Tom Dempsey

Photography on the Go

Light Travel

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

PhotoSeek.com



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





PhotoSeek Publishing ♦ Seattle, Washington

Right: A Nepali woman turns a large prayer wheel at Pangboche Gompa, 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

Introduction
Part I: How to Enliven Images
Chapter 1. How to Compose Images
Chapter 2. Focus, Expose, Edit, Create
Chapter 3. Lightweight Cameras
Part II: Where to Seek the Light
Chapter 4. Exciting Destinations
Chapter 5. Nature Worship
Chapter 6. Natural Patterns
Glossary
Index



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 also ficen prefer working with PAW files and

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.

26

Part I: How to Enliven Images



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)

Part I: How to Enliven Images



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.

Chapter 1. How to Compose Images

Color Theory

 ${\sf K}$ nowing 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 RBY color models. Brown is actually a dark orange: a certain combination of red+green in the RGB model; or red+yellow+black in the RBY color model. The names of color gradations vary by language, culture, tradition, and perception.

The most common color models RGB, CMYK, and RBY 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).

RBY is a historical set of subtractive (pigmented) primary colors **Red**, **Blue**, and **Yellow** (**RBY**). 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. RBY paints cannot be mixed to create cyan or magenta. RBY 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 RBY artistic model using subtractive primary colors,

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

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.

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.

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.



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



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



34

Part I: How to Enliven Images





RGB light

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.

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)

 \mathcal{C} urrently, 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.

Glossary

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 "**Digital Single Lens Reflex**," 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

Glossary

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 $4 \ge 5$ inches or larger.

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

= (lens focal length) ÷ (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**:

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

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



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



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.

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

Glossary

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 1600** 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 handheld-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 appearancetest 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-millionyear-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**, **midtones**, 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.

midtones

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 (<i>prefocusing</i>) can lock focus
and exposure , take care of <i>shutter lag</i> ,
and allow you to recompose before <i>fully pressing</i>
to record an image (except in <i>Continuous-Servo</i> 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 DSLR s 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 **DSLR**s boast an 18-200mm 11x **zoom** with **image stabilization** great for travel. In contrast, **compact cameras** with *megazoom*, *superzoom*, or *ultrazoom* optical lens range (≥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* poet done later on the computer to simplify

(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

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 A 1080p Full HD movie recording 66 A

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

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

> Adobe RGB color space 25, 63, 193 AE, Auto Exposure mode 27, 43, 48, 49, 51, 52, 54, 56, 184, 186, 192. See also aperturepreferred, 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
People pictures and fill flash
Color Theory
Cut reflections with a polarizing filter
Zoom your perspective
HDR: High dynamic range imaging
Focus closely and know your limits
Compensate exposure
Improve light metering
Improve focus—active or still
Capture the night.
Dynamize JPEG
Stabilize handheld shots
Enlarge prints without limit
Flip out your LCD
Learn fast on EVF or LVF
Protect camera life
The impact of travel
f/8 is great
Dynamic range—the eyes have it
Metric conversions

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 Aperturepriority/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, the ship that carried

Bellavista Cloud Forest Reserve,

Ecuador 32, 42, 111, 112,

Darwin 127

Beagle Channel 132

beep 48

beetle 35

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, 210 196 Light Travel

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

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

Canon EOS 450D/Rebel XSi DSLR

62, 66, 69, 186, 188

Canon EOS 500D/Rebel T1i DSLR

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 Champoeg 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**

198 | Light Travel

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-F728 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 - 171goethite 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

Η

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 Canvon 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 Hemsin 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

200

Light Travel

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 Hova 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

К black process ink in CMYK color model 34 K3 inks by Epson 63 Kackar 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

Μ

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 midtones (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

202 | Light Travel

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, Sonv 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 Nordenskjold, 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

0

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 Gompa, 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 eve, 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-thego 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 Prav 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 Eve 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 shutterpriority/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 shutterpriority/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 Souiggly 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, İstanbul, 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

206

Light Travel

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**

Т

symbiotic 166

Syria 162

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: Geirangerfiord **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* canvon 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

Light Travel 208

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

Ζ

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)