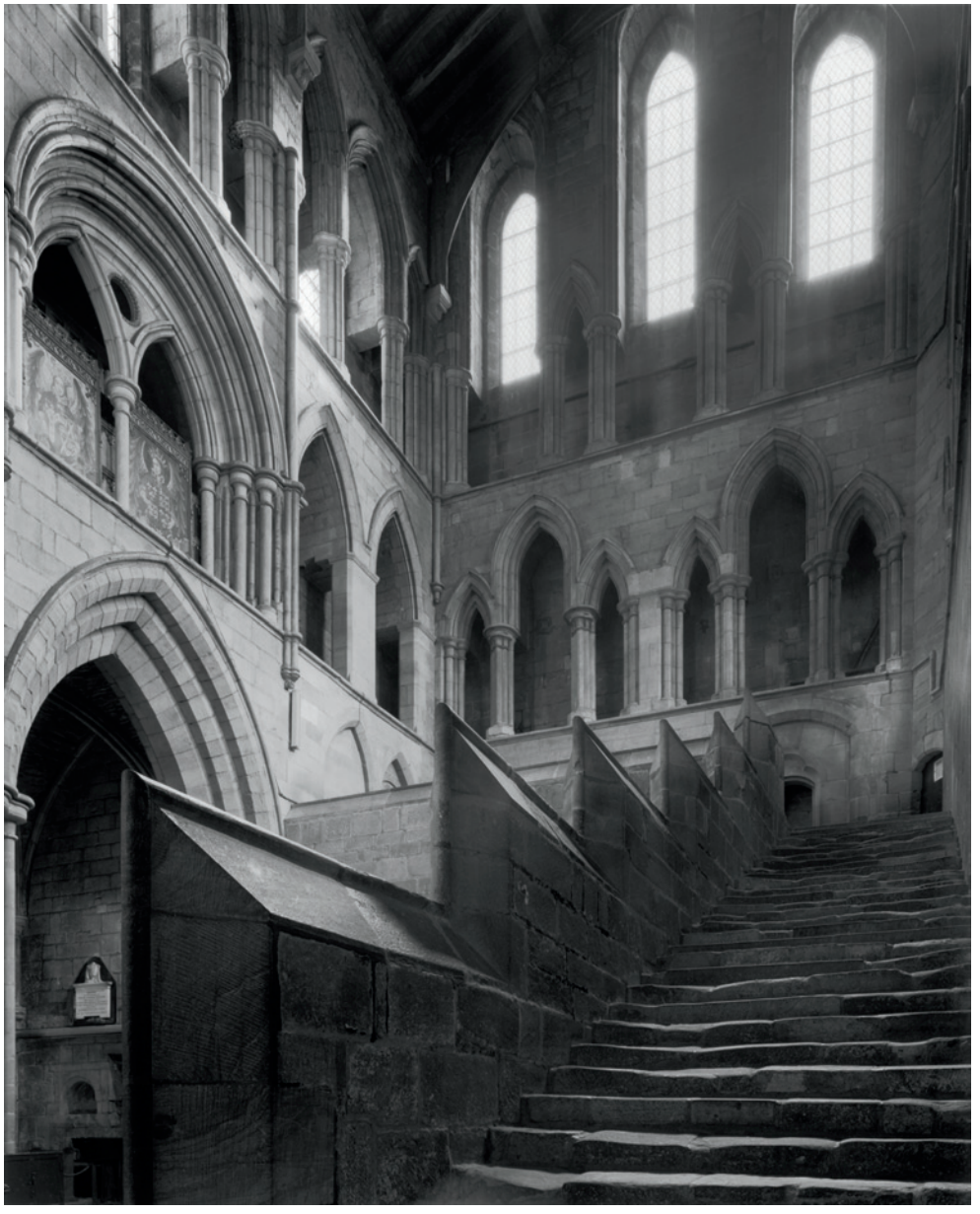
Even after lowering the ASA of the film, I still place my shadows in Zone 4. This makes my shadow placement closer to Ilford's or Kodak's (or your) Zone 4½ or Zone 5. It gives me a denser negative, but it still gives me 10 zones of good negative separations above that level before I run into the shoulder of the density curve. So I'm not losing any options. Of course, if I run into a scene with high contrast, I'll give the negative plenty of minus development to make the highlight densities printable.

In the article mentioned above, Vestal also pointed out that he often places highlights in Zone 9 ("I expose four stops more than the meter says for the bright tone.") That's perfectly fine, but it's also fine to place highlights even higher—way higher if necessary! I've done it for years with excellent, printable results.

My negatives have good, solid densities. They may require longer exposures or a more open aperture for enlargement, but when I place my shadows sufficiently high and develop appropriately for the highlights, I get all the separations and snap I want in the shadows. My prints are neither tonally nor spatially flat. The extra time under the enlarger does not materially shorten my life. It's not a problem.

Students should not be taught to keep their negatives thin. Negatives should be stout in order to yield good tonal separations from the blacks to the whites. It may be easier to focus a thinner negative, and thin negatives show lower grain—but what's more important, a negative with lower grain that is a bit easier to focus, or a print that's *alive?*

It turns out that Ansel Adams did photography an immense service by creating the zone system and an immense disservice by saddling people with the dictum, "Place your shadows in Zone 3." It's wrong. I doubt that he followed his own dictum. I place my shadows in Zone 4 or a bit higher. So does David Vestal, and I recommend that you do the same. You'll get better results. (And the sensitometrist's exposure/density curve explains exactly why ... when you shoot in the real, textured world!)



► ***Figure 13–5: Stairway, Hexham Abbey***
The south transept, with its remarkable stairway, is the only intact portion of this awesome northern England structure. The rest was demolished numerous times in the English/Scottish wars. It's a wonderful scene with exceptionally high contrast, from the windows at the top of the stairs (with the noonday sun just outside the rightmost window) to the distant alcove at the bottom. Placing the window at nearly Zone 15, and then compacting the contrast range with compensating development of the negative, I retained more than a 10-zone range of the scene on the negative in printable fashion. The print exhibits rich detail and tonal separations everywhere.

Myth #4: Negative densities should be within a fixed density range, and negatives that don't fit into that range are useless.

The first three myths directly involve the zone system. This one begins to move away from it, but not by much. It may seem like I'm fixated on the zone system, but I don't really think about it much in my own work because it's part of me. Just as you drive without thinking about driving, you can afford the luxury of not thinking about the zone system once you learn it. To use it properly, you've got to understand it so thoroughly that it's instinctive.

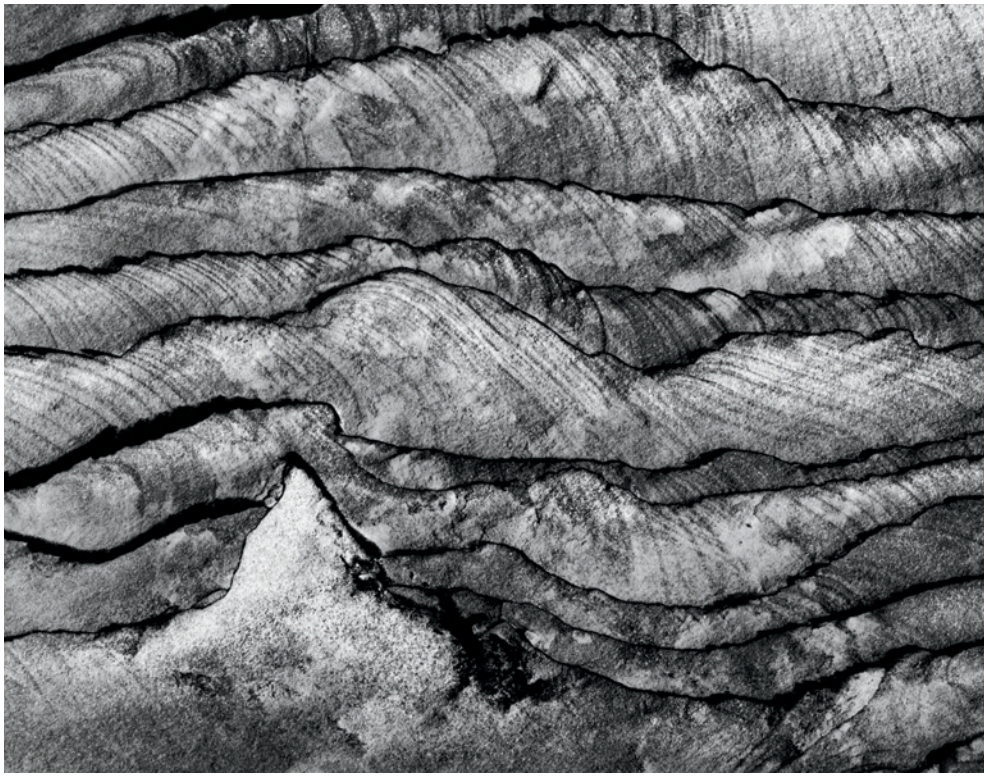
I've already pointed out that I use the full range of the negative. I don't expect all of my negatives to have the same density range, and they don't! Some people would say, "They're all over the board!" That's absolutely correct. Let's clarify this with a few examples.

Examples #1 and #2

Suppose I enter an old growth forest on a typically cloudy day in the Pacific Northwest, somewhere near my home. I can do an average reading on the forest and give it normal development, getting a range of tonalities from Zone 4 to Zone 8. (Remember, we're going higher on the scale for better shadow separations than the usual Zone 3–7 spread.) Let's forget about exposing this negative from Zone 3 to Zone 7, even if those are the tones desired in the final print (Myth #3). So, this negative now has a standard density range of Zone 4 to Zone 8. We'll call this example #1.

Suppose I have a different idea for this scene: I want it to look light, ethereal, and very dreamlike. The contrast range is the same, so suppose I expose this negative with a spread from

► ***Figure 13–6: Summit and Rolling Hills***
This flat sandstone formation in Phipps Wash, Utah struck me as a highly stylized, snow-covered mountain summit with rows of rolling hills trailing off behind it. Contrast was low, less than a zone from the brightest to the darkest portion. I increased contrast to the maximum extent in negative development, then printed at the highest possible contrast level (170 units of magenta filtration) followed by minor amounts of bleaching.



Zone 8 to Zone 12. Then I give that negative extreme minus development, or even compensating development, to radically reduce the high densities. The exposed Zone 12 drops down to about Zone 8½ or 9, while the darkest part of the scene drops from Zone 8 to about Zone 5½ or 6. (I'm not being exact here, but just using educated guesses. But then, I'm never *exact!* I fully expect to manipulate the print by dodging, burning, bleaching, etc., in the darkroom anyway, so exactness doesn't matter.)

Now I have a contrast spread of a little less than three zones, from about Zones 6–9 instead of Zones 8–12. If I print those values just a half zone lower, I'll end up with a high key, dreamy scene where the tones range from something lighter than a gray card all the way up to near-whites. Can you envision this hypothetical print? The negative that produces it is vastly different from the Zone 4–8 spread of the previous example. We'll call this example #2.

Example #1 is pure realism. Example #2 is pure fantasy. Both are legitimate. Both express a feeling about the place, but example #2 almost creates a new world out of the one I encountered. Its negative densities are all quite high, starting from an initial exposure that is substantially higher.

Example #3

I'm photographing in one of the English cathedrals. A distant stained glass window is eight zones brighter than a dark alcove off to the side. The rest of the cathedral is much darker than the window but brighter than the alcove. The distant window, along with others, is the source of the interior light. My goal is to render everything visible, with detail from the stained glass window to the dark alcove. If I place the alcove at Zone 4½, the window falls at Zone 12½. The rest of the interior architecture lies between Zones 5½ and 7½. Because the cathedral is rather dark, and I've closed my aperture for maximum depth of field, I need a long exposure. Then reciprocity failure forces even higher contrast (see chapter 9).

The highlight is so sensitized to light during the exposure that I give the negative compensating development (figure 13–7). This brings the window down in density from the exposed Zone 14 to perhaps Zone 10 in the developed negative. The alcove, too, drops in value to Zone 3½ or so, while the rest of the interior ends up around Zone 4 to Zone 6. This negative is moderately thin to average, except for the very dense window area.

Example #4

I find a flat rock with fascinating patterns that speak volumes to me. Contrast is very low—perhaps just one zone of difference between the darkest and brightest portion of the rock—so I want to increase the inherent contrast as much as possible (figure 13–6). If I underexpose and overdevelop, I can't increase contrast much because the low zones don't expand during

► ***Figure 13–7: Negative of Stairway, Hexham Abbey***
Note the high density of the three windows at the south transept and the relative thinness of the rest of the negative. However, detail with density separations is there throughout, as can be seen in figure 13–5.

extended development. So I expose normally and then overdevelop, an approach that I find far more effective than underexposing before overdeveloping.

If I place the average tones of the image around Zone 5 and give the negative maximum development to increase contrast, the average zone will end up around Zone 7 or 7½ with highlights near or above Zone 9. There may be a spread of 2–3 zones from the densest to the thinnest portions of the negative. This means that the negative may have values of roughly Zone 6 to Zone 9. This negative (figure 13–8) is considerably denser on average than that of Stairway, Hexham Abbey (figure 13–7), yet its greatest density is about as dense as the windows in that negative (compare figures 13–7 and 13–8).

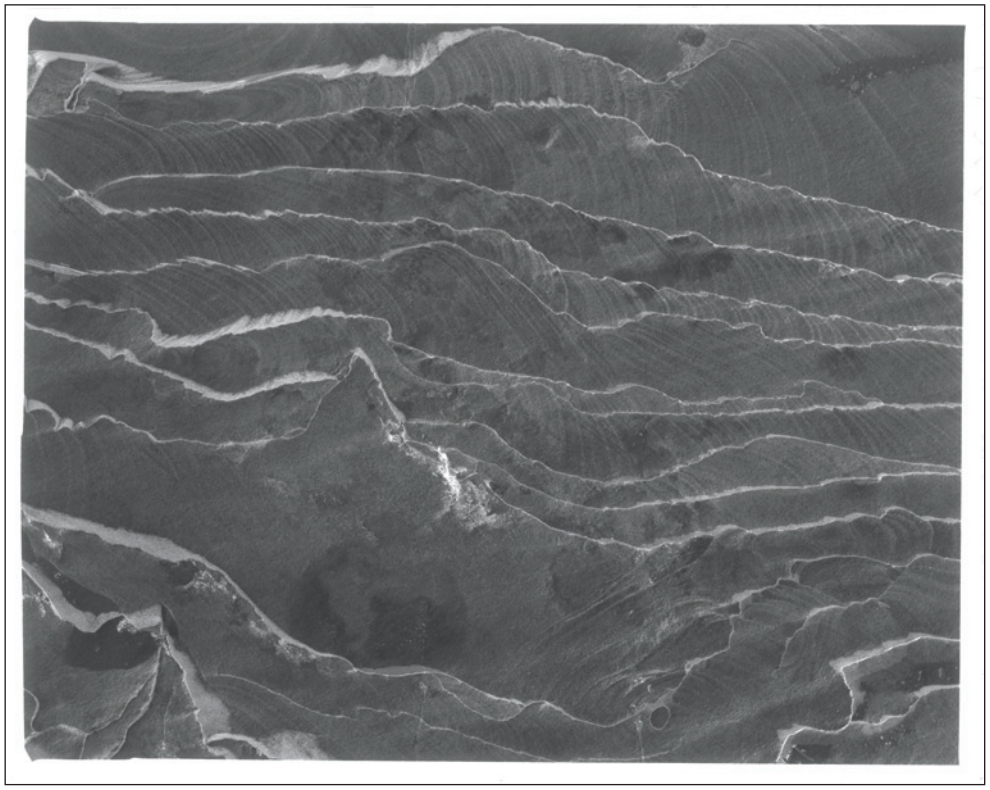
These two negatives have very different average densities and ranges. I can print example #3 by exposing the negative under the enlarger for the interior architecture and then burning the window, which otherwise would be blank white. For example #4, I'd print the average tonalities farther down on the tonal scale but use the highest contrast enlarging filter to further increase the contrast on the rock—contrast that I already partially expanded via extended negative development. Ultimately, the two prints will each have light and life throughout.

All four of these examples are good negatives, and all vary greatly from one another in density. Each one is designed to express my point of view about the world I've seen or the world I'm creating. Creating something different from reality is not only perfectly valid, but also wonderfully desirable. I couldn't make the photographs I want to make if all of my negatives had to be within a standard range.

Negative densities should be whatever they have to be. They should allow you to say what you want to say. Obviously, if you want to do a realistic version of a wintry snow scene in bright sunlight, you'll end up with a denser negative than if you want a realistic version of an open pit coal mine on a cloudy day. Those two perfectly realistic photographs will have to come from negatives that are quite different in average density. So, even within the realm of pure realism, there is no reason to expect all negatives to land within a fixed range of densities.

I have made negatives in the slit canyons of Arizona with exposures up to three and a half hours. Despite the long exposures, some portions of those negatives have no density whatsoever, indicating that areas of those canyons were so dark that no amount of exposure would have reached threshold. Yet the highlights are so bright that they have high densities even with compensating development. Some of these negatives end up way, way outside the realm of standard negative densities. Yet they produce some of my favorite, and most popular, prints.

You've got to get away from the thinking that everything has to fit inside a box. My negatives vary all over the board. Some are dense. Some are thin. Some are unnecessarily dense because I made a serious mistake somewhere along the line.



◄ ***Figure 13–8: Negative of Summit and Rolling Hills***

This negative of a very low-contrast scene—an evenly lit sandstone pattern—has relatively high density throughout. By giving ample exposure and overdeveloping the negative, I achieve a significant contrast increase and end up with a dense, but perfectly printable, negative (figure 13–8). The densest portions of this negative and the Hexham Abbey stairway negative (figure 13–7) are about the same; the remainder of this negative is far denser than the other, apart from the windows.

But I don't throw away those negatives. Some of them give me prints that I love. They're usable negatives, even if they're not perfect. I make no attempt to keep them within the boundaries prescribed by others. And I *often* expose my highlights above Zone 10...intentionally!

As I pointed out in Myth #3 above, underexposure yields flat prints and immediately ruins the possibility of making a good print. Overexposure, on the other hand, gives you a denser negative that requires a longer enlarging exposure, but the print will be just fine. In any reasonably standard situation (not cathedrals or canyons), you'd have to overexpose by 5, 6, or 7 stops to push the negative up to Zone 15 and beyond (where the negative flattens out on the shoulder of the exposure/density curve). But, if you underexpose by just ½ or 1 stop, you're below Zone 3 where the negative flattens out on the toe. As long as you're between those spots, you're OK.

The greatest sin in black-and-white photography is underexposure. If you overexpose, you get a denser negative, requiring a longer exposure under the enlarger when printing. The negative will also have a bit more grain. Other than that, you rarely lose a thing. The moral of the story: when in doubt, overexpose!

Loosen up! You don't have to be exact. In fact, being exact is a formula for disaster—or, at the very least, it's a formula for very predictable and very boring results. There's nothing about photography that's exact! Make sure you have enough exposure so you're on the straight line portion of the exposure/density curve. If you're a little too high, don't worry about it. You'll still have a perfectly workable negative. It may require a little longer enlarging exposure, but who cares? You'll have to manipulate the print anyway with some burning and dodging, just to make it look like the scene as you saw it—or as you envisioned it differently—when you stood behind the camera (please reread Myth #1). What can possibly be exact about a process like this?

Photography is an *art*. It is based on the *sciences* of light, optics, chemistry, computerization, etc., but if you get too hung up on the science, you lose the art. Understand the scientific basis, but don't worry about getting an exact Zone 5 to the fourth decimal place! After all, how many painters measure the hue of blue or red on some decimal scale? None of them! They look to see if it's the color they want. Then they work with it. Photographers should approach photography in a similar manner.

Not every negative has to fit a predetermined density range. Not every print has to have a black, a white, and all the tones in between. Some prints don't even want a black or anything near a black. (See Myth #7, below.) You can have a high

key (i.e., light toned) print without any blacks or dark grays. You can have a deep, moody, low key print with no whites or light grays. You can have a print with anything you want, as long as it effectively conveys the mood or feeling you want to convey. You can't convey your thoughts if you're restricted to printing by the rules. And you can't convey your thoughts effectively if you try to start with negatives that all have the same density range. It doesn't work. It can't work. You've got to have the flexibility and creativity to say something important, and you can't be creative if you're limited by arbitrary, restrictive rules. Throw them out, have fun, and open up to real creativity!

My educational background is not in the arts, but in the sciences. I have a bachelor's and a master's degree in mathematics from UCLA. I understand graphs. I can read an exposure/density curve, which tells me not to expose shadows in Zone 3. But I also think that following densitometry curves to determine exposures is absurd, as is remaining within strict limits in negative density range. You'll miss opportunities at every turn. You'll restrict yourself to a limited range of possibilities. It's bad enough when someone else imposes restrictions on any aspect of your life, so why impose restrictions on yourself? Break out of the box. Use the full range of the negative. Allow yourself the flexibility of negatives that vary in density. Don't feel guilty about such variation. Be proud of it. You're simply giving yourself artistic freedom. You got a problem with that?

Myth #5: All contact proof prints of negatives should be made at the same exposure.

As we just learned, negatives should not have a standard range of densities. Once you accept this truth, and once you start creating negatives that vary in density from one to another to best suit your expressive purposes, you will almost immediately discover that all contact proof prints should *not* be made at the same exposure. They can't be. If they were all made at the same exposure, you'd get very dark, unreadable contact proofs from thinner negatives and very light, unreadable contact proofs from denser negatives. In either case, you wouldn't obtain the information you need to decide how to print that negative. You might ignore a negative that is perfectly printable—perhaps a negative that is capable of yielding one of your finest prints. At worst, you might even throw away a potentially excellent photograph.

I vary my exposure for contact proofs to accommodate the wide range of densities I have on my negatives. However, I do keep one thing standard: the *contrast level* of my contact proofs. I make all of them at a fixed, low contrast level. This gives them a somewhat dull, perhaps even a slightly "muddy" look, but they give me an immense amount of information about the image.

That explodes the myth, but let's go farther. Let's look into the contrast level needed for useful contact proofs, then discuss how best to expose them. If I made my contact proofs at a medium contrast level, I might lose detail in either the highlights or the shadows on high contrast negatives, giving me little direction on how to print them. I'm looking for *information,* not *excitement,* in my contact proofs. The final print is where I want emotion; the contact proof is where I want information.

When I was printing contact proofs on graded papers, I made them on Grade 1 papers. Then, after exposing them, I developed them in a two-solution developer. I started out development in Kodak's Selectol-Soft for about two minutes, then moved the contact prints to Kodak Dektol for another two minutes or so. With this development method, I lowered the contrast even further—to about Grade ½, shall we say.

Now that I've switched to variable contrast paper, I lower the contrast level by dialing in 60 units of yellow filtration on my dichroic head enlarger. Let me explain this. On a dichroic

head (i.e., a three-color enlarging light source), you have white light as your source when no filtration is dialed in. The contrast level is about the same as normal contrast grade, or about Grade 2 on the graded papers. As you increase the magenta filtration, contrast progressively increases above the Grade 2 level. As you increase the yellow filtration (starting from white light), contrast progressively decreases below the Grade 2 level. So, with the yellow filter dialed to 60 units of filtration, I expose the proof and develop it solely in Dektol, giving me the same overall contrast level I formerly obtained on graded papers.

It turns out that a contact proof of a negative exhibits about the same contrast as the enlarged image at the same level of filtration. (This is true of diffusion light sources but not condenser light sources. Most enlargers made today feature diffusion light sources: cold light, dichroic light sources, or variable contrast light sources. I will assume that most readers are using a diffusion light source on your enlarger.) If I like the contact proof's contrast level, I dial in 60 units of yellow to make an enlarged print. If the contact proof looks low in contrast, then I dial down the amount of yellow filtration (which increases contrast), go to white light (i.e., no filtration), or even go to a low amount of magenta filtration. If the contact proof looks very low in contrast and muddy, I might dial in quite a bit of magenta filtration, say 50–75 units. If it *really* looks muddy, I may go all the way up to 150–170 units of magenta, the highest level that my LPL enlarger achieves.

On the other hand, if the contrast level of the proof looks too high, I begin printing by dialing in more than 60 units of yellow filtration. The more contrast that the proof appears to have, the greater the amount of yellow filtration I dial in to lower it.

Low-contrast contact proofs give me a great deal of information about how to approach printing my negatives. I recommend you adopt this procedure. If I varied the contrast level from negative to negative when making proof prints, I'd never know which ones were made at high contrast and which were made at low contrast, and I'd have no stable starting point. A fixed contrast level gives me a solid foundation for analyzing my negatives.

My method of making contact proofs

Let's now turn to my method of exposing the negatives to make usable contact proofs. I place two sheets of 8" × 10" enlarging paper atop a thick foam pad under my enlarger and four 4" × 5" negatives on each sheet of paper. I cover the entire setup with a ¼" sheet of glass, heavy enough to press the negatives into direct contact with the enlarging paper.

The eight negatives normally vary in density. Often there are considerable density differences among them. So I expose them all to the amount of exposure needed to get a good proof of the thinnest negative. Of course, there may be other negatives in the group that have the same relatively low density. After making that exposure, I place 4" × 5" sheets of cardboard atop the glass over each of those negatives, preventing any further exposure. (I use the cardboard sheets that come with the 4" × 5" film for this purpose.) Then I give additional exposure to the next densest negative in the group and cover that negative with cardboard. I continue giving additional exposure to successively denser negatives until I expose the densest one fully. Then I develop both sheets of paper to yield eight proof prints.

Of course, I don't always guess the perfect exposure for all eight negatives, but time and experience make my guesses reasonably good. If any of the eight are much too light or much too dark to yield useful information, I simply expose them again in the next group of eight negatives. If I still get it wrong, I do it a third time, or as many times as needed until I get a useful contact proof print. Once I get a usable proof, I'm finished with that negative, as far as proofing is concerned. After drying the sheets, I cut them into individual proofs, throwing away the bad exposures.

If I'm proofing roll film, I place a full roll (cut into strips) on each 8" × 10" sheet of paper and do the same procedure as outlined above: exposing for the thinnest negative(s), covering them, and then exposing successively denser negatives on the roll until all are fully exposed. Hopefully I get useful information on all of them. If too many fail to give me usable information, I'll do the entire roll again. I do *not* cut roll film proofs into individual negatives because the individual proofs would be too cumbersome or get lost.

■ *Darkroom work is a continuation of the work that started in the field. Printing is not a separate act of photographic creativity; it's the next step on a continuum.*

I always study a contact proof extensively before enlarging it. Why? Because it tells me how I should approach printing the negative to obtain the image I want. Remember, I was behind the camera when the scene was exposed, so I know how I felt about it at the time. I made a series of decisions in the field to put me on the right path toward my statement. Now that I've developed the negative, I study the contact proof to see how I can carry that vision into my final print. If I don't study that contact print thoroughly, I'd be starting my printing from scratch, as if I were starting with someone else's negative. Yet I always allow myself the option of seeing the image anew and going in a vastly different direction. I try not to be dogmatic or rigid. A new vision may be more worthwhile than carrying through the thoughts I had while in the field.

Darkroom work is a continuation of the work that started in the field. Printing a negative is not a separate act of photographic creativity; it's the next step on a continuum. For example, I have often developed a negative to higher contrast in an already contrasty scene. I realized while I was behind the camera that I could use the darkroom to burn down the brightest areas, but that the higher contrast negative would give me better local contrasts within the scene. Thus, I was thinking about how I would *print* the negative even before I *exposed* it (figure 7–1). Seeing the process all the way through is known as "previsualization". It's part of knowing what you want, learning the zone system, understanding the full capabilities of the negative, and recognizing the options in the darkroom to help get you there.

A writer has a good outline of a book before starting the story. A composer has a concept of an entire piece of music before composing. A painter has an idea of a painting before committing to the canvas. (There are exceptions, of course, but this is usually the case.) Similarly, photographers should have a clear outline and path for a final photograph while standing behind the camera. But you'll get there only part of the time if you restrict yourself to negatives of a standard density, proofed at a standard time. Why restrict yourself; why not expand your options?

Now that we've made good contact proofs, let's increase our efficiency in making a final print. This is integrally tied up with Myth #6.

Myth #6: The best landscape photographs are made within an hour and a half of sunrise or sunset.

Confining yourself exclusively to early and late hour photography does not guarantee the making of a great photograph. Some people may extend the stated time frame for good outdoor photographs to two hours, and a few real liberals may even go farther. I take the radical route and say that you can photograph landscapes throughout the day, from the first light of morning to the very last photon of evening, with the possibility of great results at any time. The only concession I make to timing is that you need some light; you simply can't make photographs in total darkness! Other than the need for some amount of light, there's no reason to put your camera away at any time of the day.

This doesn't necessarily mean that you can make a great photograph in every location at any time of day, certainly no more so than confining yourself to early and late hour photography could guarantee the making of a great photograph.

▲ ***Figure 13–9: Elegant Dune***
This photograph, made about 2:30 p.m., is a counterexample to the rule that good landscapes can only be made near sunrise and sunset. The slope of the land rose gently to the left, or west, and the photograph was made in early November, when the sun is relatively low in the sky. Everything came together perfectly for a strong, open, midday landscape.

► ***Figure 13–10: Surf, Olympic Peninsula, Washington***
This seascape was made at about 1:00 p.m. while crashing surf pounded the shore between huge tree-covered sea stacks.

The making of a great landscape photograph requires a number of convergent conditions, among them: your goals; special lighting and/or atmospheric conditions; special relationships of lines, forms, or tonalities; the equipment and materials you have available; your insight, intuition, and creativity; and any number of other fortuitous conditions.

Some of Edward Weston's most celebrated landscapes were made at noon, like the eroded patterns at Zabriskie Point in Death Valley. Some of his famous images of nudes on sand dunes were made at midday with axis light. Weston used midday light with confidence, and there is no reason you can't do so as well. I've photographed on the sand dunes in Death Valley at Stove Pipe Wells, and have made photographs at all times of the day that I love, including those midday hours that so many photographers avoid (see figure 5–2, "Silver Sunlit Dunes", and figure 13–9, "Elegant Dune").

Throughout my career, I've successfully photographed at all times of the day (and even at night). It's true that the early and late hours are quite special. Particularly in wide-open landscapes, the low angle of the sun in early and late hours rakes across the landscape, yielding remarkable intersections of light and shadow that exist only during those fleeting moments. Contours of the land stand out that may be invisible at midday when the sun hits at angles approaching 90 degrees. But consider this: not all landscapes are wide-open landscapes. Furthermore, not all wonderful relationships of lines or forms take place only under a low angle of light. Your insight, intuition, and creativity do not mysteriously disappear at midday, nor does your equipment, nor your materials.

◄ ***Figure 13–11: Striations and Reflections, Coyote Buttes***
I made this image between 11:00 a.m. and noon in northern Arizona after morning clouds abruptly disappeared. The evenly lit scene of deep red rocks with nearly white banding is another example of a midday landscape that was perfectly lit for what it was. I used a #58 deep green filter to further darken the red and build contrast.

Restricting your photography to the hours near sunrise or sunset limits your exploration to the times that low light exists. That cramps your options. Low light is fine, but it's not the only good light. Suppose you wake up on a foggy, rainy, or cloudy day, and that light remains constant. One of my most noteworthy photographs (figure 3–7) was made under wonderfully foggy conditions at about 11:30 a.m. The fog had several benefits: it softened the light in the forest, it evened out the light (i.e., it removed bright splotches and dark shadows), and it simplified the background by eliminating it! Trees were visible for only a short distance before disappearing into the fog. I couldn't have made that photograph at noon on a sunny day, nor could I have made it near sunrise or sunset; alternating bright sunlight and deep shade on the trees would have transformed the image into a confusing mess of light and dark spots. Fog at noon was perfect.

But the deep forest was an enclosed situation. The question arises: can you make midday photographs in an open landscape? Of course you can—remember, Weston did! It may not be easy, but it can be done. In December 2000, I went to the Olympic Peninsula on a wild, windy, rainy day. Wave upon wave pounded in, with spindrift flying off each one as it rolled

▲ ***Figure 13–12: Pinnacles, Golden Canyon***
Late morning to early afternoon is the only sensible time to photograph this dramatic, rugged landscape of colorfully eroded clays on the east flank of Death Valley. Shortly after sunrise, the entire area remains in shadow for quite some time, rendering it difficult to photograph (though it can be done). Midday is far better.

toward the beach. It would have made no difference if the time were sunrise, midday, or sunset. Conditions were exceptional. There was no reason to put down my camera simply because it was 1:00 p.m. (figure 13–10).

In 1998, I hiked into Coyote Buttes, Arizona where I had photographed for several years. I was hoping for cloudy conditions and soft light. Lo and behold, I got what I wanted! But at about 9:30 a.m. the clouds simply evaporated. Suddenly I was stuck with a blank blue sky, full glaring sunlight. I was quite disappointed, but rather than packing my bags to leave, I continued walking, looking, and enjoying this remarkable area. Just as suddenly as the clouds disappeared, I started seeing wonderful things all around me, and over the next three hours I made three of my best photographs at Coyote Buttes (figure 13–11).

Golden Canyon in Death Valley is a moonscape of severely eroded clay with virtually nothing growing on its slopes. But magnificent colors and tones and sharp pinnacles make it one of the most dramatic landscapes imaginable. The famous Zabriskie Point reaches an elevation of 1,200 feet, while the canyon cuts down to sea level. Golden Canyon gets no early sunlight because it lies in a deep bowl with higher ground to

the east. But at midday, the light is spectacular. Figure 13–12 was made in the late morning, fully four hours after sunrise, and could not have been made at any other time. Here is a case where early morning light offered little, but midday light made the scene came alive. Late afternoon light would have flattened out the scene, again producing nothing of value.

I could cite dozens of examples of slit canyon photographs made in the midday hours. It's simply too dark to see them earlier and later. These photographs constitute my largest single body of images. While I recognize that they are not exactly landscapes in the usual sense of the word, they still are photographs of landforms.

Examples of successful midday landscape photographs abound. The bottom line here is simple: Don't shut down when the sun gets high in the sky. You're shortchanging yourself if you do so. There's even more potential than I've discussed up to now. What about small details? Few photographers would suggest putting your camera away at midday if you're interested in the small details within the landscape: flowers, mosses, rocks, bark, ice, ripples on a pond...you name it! These offer wonderful possibilities—don't ignore them. Details can work for you at any time of the day.

Keep in mind that when you're looking at a landscape, you're not just looking at the land. You're looking at light. You're looking at lines and forms. You're looking at relationships among lines and forms. You're putting your creativity to work to find the compelling visual relationships that transform a wonderful scene—or even an ordinary scene—into a wonderful photograph, one that communicates your worldview to others. Those situations occur throughout the day. Limiting yourself to the early and late hours limits your options.

Myth #7: All black-and-white photographs need a good black, a good white, and tones in between.

This statement is the equivalent of saying that all good color photographs (or paintings, for that matter) need a primary blue, a primary red, a primary yellow, and all colors in between. Nobody would take that remark seriously, so why should anyone take this myth about black-and-white photography seriously? Beats me.

Of course, there's nothing wrong with a photograph that fulfills the stated mandate, as long as such tones are appropriate for the desired mood. Similarly, there is no objection to a color photograph that includes the full color spectrum, if that, too, remains consistent with your goals. My objection is to the dictate that *all* images require a full range of tonalities. They don't!

The purpose of a photograph is to make a visual statement, not to adhere to some arbitrary rule about tonal range and gradations. A photograph is supposed to be a communication between the photographer and the viewers. It's supposed to draw viewers in and hold them there until they get the message and feel the emotional impact. If every one of your photographs adheres to the stated mandate, then you're doing formula photography. There's a "sameness" to your images, and that uniformity soon bores your viewers.

■ *When you're looking at a landscape you're not just looking at the land. You're looking at light, lines, and forms. You're looking at relationships among lines and forms.*

The emotional content of subject matter coupled with tonality and line structure is the heart of expressive photography. Sometimes you want to express a mood that's depressing, sometimes uplifting, sometimes dreamlike and airy. A pure black or a pure white tonality could be inappropriate for the mood of your image (figure 13–13). Don't worry about that mandate regarding tonalities. Just print the image in the way that enhances the mood you want to project.

The way to do this successfully is to understand human visual language. There is a universal visual language that pervades all cultures on our planet. It's inherent in our being. An

► ***Figure 13–13: Winter Dream, Yellowstone***
On a subzero day, made all the more wretched by a stiff wind, I observed the hot springs of Mammoth Terraces steaming up and the steam blowing away. I stopped the aperture down to f/64 and made a three-second exposure, capturing an ethereal, unearthly image. There are no blacks or even tones as dark as middle gray, but none are needed; in fact, any dark tones would be utterly intrusive in this photograph.

image dominated by dark tones doesn't have the same feeling as one dominated by light tones. There is a mood associated with a set of tonalities. A photograph dominated by mid-tones doesn't have the dramatic impact of one replete with brilliant whites and deep blacks. This visual language extends beyond tonalities to lines and forms. Soft, flowing lines and gently rounded forms project a very different mood from straight lines, tightly curved lines, jagged lines, or sharp-edged forms.

When you combine flowing lines and rounded forms in a photograph with mid-tones or light tones, you get a very quiet, relaxing mood that may even be dreamlike or ethereal. If, on the other hand, you combine sharp-edged, broken forms and jagged or tightly curved lines with high contrast, you get an active, exciting image that may even border on the frenetic or angry. It won't convey a quiet, relaxed feeling. It can't, with those lines, forms, and high contrasts. These are strong aspects of our visual language. Employ them sensibly and appropriately to make an image that projects the mood you wish to convey.

Since 1975, in workshops I have taught, I have repeatedly seen photographs that blatantly ignore our visual language. A pastoral landscape is often rendered with striking contrasts capped by glowing whites and deep, penetrating blacks. Yet the image cries out for softer tones to convey the inherent sense of peace and serenity. I believe that the reason for the disparity between printed tonalities and appropriate tonalities is that most beginners—and many more advanced photographers—seek high drama in virtually every image. They are either reluctant or scared to convey a quiet mood with mellowed gray tonalities. I also find that those doing digital imagery often fall victim to this syndrome, especially with the advent of HDR, putting the most brilliant aspects of every exposure into the final image. But there is no hierarchy of tonalities when everything is equally brilliant. Viewing an image

like that is the equivalent of listening to a symphony in which every phrase is a crescendo; it becomes tedious very quickly. There is no sense of reality or logical light or a quieter mood.

What about color photography? The same concepts apply for line and form structures and for the brightness/darkness of any photograph, either color or black-and-white. But what about color itself? Again, the same concepts apply. Light, pastel colors convey a different mood than deep, rich colors. Saturated primary colors placed next to each other have the same high activity as high contrast tones placed next to each other in a black-and-white image. So, soft, curved lines and light pastel colors impart a far quieter and more relaxed mood than sharp, jagged lines and saturated primary colors. Yet in today's world, color photographs often take on a cartoonish air with the highest possible contrast and the most deeply saturated colors. There is no restraint and no reality.

I have seen high dynamic range (HDR) devotees photograph the equivalent of an asphalt road and turn it into a rainbow, claiming, "The colors were actually there!" Yeah, right! Too often the wrong set of colors and/or lines detracts from the appropriate mood of the image. It makes me think that the current fad in color photography (particularly in digital imagery) is based on the idea that every color photograph must indeed have a primary red, a primary yellow, and a primary blue, with all the other colors in between! We seem to have lost all sense of subtlety in the race for high impact and shock value.

I recommend that you look at books of paintings (and if possible, at the actual paintings in museums) to see their use of colors and relationships. You will see how painters use intensely rich colors to convey different moods. For example, Van Gogh often used primary colors and wildly curved or broken lines to create bold, frenetic effects; yet he also used a far more subdued palette to convey an entirely different mood. Andrew and Jamie Wyeth also used subtle colors, tones, and structures to convey wonderful moods.

So, going back to black-and-white, why would anyone implore you to have a white, a black, and tones in-between for every image? It would be like forcing the same emotion in each image. Such an admonition flies in the face of common sense. It damages the central reasons for creating any work of art: making a statement and eliciting an emotional response.

This understanding separates the top photographers from the also-rans. Photography should not become a mere technical exercise. It's the feeling that counts, not the technical expertise. I don't make photographs to solve technical problems. If I did, I would be a "tester", not a photographer. Sometimes I have to solve technical problems to make successful photographs, and I fully recognize the importance of solving those problems. If you don't solve technical problems, your message may become so compromised that it's lost.

All great art conveys emotion. This is true of music, literature, sculpture, painting, and dance as well as photography. The greatest, most time-honored works in any field have tremendous emotional impact; that's why they're considered great!

So keep this in mind: The message is the important thing. The mood is the important thing. The technique is merely support for communication between the photographer and the viewer. If your photographs are technical tour-de-forces that say nothing, then you've produced little of value. Ansel Adams, forcefully supporting this idea, said, "There's nothing as useless as a sharp photograph of a fuzzy concept." A good lens can produce a sharp image but nothing more. It's the photographer with something to say—not the sharp lens—that produces important photographs. Ignore this myth; make good photographs.

Myth #8: Two More Persistent Myths

There is an inexhaustible supply of petty myths—many under the title "rules of composition"—that make absolutely no sense. This section could go on ad infinitum and ad nauseum. I'll confine it to two of the most common myths.

► ***Figure 13–14: Horseshoe Bend of the Colorado River***

The unimaginable symmetry of nature on a grand scale drew me to make this photograph. To accentuate that symmetry, I photographed directly toward the cliffs across the 180-degree turn. To reveal the triangular rock below, which serves as a fulcrum balancing the photograph, I placed the two front tripod legs within an inch of the 700-foot cliff edge. The sun had just set to the left of the frame. The central cliff appears brightened, but it was not touched in the printing; instead, all the cliffs and lower slopes around the bend were dodged continuously during the basic exposure, then selectively bleached to balance the extreme brightness of the central rock, which seemed to be lit from within. The unexplainable lighting makes the scene even more astounding to behold.

#8-A: The center of interest should be one-third of the way up and one-third of the way into the photograph.

The so-called "rule of thirds" stems from a flawed study in the 1850s by a statistics professor who decided to learn what makes great paintings great. He worked with several art critics and art historians who chose the finest 250 paintings. (Consider this: A statistician with no real art background was working with people involved in the arts who had no understanding of statistics. There was a communication disconnect from the start.)

One question was where the center of interest should lie. Realizing that the center of interest could be placed in any one of four quadrants, and that it would end up at the exact center on average, the statistician rotated the center of interest from wherever it was found around the center of the painting to the lower right quadrant. Then he applied his statistical analysis, apparently thinking he had produced a valid analysis. He hadn't.

Consider the imaginary line that goes from the extreme corner to the center. Obviously there would be as many points above the line as below the line, in roughly equal distances from the line. So the statistical average was certain to be on that line. No center of interest is found in the exact corner of a painting, so there is no contribution from the corner, but there could be contributions from the exact center. In other words, the answer would be along the line and would be weighted toward the center.

Not surprisingly, the statistician found that the average center of interest was two-thirds of the way along the line. His analysis forced that conclusion. In other words, it was a predetermined result! Without his quadrant rotation, the analysis would have yielded the exact center as the best place to locate a center of interest.

Of course, two-thirds of the way up that line is—ta da!—exactly one-third of the way up and one-third of the way into the painting from the corner. The result goes beyond useless because it was a stupid question to begin with. Amazingly, that flawed analysis of a meaningless question is the basis of this baseless compositional rule.

Sometimes you may want to place an object directly in the center of a photograph for stability, strength, balance, symmetry, or any number of other reasons (figure 13–14). Sometimes you may want a center of interest (if there is one) near the edge or corner, perhaps to create an intentional imbalance or to balance a greater mass nearer the center on the other side (the old teeter-totter balancing act).

The rule of thirds is a cornerstone for much teaching about composition—sinking to its lowest ebb in camera club and professional photographic competitions, where it's considered the epitome of fine composition. It's an idea that best belongs in the trashcan.

#8-B: The horizon line should never divide a photograph in half.

Why not? There is simply no logical or visual reason for such a silly compositional rule. It may be that dividing the image space in half horizontally (or vertically) creates the strongest possible composition for a specific image. Every image must be approached on its own merits. It makes no sense to rule out a valid compositional approach before you begin composing. Rules, assuming there are any, have to be bent and often broken to help make a point.

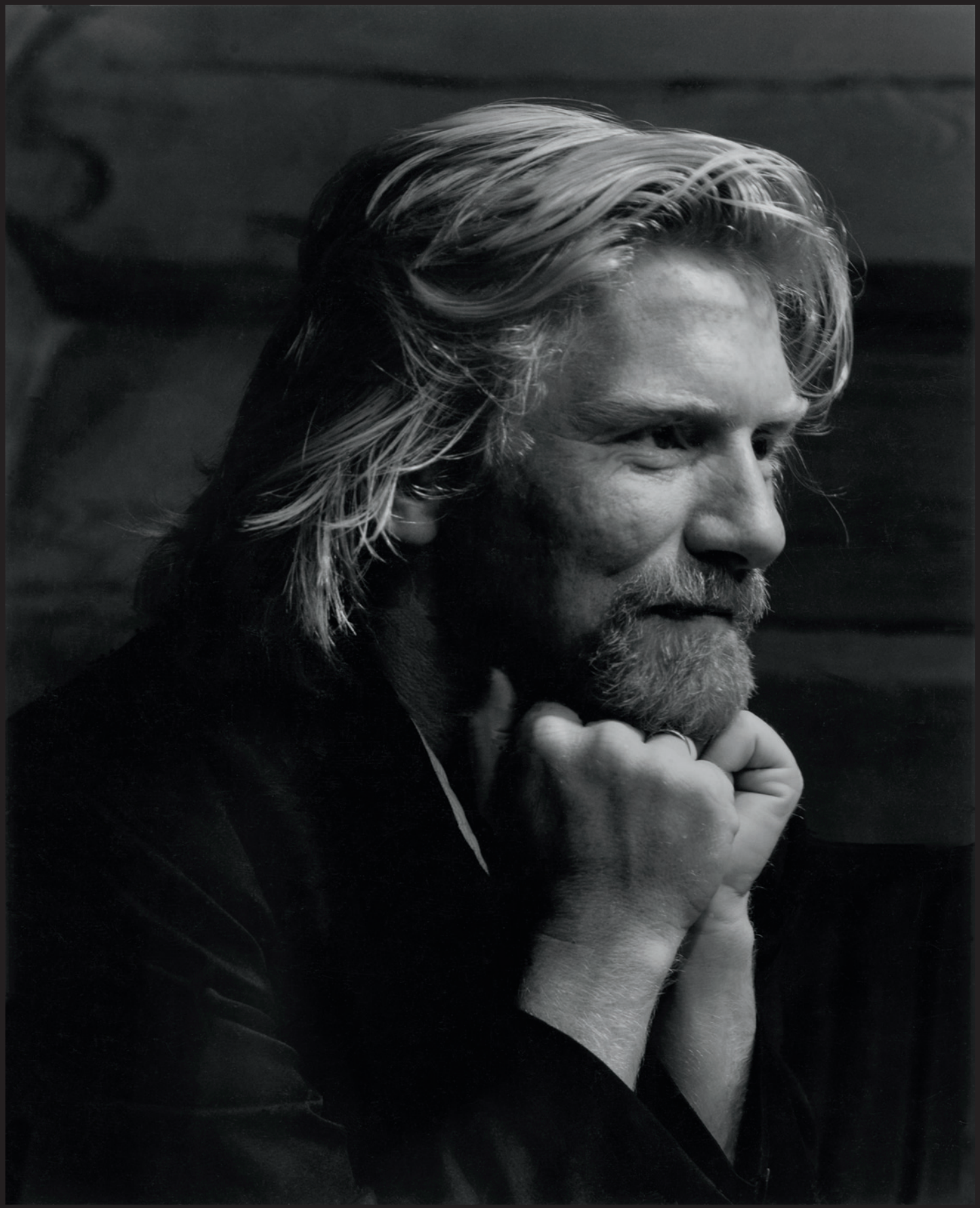
Yet there are photographers who purposely move the horizon line above or below center for no apparent reason other than to get away from dividing the space in half. That's just pure foolishness. Don't ever be swayed by this senseless rule. Figure 10–9 breaks this silly rule twice: first dividing the top and bottom in half with a horizontal line, then dividing the bottom in half with a vertical line.

These are two absurd rules of composition that are regularly bandied about as meaningful. There are other rules based

on things like the "Golden Mean", made by people who have no idea about the purely mathematical basis of that ratio as the answer to a question posed by Euclid 2,300 years ago. The Golden Mean has no artistic ramifications whatsoever. In fact, none of these purely mathematical considerations have compositional validity.

Every image must be dealt with on its own merits. Each one requires its own set of rules, which rarely apply to the next image. Some people think it's useful to know the rules so they know when to break them. I disagree. Since rules are inherently useless, knowing them simply constrains you to follow them or consciously break them. Why put something in your mind to worry about if it's inherently useless from the start? It's like putting an obstacle in your path for no reason whatsoever.

My approach can best be summed up as, "There are no rules!"



CHAPTER 14

Photographic Techniques and Artistic Integrity

BECAUSE THE CAMERA, DARKROOM, OR COMPUTER can be used to achieve such remarkable transformations of the scene that was in front of the camera, a real philosophical question is raised: When do you step over the line from legitimacy to illegitimacy in the use of photographic manipulation? How far can you go before you've gone too far?

Up to now, the question has been raised in this book only as it applies to the extent of darkroom and computer manipulations that become apparent, such as too much burning, dodging, flashing, bleaching, sharpening, cloning, etc. But are there legal, moral, ethical, or philosophical boundaries limiting the degree or extent of manipulation?

Surely there are. An obvious example would be the manipulation of photographs for blackmail or nefarious political ends. *Time* magazine once published an article showing how simple it would be to produce a realistic print of a fictional meeting between the U.S. Secretary of State and a terrorist leader. Such a photograph could be accompanied by a story about the alleged meeting and secret deals made with known enemies. In a similar way, it would be equally simple (and equally immoral) to produce a photograph of a political candidate engaging in sex with a call girl when no such encounter ever occurred, and to distribute the phony image just before an election. These would surely be gross abuses of the photographic process. Short of such obvious examples of intentional fraud and deception, there is a gray area of possibilities that warrants some serious discussion.

First, let's recognize that before you get into the darkroom or onto the computer, the camera itself can be used to alter scenes greatly. Your choice of lens,

◄ ***Figure 14–1: Morten Krogvold***
One of the world's truly great photographers, Morten struck me as a marvelous portrait subject with his strong Viking facial characteristics. But what would be the best angle to photograph him, and what type of lighting would convey that feeling most effectively? I finally decided it was the strength of his near profile. That evening, under the dim light of a chandelier, he propped his chin on his hands with his elbows on a low table for the 25-second exposure. Deep background tones surrounding him increase the feeling of strength.

camera position, filter(s), aperture, and shutter speed all have an effect on the scene. As discussed in chapter 5, the lighting of a portrait can mold the character of the person photographed, and the photographer may be in total control of this variable in a studio setting (figure 14–1). A waterfall photographed at 1/1000 of a second has a very different feel from the same waterfall photographed at one second, even if everything else is the same. Using black-and-white film in a world filled with color is, in itself, a dramatic alteration of reality. Likewise, your choice of color film and the type of print you make can drastically alter the "realistic" colors of a scene. Yet each of these distortions seems to be accepted readily.

How far can alterations go in the darkroom or on the computer before they become an ethical or moral question, or stir the ire of the viewer? It's widely known that Ansel Adams's famous "Moonrise Over Hernandez" is heavily manipulated. Not only is the print heavily manipulated, but also the negative. Nearly 10 years after making the negative, Ansel intensified the lower portion with chromium intensifier, making it significantly denser and a bit more contrasty. Beyond that, the upper portion of the print is heavily burned, making the sky a dramatic black against the light and mid-tones of the foreground. A straight print from the original, unmanipulated negative would show a sky approximately two zones brighter than the foreground. Yet despite the fact that the negative and the print were heavily manipulated, "Moonrise Over Hernandez" is accepted as pure realism. It's one of the most widely known and loved of all photographs.

I am not engaged in the photography of politically charged propaganda and deception, but in a lifetime of producing artistic creations, I have always felt that anything I do photographically is artistically legitimate because my photographs are my own artistic creations. Ansel apparently felt the same way when he intensified his negative of "Moonrise" and when he printed it with a black sky. He felt no restrictions in doing whatever he wanted to do with that negative and print. I support that approach. I rarely create the *scenes* that I photograph, but I always create the *photographs*.

My intent is to create a work of art. My expectation is that readers of this book have a similar intent. My product is not intended to *document* the scene but rather to *interpret* the scene. It is my editorial comment of the scene, so it contains a bit of me in it. As long as I attempt to produce works of art, I have artistic license to do whatever I want to produce my art. With any of my photographs, I print in the manner that I feel produces my most convincing statement—my strongest vision—of that scene. If that involves extensive manipulation, so be it.

Let's consider the mushroom example discussed in figure 10–4b. The mushrooms and the rocks were virtually the same tonality, and I wanted the mushrooms to stand out, which I accomplished via substantial burning along the rocks and the edges of the mushrooms. My final product is a *photograph* of mushrooms, not a cluster of mushrooms. After all, the mushrooms existed in Yosemite Valley long ago. My intent in both the field and darkroom is to create a work of art; in this case, I used the mushrooms as a starting point. I chose to print it in the manner shown because I felt it was my most convincing statement—my strongest vision—of that cluster of fungi. At the site of the mushrooms my eye was drawn to them very strongly, and I wanted to direct the viewer to them, too. I achieved that goal through extensive darkroom manipulation, largely burning and dodging. I contend that there's nothing wrong with that. I suspect almost everyone would agree.

You might ask, "If the zone system is such a marvelous method of exposure, why is so much darkroom manipulation necessary?" The mushroom example provides the answer. There was nothing I could have done in the field to alter the relative brightness of the rocks and mushrooms. They both metered the same; there was no tonal difference between them. The granite rocks were light gray in color and the mushrooms were beige, so no filter would have had much effect on

them because both were low in color saturation. The only avenue available to me was darkroom manipulation. Yet, importantly, the zone system still gave me an exposure of sufficient density to allow me to do all the darkroom work successfully. If I had made the print digitally (this was made in 1974, long before digital photography, or even personal computers, existed), I could have employed computer manipulations to achieve roughly the same image.

Also keep in mind the important point thoroughly discussed in chapter 4: The scene and the photograph are two very different entities! Never confuse the two. I was attracted to the mushrooms at the site by a number of things, including their astonishing size (almost a foot across) and their color, however subdued. But in the black-and-white photograph, light and composition alone are the only means of attracting the viewer. So I molded the light carefully in the darkroom to force the viewer's eye to the mushrooms in the print as my own eye was attracted to them in the field. In essence, I simply did what I had to do! All that, I'm sure anyone would agree, is perfectly ethical.

Another of my photographs, "West Doors, Bath Abbey" (figure 10–7b), presents a more radical departure. The doors were slightly darker than the surrounding stonework, yet they looked lighter to my eye (perhaps because of the wonderful carving on the doors). So the tones were opposite of what I thought they were. Had I realized that they were darker, I might not have made the exposure (and that would have been unfortunate, in my opinion). At the very least, I would have been aware of the enormity of the problem. But I wasn't, until I saw the developed negative. Then I knew I was in deep trouble.

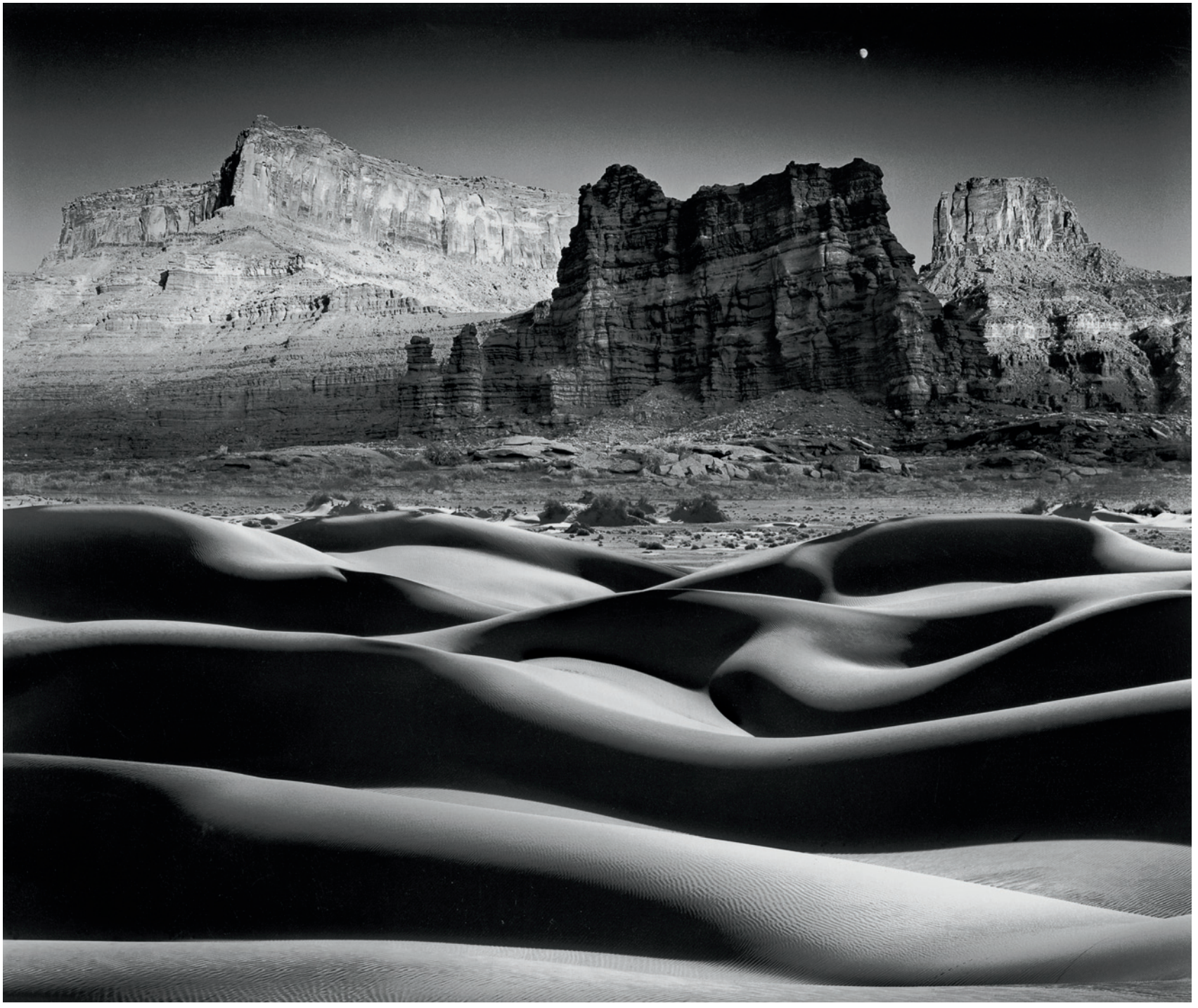
I had a goal in mind: making the doors glow as they appeared to glow when I stood before them. I used substantial dodging, burning, and bleaching to achieve that goal and overcome the unexpected difficulties. To my surprise, the final print exceeded my initial vision, and I feel fortunate for the surprisingly good result. But it was a combination of my initial vision (despite my incorrect seeing) and my determination to achieve that vision that allowed me to achieve the final print that I now display. Again, no one has ever questioned the integrity of that.

Interestingly, I find that much of the manipulation I perform in the darkroom—burning, dodging, flashing, and bleaching—is done to bring the image back in line with the way I saw it in the field. Digital practitioners report largely the same efforts on their part, which I have also found to be true in my digital shooting. The reason for this is quite logical, if not obvious. As noted in chapter 2, the eye focuses sharply on only a three-degree angle of view. Chapter 4 delves further into that point by noting that as the eye sweeps over a scene, the iris opens and closes constantly to compensate for varying light levels. In other words, it varies its aperture to accommodate all parts of the scene. But the camera shoots everything at one aperture, necessitating a great deal of residual work in the darkroom or on the computer to do what the eye does automatically. If we could all photograph the way we see—i.e., the way the eye/brain combination sees—photography would be an easier endeavor.

The darkroom or computer is as much a creative tool as the camera. All tools of any trade should be used thoughtfully and to maximum advantage

The darkroom or computer is as much a creative tool as the camera. All tools of any trade should be used thoughtfully and to maximum advantage. How can anyone feel that manipulating a print in the darkroom by dodging, burning, flashing, masking, or reducing is any less legitimate than altering contrast via paper grades, filters, or lenses; or editing an image in Photoshop by altering contrast settings, reshaping curves, or adjusting color, saturation, or hues? They are all part of creative photography.

Nobody questions a painter's right to use any manipulation they desire. Objects can be placed on the canvas at will; colors and shapes can be chosen to suit the artist's vision. Painters can set up a canvas in front of a landscape and move things around, add things, remove things, and alter the sizes,



▲ ***Figure 14–2: Moonrise Over Cliffs and Dunes***
This was the first of my "ideal landscapes", i.e., fictional landscapes derived from more than one negative. Figures 14–3 and 14–4 show the full straight prints of the component parts. Neither of them struck me as complete by themselves, with large, boring areas that required cropping. Putting the components together made good artistic sense but initially drew extreme displeasure from viewers outraged by the "falseness" of it. Some still refuse to accept it; most have changed their minds and accept it as artistically valid. Review the two component images and the final combination, and decide whether you see it as valid art or fraudulent deception.

◄ ***Figure 14–3: Dunes, Death Valley***
Exposed in 1976, this image possesses interesting rhythmic dune forms in the upper center, but the rest of it offers little. I never printed it as a single image.

◄ ***Figure 14–4: Moon Over Butte and Cliffs, Utah***
Exposed in 1991, the upper half of this scene excited me immensely, but the lower half was uninteresting. I initially considered cropping off the bottom and turning the image into a narrow panorama. Then the idea of combining it with the dune image jumped into my mind. It was a triumph, opening the door to numerous other combination prints.

shapes, and colors in any way they choose. It's all legitimate. In fact, anything can be done by painters in the name of art.

Photography can be more restrictive. Objects cannot always be moved, inserted, or removed with traditional techniques, though digital approaches easily allow these manipulations. It's necessary to find meaningful relationships between objects in the field, which often means careful placement of the camera to produce interesting relationships. Tonalities can't be altered easily in the field, but enormous changes are possible on the computer using a variety of applications. However, by using filtration in the field, followed by appropriate negative development and careful dodging, burning, flashing, or bleaching during printing, the relative brightness of two objects can even be reversed! Painters have the right to do this; photographers enjoy the same artistic rights.

With these thoughts in mind, in 1992 I began printing a series of landscape images that are created from more than one negative. Sometimes the foreground of one scene is meshed with the background of another (figures 14–2, 14–3, and 14–4). Sometimes a corner of one scene is replaced by a portion of another. Sometimes a sky from another negative is printed into the background. (This technique was quite common in the late 1800s and early 1900s when orthochromatic films rendered almost all skies white, so a second "sky negative" was employed to enrich the blank background of the prime negative.) Sometimes one negative is printed fully over another. Any other conceivable variation can be employed. There are no restrictions to the approaches I use.

These multiple negative landscapes—or abstracts drawn from the landscape—are all designed to have a realistic appearance. That's the only restriction I place upon them. They are landscape images created in the darkroom. They are photographic fiction just as a novel is literary fiction. Depending on the viewer's way of thinking, they are either artistically creative or downright phony. They are undoubtedly the most controversial images I have ever produced.

To me they represent ideal landscapes: the types of places I would love to visit if they existed. I bring them into existence in the darkroom. Painters unquestionably have the right to create their own fantasy landscapes purely from imagination. I ask for the same right to be granted to photographers. My multiple-negative imagery allows me to expand landscape photography from places I have seen and loved to places I would love to see.

These images initially created a firestorm of controversy. Interestingly, it appears that the realistic nature of the images is the prime reason for the hesitation or outright opposition I sometimes encounter. Among those who have expressed displeasure with the series, none have registered complaints with the multiple negative surrealism of Jerry Uelsmann. They recognize his works as flights of fancy and accept them on those terms. But the inherent realism of my ideal landscapes leads some viewers to feel tricked when they find out that the scene doesn't exist in reality. Apparently when they ask, "Where was that photograph taken?" and I answer, "The upper part is Utah and the lower part is California" (or something like that), they are dismayed. Others are angered. Still others find it perfectly acceptable. In short, the imagery is controversial.

Those who are excited in a positive sense see the combination print as a creative effort in the finest artistic tradition. Some people never ask where the photograph was taken; they simply respond to the visual image in front of them.

Would anybody ask a painter, "Where did you place your canvas when that painting was made?" Of course not. A landscape painting can be created entirely in the studio. It's of no consequence. But apparently the question, "Where was it taken?" is important to some viewers of landscape photographs.

I view the photographs in this series as another way of creating a pleasing image, a meaningful image. If, for instance, I did not have the opportunity, the strength, or the courage to get to a particularly rugged landscape with my camera

▲ ***Figure 14–5: Corridors*** *This two-negative image initially seems real but in fact is utterly strange. It's based on Yogi Berra's famous advice, "When you come to a fork in the road, take it".*

equipment, perhaps I could create an equally rugged scene from two or more negatives in the darkroom. This way I can create a photographic fiction that is as visually exciting to a viewer as a good novel can be to a reader, or a great piece of music can be to a listener. To me, painting, literature, music, and photography are all art forms, and anything that can produce an emotionally fulfilling experience is acceptable. I believe that the question should not be "Where was it made?" or "How was it made?" but "How do I respond to it?"

It appears that the main objection springs from my attempts to have the composite image look realistic, i.e., to be derived from a real location in front of my camera rather than two or more real locations in front of my camera at different times and places (figure 14–5). Surely there is a valid objection here, but evidently the objection is not about the artistic nature of the image but rather the reality of it. Also, I would have to agree that there is an intended deception. I try to make the image appear like a single landscape at a single moment in time, not two or more landscapes photographed at different times and places.

Some people object when I don't clearly label which images are from one negative and which are from more than one. Apparently if I mix single and multiple negative images together without stating which are which, there is an objection; if I separate them into distinct categories or clearly label them, the objection disappears. Therefore it seems that the objection is not with the imagery, i.e., the artistry, but with the perceived deception of presenting a composite image as a single negative photograph. I can understand that objection, so I will not argue it, nor will I deride those who raise that objection. My

defense is that any photograph I produce is a work of art first and foremost. It's not a "capturing" of a landscape. Because it is a work of art, I don't believe it's necessary to explain how it was created, i.e., whether it had extensive burning or dodging or flashing or bleaching, or whether it was made from one or more negatives. In a sense, all of those details are technical. To me, the real question is whether or not the produced image stirs the viewer emotionally. As long as what I'm creating is not blackmailing or damaging someone, I feel it is acceptable.

I further believe that objections or lack of them stem from the way a viewer initially responds to a landscape photograph. If the image is viewed as a specific place—as "evidence" of a moment in time—then multiple negative imagery is viewed as bothersome, unacceptable, or even a blatant lie. If the image is viewed as a work of art, then it is acceptable. Another objection comes from those who know about my lifelong environmental activism and complain that of all people, I shouldn't engage in such false imagery. I totally reject that objection, for my art is my art; it has no environmentalist component, except in rare cases (figure 1–1).

Multiple exposure, photomontage, multiple printing, negative printing, digital manipulation, and all other forms of "non-straight" photographic image making are all valid artistic endeavors. Any of them may be poorly done, but that's different than the issue of legitimacy. To me, there is no more artistic alteration in a multiple negative image than there is in some heavily manipulated single negative images. As long as the images aren't used for abusive purposes like those discussed at the start of this chapter, they strike me as perfectly valid, though others may draw the line on validity in a more restrictive manner.

However, you should always keep in mind the basic intent behind your work and use your tools properly and thoughtfully to reach those goals. This is especially true today with digital manipulation. Too many digital practitioners approach applications such as Lightroom or Photoshop the way a child approaches a huge toybox: it's all there, so let's play! I regularly encounter alterations (especially when HDR is used) that alter hue and color saturation, or equalize indoor and outdoor lighting to a degree that turns the final image into nothing less than a cartoon, with no logic to the light (i.e., indoor and outdoor light appear virtually equal in value) and no limit to color intensities.

Also, I have seen digital photographers become so comfortable with removing unwanted items (i.e., trash, power lines, vehicles, roads, people, facial blemishes, decayed teeth, etc.) that they soon fail to see the most obvious intrusions or distinguish between good and bad lighting. They feel they can always "fix it in Photoshop". I believe it's a bad start for *any* endeavor—artistic, scientific, business, etc.—to move forward with the idea that you'll fix it at the end. You're far better to start out on the right track instead of trying to get there late in the game. Furthermore, I've watched digital photographers employ a "shotgun approach" of taking dozens of shots with only minor variations of the same subject with the idea that one of them has to work. I feel it's better to look first, assess, and then shoot instead of shooting first and looking later.

That said, there are indeed serious photographers, both digital and traditional, who use the available tools appropriately and meaningfully. When photographers get away from thinking, "This is what I can *do*" and get to "This is what I can *say*", photography becomes a more mature interpretive medium.

Each of the topics discussed in this book is presented with the intent of expanding your artistic options and your approaches to creative personal expression. I don't necessarily want everyone to think about these topics the way I do, but to think about them nevertheless. There are many different approaches to the creation of photographs, and all of them can be legitimate. When used well, they can help photography transcend the realm of mere documentation to become fine art.

That photography is truly a fine art has been proven for more than 100 years by a number of extraordinary

■ *It may be worth noting that when I showed my composite work to color photographer Robert Glenn Ketchum, he jokingly suggested that I send several of the photographs to a magazine like* Outdoor Photographer *with an article about the "places" and include detailed directions to the locations! As compelling as the suggestion was, I chose not to fulfill it. But I have to admit, it would have been fun!*

photographers. The finest prints are always products of *insight* and excellent *composition,* subsequently carried through with impeccable *technique*. All three of these ingredients are essential for fine photography. None of them can stand alone. Use the appropriate techniques whenever necessary to complete your vision. To perceive any technique as illegitimate simply shrinks your artistic options.

Let's discuss digital methodology just a bit more. Digital manipulation allows objects to be removed or inserted into photographs far more easily than traditional procedures do. But there is a caveat. One of the strengths of photography has always been its perceived realism. Even a photograph as heavily manipulated as Ansel Adams's "Moonrise Over Hernandez" conveys a feeling of heroic realism. Until recently, photographs have been effectively used as evidence in court, but no longer. Overt digital manipulation has changed that, and photographs can be easily challenged and dismissed now as court evidence. It remains to be seen if the public, as well as the judges and juries, will continue to perceive photographs as real and believable. Will people actually begin to ask, "Did it look that way when Ansel snapped the shutter for 'Moonrise'?" Perhaps we should speculate *how long* photographs will continue to be viewed as realistic. Evidence at the moment seems to indicate that the public still is inclined to view photographs as realistic.

Some photographers are absolutely delighted with the thought of computerization, while others are thoroughly opposed to it (and scared of it, as well). Digital imagery represents a new form of art, an electronic palette and canvas, if you will. As with every other art form, some people do it exceptionally well while others flounder. No matter how a work of art is produced, it's the ultimate vision that determines its worth, not the method of getting there. When computerization results in new, emotionally powerful images, then it's surely a welcome addition to the world of art.

I fully endorse digital manipulation for artistic ends. If I photographed a landscape tomorrow that had several overlooked power wires that could be eliminated with digital manipulation, I would surely do so—and I believe most photographers would do so (even those who profess a disdain of digital). I'm not opposed to manipulating an image via computerization if it were the only way to produce what I wanted. I would be foolish and decidedly narrow-minded if I simply refused to improve—or create—a fine image through the use of a computer.

Is computerization altering photography as we know it? Of course it is. It's certainly offering a new process, perhaps even new thinking behind it. But just as the advent of photography altered painting (see chapter 15, "Photographic Realism, Abstraction, and Art"), I suspect that digital methods are having a great influence on photography, and I doubt that they will bring an end to photography as it has been previously practiced. To my knowledge, no art form has ever pushed a previously existing art form completely into oblivion. Painting still exists despite photography's immense influence on it. And to use musical instruments as an example, the forte piano replaced the harpsichord, which was replaced in turn by the modern piano. Yet there are recordings made on all three instruments today. Whole orchestras of ancient instruments exist today, and their recordings are quite popular. I believe that traditional film-based photography will be produced into the foreseeable future alongside digital, computer-manipulated imagery. For now, I continue to make traditional film-based and darkroom printed photographs—and I continue to feel that artistic manipulation is perfectly acceptable unless it's done with the intent of personal damage.

■ *When photographers get away from thinking, "This is what I can* do*" and get to "This is what I can say", photography becomes a more mature interpretive medium.*

Art, Communication, and Personal Integrity

I'll close this chapter by examining a completely different aspect of personal integrity. If photography is an art form (the basic premise of this book), then we must concentrate on its success and effectiveness as a form of communication. If a work of art conveys or communicates nothing to the viewer, then how can it have any artistic value?

There can be good counterarguments to this question. A magnificent baroque table or an ancient urn may qualify as art, though neither was created with any intended message other than beautiful form, extraordinary craftsmanship, and exceptional materials. So a photograph that possesses amazingly rich and beautiful tonal relationships and wonderfully captivating lines and forms may possess artistic value even though it has no real message—other than inherent beauty—to convey.

This strongly indicates that necessary ingredients of fine photographs are compelling compositional qualities. It would be hard to imagine any photograph lacking good composition still qualifying as art. Beyond that, if a message is to be communicated from the artist to the viewer, the issue of effective communication must be considered. The key issue is how deeply should you, the artist, concern yourself with your ability to convey your message and the viewer's ability to comprehend it?

Suppose you create a compositionally strong image that thoroughly pleases you. You're being true to your ideals and your vision, and additionally, you're spot-on with the message you want to convey. But suppose nobody else gets it. Do you alter your printing or even start anew with your basic photographic approach, in order to make the message clearer to others? If you do, are you selling out? Are you so concerned with the message that you compromise your art for the sake of communication? Furthermore, suppose your work is critiqued by professionals who suggest changing things to make your message clearer. Should you listen to them, or should you ignore their suggestions and go your own way?

These are tough questions to answer because there are no clear guidelines. When you're learning, it's particularly wise to listen to good constructive criticism and suggestions. That's self-evident. (But then, we're always learning, or we're dead.) But what if you're a step or two beyond basic learning levels? My experience is that it's always worth listening to others whose opinions you value. After all, you can easily and inadvertently overlook problems in your own images, ones that may jump out to someone who isn't so wrapped up in the imagery or the message. Listening and reevaluating your work is hardly selling out. It's being open-minded and sensible. But if you revise without reevaluating, then that is selling out.

Consider this: In his lifetime, Vincent van Gogh was never looked upon as a worthy artist. But he ignored all those who derided his work. He followed his vision. Today, of course, he's considered one of the great artists in history. Not during his lifetime, but today with historical perspective, we can see that he was right to ignore his critics. Also worth considering is the question of who's correct—the public and the critics in his day or those today. The answer is ever changing. Who knows if Van Gogh will be honored 120 years from now, or scorned as he was 120 years ago?

Pleasing yourself, as van Gogh did, should not be confused with producing fine art. Some people truly believe they are great artists and claim that they, like van Gogh, are misunderstood. I term their rationale "the van Gogh defense". It goes like this: "He was great, and nobody understood him during his lifetime; I'm equally great and nobody understands me either, but they will in the future." There can be no rational argument against such thinking. Unfortunately, there are very few van Goghs, even among the legions who claim to be misunderstood geniuses. In general, the van Gogh defense is a way of dodging the fact that the work is really just junk.

Because everyone's personal definition of art varies, it's impossible to come up with a universal definition of art (more about this in the next chapter). It may be equally difficult to define "effective communication". Only you can decide whether you're communicating effectively within your artistic vision or whether you're selling out and compromising your principles. You have to be honest with yourself about this.

I pose these questions as ones worthy of thought. I can't offer solid answers—only you can, and only for your work, your thinking, and your personal integrity. My views may differ from yours. I'm not trying to force your conclusions, but simply asking you to reach your own.

◀ ***Figure 14–6: Canyon Crucifix***
Sunlight was edging the deeply pitted sandstone wall of Utah's Wolverine Canyon creating a particularly pleasing form of light against the shadowed wall. Only after developing my contact proof did I notice that the sunlit form looked like a crucifix. And only after making my first 16" × 20" print did I notice the lizard in the shadows toward the lower left. Sometimes surprises occur, but these represent no ethical violations.

CHAPTER 15

Photographic Realism, Abstraction, and Art

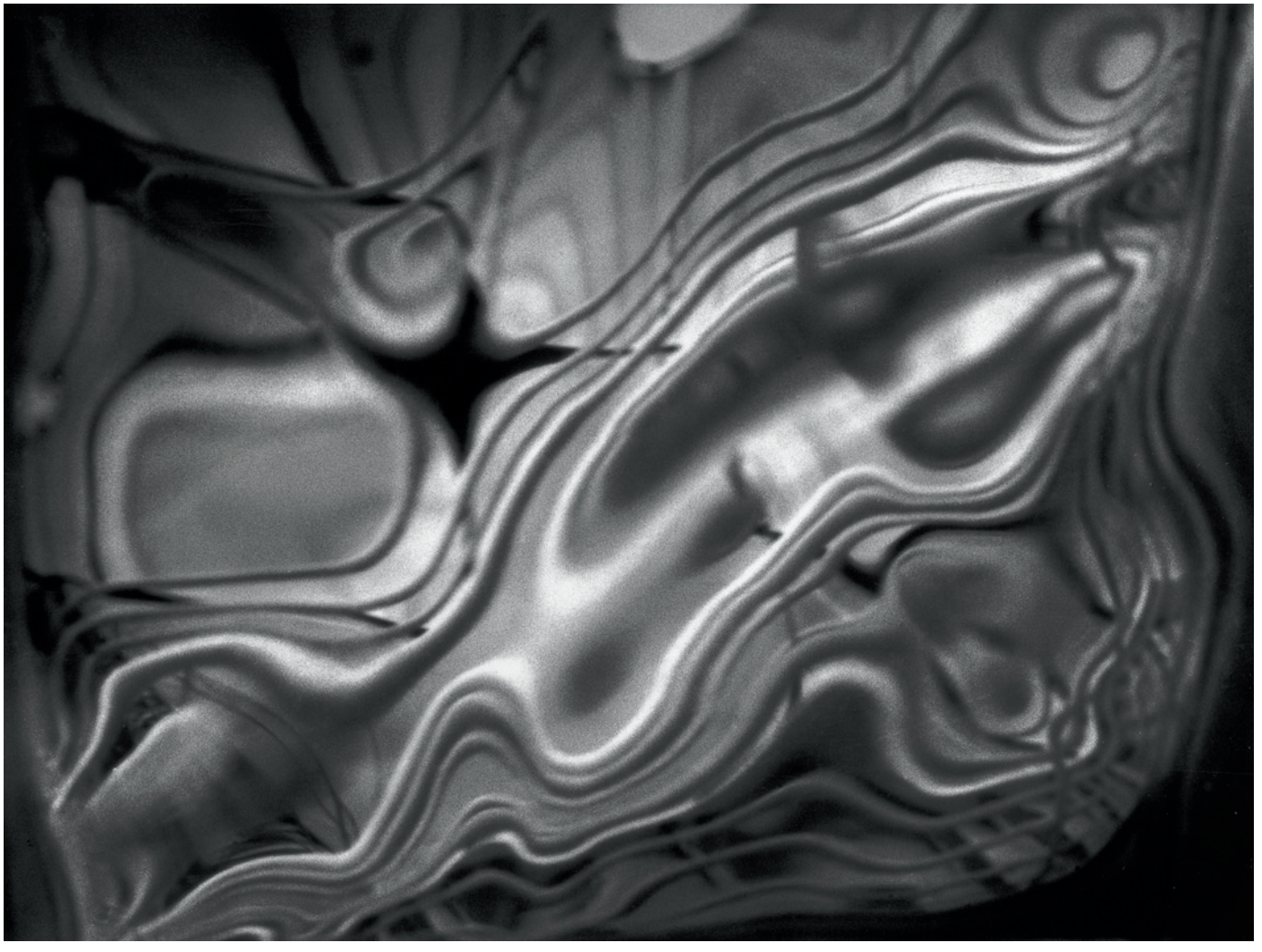
IN THE LATE 1870S, BODIE WAS A MINING TOWN of considerable importance, producing millions of dollars in gold and silver ore at the prices of its day. It was infamous for its bitter weather, brawls, and shootings. Its fortunes declined during the early 1880s as the mines were depleted. The last occupants moved away in 1940, eight years after a devastating fire destroyed most of the town. Today Bodie is a California State Historical Monument with a cluster of remaining buildings spread over a square mile area.

I first visited Bodie in 1975 on a field trip during a photography workshop. I was immediately drawn to the weathered wood, decaying interiors with peeling, stained cloth wallpaper, and warped windows. I returned often, each time photographing details of wood and windows, portions of interiors, and other bits of the formerly occupied houses. The photographs were well composed and nicely printed. They had wonderful textures, strong lines and forms, good balance and contrast, and rich tonalities (figure 15–1).

But over time, I lost interest in these images. I couldn't explain it; I just knew that they no longer meant much to me.

Over the years I continued to question why my interest in those photographs disappeared. The photographs were design-oriented, emphasizing many of the elements of composition discussed in chapter 3. They weren't truly abstract, but they weren't straight realism, either. They fell into a category that Ansel Adams called "extractions", a term that he used in place of "abstractions" for small bits or pieces taken from the whole. I realized that wherever they were on the reality/abstraction spectrum was of little consequence. What was lacking was something

◄ ***Figure 15–1: Picket Fence and Window, Bodie***
This is the only image from a decade of photographing Bodie (1975–1985) that I felt had any lasting value. It's a study of balanced asymmetry and meticulous camera placement. The window is slightly left of center to balance the pickets on the right, while the bright plaster patch at the upper left of the window completes the balance. The tip of the left picket is cradled within the dark portion of the window. The rectangular window spaces vary in size and tonality. Late afternoon sun from the left gives a tangible feeling of light hitting the rail, the pickets, and the house wall.



► ***Figure 15–2: Crystalline Light – Black Star***
This is one of the most abstract images I've ever made. Nobody has figured out what it is (though some may in the future). That alone should qualify it as being abstract. Surely, it doesn't hit you with the sense of realism and immediate recognition you had when viewing the opening photograph for this chapter.

I've previously called "inner conviction". I was photographing details because I liked their contrasts, textures, lines, forms, balances, etc., but not because the subjects meant very much to me. I didn't regard them as remnants of a rich or colorful history, or as anything else that could have imparted deeper meaning to them, but solely as present-day objects with compositional attributes.

Yet my questioning led me to thoughts about realism, abstraction, and art in general, and I know that my thoughts are still evolving today, and will continue to change as time goes by. Before delving into those thoughts, I'd like to define each of the terms contained in the chapter title: realism, abstraction, and art. The act of defining these terms is not only difficult, but also fraught with controversy. Just as chapter 2 started out with a definition of "composition", I feel that this chapter requires definitions in order to make the thoughts understandable (though not necessarily noncontroversial).

Realism is defined in my dictionary as an artistic representation felt to be visually accurate. It also is defined as an inclination toward literal truth and pragmatism.

Abstraction seems a bit more difficult to define. The dictionary refers to it as the act or process of separating the inherent qualities or properties of something from the actual physical object or concept to which they belong. Furthermore, the term *abstract* has several definitions. One states that it is a genre of art whose content depends solely on intrinsic form.

◄ ***Figure 15–3: The Crystal Ball***
This image is similar to figure 15–2 in its abstract mysteriousness. Though it may be difficult to determine the subject matter, does it hold your interest? Or, do you simply find the image meaningless or uninteresting? Abstraction allows numerous interpretations, many of which may be totally incorrect but fully satisfactory to the viewer.

Another states that something abstract is not easily understood or recognizable.

Surely there is a clear difference between realism and abstraction that emerges from these definitions. Realism deals with concrete objects in a recognizable, straightforward manner, whereas abstraction deals with the form or qualities of the object in a manner that may not be recognizable or understood (figures 15–2 and 15–3).

My photographs from Bodie were recognizably wood, window reflections, peeling wallpaper, etc., so they couldn't be defined as abstract. They were visually accurate representations of the subjects, so they were close to realism; but they presented only bits of the scene, so they might have been slightly separated from pure realism. I was striving for something that went beyond reality, and for a while I believed I had achieved it. Slowly I came to recognize that an *extraction* of reality was not an *abstraction,* nor was it necessarily art. (I should also mention that I disagree with Ansel's use of the word *extract* in place of *abstract,* for every photograph is an extract. There's always more! You choose the part you want because you feel it's cohesive, not because it's "complete" in any real sense.)

Art is almost impossible to define, and any definition is controversial. Perhaps it's akin to defining love. And perhaps the best thoughts about defining love (which apply equally to art) were penned by Oscar Hammerstein in the words to "Some Enchanted Evening" from the musical *South Pacific:*

> Who can explain it?
> Who can tell you why?
> Fools give you reasons,
> Wise men never try.

Undaunted by such sage advice, let's try. Most definitions of art are either too broad or too narrow. Furthermore, we all have our own definitions that further complicate the process. The dictionary I consulted has a number of definitions that distill down to the following: the conscious production of, or arrangement of, sounds, colors, forms, movements, or other elements in a manner that affects the sense of beauty. Or, alternately, the human creation of something that has form and beauty.

The dictionaries I referred to all used the word *beauty* several times in their definitions of art. I agree, for the most part, though I wonder if Picasso's painting *Guernica* could be considered beautiful, though it surely is fine art to my way of thinking. I do feel that beauty is a part of art—a major part—and even *Guernica* has many touches of beauty, though its message is one of overwhelming terror, anguish, and pain. In contrast to *Guernica,* much so-called art produced today appears to be based purely on shock value, bearing few meaningful thoughts and fewer concessions to beauty.

Perhaps we could broadly call art an exploration or inquiry into our world, our emotions, and our fantasies. We could call it the creation of forms that express human feelings. Beauty is not central to these definitions, nor is it even required. These attempts at defining art allow each person to set his or her own limits.

We can begin with these definitions to see where photography fits into the world of art, and to explore some starting points for producing photographs that are worthy of the title "fine art". Of course, the preceding chapters have all been devoted to this pursuit: We began by looking into ourselves to see what interests us and how we want to present those interests to others. Then we looked into the concept of composition, the elements of composition, and ways of composing a photograph to strengthen its message. Then we delved into the photographic controls that make compositional choices possible.

Photography as Fine Art

Had I spent more time analyzing the Bodie photographs from the perspective of the initial thoughts in the book (i.e., what they meant to me, and how I wanted to convey my thoughts) I would have had a clue to their shortcomings, for the truth was that I had little interest in Bodie beyond its superficial textures, lines, and forms. In other words, Bodie *didn't* mean very much to me. I was never much interested in its tawdry history, nor did I see deep meaning in its textures and forms. Instead, I was photographing Bodie and analyzing my images purely from the compositional aspect, and they seemed pleasing from that point of view.

Alone or together, good composition and technical prowess don't imply fine art. A great number of photographers can produce exquisite photographs that say nothing and inspire nobody. There is an abundance of photographs that are technically perfect but devoid of meaning. As Ansel Adams once said, "There is nothing more useless than a sharp photograph of a fuzzy concept." The painter Robert Henri said to his students, "I do not want to see how skillful you are—I am not interested in your skill. What do you get out of nature? Why did you paint this subject? What is life to you? What reasons and

what principles have you found? What are your deductions? What projections have you made? What excitement, what pleasure do you get out of it? Your skill is the thing that least interests me."

Although photography can stand on its own merits as an art form, let's consider it not in isolation, but in relation to other arts. Each art form is unique both in the message it presents and in its manner of presentation. Each art form exerts influence on the others. In particular, photography has had an immense—almost traumatic—influence on painting, but the repercussions of this influence have also been hard on photography. These repercussions have been almost entirely overlooked or ignored by art and photography historians alike. I feel that they are crucially important, and I shall delve into them.

Photography and Painting—Their Mutual Influence

Until photography came into widespread use in the mid-1800s, painting was largely representational—realistic, to use the definition above. Most fine paintings depicted people or scenes that were either realistic or idealistic, which means that real people were made to appear heroic for purposes of enhanced stature, or that scenes were aggrandized beyond reality for much the same reason. Yet even those subjects were meant to be clearly identifiable, albeit exaggerated. Furthermore, even when subject matter was aggrandized or romanticized, the result was basically representational.

But with the spread of photography during the 1850s and '60s, all that changed. Photography was better than painting at depicting reality; it was simply more accurate. Only the quality of the lens limited its accuracy. Painting, as it evolved over thousands of years, was traumatized. By the 1870s, photography was making a huge impact on the world. Painting responded to this challenge by going through a sequence of well-known movements. Impressionism, postimpressionism, pointillism, fauvism, dadaism, surrealism, cubism, and others all followed one another (or occurred simultaneously) in an effort to anchor painting as an art once again. This effort has continued with other movements like modernism, abstract expressionism, postmodernism, Campbell's soup-canism, pop art, op art, and perhaps in the future, mom-and-pop art.

But as painting changed drastically, primarily in response to photography, criticism changed along with it, and so did the definition of art. Each of the well-known movements in painting was roundly disparaged at its inception, but then was quickly incorporated into the fabric of art. As time went on, representational painting began to lose its significance as an art form. We can compare Gilbert Stuart's portrait of George Washington, which has always been considered a work of reasonable artistic merit, with any painting of a recent president that is nothing more than another in a series of presidential paintings. It seems apparent that the great portraits of the masters—Rembrandt, Goya, Gainsborough, Reynolds, etc.—would be dismissed if done today because they are too representational, too real. By the same token, photography's greatest asset, its visual accuracy—its innate realism—is also hard hit by this critical consensus. As photography forced painting to change, painting and criticism have forced the art world to change, and photography must respond to that change or be excluded from the world of art.

The inherent realism of photography is, in fact, somewhat of an obstacle to its acceptance as an art form in today's milieu, even though that aspect makes its message so powerful. A compounding factor to this problem is the universal usage of photography: everybody has a camera, therefore everybody is a photographer, but surely *everybody is not an artist*. There is the widespread feeling that photography is easy, as in Kodak's original advertising slogan: "You snap the shutter, we do the rest."

► ***Figure 15–4: Stairway, Wells Cathedral***
The English cathedrals struck me overwhelmingly as examples of what humanity can produce at its best. This image is an attempt at an ethereal "stairway to heaven" with no blacks or dark grays.

The preceding chapters indicate that expressive photography is not that easy after all. It requires immense effort—physical, emotional, and mental. But for all that effort, if the final image is to qualify as art, it must go beyond documentary realism. Even if a photograph stays within the realm of realism, it can have artistic merit if it's endowed with a leap of imagination on the part of the photographer.

The image must have something that carries it beyond pure documentation. Perhaps there's a heightened sensitivity—something deeply felt and revealed that offers the viewer deeper insights and understanding. Perhaps there's a quality of mystery—something left unanswered that requires the viewer to investigate the print and think about it further. Or maybe there's a surprise—something unexpected that leaves the viewer in wonder and amazement. Perhaps there's a heightened sense of drama or grandeur or calm. Whatever the quality, it must be more than a scene, a person, or a thing.

My Bodie photographs failed because they were photographs of things—weathered wood, peeling wallpaper, partially collapsed structures, bubbled windows, etc. They were well done, but they had no leap of imagination. Though I was fascinated by Bodie, the fascination was superficial and my photographs had no real base from which to leap. I should note that beginning in 2000, I began revisiting Bodie and producing new images that I feel are far more interesting and insightful than those produced earlier. Perhaps I have begun to see and feel Bodie differently.

The photographs I produced in the English cathedrals are different from my Bodie efforts. They, too, are pure realism: they are visually accurate (perhaps with slight aggrandizement through lens choices, view, and camera movements), and they were created with a conscious attempt to avoid any form of abstraction. In cathedral after cathedral, I was struck by three aspects of the architecture: the musical interaction of light and forms; the mathematical feeling of infinity created by repeated columns, vaults, and arches; and the overwhelming grandeur. As my gaze ran up the columns into the arches and vaulting overhead, I saw music unfolding before my eyes. I felt awed and uplifted by the magnificent forms. I attempted to depict both aspects through my photography. I felt something beyond just good architecture and wonderful craftsmanship. Those elements added up to more in my mind; Bodie's elements never did (figure 15–4).

Another way for photography to reach the realm of art is through abstraction. Abstraction, as stated in the definition, immediately removes a photograph from the realm of documentary realism. Good photographic abstraction requires tremendous insight to be effective. Anybody can photograph small portions of things to produce an unrecognizable image, but only when the image has both compositional strength and that almost indefinable commodity known as internal conviction does it prove to be a work of art.

Abstraction implies imagery in which the inherent qualities of the subject matter are separate from the physical object. The Bodie photographs lacked this characteristic. In contrast, the slit canyon photographs possess that quality. At times I saw their swirling lines and forms as the paths traced by dust particles and gases that coalesce into planets, stars, or whole galaxies, and at other times as the heavenly bodies themselves, or as the forces that move these objects about. I attempted to strengthen that vision by eliminating any references to place—i.e., to the eroded sandstone or to documentation of the canyons (figure 15–5).

The slit canyon photographs are virtually devoid of scale. Few people can tell with any certainty whether the area photographed is large or small, and most people who have expressed their perception of size to me have been woefully wrong. The uncertainty of scale is intentional on my part. I want the viewer to become involved in the flow of forms and forces, and in the cosmic aspect that I feel in the imagery—not to become involved in thoughts about the canyons themselves. I have consciously removed scale from the images by

► ***Figure 15–5: The Pinwheel, Spooky Gulch***
Cosmologists tell us that planetary systems, such as our own solar system, are accretion disks of gases, dust, and rocks surrounding a star that coalesce over millions of years into planets and other smaller bodies that revolve around the star in fixed orbits. This photograph is my vision of a several-million-year time-lapse image as that swirling mass of unconsolidated debris becomes planets, moons, and other solar objects.

using lenses that distort scale and by excluding objects that would indicate size. In much the same way, few of the images have an easily identifiable orientation. It's hard to say with certainty whether the view is straight ahead, up, or down.

The Strength of Abstraction

By seeing the canyons as analogies of the universe, from the subatomic to the cosmic, I photographed them in a particular way—a way that I would not have considered otherwise. They had a further meaning—surely a deeper meaning—to me. Minor White once said, "You photograph something for two reasons: for what it is, and for what *else* it is." (I've quoted this previously, but it's worth quoting again in this context.) I photographed the slit canyons specifically for what *else* they were. Because they are abstractions, other people see things in them that I never saw or could have imagined. One man thought they were wood details. One woman, a marine biologist by training, was reminded of underwater life forms she had studied. I've been amazed at the variety of responses, and I'm pleased by the spread of interpretations that the images afford. Each viewer brings his or her own background and imagination to the interpretation, thereby enriching me with alternative insights and interpretations.

It's been my observation in dealing with workshop students over a period of more than thirty years that beginners tend to shy away from abstraction in photography because they feel it lacks emotional value. They may be thinking in terms of cold design constructions, for it's simply not true. Photographic abstraction can be rich with emotion. The best way to explain this is by analogy. Surely music is the ultimate abstraction. It's nothing more than sounds and rhythms. Yet it's so much more. Who can listen to Beethoven's Fifth Symphony without being filled with awe; to Gottschalk's piano pieces without a feeling of delight; to Grieg's lyric suites without feelings of joy and serenity? Music of all types fills us with emotion, but where does the emotion come from? Perhaps it is within us, and the music simply unlocks it. I believe that photography can do much the same. Abstract photography may be able to do it as well—or better—than realistic photography for it may be subject to wider interpretation.

I doubt that photographs can unlock emotion in the viewer if there is none within the photographer—either in the initial seeing or in the ongoing process toward the final print. It is this inherent feeling within the photographer that I referred to earlier as "internal conviction". I can't go out and photograph an arbitrary section of something as an abstraction, then expect anyone else to respond to it intellectually or emotionally if I had no internal response to it myself.

That was my problem with the Bodie images. I was dealing with textures, tonalities, lines, forms, balances, and other aspects of composition, but not with real emotion. I thought I felt them strongly for several years, but in time I realized I didn't. (Most likely I was just pleased that they were different from my other photographs.) Internal conviction is like love at first sight: It always seems perfect when you're in the midst of it, but as time goes by you may see it differently. Whether the canyon and cathedral photographs qualify as art is not for me, but for others, to decide. But I can say this: They are honest and they are deeply meaningful to me. They depict the essence of the two subjects as I see and feel them. To me, that's the most important thing.

What about my multiple negative composites: Are they honest? I think so. They depict whole landscapes I would love to see. In other words, they convey my imagination or vision of the way I would like to see the world. Isn't that the essence of literature? Is a Brahms string quartet honest? Does it depict reality? Foolish questions, aren't they? In my composite images I've created landscapes that elicit a response in me, as a Brahms quartet surely elicits a response in me. If it also elicits a response in the viewer, so much the better.

I doubt that photographs can unlock emotion in the viewer if there is none within the photographer.

It's interesting to note that while painting has long since departed from realism, the work of a realist like Andrew Wyeth is highly valued. The revelation in 1986 of his Helga paintings further enhanced his artistic stature with the general public. Yet critics find it hard to assess his work. One of the problems that critics face is that they must make immediate assessments without the perspective that history affords. All we have to do is look at the initial critical response to the impressionists, pointillists, surrealists, etc., to see how wrong immediate assessments can be! Still, it's my contention that most critics can't deal with his work because they seek to label it, and the only applicable label is pre-20th century representationalism. They can't come to grips with the fact that realism can be fine art if it shows heightened insight and sensitivity. Wyeth's work has that innate quality; most critics do not.

The key difference between Wyeth's art and the presidential portraits referred to earlier is that Wyeth's work shows character and feeling, whereas most presidential portraits show a face and nothing more. But then again, considering some of our recent presidents, one wonders if there is more!

► ***Figure 15–6:***
Mt. Whitney, Sunrise
Mt. Whitney has a mesmerizing effect on me. I almost feel a buzz emanating from it when I'm in its vicinity. But it's deceptively difficult to photograph, rising behind other summits that appear to be even higher. This photograph was made in 1990, but was ignored for 17 years until I discovered that major cropping would convey the power that I had sought for so long.

Inwardly and Outwardly Directed Questions

In viewing and responding to photographs, most people miss the point, just as the critics do with Wyeth. All too often, several questions arise that seek information about the making of the photograph.

The first such question is: Where is it? This question applies to a realistic photograph in which things are recognizable. More often than not, the viewer who asks where the scene is located has little genuine interest in the location. However, this is not a meaningful question from an artistic point of view. What does it matter where the photograph was made? The mere fact that this question is asked implies that the photograph is not regarded as a work of art, but rather as a travel inducement.

Mt. Whitney, the highest summit in the contiguous 48 states, has always excited me immensely. But it sits far back in the Eastern Sierra, and others peaks that are not as high seem more dominant at first. I've always wanted to make a "portrait" of that mountain that conveys my awe to the viewer. In 2007, I discovered that I had done it effectively 17 years earlier, but I had not carefully studied the contact proof to see that cropping the negative would give the feeling I sought (figure 15–6). I didn't make this image as a travel inducement to visit Mt. Whitney, but rather to bring out its strength and deceptive majesty.

The second question people often ask about a photograph is: What is it? This question indicates an abstract image where viewers want to be told what they're seeing. Does it really matter? Would that question be asked of an abstract painting? Surely not! But because a photograph is real, it is "of something", people almost always ask what it is.

The final question most often asked is: How was it done? This concerns itself with the technical aspect and is the most pertinent of the three questions, but it still misses the point of artistic value. Each of the questions indicates a superficial interest in the photograph and a lack of real interest in its artistic merits. I feel that each of those questions are outwardly directed. They seek information about the making of the photograph.

From an artistic point of view, inwardly directed questions are far more pertinent. One such question is: What do I see in the photograph? This could apply to either photographic realism or abstraction. It asks how you, the viewer, interpret the work of art. A second such question is: How do I respond to it? Again, this applies to both realism and abstraction. You may respond positively or negatively; you may be confused, amused, angered, or depressed. You may experience any number of other emotional reactions. These questions are independent of the photograph's location, the subject matter, and the method of production.

I feel that when viewers ask inwardly directed questions, they are truly looking at photography as art. When photographers ask these questions, they are likely to be at the brink of producing fine art.

The outwardly directed questions appear to be unique to photography. They are rarely, if ever, asked of a painting. I doubt that such questions are ever asked of other art forms. Nobody would ask what Beethoven's Fifth Symphony *is,* but most people surely would ponder how they are affected by it!

It's important to remember that the finest art always elicits an emotional response. The response doesn't come from a print that simply has a good white and a good black, but rather from one that has good *content, good composition,* and *personal meaning.* When these three ingredients are made clear through good printing, the photograph will find an appreciative audience.

The Power of Photography

In the first chapter, I discussed my feeling that photography's inherent realism makes it the most powerful art form in the world today. People generally view a photograph as a literal depiction of reality, even when the image is highly manipulated. This gives the photographer the power to alter reality greatly and still present it as reality, a power that no other art form possesses.

For example, most viewers feel that Ansel Adams's "Moonrise Over Hernandez" is a literal depiction of the scene under extraordinary conditions. Great numbers of people roam about with their cameras waiting for the right conditions so they can duplicate the drama of that image, and they have no realization that the photograph was heavily manipulated to achieve the effect. They feel that Ansel was fortunate to come upon such spectacular conditions. They feel that he was simply in the right place at the right time. They view the conditions as realistic without recognizing that he greatly aggrandized nature by his method of printing. A painter could hardly hope to have an aggrandized landscape accepted as reality.

Although the perception of a photograph as reality appears to apply solely to realism, that perception also enhances the impact of abstraction. Again, I refer to my slit canyon images. An abstract painting of the canyons would automatically be viewed as artistic imagination, but an abstract photograph imbues the scene with reality—and therefore with heightened meaning and importance. And it goes beyond that. One of my

images, "Phantom Arch, Lower Antelope Canyon" (figure 15–7b), is a double print of a single negative. It's printed back-to-back to create the impression of a stone arch within the canyon. Because of the printing method, the image is impossibly symmetrical from a natural point of view. Yet because it's a photograph, people instinctively respond to it as reality. Most just shake their heads in amazement at the astonishing natural phenomenon! Again, only photography could do this.

Consider another aspect of photography: its universal language. Like music and the other visual arts, it needs no translation. Its message can be felt by anyone worldwide. Photography, like all other visual arts, transcends language and reaches across international boundaries. The work of André Kertesz, Ansel Adams, Joseph Sudek, Mary Ellen Mark, Sabastiao Salgado, Manuel Alvarez Bravo, Brett Weston, and others speaks to the world because the visual language is universal. It would be shortsighted and foolish to underestimate the power of that communication.

In conclusion, it must be said that photography is a very powerful art form. It's a powerful form of communication. For an individual photograph to achieve the level of *art,* it must go beyond literal representation. Both realism and abstraction offer avenues toward achieving photographic art, but each must possess the integrity of artistic conviction. Because we are so inundated with photographs in newspapers, magazines, billboards, catalogs, and dozens of other everyday items, the task of the photographer is even greater than that of artists in other media. However, when the level of art is attained, photography becomes the most powerful art form of all. To me, that makes the greater effort worth it.

◄▲ ***Figure 15–7a and 15–7b: Phantom Arch, Lower Antelope Canyon***
My eye was attracted to a dark swirl of rock surrounded by an apparent outward spiraling of forms. But the resulting image had no appeal to me (figure 15–7a). I was so displeased with myself that I vowed to do something about it before moving on to any other negative! I've never been able to reconstruct how I came upon the idea of double printing the single negative, resulting in the final image (figure 15–7b). Turning the negative 90 degrees to the right, I exposed 95 percent of it while dodging out the right edge, then turned the enlarging paper 180 degrees in the easel and made a second identical exposure. The dark form at the top merges with itself, creating the illusion of an arch within the canyon. It's complete fiction (hence the name "Phantom Arch") and one that preceded my multiple negative images by eight years.

CHAPTER 16

Thoughts on Creativity

CREATIVITY. What is it? Where does it come from? How can I become more creative? These questions are asked constantly. They are important and worthy of discussion.

In Western art, creativity is almost synonymous with originality. I specify Western art, because in Eastern art—as well as in primitive art—originality is relatively less important. Most Eastern and primitive art adheres to traditional methods, motifs, imagery, styles, and messages. An Eastern or primitive artist first strives for the quality of the ancient masters. The best artists are recognized for their superior work, and then they have the status that allows them to delve into innovation. Subsequently their innovative work is much acclaimed, producing a new standard for future artists.

Not so in Western art. Attempts to emulate the work of past masters are regarded as redundant, hollow, and meaningless. Efforts that are reminiscent of past masters are often frowned upon as "copies". At best, an attempt to copy the work of a past master—or even the appearance of copying—might be looked upon as a good learning experience, but certainly not as an attempt to produce a significant artistic statement. The connotations of copying are decidedly negative.

But when an artistic work appears to be "new", it's viewed in a more favorable light. New work indicates significant differences from the work of past masters, even if older processes are utilized. For example, Paul Caponigro uses traditional black-and-white silver prints, traditional landscape imagery, and traditional methods of presentation (i.e., mounted photographs on standard white museum board). Yet his work is quite different from that of Ansel Adams or Edward Weston. It would

◄ ***Figure 16–1: Wall with Two Ridges, Lower Antelope Canyon***
After rappelling into Lower Antelope Canyon in 1983, I had the most wonderful photographic day of my career. This photograph struck me as analogous to magnetic lines of force. The rich tonalities, smooth forms, and lyrical balance make it positively sensual.

be difficult to confuse a Caponigro photograph with an Adams or a Weston photograph, and such comparisons are rarely made. Adams and Weston endowed the landscape with distinct qualities through their photographs: Adams with Wagnerian drama, Weston with subtlety and clarity. Caponigro endows the landscape with an ethereal, mystical quality. The subject matter is not so very different, but the way it is handled surely is. Caponigro's work is accepted as original, unique, personal, and full of artistic merit. So is the work of Jerry Uelsmann. For all the surrealism of Uelsmann's multiple negative imagery, he still uses the traditional black-and-white silver print; the subject matter is often drawn from traditional landscape imagery (though combined in a nontraditional manner); and the work is mounted in the traditional manner on standard white museum board. A Uelsmann photograph is strikingly dissimilar from one by Adams or Weston—more dissimilar than a photograph by Caponigro.

Both Caponigro and Uelsmann are accepted as creative artists. Each one presents a view of reality and imagination that is unique, compelling, thought provoking, and skillful. In a word, each artist is creative. Each brings a fresh viewpoint to photography, one that has no antecedent. The methods may be traditional, but the seeing is new. The feeling is new. It's original.

I believe that creativity is a product of intelligence. I don't believe that creative work can be produced by fools, idiots, dullards, or mediocre people, except in the rarest of accidents. Creativity is a product of desire, thought, experience, experimentation, and inner conviction. Taken together, these five qualities imply intelligence and commitment. Let's look at them one at a time, though they are so interrelated that it's often difficult to separate them in a satisfactory manner.

DESIRE. It's hard to imagine creativity simply happening without a preexisting desire. The person looking for creativity sees possibilities that others tend to miss. As Ansel Adams put it, "Chance favors the prepared mind." The desire must be an active one, accompanied by actions that result in fulfillment of the goal. I don't believe in a "laid back" approach to creativity. It's something that you must pursue; it will not come to you.

While it's not always easy to recreate something that has been done in the past, it's usually easier than doing something for the first time. Creativity implies originality—doing something new—therefore, it also implies difficulty. Few difficult things are even attempted without a deep, active desire to succeed.

Creative photography can be done with subject matter that has been photographed previously by others, or with untested subject matter. It can involve any of the controls in the field, any darkroom or computer techniques, alternative processes (i.e., platinum/palladium printing, digital methods, alternative color print processes, etc.), unique methods of presentation, and every other conceivable variable in the vast realm of photography. The desire must be accompanied by the next element, thought; without thinking and planning, desire is as useless as it is to a vagrant wishing for a million dollars.

THOUGHT. One of the biggest differences between creative photographers and noncreative photographers or casual snapshooters is the thinking that precedes and accompanies all aspects of the photographic process. Each of the many controls of photography can alter the final image. By chance, a happy accident can produce an unexpectedly pleasing result—even for a dullard, but the dullard won't recognize the originality of the unexpected. Only the intelligent, thinking individual will do so.

More often than not, creativity is based on careful thinking, reasoning, planning, and execution. Chance happenings may be part of the process, but after the initial surprise, the effect can be incorporated into future planning in a controlled manner. This requires thought, intelligence, and insight, as

well as some knowledge of past photography. You don't have to be a photohistorian, but it's good to know something about the history of photography. There is little benefit in working on your "original" idea only to find that it's been done previously—except, of course, to refine and improve your thought processes and techniques. Furthermore, knowledge of the history of photography can be a springboard to new ideas and real creativity.

Thought also implies the ability to distinguish real creativity from imagined creativity. While any snapshot you take tomorrow has never existed before and may therefore be considered "original", in the deeper, artistic sense it has surely existed countless times before. To do something that truly has never been done before requires planning, as well as a great deal of personal insight.

EXPERIENCE. This can prove to be a double-edged sword. Experience can and should free you from concentrating on the mundane, mechanical aspects of the photographic process and allow you to concentrate on new concepts, techniques, and approaches. Experience tells you what to expect from most things you've done previously, freeing you from concerns with the basics. Yet too often, experience tends to lock you into regular habits and proven techniques, stifling creative potential. Every photographer has to guard against allowing experience to become a means of growing stale.

EXPERIMENTATION. Except in the case of a happy accident, originality doesn't arrive without experimentation. Nothing new comes from standard ways of seeing or standard ways of using familiar materials. Bear in mind that experimentation runs the risk of failure and that most experiments are dead ends. In recognition (or fear) of this basic truth, photographers shy away from experimentation. You must be willing to try and fail, then try and fail again, and again, and again. This can be frustrating, time-consuming, and costly, but it can also be incredibly rewarding when the experiment yields positive results.

Experimentation can be random or directed. You can work toward improving weaknesses in your existing work or toward expanding your horizons by delving into untried realms. This can take a variety of forms. If your body of work seems too limited, search for new subject matter or new ways of printing or presenting your work. If the quality of your work is not personally pleasing, try new exposure and printing techniques or different materials and chemicals. Even if everything seems pleasing, it's still important to test new concepts, new combinations, and new approaches simply to avoid stagnation and also to recharge your own batteries.

INNER CONVICTION. I've referred to this several times previously as a "gut feeling" that your imagery has meaning beyond its obvious, outward trappings. Inner conviction also means your way of expressing your personal view as you see it, and as you want it seen by others. Many photographers photograph where others have done so previously, yet a different vision marks the newer attempt. Just as each of us has different opinions about any subject, we also see things differently. If you feel your vision of even the most commonplace things is unique, satisfy that inner conviction with photographic expression.

This also implies doing what you want to do, whether or not the value of your work is immediately recognized by others. It doesn't mean following the trends of the moment or the demands of the public or the critics. It means being yourself and following your inner motivations. It means having a sense of purpose and pursuing it with an honest approach. Today, galleries and museums are filled with work that is new, different, original, and gimmicky. The emphasis on originality has created a near-paranoia among artists and would-be artists to do something different, which all too often translates to something shocking. So a tremendous amount of "different" work

is being produced, but much of it lacks personal conviction, insight, or emotion. It uses the materials of art, but it isn't art. It's nothing more than an unfeeling response to the demands of collectors, art critics, gallery owners, museum curators, and the like.

I feel that artists who maintain their personal integrity even at the risk of critical rejection are fulfilling the purpose of art more positively than those who produce original work lacking inner conviction. Van Gogh would have quit painting if his inner convictions were not as strong as they were, for his work received no acclaim in his lifetime.

Creativity, then, stems from a complex interaction of many factors. Where it comes from and how any individual can acquire it are equally complex concerns. Some people are more inclined to creativity than others; when it comes to creativity, it's obviously not true that all people are created equal. Those with intelligence, insight, and an inclination to experiment are likely to be the most creative.

Creativity can be nurtured, if not learned. You have to push yourself to do new and different things; push yourself, but not pressure yourself. There's a difference, a huge difference. It's rare indeed when anyone can produce creative work under pressure.

Obstacles to Creativity

Other than inability, there are three basic obstacles to creativity. The first and greatest obstacle is the adamant opposition most people have toward trying anything unusual, strange, wild, different, or new. I hear students of photography talk emotionally about their desire to be creative and then refuse to do anything that breaks with their entrenched patterns of thought and general approach to photography.

The second obstacle to creativity is insufficient time to think about new approaches or to implement them once conceived. Since photography is available to virtually everyone, it's widely perceived to be an "easy" art form. In one sense, it *is* easy to make decent slides, negatives, and digital files; it's also easy to send them to the lab for processing or put JPEGs on the computer for friends and relatives. With a little more difficulty, you can make your own prints with excellent technical quality. But it's not easy to produce photographs with personal insight, unique vision, and meaningful expression. If you're attempting to make art via the medium of photography, you need adequate time to reflect on the many characteristics of a successful photograph, and on the creative possibilities of changing one or more of the variables in order to produce a significantly different image. It's nearly impossible to do this on a part-time basis.

Many people who wish to be creative don't lack the ability; they lack the time. But then again, if they had the time, would they put in the required effort? Of course, thought can be devoted to photography while engaging in other endeavors (if those other endeavors aren't too demanding), and those thoughts can be pursued during the time available to photography. This increases the potential for photographic creativity on a part-time basis. Yet I have doubts about the creative possibilities for someone who picks up the camera periodically, or someone who enters the darkroom or gets in front of the screen, keyboard, and mouse infrequently and has no other time to think about the process. While photography may seem to be an easy art form, it's deceptively difficult.

The final impediment to creativity comes from without, not within. It's the staunch opposition that the public and the critics throw in front of creative artists when they take off in new directions. Jerry Uelsmann has noted that he's somewhat "boxed in" with his surrealistic, multiple-print images. He is *expected* to do that, and he finds resistance to presenting anything other than that. Jay Dusard photographed landscapes for nearly 20 years before producing his exceptional book, *The North American Cowboy, A Portrait,* in 1983. Since then, he's

been perceived by many as a "cowboy photographer" and has encountered resistance to presenting other work, even landscapes.

My first book, *Visual Symphony,* presented four different areas of my work. This multifaceted approach gave me more leeway to present other work without as much resistance. My subsequent books of the *Tone Poems* series also present several different areas of my work combined with music on CDs, which expands my range into another art form. Yet I recall that when my early landscape work began leaning toward abstraction, many of my friends and acquaintances expressed surprise—and more than a little displeasure—with the change from the imagery that they had come to expect. It can be extremely difficult to break away from what others expect—and often demand—from you.

Prerequisites for Creativity

Creative photography requires intelligence, flexibility, time, and effort. Given these qualities, creativity cannot only be attained, but also improved. Creativity requires passing up things that are obviously good but ordinary, and searching for things that may be good and are unusual. Often creativity is the process of combining two variables in a way that has never been tried before—or even combining them more successfully than ever before. Unique conditions may make the combination exceptional, though the same combination may prove to be useless under other conditions.

I would like to draw on examples of my work to help illustrate these ideas, and start with examples drawn from two areas that I've discussed in different contexts already: the slit canyons and the cathedrals. When I first saw the structure titled "Wall with Two Ridges, Lower Antelope Canyon" (figure 16–1), I immediately saw its graceful lines as electromagnetic field lines—as elegant as the lines I found in Antelope Canyon and equally dramatic. Had I not wandered into Antelope Canyon and then rappelled into Lower Antelope Canyon (long before it became a tourist attraction), I could not have imagined this imagery. It was a product of my math/physics background and the good fortune of finding the slit canyons.

This example represents creativity through new and unique subject matter. But does it go farther? I believe it does. To me, its originality stems from the interpretation of those structures as forces in nature, representing the type of force field you see by putting iron filings on a sheet of paper with a bar magnet held below it. No doubt I would have been drawn to those structures by their lyrical shapes, their compelling contrast, and their apparent movement, but those factors alone may not have been enough to make me photograph them. When I saw them as representing force fields, however, they became terribly important forms for me, with "Circular Chimney" (figure 3–6) so immediately compelling that it was the first exposure I made in Antelope Canyon. Without my background in mathematics and physics, I might have seen that form merely as unusual and fascinating, but devoid of photographic value. (This is a prime example of the thoughts expressed in chapter 1.)

After I made that image, I continued to search for and photograph additional slit canyons because of their analogies to electromagnetic or gravitational lines of force throughout space. My goal long ago was to become a theoretical researcher in that field, and my interest in it has always remained high; so the canyons transported me in a very real sense right into the heart of the areas that I have always found fascinating. The creativity that lies within those images results from my interpretation of the canyons as something more than eroded stone.

I'd like to make an important aside here concerning the contrast range of the slit canyon imagery. Let's look at "Circular Chimney" again. The contrast in the scene was excessive. As

►► ***Figures 16–2a and 16–2b: North Transept, Winchester Cathedral***

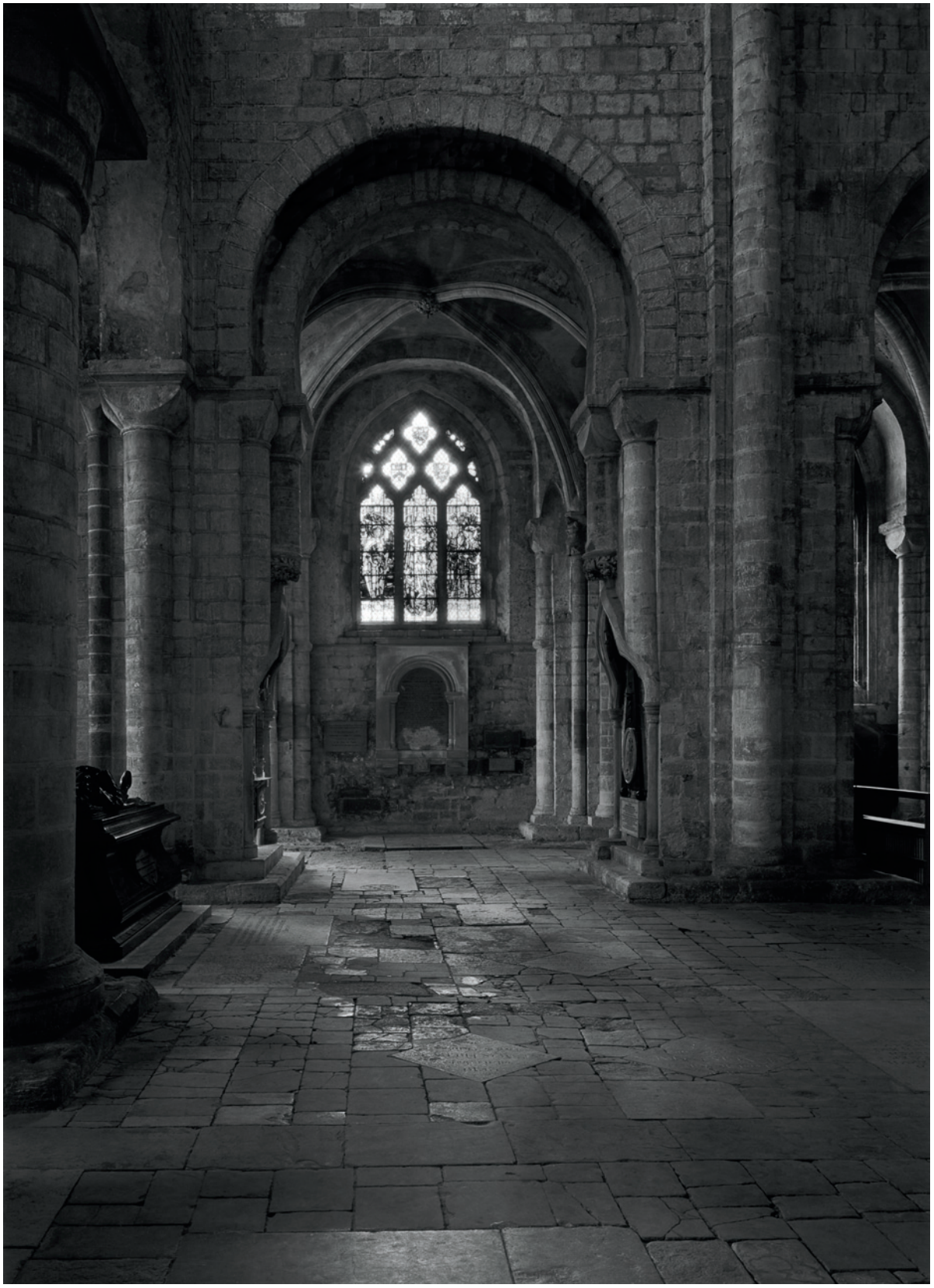
I saw the north transept of Winchester Cathedral on a rare bright, sunny day. Figure 16–2a is a literal rendition of the full negative showing the white stonework. Yet the light-toned, literal rendition failed to convey the mood I felt. I cropped the top of the negative, the right edge just below the upper triforium gallery, and along the bottom to eliminate distractions. By printing far darker than a literal rendition would have allowed, I obtained the mood I sought: a somber but brilliant mood, along with a feeling of age (figure 16–2b). This isn't how the cathedral looked to me; it's how it felt to me. Because photography is both an art form and a means of personal expression, it's far more important to convey a mood—even through a departure from reality—than to simply report on the scene in a journalistic fashion.

contrasty as the photograph is, it still represents a dramatic *decrease* in the actual tonal range of the site. My technical understanding of compensating development was enough to give me the confidence to attempt photographing there. In an amazing case of serendipity, I had learned the procedure only two weeks prior to finding Antelope Canyon. In a real sense, then, the creativity involved with that image was a direct result of my technical advancement. Without that knowledge, I probably would have walked away lamenting the limitations of photography. There is an important lesson to be learned from this: technical expertise, artistic ability, and creativity are integrally related. If you don't improve your technical ability, it may seriously inhibit your creative potential.

I "discovered" the English cathedrals, just six months after discovering Antelope Canyon, and although my methods were the same (i.e., using compensating development to rein in a high contrast scene), my philosophical approach was diametrically opposite that of the canyons. In the cathedrals, I strove for detail and information everywhere. In the canyons, I allowed areas to be devoid of detail in order to enhance the overall design and the feeling of movement. I wanted the viewer to visually wander through the cathedral images and discover the wonderful details within them as I discovered the details for myself. While the canyon photographs actively avoid showing "place", the cathedral photographs pursue it.

I find it difficult to assess the originality or creativity of my cathedral photographs. I've always wondered whether they are simply technically competent images of great structures or whether they ascend to the level of art. Perhaps my years of commercial architectural photography make me hesitant to assess this body of work, despite the fact that I recognize a number of significant departures from reality within it. Let me elaborate on one.

In the north transept of Winchester Cathedral I found a wonderful floor dating back to the early 12th century. Above it stands a series of old, rounded, Norman arches made of rough stone. There was a feeling of incredible age and history in that area, and also a quality that was almost dungeon-like. But it



was a sunny day. The area was flooded with light, and the light was enhanced by the almost white stone of the transept.

I photographed this scene knowing that the final print would bear little resemblance to the transept as I saw it (figures 16–2a and 16–2b). With major cropping and a far darker printing than a literal rendition would have allowed, I altered the mood greatly. In doing so, I attempted to re-create the feeling I experienced while standing there. I wasn't interested in capturing the scene. I was interested in conveying my mood, my *impression* of the scene.

The final photograph *appears* to be a straight documentary photograph of the scene as it was. It *appears* to be the type of scene that could have been done by anyone with a camera in hand. That's precisely what I want. I don't want viewers to be aware of anything but the apparently "straight" image before them. I want them to respond to the mood it evokes. I don't want the image to appear manipulated or altered by me in any way. This philosophical approach is typical of the entire body of work I did in the cathedrals.

Is it creative? Is it original? I can't say. Just like the question of whether or not a specific photograph qualifies as art, I leave that to others. Whatever the verdict may be, I feel that I couldn't have made the image without thought, experience, and inner conviction. It still may not be creative, or at least not obviously creative. There is little about it that appears to be new. Furthermore, I was photographing great art in the form of architecture. When you photograph someone else's creation, you have to ask the question, "How much of *you* is in the photograph?

Producing Something New—Its Real Importance

This may be an opportune time to note that newness and originality tend to be fleeting priorities, at least in the long run. Whether or not my cathedral photographs—or *any* of my photographs, for that matter—prove to have lasting significance can only be ascertained many years from now. By then the question of whether or not they were new or different at the time they were made will be forgotten. Far in the future, the images will be judged solely on their artistic merits, and inner conviction and artistic honesty will gain greater importance than originality.

To illustrate this point further, consider the following. It's immaterial today to ask who started each of the movements in painting in the late 1800s and early 1900s: impressionism, pointillism, cubism, surrealism, etc. Who were the significant artists within each movement? *That* is the only important question. Some critics have gone so far as to say that it isn't important who was the *first* to work in any new style, but who was the *last!*

By definition, the second person to paint in any of the above-mentioned styles was not original, in the pure sense of the term, but he may have been a greater contributor than the first person. For all we know, he may have been chastised for "copying" at the time (though, as we know, he was probably chastised more for going along with a little-understood and disliked new approach to painting). In either case, that criticism has no importance today. What counts is whether or not the painter's works were honest, expressive, and artistically worthwhile.

Let me move to another example of my own work in the context of creativity. I made a photograph of Mt. Assiniboine during a winter trip to the Canadian Rockies in March 1986. Variable weather prevailed while I was there, and on the final day, clouds flew past the needle-like peak at remarkable

◀ ***Figure 16–3:***
Mt. Assiniboine
"The Matterhorn of the Canadian Rockies" was an awesome sight as clouds swept past the summit. Yet I felt that photographing it would yield just another pretty mountain shot, so I tried something different. Placing two filters on the lens—a #12 one-stop deep yellow filter and a 10-stop neutral density filter—I changed an exposure that would have been $\frac{1}{125}$ second without filters to one requiring a 15-second exposure. Adding reciprocity failure to that, I exposed the scene for 30 seconds. The fast-moving clouds took on a surrealistic air, though nothing else within the scene was altered.

speeds. Rather than employ the usual approach of a fast shutter speed to stop the cloud movement, I went the other way. I used a deep yellow filter to help separate clouds and sky, along with a 3.0 (10-stop) neutral density filter to force a 30-second exposure.

My first attempt failed. Clouds obscured the summit during much of the long exposure. I waited and watched the pattern of cloud movement across the face of the mountain and the pattern of sunlight and shadow on the slope below. Then I tried again. As I monitored the scene carefully throughout the exposure, I realized that *everything* was working perfectly! Clouds moved across the face of the peak, but the summit was visible at all times. Sunlight remained on the glacier immediately below the summit, as well as on the trees of the lower slopes (figure 16–3).

To me, the strange quality of the clouds makes this a somewhat different landscape photograph, a creative photograph. If it is, then where did the idea of using the long exposure come from? I'm not absolutely sure, but I can speculate. I believe that Wynne Bullock's long exposures of the surf may have been the trigger. I discussed those exceptional photographs in the section about shutter speed in chapter 3. If I can remember my thinking back in 1976, I must have reasoned that if the moving surf could create unusual effects against fixed backgrounds, then perhaps moving clouds could create interesting effects against fixed foregrounds. The first several

► ***Figure 16–4: Reflections, Calgary***
In 1985, in Calgary Canada, I began my concentrated study of groups of modern downtown buildings. I found the geometric interactions of skyscraper groups extremely fascinating from a pure design standpoint.

times I tried the long exposures, little of value happened. But the idea stuck with me. I have tried it periodically since then, several times with pleasing enough results to maintain my interest in its potential. At Mt. Assiniboine, it worked perfectly. I did it again at Mt. Rundle, also in the Canadian Rockies, years later (figure 3–16). No doubt I'll try it again, or try variations on it. After all, there is often more than one successful answer to a question.

I can't say whether other photographers tried this before me. I suspect so, though I can't recall another photograph that employs this approach. If it's a first, then it's truly original, truly new. If it's been done previously, and done with success, then I am the second (or third, or fourth) to do it. But I'm not a copier because I've never seen it. At worst, I reinvented the wheel. What I did was put Bullock's idea into a new context.

Other examples of creativity stem from architectural abstracts and design studies that I began in the mid-1970s. These studies accelerated greatly in the mid-1980s as I focused my attention on the geometric interactions of commercial downtown buildings (figure 16–4). I confined my imagery to straight photography, avoiding multiple exposures or other types of artificial manipulation. I wanted to investigate the visual aspects of the interrelations that appeared to the eye. I felt that my most successful images were those that destroyed spatial

◄ ***Figure 16–5: Urban Cubist #4***
I wanted to take my urban geometric studies of the mid-1980s to a higher level of abstraction. The result is a group of unique images I call "urban cubists". My inspiration comes from cubist paintings. Each image is created in a unique manner, but many share a common approach. Using a single negative, I make several short exposures through the negative (say, five 5-second exposures). I block out portions of the enlarging paper during each exposure with geometric cardboard shapes (triangles, rectangles, circles, etc.) laid directly on the enlarging paper. Placement of the cardboard pieces is not arbitrary, for I can see the projected image through the enlarger's red filter at full aperture for each exposure.

relationships and produced a Mondrianesque sectioning of the image space.

In 1987, I began to move toward further abstraction. I felt a desire to go beyond geometric interplays that exist in reality and experiment with those I could create. A rush of ideas came to me. I'll confine my examples to one of those ideas.

Thinking in terms of cubist imagery, which has an obvious relationship to architectural geometry, I made a series of short enlarging exposures through a single negative. I placed geometric cardboard shapes atop the enlarging paper for each of the several exposures, moving the pieces to different positions for each successive exposure. In this way I blocked light from selected areas of the enlargement for varying portions of the total exposure. Some of the locations of the covering objects were carefully chosen; others were selected purely by chance. Each image was unique, so duplication was impossible (figure 16–5).

Each attempt was a new experiment. Sometimes the breakup of space and shape worked, and other times it failed miserably. That's the frustration and the exhilaration of experiments. I haven't done any new "urban cubist" images in years, so I can't say if they will progress any further. I have a host of other ideas to play with, and new ones may occur to me as I proceed. I do think it's creative—i.e., new and different—and

► ***Figure 16–6: Ice, December 10, 2009***
This image kicked off three successive days of digital macro photography of ice forms on my property, and nearby, during a spell of extremely cold weather.

I find it quite meaningful because it seems to extend the actual geometric characteristics of the scene into another realm that partially relates to the existing reality and partially obliterates it. Because my initial studies were most pleasing to me when spatial relationships were destroyed, the destruction of space extends that idea further.

I could continue with examples of my work and my thoughts concerning their creative aspects, but I'll stop here. I don't want to fall into the trap of saying too much about my own work. Since I know my work best, I'm simply using it to provide convenient examples for the ideas I wish to express. Creativity can be judged better by others—and best over a long period of time to allow historical perspective. Far be it from me to tread on the domain of critics or historians!

Be Prepared for Imagination, Innovation, and Creativity

Periodically I receive requests from high school and college students for information about my photographic background, my work, and my thinking for a paper they have to write. Since they have chosen me as the artist they wish to write about, I feel honored and always cooperate. Recently one student asked me a question that began, "When you were in your prime..." Stop a moment, dear reader, and ask yourself how you would respond to those words. I must admit that I was more amused than offended, but it was close!

I responded by saying that I feel I'm still in my prime (thank you very much!) because I keep looking for new things, I have the same high level of enthusiasm, I have the same desire to produce new and insightful imagery, and I still strive for top quality at all times. Was I just being defensive, or was there an element of truth in my answer?

Within days of responding to that student (early December, 2009), the weather at my home north of Seattle in the North Cascade Mountains entered a second week of subfreezing temperatures, varying between 8° and 25°F with dry, cloudless conditions. Rime ice (also known as hoar frost) grew steadily on tree limbs, grasses, bushes, and anything that was open to the frigid air. When the ice shards had grown to lengths I had never seen before, a light bulb went on in my

◄ ***Figure 16–7: Crystalline World, Blue #12***
These astoundingly intricate ice crystals on a campground picnic table—some more than an inch across—drew my attention for more than an hour of fantasy photography. It was like looking straight down into a futuristic cityscape of glass skyscrapers.

◄ ***Figure 16–8: Crystalline World, White #7***
At the same picnic bench the next morning, I found new forms and a completely different color balance in the crystalline ice. These crystal images are works in progress, made during the revision and production stages of this book. How they will ultimately end up, time will tell. To me, the important thing is the excitement of the discovery, the seeing, and the eventual completed imagery that all add up to a wonderfully creative experience.

head. Realizing that I may never again see ice formations like that, I started to photograph them.

I turned not to my 4 × 5 film camera (my general camera of choice) and film, but to my digital camera, which I could hand-hold and easily move left or right, forward or back, up or down. With my 4 × 5 camera, I couldn't possibly get my tripod close enough, and if I could, the constraints of moving the camera position millimeters at a time would have been daunting. I started along a small stream that runs through my front yard (figure 16–6), squatting down, hand-holding the camera less than a foot from the subject matter. This was basically new to me. I was just having a good time with the images I made that day and reveling in the ease of making them. It was fun, pure fun. I doubt that I produced anything great, but I enjoyed working with the ice and with the camera.

The next morning, taking my dogs for a walk at a nearby U. S. Forest Service campground that is closed during the winter months (making it perfect for dog walking), I noticed even more remarkable crystals on picnic tables set in a small open meadow by the river. I didn't have my camera with me, but I examined these extraordinary ice crystals closely. Then I returned to the campground in the late afternoon with the camera—and without the dogs—to photograph these amazing natural structures. I did nothing to alter the white balance and enjoyed the overall blue cast on the crystalline structures. With the camera in macro mode, I was so close to the intricate ice crystals at times that I displaced them while moving the camera. In other words, the camera was literally touching the subject matter. This also was completely new to me (figure 16–7).

The previous day I realized how easily I can move around for macro imagery with the digital camera, but at the picnic table I found compositions on the fly as I slowly moved the camera over the vast complexity of hexagonal, sparkling crystals. It was exhilarating. It was fun. But it was also meaningful to me. I was dead serious about what I was doing. Photographing these crystals had a distinctly artistic feel about it, and that's a visceral feeling I can't begin to explain in words.

The next morning temperatures rose slightly but still hovered below freezing. I returned for additional exposures, expecting to examine the ice-encased ground cover and adjacent grasses for entirely different images—but instead, I returned to the picnic table. I immediately noted from the camera display that the mid-morning light gave me a very different color balance. It was almost colorless, not the all-pervasive blue cast I encountered the previous afternoon. It was wonderful. I did indeed find new and different forms (figure 16–8).

During the day the temperature rose and snow began to fall. Three inches quickly covered the ice crystals. By late afternoon, the snow turned to rain, reducing everything to mush and slush. By the next morning, it was all washed away. The old saying, "He who hesitates is lost" applied perfectly. Fortunately I made my photographs at the peak of the display.

Now, consider this: How often have you been in a conversation, debate, or argument and later thought, "I should have said…"? Similarly, how often have you thought, "I should have photographed that unusual thing"? Of course, the realization came long after you had the chance to make the photographs. Instead of getting caught in that syndrome, I acted quickly.

The three figures you see here—one from each day of shooting—represent little more than my preliminary ideas about how I may process the RAW images. In essence, you're viewing the equivalent of the straight contact proofs I study for black-and-white darkroom printing. I'm excited about the possibilities. I've never seen anything like these crystals. They look, to me, like extraordinary large, planned structures… whole cities of giant, gleaming glass skyscrapers seen from above. Less than two inches in depth, they seem to keep going deeper and deeper into space. Time and my evolving ideas will determine the final printing of these images.

Several lessons about creativity emerge from this episode. First, there's the art of noticing—in this case, noticing the exceptional ice crystals, initially at home, then at the campground. Second, there's the recognition that even a picnic table can provide the perfect platform. You've got to be prepared for something different. Although I've tried photographing rime ice before, I was never successful using my 4 × 5 camera. This time I had a different camera, a different tool, to work with. The digital camera in macro mode gave me both the ability to move in closer and to move about freely, two advantages that the 4 × 5 couldn't match. While I use my 4 × 5 film camera for most of my photography, it would have been inappropriate and unproductive for this subject matter. Mark Twain once observed, "If the only tool you have is a hammer, it's amazing how many things look like a nail." So the third and fourth lessons are thinking the issue through and properly matching the tool to the job.

Fifth, though I was swamped (and under the gun) with work at home, I put it all aside for this once-in-a-lifetime opportunity. None of the important work that I put aside constituted an emergency (though it often seems that way at the time, doesn't it?), so I seized the opportunity. As it turned out, had I decided to wait, the ice crystals would have been a memory rather than a photograph (or, in this case, a series of photographs). The compelling desire was there, and I jumped.

Finally, my working procedure on this project was radically different from my normal approach. Normally I have a clear idea about the final image as I stand behind the camera. That's previsualization. With these images, however, I'm leaving the final prints open to further consideration. Why? Because everything about them is still quite new to me: the subject matter, the camera, the extreme macro, the working procedure, and even the final processing (after all, my digital background can't compete with my 40+ years of shooting with a 4 × 5 or my 40+ years of black-and-white darkroom experience). For all these reasons, I'm keeping an open mind. In time, I'll develop a better handle on it from the start—as you will in your own development.

My excited response to the ice shards on a picnic table proved that I still have the basic ingredients for creativity: enthusiasm, curiosity, and a mix of seriousness and fun. I followed that up with action. As I write this, I'm excited about this foray into something decidedly new and different. I'll leave it up to the reader to judge whether the images offer a start toward exceptional work, meritorious work, or just mediocre work (hopefully it's not really bad work). But the imagery is still in the beginning stages, and the possibilities are endless. If I'm still involved in such endeavors, maybe it's an indication that I'm still in my prime.

You're still in your prime (or maybe reaching your prime) if your enthusiasm is high, if your mind is open to all possibilities, and if you're actively noticing, thinking about, and pursuing new, different, and interesting ideas. You have to be actively involved and interested. And you must have a connection between yourself and the subject matter; it can't be new but meaningless.

Always keep this in mind: The photographic process starts with discovery accompanied by imagination. While a painter has the option of putting anything on a blank canvas, a photographer has to point the camera toward something, or start with a scan of something. But it doesn't end there; your imagination has to turn the "found object" into something of interest and importance, something more than just an object. Minor White truly had it right when he said, "We photograph something for what it is and what *else* it is" (quoted several times in this book, but with no apologies). You'll know that "something else" when you find it. And I have more to say about that in the next chapter.

CHAPTER 17

Approaching Creativity Intuitively

SOMETIMES IT SEEMS TO ME that photographers are the most hesitant, intensely careful people on earth. So many are unwilling to proceed with anything new or different unless and until they can identify every step along the way. They seem almost terrified to try something new for fear that it may fail. I have seen this syndrome for years among workshop students, hidden within questions I'm asked at lectures or gallery openings, or in casual discussions with both amateur and professional photographers. We can all get caught in such hang-ups, myself included, although I consciously try to avoid that type of hesitancy.

All of us want to be successful. All of us want to avoid failure. (These are two different things, so the previous sentences are not redundant.) But I suggest that if you want to know every result before you plunge ahead, you can't achieve an "aha!" moment that lifts you from the banality of everyday plodding (i.e., neither success nor failure, but just getting by) to something much more exciting, enlivening, and satisfying. The possibility of abject failure is the price you must be willing to pay for trying something new, something different, something removed from your normal procedures. (Initially this may appear to be contradictory to thoughts on previsualization in the early chapters, but it isn't. Read on.)

Too many photographers throw away their intuition and resort to an approach that they perceive as scientific. They move forward carefully, testing everything along the way, trying to get a complete handle on the characteristics of everything they use under every possible condition: the exact speed of the film, the exact development of the film with each potential developer, the exact time and temperature for development, and the exact agitation procedure. Then they do the

◄ ***Figure 17–1: Barnbaum: Boulders, Alabama Hills***
In the 1970s, I began photographing the boulder fields below Mt. Whitney known as the Alabama Hills. I was attracted to the seemingly inexhaustible piles of boulders, heaped on top of one another in endless varieties of forms. I made dozens—perhaps hundreds—of photographs of this bizarre area over the years, and I am still attracted to the weathered granite boulders that seem to be the remains of the creation of the earth.

same with papers and developers, asking further questions about how the paper reacts to different contrast filtration (this assumes variable contrast papers and enlargers), the exact dilution of the developer, and how long the image should be developed. Digitally, they may want to know every possible Photoshop move before trying the first one. Worse yet, when they're in the field, they're too hesitant to make a photograph that's decidedly different in subject matter or composition from what they've done before. Whew...it's mind-boggling.

My advice is to loosen up. Don't plunge ahead foolishly by trying something with no knowledge or insight, but plunge ahead nonetheless. Get a few pointers about how to do things—say, a time/temperature table, a few key Photoshop moves, and the general characteristics of the products you're using—and then proceed. Get some basic facts, a few understandings, a few tips along the way, and then experiment with what you know. Most of all, be willing to experiment with new tools, new subject matter, new ways of seeing and composing, new ways of interpreting the scene, and a new and different black-and-white or color palette.

Intuition in Science

It turns out that many great scientific advances did not proceed through methods that appear to be scientific. Rather, these advances were intuitive at the outset. Certainly this is true of two of the greatest advances in 20th century physics: Albert Einstein's theory of relativity (actually two successive theories, the special theory of relativity and then, ten years later, the general theory of relativity, with the latter building upon and extending the former) and Richard Feynman's theory of quantum electrodynamics (QED).

Einstein asked himself, "What would I see if I were traveling through space at the speed of light, or approaching the speed of light?" He proceeded with a series of thought experiments, ultimately arriving at his conclusions. Thus he used both intuition and existing scientific literature to build up his concepts and eventually his complete theory. But his initial thinking was purely intuitive, as were many of the insights along the way. Previous scientific discoveries—primarily Maxwell's equations for electromagnetism—were relied upon for the basic foundation and confirmation of his theory, but the original thinking was intuitive.

Years later, Feynman did a similar thing in co-creating the theory of quantum electrodynamics (QED). Working alone, he created a series of drawings, known as the Feynman Diagrams, to describe what others were attempting to understand mathematically. His diagrams are still used today (and have been expanded to other fields) to gain insight and explain phenomena that are almost inconceivably difficult to convey any other way. Feynman effectively used art to explain science.

It may come as a real shock that the greatest advances in physics (the hardest of hard sciences) started from intuitive insights, not from purely mathematical or scientific concepts. But it's true! Scientists often pursue an idea because it feels right to them, so they follow their instincts and uncover extraordinary new truths. Sometimes they're wrong, as in the case of two-time Nobel laureate Linus Pauling who hypothesized a single helix form of DNA before James Watson and Francis Crick showed it to be a double helix.

Avoiding Intuition

Photographers in particular (if my own experiences and observations are correct) seem decidedly averse to following their intuition and trying out new ideas, new methods, or new approaches. This is an obstacle that photographers must force themselves to overcome. Avoiding your own instincts in any aspect of photography—seeing, developing, optimizing, printing, etc.—is deadly. It boxes you in. It prevents you from

spreading your wings and flying. Even a bird has to start flying. And there's a time in the life of every bird when it jumps off the edge of its nest or the edge of a cliff and opens its wings for the first time. It's intuitive. It's instinctual. But it's the first time...and it better work! There's no second chance.

Now, think of the other arts such as painting, sculpting, writing, or composing. How much testing is done? How long do painters spend testing things before they proceed with their work? How could Michelangelo test his slab of marble before producing "David"? How could Shakespeare or Ibsen or Twain or Tolstoy "test" what they were writing—or planning to write—without just sitting down and putting the pen to the paper? Beethoven or Brahms or Rachmaninoff may have played a few bars on the piano while composing, but that doesn't give a huge amount of insight into an orchestral piece scored for dozens of woodwind, string, brass, and percussion instruments. These artists simply had to proceed with what they were doing. They didn't—perhaps couldn't—get sidetracked by testing.

But photographers get hung up on testing. They spend weeks and even months testing materials rather than going out and taking pictures. Does it make them better photographers? Emphatically not! In fact, it's like hanging a boulder around your neck. It drags you down. It sidetracks you from what's really important: personal expression, insight, involvement, and excitement with what you see and what you want to say.

Sure, you need some solid information in order to begin. You can't just pick up a camera and start firing away. After all, you don't want to load the film backwards (especially if it has an impenetrable paper backing). Nor can you go into a traditional darkroom or sit in front of the computer screen without some basic knowledge of what to do there. But don't carry it to the extreme of putting aside creativity for the sake of scientific perfection and absolute understanding of every possible variable before you proceed. You're definitely hurting yourself if you adopt that approach.

Understanding and Misunderstanding Intuition

Perhaps the real problem that prevents people from relying on their intuition is a misunderstanding of what intuition really means. When Einstein started to think about what ultimately became the theory of relativity, he had some real insights into the issue. The same applies to Feynman when he created his diagrams as a way of explaining deeply vexing problems. Both scientists were fully immersed in the field, understood what was being considered, and were fully aware of scientific understandings to that point. In other words, because they were deeply involved in the issues they were probing, they were able to proceed by applying intelligent "gut feelings" to their own research, allowing them to go where nobody had ever gone before.

Unfortunately, some people think that intuition is something that's hanging in the air, like magic. That's not what intuition is. Just as a fine chef instinctively knows that certain ingredients will work together to create a superlative dish while others may fight one another, intuition comes from deep personal interest and involvement, as well as a high degree of knowledge and experience.

My dictionary defines intuition as "the immediate knowing or learning of something without the conscious use of reason; instantaneous apprehension". Intuition is not only an immediate thing, but it comes from a great understanding of closely related or analogous issues. Intuition surfaces when you're familiar with and deeply involved with the situation at hand. It occurs when you have already given a lot of thought to the subject, so much so that it's really a part of you. You can't have intuitive notions about something you don't know, something that's foreign to you, or something with which you've had little prior interaction.

In photography, this translates into a true bond between you and the subject matter you photograph. It's the same in all

■ *Even a bird has to start flying. There's a time when it jumps off the edge of its nest and opens its wings for the first time. It's intuitive. It's instinctual. But it's the first time...and it better work! There's no second chance.*

other fields. As I pointed out in chapter 1, if you asked a noted orator like Martin Luther King, Jr. or Winston Churchill to make a speech on quilting, he would fail because he had no interest or insight into that issue. But in their areas of expertise, King or Churchill would knock your socks off with rhetoric and insight. The moral of the story is, you've got to be deeply involved and interested in the things you're photographing, and you've got to have some basic feel for how you want to depict them.

Beyond that, you need a deep respect for what you're photographing. Without that respect, something is lacking; and believe it or not, your audience can see right through it. I photograph landscapes because I feel a very close kinship with nature. Furthermore, I'm frustrated by the way humanity is destroying nature on the only planet we'll ever have to support us. That explains why I've photographed things like clearcuts (figure 1–1); not because I respect the clearcut, but because I respect nature so much that I need to show how destructive we can be in an effort to change our ways.

The greatest portraitists deeply respect the people they choose to photograph. By putting their respect together with their lighting and compositional skills, they produce insightful portraits of their subjects. Intuitively, you know what turns you on—the things that you're drawn to, that you respect, and that you work with best.

In the darkroom or at the computer screen, you need a basic idea of the image you want to create and some knowledge of the methods you're using to get to that goal. You can't make a final image if you don't know the processes involved, but you can't waste your time testing everything before you apply your knowledge and make the final image.

Examples of the Intuitive Approach

As a simple example, two people go into a landscape. One creates photographs with soft, light pastel tones or colors, while the other creates images with deep, rich tonalities and glowing highlights. It all depends on how you viscerally respond to the scene. That's both vision and intuition.

In fact, that exact dichotomy was on full view when I coinstructed a workshop with Reed Thomas in 1986. Prior to that workshop, Reed and I spent several weekends photographing together in the Alabama Hills, the immense rock-strewn landscape below Mt. Whitney in the Sierra Nevada Mountains. Prior to that, each of us had photographed that area individually and extensively over several years. My photographs were dominated by deep tonalities and bright highlights, while Reed's were characterized by softer contrasts and lighter tonalities. I focused on the boulders themselves, while Reed focused on the vast fields of boulders, seemingly spreading forever (figures 17–1 and 17–2).

Reed and I decided to open the workshop in an unusual way: we each placed 10 of our photographs in a stack and then simultaneously showed them one at a time. By the time we got to the eighth print, one of the students cried out, "OK, I see how Bruce sees this place and I see how Reed sees this place, but what does it *really* look like?" That was the perfect question. To me, it looked like my prints; to Reed, it looked like his prints. Both were valid interpretations. Both were correct. Yet they were starkly different. Each of us had our own vision, and we both followed our vision—our intuition. In essence, as we walked through the boulder fields I photographed the boulders; Reed photographed the fields. Inevitably, the students would have to see how the Alabama Hills looked through their own eyes.

The key idea here is that both Reed and I had a very definite vision of how we saw the region. Both of us were deeply involved, deeply interested in the place. It's a truly awesome

◄ ***Figure 17–2: Fields, Alabama Hills (photograph courtesy of Reed Thomas)***
Reed Thomas was also attracted to the Alabama Hills, but he interpreted the area in a completely different way. While I was drawn to the boulders in bold, contrasty images, Reed was drawn to the fields with quiet, subtle mid-tones. The differences were made even more evident as Reed applied a light sepia-type toning to his images (compare figure 17–1). Both visions were deeply felt. Both are truthful and valid. Both say something personal about the area.

area. We would walk together at times, and diverge in different directions at other times, each of us pursuing our own personal vision. Each of our photographs was consistent with the others we produced. Neither of us forced our vision. It was simply how we each saw that landscape.

On another occasion, while scouting for a workshop in northern Scotland, I was in the beautiful valley of Glen Affric. Looking from a hillside into a forest of birch trees and tall bracken ferns, I set up my camera. The scene appeared bright and airy to me, and I wanted to convey that feeling. Ian Biggar, a good friend who had assisted me on several previous workshops, was with me when I stopped to take that picture and looked through the camera when I composed the image. So he not only saw the same scene, he saw my exact composition.

After the workshop group spent a day in Glen Affric, I showed that photograph (figure 17–3). Ian leapt out of his seat (quite literally!) asking, "How did you do that?" I looked at him blankly, failing to comprehend the question. After all, he had already seen the composition in the field. What was it that he was asking? I was clueless. It turned out that the tonalities of my image surprised him. I had instinctively made the exposure by exposing the average tonality at Zone 7, quite high on the scale. I did so without thinking much about it. Everything looked bright and airy to me. I would have guessed that *everyone* would have seen it that way, since it was intuitive to me! In my mind it was not just the obvious way to see it; it was the *only* way.

Ian apparently saw the scene as an average Zone 5. So in his mind, the image would have been much darker. I finally understood his confusion when he asked if I had used infrared film. I hadn't. The negative was exposed on Kodak Tri-X panchromatic film. Infrared tends to lighten foliage, especially foliage in sunlight. I realized that the creative aspect of this photograph was my initial intuitive seeing of the scene as

► ***Figure 17–3: Birch and Bracken, Glen Affric***
While scouting for a workshop in Scotland in 1998, I came across this scene, looking steeply downhill through a forest of birch trees and a floor of dense bracken ferns. On a brightly lit day with thin, high, overcast skies I saw the nearly white tree trunks and ferns as overwhelmingly luminous. Placing the average reading in Zone 7 (very light gray), I photographed the lovely scene as I envisioned it, thinking that everyone would see it that way. Evidently not. A close friend standing beside me when I made the photograph was utterly astounded by the light tonalities when he saw the final print a year later, unable to determine what I had done to achieve it.

quite bright. Ian's question about infrared cleared things up for me; he was simply surprised by how bright the image was.

Most people see forests—even birch forests with near-white trunks—as mid-toned or dark-toned places. I tend to see forests as luminous places. I am influenced by my love of forests. I live in a forest of large, tall conifer trees in Washington State, and I revel in its light.

So the intuition, the creativity, the insight was in my seeing the forest as bright and glowing, not dark. This could only have come from a deep interest in such natural areas, despite the fact that I had never previously been to this particular area. Intuition doesn't come out of nothing. It needs deep involvement, interest, and understanding to gain a foothold.

My deepest and strongest involvement leading to intuitive insight was my reaction upon first entering Antelope Canyon (the first slit canyon I encountered), which I instantly saw as force fields rather than eroded sandstone walls. It wasn't something I thought about and concluded; it hit me spontaneously

and instantly. No thinking was involved. It was an immediate reaction, like ducking away from a ball coming at your head. The only difference between the two was that my reaction to the canyons came out of my lifelong interest in physics. This is where I believe most people misinterpret the concept of intuition. They think that intuition is simply there, like an indefinable asset that's with you at all times, and you just need to tap into it. That's not what it is. Intuition is a product of deep interest, understanding, and long involvement.

Some people are intuitive in understanding and "reading" others. Most of us are not very good at it. Those who are good at it have probably been (consciously or subconsciously) students of human behavior all their lives. They are deeply interested in how people respond to a variety of circumstances, they observe people in unusual detail, and in time they intuitively recognize how people will respond to new circumstances. Such people don't gain their insights out of nowhere, but rather from hours of carefully observing human behavior. In time, they become experts at it.

Applying Intuition to Your Photography

The idea of using intuition that I'm considering here has something to do with photography, but much more to do with life...your life. You likely have a deep interest in many things. In fact, you're undoubtedly quite knowledgeable about many subjects. You may even have reached the expert level in some things without even realizing it; and you might not accept that as fact even if it were pointed out to you.

What I'm suggesting here is to apply your lifelong interests to your photographic seeing, especially if those interests have a visual component. I had a lifelong interest in physics and saw its visual component in Antelope Canyon, though I was surely not an expert in physics. Certainly I was not in the class of Einstein or Feynman when I instantly related Antelope Canyon to force fields. I recommend you apply your own lifelong interests, knowledge, and expertise to photography whenever possible. You may not be able to preplan that, just as I couldn't have preplanned applying insights in physics to a place like Antelope Canyon. You can't know in advance exactly how the process will work, and that's OK. I didn't preplan my photograph of the birch forest in Glen Affric; I just did it when I saw it! Nor did Reed and I preplan our photographs of the Alabama Hills. Instead, we both just did it!

Follow your gut feelings about how you want to photograph and interpret subject matter. Too often photographers are so unsure of themselves that they'll point to something and ask, "Is that Zone 4?" or, "Is that low on the histogram?" Of course nothing has a zone number on it or a selected location on the histogram. It's whatever you want it to be! But the question shows both uncertainty and a desire to see the scene, photograph it, and print it in some standard, acceptable way—a "politically correct" way. That approach overrides intuition. It's walking away from your own gut feelings, from your own real goals.

When Einstein developed the theory of relativity, he didn't do reality checks with other physicists asking, "Does this make sense to you?" He plowed ahead. Feynman didn't ask if his silly pictures made any sense to others as he refined his ideas that lead to QED. He plowed ahead. I didn't ask if seeing Antelope Canyon as a force field made any sense to others. I plowed ahead. That's a critical thing to recognize: *you can't force intuition*. It happens when it happens. Before entering Antelope Canyon I couldn't tell myself to go out and find Antelope Canyon so I could apply my lifelong interest in physics to it. But once I walked into it, the ideas from my physics background instantly tumbled into my head. I went with those thoughts.

There's a lesson here. I didn't second-guess my intuitive thoughts. I didn't run away from them or try to suppress them. I didn't say, "But this doesn't tell you what Antelope Canyon looks like." In fact, that didn't matter to me. I was

using the shapes of the canyon walls to express my thoughts about something completely different: forces in nature. That became my guiding principle in subsequent photography in all the slit canyons. I've never found such forms in any other subject matter I've encountered, restricting that intuition to those narrow clefts alone.

Too many people encounter something that sparks their intuition, but since they literally fear those thoughts, they actively suppress them. They want to be sure that they're not doing something weird, bizarre, way out, or just downright silly. Well, any of those may be true. That's the chance you have to take. But if it makes sense to you, I urge you to roll with the flow and do it!

Einstein and Feynman knew a huge amount of physics, so their intuitive notions made sense to them. Just as my interest in physics made my interpretation of the slit canyons sensible to me, you can draw on your interest and knowledge of things you've observed all your life for your best imagery. Use that understanding to lead your own vision.

Of course, as your knowledge and experience of photography grows, you have progressively more to draw upon to marshal your intuitive ideas through to the final image. For example, my knowledge of reducing contrast in a scene through compensating development (figure 9–16) gave me the technical tools to carry my vision through in Antelope Canyon. That technical knowledge was new to me at the time. But I needed no new photographic knowledge to see the birches in Glen Affric as I did, nor to see the boulders of the Alabama Hills as I did.

With increased photographic knowledge, you can be looser in your field work as well as your darkroom or computer work. You get so comfortable with it that you can give yourself the freedom of altering your usual methods when necessary to create a different result. In time, such decisions also become intuitive because you quickly recognize when standard methods will fail to yield the results you want.

No matter what your level of knowledge is, you can do a lot right now! You will be able to do more in the future as your knowledge grows, but you can still do a lot now. You can, and must, apply your intuition borne of your lifelong interests to do photography in your own unique manner. If you don't, you're shortchanging yourself and depriving the world of your photographic insights.

Conclusion

First, let's see how these thoughts mesh with the ideas of previsualization expressed early in the book. I believe you should previsualize the final image to the greatest extent possible while you're standing behind the camera, but also that you should give yourself the freedom to see it *your way* rather than anyone else's way. The ideas expressed here explicitly ask you to follow your own vision and your own intuition, rather than worry about others seeing it your way (or you seeing it their way). They may see it your way. They may not. That's their problem, not yours. Follow your instincts, your vision, and your intuition of how the scene should be photographed and interpreted. These thoughts reinforce the earlier ideas about previsualization.

The bottom line is this: Know yourself and your interests. This is more difficult than it sounds because we tend to misread ourselves. Too often we overrate or underrate ourselves, or just fail to understand our own interests properly. Beyond that, we tend to doubt our own intuition, our own vision. We're afraid to rely on it or use it. We may even think it's wrong to be intuitive. It isn't. Don't run away from your strongest intuitive notions: They're likely to be valid. You've got to be bold enough to take the risk.

So, although you can't force intuition, don't deny it when it strikes. Once you get a handle on your own interests—and along with them, your areas of expertise—you can confidently

apply your intuition and understandings far more effectively to all things photographic, from the initial seeing to the finished product, and also to the methods used along the way.

When all is done, try to take a step back and view your work as a dispassionate observer. Ask yourself if your work still communicates with *you*. Be prepared (and willing) to make some adjustments.

◄ ***Figure 17–4: Gothic Fall, 40-Mile Canyon***
40-Mile Canyon is one of the many side canyons of the Escalante River in Southern Utah, itself a tributary of the Colorado River. Midway down the dry, wide canyon, the trail suddenly drops via several switchbacks into a narrow cleft with running water. A waterfall, seemingly coming out of nowhere, feeds the lower canyon. I named it Gothic Fall because of the pointed arches leading deep into the rock that holds the elegant stream, which runs down a slanted channel it carved over the millennia before dropping to the canyon floor.

CHAPTER 18

Toward A Personal Philosophy

THIS CLOSING CHAPTER BRINGS THE BOOK FULL CIRCLE. We started by inquiring into ourselves—our own personal interests—and asking what we wanted to say about them and how we wanted to say it. Then we delved into the techniques and considerations that translate those desires into visual statements, and not mere "pictures". Then we engaged in some philosophical thoughts about art and creativity. In this chapter I hope to suggest avenues for improving your vision in areas that already interest you, and for drawing inspiration and insight from areas you may have never previously considered.

Flexibility

To my way of thinking, maintaining flexibility in every aspect of photography is the best gift you can give yourself. Avoid limits; avoid boxing yourself in. Try to avoid saying, "I won't do this" or "I won't do that". We all tend to place limits on ourselves unintentionally; let's not do it intentionally. Of course, whenever you choose the things you'll do, inevitably you also choose what you won't do. You can't photograph everything; you can't print everything; you can't experiment with every approach. But you can keep an open mind and you can periodically delve into areas that didn't attract you previously. Allow that flexibility.

Approaches stressed in earlier chapters—exposing negatives higher on the scale, using the full negative scale available, pushing the histogram to the right, always shooting in RAW for best printing results, using the appropriate printing

◀ ***Figure 18–1: Retrochoir, Wells Cathedral***
When I first walked into Wells Cathedral, I was so overwhelmed by the central arches that I had to walk away, get my bearings, and collect my thoughts before returning to photograph them. I wandered to the far east end of the cathedral, where I was equally overwhelmed by the forest of columns and arches in the retrochoir. They seemed alive and exuberant to me, like fountains or fireworks. It was the first exposure I made in the cathedral before returning to photograph the central arches.

■ *Maintaining flexibility in your approach to any aspect of photography is the best gift you can give yourself.*

controls, playing with toners, etc.—expand your flexibility by allowing you to photograph in the widest possible range of lighting conditions, and to make prints with the widest possible approaches. A simple technique like cropping keeps me from being beholden to the shape of the camera format or the lenses available to me at any time. It gives me greater flexibility, thus expanding my artistic possibilities.

Don't be hobbled by thoughts of consistency. Emerson said, "A foolish consistency is the hobgoblin of small minds." For example, my negatives are wildly inconsistent in average density. Much of that inconsistency is intentional; if I want expanded contrast, I expose the scene in the mid-zones then greatly expand development, yielding a very dense negative, but one with the best possible contrast increase. I can then print those high densities down to the values I desire. So "inconsistent" negatives can produce better prints. That's the type of flexibility I desire.

What about multiple-negative prints, negative prints, time exposures that may exploit movement, double or multiple exposures, collages, mixed media, or any other type of imagery you can conceive? Try them! Try crazy ideas. Most will fail, but some will work and launch you into new realms of fun and creativity.

Visual Arts

The most obvious place to search for ideas and inspiration is the visual arts. Visit museums and galleries. Look at art books, but don't just look at the images, read the text as well. Sometimes the thoughts expressed are even more valuable than the imagery. Look beyond photographs to paintings, drawings, lithographs, and sculpture. They all have lessons to teach on composition, lighting, movement, and color. The same philosophical and compositional elements underlie all visual art forms; they are related, and you can learn from any of them.

I suggest emphasizing the study of great photographers of the past—Berenice Abbott, Ansel Adams, Diane Arbus, Eugène Atget, Bill Brandt, Margaret Bourke-White, Frederick Evans, Josef Koudelka, André Kertesz, Imogen Cunningham, Walker Evans, Josef Sudek, Alfred Stieglitz, Paul Strand, Edward and Brett Weston, Minor White, Ernst Haas, Henri Cartier-Bresson, Frederick Sommer—and contemporary photographers. Pay particular attention to those whose field of interest parallels your own, but study the others, too, looking for new ideas and interesting approaches. Don't become so thoroughly involved in only their subject matter that you can't learn from their approaches to light, texture, composition, mood, dynamics, and other aspects of seeing and feeling that you can apply to your work.

Be cautious about including illustrated travel books in your studies. There are a number of coffee table books that are exquisite to peruse but that don't exhibit the highest artistic standards. Enjoy them, as I do, for their exposition of scenic areas, but don't rely on them for fine photography.

Try to see original prints whenever possible rather than just looking through books. Though the reproduction quality of books has improved greatly, nothing compares to the photographer's own prints. In the original prints you'll see not only the composition, but also the tonal richness and the hard to define but easy to see quality of a fine photograph.

Whether you look at books or the originals, please don't look at photographs or paintings like most people do—flipping through pages or walking slowly past the originals one at a time, looking at everything and seeing nothing. Study them. Even if you have time to study only a few and must miss most of the others, study those few with care. Ask yourself if they are worthy of greatness and look them over carefully before rendering a decision. What does the photograph say to you? Is the composition good? Is it unified? Does it show insight on the part of the photographer? If not, why not? It will prove far more valuable to analyze a few photographs carefully than to

peruse dozens of them nonchalantly. It always seems strange to me that so many people go to galleries without knowing how to look at what's in front of their eyes—and then they come out yawning, bored with their waste of time.

Look for personal appearances by noted photographers, and even by "unknowns" who are yet to be famous. Universities, museums, and galleries often present lecture series in which photographers present their work and discuss their philosophy and approach. These lectures not only give you greater insight into their work, but may also stimulate ideas for your own work. Sometimes a lecturer will state a well-known idea in a slightly different way that "clicks" with your thinking. It could open up new avenues of thought for your work. Alternatively, a lecturer may express ideas with which you thoroughly disagree, but which help you articulate your own ideas more clearly.

Nonvisual Arts

Beyond the obvious benefits of seeing great art (painting, photography, lithography, sculpture, etc.), look to other art forms for insight and inspiration. There's a long history of music inspired by literature, and there's no reason photography can't draw from both literature and music. After all, our life experiences all mold the type of person we are. If we incorporate our understandings and revelations from other art forms, we can expect new insights and new directions. Composers and writers attempt to do much the same thing that photographers do: make personal statements about the world around them. Surely there are lessons to be learned from their efforts.

Music can offer extraordinary insights. I believe that I evolved a greater understanding of subtlety in printing as a result of hearing the intricacies of fine orchestration. I also feel that this understanding has been heightened in recent years through my growing interest in and love of chamber music; when only a few instruments interact, I can hear each of them individually along with their mutual interactions. The interplay of harmonies, counterpoints, rhythms, melodies, and phrases seem to have many counterparts in the interplay of lines, forms, and other photographic qualities.

How has this given me insights into printing? I have listened to the same musical composition played by different orchestras, ensembles, or soloists, each with different interpretations of the original score. Often, I have fantasized about making the ultimate recording of any one of these pieces by selecting an opening performed by one group, a closing by another group, a crescendo by still another, and so forth. I have directly translated that concept to printing in the darkroom by optimizing each section of the image for maximum effect. Some parts have to be quieted down so that others can glow with brilliance. There must always be a balance between overall brilliance and the ultimate feeling that I want to convey in the print. In that manner, classical music—particularly chamber music—has given me great insight into my approach to printing.

Relationships between music and photography have long been recognized. Ansel Adams's famous negative/print analogy—"The negative is the score; the print is the performance"—is but one famous example. Adams was a gifted pianist as a younger man, with enough ability to give public recitals and concerts. Don Worth was a gifted pianist as well, as are Paul Caponigro and Charles Cramer today. It's no coincidence that such outstanding photographers also have great talent in music. Most photographers who lack talent as musicians can still draw from their interests in music. This is true whether the music is of the classical variety (solo, chamber or orchestral), jazz, electronic, avant garde/experimental, hard rock, county-western, or any other type.

I suspect there are very strong relationships between the type(s) of music you listen to and the photographs you make (or want to make). They may be subconscious relationships,

but with effort I believe you can define them and apply them to your photography. Whatever music you find enjoyable, you can probably find some surprising insights in it that can be applied to your photography.

I feel that much of my work in the English cathedrals was heavily influenced by classical music. I saw musical relationships in the interactions of the columns, arches, and ceiling vaults, and with the play of light upon these forms. The relationships changed with every step I took, so that I felt I could control the visual music by the placement of my camera—a half step to the left, up four inches, forward just a bit. Then there were no inharmonious intrusions, no harsh dissonances to mar the score—only a symphonic flow of lines and forms, brilliantly orchestrated by the soft light filtering through the stained glass windows (figure 18–1). I was as much a conductor as a photographer in the cathedrals, but I must admit I had quite a score with which to work.

At the turn of the last century, photographer Frederick Evans worked with the same score and produced quite a different symphony. Using uncoated lenses that produced flare whenever exposed to a light source, printing on platinum papers, and working in smoke-filled cathedrals (due to candles, rarely used today), he produced prints that let viewers almost experience the air within the space. In fact, it appears that Evans photographed the air between him and the architecture, as well as the light filtering through the air, rather than the architecture itself. His images are quiet, introspective, and thoroughly magical.

It's possible, perhaps probable, that a different printing of my own negatives would produce yet another interpretation of the cathedrals. I haven't attempted the project because I can't see them any other way. But following Ansel's analogy, several years ago I did spend time in the darkroom attempting various printing results from the same negative. I was spurred on by my encounter with several recorded versions of Schubert's string quartet #14, titled "Death and the Maiden". I found that differences in tempo, emphasis, timbre, and dynamics gave each performance a wholly different character, and I wanted to see if the same would hold true of different prints produced from the same negative. Indeed it did, and I was amazed by the different interpretations a single negative could yield.

John Sexton carries this type of experiment further. Prior to a workshop, he sends copies of one of his negatives to more than 10 students, asking them to make a print of it in whatever way they choose. Cropping, burning, dodging, toning—everything is up to the students. The variation in "performances" is quite remarkable. (But of course, none of them were actually at the scene when the photograph was made, so none of them could have gained any idea of how they would have interpreted the scene had they experienced it. So while this exercise is both interesting and instructive, it is also limited.)

Does music evoke mental pictures for you? If the answer is yes, I suspect you have a strong proclivity for drawing photographic insight and inspiration from music. It is unlikely that this will produce new and wonderful photographs for you immediately, but try to open up to the possibilities that music offers. It will prove its worth over time.

Literature is another area from which artists have historically drawn inspiration. Any form of literature can provide it. I have long been fascinated by Japanese haiku, three-line poems with only 17 syllables total. The three lines have five, seven, and five syllables respectively. There are, of course, variations of this basic structure, but all haiku stay close to these rules.

Haiku are designed to evoke imagery. They have an uncanny ability of enticing the reader into conjuring up detailed scenes that fit the concept of the words. It's apparent that in a poem of only 17 syllables, little can be said. The haiku poet must allude to something without spelling it out in detail. He must build a skeleton structure and allow the reader to fill in the rest. This not only allows for widely varied interpretations, but also allows the reader to become involved in the creative

process. If you think about it, that lesson can be applied to photography. Let's look at several haiku to grasp the meanings better. I urge you to read each one slowly and think about the mental picture it conjures up before going on to the next one.

A lightning flash:
between the forest trees
I have seen water.
Masaoka Shiki

A man, just one—
also a fly, just one—
in the huge drawing room.
Issa

Small bird, forgive me,
I'll hear the end of your song
in some other world.
Anon

A bitter morning:
sparrows sitting together
without any necks.
J. W. Hackett

No sky at all;
no earth at all—and still
the snowflakes fall ...
Hashin

Each of these haiku paints a vivid picture; but when you stop to think about it, *you* painted the picture. The poem only stimulated your image. It built the structure, and you filled in the details.

How often do your photographs say everything, leaving nothing more for the viewers? If you've said it all, taking the creativity away from the viewers, you can only expect a quick glance before they move to the next photograph.

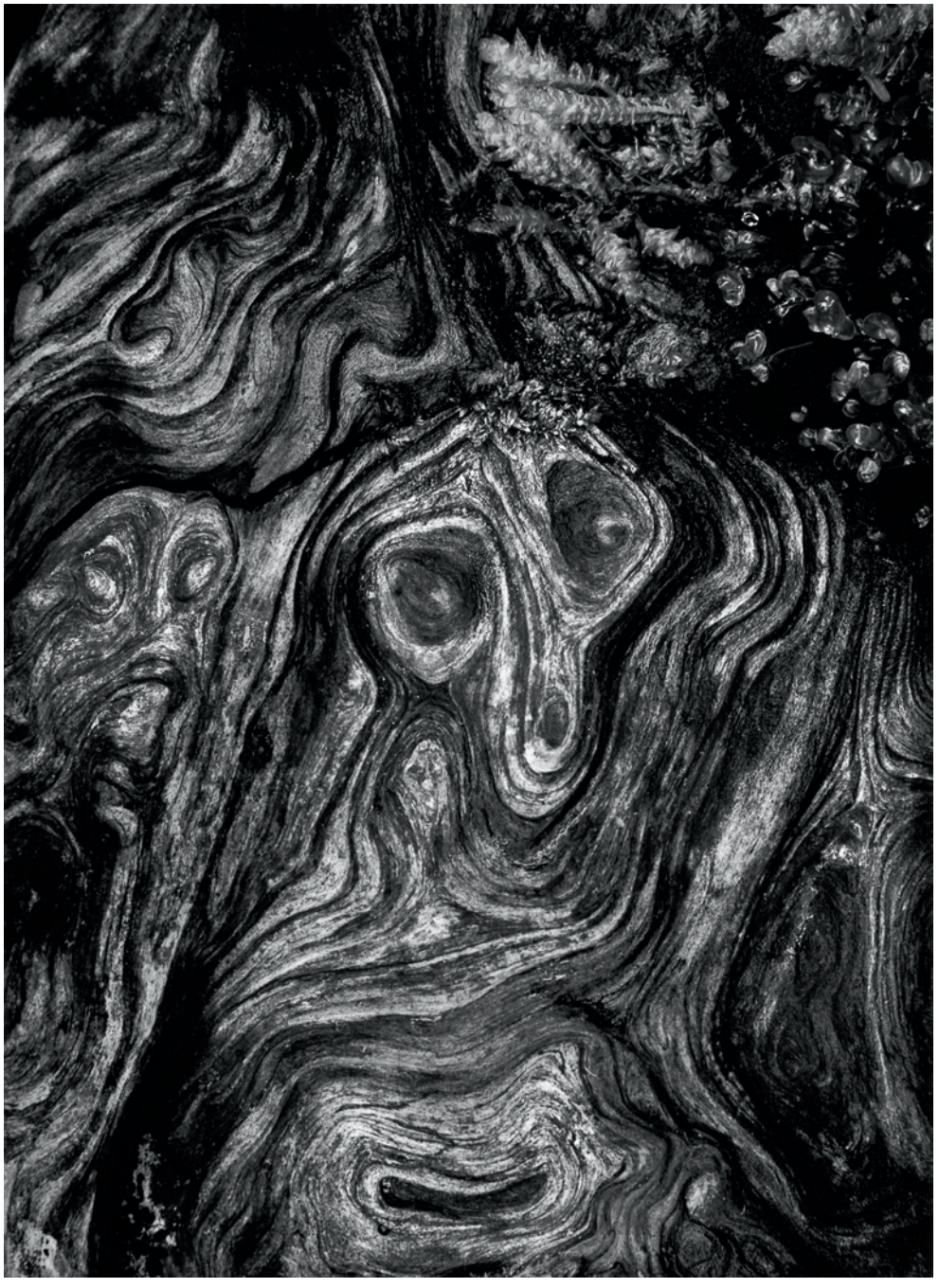
The lesson I received from haiku is to say enough to interest viewers, but to leave enough unsaid to allow creative seeing and interpretation. Let them spend time thinking about it. Let your work excite and stimulate them, but leave them an opening for their own creativity.

Haiku is not the only form of literature that contains profound messages for working photographers. Other forms of poetry, as well as novels, philosophical writings, etc., all offer new ideas. They reside on the pages like fruit on the trees: you just have to find them, pick them off, and incorporate them into your way of seeing.

Expanding and Defining Your Interests

In chapter 1, I devoted a substantial section to determining your interests. I'd like to return to that from a different viewpoint, and perhaps one that goes further. I've long felt that most people segregate their lives, putting their work in one place, photography in another, music in a third, other outside interests in a fourth, etc. I think that by integrating your life to a greater extent you can draw from multiple areas and apply the lessons to each of the others. The nonvisual arts provide perfect starting points for this integrated approach. We are all multifaceted people with a variety of interests, from politics to the arts, from financial investments to recreational pleasures. No doubt some of these interests have greater potential for a visual dialogue than others, but many have potential beyond our expectations.

In our lives, we almost have to segregate these varied interests; but in so-called primitive societies, they intermingle as one. Art, music, religion, food gathering, birth, marriage, and death are all intertwined. Each represents an essential part of life, and none can exist without support from the others. Why



◄ ***Figure 18–2: Ghosts and Masks***
This image is one of a series I made in response to a major environmental battle I led—and lost—during the 1990s. Our environmental group won every legal battle against a proposed gravel pit and hard rock quarry, but county politicians altered existing laws and ignored others to grant the permit. The photographs I produced are my "primal scream".

we have evolved into a civilization that segregates these aspects of life could be a lifelong study for an anthropologist. But I feel that those of us who are seriously interested in making photographs can benefit greatly by trying to integrate the many facets of our own lives.

What are your interests? Do you find any visual qualities in them, whether or not you see them as photographic qualities? If so, there may be ways to make comments on them with your camera. My outside interests—natural history, the cosmos and the subatomic, architecture—found photographic expression, and I feel that you can have the same gratifying experiences if you pursue your interests actively.

I wonder how many people try to find things that can be photographed where they work—where they spend nearly half of their waking hours. How many people look for photographic subjects around the house or in their neighborhood? How many people probe their general interests—or their everyday environment—for photographic possibilities?

The canyons were special to me, as were the cathedrals, which I discovered almost simultaneously. Prior to that, the natural landscape served as my major source of imagery, and it still forms the central focus of my photography. Each of these areas—as well as my work in urban areas—has opened up new avenues for me that have great importance and meaning.

Nature draws me because I love the beauty and drama of our planet, and I abhor the way we are defiling it. Yet, it has always been difficult for me to photograph the destruction. I don't like spending hours in the darkroom just to make a print that looks awful! I always wanted to make some visual commentary on humanity's disregard for the land, but it remained beyond my grasp until rampant development around my home in Agoura, California (from 1980–1982) pushed me over the brink. Then, for the first time, I became so angry that I photographed things I hated: rolling hills once covered with oaks and wild grasses, now bulldozed into bare terraces and plateaus; homes that looked like they came out of your old Monopoly set plunked down in rows with concrete block walls

◀ ***Figure 18–3: Distortion and Desperation***
This image in my "Darkness and Despair" portfolio is meant to show the turbulence, horrors, and distortions caused by the illegal political decision to permit the gravel pit and hard rock quarry. The affair proved to me that when big money is involved, there's no difference between democracy and dictatorship. The entire portfolio derives from close-up images of burls on one small log I found on my property, none more than four inches long.

surrounding each one like miniature prisons; telephone and power wires hanging in the sky. Even those photographs are meaningful to me, but I don't like them. I don't like what they represent.

In 1999, I went a step further. After an extended environmental battle that I headed, political interests overturned, rewrote, or ignored existing laws that would have protected the environment from a massive gravel pit and quarry. The permitting of this illegal project drove me to make a series of photographs that were not of the project itself, but rather designed to convey my anger, anguish, and torment over the way politicians crushed both the public and the environment with their outrageous decisions.

These photographs are details of burls on a small log I found on my own property in the state of Washington. Though they are all made under soft light conditions, they are printed with exaggerated contrast levels—including deep blacks devoid of detail and light grays glowing out from the blacks. There are few bright whites because I wanted to avoid tonalities that might be interpreted as optimistic or positive (figures 18–2 and 18–3).

I presented 10 of these images as my "Darkness and Despair" portfolio in *Tone Poems – Book 1*. They are far more artistic than the series I did in Agoura and elicit a far greater emotional response from viewers. They are quite abstract—some viewers can't determine the subject matter—but the

► ***Figure 18–4: Destroyed Home, Ninth Ward, New Orleans***
The family photograph on the dining room table, likely placed there after the flooding subsided, had a strong emotional effect on me. It was as if the family had come alive before my eyes, seen in happier days. I never walked into the house and never touched a thing. The image shows exactly what I saw from the doorway.

universal visual language of sharp contrasts and tightly curved lines expresses my ideas and feelings. Hence, these photographs use a small log for a specific purpose. In essence, I followed Minor White's dictum of photographing the log for what *else* it represented.

After Hurricane Katrina ravaged New Orleans and the Gulf Coast of Mississippi, I quickly did a scouting trip for a workshop. The workshop followed several months later. The purpose was to photograph the awful devastation caused by a natural event after years of indefensible human neglect (figures 18–4 and 18–5). It was gut wrenching to see such widespread devastation, and to see that so little changed in the seven months between the scouting trip and the workshop. I hope that these images made an impact, but it appears that government has not been terribly interested in rebuilding New Orleans or the lives of the people who once lived there.

Neither my Katrina images nor my "Darkness and Despair" images represent my "typical" approach, but they had to be done! I simply couldn't avoid doing them. Give some thought to what you want to say—with pleasure, awe, sadness, or

◄ ***Figure 18–5: Multipurpose Room, Hardin School, New Orleans***
This multipurpose room had served as an elementary school cafeteria, auditorium, and gymnasium. Caked, cracked mud covered every horizontal surface and stained the walls almost to the ceiling. None of the photographs I made following Hurricane Katrina was a pleasure to make. But I felt they had to be made.

anger—and how you can say it. Note the things you do aside from photography and see whether any of them have photographic possibilities. Note the things you think about and see whether any of them have visual aspects. Perhaps you can find material objects that relate to those visions. These are the areas where you'll find your strongest images.

When you do find a photographic possibility, work with it for a long time. Make a project of it. Study it. Photograph it in every way that has meaning to you—at different times, under a variety of lighting conditions, with an assortment of lenses, and anything else that may produce interesting and meaningful images. Don't just make one or two photographs and drop it. Keep going back to search for new possibilities. You may be amazed at how fascinating the process proves to be.

Too many people shoot randomly, snapping whatever happens to strike their fancy and failing to look deeply into any specific subject. It turns out that going deeper into a subject can be an exhilarating experience. It's a form of personal research, personal involvement, personal dedication, and above all, love. By the time you complete your project (if, indeed, you

ever complete it), you'll know it so well—more than anyone else—that you'll truly love it. I feel the best work always springs from that level of personal involvement.

As you expand your possibilities, you also more accurately define your expressive approach. My own approach is well defined. I like both the art and the craft of photography. I prefer—almost demand—that my prints be sharp and clear. The exceptional rendering power of photography, continuously improved by better lenses and technologies, is one of its chief assets. I like to take advantage of that inherent strength.

I find little appeal in the muddy, out-of-focus creations of the Diana camera with its plastic lens. Yet I don't make this preference an absolute rule. On occasion, I've produced unsharp images with limited focus because they seemed warranted and effective. Even with my strong feelings about sharpness, I try to maintain flexible thinking rather than rigid rules. The photographs of "Darkness and Despair" have very limited sharpness, especially in their original 16" × 20" size, as they were made with a medium format camera using extension tubes for extreme close-ups. I blacked out some of the most out-of-focus areas during printing. Others are visible, but they help create the macabre imagery that I sought.

Sometimes out-of-focus images can be pleasantly appealing, though generally not to me if *everything* is out of focus. You'll have to be the judge of what works best for you, and how much can go out of focus (figure 3–15).

Limitations of Photography

Somewhere in your thinking about how much can be done through photography, there must be the recognition that it can't do everything. It has limits, just like painting, sculpture, music, and literature, as well as science and technology. None of them can say everything, solve all problems, or reveal all truths. The fact is that photography may not always be up to the task of expressing your feelings, no matter how experienced you become. I still can't think of a way to express my political views photographically. I feel that an understanding of photography's limitations is as important as an understanding of its potential.

In 1986, I spent three consecutive days cross-country skiing and photographing in the Canadian Rockies with fellow photographer Craig Richards who lives near Banff National Park, Canada. One day we awakened with the first light of dawn, grabbed a few bites of breakfast, and departed Assiniboine Lodge for a day of exploration and photography before any of the other guests were out of bed. The first hour was drudgery as we laboriously skied uphill through dense forest toward Wonder Pass, several miles away. It was bitterly cold and bleak under a heavy blanket of clouds, and we had constant problems with our skis.

Suddenly, the most remarkable transformation occurred. We broke through the trees into more open country just as the clouds began to part overhead. Wonder Pass lay straight ahead, still a couple of miles away, but visible for the first time. Within seconds the immense wall of mountains to our right opened up, then the slopes and distant peaks to our left. From that moment on the weather became a constantly changing kaleidoscope of calm periods alternating with blizzard-like winds that pushed walls of windblown snow before them. Several times I stood facing the onslaught, only to turn, crouch, and cover my face at the last moment before the blast hit. A minute later it all passed, and I'd stand there cheering with my arms upraised and fists clenched by the exhilaration of it all. Periods of dense fog followed those of crystal clarity. Every moment was special; every vista was extraordinary. It was a day of magic.

At one point I looked uphill toward Wonder Pass for a possible photograph, liked what I saw, but looked to my right before setting down my tripod. What I saw there looked even better, so I skied a few feet to the side to position myself. Again

I looked to my right, and again found something better! Within moments it happened several more times. Suddenly I realized that I had skied a full 360 degree circle—everything looked better than everything else! It was sensory overload of the highest order. I photographed until I ran out of film. So did Craig. By mid-afternoon we returned to the lodge and sauna, physically exhausted but emotionally charged.

Several weeks later, from my home near Los Angeles, I phoned Craig and asked if he had come away with any particularly strong photographs. There was a period of silence, punctuated by several stutters and stammers, but no words (and Craig is not the quiet type!). I broke the silence by saying, "I'm not sure I got anything, but I don't really care. It was the *day* that was so incredible." "Exactly!" Craig blurted out. "That's exactly how I feel. I just couldn't quite find the right words! It was ... unbelievable! I don't think I got anything, either, but it doesn't matter. What a day!"

We both recognized that we were unable to show through our photography what we had experienced. There was too much going on, too fast. No single thing could have been isolated from the ever-changing panorama. It was nature at its most spectacular. Now, if either of us had been equipped with a 35mm camera or a digital SLR, which didn't exist back then, we might have been able to make the photographs that were skipping past us so quickly. This proves that every camera format has its place, its value. None are better than any other one. Each is a tool. You just have to use your tools as best you can for the task at hand. We had the wrong tools for that kind of day.

I have no regrets that the day yielded no outstanding photographs. The memories are sufficient. Even if I could, I would never trade the experience of that day for a fine photograph—or even several fine photographs. If I had to make a choice between nature and my photography, I would choose nature every time. It's important to keep things in perspective. To a large extent, my photography is a product of nature; but nature is not a product of my photography.

There are times when the magnificence of nature—or any other subject—can be conveyed with success. There are times when it can be enhanced. Perhaps it could have been on that March day near Wonder Pass, but only by someone who could have maintained his photographic sensibilities better than Craig or I did under those conditions. Perhaps, but I doubt it. There are limits to photography. It's not always possible to distill so much sensory input into a two-dimensional picture.

There is also another limitation to photography: that of interpretation. You can say what you wish to say through photography, but viewers won't always get the message you're trying to convey. This is true of verbal communication, as we have all experienced. Visual communication compounds the problem.

I've photographed nature for years—not only recognizing and paying homage to its beauty, but also hoping that others would recognize that beauty as something to be preserved. But I may never see the lush tropical rain forests before they're completely destroyed. I wonder how long air pollution will go on producing acid rain that destroys lakes, wildlife, and even our own photographs. I wonder what global warming will do to everything, and the horrible impacts it will have on wildlife around this planet. I wonder how many wild rivers I will have the opportunity to see, hear, and photograph before they are dammed and damned as extensions of our indoor plumbing and electric outlets. And how soon will our corporate mentality turn all of the world's forests into tree farms, ranches, or urban sites?

I have long since accepted the limitations of photography as the perfect vehicle of expression in all situations, but the limits of interpretation are harder for me to deal with. Perhaps a new approach on my part will help solve the problem, and I will surely look for ways to more effectively state my environmental concerns in the future.

There are other minor limitations in photography that are often difficult to detect. One hidden limitation comes via

► ***Figure 18–6: Mineral King, Sunset***
Made in 1969, this image was my entry into photography. This photograph and several others were used by The New York Times *as illustrations of this Sierra Nevada mountain valley, which was embroiled in an environmental battle and subsequently added to Sequoia National Park.* The Times *paid me for the photographs, clueing me in to the astounding fact that I could go camping and get paid for it! At that point I turned away from missile guidance computer programming, and photography became my new career.*

The image, taken just before sunset, has strong side lighting and a dramatic diagonal line of silhouetted trees, adding both depth and a diamond-like design to the photograph. Even today, it holds up as a strong image.

semantics. Landscape photography, for example, is a misnomer. Nature photography is a more appropriate phrase because it is more accurate and allows wider interpretation. My photograph "Fallen Sequoias" (figure 3–7) is a landscape photograph, in the usual parlance, yet without the fog that envelops everything in the scene, it would have been excessively complex. Thus, the interaction of the landscape with the ambient weather conditions—nature, in a word—made the photograph possible. It's not just a landscape, but a nature study, which has broader implications. By speaking of it as a landscape, I believe there is a subtle narrowing of understanding.

Most landscapes truly are broader studies; rarely are they landscapes alone. Interestingly, my abstract canyon photographs are the purest landscape images I've produced, for everything within each photograph is eroded rock. Yet they too are broader nature studies to me, because of my interpretation of them as cosmic or subatomic—the embodiment of nature at all levels throughout the known universe.

These are a few of the limitations of photography that I've experienced. Doubtless there are others. I feel it's important to recognize them so you can avoid disappointment with photography's inability to express every aspect of your thinking. It's inevitable that such limitations exist. Push those limits to the fullest, but learn to live with them.

There are also great rewards, to be sure. It's well known that the work of Ansel Adams was pivotal in preserving vast tracts

of land for parks and wilderness, but the process must have seemed glacially slow to him over the years. W. Eugene Smith's photography of the pollution at Minemata Bay, Japan dramatically alerted the world to the dangers of mercury poisoning, but he was nearly beaten to death by corporate thugs in retaliation. Yet the impact of his work was extraordinary. These are examples of photography at its most effective.

I may have contributed to a successful environmental effort even before I turned to photography as a career. In 1969, I photographed the Mineral King area of the southern Sierra Nevada Mountains, a high mountain valley surrounded by Sequoia National Park on three sides. At that time, a major controversy surrounded Mineral King: The Sierra Club wanted it included in the park, but Walt Disney wanted to build the largest ski resort in North America there. I spent several days camping, hiking, and photographing the area, then offered my images to the Sierra Club to help its efforts. Less than two months later, a few of those photographs illustrated a long article in *The New York Times Sunday Magazine* explaining the issues of the environmental battle. I'll never know if it helped in the successful effort to get Mineral King into Sequoia National Park, but it certainly didn't hurt (figure 18–6).

Developing a Personal Style

Photography students of all ages are justifiably concerned about developing a personal photographic style. As a workshop instructor, I am repeatedly asked for the means, the method, and the key. My answer to these questions is always the same: don't give it a second thought. (In fact, don't give it a first thought!) A personal style, like stuff, happens. (There's a better word than "stuff" in this context, but to keep this book on a higher plain, we'll settle for "stuff".)

It's my contention that anyone consciously working to develop a personal style ends up with a self-conscious, forced, and false style. It won't be natural. It won't reflect you. Why not? Think of it this way: In life, there are people who develop self-conscious styles, people who aren't themselves. We have names for such people: actors and actresses. It's great when they're on stage or in front of the cameras, but off stage, they can be themselves. They don't have to pretend to be someone else.

You are you because of the way you look, the way you think, the way you talk, the way you move, the way you interact with others, etc. That's you. You didn't work at that. You didn't think about being you. It just evolved. It happened. You simply ended up being the person you are. Nobody else can be you.

It's the same photographically. Once you find the subject matter that really matters to you—that raises your passion to new levels—you'll respond to it in your own unique way. You'll see it your own unique way. You'll interpret it your own unique way. You'll photograph and print it with your personal stamp. Why? Because it really means something to you, and you simply can't see or think about it in any other way. Beyond that, nobody else will see it, interpret it, or print it the way you will.

Of course, this implies that your technique as a photographer and printer allows you to do what you want to do. If your technical side is insufficient for the task, you'll fall short. But while good technique is necessary to make your expression come to life, it's not sufficient by itself. There must be the initial passion that ignites your fire, that starts your creative juices flowing. You have to find the subject matter that really matters. If you haven't already identified what it is, keep searching for it. When you discover it, you'll know; you won't have to think about it.

A corollary to the thought expressed above about seeing, interpreting, and printing things that truly excite you in your own way is that it frees you from the petty thinking that you have to guard your "secrets". People with secrets invariably lack confidence, and generally for good reason. They fail to

make a personal statement about anything, and underneath it all they recognize that failure (though they're never honest enough to admit it...even to themselves). Photographers with ability and confidence share their thinking, their techniques, and their locations freely.

In my workshops, there are no secrets. My co-instructors freely share all their insights with the students, whether it's locations, techniques, materials, thinking, etc. It's far more rewarding to share than to be secretive. We share our discoveries with each other regularly. I learned the compensating developer procedure from Ray McSavaney, who taught workshops with me for many years. I learned about potassium ferricyanide reducing (bleaching) from Jay Dusard, who teaches workshops with me regularly. I learned about printing and masking procedures for Ilfochrome from Keith Logan, a fine color photographer from Alberta, Canada. Don Kirby, with whom I've hiked and photographed for years, has greatly extended my understanding of masking. Today, I'm learning most of my digital photography through a long-time friend, Bennett Silverman.

Worthwhile photographers reason that if you learn one of their procedures, you may be able to eventually show them a wonderful photograph that benefited from that technique. Dedicated photographers enjoy not only making great photographs, but also seeing great photographs made by others. My list can go on and on, but my point is that people like these are the ones who are worthy of your company—but only if you are worthy of their company by sharing your discoveries with them.

Self-Critique, Interaction, and Study

Be your own toughest critic. That's easier to say than do because it involves an extremely difficult transition from subjective response to objective analysis. Throughout the book, I've stressed the importance of allowing your emotional response to tell you what interests you. When you get excited about making an exposure in the field, you do so because you're subjectively moved by something in front of you. You respond emotionally.

It's just as important to be objective in analyzing your own effort spontaneously. You respond intuitively. But I've also stressed the importance of perfecting the imagery with nonspontaneous thinking about camera position, lenses, filters, exposure, etc. When you look at the print days or weeks later, you must remove that subjective response and ask objectively and analytically, "Does the photograph alone convey my thoughts?" In essence, you must separate yourself from your personal involvement and ask if you'd honestly be inclined to stop and look at that photograph. *That's* a tough transition. It's a tough question. But it must be done if you want to analyze your work realistically. The subjective, emotional beginning provides your photographs with spark and life; the objective, analytical end assures that you present strong, meaningful work to others.

This is something you must do by yourself, but there is also more that you can do with others. Seek out classes and workshops with good instructors who will push your development, and seek out peers with whom you can share your experiences while pushing one another.

Try to engage in a periodic critique of your own work and the work of others—not on a competitive basis, but on a mutually supportive basis. Again, this will stimulate your thought process and put you in regular contact with other photographers, other approaches, and other ways of thinking. There may be organizations or clubs in your area that promote such gatherings, and if not, see if you can start one yourself.

Beware of organizations that sponsor contests. Contests are antithetical to art. Imagine a contest pitting Rembrandt against Van Gogh, Stieglitz against Strand, you against the next person. Who's better? It's a foolish question that deserves

no answer. The only pertinent questions in art are, "Does it say something to me?" and "Does it show insight by either answering a question or posing one?" Contests are usually based on rules of composition. The only worthwhile rule is the one stated by Edward Weston, "Good composition is the strongest way of seeing." Rules constrict creativity. In fact, creativity thrives when rules are broken.

Look for knowledgeable people to critique your work. We all begin by having friends and relatives look at our work, but at some point you have to go to those who really know what they're talking about and are willing to say what they think. It may not be easy to take, but it's the best way to boost your photographic development. Go back to your friends and relatives between bouts with those who know, and let them build up your shattered ego with praise. Then, when you're ready, go back in the ring with the pros for another round.

Read about photography and photographers. Such books can open up new avenues of thought and stimulate new directions. Look at photographs and read what the critics have to say about them, but always take their words with a grain of salt. (A review of Reed Thomas's exhibit in 1981 was quite positive, in general, except for some critical remarks about the images made from multiple negatives. The interesting thing was that Reed had never made a print from multiple negatives, but that didn't slow down the critic who failed to look carefully enough to note that the multiple image effect came from window reflections and objects behind the windows!) Here and there, good critics can shed some illumination on photographs, and those reviews are useful for helping you analyze photographs yourself.

Photography classes and seminars can be very useful, depending on the instructor. Learn who the instructor is before wasting your time with a poor one. I feel strongly that the best way to learn photography (and perhaps many other arts, crafts, and even some academic subjects) is old-fashioned apprenticeship. Apprenticeship is long outmoded, though it would be great if it could be brought back today. That approach allows you to learn directly from a master; no other approach can be as effective.

I could stand guilty of prejudice, but I feel that workshops are the best means of achieving photographic growth. Workshops are today's closest thing to apprenticeship. You can choose the photographer whose work you admire and take one or more workshops from him or her. You don't have tests. You're not graded on your performance, your attendance, your participation, or your attitude. You sign up because you want to learn. I got my start that way, and I see the intensity that develops during an uninterrupted week of interaction with other students and instructors. Nothing can be as informative as that exchange of information and viewpoints. Total, continuous immersion in photography for an extended period, without the distractions of everyday life, focuses the mind on photography. Nothing else intrudes. It's the best possible method of acquiring maximum information and ideas in a minimum amount of time. You'll improve your photographic techniques and define your photographic interests and goals.

Finally, always keep an open mind. Consider new methods and approaches. Seek to expand your own frontiers. Photography is a continuing, growing process. Keep growing. There's always another valid approach, another new insight.

Keep searching.

APPENDIX 1

Testing Materials and Equipment for Traditional Photography

SOME PEOPLE LOVE TO TEST materials and equipment, others abhor the chore. I tend to fall closest to the latter group. There are, however, several tests and equipment checks that I feel are important enough to perform periodically. The following is a run-down of the several that I feel are mandatory.

ASA (ISO) Test

A simple test for film ASA is the following. Expose a gray card at Zone 1, i.e., four stops below the Zone 5 meter reading. (Actually you can expose *anything* at four stops below the meter reading, because the meter reading is always Zone 5, remember?) Then make two additional exposures, one stop below and one stop above the Zone 1 exposure. All three exposures should be measured at the ASA you have been using until now. Develop the negatives. The true Zone 1 exposure is the one that just begins to impact the film as discernible density above the film base fog.

Check the three exposures carefully, for the Zone 1 exposure determines the true ASA for your film/developer in the following manner: If the preset ASA was 100 and the first exposure exhibits perceptible—but very thin—density, and the next lower exposure is no more than film base fog, then ASA 100 is correct. If the second exposure (one stop below the first) shows density, then the true ASA is closer to 200, for the supposed Zone 0 exposure is actually Zone 1. In fact, further testing may show that a lower exposure still will show density, which means that

◄ ***Figure App–1: Cayucos, Lago de Atitlan***
At the close of the day, Guatemalan fishermen bring their flimsy boats (Cayucos), looking like floating coffins with a prow at one end, back to the edge of Lake Atitlan (a volcanic caldera much larger than Crater Lake), and inspect them for the next day's work.

the ASA is even higher. On the other hand, if the third exposure (1 stop above the first) is the one with the first apparent density, then the true ASA is 50. If even the third exposure shows no density, then the ASA is still lower, and further testing is required to find the correct value.

You may ask, "How long should I develop the negative...N? ...N–? ...N+?" It doesn't matter! Remember, Zone 1 develops fully in several minutes and then goes no further. If the film is developed for an excessively long time, film base fog will increase, and Zone 1 will grow more dense along with it. But this will not alter the test in any way. So just develop the test negatives along with any images you happen to be developing the next time you are in the darkroom.

This simple, precise test avoids the need for densitometers or other expensive measuring devices. After all, if you can see perceptible density, you're at Zone 1. Why spend hundreds of dollars on a densitometer to measure something that requires nothing more than a careful look? All photographers should perform this simple test. It sets the basis for proper exposures. Keep in mind, however, my own procedure and my recommendation to all other photographers: after you determine the proper ASA (for sensitometric purposes), then cut it in half in order to get better separations in the low values (for photographic purposes). Reread the chapters on the zone system (if necessary) to review my thinking on this point.

Contrast Development Test

To determine contrast characteristics of your film/developer combination, use the following procedure. Once the ASA is determined, expose the gray card at Zone 5 (using the manufacturer's recommended ASA, not the lowered ASA that I recommend for actual photography) and develop the negative normally (i.e., what you have been using as "N" up until now, or what the manufacturer recommends as normal). Then print on a normal contrast paper (grade 2) to achieve the same value as the 18% gray card (which is the value the meter gives you). Now, using the same development procedure throughout and the same exposure time under the enlarger, will a Zone 9 exposure yield a pure white and a Zone 8 exposure an "almost white"? If so, your "normal development" time is correct for use with your paper/developer combination. If not, alter your negative development time to achieve those Zone 9 and Zone 8 results. For example, if both Zone 9 and Zone 8 are pure white in the print, you are actually overdeveloping your negative. Re-expose the three zones—Zones 5, 8, and 9—and develop a bit less and try the entire process again. If you achieve the desired tonalities this time, you have found the true "normal developing" time. From this point, you can adjust your development table as you now have it—or construct your own for the first time—and you have photographic standards that are correct for your own products.

Lens Sharpness and Coverage Test

Tape a newspaper to a wall and photograph it, or focus on a window screen that fills the frame, and photograph it. With a powerful magnifier, check the negative from corner to corner to see if all letters or all wires are uniformly sharp.

If you have a view camera, you can use this same approach to check your sharpness as you raise or lower your lens, thus determining how far you can move the lens before you begin to lose sharpness and, ultimately, the image itself. This tells you how large your image circle coverage is. Just place a mark on the newspaper or screen at the top of the image with the lens in the normal position, then raise the lens to the limit and rephotograph. If you lose sharpness toward the upper corners, you will know just how far you can go before you encounter a loss of sharpness, and you can work within those limitations.

Bellows Test

This is only for those who own a large format camera with bellows. If your bellows has a pinhole that allows outside light to hit the negative during exposure, your negatives will be fogged. This is bad enough in itself, but the pinhole may be situated in a way that fogs only part of the negative, so you have variable fogging, and this is even worse. The simplest and surest way to test for bellows pinholes is to go into the unlit darkroom, open the bellows and put a flashlight inside, moving the flashlight and yourself constantly to see if a beam of light comes through. Bellows corners are the most likely place to find pinholes. Also, open the bellows to several different extensions and check at each of the lengths, for a hole may open at one length, and cover itself over again at a longer or shorter extension.

I have found that black electrical tape or black masking tape will cover the hole perfectly. You don't have to buy a new bellows if you find a pinhole—just tape it over. Only when the tape becomes so thick that it begins to impede bellows movement do you need a new bellows. I use my camera a lot, and I push my bellows to the limit with rising fronts and other movements, so I have had more than my share of pinholes, and I have plenty of tape on them as a result. But it's a light-tight unit, and that's all that counts. It is also wise to carry some black tape with you at all times when in the field in case you scratch or rip the bellows, but not so badly that it is irreparable.

Safelight Test

How do you know if your safelights are, indeed, safe? Most people test by placing an opaque object on a sheet of enlarging paper under the safelight for several minutes, then develop the paper. If the outline of the object appears, it shows the safelight to be unsafe. True enough, but this test will uncover only a terribly unsafe light, not one that may have a subtle yet serious problem. Let's create a far better test.

First, any enlarging paper, just like any negative, must be exposed to a minimum amount of light before it will begin to show density. We call this the paper's threshold. In chapter 10 this was discussed under the technique of flashing. Determination of threshold forms the basis of the safelight test.

Start with the usual determination of threshold: a "test strip" with no negative in the enlarger. This time, however, do it with all safelights in your darkroom turned off. Closing the aperture down to the minimum setting, with the enlarger head at its greatest height on the column and the bellows crunched down to spread the light as wide as possible, make a series of short exposures, moving a cardboard an inch or half-inch at a time down the enlarging paper with each exposure. Assume there are twenty short exposures, and the developed paper shows a light gray band at the top end—the one that received twenty of the short exposures. The next band (receiving nineteen short exposures) is a bit lighter. The next band (eighteen exposures) is still lighter, etc. Let's assume that you can go down to band #10 with some slight degree of gray still showing. Anything less received a sub-threshold set of exposures. Therefore ten exposures is threshold, and we will now call that ten units of light.

That, of course, would be the perfect test for threshold. But instead of developing the test paper after the twenty exposures as you would for a threshold test, this time cover half of the test paper with a cardboard, covering half of each of the exposures. Now turn on all safelights in the darkroom. Leave them all on for a minimum of eight minutes, then develop the paper. Half of the test paper was now exposed to each of the enlarger exposures only; the other half received the enlarger exposures plus the safelight exposure.

If the safelights put on as little as one unit of light during that eight-minute exposure, each visible band of gray would

become one band darker. By comparing densities of gray bands across the portion that was covered by the cardboard during the safelight exposure, you can determine exactly how safe—or unsafe—your safelights are.

Enlarger Light Uniformity Test

If the light distribution across your negative is uneven, your prints will suffer greatly. This is a universal problem, but may be correctable. The way to test enlarger uniformity is this. Focus a negative at 8" × 10", then remove the negative. At any of your common working apertures (say, f/8, f/11, or f/16) expose a sheet of enlarging paper for a short enough time that it will develop to about Zone 5, the 18% gray card. (If the paper is too dark gray or too light gray, the test will not be as effective.)

Now, see if it is uniformly dense from edge-to-edge and from corner-to-corner. Then, tear the paper right down the middle, and place each corner successively against the torn center. Is the density even? Generally, there is a significant light fall-off toward the edges and corners, and this can be corrected by extra burning of each negative outward from the center. If your enlarger exhibits this common problem, you can correct it as long as you are aware of it.

The real problem comes if the fall-off is erratic or if you have somewhat of a checkerboard pattern of light and dark areas across the gray print. If you have this problem, you should buy a new light source, because there is no way to correct it!

Enlarger Lens Sharpness Test

Tape hairs across your negative carrier from opposite corners (if you are bald, borrow someone else's hair!). Be sure the hairs are pulled tightly. Focus on the crossing point. Are the hairs sharp at the edges? Stop down. Do they become sharp? If so, at what aperture? Always stop down to at least that aperture. (You should check this by actually exposing the cross hairs and developing the prints.) Do the cross hairs lose sharpness if you stop down beyond a certain aperture? If so, do not stop down that far.

A further test is to again use hairs; this time taping them across each of the four corners of your negative carrier (i.e., diagonally from one edge to the next, close to the corner) and perform the same test. The reason for this is that the lens may blur outward from the center in a uniform manner, and the two cross hairs radiating out from the center may not show the blurring that can be seen on hairs that cross them near the four corners. If both tests show the hairlines to be sharp, you have an excellent lens. If not, consider buying a new one.

Add to this list of tests as you see fit, but make sure your tests are good ones or they waste time and accomplish nothing. It is a good feeling to know your equipment and materials. Even if you find some minor defects or limitations, at least you will be aware of them and you may be able to work around them.

APPENDIX 2

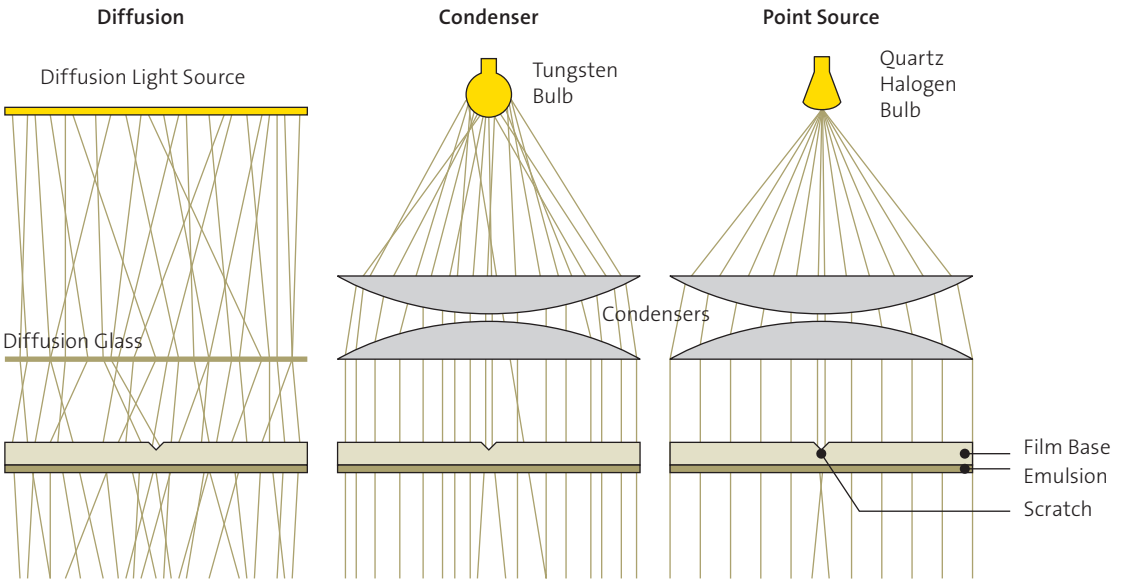
Enlarger Light Sources

THERE ARE THREE BASIC TYPES OF ENLARGER LIGHT SOURCES: diffusion, condenser, and point source. Each has its proponents, and each has characteristics that differ from the others. Diffusion gives the softest contrast of the three, point source the harshest, and condenser somewhat closer to point source than to diffusion—perhaps two-thirds of the way to point source.

With diffused illumination, such as a cold light source (so named because the fluorescent-type light source puts out little heat in relation to its light output) or a bulb diffusion source (such as the color/light heads of the Saunders LPL, Omega, and Beseler enlargers, or the variable contrast heads made by Saunders or Oriental, among others), the gradations of contrast are softer and smoother, especially in the highlights. A negative that will print with barely perceptible highlight detail from a diffused light source will lose that detail if printed with a condenser or point source enlarger. A point source enlarger is one that has a small, intensely bright lamp, such as a projector-style quartz-halogen bulb placed far from two glass condensers, which collimate the light and send parallel rays down through the negative. This light creates the sharpest contrast of all. A negative that will print with barely perceptible highlight detail with a point source light will lose a slight degree of "snap" in those highlights with a condenser source, and the same highlights will be somewhat grayed with a diffusion source.

The condenser enlarger is effectively a "poor man's point source enlarger". It has the same familiar glass condensers as the point source, but it uses a conventional bulb as its light source, and the bulb is placed relatively close to the condensers. The width of the bulb itself, and its proximity to the condensers, prevents

► ***Diagram A-2.1: Enlarger light sources Diffusion (left); Condenser (center); Point Source (right)***
The light from the diffusion enlarger (left) reaches the emulsion beneath the scratch in the base (base thickness is exaggerated in diagram) because light is refracted through the film base from all directions. With the condenser and point source, parallel beams of light refract away from the emulsion beneath the base. The scratch will be harder to see under diffusion enlargement.



the condensers from perfectly collimating the light, but a fairly good approximation of true collimated light is achieved.

Photographers argue the merits of these light sources, but the fact is that each works well as long as the negative made for it is appropriate. Use of a point source enlarger necessitates a lower contrast negative than one required for diffusion. As long as the entire system is compatible with itself, it will do the job.

Some people claim that the diffusion enlarger has less sharpness than the point source or even the condenser. It may be true, but I don't feel disappointment with lack of sharpness in my prints, nor was I unhappy with Ansel's sharpness. If a sharpness difference does exist, it may be measurable by instruments, but is not readily apparent to the eye.

The diffusion enlarger can claim superiority in one respect: slight scratches in the film base will be rendered invisible, but will be visible with the condenser or point source. The reason is that light from the diffuser hits the negative from all angles, is then refracted crazily through the thickness of the negative's base before hitting the emulsion, and continuing on to the focusing lens. Slight scratches in the film's base will cause different refraction patterns through the thickness of the negative, but light will still go through all portions of the negative. With the condenser, and even more with the point source, the collimated light hits the scratch and is diverted to the side, while light hitting elsewhere on the negative's surface goes essentially straight through. So, less light hits the emulsion below the scratch, and it is recorded as a lighter line on the print.

All negatives can be scratched, but if film holders are kept clean and pressure plates on roll film holders are cleaned regularly, and the negative is handled with care, scratches will be held to a minimum. These precautions should be followed by all photographers, under any circumstances, so do not use this as an excuse to shy away from condenser or point source enlarger light sources.

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