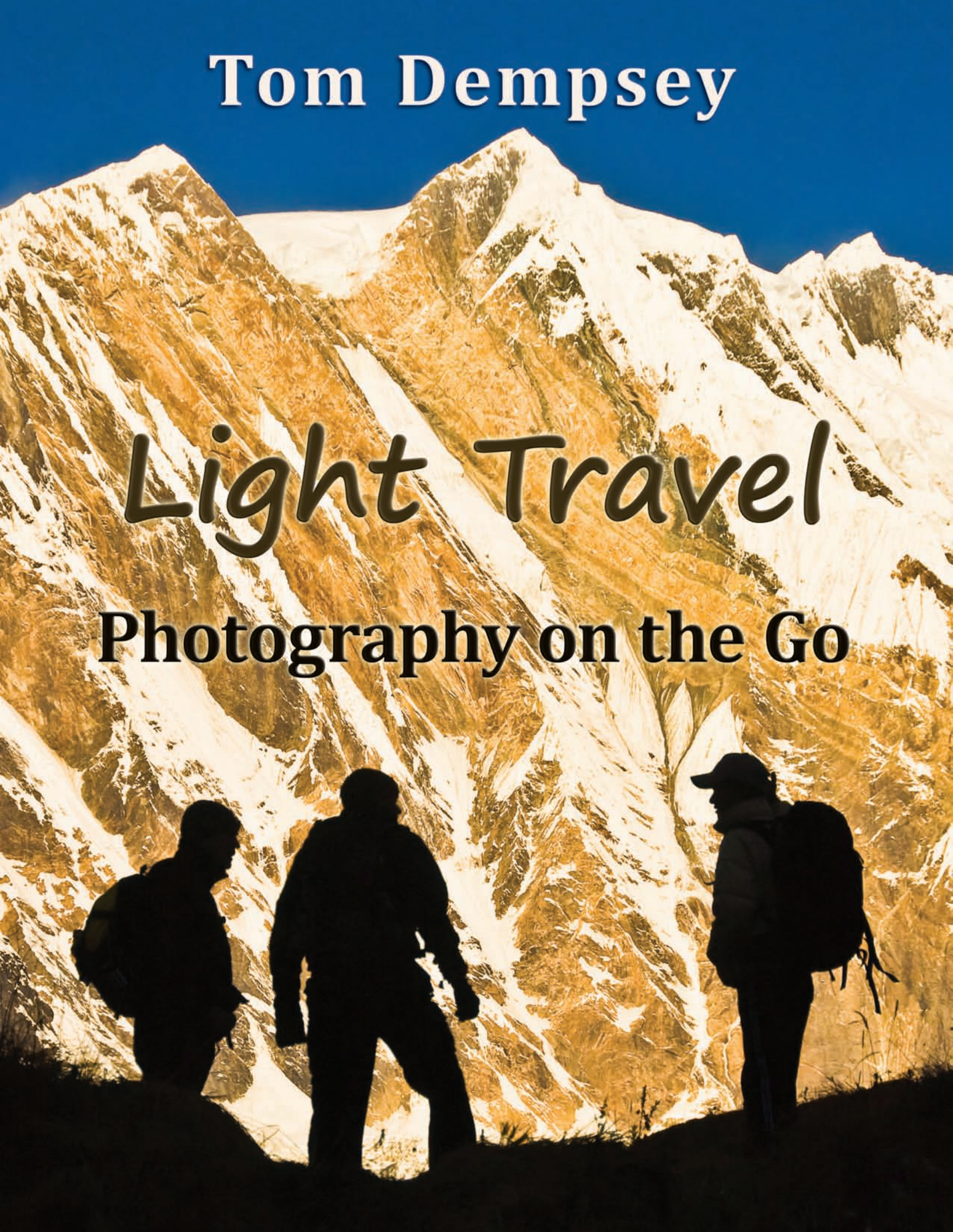
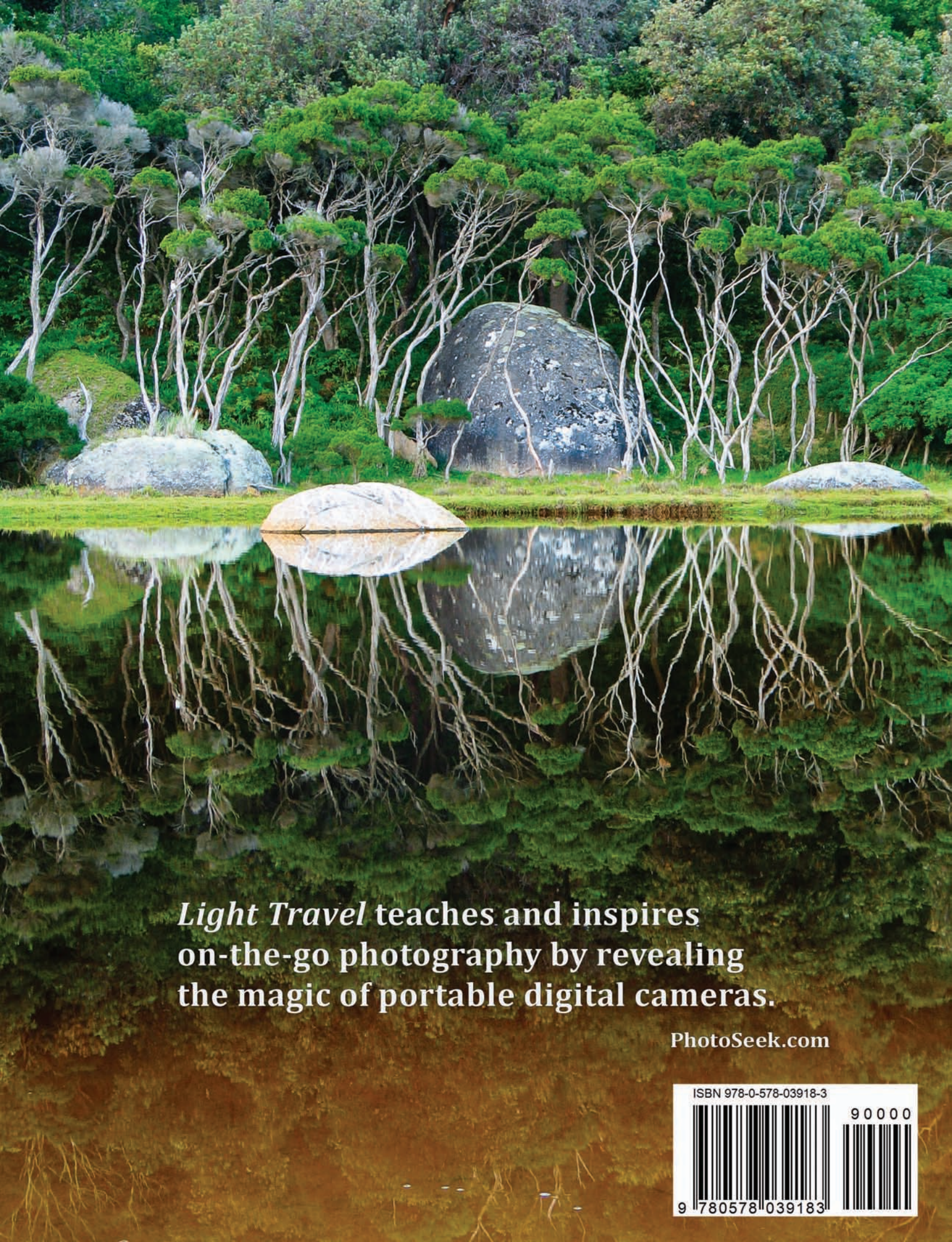




Tom Dempsey

Light Travel

Photography on the Go



Light Travel teaches and inspires
on-the-go photography by revealing
the magic of portable digital cameras.

PhotoSeek.com

ISBN 978-0-578-03918-3



9 0000



9 780578 039183

About Tom Dempsey

With 30 years of nature travel photography experience in over 20 countries, Tom has mastered the use of lightweight cameras for photography on the go. His images appear in travel publications by *Sierra*, *National Geographic*, *DK Publishing*, *Rough Guides*, *Moon Travel Guides*, and more.

He authors internet website ***www.PhotoSeek.com*** and teaches photography workshops in his home city of Seattle.

Email comments and order images/books:
tom@PhotoSeek.com



*Above: Tom traveling in New Zealand, a favorite destination.
Photo by Carol Dempsey. (2007)*

*“We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.”*

— T. S. Eliot, Little Gidding

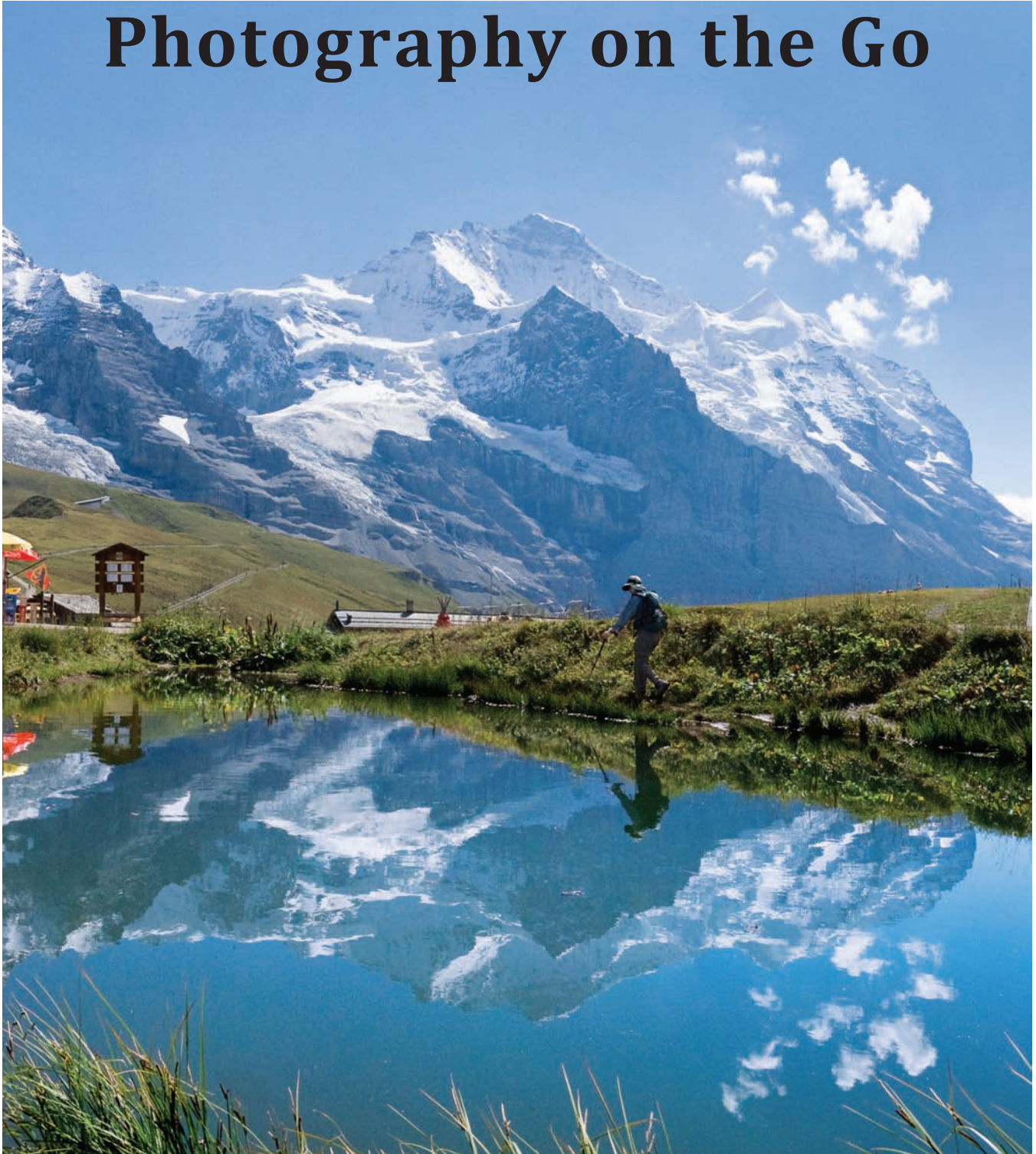
Back cover: *Natural tannins released from decomposing vegetation stain Tidal River brown, in Wilson’s Promontory National Park, Victoria, Australia. Captured with a Canon PowerShot G5 compact camera. (2004)*

Tom Dempsey



Light Travel

Photography on the Go



PhotoSeek Publishing ♦ Seattle, Washington

Right: A Nepali woman turns a large prayer wheel at Pangboche Gumpa, a Buddhist temple near Mount Everest in Sagarmatha National Park, a UNESCO World Heritage Site in Nepal. (2007)

Previous pages: The mountains of Eiger, Mönch, and Jungfrau (Ogre, Monk, and Virgin) reflect in a pond at Kleine Scheidegg train station in Switzerland. Six images were stitched to make this panorama—learn how on pages 44-45. Jungfrau-Aletsch is inscribed on the World Heritage List by UNESCO. (2005)

Cover photo: Trekkers pause at 13,000 feet/4000 meters elevation near the impressive mountain face of Fang (25,088 feet/7647 meters) in the Annapurna Sanctuary, Nepal. Photographed using a Nikon D40X Digital SLR (DSLR) camera. (2007)



Research travel, browse photographs, buy books, and shop for photo gear at
www.PhotoSeek.com

PhotoSeek Publishing
354 NW 112th Street
Seattle, WA 98177-4841

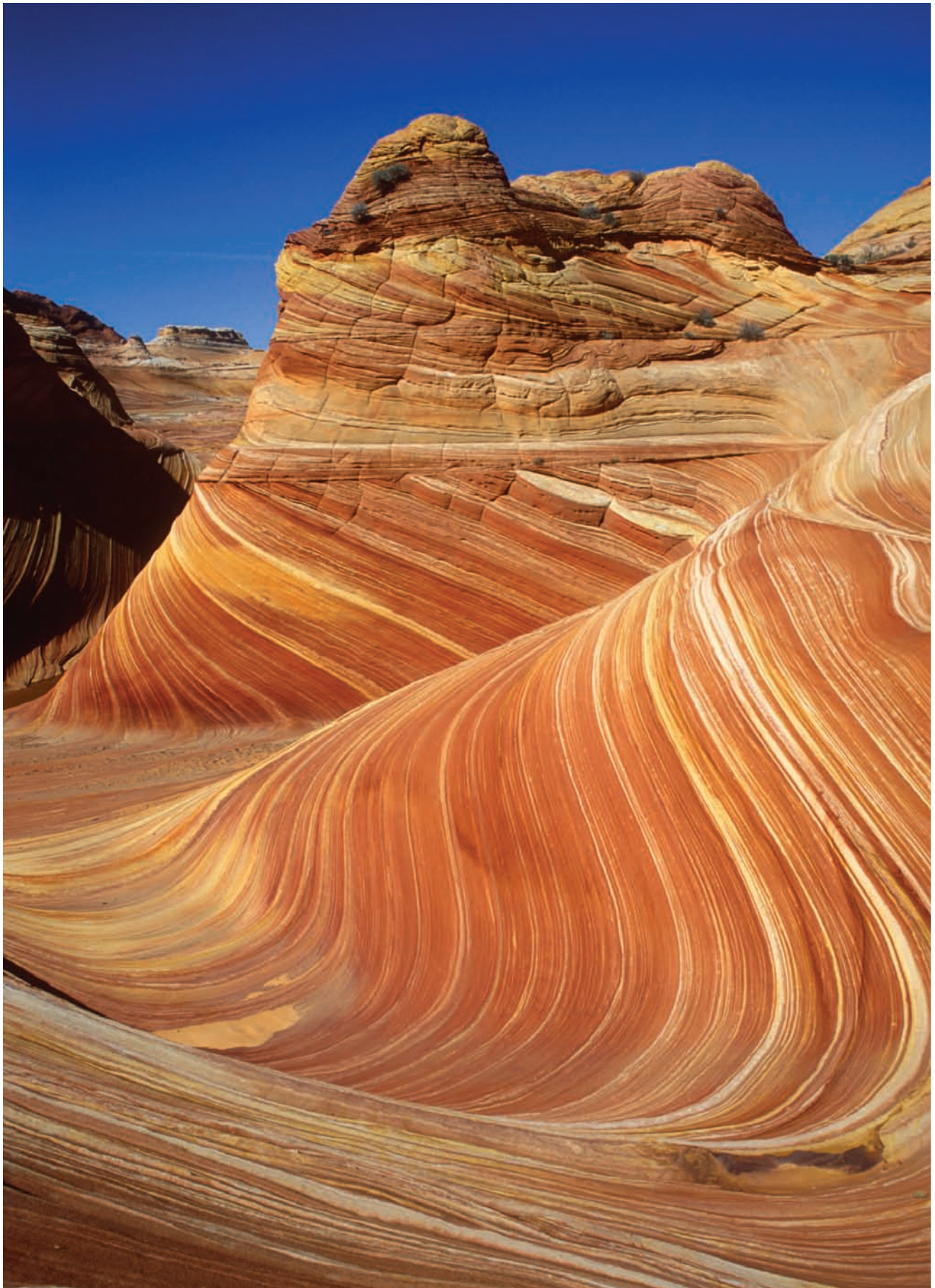
Copyright © 2009 by Tom Dempsey, All Rights Reserved
© 2010 second printing

All photographs are by Tom Dempsey except where otherwise marked. No part of this book may be reproduced in any form or by any electronic or mechanical means without permission in writing from Tom Dempsey, except for inclusion of brief quotations in review.

Printed in USA at InstantPublisher.com, Tennessee
ISBN: 978-0-578-03918-3

Contents

<i>Introduction</i>	9
<i>Part I: How to Enliven Images</i>	24
<i>Chapter 1. How to Compose Images</i>	26
<i>Chapter 2. Focus, Expose, Edit, Create</i>	48
<i>Chapter 3. Lightweight Cameras</i>	64
<i>Part II: Where to Seek the Light</i>	72
<i>Chapter 4. Exciting Destinations</i>	74
<i>Chapter 5. Nature Worship</i>	162
<i>Chapter 6. Natural Patterns</i>	172
<i>Glossary</i>	184
<i>Index</i>	194



Erosion of fossilized sand dunes created The Wave, on the Arizona side of Paria Canyon-Vermilion Cliffs Wilderness Area. To help protect this section of the Coyote Buttes, a hiking permit is required from the US Bureau of Land Management. (2003)



Photographers catch sunrise on Mount Nimrod/Nemrut Dağı in the Republic of Turkey in 1999 before digital cameras bested the quality obtained from scanning 35mm color slide film. A decade later, the digital revolution empowers us with wonderfully lightweight cameras. Improved image stabilization and high-ISO quality free us from previous tripod constraints. But at dusk, night, and dawn we still require tripods to sharpen images recorded at shutter speeds too slow for hand holding a camera.

Introduction

Light Travel teaches and inspires on-the-go photography using minimal equipment.

I illustrate an active outdoor travel style for seeking evocative images:

Part I: *How to Enliven Images* teaches how to compose, focus, expose, and optimize photographs. Which camera is best—compact or DSLR? Are your skills more important than your camera choice?

Part II: *Where to Seek the Light* suggests exciting places to visit—a new state or another country. Revealing the beauty of our world can inspire environmental preservation and sustainable living.

If a topic seems too advanced, skip onwards and revisit later. Read the **Glossary** for definitions of photographic terms. Check the **Index** to find all occurrences of a term or place name.



Mesa Arch glows at sunrise in Canyonlands National Park, Utah. (2006)

Part I: How to Enliven Images

- *Chapter 1: How to Compose Images*
- *Chapter 2: Focus, Expose, Edit, Create*
- *Chapter 3: Lightweight Cameras*



How can you create a charismatic photograph? Chapter 1 explains how in mostly non-technical terms. Chapter 2 teaches basic camera skills, then reveals optional computer techniques such as the following:

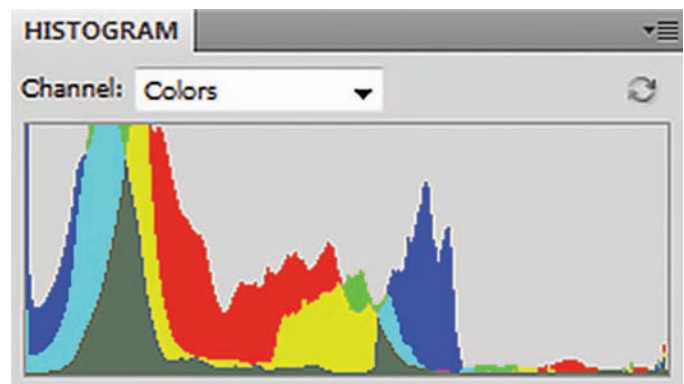


Most people shoot **JPEG files** (with the default **sRGB** color space) which are compatible with all computers and retail printers. Dedicated professionals often prefer working with **RAW files** and **Adobe RGB** color space to preserve greater color depth and a broader range (gamut) of color data for improving prints.

The above panorama was stitched from five RAW image files recorded on a Canon PowerShot Pro1 compact digital camera using ISO 50, lens 7.8mm (31mm equivalent in terms of 35mm film), aperture f/8, and shutter speed 1/160th second.

Using **Adobe Lightroom** on a personal computer, for all five pictures as a batch, I adjusted the following: Exposure down -0.65 stops, white balance WB Temp=5850 Kelvin, Tint -5, Blacks 4, Brightness +3, Saturation +63, and Red/Cyan Chromatic Aberration -55. Lights and Darks were brightened on the medium contrast Tone Curve by about 20%.

The five separate overlapping vertical photographs were stitched into a seamless panorama in **Adobe Photoshop CS3/CS4** software using the File>Automate>Photomerge menu. To the right is the histogram of brightness values shown in Photoshop for the resulting TIFF file image (which was optimized and saved in 16-bit **Adobe RGB** color space).



Chapter 1. How to Compose Images

“Genuine poetry can communicate before it is understood.”

— T. S. Eliot (1888 - 1965), critic, dramatist, and poet

All photographers, from beginning to advanced, can benefit from compositional exercises. Work through the exercises in this chapter:

- A. Evoke Emotion
- B. Fill the Frame
- C. Create Contrast
- D. Fill with Flow
- E. Apply the “Rule of Thirds”
- F. Play with Perspectives

Immediately after photographing each exercise, review image sequences in your LCD or EVF in *Playback mode*. Zoom into (magnify) each photo to check for sharp focus. Check for overexposure or underexposure using both the *highlight warning screen* and *histogram* for each photograph. Most importantly, ask yourself, “will this image maximize audience impact?” If not, shoot more as needed. When reviewing each picture on the LCD, your strongest instinctive reaction helps identify the best images.

Define it

Confused by camera lingo? See the *Glossary: Camera Terms Explained*.

Photography is communication. What do you want to say in each picture? What’s the story? Who is your audience?

Most of us take pictures for our own enjoyment and that of an audience of family and friends. Evocative images by other photographers can inspire us to record vivid touchstones for our own personal memory as well as for sharing with an audience.

Ask or imagine how others may perceive the photograph. Other viewers later won’t have your benefit of experiencing the smells, tastes, sounds, tactile sensations, or sequence of experiences that you felt when capturing the picture. Viewers will only experience what you present. Design your sensational image to stand alone, to complement a displayed sequence, or to gain impact with a well-written caption. Patient waiting or many shots may be required before recording a brief shining moment in a great photograph.

Are you serious about improving your photography? Don’t leave home without your camera. Practice makes perfect. Cameras are great tools to record pictures of products and labels while shopping, or to photograph trailhead maps and signs for safety on a hike. Good quality subcompact cameras can handily fit a pocket/purse and make respectable prints. See *Chapter 3: Lightweight Cameras*.

Have fun with composition as you advance your skills and expand your creative portfolio.



A Steller Sea Lion plays with a firehose at the Alaska Sealife Center, Seward, Alaska. Photographed using a Canon PowerShot Pro1 camera with flash turned off to prevent reflections on the aquarium glass. (2006)

People pictures and fill flash

People often look best with candid or relaxed expressions of emotion. Be ready to capture the height of spontaneous laughter or excitement when people forget the presence of a camera. A **photojournalist** records events accurately without posing, as in the above Steller Sea Lion image. To engage the feelings of your audience or enhance the sense of scale, include local people at various distances from the camera.

Sometimes you can tell a story better by posing people or subjects. When arranging people outdoors, have them remove sunglasses and hats to reveal their expressive eyes. Record at least two shots to increase the likelihood of good expressions and open eyelids. Use **fill flash**—flash always on mode—to fill harsh outdoor shadows on faces.

The fastest allowed **flash synchronization** on many cameras forces 1/200th second or slower shutter speed, which can *overexpose* flash photos in sunlit conditions outdoors. To compensate, use low *ISO* and *stop down* (increase the *f/number* for *aperture*). An advanced camera such as the compact *Canon PowerShot G11* can shoot 1/2000th second flash synchronization to improve fill flash and also freeze fast action. To prevent *motion blur*, most cameras also limit shutter speed to no slower than 1/60th second whenever using flash in most

automatic exposure modes. To expose slower and pleasingly **balance ambient light with flash**—such as indoors or at dusk, night, or dawn—use a tripod and dial your mode to *Night Scene*, *Shutter-preferred/S/Tv*, or *Manual/M* exposure mode. Or use *Slow Synchro* (or *Rear Curtain*) flash in *P/Program* or *Aperture-preferred/A/Av* mode.

Permission and legal issues

Ask *permission* before online internet posting of images with identifiable faces, and remove if later requested. On *public property* in the USA, you can legally take pictures of anyone or anything in any public place, where no expectation of *privacy* exists, though first asking permission is common courtesy. On *private property* or in other countries, follow their rules. When you record photos containing **recognizable faces of people** or **copyright works**, a **model release** (a liability waiver) protects the *publisher* against legal claims by those people or owners. Photographers should have subjects sign a model release if the image will be sold to a *stock photo agency* or will be used commercially to promote a product or message in any media. *Editorial* or *news* usage usually doesn't require a model release. Tell publishers which of your photos are **unreleased** (having no model release), because *publishers* are legally culpable for unreleased images.

How to Compose Images

Exercise A: Evoke Emotion

Emotional impact outshines everything.

You don't need a big or expensive camera to capture a striking or touching image.

Research subjects in advance and open your heart in the presence of your photographic subject. When composing pictures, enter a state of emotional sensitivity, even vulnerability, while simultaneously applying technical and critical judgment. Trust your eyes, not the camera. Check the photo on the

LCD after every shot to see if it catches the feeling of what you saw. Trust your instinctive reaction. Also seriously consider constructive feedback from your audience and peers.

If you know something emotionally crucial but not visible regarding the subject, imply it visually—zoom and play with lens perspectives, vary *shutter speeds*, follow the action (*pan*), or enhance impact with contrast or color saturation (adjusted in camera or on the computer) to match what you perceived.

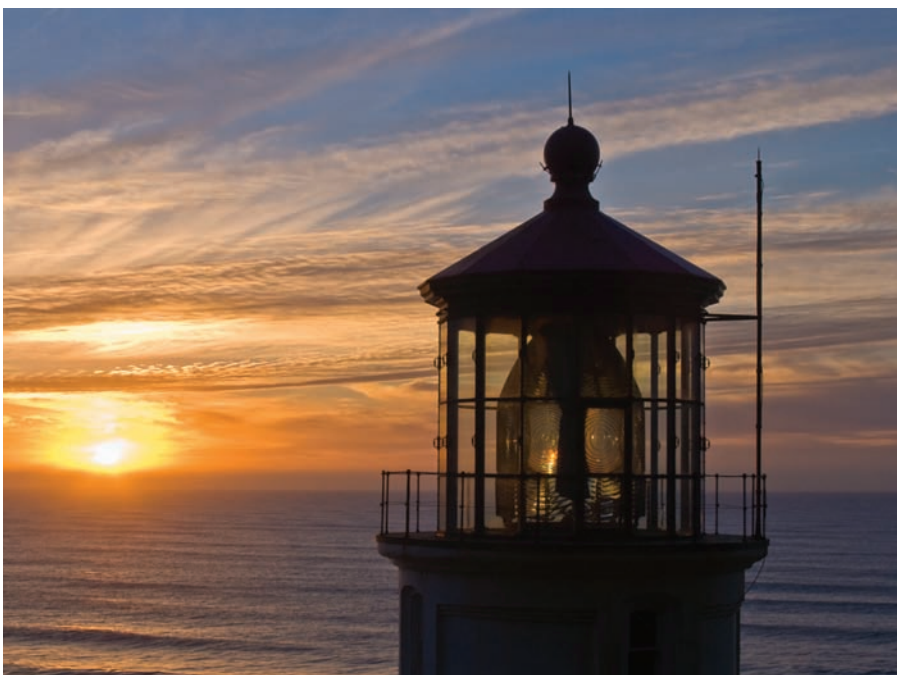
Example A1: Keep sharp focus on an animal's *eyes*, or else you risk disconnecting your audience. Little else need be in focus. We instinctively look to face and eyes for emotional cues. We project our human feelings upon (anthropomorphize) everything including other animals, plants, and inanimate nature. Morph your instinctive reactions into photographs.

A flip-out-and-twist LCD enabled viewing at arm's length low into the wombat's enclosure, with permission at Bonorong Wildlife Park, Tasmania, Australia. (2004)





Example A2: The terrifying mask contrasts with the two calm caretakers. The 1794 golden mask of Seto Bhairab (White Demon) glares in Durbar Square, Kathmandu, Nepal. Nepal Airlines proudly painted a winged version of this sculpture on their jets. (2007)



Example A3: Intense colors and a recognizable icon such as a lighthouse (at winter sunset at Heceta Head, Oregon) can evoke strong emotional responses. Use audience feedback to edit and improve what you show. Display only your best and leave your viewers wanting more. (2006)

How to Compose Images

Exercise B: Fill the Frame

Simplify your composition to make a clear statement. Exclude distracting or unrelated elements. Tell a visual **story** with emotion, motion, humor, contrast, color, tone, pattern, symmetry, asymmetry, texture, and/or detail.

Choose vertical or horizontal framing which best enhances the flow of the subject. If in doubt, record both versions and decide later.

To establish a greater sense of scale and depth when photographing an outdoor landscape, include identifiable subjects at three or more distinct distances away—near, middle, and far (as in *Example E2*, page 39).

Example B1 (two images on next page)

Question: Without changing the lens zoom or aperture, how was the second photo on the next page shot with a blurred background and enlarged subject?

Answer: The camera was **moved closer and focused closer**, sharply on the eye of the Galápagos Marine Iguana (2009).

In the upper image, a rock arch and sea lion offer background interest, but too many subjects compete for viewer attention. The lower image has stronger impact because an unusual reptile *fills the frame*. Both photographs were recorded with the same lens setting—zoomed at 90mm with an aperture of f/11 on a *Nikon D60 DSLR* camera. For a given angle of view, a *DSLR* camera lens can usually blur the background more than a *compact* camera, mainly due to larger *sensor size*.



Try this: Keep the zoom lens *angle of view* and *aperture* constant. Move your camera physically closer, which enlarges the subject in the frame. Now refocus at this closer distance, and the camera will reduce **depth of field** and blur background, as explained in the *Glossary*. Compare with pages 40-43, 53.

Example B2: All distracting elements are excluded, and enough water is included to establish pattern, space, and mood at Loutro Harbor, Crete, Greece. (2001)





Above, various subjects compete for attention...



Step in closer to fill the frame for stronger impact.

How to Compose Images



Example C1: A yellow sea nettle in the Oregon Coast Aquarium pops forward against a blue background. Yellow and blue are complements of the RGB and CMYK color models on page 34. (2008)

Exercise C: Create Contrast

- **Juxtapose** varying shapes, lines, textures, colors, and subjects to excite your audience and illustrate relationships.
- Frame a brightly-toned subject on a dark background, or darkly-toned subject on a bright background.
- Find a colorful subject on a background having a contrasting or *complementary color*. For example, **red** contrasts brightly with **green** or **cyan**. **Blue** complements **orange** or **yellow**. **Yellow** pops well against **purple** or **blue**. **Green** complements **magenta** or **red**. Read more about *Color Theory* on page 34.
 - Colors have an advancing or receding quality. Intense, warm colors (**red**, **orange**, **yellow**) and bright values come forward. Cool colors (**green**, **blue**, **purple**) and darker values seem to recede away from the viewer.
 - Darker, less intense colors invoke a somber atmosphere while brighter and lighter colors can create cheer. Play with mood.
- If the subject or pattern clearly stands out, then you have achieved good contrast.

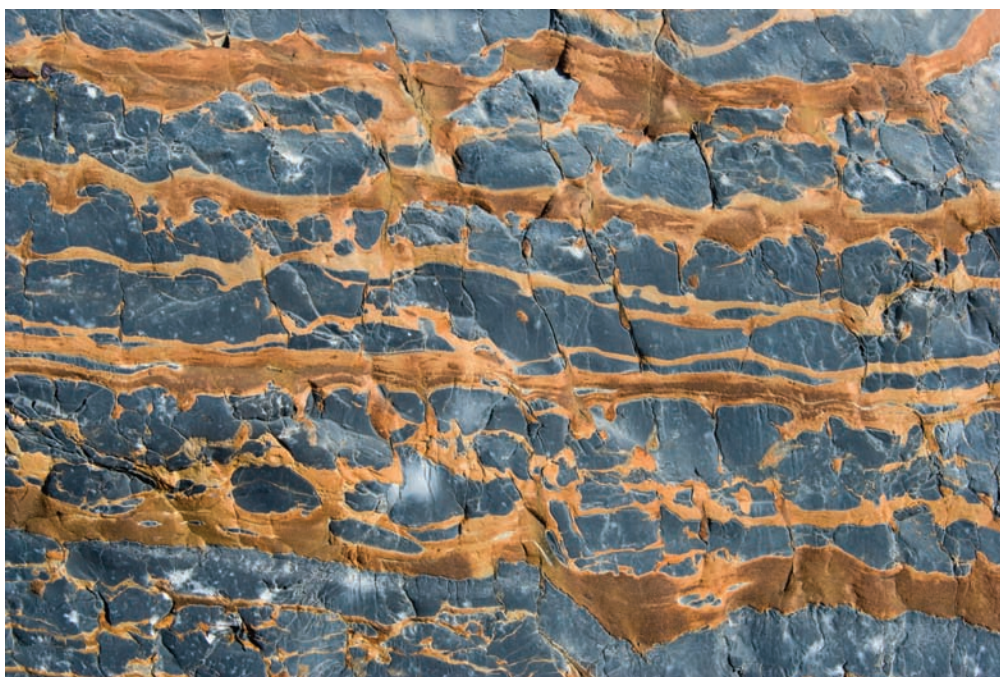
Example C2: A Booted Racquet-tail hummingbird stands out against a lighter background in Bellavista Cloud Forest Reserve, near Quito, Ecuador. Red contrasts with green on the traditional RBY Artists' Color Wheel. (2009)





Example C3: Triangular blue feet contrast with the rounded eggs and white belly of a Blue-footed Booby. (2009)

Example C4: An orange layer of rock pops out against blue in the Canadian Rockies. Orange and blue are complements on the traditional RBY Artists' Color Wheel. (2008)



*Creating contrast
is the heart of
photography.*

Color Theory

Knowing how colors contrast and combine helps you compose images in your camera and later edit color tones on a computer. *Color Theory* is based on *spectral color*:

- A **spectral color** is identified by a fixed wavelength of light in the continuous visible spectrum, as seen in *rainbows* and *prisms*. Historically, Isaac Newton described seven *spectral colors* using the acronym **ROYGBIV** in the order of decreasing wavelength: **Red, Orange, Yellow, Green, Blue, Indigo, and Violet**. Humans cannot see wavelengths that are outside of ROYGBIV such as infrared, radio, x-ray, and ultraviolet.

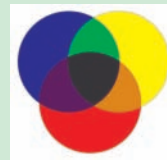
Visible **non-spectral colors** include **purple** and **magenta**, which are both mixtures of blue+red in the *RGB color model*. Mixing a *spectral color* with a *grayscale color* (white, silver, gray, or black) makes a *non-spectral color*, such as brown or pink. **Pink** is red+white in both *RGB* and *RBV color models*. **Brown** is actually a dark orange: a certain combination of red+green in the *RGB* model; or red+yellow+black in the *RBV color model*. The names of color gradations vary by language, culture, tradition, and perception.

The most common color models **RGB**, **CMYK**, and **RBV** are described below. Each model is based on three *primary colors*. Colors on opposite sides of a *model color wheel* are called *complementary*. When you place two *complementary colors* next to each other, they *pop aesthetically* and *look brighter in contrast*. Theoretically, mixing two complementary colors makes a neutral color (gray, white, or black, depending upon the color model).

- **RBV** is a historical set of *subtractive (pigmented) primary colors* **Red, Blue, and Yellow (RBV)**. These colors, commonly available in early paints (plus green), became the basis of artistic color theory in the 1700s and 1800s. The *complement* of each primary color ink is roughly the color made by mixing the other two primary color inks. Blue ink plus Yellow ink makes *green* ink. Blue ink plus Red makes *purple*. Red ink plus Yellow makes *orange*. Mixing **R+B+Y** theoretically makes *black*, but looks muddy using real-world inks. RBV paints cannot be mixed to create cyan or magenta. RBV color wheel tints vary by artist.

Mixing ink colors is called a *subtractive color system*, because inks selectively absorb and reflect different *spectral color* wavelengths and “subtract” brightness from white, non-inked paper. In the **RBV artistic model** using subtractive primary colors,

1. **Red** primary complements (contrasts with) green.
2. **Blue** primary complements orange.
3. **Yellow** primary complements purple.



RBV paints



Above: A traditional Artists' Color Wheel uses subtractive (pigmented) primary colors of Red, Blue, and Yellow—**RBV**.

- **RGB** is an *additive (glowing light) primary color* model that is used by digital cameras (where each color is roughly a peak of *spectral color*):

1. **Red** primary complements (contrasts with) cyan.
2. **Green** primary complements magenta.
3. **Blue** primary complements yellow.



RGB light

The **RGB** color model roughly relates to the three types of *cone cell* color receptors in the human eye. The light in an *additive color* model such as RGB emits directly from a source.

The *complement* of each additive primary color is the color made by mixing the other two primary colors from light-projecting sources. A Red light source plus Green makes what we see as *yellow* light. Green light plus Blue makes *cyan*. Red light plus Blue makes *magenta*. The overlapping circular spotlights above show that R+G+B make *white* light.



Above: The **RGB** Color Wheel model uses additive (glowing light) primary colors of Red, Green, and Blue.

- **CMYK** color printing technology uses a *subtractive/pigment color* model with three *primary colors* for *process inks*: **Cyan, Magenta, and Yellow (CMY)**. Theoretically you would get *black* by mixing Cyan, Magenta, and Yellow, but real-world inks combine with a muddy non-black appearance, so printers add a **Black** ink (historically abbreviated **K**). Printing presses make a *rich black* by applying K ink onto a bedding of CMY *composite black*. In the CMYK model, *white* is defined as zero ink on the white paper or print media.

The complementary color pairs for the **CMYK model** are the same as for RGB. As shown in the paint circles at right, mix two primary color inks to get *secondary colors*: Cyan ink plus Yellow makes *green*; Cyan ink plus Magenta makes *blue*; Magenta ink plus Yellow makes *red*.



CMYK inks

Example C5:
The dark feathers of a Galápagos Dove stand out against a light background. (2009)



Example C6 above: On this aster flower, yellow brightly contrasts with purplish lavender. Flowers have naturally evolved highly contrasting colors to attract pollinators. Some flowers display *ultraviolet* color patterns which are invisible to humans but attractive to bees and certain other insects. On the long wavelength end of the visible spectrum, hummingbirds have co-evolved to suck nectar from red, orange, and pink flowers—colors which tend to be inconspicuous to insect eyes. (2008)



Example C7: A green beetle contrasts with a magenta thistle in Vikos-Aoos National Park, Zagoria, Greece. Green complements magenta in the RGB color wheel model, described on previous page. (2001)

Cut reflections with a polarizing filter

A *circular polarizing filter* for your lens cuts reflected light from water or shiny surfaces, as polarizing sunglasses do for your eyes. A *polarizer* is one of the few useful filters in digital photography, because the effect cannot be reproduced later using software.

Check the potential effect *before* taking the time to screw on a polarizing filter:

Hold the filter up to your eye and rotate it back and forth through a ninety degree (90°) angle. If you like the effect, mount the filter using its threads, look through the viewfinder (or at the live LCD), then rotate the floating ring again to find the desired appearance.

If you see no change as you rotate the polarizing filter through 90° , then the filter won't help, and will in fact hurt by reducing incoming light by 3 to 4 times (1.5 to 2 stops).

When finished cutting reflections or polarizing the blue sky, don't forget to remove the polarizing filter, and replace with your standard clear UV filter to protect the expensive lens.

Only apply a polarizing filter to your lens when the image will be improved as follows:

- **Remove bright reflections** from shiny surfaces such as water, glass, metal, or green vegetation. See beneath the reflective surface of lakes or streams.
- **Enhance or remove rainbows**, depending upon filter rotation between 0° and 90° . **To find a rainbow**, look in a line from your eyes to the shadow of your head on the ground, then redirect your gaze by a 42 degree angle to an area where direct sunlight falls on water droplets from rain, waterfall, or garden hose.
- **Increase the contrast between clouds and blue sky**, with maximum effect at a 90° angle from the sun (and null effect looking near 0° into or 180° away from the sun). Clear blue sky is polarized, but not cloud. Don't overly darken an attractive blue sky unless you intend to communicate a more somber message. Skies are naturally darker at higher altitudes.



Polarized sunglasses will black out portions of LCDs and viewfinders of cameras, so wear non-polarized sunglasses for photography.

How to Compose Images

Exercise D: Fill with Flow

Arrange and balance subjects in the frame so that viewers' attention actively **circulates** within the photograph and lingers in admiration.

We are instinctively attracted to areas which are **bright, sharp** (focused or contrasty), or **warm** (red, orange, or yellow). Lines, a pointy subject, or the direction of an animal's gaze all create **directional flow** which may need balancing by adding space or another subject in that direction.

Frame the composition **horizontally** or **vertically** to best complement the directional feeling of the subject. Horizontal lines can comfort or bore. Vertical lines can impress or cramp. **Diagonal** or **curved** subjects can excite or distract. **S-shaped** subjects usually dynamize compositions. The impact of your composition depends upon presentation format, context, and subject matter.

Odd Rule: one, three, or five subjects often flow better than an even number such as two or four. However, if two mates or a pair of subjects have more emotional or romantic impact, then ignore the Odd Rule.



Example D1: Diagonal lines of the boat guide your eye into the image. The floats are framed near the *Rule of Thirds* (*Exercise E*). Complementary colors *create contrast*. Solid shapes on the boat contrast with random liquid reflections. Although the legs of the person sitting in the boat may distract attention to the upper left, he humanizes the abstract image and provides a size reference. Galápagos Islands, Ecuador. (2009)



Framing an odd number of subjects can dynamize images.

Example D2: Above, three Australian Pelicans interact with body language and bright yellow eyes in Walpole-Nornalup National Park, Australia (2004). The striking birds and curved shoreline draw you into the composition. (Recorded using a compact *Canon PowerShot Pro1* camera.) Below, Carol Dempsey photographed dark sandstone curves by steadying a subcompact, shirt-pocket-sized *Canon PowerShot SD700 IS* camera against the wall of Lower Antelope Canyon, Arizona (2006). She used a lens of 7.7mm (46mm equivalent in terms of 35mm film), aperture $f/2.8$, and shutter speed $1/13$ th second.



For good *flow*, play with curves and lines.

How to Compose Images

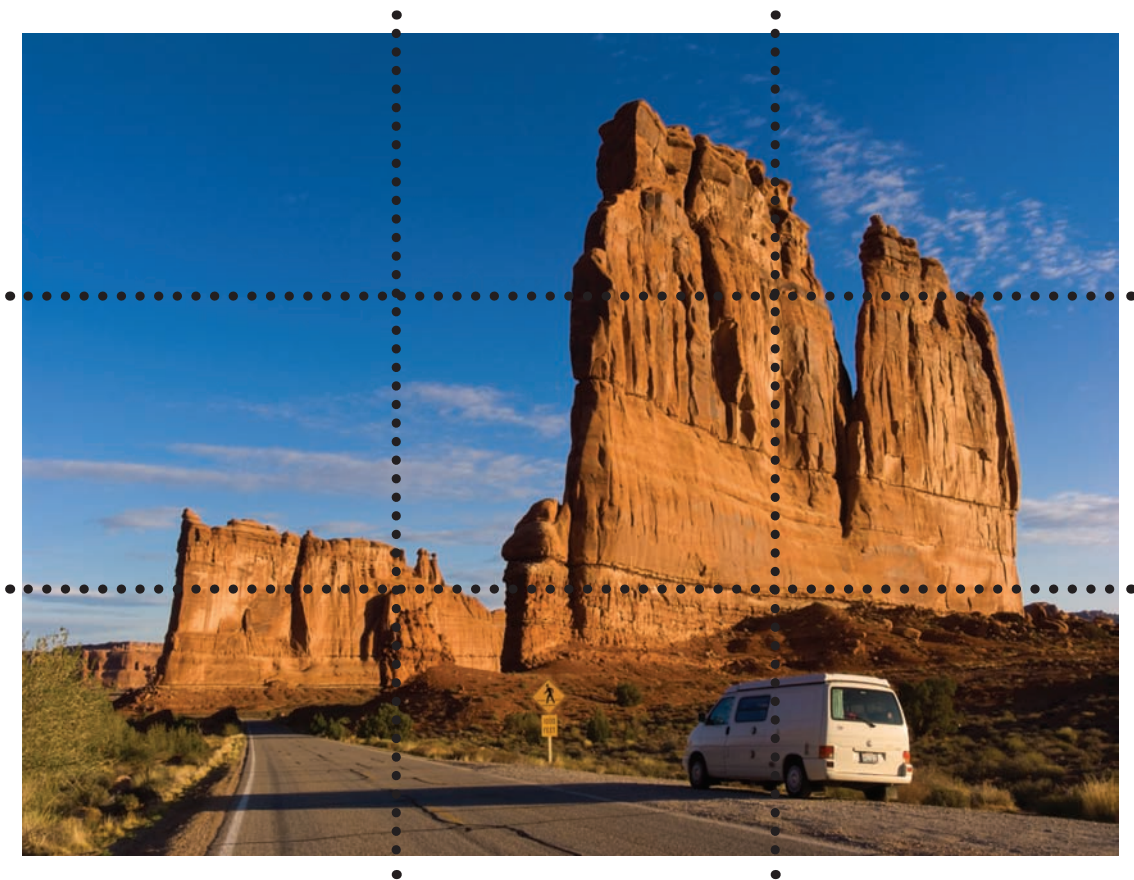
Exercise E: Apply the “Rule of Thirds”

Caution! **Centering** subjects can make a composition feel static or lack **flow**. Instead, start your composition by aligning important elements along **thirds**.

First, align important subjects of the composition along the lines of an imaginary **tic-tac-toe grid** (or activate the camera’s grid lines) and shoot. Then recompose and

record different alignments. You may be surprised by which version will later strike you and your audience as most dynamic.

For example when capturing landscapes, level the sky at about one third or two thirds of the frame. Then reframe and record several different alignments of subjects. Check your instinctive feeling



Example E1: Which elements do you see aligned with the *tic-tac-toe grid*? Answer: The *horizon line*—the distant transition from land to sky—aligns with a *horizontal third*. The van, the road, and the foreground and background rock monuments generally align with *vertical thirds*. The subjects which follow the *Rule of Thirds* help shake up my static emotional response to the empty blue sky on the upper left. Arches National Park, Utah. (2006)

Do you also see the use of *Exercise D: Fill with Flow*? The van and road in the lowest *third* point into the composition towards the empty blue sky. The massive rock monument pulls your eye to the right. The bright white van pulls your attention downwards to notice the yellow sign and follow the road back towards the sky. This arrangement keeps your *flow* of attention circulating within the image. Blue and orange contrast and complement attractively as described in *Exercise C: Create Contrast*.

or audience reaction when viewing each version. The best photograph is the one that stirs the strongest emotional response.

Remember the first principle of composition: **emotional impact overrules everything.** I often start compositions with the *Rule of Thirds*, then feel free to stray as compelled by the subject matter.

"The very essence of instinct is that it's followed independently of reason."

— Charles Darwin (1809 – 1882),
who conceived *natural selection*.

Initially, align subjects along a tic-tac-toe grid; then vary.



Example E2: The following subjects closely align with an imaginary *tic-tac-toe board*: the horizon line (the transition from sky to ground) and fog, the rock wall, the donkeys, a line of tents, the bright red trekker, and the blue tarp. The three peaks in the Cordillera Huayhuash of Peru also illustrate the *Odd Rule* in *Exercise D: Fill with Flow*.

The sense of scale is enhanced by foreground trekkers, tents, and donkeys that diminish in size with distance, towards the background of icy peaks and large glaciers jutting through fog. Attractive blue sky mixed with a few clouds usually provides a more striking backdrop than all-blue sky or mostly cloudy. Wake up early, spend extra time, and capture the right moment. (2003)

Chapter 2. Focus, Expose, Edit, Create

A. How to Focus and Expose

B. Revealing the Histogram

C. How to Edit Images

D. How to Print Images

“Remember: Your focus determines your reality.”

— George Lucas, *Star Wars: Episode I, The Phantom Menace*.

A. How to Focus and Expose

Does your camera have trouble hunting for focus? Does it expose too brightly or darkly? Try *Examples A1-A7* to learn how to focus and expose more reliably. Novice photographers may want to do these exercises in *AUTO*, or the camera’s default easy mode. If a topic seems too advanced, skip onwards and revisit later.

After you get more comfortable with your camera’s *point-and-shoot* automatic exposure modes (such as *AUTO* and *Scene modes*), learn *P* mode (*Program* auto exposure), if available. Then study *A/Av* (*Aperture-preferred auto exposure*), and *S/Tv* (*Shutter-preferred auto exposure*). *M* (*Manual*) gives you more control but requires more practice and time to prepare for a shot.

Focus

Many cameras, especially compact models, struggle to focus

- in dim light
- at the telephoto end of the zoom
- on uniform areas that have little contrast, such as blank sky or empty paper
- on very bright subjects within the focusing area

Focusing is most reliable if you first *half-press* and hold the *shutter release button* to lock focus* on an edge or contrast boundary of the subject, recompose, then fully press. Learn to distinguish your camera’s visual and audio signal (beep) for *focus lock* versus the signal for failure to achieve focus. For sharper images, tuck elbows closely to your body, then press the shutter button while breathing out.

Expose

Three basic settings interact to collect light and control image brightness:

1. **shutter speed**: the *duration* of exposure controls motion blur (see *blurred* in *Index*)
2. **aperture**: a smaller lens *pupil* increases *depth of focus* (p. 53) but admits less light
3. **ISO sensitivity**: increasing *ISO* in dimmer light amplifies recorded brightness at the cost of increasing *noise* (random mottling)

Despite advanced circuitry, cameras are not smart enough to know which subjects are supposed to be black, white, or midtone in brightness, as demonstrated in *Examples A3-A7*. Your artistic judgment now comes into play: compensate exposure at shooting time then fine-tune tones later in an image editor on a computer.

* **Exception**: A half-press of the shutter release button normally **locks focus** except in *Sports/Action scene mode* or *Continuous-Servo* or *AI-Servo autofocus*, which all continuously hunt for focus.

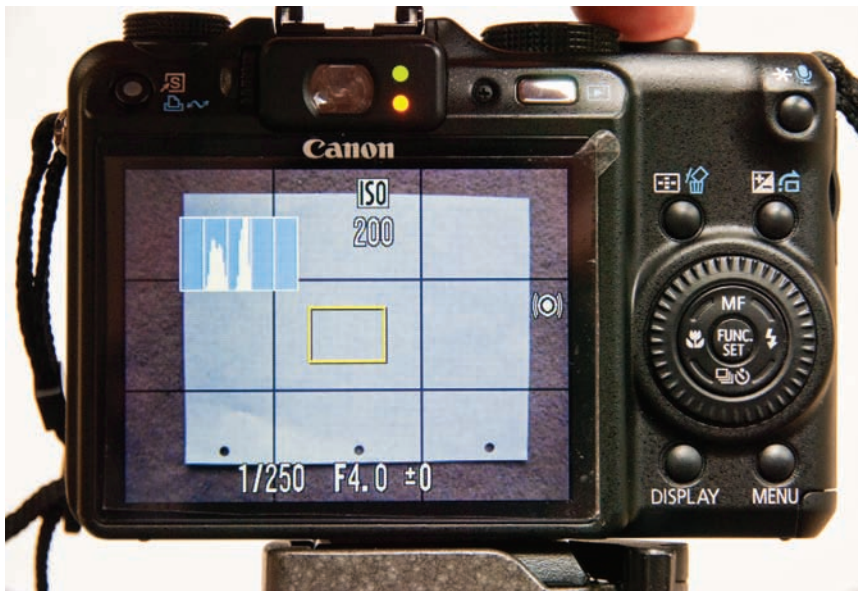
Basic skills: How to focus and expose more reliably.

Try these simple experiments with any camera: **Examples A1-A7** are important for all photographers to understand.

First, find one sheet each of white paper, black paper, and gray or tan cardboard. Lay the paper in a bright daylight area with diffuse light near a window indoors. To perform the exercises in **Examples A1-A7**, set your camera on **AUTO** (point-and-shoot mode, such as **AUTO** in green on the *Mode Dial* at right). But for better control, set your camera as described in **Improve Focus** on page 52.



Mode dial
of a Canon
PowerShot G9

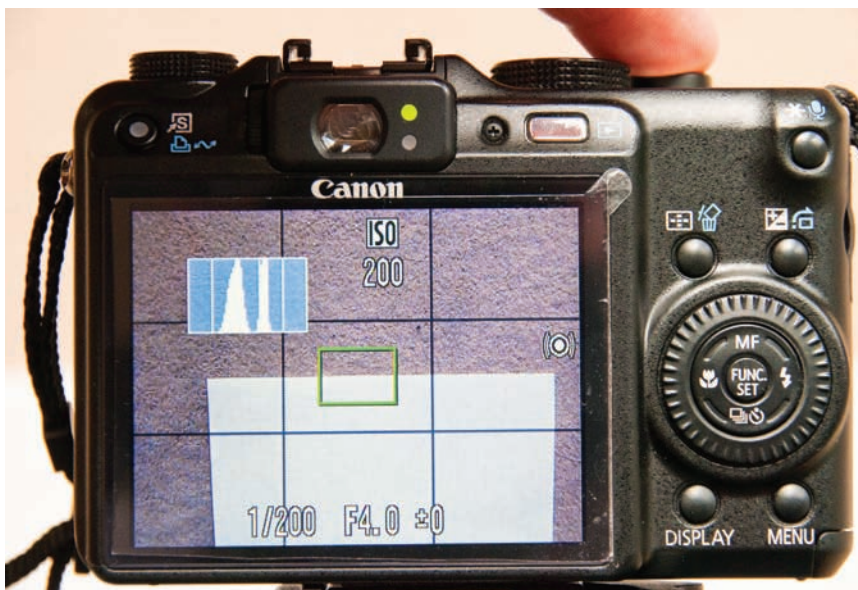


Example A1

Press halfway down on the shutter release button to lock focus* on the center of a white sheet of paper as shown above. Notice that most cameras *won't be able to achieve focus* on this uniform area having no edges and no contrast.

Check your *Camera User's Guide* under *Focus Lock*. As shown at left, the *Canon PowerShot G9* (and other cameras in the excellent *PowerShot Series*) indicate difficulty focusing by flashing a yellow light near the viewfinder (in **AUTO** mode) or showing a yellow focus box in the center of the LCD (in *P*, *Tv*, *Av*, or *M* exposure modes). Turn on your camera's *Grid Lines* (tic-tac-toe guidelines) to help align subjects.

Note the *Canon G9* camera's useful *live histogram* shown on the screen in a light blue box with white peaks. **Histograms**, discussed on pages 50-51 and 54-59, are vital for learning about *brightness* and *exposure*.



Example A2

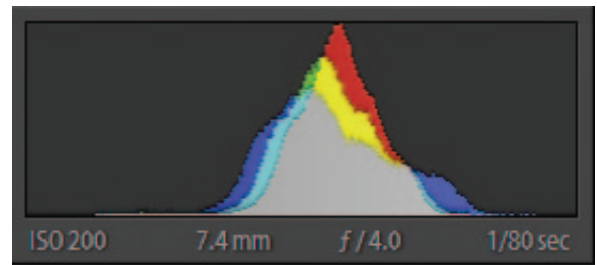
Now recompose the image so the edge of the paper is centered in the "crosshairs" of the focus. Press halfway down and hold the shutter release button to lock focus on the edge.

As shown at left, the *Canon PowerShot G9* camera indicates successful focus with a steady green focus rectangle and/or light.

If the camera still has difficulty focusing, make sure the zoom is at wide angle, move the camera slightly away from the subject, and try refocusing.

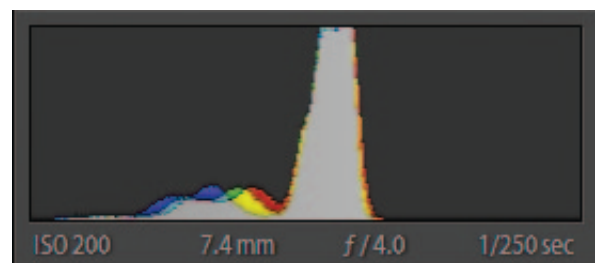
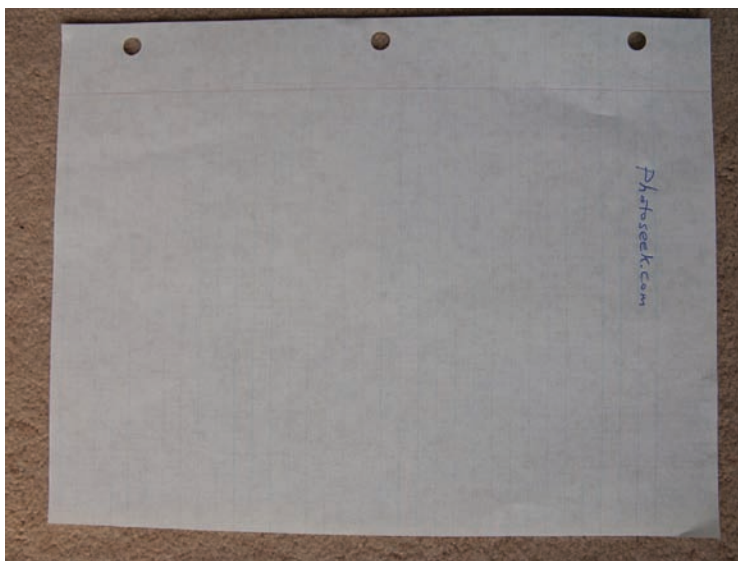
The default minimum focus distance for many cameras is about 1.5 feet or 50 centimeters. To focus closer than this, invoke *Macro Mode* (marked with a flower symbol) on a compact camera, or use a *macro lens* or *diopter filter* on a DSLR camera.





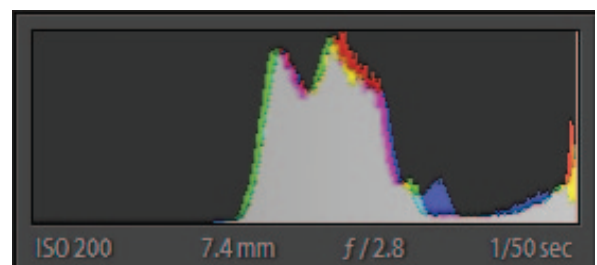
Example A3

Now compose to fill the frame with a piece of cardboard (gray or tan) laid on the carpet or floor. Fully press the shutter release button. By default, all cameras perfectly meter and expose subjects that average to middle tone (*midtone*) brightness (creating a *histogram* of brightness values peaking near the center, as shown above).



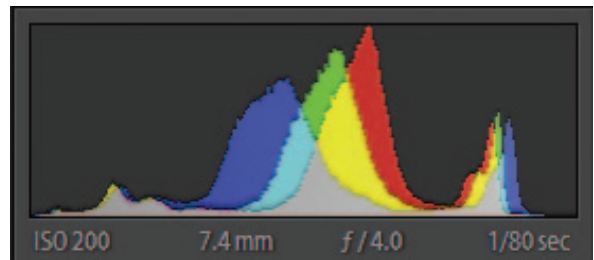
Example A4

Now compose to fill the frame with a piece of white paper. By default, all cameras mindlessly *underexpose* a predominantly white-toned subject, forcing it to appear gray (creating a *histogram* of brightness values peaking towards the center, as shown above).



Example A5

Now compose to fill the frame with a piece of dark black paper. By default, all cameras mindlessly *overexpose* a predominantly black-toned subject, forcing it to appear gray (creating a *histogram* of brightness values peaking towards the center). Any white subjects appearing as a small percentage of the image area tend to overexpose (cutting off detail beyond the *white point* on the far right of the histogram). The cut-off *highlights* are unfortunately lost in your recorded JPEG file, but much can be recovered from a RAW file in advanced cameras.



Example A6

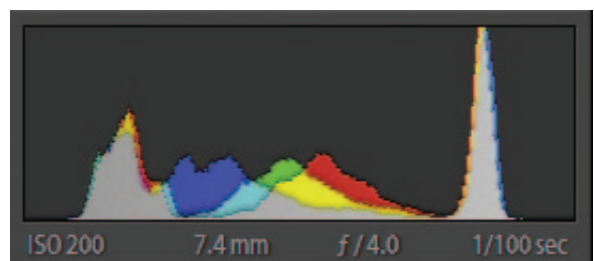
Now compose as shown, mostly filling the frame with the medium-toned cardboard, but also including some black and white paper. By default, all cameras properly *meter* and *expose* a medium-toned subject, which forces proper brightness for both white and black subjects that also appear in the frame! In the above *histogram* (a chart that tabulates pixel brightness), the cardboard peaks in the center, the white paper peaks in the highlights area to the right, and the small strip of black paper appears as bumps in the shadows area to the left.

White Balance determines color balance

Why does the camera make the cardboard appear accurately reddish brown in *Example A6*, but neutrally grayish in *Example A3*? **Answer:** The camera's *Auto White Balance (AWB)* adjusts color well when the framed area includes some neutral tones—white or gray as perceived by your eyes, such as the white sheet of paper in *Example A6*. But without a neutral color framed in *Example A3*, the camera's AWB makes the tan cardboard and light-tan carpet both appear wrongly neutral (by darkening reds and brightening blues). Proper color balance is shown in *Examples A6* and *A7*. Half-pressing and holding the shutter release button (or using an *Exposure Lock* button) also locks white balance and allows you to recompose before capturing the image with a full press. Read more about *White Balance* on pages 58-59.

Compensate exposure

Half-press and hold the *shutter release button* to lock exposure (or use an *Exposure Lock* button) on an area that averages to medium brightness (such as a *middle gray card*) in the same light as your main subject, then recompose and fully press. This more accurately renders subjects of all brightness levels, including shadows, midtones, and highlights. But take care not to *overexpose* highlights. Realize that cameras cannot record the full *dynamic range* from bright to dark that your eyes can see. For greatest control, try *Manual* exposure mode and study the camera's *histogram* and *highlight warning screen* for each image. Read more on page 56.



Example A7:

Compose as shown where black, midtone, and white subjects comprise equal areas of the image. The camera's light meter automatically calculates an average exposure with a centered histogram—just right for the appearance of these particular subjects, not too light and not too dark overall. See *Compensate exposure* on this page.

Improve light metering

Choose one of your camera's light metering methods depending upon the subject:

1. **Matrix/Evaluative** is the default for most cameras and measures light from the whole frame, often working best for **flash** photography. Beware of overexposing brightly toned portions of a predominantly dark or medium toned picture.
2. **Center Weighted** measures light from just the central area of the frame, which is the most predictable method if you get in the habit of prefocusing and exposure-locking with a half-press of the shutter release button, as I usually do.
3. **Spot** measures light from a tiny area in the middle of the frame, which usually throws off the exposure for the rest of the image unless you are very experienced.

The **auto exposure (AE)** meters in all cameras overly darken white snow to look like midtone gray, and overly brighten black subjects to appear as midtone gray (as shown in previous *Examples A3-A7*). Why? Because cameras mindlessly average whatever you frame in the metering area towards *midtone brightness* (halfway between white and black). To *compensate exposure* more reliably, set or lock exposure on an area of the subject which averages to medium tone or middle gray (or has an equal proportion of dark and light tones), then recompose and record the image.

Improve focus—active or still

Set focus mode differently for active and still subjects. (Review *focus lock/focus mode* in your *Camera User's Manual Index*: on *Canon PowerShot G9*, press *MENU* button to change focus settings.)

- For the most predictable control, set your **autofocus/AF mode** to **Single Servo** on *Canon* (or *AF-S* on *Nikon DSLRs*), which stays locked at the desired distance when you half-press and hold the shutter release button. Landscape photographers rarely use *Canon AI Servo* or *AI Focus* (or *Continuous-Servo AF* or *Focus Tracking* in *Nikon* terms), which automatically tracks fast moving subjects (such as children, animals, or sports) and uses *release priority* for fast click but focuses less reliably on where you aim the camera.
- For the most reliable focus, set your **AF frame/area** for **single point in center**. For landscapes and fixed subjects, don't use *multi-point AI Focus (Artificial Intelligence)* or *FlexiZone* or *Face Detect*, which often focus on the closest or unintended subject. Only use these modes for rapid photographs of people or action when you have no time to prefocus. Terminology may differ between camera brands.
- Most compact cameras lock both exposure and focus simultaneously when you **half press the shutter release button**. Advanced cameras offer a separate *Exposure Lock* button to helpfully grab the exposure from a framed area different from where you lock focus. Button behavior differs between brands—check your *User's Manual*.

Troubleshooting

Do your camera menus or options seem to shift and change? An accidental bump in or out of a camera bag can easily rotate



the camera's *mode dial* to an unintended setting. Be aware that each setting on the mode dial can have a different set of options which are supported for focus, exposure, shutter speed, metering, release, and flash. *Multiselector buttons* are easily bumped accidentally, moving *Single Point* autofocus off-center such as on *Nikon D40X*, *D60*, and *D5000 DSLR* cameras.



Depth of focus



aperture **f/2.8** at 1/320th second

aperture **f/8** at 1/40th second

Example A8: Aperture adjusts *depth of focus* (or *depth of field*): Looking through a pinhole puts more in focus than seen by your eye pupil alone. To improve sharpness from front to back, use a smaller opening in your camera's lens diaphragm by **increasing f/number** for *aperture*, and by **focusing at one third of the distance between subjects**.

Landscape Scene Mode increases depth of focus in bright light but doesn't in dim light. More reliably, use **Aperture-preferred (Av or A)** or **Manual** exposure mode. In the above left image, most of the keyboard is blurred when using a wide open aperture of **f/2.8** on a *Canon PowerShot G9* camera. The top right image sharpens more foreground *and* background by using an aperture of **f/8**. To match the depth of field of aperture **f/8** using a 7.4mm lens on the *Canon G9 compact camera*, the much larger sensor of a *Nikon D60 DSLR camera* would need a 24mm lens set to **f/25**, requiring 3.5 times higher ISO to match shutter speeds. (Both lenses have the angle of view of a 35mm lens in terms of 35mm film.) Read about **aperture**, **depth of focus (DOF)**, and **f/8 is great** in *Glossary* pages 184-185.



*Below: Avalanche Lilies bloom in late July at Mount Rainier National Park, Washington. Photographed with a Nikon D60 DSLR camera using ISO 400, lens 18mm (27mm equivalent in terms of 35mm film), **aperture f/16**, and shutter speed 1/250th second. (2009)*



Chapter 3. Lightweight Cameras

A. Top Three Cameras for Light Travel

B. Light Travel Camera Table

C. Big Prints from Small Cameras

D. To Full Frame and Beyond

E. The Ideal Light Travel Camera

F. Tom's Gear

We learned in *Chapter 1* that you don't need a big or expensive camera to capture a touching or striking image. **The best camera is the one that you have with you.** Small, high-quality cameras lighten your load around town or on hiking, backpacking, or international trips.

This chapter compares details of some classic cameras which record excellent image quality in a relatively lightweight body at a reasonable price value.

If you already prefer a different camera for your specific needs, that's fine! Good photographers create image quality mostly from their own skills, not from specific camera features, size, or resolution.



Carol Dempsey photographed this sculpture at Bangkok's Grand Palace using the shirt-pocket-sized *Canon PowerShot SD700 IS* camera (only 7 ounces). Visitors who see a 16-inch print of this in our home gallery cannot distinguish a quality difference from nearby prints shot on a much bulkier DSLR camera. (2007)

Canon soon upgraded the *SD700 IS* to *SD850 IS* and its wide-angle sibling *SD870 IS*.

As of 2010, you can record better quality images with the equally tiny ***Canon PowerShot S90*** subcompact (one of the *Top Three Cameras for Light Travel*). Later models will quickly surpass these.



A Glacier Lily flower blooms in the Cascades Range of Washington. (2006)

Subcompact digital cameras such as the Canon PowerShot SD700 IS (new in 2006) can capture impressive macro close focus images. See Chapter 1: Magnify your world on pages 46-47.

A. Top Three Cameras for Light Travel

After lugging cameras around the world for thirty years, I suggest the following high quality, lightweight cameras that can comfortably capture magical light in travel afar:

1. **Panasonic Lumix DMC-G2 or GH1 mirrorless camera**

32 ounces with 14-140mm zoom lens (equivalent to **28-280mm** lens on 35mm film cameras). Add 45-200mm telephoto lens for wildlife photos (equivalent to a **90-400mm** lens). Equals DSLR quality up to ISO 800. Takes both high quality still images and autofocus HD movies (with plug for *Dolby®* stereo sound). Worthy rivals: **Samsung NX10** & **Olympus PEN E-PL1**.

2. **Canon PowerShot G11, G10, or G9 compact camera**

13.4 ounces with 5x zoom (6x in **G9**) and high quality, fitting a large shirt pocket. On the **Canon G9** and **G10**, dial the ISO to no more than 400 because images shot at ISO 800+ record too much *noise*. Upgrade to **G11** to reduce noise by two ISO stops, articulate the LCD, and synchronize flash to 1/2000th second (to fill shadows in sunlight without overexposure).

3. **Canon PowerShot S90 subcompact camera**

7.2-ounces with fast f/2.0-4.9 **28-105mm** equivalent 3.8x zoom. The **Canon S90** shrinks its sibling **G11** to the size of a deck of playing cards and captures images almost as sharp.

As a backup for your main camera (such as #1 above), bring one of the smaller pocket cameras (#2 or #3). Successor models will undoubtedly improve capabilities. Check for updates at **PhotoSeek.com** online.

Top picks!

B. Light Travel Camera Table

Top pick! indicates Tom's vote for top three cameras for lightweight travel and best image quality for their size.

Camera grouped in color shade by similar image quality	Advantages (Disadvantages)	Weight of Camera with Lens and battery	Lens focal length range	Lens focal length equivalent in 35mm film terms	Closest focus distance (macro coverage)	Image size in megapixels	Sensor size
1. Panasonic Lumix DMC-G2, GH1, or G10 Top pick!	G2 & GH1 have high-res EVF/LVF and articulate a 3" LCD. Fast focus, even in Live View. HD autofocus 720p movies, Dolby® stereo sound. Rivals image quality of Canon 450D/XSi and Nikon D5000 up to ISO 800.	32 ounces / 904 grams with 14-140mm lens. 15 ounce body.	LUMIX G VARIO HD 14-140mm f/4.0-5.8 ASPHERICAL MEGA OIS lens, Optical Image Stabilization of 2-3 stops. 10x zoom.	28-280mm equiv. lens For wildlife: 90-400mm equiv. lens	30 cm (98 x 73 mm coverage, or 3.86 x 2.87 inches)	12 mp	17.3 x 13.0 mm 4/3 type MOS sensor. JPEG & RAW
2. Canon EOS 550D / Rebel T2i DSLR	3" LCD with Live View. HD movies 1080p (manual focus) @30/25/24 fps & stereo sound plug. (But fixed LCD, bulky body, and slow focus in Live View.) Better ISO ≥1600 than Canon EOS 500D/Rebel T1i.	40 ounces / 1134 grams with 18-200mm lens. 19 ounce body.	Canon 18-200mm IS f/3.5-5.6 EF-S lens (21 ounces), image stabilized up to 4 stops. 11x zoom.	29-320mm equiv. lens and many more	34.5 cm through 11x (73 x 49 mm coverage) but not sharp in center	18 mp	22.3 x 14.9 mm CMOS APS-C sensor. JPEG & 14 bit RAW
3. Nikon D5000 DSLR Tom's travel camera	Articulated 2.7" Live View LCD. HD movies 720p (but manual focus & mono sound). Better highlight, high ISO, and RAW dynamic range than Canon EOS 500D/T1i. (But bulky body, and very slow focus in Live View.)	41 ounces / 1163 grams with 18-200mm lens. 21 ounce body.	Nikkor 18-200mm VR II f/3.5-5.6G DX AF-S IF ED lens, image stabilized up to 4 stops 11x zoom.	27-300mm equiv. lens and many more	46 cm through 11x (93 x 62 mm coverage at 200mm, but corners soft even at f/11)	12 mp	23.7 x 15.6 mm CCD APS-C sensor. JPEG & 12 bit RAW
4. Canon PowerShot G11, G10, G9 Top pick!	Great image quality from a 13-ounce camera, with RAW. G11 has flip-out LCD & 1-2 stops ISO lower noise versus G9, G10. Movies 640x480 with mono sound. (Cheaper Canon A650 IS has flip-out LCD; no RAW.)	13.4 ounces / 380 grams, compact	G11, G10: 5x zoom lens, IS image stabilized 1-4 stops. 6.1-30.5mm f/2.8-4.5.	G10, G11: 5x zoom 28-140mm equiv. lens IS f/2.8-4.5 G9: 6x zoom 35-210mm equiv. lens	1 cm (17 x 22 mm coverage) at wide angle, with great depth of field	G11: 10 mp G10: 14.7 mp G9: 12 mp	7.6 x 5.7 mm CCD 1/1.7" type sensor. JPEG & RAW
5. Canon PowerShot S90 Top pick!	Canon S90 has the inner workings and manual controls of Canon G11 in half the size. Movies 640x480. (Mono sound, no viewfinder.)	7.2 ounces / 205 grams, subcompact	3.8x zoom lens, IS image stabilized. 6-22.5mm f/2.0-4.9	28-105mm equiv. lens	5 cm (65 x 49 mm coverage) at wide, with great depth of field	10 mp	1/1.7" type sensor JPEG & RAW
6. Fujifilm Finepix F200EXR or F100fd	Fujifilm F200EXR and F100fd: JPEG sharper & less noisy Canon G9 or G10. Takes 640x480 movies (with mono sound). Wide dynamic range (mitigates lack of RAW file support).	7.4 ounces / 210 grams, subcompact	5x zoom lens, image stabilized 1-2 stops. 6.4-32mm f/3.3-5.1	28-140mm equiv. lens, best quality landscape camera ≤ 8 ounces	5 cm (58 x 43 mm coverage) at wide angle, with great depth of field	12 mp	1/1.6" Fujifilm Super CCD HR VII sensor. JPEG only

Best quality images from the smallest camera

Compare the top pick **Canon PowerShot S90** to:

- **Samsung EX1/TL500** (2010) has brightest 24-72mm f/1.8-2.4 lens, flip out 3" AMOLED display, 1/1.7" CCD sensor, RAW, *but heavier, pricier, short 3x zoom.*
- **Fujifilm Finepix F200EXR** (2009) has longer 5x zoom *but lens 1.5 stops slower at wide and no RAW.*
- **Panasonic Lumix LX3** (2008) has 1/1.6" sensor and bright f/2.0-2.8 lens *but only 2.5x zoom 24-60mm.*
- Good compact travel superzooms **Casio Exilim FH100**, **Samsung HZ35W**, & bargain **Kodak EasyShare Z950** require brighter light and capture fuzzier resolution.

Top pick compact **Panasonic G Series** cameras

- have excellent mirrorless design and sharp interchangeable lenses, less bulky than DSLR
- have *Four Thirds* inch size sensor which equals APS-C up to ISO 800 *but is noisier at ISO ≥1600*
- autofocus in digital live view faster than a DSLR, *but slower than a DSLR using its optical viewfinder*
- outshine worthy **Olympus PEN E-PL1** (14-150mm lens, 2010) with better OIS, image auto-rotation, & better menus *but add 9 ounces & noise at ISO 1600+*
- beat **Olympus E-620 & E-520**, and **Fujifilm S100FS**

Promising mirrorless cameras with APS-C sensor

1. **Samsung NX10** (new in 2010) has good mirrorless APS-C design, bright AMOLED display, less bulk than DSLR. Rivals **Panasonic G Series** & costs less.
2. **Sony NEX-5/NEX-3** (2010) takes top images with value-priced, tiny, lightest-weight (10 ounce), mirrorless APS-C body *but has poor menus, buried manual controls, and can't use viewfinder with flash.*

Best travel DSLR cameras with APS-C sensor

1. **Canon EOS 550D/Rebel T2i** (www.usa.canon.com)
 - beats **Nikon D5000 DSLR** with sharper images, better movies, sharper LCD, one stop less noise at ISO ≥1600, and faster live view focus, *but the body costs more and doesn't flip out the LCD*
2. **Nikon D5000** (www.NikonUSA.com)
 - beats the mirrorless **Panasonic G2/G10/GH1** with two stops ISO low-noise advantage at ISO 1600+, one stop better VR image stabilization, and quicker *optical viewfinder* autofocusing *but autofocuses live view LCD painfully slower*
 - captures better highlights, high ISO, and RAW dynamic range than **Canon EOS 500D/T1i DSLR**
 - weighs 12 ounces less than the pricier **Nikon D300** and records similar image quality
 - retains most features of **Nikon D90** (remote flash & GPS options), lowers cost, subtracts 3 ounces, and flips out a vari-angle LCD

The **Tamron AF 18-270mm f/3.5-6.3 Di II VC LD Aspherical IF MACRO** lens can substitute as a cheaper travel lens for many DSLR cameras. But this 15x zoom autofocuses slower and less reliably compared to superior **18-200mm Nikon VR** and **Canon IS** zoom lenses, which better track rapidly moving subjects. All three *superzoom* lenses capture resolution 10 to 25% fuzzier than a *fast f/2.8* pro lens, but weigh less, zoom across a wider range, save money, and stabilize images.

Stabilize handheld shots

Do yourself a favor and get a higher-end camera/lens introduced in 2008 or later with good *optical image stabilization*, which supports sharper hand-held shots in much dimmer light when using slow shutter speeds or long telephoto lenses. Image stabilization can let you hand hold the camera for shutter speeds 1 to 4 stops slower (2 to 16 times longer), depending on the camera model and lens. Mounting a camera on a tripod usually records sharper images, but hand holding a camera using image stabilization increases your creative fun and freedom.

Each brand labels *optical image stabilization* differently:

- **Canon IS** = *Image Stabilization*
- **Nikon/Nikkor VR** = *Vibration Reduction*
- **Panasonic O.I.S.** = *Optical Image Stabilization*
- **Tamron VC** = *Vibration Compensation*
- **Sigma OS** = *Optical Stabilization*



Unleash your camera from a tripod and release your inner creativity. Use image stabilization along with higher ISO to reduce blurring caused by hand-held shake. But beware of extra image noise at ISO settings above 400 on compact cameras and above 1600 on DSLRs.

With optical stabilization turned on, you can hand hold the following camera zoom lens settings as slow as the shown *shutter speed* if you take extra shots for insurance:

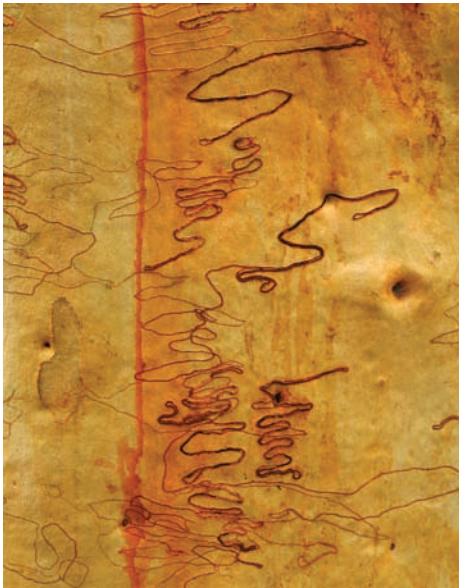
- **Canon PowerShot G11/G10** with 28-140mm zoom (equivalent in terms of 35mm film) *IS Continuous* can be steadily hand held as slow as *1/4th second* shutter speed, even at 140mm.
- **Nikkor 18-200mm VR II f/3.5-5.6G DX AF-S IF ED** lens for DSLR: hand hold as slow as *1/6th second* shutter speed at 18mm (27mm equivalent in terms of 35mm film) and *1/25th second* at 200mm (300mm equivalent).
- At shutter speeds slower than shown, use a tripod to steady the camera to prevent hand-held blurring of images.

Part II: Where to Seek the Light

- *Chapter 4: Exciting Destinations*
- *Chapter 5: Nature Worship*
- *Chapter 6: Natural Patterns*



Annapurna South (left), also known as Annapurna Dakshin or Moditse, rises to 23,684 feet/7219 meters elevation. Prayer flags express compassion at a monument to fallen climbers, at Annapurna South Base Camp (ABC at 13,550 feet/4130 meters elevation), in Nepal. Annapurna is Sanskrit for “Goddess of the Harvests.” Three images were stitched to make this sunset panorama.



For the viewer, photography is vicarious travel through time and place.

A Squiggly Bark Gum (eucalyptus tree) is marked by a worm which squirms under the bark. Ku-Ring-Gai Chase National Park, near Sydney, Australia. See Chapter 6 and Index for more natural patterns. (2004)



Wind blows prayer flags into an arch which frames Annapurna I, the world's 10th highest peak (26,545 feet/8091 meters, which appears shorter than the peak on the previous page only due to perspective). (2007)

Chapter 4. Exciting Destinations



Blue-footed Boobies do a sky pointing mating dance on the Galápagos Islands, Ecuador. Recorded with a Nikon D60 DSLR camera using a Nikkor 70-300mm VR f/4.5-5.6 lens at focal length 185mm, ISO 800, aperture f/9, and shutter speed 1/160th second. (2009)

Currently, my favorite places for outdoor photography and recreation are:

- ***New Zealand and Australia*** pages 80-93
- ***Nepal*** 72-73, 94-103
- ***The Alps: Switzerland & France*** 104-109
- ***South America: Ecuador, Peru, Chile, Argentina. Antarctica.*** 110-133
- ***Western Canada*** 134-139
- ***Western USA*** 140-161

See the *Index* to find images throughout the book for each country or state.

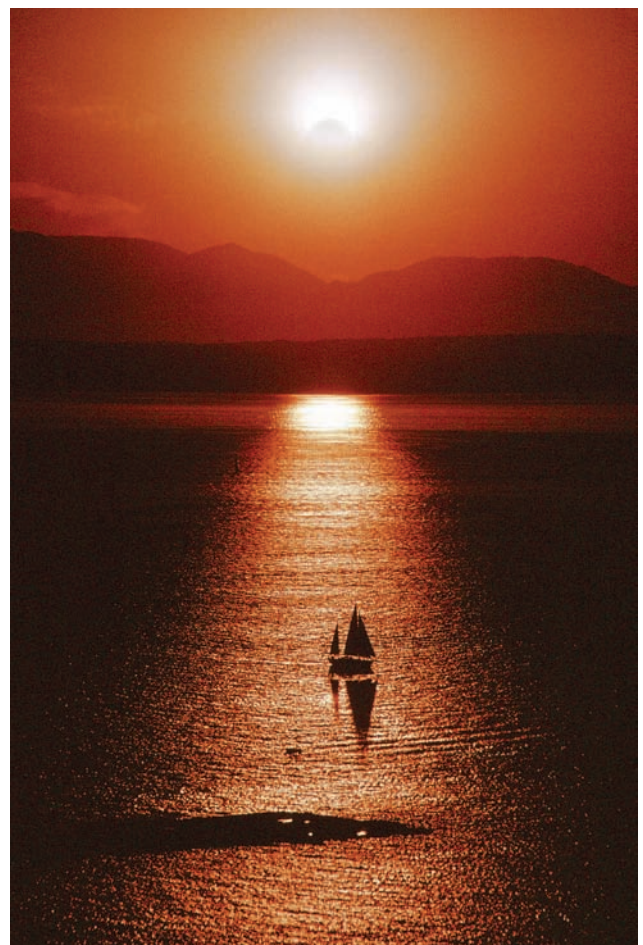
This chapter may inspire your own unique adventures. Plan a trip or see more images on my nature travel photography website:

www.PhotoSeek.com



Above: Trekkers cross the outlet stream of Lake Carhuacocha (13,600 feet/4145 meters elevation) in the Cordillera Huayhuash, Peru. Photographed on Fujichrome Velvia 50 color slide film using a Nikon N70 SLR camera. (2003)

Right: A partial solar eclipse over Puget Sound, Seattle, Washington on July 11. Photographed on Kodachrome 64 color slide film using an Olympus OM-1N SLR camera. (1991)



The Romance of Difference

My home state of Washington packs incredible scenic variety into a small area, one of the most rewarding destinations on earth. Yet I hunger for experiences beyond my familiar home horizon.

Curiosity drives creative energy. Familiar surroundings are comfortably reassuring, but can eventually dull the senses. Humans naturally seek novelty and contrast. The joy of travel lies in the romance of difference.

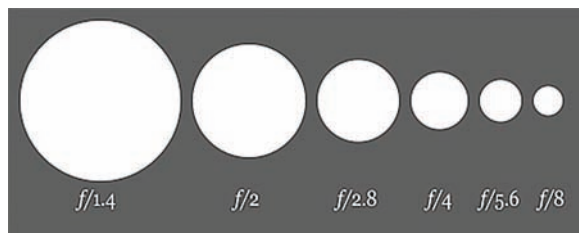
Glossary

Camera Terms Explained

Below, words in **bold** are defined as glossary entries. Items in *italics* indicate other common photographic jargon, brands of camera gear, websites, and book sections.

Adobe Lightroom

a computer software program designed by Adobe Systems (www.adobe.com) specially for photographers to elegantly and quickly organize, edit, and output images. **Adobe Lightroom** cut my workflow time in half compared to using *Adobe Photoshop with Bridge*, or *Canon Zoombrowser*. The upgrade from version 1.4 to 2.x added important *Graduated Filter*, *Adjustment Brush* tools and a quicker interface to *Adobe Photoshop CS3/CS4* for features such as *Photomerge* (for stitching *panoramas*, described on pages 44-45). **Lightroom** smartly stores its *non-destructive* editing commands and labels in a powerful database (and in *XMP sidecar files* for **RAW**). **Lightroom** gives photographers total control over adjusting **exposure**, tone, **color**, **highlight** recovery, **shadow** fill, contrast curve, black and white clipping points, sharpness, **noise** reduction, lens chromatic aberrations (red, blue, or purple *fringing*), lens vignette correction, and more. **Lightroom** version 3 imports movies and improves copyright watermarking of export files.



aperture; aperture-preferred / A / Av

The **aperture** is the hole or pupil formed by the *lens diaphragm* (overlapping blades) in a camera. Each **relative aperture** size is expressed as an **f/number**—the ratio of the lens **focal length** to the



The Glossary gives you a leg up on technical terms. A lava lizard perches on a Galápagos Marine Iguana, Ecuador. (2009)

pupil diameter. For example, an **aperture** of f/8 on an 18mm **focal length** lens makes the **aperture** diameter 2.25 millimeters (or 18mm divided by 8).

A **zoom lens** labelled *F3.5-5.6* or *1:3.5-5.6* means that as you zoom, f/3.5 is the widest (or brightest) **aperture** at *wide angle* and f/5.6 is the biggest opening at the *telephoto* end. **DSLR** and advanced **compact cameras** have an **Aperture-preferred** (or **Aperture-priority/A/Av**) auto **exposure** mode that lets you set the opening size (**f-stop**) while the camera meter automatically decides the **shutter speed** (at a given **ISO** setting).

color theory

See *Color Theory* on page 34 in *Chapter 1*.

compact camera, or point-and-shoot camera

a consumer camera designed for ease of use by a mass market, with a body smaller than a **DSLR** camera. In the hands of skillful photographers, *advanced compact cameras* (using up to **ISO** 200 or 400) can record image quality like low-end **DSLR** cameras. *Subcompact* cameras weigh up to 8 ounces and fit a shirt pocket.

depth of field, depth of focus, or DOF

the range of distance that remains *sharp* in front of and in back of where you *locked focus*. Foreground and background that are outside of the **depth of field** will appear *out of focus*, as in the keyboard example on page 53. Shallow **DOF**—where background and/or foreground blurs a short distance from the focus point—is most noticeable in **macro** close focus and *telephoto* photography. Increase **depth of focus** and sharpness from front to back by using a higher **f/number** (smaller pupil) for the **aperture** and by *locking focus one third of the distance between closest and furthest subjects*. Landscape images often employ deeper **DOF** than *portraits*. In portraiture, sharper emphasis can be drawn to the subject by *throwing the background out of focus*—by reducing the **f/number** value for the **aperture** (making a larger pupil size)—as in the Red-footed Booby photo on page 116. Focus on the eye of the person or animal being portrayed and little else need be sharp.

If you keep the **zoom lens angle of view** and **aperture** constant, then moving your camera closer to a subject and refocusing will enlarge the subject in the frame, reduce **depth of field**, and blur background (as for the second iguana on page 31). Moving away and then refocusing on the subject will increase **depth of field** and shrink the subject in the frame. If you keep the **aperture** constant and don't move the camera, then an 18mm lens shrinks the subject relative to the viewing frame and has a greater **depth of field** than a longer lens, such as 120mm telephoto.

For a given camera using a fixed **aperture**, wherever you stand or **zoom** (wide or telephoto), the **depth of field** will remain the same as long as you keep the focused subject appearing the same size in the frame (as in the tortoise example on page 41).

In bright light, many **compact cameras** let you conveniently record photos with closer, deeper focus than a camera with a larger sensor (unless you take the time to mount a special **macro** lens or diopter filter on a **DSLR** camera). For example, the *Canon PowerShot G9* compact camera can sharply magnify small objects by focusing to 1 cm (framing an area of 22 x 17 mm), which is much closer than the 50 cm closest focus on *Nikon's VR DX 18-200mm* travel lens (giving 93 x 62 mm macro coverage). To match the depth of field of the *Canon G9* with **aperture** f/8 zoomed to widest angle 7.4mm, the *Nikon D60 DSLR* camera (mounting *Nikon DX* format lenses for APS-C **sensor**) would need a 24mm lens set to f/25, and 3.5 **stops** higher **ISO** to match the **shutter speed**. The **focal length** in this example uses an equivalent to a 35mm in terms of 35mm **film**.

Depth of field is determined by lens **aperture**, **focal length** (or *optical angle of view*), distance to the focus point, and size of **sensor** or **film**. Look up the **depth of field** and *hyperfocal distance* for most cameras on

- www.dofmaster.com/dofjs.html
- www.dpreview.com/learn/?/Glossary

f/8 is great

To optimize sharpness, use an **aperture stop** of f/8 on **DSLR** cameras, or a middle **aperture** on **compact cameras**. Also use a **shutter speed** that is fast enough (with **image stabilization** turned on) to counteract blurring due to long telephoto or hand-held shake.

Most lenses capture sharpest images when using an **aperture** 1 to 2 **stops down** from the widest, brightest opening. The **depth of focus** increases with narrower **apertures** (higher **f/numbers**) but is counteracted by light diffraction through the smaller lens pupil, which softens or blurs *resolution*. **Zoom** lenses can be 5 to 25% blurrier than *prime lenses*.

To research how to optimize sharpness for a given lens, check camera reviews:

- www.dpreview.com
- www.popphoto.com
- www.photozone.de

For example, using *Nikon's* versatile *Nikkor 18-200mm VR II f/3.5-5.6G DX AF-S IF ED* lens, you can sharpen images from 70mm to 200mm by using **apertures** between f/8 and f/16 (usually *f/8 is great*). This lens transmits images worst (blurriest) at 135mm, where as a workaround you can use an aperture between f/11 and f/16 for results much sharper than the other pupil sizes.

On a **DSLR** camera, f/8 often nicely balances **depth of focus** with sufficient **shutter speed** while avoiding the fuzzier light which would diffract through a smaller opening such as f/22.

If your goal is to maximize **depth of field** while avoiding the softening effect of diffraction through the tiniest lens pupil, **f/16** is usually sharper than higher **f/numbers** for a **DSLR** camera lens (or use **f/8** for **compact cameras** in bright light). f/16 requires four times brighter light intensity (two full **stops**) compared to f/8 (for a given camera, **shutter speed**, and **ISO**).

DSLR, SLR cameras

an acronym for “**D**igital **S**ingle **L**ens **R**eflex,” a style of **camera** that allows you to see from the **optical viewfinder** through the lens via a mirror. (*Reflex* means reflection.) When you press the **shutter release button**, the mirror must flip up, temporarily

blocking the viewfinder in order to expose the digital **sensor** to light shining through the lens. A **DSLR** camera is bigger and heavier than a **compact** or **point-and-shoot camera**. **Digital SLR (DSLR)** style cameras fit a digital **sensor** in place of the **film** found in older **SLR** cameras. Prior to the use of a mirror in **DSLR** and **SLR** designs, cameras with viewfinders had two optical light paths: one light path through the lens to the **film**, and another path through the viewfinder to the eye, either positioned above the lens (a *twin-lens reflex* or *TLR*) or to the side (a *rangefinder* camera).

dynamic range

the ratio of the brightest to darkest light value recorded by a camera or displayed by a device. “2048 to 1” means the brightest **highlight** is 2048 times brighter than the darkest **shadow**. 2048 is a range of 11 **stops**, 11 doublings, or 2 to the 11th power. To increase **dynamic range**, see **RAW** in *Glossary*, **HDR** on page 45, and **Dynamize JPEG** on page 62.

RAW files can record an extra one to three **stops** of **dynamic range** from a scene compared to **JPEG** files, using **DSLR** cameras with APS-C size **sensors** (see box at right). But on **compact cameras** (which have smaller **sensors**), **RAW** files record only about half of a **stop** of extra **dynamic range** compared to **JPEG**.

exposure

the amount of light received by the **sensor** or **film**, as determined by **aperture** and **shutter speed**. The resulting image brightness and **noise** depends on the **ISO** setting of the **sensor** or **film**. The **shutter speed** determines the amount of *motion blur*, and the **aperture** determines the **depth of field**. *Overexposure* can lose **highlight** detail by *clipping* data at the *white point* of the **histogram**. *Underexposure* can lose **shadow** detail by clipping data at the *black point* and can create extra **noise** if you brighten on the computer instead of shooting with *proper exposure*. Artistic judgment determines *proper exposure*. When shooting **RAW** or **JPEG**, to preserve the most detail (from **shadows** to **midtones** to **highlights**), shoot **histograms** to

Below right: Shutter speed and aperture are interlinked. For example, in Aperture-preferred (Av or A) auto exposure mode, each increase of the f/number in the table (a full aperture stop) opens the shutter twice as long in order to let in the same amount of light. All columns transmit the same exposure value, or EV.

f/number	f/1.4	f/2.0	f/2.8	f/4	f/5.6	f/8	f/11	f/16	f/22	f/32
shutter speed seconds	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4

Dynamic range—the eyes have it

Human eyes can see a much wider **dynamic range** of light values (from brightest to darkest) compared to the range captured by cameras or portrayed by prints or display devices:

- 10 to 24 **stops** (16 million to 1) of dynamic range can be seen by human eyes when the pupil dilates or contracts like a camera’s **aperture** (or 10 to 14 stops with a fixed pupil).
- 12 stops of dynamic range are recorded in **RAW** files (or 9 stops in **JPEG** files) of *Nikon D5000* and *Canon EOS 550D/Rebel T2i DSLR* cameras (see www.dpreview.com).
- Up to 11 stops of dynamic range are recorded in **RAW** files of *Canon EOS 500D* (2009) and *EOS 40D* (2007) **DSLR** cameras, about 2000:1 ratio of brightest to darkest light. (9 stops **JPEG**.) **RAW** files from the *Canon EOS 450D/XSi* (2008) and *Nikon D60* record about 10 stops (**JPEG** 9 stops).
- 10 stops of dynamic range can be displayed by the *Canon Realis SX50 Multimedia Projector* with 1000:1 contrast ratio.
- 10 stops can be displayed by *Dell UltraSharp 2407WFP-HC 24-inch Widescreen Flat Panel LCD Computer Monitor* (2008) with 1000:1 contrast ratio and 1920x1200 **pixel** resolution.
- 8 stops are recorded in **RAW** files of a *Canon PowerShot Pro1 compact camera* (2004) with 2/3” type (8.8 x 6.6 mm) **sensor**.
- 6 to 7 stops of dynamic range can be recorded by **JPEG** files from the average compact digital camera made in 2007.
- 7 stops of dynamic range can be captured by *Kodak Gold 200 ASA* negative print **film**.
- 5 stops of range can be captured by *Fujichrome Velvia 50* color slide **film**.
- 4 to 7 stops of dynamic range can be displayed in photographs printed on paper.

far right without *clipping* (piling up) **highlights** at the white point, then adjust final appearance later on the computer. Or if you prefer to capture **JPEG** without later editing, expose more carefully at shooting time.

EVF, Electronic Viewfinder, or LVF

an acronym for **Electronic Viewfinder**, also known as a **Live View Finder**, which is the miniaturized digital image display seen through an eye cup on some digital cameras. An **EVF** or **LVF** replaces an *optical viewfinder* (eliminating the need for the bulky mirror apparatus design of **DSLR** cameras). A digital

EVF or **LVF** helpfully shows the following: the live digital image recorded by the **sensor**, current camera settings, and in some models, a live **histogram** of light values. Note that a **DSLR optical viewfinder** consumes less power and may focus more clearly and quickly than an **EVF/LVF**.

film, 35mm film=135 film format

35mm **film** was introduced in 1892 by William Dickson and Thomas Edison, using **film** stock supplied by George Eastman, with a standard image size of 24 mm by 36 mm. **Film** is a sheet of plastic coated with an emulsion of light-sensitive gelatin-bonded silver halide salts, with variable crystal sizes that determine sensitivity (**ISO**, formerly *ASA* and *DIN*), contrast, and resolution. Chemical *film developing* is required to make a visible photograph. The small, high-quality *Leica* camera, designed in 1913 and mass produced starting in 1925, helped popularize the 35mm size film for professional photography. In 1934, *Kodak* introduced the 35mm-wide *135 film* in a handy metal cartridge, which surpassed the popularity of the physically larger

medium format 120 film in the 1960s. *Large format film* is defined as 4 x 5 inches or larger.

f/number, f-number, F number, or f-stop

$$= (\text{lens focal length}) \div (\text{aperture diameter})$$

If the lens **focal length** is 16 times the **aperture** diameter, then the **f/number** is f/16. The following standard **full stop** f/numbers are listed from widest to narrowest **aperture** (left to right), each admitting half the light of the previous **full stop**:

f/1.4 2 2.8 4 5.6 8 11 16 22 32 45

When you **stop down** to narrow the **aperture**, you are changing to a higher value of the **f-stop** or **f/number**. Cameras with **Aperture-preferred** or *Manual* exposure modes can let you adjust aperture by half or one-third stop increments between the above full stop values.

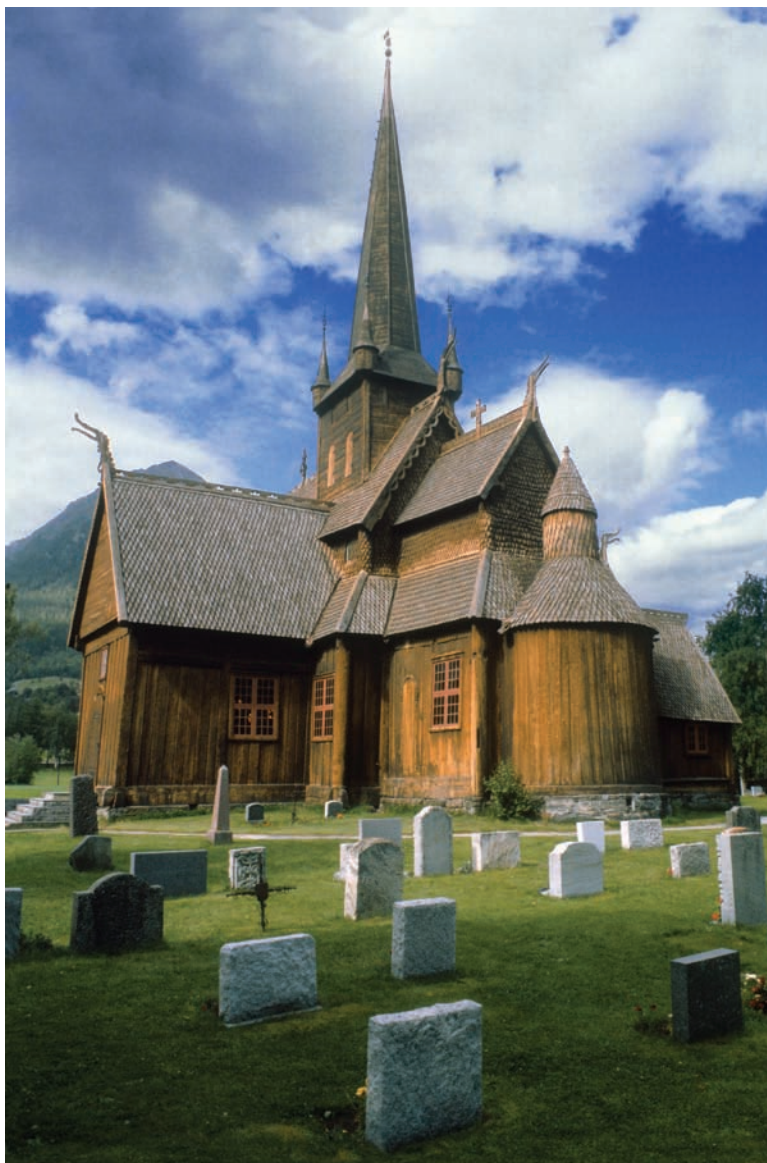
For a given camera, the brightest (widest) aperture of a *fast* lens such as f/2.8 has a larger diameter than that of a *slower* f/3.5 lens. *Faster* lenses gather more light and are usually larger, heavier, costlier, and can create better quality images than *slower* lenses. *Faster* and *slower* are terms reflecting the direct effect on **shutter speed**.

Most lenses are labeled on the barrel with their widest aperture. For example, *Nikon's 18-200mm VR zoom lens* marked "1:3.5-5.6" opens as brightly as f/3.5 at 18mm *wide angle* and f/5.6 at 200mm *telephoto*. The *Instruction Manual* says it can **stop down** to f/22 at *wide angle* and f/36 at *telephoto*.

Higher f/numbers decrease the **aperture** diameter (pupil) and admit less light while increasing depth of field. About two **stops down** from wide open is usually sharpest on typical modern lenses (thereby balancing the increased **depth of field** with the worsening diffraction of light through a smaller, darker opening).

On a given camera, a given f-stop transmits the same amount of light to the **sensor** no matter what lens you use. For example, the diameter of an f/5.6 pupil of a 200mm lens is 10 times larger than that of a 20mm lens, but both transmit the same amount of light to the sensor—at a given f-stop, a 20mm *wide-angle lens* gathers light from a wider area and stuffs it through a smaller hole than does a *telephoto lens*.

Each decreasing **full aperture stop** (measured by **f/number**) doubles the area of the pupil's circle. For each **full stop** change, the pupil's *diameter* (twice the radius size) changes by a factor of 1.414 (the square root of 2).



The Viking stave church at Lom, Norway was rebuilt in the year 1300. Photographed in 1981 on Kodak Ektachrome 200 color slide film.

focal length; and focal length multiplier or field of view crop factor

Focal length is the distance in millimeters (mm) from the optical center of the lens to the *focal point* located on the **sensor** or **film** when a subject at infinity is in focus. Lenses are defined by **focal length**, **zoom** range, brightest **aperture f/number**, closest focusing distance, and **macro** magnification. Good **zoom** lenses flexibly cover *wide* to *telephoto* angles of view, without the need for separate fixed-**focal-length** (*prime*) lenses.

The *equivalent focal length in terms of 35mm film* is the combination of camera lens and digital sensor size that captures the same *angle of view* (measured in *degrees of arc* diagonally in the frame, or sometimes horizontally) as does a 35mm **film** camera. On a 35mm film camera, 50mm is a *normal lens* with a 47° diagonal angle of view (roughly what humans perceive, about 40-60 degrees, not counting peripheral vision). With 35mm film, a 28mm lens is *wide-angle* and a 200mm lens is *telephoto*. Most **DSLR** and 35mm **film** cameras capture a width-to-height ratio of 3:2, while many **compact digital cameras** record an image with a 4:3 *aspect ratio*. For comparing cameras more accurately, check if your brand measures *35mm film equivalent angle of view* diagonally (most common) or horizontally.

A **focal length multiplier**, also known as **field of view crop factor** (such as 1.5 or 1.6 for **DSLR** cameras with APS-C size sensors), measures how many times smaller is the diagonal measurement of a **sensor** compared to the diagonal of a 35mm **film** frame. For example the *Nikon D5000, D80, D60, and D40/D40X DSLR* cameras have a 1.5 **field of view crop factor**, which makes the angle of view of the **sensor** through a 200mm lens to be the same as a 300mm lens recording onto 35mm **film**. (200mm multiplied by 1.5 equals 300mm.) Despite the sensor being 1.5 times smaller diagonally, these cameras can capture better quality images than

digitizing (scanning) 35mm film. This *Nikon* factor of 1.5 makes an 18mm **focal length** lens capture the angle of view of a 27mm *lens equivalent in terms of 35mm film cameras*. The *Canon Digital Rebel* series **DSLR** cameras all have a **field of view crop factor** of 1.6 (including models *EOS 300D, 350D/XT, 400D/XTi, 450D/XSi, 1000D/XS, 500D/T1i, 550D/T2i*) due to an APS-C **sensor** slightly smaller than *Nikon*'s.

gigabyte, gb

one billion (1,000,000,000) bytes in the context of disk or **memory card** storage capacity or data transmission. Exception: in the case of computer **RAM (Random Access Memory)**, **gigabyte** traditionally means 1,073,741,824 bytes (or 1024 to the third power).

highlights

the brightest tones in a photograph, as tabulated on the far right side of the **histogram**.

histogram

a useful chart (below left) which collates the gradations of pixel brightness of a digital image. An *image* is a spatial distribution of pixels, and its **histogram** tabulates pixel brightness frequency from dark to bright, from left to right. A camera's **histogram** sorts every pixel in an image into 256 bins of brightness value, and displays each bin count as a vertical bar. The 256 vertical bars meld into a spiky or bell-shaped curve. **Shadows** (darks and blacks) rise on the left, **midtones** pile up in the middle, and **highlights** (brightest pixels) accumulate on the right. Many cameras display a monochrome *Combined RGB histogram*. Advanced cameras show three histograms for the separate red, green, and blue *channels of primary color*. **Adobe Lightroom** helpfully shows six-color **histograms**. Learn more about **histograms** in *Chapter 2: Focus, Expose, Edit, Create*.

 To preserve the most detail, shoot **histograms** to far right, without piling up (clipping) **highlights** at the white point.

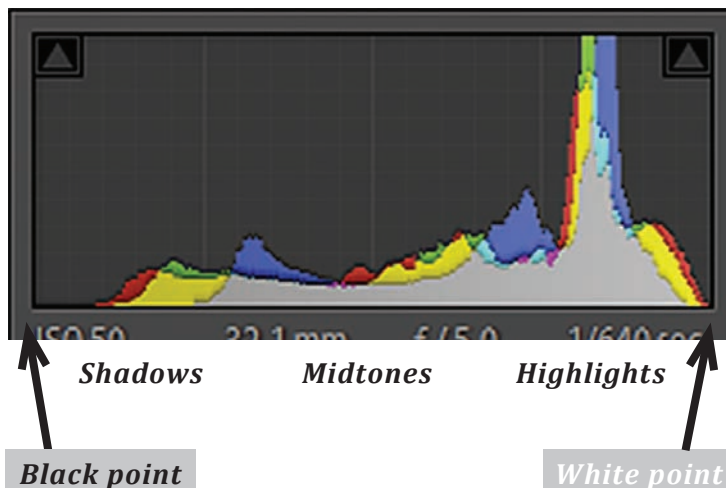


image stabilization: IS, VR, VC, OIS, OS

a desirable optical innovation to counteract the shake of hand-holding a camera, which can blur images when using a slow **shutter speed** and/or long telephoto lens. Turn off **IS** when using a *tripod*. Optical **image stabilization** can permit hand held shutter speeds 1 to 4 stops slower (2 to 16 times longer), depending on the camera model and lens. Each brand labels stabilization differently, as follows:

- Canon **IS, Image Stabilization**
- Nikon/Nikkor **VR, Vibration Reduction**
- Tamron **VC, Vibration Compensation**
- Panasonic **OIS, Optical Image Stabilizer**
- Sigma **OS, Optical Stabilization**
- Sony Alpha **Super SteadyShot CCD-shift** image stabilization in the camera body
- Pentax **body-based Shake Reduction**

ISO sensitivity rating (ASA & DIN for film)

can be set higher to shoot images in dimmer light without changing **shutter speed** or **aperture**, but at the cost of increased **noise** and contrast. **ISO** (formerly *ASA & DIN* for film) is a standard sensitivity to light defined for digital and **film** cameras by the *International Organization for Standardization (ISO)*. Most digital cameras have a lowest ISO setting of 50, 80, 100, or 200 and increase by steps:

ISO 100, 200, 400, 800, 1600, 3200...

Each doubling of **ISO** increases sensitivity by a **stop** of light, but can make the image **noisy** (grainy) at **ISO 800+** for **DSLR** cameras with APS-C size **sensors**. **Noise** is most noticeable in uniform areas such as **shadows** or blue skies at **ISO 1600** and higher. Compact cameras (having small **sensors** such as type *1/1.6"* or *1/2.5"*) usually record significant noise at **ISO 400** and higher, with images very blotchy at **ISO 1600** and higher. **DSLR** cameras with APS-C size **sensors** can record images using at least a 4 to 6 times higher **ISO** number (2 to 2.5 **stops** better sensitivity) for a given **noise** level compared to **compact cameras** with a *1/2.5 inch* type sensor.



Shoot with ISO 200 for bright sunny subjects. ISO 100 is a **stop** slower and helps reduce **noise** for many **compact cameras** but doesn't improve quality for **DSLR** cameras. For dim daylight conditions, increase ISO sensitivity to 400. In darker light, when you choose not to mount the camera on a tripod to steady the image, you may need

Metric conversions

1 meter (m) = 3.2808 feet = 39.37 inches (in)

1 meter = 100 centimeters = 1000 mm

1 centimeter (cm) = 0.3937 inches

1 millimeter (mm) = 0.1 centimeters

1 ounce (oz) = 28.35 grams (g)

to set the camera to higher ISO such as 800, 1600, or 3200. Beware of ISO 400-800 or higher on compact cameras and ISO 1600 or higher on DSLR cameras, where blotchy **noise** impacts the *maximum effective print size* (discussed on page 68). But if too slow of a **shutter speed** blurs the hand-held shot, and you are already using the lens' brightest **aperture**, then choosing a higher **ISO** may be the only choice (aside from underexposing) to invoke a faster **shutter speed** and reduce the risk of blurring due to hand-held-shake. If no *tripod* is available, try steadying the camera against a wall, surface, or tree.

For tripod mounted exposures longer than 5 seconds at night, use **ISO 200** (and no higher), in order to avoid *random hotspots* created by **sensor** imperfections on

all cameras including **DSLR** models. A black shot with lens cap on can be used to digitally subtract *hotspots* using a *Layer* in *Photoshop* with *Blend Mode=Difference*. The *Noise Reduction* feature in some cameras can automatically do the same thing, but may smear image appearance—test to find out.



Left: The sun sets near winter solstice at Three Arch Rocks, Oceanside, Oregon. (2006)



El Capitan (9846 feet/3001 meters) is a granite tower of the 50-million-year-old Sawtooth batholith, in Sawtooth Wilderness Area, Idaho. (2007)

JPEG or .JPG file format

the default, compressed image file format most commonly recorded by digital cameras. Be sure to change your camera's default recording quality to the biggest and finest **JPEG** quality (*Low Compression*, which is virtually as good as an 8-bit **TIFF** file). Reliable, fast **memory cards** can inexpensively handle the extra volume. **JPEG** is compatible with all web browsers, image viewers, and editing software, and allows photographs to be compressed by a factor 10 to 20 with little loss in image quality compared to the camera's original **RAW** version. However if you later edit image tones, **RAW files** let you better optimize images. **JPEG** is an acronym for *Joint Photographic Experts Group*. See *Dynamize JPEG* on page 62 and **RAW** in *Glossary*.

How is a **JPEG** photograph recorded? The camera shapes the **RAW sensor** data into a medium *contrast curve*, gathers the **shadows**, **midtone**s, and **highlights** between calculated *black* and *white points* on the **histogram**, and writes the image to an 8-bit **JPEG** file with *lossy compression* on your **memory card**. By shooting **JPEG** files, you give up control of *RAW conversion* to the camera's defaults, which usually don't render the image as well as you could using a *RAW converter* program on a computer.

Each time you edit and resave a **JPEG** file on your computer, the *lossy JPEG compression* loses image quality. To uphold quality, always save your original/master **JPEG** image to a **TIFF (.TIF)** file before editing. Better yet, instead of creating an extra **.TIF file**, use a *non-destructive* editor such as **Adobe Lightroom** which saves edits in a compact database instead of in a bulky new file.

LCD, Liquid Crystal Display

a screen that presents a live image or plays back photos recorded on a digital camera. An *articulated*, *flip-out-and-twist*, or *vari-angle* display is desirable

for easier **macro** photography and better creative and candid shooting at arm's length. Look for new superior, thinner **AMOLED** displays such as by *Samsung*. LCD technology is common on televisions and computer monitors. Standard monitors, printers, and many **LCD** screens use *24-bit sRGB (Truecolor) color space*—with *8 bits*, or 256 shades of **color**, for each of the three channels of *primary color* (red, green, or blue), representing 16.7 million colors for each **pixel**.

macro, close focus

Compact digital cameras usually require a special close focus mode or **Macro** button (often marked with a flower symbol) to focus on objects nearer than about 50 centimeters or within 20 inches. Focus closely to enlarge a delightful unseen world—see *Magnify your world* on pages 46-47 in *Chapter 1*. A **DSLR** camera usually requires a screw-on *diopter filter* or special *macro lens* to focus closely.



megapixel, mp

1 million **pixels** or colored dots resolved by a camera **sensor**, stored on a **memory card**, or displayed on a glowing computer monitor. For example, the *Nikon D5000 DSLR* camera records images 4288x2848 **pixels**, which equals 12.2 **megapixels**. Megapixels are commonly arranged in a *width:height aspect ratio* of 3:2 for **film** and **DSLR cameras**, 4:3 for **compact cameras** and television, and 16:9 for HD, High Definition TV. Image quality and actual *resolution* are more closely related to the physical size of the **sensor** than to a camera's total *effective megapixels*. Caution: In **compact cameras**, increasing the number of **megapixels** beyond about **8 mp** is a marketing device that consumes more **memory card** space but doesn't help image quality—see *Chapter 3* for recommendations.

memory card, flash memory

reliably stores recorded digital image files in your camera or other compatible device, even when power is shut off. For widest compatibility and economy, get a camera that uses *Secure Digital* (*SD* or *SDHC*) or *CompactFlash* memory card format. Note: *SDHC* (*SD High Capacity*) cards support 4 to 32 **gigabytes**, require an SD 2.0 card reader, and won't work in an SD 1.0 reader.

Memory cards handily carry large amounts of data from cameras to computers and other devices. To avoid compatibility problems, download and backup the card's data, then reformat the card in the camera before shooting, especially if writes or deletes were done from a different device.



Buy extra memory cards. After each photo shooting session or trip, put a removable label on the card(s) and rotate them through your *backup scheme* in coordination with your main image storage and backup on large *external hard drives*.

metering area

the portion of the *frame* (seen through a *viewfinder* or on a live **LCD**) where a camera reads light intensity to determine the **exposure** before capturing an image. *Matrix/Evaluative*—the default on most cameras—meters light based upon the whole frame and often improves flash photography. *Center Weighted* averages light intensity in the central area of the frame, giving the best control and predictability. Finicky *Spot meter* measures light from a tiny center area.

midtone

middle or medium brightness values of light falling between **shadows** and **highlights** on the **histogram**.

mm

an abbreviation for *millimeter*. One thousandth of a *meter* (1/1000 m) distance. See also **focal length**.

noise

random mottling (appearing like **film grain**) in an image, especially noticeable in **shadows** or uniform areas such as blue skies. **Noise** usually comes from using a high **ISO** setting, such as **ISO**≥400 in **compact cameras** or **ISO**≥1600 in **DSLR cameras**. **Noise** affects maximum print enlargement size, discussed on page 68.

High-end **DSLR** cameras with APS-C size **sensors** such as the *Nikon D300* (2008), *Nikon D5000* and *Canon EOS 500D* (2009) introduced the ability to record good images at **ISO 3200** with less **noise** than any **film camera**—even their **ISO 6400** can be useful.

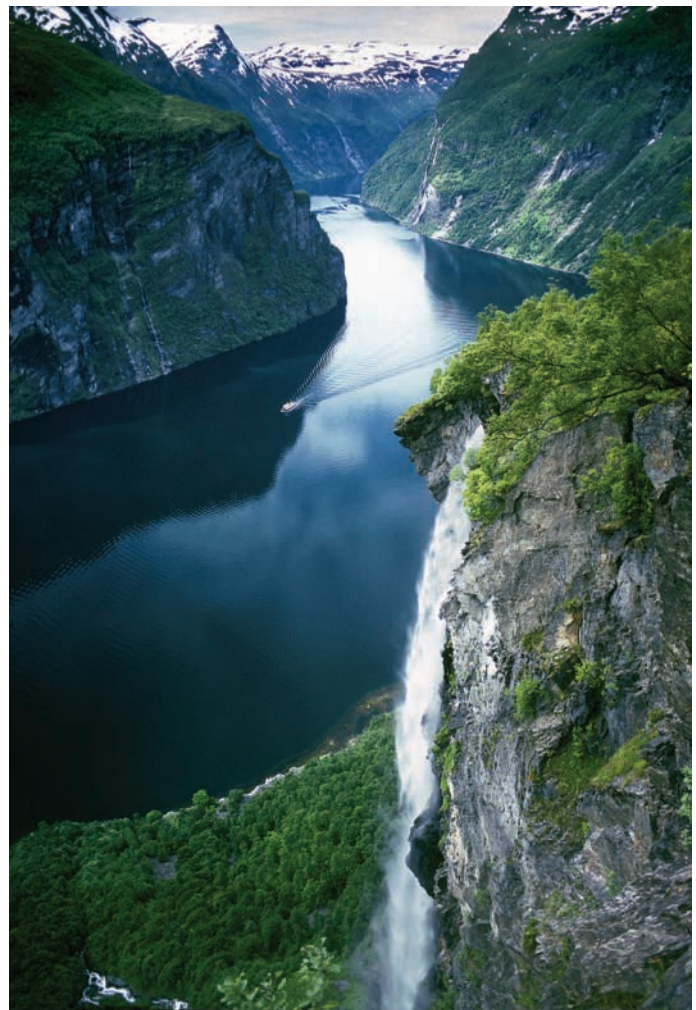


For better night images, deactivate *Noise Reduction*, record **RAW** files, and

use **ISO 200**. For tripod mounted exposures longer than 5 seconds at night, use **ISO 200** and no higher, in order to avoid random *hotspots* (created by **sensor** imperfections on all cameras including **DSLR** models). Also, a black shot with lens cap on can be used to digitally subtract *hotspots* using a *Layer* in *Adobe Photoshop* with *Blend Mode=Difference*. Your camera's *Noise Reduction* may do the same thing for long exposures but may smear pixel appearance—test it.

pixel

a dot whose **color** is determined by a combination of red, green, and blue values detected by a camera **sensor**. **Pixels** are stored in a grid of rows and columns (like an accounting *spreadsheet*), and can be displayed on a monitor or printed on paper at various resolutions expressed as *pixels per inch* (PPI) or *dots per inch* (DPI). A camera with bigger pixels (a larger **sensor** surface area per pixel) tends to capture higher quality **pixels**, which can make sharper/bigger *print enlargements* of better quality (as discussed on page 68). See also **LCD** in the *Glossary* and *Color Theory* on page 34.



Geirangerfjord, a World Heritage Site, is the epitome of Norwegian fjords. Photographed on Kodachrome 25 color slide film. (1981)

RAM, Random Access Memory

integrated circuit hardware used by a computer processor to load and run programs and store data (usually referring to the main volatile memory which is lost when the power is turned off). Computer **RAM** is traditionally measured in **gigabytes** defined as 1,073,741,824 bytes (or 1024 to the third power). But in the context of disk or **memory card** storage capacity or data transmission, a **gigabyte** means one billion (1,000,000,000) bytes.

RAW file or format

the native, unprocessed image format recorded directly from a camera's **sensor** (before the camera has built a **JPEG** file). Before **RAW** files can be printed or used, they must be converted to a standard format such as **JPEG** or **TIFF** on a computer, using special *RAW converter* software which also serves as an advanced editor (such as **Adobe Lightroom** or the freeware *FastStone Image Viewer*). The *filename extension* for a **RAW** file can be *.NEF* for *Nikon*, *.CRW* for *Canon*, *.RAW* for *Panasonic*, or other names unique by brand.

All consumer digital cameras can record images in **JPEG** files on a **memory card**, but only advanced cameras write images in their native **RAW** file format. If you want to later adjust the appearance of images with greatest flexibility, set your camera to record files as **RAW** instead of the default **JPEG**. But if you prefer not to spend much time editing images, and you prefer a simpler workflow with no **RAW** conversion step, then you may prefer shooting **JPEG**.

JPEG shooters must carefully set **exposure** and **white balance** at the risk losing **highlight** or **shadow** data, but **RAW** shooters can recover image data brighter than the camera's default *white point* and darker than default *black point*, to retrieve up to three **stops** of **dynamic range** better than **JPEG** on advanced cameras (page 186 box). **RAW** format better preserves **highlight** and **shadow** detail when editing, with 16 times more tonal leeway (4096 bits per *color channel* per **pixel** for *12-bit RAW files* compared to only 256 for **JPEG**, which is *8-bit*). When capturing **RAW file format**, the camera records unmodified *12-bit RAW sensor data* to a file (or *14-bit overkill* in advanced **DSLR** cameras).

sensor, or image sensor

measures photons of light like a bucket collecting rainwater, and allows a digital camera to record images sized in **megapixels (mp)**. Generally, camera **sensors** with larger surface dimensions record better image quality, reduce **noise** recorded at sensitivities above **ISO 400**, and require larger diameter lenses:

- A. **Full frame sensor** measures about 36 x 24 mm—the size of a 35mm **film** frame—requiring *Nikon FX* and *Canon EF* lens mounts.
- B. **APS-C size** or **1.8 inch type sensor** measures about 24 x 16 mm. Balances good image quality

with lightweight camera design, e.g. *Nikon DX format* and *Canon EF-S format* lens mounts.

- C. **4/3 inch type sensor** measures about 18 x 13.5 mm. Instead of using a *4/3" type* camera model designed in a **DSLR** style with a mirror, consider the smaller, mirrorless *Panasonic Lumix DMC-G2/G10/GH1* camera designed for lighter weight *Micro Four Thirds System* lenses.
- D. **1/1.6 inch type sensor** captures high quality for *subcompact* and **compact cameras**. Similar **1/1.7 inch type** is slightly smaller, 7.6 x 5.7 mm.
- E. **1/2.5 inch type sensor** is tiny, 5.76 x 4.29 mm, and **noisy** above **ISO 200**. Best small travel **compact superzoom**: *Casio Exilim FH100* with 24-240mm lens. With similar **1/2.3 inch type sensor**: bigger *Canon PowerShot SX20*; *Panasonic FZ35, FZ28*, & small *ZS7*; *Samsung HZ35W*; and bargain *Kodak EasyShare Z950*.

shadows

the darkest tones in an image. **Shadows** are counted by brightness value and shown as vertical lines which make a curve on the far left side of the **histogram**.

shutter release button



Half-pressing then holding the **shutter release button** (*prefocusing*) can lock focus and **exposure**, take care of *shutter lag*, and allow you to recompose before *fully pressing* to record an image (except in *Continuous-Servo* or *AI-Servo autofocus* or *Sports/Action* scene mode, which all continuously hunt for focus, as on pages 48-52). Taking your time to prefocus with a half-press makes the subsequent full press of the **shutter button** *almost instant* on most cameras. Half-pressing on most **compact cameras** locks both **exposure** and focus, whereas more advanced cameras such as **DSLRs** can use a separate *Exposure Lock (EL)* button.

shutter speed, shutter-preferred / S / Tv

how long (in seconds) the camera's **sensor** or **film** is exposed to light when capturing a photograph. Each doubling or halving of **shutter speed** is a **stop** of light, such as from 1/15th to 1/30th second of **exposure**. Standard **shutter speeds** progress as follows in fractions of a second starting *slower* on left, to *faster*:

...1 second, 1/2, 1/4, 1/8, 1/15, 1/30, 1/60, 1/125, 1/250...

For simplicity, most cameras round off shutter speed fractions to the **full stops** shown above. **DSLR** and advanced **compact cameras** have a *Shutter-preferred* auto **exposure** mode (also known as *Shutter-priority*, *S*, or *Tv*) that lets you set the **shutter speed** while the camera meter automatically decides the **aperture** at your given **ISO** setting. Caution: Slow **shutter speeds** and long *telephoto* lenses worsen the risk of blurring caused by the unintentional shake when your hands hold a camera. Be sure to turn on **image stabilization** (if supported by your camera or lens) to counteract

hand-held shake. After capturing a photograph, in your camera's *Playback* mode, magnify the image on the **LCD** to check that details are sharply focused, by pressing the zoom controls (or *magnifying glass* symbols marked **+** plus and **-** minus). See **aperture**.

stop, full stop / Exposure Value, EV

Each **full stop**, or unit of light, halves or doubles the amount of light from the previous stop. One **EV** or **Exposure Value** commonly refers to one **stop**. **Stop** usually means **aperture stop (f-stop)**, but can also refer to a doubling or halving of the amount of light controlled by **shutter speed** or **ISO**. See also **Exposure**.

TIFF or .TIF file

Tagged Image File Format (© Adobe Systems), trusted since 1992, is now universally edited. **TIFF files** retain every pixel value without lossy compression. To save space on computer hard drive storage, squeeze "**.TIF files**" smaller using non-lossy *LZW compression*. I convert my best **RAW** image files to 16-bit **TIFF** in *Adobe RGB color space* to fine tune in *Adobe Photoshop* before converting to an *sRGB color space* file for retail printing. To better preserve image integrity, convert original **JPEG** files to **TIFF** before extensive editing. Or, simply skip the intermediate **TIFF** by using a *nondestructive editor* such as **Adobe Lightroom**.

Most computers and cameras come with a basic free *image editor* which can adequately modify **JPEG** and **TIFF** image files. For an excellent free editor, try the freeware *FastStone Image Viewer* from www.faststone.org which also imports **RAW** image files from most cameras. For advanced editing required for publications and prints, use a combination of **Adobe Lightroom** and *Photoshop CS4/CS5*.

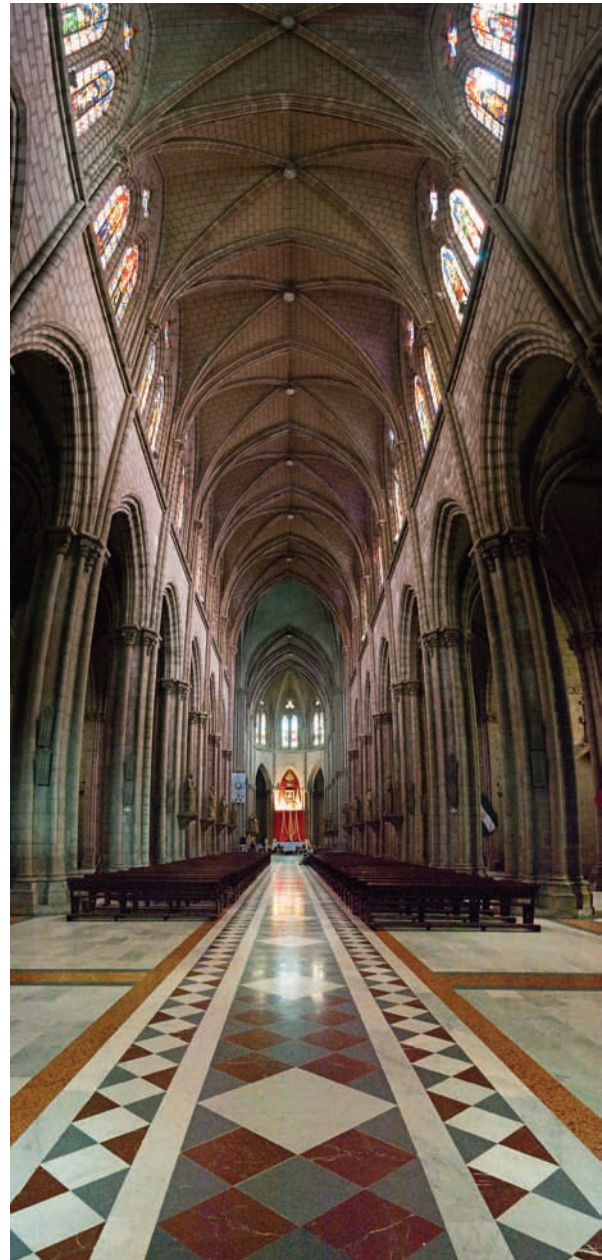
White Balance, WB, AWB

sets color balance, as explained on pages 51 and 58-59 in *Chapter 2*. Digital **Auto White Balance (AWB)** adapts (as our eyes/brain do) to compensate for off-color casts on the appearance of relatively "white" or "gray" subjects when lit by differently colored light sources, such as daylight, clouds, or light bulbs.

zoom lens (wide angle to telephoto)

has a sliding range of optical **focal lengths** to handily vary the *angle of view* of the *frame* recorded by the camera **sensor** or **film**. (A *prime lens* doesn't **zoom**.) Compact cameras by default start their **zoom lens** at widest angle when power is turned on, and a lever (or lens ring on **DSLR** cameras) lets you zoom towards telephoto to optically narrow the viewing angle. On a *10x optical zoom*, the *telephoto* end has ten times the **focal length (mm)** of the *wide angle* end, and ten times narrower *angle of view* (which is measured in *degrees of arc*, usually diagonally).

Nikon and *Canon* **DSLRs** boast an 18-200mm *11x zoom* with **image stabilization** great for travel. In contrast, **compact cameras** with *megazoom*, *superzoom*, or *ultrazoom* optical lens range ($\geq 10x$) physically



Basílica del Voto Nacional in Quito, Ecuador was built starting in 1892. Eight stitched images make this panorama. (2009)

require a smaller sensor, which often lowers image quality compared to *cropping* images from **compact cameras** with larger sensors. For better print enlargement quality, upgrade to a larger **sensor** surface area and lens with larger optical diameter.



On a **compact camera**, turn off the *digital zoom* setting, which usually *crops* poorly and may be *on* by default. *Cropping* (which is best done later on the computer to simplify a composition) narrows the *angle of view* like a **telephoto lens**, but reduces **pixel count** (reducing effective print viewing size, discussed on page 68).

Index

Bold page numbers indicate photographs.
Non-bold page numbers refer to text.

Symbols

© 4, 193. *See also* copyright
1/1.6 inch type sensor 66, 67, 69, 189, 192
1/1.7 inch type sensor 66, 69, 192
1/2.3 inch type sensor 69, 192
1/2.5 inch type sensor 189, 192
1.8 inch type sensor (APS-C) 192.
See also APS-C
1D, 5D, 7D, 40D, 450D, 500D, 550D.
See Canon DSLR cameras
2/3 inch type sensor (such as in Canon PowerShot Pro1) 186
4/3 inch type sensor. *See* four thirds inch type sensor
8-bit 190, 192
12-bit 63, 192
16-bit 25, 193
18-200mm lens 20, 41, 46, 66, 67, 70, 71, 153, 185, 187
18-270mm lens 67
24-bit sRGB color space model 190
35mm film 9, 16, 17, 58, 68, 69, 120, 187, 188, 192
70-300mm lens 71, 74, 115
135 film. *See* 35mm film
640x480 pixel VGA movie format 66

720p HD movie recording 66, 70, 71
1080p Full HD movie recording 66

A

A. *See* aperture-preferred auto exposure mode
Abel Tasman National Park, New Zealand **85**
aboriginal art **88**
Abraham 162
acid-free paper 63
action/sports photography 27, 48, 52, 68, 70, 192
Active D-Lighting. *See* Nikon Active D-Lighting
additive color 34
Adelaide, Australia 92–93
Adjustment Brush tool in Adobe Lightroom 45, 62, 184
Adjustment Layers 63. *See also* Layer
Adobe Bridge 62, 184
Adobe Lightroom (see Glossary) 25, 45, 54, 55, 57, 62, 63, 70, 184, 188, 190, 192
Adobe Photoshop CS3/CS4/CS5 25, 44, 44–45, 60, 62, 63, 184, 189, 191, 193

Adobe RGB color space 25, 63, 193
AE, Auto Exposure mode 27, 43, 48, 49, 51, 52, 54, 56, 184, 186, 192. *See also* aperture-preferred, shutter-preferred, Program/P, Night Scene, Landscape, exposure, aperture, ISO
Aegean Sea **168**
AE Lock (Auto Exposure lock) 46, 48, 49, 51, 52, 56, 192
AF assist lamp (for autofocus) 60
Africa 161, 162
AF-S: Nikon Autofocus Silent Wave Motor (fast & quiet focusing ultrasonic motor like Canon USM) (is also an abbreviation for Nikon AF Single-Servo mode) 41, 46, 52, 66, 67, 71, 185
Aguas Calientes, Peru 121
Aiguilles de la Tsa, Switzerland **106–107**
air/atmosphere 32, 58, 84, 95, 153, 161, 167
AI-Servo autofocus (AF) 48, 52, 192
Akrotiri, Greece 169
Alaska **14–15, 27, 76, 78, 176**

Special Topics

Define it	26
People pictures and fill flash.	27
Color Theory	34
Cut reflections with a polarizing filter	35
Zoom your perspective	40
HDR: High dynamic range imaging	45
Focus closely and know your limits	46
Compensate exposure	51
Improve light metering	52
Improve focus—active or still	52
Capture the night.	60
Dynamize JPEG	62
Stabilize handheld shots	67
Enlarge prints without limit	68
Flip out your LCD	69
Learn fast on EVF or LVF	69
Protect camera life	70
The impact of travel	161
f/8 is great.	185
Dynamic range—the eyes have it	186
Metric conversions	189

- Albergue Los Cuernos (Refuge), Chile **130–131**
- Alberta. *See* Canada
- algae. *See* plant images>algae
- aligning subjects. *See* realigning subjects, perspectives, and Rule of Thirds
- Alpine Lakes Wilderness Area, Washington **156, 177**
- Alps **2–3, 104–109, 163**
- Ama Dablam, Nepal **100**
- Amasya, Turkey **79**
- AMOLED (Active-Matrix Organic Light-Emitting Diode), bests LCD **67, 68, 69, 70, 190**
- Anasazi **140**
- Anatolia (Greek name for what Romans called Asia Minor and Turks call Anadolu) **9, 16, 162–163, 165**. *See also* Turkey
- ancient voyagers **82**
- Andes Mountains. *See* South America
- anemone, sea **166, 178**
- angle of view **30–31, 40, 40–47, 41–42, 42, 43, 46, 185, 188, 193**
- animal images:
- bird images:
 - Australian Pelican **37**
 - booby
 - Blue-footed Booby **33, 74**
 - Red-footed Booby **116** - Danphe Pheasant **94**
 - emu **92**
 - Galápagos Brown Pelican **117**
 - Galápagos Dove **35**
 - geese
 - Caiquen, or Upland Goose **127**
 - Snow Geese **158** - Great Frigatebird **118**
 - gull in Australia **12–13**
 - hummingbirds
 - Booted Racquet-tail **32, 112**
 - White-Necked Jacobin **111** - Kea, alpine parrot **81**
 - Laughing Kookaburra/kingfisher **90**
- insect images:
- beetle **35**
 - cicada **47**
 - moth **113**
 - with blue wings, orange head, Ecuador **42**
- lava lizard **118, 184**
- sea creatures:
- Clownfish **166**
 - Galápagos Marine Iguana **31, 114, 184**
 - gray whale **22**
 - green sea turtle **119**
 - Sally Lightfoot or red lava crab **71**
 - sea anemone **166, 178**
 - sea nettle (Chrysaora), sea jelly **32**
 - Steller Sea Lion **27**
 - sheep **85**
 - wombat **28**
- Annapurna I, Nepal **60, 73**
- Annapurna Sanctuary and ABC (Annapurna South Base Camp), Nepal **4, 60, 72–73, 94, 96, 103**. *See also* front cover photo
- Annapurna South/Dakshin/Moditse, Nepal **60, 72–73, 103**
- Antarctica **21, 132–133**
- Antarctic Circumpolar Current **132**
- Antelope Canyon Navaho Tribal Park, Arizona **37, 140, 144, 164**
- Antiochus, King **161**
- Anu **162**
- Aoraki/Mount Cook, New Zealand **84**
- Aperture-preferred or Aperture-priority/A/Av auto exposure mode (see Glossary) **27, 40, 48, 49, 53, 184, 185, 186, 187, 189**
- aperture (see Glossary) **19, 20, 21, 25, 27, 30, 37, 40, 41, 42, 43, 45, 46, 47, 53, 55, 60, 61, 63, 71, 74, 133, 153, 166, 184, 185, 186, 187, 188, 189, 193**. *See also* Apple Aperture software
- Appalachian Mountains, USA **56–57, 179, 182–183**
- Apple iPhoto photo editing/workflow software **63**
- Apple Macintosh **62–63**
- APS-C size sensor for digital cameras **66, 67, 68, 69, 70, 71, 185, 186, 188, 189, 191, 192**
- aquarium photography **27, 32, 166, 178**
- Arakam Tse, Nepal **103**
- Arches National Park, Utah **38, 142, 167**
- archival inks **63**
- Argentina **10–11, 126, 127, 128–129, 132**
- Arizona **6, 37, 140, 143–145, 164, 172**
- Arolla Valley, Switzerland **107–108, 163**
- art **88, 161**
- Artemis **162**
- articulated (flip-out-and-twist) LCD **17, 28, 47, 65, 66, 67, 69, 70, 71, 185, 190**
- ASA film sensitivity (ISO) **189**
- Asia **161**. *See also* Nepal, Turkey, Anatolia
- Asia Minor. *See* Anatolia
- aspect ratio **188, 190**
- aspherical lens, corrects aberrations **16, 66, 67**
- Assiniboine. *See* Mount Assiniboine Provincial Park, Canada
- aster **35**
- Astoria, Oregon **150**
- Athena **162**
- Auckland, New Zealand **84**
- aurora borealis **76**
- Aurora, Roman goddess of dawn **76**
- Australia **12–13, 18, 21, 28, 37, 73, 88–93, 166**. *See also* back cover photo
- Australian Pelican **37**
- Austria **105**
- auto **27, 43, 48, 49, 51, 52, 54, 56, 58, 59, 193**
- auto exposure/AE. *See* AE, AE Lock, exposure, aperture, shutter speed, ISO
- autofocus **46, 48, 52, 60, 65, 66, 67, 69, 70, 71, 192**. *See also* focus, AF assist lamp, Continuous-Servo, AI-Servo autofocus, Manual focus (MF)
- AUTO, on Mode Dial **27, 48, 49, 52, 54, 56**
- Auto White Balance/AWB **51, 51–52, 58, 58–59, 59, 193**
- Av. *See* Aperture-preferred auto exposure mode
- Avalanche Lily (Erythronium) **53, 152**
- AVCHD, Advanced Video Coding High Definition format requiring high-end hardware & editor **70**
- AWB. *See* Auto White Balance
- ## B
- background **20, 30, 32, 35, 38, 39, 40, 41, 53, 115, 171, 185**
- backpacking. *See* trekking
- Bainbridge Island, Washington **179**
- Baja California **22**
- Baker. *See* Mount Baker, Washington
- Banff National Park, Canada **135–136, 138**
- Bartolomé Island, Ecuador **114–115**
- Basílica del Voto Nacional, Quito, Ecuador **193**
- batch **25, 62, 70**
- batholith **190**
- battery **20, 66, 70**
- BCE/Before the Common Era/BC **161, 162, 163, 168**. *See also* Canada (for BC, British Columbia)
- Beagle Channel **132**
- Beagle, the ship that carried Darwin **127**
- beep **48**
- beetle **35**
- Bellavista Cloud Forest Reserve, Ecuador **32, 42, 111, 112, 113**

bell tower **168-169**
 Berner Oberland, Switzerland
108-109
 bicycling 135, 151
 Bingham, Hiram 121
 birds. *See* animal images
 black 34, 35, 48-63, 153, 161, 188, 189
 Black Clipping 54, 184
 black point 54-57, 56, 62, 188, 190, 192
 Blacks slider in Adobe Lightroom 25, 54, 62
 Blend Mode 60, 189, 191
 BLM/United States Bureau of Land Management 6, 172
 Bloedel Reserve, Washington **179**
 blue 32, 33, 34, 35, 38, 39, 42, 49, 54, 55, 58, 59, 63, 74, 82, 124, 155-156, 164, 168, 184, 188, 189, 190, 191
 Blue-footed Booby **33, 74**
 Blue Lake, Washington **155-156**
 Blue Mosque/Sultanahmet Mosque, Turkey **165**
 blurred images. *See also* optical image stabil., shutter speed, macro, sharpening, depth of field, night photog., diffraction
 blur from low resolution or insufficient number of pixels 42, 63, 64, 67, 68, 69, 185, 187, 190, 191, 192, 193
 blur from shake of hand holding a camera 60, 67, 68, 185, 188, 189, 192
 blur induced randomly by Image Stabilization activated when on tripod 60
 blur the background using shallow depth of focus 30, **31, 53**, 68, 185
 motion blur (due to moving subject such as water or fireworks) **9, 19, 20, 27, 48, 59, 60, 68, 76, 90, 145**, 186, **209**
 Booby **33, 74, 116**
 Booted Racquet-tail hummingbird **32, 112**
 Boreas 76
 bracketing (taking several different exposures of same scene) 45
 Brahman 97
 bridge 102, 108. *See also* Adobe Bridge
 brightness 25, 32, 34, 35, 37, 38, 39, 42, 46, 48, 48-63, 49, 50, 51, 52, 53, 54, 55, 56, 57, 62, 63, 67, 69, 71, 184, 185, 186, 187, 188, 189, 191, 192
 British Columbia. *See* Canada
 brown 34, 51, 117, 177, 210

Brown Pelican **117**
 browser, internet web 62, 190. *See also* internet and www...
 Brushtail Possum. *See* Common Brushtail Possum
 Bryce Canyon National Park, Utah **61, 140**
 bubble level 44
 Buckhorn Wilderness, Washington **160**
 Buddhism 4, 95, 97, 100, 101, 102, 167, 171
 Bugaboo Provincial Park, Canada **134, 136, 139**
 bulbs, light producing electrical 58, 193
 Bulb/Time setting for long manual exposure 20, 60
 bus and public transportation 15, 82, 104, 120, 121

C

Caiquen (Upland Goose), Patagonia **127**
 calibration of computer monitor 58, **63**
 California **146**
 Baja California **22**
 camera 9, 16, 17, 18, 19, 20, 21, 25, 26, 27, 28, 30, 34, 37, 38, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 74, 75, 93, 115, 133, 153, 166, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 209, 210. *See also* Chapter 3 and each brand by name
 campervan **38, 82, 84, 88, 90, 92**
 Canaan (Middle East) 162
 Canada **33, 44-45, 134-139**
 Canadian Rockies/Canadian Rocky Mountains. *See* Canada
 candid photography 17, 27, 69, 190. *See also* people pictures
 Cannon Beach, Oregon **150, 151**
 Canon 18-200mm IS f/3.5-5.6 EF-S lens 41, 46, 66, 67, 70, 193
 Canon Digital Rebel EOS series: 300D, 350D/XT, 400D/XTi, 450D/XSi, 1000D/XS, 500D/T1i, 550D/T2i 188. *See also* Canon EOS ... DSLR
 Canon EF format, lens mount for full frame sensor (36 x 24 mm) cameras 69, 192
 Canon EF-S format, lens mount for APS-C sensor cameras 46, 66, 192
 Canon EOS 1D DSLR 69
 Canon EOS 5D DSLR 62, 69
 Canon EOS 40D DSLR 62, 186

Canon EOS 450D/Rebel XSi DSLR 62, 66, 69, 186, 188
 Canon EOS 500D/Rebel T1i DSLR 62, 66, 67, 186, 188, 191
 Canon EOS 550D/Rebel T2i DSLR 62, 66, 67, 68, 186, 188
 Canon Highlight Tone Priority 62
 Canon IS, Image Stabilization 37, 46, 64, 65, 66, 67, 69, 71, 188
 Canon PowerShot A650 IS 66
 Canon PowerShot G5 17, 18, 19, 21, 93, 166, 210
 Canon PowerShot G9 **49, 52, 53, 65, 66, 71, 185**
 Canon PowerShot G10 65-71, 67
 Canon PowerShot G11 27, 65-71
 Canon PowerShot Pro1 21, 25, 27, 37, 42, 43, 47, 54, 55, 61, 133, 186, 209
 Canon PowerShot S90 small compact 64, 65, 66, 67, 68
 Canon PowerShot SD500 Digital ELPH small compact 71
 Canon PowerShot SD700 IS Digital ELPH small compact 37, 64, 65, 71
 Canon PowerShot SD850 IS Digital ELPH small compact 64
 Canon PowerShot SD870 IS Digital ELPH small compact 64
 Canon PowerShot SX20 IS 28-560mm 192
 Canon printers 63
 Canon Zoombrowser 45, 63, 184
 Canon Zoombrowser Photostitch 45-46
 canyon **6, 24-25, 37, 140, 141, 144, 164**. *See also* valley
 Canyonlands National Park, Utah **24-25, 140**
 Capitol Reef National Park, Utah 140
 Cap Keeper for not losing lens cap 71
 Cappadocia, Turkey 163
 captions for images 26
 Carbon Glacier, Washington 153
 card reader 191
 Carol Dempsey. *See* Dempsey, Carol
 car rental 82, 84, 88, 90, 105. *See also* campervan
 cartridge 187
 Cascades/Cascade Mountain Range **54-55, 154-159**
 Casio Exilim EX-FH100 24-240mm small compact 67, 192
 cathedral 146, 162, **193**
 Cathedral Peak and Lake, California **146**
 Catlins District, New Zealand **83**
 cavern/cave **179, 182**
 CCD sensor (Charge-Coupled Device) 66
 CCD-shift image stabilization on the sensor in the camera body 188

- cedar 161
 Center Weighted light metering 52, 191. *See also* metering, light (see Glossary)
 centimeter conversion to inches 189
 Cerro Fitz Roy. *See* Mount Fitz Roy, Argentina
 Cerro Torre, Argentina **10–11**
 Chamonix, France 105
 Champagne Pool, New Zealand **82**
 Champoege State Heritage Area & Campground, Oregon **150**
 channel 58, 59, 63, 188, 192
 chaos 172
 charismatic images 25, 45. *See also* Chapters 1 and 2
 chest bag to protect camera 70
 Chhukhung, Nepal 100
 Chilca, Peru 121
 Chile 126, **127, 130–131**
 China 162, 167
 Chiricahua National Monument, Arizona **143**
 Chomolungma (Mt. Everest), Nepal **95, 102–103, 170–171**
 Chomrong, Nepal 101
 Christchurch, New Zealand 84
 Christianity 144, 162–163, **168–169, 187, 193**. *See also* church and cathedral
 chromatic aberration 25, 62, 184
 church **168–169, 187, 193**. *See also* cathedral
 cicada insect **47**
 circular polarizing filter 35, 71
 Clarity slider in Adobe Lightroom 55, 57, 62
 climate. *See* weather
 clipping 54, 55, 56, 59, 184, 186
 close focus photography. *See* macro
 cloud 32, 35, **39**, 42, **44**, 45, 58, 59, 111, 112, 113, 193
 Cloudy white balance 58–59, 193
 Clownfish **166**
 CMOS sensor (Complementary metal-oxide semiconductor) 66
 CMYK 32, 34, 63
 coast 70, **85, 114–115, 150–151**, 177
 coating on filter for antireflection, single vs multicoating 71
 cold 63, 70, 95
 color balance 25, 51, 55, 58, 59, 61, 62, 68, 192, 193. *See also* white balance (see Glossary)
 color depth 25, 63, 190
 color, primary. *See* primary color
 color saturation. *See* saturation
 color, secondary. *See* secondary colors
 color space 25, 63, 190, 193
 color temperature 25, 58, 62. *See also* color balance or white balance
 Color Theory (see Glossary) 32, 34, 59, 184
 ColorVision. *See* Spyder3Express, spyder.datacolor.com
 color wheel 34
 Columbia River 153
 Combined RGB 188
 Common Brushtail Possum 92
 communication 26, 69
 compact camera (see Glossary) 26–27, 30, 42–43, 46–47, 49–63, 64–71, 184–193, 192–193
 CompactFlash 191. *See also* memory card (see Glossary)
 compact fluorescent 58
 compensate exposure. *See* exposure compensation
 complementary color 32–35
 composite 34, 45
 composite black 34
 composition 24–47, 50–63. *See also* framing images in the viewfinder
 compression 62, 190, 193
 computers and laptops 25, 28, 34, 42, 44, 45, 48, 54, 55, 57, 58, 62, 63, 184, 188, 190, 191, 192, 193
 conch shell **80**
 condensation 70. *See also* water and rain
 cone cell 34
 conflict 161
 conservation 178
 Continuous-Servo autofocus (AF) 48, 52, 192
 contrast 27, 32, 33, 34, 35, 36, 38, 42, 45, 48, 49, 54, 55, **56, 57**, 60, 62, 68, 75, 184, 186, 187, 190
 contrast-detect autofocus 60, 68
 conversion 189, 190, 192, 193
 Cook. *See* Mount Cook/Aoraki, New Zealand
 copyright 27, 184, 193
 Cordillera Blanca, Peru 120, **124–125**
 Cordillera Huayhuash, Peru **39, 75, 79, 120**
 covered bridge **108**
 Coyote Buttes, Arizona **6**
 Cradle Mountain-Lake Saint Clair National Park, Tasmania, Australia **88, 89, 93**
 Crater Lake National Park, Oregon **151**
 crater, volcanic **83, 112–113, 114, 115, 151**. *See also* volcano
 Crete, Greece **30**, 161, 169
 crop factor for sensor field of view. *See* focal length in Glossary
 cropping images 42, 43, 45–46, 47, 62, 120–121, 188, 193
 Crucible Lake, New Zealand **87**
 CRW, Canon RAW file format 192
 crystal 190
 Fuji Crystal Archive Paper 63
 Liquid Crystal Display, LCD 17, 190. *See also* LCD
 silver halide salts used in film 187
 CS3, CS4, CS5, from Adobe. *See* Adobe Photoshop CS3/CS4/CS5
 Custom/Preset Manual white balance 58
 Custom WB 58
 Cuzco, Peru 121
 cyan 25, 32, 34, 54
 Cybele **162**
- ## D
- D5000, D700, D3, D300, D90, D80, D60, D40/D40X. *See* Nikon DSLR
 Danphe Pheasant **94**
 dark 20, 25, 32, 34, 35, 37, 43, 48, 50, 51, 52, 54, 56, 62, 63, 92, 131, 152, 186, 187, 188, 189, 192
 Darwin, Charles 39, 127
 database 62, 184, 190
 dawn **9**, 20, 27, 59, **61**
 daylight 49, 58, 59, 189, 193
 default 49, 50, 51, 52, 56, 58, 59, 63, 190, 192, 193
 degrees of arc 188, 193
 Dell UltraSharp 186
 democracy 163
 Dempsey, Carol 7, 19, **21**, 71, 76, **79**, 82, 88, 163
 images by Carol
 Australia: Tom ascends Diamond Tree **18**
 New Zealand: portrait of Tom **210**
 Thailand: Bangkok: sculpture **64**
 USA: Alaska: Alaska Range aerial **78**
 USA: Arizona: Lower Antelope Canyon **37**
 Dempsey, Tom
 about the author 210
 all book images shot on film. *See* film
 images of Tom **18, 21, 210**
 Denali National Park and Preserve, Alaska **14–15, 76, 78**
 Denali State Park, Alaska **176**
 Dents des Veisivi, Switzerland **106–107**
 depth of field/depth of focus (see Glossary) 17, 30, **31**, 40, **41**, **42–43**, 46, 48, **53**, 60, 66, 185, 187
 desert 140, **140–145**, 153, 162

Dharma 95
 diagonally **36**, 70, 188, 193
 diameter 184, 187, 193
 diaphragm 53, 184
 Dickson, William 187
 Dietrich, William 161
 Difference 60, 75, 189, 191
 diffraction 185, 187
 digital camera. *See* photography, light, camera
 digital projector. *See* projector
 digital zoom 42, 193. *See also* cropping
 digitizing. *See* scanning
 DIN film sensitivity (ISO) 189
 Dingboche, Nepal **100**
 dinosaur 161
 diopter filter 42, 46, 49, 185, 190
 display. *See* monitor, LCD, Display button
 Display button 56
 DK Publishing 210
 D-Lighting, Nikon Active 62
 DMC. *See* Panasonic cameras
 DNA 161
 DOF. *See* depth of field/depth of focus (see Glossary)
 Dolby stereo sound recording 65, 66, 69
 Dolomites, Italy 105
 Dome Peak, Washington **167**
 door **124**
 Double Arch, Utah **167**
 Dove Lake, Australia **89**
 DPI/dots per inch 62, 63, 191
 Drake Straight 132
 D-Range priority, Fujifilm 62
 DSLR (see Glossary) 4, **20**, **30**, 41, **42**, 46, 49, 52, **53**, 60, 66–71, 70, **115**, **153**, 184–193
 DSLR versus compact 68
 Dudh Kosi (Milky River), Nepal **102**
 Durbar Square, Nepal **29**, **97**
 dusk **9**, **20**, 27, 59, **152**
 dust 17, 70, 95. *See also* Spot Removal
 DX. *See* Nikon DX format
 Dynamic Range Optimizer (DRO), Sony 62
 dynamic range (see Glossary) 45, 51, 56, 58, 62, 63, 66, 67, 186, 192. *See also* HDR

E

earth 16, 18, 75, 82, 95, 104, 161, 167, 168, 170
 Eastman, George 187
 EasyShare, Kodak 67, 192
 echidna 92
 eclipse, solar 75
 Ecuador **31**, **32**, **33**, **35**, **36**, **42**, **71**, **74**, **110**, **111–119**, **184**, **193**

ED, Extra-low Dispersion glass, to minimize chromatic aberration 41, 46, 67, 71, 185
 Edison, Thomas 187
 editing images 7, 29, 34, **44–45**, **48**, **54–55**, **56**, **57**, 62, 63, 184, 186, 188, 190, 192, 193.
 See also Chapter 2, Glossary, Adobe Lightroom, www.FastStone.org
 editorial usage of images 27
 EF. *See* Canon EF format lens mount
 EF-S (the S stands for short back focus). *See* Canon EF-S format lens mount
 Egmont. *See* Mount Egmont/Taranaki, New Zealand
 Egypt 162
 Eiger, Mönch, and Jungfrau, Switzerland **2–3**, **108–109**
 Ektachrome, Kodak color slide film 187
 El Capitan, Idaho **190**
 El Chalten, Argentina **10–11**, 126, **127**
 Electronic Viewfinder. *See* EVF
 Eliot, T.S. 26, 210
 Emmons Glacier, Washington **17**
 emotion 28–29, 38–39, 68
 Emu Park Holiday Park, Australia **88**, **92**
 Engadine, Switzerland **108**
 enlargement 17, 30, **31**, 40, **41**, 42, **43**, 46, **47**, 60, 68, 185, 190, 191, 193
 environmental impact **85**, 94, **102**, 161
 EOS/Electro-Optical System = Canon autofocus cameras with EF lens mount (or Eos, Greek Titan Goddess of dawn). *See* Canon DSLR
 Ephesus, Turkey 16
 Epson 63
 Epson Premium Luster photo paper 63
 equivalent focal length in terms of 35mm film 188
 Española/Hood Island, Ecuador **117**
 Ether 167
 eucalyptus **18**, **73**, 92, **93**
 Europe. *See* Austria, France, Germany, Greece, Italy, Norway, Switzerland, Turkey
 European 22, 104, 167
 Evaluative light metering (or Matrix metering) 52, 191. *See also* metering in Index and Glossary
 Everest. *See* Mount Everest, Nepal
 EV, Exposure Value 54, 186, 193.
 See also stop

EVF, Electronic Viewfinder, or LVF (see Glossary) 17, 26, 66, 68, 68–71, 69, 70, 186, 187
 Explorer, M/S **132**
 Export 62
 exposure compensation **50–51**, 52, **54–57**, 62–63
 button for 56
 exposure lock. *See* AE Lock (Auto Exposure lock)
 exposure (see Glossary) 17, **20**, **24**, **25**, 26, 27, **44**, **45**, 46, 48, 48–63, **50**, **51**, 52, 54, **54–57**, 56, 57, 62, 65, 68, 184, 186, 189, 191, 192.
 See also overexposure and underexposure
 Exposure Value. *See* EV, Exposure Value
 eye 27, **28**, 30, 34, 35, 36, **37**, 38, 40, 51, 53, 54, 55, 58, 62, 69, 90, 186, 193

F

f/8 19, 21, 25, 42, 45, 47, 53, 60, 61, 164, 184, 185, 186, 209
 f/16 53, 60, 185, 186, 187
 Face Detect 52
 fall foliage/leaf color **56–57**, **126**, **134**, **136**, **176**, **179**, **182–183**
 False Chanterelle Mushroom 47
 Fang, Nepal 4. *See* front cover photo
 fast pro lens 67
 defined by brightest f/number 187
 FastStone Image Viewer, www.faststone.org 63, 192, 193
 fauna. *See* animal images
 Fernandina Island, Ecuador **115**
 ferry 84, 93
 FH100, Casio Exilim EX-FH100 24–240mm small compact 67, 192
 field of view crop factor 188
 fill 26, 27, 30, 31, 36, 38, 39, 42, 50, 54, 57, 62, 65, 95, 158, 184
 fill flash 27, 65
 Fill Light, slider in Adobe Lightroom 57, 62
 fill the frame **30–31**, **42–43**, **50–51**
 film (see Glossary)
 35mm film lens equivalent for digital camera angle of view 20, 21, 25, 40, 41, 42, 43, 45, 47, 53, 55, 61, 65, 66, 67, 82, 115, 133, 153, 185
 digital camera photography versus film 9, 16, 17–19, 58, 68, 69, 70, 188, 189, 190, 191, 192, 193
 history of film 187
 images that Tom shot on film 1978–2004 [note: he began digital in 2003] **6**, **9**, **16**, **17**,

22, 23, 30, 35, 39, 75, 77, 79, 109, 120–121, 122–123, 124, 125, 134, 135, 136, 137, 139, 143, 145, 146, 161, 162, 165, 168–169, 172, 174–175, 187, 191

plastic film cover to protect LCD 71

rangefinder and twin-lens reflex/TLR cameras defined 186

filter 35, 42, 45, 46, 49, 58, 62, 71, 95, 184, 185, 190

Finepix. *See* Fujifilm cameras

Fiordland National Park, New Zealand **80–81**

fire 18, 126, **167**

fireweed leaves **134**

fireworks photography **20**. *See also* night photography

Fir Island, Washington **158**

fish 150, 161, **166**

Fish Tail Mountain/Machhapuchhare, Nepal **96**

Fitz Roy. *See* Mount Fitz Roy, Argentina

Fitzroy, Captain of the Beagle 127

flare, lens internal reflections 71

flash 27, 46, 49, 52, 58, 60, 65, 67, 68, 70, 166, 191

flash memory 191

flash photography 27, 52

flash synchronization 27, 65

Flatten Image Layers in Adobe Photoshop 45

FlexiZone 52

Flinders Chase National Park, Australia **89**, 92–93

flip out LCD. *See* articulated

flower 105. *See* plant images

flower symbol for macro photography **46, 49, 190**

Fluorescent 58

f/number, f-number, F number, or f-stop for relative aperture (see Glossary) 40–41, 46, 53, 184, 187

focal length, multiplier, crop factor (see Glossary) 40, 66, 74, 184, 185, 187, 188, 191, 193

focal point 188

focus 9, 17, 26, 28, 40–41, 42, 43, 46, 47, 48, **49**, 52, **53**, 56, 60, 66, 69, 70, 71, 185, 187, 188, 190, 192

focus lock. *See* AE Lock and shutter release

focus ring 60

Focus Tracking 52

foliage. *See* plant images

foreground 38, 39, 40, 41, 45, 53, 71, 185

forest 59, 85, 88, 126, 136, 161, 167, **179**

format 19, 36, 56, 62, 69, 185, 187, 190, 191, 192, 193

four thirds or 4/3 inch type sensor 66, 68, 70, 192. *See also* Micro Four Thirds System interchangeable lenses

framing images in the viewfinder 26, 30, 31, 32, 36, 38, 40, 42, 43, 46, 50, 51, 52, 56, 58, 64, 68, 69, 70, 71, 73, 185, 188, 191, 192, 193. *See also* composition

France 104–105

Frigatebird **118**

fringing 184

f-stop, f/stop, f/number, or F number. *See* stop, aperture, shutter speed, ISO, exposure

Fujichrome Velvia 35mm color slide film 16, 17, 75, 186

Fuji Crystal Archive Matte photo paper 63

Fujifilm 62, 66, 67, 68

Fujifilm Finepix F31fd small compact 68

Fujifilm Finepix F100fd small compact 62, 66, 68

Fujifilm Finepix F200EXR small compact 62

Fujifilm FinePix S100FS camera 67

full frame digital sensor (36 x 24 mm) 64, 69, 71, 192. *See also* Canon EF format, Nikon FX format

fuzzy photos. *See* blurred images, optical image stabilization, sharpening, shutter speed, macro

FX. *See* Nikon FX format

FZ28. *See* Panasonic Lumix DMC-FZ28

FZ35. *See* Panasonic Lumix DMC-FZ35

G

G5, Canon 17, 18, 19, 21, 93, 166, 210. *See also* Canon PowerShot G9, G10, G11, Pro1, SD...

Gaia 162

Galápagos Brown Pelican **117**

Galápagos Dove **35**

Galápagos Islands, Ecuador **30, 31, 33, 35, 36, 41, 71, 74, 114–119, 184**

Galápagos Marine Iguana **31, 114, 184**

gamut 25, 63

gannet **116**

Gassendi, Pierre 76

geese **127, 153, 158**

Geirangerfjord, Norway **191**

Gentoo penguins **132**

Germany 161

Gibson Steps, Australia **21**

gigabyte/gb (see Glossary) 188, 192

glacier **10–11, 17, 22, 39, 65, 102, 103, 125, 126, 127, 128–131, 132, 133, 136, 137, 139, 147, 152, 153, 167, 174**

Glacier Lily **65, 152**

Glacier National Park, Montana **22, 147, 174–175**

Glacier Peak Wilderness Area, Washington **167**

glass 27, 35, 63, 166, 193

Glen Canyon National Recreation Area, Utah/Arizona 140

global warming 161

Glossary 184–193

Goanna 92

Goblin Valley State Park, Utah **141, 142**

god **161, 162**

goddess **72–73, 76, 103, 162, 170–171**

goethite **172**

Gokyo Ri, Nepal **102–103**

gold 16, **29, 58, 64, 186**

GPS, Global Positioning System recording 67

graduated filter digital 45, 55, 62, 184 split neutral density glass 71

gram conversion to ounces 189

Grampians, Australia **88, 92**

Grand Canyon National Park, Arizona 140, **145**

Grand Prismatic Spring, Wyoming **180–181**

Grand Staircase-Escalante National Monument, Utah 140

Grand Teton National Park, Wyoming **148–149**

granite 88–89, **130–131, 146, 190**

granodiorite **130–131**

grass/grazing **85, 127, 161**

gray card, middle or 18% gray card (halfway between black and white) 20, 51, 54, 58

grayscale, gray, or grey 22, 34, 49, 50, 51, 52, 54, 58, 59, 176, 193

Great Barrier Reef, Australia 93

Great Frigatebird (*Fregata minor*) **118**

Great Ocean Road, Australia 88

Greece **30, 35, 77, 161, 168–169**

Greek **16, 76, 162, 167, 168–169**

Greek Classical Elements **166–167**

Greek Orthodox **168–169**

green 32, 34, 35, 49, 54, 58, 59, 61, 63, 112, 115, 119, 188, 190, 191

greenhouse gas 161

green sea turtle **119**

grid lines **38, 39, 44, 49**

Grindelwald Valley, Switzerland **108–109**

guidebooks 93, 104, 210
guide (trip leader) 94, 104, 120,
210. *See also* grid lines
gull, Australia **12–13**
gum trees. *See* eucalyptus

H

haka 80
Haleakala National Park, Maui,
Hawaii **146**
hand 9, 16, 17, 45, 46, 60, 67, 70, 71,
95, 115, 188, 189, 193
Hanging Rock State Park, North
Carolina **56–57**
Harran 162
Hathor 162
Havasu Falls and Creek, Arizona
145
Havasupai Indian Reservation,
Grand Canyon National Park,
Arizona **145**
Hawaii **146**
Haystack Rock, Oregon **150**
HD/High Definition movies, 720p or
higher 65, 66, 69, 70, 71, 190
HDR/HDRI (high dynamic range
imaging) 45, 62, 186
head 17, **29**, 35, 40, 60, 69, **161**
Heart of the Rocks Loop Trail,
Arizona **143**
Heceta Head, Oregon **29**
height 27, 121, 188, 190
Hematite **172**
Hemşin people, Turkey 163
Herbert Lake, Canada **134, 135**
Hewlett-Packard 63
High Definition. *See* HD
highlights (see Glossary) 26, 43,
45–46, 50–63, 51, 54, 56, 59,
62, 66, 67, 184, 186, 188, 190,
191, 192
Highlight Tone Priority, Canon 62
highlight warning 26, 43, 51, 56, 59
High Route, the Alps, Europe
106–107, 109, 163
High Sierra. *See* California
Himalayan World Adventure, Nepal
94
Hindu 94, **97, 103**, 162
histogram (see Glossary) 25, 26,
43, 49, 49–63, 50, 51, 54, 56,
58, 59, 62, 186, 187, 188, 190,
191, 192
Holiday Parks/Motor Camps/RV
campgrounds in Australia
& NZ 82, 88, 92. *See also* campervan and car
rental
Hood Island/Española, Ecuador
117
hoodoos **140, 143**

Hoodskins HSK-4 plastic protector
for LCD 71
horizon line **38–39**
horizontally 30, 36, 188
Hosteria Balmaceda, Chile 126
hotels 90, 105
hotshoe (mount for attachable flash
unit) 44
hotspots on long exposures 60,
189, 191
Hoya UV filter 71
Huaraz, Peru **124**
Huascaran National Park, Peru **125**
Huayhuash Range, Peru.
See Cordillera Huayhuash
Huayna Picchu, Peru **122–123**
hue 58
hugin.sourceforge.net, photo
stitching freeware 45–46
humidity 70
hummingbird **32, 35, 111, 112**
Hump Ridge Track, New Zealand
80–81
huts and refuges 82, 87, 88, 105,
126. *See also* trekking via
huts, tents, or backpacking
hyperfocal distance 185
HZ35W, Samsung 24–360mm small
compact 67, 192

I

ice **21, 87, 102–103, 128–129,**
130–131, 132, 133. *See*
also glacier, snow, iceberg,
water
iceberg **21, 87, 128–131, 133**
Icefields Parkway/Alberta #93
Provincial Highway **134, 135**
icons 29
Idaho **190**
IF, Internal Focus (keeps filters
stationary as lens focuses)
41, 46, 67, 71, 185
iguana **31, 184, 185**
image stabilization (see Glossary).
See optical image
stabilization
Imja Khola river valley, Nepal 100
Inca 121
Incandescent/Tungsten 58–59
India 167
indigo color 34
infinity 188
Info button 56
infrared 34
ink 34, 63
inkjet 56, 63
Inn River/En River, Switzerland
108
insect. *See* animal images
InstantPublisher.com 4
instinct 26, 28, 36, 38, 39, 161
interchangeable lenses 68, 70
International Fountain, Seattle **152**

internet. *See* web, and www...
iPhoto. *See* Apple iPhoto software
Ira Spring Memorial Trail,
Washington **177**
Irish 78, 162
iron oxide 172
IS. *See* Canon IS, Image
Stabilization
Isabela Island, Ecuador **119**
Isis 162
i-Site, New Zealand town visitor
centers 82
Isla Genovesa/Tower Island,
Ecuador **116**
Islam 162–165
ISO sensitivity (see Glossary) 25,
27, 42, 43, 45, 46, 47, 48, 60,
65–71, 184–187, 185, 189,
191–193
Israel 162
İstanbul, Turkey **165**
Italy 105, 120

J

James Island/Santiago, Ecuador
114, 115
Japan 82, 162, 167
Japanese maple **179**
Jasper National Park, Canada 135
jellyfish
sea nettle (Chrysaora), sea jelly
32
jet boat 82
jet window **55**
JPEG (see Glossary) 25, 50, 56, 58,
62, 63, 66, 66–71, 186, 190,
192, 193
Judaism/Jewish 162
July 4 US Independence Day 20
Jungfrau, Switzerland **2–3, 108–**
109
Jurassic 172

K

K
black process ink in CMYK color
model 34
K3 inks by Epson 63
Kaçkar Mountains, Turkey 163
Kalalau Beach, Kauai, Hawaii **146**
Kali 162
kangaroo **88, 92**
Kangaroo Island, Australia 88, **89,**
92–93
Karri trees, Australia **18**
Kastraki, Greece **77**
Kathesimbhu, Nepal **101**
Kathmandu, Nepal **29, 94–95,**
96–97, 101
Kauai, Hawaii **146**
Kea, alpine parrot **81**
Khumbu, Nepal **94, 95, 98–99, 100,**
102–103
Khumjung, Nepal 95

Kimche, Nepal **94**
kingfisher **90**
King Penguins **132**
Kingscote Airport, Australia **93**
kit lens default sold with camera **46**
Kiwi **82**
K (Kelvin) degrees of color
temperature **55, 58–59**
Kleine Scheidegg, Switzerland **2–3**
koala **92**
Kodachrome color slide film **17, 75, 191**. *See also* film
Kodak **17, 186, 187**
Kodak EasyShare Z950 35-350mm
small compact **67, 192**
Kodak Gold 200 ASA negative print
film **186**
Kookaburra (large kingfisher bird)
90
Kootenay National Park, Canada
135
Ku-Ring-Gai Chase National Park,
Australia **73**

L

lab, print **63**
La Cumbre volcano, Ecuador **115**
lag. *See* shutter lag/slow autofocus
Laguna de los Tres, Argentina **127**
Lake Argentina **128–129**
Lake Carhuacocha, Peru **75**
Lake Louise, Canada **135**
Lake Nordenskjold, Chile **130–131**
Lake O'Hara, Canada **137**
Lake Poteriteri, New Zealand **81**
Lake Powell, Utah/Arizona **140**
Lake Saint Clair, Tasmania,
Australia **88**
Lake Superior, Michigan **173**
Lake Waikaremoana, New Zealand
87
landscape **30, 38, 46, 52, 53, 60, 62, 66, 104, 161, 163, 185**
Landscape Mode **52, 53, 60, 185**
larch **105, 136, 137, 154–155**
large format **69, 187**
Larja Bridge, Nepal **102**
Laughing Kookaburra **90**
Lauterbrunnen Valley, Switzerland
104, 105, 108–109
lava. *See* volcano
lava lizard **118, 184**
Layer **45, 60, 63, 189, 191**
Laz people, Turkey **163**
LCD/Liquid Crystal Display (see
Glossary) **17, 26, 28, 35, 44, 47, 59, 65, 66, 67, 69, 70, 71, 186, 190, 191, 193**
leaf. *See* plant images
legal/law and permission issues
with photography **27**
Leica **187**
Lenga/Nothofagus **126**
lens **16, 17, 20, 21, 25, 28, 30, 35, 40, 41, 42, 43, 44, 45, 46, 47,**

49, 53, 55, 60, 61, 65, 66, 67, 68, 69, 70, 71, 74, 115, 133, 153, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 209.
See also interchangeable,
and Symbols at front of Index
lens cap **60, 71, 189, 191**
lens diaphragm **53**
level **38, 40, 44, 51, 55, 94, 153, 189**
Lhotse, Nepal **98–99, 170, 171**
liability waiver **27**
lichen **89, 143, 176**
light **3, 9, 10, 17, 34, 35, 42, 44, 46, 48, 49, 51, 52, 53, 57, 58, 59, 60, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 81, 84, 109, 142, 185, 186, 187, 189, 191, 192, 193.** *See also* color,
exposure, midtones,
highlights, shadows,
histogram, metering, optical,
white, black, etc
lightning **20**
Lightroom. *See* Adobe Lightroom
(see Glossary)
lights **58, 71, 76, 152**
lightweight **9, 16, 17, 18, 24, 26, 64, 65, 66, 68, 71, 192, 210**
Lily **42–43, 65, 152, 156**
limestone **182**
line **35, 38, 39, 68, 161, 177**
Little Wild Horse Canyon, Utah **141**
live histogram **49**
Live View **66, 67, 69, 70, 71, 186**
lizard **92.** *See* animal images
lock. *See* AE Lock (Auto Exposure
lock)
logging **85**
Lonely Planet guidebooks **93**
Los Cuernos del Paine. *See* Torres
Del Paine National Park,
Chile
Los Glaciares National Park,
Argentina **10–11, 126, 127, 128–129**
lossy **190, 193**
Loutro Harbor, Greece **30**
low light. *See* photography
Lucas, George **48**
luminosity **54**
lupine flower **112–113, 125**
Luray Caverns, Virginia **178**
LVF, Live View Finder. *See* EVF,
Electronic Viewfinder, or LVF
(see Glossary)
LZW, compression option for TIFF
193

M

Machhapuchhare, Nepal **96**
Machu Picchu, Peru **120–121, 122–123**
Macintosh. *See* Apple Macintosh

macro, close focus photography
(see Glossary) **17, 40, 40–46, 42–43, 46, 47, 49, 65, 69, 70, 71, 185, 188, 190**
magenta **32, 34, 35, 54, 55, 61**
magnify **41, 56, 60, 185, 193.** *See also* perspectives, lens
Makalu, Nepal **102–103, 170, 171**
Mammoth Hot Springs, Wyoming
147
mani **4, 95, 100**
Mani wheel **4, 95**
Männlichen Peak, Switzerland
108–109
Manual Focus/MF **17, 46, 60, 66, 71**
Manual/M exposure mode **17, 20, 44, 48, 51, 53, 56, 60, 187**
Manual (User's Guide for camera or
lens) **46, 49, 52, 187**
Manual White Balance/Custom WB/
Preset WB **58**
Māori **80**
maple **179**
Maria Island National Park,
Tasmania, Australia **90, 91, 92**
Marine Iguana, Galápagos **31, 114, 184**
marsupial **92.** *See also* animal
images
Mason Lake, Washington **177**
masonry **121, 122–123**
Matrix/Evaluative light metering
52, 191. *See also* metering
(see also metering area in
Glossary)
Matterhorn, Switzerland **109**
Maui, Hawaii **146**
maximum print size **44, 46, 68, 189, 191**
Mediterranean **168–169**
medium format **69, 187**
megapixel/mp (see Glossary) **40, 42, 43, 44, 66, 68, 190, 192**
megazoom. *See* superzoom compact
cameras
Melbourne, Australia **88, 92–93**
memory **16, 46, 62, 70, 76, 88, 188, 190, 191, 192**
memory card (see Glossary) **62, 70, 188, 190, 191, 192**
menu
in camera **52, 62, 68**
in software on computer **25**
merge **44, 45.** *See also* Photomerge,
panorama, and HDR
Mesa Arch, Utah **24–25**
Meteora, Greece **77**
meter **4, 10, 11, 14, 18, 22, 43, 46, 50, 51, 52, 54, 55, 60, 68, 72, 73, 75, 82, 84, 86, 87, 93, 95, 97, 98, 100, 102, 103, 105, 109, 111, 112, 121, 122, 125,**

127, 130, 131, 136, 139, 147,
150, 152, 153, 161, 167, 170,
171, 184, 190, 191, 192
conversion to inches 189
metering, light (see Glossary)
50–63, 52, 54, 191
metric to English/Imperial/
USA measurement system
conversions 189
Mexico **22**
MF. *See* Manual Focus
Michigan **19**, 173
Micro Four Thirds System
interchangeable lenses 66,
67, 68, 192
Microsoft. *See* Windows
midday **2–3**, **6**, **14–15**, **37**, **53**,
54–55, **56–57**, 58, **127–**
128, **164–165**, **193**. *See*
also daylight, contrast, HDR
Middle Ages 167
Middle East 162
midtone (see Glossary) 48, 48–63,
51, 52, 54, 55, 56, 57, 62, 188,
190, 191
minimum focus distance 46, 47, 49,
190
Minoan 169
mirror 65, 67, 68, 71, 185, 186, 192
mm, millimeters (see Glossary) 47,
66, 69, 71, 185, 186, 187, 188,
191, 192, 193
conversion to inches 189
mode dial 27, 49, 52
model release 27
moisture. *See* rain, condensation,
water, weather
moksha/liberation 97
monitor 62, 63, 186, 190, 191
Monkey Temple, Nepal **101**
monophonic or mono sound
recording 66, 71
monotheism 162
monotone (single tone) or
monochrome histogram 54,
188
Montana **22**, **147**, **174–175**
Mont Blanc, France 105
Monument Valley Navajo Tribal
Park, Arizona 140
moonlight **60**
Moon Travel Guides 210
MOS (metal-oxide semiconductor)
sensor 66
mosque 162, **165**
moth **113**
Mount Aspiring National Park, New
Zealand **87**
Mount Assiniboine Provincial Park,
Canada **44–45**, 135
Mount Baker, Washington **42–43**
Mount Cook/Aoraki, New Zealand
84

Mount Egmont/Taranaki, New
Zealand **86**
Mount Everest, Nepal 4, **95**, **102–**
103, **170–171**
Mount Field National Park,
Australia **90**
Mount Fitz Roy, Argentina **10**, 126,
127
Mount McKinley. *See* Denali, Alaska
Mount Ngauruhoe, New Zealand **83**
Mount Nimrod/Nemrut Dağı,
Turkey **9**, **161**
Mount Rainier National Park,
Washington **17**, **53**, **54–55**,
153, **157**
Mount Robson Provincial Park,
Canada 135, **137**
Mount Taulliraju, Peru **125**
Mount Townsend, Washington **160**
movies/video capture 17, 62, 65,
66, 69, 70, 71
mp. *See* megapixel/mp (see
Glossary)
MPEG-4, well-compressed video
format requiring high-end
hardware & editor 70
M-Rock 70
Muir, John 163
MultiCoated, Hoya filter 71
multiplier for focal length. *See* focal
length in Glossary
multi-point AI Focus 52
multiselector button 52, 56
Muslim. *See* Islam
Mutton Cove, New Zealand **85**
mutualism 166

N

Namche Bazaar, Nepal 102
Na Pali Coast, Kauai, Hawaii **146**
National Geographic Magazine 82,
161, 210
National Wildlife Refuge, US Fish &
Wildlife Service **150**
Native American 140, 144, 145, 150,
162. *See also* Navajo
natural selection 39
nature and natural 22, 28, 39, 59,
72, 74, 76, 82, 92, 126, 135,
162, 162–171, 163, 167, 172,
182, 210
Navaho 140, 164
Navajo sandstone **141**, **172**
necklace 111
NEF, Nikon RAW file format 192
Neko Harbor, Antarctica **133**
Nemrut Dağı, Turkey **9**, **161**
Nepal **4**, **29**, **60**, **72–73**, **94–103**,
163, **170–171**. *See also* front
cover photo
neutral color 51
neutral density graduated filter 71
neutral reference tone 51, 58
Nevada 140

New South Wales. *See* Australia
Newton, Isaac 34
New Zealand **47**, **59**, **80–87**, 161
NEX-5/NEX-3, Sony 67
Ngauruhoe (Mount), New Zealand
83
Ngozumpa Glacier, Nepal **102–103**
night **9**, **20**, 27, **60**, **61**, **76**, **79**, **115**,
152–153, **189**, 191
night photography **9**, **20**, 27, **60–61**,
76, **79**, **115**, **152–153**, **189**,
191
Night Scene auto exposure mode
27, 60, 152
Nikkor (Nikon's) 18–200mm VR II
f/3.5–5.6G DX AF-S IF ED lens
20, 41, 46, 66, 67, 70, 71, 153,
185, 187, 193
Nikkor (Nikon's) 70–300mm VR
f/4.5–5.6G AF-S IF ED zoom
lens 71, 74, 115
Nikon Active D-Lighting 62
Nikon compact cameras 68
Nikon D3/D3X DSLR 69, 71
Nikon D40/D40X DSLR 4, 20, 52,
60, 153
Nikon D60 DSLR 30, 41, 52, 53, 56,
62, 69, 71, 74, 115, 185, 186,
188
Nikon D80 DSLR 188
Nikon D90 DSLR 67, 71
Nikon D300 DSLR 67, 69, 71, 191
Nikon D700 DSLR 69, 71
Nikon D5000 DSLR 45, 52, 66–71,
186, 188, 190, 191
Nikon DX format, lens mount for
APS-C sensor cameras 41,
46, 66, 67, 69, 71, 185, 192
Nikon FX format, lens mount for full
frame sensor (36 x 24 mm)
cameras 69, 71, 192
Nikon imaging software 63
Nikon N70 SLR 16, 17, 75
Nikon VR/Vibration Reduction 20,
41, 46, 66, 67, 71, 74, 115,
153, 185, 187, 188
Noise Reduction feature 60, 62,
184, 191. *See also* noise (see
Glossary)
noise (see Glossary) 46, 48, 54, 60,
65, 65–67, 66, 67, 69, 184,
186, 189, 191, 192
non-destructive editor 184, 190
non-spectral colors 34
Nordenskjöld, Lake **130–131**
North Carolina **56–57**
North Cascades mountain range
154–155. *See also* Cascades
North Island. *See* New Zealand
North Umpqua River, Oregon **209**
Norway **23**, 161, **187**, **191**
Nothofagus/Lenga/Southern Beech
126
novelty 75
Nugget Point, New Zealand **83**
NX10, Samsung 65, 67

O

ocean **30, 31, 36, 37, 75, 83, 85, 88, 91, 114–115, 119, 132, 133, 146, 150, 151, 152–153, 161, 184, 189**

Oceanside, Oregon **189**

Odd Rule **36, 37, 39**

Oia, Greece **168–169**

OIS/O.I.S.. *See* Panasonic OIS, Optical Image Stabilizer

Okanagon National Forest, Washington **154–155**

olive **161**

Olympic Mountains **152–153**

Olympic National Forest, Washington **160**

Olympus **17, 47, 62, 67, 75**

Olympus E-420 DSLR **62**

Olympus E-620 and E-520 DSLR **67**

Olympus OM-1N SLR **17, 75**

Olympus PEN E-PL1 **65, 67**

Olympus Stylus 850 SW **62**

Om Mani Padme Hum (“Hail to the jewel in the lotus” Buddhist prayer) **100**

online. *See* web and www

opening. *See* aperture

optical image stabilization **9, 60, 66–67, 67, 70, 71, 185, 188, 192. *See also* blurred images, sharpening, Canon IS, Nikon VR, Tamron VC, Panasonic OIS, Sigma OS**

optical viewfinder **67, 68, 71, 185, 186, 187**

optical zoom. *See* zoom lens (see Glossary)

orange **32, 33, 34, 35, 36, 38, 42, 58, 88, 90, 176**

Oregon **29, 32, 150–151, 177, 189**

Oregon Coast Aquarium, Newport **32**

OS. *See* Sigma OS, Optical Stabilization

Otavalo, Ecuador **110**

Otorohanga Kiwi House, New Zealand **82**

ounce to grams conversion **189**

outdoors **7, 9, 16, 27, 30, 74. *See also* trekking, sunlight, light, midday, dawn, dusk, sunrise, sunset, each country/state**

output devices **63**

Output Sharpening **62**

overexposure **17, 20, 26, 27, 50, 51, 54, 57, 58, 59, 62, 65, 186. *See also* exposure, highlights, Recover, RAW**

Overland Track, Tasmania, Australia **88, 89, 93**

P

P. *See* Program/P mode auto exposure

Pachacuti, Inca emperor **121**

Pacific Northwest (of North America). *See* Oregon, Washington, Idaho, Montana, Alaska, British Columbia

Pacific Ocean **82, 83, 114–119, 150, 151, 153**

Page, Arizona **164**

paint **34**

Painted Cliffs, Tasmania, Australia **91**

Palestine, Middle East **162**

Palette Spring, Yellowstone NP, Wyoming **147**

Palmerston North, New Zealand **85**

Panasonic Lumix DMC-FZ8 **68**

Panasonic Lumix DMC-FZ28, 27-486mm superzoom **192**

Panasonic Lumix DMC-FZ35, 27-486mm superzoom **192**

Panasonic Lumix DMC-G2 **65, 66, 68, 69, 192**

Panasonic Lumix DMC-G10 **66, 68, 192**

Panasonic Lumix DMC-GH1 **65–71, 66, 192**

Panasonic Lumix DMC-ZS7 small compact 25-300mm superzoom **68, 192**

Panasonic Lumix LX3 small compact **67**

Panasonic OIS, Optical Image Stabilizer **66, 67, 188**

Panekiri Bluff, New Zealand **87**

Pangboche Gumpa, Nepal **4**

panorama **2, 3, 10, 11, 24, 25, 44–45, 60, 72, 73, 80, 81, 87, 93, 102, 103, 104–105, 105, 106, 107, 108, 109, 112–113, 114, 115, 122–123, 128–129, 130–131, 134–135, 138, 147, 148–149, 151, 152, 153, 154–155, 158, 159, 164, 180–181, 184, 193**

How to stitch panoramas **44–45**

pan or panning (sharply following a moving subject with your camera with motion blur in the background) **28, 68**

paper **34, 48, 49, 50, 51, 56, 58, 63, 186, 191. *See also* print**

parallel **46, 156**

Paria Canyon-Vermilion Cliffs Wilderness Area, Utah/Arizona **6, 140**

Patagonia, South America **10, 126–131**

Patan, Nepal **96**

pattern photography **6, 12–14, 20, 22, 30, 32, 33, 34, 36, 37, 73, 87, 88, 89, 91, 92, 93, 94, 120–121, 124, 126, 134, 141, 143, 144, 146, 147, 150, 158, 163, 164–165, 166, 167, 168–169, 172–183, 174**

pea **142. *See also* lupine flower**

pelican **37, 117, 118**

penguin **115, 132**

people pictures **9, 17, 18, 21, 22–23, 27, 40, 52, 70, 79, 80, 91, 94–99, 102, 110, 114, 120–121, 150, 185, 192, 210. *See also* candid photography**

point-and-shoot **184**

perception, sight, seeing **26, 28, 34, 35, 38, 40, 44, 45, 46, 51, 53, 58, 59, 62, 68, 69, 75, 76, 172, 185, 186, 190. *See also* eye, vision, perspectives, dynamic range, Chapters 1-2, 5, 6**

periodic table of the chemical elements **167**

Perito Moreno Glacier, Argentina **128–129**

permission to take or use photos **4, 27, 28**

Persian **161**

perspectives **17, 26, 28, 40, 40–47, 40–41, 41, 42, 60, 69, 73, 76**

Perth, Australia **93**

Peru **39, 75, 79, 120–127**

Pharilapche Peak, Nepal **103**

phase-detect autofocus **60, 68**

photography. *See also* pattern photography, film, DSLR

action/sports photography **27, 48, 52, 68, 70, 192**

camera and computer skills **24–47, 48–63**

camera reviews and recommendations for on-the-go gear **64–71**

composition tips **26–47, 48–63. *See also* framing images in the viewfinder**

exposure tips. *See* Chapter 2, exposure, Glossary

focus and sharpening tips **26, 28, 30–31, 36, 40–41, 42–47, 44, 46–47, 47, 48–63, 62–63, 66, 67, 68, 69, 70, 185, 187, 188, 190, 192. *See also* blurred images**

Glossary of photographic and computer terminology **184–193**

night, dusk, dawn, and low light photography **9, 20, 27, 60, 69, 115, 152–153, 189, 191**

portraiture and people **27, 185. *See also* people pictures, portraits**

travel and landscape photography. *See* Part II (Chapters 4-6) and images throughout book

photojournalist 27
 Photomerge command in Adobe Photoshop 25, 44, 44–45, 184
 PhotoSeek Publishing address & email 4
 PhotoSeek website by Tom Dempsey 4, 19, 65, 68, 71, 74, 104, 210
 Phrygian 162
 Pictured Rocks National Lakeshore, Lake Superior, Michigan 173
 pinhole 53
 pink 34, 35
 Pinnacle Rock, Ecuador 114–115
 pixel (see Glossary) 43, 47, 51, 54, 60, 63, 186, 188, 190, 191, 192, 193. *See also* megapixel/mp (see Glossary)
 plant images. *See also* fall foliage, forest, grass
 algae 106–107, 147, 177, 180–181
 eucalyptus/gum trees 93
 eucalyptus: Squiggly Bark Gum bark 73
 eucalyptus: Tingle Tree, Giant 93
 False Chanterelle Mushroom 47
 fireweed leaves 134
 flower images:
 aster 35
 Avalanche Lily (*Erythronium*) 53, 152
 copihue (*Lapageria rosea*) 127
 Glacier Lily 152
 lupine flowers 112–113, 125
 rhododendron 160
 silversword 146
 Tiger Lily or Columbia lily 42–43, 156
 vetch (pea family) 142
 Yellow Balsam (*Impatiens scabrida*) 101
 grass and Mount Fitz Roy 127
 lichen images: 89, 143
 lichen and fallen leaf 176
 logged ecosystem 85
 maple leaf fall color 176, 179
 skunk cabbage 173
 trees reflect in Tidal River 12–13. *See also* back cover photo
 trees reflect on underwater logs 177
 plastic 70, 71, 187
 playback mode 46, 56, 193
 pocket 26, 37, 64, 65, 70, 71, 184
 poetry 26, 78, 163, 210
 point-and-shoot 48, 68, 184, 186
 polarizing filter 35, 71
 Porcupine Mountains Wilderness State Park, Michigan 19
 portrait 27, 40, 172, 185
 posterization/banding/loss of color depth 63

PowerShot. *See* Canon PowerShot
 PPI/pixels per inch 191. *See also* DPI, resolution, sharpening, maximum print size
 prayer flags 72–73, 96, 101, 102–103, 170–171
 prayer wheel 4, 95
 Pray Lake, Montana 147
 Preset Manual WB, white balance 58
 Presque Isle River, Michigan 19
 press 48, 49, 50, 51, 52, 56, 60, 70, 185, 192, 193
 printing press 34, 63
 previsualize 40
 primary color 34, 54, 58, 63, 188, 190
 prime lens (fixed focal length) 185, 188, 193
 print 25, 26, 34, 40, 44, 46, 56, 62, 63, 64, 68, 69, 70, 186, 189, 190, 191, 193. *See also* enlargement
 print sharpness 40, 44, 46, 62, 63, 69, 193. *See also* sharpening, maximum print size, blurred images
 prism 34
 privacy 27
 private property 27
 program 54, 55, 62, 63, 184, 190, 192
 Program/P mode auto exposure 48, 49, 71
 projector, digital 63, 186
 Proof Setup 63
 proportion 40, 44, 52
 public property 27
 publish 3, 4, 27, 63, 68, 69, 193. *See also* Adobe InDesign
 Puerto Natales, Chile 126
 Puget Sound, Washington 75, 152–153
 Pulpit (Prekestolen), Norway 23
 Punta Union Pass, Peru 125
 pupil 40, 46, 53, 184, 185, 186, 187
 purple 32, 34, 35, 71, 172, 184
 purple fringing 184

Q

quality 9, 17, 26, 32, 46, 56, 62, 63, 64, 65, 66, 67, 68, 69, 71, 84, 184, 187, 188, 189, 190, 191, 192, 193
 Queen's Garden, Utah 140
 Quilotoa, Ecuador 112–113
 Quito, Ecuador 32, 111, 112, 193

R

radius 187
 rain 35, 70, 137, 153
 rainbow 34, 35
 Rainier. *See* Mount Rainier National Park, Washington
 RAM/Random Access Memory (see Glossary) 188, 192
 ranch 85, 161
 range 40, 45, 46, 51, 55, 56, 58, 62, 63, 65, 66, 67, 70, 78, 79, 94, 186, 188, 192, 193
 rangefinder 186
 ratio 186, 188, 190
 RAW converter 25–26, 62–63, 184, 190, 192, 193. *See also* Adobe Lightroom (see Glossary)
 RAW (see Glossary) 19, 25, 50, 56, 60, 62–63, 66, 67, 71, 184, 190, 191, 192, 193
 Rayleigh scattering 58
 RBY/Red+Blue+Yellow artistic color model 32, 33, 34
 realigning subjects 38, 39, 40, 41, 44–45, 49
 Realis SX50 Multimedia Projector 186
 Rear Curtain. *See* Slow Synchro flash
 Recovery slider in Adobe Lightroom 57, 62
 red 25, 32, 34, 35, 36, 39, 42, 51, 54, 55, 58, 59, 62, 63, 71, 82, 93, 116, 118, 184, 188, 190, 191
 Red Crater, New Zealand 83
 Red Eye 62
 Red-footed Booby 116
 reflection 2–3, 12–13, 20, 30, 34, 35, 36, 44–45, 75, 89, 106–107, 135–136, 139, 141, 146, 147, 148–149, 150–151, 177, 179, 185
 reformat 191
 refuge. *See* huts
 relative aperture 184
 release priority (capture without guaranteeing focus) 52
 religion/worship 162–171. *See also* worship, church, cathedral, prayer flags, temple, mosque
 Remarkable Rocks, Australia 89, 92
 remote control cord or wireless transmitter 20, 60, 71
 Renaissance 167
 reptile 31, 92. *See also* animal images
 resealable zip lock bag 70
 resize 62
 resolution 63, 64, 69, 70, 185, 186, 187, 190. *See also* maximum print size, DPI, sharpening
 RGB 32, 34, 35
 rhododendron 160

rich black 34
 roaring forties 84
 Robson. *See* Mount Robson
 Provincial Park, Canada
 rock **22, 31, 33, 38, 56, 57, 58, 77,**
92, 100, 115, 131, 140–147,
150, 172, 174
 romance of difference 75, 82
 Rotorua, New Zealand 80
 Rough Guides 210
 ROYGBIV, Newton's 7 spectral
 colors 34
 Rule of Thirds 36, **38–39**
 Russell Falls, Australia 90
 RV, recreational vehicle. *See* see
 campervan

S

S. *See* Shutter-preferred or shutter-
 priority/S/Tv auto exposure
 mode
 Sadhu/Hindu holy man 97
 Sagarmatha National Park, Nepal
4, 94–95, 98–100, 102–103,
163, 170–171
 Sahale Arm trail, Washington
158–159
 Salinas, Peru **120–121**
 Sally Lightfoot or red lava crab 71
 salt 70, **120–121, 187**
 Samsung HZ35W 24–360mm small
 compact 67, 192
 Samsung NX10 camera 65, 67, 68
 Samsung TL500/EX1 compact 67,
 68, 69
 sandstone **37, 90, 91, 92, 140, 141,**
142, 144, 172
 San Ignacio Lagoon, Baja California,
 Mexico 22
 San Juan Islands, Washington 153
 sannyasi 97
 San Rafael Reef, Utah 141
 Sanskrit 72, 103
 Santiago/James Island, Ecuador
114–115
 Santorini Island, Greece **168–169**
 saturation, color 25, 45, 57, 59
 Sawtooth Wilderness Area, Idaho
190
 scanning/digitizing film 9, 17, 188
 Scene modes 48
 Landscape 53
 Night Scene 9, 20, 27, 60, 152–153,
 189, 191
 Sports/Action 48, 192
 Schwabacher Landing, Wyoming
148–149
 screen protector for camera display
 71
 Scuol, Switzerland 108
 SD, SDHC (High Capacity), Secure
 Digital memory cards 191
 sea **30, 32, 114, 115, 118, 119,**
132–133, 150, 151, 166, 178
 sea anemone **166, 178**

sea lion **27, 115, 118**
 sea nettle 32
 sea stacks **83, 150, 151**
 Seattle Aquarium, Washington **178**
 Seattle Center, Washington **152–**
153
 Seattle, Washington **20, 75, 152–**
153, 178, 210
 sea turtle 119
 secondary colors 34
 Secure Digital (SD, SDHC) memory
 card 191
 seeing/sight. *See* perception, eye,
 perspectives, color, dynamic
 range, light
 self timer to delay start of exposure
 21, 60, 172
 Seno de Ultima Esperanza/Sound of
 Last Hope, Chile 126
 sensitivity. *See* ISO sensitivity (see
 Glossary)
 sensor for digital cameras (see
 Glossary) 30, 42, 46, 60, 66,
 66–71, 67, 68, 69, 70, 185,
 186, 187, 188, 189, 190, 191,
 192, 193
 Serrano Glacier, Chile 126
 Seward 27
 Sextet Ridge Glacier, Canada 136
 Shade white balance 58–59
 Shadow Adjustment Technology
 (SAT), Olympus 62
 shadows (see Glossary) 27, 35,
 45–46, 46, 51, 51–63, 54, 55,
 56, 57, 62, 65, 153, 184, 186,
 188, 189, 190, 191, 192
 shake, hand-held camera 46, 60,
 67, 70, **71, 185, 188, 189, 192,**
 193
 Shake Reduction, Pentax 188
 sharpening 9, 26, 28, 30, 40, 44, 46,
 53, 56, 60, 62, 63, 66, 68, 69,
 70, 76, 115, 184, 185, 187. *See*
 also blurred images, print
 sharpness
 sheep 85
 Shenandoah Valley, Virginia 178
 Sherpa, Ang Dendi 94
 Shinto 162
 Shuksan. *See* Mount Shuksan,
 Washington
 shutter lag/slow autofocus 66, 68,
 70, 192
 Shutter-preferred or shutter-
 priority/S/Tv auto exposure
 mode 20, 27, 28, 46, 48, 49,
 60, 185, 186, 187, 188, 189,
 192, 193
 shutter release button (see
 Glossary) 48–63, 60, 70, 71,
 185, 192
 shutter speed (see Glossary) 20, 21,
 25, 27, 37, 42, 43, 45, 46, 47,
 48, 49, 52, 53, 55, 60, 61, 67,
 70, 71, 74, 115, 133, 153, 166,

184, 185, 186, 187, 188, 189,
 192, 193
 Siberia Hut, New Zealand 87
 sidecar file 184
 Sierra Magazine 210
 Sigma 16, 67, 188
 Sigma OS, Optical Stabilization 67,
 188
 silk 70
 silver halide salts in film 187
 silversword plant, Maui, Hawaii
146
 single point and center autofocus
 (AF) 52
 Single-Servo autofocus 52
 Sinopah Mountain, Montana 147
 Skagit River Valley, Washington
158
 skin 161
 skunk cabbage 173
 sky 35, 38, 39, 45, 48, **54–55, 58,**
59, 60, 62, 63, 71, 74, 142,
152, 152–153, 153, 158, 170,
189
 Skyline Arch, Utah 142
 slide film 9, 16, 17, 75, 186
 Slik "Sprint Pro II GM" tripod 71
 slow autofocus. *See* shutter lag
 slow lens defined by f/number 187
 Slow Synchro and Rear Curtain
 flash (with shutter speed
 slower than about 1/60th
 second) 27
 SLR/Single Lens Reflex camera (see
 DSLR in Glossary) 16, 17, 75,
 185, 186
 Smart Sharpen 63
 Snake River, Wyoming **148–149**
 snow 52, **54–55, 148–149, 151,**
154, 157
 Snow Geese 158
 Snowpatch Spire, Canada 139
 Socratic 167
 soil 161
 solar eclipse 75
 Sony 62, 188
 Sony Alpha DSLR 62
 Sony Cyber-Shot 62
 Sony NEX-5/NEX-3 67
 Sony Super SteadyShot CCD-shift
 in-body stabilization 188
 sound 65, 66, 69, 70, 71, 76
 Sound **75, 126, 152–153**
 Sound of Last Hope, Chile 126
 South America **110–131. See**
 also Ecuador, Peru, Chile,
 Argentina
 Southern Alps. *See* New Zealand
 (South Island)
 South Georgia Island 132
 South Island. *See* New Zealand
 Space Needle, Washington **152–**
153
 Spaniards 121

spectral color 34
 spectrum 35
 Sports/Action scene mode 27, 48, 52, 68, 192. *See also* people pictures
 Spot light metering 52, 62, 191. *See also* metering in Glossary and Index
 spotlights 34, 71, 140
 Spot Removal, Adobe Lightroom 62, 70
 Spyder3Express/Spyder3Elite/Spyder2Express/Spyder2Pro, spyder.datacolor.com 58, 63
 Squiggly Bark Gum 73
 sRGB 25, 63, 190, 193
 stalactites 179
 Staubbach Falls, Switzerland 104–105
 Stehekin Valley, Washington 158–159
 Steller Sea Lion 27
 stereo sound recording 65, 66, 69, 70
 Stewart Island/Rakiura, New Zealand 82
 stitching panoramas 44–45. *See also* panorama
 stock photo 27
 stop (see Glossary) 25, 35, 43, 46, 54, 65, 66, 67, 69, 70, 71, 185, 186, 187, 188, 189, 192, 193. *See also* EV, Exposure Value
 storm 137
 strangers 78
 strikes 120
 stupa 101
 subcompact cameras (small, thin compacts 8 ounces or less) 26, 37, 65, 66, 70, 184, 192
 subtractive color 34
 sugar-glider 92
 Sultanahmet Mosque, Istanbul, Turkey 165
 Sumerian 162
 summer 87, 88, 90, 105, 133
 sunglasses (polarized versus nonpolarized for photography) 35
 sunlight 27, 56–57, 58–59, 62, 140, 152–153, 189. *See also* midday, sunrise, sunset, color, light
 Sunny/Daylight white balance 58–59
 sunrise 9, 24–25, 44–45, 58, 61, 103, 109, 130–131, 147, 148–149, 157, 163
 Sunrise Visitor Center, Washington 157
 sunset 29, 58, 59, 72–73, 75, 84, 96, 119, 140, 142, 146, 150, 152–153, 161, 163, 189, 190

Super Macro 47
 superzoom, megazoom, or ultrazoom compact cameras 67, 68, 192, 193
 sustainable living 9, 161
 Swayambhunath, Nepal 101
 Swiss Saver Pass 104
 Switzerland 2–3, 104–109, 161, 163
 SX20. *See* Canon Powershot SX20 IS
 Sydney Aquarium, Australia 166
 Sydney, Australia 88, 90, 91, 166
 symbiotic 166
 Syria 162

T

Tagus Cove, Isabela Island, Ecuador 119
 Talkeetna Airport, Alaska 78
 Tamaki Māori Village, New Zealand 80
 Tamrac 70
 Tamron 67, 188
 Tamron AF 18–270mm VC lens 67
 Tamron VC, Vibration Compensation 67, 188
 tannin 12–13, 210
 Taranaki/Mount Egmont, New Zealand 86
 Tararua Wind Farm, New Zealand 85
 Tasmania, Australia 28, 88, 89–93
 teahouse 94–95
 Teklanika Campground, Alaska 76
 telephoto 40, 40–47, 41, 42, 46, 48, 65, 67, 69, 184, 185, 187, 188, 192, 193
 telescope 40
 television 190
 temperature 25, 58, 62, 70, 93, 150, 153. *See also* color temperature, Kelvin, cold, warm
 temple 4, 101, 162
 terrorist 161
 Te Urewera National Park, New Zealand 87
 textiles 111
 Third Gokyo Lake, Nepal 103
 third or thirds
 focus one-third between subjects for DOF 60
 Micro Four Thirds Interchangeable Lens System 192
 one-third stop aperture/shutter speed increments 43, 187
 overlap shots by one-third for panorama 44–45
 Rule of Thirds 36, 38–39
 to the third power 188, 192
 Three Arch Rocks, Oceanside, Oregon 189
 tiara 161
 Tibetan 96, 100, 102–103, 170–171
 tic-tac-toe grid 38, 39, 49
 Tidal River, Australia 12–13, 92. *See also* back cover photo
 tidal wave 169
 tide 151, 177
 Tierra del Fuego 126, 132
 Tierra del Fuego National Park, Argentina 126
 Tiffen P ND 0.6 Gradual Soft Edge rectangular filter 71
 TIF/TIFF/Tagged Image File Format (see Glossary) 25, 190, 192, 193
 Tiger Lily (or Columbia lily) 42–43, 156
 tilt-shift lens 46
 Time/Bulb manual exposure length 20, 60
 timer. *See* self timer to delay start of exposure
 Tingle Tree 93
 Tingopampa Valley, Peru 125
 Tint 25, 34, 55, 58, 61, 62. *See also* color balance or white balance
 TL500, Samsung EX1 69
 Tolovana Beach State Recreation Site, Oregon 150–151
 Tom Dempsey. *See* Dempsey, Tom
 tone 25, 30, 32, 34, 45–47, 48–63, 52, 56, 58, 62, 63, 68, 184, 188, 190, 191, 192
 Tone Curve 25, 62
 Tongariro National Park, New Zealand 83
 Top pick cameras 65–71
 Torres Del Paine National Park, Chile 126, 127, 130–131
 tortoise sculpture 41
 Tower Island/Isla Genovesa, Ecuador 116, 118
 Townsend. *See* Mount Townsend, Washington
 trade 46, 153
 trail 87, 126, 127, 143, 158–159, 177. *See also* trekking
 train 4, 98–99, 104, 121, 182
 tramping 82, 85
 Transform>Warp (in Adobe Photoshop Edit menu) 45
 travel 9, 16, 18, 19, 41, 64, 65, 66, 67, 68, 69, 70, 71, 73, 74, 75, 76, 82, 88, 95, 104, 120, 161, 162, 167, 185, 210. *See* Part II
 tree 73, 93, 161. *See also* plant images
 trekking via huts, tents, or backpacking. *See also* each state/country in Index
 Alps: High Route, Berner Oberland, Valais, Engadine 104–109

Arizona: Havasupai: Havasu Canyon **145**
 Australia: Tasmania: Overland Track **88**
 Cradle Mountain and Dove Lake **89**
 eucalyptus/gum trees **93**
 Canada: Lake O'Hara, Mount Robson/Berg Lake **137**
 Nepal: Annapurna Sanctuary, Everest/Khumbu **72-73, 94, 96, 101, 103**
 New Zealand: Fiordland, Aspiring, Abel Tasman, Egmont/Taranaki, Tongariro **80-87**
 Norway: extensive trails with comfy huts **23, 191**
 Patagonia: Chile/Argentina **126-131**
 Peru: Cordillera Blanca, Cordillera Huayhuash, Machu Picchu **75, 120-125**
 Triabunna, Tasmania **90**
 tripod **9, 16, 19, 20, 21, 27, 44, 45, 60, 61, 67, 70, 71, 153, 172-174, 188, 189, 191, 209**
 tropical **70, 116**
 troubleshooting **27, 48-63, 52, 58, 60, 185, 191**
 Truecolor **190**
 Tuatapere Hump Ridge Track, New Zealand **80-81**
 tulum bagpipe **163**
 Tungsten **58-59**
 Turkey, Republic of **9, 16, 79, 161, 162, 162-163, 165. See also Anatolia**
 Turquoise Coast, Turkey **163**
 turtle **115, 119**
 Tv. *See* Shutter-preferred or shutter-priority/S/Tv auto exposure mode
 TV, television **190**
 Twelve Apostles Marine National Park, Australia **21**
 twin-lens reflex/TLR **186**
 type of sensor. *See* sensor for digital cameras (see Glossary)

U

UltraChrome inks by Epson **63**
 ultraviolet **34, 35**
 ultrazoom. *See* superzoom compact cameras
 Ulva Island, New Zealand **82**
 Umpqua River, Oregon **209**
 underexposure **17, 27, 50, 54, 58, 59, 62, 186, 189. See also exposure, shadows, Fill Light slider, RAW**
 underwater camera **71**
 UNESCO, World Heritage List
 Argentina: Los Glaciares National Park **10-11, 126, 127, 128-129**

Australia: Sydney Opera House **91**
 Australia: Tasmanian Wilderness **28, 88-90, 89, 90, 91, 92, 93**
 Canadian Rocky Mountain Parks **44-45, 134-139**
 Ecuador: City of Quito **193**
 Ecuador: Galápagos Islands **31, 33, 35, 36, 41, 71, 74, 114-119, 184**
 Greece: Meteora **77**
 Mexico: Whale Sanctuary of El Vizcaino: San Ignacio Lagoon **22**
 Nepal: Kathmandu Valley **29, 94-95, 96-97, 101**
 Nepal: Sagarmatha National Park **4, 94, 95, 98-100, 102-103, 163, 170-171**
 New Zealand: South West/Te Wahipounamu: Aoraki/Mount Cook **84**
 New Zealand: South West/Te Wahipounamu: Fiordland National Park **80-81**
 New Zealand: South West/Te Wahipounamu: Mount Aspiring/Tititea **87**
 New Zealand: Tongariro National Park **82-83**
 Norway: Geirangerfjord **191**
 Peru: Historic Sanctuary of Machu Picchu **120-121, 122-123**
 Peru: Huascarán National Park **125**
 Switzerland: Swiss Alps Jungfrau-Aletsch **2-3, 104-107, 108-109**
 Turkey: Historic Areas of İstanbul **165**
 Turkey: Nemrut Dağı National Park **9, 161**
 USA: Arizona: Grand Canyon National Park **145**
 USA: California: Yosemite National Park **146**
 USA/Canada: Waterton-Glacier International Peace Park: Glacier NP **22, 147, 174-175**
 USA: Wyoming: Yellowstone National Park **147, 180-181**
 unreleased images (model release) **27**
 Unsharp Mask **63**
 Upland goose **127**
 Urubamba Valley, Peru **120-123**
 USA/United States of America **140-161. See also Alaska, Arizona, California, Hawaii, Idaho, Michigan, Montana, Nevada; See also North Carolina, Oregon, Utah, Virginia, Washington, Wyoming**
 Ushuaia, Argentina **132**
 Utah **24-25, 38, 61, 140-142, 167**

V

Valais (Wallis/Valley) Canton of Switzerland **106-107**
 Matterhorn **109**
 valley **104-105, 108, 109, 120, 121, 125, 138, 140, 141, 158-159, 163. See also canyon**
 Valley of Fire State Park, Nevada **140**
 Valley of the Ten Peaks, Canada **138**
 van. *See* campervan
 vari-angle LCD **67, 69**
 VC. *See* Tamron VC, Vibration Compensation
 vehicle. *See* campervan and car rental
 vehicle relocation discount **84**
 Velvia. *See* Fujichrome Velvia
 vertically **30, 36, 38, 44, 54, 109, 123, 130, 188, 192**
 vetch flower **142**
 Vibrance slider in Adobe Lightroom **57, 62**
 Vibration Compensation. *See* Tamron VC
 Vibration Reduction. *See* Nikon VR
 Victoria, Australia **12-13, 21, 88, 90, 92. See also back cover photo**
 video. *See* movies capture
 viewfinder **35, 44, 49, 66, 68, 69, 71, 185, 186, 187**
 Vignette lens correction slider in Adobe Lightroom **55, 184**
 Vikos-Aoos National Park, Greece **35**
 Violet **34, 35**
 Virginia **179, 182-183**
 visible spectrum **35**
 vision **68. See also eye, color, perspectives**
 volcano **17, 42-43, 53-55, 82-83, 86, 112-113, 114-115, 143, 147, 151, 153, 161, 168-169**
 VR. *See* Nikon VR

W

Wai-O-Tapu Thermal Wonderland, New Zealand **82**
 wallabies **92**
 Walpole-Nornalup National Park, Australia **37, 93**
 warm **32, 36, 58, 70, 105, 153, 163**
 Warp (in Adobe Photoshop CS3/CS4 Edit>Transform menu) **45**
 Washington **17, 42-43, 47, 53, 54-55, 65, 75, 152-160, 167, 173, 177, 178-179**

water **2-3, 12-13, 19, 20, 21, 22-23, 27, 29, 30, 32, 36-37, 44-45, 59, 70, 71, 75, 80-81, 82-83, 85, 86, 87, 89, 90-91, 103, 105, 106-107, 108, 112-113, 114-115, 119, 120-121, 125, 130-131, 132-133, 135-136, 138, 139, 141, 145, 146-147, 148-149, 150-153, 173, 177-178, 178, 179, 180-181, 189, 190, 191, 209.** *See also* back cover photo

watermarks for Copyright images 62, 184

waterproof 70, 71

waterproof camera housing 71

Waterton-Glacier International Peace Park **22, 147, 174-175**

wave **6, 146, 172**

wavelength 34, 35

Wave/The Wave, Arizona **6, 172**

WB Temp/Tint slider in Adobe Lightroom 25, 58, 61, 62. *See also* white balance or color balance

weather and climate 70, 93, 95, 105, **132, 137, 150, 153**

web/internet World Wide Web 4, 19, 27, 46, 62, 63, 65, 68, 71, 74, 93, 104, 184, 185, 186, 190, 193. *See also* www...

Wenatchee National Forest, Washington **47**

Western Australia **37, 93**

whale **22**

white 29, 33, 34, 38, 48-63, 111, 152, 161, 184

white balance (see Glossary) 25, 51-52, 55, 58-59, **59, 61, 62, 192, 193**

white clipping 184

White-Necked Jacobin (*Florisuga mellivora*) **111**

white point 50-63, 54-57, 188, 190

wide angle 40, 40-47, 41, 46, 49, 184, 187, 193

wide open aperture 53, 187

width 68, 190

wilderness 82, 84, 87, **90, 162**

wildlife photography **28, 65, 71, 92, 150.** *See also* animal images

Willamette River, Oregon 150

Wilson's Promontory National Park, Australia **12-13, 90, 92.** *See also* back cover photo

wind **53, 72-73, 76, 84, 85, 126, 127, 153, 167**

Windows, Microsoft 62

Wingate sandstone **141**

winter **29, 55, 189**

wireless remote control transmitter 20, 71

workflow 54, 62, 63, 184, 192

workshops 210

World Heritage Site/List/Area. *See* UNESCO

World's Fair 152

worship 72-73, 162-171

W Route Trek, Chile 126, **127, 130-131**

www.2filter.com, The Filter Connection 71

www.adobe.com 184

www.dofmaster.com, depth of field tool 185

www.dpreview.com, compact and DSLR camera/lens reviews 68, 185, 186

www.faststone.org, freeware image & RAW editor 63, 193

www.Frommers.com, online travel guide 93

www.InstantPublisher.com, book self publishing 4

www.M-Rock.com bags for cameras and lenses 70

www.NikonUSA.com, official Nikon site 67

www.photoseek.com, by Tom Dempsey 3, 4, 19, 65, 68, 71, 74, 104, 210

www.photozone.de, DSLR camera and lens reviews 185

www.popphoto.com, Popular Photography Magazine 185

www.usa.canon.com, official Canon site 63, 67

Wyoming **147-149, 180-181**

X

x. *See* zoom (as in 10x optical zoom)

X-ray 16

Y

yak **98-99**

Yeats, William Butler 78

yellow 22, 32, 34, 35, 36, 37, 38, 49, 54, 58, 101, 104, 105, 106, 143, 152

Yellow Balsam (*Impatiens scabrida*) **101**

Yellowstone National Park, Wyoming **147, 180-181**

Yoho National Park, Canada **137**

Yosemite National Park, California **146**

Z

Z950, Kodak EasyShare 35-350mm small compact 67, 192

Zagoria, Greece **35**

Zeikos.com Universal Lens Cap Keeper 71

Zermatt, Switzerland **109**

Zeus **161**

Zion National Park, Utah 140

zip lock resealable bag 70

Zodiac boat **21, 133**

Zoombrowser, Canon 45, 63, 184

zoom lens (see Glossary) 16, 26, 28, 30, 40, 42, 46, 48, 49, 56, 60, 65, 66, 67, 70, 71, 184, 185, 187, 188, 193

ZS7, Panasonic Lumix DMC small compact 25-300mm superzoom 192

Bold page numbers indicate photographs.
Non-bold page numbers refer to text.



Waterfalls plunge along the North Umpqua River in Oregon. Recorded with a compact Canon PowerShot Pro1 camera using ISO 50, lens 7.2mm (28mm equivalent in terms of 35mm film), aperture f/8, and shutter speed 1 second on a tripod. (2004)