

SCIENCE, POETRY, and PARKS:

A Sourcebook for Interpreters of California's Natural History

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California State Parks**

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“To a person uninstructed in natural history, his country or sea-side stroll is a walk through a gallery filled with wonderful works of art, nine-tenths of which have their faces turned to the wall.”

---Thomas Henry Huxley

*“---to feel
Greatly, and understand greatly, and express greatly, the
natural
Beauty, is the sole business of poetry.”*

---Robinson Jeffers

“Science and poetry go hand in hand in this respect at least---they transform and illuminate the common, the near at hand. They show us the divine underfoot....The poets know that beauty and mystery lurk everywhere, and they bring the fact home to our emotions, while science brings it home to our understanding.”

---John Burroughs

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INTRODUCTION

It's a curious detail of history that California was once regarded as an island, both in myth and on explorers' maps. Even more curiously, an island is just what California has proved to be—an island of natural wonders that set the Golden State apart from all its neighbors.

The wonders themselves are deservedly renowned. There is the scenery, of course, indisputably world-class. There is the geology—complex, undeniable, and occasionally terrifying. There is a multiplicity of climates, ranging from the idyllic to the unbearable. And there is an incredibly diverse assortment of natural communities, each of them home to a fascinating array of life-forms—some representative, some unique.

Equally wondrous, perhaps, is the fact that roughly one-tenth of California has been designated state or federal parkland and wilderness. Many of the finest examples of natural landscape are thereby preserved and protected as a lasting heritage. The story of these places—what they hold, how they function, why they're important—is conveyed to the visiting public through the interpreter's art.

For the park interpreter or other outdoor educator, sharing the natural world with an audience can be a highly rewarding experience; however, understanding nature well enough to discuss its features, ways, and meanings can be a daunting task. To convert that task into an adventure is the main purpose of this book.

Science, Poetry, and Parks is a specialized bibliography—a survey of the literature that describes, explains, and celebrates California's rich natural history. Included here are citations for more than 700 selected works, accompanied by notes suggesting why each might be of value or interest to the reader. This volume has been developed primarily as a reference for park interpreters, but teachers, camp leaders, naturalists, and nature-oriented park visitors should be able to make good use of it as well.

Most of the cited sources involve one branch of natural science or another; in many cases, they also relate specifically to California. Some of the listings exemplify what John Steinbeck called “poetry in scientific writing” with their eloquent, insightful prose, and a few works are actually poetic in terms of meter or rhyme. Other writings pertain to parks or park-related matters such as resource management and interpretation. Thus the book's title is accounted for.

For convenience, the entries have been grouped by subject—there are more than thirty categories altogether---so that anyone who wants to learn about plant identification, say, or the Sierra Nevada can turn directly to those sections for titles to consult. Although certain sources could have been assigned to several categories, each work is listed only once.

In terms of age, the selections in this sourcebook vary widely. The earliest items predate California's admission to the United States; the latest date from the year 2000.

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Authors of government-issued documents tend to avoid writing in the first person, but a few personal remarks seem necessary at this point.

In my role as an interpreter with California State Parks, I've been given a marvelous opportunity to examine natural history literature from a statewide perspective and in some depth. Often my studies have yielded more good information and ideas than I could put to use. The titles, notations, and quotes that fill this book are, for me, a way of sharing the best of what I've come across during a quarter-century of research and reading.

Just as an interpretive program always bears the mark of its presenter, so does this sourcebook reflect my own interests and enthusiasms to some degree. Still, I've tried to do a reasonably balanced, comprehensive job...and I'm including a sample "recommendation form" so that you, the reader, can nominate new entries for a future edition.

I hope that *Science, Poetry, and Parks* will serve as a handy reference when you're planning your next campfire program or wondering how to locate the answer to some question you've been asked. But you'll be better served, I think, if you approach these pages with your long-range development as an interpreter in mind. You can use this treasury of sources to help you to chart a course, to find a voice, or to stage your own ongoing celebration. With the literature as a guide, you'll soon discover some exhilarating new vistas of California's natural landscape. In time—if you're willing to do the homework—you'll become privy to secrets and witness to wonders that now go unperceived.

John Werminski
Sacramento, California
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**NATURAL HISTORY:
GENERAL and STATEWIDE CALIFORNIA**

FUNDAMENTALS:

matters of number, pattern, and scale

The following sources deal with basic aspects of the natural world— aspects that are sometimes hidden, often elegant, and usually mathematical.

All of the included items are suitable for use by lay readers. Several fine, authoritative references are noticeably absent, having been omitted because of their more specialized or technical approach. Citations for these can be found, if needed, by consulting the bibliographies in sources listed here.

“For the harmony of the world is made manifest in Form and Number, and the heart and soul and all the poetry of Natural Philosophy are embodied in the concept of mathematical beauty.”

—D’Arcy Wentworth Thompson

“But then when we see how the branching of trees resembles the branching of arteries and the branching of rivers, how crystal grains look like soap bubbles and the plates of a tortoise’s shell, how the fiddle-heads of ferns, stellar galaxies, and water emptying from the bathtub spiral in a similar manner, then we cannot help but wonder why nature uses only a few kindred forms in so many different contexts. Why do meandering snakes, meandering rivers, and loops of string adopt the same pattern, and why do cracks in mud and markings on a giraffe arrange themselves like films in a froth of bubbles?”

—Peter S. Stevens

*“Atom from atom yawns as far
As moon from earth, or star from star.”*

—Ralph Waldo Emerson

Briggs, John. *Fractals: the patterns of chaos*. New York: Simon & Schuster, 1992. 192 pp.

Closely intertwined with modern “chaos theory,” “fractals” refer to a class of forms quite unlike those of traditional geometry. Fractals are complex patterns resulting from unpredictability, patterns that are irregular yet which retain their identity at different scales. In nature, fractals are everywhere—from the branching of a fern frond to the jaggedness of lightning to the spacing of stars in the night sky.

This book not only considers the significance of fractals; with more than 150 illustrations, it also celebrates their beauty. Because fractals are rooted in mathematics, that beauty isn’t restricted to the natural realm. Computers are able to generate stunning “portraits” of fractal equations that resemble abstract art...and even can create imaginary fractal “landscapes” that seem at once exotic and familiar.

Burgess, Jeremy, Michael Marten, and Rosemary Taylor. *Microcosmos*. Cambridge: Cambridge University Press, 1987. 208 pp.

Here is a startling visual tour through the realm of the very small.

More than 300 photographs are presented in this book, including some in color. The images range from a fruit fly’s face magnified about a hundred-fold to uranium atoms enlarged 120,000,000 times. Text—much of it in the form of photo captions—is very detailed and likely to be of less interest.

Calder, Nigel. *Timescale: an atlas of the fourth dimension*. New York: The Viking Press, 1983. 288 pp.

The heart of this volume is a 94-page time line, logarithmically scaled, extending from the Big Bang to the present. Matched with an explanatory narrative and graphics, it highlights and orders important events in cosmology, geology, organic evolution, and human history.

A thought-provoking “overview,” elaborate reference index, and map section round out the book.

Diagram Group. *Comparisons*. New York: St. Martin’s Press, 1980. 240 pp.

As its title claims, this reference offers “comparisons of distance, size, area, volume, mass, weight, density, energy, temperature, time, speed and number throughout the universe.”

A mind-stretching array of facts, records, and juxtapositions are depicted graphically, relating such things as the Precambrian era to the present, viruses to whales, or the growth rate of lichens to the speed of light. The result is a fascinating book to browse.

Ehrlich, Robert. *The Cosmological Milkshake: a semi-serious look at the size of things.* Illustrated by Gary Ehrlich. New Brunswick, New Jersey: Rutgers University Press, 1994. 260 pp.

Each of the 135 mini-essays in this book consider some aspect of magnitude—how big, far, fast, hot, heavy, or old various things can be. The explanations are a blend of math, science, imagination, and whimsy, augmented by technical footnotes and humorous cartoons.

One example: Reading “How Much Does Your Weight Vary on Earth?” we learn that a person weighs less at high altitudes than at sea level—and why. This bit of trivia might be fun for interpreters in mountain parks to use. Incidentally, we’re also told that if the earth rotated on its axis 17 times faster than it does, at the equator one would weigh nothing at all!

Garland, Trudi Hammel. *Fascinating Fibonacci: mystery and magic in numbers.* Palo Alto, California: Dale Seymour Publications, 1987. 103 pp.

In an entertaining and non-technical manner, this book explores the ramifications of a curious set of numbers known as the “Fibonacci sequence.” The sequence begins 1, 1, 2, 3, 5, 8, 13, 21, 34, 55...and extends indefinitely, with each successive number being the sum of the previous two.

Fibonacci numbers, and ratios derived from them, turn up in many unexpected places—in architecture, art, music, and poetry, for instance—and they particularly abound in nature. The arrangement of a pine cone’s scales, the number of petals in a daisy, and the graceful spiral of the chambered nautilus are just a few of the forms traceable to “Fibonacci.”

Gould, Stephen Jay. “Size and Shape.” *Natural History*, Vol. LXXXIII, No. 1 (Jan. 1974): pp. 20-26.

This article introduces the reader to a curious fact of life—that an organism’s form is strongly influenced by its size. The explanation can be traced to “the geometry of space itself,” and specifically to a relationship between volume and surface area that affects many biological systems.

This subject is examined more thoroughly in another cited source, McGowan's *Diatoms to Dinosaurs*. However, Gould's essay contains some interesting digressions, such as how the miniaturized people and gigantic insects of science fiction films behave in ways that violate the laws of physics.

Hall, Nina, ed. *Exploring Chaos: a guide to the new science of disorder*. New York: W. W. Norton & Company, 1993. 224 pp.

Here is a fine introductory overview of "chaos theory," the emerging branch of science that provides new insights into the complexity of the natural world.

Essays contributed by various authorities form the chapters of this book. As summarized by editor Hall, these articles "explain what chaos is, the mathematics behind chaos, how chaos can be found in virtually every discipline from astronomy to population dynamics, and how chaos theory can be applied practically to areas such as engineering and economics."

Hoffer, William. "A Magic Ratio Recurs throughout Art and Nature." Illustrations by Barbara Alu. *Smithsonian*, Vol. 6, No. 9 (Dec. 1975): pp. 110-124.

Hoffer's essay provides an intriguing introduction to the numerical "Fibonacci sequence" and its diverse manifestations (see the notation for Garland's *Fascinating Fibonacci*, cited above). Special attention is given to the fixed ratio between successive Fibonacci numbers because, according to the article, "the curves of seashells and galaxies, the proportions of playing cards and the Parthenon are all based on the ratio .618034."

McGowan, Chris. *Diatoms to Dinosaurs: the size and scale of living things*. Washington, D.C.: Shearwater Books, Island Press, 1994. 288 pp.

Combining scholarship and anecdote with a clear explanatory style, this book examines how an animal's size profoundly shapes its life. Anatomy, physiology, behavior, and survival are all affected.

Geometry tells us that as an organ or organism changes in size, its length, surface area, and mass each change at a different rate. Because of this, gravity and other physical forces affect life very differently at different scales. A fly is able to walk on walls, for instance, while a beached whale can't even support its own weight.

Readers will be impressed by the number of size-related phenomena that are covered—ranging, as the author puts it, “from the gliding mechanism of diatoms to the blood-pressure problems of dinosaurs.”

Morrison, Philip, and Phylis Morrison, and The Office of Charles and Ray Eames. *Powers of Ten: a book about the relative size of things in the universe and the effect of adding another zero.* New York: Scientific American Library, 1994. 160 pp.

Based on a simple yet elegant concept, this work surveys the entire known universe in a wonderfully interpretive way.

The book’s key feature is a series of 42 views, each one at a scale that differs from the next in the sequence by a factor of ten. Just by turning pages, readers are able to traverse the macrocosmic and microcosmic realms—zipping through the world of our everyday experience in only a few exponential steps.

Supplementary text and graphics enhance this “journey of mind and eye.”

Originally published in 1982.

Murphy, Pat, and Paul Doherty. *Traces of Time: the beauty of change in nature.* Photographs by William Neill. San Francisco: Chronicle Books, 2000. 120 pp.

Familiar to everyone yet profoundly mysterious, time is a concept of great importance to interpreters.

This source considers various ways by which the natural world reveals and records the passage of time. Examples—on differing scales—include such things as the movement of shadows during the course of an hour, the adding of annual growth rings to a tree, and the multimillion-year formation of a crystalline rock. The authors extract “stories” from time’s handiwork, noting how plants divulge the fire history of an area, for instance, or how sediments tell tales of changing climate.

Captioned color photographs support the text and beautify the book. In many cases, the items illustrated are Californian.

Neill, William, and Pat Murphy. *By Nature’s Design.* San Francisco: Chronicle Books, 1993. 119 pp.

Nature’s common recurring forms—forms such as spheres and spirals, ripples and meanders, cracks and branchings—are the focus of this attractive work.

Murphy's text is insightful as well as interpretive, while Neill's photographs showcase the aesthetic qualities of "nature's design." There is considerable overlap between this book and Stevens' *Patterns in Nature* (cited below, and explained more fully), but also enough difference in their scope and detail to make a check of both worthwhile.

Packard, Edward. *Imagining the Universe: a visual journey*. New York: Perigee Books, The Berkley Publishing Group, 1994. 154 pp.

This book helps the reader begin to comprehend scales of space and time that lie outside one's everyday experience.

A series of geographic analogies are used—all based around San Francisco's Candlestick Park. One example: If a baseball were enlarged to the earth's size, then a similarly-magnified human chromosome would span the ball park's playing field, and a speck of pollen would fill the Golden Gate. Another: Shrink the earth to the size of a sand grain at home plate, and our nearest visible nighttime star would be proportionally as far away as Kansas.

Pappas, Theoni. *The Joy of Mathematics: discovering mathematics all around you*. Revised edition. San Carlos, California: Wide World Publishing/Tetra, 1989. 240 pp.

Simply put, this book is fun. Stories, puzzles, and demonstrations enliven this look at our world from a mathematician's point of view.

With nearly 150 topics touched upon, nature isn't overlooked. For example, the author relates crystals to polyhedrons, logarithms to earthquakes, orbits to ellipses, and hexagons to honeycombs and snowflakes.

Graphics abound, helping clarify the brief pieces of explanatory text.

Porter, Eliot, and James Gleick. *Nature's Chaos*. Compiled and edited by Janet Russek. New York: Viking Penguin, a division of Penguin Books USA Inc., 1990. 126 pp.

Only about one-eighth of this volume is devoted to Gleick's text—Porter's photography dominates the book—but this text will provide an entirely new outlook on nature for many interpreters.

Recent developments in math and physics are revealing a hidden order in the apparently chaotic forms of crags and coastlines, currents and clouds. As the author demonstrates, "even the most random-seeming of the earth's

images...distribute themselves according to laws that subtly organize the relation of large things to small."

Schneider, Michael S. *A Beginner's Guide to Constructing the Universe: the mathematical archetypes of nature, art, and science*. New York: HarperCollins Publishers, 1994. 352 pp.

Focusing on the numerals one through ten, this notable book considers the broad significance of number. It shows, for instance, how patterns of five relate an apple to a starfish, and tells why multiples of six are often used to measure time and space.

Mathematics, nature, and science aren't the only subjects covered. Numbers have long played an important symbolic role in philosophy, religion, folklore, and art, and much attention is given to these connections. According to the author, "everything speaks its purpose through its patterns," regardless of whether the thing is a DNA molecule or a cathedral window.

Along with illustrations, the book provides exercises involving a pencil, straightedge, and compass to help clarify its points. Also, many fine quotations accompany the text—in themselves a good reason to consult this source.

Stevens, Peter S. *Patterns in Nature*. Boston: Little, Brown and Company, 1974. 240 pp.

"Our subject concerns the visual patterns and forms in the natural world," the author states. "It turns out that those patterns and forms are peculiarly restricted, that the immense variety that nature creates emerges from the working and reworking of only a few formal themes."

These organizing "themes" are evident all around us—in the similar branching patterns of trees and arteries, in the meandering curves of snakes as well as rivers, and in the spiraling we find in snail shells and storm systems alike. Such kinships are shaped by powerful hidden influences, among them the laws of physics, the rules of geometry, and an underlying natural tendency to economize.

Without resorting to math or jargon, the book investigates these things...and in doing so, provides answers to basic questions that the reader may never before have thought to ask.

Thompson, D'Arcy Wentworth. *On Growth and Form*. Revised and enlarged edition. Cambridge: Cambridge University Press, 1942. 1116 pp.

With its command of subject and its enduring reputation, this book is a true classic of scientific literature. The author analyzes basic biological issues of growth, form, and function, relating them to principles of math and physics.

One chapter deals with “magnitude” —how an organism’s size influences not just its shape, but also its metabolism, longevity, and behavior. Other topics of inquiry include: factors affecting growth rates of various species, the mechanical efficiency of wings and bones, mathematical patterns of leaf arrangement, the significance of shape in shells, teeth, and horns—and more. Especially eye-catching are diagrams that show hidden relationships among different evolutionary forms by distorting the grid-lines on which they’re drawn.

Here is a fine, thought-stirring resource for interpreters...but because of the book’s exhaustive detail and scholarly tone, it is a source more likely to be browsed than read cover-to-cover.

This volume builds upon a work which originally appeared in 1917. The revised edition described here was reprinted by Dover Publications, Inc. in 1992.

GENERAL SCIENCE

Science, as a quest to understand the workings of nature at every scale, surely ranks among the greatest enterprises of humanity. Through science we've acquired a vast body of knowledge that's both empowering and humbling.

Included here are a number of works whose subject is the whole of science...or, at least, whose scope isn't confined to any of the narrower scientific categories that follow.

“One thing I have learned in a long life: that all our science, measured against reality, is primitive and childlike—and yet it is the most precious thing we have.”

—Albert Einstein

“Without detailed, scientific knowledge of the way the world works, most of the world’s stories remain untold. Knowledge lets nature speak.”

—Chet Raymo

“Science, at its best, should leave room for poetry. It should note helpful analogies and metaphors that stimulate the imagination, conjure in the mind images and allusions that go beyond the needs of straightforward understanding.”

—Richard Dawkins

“Science is not only compatible with spirituality; it is a profound source of spirituality. When we recognize our place in an immensity of light-years and in the passage of ages, when we grasp the intricacy, beauty, and subtlety of life, then that soaring feeling, that sense of elation and humility combined, is surely spiritual.”

—Carl Sagan

Adler, Irving. *Dust*. Illustrated by Ruth Adler. New York: The John Day Company, 1958. 122 pp.

Although this modest volume uses simple language in an ordinary manner, its underlying concept is actually quite brilliant.

“Dust is the stuff of the universe. Here is its fascinating story, from the sunlit specks dancing in your room to the cosmic particles that dim the stars.” Such is the claim on the book’s “dust” jacket. Soil erosion and sunsets, cloud formation and chalk, meteors and microscopic life—these and various other things are shown to have a common denominator: dust.

This work is cited here as proof that, to a creative interpreter, even dust can become a source of inspiration!

Asimov, Isaac. *Asimov’s New Guide to Science*. New York: Basic Books, Inc., Publishers, 1984. 940 pp.

This volume is the fourth edition (each with a somewhat different title) of a work which was first published in 1960. It, too, grows increasingly dated as science continues to advance.

Nonetheless, the book remains a monumental achievement. Divided into two main parts representing the physical and the biological sciences, it covers each in considerable detail. Equally remarkable is the author’s interpretive style—not just informative, but imaginative and entertaining.

Barrow, John D. *The Artful Universe*. Oxford: Clarendon Press, 1995. 274 pp.

This mind-stretching book helps bridge the age-old gap between the sciences and the arts—“two things [which are] most uniquely human.” Author Barrow shows how the very “structure of the Universe” influences not only our beliefs and tastes, but also such basic cultural elements as language, art, and music. A Babylonian calendar, a Bach concerto, and a computer-generated graphic are among the diverse examples chosen to support this theme.

Rich in esoteric detail, this work will require a little effort of some readers. But interpreters, attuned as they are to the interconnectedness of things, should find its bold ideas well worth their time.

Bodanis, David. *The Secret House: 24 hours in the strange and unexpected world in which we spend our nights and days.* New York: Simon and Schuster, 1986. 224 pp.

Combining a scientist's store of information with a storyteller's flair, the author conducts a home tour that is truly unforgettable. Ordinary objects are viewed in novel ways—the acoustics of a leaky faucet, the unappetizing chemistry of toothpaste, the microbial ecology of a dish towel, and the thermodynamics of a ringing alarm clock are a few examples.

Cottrell, William H., Jr. *The Book of Fire.* Missoula, Montana: Mountain Press Publishing Company, in cooperation with the National Park Foundation, 1989. 71 pp.

Flames, glowing embers, white ash, charcoal—what do they really mean?

This booklet provides much insight into subtle as well as dramatic aspects of the burning process. Here, readers will learn about the structure of flames, phases of combustion, fire behavior in forests, and the deciphering of post-fire landscapes. There's even a step-by-step account of the "life history" of a campfire.

The easy-to-read text is accompanied by eye-catching color diagrams on nearly every page.

Davies, Paul. *The Mind of God: the scientific basis for a rational world.* New York: Simon & Schuster, 1992. 254 pp.

This is a book about big questions and clear thinking. It re-examines some ancient quandaries of existence in the light of modern science.

As scientists search for an all-embracing "Theory of Everything," they venture into provinces of thought that traditionally have belonged to philosophy and religion. Why are the laws of nature as they are? Was there a creation event that gave rise to space and time? Is beauty (or mathematical elegance) a guide to truth? How much of the universe is accessible to human reason? The author, a prominent physicist, ponders mysteries such as these—and provides insights, if not answers.

Dawkins, Richard. *Unweaving the Rainbow: science, delusion and the appetite for wonder.* Boston: Houghton Mifflin Company, 1998. 337 pp.

The title of this volume is from a poem by John Keats, who believed that Isaac Newton had destroyed the "poetry" of the rainbow by explaining its colors. Author Dawkins, however, contends the opposite: that science can inspire—and be inspired by—a "poetic sense of wonder."

While parts of the book seem to stray from this premise or to delve into technicality, there remains some good, thought-provoking material for interpreters—particularly those with an interest in genetics. The opening chapter, for instance, ponders the staggering improbability of one’s very existence; the closing chapter speculates about the role that a “poetic impulse” may have played in human evolution.

Horvitz, Leslie Alan. *The Quotable Scientist: words of wisdom from Charles Darwin, Albert Einstein, Richard Feynman, Galileo, Marie Curie, and more.* New York: McGraw-Hill, 2000. 169 pp.

Here’s a collection of interesting observations on a broad range of scientific topics—astronomy, geology, biology, climate, taxonomy, and the scientific method, among others. Scientists past and present account for many of the quotations, as the book’s title indicates; but poets, philosophers, and playwrights are represented, too.

One entry in particular—by Robert Stetson Shaw, a physicist—seems to speak directly to interpreters: “You don’t see something until you have the right metaphor to let you perceive it.”

McKeever, Susan, senior ed., and Martyn Foote, senior art ed. *The Dorling Kindersley Science Encyclopedia.* New York: Dorling Kindersley, Inc., 1993. 448 pp.

Filled with fundamental information, this volume introduces lay readers to the whole of science—both natural and applied.

The book is conveniently organized into twelve thematic sections; “Forces and Energy,” “Earth,” and “Ecology” are some examples. These in turn are divided into more than 250 subject areas, ranging from space stations to seashores, crystals to classifying, and electric currents to evolution. Biographical sketches and other inset features add depth and clarity, while a multitude of colorful photos, drawings, charts, and maps make this reference work a visual treat.

Murchie, Guy. *Music of the Spheres: the material universe—from atom to quasar, simply explained.* In two volumes. New York: Dover Publications, Inc., 1967. 644 pp.

Music of the Spheres is an ambitious exploration of the inorganic realm at every scale. Volume I spans the “macrocosm”—earth, solar system, stars, and galaxies. Volume II covers the “microcosm”—matter, radiation, and relativity. Both are revised from a single volume which was published in 1961.

In its scholarship, its scope, and its highly interpretive style, this book nicely complements Murchie's companion work on life (*The Seven Mysteries of Life*, cited under "General Life Sciences"). Its only drawback is its age; the reader will find no references to quarks, plate tectonics, or black holes here.

Murphy, Pat, and Paul Doherty. *The Color of Nature. Featuring photography by William Neill.* San Francisco: Chronicle Books, 1996. 143 pp.

With vivid photographs and interpretive text, this book focuses on nature's colors—their beauty, their causes, and their significance.

Among other things, readers will learn what blue jay feathers and crimson sunsets have in common; why the inside of an abalone shell is iridescent; how plants and animals use color to convey messages of enticement or warning; and what colors can reveal about the age of deserts and the temperature of stars.

Quammen, David. *Natural Acts: a sidelong view of science and nature.* New York: Nick Lyons Books/Schocken Books, 1985. 221 pp.

From virgin birth among aphids to the supernova of 1572, Quammen's entertaining yet thought-provoking essays shed light into odd corners of the natural world.

Ronan, Colin A., general ed. *Science Explained: the world of science in everyday life.* New York: Henry Holt and Company, 1993. 240 pp.

From the periodic table of the elements to artificial intelligence, this book introduces an array of important scientific concepts and explains them in "the context of everyday reality." Topics are grouped into five general categories: space, energy, atoms and matter, life, and brains and computers.

An appealing overview of modern science—well-organized, clearly written, and profusely illustrated in color.

Sagan, Carl. *The Demon-haunted World: science as a candle in the dark.* New York: Random House, 1995. 461 pp.

In this book, a well-known popularizer of scientific matters argues passionately for science itself.

Surveys suggest that the great majority of Americans are "scientifically illiterate." With clear, compelling prose, author Sagan examines the many facets

of that illiteracy—and warns of dire consequences if it's not overcome. Of special interest is his "baloney detection kit," which offers guidelines for critically analyzing political, social, religious, and other issues.

Above all else, this source should serve as a reminder to interpreters that the visiting public may embrace ideas and attitudes quite different than their own.

Science Curriculum Framework and Criteria Committee. *Science Framework for California Public Schools: kindergarten through grade twelve*. Sacramento: California Department of Education, 1990. 220 pp.

This document sets forth the policies and principles that guide public school science teachers statewide. It also outlines, by subject and age group, the basic concepts to be taught. Such information can be of great value to interpreters, helping them tailor their messages to the learning levels of children and to the curricula of school groups.

A companion *History-Social Science Framework*, published by the Department of Education in 1988 and updated in 1997, deals with cultural themes in a similar way.

Trefil, James. *Meditations at Sunset: a scientist looks at the sky*. New York: Charles Scribner's Sons, 1987. 208 pp.

Clouds and colors, sunspots and suntans—these and other sky-related phenomena serve as lessons in physics in this engaging book.

Trefil, James. *Meditations at 10,000 Feet: a scientist in the mountains*. New York: Charles Scribner's Sons, 1986. 236 pp.

A physicist investigates the workings of the mountain world, from the twisting of trees at timberline to the turbulence of a mountain stream. Explanations lead the reader inside rocks, down a glacier, and back through geologic time.

Trefil, James. *1001 Things Everyone Should Know about Science*. New York: Doubleday, 1992. 305 pp.

This book draws from practically every branch of the natural sciences—astronomy, earth science, physics and chemistry, classical and molecular biology, and evolution.

Science, Poetry, and Parks
Natural History: General and Statewide California

The author describes the volume's contents as "1001 bits of fact, theory, philosophy, and history." These "bits," arranged by subject and consisting of a paragraph or two, make for browsing that's both pleasant and productive.

Walker, Jearl. *The Flying Circus of Physics: with answers*. New York: John Wiley & Sons, 1977. 295 pp.

Why do we see only one side of the moon? Why are mountaintops cold? Why do birds fly in a "V" formation? Why do ocean waves so closely parallel the shore? Here is a ready source of answers.

This book straightforwardly explains the physics behind hundreds of commonplace and unusual phenomena. Many examples are drawn from nature, while others deal with the home environment.

Wood, Elizabeth A. *Science from Your Airplane Window*. Second revised edition. New York: Dover Publications, Inc., 1975. 227 pp.

This book cleverly transforms an ordinary airplane window seat into a mobile science laboratory. It explains a variety of common phenomena which can be heard (ears popping), felt (gravity and turbulence), and seen (landforms, cloud types, and vegetation patterns). Some less-common phenomena, such as full-circle rainbows and other curious optical effects, are also covered.

Readers are invited to experiment as well as observe. The book itself serves as a protractor-like device for measuring acceleration and determining altitude. Once one's altitude is known, charts can be used to estimate the horizon's distance and the amount of earth surface visible below (these charts work for mountaintops as well as planes).

A revision of the 1968 work titled *Science for the Airplane Passenger*.

ASTRONOMY and COSMOLOGY

For those wishing to consider the “big picture” in its broadest sense, the sources listed here should prove ideal. Some are designed to guide the reader through the vastness, beauty, mystery, and wonder of the heavens. Others attempt to explain the very nature and origin of the universe, using theories that bind together matter and energy, space and time.

Many of these works are relatively new or recently revised—a factor to consider when dealing with rapidly advancing fields of study. Also, many overlap one another in their subject matter; they differ, though, in their organization, emphasis, and level of detail, suiting them to different readers.

*“It flows out of mystery into mystery: there is no beginning—
How could there be? And no end—how could there be?
The stars shine in the sky like the spray of a wave
Rushing to meet no shore, and the great music
Blares on forever...”*

—Robinson Jeffers

“In the time it takes to read this sentence, the Earth will glide 200 miles in its orbit around the sun, the sun 3,000 miles in its orbit around the center of our galaxy, and 350,000 miles of additional space will have opened up between our galaxy and those of the Hydra cluster as the universe goes on expanding.”

—Timothy Ferris

“The immense distances to the stars and the galaxies mean that we see everything in space in the past—some as they were before the Earth came to be. Telescopes are time machines.”

—Carl Sagan

“To ask what happens before the big bang is a bit like asking what happens on the surface of the earth one mile north of the North Pole. It’s a meaningless question.”

—Stephen Hawking

“One might think the atmosphere was made transparent with this design, to give man, in the heavenly bodies, the perpetual presence of the sublime....If the stars should appear one night in a thousand years, how would men believe and adore; and preserve for many generations the remembrance...”

—Ralph Waldo Emerson

“The universe begins to look more like a great thought than like a great machine.”

—Sir James Jeans

Allen, Richard Hinckley. *Star Names: their lore and meaning.* New York: Dover Publications, Inc., 1963. 563 pp.

A reprinted edition of Allen's *Star-Names and Their Meanings*, originally published in 1899.

This scholarly work describes the names, folklore, and history surrounding the stars and constellations. The text draws heavily from ancient Chinese, Middle Eastern, Greek, and Roman cultures (in fact, special Greek and Arabic indexes are included in the book).

Some readers may be dismayed by the sheer amount of detail presented; but for those seeking stories about particular stars, this is the source.

Asimov, Isaac. *Asimov on Astronomy.* New York: Bonanza Books, a division of Crown Publishers, Inc., 1979. 238 pp.

Space science has seen some important developments and discoveries since the essays collected in this book were written. Even so, age is not a serious drawback here. Asimov's store of knowledge, his imaginative thinking, and his storytelling skill are still marvels to behold.

One piece in particular, "Heaven on Earth," is more than fine interpretation; it's based on an unusual idea which the famous author claims to be "the most brilliant I have ever had."

Audouze, Jean, and Guy Israël, eds. *The Cambridge Atlas of Astronomy.* Third edition. Cambridge: Cambridge University Press, 1994. 471 pp.

Expanded and updated, this work is aptly described as "the most complete account of modern astronomy available in one highly illustrated volume....a sumptuous reference book." Its text incorporates 130 articles, thematically arranged, covering the solar system, stars, galaxies, the universe, and cosmology. Also included are some 1,100 illustrations and 50 tables of data.

This source will be most useful to the serious student. Interpreters looking for a less exhaustive (and less expensive) general reference may prefer Ronan's *The Natural History of the Universe* (cited below).

Beatty, J. Kelly, and Andrew Chaikin, eds. *The New Solar System*. Third edition. Cambridge, Massachusetts: Sky Publishing Corporation/Cam-bridge: Cambridge University Press, 1990. 326 pp.

In recent decades, spacecraft and other technological tools have vastly improved our view of the solar system. From Martian stream channels to the ring system of Uranus to Pluto's moon, vistas of unanticipated beauty, diversity, and mystery have been revealed.

This source—a collection of articles by eminent scientists—provides an authoritative look at what's been learned. The text is quite readable, despite its rather technical nature. Also, readers will find the book's high-quality photos, computer imagery, and artwork to be consistently fascinating...and occasionally glorious.

Berman, Bob. *Secrets of the Night Sky: the most amazing things in the universe you can see with the naked eye*. New York: William Morrow and Company, Inc., 1995. 320 pp.

Unlike most other listings in this section, Berman's book is neither an encyclopedic reference, an observer's manual, a sky atlas, nor a study of ancient lore or modern theory. Instead, it's a wonderful example of celestial interpretation.

Writing with a lively, entertaining style, the author transforms common sights into memorable insights. The star Betelgeuse becomes "the largest single thing most of us will ever see." The harvest moon becomes not an object, but an event. And "the incomparable crimson of our own earth's roses" becomes the favorite color of the universe.

Burnham, Robert, Jr. *Burnham's Celestial Handbook: an observer's guide to the universe beyond the solar system*. In three volumes. Revised and enlarged edition. New York: Dover Publications, Inc., 1978. 2138 pp.

This reference work, called "a modern classic," contains an awesome amount of information about the starry sky. Thousands of celestial objects are listed here, with many described in detail—detail that includes observational data, interesting scientific facts, and illuminating bits of astronomical history, folklore, and even poetry. Hundreds of charts, diagrams, and photographs are also supplied. The 98 pages devoted to the constellation Sagittarius alone (or the 17 pages on the star Polaris) give some idea of the coverage provided!

Although novices can gain a “working knowledge” of the heavens from the lengthy introductory section in Volume One, this handbook will be most valuable to serious observers using telescopes in the two- to twelve-inch range.

Chartrand, Mark R. *Skyguide: a field guide to the heavens*. Illustrated by Helmut K. Wimmer. Revised edition. New York: Golden Press, Western Publishing Company, Inc., 1990. 280 pp.

Compact and well-illustrated, *Skyguide* is a good first reference for those unfamiliar with the night sky.

This guidebook provides not only a standard overview of astronomical concepts and celestial objects, but also extensive coverage of the constellations. Seasonal sky charts help with orientation, then more detailed maps and text focus on each of the 88 star patterns. The facts and lore presented include much interpretive “grist.”

Consolmagno, Guy, and Dan M. Davis. *Turn Left at Orion: a hundred night sky objects to see in a small telescope—and how to find them*. Second edition. Cambridge: Cambridge University Press, 1995. 205 pp.

True to its subtitle, this guidebook is designed for anyone wishing to observe the heavens with a small telescope. The moon, planets, and dozens of more distant “deep sky” objects are showcased in it.

Among the book’s useful features are maps to help beginners navigate the sky, drawings to show what one will actually see through the eyepiece, and explanatory text to add meaning to what’s seen. Also, tables let the reader know where and when to look for planets through the year 2006.

Cornelius, Geoffrey. *The Starlore Handbook: an essential guide to the night sky*. San Francisco: Chronicle Books, 1997. 176 pp.

Handy, interesting, and attractive, this source serves as a fine introduction to the rich cultural lore of the night sky. Interpreters can take advantage of the book’s synopsis tales about the constellations, planets, sun, and moon. In addition, there are star charts, tables for locating planets, and nice color illustrations of celestial mythology.

Ferris, Timothy. *Coming of Age in the Milky Way.* New York: William Morrow and Company, Inc., 1988. 496 pp.

This book is essentially a history of scientific inquiry about the universe. Put another way, it chronicles the awakening of the human species to the true nature of cosmic space and time.

Author Ferris has the ability to make difficult concepts comprehensible, and his biographical sketches of figures from Archimedes to Einstein are fascinating studies in both genius and eccentricity. Ferris' philosophical musings ("Life might be the galaxy's way of evolving a brain") and liberal use of quotations also enrich the work.

Harrington, Philip S. *Touring the Universe through Binoculars: a complete astronomer's guidebook.* New York: Wiley Science Editions, John Wiley & Sons, Inc., 1990. 294 pp.

Binoculars have certain advantages over telescopes for viewing the starry sky. They're easily portable and relatively inexpensive; they provide truly stunning wide-field views; and, by taking advantage of both eyes, they actually improve an observer's visual acuity.

This comprehensive manual fills a gap in the astronomical literature. After considering the sun, moon, and planets, the author lists more than one thousand "deep sky" objects visible through binoculars, describing several hundred of them in some detail. Appendixes offer tips on how to select, mount, and care for one's binoculars.

Hathaway, Nancy. *The Friendly Guide to the Universe.* New York: Viking Penguin, a division of Penguin Books USA Inc., 1994. 462 pp.

An unusual mix of items make up this book. There are biographical sketches, planetary statistics, and "an abbreviated history of the universe." There are quotations from sources as diverse as Geoffrey Chaucer and James Joyce. There are brief pieces discussing such topics as anti-matter, UFOs, defunct constellations, and the Star of Bethlehem. Perhaps best of all, there are tantalizing bits of information on almost every page—what the Pleiades star cluster had to do with Aztec human sacrifices, for example, or how the outcome of the Battle of Hastings was attributed to Halley's Comet, or why Orion has been called "the California of the Sky."

This is a very entertaining work...and for interpreters in search of fact and anecdote, a very useful one.

Hawking, Stephen. *The Illustrated A Brief History of Time.* New York: Bantam Books, 1996. 248 pp.

Stephen Hawking is widely regarded as the most brilliant theoretical physicist since Albert Einstein. In *A Brief History of Time*, published in 1988, he has attempted to convey “the basic ideas about the origin and fate of the universe...in a form that people without a scientific education can understand.” The book spent about two years on the *New York Times* bestseller list, even though it deals with such abstruse concepts as relativity, quantum mechanics, and a “grand unified theory” which, if discovered, might ultimately enable humans to “know the mind of God.”

This volume is a revised edition of the original work—updated, expanded, and supplied with color illustrations that help clarify the text.

Krupp, E. C. *Beyond the Blue Horizon: myths and legends of the sun, moon, stars, and planets.* New York: HarperCollins Publishers, 1991. 387 pp.

Here is a multicultural tour of the sky, revealing how different peoples at different times have searched the heavens for an understanding of the universe ...and their place in it.

The astronomical lore presented is an eclectic lot. Readers will encounter Greek mythology, UFO accounts, the literary eclipse predicted by Mark Twain’s Connecticut Yankee, and California Indian beliefs about the spiritual meaning of the Milky Way. Amid such diversity, the author finds “a worldwide unity of essential themes and an elementary vocabulary of celestial devices to dramatize them.” Around these he organizes his book.

An extensive bibliography is included.

Miller, Ron, and William K. Hartmann. *The Grand Tour: a traveler’s guide to the solar system.* Revised edition. New York: Workman Publishing, 1993. 208 pp.

With its stunning artwork and interpretive text, this book offers earth-bound “tourists” a great armchair adventure...and a wealth of new perspectives. Readers will be astonished by our solar system’s many exotic realms—worlds with molten sulfur lakes or swirling acid clouds, as well as places where the sun sets twice a day or where the atmosphere lies frozen and brittle on the ground.

This revised edition includes important findings made by the *Voyager 2* spacecraft during the 1980s.

Muirden, James. *How to Use an Astronomical Telescope: a beginner's guide to observing the cosmos.* New York: Linden Press/Simon & Schuster, 1985. 397 pp.

"Inside every astronomical telescope," the author promises, "you will find a whole universe waiting to be explored." Aside from a good star atlas and the telescope itself, this volume provides just about everything one needs to launch an investigation of the heavens.

After explaining how to select an instrument and set it up, Muirden devotes most of the book to the matter of observing. Sun, moon, planets, comets, double stars, star clusters, nebulae, and galaxies are covered in the various chapters. Emphasis is placed on training the eye (to get the most out of the telescope) and on observing systematically (to get the most out of the sky).

Raymo, Chet. *The Soul of the Night: an astronomical pilgrimage.* Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1985. 209 pp.

"The art of observing the night sky is 50 percent vision and 50 percent imagination," claims the author. Likewise, this book might be described as half poetry, half science. Raymo's interdisciplinary grasp and his inspiring insights make for an ideal introduction to the subject of astronomy.

One chapter, "The Shape of Night," is particularly notable; reading it may permanently alter one's impression of the dark.

Raymo, Chet. *365 Starry Nights: an introduction to astronomy for every night of the year.* Englewood Cliffs, New Jersey: Phalarope Books, Prentice-Hall, Inc., 1982. 225 pp.

"This book," explains author Raymo, "is designed to be a kind of companion to the night." Unique in format, it's divided into 365 entries that follow the seasonal changes in the starry sky. The entries—a mix of history, mythology, science, and observation—are illustrated with simple star diagrams or line drawings on every page. Together, they constitute a year-long "mini-course" in descriptive astronomy.

Ridpath, Ian, ed. *Norton's 2000.0: star atlas and reference handbook*. Eighteenth edition. Essex, England: Longman Scientific & Technical, 1989. 179 pp.

"Norton's," used by generations of amateur astronomers, is the best-known star atlas in the world. Its charts show all stars which are visible to the naked eye, as well as many other "deep sky" objects. As a reference handbook, this updated volume contains lists, tables, explanations, and advice that observers will turn to time and again.

An atlas such as this is indispensable for anyone who wants to begin exploring the night sky with binoculars or a telescope. Experienced observers often "graduate" to more detailed atlases showing fainter stars.

Ronan, Colin A. *The Natural History of the Universe: from the Big Bang to the end of time*. New York: Macmillan Publishing Company, 1991. 212 pp.

This book does a nice job of measuring up to its rather pretentious title. The contents are divided into three parts—one discusses universal laws and origins, another surveys the physical universe, and the last examines the significance and possibilities of life. Each part deals with numerous stimulating topics; these are presented in two-page spreads that combine dazzling graphics with clearly-written text.

Here is a fine introduction to this subject area for interpreters, certain to delight the eye and challenge the imagination. Another work by the same author, *The Universe Explained: the Earth-dweller's guide to the mysteries of space* (New York: Henry Holt and Company, 1994; 192 pp.), is similar and may be easier to locate.

Sagan, Carl. *Cosmos*. New York: Random House, 1980. 365 pp.

This is a work as encompassing as its title suggests. The universe's birth and evolution, the history of scientific thought, the genetic code, the search for extraterrestrial life, and humanity's future are among the subjects considered. Sagan's lucid, imaginative style also makes the book a fine example of interpretation.

It's been claimed that *Cosmos* is the best-selling science book ever published in the English language.

**Schaaf, Fred. *Seeing the Sky: 100 projects, activities, and explorations in astronomy.*
New York: Wiley Science Editions, John Wiley & Sons, Inc., 1990. 212 pp.**

At the amateur level, astronomy isn't normally thought of as an experimental science, but this unusual book should convince readers otherwise.

Observational activities are suggested that investigate star color, moon shadows, planetary motion, meteor showers, eclipses, and a broad range of other topics (some of which happen to be atmospheric in nature rather than astronomical).

**Staal, Julius D. W. *The New Patterns in the Sky: myths and legends of the stars.*
Blacksburg, Virginia: The McDonald and Woodward Publishing Company, 1988. 300 pp.**

A revised edition of Staal's *Patterns in the Sky*, published in 1961.

This is an excellent source of celestial lore, gathered from around the world and conveniently arranged; but the book's subtitle perhaps should read "myths and legends of the constellations." Individual stars are dealt with much more effectively in Allen's *Star Names* (cited above).

GENERAL EARTH SCIENCES

The subject of this section is the physical, dynamic earth, from its turbulent atmosphere and restless oceans to its constantly transforming crust. The sources listed here portray the world not just in terms of natural geography, but also in terms of interacting systems, cycles, and flows that operate through vast expanses of geologic time.

Works which focus on a certain branch of earth science—meteorology, for instance—are listed elsewhere under more specific headings.

“One generation passeth away, and another generation cometh: but the earth abideth for ever.”

—Ecclesiastes

“This grand show is eternal. It is always sunrise somewhere; the dew is never all dried at once; a shower is forever falling; vapor is ever rising. Eternal sunrise, eternal sunset, eternal dawn and gloaming, on sea and continents and islands, each in its turn, as the round earth rolls.”

—John Muir

Christopherson, Robert W. *Geosystems: an introduction to physical geography*. New York: Macmillan Publishing Company, 1992. 663 pp.

This college-level physical geography textbook has much to recommend it. It's well-organized, clearly written, attractively illustrated, and reasonably up-to-date. The various earth sciences (except for oceanography) are covered in some detail; geographic subjects such as mapping and human impact are considered also. Although the book's scope is necessarily global, a number of examples and case studies are drawn from California and the West.

McKnight, Tom L. *Physical Geography: a landscape appreciation*. Fifth edition. Upper Saddle River, New Jersey: Prentice-Hall, Inc., 1996. 612 pp.

With its lucid writing and many colorful graphics, *Physical Geography* presents its subject extremely well. This one volume covers a lot of basic material found in meteorology, physical geology, and biogeography textbooks. It also features "focus boxes" which offer added insight into certain topics—topographic maps, global warming, tides, rain forest removal, and the magnitude of geologic time are some examples.

To quote from the book's first chapter, "The fundamental questions of geographic inquiry are, Why is What Where? and So What?" Naturalists and interpreters might benefit from asking both of these frequently.

Ordway, Richard J. *Earth Science and the Environment*. New York: D. Van Nostrand Company, 1974. 486 pp.

This somewhat dated textbook is cited here to call attention to the analogies it uses to help readers grasp the immensity of geologic time.

In one case, imagine that you're walking into the past at the rate of one century per step. Two steps nearly carry you back to the Revolutionary War, and twenty steps take you to the time of Christ. After about 110 steps you'd enter the Ice Age. However, to walk far enough to see a dinosaur (figuring three feet per step) would require a 360-mile hike.

A more familiar analogy compresses the earth's entire history into a single calendar year. On this scale, all recorded human activity takes place in the last 90 seconds of December 31!

Pellant, Chris, consultant ed. *Earthscope: a comprehensive survey of the processes that shape our planet...* London: Tiger Books International, 1985. 208 pp.

Here is a good thematic overview of the earth sciences—and a visually appealing one, with hundreds of colorful photos, diagrams, and maps. It incorporates discoveries that have reshaped our understanding of the planet in recent decades, and also explains the new technology that contributed to these advances. Appropriately, the book draws its examples from many parts of the world; but as a result, the specific references to California are few.

Smith, David G., ed. *The Cambridge Encyclopedia of Earth Sciences*. New York: Crown Publishers, Inc./Cambridge University Press, 1981. 496 pp.

This authoritative reference work emphasizes the earth's physics, chemistry, and tectonic processes. The atmosphere, oceans, and surface geology are covered less thoroughly.

Some readers may find the text too technical and “encyclopedic” to keep their interest. More serious students, however, will appreciate how the book's colorful graphics portray earth science concepts in some interesting and unusual ways.

Van Andel, Tjeerd H. *New Views on an Old Planet: a history of global change*. Second edition. Cambridge: Cambridge University Press, 1994. 439 pp.

“This is a book about change,” the author notes in an earlier edition, but actually it is two. Viewed one way, it's a book about the dynamics of earth history—about drifting continents, fluctuating climate, and evolving life. Viewed another, it's a book about the dynamics of earth science—a science which has seen revolutionary advances since the 1960s.

Van Andel's substantive yet lucid treatment makes this an ideal introduction to the subject for serious lay readers. In particular, the section called “Foundations” will help those who are interested in deciphering the rock record or making sense of geologic time.

WEATHER, CLIMATE, and OTHER ATMOSPHERIC PHENOMENA

Ever-changing and often dramatic, the atmosphere is an interpretive resource of great potential. In California this is especially true, because the distinctive “Mediterranean” climate and its many regional variations exert so powerful an influence on land and life. Geomorphic features, plant adaptations, and animal behavior all reflect the workings of the weather ...as do a wide range of human affairs.

The works cited here are excellent sources of atmosphere-related information, but interpreters may find some to be equally valuable as sources of awareness. Once alerted to the possibilities, we begin to notice things—rainbows in dewdrops, for example, or personalities in storms, or even phantoms lurking in the morning mist.

*"I met a Californian who would
Talk California—a state so blessed,
He said, in climate, none had ever died there
A natural death..."*

—Robert Frost

"No two winters in ten years are alike; no two summers are different."

—Theodore S. Van Dyke (noting the peculiarities of California climate)

*"More than any other thing, the Pacific high has written the social and economic
history of California."*

—Marc Reisner

*"It is clear that two people, standing side by side admiring 'the rainbow,' are
actually seeing light refracted and reflected by different sets of raindrops. Each
person has his or her own personal rainbow."*

—Robert Greenler

"A change in the weather is sufficient to recreate the world and ourselves."

—Marcel Proust

Ahrens, C. Donald. *Meteorology Today: an introduction to weather, climate, and the environment.* Fifth edition. Minneapolis/St. Paul: West Publishing Company, 1994. 592 pp.

This textbook is an excellent reference—up-to-date, interpretively written, and abundantly illustrated with color diagrams and photos.

Standard meteorological subjects are treated with an emphasis on “watching the weather so that it becomes ‘alive’.” Sidebars focus the reader’s attention on unexpected topics, from the fate of a sunbeam to the shape of raindrops. Santa Ana winds, temperature inversions, El Niño events, and other “Californian” phenomena are also discussed, along with current concerns such as the ozone hole and global warming.

Anderson, Bette Roda. *Weather in the West: from the midcontinent to the Pacific.* Palo Alto, California: American West Publishing Company, 1975. 224 pp.

The author notes that the word “climate,” from the Greek, means “inclination” — a reference to how one’s latitude affects the slant of the sun’s incoming rays. Fittingly, this book’s greatest strength is its own regional “slant.” The text explores Western American weather—its curious, distinctive aspects, its shaping of major climatic regimes, and its influence on human life and history.

A well-written and nicely illustrated work.

Bailey, Harry P. *Weather of Southern California.* California Natural History Guides: 17. Berkeley and Los Angeles: University of California Press, 1966. 87 pp. + 8 plates of color photos.

This little book does a nice job of introducing readers to the many fascinations of Southern California’s climate. It explores the dramatic changes that occur between mountain, coast, and desert sites. It shows how the Southland’s seasons are defined by weather imported on the winds from every corner of the map. Also, it discusses important climate-related topics such as temperature inversions, fires, floods, and smog.

Originally titled *The Climate of Southern California.*

Canby, Thomas Y. "El Niño's Ill Wind." *National Geographic*, Vol. 165, No. 2 (Feb. 1984): pp. 144-183.

"El Niño" refers to a periodic warming of ocean water in the tropics of the eastern Pacific. Such warming can in turn affect the weather in strange, far-reaching ways.

This illustrated essay examines one particularly strong El Niño event, with a focus on its human impact. Californians remember the 1982-83 El Niño for the record rainfall, flooding, and coastal damage associated with it. Globally, the climatic disruption plagued five continents with a mix of flood, winds, drought, fire, and famine.

The article combines journalistic text, dramatic photos of the devastation, and explanatory diagrams and maps.

Felton, Ernest L. *California's Many Climates*. Palo Alto, California: Pacific Books, Publishers, 1965. 169 pp.

Most of this book consists of climatic "portraits" —25 in all—of the various regions of the state.

Descriptive text shows how geographic factors affect an area's climate, and how climatic factors in turn affect that area's land use and general livability. Temperature and precipitation data are given for more than 100 California weather stations scattered from Needles to Crescent City.

This is a good reference for comparing the state's "smorgasbord" of climates. However, the weather extremes of recent decades are not reflected in the statistics...and, unfortunately, the book is out of print. (Tritenbach's '*California's Climates*,' cited below, provides similar information.)

Gilliam, Harold. "San Francisco's Own 'Specter of the Brocken'." *San Francisco Sunday Examiner & Chronicle*, Feb. 19, 1967: This World section, p. 25.

The "specter of the Brocken" is a rare but spectacular phenomenon in which an observer's shadow is projected onto a screen of water vapor, sometimes in such a way as to appear enormous. Typically, this apparition is witnessed early or late in the day from a vantage point just above a bank of clouds. The shadow's "head" may be encircled by a colorful halo called a "glory."

This newspaper article, by an authority on San Francisco area weather, describes a personal encounter with the specter. Gilliam also relates other sightings (one by John Muir) as well as folklore and other cultural allusions to this strange effect.

Gilliam, Harold. "Summer Mirages." *San Francisco Sunday Examiner & Chronicle*, July 28, 1985: This World section, p. 17.

In this article, the author tells of curious mirage effects he has observed in the San Francisco area—offshore islands hanging upside down in the sky, vertically elongated ships, and the buildings of downtown Oakland “planted firmly in the waters of the bay.” Under certain conditions, the base of an inversion layer will act like a mirror, producing reflected and distorted images such as these.

One particularly odd mirage is noted in a sidebar: “Residents of the California desert city of El Centro have on occasion been startled to see over the mountains to the west a heavenly reflection of the boats in the harbor at San Diego, 90 miles away.”

Greenler, Robert. *Rainbows, Halos, and Glories*. Cambridge: Cambridge University Press, 1980. 195 pp.

Air, water, and light combine in the sky to create an array of optical effects. These range from familiar rainbows, halos, and “sun dogs” to more elusive phenomena such as floating inverted mirages, diffraction-halo “glories,” the “green flash” at sunset, and the shadowy “specter of the Brocken.”

This fascinating book not only informs the reader that so many remarkable effects exist; it also explains their physical origins (often using geometric diagrams as aids) and advises how to look for them. Striking color photos supplement the text.

Keen, Richard A. *Skywatch: the Western weather guide*. Golden, Colorado: Fulcrum, Inc., 1987. 158 pp.

This source covers much of the same ground—or sky—as Anderson’s *Weather in the West* (cited above). The two books differ in some particulars, though. This one is more current by a decade (it contains material on El Niño events and the Mount Saint Helens eruption, for example), but it lacks the other’s discussion of certain interesting topics. In any case, both works merit a look.

Knox, Joseph B., with Ann Foley Scheuring, eds. *Global Climate Change and California: potential impacts and responses*. Berkeley and Los Angeles: University of California Press, 1991. 184 pp.

In this volume, some highly qualified scientists attempt to look into California's future—that is, into a future impacted by global warming from the so-called “greenhouse effect.”

This book studies the implications of climate change for the state's water resources, agriculture, natural ecosystems, and energy use. Its predictions include a rising sea level, changes in seasonal runoff with more frequent flooding, and the up-slope movement of forests and snow levels, among other things.

A case in point: If climate-model projections are correct, the natural ecosystems of California will change significantly during the 21st century. This could involve “major changes in our national and state parks....Many areas currently set aside for the conservation of specific ecosystems might no longer be suitable to them.” Endangered species extinctions may accelerate as well.

Obviously, much uncertainty exists about “greenhouse” warming and its possible consequences. The speculations offered here are both intriguing and sobering nonetheless.

Lehr, Paul E., R. Will Burnett, and Herbert S. Zim. *Weather*. Illustrated by Harry McNaught. New York: Golden Press, Western Publishing Company, Inc., 1987. 160 pp.

From global air circulation to microclimates and from fronts to forecasting, this pocket-sized “Golden Guide” provides a basic overview of meteorological science. The many color illustrations are helpful both for recognizing phenomena and for understanding concepts.

A revised edition; the work was first published in 1957.

Lockhart, Gary. *The Weather Companion: an album of meteorological history, science, legend, and folklore*. New York: John Wiley & Sons, Inc., 1988. 230 pp.

Unlike most of the sources listed in this section, *The Weather Companion* looks at meteorology from a cultural as well as scientific point of view. It uses folklore along with facts to demonstrate just what a remarkable array of things have been associated with the weather. These include arthritis, earthquakes, classical music,

the moon, dreams, bird behavior, and personal greetings (such as the Egyptian "How do you perspire?"), among other items.

Casual sky-watchers will find the book informative and entertaining; interpreters of the atmosphere will find it invaluable.

Ludlum, David M. *The American Weather Book*. Boston: Houghton Mifflin Company, 1982. 296 pp.

Arranged like an almanac, this book divides its coverage of U. S. weather into twelve monthly, thematic parts (February deals with snow, for instance, and October's topic is air pollution). Each chapter combines a nationwide overview of seasonal changes with background material on that month's theme and accounts of historic weather events. A separate section gives state-by-state listings for record heat, cold, and precipitation.

It's too bad that the unusual weather occurrences of recent years aren't included here.

Minnaert, Marcel. *Light and Color in the Outdoors*. Translated and revised by Len Seymour. New York: Springer-Verlag, 1993. 417 pp.

This work first appeared in 1937 and is now a classic in its field.

While the book covers many of the impressive sky phenomena found in Greenler's *Rainbows, Halos, and Glories* (cited above), it also deals with more intimate, everyday effects as well. Attention is given to such things as the tiny upside-down images in a drop of water, the concentric glints of light we see in backlit treetops, and the different colors that develop in an ocean wave. Readers are shown how shading their eyes will alter the tints of a landscape, and why the shadow of a bird or butterfly is rounded by the sun.

"I feel more and more overwhelmed by the beauty and extent of the material," the author remarks in his preface, and rightly so. For those who really want to exercise their vision, here is a "user's guide."

Schroeder, Mark J., and Charles C. Buck. *Fire Weather: a guide for application of meteorological information to forest fire control operations.* [U. S. Department of Agriculture Handbook 360. Washington, D.C.: U. S. Government Printing Office, May 1970. 229 pp.

Only two chapters (“Weather and Fuel Moisture” and “Fire Climate Regions”) in this manual really seem to justify its title; the other ten deal mostly with general weather concepts.

Regardless, the overall treatment should be extremely useful to interpreters because it emphasizes how the land and atmosphere interact. Even within a small area, evidence of this interaction can be found—in the way surface temperatures change abruptly between sun and shade, for instance, or the way airflow is affected by a woodland clearing or a canyon rim. Once aware of such things, readers will find that details of the *living* landscape are more likely to make sense.

Numerous diagrams reinforce and clarify the text.

Scorer, Richard. *Clouds of the World: a complete colour encyclopedia.* Melbourne, Australia: Lothian Publishing Co Ltd, 1972. 176 pp.

Here’s an answer for anyone who has wondered how to “read” the daytime sky. This book contains hundreds of photographs—many of them in color—showing cloudiness of almost every kind. Not only are the cloud types classed and identified; text and diagrams also explain the unseen processes that shape them. Halos, arcs, and other optical effects are considered, too.

Stewart, George R. *Storm.* New York: Random House, 1941. 349 pp.

“I realized...a storm itself had most of the qualities of a living thing,” author Stewart once explained. Accordingly, this unusual novel becomes a biography of sorts, tracing the life history of a fictitious weather system called Maria. The storm strikes California with a fury that impacts the lives of residents in many different ways.

Readers will find that the book’s technological references are now outdated enough to give the story a secondary historical interest.

Tritenbach, Paul. *'California's Climates.'* Bishop, California: Excellence Press, 1999. 142 pp.

Written with the needs of the lay person in mind, this “guide to California’s cornucopia of climates” explains in some detail why those climates vary so dramatically. It also helps readers to understand and evaluate weather data of different types.

Descriptions of the state’s climatic regions form the core of the book, just as they do in Felton’s *California’s Many Climates* (cited above). Here, however, more regions are differentiated—38 in all—and station data is usually presented in graphs instead of tables. Significantly, the information is more current in this source as well.

Williams, Jack. *The Weather Book: an easy-to-understand guide to the USA’s weather.* New York: Vintage Books, a division of Random House, Inc., 1992. 212 pp.

This is an informative and visually exciting work, produced by the people who developed *USA Today’s* style-setting Weather Page. Its many colorful diagrams, maps, and other graphics transform important weather concepts into eye-catching art. At the same time, headings such as “How a storm picks up energy,” “What a cloud’s appearance tells us,” or “Why sunsets are red” draw readers to the explanatory text. In one section, state-by-state weather statistics invite some interesting comparisons.

For interpreters, *The Weather Book* may be the best introduction to meteorology now available.

WATER RESOURCES

The literature on California water is quite extensive, but most of it is too technical to be of much value to interpreters. However, the sources noted in this section should provide a useful introduction to the subject.

Among the works included here are an eloquent ecological tribute, a rich historical saga, a beautiful atlas, and a data-packed report. Each, in its own way, speaks of California's basic and binding relationship with water.

*“Under heaven nothing is more soft and yielding than water.
Yet for attacking the solid and strong, nothing is better;
It has no equal.”*

—Lao Tsu

*“What wondrous stories a water molecule could tell, of wild peaks visited on
stormy nights, of quiet rivulets and raging rivers traveled, of peaceful fogs and
sun-colored clouds, of glaciers and ocean currents,...and of the seething
protoplasmic retorts of living cells—a zillion places visited since the earth’s
beginning.”*

—David Cavagnaro

*“It has always been a happy thought to me that the creek runs on all night, new
every minute, whether I wish it or know it or care, as a closed book on a shelf
continues to whisper to itself its own inexhaustible tale.”*

—Annie Dillard

*“Lakes do to light and sound what sleep does to thought. There is an odd mix of
reality and illusion. The setting is not made for action, but for contemplation and
dream.”*

—Peter Steinhart

“If there is magic on this planet, it is contained in water.”

—Loren Eiseley

Baxter, Don J. *Lakes of California*. San Francisco: Pacific Gas and Electric Company, 1972. 47 pp.

This source—drawn from a series of articles that appeared in the newsletter *P G and E Progress*—provides some interesting information about California’s best-known bodies of water. Included here are natural features such as Mono Lake and Lake Tahoe, reservoirs such as Folsom Lake and Lake Oroville, and curiosities such as the “phantom” Tulare Lake and the “accidental” Salton Sea.

Braun, Ernest and David Cavagnaro. *Living Water*. Palo Alto, California: American West Publishing Company, 1971. 184 pp.

Here is “a story of life and water flowing, pulsing with the various rhythms of days, seasons, even centuries.” Author Cavagnaro and photographer Braun follow a typical Sierra stream along its course from timberline to the sea, freely digressing (much as a water molecule might) into storms and snowbanks, soil and seeds.

As in his companion volume, *This Living Earth* (cited under “Ecology and Miscellaneous Natural History”), Cavagnaro finds—and interprets eloquently—the profound significance of nature’s common workings.

Brickson, Betty, J. K. Hartshorn, and Elizabeth McCarthy. *Layperson’s Guide to California Water*. Updated edition. Sacramento, California: Water Education Foundation, 2000. 24 pp.

Combining historical and current information, this booklet gives a brief overview of the development and allocation of water resources in California. Flood management, water quality, and other environmental issues are also touched upon.

Harding, Sidney T. *Water in California*. Palo Alto, California: N-P Publications, 1960. 231 pp.

Informative and well-organized, this source provides “a history of water in California.”

Early chapters include a survey of the state’s original waterscape and a look at water rights and laws. The book chronicles the use of water for mining and irrigation, then traces the development of municipal water supplies, hydroelectric power systems, flood control measures, and regional multi-purpose water projects.

One problem: References in the closing chapters to “present” status and “future” plans have become hopelessly outdated. In fact, the monumental State Water Project was only an unfunded proposal when this material was written.

Hundley, Norris, Jr. *The Great Thirst: Californians and water, 1770s-1990s*. Berkeley and Los Angeles: University of California Press, 1992. 552 pp.

The need to use, control, and profit from water is a fundamental part of Western history. This book tells the story of the unique relationship between Californians and their water, from mission irrigation ditches to the Peripheral Canal. This is a scholarly work whose notes and bibliography fill more than a hundred pages; yet it reads a bit like a novel as it weaves a tale of colorful characters, conflicting values, political dealings, and ambitious dreams.

Park interpreters should be interested in the environmental consequences of the state’s “great thirst.” The ravages of hydraulic mining, the damming of Yosemite’s Hetch Hetchy Valley, and Los Angeles’ controversial taking of eastern Sierra water are among the topics covered here.

Kahrl, William L., ed. *The California Water Atlas*. Sacramento: Office of Planning and Research/Department of Water Resources, State of California, 1979. 118 pp.

With its large format and high-quality “look,” this volume isn’t a typical government publication. Nor is it just an atlas, considering its historical illustrations, biographical sketches, and detailed text.

Editor Kahrl neatly summarizes this work: “The reader will find here treatments of every aspect of water supply, delivery, and use in California.” This includes the natural water environment, the history of water development, the operation of the modern water system, water’s role in business and recreation, water quality, and water policy issues.

The colorful aerial photography, maps, and other graphics are superb.

McClurg, Sue. *Water and the Shaping of California*. Sacramento, California: Water Education Foundation/Berkeley, California: Heyday Books, 2000. 168 pp.

Generously illustrated with photographs and embellished with interesting quotations, this book explains how water has played a crucial role in the development of the Golden State. Topics include California’s pristine waterscape, historic floods, recurring droughts, rivers as “arteries of commerce,”

irrigation and agriculture, water reclamation projects, and water philosophy and politics.

Meyer, Carl B. *Water Resources of California. Bulletin No. 1. Sacramento: [California] State Water Resources Board, 1951. 648 pp. + 3 separate map plates.*

This volume contains a wealth of detailed information about California's waterscape, most of it in the form of tables and graphs. The state is divided into seven "major hydrographic areas," each of which is analyzed in terms of its component streams and drainage basins, precipitation, runoff, flood flows and frequencies, and water quality.

California's water picture has changed considerably since this report was published. Even so, some of the data found here may still prove useful—either in a historic sense or for comparative purposes.

Mount, Jeffrey F. *California Rivers and Streams: the conflict between fluvial process and land use. Berkeley and Los Angeles: University of California Press, 1995. 360 pp.*

The first part of this volume examines the way California's rivers naturally work, from the physics of their flowing water to the shaping of their watersheds. A second part considers how land use practices—mining, logging, agriculture, urbanization, and dam-building—affect the dynamic river systems.

Chapters focus on such topics as the concept of flood frequency, water-related California history, and the possible consequences of a changing climate. A comparison of the state's various "hydrologic regions" is also included, along with basic data about each region's important rivers.

Well-written and highly informative, this book is a "must" for interpreters who are interested in or involved with California watercourses.

Pielou, E. C. *Fresh Water. Chicago: University of Chicago Press, 1998. 275 pp.*

"The natural history of fresh water" forms the subject of this book. Chapters clearly and interestingly discuss the water cycle, groundwater, flowing water, frozen water, atmospheric water, and wetlands. It's worth noting that physical aspects of limnology are emphasized over biological ones; except for an eleven-page chapter on microscopic life, the living world is considered only incidentally.

This source can provide interpreters with useful insights into the remarkable ways of water, helping them understand such things as the behavior of currents

in a stream, the movement of pollutants through an aquifer, or the differences between a reservoir and a natural lake.

Reisner, Marc. *Cadillac Desert: the American West and its disappearing water*. New York: Viking Penguin Inc., 1986. 582 pp.

In *Cadillac Desert*, author Reisner weaves history, biography, engineering, politics, and economics into a fascinating story—a story of the quest to control and allocate the West’s precious supply of water.

Because “California’s very existence is premised on epic liberties taken with water,” our state figures prominently in this account. According to the book, “California has twelve hundred major dams, the two biggest irrigation projects on earth, and more irrigated acreage than any other state.” *Cadillac Desert* explains how such things came to be, paying special attention to Los Angeles’ compulsive search for water sources and the Central Valley’s transformation from “an American Serengeti” to an agribusiness empire.

A sharp tone of criticism pervades the work. Readers are notified in an epilogue that “the cost of all this [water development]...was a vandalization of both our natural heritage and our economic future, and the reckoning has not even begun.”

— — — — —. ***Rivers of California*. San Francisco: Pacific Gas and Electric Company, 1962. 48 pp.**

Like *Lakes of California* (cited above), this booklet began as a series of articles in *P G and E Progress*. It’s “a collection of information about California’s rivers, their history, development and geography.” Readers will learn, for example, that the Salinas River is the largest “submerged” (mostly subsurface) stream in America, and that the Truckee River was named by emigrants in honor of a Paiute Indian guide.

OCEANOGRAPHY

The oceans are an amazing realm, from shorelines constantly astir with life and motion to mysterious depths wrapped in absolute, eternal night. The surf's rhythmic power inspires us; a tide pool's denizens delight us; and the open seas beckon our imagination.

The sources noted here should help augment, with knowledge, any sea-watcher's sense of wonder. These works look at oceans generally — physically, biologically, aesthetically, globally. Sources of a more specific nature are listed under "California Regional and Local References: Ocean and Coast" or other appropriate headings.

“How inappropriate to call this planet Earth, when clearly it is Ocean.”

—Arthur C. Clarke

“We want to explore the themes of the ocean’s existence—how it moves and breathes, how it experiences dramas and seasons, how it nourishes its hosts of living things, how it harmonizes the physical and biological rhythms of the whole earth, what hurts it and what feeds it—not least of all, what are its stories.”

—Jacques-Yves Cousteau

“The impulse which drives a man to poetry will send another man into the tide pools and force him to try to report what he finds there.”

—John Steinbeck

“Does the song of the sea end at the shore or in the hearts of those who listen to it?”

—Kahlil Gibran

“Our blood is sea water: it remembers tides, the moon’s pull. In the hollow of the womb each of us is life evolving from the sea.”

—Nancy Newhall

Bascom, Willard. *Waves and Beaches: the dynamics of the ocean surface*. Revised and updated edition. Garden City, New York: Anchor Books, Anchor Press/Doubleday, 1980. 366 pp.

Waves and beaches aren't just familiar elements of scenery; they're also expressions of a geophysical system whose workings are closely examined in this book.

Here readers will learn, for instance, about the entire spectrum of ocean waves, from ripples to tides; that the size of a wind-generated wave is governed by three factors; and how wave energy may be focused by underwater topography (much like a lens can focus light). Topics as varied as wave theory and surfing are ably discussed.

Beach-related chapters employ a curious vocabulary of processes and forms. "Littoral drift," "rip currents," "swash marks," "cusps," and "berms" — once such terms are understood, any sandy stretch of coast becomes a thing of fascination.

This source is recommended especially for interpreters who have looked for order and meaning in the ceaseless tumult of the shore.

Carson, Rachel L. *The Sea Around Us*. Special edition. New York: Oxford University Press, 1989. 250 pp.

This literary interpretation of the ocean world, first published in 1951, has become a classic. Carson's "absorption in the mystery and meaning of the sea" is reflected here in prose that's lyrical as well as scientifically precise.

A special "afterword" updates this edition, telling of new marine findings...and new environmental threats.

Cousteau, Jacques-Yves. *Jacques Cousteau/The Ocean World*. New York: Harry N. Abrams, Inc., Publishers, 1979. 446 pp.

Colorfully illustrated and interpretively written, this large volume captures the richness, beauty, and significance of the ocean realm.

These selected chapter titles and subheadings should give a sense of the book's scope and style: "Provinces of the Sea" (ocean environments), "Dying for Survival" (natural selection), "Invisible Messages" (how animals communicate), "Diving to the Past" (marine archeology), "Wet Muses" (the sea as a source of

inspiration), “Political Waters” (international concerns), and “Hope or Else” (protecting the resource).

Fox, William T. *At the Sea's Edge: an introduction to coastal oceanography for the amateur naturalist.* Illustrated by Clare Walker Leslie. Engle-wood Cliffs, New Jersey: PHalarope Books, Prentice-Hall, Inc., 1983. 317 pp.

Interpreters should find this fact-filled manual to be a useful aid in understanding seashores. It's organized around three main subjects—the physical processes, landforms, and ecology of the coastal zone. Geographically as well as scientifically the book maintains a broad perspective, citing examples from around the world.

As author Fox notes, the shore can be regarded as an outdoor laboratory—a place for careful observation and systematic study. Accordingly, readers are given tips about such activities as field sketching, rock fragment identification, and the measurement of beach profiles and longshore currents.

Line drawings and black-and-white photos supplement the text.

Garrison, Tom. *Oceanography: an invitation to marine science.* Second edition. Belmont, California: Wadsworth Publishing Company, 1996. 574 pp.

“An oceanographer needs to be acquainted with a broad and beautiful array of information,” asserts the author in his preface. This college-level textbook provides exactly that.

Physical processes, marine life, economic resources, and environmental concerns—all are covered here, with an engaging style and a unifying outlook that interpreters are sure to like. “The rise of a wave is linked to the twinkle of distant starlight,” we are reminded, and “a soft summer breeze is shaped by the chemistry of a billion microscopic plants.”

Eye-catching, instructive graphics also add to the appeal of the book; these range from a colorful high-tech image of the world's ocean floor to a *Calvin and Hobbes* comic strip pondering the “Coriolis effect.”

Gilliam, Harold. “The Critical Point of the Breaking Wave.” *San Francisco Sunday Examiner & Chronicle*, Apr. 14, 1974: This World section, p. 24.

As a piece of interpretation, this little essay is superb. Imaginatively, eloquently, one of the commonest coastal sights is raised almost to the level of a revelation.

Central to the essay is a familiar fact—that ocean waves change form as they approach the shore. Attention is focused on a pivotal (yet strangely elusive) point in the process: the instant when a shoaling wave’s convex face becomes concave. For author Gilliam, on the day described, “that point of change in the shape of the wave became symbolic of all such moments of change, both in nature and human affairs.”

The rest of the article thoughtfully explores this theme. Examples from music, poetry, and architecture show how for centuries “men have sensed the universality of these moments of transformation and have tried to express them in the arts.” Broadening his analogy to include history, Gilliam pictures America—with its new-found ecological awareness and urgent environmental problems—as balanced at a fateful moment of transition, too.

Levinton, Jeffrey S. *Marine Biology: function, biodiversity, ecology*. New York: Oxford University Press, 1995. 420 pp.

Marine biology is a “hybrid” subject, incorporating elements of oceanography, ecology, physiology, taxonomy, and other disciplines.

This college-level textbook serves well as a marine biology reference. It’s comprehensive and very clearly written, blending general principles with factual detail. Readers will find the frequent text-block summaries to be a helpful feature. Photos, drawings, and other graphics suitably illustrate the volume.

Pernetta, John, general ed. *Atlas of the Oceans*. Revised edition. U.S.A.: Rand McNally, 1994. 208 pp.

Only about one-fourth of this volume is an “atlas” in the conventional sense—that is, a systematic survey of the world’s ocean areas. Much of the book deals with more general oceanographic topics: plate tectonics, changing sea level, water chemistry, tides, human exploration, marine ecology, economic resources, and much more. A concise phylum-by-phylum “Encyclopedia of Marine Life” is included also.

A relatively up-to-date, well-organized, and lavishly illustrated source.

Scheffer, Victor B. *Messages from the Shore*. Seattle, Washington: Pacific Search Press, 1977. 80 pp.

This book's text and photographs draw attention to physical and biological patterns that find expression in coastal settings. Natural history and aesthetics—meaning and beauty—are combined in what the author calls “an appreciation” of saltwater shores.

Trefil, James. *A Scientist at the Seashore*. New York: Charles Scribner's Sons, 1984. 208 pp.

Here is a very readable explanation of the physics behind common coastal features such as tides, waves, and beaches. The sea's saltiness, footprints in the sand, and “one of the most picturesque effects in oceanography” (see pp. 14-15 of the book) are among the other things discussed.

Voss, Gilbert L. *Oceanography*. Illustrated by Sy Barlowe. New York: Golden Press, Western Publishing Company, Inc., 1972. 160 pp.

Like other “Golden Guides,” this small book is packed with basic information about its subject—and with colorful, clarifying graphics. Its age is becoming evident in such sections as “Marine Geology” and “Ocean Engineering,” though.

Zim, Herbert S., and Lester Ingle. *Seashores: a guide to animals and plants along the beaches*. Revised edition. Illustrated by Dorothea and Sy Barlowe. New York: Golden Press, Western Publishing Company, Inc., 1989. 160 pp.

This “Golden Guide” devotes only a few pages to the physical shoreline environment; instead, it concentrates on coastal life. The many color illustrations allow readers to “picture key” common marine organisms—to general type, if not to species.

GEOLOGY and PALEONTOLOGY

With its diverse landforms, its chaotic assemblage of rocks, and its unpredictable earth movements, California is one of the most complex geological areas in the world. Little wonder, then, that interpreters may feel reluctant to share their limited knowledge of the subject with park visitors.

Still, in many situations a basic understanding of geology is essential. Some of our best-known parks were set aside to showcase geologic scenery, or to protect ecosystems with strong geologic ties. And consider historic sites: Old mining camps, for instance, weren't haphazardly scattered across the map, but instead sprang up in places preordained geologically millions of years before.

The works which follow will provide readers with a firm "grounding" in modern geology. Some are general sources, while others deal just with California (or with only the northern, southern, or middle portions of the state). For information of a more site-specific nature, the listings under "California Regional and Local References" should be consulted.

“Geology itself is chiefly a matter of the imagination—one man can actually see into the ground as far as another....”

—Clarence King

“I used to sit in class and listen to the terms come floating down the room like paper airplanes. Geology was called a descriptive science, and with its pitted outwash plains and drowned rivers, its hanging tributaries and starved coastlines, it was nothing if not descriptive. It was a fountain of metaphor....There were festooned crossbeds and limestone sinks, pillow lavas and petrified trees, incised meanders and defeated streams. There were dike swarms and slickensides, explosion pits, volcanic bombs. Pulsating glaciers. Hogbacks. Radiolarian ooze.”

—John McPhee

*“The hills are shadows, and they flow
From form to form, and nothing stands;
They melt like mist, the solid lands,
Like clouds they shape themselves and go.”*

—Alfred, Lord Tennyson

“No life on earth, neither the old sequoia nor the whales...so arouses the imagination and gives it romance and vision as the story which fossil facts picture and restore. Paleontology reveals the zoology of the past—one hundred horizons once filled with life, movement, and song.”

—Enos A. Mills

“The Southern Californian who enjoys his high mountains and flat, hot deserts within minutes of each other probably never considers just how this could happen, nor does he relate their existence with the sharp midnight shudder that rattles the windows and sets the neighborhood dogs to barking.”

—Robert Iacopi

Alt, David, and Donald W. Hyndman. *Roadside Geology of Northern and Central California*. Missoula, Montana: Mountain Press Publishing Company, 2000. 370 pp.

This guidebook does a remarkable job of making a complex subject not just understandable, but interesting.

Authors Alt and Hyndman examine the various geologic provinces of Northern and Central California, explaining the rocks and landforms to be found along major highways that pass through each region. National and state parklands often figure into the discussion, from Point Reyes to Lassen Peak and from Castle Crags to Lake Tahoe's Emerald Bay.

Geological features are interpreted in light of current "plate tectonic" theory. Consequently, readers will encounter such terms as "ophiolite," "subduction," and "terrane," accompanied by simple definitions. At the same time, the text offers some memorable observations and insights—that here the earth mainly tells "a tale of three oceanic trenches," for example...or how bedrock affects the taste of Napa Valley wines...or why Yosemite is "almost a cartoon version" of a glaciated valleyscape.

Also included is a geologic time scale that helpfully indicates key events in the state's prehistory.

Bates, Robert L., and Julia A. Jackson, eds. *Dictionary of Geological Terms*. Third edition. Prepared under the direction of the American Geological Institute. New York: Anchor Books, Doubleday, 1984. 571 pp.

Geological terms are an interesting lot. They range from the lovely ("pyrite," "Eocene") to the laughable ("yazoo stream"), and from the obvious ("marine terrace," "sandstone") to the obscure ("epeirogeny," "pahoehoe," "col"). Anyone who plans to delve into the geological literature or who harbors some doubts about pronouncing words like "Quaternary" and "gneiss" should have access to a good dictionary such as this.

Brown, Kenneth A. *Cycles of Rock and Water: at the Pacific edge*. New York: HarperCollins Publishers, 1993. 309 pp.

This book presents a geology-oriented "collection of stories and discoveries" that the author gleaned through interviews and from his own exploration of the Pacific Coast.

The settings highlighted in the narrative range from Baja California to Alaska, but fully half of them are Californian. These include the oil-rich Los Angeles Basin, Monterey Bay's submarine canyon, and fault-sliced Point Reyes, among others.

Along with earth processes, various connections between the landscape and its life-forms are discussed. To quote from the prologue, "plants and animals...provide clues about changing climate, the rise and fall of sea level, and even the motions of continents."

Brown, Vinson, David Allan, and James Stark. *Rocks and Minerals of California*. Third revised edition. Happy Camp, California: Naturegraph Publishers, Inc., 1987. 200 pp.

This state-specific guidebook is a handy reference for "rock hounds" and interpreters alike. It contains keys to common minerals and rocks, along with information about how the various materials form and why they're interesting or important. A sketch of California's geologic history and a simplified state geologic map are included also. Still, nearly two-thirds of the book consists of a map section and map index that pinpoint the location of different kinds of rock and mineral deposits.

Camp, Charles L. *Earth Song: a prologue to history*. Palo Alto, California: American West Publishing Company, 1970. 192 pp.

Written by an eminent paleontologist, this book paints a clear picture of California's evolving land and life. From primitive sea-dwelling trilobites to Ice Age mammoths, the state's prehistoric animals and their environments are not only described but also related to specific evidence in the fossil record. A brief look at humans and their place in this grand "procession" completes the story.

This is an unusual work, an odd mix of scholarship and artistic license. *Earth Song* was first published in 1952, and even this later edition seems seriously dated now. Nonetheless, it fills a void in the literature.

Collier, Michael. *A Land in Motion: California's San Andreas Fault*. Illustrations by Lawrence Ormsby. San Francisco: Golden Gate National Parks Association/Berkeley and Los Angeles: University of California Press, 1999. 118 pp.

Written in a journalistic style, this source offers lay readers an up-to-date introductory overview of "the most famous fault on earth." The San Andreas fault system's complex movements, its curious landforms, and its fearsome

earthquakes are discussed...along with basic concepts of plate tectonics and seismology.

The book is beautifully illustrated with colorful maps, diagrams, and the author's high-quality photographs—including some dramatic aerial views.

Cvancara, Alan M. *A Field Manual for the Amateur Geologist: tools and activities for exploring our planet*. Revised edition. New York: John Wiley & Sons, Inc., 1995. 335 pp.

Beginners looking for a compact, comprehensive, activity-oriented introduction to geology will appreciate this guide.

Landforms, rocks, minerals, and fossils are covered in considerable detail. Most noteworthy, though, is the book's treatment of "how to do geology"—how to make a rock collection, how to read geologic maps, how to prospect for gold, and more. In fact, there's even a chapter titled "Parks for Geologic Observation and Contemplation."

Eng, Sheryl. *California Geology Magazine Index: 1948-1986*. Special Publication 92. Sacramento: California Department of Conservation, Division of Mines and Geology, 1987. 69 pp.

For the past half-century, the California Division of Mines and Geology has published a useful periodical about the state's geology, mineral resources, mining history, and geologic hazards. Appropriately, the magazine is now called *California Geology*, but prior to 1971 it was known as *Mineral Information Service*.

This index lists hundreds of articles, cross-referenced according to subject and author. The subject headings include many of possible interest to interpreters; "Coastal Geology," "Desert Features," "Energy," "Faults," "Maps," "Mother Lode History," and "State Parks" are some examples.

(*California Geology* is cited elsewhere, under "Periodicals." Indexes to more recent articles can be found in the magazine's last issue for each calendar year.)

Fenton, Carroll Lane, and Mildred Adams Fenton. *The Fossil Book: a record of prehistoric life*. Revised and expanded by Patricia Vickers Rich, Thomas Hewitt Rich, and Mildred Adams Fenton. New York: Doubleday, 1989. 740 pp.

Whether read as a reference or browsed as a "picture key," this is an impressive work. It surveys the entire realm of prehistoric animals and plants, from traces of

life more than three billion years old to creatures that lived only a few centuries ago. Explanations of anatomy and evolutionary history share space with more than 1,500 drawings and photographs.

The book is international in scope. The fossils depicted may not be identical to those the reader will encounter, but often they should be similar. Some entries *are* specifically Californian, including a 50-inch-long oyster and Ice Age victims of the La Brea tar pits.

Gore, Rick. "Our Restless Planet Earth." *National Geographic*, Vol. 168, No. 2 (Aug. 1985): pp. 142-181 + map supplement.

The author pieces together geological evidence from around the world in this journalistic report on plate tectonics. Concepts such as "sea-floor spreading" and "subduction" are woven into the narrative; also, readers will learn of "hot spots" (which account for Hawaiian volcanos and Yellowstone geysers) and California's mosaic of accreted crustal fragments called "terranes."

Equally informative (and certainly more eye-catching) are the graphics that accompany the essay. These include a fold-out time line of earth history, colorful computer-drawn maps, and a separate two-sided map supplement. The supplement—with maps titled "Earth's Dynamic Crust" and "The Shaping of a Continent: North America's active West"—is a great reference by itself.

Guyton, Bill. *Glaciers of California*. California Natural History Guides: 59. Berkeley and Los Angeles: University of California Press, 1998. 198 pp. + 8 plates of color photos.

People may not readily associate glaciers with "sunny California." Nonetheless, glacial ice has helped create some of the state's most dramatic mountain scenery.

This book provides interpreters with ample information about "California's glacier story." One section discusses Ice Age glaciation and its effects in the Sierra Nevada and elsewhere, with a full chapter devoted to Yosemite Valley. Another part surveys the state's small "modern" glaciers—which number more than one hundred, by the author's count. Woven into the text is a history of glacial study in California, including quotes by John Muir, François Matthes, and others. Field trip directions for a "Sierra glacier tour" are given, too.

Hamblin, W. Kenneth, and Eric H. Christiansen. *Earth's Dynamic Systems*. Seventh edition. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1995. 710 pp.

A number of up-to-date college-level textbooks are available that will effectively introduce readers to the subject of physical geology. This one is particularly good. It's well-organized, clearly written, and generously illustrated with color diagrams and photos.

Harbaugh, John W. *Field Guide/Northern California*. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1975. 123 pp.

This guidebook explains the geology along four routes in Northern California. The field trips described are: Point Reyes, a coastal strip between San Francisco and Santa Cruz, Yosemite National Park and the Mono Lake area, and Lassen Peak to Mount Shasta via Burney Falls and Castle Crags.

Harden, Deborah R. *California Geology*. Upper Saddle River, New Jersey: Prentice Hall, Inc., 1998. 479 pp. + 8 pp. of color photographs.

This up-to-date source gives an interesting overview of California geology. Basic principles are covered first, for those without a background in the subject. Next comes the heart of the book—a survey of the state's various regions, examining the important geologic features and processes of each. Then, in an effort to “assemble a unifying picture,” the author briefly traces the structural evolution of California through time...and closes by considering the relevance of geology in everyday life. Numerous photos, maps, and diagrams are included.

Interpreters will appreciate this textbook's multidisciplinary approach. Sidebars recall historic events, address environmental issues, offer safety tips, and even quote poetry—all related to things geologic.

Hill, Mary. *California Landscape: origin and evolution*. California Natural History Guide: 48. Berkeley and Los Angeles: University of California Press, 1984. 262 pp. + 16 pp. of color photographs.

This book deals with the state's landforms as they have been shaped in relatively recent times—that is, within the last 10,000 years.

Topics include mountain-building by faulting and volcanism, the erosive work of streams and glaciers, coastal and desert geomorphic processes, and humans as an agent of geologic change. Line drawings and color photos supplement the text, and tables show where good examples of landscape features can be found.

Hinds, Norman E. A. *Evolution of the California Landscape*. Bulletin 158. San Francisco: State of California, Department of Natural Resources, Division of Mines, Dec. 1952. 240 pp. + 2 separate map plates.

So much has been learned about California geology since Bulletin 158 was published, one may wonder about the usefulness of this source. However, its subject—geomorphology, or the study of landforms—hasn't undergone the radical rethinking that some other branches of earth science have.

This volume divides the state into twelve “geomorphic provinces,” regions which can be distinguished by their geologic nature and their topographic “look.” The Cascade Range, Great (Central) Valley, Sierra Nevada, and Mojave Desert are examples. Each province's features are described in some detail, and the origins of many landforms are explained.

Black-and-white aerial photos present interesting (though rather dated) views of California's varied landscapes.

Howard, Arthur D. *Geologic History of Middle California*. California Natural History Guides: 43. Berkeley and Los Angeles: University of California Press, 1979. 114 pp. + 12 pp. of photographs.

“Middle California,” as defined here, extends from Point Arena to Big Sur and inland to the Sierra foothills. This compact volume chronicles the events which have physically shaped this region over the past several hundred million years.

The story is a complicated one, with conditions varying widely not just through time but also from place to place. Remarkably, the author's account is clear, jargon-free, and geographically precise. In fact, by browsing the book for details and by studying its map-like drawings of the evolving landscape, readers may find that they can piece together the geologic history of particular parks or other Middle California locations they're interested in.

Iacopi, Robert L. *Earthquake Country*. Fourth edition. Tucson, Arizona: Fisher Books, 1996. 146 pp.

“Despite its great variety of natural wonders, California may be best known internationally for just one thing—earthquakes. California is Earthquake Country.” With these lines, author Iacopi begins the latest edition of a popular book which was first published in 1964.

This new edition of *Earthquake Country* is superior to previous ones in its updated discussions of plate tectonics, earthquake mechanics and measurement, historic shocks, future seismic prospects, and preparedness tips. As before, maps and black-and-white photos accompany the text; many of the pictures capture scenes of devastation that are—to say the least—dramatic.

Earlier versions of the work (published by Lane Books: Menlo Park, California) still have one important advantage, though. They devote a much greater amount of space to exploring the state's faults and recognizing fault features. Their landscape photos are often highlighted in red to indicate fault lines—a useful interpretive technique that the current volume lacks.

Kious, W. Jacquelyne and Robert I. Tilling. *This Dynamic Earth: the story of plate tectonics*. U. S. Department of the Interior, U. S. Geological Survey. 77 pp.

This Dynamic Earth is an excellent primer on plate tectonics—an ideal source for those who are curious about the subject but perhaps intimidated by the sound of it.

A sizeable portion of this booklet explains the development, over decades, of the plate tectonics theory. Key elements of the modern concept—sea-floor spreading, plate boundary interactions, paleontological evidence, and such—are presented in a clear and minimally technical way. Also, there's a section on the related hazards of earthquakes, volcanic eruptions, and tsunamis.

Numerous photos, maps, and diagrams complement the text; most are in color, and several pertain directly to California.

Lydon, Philip A. *Explorations in Physical Geology*. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1988. 189 pp.

This is actually a lab manual, intended for use in college-level introductory geology courses. However, many parts of it are also well suited for self-instruction.

Interpreters might find one group of exercises particularly worthwhile; these show, step by step, how to decipher the wealth of information that's contained in topographic and geologic maps. Other sections offer practical advice on "how to read the stories of ancient times that are inscribed within ordinary rocks."

Northern California is well represented in the author's selection of examples.

McPhee, John. *Assembling California*. New York: Farrar, Straus, and Giroux, 1993. 304 pp.

This book offers readers a modern look at the complex patchwork of earth-crust we know as Northern/Central California. It does so by immersing them in the concepts, terminology, and evidence of plate tectonics—the mechanism by which California appears to have been gradually assembled (“an island arc here, a piece of a continent there”).

McPhee’s artful journalistic style enlivens the rather technical subject matter. Sections about the gold rush and the 1989 Loma Prieta quake show, in fascinating detail, how geology can powerfully impact human life and history.

Merriam, John C. *The Living Past*. New York: Charles Scribner’s Sons, 1930. 144 pp.

In *Interpreting Our Heritage*, Freeman Tilden singled out this book for praise, noting that even its title “supplies us with an interpretative ideal.” Chapter headings are equally evocative—“An Abyss in Time” (referring to the Grand Canyon), “Pools that Reflect the Past” (the La Brea tar pits), or “A Living Link in History” (a redwood forest).

Merriam was an early advocate of park interpretation. Appropriately, these essays about “the meaning of the history of life” express a scientist’s understanding with poetic flair.

Although *The Living Past* is out of print, one significant part of it does remain available: *A Living Link in History*, published as a pamphlet by the Save-the-Redwoods League.

Norris, Robert M., and Robert W. Webb. *Geology of California*. Second edition. New York: John Wiley & Sons, Inc., 1990. 541 pp.

This college-level textbook provides an updated, comprehensive look at the state’s geologic picture. It examines California’s various “geomorphic provinces” one at a time—and from different angles, showing their component rocks, landforms, geologic history, processes at work, and features of special interest. An introductory chapter covers basic concepts for beginning students, and a separate chapter deals with the San Andreas fault. Also, an appendix nicely summarizes “some theories pertinent to California geology.”

An excellent reference, best suited for interpreters who have some geologic background.

Oakeshott, Gordon B. *California's Changing Landscapes: a guide to the geology of the state.* Second edition. New York: McGraw-Hill Book Company, 1978. 379 pp.

Written for college students and others interested in earth science, this book contains "all materials needed for a beginning study of California geology," as the author states. Maps, charts, diagrams, and black-and-white photos augment the informative text.

There are three parts to the volume. "Rocks, Principles, and Processes" explains basic concepts using California examples. "California through the Geologic Ages" is a chronological survey of the state's geologic history, rock formations, and prehistoric life. And "Geologic Views and Journeys in the Natural Provinces" tells the reader where to go and what to see.

Pellant, Chris. *Rocks and Minerals.* New York: Dorling Kindersley Inc., 1992. 256 pp.

Although rocks and minerals are often difficult to identify with certainty, this "Eyewitness Handbook" is so well-organized and beautifully illustrated that it maximizes one's chances for success.

With its quality color photos of hundreds of rock or mineral types, the guide can be used to some advantage as a picture key. For a more scientific approach, the reader can become familiar with some basic differentiating properties (hardness, grain size, etc.) in an introductory section, then use them to progress through a rock key or mineral identification table. Rocks are classified by their manner of origin, and minerals by their chemistry.

Raymo, Chet. *The Crust of Our Earth: an armchair traveler's guide to the new geology.* Englewood Cliffs, New Jersey: PHalarope Books, Prentice-Hall, Inc., 1983. 135 pp.

Here is modern geology as presented by a master storyteller. Interpreters are likely to learn from both the author's material and his approach.

The reader is guided on "a journey of the imagination" to sixty sites around the world. At each, a fascinating explanatory tale is spun around some geologic setting, object, or event. Many of the stories involve "a comprehensive new theory of remarkable scope and power" — the theory of plate tectonics.

Several of the brief, illustrated essays pertain to the American West. Topics include the 1906 San Francisco earthquake; the eruption of Mount St. Helens; the Great Basin's vanished lakes; Yellowstone's subterranean "hot spot;" and the

“Spokane flood,” an Ice Age deluge that swept through eastern Washington with the volume of a hundred Mississippi Rivers.

Rhodes, Frank H. T. *Geology*. Revised edition. Illustrated by Raymond Perlman. New York: Golden Press, Western Publishing Company, Inc., 1991. 160 pp.

This “Golden Guide” makes an ideal “first source” for those having no prior experience with geology. By means of concise text and colorful graphics, readers are given a broad overview of the subject and are introduced to basic terms and concepts. The little book’s quite inexpensive, as well.

Rhodes, Frank H. T., Herbert S. Zim, and Paul R. Shaffer. *Fossils: a guide to prehistoric life*. Illustrated by Raymond Perlman. New York: Golden Press, Western Publishing Company, Inc., 1962. 160 pp.

This book—another of the compact and well-illustrated “Golden Guides”—offers a nice introductory survey of prehistoric life. The various periods of earth history are considered, as are representative types of fossil vertebrates, invertebrates, and plants.

Rice, Salem J. *A Description of the Set of Minerals and Rocks Furnished to California Schools by the California Division of Mines and Geology*. Special Publication 33. Sacramento: [California] Division of Mines and Geology, 1962. 55 pp.

Years ago, the State Division of Mines and Geology provided California schools with sets of minerals and rocks—a service which has since been discontinued. This publication was prepared to accompany the sets.

The booklet includes an explanation of basic rock types (igneous, sedimentary, and metamorphic) and observable properties of minerals, followed by descriptions of each of the 35 specimens in the set. Many of the materials represented are quite common; granite, serpentine, sandstone, mica, and quartz are some examples. Their location, geologic significance, and economic use are concisely noted in the text.

Interpreters who are new to the subject—or to the state—should find this information very helpful.

Ritchie, David. *The Ring of Fire*. New York: Atheneum, 1981. 258 pp.

Surrounding the Pacific Ocean is a narrow zone of intense seismic and volcanic activity—the so-called “Ring of Fire.” This book combines fact, lore, and anecdote in a riveting account of the infamous ring’s human impact.

Recounted here are case histories of disastrous earthquakes, violent eruptions, and deadly tsunamis (seismic sea waves), as the reader might expect. Less predictably, the author also includes such things as Inca Empire gold, New England's "year without a summer," Native American mythology, and cold war weapons testing...and relates each to the Ring of Fire.

This is a great source of stories for interpreters who want to make geology seem more exciting. A few chapters deal specifically with California and the West.

Sharp, Robert P. *A Field Guide to Southern California*. Third edition. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1994. 301 pp.

After a province-by-province overview of the Southland's geologic setting, this guidebook closely examines the geology along some well-chosen routes. One "field trip" leads to Death Valley by way of Barstow and Baker; another follows U.S. Highway 395 as far north as Mammoth. Other trip segments cross the Mojave-Palmdale area, run from Riverside or San Bernardino to Palm Springs, and track Interstate Highway 5 into the San Joaquin Valley.

Sharp, Robert P., and Allen F. Glazner. *Geology Underfoot in Southern California*. Missoula, Montana: Mountain Press Publishing Company, 1993. 224 pp.

What earth-shaping message do the colorful beach pebbles at San Simeon contain? How are Mitchell Caverns linked to the Ice Age? Why is the landmark known as Morro Rock thought to be the remnant of an old volcano? The answers to these and other geological puzzles are revealed in this interpretive guide.

The authors contend that "rocks tell stories that can be read like pages in a book." With this in mind, they present twenty "vignettes" — each a story focused on some geological subject of particular interest and significance. Several involve California State Park System units. Besides the places noted above, Red Rock Canyon State Park, San Onofre State Beach, and Torrey Pines State Reserve are represented.

Shelton, John S. *Geology Illustrated*. Drawings by Hal Shelton. San Francisco: W. H. Freeman and Company, 1966. 434 pp.

In a way, this unusual source brings field geology indoors. Its hundreds of photographs and detailed drawings clearly show geological features ranging from marine terraces to glacial moraines to desert alluvial fans.

Text and captions are used to interpret the illustrations, with the material arranged to develop some of the main principles of physical and historical geology. Most of the book's examples come from the American West and Southwest; California is well represented.

Sorrell, Charles A. *Rocks and Minerals*. Illustrated by George F. Sandström. New York: Golden Press, Western Publishing Company, Inc., 1973. 280 pp.

At first glance, this "Golden Field Guide" appears quite similar to Pellant's *Rocks and Minerals* (cited above), but there are some notable differences. Rocks are covered less thoroughly here—in fact, the book is devoted almost entirely to minerals. On the other hand, the treatment of mineral chemistry and crystal systems is superior in this work. Also, specimens are illustrated using high-quality color artwork, as opposed to the other handbook's color photos.

This source was originally titled *Minerals of the World*.

Stokes, W. Lee. *Essentials of Earth History: an introduction to historical geology*. Fourth edition. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1982. 577 pp.

"Historical" geology deals with the history of the earth and its diverse life-forms. This textbook provides a fine overview of the subject—one that's balanced, interesting, and clear.

About one-half of the volume chronicles our planet's physical and biological development. Other chapters examine related topics such as plate tectonics, geologic time, fossils, organic evolution and extinction, and the basic principles on which this branch of science depends.

Sullivan, Walter. *Landprints: on the magnificent American landscape*. New York: Times Books, The New York Times Book Co., Inc., 1984. 384 pp.

Grand scenery, puzzling landforms, even the human geometry of city and farm—all are "histories written on the land." Author Sullivan's aim is "to help the reader share the excitement and wonder of these epic tales."

Because this book is continental in its scope, California figures prominently in only a few chapters. These, however, furnish excellent insights into the state's tectonic past. For instance, they note that 85 percent of California was "accreted" (added) to North America during a great slow-motion collision with the Pacific Ocean floor...and that some of this accreted material may have originated as far away as Asia or Australia!

A fascinating, interpretively written work.

———. “Earthquakes.” *California Geology*, Vol. 37, No. 9 (Sept. 1984): pp. 194-200.

So many articles in *California Geology* magazine are potentially valuable to interpreters that they can't all be listed here. (Instead, see the periodical's published *Index*, cited above.) One piece, however, merits special listing for a simple yet memorable graphic it contains.

This graphic relates the amount of energy released by an earthquake to the size of a circle—a circle to be thought of as a sphere. The energy released by a quake of magnitude 1 on the Richter scale is represented by the volume of a ½-inch diameter sphere; that of a magnitude 2 quake, by a 1½-inch sphere; and a magnitude 3 quake by a 5-inch sphere. Proportionally, to show the energy released by the 1906 San Francisco earthquake (magnitude 8.3) would require a sphere 220 feet across!

———. *List of U. S. Geological Survey Geologic and Water-Supply Reports and Maps for California*. [U. S.] Department of the Interior, Sept. 1987. 468 pp.

One of the best sources of information about the state's geology is the U. S. Geological Survey. This document lists California-related reports and maps that were published by the U.S.G.S. between 1879 and 1987.

In all, approximately 20,000 citations can be found in the general index of this catalog. Most will prove unusable, but some are sure to contain exactly the kind of detailed, site-specific material that geology-minded park interpreters will be looking for. Happy hunting!

SOILS

With a thickness measured in mere inches, they span the continent. Though close at hand, they're home to creatures as exotic as any found in zoos. Unseen, in darkness, they conduct a type of alchemy that supports ecosystems and civilizations alike. "They," of course, are soils.

Whether because of their commonness or their complexity, soils aren't often enough the focus of interpretation. Willing interpreters who need some guidance through this nether world can find help among these listed sources.

“Soil cannot be taken lightly. Thousands of years and the work of billions upon billions of generations of living things are required for its formation. We are dependent upon it and upon the system that creates and sustains it. When it is gone from a piece of land, it is gone for a very long time, and no man can manufacture it anew.”

—David Cavagnaro

“More organization and complexity exist in a handful of soil than on the surfaces of all the other planets combined.”

—Edward O. Wilson

Brady, Nyle C., and Ray R. Weil. *The Nature and Properties of Soils*. Eleventh edition. Upper Saddle River, New Jersey: Prentice Hall, 1996. 740 pp.

This textbook provides an excellent overview of soil science. In the words of its authors, it “emphasizes the soil as a natural resource and highlights the many interactions between the soil and other components of the ecosystem.” Among the topics covered are soil formation and classification, water and nutrient cycles, soil organisms and ecology, soil erosion, and soil management considerations.

The *Nature and Properties of Soils* is a standard, even classic, reference. This is the latest in a series of editions dating back to the 1920s.

Logan, William Bryant. *Dirt: the ecstatic skin of the earth*. New York: Riverhead Books, 1995. 202 pp.

Science, history, philosophy, and the author’s playful style all contribute to this collection of short essays, whose common denominator is dirt.

A diverse and unlikely set of topics are touched upon, ranging from cosmology to classical poetry and from earthquakes to excrement. Readers will consider such things as the natural history of a grave, the discovery of antibiotics, and the inevitability of gophers. Curious facts are also interspersed—for example, a single gram of clay powder can have a total surface area larger than a football field!

Simply put, this work offers not a study but rather a contemplation of the soil.

Milne, Lorus J., and Margery Milne. *A Shovelful of Earth*. Illustrated by Margaret La Farge. New York: Henry Holt and Company, 1987. 114 pp.

Suitable for both older children and adults, this book invites its readers to investigate “the whole new world” that lies beneath their feet.

Physical aspects of the soil—color, moisture, particle size, etc.—are mentioned in an introductory way, but the authors’ emphasis is obviously on the soil’s “tenants.” The life histories, adaptations, and interactions of various common ground-dwellers are described. Separate chapters explore leaf litter, topsoil, and subsoil zones, as well as forest, grassland, desert, and alpine soils.

Stippled black-and-white drawings add to the book’s interest, and are nicely done.

Storie, R. Earl, and Walter W. Weir. *Generalized Soil Map of California. Manual 6.* University of California, Division of Agricultural Sciences, Agricultural Experiment Station and Extension Service. 52 pp. + separate map.

Despite its title, this publication is actually an explanatory booklet. The separate, multicolored “Generalized Soil Map of California” (by the same authors and publisher, Berkeley, California, Apr. 1951; 36” x 32”) can be found in a pocket on the inside back cover.

The text describes and the map depicts, in a very general way, the soil geography of California. On the map, eighteen “mapping categories” are designated (plus one for an unmapped southeastern desert region). In the booklet, tables subdivide each map category into more specific soil groupings, such as “Ferndale loam,” “Tujunga gravelly sand,” “peat muck,” or “Diablo clay.”

Users of this manual won’t learn to identify every soil type, but they should gain a better sense of the state’s remarkable soil diversity. They may also come away better understanding the interrelationship between an area’s bedrock geology, climate, vegetation, and land use—as expressed by the nature of the soil.

Trott, Kenneth E., and Greg Frantz. *An Index to Soil Surveys in California. Second edition.* Publication No. S-86-01. California Department of Conservation, June 1986. 31 pp. + separate “Appendix” (76 pp.).

Here’s a valuable reference for those who need detailed maps and other information about their local soils.

Over the years, a number of agencies have conducted soil-related surveys in California—the U. S. Soil Conservation Service, U. S. Forest Service, and California Department of Water Resources, among others. This booklet describes the nature and extent of these surveys, and tells where to locate copies of the resulting maps and reports. The actual *index* to the various documents takes the form of a separately printed “Appendix,” arranged by county and with listings as current as 1995.

GENERAL LIFE SCIENCES

Some of the sources in this section deal with biology as a whole; all of them deal with subjects that span the division between the plant and animal kingdoms. Evolution—a key biological concept and one that’s often misunderstood—is the focus of several works.

Variously the authors use science, history, philosophy, linguistics, and poetry to enhance their readers’ understanding of life.

“The true frontier for humanity is life on earth—its exploration and the transport of knowledge about it into science, art, and practical affairs.”

—Edward O. Wilson

“All the green in the planted world consists of these whole, rounded chloroplasts...If you analyze a molecule of chlorophyll itself, what you get is one hundred thirty-six atoms of hydrogen, carbon, oxygen, and nitrogen arranged in an exact and complex relationship around a central ring. At the ring’s center is a single atom of magnesium. Now: If you remove the atom of magnesium and in its exact place put an atom of iron, you get a molecule of hemoglobin. The iron atom combines with all the other atoms to make red blood...”

—Annie Dillard

*“I believe the first living cell
Had echoes of the future in it, and felt
Direction and the great animals, the deep green forest
And whale’s-track sea; I believe this globed earth
Not all by chance and fortune brings forth her broods,
But feels and chooses.”*

—Robinson Jeffers

“The earth has been rolling blindly through the void for some five billion years, slowly developing an organ of consciousness, and it is just now arriving at the stage where it is capable of seeing and understanding itself. Its stones and rivers have begun to speak and its winds at last have found their tongues in the mind of man. The very layers of the soil, the grain of glaciers, the rings of trees, even the sea bottoms have become living pages of our world’s diary that she may read back to herself for the first time.”

—Guy Murchie

“Facts are only part of a humane relationship with the biosphere; feelings are just as important because they dictate behavior.”

—David Rains Wallace

Ackerman, Diane. *A Natural History of the Senses*. New York: Random House, 1990. 332 pp.

Scientific facts, cultural lore, and personal insights come together in this rich contemplation of the senses. "Perception is itself a form of grace," declares the author; accordingly, her book becomes "an act of celebration."

The topics of discussion are both fascinating and eclectic. They include how scents can trigger vivid distant memories; how language is "steeped in metaphors of touch;" how owls are able to pinpoint sounds at night; how lead poisoning may have contributed to the fall of the Roman Empire; and—as one California-related section is titled—"How to Watch the Sky."

Because interpreters deal in sense-based commodities such as awareness and appreciation, this source may prove to be every bit as instructive as a field guide. Certainly it makes better reading.

Attenborough, David. *Life on Earth: a natural history*. Boston: Little, Brown and Company, 1979. 319 pp.

The chapters of this book—like the programs of the television series on which it's based—trace the general course of life's evolution. Organisms ranging from bacteria to humans are used to illustrate divergent lineages. A fascinating array of biological adaptations are covered, in a way that's clear and jargon-free.

The author strongly emphasizes animals in *Life on Earth*; a companion volume (cited under "General Botany") investigates *The Private Life of Plants*.

Ayensu, Edward S. and Philip Whitfield, consultant eds. *The Rhythms of Life*. New York: Crown Publishers, Inc., 1982. 199 pp.

To quote from the book's dust jacket, "All life has rhythm. Every creature on earth...dances to the music of time." Here one will learn not only about this living "dance" in its many fascinating forms, but also about the different environmental "beats" that guide it. Topics range from the cosmic to the microscopic, and from mechanical clocks to biological ones.

Once interpreters become attuned to the idea of rhythm in nature, examples like those given—involving such things as growth, movement, and behavior—will seem both obvious and all-pervading.

Baker, Robin, chief contributing ed. *The Mystery of Migration*. New York: The Viking Press, 1981. 256 pp.

Here's a clear, comprehensive, well-illustrated work on the subject of migration. Surveying the animal kingdom from invertebrates to humans, its story is one of marvels as well as mysteries. Plants are covered, too, in a chapter that considers the movement of spores, seeds, and fruits by different agents.

Although the book maintains a global perspective, some of California's wildlife is represented—from the local comings and goings of newts and grunion to the epic journeys of swallows, monarch butterflies, and whales.

Barlow, Connie, ed. *Evolution Extended: biological debates on the meaning of life*. Cambridge, Massachusetts: The MIT Press, 1994. 333 pp.

Is evolution a religion? How can "progress" in life's history be defined? What are the selective roles of cooperation and of strife? This anthology offers opinions on such matters from eminent biologists, philosophers, poets, clerics, and even the U. S. Supreme Court. Often eloquently, the selected writings and editorial comments *extend* evolutionary biology from its factual foundations into a broader "realm of meaning."

Evolution has always been a controversial subject, and the viewpoints represented are diverse. However, some arguments raised by creationists won't be found because "the topic here is 'evolution extended'—not 'evolution questioned.'"

There's a great deal to think about between the covers of this book.

Borror, Donald J. *Dictionary of Word Roots and Combining Forms: compiled from the Greek, Latin, and other languages, with special reference to biological terms and scientific names*. Palo Alto, California: Mayfield Publishing Company, 1960. 134 pp.

Scientific names and other biological terms are made up of various "word roots," often Greek or Latin in origin. This source concisely lists and defines thousands of these roots, and it also explains the rules for combining and pronouncing them.

Interpreters tend to avoid technical jargon, but here they'll find that many such terms contain stories they can use. For example, clovers belong to the genus *Trifolium*, meaning "three leaf" in reference to their usual number of leaflets. The Steller's jay's generic name *Cyanocitta* translates as "dark blue chattering bird," a

fair description. And the striped skunk's binomial, *Mephitis mephitis*, denotes "a foul odor" – twice!

Campbell, Neil A., Lawrence G. Mitchell, and Jane B. Reece. *Biology: concepts and connections*. Redwood City and Menlo Park, California: The Benjamin/Cummings Publishing Company, Inc., 1994. 846 pp.

Intended primarily for non-biology majors, this college-level textbook is clearly written and nicely illustrated with color diagrams and photos. For interpreters, though, its greatest asset may be the way it's organized.

Six basic units are presented: cellular biology, genetics, evolution, animals, plants, and ecology. Each unit is divided into chapters that examine important subjects (some examples: "A Tour of the Cell," "How Animals Move," and "Population Dynamics"). Each chapter in turn consists of brief thematic "modules" that identify and explain key concepts (such as "Life's diversity is based on the properties of carbon" or "Fungi help most plants absorb nutrients from the soil"). Throughout, attention is given to conceptual connections—"how the ideas fit together and how they relate to students' lives."

An excellent general reference.

Evans, Howard Ensign. *Pioneer Naturalists: the discovery and naming of North American plants and animals*. New York: Henry Holt and Company, 1993. 294 pp.

Many plants and animals have common or scientific names that serve as memorials to early naturalists. Examples include the Steller's jay and *Eschscholzia*, the California poppy.

Here, author Evans tells some fascinating stories about "the men (and more rarely, women) who devoted their lives to roaming the fields and forests in order to make known the richness of our continent. They were a curious lot, and we shall not see their likes again."

Several dozen brief accounts match individuals with their namesake species.

Hoagland, Mahlon, and Bert Dodson. *The Way Life Works*. New York: Times Books, 1995. 233 pp.

In this case, the collaborative efforts of a biologist (Hoagland) and an illustrator (Dodson) have produced a truly original book. *The Way Life Works* is imaginative and eye-catching, humorous yet profound. Above all, it is great interpretation,

celebrating “the unity of life” through the inspired use of theme, analogy, and art.

Readers are shown, for instance, what car headlights have to do with evolutionary theory; how bronchial tubes are designed like pine cones and seashells; and why DNA more closely resembles a recipe than a blueprint. On another level, this source serves as a reminder that even technical information— if ingeniously presented— can become not merely comprehensible, but fun.

Jaeger, Edmund C. *A Source-book of Biological Names and Terms*. Third edition. Springfield, Illinois: Charles C Thomas·Publisher, 1955. 323 pp.

This standard reference is similar to Borror’s *Dictionary of Word Roots and Combining Forms* (cited above), but it provides a more extensive and detailed treatment of life science terminology. For example, one section gives brief biographies of hundreds of people commemorated in botanical and zoological names.

To excerpt from the book’s dedication page: In any “well-made scientific name” one may find “a treasure house of meaning,” with “valuable clues to identification” or “rich allusions to scientific history and discovery.”

Lewin, Roger. *Thread of Life: the Smithsonian looks at evolution*. Washington, D.C.: Smithsonian Books, 1982. 256 pp. + insert.

Here is a very readable and beautifully illustrated “look” at evolution. The first of the book’s four sections acquaints the reader with some basic concepts and history of evolutionary science; the other parts outline the story of the earth’s evolving life, with the last one devoted to humans.

Accompanying this book is a separate folded time line/graphic, titled “The Tower of Time,” which strikingly portrays the history of life from single cells to *Homo sapiens*.

Murchie, Guy. *The Seven Mysteries of Life: an exploration in science and philosophy*. Boston: Houghton Mifflin Company, 1978. 690 pp.

This is a monumental work. It required seventeen years to write and illustrate, and deals with nothing less than “all of life,” interpreted in the broadest possible sense— physically, mentally, and spiritually.

Selected topic headings may indicate something of the volume's scope: "Order out of Disorder," "Octaves Invisible," "The World of Little," "Mathematics of Plant Form," "Fire Ecology," "Group Mind of Bees," "Genetic Puzzles," "Dying," "Shape of Evolution's Tree," "The Unfolding of Creativity," "Machine Consciousness," "Superorganism Earth," "Spiral Grain of the Universe," "Origins of Spirit," "God's Dream."

Throughout, raw facts are combined imaginatively to form fresh insights. Interpreters searching for *ideas* will find this book an inexhaustible source.

Raymo, Chet. *Biography of a Planet: geology, astronomy, and the evolution of life on Earth*. Englewood Cliffs, New Jersey: PHalarope Books, Prentice-Hall, Inc., 1984. 176 pp.

With a scientist's understanding, an illustrator's skill, and an interpreter's engaging style, Raymo traces the evolution of life on our planet. The story unfolds against a dynamic physical backdrop; supernovas, plate tectonics, and global climate change are just a few of the influences depicted and discussed.

An enjoyable as well as informative approach to the subject.

Thomas, Lewis. *The Lives of a Cell: notes of a biology watcher*. New York: The Viking Press, 1974. 153 pp.

In this award-winning collection of essays, a physician muses about germs, computers, social behavior, mythical beasts, and various other topics. One piece ponders the fact that death in nature is largely hidden from our view; another considers how human language grows and evolves, with words that mutate and hybridize like species.

Interpreters will find an intriguing assortment of biological insights here, often delightfully expressed.

Whitfield, Philip. *From So Simple a Beginning: the book of evolution*. New York: Macmillan Publishing Company, 1993. 220 pp.

Well-organized, informative, and visually appealing, this book serves as a fine introduction to evolutionary science.

The text is divided into four parts. The first deals with fossils and the history of life; the second, genetics and natural selection; the third, different types of

adaptations, from the cellular level to the social; and the fourth, topics of special interest, such as mass extinction and genetic engineering.

Wilson, Edward O. *In Search of Nature*. Washington, D.C. and Covelo, California: Island Press, 1996. 214 pp.

This collection of essays introduces readers to the stimulating ideas of an eminent biologist.

A variety of topics are addressed, including altruism in animals, culture as being a biological product, biophilia (Wilson's term for "the innately emotional affiliation of human beings to other living organisms"), and the question of whether or not humanity is suicidal. Still, these writings share a central theme—"that wild nature and human nature are closely interwoven."

GENERAL BOTANY

From stately fog-bound redwood groves to ephemeral desert “belly” plants, California is endowed with one of the most remarkable floras on earth. Part of why our parklands exist is to preserve, honor, and celebrate this botanical bounty.

Although they’re grouped under a “general botany” heading, most of the sources in this section concentrate on *California* botany instead. Some explore the state’s entire vegetation scheme; others examine just a certain aspect of it, such as medicinal plants or oaks. In any case, the listed works provide facts, stories, and ideas which—when passed along by an interpreter—can help the public see park vegetation as something more than pleasant background greenery.

Note: Sources that *aren’t* found here include plant identification guides (cited in the following section), endangered species materials (cited under “Conservation, Resource Management, and Other Environmental Issues”), and regional or local plant references (also cited separately).

“There is perhaps no nature-study that can yield the same amount of pure and unalloyed pleasure with so little outlay as the study of the wild flowers. When one is interested in them, every walk into the fields is transformed from an aimless ramble into a joyous, eager quest...”

—Mary Elizabeth Parsons

“To a resident, California is the large oaks which watch over the gently rolling hillsides and shade the hot valley floors. The Californian names his towns and schools and shopping centers after them and lays plaques at the feet of venerable specimens to remember bygone ages. In an otherwise treeless landscape, the oaks shelter him from the shrillness and abrasion of a money-driven world. They remind him that there are things which are freely given, unplundered and enduring. When he is away, it is the oaks that frame his memory of home.”

—Peter Steinhart

“The redwoods, once seen, leave a mark or create a vision that stays with you always. No one has ever successfully painted or photographed a redwood tree. The feeling they produce is not transferable. From them comes silence and awe. It’s not only their unbelievable stature, nor the color which seems to shift and vary under your eyes, no, they are not like any trees we know, they are ambassadors from another time.”

—John Steinbeck

“What is a weed? A plant whose virtues have not yet been discovered.”

—Ralph Waldo Emerson

Attenborough, David. *The Private Life of Plants: a natural history of plant behaviour.* Princeton, New Jersey: Princeton University Press, 1995. 320 pp.

In this book, author/film-maker Attenborough conveys a wealth of information about the plant world with enthusiasm and clarity. The text is organized around such topics as seed transport, growth, flowering, interactions, and survival. Eye-catching color photos nicely complement the writing.

Interesting, intimate case studies are drawn from almost everywhere—from oceans, mountaintops, and deserts, as well as from the polar regions to the tropics. Examples include fungal spores so small that a single mushroom may discharge ten billion of them, and giant sequoias “so big, so nobly impressive that they have their own individual names.”

Baker, Richard St. Barbe. *The Redwoods.* Famous Trees Library No. 1. Revised and expanded edition. London: George Ronald, 1960. 160 pp.

“Quaint” could be one way to describe this source. Much has happened involving its primary subjects—the coast redwoods and Sierran big trees—since the book originally appeared in 1943. But the author’s narrative style, his appreciatory tone, and his now-historical references to places and people may well interest interpreters in this British publication.

Other examples of redwood and big tree literature are cited under “Regional and Local References” (specifically, under “Coast Ranges and Northwestern Mountains” and “Sierra Nevada”).

Balls, Edward K. *Early Uses of California Plants.* California Natural History Guides: 10. Berkeley and Los Angeles: University of California Press, 1962. 103 pp.

For those who’d like to learn about the utilitarian nature of California’s plants, this book is a good place to start. It describes many interesting historic uses of the state’s vegetation—not only by Indians, but also by Spanish, Mexican, and American settlers.

Plants are grouped according to how they were utilized—for food, drink, fiber, medicine, soap, dye, and other purposes. The last section of the book looks at some modern commercial applications, with end-products ranging from lumber to candy. In all, about one hundred species of plants are represented.

A few other, more specialized sources dealing with edible, medicinal, and poisonous plants are cited below.

Barbour, Michael, Bruce Pavlik, Frank Drysdale, and Susan Lindstrom. *California's Changing Landscapes: diversity and conservation of California vegetation.* Sacramento, California: California Native Plant Society, 1993. 246 pp.

This book presents an excellent overview of California's wild vegetation. It contains a rich store of information, both general and specific, that interpreters can use.

Lucid text and striking photos guide the reader through the state's various plant communities—"from coast to desert, from past to future, from pristine to managed," as the authors note. The "intimate relationships" between people, vegetation, and the landscape are considered throughout; separate chapters deal with Indian uses of plants and habitat restoration.

Barbour, Michael G., and Jack Major, eds. *Terrestrial Vegetation of California.* New expanded edition. Special Publication Number 9. Sacramento, California: California Native Plant Society, 1988. 1030 pp.

Depending on one's biological background, this source will either be viewed as an impressive work or an intimidating one. It examines, in detail, the plant communities that make up the state's several "floristic provinces," and it also considers other aspects of California vegetation such as climatic relationships and evolutionary history. Numerous figures and tables are included, and the literature cited is extensive. The writing is undeniably technical, however, with plants referred to by their scientific names.

While the new edition contains a 28-page supplement, it lacks the useful "Natural Vegetation of California" map (by A. W. Küchler) that accompanied the original 1977 printing.

Bossard, Carla C., John M. Randall, and Marc C. Hoshovsky, eds. *Invasive Plants of California's Wildlands.* Berkeley and Los Angeles: University of California Press, 2000. 360 pp.

This book is concerned with "non-native plants that invade parks, preserves, and other wildlands in California." It focuses on species—more than 75 of them—that pose the most serious ecological threat.

Detailed and up-to-date species accounts address the following questions: "How do I recognize it?" "Where would I find it?" "Where did it come from and how does it spread?" "What problems does it cause?" "How does it grow and reproduce?" And "How can I get rid of it?" Plant illustrations include line drawings as well as color close-up and habitat photos.

This source is perhaps more useful as a general reference than as an identification guide. After all, it covers only a small fraction of the state's exotic plants...and it contains no keys.

Coffey, Timothy. *The History and Folklore of North American Wildflowers*. New York: Facts On File, Inc., 1993. 356 pp.

Because of this volume's broad geographic reach, many of the species covered in it won't be found in California parks. Even so, enough of its entries match our plants at the *genus* level to make the book worth citing here. Interpreters who keep this in mind should find a lot of unusual material they can apply.

The author draws from centuries of human experience with plants, incorporating herb-related traditions, superstitions, remedies, and anecdotes. Numerous historical figures are quoted, from Pliny the Elder to Shakespeare to Thoreau. Old botanical engravings illustrate the work.

Critchfield, William B. *Profiles of California Vegetation*. USDA Forest Service Research Paper PSW-76. Berkeley, California: Pacific Southwest Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture, 1971. 54 pp.

This unusual publication contains 57 elevational profiles that graphically depict the dominant vegetation covering about one-fifth of the state. Mapped areas include the north-central Sierra Nevada, the southern Coast Ranges, and montane Southern California.

It's worth noting that the profiles were drawn (by Michael N. Dobrotin) during the 1930s. In the decades since, logging, fires, plant succession, and urbanization have significantly altered California's landscape. History as well as natural history is thus recorded on this booklet's fold-out sheets. At any rate, general vegetation patterns still show clearly, as do the effects of such ecological factors as elevation, exposure, and slope.

Faber, Phyllis M., ed. *California's Wild Gardens: a living legacy*. Sacramento, California: California Native Plant Society, for the California Department of Fish and Game, 1997. 236 pp.

This source treats the subject of California plant life in a novel way. It surveys the various regions of the state, concentrating on botanical sites of special interest and the distinctive species which they contain. Some state and federal parklands are represented among the sites.

An introductory section looks more broadly at California's native flora—its richness, its endangerment, its conservation. Sidebars discuss fire ecology, invasive weeds, and other topics.

Browsers of this book should enjoy its many fine color photographs of vegetation. Readers will likely come away not just with new insights, but also with a personal list of “wild gardens” to explore.

Fuller, Thomas C., and Elizabeth McClintock. *Poisonous Plants of California*. California Natural History Guides: 53. Berkeley and Los Angeles: University of California Press, 1986. 433 pp.

As defined here, “poisonous” plants are those which contain substances capable of causing discomfort, illness, or even death to humans and other animals. Many of California's poisonous plants aren't native species, but rather ornamentals or naturalized weeds.

Handy as well as comprehensive, this manual catalogues the state's toxic vegetation; algae, fungi, and vascular (“higher”) plants are included. Brief descriptions of the different plants are given, along with explanations of their adverse effects. A separate section of the book examines plant toxins and derivative drugs.

Griffin, James R., and William B. Critchfield. *The Distribution of Forest Trees in California*. USDA Forest Service Research Paper PSW-82. Reprinted with Supplement. Berkeley, California: Pacific Southwest Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture, 1976. 118 pp.

Using range maps and explanatory text, this publication describes where most of the state's native trees are found. Many species are shown to be curiously restricted in their natural distribution. In the Coast Ranges, for instance, sycamores are quite common south of San Francisco Bay, but absent north of it;

coast redwoods rarely thrive more than thirty miles from the ocean; and Monterey cypresses exist only in two small “relict” stands.

Thumbing through this source is a good way to start one thinking about biogeography. Readers who are already familiar with California’s trees may find themselves becoming more interested in what grows where...and why.

Note: Some knowledge of tree scientific names would come in handy.

Griffin, James R., Philip M. McDonald, and Pamela C. Muick, compilers. *California Oaks: A Bibliography*. General Technical Report PSW-96. Berkeley, California: Pacific Southwest Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture, May 1987. 37 pp.

This booklet is cited here primarily to make a point—that, with a little research, interpreters have access to an extensive body of information on almost any given subject.

This bibliography, for instance, lists more than 750 references on the natural history, management, and utilization of California oaks. Sources include books, reports, articles, and theses. The listings are organized two ways—in a topical outline under such headings as “regeneration” or “ethnobotany,” and in a species index.

Jepson, Willis Linn. *The Trees of California*. Second edition. Berkeley, California: Associated Students Store, University of California, 1923. 240 pp.

Written by an eminent California botanist, this long-out-of-print manual provides an intimate look at the state’s remarkable assortment of native trees. The book’s contents include species accounts, a taxonomic key, and miscellaneous items about such things as life zones, tree “islands,” fire-adapted pines, and the influence of Indians on tree distribution.

Although some parts of the text are outdated, they’re still worth reading for the historical insights they now furnish. The author’s tribute to the coast redwood is a case in point. Redwood lumber, which was then “both abundant and cheap,” went into “boxes, bins, bats, barns, bridges, bungalows,” and much, much more. “Redwood enters directly or indirectly into almost every industry and activity in the State,” Jepson could claim in the 1920s. “From the cradle to the grave, Californians are in some way in touch with Redwood.”

Keator, Glenn. *The Life of an Oak: an intimate portrait*. Artwork by Susan Bazell. Berkeley, California: Heyday Books/Oakland, California: California Oak Foundation, 1998. 256 pp.

Clearly written and generously illustrated, this source indeed offers “an intimate portrait” of the genus *Quercus*. Sections of the book examine oak architecture, life cycle, diversity, and habitats. Topics range from cellular processes to ecological relationships to evolutionary history, and no fewer than 25 pages are devoted to “a tour around a leaf.”

For interpreters of California natural history, a knowledge of oaks can be extremely useful. Here’s a good place to advance one’s education.

Keator, Glenn, Linda Yamane, and Ann Lewis. *In Full View: three ways of seeing California plants*. Berkeley, California: Heyday Books, 1995. 92 pp.

In Full View is based on a great interpretive idea. A botanist (Keator), a Native American scholar (Yamane), and an artist (Lewis) share their impressions of some common California plants. All three contributors are keen observers and able to find meaning in what they see, yet each views the vegetation from a wholly different perspective. Their diverse viewpoints, when juxtaposed, prove to be nicely complementary.

Kirk, Donald R. *Wild Edible Plants of the Western United States: including also most of southwestern Canada and northwestern Mexico*. Illustrated by Janice Kirk. Healdsburg, California: Naturegraph Publishers, 1970. 326 pp.

Interpreters with a curiosity about edible plants will find this handbook to be a useful reference. Its geographically-grouped entries cover some 300 genera of “higher” plants, representing approximately 2,000 edible species. Each entry includes a description of a significant plant type, a note about its habitat and distribution, information regarding its preparation and uses, and a line-drawing illustration.

Lanner, Ronald M. *Conifers of California*. Featuring the art of Eugene O. Murman. Los Olivos, California: Cachuma Press, 1999. 274 pp.

California is home to fifty-plus native conifers, more than any other state in the Union. These include not only “superlative” trees such as the giant sequoia, coast redwood, and bristlecone pine, but also interesting lesser-known species like the Torrey pine and Santa Lucia fir.

This attractive book considers the conifers individually, combining informative species accounts with high-quality color illustrations, photographs, and range maps. Plants can be identified to genus using either of two keys provided—one based on foliage, the other on cones and related reproductive structures.

Leite, Daliel. *Don't Scratch!: the book about poison-oak. Walnut Creek, California: Weathervane Books, 1982. 61 pp.*

Beautiful, hazardous, and common enough to be called “our unofficial state shrub,” poison oak is a source of interest and concern for many park visitors. “If there is any one wild plant every venturous person ought to know,” says author Leite, “it is this one.”

This little book contains virtually everything a naturalist should know about poison oak. It clears up common misconceptions about the infamous plant, and answers a variety of common questions—how to recognize it, where it’s found, why it irritates the skin, and what to do (or *not* do) in case of a reaction. Poison oak’s use by Indians, its importance to wildlife, and even its value as a garden plant are also discussed.

Nilsson, Karen B. *A Wild Flower by Any Other Name: sketches of pioneer naturalists who named our Western plants. Yosemite National Park, California: Yosemite Association, 1994. 152 pp.*

Douglas-fir, Torrey pine, Kellogg oak, and Fremont cottonwood are just a few of the California plants whose names tell human stories. This book contains anecdotal background information about plant names (and namers) that interpreters should find both interesting and useful.

Ornduff, Robert. *An Introduction to California Plant Life. Berkeley and Los Angeles: University of California Press, 1974. 152 pp.*

Though relatively small and inexpensive, this book brings together a lot of basic information about California’s remarkable flora. Much of the text explores the close relationship between vegetation and the state’s varied, dynamic environment.

Among the topics touched upon are plant succession, adaptation to drought, life zones, “endemic” (geographically or ecologically restricted) plants, and species that serve as “indicators” (of soil conditions, overgrazing, or past fires). Plant communities—from coastal strand to alpine fell-field to alkali sink scrub—are

described in some detail. The book closes with a look at the prehistoric evolution of the California flora...and the impact of humans on it in more recent times.

Parker, Vivian, compiler. *Fremontia: Twenty Year Index: Volumes I-XXI (Apr. 1973-Oct. 1993)*. Sacramento, California: California Native Plant Society, Sept. 1994. 54 pp.

Fremontia, the quarterly journal of the California Native Plant Society, is a good source of current information about the flora of the state. (Look under "Periodicals" for a complete *Fremontia* citation.)

This index guides the reader to hundreds of well-written, minimally-technical journal articles on a broad range of topics—interesting species, unusual plant assemblages, vegetation management, conservation issues, notable botanists, and more. The index's sizeable list of book reviews could stand by itself as a useful bibliography.

(More current supplementary indexes have been printed in *Fremontia* at two-year intervals; they appear in the January issues of even-numbered years.)

Pavlik, Bruce M., Pamela C. Muick, Sharon G. Johnson, and Marjorie Popper. *Oaks of California*. Los Olivos, California: Cachuma Press/Sacramento, California: California Oak Foundation, 1991. 184 pp.

This source artfully examines—one might even say "celebrates"—the unique role of oaks in California's natural and cultural history. Informative text and fine photography both contribute to the book's effectiveness, and to its beauty.

Different chapters look at oaks from different angles. Readers are introduced first to the state's various oak species and communities, then to the richness of oak ecology, and finally to the challenges of oak conservation. The long, changing relationship between people and the great trees is outlined, too; in the authors' words, "The human history of California began in the shade of her native oaks."

Peattie, Donald Culross. *Flowering Earth*. New York: G. P. Putnam's Sons, 1939. 260 pp.

Although this book shows its age in places and may be hard to find, it deserves a citation here. It's a naturalist's tribute to the "Green Kingdom"—an interpretive blend of science and autobiography, expressed in lyric prose. California's plant life is frequently mentioned, and the author's telling of his "pilgrimage" to the Sierran big trees is especially fine.

Indiana University Press issued a new edition of this work in 1991.

Peattie, Donald Culross. *A Natural History of Western Trees.* Illustrated by Paul Landacre. Boston: Houghton Mifflin Company, 1953. 751 pp.

This volume contains so much valuable material for interpreters that one might wonder if it was written with interpretation specifically in mind. Interesting scientific facts, impressive statistics, noteworthy quotes, historical anecdotes, and romantic lore—all are deftly woven into the species accounts of more than 200 native Western trees.

Among other things, the author notes that Monterey pines were immortalized by Robert Louis Stevenson in *Treasure Island*; that motion pictures have made the coast live oak “the American tree best known all around the world;” that Oregon myrtle becomes California laurel as soon as the state line is crossed; that the nectar of buckeye flowers may poison bees; and that coast redwood lumber was used to construct gold rush sluice boxes, the Russian outpost of Fort Ross, and Junípero Serra’s coffin.

One small consideration: Due to decades of steady logging since the book was published, some of the West’s “wood resources” may no longer match the descriptions given.

Roth, Charles E. *The Plant Observer’s Guidebook: a field botany manual for the amateur naturalist.* Englewood Cliffs, New Jersey: PHalarope Books, Prentice-Hall, Inc., 1984. 222 pp.

This is an excellent “how-to, hands-on” manual for anyone who wishes to pursue an interest in plant life. Journal-keeping, specimen-collecting, identification, field mapping, photography, and rare species conservation are among the many activities which are encouraged and explained.

Basic botanical concepts are presented along with the field techniques; for example, one chapter surveys various plant groups (fungi, marine seaweeds, etc.) while suggesting ways to investigate them. A good bibliography completes the book.

Saunders, Charles Francis. *Western Wild Flowers and Their Stories*. Garden City, New York: Doubleday, Doran & Company, Inc., 1933. 320 pp.

Here, collected in a single volume, is a wealth of fact and lore about a wide selection of wild California plants. Wildflowers are showcased, but notable flowering shrubs, vines, and trees are included, too.

Drawing from Native American myths, explorers' accounts, botanical reports, and "the delightful memories of the older generation of Spanish Californians," the author emphasizes not biology but "human associations." As he notes, "every wild flower—even the humblest weed—has a literature."

This out-of-print book may be difficult to find, but it's well worth searching for. Its stories are sure to add interest, depth, and a touch of history to any springtime nature walk.

Ulrich, Larry. *Wildflowers of California*. Interpretive text by Susan Lamb. Santa Barbara, California: Companion Press, 1994. 136 pp.

Through pictures more than words, this book captures the diversity, abundance, and beauty of California's native flowers. Photographer Ulrich's color prints range from exquisite close-ups to stunning wide-angle views. Camera-minded naturalists might want to study the photos for their artistic merit, or check the captions to learn where and when such shots may be taken.

Lamb's rather brief text discusses pollination and leads readers on a region-by-region "tour" of wildflower habitats.

Westrich, LoLo. *California Herbal Remedies*. Houston, Texas: Gulf Publishing Company, 1989. 180 pp.

The core of this book is a catalog of notable medicinal plants that grow wild in California, alphabetically arranged from alder to yerba santa. Each plant type is discussed in terms of its early (and sometimes modern) remedial uses. There are also helpful tips for recognizing the plant in question, and a listing of its English, Spanish, and Native American names.

Interpreters will find some good, usable information here—material that demonstrates the interconnectedness of the natural and cultural realms. Quoting the author, "To know California's old-time remedies is to know the land, its flora, its fauna, its wilderness, its parks, people, towns, and its history in a most intimate way."

Zim, Herbert S. *Plants: a guide to plant hobbies*. Illustrated by John W. Brainerd. New York: Harcourt, Brace and Company, 1947. 398 pp.

It's unfortunate that this handbook hasn't been kept in print and updated where necessary. Today's naturalists—whether amateur or professional—could use a source that conveys so much basic botany so simply and concisely.

For those who can find a copy, the half-century-old manual still serves as a handy reference. It covers the entire plant kingdom, from algae to seed plants and from prehistoric to domesticated forms. Many plant-related activities are suggested, too; some involve visiting interesting locations or making collections of various kinds, while other projects outlined are of a more experimental nature.

PLANT IDENTIFICATION

California boasts the largest state flora in the nation. It contains several thousand native or naturalized species of “higher” plants (flowering plants, conifers, and ferns, primarily), plus a variety of “lower” types (such as algae, fungi, lichens, and mosses). Some of these last have been reassigned by modern biologists to separate kingdoms, but for our purposes all can simply be considered “plants.”

The identification aids listed in this section will formally introduce their users to California’s vegetation in all its rich detail. For interpreters, this access to names is especially important. Names, after all, aren’t just labels that satisfy the park visitor’s curiosity; they’re also keys that unlock a wealth of information in the literature.

Which guidebook should a person use? That depends partly on one’s level of expertise...but also on the situation. When possible, it makes sense to choose a guide that deals only with the type of plant in question (shrubs, for example). Other times the best choice may be a guide of limited geographic scope; for a selection of these, look under “California Regional and Local References.”

*"I pull a flower from the woods,
A monster with a glass
Computes the stamens in a breath,
And has her in a class."*

—Emily Dickinson

"Some people, those with orderly minds, are able to use keys in running down their flowers, but many throw up their hands in despair because of the bewildering terminology....There are at least 60 ways to say that a plant is not smooth, that it has fuzz, hair, prickles, or roughness of some sort: aculeate, aculeolate, asperous, bristly, bullate, canescent, chaffy, ciliate, ciliolate, coriaceous, corrugated, downy, echinate, floccose, flocculent, glandular, glanduliferous, glumaceous, glutinous, hairy, hispid, hispidulous, hirsute, hirsutulous, hirtellous, hoary, lanate, lepidote, nodose, palea-ceous, pannose, papillose, penicillate, pilose, pilosulous, prickly, puberulent, puberulous, pubescent, rugose, scabridulous, scabrous, sericeous, setiferous, setose, setulose, spinous, spinulose, strigose, strigulose, tomentose, tomentulose, velutinous, velvety, verrucose, verruculose, villose, villosulous, villous, viscid, and woolly!"

—Roger Tory Peterson

"There is so much in a name. To find out what a thing is called is a great help. It is the beginning of knowledge; it is the first step....As soon as we know the name of a thing, we seem to have established some sort of relation with it."

—John Burroughs

"I remember best, I find, not the plants I learned most recently, but, like poetry, those I memorized when the tablets of my brain were fresh."

—Donald Culross Peattie

Abrams, LeRoy, and Roxana Stinchfield Ferris. *Illustrated Flora of the Pacific States: Washington, Oregon, and California*. In four volumes. Stanford, California: Stanford University Press, 1940, 1944, 1951, 1960. 538+635+866 +732 pp.

This classic reference has some drawbacks: its age, its cost (roughly \$300 per set), and its unsuitability for field use (the four volumes weigh about twelve pounds). On the plus side, the scope of the work is truly grand. As author Abrams claims, "Every species of fern, flower, tree, and shrub known to grow wild in the Pacific States is illustrated and described."

Altogether, the line-drawing illustrations number more than *six thousand*. No wonder, then, that naturalists puzzling over a difficult plant identification have often turned to "Abrams and Ferris" as their source of last resort.

Arora, David. *Mushrooms Demystified: a comprehensive guide to the fleshy fungi*. Second edition. Berkeley, California: Ten Speed Press, 1986. 959 pp.

This book claims to be "the most comprehensive field guide to wild mushrooms" —and with good reason. It contains keys and descriptions for more than 2,000 species of mushrooms and other types of fungi. Its black-and-white and color photos number in the hundreds. In addition, there are sections on terminology, classification, habitats, toxins, cookery, and other topics.

The first edition of *Mushrooms Demystified* (published in 1979) was designed primarily for California. The second edition is useful throughout the United States and Canada, but it retains a "California slant," with special attention paid to the central California coast.

Arora's text is authoritative, yet often entertaining.

Bailey, L. H., and the staff of the Bailey Hortorium at Cornell University. *Manual of Cultivated Plants*. Revised edition. New York: Macmillan Publishing Co., Inc., 1949. 1116 pp.

Even wild parklands usually have some history of settlement, and sometimes traces of that history are reflected in the vegetation. Through an able interpreter, a gnarled apple tree or clump of daffodils may tell about individuals and enterprises long forgotten.

For those who occasionally need to identify plants that don't show up in the field guides, Bailey's manual is a valuable reference. It provides technical keys and

descriptions for more than 5,000 species under cultivation in the United States and Canada. Unfortunately, illustrations are scarce; users may want to confirm their identifications with a more pictorial source, such as Wright's *Handbook of Garden Plants* (cited below).

This revised edition has gone through numerous printings. It is the outgrowth of a classic work which first appeared in 1924.

Conard, Henry S. *How to Know the Mosses and Liverworts*. Revised edition. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1956. 226 pp.

Few people bother to investigate the world of mosses and liverworts. This guide, with its illustrated keys to many North American species, may entice some interpreters to do so.

Even with this helpful source, identification can pose quite a challenge. A microscope is needed, along with a working knowledge of some specialized terms. But whether or not one's keying is successful, the very act of trying will gain a person entry to new Lilliputian realms.

Crampton, Beecher. *Grasses in California*. California Natural History Guides: 33. Berkeley and Los Angeles: University of California Press, 1974. 178 pp. + 8 plates of color photos.

This manual serves as a handy "first guide" to what the author calls "the most abundant, widespread, and useful plants in California." It keys and describes more than 150 species of native and introduced grasses—about one-third of all those found in the state. It also explains the growth styles of grasses (annual or perennial), their distinctive structural features (essential information for using the keys), and their regional distribution.

Grasses are often either overlooked or avoided as objects to identify. But interpreters who do learn to tell them apart will be intrigued by what the different types reveal about an area's soil, climate, and land-use history.

Dawson, E. Yale. *The Cacti of California*. California Natural History Guides: 18. Berkeley and Los Angeles: University of California Press, 1966. 64 pp. + 8 plates of color photos.

Although typically associated with desert country, California's cacti occupy habitats ranging from glacial lake basins in the Sierra to foggy coastal bluffs.

Dawson's guide is a good starting point for a study of this highly-adapted group of plants. It provides a key to genera, species descriptions, drawings or color photos of the cacti, and some useful interpretive information.

Grillos, Steve J. *Ferns and Fern Allies of California*. California Natural History Guides: 16. Illustrated by Rita Whitmore. Berkeley and Los Angeles: University of California Press, 1966. 104 pp.

Redwood-scented creek banks, icy ledges high in the Sierra, even desert mountainsides—all are graced by ferns.

More than fifty members of the state's diverse fern flora are treated in this field guide; "allied" plant types—horsetails, quillworts, club-mosses, and such—are included, too. Black-and-white drawings of many species aid in identification. Keying is less convenient than with the *Pacific Coast Fern Finder* (by Keator and Atkinson, cited below), but there's more descriptive and explanatory material here than in the other work.

Hale, Mason E., Jr., and Mariette Cole. *Lichens of California*. California Natural History Guides: 54. Berkeley and Los Angeles: University of California Press, 1988. 254 pp. + 12 plates of color photographs.

Lichens are both interesting and familiar, yet most interpreters can't name more than a few basic types. This guidebook—the first to deal exclusively with California's lichens—can open up new micro-realms to recognition.

Full descriptions are given for nearly 200 species, and many others are mentioned. Identification keys are provided; using them may involve some simple chemical tests. Color plates allow less serious students to "picture key" dozens of common lichens...or to just browse among a kaleidoscopic array of bright hues and curious forms.

Harrington, H. D. *How to Identify Plants*. Illustrated by L. W. Durrell. Chicago: The Swallow Press Inc., 1957. 203 pp.

This enduring manual provides practical help for those who want to learn how to identify plants by using a technical key. It explains, organizes, and often illustrates the highly specialized terminology which makes plant keys so confusing to beginners (for instance, the twenty-plus terms denoting the different kinds of hairiness of a leaf). Separate sections cover related topics such as plant names, botanical taxonomy, and the collecting and preparing of specimens.

Hickman, James C., ed. *The Jepson Manual: higher plants of California*. Berkeley and Los Angeles: University of California Press, 1993. 1403 pp.

The Jepson Manual is related to an earlier standard identification guide—Willis Linn Jepson's *A Manual of the Flowering Plants of California*, which dates back to 1925. Other than their general goals and their names, however, there's not much resemblance between these two works.

This new volume incorporates recent scientific findings about California's flora. It contains information about nearly eight thousand varieties of native and naturalized plants—including their common and scientific names, range and habitat, horticultural value or weediness, endangerment, and toxicity. Line drawings of many (but not all) species are provided, too. Unfortunately, such comprehensive-ness comes at a price; the keys are necessarily technical, and the highly-condensed plant descriptions will be difficult for some interpreters to follow.

The Jepson Manual promises to be the “bible” of California field botany in the foreseeable future. Emerging natural history literature is likely to conform to it.

Hitchcock, A. S. *Manual of the Grasses of the United States*. Second edition, revised by Agnes Chase. United States Department of Agriculture Miscellaneous Publication No. 200. Washington, D.C.: U. S. Government Printing Office, 1950. 1051 pp.

This reference describes all grasses known to grow in the “Lower Forty-eight” states. Detailed line drawings of most species accompany the keys and text.

Because of the manual's thoroughness and scope, it allows naturalists to identify grasses with more certainty than does Crampton's guide (cited above). For the same reasons, “Hitchcock and Chase” is also much bulkier and more difficult to use.

In 1971 Dover Publications, Inc. reprinted this standard work; it's available as a two-volume set.

Keator, Glenn, and Ruth M. Atkinson. *Pacific Coast Fern Finder*. Illustrated by Valerie R. Winemiller. Berkeley, California: Nature Study Guild, 1981. 61 pp.

Here is an easy-to-use, inexpensive, pocket-sized key to the ferns and “fern relatives” of California and parts of other Western states. In its format it resembles Watts' *Pacific Coast Tree Finder* (cited below).

Mason, Herbert L. *A Flora of the Marshes of California*. Berkeley and Los Angeles: University of California Press, 1957. 879 pp.

Here is an ideal plant identification guide for those who deal with the state's wetland habitats. With so many non-wetland species removed from consideration, the job of keying becomes a great deal easier.

Mason's flora covers more than just salt and fresh-water marshes. The plants of estuaries, lakes, ponds, vernal pools, bogs, riparian areas, and wet meadows are represented, too.

Only selected species are illustrated, but the precise line drawings of these are quite nice.

McMinn, Howard E. *An Illustrated Manual of California Shrubs*. With a chapter on the use of the California shrubs in the garden design by Fred H. Schumacher. San Francisco: J. W. Stacey-Incorporated, 1939. 689 pp.

This comprehensive work gives detailed descriptions of the hundreds of species of shrubs and shrub-like plants which are native to the state. Many of the plants are illustrated with line drawings, and some with photos. Identification keys contain the usual technical terminology, but they're relatively easy to use.

Over the years, reprintings of this standard reference have been published by University of California Press. (Schumacher's chapter was dropped.)

McMinn, Howard E., and Evelyn Maino. *An Illustrated Manual of Pacific Coast Trees*. With lists of trees recommended for various uses on the Pacific Coast by H. W. Shepherd. Second edition. Berkeley, California: University of California Press, 1937. 409 pp.

This standard work is a reliable guide to the native and commonly cultivated trees of California and the Pacific Northwest. Illustrations consist mostly of detailed line drawings of leaves, cones, and other plant parts.

Munz, Philip A. *A Flora of Southern California*. Berkeley and Los Angeles: University of California Press, 1974. 1086 pp.

For Southland users, this volume has one obvious advantage over Munz's *California Flora* (cited below)—namely, that it excludes a large number of plants from the northern and central parts of the state, making the task of keying that much simpler.

Although the book contains hundreds of line drawings, these illustrate only a small fraction of all the species covered.

Munz, Philip A., in collaboration with David D. Keck. *A California Flora and Supplement*. Berkeley and Los Angeles: University of California Press, 1973. 1681+224 pp.

This edition combines the original *A California Flora* (1959) with *Supplement to A California Flora* (1968).

“Munz” has long been a standard reference for identifying and classifying the state’s vascular plant life. Until publication of *The Jepson Manual* in 1993, it was the definitive work. It has few illustrations, however, and the separately organized *Supplement* makes it rather awkward to use.

Niehaus, Theodore F., and Charles L. Ripper. *A Field Guide to Pacific States Wildflowers*. Boston: Houghton Mifflin Company, 1976. 432 pp.

This is a convenient guide to nearly 1,500 species of Western wildflowers. Due to the large number of plants covered and the judicious selection of them, users are sure to find many of the flowers they come across included here.

The book combines a key to the various flower families with species illustrations that are organized by color. As with other volumes in the “Peterson Field Guide Series,” similar objects are placed together for easy comparison while distinguishing features are marked by arrows.

The text is by Niehaus and illustrations are by Ripper.

Orr, Robert T., and Dorothy B. Orr. *Mushrooms of Western North America*. California Natural History Guides: 42. Berkeley and Los Angeles: University of California Press, 1979. 293 pp. + 24 pp. of color photographs.

This handy manual describes hundreds of mushrooms and other fungi of the West. In many cases, it tells where and when they can be found and also advises about their edibility. The guidebook has identification keys that, while not jargon-free, are relatively easy to follow. For corroborative or picture-keying purposes, some species are illustrated—mostly with color photos.

Additionally, interpreters will discover some useful gems of fact scattered among the species accounts. We’re told, for example, that the toxic *Amanita phalloides* has recently become much more common in California; that it’s responsible for most

mushroom-caused fatalities; and that “the flavor, according to survivors, is excellent.”

Naturalists can begin their study of mycology with this source, and most won't rapidly outgrow it. A similar work, Smith's *Field Guide to Western Mushrooms*, is cited below.

Peterson, P. Victor. *Native Trees of Southern California*. California Natural History Guides: 14. Berkeley and Los Angeles: University of California Press, 1966. 136 pp. + 16 plates of color illustrations.

As an identification tool, this source is less satisfactory than the other tree guides cited in this section. With it, most trees can only be keyed to one of several plant groups; then the group's members must be compared using illustrations and descriptive text.

On the other hand, the book gives a fine overview of its subject, familiarizing readers with an assortment of trees as varied as the Southland itself. Notable features include a section that shows how to recognize different trees from a distance, and another that suggests where to find them.

Raven, Peter H. *Native Shrubs of Southern California*. California Natural History Guides: 15. Berkeley and Los Angeles: University of California Press, 1966. 132 pp. + 8 plates of color illustrations.

Mojave yucca...seacliff buckwheat...mountain gooseberry...creek dogwood...mission manzanita...chaparral pea—one can get a sense of the Southland's brushy vegetation just by browsing through the pages of this book. Most native Southern California shrubs are listed here; many have clear and detailed species descriptions. However, accurate plant identification is hindered by the limited number of illustrations and a shortage of systematic keys.

Robbins, W. W., Margaret K. Bellue, and Walter S. Ball. *Weeds of California*. Revised edition. Sacramento: Department of Agriculture, State of California, 1970. 547 pp.

There's a built-in problem with this manual, one that's due to the nature of the subject. Weeds are hard to define objectively; more often they're just *described*, using subjective terms like “troublesome” and “misplaced.” As a result, confusion arises. One can't tell, by simply looking, if the plant in question is a weed or not...or whether it's treated in this book.

Otherwise, *Weeds of California* is easy enough to use. The authors provide minimally-technical keys and clear descriptions of several hundred common weedy species. Many plants are illustrated with photos or line drawings. Also, an introductory section discusses principles and methods of weed control.

Shuttleworth, Floyd S., and Herbert S. Zim. *Non-flowering Plants*. Illustrated by Dorothea Barlowe et al. New York: Golden Press, Western Publishing Company, Inc., 1967. 160 pp.

“Non-flowering plants,” as treated here, include algae, fungi, lichens, mosses, ferns, and conifers, along with a number of less familiar groups.

Minimally technical and abundantly illustrated, this “Golden Nature Guide” introduces a subject that embraces microscopic bacteria and towering redwoods alike. The organisms described are a curious lot, with names that linger in the mind—“mermaid’s wine glass,” “lollipop lichen,” “great scented liverwort,” “luminous moss,” “serpent slime mold,” and “dead man’s finger.”

This source does have a few drawbacks. Most notable are its cosmopolitan scope (limiting its usefulness as a picture key); its outdated taxonomy (fungi, for instance, aren’t considered true plants any longer); and the fact it’s out of print.

Smith, Alexander H. *A Field Guide to Western Mushrooms*. Ann Arbor, Michigan: The University of Michigan Press, 1975. 280 pp.

This guide describes and illustrates some 200 types of Western fungi. Among the species covered are highly-prized edible ones, very dangerous ones, and others of special interest.

Fewer species are treated here than in the similar *Mushrooms of Western North America* (by Orr and Orr, cited above); however, Smith’s book has twice as many color photos.

Watts, Tom. *Pacific Coast Tree Finder: a pocket manual for identifying Pacific Coast trees*. Berkeley, California: Nature Study Guild Publishers, 1973. 61 pp.

It’s hard to conceive of a tree key that would be simpler to use than this. Clear paired choices, effective illustrations, and range maps all contribute to its exceptional design.

Science, Poetry, and Parks
Natural History: General and Statewide California

Practically all of California's native trees are represented, plus a number of species usually regarded as shrubs. A few common "somewhat naturalized" trees (such as pepper tree, locust, and eucalyptus) are included, too.

This booklet replaces Watts' similar *California Tree Finder* (1963).

Wright, Michael, assisted by Sue Minter and Brian Carter. *The Complete Handbook of Garden Plants*. New York: Facts On File Publications, 1984. 544 pp.

This compact reference treats more than 9,000 species and varieties of garden plants, some of which have found their way into our "natural" parks. Over 2,500 of the plants are illustrated with color artwork.

There are no identification keys. Instead, one proceeds by selecting a category such as "rock plants" or "perennial climbers" and then by scanning the appropriate illustrations to come up with a match. For more reliable determinations, this handbook can be used in combination with Bailey's *Manual of Cultivated Plants* (refer to its citation above).

GENERAL ZOOLOGY

In purely material terms, animals comprise an almost negligible portion of the landscape; yet they possess a vital energy—an “imponderable essence,” Aldo Leopold called it—that bears no relation to their number or size. Regardless of whether they delight, intrigue, annoy, or frighten us, animals capture and hold our interest like nothing else.

The zoological literature is extremely rich and varied—so much so that the items listed here scarcely provide a sample. These sources are included for different reasons: some to showcase notable species or to survey major groups, some to explain the behavior of animals or to explore their perceptions, some to propose activities or to just provide a chuckle. As closely as possible, the works relate to California’s fauna. All should help interpreters build upon the natural interest park visitors have in wildlife.

Not found here are guides whose main purpose is animal identification (cited in the next section); endangered species sources (cited under “Conservation, Resource Management, and Other Environmental Issues”); and regional or local animal references, including ones that deal with marine wildlife (cited separately, also).

“Wilderness without animals is mere scenery.”

—Lois Crisler

“We need another and a wiser and perhaps a more mystical concept of animals....In a world older and more complete than ours they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings; they are other nations, caught with ourselves in the net of life and time, fellow prisoners of the splendour and travail of the earth.”

—Henry Beston

“I began to see that, among the many universes in which the world of living creatures existed, some were large, some small, but that all, including man’s, were in some way limited or finite. We were creatures of many different dimensions passing through each other’s lives like ghosts through doors.”

—Loren Eiseley

“Bones are beautiful. Their lines are graceful and their textures complex. As you turn, say, the skull of a mouse, the light about it changes, the lines undulate, the forms tumble in and out of one another. A rib cage has the rhyme and meter of a poem.”

—Peter Steinhart

Berenbaum, May R. *Bugs in the System: insects and their impact on human affairs.* Reading, Massachusetts: Addison-Wesley Publishing Company, Inc., 1995. 377 pp.

A fascinating, entertaining mix of entomology and history, this book is filled with statistics and stories that interpreters of “bugs” will relish. These items enliven the author’s treatment of standard topics such as classification, physiology, and parasite/host relations.

Some examples: About three out of four humans house hair-follicle mites on their faces. A single house fly could produce more than five billion offspring in a year, if all survived. In medieval times, flea-transmitted plague claimed a third of Europe’s population, changing the entire social order. One spider’s habit of “pitching” balls of bait to its prey earned it a species name of “dizydeani.” Also, beehives were used as weapons in the Civil War.

A chapter called “Appreciating Insects” considers their role as totemic symbols and as movie monsters, among other things.

Brown, Tom, Jr., with Brandt Morgan. *Tom Brown’s Field Guide to Nature Observation and Tracking.* New York: Berkley Books, 1983. 282 pp.

This manual integrates the science of natural history, the art of observation, and a philosophy that promotes a more ecologically-attuned “way of being.”

The first part of the book provides readers with suggestions and exercises for clearing their minds, sharpening their senses, and “developing a rapport with nature.” A second, larger section explains how to identify and interpret a variety of tracks, trails, scats, and other animal signs.

Author Brown takes his instruction of techniques to a quite sophisticated level. “The entire landscape is a living manuscript written and rewritten each day,” he notes...and it’s amazing to learn how much can be deciphered from it, using the subtlest of clues.

Burton, Maurice, and Robert Burton. *Encyclopedia of Insects and Arachnids.* Finsbury Books, 1984. 252 pp.

From alder-flies to wolf spiders, a good selection of six- and eight-legged creatures is presented in this source. Their alphabetical arrangement doesn’t work well for identification; but if some common type of insect or arachnid is

already known, the reader may find several paragraphs of interesting background material on it here.

Striking close-up color photos form an important part of the book.

The California Center for Wildlife, with Diana Landau and Shelley Stump. *Living with Wildlife: how to enjoy, cope with, and protect North America's wild creatures around your home and theirs.* San Francisco: Sierra Club Books, 1994. 341 pp.

Occasionally, interpreters are asked about animals that park visitors find around their own homes—garden-browsing deer, for example, or attic-roosting bats. This guide provides some good information to pass along.

The book describes at least 100 types of wild creatures, ranging from salamanders to bears. Species notes often point out human/wildlife problem situations that may arise, then advise how to resolve the conflicts humanely. In other cases, tips are given for observing animals, for rehabilitating them after an injury, or for improving their habitat.

Caras, Roger A. *North American Mammals: fur-bearing animals of the United States and Canada.* New York: Galahad Books, 1967. 578 pp.

Here's a good basic source of information about America's wild mammals. It's thorough in its coverage, selective in its detail, amply illustrated, and easily read.

Author Caras not only discusses the key characteristics of "animals great and small, common and extremely rare;" he also offers practical advice about how each can be observed. Photos, range maps, and track drawings accompany the text. Appendixes list species according to their taxonomy, habits, and location.

Clark, Jeanne L. *California Wildlife Viewing Guide. Revised and expanded edition.* Helena and Billings, Montana: Falcon Press, 1996. 192 pp.

This handy, attractive book will lead the reader to 200 of the state's best wildlife-viewing locations, "whether your destination is a two-acre tidepool or 600,000 acres of desert park." Site descriptions are grouped into eight bioregional sections, each of which is introduced with a thematic statement and a map.

As part of the National Watchable Wildlife Program, eighteen private organizations and government agencies (including California State Parks) cooperated in the production of the guide.

Dasmann, Raymond F. *Wildlife Biology*. New York: John Wiley & Sons, Inc., 1964. 231 pp.

Though rather old, this textbook succinctly introduces readers to principles of wildlife biology. After covering some basic ecological concepts, the author discusses wild animals in terms of their habitat needs, their population characteristics, their territories and travels, and their management. One chapter describes methods used to study wildlife, and another reviews the history of wildlife destruction and conservation in California.

Dawson, William Leon. *The Birds of California: a complete, scientific and popular account of the 580 species and subspecies of birds found in the state*. In four volumes. San Diego, Los Angeles, San Francisco: South Moulton Company, 1923. 2121 pp.

This large, richly-illustrated work probably won't be found except in a rare book collection. Even so, it's worth citing here—not just as a landmark reference on California natural history, but also as literature.

Most noteworthy are the author's colorful species commentaries. In these portrayals, the turkey vulture becomes "a gentle ghoul;" scrub jays are "as innocent as morning, as industrious as noon, as wicked as night." The writing may seem quaint and florid by modern standards, but it's consistently entertaining. Interpreters who browse the volumes are sure to pick up ideas and expressions that will enrich their bird-related programs.

Devoe, Alan. *This Fascinating Animal World*. New York: McGraw-Hill Book Company, Inc., 1951. 303 pp.

Why do animals' eyes shine in the dark? How does a snake move? Does a centipede have a hundred legs? Can a pelican's beak hold more than its belly? This book poses, and then answers, many commonly-asked questions about wildlife.

Though it's several decades old now and out of print, this remains a worthwhile source for interpreters to review.

Downer, John. *Supersense: perception in the animal world*. New York: Henry Holt and Company, 1988. 160 pp.

In remarkable ways, the senses of animals often outperform our own. Snakes have special organs that gather infrared rays to form a "heat picture" of their prey. Whales communicate over vast ocean expanses by means of their low-frequency calls. Migrating birds and butterflies are able to use the earth's

magnetic field as a guide. Ants blaze trails the same way coyotes mark their territories: with scent. And bats employ an "echolocation" system that's as sophisticated as radar.

These and a multitude of other cases are investigated in *Supersense*. Even seasoned naturalists should learn much from this source about how animals perceive their world.

Drummond, Roger. *Ticks and What You Can Do about Them*. Berkeley, California: Wilderness Press, 1990. 66 pp.

Tick-borne disease is increasingly a concern in California's parklands, for visitors and field staff alike. This little manual is a convenient source of information on the subject.

The book describes and illustrates several important tick species, explaining how to avoid contact with the pests and how to remove them if necessary. Tick-related illnesses such as Lyme disease and Rocky Mountain spotted fever are discussed, too, in terms of their human history, biology, symptoms, and treatment.

A single-sheet "1992 Update" is inserted.

Ehrlich, Paul R., David S. Dobkin, and Darryl Wheye. *The Birder's Handbook: a field guide to the natural history of North American birds*. New York: Simon & Schuster Inc., 1988. 785 pp.

This book has been called "a portable library," and rightly so. Its reference qualities make it an ideal "companion" volume to bird identification manuals.

The handbook's format integrates two elements: species descriptions for nearly 650 North American birds, and dozens of informative bird-related articles. Using symbols and abbreviations to save space, the species descriptions contain a wealth of biological detail not found in conventional field guides. The articles cover a variety of interesting topics; "John James Audubon," "Conservation of the California Condor," "Bird Droppings," "Sonagrams: Seeing Bird Songs," and "Wing Shapes and Flight" are some of their titles.

A 1600-item bibliography completes the work.

Finamore, Roy, ed. *Ogden Nash's Zoo*. Illustrations by Etienne Delessert. New York: Stewart, Tabori & Chang, 1987. 81 pp.

Sharks, oysters, caterpillars, swans, and panthers are just some of the animals encountered in this collection of Nash's poems. The verses are often silly and contrived—just right for adding a touch of levity to an interpretive talk.

An example: "The Lord in His wisdom made the fly/And then forgot to tell us why."

Gray, Mary Taylor. *Watchable Birds of California*. Photographs by Herbert Clarke. Missoula, Montana: Mountain Press Publishing Company, 1999. 265 pp.

This source focuses on some 150 California birds that are "especially fun and interesting to observe." These species are grouped by general habitat—"seacoast," "freshwater," "open country," and "high country"—rather than taxonomically.

The book's main value to interpreters isn't as a field guide, although its color photographs and descriptive notes can help with bird identification. Instead, it's the well-written species profiles—packed with natural history facts, folklore, and observations—that should prove most useful.

The author's fanciful avian analogies may particularly linger in the reader's thoughts. For example, the great egret is likened to "a white shadow at the water's edge," the calliope hummingbird to "a shrill green bullet," the varied thrush to "a jockey in boldly colored silks," and the American dipper to "some fantasy underwater airplane from a James Bond film."

[Grinnell, Joseph.] *Joseph Grinnell's Philosophy of Nature: selected writings of a Western naturalist*. Berkeley and Los Angeles: University of California Press, 1943. 237 pp.

Grinnell was an eminent zoologist who used California as a field laboratory to study the factors shaping animal distribution and evolution. This volume presents, from among his published papers, more than two dozen essays that shed light on various aspects of the state's fauna.

Grinnell, Joseph, Joseph S. Dixon, and Jean M. Linsdale. *Fur-bearing Mammals of California: their natural history, systematic status, and relations to man*. In two volumes. Berkeley, California: University of California Press, 1937. 777 pp. + 13 color plates.

Long a standard reference, this work primarily deals with carnivores, but it also includes certain pinnipeds, the state's one marsupial, and a few of the larger rodents.

Diagrams, tables, maps, photos, and color artwork nicely augment the species accounts. Much of the text has become seriously dated in its particulars, but is increasingly valuable as a historical record.

Hansen, Kevin. *Cougar: the American lion*. In association with the Mountain Lion Foundation. Flagstaff, Arizona: Northland Publishing, 1992. 129 pp.

As mountain lion incidents continue to make news, controversy intensifies about the cougar's future. This book helps illuminate the issue, even though it intentionally reflects the author's "advocacy bias" toward his subject.

Cougar summarizes what's known—and not known—about this "consummate cat." The animal's behavior is examined in some detail, along with other aspects of its natural history. Also included are a historical review of cougar/human relations, a look at mountain lion endangerment around the country, and a number of excellent color photographs.

(For a state-specific report on the cougar situation that's more management-oriented, see the special issue of *Outdoor California* cited under "Conservation, Resource Management, and Other Environmental Issues.")

Hickman, Cleveland P., Jr., and Larry S. Roberts, with contributions by Allan Larson. *Biology of Animals*. Sixth edition. Dubuque, Iowa: Wm. C. Brown Publishers, 1994. 834 pp.

Here is an excellent college-level introduction to general zoology. The authors cover life's origin and evolution first, then animal form and function. A phylum-by-phylum survey of the animal kingdom comprises the remainder of the book.

This source should provide interpreters with all the basic zoology they'll need...and more. Despite its technical detail, the text is clearly written and well organized throughout. Especially praiseworthy are the many fine color graphics,

which make matters of anatomy, life history, and phylogeny not just more understandable, but also much more interesting.

Hubbell, Sue. *Broadsides from the Other Orders: a book of bugs*. New York: Random House, 1993. 276 pp.

Broadsides is an entertaining narrative, a mix of natural history facts and personal reflections. Chapters in the book each deal with a particular order of insects.

The “beetle” order, Coleoptera, serves as a good example. This single order contains hundreds of thousands of named species—more than one-quarter of all the kinds of animals on earth. Interpretively, the author approaches the topic with a story: “When asked what he had learned about the nature of the Creator from his studies, the great British biologist J. B. S. Haldane is said to have replied that ‘God has an inordinate fondness for beetles’.” The chapter goes on to discuss insect evolution, ladybug-collecting in the Sierra, and the puzzling origin of a familiar nursery rhyme.

Imes, Rick. *The Practical Entomologist*. New York: Simon & Schuster Inc., 1992. 160 pp.

For those wanting to pursue a curiosity about insects, this guidebook makes a fine first source.

The guide supplies some basic information about insect taxonomy, morphology, life cycles, and behavior. Major insect orders are showcased, and important families introduced. Hobbyists are advised how to capture and keep live insects, how to “gear up” for insect photography, and how to make a mounted insect collection.

This is an attractive work, nicely organized and lavishly illustrated with striking close-up color photos.

Klauber, Laurence M. *Rattlesnakes: their habits, life histories, and influence on mankind*. Abridged by Karen Harvey McClung. Berkeley and Los Angeles: University of California Press, 1982. 350 pp.

Because rattlesnakes arouse such public interest, park staff should know where to find reliable information about them. For answering most questions, this one reference should suffice.

Both the rattlesnake's natural history and its relationship with people are covered in detail. A full chapter is devoted to the snake's "rattle" organ, and three others to bite-related topics. In the chapters titled "Indians and Rattlesnakes" and "Myths, Folklore, and Tall Stories," there's some good material that interpreters will enjoy using.

This book is an abridged, and partially updated, edition of a two-volume work that was originally published in 1956.

Knutson, Roger M. *Furtive Fauna: a field guide to the creatures who live on you*. New York: Penguin Books USA Inc., 1992. 118 pp.

This book looks closely at ticks, flies, mosquitos, lice, and other small organisms that humans unwillingly host. Interpreters will find material certain to intrigue (and sometimes appall) audiences young or old.

Kohl, Judith, and Herbert Kohl. *The View from the Oak: the private worlds of other creatures*. Illustrated by Roger Bayless. San Francisco: Sierra Club Books/Boston: Little, Brown and Company, 1977. 112 pp.

What does a field of flowers look like to a bee? How does time pass for a snail or a tick? What's life like in the two-dimensional realm of a water strider? How differently is an oak tree perceived by a fox nestled among its roots than by an owl roosting in its branches?

This fascinating book attempts to answer questions such as these. The term "umwelt" is introduced, meaning "the world around a living thing as that creature experiences it." Here, readers will find explanations, activities, and graphics designed to help them "enter" some of those worlds.

Leopold, A. Starker. *The California Quail*. Berkeley and Los Angeles: University of California Press, 1977. 281 pp.

This book is cited partly because its subject is the official state bird of California, and partly because of its author's renown as a wildlife biologist. At the same time, it's included here as an example—to show the kind of information that's available to naturalists about many animals of interest.

Leopold's monograph is a definitive work from both the natural history and game management points of view. It examines virtually every aspect of quail existence, often in greater detail than interpreters will likely need. Some of the particulars are intriguing, though; for instance, studies suggest that in dry years,

when survival chances are reduced, the quail's food plants produce certain compounds that limit the bird's reproduction.

Martin, Laura C. *The Folklore of Birds*. Old Saybrook, Connecticut: The Globe Pequot Press, 1993. 231 pp.

With their beauty, song, and power of flight, birds have always been a source of fascination—and the object of much lore and symbolism. Romans used the breastbone of a goose to predict the weather. The Chinese believed that owls snatched away the soul. Birds figure prominently in Native American creation stories, and they appear in everyday idioms such as “swan song” and “eating crow.”

In this book, the author has compiled not just folklore but also literary references, name origins, and natural history facts about nearly 100 birds. The species selected are American, but the material presented is quite generic, coming from cultures past and present all around the world.

Martin, Laura C. *Wildlife Folklore*. Old Saybrook, Connecticut: The Globe Pequot Press, 1994. 183 pp.

Using the same approach as in her bird lore book (cited above), the author considers the cultural significance of other wildlife. More than 80 mammals, reptiles, amphibians, and invertebrates are represented. These animals are interestingly linked to Siberian folk tales, Latin proverbs, Biblical passages, historical anecdotes, and such.

Here's one excerpted bit of material that interpreters may want to use: The “Miss Muffet” of nursery rhyme fame was actually the daughter of a physician who had her swallow spiders as a cure for various ills!

Milne, Lorus, and Margery Milne. *Invertebrates of North America*. New York: Doubleday & Company, Inc. 252 pp.

Wildlife interpretation tends to focus on the vertebrates—fish, amphibians, reptiles, birds, and mammals. Insects may be featured on occasion, too. However, it's not these groups but all the *rest* of the animal kingdom which forms the subject of this book.

Here, readers will become acquainted with invertebrate types ranging from tapeworms to tarantulas and from corals to clams. Interesting details about their anatomy, life history, and ecology are provided. Photographs effectively show

the variety and exotic beauty to be found among North America's "lesser" creatures.

Moyle, Peter B. *Fish: an enthusiast's guide*. Berkeley and Los Angeles: University of California Press, 1993. 272 pp.

Here's a fine introduction to the natural history of fishes. The book is clearly written, scientifically informed, and—befitting its subtitle—enthusiastic.

Fish anatomy, behavior, and ecology are among the topics covered. Because the animals occupy such a wide array of habitats, separate chapters examine their place in stream, lake, pond, estuary, intertidal, and open-ocean ecosystems. A number of California species and locations serve as examples.

Fish also contains a section on conservation issues, lists of home and field projects for aquatic naturalists, and a good bibliography.

Pasquier, Roger F. *Watching Birds: an introduction to ornithology*. Illustrated by Margaret La Farge. Boston: Houghton Mifflin Company, 1977. 301 pp.

Watching Birds is a fine source—it has the scope of an ornithology textbook without the dry technicality of one. Chapters discuss avian evolution, anatomy, feeding, breeding, song, migration, and other bird-related topics.

Interpreters are sure to pick up useful bits of information, such as what the shape of a bird's egg may reveal about its nesting site...or why a blue jay's feathers actually aren't blue at all.

The book's many black-and-white drawings add a nice artistic touch to the work.

Pickett, Edwin R. *Birds of Central California*. As reprinted from *The Sacramento Bee*. 1971. 161 pp.

This book reproduces a series of articles which were published under the heading "The Bird Watcher" in *The Sacramento Bee* between October 1966 and July 1970.

The format is simple. There are a few paragraphs of interesting factual material about each type of bird, plus an illustration. A different bird is featured on each page, with 160 species treated in all.

Natural history interpreters should take advantage of this handy source of useful information.

Roth, Charles E. *The Wildlife Observer's Guidebook*. Englewood Cliffs, New Jersey: PHalarope Books, Prentice-Hall, Inc., 1982. 239 pp.

The advice and encouragement this manual offers will help readers make the most of wildlife-watching. The author suggests ways to hone one's observing skills and senses, to "read" tracks and other signs, to use field equipment, to study various types of animal behavior, and to add to scientific knowledge by careful record-keeping.

Both this and Roth's companion work, *The Plant Observer's Guidebook* (cited under "General Botany"), make good additions to a naturalist's library.

Runtz, Michael. *Wild Things: the hidden world of animals*. Erin, Ontario: The Boston Mills Press, 1995. 120 pp.

This book about animal life is organized not taxonomically but thematically. Chapters are devoted to such topics as camouflage, defense mechanisms, feeding strategies, courtship and mating, and the rearing of young. Familiar species of the continental U. S. and Canada serve as examples, showing that "in the realm of wild animals, elegant adaptations and elaborate behaviors are the rule, not the exception."

The text is interpretively written, and fine color photos by the author embellish the work.

Shanks, Bernard. *California Wildlife*. California Geographic Series: No. 4. Helena and Billings, Montana: Falcon Press Publishing Co., Inc., 1989. 11 pp.

Superb color photography and fine interpretive text make this source a fitting tribute to the rich wildlife heritage enjoyed by Californians.

Most of the book surveys the state's diverse wildlife habitats, showcasing animals that are representative of each. As part of the discussion, topics ranging from elegant adaptations to valiant conservation efforts are touched upon. Readers will also find a directory that lists good wildlife-viewing areas along with the agencies responsible for managing them.

Small, Arnold. *The Birds of California*. New York: Winchester Press, 1974. 310 pp.

A strong geographic focus adds to the value of this source. Not only is coverage of bird life limited to California species; the state's diversified landscape also figures prominently in the text.

Two sections dominate the book. One is an annotated list of more than 500 California birds, giving detailed information about their seasonal status, habitat, and range. An even larger section identifies and surveys 25 major habitats for birds, ranging from sea cliffs to cities to desert oases; here the discussion often turns to avian migratory patterns or ecological ties.

Steinhart, Peter. "Dreaming Elands." *Audubon*, Vol. 84, No. 2 (Mar. 1982): pp. 8-10.

Written with eloquence and perception, this essay looks at animals in an unusual light: in terms of their influence on the human psyche.

Animals infiltrate our language in words like "bullish" and "chubby;" they pervade our folklore; they even lend their names and symbolism to sports teams and cars. "Animals are a part of our minds," author Steinhart contends—"a part of the loom upon which we spin out thoughts." His article ponders the notion that animals may figure importantly in our brain development as children, helping us acquire our humanity.

Stienstra, Tom. *California Wildlife: a practical guide*. Emeryville, California: Foghorn Outdoors, Avalon Travel Publishing, Inc., 2000. 514 pp.

From crayfish to condors to coyotes, this source profiles more than a hundred types of wildlife found in the state. Well-known animals are usually featured; still, with so many kinds to choose among, some selections are quite arbitrary.

A typical species (or group) entry contains factual "biologists' notes," a list of suggested viewing areas, a range map, and a nice black-and-white artwork illustration. Perhaps best of all, the entries also include the author's entertaining commentary, laced with humor and anecdotes that interpreters may want to pass along.

A separate section of the book provides helpful information about some 300 excellent places in California to observe wildlife. Not surprisingly, a good number of the locations are state or federal parklands.

Stokes, Donald W. *A Guide to Observing Insect Lives*. Boston: Little, Brown and Company, 1983. 371 pp.

In a way, manuals in the “Stokes Nature Guide” series pick up where most field guides leave off. Rather than stress identification, they show readers how to investigate the *lives* of animals (and plants). Such an “in-depth” approach to nature-watching obviously has great value and appeal. However, Californians who use these works may be frustrated by the limited coverage given to Western species. Also, it’s questionable how much of the seasonal life history material in the guides can be applied, due to our state’s unusual “Mediterranean” climate.

This particular Stokes Guide sheds light on the often-fascinating life cycles and behavior of common insects—ants, wasps, butterflies, beetles, crickets, water striders, and many more. Interpreters will find not only general information they can pass along, but also encouragement to pursue field studies of their own.

Stokes, Donald W., and Lillian Q. Stokes. *A Guide to Bird Behavior*. In three volumes. Boston: Little, Brown and Company, 1979, 1983, 1989. 336+334+ 397 pp.

These “Stokes Nature Guides” are a valuable tool for those who want to observe and understand avian behavior. Readers get a complete file on each kind of bird discussed—a file that explains the general timing of its life stages, the auditory and visual displays it uses to communicate, and its main behavior patterns (territorial defense, breeding, social activity, migration, etc.).

The three volumes in this set differ somewhat in their emphasis; one book deals with a number of city-dwelling birds, for instance, while another features suburban and farmland types. In all, 75 species are represented. An “Eastern” bias is evident in their selection, but about two-thirds of the birds are found in California nonetheless.

Volume I, authored solely by Donald Stokes, was originally titled *A Guide to the Behavior of Common Birds*.

Storer, Tracy I., and Lloyd P. Tevis, Jr. *California Grizzly*. Berkeley and Los Angeles: University of California Press, 1955. 335 pp.

It’s ironic that the animal portrayed on California state park vehicles, signs, uniforms, and ranger station flags is now extinct. The California grizzly bear—a unique race—had been hunted to oblivion by the 1920s.

This book draws from zoological, archeological, and historical records to reconstruct a picture of “our most spectacular and interesting wild animal.” The authors first describe the grizzly’s features and habits, then detail the bear’s relationship with humans throughout California history. The final chapters of the book deal with “grizzly lore” and “the California grizzly as an emblem.”

University of Nebraska Press reprinted this volume in 1978.

Wigglesworth, V. B. *The Life of Insects*. Cleveland, Ohio: The World Publishing Company, 1964. 360 pp.

Even though this book is decades old, its content, organization, and style still make it a fine introduction to the insect world.

Insects are examined from all angles—their distinctive form, their fascinating behavior, their complex life cycle, their incredible diversity. Considered also are the roles that insects play as pollinators and as pests.

Zeiner, David C., William F. Laudenslayer, Jr., Kenneth E. Mayer, and Marshall White, eds. *California’s Wildlife*. In three volumes—*Volume I: Amphibians and Reptiles*, *Volume II: Birds*, and *Volume III: Mammals*. Sacramento: [California] Department of Fish and Game, May 1988, Nov. 1990, & Apr. 1990. 272+731+407 pp.

Together, the volumes in this set provide a wealth of basic biological information about all of the terrestrial vertebrates residing in, or regularly migrating to, California. Species accounts summarize what’s known about each animal’s taxonomy, distribution, habitat use and requirements, life history, and management. Range maps, reference listings, and black-and-white illustrations are included.

Extremely useful by itself, *California’s Wildlife* is actually just one component of an elaborate information system dealing with the state’s wildlife and habitats. (For details, see the notation for *Airola’s Guide to the California Wildlife Habitat Relationships System*, cited under “Conservation, Resource Management, and Other Environmental Issues.”)

———. *Book of North American Birds*. Pleasantville, New York: The Reader’s Digest Association, Inc., 1990. 576 pp.

With its descriptive species notes, range maps, and beautiful color illustrations, this book might well have been listed among the animal field guides. It’s cited here instead because of the brief interpretive essays it contains—hundreds of

Science, Poetry, and Parks
Natural History: General and Statewide California

them, each relating to a particular type of bird. Some of the essays focus on a key aspect of a bird's appearance or behavior; others tell interesting stories, such as how starlings were introduced to America by a Shakespearean zealot...or why the California gull is the state bird of Utah...or where towhees got their name.

ANIMAL IDENTIFICATION

Identifying objects—stars, clouds, rocks, plants—is a fundamental part of nature study. But animals pose a special challenge in this regard, because they’re so mobile, unpredictable, and wary of observers.

Luckily, there’s a fine selection of field guides available to the wildlife-minded interpreter. Many of the best ones are listed here. All the major animal groups from insects to mammals are well represented—when possible, by sources that are specific to California. Some guides even enable the user to identify creatures indirectly, by means of their songs, tracks, or skeletal remains.

In certain cases, the decision whether a source belongs under “Animal Identification” or “General Zoology” is rather arbitrary. Generally, though, if formal keys, picture keys, and descriptive species accounts play a dominant role in the work, it’s cited in this section.

Other guidebooks worth consulting can be found under “California Regional and Local References.” Their more restricted scope often helps simplify the identification process.

“To the uninitiated, the identification of wild birds in the field seems to be nothing short of wizardry. A speck on the horizon, a dot in the sky, a formless shape huddled in a tree, a distant blob on a lake, a hummingbird zooming past at 50 miles per hour, a chip, a lisp of a song, a chirp, a hoot in the night, a silhouette against the sunset—all of these and more, if they are birds, can be identified with uncanny precision by expert birders.”

—Arnold Small

“Tracking is a language, and the best trackers are highly sophisticated linguistic interpreters. But any language begins with its alphabet, and the species identification of clear footprints is the alphabet of tracking.”

—Carl A. Strang

*“Ah, what’s a butterfly? At best
He’s but a caterpillar, drest.”*

—John Gay

Booth, Ernest Sheldon. *Mammals of Southern California*. Illustrated by Harry Baerg. California Natural History Guides: 21. Berkeley and Los Angeles: University of California Press, 1968. 99 pp. + 8 color plates.

This guide serves as a handy introduction to a great majority of Southern California's mammals. Species notes describe their distinguishing features, their habitats and ranges, and often their food. Many of the animals are depicted in black-and-white or color artwork. Certain groups—such as bats and whales—have identification keys.

Cogswell, Howard L. *Water Birds of California*. Illustrated by Gene Christman. California Natural History Guides: 40. Berkeley and Los Angeles: University of California Press, 1977. 399 pp. + 12 color plates.

This guide focuses on birds that are associated with California's fresh- or salt-water habitats. The species covered number more than 150.

Illustrations—mostly black-and-white drawings—are in good supply, serving as identification aids. More noteworthy, though, are the author's species accounts, which describe each bird's distinguishing characteristics and habits with considerable expertise. The book opens with a useful section on observing and record-keeping techniques, and it closes with a set of "graphic calendars" that chart the seasonal status of the different species.

Cornell Laboratory of Ornithology/Interactive Audio. *A Field Guide to Western Bird Songs*. Second edition. Boston: Houghton Mifflin Company, 1992. A set of 3 audio cassettes plus a 32-page booklet listing taped bird songs and calls.

It's often advantageous to be able to identify birds by sound rather than by sight. This "Peterson Field Guide," in audio-cassette form, can help the user learn to do just that.

Included are recordings of more than 500 species—all the most common and vocal birds found in the western part of North America. To quote from the accompanying booklet, "You will find these songs and calls to be as diverse and striking as the visual images that birds present." The taped material is organized to be used in conjunction with *Peterson's Field Guide to Western Birds* (cited below).

Essig, E. O. *Insects and Mites of Western North America*. New York: The Macmillan Company, 1958. 1050 pp.

This is an excellent reference, providing detailed information about a multitude of insect types. There are keys to insect orders, suborders, and families, though not to genera or species. Illustrations consist of photos and drawings in black-and-white.

Crustaceans, arachnids, and other arthropods are included, too, but are treated in a cursory way—except for mites, which are given more thorough coverage, presumably because of “their influence on the welfare of man.”

The book is a revised edition of *Insects of Western North America*, which first appeared in 1926. Regrettably, even this revision is now out of print and scarce.

Farrand, John, Jr., ed. *The Audubon Society Master Guide to Birding*. In three volumes. New York: Alfred A. Knopf, 1983. 448+400+400 pp.

Described as “an advanced field handbook to the birds of North America,” this set differs from the other cited bird guides in its more detailed species notes and its use of color photographs (more than 1,200 of them) as illustrations. Also worth mentioning is the “similar species” information provided for most birds—a useful tool for reducing the degree of uncertainty in an identification.

Fry, Donald H., Jr. *Anadromous Fishes of California*. Revised edition. [California] Department of Fish and Game, 1979. 112 pp.

By definition, “anadromous” fish grow and mature in salty water but swim into fresh water to spawn. Salmon, steelhead, striped bass, and sturgeon are examples.

This booklet describes, illustrates, and relates interesting facts about twenty anadromous species found in the state. Keys are provided, but one must know that the fish in question is anadromous before using them.

This is one of several handy guides produced by the Department of Fish and Game; others are cited below.

Garth, John S., and J. W. Tilden. *California Butterflies*. California Natural History Guides: 51. Berkeley and Los Angeles: University of California Press, 1986. 246 pp. + 24 plates.

California has at least 235 species of butterflies, with wingspans ranging from half an inch to half a foot. Anyone interested in learning about them should know about this book.

The manual not only discusses the structure, behavior, and distribution of California butterflies, but also explains how to observe, collect, and identify them. The guide's largest section is devoted to species accounts, which give information about distinguishing features, developmental stages, habitat, food plants, and flight period for each insect type. A key to butterfly families is provided, and most species are illustrated in color.

Harrison, Hal H. *A Field Guide to Western Birds' Nests*. Boston: Houghton Mifflin Company, 1979. 279 pp. + 32 color plates.

This "Peterson Field Guide" sheds some light on a specialized area of nature study. Dealing with more than 500 types of breeding birds, the book describes the habitat, construction, and dimensions of their nests as well as the color, shape, size, and number of their eggs.

About half of the species have their nests and eggs shown in color photos. Even so, similarities among them often limit the effectiveness of picture-keying...and there are no other keys.

Ingles, Lloyd G. *Mammals of the Pacific States: California, Oregon, and Washington*. Stanford, California: Stanford University Press, 1965. 506 pp.

This standard reference is written at the level of a college text. Its identification keys are quite technical, requiring some prior knowledge of zoology and often a specimen in hand as well. However, the black-and-white species illustrations make picture-keying an option.

Introductory chapters discuss mammalogy, ecology, and evolution, but the heart of the volume is its collection of species accounts. These are well-written pieces that provide much interesting natural history information, even though some of the details are noticeably dated. There's also an appendix which explains how to collect and prepare animal specimens for study.

Earlier, more geographically-restricted editions of this book were published in 1947 as *Mammals of California* and in 1954 as *Mammals of California and Its Coastal Waters*.

Jameson, E. W., jr., and Hans J. Peeters. *California Mammals*. California Natural History Guides: 52. Berkeley and Los Angeles: University of California Press, 1988. 403 pp. + 16 color plates.

The first part of this manual serves as a good general introduction to the study of mammals. Various aspects of their lives—feeding, reproduction, dormancy, migration—are discussed, often with regard to California species. Some important types of wildlife/human interactions are considered, too.

As an identification aid, the guidebook includes mammal descriptions, range maps, illustrations, and keys to families, genera, and species. Interpreters will find a wealth of natural history material among the species accounts. Equally valuable are reference lists that cite more in-depth and animal-specific sources.

Kimsey, J. Bruce, and Leonard O. Fisk. *Freshwater Nongame Fishes of California*. Sacramento: [California] Department of Fish and Game, 1964. 54 pp.

This booklet deals with fresh-water fish that aren't regularly sought by anglers. Though sometimes referred to as "bait fish," "forage fish," or "trash fish," as a group these animals are diverse, interesting, and ecologically important.

There are no keys in this guide, so fish identification must proceed by comparing the black-and-white drawings and written descriptions. Some general information about each species is also provided.

Knutson, Roger M. *Flattened Fauna: a field guide to common animals of roads, streets, and highways*. Berkeley, California: Ten Speed Press, 1987. 88 pp.

Characterized as "unique," "bizarre," and "incidentally amusing," this guidebook deals with a subject that's familiar but usually ignored: road kills.

Squashed-animal silhouettes, descriptive text, and a simple key can be used to identify selected amphibians, reptiles, birds, and mammals. One chapter offers some tongue-in-cheek advice on how and where to study the "road fauna." There's even a place for the guide user to keep a personal "death list" of wildlife encounters.

From an interpretive standpoint, *Flattened Fauna* merits a second look. Connections are made between each animal's behavior patterns and its "two-dimensional" fate. "The road fauna is made up of creatures who are victims of their own habits," the author explains. "Why an animal is on the road and what it was doing there ...are recorded in its flat remains as surely as the history of a tree is recorded in its annual rings."

Levi, Herbert W., and Lorna R. Levi. *Spiders and Their Kin*. Illustrated by Nicholas Strekalovsky. New York: Golden Press, Western Publishing Company, Inc., 1987. 160 pp.

This "Golden Guide" features a miscellany of crawly creatures that are sometimes mistaken for insects or just dismissed as "bugs." These include spiders, scorpions, mites, centipedes, and land crustaceans such as pill bugs, among others.

With its clear text and abundant color illustrations, this little manual can serve as both a basic factual reference and a "picture key."

McGinnis, Samuel M. *Freshwater Fishes of California*. Illustrations by Doris Alcorn. California Natural History Guides: 49. Berkeley and Los Angeles: University of California Press, 1984. 316 pp. + 16 plates of color photographs.

This manual deals with those California fish which spend all or part of their natural life cycle in fresh water. The book combines elements of both a desk reference and a field guide.

For identification purposes, there's a key to fish families; this leads the user to species drawings and written descriptions that then can be compared. There are also color photos of selected species. The most space, however, is devoted to natural history information and angling notes about various fish types. Other sections of the guidebook provide advice on watching, photographing, and collecting fish—not to mention on cleaning and cooking them.

Moyle, Peter B. *Inland Fishes of California*. Illustrated by Alan Marciochi and Chris van Dyck. Berkeley and Los Angeles: University of California Press, 1976. 405 pp.

This source deals with the natural history, identification, and management of California's inland fish.

Informative opening chapters of the book discuss the distribution, ecology, and changing nature of the state's inland fish fauna. Keys to species are provided,

too. Most space, however, is devoted to species accounts with black-and-white drawings of fish included. The accounts are more detailed than those in McGinnis' *Freshwater Fishes of California* (cited above), but the illustrations aren't arranged as well for comparison.

Murie, Olaus. *A Field Guide to Animal Tracks*. Boston: Houghton Mifflin Company, 1954. 375 pp.

As the book's dust jacket states, "This is a field guide to the animals you didn't see."

A large number of North American mammals are represented, plus an assortment of birds, reptiles, amphibians, and invertebrates. Hundreds of drawings—most of them by the author—show track patterns, scats, and other animal signs. The text is relatively informal for a "Peterson Field Guide," drawing as it does from Murie's rich store of personal experience and insights.

A standard reference.

Peterson, Roger Tory. *A Field Guide to Western Birds*. Third edition. Maps by Virginia Marie Peterson. Boston: Houghton Mifflin Company, 1990. 432 pp.

Every type of bird found west of the Great Plains is covered in this source. It gives brief species descriptions that include field marks, voice, range, and habitat. More than 150 color plates of birds, all painted by the author, are the main keys to identification. As in other "Peterson Field Guides," distinguishing characteristics are indicated on the illustrations.

Countless people have learned birds using Peterson's Western guidebook since it first appeared in 1941. This completely revised and updated edition features new artwork, a range map section, and an improved format—the pictures and descriptions now are found on facing pages.

Powell, Jerry A., and Charles L. Hogue. *California Insects*. California Natural History Guides: 44. Berkeley and Los Angeles: University of California Press, 1979. 388 pp. + 16 plates of color photographs.

Of California's estimated 28,000 insect species, about 600 are treated in this book. While common and conspicuous types are well represented, the authors have also included some interesting lesser-known forms (such as death-watch beetles, a petroleum fly, and the yerba santa bird-dropping moth).

The guide is less than ideal as an identification tool, due to its limited number of color illustrations and its lack of keys. The descriptive species notes are quite informative, however, and as a handy, state-specific insect reference, this volume stands alone.

Rezendes, Paul. *Tracking and the Art of Seeing: how to read animal tracks & sign.* Charlotte, Vermont: Camden House Publishing, Inc., 1992. 320 pp.

This book is cited here, rather than in the previous section with other tracking and observing guides, because of its stronger emphasis on identification.

Fifty species of mammals are represented, about two-thirds of which are (or were) found in California. As the author discusses each animal, he fully describes and explains its tracks, trails, and other signs of residence or passage—dens, caches, kill sites, scent posts, scats, and such.

Of the various listed tracking aids, this one's the most visually appealing. There are high-quality color wildlife photographs, good documentary shots of animal evidence, and analytical track-pattern diagrams—all with instructive captions.

Robbins, Chandler S., Bertel Bruun, and Herbert S. Zim. *Birds of North America.* Illustrated by Arthur Singer. Expanded, revised edition. New York: Golden Press, Western Publishing Company, Inc., 1983. 360 pp.

The "Golden Field Guide" to birds resembles its Peterson Series and National Geographic Society counterparts in most respects; all contain quality color artwork, succinct species notes, and range maps. However, only this cited source features "sonagrams"—bird songs converted to visual patterns—for selected species.

Russo, Ron, and Pam Olhausen. *Mammal Finder: a guide to mammals of the Pacific Coast states, their tracks, skulls, and other signs.* Berkeley, California: Nature Study Guild, 1987. 93 pp.

This pocket-sized guide is cleverly organized and packed with useful information. There are charts comparing the shapes, skulls, scats, and tracks of various mammals. There's a key for identifying mammal nests, burrows, chew marks, and other signs. And—predominantly—there are concise, multi-illustrated descriptions of more than fifty species, complete with dental formulas and range maps.

Note: Marine mammals and a few other groups have been omitted.

Searfoss, Glenn. *Skulls and Bones: a guide to the skeletal structures and behavior of North American mammals*. Mechanicsburg, Pennsylvania: Stackpole Books, 1995. 277 pp.

Bones not only fascinate us; they also have stories to tell. This book shows how to “read” these stories—first by helping the guide user identify a variety of skulls and other mammal bones, then by explaining what an animal’s bone structure indicates about its life style.

There are numerous line drawings of skeletal parts, chapters on collecting and preparing specimens, and other useful features.

Sibley, David Allen. National Audubon Society *The Sibley Guide to Birds*. New York: Alfred A. Knopf, Inc., 2000. 544 pp.

Applied to this field guide, the term “comprehensive” is practically an understatement.

The single volume contains well over 6,000 illustrations—almost all in color—of more than 800 North American birds. All significant age-related, sexual, seasonal, and geographic variations are depicted. Consequently, there can be a dozen or more paintings of certain species—even as many as *forty* in the case of the red-tailed hawk!

Along with the author’s avian artwork, the book is filled with descriptive notes and range maps that aid in identification. Also helpful are pages that introduce bird families (or groups of families), comparing related species side-by-side.

Seasoned birders will be delighted by *The Sibley Guide’s* wealth of information; for novices, however, the level of detail might prove confusing.

Stall, Chris. *Animal Tracks of Northern California*. Seattle: The Mountaineers, 1989. 128 pp.

This identification guide is compact, it’s informative, it’s limited to California wildlife, and it’s easy to use—for each animal, the species notes and track drawings are placed on facing pages. Mammals are covered quite thoroughly; a few representative birds, reptiles, amphibians, and invertebrates are included, too.

Stall, Chris. *Animal Tracks of Southern California*. Seattle: The Mountaineers, 1990. 125 pp.

In its size and format, this guide resembles the one just cited; even some of its species entries are essentially the same. However, enough geographic “customizing” has been done to make this an advantageous source for Southland users.

Stebbins, Robert C. *Amphibians and Reptiles of California*. Illustrated by the author. California Natural History Guides: 31. Berkeley and Los Angeles: University of California Press, 1972. 152 pp. + 8 color plates.

Compact, authoritative, nicely illustrated, and state-specific, this guide to “herps” makes a fine companion on field trips. Unfortunately, it’s no longer in print. A good alternative is the next cited source, also by Stebbins.

Stebbins, Robert C. *A Field Guide to Western Reptiles and Amphibians*. Second edition. Boston: Houghton Mifflin Company, 1985. 336 pp. + 48 plates.

This “Peterson Field Guide” covers all species of salamanders, frogs, toads, turtles, lizards, and snakes that are known to occur in the West.

Detailed notes describe each animal’s distinguishing features, its range, and its habitat. Information about food, voice, habits, and seasonal activities is included, too. The book contains dozens of beautiful plates of reptile and amphibian illustrations, all drawn or painted by the author; most are in color. Identification keys direct the guide user to the proper plate. And last, there’s an extensive set of species distribution maps.

Zim, Herbert S., and Clarence Cottam. *Insects*. Illustrated by James Gordon Irving. Revised edition. New York: Golden Press, Western Publishing Company, Inc., 1987. 160 pp.

As a beginner’s tool for picture-keying insects, this “Golden Guide” is ideal. It’s surprising how much can be learned by simply thumbing through the pages.

North America’s most common, important, and showy insects are represented here, grouped according to their taxonomic orders. Colorful species illustrations—often showing both adult and immature forms—are accompanied by concise, informative blocks of text. Range maps are included, also.

— — — — —. *Field Guide to the Birds of North America*. Washington, D.C.: National Geographic Society, 1983. 464 pp.

Here's one more field guide to birds. In terms of quality, it's equivalent to those already cited; in content, it's quite similar. And—like each of the others—the differences it does possess will cause some birders to prefer it.

— — — — —. *Trout of California*. Third edition. Sacramento: [California] Department of Fish and Game, 1969. 56 pp.

This booklet contains descriptive notes, illustrations, and background material about the state's seven trout species and some subspecies. General information is provided about both the trout's natural history and trout management in California. Record catches (as of the late 1960s) are listed, too.

— — — — —. *Warmwater Game Fishes of California*. Third edition. [California] Department of Fish and Game, 1981. 54 pp.

"Warm" water, as defined here, is fresh water that's too warm for trout.

About two dozen game fish are described in this booklet, only one of which—the Sacramento perch—is native. Species notes cover distinguishing characteristics, distribution, and life history. A black-and-white drawing of each fish is also included. There's a listing of record catches, too.

ECOLOGY and MISCELLANEOUS NATURAL HISTORY

Just as ecology is an interdisciplinary science, the sources cited below are interdisciplinary, too. In their connecting and combining of things, these works cross subject boundaries in ways that materials cited previously do not.

Aside from this, the listings here are quite diverse. Some survey the broad fields of ecology or natural history, while others focus on narrowly specialized topics— insect/flower relationships, for example. Some explore the nature of a certain geographic area, such as California...or a certain type of environment, such as wetland, or winter, or night. (However, for marine and desert sources see “California Regional and Local References.”)

With styles that range from the practical to the poetic, these writings should help naturalists to direct their inquiries, and interpreters to expand their outlook.

“When we try to pick out anything by itself, we find it hitched to everything else in the universe.”

—John Muir

“A single night has no beginning and no end, exactly, because it comes gradually from dusk and, through dawn, becomes day. Neither has an owl, for its very substance has been mice and seeds, earth and rock, rivers and clouds, maybe even other planets and other stars.”

—David Cavagnaro

“Each living thing on the earth is a spark of sunlight caught in a vast web of life. And each living thing is connected through the energy and material strands of that web to every other living thing.”

—Steve Van Matre

“There is other music in these hills, by no means audible to all. To hear even a few notes of it you must first live here for a long time, and you must know the speech of hills and rivers. Then on a still night, when the campfire is low...sit quietly and listen...and think hard of everything you have seen and tried to understand. Then you may hear it—a vast pulsing harmony—its score inscribed on a thousand hills, its notes the lives and deaths of plants and animals, its rhythms spanning the seconds and the centuries.”

—Aldo Leopold

“The whole of nature is a conjugation of the verb to eat, in the active and the passive.”

—Dean Inge

Alden, Peter, Fred Heath, Richard Keen, Amy Leventer, and Wendy B. Zomlefer. *National Audubon Society Field Guide to California*. New York: Alfred A. Knopf, Inc., 1998. 448 pp.

When it comes to a statewide natural history field guide with maximum coverage and minimum size, one can't do better than this source.

Separate sections of the guidebook give illustrated overviews of California's geology, weather patterns, habitat types, and protected natural areas. There's even a section on the night sky, complete with star charts.

However, about two-thirds of the guide is devoted to the state's rich flora and fauna. One thousand of the most common species are represented—from algae and mushrooms to flowering plants, and from invertebrates to mammals. Identification depends on color photographs and concise descriptive accounts; there are no keys. With this approach, only tentative determinations will be possible in many cases.

Bakker, Elna S. *An Island Called California: an ecological introduction to its natural communities*. Second edition, revised and expanded. Berkeley and Los Angeles: University of California Press, 1984. 487 pp.

First published in 1971, this overview of the state's ecology remains a standard reference. Much of the book is organized as a west-to-east transect across the central part of California—seashore, coastal hills, Central Valley, Sierra slopes, and high desert. Three new chapters about Southern California supplement the revised edition.

Bakker's thematic approach and flowing style make pleasant, worthwhile reading for interpreters.

Barth, Friedrich G. *Insects and Flowers: the biology of a partnership*. Translated by M. A. Biederman-Thorson. Princeton, New Jersey: Princeton University Press, 1991. 408 pp.

The relationship between flowers and insects is both an intimate and an ancient one. Floral shapes, colors, and scents all have evolved as ways of attracting pollinators, while insect anatomy and behavior show corresponding adaptations for using flowers as a source of food.

Insects and Flowers carefully examines this remarkable interdependence. Chapters are devoted to such topics as the “kaleidoscope” of flower forms, pollen and nectar, floral “signposts,” insect vision, the “dance language” of bees, and even the “biomechanics of the lepidopteran proboscis.”

Bates, Marston. *The Forest and the Sea: a look at the economy of nature and the ecology of man.* New York: Random House, 1960. 278 pp.

“Ecology” was a much less familiar term when this book was written, and since then the discipline has evolved considerably. Even so, this work remains an interesting discussion of “the economy of nature” and the role of humans in it. The author explains key ecological concepts, surveys the world’s major ecosystems, and muses about “the application of ethics to man’s relations with nature” — all in a clear, perceptive way.

Benyus, Janine M. *The Field Guide to Wildlife Habitats of the Western United States.* Illustrations by Glenn Wolff. New York: Simon & Schuster Inc., 1989. 336 pp.

This guidebook nicely introduces readers to eighteen distinctive habitat types, most of which occur in California. Each habitat is explained in terms of why it’s unique and what it offers to wildlife. There are profiles of representative animal species, lists of indicator plants, wildlife locator charts, and other useful features.

The text is very “interpretively” written, touching upon quite a number of important ecological themes—adaptations to desert heat and dryness, human impact on oak woodlands, the role of dead tree snags in old-growth forest, and coastal salt marsh productivity, for example.

Detailed drawings not only illustrate the habitats and their wildlife, but also add charm to the book.

Brown, Vinson. *The Amateur Naturalist’s Handbook.* With drawings by Don Greame Kelley. Boston: Little, Brown and Company, 1948. 475 pp.

This classic handbook gives information, advice, and encouragement to budding naturalists young or old. It’s organized in sections that correspond to stages in the amateur’s development. Chapters discuss the “hands-on” study of geology, meteorology, botany, zoology, and ecology; some deal with collecting and classifying natural history specimens. Keys, glossaries, and other aids are included—even “nature tests” to gauge the reader’s level of understanding.

Sadly, the manual is no longer in print; but after more than a dozen printings of it, copies might still be found at libraries or used book stores.

Brown, Vinson. *How to Explore the Secret Worlds of Nature*. Boston: Little, Brown and Company, 1962. 174 pp.

A “secret world,” as the author defines it, is “an area of knowledge little known or penetrated by man.” Such worlds exist underfoot and overhead, in the dark, and even on a desk top. Some can be surveyed through an eyepiece; others are charted on graphs. To explore them requires the curiosity of a child plus the methodology of a scientist.

Written for school-age amateur naturalists, this book proposes some fascinating investigations—tracking the daily rhythms of life in a stream, sampling microclimates, mapping animal travels or territories, and measuring erosion rates, to name a few.

Brown, Vinson. *Knowing the Outdoors in the Dark*. Harrisburg, Pennsylvania: Stackpole Books, 1972. 191 pp.

This book could just as well be called “A Field Guide to Night.” It’s a guide to nocturnal things seen and unseen: the green reflection from a bullfrog’s eyes...an opossum’s fetid odor...ducks exposed in silhouette against the moon...even a certain “seething” wind-sound that only conifer needles can produce.

Readers learn how to recognize numerous animals and plants at night, not just visually but by sound and scent. Range maps and species illustrations are provided, serving as a useful check. The manual also offers tips for sharpening one’s senses, for exploring the darkness safely, for conducting field studies, and more.

Leaders of “night prowling” programs definitely should be familiar with this source.

Brown, Vinson. *Reading the Woods*. Harrisburg, Pennsylvania: Stackpole Books, 1969. 160 pp.

This source isn’t recommended for its coverage of California’s forests and woodlands; they’re treated only briefly here. Rather, the book’s value lies in its approach to understanding woods of any kind.

The goal is purely interpretive—“to see not just a mass of trees, but variations and details that have meanings,” as author Brown puts it. Text, charts, and illustrations show how climate, soil, fire, animals, and human activity each shape the forest in ways that can be recognized and “read.”

Burcham, L. T. *California Range Land: an historico-ecological study of the range resource of California*. Sacramento: Division of Forestry, [California] Department of Natural Resources, 1957. 261 pp. + separate map.

California’s range lands—particularly its grasslands—have changed significantly in historic times. Due to livestock grazing, drought, and other factors, the dominant native “bunchgrasses” were replaced by weedy species such as wild oat, mustard, and filaree. Most of the state’s foothills and valleys were impacted...including many areas which would become our “natural” parks.

This book gives a full account of that ecological transformation, chronicling the development of the range livestock industry in California as well. The text, adapted from a doctoral dissertation, contains much more detail than interpreters will need. Grassland-oriented naturalists, however, may find even the more esoteric facts, quotes, and statistics interesting to peruse.

In 1982 this work was reprinted (with minor changes) as Publication Number 7 of the Center for Archaeological Research at Davis, University of California, Davis.

Callenbach, Ernest. *Ecology: a pocket guide*. Berkeley and Los Angeles: University of California Press, 1998. 155 pp.

This source serves nicely as a primer for those without much background in ecology.

Dozens of key terms are clearly and interestingly explained. Among the topics discussed are fundamentals such as “water,” “energy,” “species,” and “time;” ecological concepts such as “food webs,” “carrying capacity,” and “succession;” and conservation issues such as “land use” and “sustainable yield.”

The author’s cross-referencing weaves the entries into a network of vocabulary and ideas—one that’s suggestive of the interwoven ecological world that the book describes.

Cavagnaro, David. *This Living Earth*. Palo Alto, California: American West Publishing Company, 1972. 191 pp.

On one level, this book describes the intricate ecology of an ordinary patch of Northern California countryside. On another, it traces the progress of one naturalist on a personal journey from awareness to understanding. Either way, its message is a celebration.

This is a masterful interpretive work—beautifully illustrated with the author’s color photographs, elegantly written, and filled with examples of how broad insights can be gleaned from small encounters.

Durrell, Gerald, with Lee Durrell. *The Amateur Naturalist*. New York: Alfred A. Knopf, Inc., 1983. 320 pp.

This guide for “aspiring naturalists” largely consists of a survey of natural environments, ranging from ocean to desert and from exotic rain forest to one’s own back yard. In each case, general ecological concepts are presented along with a look at specific things that readers can investigate on field trips. A separate section describes various home-based activities—setting up a nature lab, developing collections for study, and keeping live animals and plants.

The book is visually appealing, with an effective layout and interesting graphics. Most notable are the photographed assemblages of natural objects—leaves, shells, bones, feathers, and such; each picture resembles an exhibit, caption-labeled and portraying a certain habitat.

Eddy, William H., Jr., Gonzalo S. Leon, and Robert C. Milne. *Consider the Process of Living*. Washington, D.C.: The Conservation Foundation, 1972. 130 pp.

This work is an eloquent, evocative statement of what ecology and conservation are all about. The book asks readers to thoughtfully consider the process of living—the need for air and water, the meaning of earth and energy. It asserts, and reasserts, that humanity’s relation to the “delicate fabric” of life-supporting forces is “neither separate nor above, but intricately and permanently interwoven.”

Color photos and other graphics complement the text.

Farb, Peter. *Face of North America: the natural history of a continent*. New York: Harper & Row, Publishers, 1963. 316 pp.

From Gulf Stream coral islands to ice-capped volcanos of the Pacific Rim, North America's landscape forms a vast, diverse, and often spectacular panorama. This book surveys the main components of that landscape, explaining the natural history behind the scenery, interweaving stories of land and life. However, readers should know that certain geologic statements by the author are outdated now.

California-oriented interpreters may find that this source not only broadens their horizons, but also helps them "connect" with park visitors from out-of-state.

Guinness, Alma E., ed. *Joy of Nature: how to observe and appreciate the great outdoors*. Pleasantville, New York: The Reader's Digest Association, Inc., 1977. 352 pp.

Here is an excellent overview of the natural world, presented in bite-sized pieces. Well over 100 interpretive topics are explored in eye-catching, informative two-page spreads. "Seeing Patterns in Nature," "The Autobiography of a Tree," "Zones of Life on a Mountainside," "The Rhythm of the Tides," "Desert Contrasts: Day to Night," "Watching Sky Spectaculars," and "Time: The Master Sculptor" are a sampling of the titles. The articles are lavishly illustrated in color with high-quality artwork and photos.

Also, interspersed throughout the volume are "participation features" designed to enhance the reader's enjoyment of nature. Many suggest activities such as photographing "star trails" or making plaster casts of animal tracks.

This book is a particularly good source of ideas and examples for interpreters who'd like to make their programs more thematic.

Halfpenny, James C., and Roy Douglas Ozanne. *Winter: An Ecological Handbook*. Boulder, Colorado: Johnson Books, 1989. 275 pp.

Here's a guide to a domain not charted on any map...except possibly a weather map. The authors use the term "winter" in its coldest, windiest, snowiest sense—that is, in a way that applies to only certain parts of California.

This "compilation of knowledge about winter" combines the academic with the practical. Snow crystal classification, plant and animal coping strategies, and human safety and recreation are among the topics covered.

Head, W. S. *The California Chaparral: an elfin forest*. Edited by Florence Musgrave. Healdsburg, California: Naturegraph Publishers, 1972. 96 pp.

Chaparral is an important natural community in California—but it's not always an easy habitat for people to explore, understand, or appreciate. This source serves as a basic introduction to the “elfin forest's” features and wonders. (In it, however, the ecological role of fire is understated.)

The author spends much of the book discussing common chaparral plants and animals, noting their appearance, behavior, interactions, use by Native Americans, and such. His writing style is quite informal; facts are intermingled with personal observations and anecdotes. Interpreters who conduct nature walks may find this approach a comfortable one...and draw material from it.

Illustrations consist mostly of black-and-white artwork of fair to good quality.

Johnston, Verna R. *California Forests and Woodlands: a natural history*. Drawings by Carla J. Simmons. California Natural History Guides: 58. Berkeley and Los Angeles: University of California Press, 1994. 224 pp. + 16 color plates.

Engagingly written yet packed with facts, this book guides the reader on a naturalist's tour of California's tree-dominated biotic communities. Author Johnston notes the unique aspects of each forest and woodland type while examining the plant and animal interrelationships to be found within. She also explains how climate, soil, fire, flood, and humans affect the ecology.

Illustrations include not only color photographs (by the author) but also a number of black-and-white drawings which are particularly nice.

Klots, Elsie B. *The New Field Book of Freshwater Life*. Drawings by SuZan Noguchi Swain. New York: G. P. Putnam's Sons, 1966. 398 pp. + 8 color plates.

Anyone who looks closely will discover that ponds, streams, and other freshwater habitats support a confusing abundance of life. This is a guide to that life—from microscopic algae and protozoa to aquatic insects and crustaceans to larger, more familiar plant and vertebrate forms. The book provides natural history information about the various types of organisms, along with keys, charts, and illustrations to help identify them. However, California users will have to “wade” through numerous genera and species that aren't found in the West.

Laun, H. Charles. *The Natural History Guide: a study, reference, and activity guide.* Third edition. Alton, Illinois: Alsace Books and Films, 1967. 449 pp.

Like Brown's *Amateur Naturalist's Handbook* (cited above), this is a fine source for interpreters that's no longer in print. Laun's *Guide* differs from the *Handbook* in that it has more organized factual information, but less explanatory text.

Here one will find charts to help identify major soil groups, common trees, insect families, mammal skulls, and much more. Also provided are directions for a wide range of activities—telling time by the stars, making weather instruments, photographing wildflowers, and recording bird songs, for example.

Lovelock, J. E. *Gaia: a new look at life on Earth.* Oxford: Oxford University Press, 1979. 157 pp.

This pioneering work has generated a great deal of discussion. It introduces the "Gaia hypothesis"—the idea that, on a global scale, life doesn't merely react to its physical environment, but rather is actively involved with regulating and maintaining conditions needed for survival.

Martin, Alexander C., Herbert S. Zim, and Arnold L. Nelson. *American Wildlife and Plants.* New York: McGraw-Hill Book Company, Inc., 1951. 500 pp.

This reference work contains a wealth of ecological data that will interest naturalists, interpreters, and resource managers alike. Given the subject matter, the age of the material shouldn't greatly diminish its usefulness.

The book consists of an orientation section and two main parts. The first part analyzes the eating habits of more than 300 types of birds and mammals, noting the relative importance and seasonality of their dietary items. The second part catalogues about 250 genera of plants, listing the animals that feed on each. A final chapter ranks the plants by their value to wildlife; pine, oak, wild oat, filaree, and pondweed score very high in the "Pacific Region."

Dover Publications issued a reprint of this volume in 1961.

Mayer, Kenneth E., and William F. Laudenslayer, Jr., eds. *A Guide to Wildlife Habitats of California.* Sacramento: California Department of Forestry and Fire Protection, Oct. 1988. 166 pp.

This guide differentiates more than fifty "vegetative complexes" which are important to California wildlife. These habitat types, ranging from "subalpine conifer" to "urban," are described in some detail. Each habitat is considered in

terms of its physical setting, component plants, vegetation height and density, successional patterns, and wildlife. Distribution maps and color photographs of the habitats are also included.

This reference is part of a larger information system that's explained in Airola's *Guide to the California Wildlife Habitat Relationships System* (cited under "Conservation, Resource Management, and Other Environmental Issues").

Milne, Lorus J., and Margery J. Milne. *The World of Night*. Illustrations by T. M. Shortt. New York: Harper & Brothers, 1956. 248 pp.

Here is an informed and eloquent guided tour of night. Chapter by chapter, readers explore not one but many nocturnal realms; these include forest, desert, beach, and streamside, plus other settings as diverse as caves and cities or tropics and poles. Each affords a different look into the lives of animals that inhabit the darkness, from luminescent deep-sea creatures to night-migrating birds.

The book's scratchboard-type illustrations work well, capturing the "feel" of night.

Morgan, Sally. *Ecology and Environment: the cycles of life*. New York: Oxford University Press, 1995. 160 pp.

With its succinct explanatory text and its many captioned illustrations, this source makes a good primer on ecology.

Basic concepts and other important topics are presented in eye-catching two-page spreads; "Habitats and Niches," "Energy Transformation," "The Water Cycle," "Succession," and "Population Curves" are among the titles. Some of the entries focus on human ecological impacts—"Atmospheric Pollution" and "Preserving Diversity," for example.

The book also includes a glossary of useful terms and a "factfile" with global information.

Needham, James G., and Paul R. Needham. *A Guide to the Study of Freshwater Biology*. Fifth edition, revised and enlarged. San Francisco: Holden-Day, Inc., 1962. 108 pp.

Here's a handy guide to the life of what author Paul Needham calls "one of the richest and most diverse environments in the world"—the fresh water of lakes, ponds, and streams.

The booklet's keys, tables, and black-and-white drawings will help users to identify common algae, protozoans, invertebrates, and fishes. In most cases, only scientific names are given. A separate section discusses collecting methods, water analysis, and other related topics.

Rezendes, Paul, and Paulette Roy. *Wetlands: the web of life*. Photographs by Paul Rezendes. San Francisco: Sierra Club Books, 1996. 156 pp.

Both verbally and visually, this book provides a good overview of North America's wetlands. Separate chapters survey the ecological workings of different wetland types—inland marshes, coastal wetlands, peatlands, swamps, lakes and ponds, and rivers and streams. More than a hundred fine color photographs share space with the interpretive essays.

Rockwell, David. *The Nature of North America: a handbook to the continent: rocks, plants, and animals*. New York: Berkley Books, 1998. 379 pp.

This source is ideal for interpreters who want to consider California's natural history in a broader context.

Parts of the text survey North America's "natural foundations"—its geologic provinces, hydrologic regions, soil orders, climatic zones, and biotic communities. Other parts focus more narrowly on such topics as regional amphibian declines or current thinking that fungi may be more closely related to animals than to plants. A number of individual species are showcased as well—quaking aspen, for instance, whose cloning ability has given rise to "the most massive living organism known."

Besides being clearly and interestingly written, the book is well supplied with drawings, tables, and maps.

Russo, Ronald A. *Plant Galls of the California Region*. Pacific Grove, California: The Boxwood Press, 1979. 203 pp.

A gall is an odd but intriguing ecological creation—a plant's tumor-like growth response to an invading insect or other organism. Galls come in a great variety of sizes, shapes, textures, and colors, depending on the particular combination of host plant and invader that are involved.

This guidebook is a welcome aid for naturalists and interpreters who want to better understand the galls they come across. It provides explanatory accounts of

numerous gall types as well as clear, non-technical keys for their identification. The guide is liberally illustrated with drawings and photos by the author; unfortunately, only the cover illustrations are in color.

Schoenherr, Allan A. *A Natural History of California*. California Natural History Guides: 56. Berkeley and Los Angeles: University of California Press, 1992. 772 pp. + 16 plates of color photographs.

Here is an extremely valuable work, probably the best single source of its kind available. Remarkably, the author manages to compress a small library's worth of useful information into this one volume.

The book fully explores and explains California's rich natural diversity. After an introductory overview, a pair of chapters familiarize the reader with basic concepts of ecology, geology, and climate. Most of the volume is organized around the main geographic regions of the state—Coast Ranges, Sierra, Central Valley, deserts, and such—with each described in terms of its physical environment and biotic communities.

Many species of plants and animals are showcased in the text. Some are representative types, and some unique; their stories will be of interest to interpreters, often involving elegant adaptations or intricate ecological ties.

Every park should have a reference copy of Schoenherr's book to complement its set of field identification guides.

Smith, Robert Leo. *Ecology and Field Biology*. Fifth edition. New York: HarperCollins College Publishers, 1996. 824 pp.

This standard ecology textbook makes a fine reference for naturalists and interpreters. It's well-written (though moderately technical in spots), attractively illustrated, and up-to-date.

All the basic ecological topics are covered—the physical environment's influence on life-forms; energy flow, food chains, and nutrient cycling; competitive and cooperative interactions; population dynamics; biotic communities; major world ecosystems; and much more.

Also included, as appended material, are directions for conducting various types of biological field studies. For those whose investigations lead to libraries, there's a bibliography listing about two thousand titles.

Storer, John H. *The Web of Life: a first book of ecology*. New York: The Devin-Adair Company, 1953. 144 pp.

The Web of Life is a time-honored book that clearly explains basic concepts of ecology and conservation, with a number of examples chosen from California and the West.

Terwilliger, Elizabeth. *Sights and Sounds of the Seasons*. Tiburon, California: The Elizabeth Terwilliger Nature Education Foundation, 1976. 131 pp.

In this source, a popular interpreter guides readers month-by-month through the natural year...and in the process, serves as an example for guiding others. Terwilliger's essays read like a transcript of her presentations—knowledgeable, enthusiastic, and engaging, with remarks alternately directed to children and to adults.

The book is rich in natural history lore; whales and wildflowers, redwoods and rattlesnakes, oak galls and owl pellets—all are incorporated into its seasonal tour. Biologically diverse Marin County is the setting for most discussions, but a few range farther afield to the Delta region and the Sierra.

Van Dyke, John C. *Nature for Its Own Sake: first studies in natural appearances*. New York: Charles Scribner's Sons, 1898. 292 pp.

Natural history interpreters often acknowledge the beauty of things, but rarely do they make beauty the focus of their presentations. This source will give some direction to those who'd like to consider nature from an aesthetic point of view.

Nature for Its Own Sake was written at a time when visual appreciation—of form, texture, color, shading, and such—was a standard part of one's education. The book carefully examines the dramatic and subtle effects of light on mountains, plains, lakes, streams, coastlines, clouds, and vegetation. "The blue sky" alone takes up an entire chapter. It's the author's aim "simply to call attention to that nature around us which...too many people look at every day and yet never see." This out-of-print volume is difficult to find, and its scientific explanations can't be trusted. As a study in awareness, however, it's truly a revelation.

Vessel, Matthew F., and Herbert H. Wong. *Natural History of Vacant Lots*. Drawings by Pamela Vesterby. California Natural History Guide No. 50. Berkeley and Los Angeles: University of California Press, 1987. 285 pp. + 16 plates of photographs.

This book concentrates on a subject that's not typically the focus of field guides: the nature of vacant lots, waysides, and other "disregarded" town or city sites.

The authors discuss these places as ecosystems and also suggest activities for investigating them. The greater part of the book describes some 300 plants and animals that commonly occur in California's disturbed urban environments. Species accounts include interpretive remarks, and most of the organisms are illustrated with drawings or photos.

Note: Because so many life-forms must be omitted from a guidebook of this sort, identifications made while using it should be confirmed, if possible, by other sources.

Watts, May Theilgaard. *Reading the Landscape of America*. Revised and expanded edition. New York: Macmillan Publishing Co., Inc., 1975. 354 pp.

These essays about selected American habitats are well-crafted pieces of interpretation, blending personal experience with natural (and human) history. Several deal with Californian subjects: grassland, chaparral, redwoods, pygmy forest, and desert.

Particularly interesting is an explanation of how old adobe bricks have been used to date the arrival of weedy species such as wild oat and filaree.

Zwinger, Ann H., and Beatrice E. Willard. *Land above the Trees: a guide to American alpine tundra*. With line drawings by Ann H. Zwinger. New York: Harper & Row, Publishers, 1972. 489 pp. + 24 plates of color photos.

According to its preface, "This book brings together for the first time in one place most of what is known about the alpine tundra of the United States." And with its clear, informative text and its numerous illustrations (nearly all of them of plants), the volume does so quite effectively.

Though very restricted geographically, areas above timberline are of special ecological interest; nowhere else in California does winter play a stronger shaping role. Plants and animals are highly adapted for survival under harsh conditions, and the limited number of species makes this, in the authors' words, "a good place for a beginning ecology student to get his bearings in understanding the elegant relationships of a vast natural world."

— — — — —. *Nature in America*. Pleasantville, New York: The Reader's Digest Association, Inc., 1991. 456 pp.

Acid rain, caddisfly, feldspar, niche, syzygy, tsunami, yucca—these and more than a thousand other items can be found in this “A-to-Z guide” to the natural world.

Nature in America is an introductory-level general reference, with brief, non-technical entries and many color illustrations. It's a good place for interpreters to check a not-quite-familiar term or to broaden their base of information.

**CALIFORNIA:
ITS PLACES, PEOPLE and PAST**

GENERAL CALIFORNIA GEOGRAPHY

By almost any geographic measure—regardless of whether it's physical or cultural—California is an extraordinary place. Superlatives abound, and diversity is encountered at every turn.

It's often helpful for interpreters to think of their parks in some broader geographic context—a context which the sources in this section can provide. Listings include textbooks, guidebooks, an atlas, an almanac, a commentary, and several other place-related references. Most are state-wide in scope.

“Know ye that on the right hand of the Indies there is an island called California, very near the Terrestrial Paradise...”

—Garcí Rodríguez Ordóñez de Montalvo (ca. 1510)

“It is not down in any map; true places never are.”

—Herman Melville

*“One of the best-paying professions is **getting ahold** of pieces of country in your mind, learning their smell and their moods, sorting out the pieces of a view, deciding what grows there and there and why, how many steps that hill will take, where this creek winds and where it meets the other one below, what elevation timberline is now, whether you can walk this reef at low tide or have to climb around, which contour lines on a map mean better cliffs or mountains. This is the best kind of ownership, and the most permanent.”*

—Terry and Renny Russell

“Californians are people who were born somewhere else and then came to their senses.”

—Will Rogers

Bright, William. *1500 California Place Names: their origin and meaning.* Berkeley and Los Angeles: University of California Press, 1998. 171 pp.

This little volume gives name explanations for well-known geographic features of the state—and some lesser-known ones, too. Bright’s handy reference isn’t as comprehensive as Gudde’s classic *California Place Names* (cited below); but it isn’t as expensive, either, and many interpreters will find it adequate for their needs.

The book is actually a revised, updated version of *1000 California Place Names*, third edition, by Erwin G. Gudde.

Delahanty, Randolph. *California: A Guidebook.* San Diego: Harcourt Brace Jovanovich, Publishers, 1984. 364 pp.

There’s certainly no shortage of tourist-oriented guidebooks about California. This one, though not the most current, offers a relatively in-depth look at many of the state’s attractions. Its write-ups are rich in historic lore and cultural insights; some bear thematic titles, such as “Mendocino: New England on the California Coast” and “Disneyland: An American Creation Myth.”

Donley, Michael W., Stuart Allan, Patricia Caro, and Clyde P. Patton. *Atlas of California.* Culver City, California: Pacific Book Center, 1979. 191 pp.

With its colorful maps and diagrams, this atlas does an admirable job of depicting the geography of California. The state’s physical environment, its historic development, and its socioeconomic structure are all portrayed in sharp detail. Natural history graphics include vegetation profiles, geologic cross-sections, wildlife range maps, precipitation charts, and various other illustrations.

Some—though by no means all—of the information in this source grows increasingly dated. The atlas is now out of print, but many libraries have a reference copy.

Fairbanks, Harold W. *California.* San Francisco: Harr Wagner Publishing Co., 1920. 240 pp.

This old elementary school textbook approaches the subject of California geography by what the author termed “the method of presenting all facts in the light of their natural associations and from the point of view of their influence upon life.” This involves a question-and-answer format that modern interpreters will still find useful and intriguing.

The following are typical of queries posed—and answered—in the text: Why is there so much oil in the Coast Ranges and so little coal? Why is the Sacramento Valley smaller than the San Joaquin, yet drained by a larger river? Why does the Sierra's western slope have such great forests, while its eastern side descends into desert? Why do we find large lakes in the arid Great Basin?

A later edition of this book, revised and adopted by the State Board of Education, was published by the California State Printing Office at Sacramento in 1927. Though long out of print, copies of Fairbanks' "progressive geography" occasionally turn up at used book stores.

Fay, James S., ed. *California Almanac*. Seventh edition. Santa Barbara, California: Pacific Data Resources, 1995. 249 pp.

This is a handy compendium of practical and interesting information about the Golden State. Broadly inclusive, its subject matter ranges from vital statistics to sports.

At the very least, interpreters will want to browse the sections on "population and immigration," "geography and environment," and "public lands and wildlife." Here they'll learn, for instance, that California is the most urbanized state in the nation (about 93% of the population), or that in 1993 campers contributed almost two billion dollars to the state economy, or that the "granddaddy of California droughts" lasted more than 115 years.

In the past, new editions of the *Almanac* were published at roughly two-year intervals. Editions prior to the sixth contain considerably more material than the current one.

Finson, Bruce, ed. *Discovering California*. San Francisco: California Academy of Sciences, 1983. 192 pp.

This volume consists of articles and photos reprinted from *Pacific Discovery* magazine (which is cited separately under its new name, *California Wild*, in the "Periodicals" section). The articles aren't strictly geographic, but they do have a geographic commonality: California.

Several of the selections relate directly to state or national parks. Topics include the tule elk's return from near-extinction, an ecological "staircase" on the

Mendocino coast, a Miwok harvest celebration, and Lassen Peak's volcanic history, among other things. Some of the material shows its age, however.

Fradkin, Philip L. *The Seven States of California: a natural and human history*. New York: Henry Holt and Company, 1995. 474 pp.

It's the premise of this book that California can be divided into seven distinct geographic and cultural provinces. From each, the author selects one "emblematic landscape feature" around which to weave strands of story. In the case of the state's central coast region, that feature is an earthquake fault; for the Sierra, it's a mountain pass. The story topics are diverse, to say the least; they range from writers to redwoods to race relations, and from the mission system to Charles Manson.

Fradkin describes his book as "part history, natural guide, travelogue, memoir, and elegy."

Gudde, Erwin G. *California Place Names: the origin and etymology of current geographical names*. Fourth edition, revised and enlarged by William Bright. Berkeley and Los Angeles: University of California Press, 1998. 468 pp.

Interpreters can benefit greatly from a knowledge of place names and their meanings. For California, this is the standard reference on the subject, listing and explaining thousands of geographic terms.

The following are samples of what readers will learn. John Muir, the famed naturalist, has been honored in state nomenclature more than any other person. As a name, "Golden Gate" turned out to be prophetic—it was given to the bay entrance by explorer John C. Fremont two years before the historic gold discovery. Many place names are of Spanish origin, such as "Sierra Nevada" ("a range covered with snow"), "Salinas" ("salt marshes"), and "Palomar" ("pigeon-roost"). "Shasta" and some other notable terms are Native American; "Ojai," for instance, comes from a Chumash word for "moon" ...and "Yosemite" is of Miwok derivation, meaning "they are killers."

Hansen, Harry, ed. *California: A Guide to the Golden State*. Third edition, completely revised. New York: Hastings House, Publishers, 1967. xxxii + 733 pp. + 56 pp. of black-and-white photographs.

Broad in its coverage and rich in its detail, this guidebook provides a vivid time-capsule view of California in the 1960s. Dramatic changes have taken place since

then, of course, but enough material remains factual to make this work worth citing here.

The volume contains three main sections. The first portrays the state's natural setting, its history, and other attributes. The second looks closely at important California cities. The third and largest part guides readers through a series of regional tours, highlighting features of special interest.

Part of the "American Guide Series," this book's first edition was produced by the Federal Writers' Project of the Works Progress Administration, and was published in 1939.

Hill, Russell B. *California Mountain Ranges. California Geographic Series: No. 1. Helena and Billings, Montana: Falcon Press Publishing Co., Inc., 1986. 120 pp.*

From sun-seared desert ranges to Mount Shasta's icy cone, mountains define much of California's landscape. No other state has such a variety of them.

Region by region, this source portrays California mountains "in all their splendid beauty and inconvenient disarray." The text is a pleasure to read, with its vivid descriptions and its wealth of lore. There's a retelling of Bret Harte's legend of Mount Diablo, for instance, and the story of how Mount Whitney bears the name of a geologist "more famous for being wrong than for being right." The book's many calendar-quality photographs are equally enticing.

Holing, Dwight. *California Wild Lands: a guide to the Nature Conservancy preserves. San Francisco: Chronicle Books, 1988. 211 pp.*

Over the years, the Nature Conservancy has acquired remnants of California's pristine landscape in order to preserve them. These parcels of land not only exemplify the state's biotic richness; in some cases, they support the last habitats of their kind left on earth.

This well-written book draws attention to more than twenty of the Conservancy's preserves, explaining their ecological significance and telling how to gain access to them.

Horan, Andrew. *California National Forests. Helena and Billings, Montana: Falcon Press Publishing Co., Inc., 1989. 127 pp.*

Here, beautiful color photographs and informative text combine to acquaint readers with the diverse attractions of California's nineteen national forests.

Directories conveniently catalogue each forest's features of interest, recreational opportunities, and administrative offices. Special forest-related topics such as condor survival and the story of Ishi are also addressed.

This source doesn't pertain to parks directly, but as background material it may still be worth citing because the public frequently confuses park and forest lands.

Kreissman, Bern, assisted by Barbara Lekisch. *California: An Environmental Atlas and Guide*. Davis, California: Bear Klaw Press, 1991. 257 pp.

A useful and time-saving reference, this book lists, locates, and describes "those features of California of most interest to the environmental community."

Faults and earthquakes, giant kelp forests, waterfalls, redwood parks and preserves, national wildlife refuges, and off-highway vehicle areas are among the dozens of topics treated. There's also a detailed directory of environment-related agencies—international, federal, state, regional, county, and private.

Sources of this type soon become dated as organizational schemes and office addresses change. Here, several maps show State Park System "regions" which no longer exist.

Lantis, David W., Rodney Steiner, and Arthur E. Karinen. *California: The Pacific Connection*. Chico, California: Creekside Press, 1989. 595 pp.

With its wealth of geographic information about California, this is a valuable source. However, its age is gradually becoming a concern—as with any such work that provides a "snapshot" of our rapidly evolving state.

Most of the text is organized around the state's various regions and subregions. Physical and cultural landscape elements are explained together, so that readers come to understand not just the "what" and "where" of places, but the "why" as well.

A separate section gives brief "overviews" of California's population, climate, and such.

Marinacci, Barbara, and Rudy Marinacci. *California's Spanish Place-Names: what they are and how they got here.* San Rafael, California: Presidio Press, 1980. 268 pp.

Place names of Spanish origin abound in California. Not only is “California” itself a Spanish word; most major metropolitan areas also have Spanish names, along with 32 of the state’s 58 counties.

This book relates the stories behind a multitude of names—whether they’re descriptive like “Loma Prieta” (“dark hill”), commemorative like “San Juan Bautista” (“Saint John the Baptist”), or contrived like “Asilomar” (“refuge-by-the-sea”). Readers will also find a section on Spanish pronunciation and grammar, plus a dictionary of terms that’s conveniently indexed to the text.

McMillon, Bill. *Seasonal Guide to the Natural Year: Northern California.* Golden, Colorado: Fulcrum Publishing, 1995. 342 pp.

This viewing guide is unusual in that it’s organized not by subject matter or by location, but by time of year.

Month by month, more than seventy natural events are covered. One selection for January involves newt mating activity in the Berkeley Hills, for instance, while April’s features include flowery vernal pools in the Central Valley. Likewise, readers learn that the Perseid meteor shower adds interest to High Sierra nights in August, and that December is ideal for exploring “storm beaches” along the state’s north coast.

Miller, Crane S., and Richard S. Hyslop. *California: The Geography of Diversity.* Palo Alto, California: Mayfield Publishing Company, 1983. 255 pp.

Well-written and effectively illustrated in black-and-white, this textbook covers the fundamentals of California geography quite nicely. Chapters examine such topics as landform provinces, cultural landscapes, biotic regimes, water, energy, agriculture, urbanization, and historical geography. Collectively, the material reflects the state’s astonishing “variety and sweep.”

Perry, John, and Jane Greverus Perry. *The Sierra Club Guide to the Natural Areas of California.* New edition, with revisions by Roger Rapoport, Linda Cohen, and Nancy Madway. San Francisco: Sierra Club Books, 1997. xxii + 394 pp.

Here is a handy guide to “California’s quiet places”—places where a visitor can enjoy nature. More than 200 such areas are catalogued; these include state and national parks, forests, and wildlife preserves, as well as some Bureau of Land Management sites.

Each location is painstakingly described. The book's entries not only note physical and biological features of the natural areas—they also inform about access, rules and regulations, activities allowed, interpretive services, and pertinent publications.

Wade, Judy. *Seasonal Guide to the Natural Year: Southern California and Baja*. Golden, Colorado: Fulcrum Publishing, 1997. 346 pp.

Like McMillon's companion volume on Northern California (cited above), this guide to natural events tells not just where to go, but when.

Examples of seasonal entries for the Southland include January whale watching along the coast, the March return of swallows to San Juan Capistrano, bighorn sheep spotting in August as the reclusive animals are drawn to water, and October's display of colorful foliage in the mountains.

Wuerthner, George. *California's Wilderness Areas: the complete guide*. In two volumes. Englewood, Colorado: Westcliffe Publishers, Inc., 1997 & 1998. 328 + 320 pp.

Although it's the most populous state in the nation, California is second only to Alaska in the amount of designated wilderness it contains—nearly fifteen million acres, divided among well over a hundred areas.

This pair of guidebooks describes the wilderness areas individually, giving readers basic information about their physical features, flora and fauna, history, recreational opportunities, and access. Color photographs (by the author) and maps are generously provided, too.

Volume 1 covers the state's mountains and coastal ranges; Volume 2, its deserts.

— — — — —. ***California*. New York: DK Publishing, Inc., 1997. 630 pp.**

The written descriptions in this "Eyewitness Travel Guide" are informative and up-to-date, yet they're clearly outshone by a display of graphics that's nothing short of extraordinary. There are well over a thousand color photographs and numerous detailed maps, plus fascinating cut-away diagrams of famous structures—Hearst Castle and the State Capitol, for example—and bird's-eye drawings of key sightseeing districts such as historic Monterey.

CALIFORNIA REGIONAL and LOCAL REFERENCES

Most of the works cited in previous sections are statewide or broader in their scope, and those that aren't at least claim Northern, Central, or Southern California as their domain. By contrast, the works in the next several sections all have a tighter regional or local focus. This latter approach is doubly advantageous for anyone who wants to learn about a particular area; it allows for in-depth treatment of a place or subject while eliminating geographically-extraneous material.

For present purposes, California can be divided into seven parts, with sources grouped accordingly. The seven categories are:

- Ocean and Coast
- Northeastern Volcanic Provinces
- Coast Ranges and Northwestern Mountains
- Central Valley
- Sierra Nevada
- Great Basin and Southern California Deserts
- Southwestern Mountains, Hills, and Valleys

“There is no one California. The state contains distinctive parts of the entire continent: the hot deserts of the Southwest, the wet rain forests of the Northwest, the high peaks of the Rocky Mountain states, the cold steppes and waving grasslands of the Plains states, the meandering bayous of the Gulf states, the wooded valleys and mountains of Appalachia, the sandy coasts of the Mid-Atlantic states, and the rocky coast of Maine. California is all those places, yet none of them. It is its own diverse, transcendent self.”

—Philip L. Fradkin

OCEAN and COAST

Between Oregon and Mexico, California's coastline runs 1,100 miles. What appears as just a crooked, color-separating line on maps is actually a grand array of headlands and islands, salt marshes and tide pools, mud flats and kelp forests, beaches and bays. Fortunately, some of the finest places have been set aside for public enjoyment; land meets sea in more than one hundred State Park System units...and several National Park Service ones, as well.

The sources listed in this section look at the California coast from a variety of angles. Whether cataloguing its resources, revealing its hazards, identifying its life-forms, explaining its ecological relations, or celebrating its beauty, these works all can help foster a deeper understanding and appreciation of our Pacific shore.

Note: Sources dealing with specific coastal parks aren't included here, but are cited in other appropriate regional reference sections.

“The shore is an ancient world, for as long as there has been an earth and sea there has been this place of the meeting of land and water. Yet it is a world that keeps alive the sense of continuing creation and of the relentless drive of life. Each time that I enter it, I gain some new awareness of its beauty and its deeper meanings, sensing that intricate fabric of life by which one creature is linked with another, and each with its surroundings.”

—Rachel Carson

“Nowhere else in the natural world are two such richly different environments so close together. To seaward are fish and brown pelicans in measured flight just above the outer breakers; to land, cliffs or sand dunes with wildflowers and white-footed mice.”

—Elna Bakker

“The waves come in slowly, vast and green, curve their translucent necks, and burst with a surprising uproar, that runs, waxing and waning, up and down the long keyboard of the beach....On no other coast that I know shall you enjoy, in calm, sunny weather, such a spectacle of Ocean’s greatness, such beauty of changing colour, or such degrees of thunder in the sound.”

—Robert Louis Stevenson

“This is the mountain-bordered inland sea which became the nerve center of a western empire, rimmed by a dozen cities, harboring ships and planes from around the world. Yet its waves still wash remote shores where deer and beaver and mink come to the water’s edge, where sea lions roar, where great flocks of sea birds stop off in their long migrations down the flyways of the hemisphere.”

—Harold Gilliam (describing San Francisco Bay)

Abbott, Isabella A., and George J. Hollenberg. *Marine Algae of California*. With contributions by six specialists and a history of West Coast algal study by George F. Papenfuss. Stanford, California: Stanford University Press, 1976. 827 pp.

This specialized work is intended as “a combined laboratory and field reference for identifying the marine algae of California.” In it, more than 650 types are described and illustrated with black-and-white drawings; keys to genera and species are provided, too. However, both keys and descriptions are heavily laden with technical terms, which are explained in a glossary.

Serious students of marine biology will appreciate this source. For most others, the smaller, simpler *Seashore Plants of California* by Dawson and Foster (cited below) should suffice.

Abbott, R. Tucker. *Seashells of North America*. Illustrated by George F. Sandström. New York: Golden Press, Western Publishing Company, Inc., 1968. 280 pp.

Any general study of seashells could profitably begin with this “Golden Field Guide.” Even a quick look through it will reveal much about the variety, beauty, and relationships to be found among North American shells.

Most of the book is designed for identification; hundreds of shell types are organized, described, and illustrated with fine color artwork. An introductory section covers the natural history of marine mollusks and explains how to collect and store shell specimens.

Blunt, C. E., Jr., coordinator. *Atlas of California Coastal Marine Resources*. State of California, Department of Fish and Game, Dec. 1980.

This atlas is made up of 134 uncolored line maps, each of which covers a portion of California’s coast or its offshore islands.

Most of the maps are highly annotated. They not only indicate features of biological interest—tide pools, kelp beds, spawning areas, shellfish concentrations, sea bird rookeries, marine mammal “haul-out” sites, and such; they also specify which animals locally inhabit various near-shore and offshore environments.

Braun, Ernest. *Tideline*. New York: The Viking Press, 1975. 144 pp.

In a rather unusual approach to the subject of shores, this book describes a single day of exploration in the intertidal zone. The text is an insightful narrative—one

person's observations and reflections, following the ocean's ebb and flow. More than half of the volume consists of beautiful, evocative color photography by the author.

Tideline's setting is evidently somewhere along the Northern California coast; thematically, though, much of the material applies to shorelines all around the planet.

California Coastal Commission. *California Coastal Access Guide*. Fifth edition. Berkeley and Los Angeles: University of California Press, 1997. 304 pp.

For those who want to explore California's coastline as fully as possible, this is an indispensable aid. It shows where to go, how to get there, and what facilities and type of environment to expect.

The guidebook is divided by county into fifteen sections, then into subsections with maps, site descriptions, and information grids. Interspersed are clear explanations of coastal features—fog, tides, pygmy forests, grunion, and many others. Black-and-white photos and artwork also enhance the guide.

California Coastal Commission. *California Coastal Resource Guide*. Berkeley and Los Angeles: University of California Press, 1987. 384 pp.

This book starts with a statewide overview of coastal resources—both natural ones such as habitats and life-forms, and cultural ones ranging from history to recreation. Most of the volume, however, consists of a county-by-county survey of these varied resources, with maps, detailed site descriptions, and lists of notable species.

A worthy companion to the *California Coastal Access Guide* (cited directly above).

Connor, Judith. *Seashore Life on Rocky Coasts*. Monterey, California: Monterey Bay Aquarium, 1993. 64 pp.

Like other publications in the "Monterey Bay Aquarium Natural History Series," this is an introductory-level source with fine color illustrations on practically every page.

Here, readers become familiar with rocky coastlines on a tour through the levels of the intertidal zone. Along the way, an assortment of strange, beautiful, and highly-adapted life-forms are inspected.

The text deals with rocky shores in a general way, but many of the species noted can be found along our coast.

Connor, Judith, and Charles Baxter. *Kelp Forests. Monterey, California: Monterey Bay Aquarium, 1989. 64 pp.*

This source introduces readers to the underwater “forests” along our coast, “from the towering golden kelp plants that structure the community to the whales and worms that pass through.” Text and color photos vividly depict various aspects of this exotic realm—its microhabitats, its ecology, its seasons.

Kelp Forests is part of the “Monterey Bay Aquarium Natural History Series.”

Conradson, Diane R. *Exploring Our Baylands. Third edition. Fremont, California: San Francisco Bay Wildlife Society, 1996. 69 pp.*

Here’s a source that focuses on salt marshes and mud flats—specifically, those of San Francisco Bay. Quite a bit of the material is applicable to similar environments up and down the coast, however.

Text and photographs familiarize readers with plants, invertebrates, and vertebrate wildlife of the biologically-rich “baylands.” Interpreters will find a good supply of interesting natural history facts they may want to use.

Daugherty, Anita E. *Marine Mammals of California. Third revision. University of California Sea Grant Marine Advisory Program, 1979. 61 pp.*

Coastal interpreters should find this booklet useful. Developed by the California Department of Fish and Game, its text discusses every kind of marine mammal ever recorded in the state. Interesting natural history material, pertinent historical facts, and even an occasional literary reference can be found in the species accounts. Black-and-white animal illustrations—primarily drawings—are included.

Dawson, E. Yale, and Michael S. Foster. *Seashore Plants of California. California Natural History Guides: 47. Berkeley and Los Angeles: University of California Press, 1982. 226 pp. + 12 plates of color photos.*

This guidebook is informative enough to adequately deal with its subject, yet small enough to be used conveniently in the field.

An introductory section covers the structure, life history, and vertical distribution of marine algae. Keys for major seaweed groups lead to descriptions

of genera and species; many plants are illustrated, either with black-and-white drawings or color photos. Common types of coastal dune and salt marsh vegetation are also treated, but without keys.

Ferguson, Ava, and Gregor Cailliet. *Sharks and Rays of the Pacific Coast*. Monterey, California: Monterey Bay Aquarium, 1990. 64 pp.

This “Monterey Bay Aquarium Natural History Series” publication focuses mainly on the sharks and other “cartilaginous fishes” of California’s central coast. It’s an interesting and well-illustrated introductory source.

The authors incorporate much region-specific material into a general discussion of the animals’ lives and habitats. For example, the high incidence of white shark attacks in the so-called “red triangle” around the Farallon Islands is addressed.

Gilliam, Harold. *San Francisco Bay*. Garden City, New York: Doubleday & Company, Inc., 1957. 336 pp.

Here is a marvelous verbal portrait of San Francisco Bay. Although dated in many of its particulars, it nonetheless provides a wealth of facts, stories, and ideas that should interest present-day interpreters.

In graceful prose, author Gilliam relates the lore behind the bay’s islands and bridges; he lyrically describes and explains the fogs and tides; he tells how, during the gold rush, this place was “the focal point of the greatest treasure hunt in history;” and, turning to wildlife, he shows how the bay waters support “a galaxy of societies as varied and complex as the cities on the shores.”

Goodson, Gar. *Fishes of the Pacific Coast: Alaska to Peru, including the Gulf of California and the Galapagos Islands*. Illustrated by Phillip J. Weisgerber. Stanford, California: Stanford University Press, 1988. 267 pp.

Compact and attractive, this guidebook treats all the common types of fish—plus many uncommon ones—found in coastal waters from Alaska to California to Peru.

More than 400 species are described, each of them illustrated with fine color artwork. Species accounts include identification tips and much other information of interest to interpreters; in many cases, even the fish’s *Spanish* common name is given.

Gordon, David G., and Alan Baldrige. *Gray Whales*. Monterey, California: Monterey Bay Aquarium, 1991. 64 pp.

This interesting and attractive publication—one of the “Monterey Bay Aquarium Natural History Series”—introduces readers to California’s official state marine mammal.

Gray Whales provides a very good general overview of the species. The authors track the great creatures on their annual migration from warm Mexican lagoons to icy northern seas, discussing how they mate, feed, and navigate. A brief history of gray whale hunting—and protection—is included, too.

Griggs, Gary, and Lauret Savoy, eds. *Living with the California Coast*. Durham, North Carolina: Duke University Press, 1985. 394 pp.

This book examines the California coastline’s entire length in detail. Using text, maps, and photos, the various authors document the history and hazards of development in this alluring, unstable environment.

Facts of interest to interpreters are liberally scattered throughout. For example, Año Nuevo Island was probably still connected to the mainland when the explorer Vizcaíno sailed by in 1603; and the Los Angeles area’s forty miles of beach-front averages out to only one-quarter inch per resident!

Hinton, Sam. *Seashore Life of Southern California*. Revised edition. California Natural History Guides: 26. Berkeley and Los Angeles: University of California Press, 1987. 218 pp. + 16 pp. of color photographs.

With its warmer waters, the Southern California coastline differs biologically from areas to the north. This guide to seashore animals serves well for field use between Point Conception and the Mexican border.

Introductory sections cover fundamentals—ocean currents, waves, and tides, for instance, and the intertidal zone as a habitat. Much of the book consists of interesting species accounts, organized by phylum. While invertebrates dominate the entries, fish are also represented.

Because there aren’t any keys, the author’s illustrations figure prominently in the identification process; fortunately, his line drawings are quite good.

Light, S. F., Ralph I. Smith, Frank A. Pitelka, Donald P. Abbott, and Frances M. Weesner. *Intertidal Invertebrates of the Central California Coast*. Berkeley and Los Angeles: University of California Press, 1954. 446 pp.

“Light’s Manual” has long been the standard work for identifying central California’s tide-zone invertebrates. Outside this stretch of coast, however, its usefulness diminishes with distance.

This is a technical reference, with numerous taxonomic keys—scientific names only—and a scattering of black-and-white illustrations. One section of the book gives directions for conducting field studies.

Love, Milton. *Probably More Than You Want to Know about the Fishes of the Pacific Coast*. Second edition. Santa Barbara, California: Really Big Press, 1996. 381 pp. + 16 pp. of color photographs.

Here’s a valuable source—a species-by-species compendium of natural history facts and interpretive lore about our coastal fish, illustrated with black-and-white drawings and some color photos.

The book’s distinguishing feature, though, is its offbeat humor. “My goal,” the author explains, “was to cover those species which you are most likely to see when diving, fishing or hiding in dumpsters behind fish markets.” Likewise, we’re told that the monkeyface prickleback—a real fish, like the sarcastic fringehead—“looks remarkably like Joseph Stalin (minus the mustache), circa 1926.” Readers will encounter many such remarks.

McConnaughey, Bayard H., and Evelyn McConnaughey. *Pacific Coast*. New York: Alfred A. Knopf, Inc., 1985. 633 pp.

Of the sources cited in this section, none includes more categories of coastal life than this handy “Audubon Society Nature Guide.” Marine plants, invertebrates, fish, birds, mammals, and even seashore wildflowers are represented—several hundred organisms in all.

One part of the book describes the selected species; another part illustrates them, mostly with color photos. Types of coastal habitats are also discussed.

Miller, Daniel J., and Robert N. Lea. *Guide to the Coastal Marine Fishes of California. California* [Department of Fish and Game] Fish Bulletin Number 157. With addendum. Richmond, California: Division of Agricultural Sciences, University of California, 1976. 249 pp.

All of the fish found in California's shallow marine waters are covered by this guide —more than 550 types. The book is strictly an identification tool; its keys are rather technical, but an illustrated glossary and annotated species drawings make them easier to use.

Morris, Robert H., Donald P. Abbott, and Eugene C. Haderlie. *Intertidal Invertebrates of California.* With 31 text contributors. Stanford, California: Stanford University Press, 1980. 690 pp. + 200 plates of photographs.

This volume provides a wealth of detailed information about the invertebrates of California's coastal waters. It also presents a very large collection of color photos of them.

The book concentrates on conspicuous and distinctive organisms, but some others are included, too. Entries typically describe a species' distinguishing features, range and habitat, life history, ecology, and economic importance (if any).

Seaside naturalists will find this to be a valuable reference work—even though its weight and lack of keys pose disadvantages for field use.

Munz, Philip A. *Shore Wildflowers of California, Oregon and Washington.* Berkeley and Los Angeles: University of California Press, 1964. 122 pp.

Some notable plants of coastal bluffs, salt marshes, and beaches are showcased in this introductory guide. The author includes not just wildflowers, but certain ferns, shrubs, and trees as well.

There isn't a formal key; instead, most species are simply grouped according to flower color. Brief descriptions and illustrations—either black-and-white drawings or color photos—assist in identification.

Niesen, Thomas M. *Beachcomber's Guide to California Marine Life.* Line drawings by David I. Wood. Houston, Texas: Gulf Publishing Company, 1994. 192 pp.

This is a well-written, informative guide to California's tidal environments and their inhabitants, covering the coast from San Francisco to San Diego. It's less technical than *Between Pacific Tides* (by Ricketts and others, cited below), though

similarly organized by habitat. High-quality black-and-white drawings are combined with numerous photographs to illustrate the book.

North, Wheeler J. *Underwater California*. With sections on underwater photography by Robert Hollis. California Natural History Guides: 39. Berkeley and Los Angeles: University of California Press, 1976. 276 pp. + 8 plates of color photos.

Here's a divers' guide to California's submarine realm—its geography, ecology, life, and recreational opportunities.

Descriptions of common marine plants and animals—often accompanied by line drawings—comprise nearly half of the book. Other parts of it suggest some excellent diving spots and explain the basics of underwater photography.

Orr, Robert T., and Roger C. Helm. *Marine Mammals of California*. Revised edition. California Natural History Guides: 29. Berkeley and Los Angeles: University of California Press, 1989. 94 pp. + 12 pp. of photographs.

This handy guide introduces readers to all the marine mammals found along California's coast. Along with written descriptions of the various species, there's good information about their distribution and natural history. Animal illustrations include both photographs and drawings; the artwork is by Jacqueline Schonewald.

Ricketts, Edward F., Jack Calvin, and Joel W. Hedgpeth. *Between Pacific Tides*. Fifth edition. Revised by David W. Phillips. Stanford, California: Stanford University Press, 1985. 652 pp.

This standard reference (first published in 1939) organizes California's seashore life according to basic habitat type—rocky coast, beach, bay, estuary—and by intertidal zonation. Good information about the life history, physiology, and ecology of many animal species is provided.

Riedman, Marianne. *Sea Otters*. Monterey, California: Monterey Bay Aquarium, 1990. 80 pp.

This well-illustrated source gives insight into the fascinating world of sea otters, examining their environment, life history, social behavior, diet, and population recovery. Among other things, readers will learn that sea otters are related to skunks...and that they have "the world's warmest fur."

A "Monterey Bay Aquarium Natural History Series" publication.

Russo, Ron, and Pam Olhausen. *Pacific Intertidal Life: a guide to organisms of rocky reefs and tide pools of the Pacific Coast*. Berkeley, California: Nature Study Guild Publishers, 1981. 61 pp.

Easy to use, inexpensive, and small enough to fit in a shirt pocket, this guide to seashore life is a good choice for beginners.

It briefly explains the natural history of important tide-line plant and animal groups; representative species are described and illustrated with black-and-white drawings. There's also a simple identification key and a summary of basic ecological concepts.

Scharp, Hal. *Answers to Your Questions about Sharks*. Happy Camp, California: Naturegraph Publishers, 1979. 68 pp.

Where did the word "shark" come from? Can a shark really smell a drop of blood in the water from a mile away? How many shark attacks occur in a year's time? These and numerous other shark-related questions are posed—and answered—in this source. Interpreters may recognize at least some of the queries as ones that park visitors are inclined to ask.

(Incidentally, the answers to the questions above are, in order: from the German word "schurke," meaning knave or villain; probably not, although it can detect one part of blood in ten million parts of water; and 28 on average world-wide, 10 of which are fatal.)

Schoenherr, Allan A., C. Robert Feldmeth, and Michael J. Emerson. *Natural History of the Islands of California*. Illustrations by David Mooney and Michael J. Emerson. California Natural History Guides: 61. Berkeley and Los Angeles: University of California Press, 1999. 492 pp. + 16 plates of color photographs.

Simply by virtue of their geography, California's islands are intriguing places. But some of them are also fascinating in another sense—as long-isolated "evolutionary laboratories" where many unique plants and animals can be found.

This guidebook makes an excellent reference for interpreters and naturalists, giving a clear, comprehensive treatment of its subject. All eight Channel Islands are covered, as are Año Nuevo Island, the Farallones, and several islands in San Francisco Bay. More than half of the book focuses on islands individually or in groups, discussing their geology, vegetation, animal life, and history. Other

chapters deal a bit more broadly with the topics of island ecology and biogeography, geologic history, marine life, and early humans.

With its photographs and drawings of selected species, this source also has some value as an identification guide.

Sheldon, Ian. *Seashore of Northern and Central California*. Renton, Washington: Lone Pine Publishing, 1999. 215 pp.

This attractive guidebook introduces seashore visitors to more than 150 commonly-seen organisms of the intertidal zone. Geographically, the book's coverage extends from Point Conception (west of Santa Barbara) to the Oregon border.

Invertebrates account for the majority of life-forms that are treated; mammals, fish, and plants are represented, too, but birds are not. Each species entry fills a single page, combining some natural history information with eye-catching color artwork. Elsewhere in the guide, species illustrations are grouped and color-coded for quick comparison, forming an effective "picture key." (Author Sheldon is also the illustrator of this book.)

Snyderman, Marty. *California Marine Life: a guide to common marine species*. Edited by Michelle Bailey. Niwot, Colorado: Roberts Rinehart Publishers, in cooperation with Monterey Bay Aquarium, 1998. 180 pp.

Interpretively written and attractively presented, this book is intended "to help readers acquire a practical knowledge of the natural history of many of the plants and animals of California's marine environment."

After an introduction to the taxonomy of sea life and an orientation to the physical setting, the author surveys marine habitats ranging from beaches to the open ocean, explaining the habits, interactions, and adaptations of organisms found in each. Descriptive text and fine color photographs aid in identifying a variety of species.

This is a revised edition, though not labeled as such.

Steinbeck, John. *The Log from the Sea of Cortez: the narrative portion of the book, Sea of Cortez*, by John Steinbeck and E. F. Ricketts, 1941, here reissued with a profile "About Ed Ricketts." New York: The Viking Press, 1951. lxxvii + 282 pp.

Steinbeck blends marine biology with philosophy in this account of an expedition to the Gulf of California. A passage in Chapter 21 about looking "from the tide pool to the stars" is particularly grand.

Tierney, Robert J., Joseph W. Ulmer, Leonard J. Waxdeck, Harris N. Foster, and John R. Eckenroad, with additions by Samuel L. Dederian. *Exploring Tidal Life along the Pacific Coast, with emphasis on Point Reyes National Seashore.* Third edition. Oakland, California: Oecos Ltd., 1972. 66 pp.

With this little field guide, it's quite easy to identify many forms of intertidal life that are commonly encountered along California's northern and central coast. Non-technical keys and simple line drawings of organisms are provided, as are descriptive and explanatory notes which help "flesh out" the taxonomic groups.

Tweit, Susan J. *Seasons on the Pacific Coast: a naturalist's notebook.* Illustrations by James Noel Smith. San Francisco: Chronicle Books, 1999. 224 pp.

This book profiles nearly forty interesting life-forms found along the Pacific Coast between Canada and Mexico. Among the featured organisms are such plants as the coast redwood, pickleweed, and giant bladder kelp...and such animals as the gray whale, California least tern, and monarch butterfly. The text is organized by season, reflecting the time of year a given species is most prominent or some other important event in the story of its life.

Each species entry contains basic descriptive information, an attractive watercolor illustration, and a pertinent quote. More significantly, each includes a concise, well-crafted essay that interpreters might draw upon to develop or improve their own presentations. A separate section recommends readings and places to visit for those who'd like to learn more about the plants and animals discussed.

Wertheim, Anne. *The Intertidal Wilderness.* San Francisco: Sierra Club Books, 1984. 156 pp.

The Intertidal Wilderness is somewhat unusual in that it's organized neither zonally nor taxonomically, but by theme. Chapters consider such matters as competition, predation, and reproduction in organisms, as well as habitat dynamics.

Author and photographer Wertheim conveys much of her message by pairing exquisite color photos with pieces of explanatory text. As she notes, "What first draws one to the shore is its beauty, yet a little knowledge serves...to emphasize the awesome, harmonious forces at play in the design of nature."

Geographically, the book deals with North America's west coast.

— — — — —. *Marine Sportfish Identification: California*. Sacramento: State of California, Department of Fish and Game, 1987. 164 pp.

This handy, attractive field guide is intended to help coastal anglers identify the fish they catch. Some eighty common sport species are represented, with natural history and fishing information provided about each. There are color illustrations and written descriptions of the animals, but no keys.

State and federal agencies collaborated on the publication.

— — — — —. *A Natural History of the Monterey Bay National Marine Sanctuary*. [Monterey, California:] Monterey Bay Aquarium, in cooperation with the National Oceanic and Atmospheric Administration, 1997. 259 pp.

The Monterey Bay National Marine Sanctuary spans one-fifth of California's coast, extending from San Simeon to the Marin Headlands and offshore as far as fifty miles.

Chapter by chapter, this book guides readers through the diverse habitats of the sanctuary: wetlands, beaches and dunes, rocky shores, reefs and pilings, kelp forests, sandy seafloor, open waters, and the deep sea. Life-forms and ecological relationships within each habitat are discussed in clearly-written text. Some background information on oceanography and geology is provided in a separate section.

Numerous black-and-white drawings and photos add to the usefulness of this source.

NORTHEASTERN VOLCANIC PROVINCES

In its “look” and “feel” —not to mention its geologic history—the country around Mount Shasta, Lassen Peak, and the Modoc Lava Beds stands apart. Two volcanic provinces define this region: the southern end of the Cascade Range and a lobe of the vast Columbia Plateau. Not surprisingly, then, the landscape bears a stronger resemblance to parts of Oregon, Washington, and Idaho than to the rest of California.

Perhaps as a result, there are relatively few good natural history sources that deal strictly with this corner of the state. Such works typically focus on well-known peaks and parklands, as the following titles will attest.

LAVA FLOOD STREAMS DOWN LASSEN

— — —

ERUPTION MOST VIOLENT OF VOLCANO'S ACTIVITY

—

SMOKE THROWN INTO AIR FOUR MILE

—

*Big Explosion Seen From Capitol Dome Throws Ashes
for Miles—Redding Turns Out to See Novel Sight.*

—*The Sacramento Union*, May 23, 1915

"Lonely as God, and white as a winter moon..."

—Joaquin Miller (describing Mount Shasta)

"Here you trace yawning fissures, there clusters of sombre pits; now you mark where the lava is bent and corrugated in swelling ridges and domes, again where it breaks into a rough mass of loose blocks. Tufts of grass grow far apart here and there and small bushes of hardy sage, but they have a singed appearance and can do little to hide the blackness. Deserts are charming to those who know how to see them...but the Modoc Lava Beds have for me an uncanny look."

—John Muir

Dillon, Richard. *Burnt-out Fires: California's Modoc Indian War*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973. 371 pp. + 8 pp. of photographs.

The Modoc War of 1872-73 is primarily remembered as a dark chapter in Northern California history. However, the conflict also stands as a dramatic example of the natural landscape's influence on human affairs.

The setting was a volcanic jumble of rocks, crevices, and caves—land once called “Hell with the fires gone out,” and now designated Lava Beds National Monument. Using the labyrinthine lava beds as a stronghold, some fifty Indian warriors were able to hold off a U. S. Army force that grew to *twenty times* their size for a period of several months, inflicting heavy losses on the soldiers.

Burnt-out Fires chronicles the whole story.

Grinnell, Joseph, Joseph Dixon, and Jean M. Linsdale. *Vertebrate Natural History of a Section of Northern California through the Lassen Peak Region*. Berkeley, California: University of California Press, 1930. 594 pp., including color fold-out map.

Although this source is out of print and old enough to be historic, it still may interest naturalists within its range.

Intended for the “serious student,” this treatise catalogues the wildlife found in a representative slice of northeastern California—a strip extending from the Sacramento River through Lassen Park almost to the Nevada border. Detailed observations about each type of land vertebrate comprise much of the book; but there's also a sizeable section giving general information about the region's plants, habitats, and elevation-related “life-zones.”

Kane, Phillip S. *Through Vulcan's Eye: the geology and geomorphology of Lassen Volcanic National Park*. Loomis Museum Assoc., in cooperation with the National Park Service, 1980. 118 pp.

With its detailed explanatory text and good use of illustrations, this book is a local reference well worth consulting. Chapters examine rocks, landforms, weathering processes, geologic history, and plate tectonics in relation to the Cascade Range.

Loomis, B. F. *Pictorial History of the Lassen Volcano*. San Francisco: California Press, 1926. 142 pp. + fold-out map.

Lassen Peak is the southernmost of the Cascade volcanos, and the last to erupt (1914-1921) before Mount St. Helens did in 1980.

This now-historic work documents the Lassen eruptions by combining the author's personal narrative with reprinted newspaper reports and numerous photographs. Eyewitness accounts lend a good deal of human interest to the geologic events.

Under the cover title *Eruptions of Lassen Peak*, an edited version of the book has been published by the Loomis Museum Association, Lassen Volcanic National Park, in cooperation with the National Park Service.

Nelson, Raymond L. *Field Guide to the Trees and Shrubs of Lassen Volcanic National Park*. Revised edition. Mineral, California: Loomis Museum Association, Lassen Volcanic National Park, in cooperation with the National Park Service, 1965. 35 pp.

This booklet serves as an introduction to the park's common woody plants—sixty types in all, occurring between elevations of 5,000 and 10,000 feet. A simple key directs the user to a line drawing of the appropriate species and some descriptive notes.

Showers, Mary Ann, and David W. Showers. *A Field Guide to the Flowers of Lassen Volcanic National Park*. Second edition. Illustrations by Mary Ann Showers. Mineral, California: Lassen Loomis Museum Association, Lassen Volcanic National Park, 1996. 97 pp.

This guide makes it relatively easy to identify the more common wildflowers of Lassen Park. The book is divided into sections according to habitat type, then subdivided by flower color. The treated species have brief written descriptions with distributional notes, accompanied by line drawings. A limited number of plants are also illustrated with color photos.

Whitney, Stephen R. *A Field Guide to the Cascades and Olympics*. Seattle: The Mountaineers, 1983. 288 pp.

Like the Cascade Range itself, this book's coverage is centered north of the California-Oregon border. Even so, naturalists in the general vicinity of Mount Shasta and Lassen Peak should find it useful.

As noted in its introduction, this volume is actually ten field guides in one. It treats ferns, flowers, shrubs, trees, butterflies, trout and salmon, amphibians, reptiles, birds, and mammals—about 600 species in all. Common plants and animals can be identified by matching them with artwork illustrations—some color, some black-and-white—and with accompanying written descriptions.

Some good geologic, climatic, and ecologic information about the Cascades and other Northwestern mountain ranges is also provided.

Zanger, Michael. *Mt. Shasta: history, legend and lore*. Berkeley, California: Celestial Arts Publishing, 1992. 120 pp.

Naturalist John Muir aptly described Mount Shasta as “the pole-star of the landscape.” But the 14,000-foot volcano is more than just a stunning *physical* landmark; it’s an important *cultural* one as well.

This book tells the human story of Shasta. Native Americans, explorers, trappers, scientists, climbers, writers, loggers, environmentalists, and mystics are each discussed in terms of their involvement with the mountain. Historical art, photos, and other graphics complement the text.

COAST RANGES and NORTHWESTERN MOUNTAINS

The part of California consisting of the Coast Ranges and adjacent Klamath Mountains can be summarized in a single word: diverse. North to south, average rainfall varies from more than one hundred inches per year to less than ten. West to east, habitats can change from dusky evergreen forest to windswept subalpine scrub to sun-baked chaparral. Underlying everything is a geological jumble of sandstone, granite, serpentine, shale, marble, basalt, and other rocks. Even on a much smaller scale—as within the confines of a park—the amount of natural diversity is apt to be surprising.

Coast Range naturalists and interpreters are fortunate to have available a very good selection of guidebooks about specific subregions—particularly the San Francisco Bay Area—as well as guides to specific parks. Many of the most useful works are cited here. A couple of notes: Coastal parkland references are listed in this section rather than under “Ocean and Coast,” because upland or inland areas are often included in their coverage. Also, if coast redwoods seem to be disproportionately represented among the sources, it’s because these famed trees are disproportionately symbolic of state parks, California, and the conservation movement.

"That morning's trail was the most delightful I had experienced....Across the cañon the mountains rose in steep slopes of faded gold, laced here and there with dark files of timber; and beyond, the distant back ranges receded in varying tones of blue. The fog was slowly drawing out to sea, and suddenly, as if a curtain were partly lifted, I could look beneath the sheet of dazzling cloud and see the crinkled water a thousand feet below..."

—J. Smeaton Chase

"Generations of geologists have been driven to despair by the scrambled rocks of the Coast Ranges....If all rocks resembled these, the science of geology could never have been developed."

—David D. Alt and Donald W. Hyndman

"On the elevated sections of the road they felt the cool, delicious breeze from the Pacific forty miles away; while from each little dip and hollow came warm breaths of autumn earth, spicy with sunburnt grass and fallen leaves and passing flowers."

—Jack London

"Time, time as we dissect it in days and hours and minutes, loses all meaning in a setting such as this. Here is a forest that was young when life itself was young. Here are trees that have already stood for a millenium or two—and still their lives will outlast yours a thousand years."

—François Leydet (referring to a coast redwood grove)

*"the multiform
And many-canyoned coast-range hills were gathered into one
carven mountain, one modulated
Eagle's cry made stone, stopping the strength of the sea."*

—Robinson Jeffers

Becking, Rudolf W. *Pocket Flora of the Redwood Forest*. Covelo, California: Island Press, 1982. 239 pp. + 8 plates of color photographs.

This guidebook enables its users to identify more than 200 of the redwood forest's most frequently-seen plants.

The keys and descriptions provided are rather technical, and—except for the coast redwood itself—interpretive material is lacking. However, the author has illustrated each species with detailed line drawings that include close-up views of flowers, fruit, or other significant plant parts.

Berry, William D., and Elizabeth Berry. *Mammals of the San Francisco Bay Region*. California Natural History Guides: 2. Berkeley and Los Angeles: University of California Press, 1959. 72 pp.

This guide describes nearly fifty of the Bay Area's most common land mammals. Their identifying features, habitat, range, food items, and breeding habits are noted in the text. In many cases, there's information about their behavior, special adaptations, or pest status as well.

William Berry's species-illustrating artwork—much of it black-and-white, but some in color—is quite nice.

Bronson, William. *The Earth Shook, the Sky Burned*. Garden City, New York: Doubleday & Company Inc., 1959. 192 pp.

As writer John McPhee has noted, an earthquake marks one of those occasions when “the human and the geologic time scales intersect.” Certainly the earthquake of April 18, 1906 was a momentous event in both seismic and historic terms. Ground rupture along the San Andreas fault extended nearly 200 miles; in San Francisco, the destruction by quake and fire was catastrophic.

This book succeeds in its effort “to catch the temper of the day and to record the events which made up the disaster and its aftermath.” It focuses mainly on the city, and is richly illustrated with dramatic period photos.

Chronicle Books has reprinted the volume.

Brower, David, ed. *Not Man Apart: lines from Robinson Jeffers. Photographs of the Big Sur coast by Ansel Adams et al. San Francisco: Sierra Club, 1965. 160 pp.*

This book artfully matches the powerful, brooding poetry of Robinson Jeffers with images of the central California coast he knew so well. “Each of my too many stories has grown up like a plant from some particular canyon or promontory, some particular relationship of rock and water,” Jeffers once remarked.

Naturalists will find both scientific and aesthetic insights compressed into Jeffers’ lines. The coastal mountains become “one modulated/Eagle’s cry made stone;” sunsets “flower and burn through color to quietness.” Beauty exists in the obscure (“secret rainbows/On the domes of deep sea-shells”), the mundane (“Not even the weeds to multiply without blossom/Nor the birds without music”), even the violent (“What but the wolf’s tooth whittled so fine/The fleet limbs of the antelope?”).

Careful editing makes this a very good introduction to Jeffers’ verse—possibly the *best* one for interpreters, because much of the poet’s other work isn’t well suited for sharing with the general public.

Brown, Joseph E. *Monarchs of the Mist: the story of Redwood National Park and the coast redwoods. Point Reyes, California: Coastal Parks Association, 1982. 44 pp.*

Through word and picture, this booklet introduces readers to Redwood National Park. The succinct text not only interprets the ecology of forest, prairie, stream, and seacoast; it also tells about the area’s history and park restoration efforts. High-quality photographs—in both black-and-white and color—add visual appeal.

Chestnut, V. K. *Plants Used by the Indians of Mendocino County, California. Fort Bragg, California: Mendocino County Historical Society, 1974. Pp. 295-422.*

This book is a reprint of material that originally appeared in 1902 in *Contributions from the United States National Herbarium*, Volume VII.

Here’s a treasury of information about the early uses of native plants—most of it obtained directly from members of various Indian groups. The text is conveniently organized by plant family and species. Because so many of the plants occur outside Mendocino County as well, interpreters in other Coast Range areas can also benefit from this source.

de Vries, Carolyn. *Grand and Ancient Forest: the story of Andrew P. Hill and Big Basin Redwoods State Park*. Fresno, California: Valley Publishers, 1978. 100 pp.

Often the history of a park can be traced to some individual or group, without whose generous efforts the place might not have been set aside for public use. In the case of Big Basin Redwoods State Park, that individual was Andrew P. Hill, an artist and photographer; the group was the Sempervirens Club, which Hill helped form. This book tells their story.

The campaign to protect Big Basin is an especially significant one. With it the movement to save coast redwoods began in earnest, and from it came the establishment in 1902 of what is now California's oldest state park.

Division of Publications, National Park Service. *Redwood: a guide to Redwood National and State Parks*. Handbook 154. Washington, D.C.: U. S. Department of the Interior, 1997. 111 pp.

Bountifully illustrated and written in a journalistic style, this guide gives readers an overview of the redwood region's cooperatively-managed federal and state parklands.

The handbook contains three sections. One introduces the parks and tells of the movement to protect the world's tallest trees. Another looks at redwood natural history, the restoration of logged lands, and the area's Indian culture. The last part provides maps and other useful touring information.

Engbeck, Joseph H., Jr., ed. *Point Lobos State Reserve: interpretation of a primitive landscape*. Revised edition. State of California—The Resources Agency, Department of Parks and Recreation, ca. 1970. 80 pp.

There's plenty of good information about Point Lobos in this book, but even more noteworthy is the list of those who provided it. Frederick Law Olmsted, Jr., landscape architect; John Campbell Merriam, educator and conservationist; Ralph W. Chaney, paleontologist; Willis Linn Jepson, botanist; Joseph Grinnell, zoologist; V. Aubrey Neasham, historian; and Newton B. Drury, then Chief of the state's Division of Beaches and Parks—a more distinguished group of contributors is difficult to imagine. Each lent his expertise in an effort to explain the special significance of Point Lobos, helping to justify its designation as a "reserve."

The first edition (ca. 1954) was edited by Aubrey Drury. This revision keeps much of the original text, but adds a chapter on the adjacent marine reserve plus some new photos.

Evens, Jules G. *The Natural History of the Point Reyes Peninsula*. Revised edition. Point Reyes, California: Point Reyes National Seashore Association, 1993. 224 pp.

This source deals masterfully with the natural history of Point Reyes—its distinctive maritime climate, its anomalous geology, and its interesting assemblage of habitats and life-forms. A sense of time is evident, too, in the text's attention to seasonal cycles and changing wildlife populations. Overall, the book is a fine example of how to "weave history, science, and anecdote into a coherent story and an accurate record."

Black-and-white photos, art, and other graphics are included; the chapter-introducing drawings by Keith Hansen are especially nice.

Fisher, Chris C., and Joseph Morlan. *Birds of San Francisco and the Bay Area*. Redmond, Washington: Lone Pine Publishing, 1996. 160 pp.

This source describes common and interesting birds of the San Francisco area—125 of them in all.

The book's most obvious attribute is its color artwork; the bird illustrations are beautifully done. Species write-ups also add much to this work's value as a "bird appreciation guide." Users will learn, for instance, why a great horned owl feather can often be identified by smell, or how robins contribute to the "emotional landscape" of human communities, or that the wren's song "accelerates like a ping pong ball coming to rest."

Fritz, Emanuel. *Story Told by a Fallen Redwood*. San Francisco: Save-the-Redwoods League, 1934.

This pamphlet is a classic piece of natural history interpretation; 1995 marked its 49th printing.

The "fallen redwood" referred to here is located in Richardson Grove State Park in Humboldt County. From its growth rings, burn scars, and exposed root system the author is able to deduce a good deal about the tree's life...and about the fire and flood history of the area.

Gilliam, Harold. *The San Francisco Experience*. Garden City, New York: Doubleday & Company, Inc., 1972. 247 pp. + 16 pp. of photographs.

This is a wonderfully interpretive work. Author Gilliam presents a combination of natural history facts, historical lore, and personal observations, all wrapped in captivating prose. Just occasionally does the material show its age.

Actually, only about a quarter of the book confines itself to San Francisco; the rest ranges freely around the Bay Area. Parklands are well represented—separate chapters are devoted to Mount Tamalpais, Muir Woods, Angel Island, the East Bay's regional parks, and Mount Diablo. Readers also gain insight into the lives of conservationists John Muir and William Kent.

Gilliam, Harold. *Weather of the San Francisco Bay Region*. California Natural History Guides: 6. Berkeley and Los Angeles: University of California Press, 1962. 72 pp.

"Probably no comparable area on earth displays as many varieties of weather simultaneously as the region around San Francisco Bay," states author Gilliam.

Using specific examples, this guide explains how the Bay Area's complex geography accounts for its array of microclimates. The book also clearly traces the general atmospheric changes that occur during the course of a year. Several pages of photographs of weather phenomena are included.

Gordon, Burton L. *Monterey Bay Area: Natural History and Cultural Imprints*. Third edition. Pacific Grove, California: The Boxwood Press, 1996. 375 pp.

Concentrating on the Monterey Bay area, this book considers the nature and scope of ecological changes brought about by human activity. Accordingly, the text has a "strongly historical emphasis."

The author discusses the impact of such things as Indian fire-setting, the Spanish/Mexican livestock industry, whaling, logging, salt production, irrigation, and the introduction of exotic species. Good supportive documentation is provided.

Ultimately, readers are left to ponder some fundamental questions, such as this: "In 'preserving nature' what, in fact, are the conditions we are trying to preserve—a landscape already molded by centuries of human occupancy?"

Hart, John. *Muir Woods: redwood refuge.* Golden Gate National Park Association, 1991. 48 pp.

“It may be the most-looked-at ancient forest in the world,” the author begins. “In long plain lines the redwoods rise, toward wind noise, or toward silence. They rise clear out of the place you walk in, the one made green and ferny by their shade....”

Engagingly written and attractively illustrated with color photos and artwork, this guidebook is an exemplary piece of interpretation; it seems to celebrate as well as explain its subject. Among other things, readers will find the inspirational story of how the national monument came to be.

Henson, Paul, and Donald J. Usner. *The Natural History of Big Sur.* Illustrations by Valerie A. Kells. California Natural History Guides [57]. Berkeley and Los Angeles: University of California Press, 1993. 416 pp. + 16 pp. of color photographs.

The Big Sur area is a grand ecological mix. There are miles of scenic coastline, rugged mountain peaks, and park-like valleys. Natural communities range from sun-baked chaparral to foggy redwood forest to the intertidal zone.

This book gives an excellent account of the nature of Big Sur. The largest part of the volume describes and explains the area’s geology, climate, flora, fauna, resource-related human history, and such. A second part serves as a field guide to public lands.

Color photos show something of the landscape’s variety and beauty; black-and-white drawings depict a good selection of animals and plants.

Keator, Glenn. *Plants of the East Bay Parks.* Illustrations by Susan Bazell and Peg Steunenberg. Niwot, Colorado: Roberts Rinehart Publishers, Inc., 1994. 332 pp.

This plant guide covers the parklands of Alameda and Contra Costa counties. It includes most of the trees, shrubs, vines, and wildflowers likely to be encountered there.

Several features add value to the book—easy-to-use identification keys, good line drawings or color photos of many species, plant community overviews, a plant location list, and an illustrated glossary. There are also “encyclopedia” sections which interpreters can browse for tidbits of information about a plant’s life history, special adaptations, method of pollination, historical uses, or name origin.

Because many of the treated species range well beyond the East Bay, this source has a broader usefulness than its title indicates.

Kozloff, Eugene N., and Linda H. Beidleman. *Plants of the San Francisco Bay Region: Mendocino to Monterey.* Pacific Grove, California: Sagen Press, 1994. 332 pp. + 110 plates of photographs and drawings.

Here's a thorough, handy field guide to the flora of the nine counties bordering San Francisco Bay. Much of the book consists of keys; these are necessarily somewhat technical, requiring a working knowledge of botanical terms. In all, more than 2,000 plant types are covered—hundreds of which are illustrated with good line drawings or color photos.

Le Boeuf, Burney J., and Stephanie Kaza, eds. *The Natural History of Año Nuevo.* Pacific Grove, California: The Boxwood Press, 1981. 425 pp.

As used here, "Año Nuevo" refers to a rather indefinite coastal area north of Monterey Bay. This local guidebook describes its nature...and also reviews its history.

Much of Año Nuevo's natural history is treated in depth, including its geology, vegetation, intertidal life, birds, and mammals; an entire chapter is devoted to elephant seals. On the other hand, insects, fish, amphibians, and reptiles aren't covered at all. Black-and-white photos, maps, graphs, diagrams, and species drawings illustrate the book.

Margolin, Malcolm. *The East Bay Out: a personal guide to the East Bay Regional Parks.* Revised edition. Illustrations by Carl Dennis Buell. Maps by Sharon G. Johnson. Berkeley, California: Heyday Books, 1988. 228 pp. + 24 pp. of maps.

On one level, this book is a guide to the lands and waters of the East Bay Regional Park District in Alameda and Contra Costa counties. On another, it's a set of delightful essays that are gems of interpretation—personal, informed, and celebratory. While the writings describe specific parks, they also explore themes which apply to natural parklands in general.

Author Margolin's approach can be quite creative. For instance, a discussion of campgrounds begins with a parable about the value of darkness ("One day the people of Oakland discovered that someone had stolen night..."). District reservoirs are likewise introduced in an unorthodox manner ("What we witness...is an exciting interchange between a misguided technology that

destroys creeks to build lakes and a patient nature which is clothing these lakes with beauty.”).

Guidebooks typically suggest different things to see; this one suggests a different *way* of seeing, too.

Margolin, Malcolm. *The Ohlone Way: Indian life in the San Francisco-Monterey Bay Area.* Illustrated by Michael Harney. Berkeley, California: Heyday Books, 1978. 182 pp.

In this source, the author attempts to re-create the lost world of the Ohlone Indians. His thoughtful portrayal sheds considerable light on the physical, cultural, and spiritual aspects of their existence.

Among other things, readers will come to understand that the Bay Area’s natural state was one “of almost unimaginable richness and variety;” that the Ohlone, as hunters, had “a thoroughly intimate knowledge” of the local wildlife; that for this acorn-gathering people, “time itself was measured by the oaks;” and that theirs was “a world swarming with power and magic” where “every object—the sun, a trail, a spring...had a life and a force of its own.”

Metcalf, Woodbridge. *Native Trees of the San Francisco Bay Region.* Illustrated by Mary B. Pomeroy, Fred Pomeroy, and Eugene Murman. California Natural History Guides: 4. Berkeley and Los Angeles: University of California Press, 1959. 72 pp.

The Bay Area’s ecological diversity shows in its variety of native trees; about fifty types are treated in this guidebook.

Written species descriptions are provided, along with some interesting black-and-white and color artwork illustrations. Even so, for interpreters the guide may be more useful as a source of background information about the trees than as a means of identifying them.

Mount Diablo Interpretive Association. *The Mount Diablo Guide.* Berkeley, California: Berkeley Hills Books, 2000. 152 pp.

Because of its diverse plant, animal, and rock types—not to mention its world-class view—Mount Diablo is an ideal place to gain a sense of California’s rich natural history. This handy guidebook can help visitors explore and appreciate the special qualities of the mountain.

About half of the guide is devoted to natural history topics, including a particularly good discussion of Diablo's complex geology. Cultural history, hiking routes, and state park "highlights" are covered also.

Noss, Reed F., ed. *The Redwood Forest: history, ecology, and conservation of the coast redwoods*. Washington, D.C. and Covelo, California: Island Press, 2000. 339 pp.

As an authoritative, up-to-date source of information about coast redwood forests, this book earns high marks. If anything, interpreters may find more technical detail in it than they can use.

A concise overview of redwood-related history is included, but—to quote editor/author Noss—"This is a book primarily of redwood science. Botany, zoology, ecology, paleontology, forestry, conservation biology, and other natural sciences form the core of its content."

Developed in support of a Save-the-Redwoods League master plan, *The Redwood Forest* is intended to provide factual guidance for the ecosystem's protection, restoration, and sustainable management.

Rohde, Jerry, and Gisela Rohde. *Humboldt Redwoods State Park: The Complete Guide*. Illustrations by Larry Eifert. Eureka, California: Miles & Miles, Publishers, 1992. 298 pp.

This is a fine general guide to the largest of the redwood state parks. It features detailed road and trail descriptions, entertaining historical sketches, and numerous black-and-white drawings that delight the eye.

Coverage of natural history is somewhat limited, though. Brief chapters introduce the park's physical environment, habitats, and notable wildlife. Illustrated profiles of plant species are scattered throughout the book.

The chapter titled "The Redwoods and the Park" is particularly worth reading. Here the authors summarize the coast redwood's remarkable natural qualities, explain the importance of redwood as an economic resource, and chronicle the efforts to protect the trees.

Schrepfer, Susan R. *The Fight to Save the Redwoods: a history of environmental reform, 1917-1978.* Madison, Wisconsin: The University of Wisconsin Press, 1983. 339 pp.

This is a scholarly work, rich in detail and documentation. At the same time, it's a well-written, illuminating account of an exciting chapter in American conservation history.

The book does more than just recount the long struggle to preserve some remnants of old-growth redwood forest. It also puts that struggle in a broader context, explaining the scientific, philosophical, and political influences that were involved. The Save-the-Redwoods League, the Sierra Club, the National Park Service, and the California State Park System all figure prominently in the story...and readers will learn much about the motivations of their leaders.

Interpreters should find the chapter titled "Parks: Recreation or Enlightenment?" particularly interesting. It gives the background on a continuing debate.

Stebbins, Robert C. *Reptiles and Amphibians of the San Francisco Bay Region.* California Natural History Guides: 3. Berkeley and Los Angeles: University of California Press, 1959. 72 pp.

More than forty types of amphibians and reptiles inhabit the Bay Area; this guide serves as a handy introduction to them. Species accounts include interesting interpretive material as well as the standard notes about an animal's key characteristics, habitat, food, seasonality, and such.

The guide's artwork is by author Stebbins. His black-and-white drawings are nicely done; his color species illustrations are extraordinary.

Steinbeck, John. *East of Eden.* New York: The Viking Press, 1952. 602 pp.

This epic, allegorical novel is well worth reading in any case, but it's included here mainly on the basis of its first chapter, which beautifully describes the natural setting and early settlement of the Salinas Valley—and by extension, much of central California.

Stevenson, Robert Louis. *The Silverado Squatters.* London: Chatto and Windus, 1883. 254 pp.

In the summer of 1880, Robert Louis Stevenson and his bride honeymooned in a cabin at an abandoned silver mine high on the side of Mount Saint Helena. This book, a classic of California literature, is a charming account of their life there.

The author's descriptions of the region are as vivid as they are idyllic—and perhaps most memorable in the chapter called “The Sea Fogs.”

A paperback edition of *The Silverado Squatters* was printed by Lewis Osborne (Ashland, Oregon) in 1974.

Vieira, Linda. *The Ever-living Tree: the life and times of a coast redwood*. Illustrations by Christopher Canyon. New York: Walker and Company, 1994.

This book for younger readers tells the story of a 2,000-year-old redwood tree, charting its development against a backdrop of world history. The concept isn't original, but its presentation here—using fine color artwork that juxtaposes intimate forest views with exotic scenes of great events—should capture the imagination, regardless of one's age.

Wallace, David Rains. *The Dark Range: a naturalist's night notebook*. Illustrated by Roger Bayless. San Francisco: Sierra Club Books, 1978. 132 pp.

Vividly, intimately, *The Dark Range* describes the nocturnal ecology of Northern California's Yolla Bolly Mountains. Author Wallace distills years of observations into this account of a single summer night. The night is viewed from three perspectives, representing each of the area's altitudinal zones—foothill, forest, and high country.

After eavesdropping on the activities of creatures ranging from beetles to bears, readers are sure to agree with the introductory statement that “night is more than a negation.”

Wallace, David Rains. *The Klamath Knot: explorations of myth and evolution*. San Francisco: Sierra Club Books, 1983. 149 pp.

This unusual work is partly a regional natural history, partly a discussion of evolution, and partly a personal narrative. These elements are deftly interwoven around a dual premise: that “every place on earth contains a treasury of evolutionary stories in its living animals and plants,” and that “the Klamath Mountains are an exceptionally rich storehouse” in this regard.

The author traces basic landscape elements—rock, water, tree, and grass—not only into the “fourth dimension” of the past, but also into a mythic dimension where people have always searched for origins and meanings.

Webb, Ralph C., ed. *Natural History of the Pinnacles National Monument*. Pinnacles Natural History Association, 1969. 72 pp.

This source examines a part of the Coast Ranges quite different from such parklands as Humboldt Redwoods and Point Reyes—the semi-arid, summer-hot Pinnacles area.

Although this guidebook has been replaced by more current park literature, in most respects its natural history coverage is superior. However, the geology section needs revising; there's no mention of tectonic processes that moved the Pinnacles' volcanic rock nearly 200 miles northward to its present location.

Wieman, Harold F. *Nature Walks on the San Luis Coast*. San Luis Obispo, California: Padre Productions, 1980. 108 pp.

This guidebook is “intended for the general reader and for those who lead field trips.” It reads much like a good interpretive program—or more accurately, a *series* of them—might sound. The guide embraces coastal San Luis Obispo County, emphasizing the area around Morro Bay.

Here, readers are invited to roam a sandy beach “pounded by eight thousand waves a day;” to become acquainted with the denizens of mudflats and tide pools; to track the comings and goings of migratory wildlife; and to investigate, at least vicariously, a long-abandoned Chumash camp. One chapter tells of a local peak where it's possible to “see twenty million years into the past,” and another titled “Exploring the Summer Fog” is equally intriguing.

— — — — —. ***Parkland Discoveries: an educator's guide to the natural and cultural resources of East Bay Regional Park District*. Oakland, California: East Bay Regional Park District, 1988. 50 pp.**

This guide, “created with teachers and students in mind,” provides an excellent overview of the East Bay Regional Park District's resources. Articles by staff naturalists interpret a variety of subjects—streams, geology, Native Americans, chaparral, ranching, salt marshes, even eucalyptus trees. A park/habitat matrix and some activity suggestions are included, too.

With its informative text, interesting illustrations, and user-friendly design, this source could serve as a model for similar publications about other parklands.

CENTRAL VALLEY

Of all of California's natural provinces, the Central Valley has undergone the greatest transformation. A century and a half of human enterprise have re-engineered the valley's hydrology and converted its teeming wilds to fabulously productive farmland. Today, only an estimated *four percent* of the landscape remains unchanged.

Still, the Central Valley holds much to interest naturalists...and to inspire interpreters. Its relict "museum pieces" of prairie, river, and wetland are all the more poignant and intriguing for their scarcity. Regional features also include "island" buttes, a "phantom" lake, and wildlife gatherings that are impressive by any standard. The "built environment" of cities, farms, and aqueducts is worth considering as well, filled as it is with stories and lessons about subjugating nature and harvesting its bounty.

The sources listed below, though not very numerous, will help readers gain useful new insights into this "heartland" valley.

“The Great Central Plain of California, during the months of March, April, and May, was one smooth, continuous bed of honey bloom, so marvelously rich that, in walking from one end of it to the other, a distance of more than four hundred miles, your foot would press about a hundred flowers at every step....The radiant, honeyful corollas, touching and overlapping, and rising above one another, glowed in the living light like a sunset sky—one sheet of purple and gold...”

—John Muir

“The amount of rain that has fallen is unprecedented....The great central valley of the state is under water—the Sacramento and San Joaquin valleys—a region 250 to 300 miles long and an average of at least twenty miles wide....Thousands of farms are entirely under water—cattle starving and drowning.”

—William H. Brewer (January, 1862)

“We emerged from Corral Hollow on the San Joaquin plains. ...The heat now became intense; the wind, though strong, was dry and burning. Over the perfectly level, dry, parched, dusty, and now desert plains, with baked lips and bleeding noses, we pressed on...”

—Joseph LeConte

“A satellite soaring nearly six hundred miles above earth reveals California’s most arresting landmark, a vast tan-and-green trough crowded with geometric patches. Dark ganglia of rivers, their forms sensuous, perhaps deranged, plunge into it from the east, contrasting dramatically with the precise angles of an engineered aqueduct that stretches along much of its west side. Illusions of disorder and order, of nature and human aspiration, seem poised in that distant earthly realm, the Great Central Valley.”

—Gerald Haslam

Anderson, Walt. *The Sutter Buttes: a naturalist's view.* Chico, California: The Natural Selection, 1983. 327 pp.

This reference is much more valuable than its title might suggest. It does focus closely on the natural history of a single isolated landform in the Sacramento Valley; but the Sutter Buttes are actually a microcosm, rich in plants and animals that are common to many other parts of California. Interpreters who browse the volume's contents are likely to find a surprising amount of material they'll want to use.

The author's style is wonderfully engaging, too—conversational, enthusiastic, even humorous. So much personal knowledge and insight is conveyed that one reads this book with the impression of receiving both a grand tour and a gift.

Dillon, Richard, and Steve Simmons. *Delta Country.* Novato, California: Presidio Press, 1982. 134 pp.

The Delta, in author Dillon's words, is "a broad flatland arteried by the pulsating Sacramento and San Joaquin rivers and veined by countless sluggish sloughs." Though it occupies just one percent of the state's land area, more than a quarter of all California drains into it.

For the most part, this source affords the reader a look backward at the Delta. Except for an introductory section on "the lay of the land," the text concentrates on this region's past—its Indian groups, explorers, and settlers as well as its history of reclamation and agriculture. Likewise, Simmons' black-and-white photographs, while taken circa 1980, reflect "the easygoing rural and pastoral California of a century ago."

Haslam, Gerald. "The Lake That Will Not Die." *Pacific Discovery*, Vol. 42, No. 2 (Spring 1989): pp. 28-37.

The Central Valley's Tulare Lake was once the largest body of fresh water west of the Mississippi River. Today, the reclaimed lake bed is farmland—"geometry of ownership replacing geography of nature," as the author puts it.

This essay sketches the lake's remarkable story—its pristine ecological bounty, its conversion to agriculture, and its present role as an aqueous "ghost" that occasionally reappears in years of heavy runoff.

Johnson, Stephen, Gerald Haslam, and Robert Dawson. *The Great Central Valley: California's heartland.* Berkeley and Los Angeles: University of California Press, in association with the California Academy of Sciences, 1993. 254 pp.

The Central Valley's flat expanses give the landscape a visual simplicity...but the region's history, culture, and economy are complex, to say the least. This volume accurately, evocatively portrays the place called "California's heartland."

Peppered with illuminating quotes, the text not only explains how this valley became "the richest farming area in the world;" it also examines the associated human and environmental costs. The book's many illustrations include photographs documenting "ordinary" valley land and life, historical artwork, satellite imagery, colorful maps, and more.

This work is an outgrowth of a photographic project by Stephen Johnson and Robert Dawson, with text by Gerald Haslam.

Lagomarsino, Barbara. "Sacramento on the Rise." In *Sketches of Old Sacramento: a tribute to Joseph A. McGowan*, edited by Jesse M. Smith, pp. 193-210. Sacramento, California: Sacramento County Historical Society, 1976.

Located at the junction of two flood-prone rivers, Sacramento was repeatedly inundated in its early days. This historical "sketch" documents an inventive response to the problem: the physical raising of streets and buildings in the city's business district.

This story is worth noting here as a colorful episode in the ongoing human effort to control and reshape the Central Valley...and also because evidence of the nineteenth-century engineering project can still be seen in a state historic park.

Smith, Jo, ed. *The Outdoor World of the Sacramento Region: a local field guide.* Revised edition. The American River Natural History Association, 1993. 214 pp.

Here's a very good regional natural history source, covering a section of the Central Valley that extends from the Delta to the Sierra Nevada foothills.

This guidebook is noteworthy for its breadth of coverage. Readers will find introductory information about the area's geology, climate, and habitats. Both non-flowering and flowering plants are represented, as are animals ranging from worms and mollusks to the "higher" vertebrate forms. Species entries include descriptive notes, line drawings, and usually some interpretive remarks. Keys are lacking, however.

Over the years, ten different editions of this work have been published under various titles; the first appeared in 1963.

Swinehart, D. Bruce, Jr. *Nature's Window*. Drawings by Jo Smith. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1976. 190 pp.

This book is a compilation of newspaper columns that appeared in *The Sacramento Union* during the 1970s. A typical article gives basic information about some animal or plant associated with the Central Valley; cottonwoods, crickets, crows, cockleburs, coyotes, and carp are each featured, for example. Certain other topics—bird names, autumn foliage, tule fog—are also treated.

Witham, Carol, ed. *Jepson Prairie Preserve: handbook*. San Francisco: The Nature Conservancy, 1989. 67 pp.

California's native grasslands have all but disappeared within historic times. Jepson Prairie Preserve, in Solano County, is an ecological relict; it's been called "the best remaining example of bunchgrass prairie" in the Central Valley. Vernal pools — also critically rare — grace the property as well.

This booklet discusses the physical environment, life-forms, habitats, and history of the preserve. Selected wildflowers, grasses, and pool-dwelling animals are illustrated with line drawings. Species lists of plants and wildlife are provided, too.

SIERRA NEVADA

If the Central Valley is the *heart* of the state, then the Sierra Nevada mountains form California's *spine*. Rising from desert and plain, this grand "earth-gesture" — as Ansel Adams called it—culminates in snowy summits nearly three miles high. Eastward, the Sierra casts a long, withering rain shadow; westward, it waters the richest agricultural region in the world. Ecologically, the range is a continent in miniature, its "life-zones" representing a habitat spectrum that extends from Mexico to the Arctic. Far-reaching in other ways, Sierran scenery is internationally renowned...and Sierran gold once changed the course of history.

The Sierra Nevada's special qualities are reflected in a large body of natural history and park-related literature. Readers will find a good sampling in the citations that follow.

“Reaching the summit, we are in the midst of a vast wild sea of peaks, a wondrous expanse of mountain-tops and crags and cliffs and pinnacles and canyons, uncounted and uncountable....Here we are above the empty babble of the world—uplifted into the great silences.”

—Edwin Markham

“Solitary and coherent, the Sierra Nevada rises skyward like a medieval cathedral (no, like a phalanx of medieval cathedrals!), like a great and unaccounted for epic poem—the Iliad or Odyssey of the montane Far West—like Beethoven’s Ninth Symphony heard above lesser music.”

—Kevin Starr

“And after ten years spent in the heart of it, rejoicing and wondering, bathing in its glorious floods of light, seeing the sunbursts of morning among the icy peaks, the noonday radiance on the trees and rocks and snow, the flush of the alpenglow, and a thousand dashing waterfalls with their marvelous abundance of irised spray, it still seems to me above all others the Range of Light, the most divinely beautiful of all the mountain chains I have ever seen.”

—John Muir

“I know no single wonder of nature on earth which can claim a superiority over the Yosemite.”

—Horace Greeley

“At last the Lake burst upon us—a noble sheet of blue water lifted six thousand three hundred feet above the level of the sea....As it lay there with the shadows of the mountains brilliantly photographed upon its still surface I thought it must surely be the fairest picture the whole earth affords.”

—Mark Twain (describing Lake Tahoe)

Arno, Stephen F. *Discovering Sierra Trees*. Illustrated by Jane Gyer. Yosemite Association and Sequoia Natural History Association, in cooperation with the National Park Service, 1973. 89 pp.

This source isn't particularly useful as an identification guide; Petrides' *Trees of the California Sierra Nevada* (cited below) serves better for that. The real value of this work lies in its store of interpretive material about the various trees. For instance, readers will learn about knobcone pine's fire dependence, fall color patterns in quaking aspen groves, and the connection between red firs and Yosemite's historic "firefall."

Artist Gyer's distinctive illustrations add considerable charm to the book.

Barrett, S. A., and E. W. Gifford. *Miwok Material Culture*. *Bulletin of Milwaukee Public Museum*, Volume 2, Number 4, March 1933. Yosemite National Park, California: Yosemite Natural History Association, Inc. Pp. 119-377.

This book deals with the material culture of four Miwok subgroups, three of which drew their sustenance from the foothills and mountains of the Sierra Nevada.

Authors Barrett and Gifford catalogue and discuss the Indian uses of natural materials for food, shelter, clothing, tools, medicine, basketry, ornamentation, trade, games, and music. Some of the information is conveniently presented in the form of annotated species lists. Black-and-white photos show numerous crafted items.

Basey, Harold E. *Discovering Sierra Reptiles and Amphibians*. [Yosemite Natural History Association and Sequoia Natural History Association, in cooperation with the National Park Service (?),] 1976. 50 pp.

This booklet deals with practically all of the amphibians and reptiles of the central Sierra's western slope. Species accounts not only describe each animal's distinguishing features and its range, but also include a few paragraphs of more interpretive natural history material. Color photos by the author help with identification.

Beedy, Edward C., and Stephen L. Granholm. *Discovering Sierra Birds: western slope.* Yosemite Natural History Association and Sequoia Natural History Association, in cooperation with the National Park Service, 1985. 229 pp. + 44 color plates.

Species accounts—nearly 200 of them—form the heart of this guidebook. They describe the ecology, distribution, and behavior of west-slope Sierran birds; birds of the eastern Sierra are mentioned, too, but much more briefly. Introductory sections cover bird habitats and seasonal activities. Species artwork occupies most of the book's color plates.

Carrighar, Sally. *One Day on Beetle Rock.* Illustrations by Henry B. Kane. New York: Alfred A. Knopf, 1944. 196 pp.

Written with a novelist's skill and a naturalist's knowledge, this book has become a Sierran classic. The setting is a granite exposure in Sequoia National Park. The time frame is a single day in June. The characters are animals—bear, jay, squirrel, lizard, coyote, and others—whose interactions create a “tension that keeps a wilderness society stable.”

Author Carrighar manages to capture these creatures' different worlds on paper, enabling the reader to venture inside. In the final chapter, when a boy shouts excitedly from the trail below, it's as a deer—not as a human—that one seems to hear him.

Carville, Julie Stauffer. *Lingering in Tahoe's Wild Gardens.* Chicago Park, California: Mountain Gypsy Press, 1989. 350 pp. + 8 pp. of color photographs.

To quote from the book: “*Lingering in Tahoe's Wild Gardens* takes the reader as an active partner into hundreds of the region's most beautiful wildflower gardens, within a format of 30 scenic hikes.” Author Carville conveys an intimate knowledge of the area, its plants, and their stories—all the while freely sharing her enthusiasm for “the richness of life around us.”

There are better field guides for identifying the Tahoe Basin's flowers; but for *locating* and *appreciating* them, this is the source to consult. Pencil drawings and the author's color photos add to its charm.

Crippen, J. R., and B. R. Pavelka. *The Lake Tahoe Basin, California-Nevada.* Geological Survey Water-Supply Paper 1972. Department of the Interior, U. S. Geological Survey, 1970. 56 pp.

By almost any standard, Lake Tahoe is extraordinary. It's the highest lake of its size in the United States, the third deepest in North America, and—as of 1970—

one of the clearest in the world. So great is Tahoe's volume that its waters would cover a flat area the size of California to a depth of more than a foot!

This booklet contains many interesting facts about Lake Tahoe and its basin, including those noted above. The text briefly summarizes local natural and human history; hydrology and water-related problems are treated in greater detail.

When reading sections on human population trends, water use, and lake contamination, the material's age needs to be considered.

Dillinger, William C. *The Gold Discovery: James Marshall and the California gold rush*. Santa Barbara, California: Sequoia Communications, 1990. 47 pp.

James Marshall's finding of some gold flakes in the tailrace of a Coloma sawmill is, arguably, *the* pivotal event in California history. This interesting, well-illustrated booklet recounts the story of that 1848 discovery. The author provides context with information about the people involved, the setting (now Marshall Gold Discovery State Historic Park), and the ensuing gold rush that "changed the world."

Division of Publications, National Park Service. *Sequoia and Kings Canyon: a guide to Sequoia and Kings Canyon national parks, California*. Handbook 145. Washington, D.C.: U. S. Department of the Interior, 1991. 128 pp.

Well-written and extensively illustrated, this National Park Handbook serves as a fine introduction to two of California's great mountain reserves.

Natural communities, giant sequoia ecology, park preservation efforts, resource management philosophy, and air quality problems are some of the topics addressed. Practical tourist-related information and advice are included, too.

Division of Publications, National Park Service. *Yosemite: a guide to Yosemite National Park, California*. Handbook 138. Washington, D.C.: U. S. Department of the Interior, 1988. 145 pp.

Much of what makes Yosemite so special is captured in this interpretive guide—either by means of eye-catching photography and art, or through thought-provoking text.

The handbook is divided into three parts. The first considers the "fortuitous combination" of Yosemite and John Muir; the second explores the park's rich

natural and cultural history; and the third presents travel and reference material that visitors should find helpful.

Engbeck, Joseph H., Jr. *The Enduring Giants*. Berkeley, California: University Extension, University of California, Berkeley, in cooperation with the California Department of Parks and Recreation, Save-the-Redwoods League, and the Calaveras Grove Association, 1973. 120 pp.

Like *Giant Sequoias* (by Harvey and others, cited below), this source carefully examines the natural history of the world's largest living things. However, a good part of *The Enduring Giants* concentrates on the groves at Calaveras Big Trees State Park, detailing the story of their discovery, use, and preservation.

The book's many illustrations include some interesting old lithographs of early-day tourism and color photos of the forest community's plants and wildlife.

Farquhar, Francis P. *History of the Sierra Nevada*. Berkeley and Los Angeles: University of California Press, in collaboration with the Sierra Club, 1965. 262 pp.

Not only is the history of the Sierra Nevada unusually colorful, it's also closely linked to the physical nature of the region. The Donner Party's ordeal, for instance, grew out of the range's formidable topography and abundant snows. Similarly, the great gold rush owed its existence to the geologic riches of a mother lode.

This standard reference reviews many important and interesting chapters in Sierran history, from early Indian occupancy to the modern use of resources. One glaring exception, however, is the gold rush, which the author virtually ignores. The omission makes some sense when it's explained that the volume deals primarily with the "High Sierra."

Graf, Michael. *Plants of the Tahoe Basin: flowering plants, trees, and ferns*. Sacramento, California: California Native Plant Society Press/Berkeley and Los Angeles: University of California Press, 1999. 308 pp.

This guidebook's high-quality color photos and written descriptions can help users identify more than 600 plant species of the Tahoe Basin. The species entries are organized taxonomically, but there are no keys.

An introductory section discusses the ecology of the Tahoe Basin's vegetation, and it also touches upon the area's geologic, climatic, and human history.

Grater, Russell K. *Discovering Sierra Mammals*. Illustrated by Tom A. Blaue. Yosemite Natural History Association and Sequoia Natural History Association, in cooperation with the National Park Service, 1978. 174 pp.

Like *Discovering Sierra Birds* (by Beedy and Granholm, cited above), this source contains much good natural history information about the range's wildlife. Similarly, too, its treatment is slanted toward Yosemite and Sequoia-Kings Canyon national parks.

The book's species accounts are interpretively written, and its black-and-white pencil drawings are remarkable as pieces of art. However, for identification purposes the text and illustrations aren't especially useful.

Grinnell, Joseph, and Tracy Irwin Storer. *Animal Life in the Yosemite*. Berkeley, California: University of California Press, 1924. 752 pp. + attached color map and cross-section of the area covered.

This pioneering report describes the vertebrate life—minus fish—found within a section of the central Sierra. The study area extends from the edge of the San Joaquin Valley through Yosemite Park to Mono Lake. Six different altitudinal “life-zones” are represented.

Though long out of print, this source may still prove useful to naturalists who can locate a copy. Its hundreds of species accounts contain a wealth of observational details and anecdotes...and its statements about animal distribution and ecology are often quite perceptive, considering their age.

Harvey, H. T., H. S. Shellhammer, R. E. Stecker, and R. J. Hartesveldt. *Giant Sequoias*. [Three Rivers, California: Sequoia Natural History Association, Inc. (?),] 1981. 77 pp.

This source gives a very clear overview of the giant sequoia—its life cycle, its past and present distribution, its ecological relationships, and its place in California history.

The text draws, at least in part, from the authors' years of field study; their research has altered many accepted ideas about the trees. Discussions of fire's role in giant sequoia survival and the effects of soil compaction by visitors are particularly interesting.

A nice mix of illustrations—many in color—enhance the work.

Hill, Mary. *Geology of the Sierra Nevada*. California Natural History Guides: 37. Berkeley and Los Angeles: University of California Press, 1975. 232 pp. + 8 pp. of color photographs.

In this book, author Hill does a great job of making the Sierra's complex geology comprehensible to lay readers. Better still, she makes it interesting.

Chapters explain the range's granitic core, its metamorphic "remnants of a vanished sea," its gold-bearing "fossil rivers," its past volcanic activity, and its repeated glaciation. Interpreters will come upon some "grabber" facts—that an 1872 earthquake suddenly lifted the east side of the Sierra more than a dozen feet, for instance, or that hikers in one area may have their compass needles deflected by magnetic ore.

Supplementing the text are maps which pinpoint features of geologic interest, a field key to rock types, and illustrative drawings and photos.

Huning, James R. *Hot, Dry, Cold, Wet, and Windy: a weather primer for the national parks of the Sierra Nevada*. Yosemite Natural History Association/ Sequoia Natural History Association, 1978. 57 pp.

Why are mountaintops so windy? Why will early-morning campfire smoke concentrate in valley bottoms? Why do clouds often billow up on summer afternoons? This booklet provides answers to common queries such as these.

In his discussion of Sierran weather, the author considers general atmospheric patterns, microclimates, and geographic variations in temperature and precipitation...not to mention phenomena such as inversions, thunderstorms, snow-banners, and alpenglow. Diagrams, tables, and black-and-white photos are included.

Huntington, Ardeth [ed.]. *A Winter Day in Yosemite: an account of a walk in a Yosemite forest with Dr. Carl Sharsmith*. Yosemite National Park, California: Yosemite Natural History Association, 1981. 39 pp.

This booklet is essentially an annotated, edited transcript of a winter ecology field seminar conducted by Carl Sharsmith, Yosemite's renowned ranger-naturalist. It captures something of the charm as well as the knowledge of this master interpreter at work.

Irwin, Sue. *California's Eastern Sierra: a visitor's guide*. Los Olivos, California: Cachuma Press, in cooperation with the Eastern Sierra Interpretive Association, 1991. 144 pp.

This guidebook explores and explains some of the most magnificent country in California. It covers the High Sierra's precipitous eastern slope, the adjacent chain of basins from the Bridgeport to the Owens valleys, and the arid White and Inyo mountains beyond. Dramatic contrasts in topography, geology, climate, flora, and fauna make the region a fascinating one for naturalists.

The guide gives an overview of "Eastern Sierra" natural history—both topically and with reference to particular sites. Human history is treated in a similar manner. Fine color photographs add much to the attractiveness of the book.

James, George Wharton. *The Lake of the Sky: Lake Tahoe*. Boston: L. C. Page & Company, 1915. 395 pp. + fold-out map.

This early-twentieth-century guidebook is primarily of historical interest, reading somewhat like an elaborate post card from another era. Nonetheless, it contains much natural and cultural lore about Lake Tahoe that present-day interpreters can use.

Topics discussed include the area's geology, vegetation, and wildlife; the lake's discovery and naming; local logging and mining history; Indian legends; and tourist routes, resorts, and other destinations—circa 1915. Appended to the volume are some Tahoe-related writings by luminaries such as Mark Twain. Black-and-white period photographs are interspersed throughout the book.

Nevada Publications issued a re-formatted edition of *Lake of the Sky* in 1992.

Johnston, Verna R. *Sierra Nevada: the naturalist's companion*. Revised edition. Berkeley and Los Angeles: University of California Press, 1998. 208 pp. + 32 pp. of photographs.

The aim of this book, as stated in its first edition, is "to tell the story of Sierra Nevada wildlife in terms of the plant communities in which the animals live...with full consideration of how fire, geology, man, history, and evolution have shaped the ecology of the range."

This updated volume ably guides readers over the Sierra from west to east, investigating the ecological workings of the different "life-zones" that are encountered. Interesting as well as informative, the text is both enjoyable to read

and a fine source of material for interpreters. Nice color photographs by the author show selected animals, plants, and habitats.

Keator, Glenn. *Sierra Flower Finder*. Illustrated by Valerie R. Winemiller. Berkeley, California: Nature Study Guild Publishers, 1980. 125 pp.

This compact field guide will help identify a wide selection of Sierran wildflowers. Foothill species and woody plants aren't included, though.

The keys provided have little botanical jargon and are quite easy to follow. At the end of the keying process, one finds the flower's common and scientific names, an uncolored line drawing, and symbols denoting the plant's range, habitat, and blooming period.

King, Clarence. *Mountaineering in the Sierra Nevada*. Boston: James R. Osgood and Company, 1872. 292 pp.

"Beyond rose three hundred miles of Sierra half lost in light and cloud and mist," King marvels in his opening chapter. "Lifted above the bustling industry of the plains and the melodramatic mining theatre of the foot-hills, it has a grand, silent life of its own, refreshing to contemplate even from a hundred miles away."

This book has been called the first real literature of the Sierra Nevada. It is based largely on the author's experiences as a member of the California Geological Survey during the mid-1860s. More than just a vivid account of mountain-climbing exploits, it also contains humorous character sketches and lyric descriptions of the California landscape (such as that quoted above).

A reprinted edition is available to modern readers.

Koeppel, Elliot H. *The California Gold Country, or Highway 49 revisited*. Malakoff & Co. Publishing, 1996. 235 pp. + separate map.

Although the gold rush's impact was felt throughout California and far beyond, much of its drama was played out in the Sierra foothills. A century and a half later, this "mother lode" region remains a rich repository of structures and stories from the period.

This book is only one of various gold country guides that have been produced over the years. However, its interpretive text, numerous illustrations, and recent publication date all serve to recommend it.

Columbia, Marshall Gold Discovery, Empire Mine, and Malakoff Diggins state historic parks are just a few of the sites discussed.

Matthes, François E. *The Incomparable Valley: a geologic interpretation of the Yosemite*. Edited by Fritiof Fryxell. Berkeley and Los Angeles: University of California Press, 1950. 160 pp.

In his time, François Matthes earned respect not just as a geologist but as a gifted *interpreter* of the geologic scene. This book, posthumously assembled, shows why. Here's a scientific work that's presented artfully enough to qualify as true literature—some of the Sierra's finest.

After an introductory survey of the whole range, Yosemite Valley's cliffs, domes, and waterfalls are carefully examined. Readers are shown how physical evidence, both striking and subtle, can be used to decipher the story of the landscape's origin. By way of illustration, dozens of black-and-white photographs with explanatory captions are provided.

Matthes, François E. *Sequoia National Park: a geological album*. Edited by Fritiof Fryxell. Berkeley and Los Angeles: University of California Press, 1950. 136 pp.

Rather than relying on lengthy text, this unusual volume interprets the main geologic features of Sequoia Park primarily by means of annotated photographs. Consequently, this album serves somewhat like a guided tour.

The effects of faulting, glaciation, stream erosion, avalanches, chemical weathering, and volcanic activity are all shown and explained in the captioned black-and-white pictures.

Muir, John. *My First Summer in the Sierra*. Boston: Houghton Mifflin Company, 1911. 354 pp.

John Muir's collected writings are cited elsewhere, but this one book deserves a separate mention. It describes, in journal form, the author's personal discovery of the Yosemite backcountry in 1869 as he accompanied a flock of sheep to upland pastures.

My First Summer has a vitality not found in Muir's other California works. From hot, dry foothills to icy summits, it shows readers the Sierra Nevada range through the eyes of one of its most ardent, articulate, and influential admirers.

Difficult to find for many years, this volume was reprinted by Sierra Club Books in 1989.

Olmsted, Frederick Law. *Yosemite and the Mariposa Grove: A Preliminary Report, 1865*. Introduction by Victoria Post Ranney. Yosemite National Park, California: Yosemite Association, 1995. xx + 33 pp.

In 1864 Congress granted Yosemite Valley and the Mariposa Big Tree Grove to the State of California “for public use, resort, and recreation;” this landmark legislation created the nation’s first state park. The act also authorized a managerial commission, of which Frederick Law Olmsted was made chairman. In 1865 he presented the report reprinted here.

As Ranney explains in her introduction, “It was a groundbreaking document, for it laid out reasons justifying the government of a republic in reserving land of scenic value for its people. It also proposed farsighted guidelines for management that still serve as models for administrators and advocates of national parks today.” The origins of California state park policy, too, can be traced to this report.

Ortiz, Beverly R., as told by Julia F. Parker. *It Will Live Forever: traditional Yosemite Indian acorn preparation*. Photographs by Raye Santos. Second edition. Berkeley, California: Heyday Books, 1996. 148 pp.

With great care and sensitivity, author Ortiz examines the process of gathering, drying, cracking, shelling, winnowing, pounding, sifting, leaching, and cooking acorns in this book. At the same time, *It Will Live Forever* serves as a tribute to Julia Parker—a respected cultural interpreter whose techniques are related here.

Numerous black-and-white photos further document the Yosemite Miwok/Paiute “acorn making” procedure.

Petrides, George A. *Trees of the California Sierra Nevada*. Illustrated by Olivia Petrides. Williamston, Michigan: Explorer Press, 1996. 79 pp.

Those who want to make sense of the Sierra Nevada would do well to begin with trees. Many types are distributed quite predictably—so much so that John Muir noted how “one need never be at a loss in determining, within a few hundred feet, the elevation above sea-level by the trees alone.”

Identifying Sierran trees is relatively easy with this handy guide. Trees are divided into numerous small groups, based on easily-observable traits; within

each group, species can be told apart by comparing written descriptions and illustrations. Black-and-white drawings show leaves, cones, flowers, bark, twigs, tree silhouettes, and other distinguishing features.

Reid, Robert Leonard, ed. *A Treasury of the Sierra Nevada*. Berkeley, California: Wilderness Press, 1983. 363 pp.

This anthology gives an excellent sampling of the rich body of literature which the Sierra has inspired.

Here readers will find entries by explorers, immigrants, scientists, poets, tourists, conservationists, and climbers. The writers include John Muir, Clarence King, Mark Twain, Bret Harte, Robert Louis Stevenson, Mary Austin, François Matthes, David Brower, Gary Snyder, and various others.

The editor prefaces each selection with some explanatory remarks; these often prove as interesting as the quoted material.

Robertson, David. *West of Eden: a history of the art and literature of Yosemite*. Yosemite Natural History Association and Wilderness Press, 1984. 174 pp. + 24 pp. of color plates.

Since the mid-1800s, Yosemite's scenic grandeur has drawn writers and artists who've strived to capture their impressions on paper, canvas, and film. This book —“partly biographical and partly critical,” according to the author—is a record of that striving.

Among the works illustrated, quoted, or discussed here are dramatic landscape paintings by Albert Bierstadt, Thomas Hill, and William Keith; prints by photographers early and modern, such as Carleton Watkins and Ansel Adams; narrative essays by John Muir and Clarence King; and poetry by Gary Snyder. In a postscript, even the John Muir Trail with its interpretive signage is considered: “To see it we must ‘do’ it. Like stations of the cross, it is liturgical art.”

Runte, Alfred. *Yosemite: The Embattled Wilderness*. Lincoln, Nebraska: University of Nebraska Press, 1990. 271 pp. + 48 pp. of illustrations.

This book chronicles a common parkland struggle—the need to balance the conflicting demands of resource preservation and visitor use. Yosemite's long park history and heavy visitation give it unique value as a case study in this regard.

Changes in park policy are tracked as the author examines such issues as predator control, fire management, and the development of tourist facilities. All too often one sees that official decisions have been guided not by philosophical ideals or scientific evidence, but by pressure from special interests and the general public.

Interpreters should find one chapter, "University of the Wilderness," particularly worthwhile. In it, the origin of park interpretation is discussed in some detail.

Schaffer, Jeffrey P. *The Geomorphic Evolution of the Yosemite Valley and Sierra Nevada Landscapes: solving the riddles in the rocks.* Berkeley, California: Wilderness Press, 1997. 388 pp.

This book represents a radical rethinking of Sierra Nevada geomorphology. Schaffer, a naturalist, calls into question certain premises on which our understanding of mountain landforms has been based. After laying the historical groundwork for his case, he presents evidence indicating that the Sierran landscape may be much older than is generally thought, and that glaciers might have played a less important role in shaping it.

For those who are new to the subject, this treatise is apt to seem heavy with detail; after all, it's derived from the author's doctoral dissertation. But to readers who've studied the Sierra's evolution, the arguments set forth—and the debate they're likely to generate—should prove intriguing.

Siebert, Diane. *Sierra. Paintings by Wendell Minor.* HarperCollins Publishers, 1991.

"A place of strength and lofty height;
Of shadows shot with shafts of light;
Where meadows nestle in between
The arms of forests, cool and green;
Where, out of clefted granite walls,
Spill silver, snow-fed waterfalls."

This children's book uses poetry and color artwork to evoke a strong sense of the majesty, beauty, and life of the Sierra Nevada range.

Storer, Tracy I., and Robert L. Usinger. *Sierra Nevada Natural History: an illustrated handbook*. Berkeley and Los Angeles: University of California Press, 1963. 374 pp. + 24 color plates.

This handy book describes a very wide variety of common Sierran organisms. Some groups that it includes—fungi and invertebrates, for example—aren't covered by the other field guides cited in this section. However, one problem with such a broad approach is that large numbers of less common species are omitted... making it difficult to assign specific names to unknown plants or animals with certainty.

In place of taxonomic keys, there are written species accounts, identification charts, and illustrative artwork and photos in both black-and-white and color. Introductory chapters provide some general information about the natural history of the range.

Weeden, Norman F. *A Sierra Nevada Flora*. Fourth edition. Berkeley, California: Wilderness Press, 1996. 259 pp.

Handy yet thorough, this regional flora is a valuable reference for students of Sierran plant life. Its taxonomic keys and species descriptions should enable users to identify most types of mountain vegetation. Western foothill and east-side Great Basin plants are generally excluded, however.

Standard botanical jargon must be dealt with, but there's a glossary to help decipher it. Helpful, too, are the simple line drawings which illustrate each genus.

Whitney, Stephen. *A Sierra Club Naturalist's Guide to the Sierra Nevada*. San Francisco: Sierra Club Books, 1979. 526 pp. + 8 color plates.

This is an excellent natural history reference—probably the best single-volume treatment of its subject for interpreters. With it, readers can gain a clear sense of not only *what* constitutes the Sierra Nevada, but also *why* things are as they are.

Early chapters discuss the range's geography, geology, and weather patterns. A mountain-oriented look at ecological concepts comes next. Then author Whitney describes the Sierra's major subregions—its western foothills, forest belt, alpine zone, and desert-like east flank; details are provided about the plant communities and animal life of each.

The book is nicely illustrated with drawings and diagrams.

Wilson, Lynn, Jim Wilson, and Jeff Nicholas. *Wildflowers of Yosemite*. Yosemite, California: Sunrise Productions, 1987. 143 pp.

Centrally located in the range, Yosemite National Park is an ideal place to become acquainted with Sierran flowers. There one can follow the annual “bloom” upward through several life-zones...and across several pages of the calendar.

This Yosemite wildflower guidebook is divided into three main parts. One part suggests some field trips within the park, pinpointing good places to find flowers. Another section illustrates more than 200 types of flowering plants with fine color photos that can be used for picture-keying. A final segment gives descriptive species accounts, many of which contain items of interest to interpreters.

Wuerthner, George. *California's Sierra Nevada*. Helena, Montana: American & World Geographic Publishing, 1993. 104 pp.

Here's a good introductory overview of the Sierra range. The book is attractively illustrated, mostly with color photographs by the author. The text deals briefly with a variety of topics—geology, climate, vegetation, wildlife, fire ecology, and human history, among others.

GREAT BASIN and SOUTHERN CALIFORNIA DESERTS

Together, the Great Basin, Mojave, and Colorado deserts occupy about one-third of California. In this land of little rain, the impact of aridity is inescapable. Nature responds to what Joseph Wood Krutch termed “the grand fact of dryness” in ways that variously seem awesome, ingenious, beautiful, and strange.

The sources listed here are likewise varied in their approaches to the desert environment. They include ecological overviews, identification guides, park-oriented references, evocative narratives, and even a children’s poem. As might be said of any group of live interpreters, these works will prove informative, entertaining, and inspirational in differing proportions.

“Spread out below us lay the desert, stark and glaring, its rigid hill-chains lying in disordered grouping, in attitudes of the dead. The bare hills are cut out with sharp gorges, and over their stone skeletons scanty earth clings in folds, like shrunken flesh....Ghastly colors define them from the ashen plain in which their feet are buried. Far in the south were a procession of whirlwind columns slowly moving across the desert in spectral dimness. A white light beat down, dispelling the last trace of shadow, and above hung the burnished shield of hard, pitiless sky.”

—Clarence King

“But what tongue shall tell the majesty of it, the eternal strength of it, the poetry of its wide-spread chaos, the sublimity of its lonely desolation! And who shall paint the splendor of its light; and from the rising up of the sun to the going down of the moon over the iron mountains, the glory of its wondrous coloring!”

—John C. Van Dyke

“Life nowhere appears so brave, so bright, so full of oracle and miracle as in the desert.”

—Edward Abbey

“When crushed, sage brush emits an odor which isn't exactly magnolia and equally isn't exactly polecat—but is a sort of compromise between the two.”

—Mark Twain

“In desert country everything from the color of a mouse or the shape of a leaf up to the largest features of the mountains themselves is more likely than not to have the same explanation: dryness.”

—Joseph Wood Krutch

Austin, Mary. *The Land of Little Rain*. Boston and New York: Houghton, Mifflin and Company, 1903. 281 pp.

The Land of Little Rain is an early, personal celebration of California's desert country. Austin's writing conveys a deep familiarity with—and affection for—the land “east away from the Sierras, south from Panamint and Amargosa, east and south many an uncounted mile.”

Over the years, various editions have kept this classic work in print.

Bean, Lowell John, and Katherine Siva Saubel. *Temalpakh: Cahuilla Indian knowledge and usage of plants*. Morongo Indian Reservation: Malki Museum Press, 1972. 225 pp.

Temalpakh deals with the ethnobotany of Southern California's Cahuilla Indians, whose territory covered part of the Colorado Desert and adjacent mountain areas. “Temalpakh” is the Cahuilla way of saying “from the earth.”

This book describes the native uses of some 250 types of plants, many of which are desert-dwelling species. Introductory sections give an overview of the Cahuilla natural environment and the place of plants in Cahuilla culture. Some black-and-white photos of plants and plant products are included.

Carle, David. *Mono Lake Viewpoint*. Illustrated by Carl Dennis Buell. Lee Vining, California: Artemisia Press, 1992. 126 pp.

Here's a good example of an interpreter's mind at work—a collection of imaginative, entertaining, and informative essays by a park ranger about a place he intimately knows.

These Mono Lake-related writings are quite informal and often conversational in style. Topics range from tufa towers to tourist comments, from “no-see-ums” to the night sky. Some of the pieces have enticing titles, such as “Tsk Tsk Tamarisk” or “The Once and Future Shrimp.”

Collins, Barbara J. *Key to Trees and Shrubs of the Deserts of Southern California*. 1976. 150 pp. Available from Northridge, California: California State University Foundation, Northridge.

Unlike many plant keys, this handy guide doesn't rely heavily on the presence of flowers; as a result, it can be used to identify “desert perennials” at any time of year. Its keys lead, as simply as possible, to detailed written species descriptions

—each accompanied by a line drawing of the tree or shrub or cactus in question. Some general information about desert geography, geology, and ecology is given in a separate section.

(For a companion key to desert wildflowers, see the next citation.)

Collins, Barbara J. *Key to Wildflowers of the Deserts of Southern California*. 1979. 143 pp. Available from Northridge, California: California State University Foundation, Northridge.

This compact guidebook should enable users to identify “most of the wildflowers” that they’ll encounter in the Mojave and Colorado deserts. The minimally-technical key includes moderately good drawings of more than 250 species. A glossary illustrates some of the guide’s botanical terms.

Cornett, James W. *Death Valley National Park: an interpretive history*. Santa Barbara, California: Companion Press, 1996. 48 pp.

With the lowest elevation in the Western Hemisphere, the hottest temperature ever recorded in North America, and the largest national park in the contiguous United States, Death Valley is a place of remarkable extremes. This publication gives the reader a sense of its strange marvels.

High-quality color photographs dominate the work, beautifully portraying the region’s landscapes and life. The text is clearly written and concise; in it, the author discusses various places of interest in terms of their natural history, and he also relates how people historically have dealt with the rigors and resources of the land.

Cowles, Raymond B., in collaboration with Elna S. Bakker. *Desert Journal: a naturalist reflects on arid California*. Berkeley and Los Angeles: University of California Press, 1977. 263 pp.

Through this book, a respected biologist shares his natural history knowledge of the California desert...and his personal experiences in it.

Much of the material relates to the survival of animals in a desert environment. Various topics are addressed, from ecological niches to protective adaptations to cold-bloodedness.

A non-technical approach and narrative style make for pleasant reading.

Gaines, David. *Mono Lake Guidebook*. Fourth edition. Revised by Lauren Davis. Lee Vining, California: Kutsavi Books, 1989. 104 pp.

Mono Lake is remarkable for several reasons—its great age...its unusual water chemistry...its biological significance...its other-worldly “look.” Collectively, these and other attributes make the lake not just remarkable, but unique.

After opening with an eleven-stop self-guided tour, this well-illustrated guidebook gives an excellent overview of the lake’s natural and human history. The last chapters chronicle “the unraveling of an ecosystem” brought about by water diversions to Los Angeles, and the book closes with concern over the shrinking lake’s plight.

An updated edition of this work is needed to tell how, in 1994, years of debate and litigation resulted in a decision to stabilize the level of Mono Lake.

Hogue, Lawrence. *All the Wild and Lonely Places: journeys in a desert landscape*. Washington, D.C. and Covelo, California: Island Press, 2000. 272 pp.

This narrative reports on one individual’s penetrating inquiry into a certain place—the Anza-Borrego desert region. The book’s chapters describe a series of forays that investigate the landscape as well as its history of occupancy, use, and management.

In his quest “to get to the heart of what this place is,” the author comes to see the desert in a new way—as “a manuscript of overlaid marks and erasures” made by people over many centuries. This insight prompts him to ponder an intriguing question: “If the landscape that was here 200 years ago was not a ‘natural’ ecosystem but one shaped by humans, and if that landscape is nothing like what we see today, then what exactly are we protecting in habitat preserves...such as Anza-Borrego Desert State Park?”

Hunt, Charles B. *Death Valley: geology, ecology, archaeology*. Berkeley and Los Angeles: University of California Press, 1975. 234 pp.

This book’s subtitle is a little misleading. Geology accounts for the largest share of the text by far, more than ecology—actually plant and animal geography—and archeology combined.

The subject matter may prove less interesting to lay readers than to serious or specialized students of the Death Valley region. For example, one section traces the orderly crystallization sequence of salt minerals on the drying desert floor.

Another part, involving “the archaeology of litter,” explains why discarded glass bottles sometimes become purplish or iridescent with age.

Photos, drawings, and tables augment the work.

Jaeger, Edmund C. *The California Deserts*. Fourth edition. Stanford, California: Stanford University Press, 1965. 208 pp. + 16 pp. of black-and-white photographs.

Written by an authority on the subject, this source gives a very nice overview of Southern California desert natural history.

Much of the book is devoted to desert plants and animals—their forms, habits, adaptations, and ecology. Regional geology, climatic effects, and early human habitation are also discussed. A final chapter urges the preservation of arid lands as “places which, left undisturbed, minister greatly to the pleasure and ennoblement of man’s mind.”

Line drawings and photos illustrate selected desert scenes and species.

Jaeger, Edmund C. *Desert Wild Flowers*. Revised edition. Stanford, California: Stanford University Press, 1941. xxx + 322 pp.

After more than half a century, this field guide remains one of the best references for identifying California’s desert vegetation. Users will find not only herbaceous flowers in it, but also shrubs and trees.

There are written descriptions of some 750 plants, with interpretive material in many of the accounts. The author’s detailed line drawings of “nearly every species” are particularly helpful. A botanical key that’s relatively easy to use is provided, too.

Jaeger, Edmund C. *Desert Wildlife*. Stanford, California: Stanford University Press, 1961. 308 pp.

Quoting author Jaeger, “*Desert Wildlife* is a series of intimate and authentic sketches depicting the lives of native animals of our Southwestern deserts, from mammals to birds and reptiles, as well as many of the lesser desert denizens.”

Sound natural history information and interesting personal anecdotes intermingle nicely in this work. Beyond these, a certain grace pervades the writing, as this prefatory note suggests: “Photographic illustrations

without...names below them record some of the author's moments of pleasure in desert wilderness places."

Kirk, Ruth. *Desert: The American Southwest*. Boston: Houghton Mifflin Company, 1973. 361 pp. + 8 pp. of color photographs.

This volume focuses primarily on Sonoran Desert country to the east of our state. However, much of the material involves life-forms, adaptations, and environmental conditions common to California's deserts also.

Facts, anecdotes, and personal impressions all contribute to the text. On one page, author Kirk cites research showing "a total production of one and one-half billion seeds per acre in the California desert." On another, her remarks are more poetic: "An oasis celebrates life. It forms a microhabitat of the possible, set in an infinity of the difficult." In short, this interpretation of the desert realm is both enlightening and a pleasure to read.

Krutch, Joseph Wood. *The Voice of the Desert: a naturalist's interpretation*. New York: William Sloane Associates, 1955. 223 pp.

This book offers a thoughtful, literate look at the highly-adapted plant and animal life of the Southwestern desert region. Krutch's writings center around Arizona, but many of the subjects he discusses—kangaroo rats, tarantulas, yucca moths, roadrunners, and such—relate to California as well.

Larson, Peggy, with Lane Larson. *A Sierra Club Naturalist's Guide to the Deserts of the Southwest*. Drawings by Lynn Larson. San Francisco: Sierra Club Books, 1977. 286 pp.

This handbook examines each of the three types of desert found in California—the Great Basin Desert; the Mojave Desert (here spelled "Mohave"); and the Sonoran Desert, of which our Colorado Desert (here called the "Lower Colorado Valley Desert") is a part.

In particular, the guide explains how native plants and animals are specially adapted to endure the rigors of desert climate and terrain. Also, a sizeable portion of the book deals with the various hazards which a human may face in desert country...and how to avoid or cope with them.

Some maps, charts, and species drawings are included, too.

Latting, June, and Peter G. Rowlands, eds. *The California Desert: an introduction to natural resources and man's impact.* In two volumes. Riverside, California: June Latting Books, 1995. 665 pp.

This work has been called “the sum of what we know about the California deserts.” It was prepared with the hope that its information would provide “an exhaustive scientific background for decision-making.”

Together, the two volumes contain more than 25 authoritative reports. These deal with a broad range of desert-related topics—geology, soils, climate, vegetation, wildlife, ecology, human impacts, methods for resource protection and management, research and educational uses, and more.

A valuable reference to have in our desert parks.

Lindsay, Lowell, and Diana Lindsay. *The Anza-Borrego Desert Region: a guide to the state park and adjacent areas of the western Colorado Desert.* Fourth edition. Cartography by Casey Cook. Berkeley, California: Wilderness Press, 1998. 258 pp. + separate map.

Moonlight Canyon...Pinyon Mountain Dropoff...Tarantula Wash...Well of the Eight Echoes...Yaqui Pass—these are just a few of the colorfully-named places that are mentioned in this authoritative guidebook.

Much of the book consists of area and trip descriptions; these contain not only necessary geographic information, but also a wealth of site-specific natural and cultural lore. Black-and-white photos help readers visualize California's largest state park and its surroundings.

Merlin, Pinau. *A Field Guide to Desert Holes.* Illustrations by Pamela Ensign. Tucson, Arizona: Arizona-Sonora Desert Museum Press, 1999. 131 pp.

This field guide deals with desert animals in an unusual way—by focusing on “holes” that indicate their presence or activity. Anthills, coyote dens, deer beds, sapsucker drillings, ground squirrel burrows, and tarantula holes are some of the cavities represented.

Users of the guide first classify a hole according to its location, shape, and size. Then they can choose among more detailed hole descriptions and find natural history information about possible hole “builders” or other occupants. This process might not always yield a positive identification...but it's almost certain to result in a heightened *awareness* of the desert's hidden life.

Miller, Alden H., and Robert C. Stebbins. *The Lives of Desert Animals in Joshua Tree National Monument.* Illustrated by Gene M. Christman. Berkeley and Los Angeles: University of California Press, 1964. 452 pp.

This volume catalogues the mammals, birds, reptiles, and amphibians of Joshua Tree National Monument (now a national park).

Based on careful field study, detailed species accounts tell of the “adaptations, ecology, and distribution of the animals of this part of the Californian deserts.” The monument’s three altitudinal “plant belts” — characterized, from lowest to highest, by creosote bush, yucca, and piñon pine — are discussed in a separate section, along with more localized habitat types such as sand dunes, desert washes, and oases.

Illustrations figure prominently in this report; artwork and photos show many kinds of wildlife in black-and-white or color.

Remeika, Paul, and Lowell Lindsay. *Geology of Anza-Borrego: Edge of Creation.* San Diego, California: Sunbelt Publications, 1992. 208 pp. + fold-out color geologic map.

Because there’s not much obscuring vegetation, deserts are ideal places to study earth science...and the geologically complex and active Anza-Borrego desert region is especially interesting. This source takes full advantage of these facts.

The guidebook is moderately technical and richly detailed; yet the writing is quite clear, often interpretive, and even poetic in spots. Chapters examine the region’s geologic history, plate tectonics, faulting, mountain-building, and erosion. Several field trips are suggested, with roadside features explained in route logs. Illustrative charts, maps, and black-and-white photos are provided, too.

Schad, Jerry. *California Deserts.* [Revised edition.] Helena, Montana: Falcon Press, 1988. 104 pp.

Interpretively written and attractively illustrated, this book does an excellent job of introducing readers to the wonders of California’s desert country.

As described here, the state’s arid lands seem to abound with “believe it or not”-type curiosities. Among them are “musical” sand dunes, rodents that don’t require drinking water, ground temperatures hot enough to fry an egg in just six minutes, and creosote bush “clones” now considered to be the world’s oldest living things.

One section of *California Deserts* summarizes the region's human history; another samples the flora and fauna. Other parts briefly survey major scenic attractions—Anza-Borrego Desert State Park, Death Valley and Joshua Tree national parks, and the Mojave National Preserve.

(This new, re-formatted edition incorporates changes resulting from the California Desert Protection Act of 1994; for some reason, it still bears the book's original publication date.)

Sharp, Robert P., and Allen F. Glazner. *Geology Underfoot in Death Valley and Owens Valley*. Missoula, Montana: Mountain Press Publishing Company, 1997. 321 pp.

Not many geological field guides actually make enjoyable reading, but this one does. Here, the authors present a collection of thirty "vignettes," each of which tells an interesting interpretive story about some geological feature, relationship, or event occurring in the eastern part of the state.

Topics range from the "lunar landscape" of the Trona Pinnacles to the historic Owens Valley earthquake of 1872 to the unusual glacial moraines around Convict Lake. Among other things, readers will learn about a "fossil" waterfall, desert varnish, the Death Valley region's curious "sailing stones," and a prehistoric eruption that deposited volcanic ash as far off as Nebraska.

Siebert, Diane. *Mojave. Paintings by Wendell Minor*. New York: Thomas Y. Crowell, 1988.

This children's book celebrates the Mojave Desert with striking art and stirring verse that adults also will find appealing.

Opening and closing lines invite the reader:

"I am the desert.

I am free.

Come walk the sweeping face of me."

Smith, Genny, ed. *Sierra East: edge of the Great Basin*. Illustrated by Flora Pomeroy Smith and the authors. California Natural History Guides: 60. Berkeley and Los Angeles: University of California Press, 2000. 489 pp. + 16 pp. of color photographs.

In editor/author Smith's words, this guidebook deals with "a region where desert valleys of long summers and snow-spangled mountains of long winters lie side by side." (The steep eastern slope of the Sierra Nevada is treated fully...but

because the book's area of coverage has a strong kinship with the Great Basin, *Sierra East* is listed here, rather than in the previous section.)

Chapters separately discuss the region's geography, geology, climate, water, vegetation, arthropods, native fishes, amphibians, reptiles, birds, and mammals. There are informative written descriptions of many animals and plants, plus species illustrations in the form of black-and-white artwork or color photos. Keys to help with identification are lacking, however.

Trimble, Stephen. *The Sagebrush Ocean: a natural history of the Great Basin.* Illustrations by Jennifer Dewey. Reno and Las Vegas, Nevada: University of Nevada Press, 1989. 248 pp. + 32 pp. of color photographs.

Stretching eastward from the Sierra Nevada is the vast physical and biological province of the Great Basin. This book investigates the region's diverse natural environments: salt-encrusted playas...shrunken remnants of Ice Age lakes..."seas" of sagebrush...and "island" mountains graced with four-thousand-year-old pines.

As a natural history source, *The Sagebrush Ocean* pays special attention to biogeography—"what lives where, and why." But this work also has a celebratory side; it's interlaced with personal narrative, apt quotations, and photography by the author that's at once documentary and artistic.

Van Dyke, John C. *The Desert: further studies in natural appearances.* New York: Charles Scribner's Sons, 1901. 233 pp.

In 1898 a sickly professor-librarian packed a modest supply of gear and water, mounted an Indian pony, and rode out into the Southern California desert. This book is an account of what he found.

Every aspect of the arid landscape is considered, but perhaps most fascinating are the author's sensitive impressions of light and color. Entire chapters are devoted to the visual effects produced by dust and weather-staining, moonlight and sunsets, mirages and even the shadows of passing clouds. As a study in pure seeing, few Western writings can compare.

This is a desert classic, available to modern readers in a reprinted edition (The Johns Hopkins University Press, 1999).

Watts, May Theilgaard, and Tom Watts. *Desert Tree Finder*. Rochester, New York: Nature Study Guild, 1974. 61 pp.

This pocket-sized guide comes with an easy-to-use key, plant illustrations, and range maps. The area it covers extends from Southern California to New Mexico.

The booklet helps identify an interesting mix of species. Along with predictable entries—California fan palm and Joshua tree, for instance—users will find trees of “man-made oases” represented, and less-tree-like plants such as tamarisk and ocotillo. Trees of “higher altitudes” are omitted, though.

Wedertz, Frank S. *Bodie: 1859-1900*. Bishop, California: Chalfant Press, Inc., 1969. 212* pp.

During its boom years—1877 to 1881—Bodie was known as one of the wildest mining camps in the West. Today, its picturesque weathered remains form an authentic ghost town...and a state historic park. Better than most places, Bodie reminds us of how colorful human history can be generated by an inert substance, gold.

With detailed text and historic graphics, this source paints a vivid picture of Bodie’s “life and spirit.” The book is divided into three parts: “The Town,” “The People,” and “The Mines.” Each part in turn is subdivided to cover specific topics such as “Bonanza Street,” “gamblers,” or “the Cornish pump.”

*Pagination is irregular; many pages are given two consecutive numbers, while others have one or none at all.

Zwinger, Susan. *Still Wild, Always Wild: a journey into the desert wilderness of California*. Photographs by Jeff Garton. San Francisco: Sierra Club Books, 1997. 132 pp.

Much of this book reads like a journal, describing one naturalist’s exploration of areas affected by the 1994 California Desert Protection Act.

Maps chart the author’s travels through an impressive array of public lands—from reclassified and enlarged national parks to newly-designated wilderness areas. The narrative text captures the delight of discovery in “a land grand enough...to expand one’s soul with vast possibilities, to awaken all one’s senses.” Numerous photographs capture the colors, textures, and contrasts of the desert’s stark, surreal beauty.

SOUTHWESTERN MOUNTAINS, HILLS, and VALLEYS

Two geologically dissimilar natural provinces—the Transverse Ranges and the Peninsular Ranges—are combined here as one last designated “region” of California.

The sources cited in this section form a miscellaneous group. Their subjects range from Chumash archeoastronomy to Los Angeles Basin insects to individual parks. These works should prove helpful to naturalists and interpreters whose interests match their titles.

“The highest peak of the San Bernardino mountains is quite sharp and bare upon the summit....From the top of this peak, eleven thousand feet above the general level of the habitable part of the land, one may on a clear day look down upon a landscape that embraces all possible extremes of barrenness and fertility, of wildness and civilization, with nearly all the varieties of mountain, plain, and valley that time and the elements can form.”

—Theodore S. Van Dyke

“I like to picture the land in LA [Los Angeles] as it was decades — even centuries — ago. When I drive across Sepulveda Pass, I prefer to see the rugged canyon Gaspar de Portolá explored rather than a mountain valley sliced open by a ten-lane freeway....When I’m feeling especially mischievous, I turn the clock so far back that the skyscrapers of downtown LA are replaced by domed huts built of willow sticks — the Gabrieleño village of Yang-Na.”

—David Wicinas

Berger, W. H. *Walk along the Ocean. With contributions by G. Kuhn. Benson, Arizona: Border-Mountain Press, 1976. 73 pp.*

This guide to the seashore between La Jolla and Encinitas is based on an actual beach tour which the author has led.

Readers are told about basic coastal processes and forms—wave action, sand transport, cliff structure, and conspicuous shore life—in a clear and interesting way. Black-and-white photos and diagrams reinforce the writing.

Collins, Barbara J. *Key to Coastal and Chaparral Flowering Plants of Southern California. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1985. 249 pp.*

With this handy key, users should be able to identify most common flowering plants—except grasses and sedges—of Southern California’s coastal regions and brush-covered mountains.

Straightforward key choices lead to detailed written descriptions and simple line drawings of the species. Some basic information about keying, collecting, and preserving specimens is given, too.

Dale, Nancy. *Flowering Plants: the Santa Monica Mountains, coastal and chaparral regions of Southern California. Santa Barbara, California: Capra Press, in cooperation with the California Native Plant Society, 1986. 239 pp.*

Some 250 common flowering plants of the Santa Monica Mountains are showcased in this guide. Species entries usually include a written description, interpretive facts, and either a fine color photo or a line drawing. Additionally, there’s a list of suggested wildflower-viewing sites with accompanying maps.

Flowers are indexed by color, but anyone wanting to identify the area’s vegetation more systematically should consult Collins’ *Key to Coastal and Chaparral Flowering Plants* (cited above).

Evarts, Bill. *Torrey Pines: landscape and legacy. La Jolla, California: Torrey Pines Association, 1994. 86 pp.*

Through its fine color images and interpretive text, this book captures the essence of Torrey Pines State Reserve. The reserve, not far from San Diego, contains the only mainland groves of the rarest pine species in the United States.

Among other things, author and photographer Evarts tells how decades of effort were required to protect the trees; how scientists have yet to solve the puzzle of their distribution; and how, even with careful management, the future of the pines remains uncertain.

Dramatic and intimate pictures of the reserve are matched with explanatory captions; the effect is rather like a guided tour.

Fine, David. *Coming Home to California, the Bioregional Series: The Los Angeles Bioregion.* Sacramento: California State Parks. 114 pp.

“Coming Home to California” is a park-oriented program designed to connect children and their teachers to the natural and historical treasures of the state. Its aim is not only to educate, but to arouse feelings of identity, caring, and responsibility —to inspire a “sense of place.”

This is the first in a planned series of teacher guides to the various “bioregions” of California. The Los Angeles bioregion incorporates the Los Angeles Basin, Transverse Ranges, and Mojave Desert.

Topics touched upon in the guide range from “immigrant” plants to desert poets, reflecting the series’ multidisciplinary approach. Diverse state park units are profiled as well, including a restored Spanish mission, a working citrus grove, and “the world’s largest wild land within a major city.” Worth noting, too, are matrix charts that relate state curriculum frameworks to park learning opportunities.

Fisher, Chris C., and Herbert Clarke. *Birds of Los Angeles, including Santa Barbara, Ventura and Orange counties.* Renton, Washington: Lone Pine Publishing, 1997. 160 pp.

Some 125 birds are treated in this regional guidebook, with species selections representing “a balance between the familiar and the noteworthy.”

The book combines beautiful color artwork with interpretive text of comparable quality. Interesting facts and fanciful descriptions enliven the species entries; for example, the authors report that a white-throated swift may travel more than one million miles in its lifetime...and the lesser scaup is deemed “the Oreo cookie of the coastal ducks—black at both ends and white in the middle.”

This guide also briefs readers about each bird's distinguishing features, its seasonal abundance, and its habitat.

Havert, Bill, and Gary Gray. *Nature Guide to the Mountains of Southern California, by car and on foot.* Illustrations by Sue Adams. Idyllwild, California: Earth Trails Publications, 1996. 138 pp.

Here's a basic introduction to the vegetation and wildlife of the San Gabriel, San Bernardino, San Jacinto, Santa Rosa, Cuyamaca, and Palomar mountains. Common trees, shrubs, wildflowers, birds, and mammals are described, with tidbits of interpretive lore sometimes included. Most species are illustrated with black-and-white or color artwork.

One section of the book specifies which biotic communities and notable plants can be seen along selected mountain roads.

Hogue, Charles L. *Insects of the Los Angeles Basin.* Second edition. Los Angeles: Natural History Museum of Los Angeles County, 1993. 447 pp.

This is a marvelous entomological work, richly informative and attractively presented. Though intended for "the Angeleno," it should prove useful throughout the coastal area between Santa Barbara and San Diego.

Nearly 500 types of insects and other arthropods are covered. Many of these aren't merely described, but also discussed in terms of their habitat, food, behavior, life history, and involvement with humans. Naturalists and interpreters will appreciate the interesting, well-referenced treatment.

High-quality drawings or color photos illustrate all but a few of the species.

Hubbs, Carl L., and Thomas W. Whitaker, eds. *Torrey Pines State Reserve.* Second edition. La Jolla, California: Torrey Pines Association, 1972. 96 pp.

Although older and less evocative than Evarts' *Torrey Pines* (cited above), this source conveys much more specific natural history information about the state reserve. Local geology, vegetation, and wildlife are covered in some detail, and an appended species list fills thirteen pages. The history of the reserve is chronicled for readers, too.

Black-and-white illustrations depict an assortment of reserve features.

Hudson, Travis, and Ernest Underhay. *Crystals in the Sky: an intellectual odyssey involving Chumash astronomy, cosmology and rock art*. Ballena Press Anthropological Papers No. 10. Socorro, New Mexico: Ballena Press/ Santa Barbara Museum of Natural History, 1978. 163 pp.

This book is “a tentative, preliminary exploration” of the Chumash conception of the heavens...and of how that cosmic view might have influenced Chumash life. The authors’ conclusions are conjectural, but they’re based on a careful review of history, archeology, ethnography, linguistics, and the astronomical lore of other California Indian groups.

What sorts of evidence does such an inquiry produce? Among other things, a cave that appears to be a solstice observing site; rock paintings that may depict eclipses; mythology suggesting that the star Polaris was regarded as “Sky Coyote,” the father of mankind; and rituals that were probable attempts to interact with celestial forces.

Interpreters who think of native cultures in a strictly earthbound way should find this “odyssey” enlightening.

Huffman, Margaret. *Wild Heart of Los Angeles: the Santa Monica Mountains*. Niwot, Colorado: Roberts Rinehart Publishers, 1998. 195 pp.

With more than twelve million people living within an hour’s drive, the Santa Monica Mountains have become an “island” of open space surrounded by urban and suburban “seas.” *Wild Heart of Los Angeles* explores the wonders—and the problems—of this isolated and impacted natural area.

Separate chapters consider the range’s “patchwork quilt” of ecosystems—chaparral, sage scrub, oak woodland and savanna, riparian areas, and even the tidal zone. The book’s lively text combines natural history information with personal anecdotes and other stories. Adding to this portrayal are a large number of photographs and various maps.

Jorgen, Randolph. *Mountains to Ocean: a guide to the Santa Monica Mountains National Recreation Area*. Tucson, Arizona: Southwest Parks and Monuments Association, 1995. 100 pp.

The Santa Monica Mountains National Recreation Area includes a mix of federal, state, county, city, and other parklands. This publication serves as a guide to many of these sites.

An introductory section gives an overview of the area's geology, climate, natural communities, and wildlife. Other natural history information—and artwork—is interspersed throughout the text. There's also an activity index that suggests good places for fishing, tidepooling, photographing wildflowers, and observing animal life.

Sharp, Robert P. *Field Guide/Coastal Southern California*. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1978. 268 pp.

Like author Sharp's companion volume, *A Field Guide to Southern California* (cited under "Geology and Paleontology"), this book describes and explains the geology along selected Southland highway routes. Whereas the other guide directs its users well inland, this one concentrates on country "within the coastal belt...from the Mexican border to San Luis Obispo."

Maps and black-and-white photos—many of them aerial views—augment the text.

Stock, Chester. *Rancho La Brea: a record of Pleistocene life in California*. Sixth edition. Los Angeles County Museum of Natural History, 1956. 81 pp.

Located in the city of Los Angeles, the natural tar seeps of Rancho La Brea have yielded one of the most famous collections of fossil birds and mammals ever found.

This publication inventories the Rancho La Brea findings—mammoths, saber-toothed cats, ground sloths, dire wolves, camels, condors, and many other forms of prehistoric life. The text provides good paleontological information without resorting to much technicality. Skeletons of various animal types are illustrated.

Werminski, John. *A Survey of the Natural History of Lake Perris State Recreation Area*. Sacramento: State of California, Department of Parks and Recreation, Dec. 1976. 47 pp.

This report is designed to help park staff and visitors alike to understand and appreciate the natural world of Lake Perris S.R.A.

The document is written with an interpretive slant. It not only explains the area's geology, climate, vegetation, and wildlife, but also calls attention to "ecological contexts and themes" such as interrelationship, human impact, and aridity. Drawings by the author depict representative species and illustrate some key concepts in a site-specific way.

Wicinas, David. *Sagebrush and Cappuccino: confessions of an LA naturalist*. San Francisco: Sierra Club Books, 1995. 218 pp.

Quoting from the preface, “The mountains and seas that surround Los Angeles poke their toes into many neighborhoods, and on any day they are apt to toss up small wonders.”

This book is an entertaining account of the author’s pursuit of those wonders—primarily on foot. His often-humorous musings cover topics ranging from mountain lions to earthquakes, and from beach litter to a legendary bandit.

The moral to the stories: “Discovering a few special spots, and the eyes you need to see them, might help refresh your soul, especially if it is feeling a little withered from living in the city.”

CALIFORNIA ARCHEOLOGY

California's extensive, diverse archeological record has been called both a remarkable heritage and one of the state's best-kept secrets.

Archeology as a subject would fall outside the scope of this document, were it not for the light it sheds on past environmental conditions and patterns of natural resource use. These topics are considered further by sources listed in the next two sections— "California Indians" and "California History." Only a couple of general archeological references are cited here.

“Today, more than 25 million people live in California. Few of these people are aware that all around them, literally beneath their feet in many cases, is one of California’s greatest resources and certainly one of its best-kept secrets: its archaeological record. Not wealth, in the traditional sense, but rather a wealth of information, this record traces and illuminates the full course of human experience in California from the earliest bands of Pleistocene hunters and gatherers to the suburbanites of the twentieth century.”

—Joseph L. Chartkoff and Kerry Kona Chartkoff (1984)

“Some time or other, you would say, it had rained arrowheads, for they lie all over the surface of America....It is humanity inscribed on the face of the earth....They are not fossil bones, but, as it were, fossil thoughts, forever reminding me of the mind that shaped them....I am on the trail of mind...”

—Henry D. Thoreau

Chartkoff, Joseph L., and Kerry Kona Chartkoff. *The Archaeology of California*. Stanford, California: Stanford University Press, 1984. 456 pp.

“Beneath the urban sprawl and golden hills of California lies one of the nation’s richest archaeological records,” note the authors of this work.

Written for the general public as well as for specialists, *The Archaeology of California* gives a fine overview of that record. Coverage is basically chronological, extending from the earliest known Indian occupancy sites to Spanish, Mexican, and American period remains. The emphasis is interpretive throughout, with archeological evidence used to reconstruct a picture of past lifeways.

Photos, drawings, and maps augment the text.

Moratto, Michael J. *California Archaeology*. With contributions by David A. Fredrickson, Christopher Raven, and Claude N. Warren. Orlando, Florida: Academic Press, Inc., 1984. 757 pp.

Here’s another useful single-volume summary of California archeology.

This source differs from the one cited directly above in several respects. It’s organized geographically instead of chronologically. It’s more concerned with the significance of sites and artifacts than with the interpretation of general themes. It deals solely with Indian cultures, and only up to European contact. The natural environment is a recurring topic of discussion.

Maps, charts, and numerous artifact illustrations are included. There’s also a lengthy reference list.

CALIFORNIA INDIANS

For perhaps 98 percent of its human history, California was occupied by Indians alone. There was a populous, diverse array of cultures, each attuned at every level to the nature of the land.

An impressive body of literature about Native Californians exists, but it's barely sampled here. The citations that follow include just a few standard surveys and some works with particularly strong ties to natural history. A scattering of other Indian-related sources can be found under "General Botany," "General Zoology," "California Regional and Local References," and "California Archeology."

“For a graphic and memorable report of the contours of any country, see always the aboriginal account of its making. That will give you the lie of the land as no geographer could sketch it forth for you.”

—Mary Austin

*“To the California Indian way of thinking, **nothing** was inanimate. Animals, plants, rocks, trees, trails, mountains, springs, manufactured objects and natural objects—indeed all things—were **people**, fully alive and intelligent, with complex and interconnected histories.”*

—Malcolm Margolin

“He looked upon us as sophisticated children—smart, but not wise. We knew many things, and much that is false. He knew nature, which is always true. His were the qualities of character that last forever. He was kind; he had courage and self-restraint, and though all had been taken from him, there was no bitterness in his heart. His soul was that of a child, his mind that of a philosopher.”

—Saxton T. Pope (describing Ishi)

Bibby, Brian. *The Fine Art of California Indian Basketry.* Sacramento, California: Crocker Art Museum, in association with Heyday Books (Berkeley, California), 1996. 113 pp.

In few forms do nature and culture combine more obviously or exquisitely than in the Native Californian basketry pictured in this book. Examples chosen range from highly decorated gift baskets to utilitarian cookware, and from seed beaters to cradles to caps. Such objects merit recognition not only as artifacts, but also as art.

Color illustrations are accompanied by text discussing the weaving techniques, aesthetics, and social history of each basket. The various plant and animal materials used in making them are specified as well.

Blackburn, Thomas C., and Kat Anderson, eds. *Before the Wilderness: environmental management by Native Californians.* Menlo Park, California: Ballena Press, 1993. 476 pp.

The California landscape that greeted the first white explorers and settlers has customarily been regarded as “pristine,” “natural,” and “wild.” This source challenges that view.

A collection of rather scholarly writings, *Before the Wilderness* investigates how, for centuries, Indians actively managed California’s lands. Through native burning practices, harvesting strategies, and early efforts at cultivation, habitats were manipulated—and in some cases, transformed. As editor/author Anderson puts it, “California has been sculpted by prehistoric human hands.”

Campbell, Paul Douglas. *Survival Skills of Native California.* Salt Lake City: Gibbs Smith, Publisher, 1999. 448 pp.

Anyone who’s interested in explaining or demonstrating California Indian crafts should know about this source.

Here, interpreters can find detailed information about a broad range of native skills—how to construct dwellings, utilize plant materials, hunt and fish, obtain clothing, make baskets and pottery, plus much more. Many of the state’s Indian cultures are represented by the objects and procedures that are discussed.

Some of the book’s contents come from historical and ethnographic literature, some from observing modern practitioners, and some from the author’s own

experience. Hundreds of “instructional illustrations” add to the value of this work.

d’Azevedo, Warren L., ed. *Handbook of North American Indians, Volume 11: Great Basin*. Washington [D.C.]: Smithsonian Institution, 1986. 852 pp.

Volume 11 in the *Handbook of North American Indians* series is worth noting here as an adjunct to *Volume 8*, which is cited below (under Heizer, ed.) and described in greater detail.

In its survey of the Great Basin region, this book discusses Paiute, Shoshone, and other native peoples whose territories encompass parts of eastern California...but who don’t belong to the “California culture” sphere that’s examined in the companion work.

Gifford, Edward W., and Gwendoline Harris Block, compilers. *Californian Indian Nights Entertainments: stories of the creation of the world, of man, of fire, of the sun, of thunder, etc.; of coyote, the land of the dead, the sky land, monsters, animal people, etc.* Glendale, California: The Arthur H. Clark Company, 1930. 323 pp. + fold-out map.

Here’s a good collection of Native Californian lore, gathered from various regions of the state. Interpreters of natural as well as cultural history may find the material interesting and useful.

Most of the stories presented here are closely linked to the natural world through their characters and settings, incorporating elements as diverse as meadowlarks, Mount Shasta, and the Milky Way. A rather dated introductory section provides some background about California Indian culture...and about the types of tales to follow.

In 1990, University of Nebraska Press reprinted a “Bison Book” edition of this work, titled *Californian Indian Nights*.

Heizer, Robert F., ed. *Handbook of North American Indians, Volume 8: California*. Washington [D.C.]: Smithsonian Institution, 1978. 800 pp.

As a general reference on California Indians, this work is practically indispensable. Its only serious rival is Kroeber’s much older *Handbook of the Indians of California* (cited below).

“Volume Eight” considers about sixty tribes, summarizing what’s known about their territories, their cultures, and their histories. In many cases, at least a

chapter is devoted to each group, with the Pomo, Yokuts, Miwok, and Chumash given the most space. Other sections of the book more generally discuss such topics as natural environment, languages, mythology, basketry, and Euro-American impact. A fine bibliography guides readers deeper into the anthropological literature.

Geographically, this source covers much—but not all—of California. The easternmost part of the state largely falls within the scope of *Volume 11: Great Basin*, edited by d’Azevedo (cited above).

Heizer, Robert F., and Albert B. Elsasser. *The Natural World of the California Indians. California Natural History Guides: 46. Berkeley and Los Angeles: University of California Press, 1980. 271 pp. + 8 pp. of color plates.*

For those who want to learn about the relationship between California Indians and the natural environment, this book makes an excellent first source.

It describes how various natural commodities were used for food, shelter, clothing, basketry, medicine, ceremony, trade, and other purposes. It also explains how regional differences affected Indian lifeways, from woodcraft in northwestern forests to foothill fire-setting to flood-plain agriculture along the Colorado River.

Additionally, there’s information about tribal territories and languages, the native “world view,” and the fate of California’s Indians in historic times.

Kroeber, A. L. *Handbook of the Indians of California. Smithsonian Institution, Bureau of American Ethnology, Bulletin 78. Washington [D.C.]: [U. S.] Government Printing Office, 1925. 995 pp. + 83 plates of photographs and maps.*

This is truly an impressive work, researched thoroughly and written by the foremost authority on the subject. Kroeber’s handbook has been a standard reference for generations—and it remains so, even though some of its material has been called into question.

Some fifty California Indian tribes are examined, either individually or as related groups. Attention is given to their geographic distribution, linguistic relationships, material culture, social customs, and religious beliefs...but not their tragic post-contact history. Several “summary and comparative” chapters follow these tribal descriptions. Photos, drawings, tables, and maps are interspersed.

Dover Publications issued a reprint of the handbook in 1976.

Kroeber, Theodora. *Ishi in Two Worlds: a biography of the last wild Indian in North America*. Berkeley and Los Angeles: University of California Press, 1961. 258 pp. + 32 pp. of photographs.

In the annals of California anthropology, this case stands apart. Interpreters should be familiar with it.

Victims of persecution, the Yahi Indians were believed to be extinct when a lone survivor called Ishi appeared near Oroville in 1911. In a remarkably short time, Ishi was able to make the transition from a Stone Age existence to twentieth-century urban life.

There's much sadness and irony in the story of a "wild" Indian from a "lost" tribe who endeared himself to many by his good nature and who spent his last years living in a museum. Here, that story is told factually, sympathetically, and well.

Kroeber, Theodora, Albert B. Elsasser, and Robert F. Heizer. *Drawn from Life: California Indians in pen and brush*. Socorro, New Mexico: Ballena Press, 1977. 295 pp.

This source reproduces, in black-and-white, more than 300 oil paintings, watercolors, etchings, lithographs, drawings, and pencil sketches of California Indians. Some of the illustrations are simply portraits, but many depict native people in a cultural or natural setting. The earliest picture dates from about 1600; the latest, about 1880. Material is organized by regions of the state.

There's also a limited amount of interpretive text, providing background about both the artwork and its subjects.

Margolin, Malcolm, ed. *The Way We Lived: California Indian stories, songs and reminiscences*. Revised edition. Berkeley, California: Heyday Books/ San Francisco: California Historical Society, 1993. 248 pp.

This anthology provides some interesting glimpses into Native Californian culture, past and present.

More than a hundred stories, prayers, songs, recollections, speeches, and laments are presented here, organized under such headings as "An Ordered World,"

“Mythic Time,” and “The Coming of the Whites.” Selections frequently involve animals or other natural objects.

For many readers, editor Margolin’s insightful commentary will add greatly to an understanding and appreciation of the material. Included, too, is an assortment of historic photos.

Merriam, C. Hart. *Indian Names for Plants and Animals among Californian and Other Western North American Tribes.* Assembled and annotated by Robert F. Heizer. Ballena Press Publications in Archaeology, Ethnology and History No. 14. Socorro, New Mexico: Ballena Press, 1979. 296 pp.

This reference provides Native American names for more than 400 “Pacific Coast Region” plants and animals. Much of the information is organized into vocabulary lists representing dozens of California Indian groups. One can find, for instance, that “Poo-wa” is the given Chumash word for a mosquito, while the corresponding Washo term is “Tahm-moo-ki-ki.”

The book also includes name annotations, a bibliography that focuses on California ethnobiology, and a phonetic key.

Olson, Dennis L. *Shared Spirits: wildlife and Native Americans.* Minocqua, Wisconsin: NorthWord Press, Inc., 1995. 144 pp.

This source presents Indian stories about twelve animals of great significance to native cultures—coyote, raven, mouse, bear, spider, salmon, eagle, deer, and fox among them.

Besides relating the tales, the author draws comparisons between traditional and modern “world views.” The result is text that’s both entertaining and enlightening. References to California Indians are scarce, but the stories should have value to our state’s interpreters nonetheless.

Striking color photographs and other design elements make the book visually appealing.

Powers, Stephen. *Tribes of California.* With an introduction and notes by Robert F. Heizer. Berkeley and Los Angeles: University of California Press, 1976. 480 pp.

During the 1870s, a journalist named Stephen Powers visited and studied numerous Indian groups in the northern and central parts of the state. *Tribes of California* is a very interesting—and historically important—account of what he

learned. While Powers' writing reflects some of the negative cultural biases of its time, his portrayal of post-gold-rush Indian life is actually quite sympathetic. Dozens of fine artwork illustrations accompany the text.

This book is a reprint of Powers' 1877 report in *Contributions to North American Ethnology*, Volume III.

Salcedo, Nancy. *A Hiker's Guide to California Native Places: interpretive trails, reconstructed villages, rock-art sites and the indigenous cultures they evoke*. Berkeley, California: Wilderness Press, 1999. 282 pp.

This guidebook describes more than one hundred hikes selected for their connections to California Indian culture. Interpretive trails, native plant trails, reconstructed villages, mortars, pictographs, petroglyphs, and sites associated with Native Californian stories are variously featured. About half of the hikes take place on state or federal parklands.

The book is divided into sections that correspond to different cultural regions of the state. Along with hike descriptions and maps, there's information about each area's native groups and their use of natural resources...plus listings of museums, visitor centers, guided walks, and such for readers who want to learn more.

CALIFORNIA HISTORY

To a considerable extent, the natural environment has shaped California's human history. The abundance of minerals and timber...the fertility of soil...the allure of scenery and climate...the distribution of water...the challenge of mountain and desert barriers...the danger of earthquake and flood—each has had an impact on the state's development. In such cases as the 1848 gold discovery and the destruction of San Francisco in 1906, those impacts weren't just a matter of history; they became the stuff of myth.

The following list of titles in no way qualifies as a serious California history bibliography. It's merely a selection of historical sources that natural history interpreters may find interesting or useful. Some are modern standard references. Others are well-known older accounts that either describe the early California landscape or tell of memorable encounters with it. A few pictorial works are cited, too.

Additional history-related sources can be found among "California Regional and Local References," under "Parks and Park-related Philosophy," and elsewhere.

“Know ye that on the right hand of the Indies there is an island called California, very near the Terrestrial Paradise...”

—Garci Ordóñez Rodríguez de Montalvo (1510)

“Since California’s actual history has so often resembled romantic fiction, it is not entirely inappropriate that it got its name from a novel.”

—Walton Bean

“It is axiomatic that the history of any region is shaped largely by its geography, but in few other places on earth has the maxim been illustrated more clearly than in California.”

—T. H. Watkins

“The beauty of history is that events which happened in the past still find expression in the present.”

—David Cavagnaro

Beck, Warren A., and Ynez D. Haase. *Historical Atlas of California*. Norman, Oklahoma: University of Oklahoma Press, 1974.

This atlas contains some 100 black-and-white maps, most of which shed light on various aspects of California's history and development. Among other things, the maps depict Indian territories, Spanish exploration routes, Mexican land grants, American immigrant trails, gold rush geography, the evolution of county boundaries after statehood, railroad lines, large turn-of-the-century ranches, Depression-era CCC camp sites, World War II military installations, water distribution projects, modern (1970) agricultural production, and population changes. Some maps relate to the state's natural environment instead, showing geomorphic provinces, rainfall and temperature patterns, vegetation types, and such.

Alternating pages of text or tables supply much additional information, giving con-text to the maps.

Bolton, Herbert Eugene, ed. *Anza's California Expeditions, Volume IV: Font's Complete Diary of the second Anza expedition*. Berkeley, California: University of California Press, 1930. 552 pp. + fold-out map.

In 1775-76, Captain Juan Bautista de Anza led his second expedition to Alta California, one result of which was the founding of the presidio and mission at San Francisco. Pedro Font, a Franciscan missionary, accompanied him as chaplain and cartographer. Father Font's full record of the journey is, according to historian/translator/editor Bolton, "a superb diary—one of the best in all Western Hemisphere history, it is safe to say."

As he chronicles the expedition's progress, Font gives graphic descriptions of natural features, Indians, and Spanish settlements passed en route. Modern readers are thus afforded a sharp-eyed view of California as it appeared prior to extensive Euro-American impact.

Where appropriate, editorial notes clarify or comment on the narrative.

Chase, J. Smeaton. *California Coast Trails: a horseback ride from Mexico to Oregon*. Boston: Houghton Mifflin Company, 1913. 326 pp.

In 1910 and 1911, J. Smeaton Chase leisurely journeyed through California's "coast regions," seeking contact with unspoiled nature and the romantic past. His experiences and impressions are reported in this charming book.

Interpreters may notice that the author visited and described quite a number of places that today enjoy park status. San Diego's Old Town, La Purisima Mission, Point Lobos, Big Basin, Mount Tamalpais, Fort Ross, and Humboldt Lagoons are some examples. However, readers comparing "then" with "now" will also be reminded how, elsewhere, much of the state's pastoral character has been lost.

Tioga Publishing Company (Palo Alto, California) reprinted this work in 1987, adding a list of plant species mentioned in the account.

Crain, Jim. *California in Depth: a stereoscopic history*. San Francisco: Chronicle Books, 1994. 112 pp. + separate viewer.

Here's a state history source that isn't just interesting; it's *fun*. *California in Depth* features a fine collection of old "stereoviews" — paired photographs which look three-dimensional when seen through a special optical device. A simple "3-D viewer" of this sort comes with the book.

The stereoviews depict natural wonders and bustling industry, newsworthy events and everyday life. For instance, there are pictures of a hydraulic mining operation, a railroad sleeping car, an Indian war battlefield, a sewing bee, and John Muir with Teddy Roosevelt in Yosemite. Southern California is scarcely represented, though. Photo captions and some general text explain what's being seen.

As images of the past take on depth, they seem to become more real. The overall effect is rather like "a magic carpet ride through nineteenth-century California," to use the author's words.

Cronise, Titus Fey. *The Natural Wealth of California*. San Francisco: H. H. Bancroft & Company, 1868. 696 pp.

This "comprehensive and elaborate treatise" is a wonderful source of information about California two-thirds of the way through the nineteenth century. Browsing its pages, one has the feeling of eavesdropping on another time.

The book's best feature may be its thorough coverage of the state's then-fifty counties; their topography, natural resources, communities, industrial activity, and agricultural products are all noted in detail. Also, separate chapters offer an

1860s-era understanding of California's geography, geology, flora, fauna, and climate.

Readers will encounter many fascinating statements and statistics. A few examples: When this volume was written, more people lived in Angels Camp than in San Diego. Oakland's namesake trees made the town look "as if built in a huge orchard." The southern part of the Central Valley held a lake some thirty miles long by twenty wide, bordered by tule lands that periodically became "immense lagoons." And, though grizzly bears had grown scarce, they could still be seen in "menageries."

Long out of print, *Natural Wealth* might take some work to find.

Dana, Richard Henry. *Two Years Before the Mast: a personal narrative of life at sea.* New York: Harper & Brothers, 1840. 483 pp.

A young Yankee seaman in the hide trade, Dana sailed along California's coast in the mid-1830s, stopping at various points between San Diego and San Francisco Bay. Woven into this story of his voyage is a clear picture of California before American rule—its culture Hispanic, its economy cattle-based, and its scenery unspoiled.

Certain passages may be of special interest to state park interpreters. One, for instance, recalls the misery of a stormy night spent at Angel Island; others describe the picturesque charm of Monterey.

An 1869 edition added material about a second visit to California by the author. Many reprintings have been issued since.

Dillon, Richard. *Humbugs and Heroes: a gallery of California pioneers.* Garden City, New York: Doubleday & Company, Inc., 1970. 362 pp. + 24 pp. of illustrations.

If the greater part of history is biography, as some contend, then *Humbugs and Heroes* should prove a useful source for interpreters of California's past.

Here, written in an entertaining style, are biographical sketches of more than sixty individuals who left their mark on the state. Mary Austin, John Bidwell, Ishi, Hiram Johnson, Jack London, John Muir, Leland Stanford, and Mariano Vallejo are among the people featured.

Farquhar, Francis P., ed. *Up and Down California in 1860-1864: the journal of William H. Brewer....* New Haven [Connecticut]: Yale University Press, 1930. 601 pp.

As leader of the California Geological Survey's field parties, William Brewer came to know the state as no one before him ever had, traveling thousands of miles by foot, mule, and stage. His keen observations of the natural and cultural scene were recorded in a series of letters which Francis Farquhar assembled and edited, many years later, to form this book.

Here is a "time-capsule" portrait of California shortly after the gold rush, from grand mountaintop panoramas to grim views of flood and drought. So many spots were visited and described by Brewer that at least some should be of interest to each reader.

University of California Press has issued more recent printings of this important work.

Hart, James D. *A Companion to California*. New edition, revised and expanded. Berkeley and Los Angeles: University of California Press, 1987. 592 pp.

This encyclopedic source indeed makes a handy "companion" for those in need of California-related information. Its 3,000 cross-referenced entries deal with topics ranging from abalone to Zorro and from petroglyphs to the Peripheral Canal. Many of these brief accounts identify historically-significant people, places, or events. The book closes with a year-by-year chronology of California history, spanning the period 1510-1986.

Holliday, J. S. *Rush for Riches: gold fever and the making of California*. Oakland Museum of California/Berkeley and Los Angeles: University of California Press, 1999. 355 pp.

"Gold rush wealth gave California an adolescence unique among all states and nations," observes the author in his epilogue. *Rush for Riches* artfully elaborates on this theme with fine interpretive text and an array of eye-catching illustrations.

This volume chronicles California's rapid transition from an undeveloped province to a hub of economic growth—a process due, in large measure, to the discovery of gold in 1848. Among other things, the book examines the social tumult, ambitious enterprises, and environmental havoc that accompanied or followed the gold rush. The evolution of mining "from a treasure hunt to an industry" is traced in particular detail.

Hoover, Mildred Brooke, Hero Eugene Rensch, Ethel Grace Rensch, and William N. Abeloe. *Historic Spots in California*. Fourth edition. Revised by Douglas E. Kyle. Stanford, California: Stanford University Press, 1990. 617 pp.

This guide to California's historically-significant sites is in a class by itself. Here's an authoritative, comprehensive, and long-familiar reference work, thoroughly revised and updated in its fourth edition.

The book's main contents are organized first by county, then by locality. For example, the "Los Angeles County" section contains a segment titled "Hollywood and Motion Pictures" which in turn has a paragraph on nearby Will Rogers State Historic Park. A "historical introduction" briefly reviews the state's history as a whole, and a fine bibliography—much of it county-specific—is provided also. Black-and-white photos illustrate selected sites.

Hutchings, J. M. *Scenes of Wonder and Curiosity in California*. Revised edition. New York and San Francisco: A. Roman and Company, Publishers, 1870. 292 pp.

With its quaint prose and charming engravings, this old guidebook nicely captures the spirit of tourism in the early years of the state.

More than one-third of the volume is devoted to the "Yosemite Valley." The "mammoth trees of Calaveras," the "California Geysers," the "Farallone Islands," Mount Shasta, and Lake Tahoe also merit separate chapters. Various other places of interest are described as well.

Hutchings' book was first published in 1860; the edition cited here was the last to be substantially revised. A related—and more easily obtainable—source is *Scenes of Wonder and Curiosity* from *Hutchings' California Magazine*, 1856-1861, edited by R. R. Olmsted and published by Howell-North Books in 1962. This latter work omits nearly all of the guide's Yosemite material but adds many other period articles and illustrations.

Manly, William Lewis. *Death Valley in '49*. San Jose, California: The Pacific Tree and Vine Company, 1894. 498 pp.

Deserts and mountains proved a formidable barrier to Easterners journeying overland to California in the early days. This classic work dramatically documents the hardships of a group of emigrants who attempted a shortcut through the "wild, dreary sunken desolation" of Death Valley. William Manly figured prominently in the historic episode he tells of here.

Despite its title, only a few chapters of the book actually focus on Death Valley. However, the author also writes interestingly about his subsequent wanderings through California, which took him from Los Angeles—“a thinly populated place”—to Sierran mining camps.

Reprintings have kept this source available.

McWilliams, Carey. *California: The Great Exception*. New York: Current Books, Inc., A. A. Wyn, Publisher, 1949. 377 pp.

“California is...an anomaly, a freak, the great exception among the American states,” author McWilliams asserts. He develops this theme by considering the social sources of California’s distinctiveness—its cosmopolitan population; its tradition of land monopoly; its peculiar political history; its highly-specialized agriculture; its chronic water problems; its leadership in technology; and, above all, its “chain-reaction, explosive, self-generating pattern of development” that started with the gold rush.

Although the book’s approach is basically historical, many of its statements now betray their own half-century of age. Still, this classic work functions surprisingly well as the author intended it—as an aid in understanding the Golden State.

Rawls, James J., and Walton Bean. *California: An Interpretive History*. Sixth edition. New York: McGraw-Hill, Inc., 1993. 538 pp.

First published in 1968, *California: An Interpretive History* has become a standard reference. This sixth edition offers, in author Rawls’ words, “a comprehensive survey of the state’s cultural and social affairs, as well as its political and economic history.”

Users will find the text well-organized and interesting to read. Illustrations include black-and-white photos, maps, cartoons, and other graphics.

Robinson, W. W. *Panorama: A Picture History of Southern California*. Los Angeles: Title Insurance and Trust Company, 1953.

An annotated album of historical photographs and artwork, *Panorama* affords glimpses of a Southern California which no longer exists...and which in some cases is hard to even imagine.

Illustrations of places and people cover a time span ranging from the era of European exploration to the middle of the twentieth century. Of special interest

are comparative pictures of Los Angeles, Santa Barbara, and other Southland locales, taken from the same vantage points but several decades apart.

This book was issued to celebrate the anniversary of a firm; it hasn't been kept in print.

Smith, Michael L. *Pacific Visions: California scientists and the environment, 1850-1915*. New Haven, Connecticut: Yale University Press, 1987. 243 pp.

This source sheds light on an aspect of California history that's often overlooked: the development of a scientific community in the young state. As the author explains, the early scientists, surveyors, and naturalists did more than just "read the message of the terrain;" they also became a social force, nurturing public support for science and advocating environmental reform.

Pacific Visions provides some good background information about such individuals as Josiah Whitney, George Davidson, John Muir, Clarence King, and Alice Eastwood...and about such institutions as the California Academy of Sciences, the University of California, and the Sierra Club.

Stewart, George R. *Ordeal by Hunger: the story of the Donner Party*. New edition. Boston: Houghton Mifflin Company, 1960. 394 pp.

In one sense, the tragedy of the Donner Party stands as a stark example of how human history may be shaped by the natural environment.

Author Stewart here presents a factual yet gripping account of the emigrants' journey west and their ghastly ordeal when snow-bound in the Sierra during the winter of 1846-47. This second edition supplements the original 1936 text with survivors' diaries and other pertinent information.

Taylor, Bayard. *Eldorado, or, Adventures in the Path of Empire*. In two volumes. New York: George P. Putnam/London: Richard Bentley, 1850. 251+ 247 pp.; 4+4 colored plates.

Eldorado is "probably the outstanding book on the early gold rush," according to *The Zamorano Eighty*, a listing of selected California works.

Bayard Taylor's vivid firsthand descriptions of Monterey, San Francisco, Sacramento, "the Diggings," and the country in between now form an important historical record. At the same time, his narrative of life among "so many curious

and shifting phases of society” makes for entertaining reading. Accompanying illustrations—most of them by the author—are very nicely done as well.

Reprinted editions of this classic can be found, either as a single volume or as a pair.

Twain, Mark (Samuel L. Clemens). *Roughing It*. Hartford, Connecticut: American Publishing Company, 1872. 591 pp.

This is a boisterous, entertaining narrative of Mark Twain’s Western experiences in the days of the Comstock Lode. Written with a mix of humor, hyperbole, and sarcasm—the author’s trademark style—it includes memorable descriptions of Lake Tahoe, Mono Lake, and an earthquake in San Francisco.

Time-Life Books published an attractive facsimile reprint of this classic work in 1982.

Vincent, Stephen, ed. *O California!: nineteenth and early twentieth century California landscapes and observations*. San Francisco: Bedford Arts, Publishers, 1990. xxviii + 272 pp.

Words and images combine to evoke times past and places lost in this remarkable book.

The words are drawn from the writings of Richard Henry Dana, Jr., John Muir, Robert Louis Stevenson, Mary Austin, Jack London, Robinson Jeffers, and John Steinbeck, among others. Well-chosen passages vividly describe the grandeur and the particulars of the early California scene.

Interspersed among the text selections are images of historic landscape art, beautifully reproduced in color. These works, by such painters as Albert Bierstadt, William Keith, and Thomas Hill, capture a natural glory that today’s Californians are apt to view with awe, envy, or sadness.

The volume’s contents are organized geographically. Some prefatory comments by historian Kevin Starr eloquently weave the various parts into a whole.

Watkins, T. H. *California: An Illustrated History*. Updated edition. New York: American Legacy Press, 1983. 543 pp.

Here’s an attractive—though now somewhat dated—presentation of California history.

Watkins' text is highly interpretive, blending information, theme, and style. Main chapters cover standard subjects such as early Spanish rule and the Progressive era. Alternating with the chapters are essays that showcase more specific topics—life in the mining camps, San Francisco's 1915 exposition, and our "parkland heritage" among them.

More than 500 historical and modern illustrations grace the book, nearly half of which are in color.

— — — — —. *California Historical Landmarks*. Twelfth edition. Sacramento: Office of Historic Preservation, California State Parks, 1996. 346 pp.

Scattered around the state, more than a thousand official landmarks designate locations, preserve features, or commemorate events pertaining to California's past. Missions, forts, gold rush towns, and famous homes are well represented, as one might expect; but many other kinds of sites are remembered, too—ski areas, oil wells, World War II detention camps, a movie studio, a petrified forest, and the world's first broadcasting station, for example.

This handy guidebook lists each landmark and gives a brief description of its significance. Entries are grouped according to county and are indexed by both their names and numbers. (Number 1, incidentally, happens to be the old Custom House in Monterey.) Also included are county maps, which will prove convenient for travelers.

**PARKS,
CONSERVATION,
and INTERPRETATION**

PARKS and PARK-RELATED PHILOSOPHY

Because this document is primarily intended for use by park interpreters and naturalists, it seems appropriate to devote a section of it to the general subject of parks.

The sources listed below provide good background material about our state and national parks. Along with park system guidebooks, there are agency histories, park-related writings of lasting significance, and examinations of the philosophy underpinning parks. However, sources that focus on any *particular* park are cited elsewhere—under “California Regional and Local References.”

Some of these works inform, some inspire, and some invite contemplation. All should help park personnel to view things in a broader context.

“Park and recreation resources are more, much more, than places to have a little fun or learn the names of butterflies and dead generals.”

—William E. Brown

“There is nothing so American as our parks. The scenery and wildlife are native. The fundamental idea behind the parks is native. It is, in brief, that the country belongs to the people....Parks stand as the outward symbol of this great human principle.”

—Franklin Delano Roosevelt

“When I started rangering I used to think I was there to do something, to save something. I do little things; I save some things; but I am beginning to think I am there to witness: the light, the green, the sound of water, rocks falling off a mountain, the glint of animal eyes in the brush along the roads at night, the good and bad things that happen on the edge between people and open country.”

—Jordan Fisher-Smith

“The heart of our movement [the park movement] is a thing of the spirit, although the material we deal with is land. It is a high calling that has as its purpose to assure the people of the future that they will have the great experiences in the out-of-doors that we have had.”

—Newton B. Drury

“Nature is said to be an open book for those who really wish to read, but there are grades and shades of meaning that may be hard to understand. There is certainly no place where the leaves are spread more widely, or the print more clear, than in these portions of the book.”

—John C. Merriam (referring to national parks)

Albright, Horace M., as told to Robert Cahn. *The Birth of the National Park Service: the founding years, 1913-33*. Salt Lake City, Utah: Howe Brothers, 1985. 340 pp.

It's been claimed that two individuals—Stephen Mather and Horace Albright—actually created the National Park Service, giving the organization its structure, its creed, its direction, and its mystique. Here is the story of that fateful collaboration, told by one of the principal figures.

Albright's narrative not only offers valuable insight into the politics and personalities involved with the Park Service's early development; his richly anecdotal account also makes enjoyable reading.

Book Division, National Geographic Society. *National Geographic's Guide to the National Parks of the United States*. Revised edition. [Washington, D.C.:] National Geographic Society, 1997. 448 pp.

This handy, general-purpose guidebook features 54 "scenic" national parks—many of them Western units set aside for their natural endowments.

Tourist information about what to do, when to go, and where to stay is combined with park maps and an array of beautiful color photos. Explanations of park scenery are quite limited, however.

Brown, William E. *Islands of Hope: parks and recreation in environmental crisis*. Arlington, Virginia: National Recreation and Park Association, 1971. 194 pp.

Published in the early 1970s, *Islands of Hope* reflects the idealism and energy of the environmental movement in its prime.

The book encourages park and recreation professionals to become activists, and to regard their resources as catalysts for reform. It advocates managing parklands as "models...where quality life in both the ecological and social senses can be experienced." And it explains how interpretation should be redirected to promote an "environmental ethic"—one that's intended to be carried beyond the parks.

The author outlines general principles and cites specific examples to make his case. Natural, historical, and recreational situations are considered.

Des Jardins, Joseph R. *Environmental Ethics: an introduction to environmental philosophy*. Second edition. Belmont, California: Wadsworth Publishing Company, 1997. 260 pp.

Our natural parks exist and function as they do because of a value system that few park employees or visitors fully understand. This source acquaints readers with philosophical concepts that underlie a broad range of environmental concerns—including park-related ones. Positions ranging from Aristotle’s “natural law” to Aldo Leopold’s “land ethic” to modern “deep ecology” are critically reviewed.

The author considers such questions as these: Is everything that’s “natural” also good? Do moral obligations extend to natural objects or future generations? Why should we value the integrity and stability of ecosystems? To what extent should public agencies base their environmental policies on economics? Can aesthetic appreciation be taught?

The incisive text affords some worthwhile exercise in thinking.

Editors of Olympus Press. *California State Parks Guide*. Revised edition. Santa Barbara, California: Olympus Press, 1987. 231 pp.

Here’s a valuable source of information about the natural, historical, and recreational attributes of California’s 250-plus State Park System units. The editors have gathered, in one book, a wealth of well-researched material from existing site-specific park brochures. Numerous maps and other black-and-white illustrations are included.

Note: Statements pertaining to reservations and fees are out of date, and should be disregarded.

Engbeck, Joseph H., Jr., and Philip Hyde. *State Parks of California from 1864 to the present*. Portland, Oregon: Charles H. Belding, 1980. 129 pp.

This source, according to author Engbeck, is “an illustrated and readable interpretive history of the California State Park System and the movement that created it.” Emphasis is placed on “the ideas behind the movement” and on the groups and individuals who converted those ideas into “the practical (and still evolving) reality that we know today.” Fine color images by photographer Hyde remind readers of the heritage preserved in parks.

State Parks of California was published following the park system's fiftieth anniversary celebration, an event of the late 1970s. More recent developments—some of them quite significant—aren't reported in the book. Even so, with its authoritative text and its many archival pictures, this work remains the most useful general state park history reference.

Evison, Herbert, ed. *A State Park Anthology*. Washington, D.C.: National Conference on State Parks, 1930. 200 pp.

This rather obscure volume sheds light on a time in America when the "State Park movement" was a work-in-progress. The anthology's selections are drawn from park conference speeches, park commission reports, and other sources dating mostly from the 1920s.

These articles address a variety of park-related matters, from site selection and planning to development, administration, and use. Two pieces, "The Study of Nature in the Out-of-Doors" and "Trailside Conversations," afford a fascinating look at early park interpretation. Another, "How to Enjoy State Parks," is simply a delight.

Heacox, Kim. *California State Parks*. California Geographic Series: No. 2. Helena and Billings, Montana: Falcon Press Publishing Co., Inc., 1987. 127 pp.

Written in an engaging journalistic style and illustrated with many fine color photographs, this source offers an excellent introduction to its subject.

The author approaches California's State Park System in a thematic way, devoting separate sections to gold rush sites, redwood parks, coastal units, famous homes, "ecological islands," and other parkland categories. Selected park units are showcased in most of these sections. A directory at the back of the book gives thumbnail descriptions and tabulated information for a much larger number of sites.

Helmich, Mary A., compiler. *Park-to-Park Index*. Sacramento: California State Parks, 2000. 310 pp.

Which state park unit boasts the most expansive view in the United States? Which one protects the world's tallest tree? Which units contain vernal pools, or have poaching problems, or offer a Junior Naturalist program? The answers to these and countless other questions can be found in this comprehensive, cross-referenced inventory of California's State Park System.

The loose-leaf *Park-to-Park Index* gathers, in one place, a great store of information about natural, cultural, and recreational park resources—and about interpretive facilities and activities as well. Field staff can use this document not only to answer public inquiries, but also to identify other state park units having similar features, programs, or themes.

An indispensable reference for state park personnel.

Houk, Walter, Sue Irwin, and Richard A. Lovett. *A Visitor's Guide to California State Parks*. Sacramento: State of California, Department of Parks & Recreation, 1990. 120 pp.

This guidebook provides an excellent, enticing overview of the California State Park System.

Parklands are grouped geographically and treated individually, with a paragraph or two of helpful information given about each. A separate table shows which types of recreational opportunities and interpretive services are available at the different sites. Also included are sidebars that draw the reader's attention to redwoods, the gold rush, sea mammals, Native Californians, and other park-related subjects.

Visually, the book is very pleasing, with high-quality color photographs of park features on almost every page.

Kellert, Stephen R. *The Value of Life: biological diversity and human society*. Washington, D.C.: Island Press, 1996. 263 pp.

The value of biological diversity is typically expressed in ecological terms, or sometimes in economic ones. This book takes a different approach, investigating the role that biodiversity may play in the physical, intellectual, emotional, and even spiritual well-being of people.

One chapter identifies the various basic "values" of nature to humans, from utilitarian to aesthetic to symbolic. Another analyzes how these values vary within American society according to age, gender, education, occupation, and ethnicity. Still others examine the effects of different species on the psyche and the challenge of conserving biodiversity.

Based on extensive social/psychological research, this work offers interpreters some insights into their own attitudes as well as those of their audiences.

[Merriam, John Campbell.] *Published Papers and Addresses of John Campbell Merriam*. Publication No. 500. Washington, D.C.: Carnegie Institution of Washington, 1938. Volume IV: pp. 1945-2672.

A distinguished scientist and educator, John C. Merriam actively promoted the “inspiring, informing, and rejuvenating influences” of natural parklands during the 1920s and 1930s.

Many of the essays and addresses printed here exemplify the kind of high-minded thinking that helped shape the state park movement in California and early interpretive efforts in the national parks. Merriam’s titles include “Parks as an Opportunity and Responsibility of the States,” “Preservation of the Sequoia Forests,” “The Meaning of the National Parks,” “Influence of Science upon Appreciation of Nature,” and “Educational Values of Recreation.” Such pieces still make worthwhile reading—both for their historical interest and for the philosophical grounding they provide.

Nash, Roderick. *Wilderness and the American Mind*. Third edition. New Haven, Connecticut: Yale University Press, 1982. 425 pp.

When put in a historical context, our present-day appreciation of wild country is really quite remarkable. In the course of a few centuries, the “hideous and desolate” wilderness encountered by the Pilgrims has become a valuable commodity that requires careful management to prevent its being “loved to death.”

An important study in its field, this work traces the development of American attitudes about wild lands. Author/historian Nash examines key ideas and individuals against a background of natural places and sociopolitical events. Separate chapters focus on three influential writers: Henry David Thoreau, John Muir, and Aldo Leopold.

The text, though rather scholarly, can be read with interest.

Oelschlaeger, Max. *The Idea of Wilderness: from prehistory to the age of ecology*. New Haven, Connecticut: Yale University Press, 1991. 477 pp.

Drawing from philosophy, ecology, and other disciplines, this “intellectual history” explores wild nature as an evolving concept. Oelschlaeger’s book reviews ideas that form the roots of modern environmentalism...and writings that form the poetic soul of it.

To some extent, the subject matter overlaps with that of Nash's *Wilderness and the American Mind* (cited above). However, this source pays more attention to Old World mythology and traditions, and less to the impact of conceptions on actual places and events.

Interpreters of wild lands should become familiar with at least some of the seminal thoughts and thinkers referred to here.

Olmsted, Frederick Law. *Report of State Park Survey of California*. Sacramento: California State Printing Office, 1929. 72 pp.

In 1928 the newly-established California State Park Commission authorized Frederick Law Olmsted to determine what lands would be "suitable and desirable for...a comprehensive, well-balanced state park system." This report not only recommended about 125 sites for inclusion, but also outlined the principles that should govern parkland acquisition and development.

If the State Park System can be said to have a "blueprint," this is it. Readers will be impressed to see how much of Olmsted's visionary plan has been fulfilled.

Ostertag, Rhonda, and George Ostertag. *California State Parks: a complete recreation guide*. Seattle, Washington: The Mountaineers, 1995. 384 pp.

As its subtitle indicates, this California State Park System guidebook concentrates on what visitors can see and do. The coverage is quite comprehensive...and relatively current, except for some "park user information" in the introductory section.

The book's 185 entries treat park units either individually or in small related groups. These entries describe activities suitable for each site; skiing, fishing, climbing, boating, gold panning, tidepooling, and spelunking show up among the listings. Special attention is given to exploring park trails.

Black-and-white photos and maps augment the text.

Runte, Alfred. *National Parks: The American Experience*. Second edition. Lincoln, Nebraska: University of Nebraska Press, 1987. 335 pp.

This volume presents a comprehensive history of "the national park idea" — that is, America's perception of the purpose and functions of its national parks. Specific parklands, people, and events are noted mainly in connection with that idea.

Author Runte contends that “the search for a distinct national identity...was the initial impetus behind scenic preservation,” and that “economic motivations have far outweighed long-range ecological considerations” in establishing and protecting the parks. His book examines such topics as the struggle between park preservation and use, the evolution of “biological management,” and the adding of “nontraditional” units to the park system.

Captioned black-and-white photos reinforce the message of the text.

Sax, Joseph L. *Mountains without Handrails: reflections on the national parks*. Ann Arbor, Michigan: University of Michigan Press, 1980. 152 pp.

This source ponders a fundamental question: “For whom and for what are the [national] parks most important?” Specifically, it considers a certain type of park use — “reflective recreation” — promoted by a certain group of park users—the “preservationists.”

“Reflective” recreation puts a premium on aesthetic and contemplative pursuits. Just as preservationists are “moralists at heart,” according to author Sax, reflective recreation is ideological at its core. Its proponents take a negative view of high-impact tourism, favoring “intensiveness of experience” instead. They contend that the most appropriate use of highly scenic areas is “not to serve popular taste but to elevate it.”

Historically, this minority viewpoint has played a major role in the establishment, management, and interpretation of natural parklands. Today’s recreational demands and commercial interests challenge its authority, however.

Park professionals should find Sax’s book both thought-provoking and enlightening.

Tilden, Freeman. *The National Parks*. Revised and enlarged edition. New York: Alfred A. Knopf, Inc., 1976. 608 pp.

Since it first appeared in 1951, *The National Parks* has occupied a place of distinction among the guidebooks in its field.

This work can be called “interpretive” in the finest sense. Tilden’s ideas aren’t just informed, but wise; his writing isn’t just eloquent, but inspirational. At the same time, his presentation is consistently entertaining and enthusiastic.

Most of the book consists of an “audit of the treasure” — a site-by-site consideration of natural, recreational, and historic National Park System units. Separate chapters discuss the meaning of national parks, the value of interpretation, and the appreciation of beauty. Well over 200 black-and-white photographs are interspersed.

Tilden, Freeman. *The State Parks: their meaning in American life.* [Revised edition.] New York: Alfred A. Knopf, Inc., 1970. 509 pp. + 80 plates.

This volume serves as a companion to *The National Parks* (cited directly above). Although only a small percentage of the state parks described are Californian, the author’s erudite, engaging accounts make the entire book worth examining.

Our state’s entries include Anza-Borrego Desert State Park, Columbia State Historic Park, Hearst San Simeon State Historical Monument, Humboldt Redwoods State Park, and Point Lobos State Reserve. It’s interesting to see how Tilden, a master interpreter, approaches each. In one passage, a redwood forest becomes a means of bolstering “our faith in the continuity of existence;” in another, a Hearst Castle floor tile is used to connect human aspirations across the ages.

An introductory section gives some background on the “state park movement” and acquaints the reader with state park purposes, policies, and problems. Black-and-white photographs depict a diversity of sites.

Aside from some updated appendix material, this edition differs little from the 1962 original.

— — — — —. *Our National Parks: America’s spectacular wilderness heritage.* Pleasantville, New York: The Reader’s Digest Association, Inc., 1985. 352 pp.

From a natural history standpoint, this survey of the national parks is particularly good. The text interprets park geology, climate, flora, fauna, and ecological relationships in an interesting and non-technical manner. Color photographs, maps, and other illustrations add to the value of the work.

Of the nearly fifty national parks discussed, six are Californian: Channel Islands, Lassen Volcanic, Redwood, Sequoia-Kings Canyon, and Yosemite. Absent are Death Valley and Joshua Tree, which weren’t designated “parks” at the time of publication.

CONSERVATION, RESOURCE MANAGEMENT, and OTHER ENVIRONMENTAL ISSUES

Collectively, the sources listed in this section explore a wide range of environmental issues. Individually, most of the works have a particular thematic or geographic focus.

Of the various writings, some are classics now, by virtue of their impact on the environmental movement. Some are histories of land management...or mismanagement. Some are inventories, evaluations, or warnings, noting threats to biodiversity and the quality of human life. Some are action plans, intended to help solve existing problems. One is a "who's who" of influential environmentalists.

Several of the selections pertain specifically to California. In one way or another, all of the selections relate to parks.

“The conservation of our natural resources and their proper use constitute the fundamental problem which underlies almost every other problem of our national life.”

—Theodore Roosevelt

“We are involved now in a profound failure of imagination. Most of us cannot imagine the wheat beyond the bread, or the farmer beyond the wheat, or the farm beyond the farmer, or the history beyond the farm. Most people cannot imagine the forest and the forest economy that produced their houses and furniture and paper; or the landscapes, the streams, and the weather that fill their pitchers and bathtubs and swimming pools with water. Most people appear to assume that when they have paid their money for these things they have entirely met their obligations.”

—Wendell Berry

*“If, as some believe, the evolution of humankind is the means by which the earth has become conscious of itself, then it may follow that the conservationist awakening is the late-flowering **conscience** of that world mind.”*

—Edward Abbey

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”

—Aldo Leopold

“We have relatively short lives, and yet by preserving the world in a condition that is worthy of us, we win a kind of immortality.”

—Peter Raven

“What is the use of a house if you haven’t got a tolerable planet to put it on?”

—Henry David Thoreau

Agee, James K., and Darryll R. Johnson, eds. *Ecosystem Management for Parks and Wilderness*. Seattle: University of Washington Press, 1988. 237 pp.

This source reviews current problems and considers future opportunities in ecosystem management. It explains why “a new vision” is needed to properly manage park and wilderness areas—a vision that emphasizes cooperation among land-managing agencies and other sectors of society. Some specific management strategies are examined.

Chapters focus on vegetation, wildlife, natural processes, human ecology, economic considerations, and legal issues. The discussions refer to California only infrequently, but the information and ideas presented here include much that’s applicable to our state.

Airola, Daniel A. *Guide to the California Wildlife Habitat Relationships System*. Prepared for the State of California Resources Agency, Department of Fish and Game, Mar. 1988. 74 pp.

This booklet introduces and explains the “California Wildlife Habitat Relationships System,” a modern information system that describes the distribution, life history, habitat requirements, and legal status of California’s wildlife species. The “WHR” system has great potential as a tool for resource managers, planners, and other park professionals.

There are several components to this system, ranging from a list of the state’s 880 terrestrial vertebrates (fish are excluded) to a computerized species-habitat database that can be used to develop predictive models. Two other components deserve special mention as reference works—*California’s Wildlife* by Zeiner et al. (cited in the “General Zoology” section) and *A Guide to Wildlife Habitats of California* by Mayer and Laudenslayer (cited under “Ecology and Miscellaneous Natural History”).

Axelrod, Alan, and Charles Phillips. *The Environmentalists: a biographical dictionary from the 17th century to the present*. New York: Facts on File, Inc., 1993. 258 pp.

This useful reference contains more than 600 profiles of “individuals and organizations, present and past, who influence or have influenced the environmental movement.” Some of these notables are associated with state or national parks as well.

Listings include such names as Ralph Waldo Emerson, Rachel Carson, William Penn Mott, Jr., the Civilian Conservation Corps, and Earth First!.

Biswell, Harold H. *Prescribed Burning in California Wildlands Vegetation Management*. Berkeley and Los Angeles: University of California Press, 1989. 256 pp.

During the last half-century, much has been learned about the important role fire plays in many ecosystems. Consequently, controlled or “prescribed” burning has been adopted as a management tool to offset the ill effects of long-term fire suppression on public lands. Author Biswell, an eminent fire scientist, helped initiate such a burning program in California’s state parks.

Clearly written and California-oriented, this book explains the behavior, history, and ecology of fires, as well as “the why, where, when, and how of prescribed burning.” Black-and-white photos and other graphics are included.

Botkin, Daniel B. *Discordant Harmonies: a new ecology for the twenty-first century*. New York: Oxford University Press, 1990. 241 pp.

It’s this book’s premise that misguided beliefs, more than lack of knowledge, have hampered efforts to solve environmental problems. These beliefs are based on cherished but flawed assumptions about the order, constancy, and balance of nature. In reality, argues author Botkin, we deal with “a landscape that is always in flux, changing over many scales of time and space.” Numerous case studies—two of which involve California’s sea otters and giant sequoias—are used to portray a complex and dynamic biosphere.

Discordant Harmonies may force readers to reevaluate their ideas about nature and the role of people in it. Botkin concludes that we will have to choose the kind of naturalness we want...and use modern technology to achieve or maintain it. “Nature in the twenty-first century,” he predicts, “will be a nature that we make.”

Resource managers in particular will find this a provocative work.

Botkin, Daniel B., and Edward A. Keller. *Environmental Science: Earth as a living planet*. New York: John Wiley & Sons, Inc., 1995. 680 pp.

This textbook provides an excellent introduction to modern environmental study. Its scope is global and its approach is interdisciplinary, bringing both natural and social sciences to bear upon a broad range of practical concerns.

The text covers general ecological principles; the conservation and management of living resources; air, water, energy, and human population issues; and relationships between society and the environment. Case studies and critical thinking exercises are included. In addition, the book is richly illustrated with color photos, diagrams, and charts.

Brower, David R. *For Earth's Sake: the life and times of David Brower*. Salt Lake City: Peregrine Smith Books, Gibbs Smith, Publisher, 1990. 556 pp.

Controversial and charismatic, David Brower was one of America's leading conservationists for decades—and was an eloquent, entertaining writer besides. This unusual autobiography collects many of his earlier writings and threads them together with new narrative. Interpreters will appreciate not just Brower's ability to turn a phrase, but also his unique view of key issues and individuals within the environmental movement.

Brower, David R. *Work in Progress*. Salt Lake City: Peregrine Smith Books, Gibbs Smith, Publisher, 1991. 348 pp.

This is a second autobiographical volume by Brower, similar in format to the first (*For Earth's Sake*, cited directly above), but with an eye to the future of environmentalism as well as the past.

Carson, Rachel. *Silent Spring*. Drawings by Lois and Louis Darling. Boston: Houghton Mifflin Company/Cambridge, Massachusetts: The Riverside Press, 1962. 368 pp.

"Over increasingly large areas of the United States, spring now comes unheralded by the return of the birds, and the early mornings are strangely silent...."

Here, with reasoned arguments and graceful prose, Rachel Carson builds a compelling case against the indiscriminate use of toxic chemicals—a growing problem following the Second World War. She clearly shows how pesticide contamination results in "chains of poisonings" that adversely affect soil, water, wildlife, and humans. Of course, some of the material presented seems quite dated today.

Called "one of the landmark books of the twentieth century," *Silent Spring* generated a public outcry that led to corrective legislation...and helped launch the environmental movement.

Dasmann, Raymond F. *The Destruction of California*. New York: The Macmillan Company, 1965. 247 pp.

Few books so clearly explain the impact of human history on California's natural setting as this one does. Likewise, few books so eloquently eulogize what has been lost—old-growth forests, native grasslands, wildlife, pure air, open space...and something of the human spirit.

Author Dasmann considers the state's relentless population growth to be "the most compelling reality of life," but notes in closing that "the very population pressure that threatens to destroy California has set in motion counterforces of conservation that can save it."

Dick, Dave, ed. "Special Mountain Lion Issue." *Outdoor California*, Vol. 57 (see note), No. 3. 33 pp.

In recent years, encounters between mountain lions and humans have caused growing concern among visitors to California's wildland parks. This special issue of *Outdoor California*, published by the state's Department of Fish and Game in 1995, provides background information that interpreters can use when they discuss the matter.

Articles in the magazine brief readers about mountain lion natural history, attacks on people in the state, animal control measures, and ways to avoid becoming a victim.

Note: Although labeled "Volume 57," this issue is actually part of Volume 56.

Faber, Phyllis M., ed. *Fremontia*, Vol. 12, No. 4 (Jan. 1985). 32 pp.

Invasive plants pose a serious problem in many of our parks. Whether they're attractive or simply "weedy," these aggressors displace native species and disrupt natural ecosystems.

This issue of the California Native Plant Society's quarterly journal, *Fremontia*, is devoted to weeds and their control. Of particular interest is a section giving status reports on several notorious invasive plant types—gorse, broom, pampas grass, eucalyptus, European beachgrass, artichoke thistle, and tamarisk.

Fulton, William. *California: Land and Legacy.* Englewood, Colorado: Westcliffe Publishers, Inc., 1998. 180 pp.

Those who browse this volume are sure to be impressed by its exquisite color photographs of the state's natural beauty. But those who read its text will piece together a striking picture of another kind—that of the relationship, past and present, between Californians and the land. Documentary black-and-white photos help explore this theme.

Several of the book's chapters review the historic use of important natural resources, such as gold, water, timber, soil, and the sea. Other chapters focus on various regions, noting current environmental issues that they face.

This source gives not an in-depth treatment but rather an interpretive overview of its subject, enhanced by some interesting details.

Gonick, Larry, and Alice Outwater. *The Cartoon Guide to the Environment.* New York: HarperCollins Publishers, Inc., 1996. 230 pp.

Here's an unusual introduction to environmental science, consisting of humorous cartoons accompanied by morsels of serious text. The result is a source that's educational as well as highly entertaining.

This guide conveys basic information—concepts, terms, and facts—about topics ranging from biotic communities and food webs to waste disposal and global warming.

Gore, Al. *Earth in the Balance: ecology and the human spirit.* Boston: Houghton Mifflin Company, 1992. 408 pp.

In this book, a national political figure draws attention to the worsening global environmental crisis. "Unless we find a way to dramatically change our civilization and our way of thinking about the relationship between humankind and the earth," warns author Gore, "our children will inherit a wasteland."

Gore doesn't just review a number of widespread and urgent environmental threats; he also offers specific, "undoubtedly controversial" proposals for dealing with them. His writing is scientifically informed yet personal and passionate, enriched by references to history, philosophy, and economics.

Interpreters will appreciate the creative analogies found scattered through the text. For example, historical events are likened to cosmic black holes, information

to surplus grain, and patterns of environmental degradation to a computer-generated image of a face.

Hardin, Garrett. "The Tragedy of the Commons." *Science*, Vol. 162, No. 3859 (13 Dec. 1968): pp. 1243-1248.

This essay received wide circulation in the early years of the environmental movement. Its name crops up in discussions even now.

The term "commons" here refers to any freely-shared resource. The problem with a commons, author Hardin asserts, is that individuals can gain more *personally* than they lose *communally* by exploiting it. Use of a public resource must therefore be regulated to prevent its ruin; otherwise, the selfishness of some will ultimately bring tragedy to all.

Hardin's main concern is the human population issue, which involves a kind of reproductive commons. However, he also touches on other thought-provoking topics—how "the greatest good for the greatest number" is a theoretical impossibility, why conscience may be "self-eliminating," and how the commons principle applies to resources ranging from parking spaces to national parks.

Jensen, Deborah B., Margaret S. Torn, and John Harte. *In Our Own Hands: a strategy for conserving California's biological diversity*. Berkeley and Los Angeles: University of California Press, 1993. 302 pp.

In Our Own Hands gives a detailed and reasonably up-to-date assessment of California's problem with declining biological diversity.

First, the book explains what biodiversity is, why it's important, and how it's lost. Next comes a status account of species and ecosystem diversity in California, then a survey of the threats to this natural heritage. Finally, there are policy recommendations that comprise a state-level strategy for biological conservation.

Tables and lists provide handy information about the protection of various habitat types, extinct plants and animals, land-use patterns, and human population trends.

Leopold, Aldo. *A Sand County Almanac, with other essays on conservation from Round River.* Illustrated by Charles W. Schwartz. New York: Oxford University Press, 1966. 269 pp.

This volume combines the text of Leopold's *A Sand County Almanac*, which was originally published in 1949, with several essays from his *Round River*, published in 1953.

Here is a classic, indispensable body of work. Thematically, it's an attempt by the author to integrate three concepts: that land is a "community," that land is to be loved and respected, and that land is capable of yielding a "cultural harvest." The exquisitely crafted essays are more than just a joy to read and quote; some—such as "A Land Ethic" and "Thinking like a Mountain"—are milestones of ecological thought.

Leopold, A. Starker, S. A. Cain, C. M. Cottam, I. N. Gabrielson, and T. L. Kimball. "Wildlife Management in the National Parks." In *Transactions of the Twenty-eighth North American Wildlife and Natural Resources Conference*, edited by James B. Trefethen. Washington, D.C.: Wildlife Management Institute, 1963. pp. 28-44.

Prepared by a team of distinguished scientists but known simply as "the Leopold Report," this landmark document was instrumental in changing the way the National Park Service manages its wild lands.

The report proposes, as a primary goal, that the "ecologic scene" in each park be managed to maintain—or, if necessary, to re-create—"a reasonable illusion of primitive America." Because park ecosystems are complex, dynamic, and in many cases compromised, the authors warn that traditional "passive protection" of these resources may not achieve the "naturalness" desired. Instead, they call for a radical new approach: a policy of *active intervention* to restore habitats, control wildlife populations, and perpetuate natural processes such as fire.

Current management practices in California's state as well as federal parks often can be traced to the farsighted recommendations of the Leopold Report.

Lopez, Barry. "The Passing of the Night." *Audubon*, Vol. 77, No. 4 (July 1975): pp. 18-25.

This article is part elegy, part plea for a little-appreciated natural resource: the night. As urbanization and artificial lighting spread, night's quality declines, in turn diminishing us all. "When the human eye can no longer see Arcturus, we

will not have simply lost a star," the author warns, "we will have lost a perspective."

Lopez contends that the "gifts" of night are as valuable as those of daylight hours. Mysterious and exciting, the night sharpens our senses, challenges our imagination, and invites us to believe that "with a little patience one can, sitting on a dark hill or by a dark shore, become privy to profound secrets."

Lotter, Donald W. *EarthScore: your personal environmental audit and guide*. Lafayette, California: Morning Sun Press, 1993. 105 pp. + fold-out "EarthScore" chart.

This distinctive source provides a way for people to gauge the magnitude of their impact on the environment. The reader evaluates his or her personal behavior with regard to energy and water use, consumerism, recycling, environmental advocacy, and other matters. Environmentally harmful—and beneficial—actions earn rating points which then are tallied to determine one's score.

Interpreters will notice that interesting facts, tips for improvement, and lists of pertinent resources are scattered throughout the book.

McKibben, Bill. *The End of Nature*. New York: Random House, 1989. 226 pp.

That "we live at the end of nature, the moment when the essential character of the world...is suddenly changing," is the premise of this book. As human activity alters atmospheric chemistry and so affects the weather, every spot on earth becomes "man-made and artificial" to some degree.

With scholarship and passion, the author explores the various ramifications of such a change—ecological, philosophical, political, and personal. His conclusions are, in a word, disturbing.

Merchant, Carolyn, ed. *Green Versus Gold: sources in California's environmental history*. Washington, D.C. and Covelo, California: Island Press, 1998. 489 pp.

This reference about California environmental history would make a fine addition to any interpreter's library.

Chapters consider a wide range of resource-related topics—the state's natural environment, early Indian ways, impacts of the gold rush, forest and rangeland exploitation, water "empire"-building, park preservation efforts, battles over energy, urban environmental issues, and more. Each chapter contains primary historical writings, interpretive essays, and a reading list. The book concludes

with a piece by editor Merchant titled “Environmental Ethics and California’s Future.”

Noss, Reed F., and Allen Y. Cooperrider. *Saving Nature’s Legacy: protecting and restoring biodiversity*. Washington, D.C. and Covelo, California: Island Press, 1994. 417 pp.

As stated in its preface, this book serves to “introduce and defend the concept of biodiversity, review some failures of past land management, offer an alternative vision for the future, and provide guidelines for achieving ambitious conservation goals.” Among other things, the text discusses methods for inventorying biodiversity, the design of reserve networks, and the management of forest, rangeland, and aquatic ecosystems.

A valuable source for practitioners and interpreters of wildland management.

Palmer, Tim, ed. *California’s Threatened Environment: restoring the dream*. Washington, D.C.: Island Press, 1993. 305 pp.

This book gives readers a thorough and relatively recent critique of the Golden State’s environmental ills. Chapters examine such topics as population growth, air quality, water supply, coastal concerns, forests, wildlife, and parks and recreation.

The contributing authors not only present a multitude of sobering facts; they also discuss the underlying causes of California’s problems, assess future prospects, and suggest corrective measures.

Quammen, David. “The Newmark Warning: why our national parks are resembling desert isles.” *Outside*, Vol. XIII, No. 5 (May 1988): pp. 31-36.

This essay is based on the disturbing findings of ecologist William D. Newmark—findings which were published in the journal *Nature* in 1987.

Newmark had applied a principle of biogeography—that an island separated from the mainland will lose species over time—to his investigation of national parks, themselves becoming isolated by habitat disturbance outside their borders. In brief, Newmark’s research showed that the *older* the reserve, and the *smaller* the reserve, the *greater* the number of mammal species that were likely to have disappeared from it. Newmark concluded that “virtually all western North

American national parks were too small to maintain the mammalian faunal assemblage found at time of park establishment.”

Quammen’s article is a fine piece of interpretive reporting. Its message has particularly dire implications for California’s state parks because of their smaller size.

Rienow, Robert, and Leona Train Rienow. *Moment in the Sun: a report on the deteriorating quality of the American environment.* New York: The Dial Press, 1967. 286 pp.

This haunting book opens with a look at the “phenomenal plenty” enjoyed by a growth-addicted, wasteful America in the 1960s; it then proceeds to document a long list of sobering consequences and hidden costs. Now, several decades later, the authors’ grim warnings still seem compelling...and a bit prophetic.

Rodes, Barbara K., and Rice Odell, compilers. *A Dictionary of Environmental Quotations.* New York: Simon & Schuster, 1992. 335 pp.

This source contains thousands of quotations relating to “the interactions of human beings and the natural environment.” The material has been drawn from “proverbs and poems, speeches and scientific papers, philosophical works and bumper stickers,” note the compilers.

Quotes are organized by topics—well over a hundred of them—ranging from “acid rain” to “zoos.” Because the entries are chronologically ordered within each category, they also reveal something about the evolution of environmental thought.

Runte, Alfred. *Public Lands, Public Heritage: The National Forest Idea.* Niwot, Colorado: Roberts Rinehart Publishers, in cooperation with the Buffalo Bill Historical Center, 1991. 90 pp.

The creation of federal forest reserves—today’s national forests—was a milestone in America’s conservation history. Here, author Runte tells about the circumstances leading to that achievement and the individuals involved. Special attention is paid to the novel philosophy of resource stewardship that emerged—the “national forest idea.” Included, too, is a “guest essay” by Harold K. Steen titled “The Origins and Purposes of the National Forests.”

Along with an interesting selection of photographs, this well-illustrated book contains some fine color reproductions of historic artwork.

Sellers, Richard West. *Preserving Nature in the National Parks: a history*. New Haven, Connecticut: Yale University Press, 1997. 380 pp. + 16 pp. of illustrations.

The National Park Service has long grappled with its dual mission set forth in the 1916 "Organic Act" – to "provide for the enjoyment" of park features while leaving them "unimpaired for...future generations." In practice, this mandate often led to policies that promoted recreational tourism at the expense of sound resource management.

Here's a thorough historical account of the park service's natural resource management efforts. The author documents how various programs originated, evolved, and in some cases ceased to be. Fire suppression, livestock grazing, bear feeding, pesticide spraying, and predator control are among the practices discussed.

Skinner, Mark W., and Bruce M. Pavlik, eds. *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California*. Special Publication No. 1. Fifth edition. Sacramento, California: The California Native Plant Society, Feb. 1994. 338 pp.

This volume supplies information about the distribution, habitat, blooming time, rarity, and legal status of more than 1,700 members of California's increasingly endangered flora.

Some interesting articles precede the actual inventory. One discusses rare plant ecology, noting that habitats with the most rare species are under-represented in our parks and preserves. Another describes the California Department of Fish and Game's "Natural Diversity Data Base" (which catalogues the locations of the state's rarest species and natural communities). Yet another explains the federal Endangered Species Act.

Steinhart, Peter. "As the Old Oaks Fall." *Photography by David Cavagnaro. Audubon*, Vol. 80, No. 5 (Sept. 1978): pp. 30-40.

This eloquent essay calls attention to a worrisome problem: the decline of California's magnificent and characteristic oaks. Urbanization's impacts are considered, along with the more subtle, complex difficulties of oak regeneration.

Interestingly, author Steinhart views the loss of trees as a cultural concern as well as an ecological one. "Oaks are...part of the natural model around which the California character forms," he states. "As the landscape changes, so too will the people."

Steinhart, Peter. *California's Wild Heritage: threatened and endangered animals in the Golden State.* With an introduction to California's biological diversity by Robert I. Bowman. Sacramento: California Department of Fish and Game/San Francisco: California Academy of Sciences/San Francisco: Sierra Club Books, 1990. 108 pp.

As a result of habitat loss, more than a hundred of California's animal species are threatened with extinction. This book tells the story of each—from marbled murrelets on the state's north coast to bighorn sheep of Southland desert mountains. Fine color photographs accompany the written accounts.

A convenient source of endangered species information.

Sussman, Art. Dr. *Art's Guide to Planet Earth: for Earthlings ages 12 to 120.* White River Junction, Vermont: Chelsea Green Publishing Company/San Francisco: WestEd, 2000. 122 pp.

As a primer on “how our planet works” and “how our actions can affect the environment,” *Dr. Art's Guide* can be recommended highly. Imaginative, eye-catching, and easy to comprehend, it should appeal to lay readers and educators alike.

The book takes a “systems”-oriented approach to understanding the earth, with chapters devoted to the cycling of matter, the flow of energy, and the web of life. Once they've been explained, these concepts are then applied to global and local environmental issues that people face.

Thelander, Carl G., editor in chief. *Life on the Edge: a guide to California's endangered natural resources: Wildlife.* Santa Cruz, California: BioSystems Books, 1994. 550 pp.

This is a large, magnificent work—as much an elegant tribute as a practical guide.

Here readers will find clear, factual accounts of the state's 115 threatened and endangered wildlife species, complete with range maps, references, and beautiful color illustrations. But there are also thought-provoking essays and interviews, literary excerpts and historical photos, Indian creation legends and editorial cartoons—all artfully arranged to place those animals within a broader cultural context.

One is likely to come away thinking of California as James Houston describes it on the book's dust jacket: "a region where so much has been lost and where so much remains to be saved, if we choose to do so."

Udall, Stewart L. *The Quiet Crisis*. New York and San Francisco: Holt, Rinehart and Winston, 1963. 209 pp. + 32 pp. of illustrations.

Authored by the Kennedy administration's secretary of the interior, this book occupies a special niche in environmental literature. Interpreters should still find much of it to be enlightening.

Its title refers to what Udall calls "the quiet conservation crisis of the 1960's." The text, however, is largely historical—"an attempt to outline the land-and-people story of our continent." Most chapters link key individuals with conservation-related topics; these couplings include Thomas Jefferson with the birth of a land policy, Henry David Thoreau with environmental conscience, Gifford Pinchot with forestry, John Muir with parks, "the Roosevelts" with political action, and Frederick Law Olmsted with urban planning.

— — — — —. *California Endangered Species Resource Guide*. Sacramento: California Department of Education, 1993. 128 pp.

This source provides county-by-county lists of California's rare, threatened, and endangered plants and animals; both state and federal status are given for each. A directory of agencies and organizations concerned with species preservation is included, too...along with information about how schools can become involved with species and habitat protection.

— — — — —. *Interpreting Biological Diversity: a handbook for National Park Service communicators*. National Park Service [U. S. Department of the Interior].

In 1989 the National Park Service launched an "initiative" to emphasize the interpretation of biological diversity. This excellent loose-leaf reference handbook was developed as part of that effort.

Divided into sections, this document contains report summaries, informational papers, articles, fact sheets, and sample programs. These cover various biodiversity-related topics, from economically-important species to ecosystem restoration to ethical concerns.

GENERAL INTERPRETATION

Interpretation—of the kind that relates to parks and natural history—is a surprisingly difficult endeavor to define. “Revelation based upon information” is how Freeman Tilden explained it. “An approach to communication,” wrote Sam Ham. “A service for visitors,” began Grant Sharpe. Interpretation is part education, part inspiration, part entertainment. It is a sharing of knowledge, enthusiasm, appreciation, and wonder. It is a profession; it is an art.

Cited in this section are sources that not only tell what interpretation is—in some cases, quite eloquently—but that also describe in detail how it’s done. Listings include both general references and more focused publications about interpretive philosophy, presentation techniques, and various other topics. All offer insights that can help park interpreters translate the language of nature in a more meaningful way.

Note: Sources dealing specifically with environmental education for children are listed in a separate section.

"Everything is worthy of notice, for everything can be interpreted."

—Herman Hesse

"Interpretation is a voyage of discovery in the field of human emotions and intellectual growth, and it is hard to foresee that time when the interpreter can confidently say, 'Now we are wholly adequate to our task.'"

—Freeman Tilden

"How often, if we learn to look, is a spider's wheel a universe, or a swarm of summer midges a galaxy, or a canyon a backward glance into time. Beneath our feet is the scratched pebble that denotes an ice age, or above us the summer cloud that changes form in one afternoon as an animal might do in ten million windy years."

—Loren Eiseley

"Interpreting means demonstrating why something matters, how it has made a difference. Ideally, interpretation helps us gain not just knowledge but that rarer and more precious commodity, wisdom."

—Kenneth L. Ames

Alderson, William T., and Shirley Payne Low. *Interpretation of Historic Sites.* Nashville, Tennessee: American Association for State and Local History, 1976. 189 pp.

This book—a standard reference in its field—relates to natural history interpretation only incidentally. However, some historic sites do relate to natural history because natural resources or natural events helped shape their human story. For that reason the work is cited here.

The authors state that they're concerned "not with the principles and psychology of interpretation, but with the very practical problems of developing and conducting interpretive programs at historic sites." Chapters address such topics as interpretive planning, presenting the site, interpreting for school tours, selecting interpreters, training them, and evaluating interpretive programs.

Beck, Larry, and Ted T. Cable. *Interpretation for the 21st Century: fifteen guiding principles for interpreting nature and culture.* Champaign, Illinois: Sagamore Publishing, 1998. 242 pp.

This book updates and builds upon the interpretive philosophy originally espoused by Freeman Tilden and Enos Mills (whose works are cited below). Here, authors Beck and Cable present fundamental principles in a modern context, incorporating things such as volunteerism, high technology, and political support into the discussion.

Besides being highly instructive, the text is quite eloquent and inspiring. Many thought-provoking quotations are interspersed, drawn from sources as diverse as Napoleon Bonaparte, Rachel Carson, Kahlil Gibran, and a *Dilbert* comic.

Grinder, Alison L., and E. Sue McCoy. *The Good Guide: a sourcebook for interpreters, docents and tour guides.* Scottsdale, Arizona: Ironwood Press, 1985. 147 pp.

This manual is designed primarily for tour guides who interact with the public in a museum setting. However, much of the information in *The Good Guide* can also benefit natural history-oriented park interpreters—particularly those who work in visitor centers.

Chapters examine the development of museum education, important learning theories, profiles of different visitor types, and various interpretive techniques. There's also a "personal guide" to help improve the presenter's communication skills.

Ham, Sam H. *Environmental Interpretation: a practical guide for people with big ideas and small budgets*. Golden, Colorado: North American Press, 1992. 456 pp. + 5 pp. of color plates.

Here's a thorough and reasonably up-to-date "how-to" book that interpreters are sure to find useful. "Being able to communicate well with limited resources" is the author's primary concern.

Each chapter focuses on a different aspect of interpretation—how to prepare and present a talk, how to develop exhibits, and how to produce an audio-visual program, among others. The text contains boxed insets that provide instructive details or that present case studies of successful techniques. Photos and drawings augment the explanations.

Interpreters may especially profit from reading the section titled "Important Concepts." In it, Ham explores the idea that interpretation is characterized by four qualities: it's entertaining, relevant, organized, and thematic.

Heintzman, James. *Making the Right Connections: a guide for nature writers*. Stevens Point, Wisconsin: UW-SP (University of Wisconsin-Stevens Point) Foundation Press, Inc., 1988. 48 pp.

Making the Right Connections is one component of the "Interpreter's Handbook Series," a set of practical guides for interpretive professionals and students. (Others are cited below.)

Oriented toward natural history in its choice of examples, this booklet should be quite helpful to anyone who needs to hone his or her basic writing skills. The author provides good advice about selecting a topic, organizing one's thoughts, writing "for the reader," revising material, and preparing it for printing.

Helmich, Mary A. *Workbook for Planning Interpretive Projects in California State Parks*. Sacramento: California State Parks, 1997. 104 pp.

Park personnel who are involved with interpretive planning should find this source to be practically indispensable. It will guide them step-by-step through the planning process, from justifying the initial proposal to evaluating the finished project. An "interpretive glossary" and a "bibliography for interpretive planning" offer added assistance.

The unbound document functions as a workbook as well as a reference. There's ample space for note-jotting, and checklists are included to make sure that no

important considerations get overlooked. Because it's expected that the workbook will be marked up, each interpretive project should be assigned a separate copy.

Hooper, Jon K. *Effective Slide Presentations: a practical guide to more powerful presentations*. Golden, Colorado: Fulcrum Publishing, 1997. 194 pp.

Here's an excellent reference for anyone whose goal is giving lively, well-organized slide shows.

The entire process of program development and presentation is covered, from general principles to technical details. One chapter suggests various ways to arrange subject matter to achieve an orderly flow. Some other parts of the book tell how to produce graphics, operate audio-visual equipment, and evaluate a presentation site. Regardless of whether the reader is interested in mechanical troubleshooting or establishing rapport with an audience, *Effective Slide Presentations* offers valuable advice.

Knudson, Douglas M., Ted T. Cable, and Larry Beck. *Interpretation of Cultural and Natural Resources*. State College, Pennsylvania: Venture Publishing, Inc., 1995. 509 pp.

Comprehensive, relatively current, and engaging, this textbook makes an excellent general reference on interpretation.

The contents are a rich amalgamation of theories, facts, methodologies, insights, and examples. Readers will find large sections on how to interpret and how to manage interpretation. Chapter titles include "Evaluation," "Foundations: How People Learn," and "Making It Pay." Specific topics range from museum philosophy to exhibit layout and from visitors with disabilities to the "essence of place."

Photos and diagrams illustrate the text.

Lewis, William J. *Interpreting for Park Visitors*. Illustrated by Keith L. Hoofnagle. Philadelphia, Pennsylvania: Eastern Acorn Press, 1980. 159 pp.

With its conversational tone and humorous artwork, this handbook explains interpretive presentation techniques in a pleasing way. Author Lewis' remarks are directed primarily at National Park Service staff, but his advice applies just as well to interpreters in other situations.

One chapter invites readers to evaluate themselves using a detailed list of interpretive standards—181 criteria in all!

Machlis, Gary E., and Donald R. Field, eds. *On Interpretation: sociology for interpreters of natural and cultural history*. Revised edition. Corvallis, Oregon: Oregon State University Press, 1992. 308 pp.

This collection of writings looks at interpretation from a sociological perspective. It's the editors' premise that the social sciences can "enhance communication of interpretive messages"—both by helping interpreters better understand their "clientele" and by helping them better gauge the effectiveness of their efforts.

Divided into three sections, the book presents useful concepts and methods from sociology, case studies involving different types of visitor groups, and essays on contemporary issues affecting interpretation. Topics include cultural diversity in the United States, interpretation for children and the elderly, gender-bias in museums, and even the social organization of family camping.

One piece, titled "Some Radical Comments on Interpretation," will provoke many readers with its "disenchanted" point of view. In it, author Kenneth Nyberg contends that "environmental interpretation is not only largely unnecessary, but significantly more likely to produce harm than benefit."

McDonald, Linda L. *Aiming for Excellence: an evaluation handbook for interpretive services in California State Parks*. Illustrated by James A. Maddox. [Sacramento:] California State Parks, Interpretation Section, 2000. 68 pp. + xxiv pp. of appendixes and bibliography + sample forms.

Developed by California State Parks, this document presents measures and measurement tools to help assess the quality of the department's interpretive offerings.

The loose-leaf handbook covers a variety of evaluation methods, from supervisory review to self-critiquing to visitor and teacher surveys. One special feature is the use of an acronym, "RAPPORT," to denote key attributes of good interpretation: Relevant, Accurate, Provocative/enjoyable, Programatically accessible, Organized, Retained, and Thematic.

Aiming for Excellence also contains helpful guidelines for evaluation planning, an explanation of data-gathering principles, official policy information, resource lists, and sample evaluation forms.

Mills, Enos. *Adventures of a Nature Guide and essays in interpretation*. Edited by Enda Mills Kiley. Friendship, Wisconsin: New Past Press, Inc., 1990. 251 pp.

Writer, lecturer, and mountain guide, Enos Mills is justly regarded as one of the founding fathers of modern interpretation. In the late 1800s and early 1900s he did much to develop and promote the profession of “nature guiding” — or “helping people to become happily acquainted with the life and wonders of wild nature,” as he put it.

This source reprints Mills’ 1920 book, *The Adventures of a Nature Guide*, which combines stories about the author’s experiences in the Colorado Rockies with discussions of nature guiding principles and practices. Also included in this new edition are several other writings by Mills that relate either to parks or to interpretation.

Porter, Erika R. *All Visitors Welcome: accessibility in state park interpretive programs and facilities*. Illustrations by James A. Maddox. Second edition. [Sacramento:] California State Parks, Park Services Division, 1998. 262 pp.

The federal Americans with Disabilities Act of 1990 (better known as “ADA”) is having a substantial effect on park interpretation. This handbook shows precisely how.

All Visitors Welcome has three purposes: to inform park staff about access requirements, to explain common disabilities, and to provide guidelines for making interpretive services more accessible to everyone. From campfires to concessions, the book offers detailed suggestions for improving the way that programs are conducted and the way that facilities are designed and operated. Examples drawn from more than a dozen state park units are noted in the text.

Here, readers will learn—or will be reminded—that such things as the height of a counter, the mannerisms of a speaker, or the size of label type may determine whether or not an interpretive message is successfully conveyed.

Regnier, Kathleen, Michael Gross, and Ron Zimmerman. *The Interpreter’s Guidebook: techniques for programs and presentations*. Stevens Point, Wisconsin: UW-SP (University of Wisconsin-Stevens Point) Foundation Press, Inc., 1992. 101 pp.

Practical and visually appealing, this source is typical of most guides in the “Interpreter’s Handbook Series.” Here, the focus is on interpretive programs—how to plan, present, and evaluate them. Chapters are devoted to specialized topics such as slide shows, interpreting for children, “spontaneous”

interpretation, and trail techniques. A section called “Developing Your Interpretive Style” showcases the work of certain master interpreters, including the legendary Josh Barkin. Numerous photographs and other illustrations accompany the text.

A revision of *The Nature Fakir's Handbook*.

Sharpe, Grant W. *Interpreting the Environment*. Second edition. New York: John Wiley & Sons, 1982. 694 pp.

Originally published in 1976, *Interpreting the Environment* became the first textbook to deal comprehensively with the subject of interpretation. Sections of the book examine such topics as the origins of interpretation, interpretive plans, conducted activities, exhibits, publications, self-guided trails, urban interpretation, vandalism, and professional development. The second edition adds a chapter on historical interpretation.

More than twenty authorities contributed to this work.

Tilden, Freeman. *Interpreting Our Heritage*. Third edition. Chapel Hill, North Carolina: The University of North Carolina Press, 1977. 119 pp.

Even the term “classic” doesn’t quite do justice to such a landmark work as this—the first to express, in an organized way, the philosophy behind interpretation. The first edition of this modest-looking volume appeared in 1957, and since then its impact on the interpretive profession has been immeasurable. It continues to be cited extensively today.

The lasting value of *Interpreting Our Heritage* lies in its emphasis on guiding principles. Among the six which author Tilden postulates are these: “Interpretation is revelation based upon information” and “The chief aim of Interpretation is not instruction, but provocation.” Throughout the book, Tilden explains his ideas with a felicity that demonstrates his own interpretive skill.

Trapp, Suzanne, Michael Gross, and Ron Zimmerman. *Signs, Trails, and Wayside Exhibits: connecting people and places*. Stevens Point, Wisconsin: UW-SP (University of Wisconsin-Stevens Point) Foundation Press, Inc., 1992. 108 pp.

A sign, trail panel, or wayside exhibit can be a valuable interpretive device, helping park visitors to meaningfully experience a site. This volume in the “Interpreter’s Handbook Series” does a fine job of explaining how to produce

effective signage. Sign materials, fabrication methods, text content, and type are each considered.

The book devotes a good amount of space to trails, too—telling not just how to construct, maintain, and interpret these “corridors to adventure,” but how to design them for “mystery, variety, and beauty.”

Color photographs show numerous sign and trail examples.

Veverka, John A. *Interpretive Master Planning*. Helena, Montana: Falcon Press Publishing Co., Inc., 1994. 162 pp.

Author Veverka observes that “great interpretation, while emanating from the heart, must also be based upon...the principles of good planning.” The concepts and strategies outlined in this book can help park planners develop interpretive services that are well-integrated and highly effective.

Interpretive Master Planning examines each step in the planning process: identifying goals, inventorying resources, analyzing visitation, determining themes, selecting media, implementing and operating interpretive services, and then evaluating them. Budget issues are addressed, too, but only in a cursory way.

Chapters are devoted to planning exhibits, conducted programs, and self-guided trails and tours.

Zehr, Jeffrey, Michael Gross, and Ron Zimmerman. *Creating Environmental Publications: a guide to writing and designing for interpreters and environmental educators*. Stevens Point, Wisconsin: UW-SP (University of Wisconsin-Stevens Point) Foundation Press, Inc., 1991. 88 pp.

This guide in the “Interpreter’s Handbook Series” contains clear, practical information about how to develop newsletters, folders, booklets, pamphlets, and posters.

The book outlines fundamentals of design, writing, production, and printing; however, the use of computers is treated only briefly. A glossary explains trade terms such as “serif,” “PMT,” and “color separation.” Various examples of publications are depicted—some of them in color.

ENVIRONMENTAL EDUCATION for CHILDREN

Interpreting the environment to children is a special opportunity and challenge, calling for a fundamentally different approach than that used with adults. The sources listed in this section should help interpreters deal with young park visitors more effectively.

Most of the cited works are instructors' guidebooks describing environmental activities for youths. These guides differ in the subject areas they cover, the amount of background information they provide, and the extent to which they correlate with school curricula. Their goals, however, are essentially the same: to help children better understand and appreciate their natural surroundings. The guides represent only a sampling of available sources—a fact made clear by browsing the state-issued environmental education “compendia” which are also cited here. Included, too, are a few references of a more general nature that environmental educators may find useful.

Note: No attempt has been made to survey the vast body of children's literature pertaining to natural history or other environmental matters.

“A child’s world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood.”

—Rachel Carson

“The chief means of interesting children in nature is to expose them—to bring them into contact with outdoor things.”

—Enos A. Mills

“Our first teachers in natural philosophy are our feet, hands, and eyes.”

—Jean Jacques Rousseau

Armstrong, Pam, Judith Connor, Chris Parsons, Judy Rand, and Jenny Vuturo-Brady. *Sea Searcher's Handbook: activities from the Monterey Bay Aquarium*. Monterey, California: Monterey Bay Aquarium, in cooperation with Roberts Rinehart Publishers, 1996. 224 pp.

This activity-oriented source introduces youngsters to the ocean world, using examples from the California coast.

Several sections of the *Sea Searcher's Handbook* investigate diverse marine habitats, ranging from the rocky or sandy shore to the deep sea canyon. Other sections examine different kinds of ocean life, marine food webs, and connections between people and the sea.

Sections are typically subdivided into "field notes" that give background information on the featured topic; illustrated "field guides" that draw attention to selected species; and activities—of which there are more than ninety in the book, suitable for ages five and up.

Burnie, David. *How Nature Works*. Pleasantville, New York: The Reader's Digest Association, Inc., 1991. 192 pp.

With interesting text and a profusion of color illustrations, this book attractively presents "100 ways parents and kids can share the secrets of nature." Readers will find some good background natural history information as well as instructions for carrying out experiments and other educational projects.

It's not evident from the title, but *How Nature Works* concentrates on plant and animal life. Three other volumes in this Reader's Digest series deal with non-biological aspects of nature in a similar way. They are: *How the Earth Works* (by John Farndon, published in 1992); *How the Universe Works* (by Heather Couper and Nigel Henbest, published in 1994); and *How the Weather Works* (by Michael Allaby, published in 1995).

Caduto, Michael J., and Joseph Bruchac. *Keepers of the Earth: Native American stories and environmental activities for children*. Illustrations by John Kahionhes Fadden and Carol Wood. Golden, Colorado: Fulcrum, Inc., 1989. 209 pp.

Keepers of the Earth creatively combines North American Indian stories with environmental learning activities for children aged five through twelve. The resulting blend of traditional wisdom and modern science is intended to inspire youngsters and to help them feel a part of their surroundings.

Topics treated in this manner include energy, astronomy, seasons, weather, fresh water, the seashore, flowers and pollination, animal survival, Earth stewardship, and a sense of place. A separate chapter offers advice on how to use the stories and activities effectively.

Interpreters who like this cross-cultural approach to environmental education may be interested in the authors' other volumes in the Fulcrum "Keepers" series. They are: *Keepers of Life* (published in 1994 and focusing on plants), *Keepers of the Animals* (published in 1991 and focusing on wildlife), and *Keepers of the Night* (published in 1994 and focusing on the nocturnal realm).

Clymire, Olga N., principal writer. *A Child's Place in the Environment*. In six volumes. Sacramento: California Department of Education.

A Child's Place in the Environment is actually a series of curriculum guides for elementary school teachers. Collectively, these guides form a blueprint for a comprehensive, interdisciplinary environmental education program in California's public schools. Because the guides reflect the viewpoint of the State Department of Education, park interpreters who interact with school groups should be familiar with them.

Six in all, the guides individually consist of a grade-specific, thematic "unit" that comes in a loose-leaf binder. Each unit contains about twenty sequential lessons to help students become "environmentally literate and active." A unit's number matches the grade level for which the guide is designed. Specifically, the guides (and their dates of publication or revision) are:

- Unit 1: *Respecting Living Things* (1997)
- Unit 2: *Protecting Soil* (1998)
- Unit 3: *Preserving and Restoring Ecosystems* (1994)
- Unit 4: *Caring for Aquatic Systems* (1997)
- Unit 5: *Conserving Natural Resources* (1997)

- Unit 6: *Achieving a Sustainable Community* (1996)

Cornell, Joseph. *Sharing Nature with Children: the classic parents' and teachers' nature awareness guidebook. Second edition, revised and expanded.* Nevada City, California: DAWN Publications, 1998. 173 pp.

As author Cornell puts it, this book is about “using nature to stimulate joyful, enlightening insights and experiences.”

Accordingly, fifty “nature-awareness” activities are presented here. Some give insights into how nature works; some help attune a person’s feelings to nature’s peace, beauty, energy, mystery, and wonder; some are just fun. Again quoting the author, “Each game is a mouth through which nature speaks—sometimes in the language of the scientist, sometimes in that of the artist or mystic.”

More nature activities—and a successful four-step teaching method—are discussed in Cornell’s 1989 companion volume, *Sharing the Joy of Nature* (same publisher).

Duensing, Edward. *Talking to Fireflies, Shrinking the Moon: a parent’s guide to nature activities.* Illustrations by Lois Sloan. New York: Penguin Books USA Inc., 1990. 177 pp.

This book combines some intriguing nature lore with suggestions for more than thirty outdoor activities involving children.

Among other things, the author explains how to determine a pine tree’s age by counting its whorls of branches; how to use the Big Dipper to tell time at night; and how to follow a “beeline” to a hive. Notable, too, is the way he links common objects to larger concepts—for instance, a snowflake becomes an example of “unity in diversity,” and a jay feather’s blueness is revealed as an illusion, like the blueness of the ocean or the sky.

Interpreters who are looking for a little “nature magic” to spice up their presentations should check out this source.

Gross, Phyllis, and Esther P. Railton. *Teaching Science in an Outdoor Environment.* Berkeley and Los Angeles: University of California Press, 1972. 188 pp. + 12 pp. of photographs.

One of the “California Natural History Guides,” this handbook is a very good source of ideas for teaching science to children in a field setting. Unfortunately, it’s no longer in print.

After discussing how to prepare for an outdoor learning experience and suggesting where to go, the book outlines nearly forty activities that can be used to investigate the environment. Among other things, there are directions for conducting a “five-senses” hike, gauging stream flow, measuring the light requirements of plants, mapping animal movement, studying a food web, and exploring at night.

An effort has been made to coordinate these exercises with the *Science Framework for California Public Schools* (1970 edition). In addition, specific referencing links each activity to other volumes in the California Natural History Guide series—many of which are cited elsewhere in *Science, Poetry, and Parks*.

Lingelbach, Jenepher, ed. *Hands-on Nature: information and activities for exploring the environment with children.* Illustrated by Edward Epstein. Woodstock, Vermont: Vermont Institute of Natural Science, 1986. 233 pp.

This guidebook can help children—and those who teach them—to discover “a world of simple wonders.” Bird songs, snowflakes, rotting logs, seed dispersal, and camouflage are among the thirty-plus topics that are treated through a combination of readings and activities. Adaptations, habitats, cycles, and natural designs are all represented.

Although the book’s examples favor the eastern part of the United States, much of the material presented is also applicable to the West.

Machlis, Gary, and Maureen McDonough. *Children’s Interpretation: a discovery book for interpreters.* National Park Service/Seattle, Washington: Cooperative Park Studies Unit, College of Forest Resources, University of Washington, Spring 1978. 28 pp.

This booklet shows how a “sound understanding” of children can be used to create effective interpretive experiences for them.

Readers will learn how a child’s needs, capabilities, and interests change as he or she physically and cognitively develops. Examples relate this general

information to specific interpretive situations and opportunities—from designing a written guide for young visitors to planning a children’s walk.

Meads, Christina, and Jennifer Turner, compilers and editors. *Junior Ranger Program Handbook*. Revised edition. Sacramento: [California] Department of Parks and Recreation, Interpretation Section, June 1998. 413 pp. + 32 pp. insert.

This handbook was developed for presenters of California State Parks’ “Junior Ranger” programs, which are attended by children aged seven to twelve. These activity-oriented programs are designed to help young visitors understand and appreciate the natural and cultural heritage preserved in parks.

The handbook contains background information, activities, and directions for conducting programs in a dozen different subject areas—animal life, ecology, energy, geology, history, Native Californians, park careers, plant life, recycling, safety and survival, water, and weather and climate. Self-guided activities for youngsters are included, too, along with some general advice about working with children.

The *Junior Ranger Program Handbook*’s loose-leaf contents come with or without a three-ring binder.

National Wildlife Federation. *Ranger Rick’s NatureScope*. New York: Mc-Graw-Hill.

Ranger Rick’s NatureScope is a popular series of publications “dedicated to inspiring in children an understanding and appreciation of the natural world, while developing the skills they will need to make responsible decisions about the environment.”

Some of the *NatureScope* titles (and their most recent publication dates) are *Astronomy Adventures* (1997); *Birds, Birds, Birds!* (1997); *Discovering Deserts* (1998); *Diving into Oceans* (1998); *Geology: The Active Earth* (1997); *Incredible Insects* (1998); *Trees Are Terrific!* (1998); *Wading into Wetlands* (1998); and *Wild about Weather* (1997).

Each issue contains informational essays and case studies, activities with instructions, reproducible game or picture pages, and more. The materials are designed for youngsters in the kindergarten-to-eighth-grade range—and for those who teach them.

Sly, Carolie, Leslie Comnes, and Sandra Brislain. *Water Wisdom: a curriculum for grades four through eight*. Hayward, California: Alameda County Office of Education, 1990. 119 pp.

Water Wisdom consists of three activity-rich instructional units aimed at children in the middle school grades. The first unit emphasizes science; the second, social studies; and the third, cross-cultural literature. Within each unit, lessons build on one another sequentially to provide an increasingly sophisticated understanding of water.

Through these lessons, the authors hope that “learners will gain the wisdom to make sound decisions about water issues, and to hold a deep understanding of its preciousness—not only as a life-giving liquid, but as a source of spiritual and emotional renewal.”

Water Wisdom is a supplement to *The California State Environmental Education Guide* (cited below).

Sly, Carolie, Leslie Comnes, and Celia Cuomo. *The California State Environmental Education Guide: a curriculum guide for kindergarten through sixth grade*. Hayward, California: Alameda County Office of Education, 1988. 323 pp.

The purpose of this guide is to provide educators with lessons and techniques that can help children gain a “fundamental understanding of the environment.”

Primarily a classroom tool, the book contains eight instructional units, each of which is organized around a different concept; “homes and habitats” and “caring for the environment” are examples. Some of the activities described in the units are suitable for—or adaptable to—park settings.

Van Matre, Steve. *Earth Education: a new beginning*. Illustrated by Jan Muir. Greenville, West Virginia: The Institute for Earth Education, 1990. 334 pp.

“Earth education” is an experiential learning program that’s designed to help people achieve “a harmonious and joyous relationship” with the natural world. It’s an outgrowth of ideas and activities that Van Matre popularized in a 1972 book called *Acclimatization*.

The author opens this later volume by justifying his belief that conventional environmental education has been “co-opted, and diluted, and trivialized.” The rest of *Earth Education* discusses the “what, why, and how” of his alternative approach. Delightful drawings and interesting quotations embellish the work.

Wilke, Richard J., ed. *Environmental Education Teacher Resource Handbook: a practical guide for K-12 environmental education*. Millwood, New York: Kraus International Publications, in cooperation with the National Science Teachers Association, 1993. 448 pp.

With its emphasis on curricula, this source is better suited for teachers than interpreters. Even so, interpreters who work with school groups may find it well worth browsing.

Here, readers can obtain information about the history of environmental education, planning an environmental education curriculum, state-by-state curriculum guidelines, environmental education materials and their producers, and environmental education assessment.

— — — — —. ***Acorn Naturalists [Catalog]: 2000*. Tustin, California: Acorn Naturalists, 2000. 160 pp.**

“Acorn Naturalists” is a Southern California company that specializes in environmental education resources “for the trail and classroom.” Its annual catalog is a resource in itself, listing thousands of items ranging from microscopes to puppets.

The catalog is cited here because it also contains descriptive notes for a large number of publications that pertain to environmental education. General references, identification manuals, and activity guides for naturalists and educators are included...and children’s literature is represented particularly well.

— — — — —. ***California Environmental Education Resource Guide*. Third edition. Sacramento: California Department of Education, 1995. 78 pp.**

This booklet catalogues a broad array of resources for the environmental educator. Included among the listings are curriculum and activity guides, audio-visual and electronic aids, sites and facilities for field trips, organizations involved with environmental education, and opportunities for teachers and students such as workshops and fairs. Each entry briefly describes a particular resource and tells how to find out more about it.

A valuable reference for those who interpret to children outdoors.

— — — — —. *Environmental Education Activity Guide: Pre K-8*. Washington, D.C.: Project Learning Tree, 1993. 402 pp.

This interdisciplinary activity guide is a key part of the “Project Learning Tree” environmental education program, sponsored in California by the State Department of Forestry and Fire Protection. Using the forest as a “window on the world,” Project Learning Tree helps children to better understand their environment, encouraging them to make informed decisions and take responsible action on the environment’s behalf.

The guidebook contains nearly 100 activities that are grouped under five headings: “Diversity,” “Interrelationships,” “Systems,” “Structure and Scale,” and “Patterns of Change.” Activities are conveniently cross-indexed by topic—“careers,” “endangered species,” “native cultures,” or “poetry,” for example. Charts indicate an activity’s grade level as well as the amount of time it requires.

Educators can obtain a copy of the guide by attending a Project Learning Tree workshop.

— — — — —. *Environmental Education Compendium for Energy Resources*. [California Department of Education,] Mar. 1992. 39 pp.

The California Department of Education, in partnership with other agencies, has produced several “compendia” that evaluate program materials used for kindergarten-through-twelfth-grade environmental education. A typical program evaluation includes a curriculum description, a lesson sample, and a “report card” that assesses the program’s value as a teaching and learning tool. Such information can be very helpful to the park interpreter who’s looking for new activity ideas.

Each compendium focuses on a particular subject area—energy resources in this case, and natural communities and water resources in two others cited below. Programs critiqued in this compendium deal with energy sources, energy conservation, the social effects of energy use, and similar topics.

— — — — —. *Environmental Education Compendium for Natural Communities*. [California Department of Education,] Jan. 1995. 152 pp.

This compendium is a handy guide to environmental education materials that concentrate on natural communities—both terrestrial and aquatic—and the effects of human interaction with them.

Dozens of programs are evaluated, based on their content, presentation, “teacher usability,” and other factors. Project Learning Tree, Project WILD, and Ranger Rick’s NatureScope are among the resources considered.

— — — — —. *Environmental Education Compendium for Water Resources. Second edition*. [California Department of Education,] Nov. 1996. 238 pp.

The teaching materials examined in this environmental education compendium all pertain to water. Many of them combine instruction in water science and investigations of human relationships with water. Topics range from aquatic ecosystems to personal water conservation strategies to water politics.

Project WET, Aquatic Project WILD, and WOW!: The Wonders Of Wetlands are just a few of the programs reviewed. Certain others have been designed specifically for use in California.

Program evaluations resemble those in the compendia cited above.

— — — — —. *Project WET Curriculum and Activity Guide*. Bozeman, Montana: Project WET, 1995. 516 pp.

Project WET (“Water Education for Teachers”) is a water education program designed to promote awareness, appreciation, knowledge, and stewardship of water resources.

The heart of this guidebook is a collection of some ninety interdisciplinary activities for children in the kindergarten-through-twelfth-grade range. Activities focus on human relationships with water as well as water’s physical, chemical, biological, and ecological aspects. Cross-referencing and planning charts at the back of the guide aid in the selection of appropriate activities.

Among other things, youngsters are invited to imagine a water molecule on its journey; to calculate the amount of water wasted by a dripping faucet; to solve a mystery about a water-borne disease; to role-play organisms adapted to life in a

salt marsh; and to capture, through artwork, the movement and sound of water in nature.

As with Project Learning Tree and Project WILD materials (cited above and below), Project WET guidebooks are only available through training workshops.

— — — — —. *Project WILD Aquatic Education Activity Guide. Second edition.* Bethesda, Maryland: Project WILD, 1992. 242 pp.

In its format and its grade-level range, this volume closely resembles the *Project WILD K-12 Activity Guide* (cited and discussed below). The forty activities offered here focus on aquatic wildlife and ecosystems, however.

Like its companion source, this guidebook is distributed through training workshops. (Note: The Project WILD workshop is a prerequisite for the Aquatic Project WILD workshop.)

— — — — —. *Project WILD K-12 Activity Guide. Second edition.* Bethesda, Maryland: Project WILD, 1992. 386 pp.

Project WILD is an interdisciplinary conservation and environmental education program emphasizing wildlife. The program's goal is to help participants develop knowledge, skills, attitudes, and behavior that will benefit wildlife and the environment. In California, Project WILD is sponsored by the State Department of Fish and Game.

This Project WILD guidebook describes more than 100 instructional activities, including ones titled "Spider Web Geometry," "The Power of a Song," and "What Did Your Lunch Cost Wildlife?" The activities are organized by general subject—"ecological principles," for example—and are then cross-referenced by topic, grade level, and other criteria.

The guide is provided to educators who take part in a Project WILD workshop.

— — — — —. *WOW!: The Wonders Of Wetlands. Revised edition.* St. Michaels, Maryland: Environmental Concern Inc./Bozeman, Montana: The Watercourse, 1995. 330 pp.

Fascinating, important, and often close at hand, wetlands can be wonderful places in which to learn. This guidebook effectively explores the potential of wetlands as an educational tool.

**Science, Poetry, and Parks
Parks, Conservation, and Interpretation**

The first part of the book provides environmental educators with useful background material pertaining to wetlands. The larger second part presents more than forty wetland-related activities for kindergarten-through-twelfth-grade youths. Activities deal with such topics as species identification, adaptations of wetland life-forms, marsh productivity, habitat restoration, and land-use decision-making.

ADDITIONAL SOURCES

OTHER GOOD LITERATURE

This section lists an assortment of works that don't fit comfortably under any of the previous subject headings. Obviously, the listing is incomplete—just as the selections are arbitrary.

Most of the sources cited here are notable, above all else, for their literary quality. Many are remarkable—even inspiring—in the way the authors creatively weave their personal experiences with the natural world into written works of art. Several of the volumes are anthologies, exposing the reader to a variety of interesting styles. Finally, a few references focus primarily on the writers themselves, providing background and context that interpreters may find useful.

*“The flashing and golden pageant of California,
The sudden and gorgeous drama, the sunny and ample lands...”*

—Walt Whitman

*“For California is a Poem! The land of romance, of mystery, of worship, of beauty
and of Song.”*

—Ina Coolbrith

*“No place, not even a wild place, is a place until it has had that human attention
that at its highest reach we call poetry.”*

—Wallace Stegner

*“For what has made the sage or poet write
But the fair paradise of Nature’s light?”*

—John Keats

*“Why are we reading, if not in hope of beauty laid bare, life heightened and its
deepest mystery probed?”*

—Annie Dillard

Abbey, Edward. *Desert Solitaire: a season in the wilderness.* New York: McGraw-Hill Book Company, 1968. 269 pp.

Here's a portrayal of Utah's high-desert canyonland country, written from an iconoclastic park ranger's point of view. Abbey's distinctive style—alternately witty and irreverent, philosophical, and lyrically descriptive—makes this a memorable book.

Desert Solitaire isn't cited for its relevance to California natural history, but rather for the author's artful use of the desert in his storytelling. "I have tried to create a world of words in which the desert figures more as medium than as material," he explains. "Not imitation but evocation has been the goal."

Adams, Ansel, and Nancy Newhall. *This Is the American Earth.* San Francisco: Sierra Club, 1960. 89 pp.

Justice William O. Douglas hailed this book as "one of the great statements in the history of conservation." It is a testament to the value of wilderness, a powerful synthesis of photographs—some by Adams—and Newhall's eloquent, poetic text. The closing pages are particularly stirring:

"You shall know immensity,
and see continuing the primeval forces of the world....
You shall top a rise and behold creation.
And you shall need the tongues of angels
to tell what you have seen."

Beers, Terry, ed. *Unfolding Beauty: celebrating California's landscapes.* Santa Clara, California: Santa Clara University/Berkeley, California: Heyday Books, 2000. 403 pp.

To quote its editor, "This book is a celebration of [California's] astonishing beauty as it unfolds in the writings of the men and women who have taken it for subject and setting." Dozens of authors, with styles ranging from "extravagant" (John Muir) to "edgy" (Joan Didion), are represented. Selections include modern poetry as well as historic prose.

The volume is divided into seven parts, each devoted to a particular region of the state. An introductory statement about each area nicely relates the literature to the land. Interesting, too, are biographical sketches of the writers which precede many of the pieces, providing context of a different type.

In its content and organization, this anthology resembles Gilbar's *Natural State* (cited below).

Browning, Peter, compiler and editor. *John Muir in His Own Words: a book of quotations*. Lafayette, California: Great West Books, 1988. 98 pp.

This is an indexed collection of more than 300 quotes by the famed naturalist, park advocate, and author.

Caughey, John, and Laree Caughey. *California Heritage*. Los Angeles: The Ward Ritchie Press, 1962. 536 pp. + 16 pp. of photographs.

It's hard to tell whether this anthology should be categorized as history or literature, because it clearly contains both. As the editors note, the book offers "a quick tour along the march of California experience and an introduction to the wealth of good writing that is the state's heritage." Well over a hundred authors are represented in it.

The selections range from "sober history" to "lyrical and analytical description" to "indubitably creative writing." The natural landscape figures prominently in quite a number of the pieces. Examples include the Yokuts story explaining how mountain ranges were made; Juan Crespi's 1769 journal entries describing the site of present-day Los Angeles; James Marshall's account of his momentous gold discovery; a poem by Ina Coolbrith celebrating the California poppy; a contemplation of desert color by J. Smeaton Chase; and an excerpt from Sally Carrighar's "one-act, one-scene drama" of animal life on an outcropping of Sierran rock.

Daniel, John, ed. *Wild Song: poems of the natural world*. Athens, Georgia: University of Georgia Press, 1998. 129 pp.

The poems in this collection interpret various natural history topics in an imaginative and sometimes personal way. A few of the topics are distinctly Californian.

Readers may find themselves intrigued by some of the ideas and images evoked here with words—the optical intricacies of a stream's reflection, for instance...or starlight filtering into soil...or the strange delights of landscapes yet unborn.

Dillard, Annie. *Pilgrim at Tinker Creek*. New York: Harper's Magazine Press, in association with Harper & Row, 1974. 271 pp.

In this Pulitzer Prize-winning book, a valley in Virginia serves as a stage for some wide-ranging adventures of the mind. Those adventures are distilled into a memorable narrative—one that combines nature observations and mystical musings with an odd array of facts, stories, and quotes.

As reported in the narrative, author Dillard cultivates a keen awareness of her surroundings—stalking muskrats, inspecting microbes, practicing the act of living purely in the present. Meanwhile, she conducts a broad inquiry into the “active mystery” of existence. Her contemplations encompass the extravagant detail and variety of things, the grim work of parasites and predators, the blind forces of growth and reproduction, the gratuitous grace of beauty, and “the monster evolution loves” called death. Dillard asks, “What do we think of the created universe?” ...and finds that insights may come in the form of reveries or nightmares.

Pilgrim at Tinker Creek presents the reader with a trove of provocative views, eloquently expressed.

Eiseley, Loren. *The Immense Journey*. New York: Random House, 1957. 210 pp.

This book established Loren Eiseley's reputation as a “literary naturalist;” here, as in later works (see below), his essays are scientifically informed yet introspective and poetic in style.

The Immense Journey is a collection of pieces whose common theme is evolution—in particular, the evolution of human life and intellect. Eiseley approaches this subject from various angles, including one which attributes the rise of warm-blooded animals to energy-rich nectar, fruits, and seeds of flowering plants. “The weight of a petal has changed the face of the world,” he concludes, “and made it ours.”

Eiseley, Loren. *The Invisible Pyramid*. New York: Charles Scribner's Sons, 1970. 173 pp.

With these essays, anthropologist Eiseley relates the problems and perils of our technological age to man's evolutionary past.

Imaginative and sometimes haunting analogies lace Eiseley's work. In a piece called “The World Eaters” he compares a swelling human population to a

spreading slime mold, and space travel to the dispersal of spores. In “The Cosmic Prison” our relation to the universe is likened to a blood cell’s—freely adrift, yet hopelessly trapped, within some greater unknown body.

Eiseley, Loren. *The Unexpected Universe*. New York: Harcourt, Brace & World, Inc., 1969. 239 pp.

“How often, if we learn to look, is a spider’s wheel a universe...or a canyon a backward glance into time,” muses Eiseley. “Beneath our feet is the scratched pebble that denotes an ice age, or above us the summer cloud that changes form in one afternoon as an animal might do in ten million windy years.”

Symbols, metaphors, and messages deciphered from “the ancient alphabets of nature” figure prominently in this intriguing book.

Finch, Robert, and John Elder, eds. *The Norton Book of Nature Writing*. New York: W. W. Norton & Company, Inc., 1990. 921 pp.

According to the editors, the primary aim of this anthology is “to represent, as fully as possible, the range of nature writing in English over the past two centuries.” As a result, readers are exposed to a variety of interpretive styles and—through the subject matter—to all sorts of natural places, natural phenomena, and natural lives.

Among the ninety-plus authors represented are Henry David Thoreau, John Burroughs, John Muir, Henry Beston, Aldo Leopold, Joseph Wood Krutch, Edwin Way Teale, Rachel Carson, Loren Eiseley, Lewis Thomas, Edward Abbey, Peter Matthiessen, Wendell Berry, Annie Dillard, and Barry Lopez. A bit of background information about each writer accompanies the selections.

Gilbar, Steven, ed. *Natural State: a literary anthology of California nature writing*. Berkeley and Los Angeles: University of California Press, 1998. 377 pp.

Readers should enjoy this fine collection of writings about natural California—the first of its kind. Most of the pieces deal with a certain type of landscape (mountains, hills and valleys, deserts, or coast) or with some natural process, and the anthology is organized accordingly. Works of fiction as well as nonfiction are included.

Some of the selections qualify as classics, such as Mark Twain’s account of a visit to Lake Tahoe (excerpted from *Roughing It*) and Robert Louis Stevenson’s description of “the sea fogs” (from *The Silverado Squatters*). This volume also

gives a good sampling of more recent literature, with contributions by John McPhee (on faulting and plate tectonics), Joan Didion (Santa Ana winds), Edward Abbey (Death Valley), David Rains Wallace (the Klamath Mountains), Ann Zwinger (the High Sierra), and Gary Snyder (bioregions).

Greene, Marjorie, and Harold Wood, compilers. *New Improved Quotable Quotes...a handy reference for interpreters*. Sacramento: State of California, Resources Agency, Department of Parks and Recreation, Division of Operations, Visitor Services Branch, Jan. 1974. 89 pp.

For those who can locate a copy, this loose-leaf document still does make a handy reference—even though the last quarter-century isn't represented in it.

About 400 quotations are included, grouped according to subject—parks, conservation, animal life, history, and “nature and man,” among others. Quotation sources range from Ecclesiastes to Einstein; John Muir, Henry David Thoreau, and certain other environmental luminaries are cited frequently. A “references” section lists, and briefly describes, many of the quoted sources—both the authors and their works.

Lee, W. Storrs, ed. *California: A Literary Chronicle*. Illustrations by W. Ralph Merrill. New York: Funk & Wagnalls, 1968. 537 pp.

Like the Caugheys' *California Heritage* (cited above), this is an anthology of California literature, organized to give “a panoramic impression” of the state's colorful history. (The two books overlap considerably in the writers they include, but not in the writings they present.)

Among the nature-related selections found here are John C. Frémont's account of a perilous winter crossing of the Sierra in 1844, Walt Whitman's “Song of the Redwood Tree,” and excerpts from George R. Stewart's fictional biography of a wildfire.

Introductory comments by the editor give context to each piece.

[Muir, John.] *John Muir: the eight wilderness-discovery books*. London: Diadem Books/Seattle: The Mountaineers, 1992. 1030 pp.

Here, collected in a single volume, is most of Muir's best nature writing, originally published between 1894 and 1918. Four of the books included—*My First Summer in the Sierra*, *The Mountains of California*, *Our National Parks*, and *The Yosemite*—deal largely or entirely with Californian themes.

Noto, Sal, ed. *Jack London's California: "The Golden Poppy" and other writings*. New York: Beaufort Books, 1986. 156 pp.

This anthology focuses on those writings of Jack London that capture something of the people, events, and landscape of the Golden State. London's enthusiasm and affection for his native region is evident throughout.

Selections include excerpts from the novels *Martin Eden*, *Burning Daylight*, and *The Valley of the Moon*, as well as some short stories rich in "local color" and an eyewitness account of the aftermath of the 1906 San Francisco earthquake.

Peattie, Donald Culross. *An Almanac for Moderns*. New York: G. P. Putnam's Sons, 1935. 396 pp.

A reviewer once called this "a curious and lovely book which reveals the very poetry of biology."

The almanac's single-page essays—one for each day of the year—combine natural history observations and philosophical musings with a lyrical writing style. Some of the entries focus on specific topics, such as beetles or sunset colors or the constellation Orion. Other pieces pay homage to famous naturalists when their birthdays come up on the calendar. Throughout, the author attempts to answer a fundamental question he poses at the outset: given the universe's indifference toward him, "How can a man base his way of thought on Nature and wear so happy a face?"

Though dated in some respects and out of step with California's seasonal cycle, this classic work still makes good reading. It was reprinted by David R. Godine, Publisher (Boston, Massachusetts) in 1980.

Powell, Lawrence Clark. *California Classics: the creative literature of the Golden State*. Los Angeles: The Ward Ritchie Press, 1971. 393 pp.

Readers who are already somewhat familiar with California's "classic" literature may be interested in this source. Part biography and part literary criticism, it provides some background about the lives and works of thirty-plus authors whose masterpieces were inspired by the history, lore, or landscape of the Golden State.

The natural setting plays an important role in quite a few of the writings discussed. Examples include Austin's *The Land of Little Rain*, Brewer's *Up and*

Down California in 1860-1864, Muir's *The Mountains of California*, Stevenson's *The Silverado Squatters*, and Chase's *California Coast Trails*.

Snyder, Gary. *The Practice of the Wild*. San Francisco: North Point Press, 1990. 190 pp.

Bioregions, sacred places, language, ethics, grace—all figure into this collection of essays, written by a Pulitzer Prize-winning poet. Here the idea of cultivating a deeply personal relationship with the “wildness” of the world is explored.

Snyder, Gary. *Turtle Island*. New York: New Directions Publishing Corporation, 1974. 114 pp.

“Turtle Island” is a name for North America, derived from old creation myths and applied here, explains the author, “that we may see ourselves more accurately on this continent of watersheds and life-communities.”

The relationship between people and their environment is clearly the key issue in this collection of poetry and prose. The poems in particular “speak of place,” as Snyder puts it, and are remarkably rich in the language of natural history. Browsing the pages, readers will find mention of snowfields melting, the smell of bats, manzanita seeds, rabbit tracks, night herons, abalone, bunch-grass, sea-bed strata, and volcanic ash...while naturalists may nod in recognition of such terms as “geosyncline,” “Boletus,” and “Rigel.”

This work was honored with a Pulitzer Prize.

Stegner, Page, ed. *Marking the Sparrow's Fall: Wallace Stegner's American West*. New York: Henry Holt and Company, 1998. 359 pp.

As a novelist, essayist, historian, and environmental advocate, Wallace Stegner has become closely identified with the American West—particularly the country “from the hundredth meridian to the crest of the Sierra/Cascades.”

The writings in this collection nicely demonstrate the author's insightful thinking and eloquent style. Of the various pieces, interpreters should at least read “It All Began with Conservation,” “Living on Our Principal,” “The Best Idea We Ever Had” (the national park idea), and the now-classic “Wilderness Letter.”

Stewart, Frank. *A Natural History of Nature Writing*. Washington, D.C.: Shearwater Books, Island Press, 1995. 279 pp.

Nature writing is a distinct literary form that combines the rigors of science with the aesthetic values of art. This book traces the development of this genre

through the works of several prominent authors, including Henry David Thoreau, John Burroughs, John Muir, Aldo Leopold, Rachel Carson, and Edward Abbey.

Biographical sketches highlight the poetic vision that emerged from the writers' own experiences—from their observations and discoveries, their delight and, at times, their outrage. Quotations, skillfully selected, add depth and power to the text.

A very worthwhile look behind the “big names” of American environmental literature.

Torrey, Bradford, and Francis H. Allen, eds. *The Journal of Henry D. Thoreau*. In fourteen volumes bound as two. New York: Dover Publications, Inc., 1962. 1804 pp.

This work is a replication from a set of Thoreau's writings that was published in 1906.

To one as insightful as Thoreau, an arrowhead became a “fossil thought,” and a gnat's hum echoed the music of the spheres. His journals—written between 1837 and 1861—contain a lifetime's worth of metaphorical musings about the natural world. Drawing from them, he crafted *Walden*.

PERIODICALS

Periodical publications should not be overlooked as resources for the interpreter. Because they're often quite focused in their scope, periodicals are able to provide good coverage of specialized topics. Because they're issued regularly, periodicals can keep readers informed about new developments in a field or about upcoming events. And because some are produced by membership-based organizations, periodicals may serve as a link between people who have similar interests or viewpoints.

The magazines and books cited in this section all deal with subjects that relate, directly or indirectly, to the study or interpretation of California natural history. Newsletters—with one exception, *The Catalyst*—are not listed.

“One of the most valuable philosophical features of journalism is that it realizes that truth is not a solid but a fluid.”

—Christopher Morley

***Audubon*. [New York:] National Audubon Society. Published bimonthly (every two months). Since 1899.**

Reflecting the National Audubon Society's interests and views, *Audubon's* articles deal largely with wildlife and other environmental topics, including conservation matters. For example, one issue contained pieces on the resourcefulness of coyotes, invasive weeds, trapping as a management tool, and gardening to attract butterflies.

During the 1980s, the magazine included some especially nice essays by Peter Steinhart as a regular feature. Steinhart's perceptive writings shed light on a variety of things familiar to natural history interpreters—a clear night sky, the abundance of life, names on maps, the joy of walking, fire-watching, the wind, bones, creeks, colors, silence, and time.

***California Coast and Ocean*. Oakland, California: [California] Coastal Conservancy, in association with the California Academy of Sciences. Published quarterly (every three months). Since 1985.**

This magazine is published by the Coastal Conservancy, a California state agency that works “to preserve, improve, and restore public access and natural resources along the coast and around San Francisco Bay.”

Some articles focus on coastal resources ranging from abalone and elephant seals to wetlands and urban creeks; others focus on resource-related issues, programs, and projects.

California Coast and Ocean was called *California Waterfront Age* until 1990.

***California Geology*. Sacramento: [California] Department of Conservation, Division of Mines and Geology. Published bimonthly. Since 1948.**

This magazine's contents sometimes deal with practical aspects of geology—mining activity or earthquake hazards, for instance—in a geographically-specific and somewhat technical way. Of greater interest to interpreters are the articles that explain general earth science concepts, that relate to the gold rush and other historic events, or that describe the features of particular parks.

Before 1971, *California Geology* was known as *Mineral Information Service*. An index covering all issues through 1986 is cited in the “Geology and Paleontology” section.

***California History*. San Francisco: California Historical Society. Published quarterly. Since 1922.**

While this journal obviously concentrates on the history of California and the West, occasionally its articles relate to natural history as well. Examples include pieces on the state's early "waterscape," gold rush mining methods, Chinese shrimp harvesting, the introduction of eucalyptus trees, and environmental activism.

Historical photographs and artwork accompany the text, providing interesting glimpses of life and landscape from California's past.

Prior to 1978, *California History* was called *California Historical Quarterly* among other names.

***California Wild*. San Francisco: California Academy of Sciences. Published quarterly. Since 1948.**

California Wild is an excellent source of information about "the natural state of our state." Besides celebrating California's wild wonders, this periodical examines current environmental issues and chronicles discoveries in the natural sciences.

Regular features include "Skyguide," a list of upcoming celestial events; "Naturalist's Almanac," with notes about seasonal attractions at various locales; "A Trail Less Traveled," exploring a place of special interest; and "Wild Lives," which showcases some type of organism.

Known as *Pacific Discovery* for many years, this magazine became *California Wild* in 1997. A selection of articles from *Pacific Discovery* was published as a book, *Discovering California*, in 1983. (See the "General California Geography" section for its citation.)

***The Catalyst*. Sacramento: California State Parks, Park Services [Division], Interpretation [Section]. Published periodically. Since 1993.**

A subtitle describes this periodical as "the newsletter for interpretation in California State Parks."

Among other things, *The Catalyst* reports on interesting interpretive activities, offers helpful tips, calls attention to resources and training opportunities for interpreters, and presents thought-provoking views. Articles include both

original contributions and previously published pieces. Not all items deal with California State Parks, however, nor are all written by department staff.

The first issue of the newsletter was titled *Facts to Fax*.

***Climatological Data: California.* Asheville, North Carolina: National Climatic Data Center, National Oceanic and Atmospheric Administration [U. S. Department of Commerce]. Published monthly, plus an “Annual Summary” issue.**

This periodical tabulates weather data collected at some 400 stations scattered around California—including dozens located in or near state and federal parklands.

Daily maximum and minimum temperatures and precipitation amounts are reported in the monthly issues; the “Annual Summary” issue gives monthly and yearly temperature averages, precipitation totals, and statistical departures from normal.

***Fremontia.* [Sacramento:] California Native Plant Society. Published quarterly. Since 1973.**

The principal aims of the California Native Plant Society are “to preserve the native flora and to add to the knowledge of members and the public at large.” *Fremontia* is the society’s journal.

Fremontia’s articles will inform Californian interpreters about a variety of vegetation-related matters. Interesting plants and plant communities, places of special significance, new botanical discoveries, the cultivation of native species, and resource issues such as fire management and grazing are some of the topics addressed.

A twenty-year index to *Fremontia* (cited separately under “General Botany”) was published in 1994.

***The Interpreter.* [Eatonville, Washington:] Western Interpreters Association. Published quarterly. Until 1988.**

This periodical shared information among the membership of the Western Interpreters Association, an organization “dedicated to enhancing the profession of natural and cultural interpreters.” Publication ceased when the Western Interpreters Association merged with the Association of Interpretive Naturalists to form the National Association of Interpretation.

Between its inception in the late 1960s and its final issue in 1988, *The Interpreter* evolved from a newsletter to a more formal “journal for environmental communicators.” In the process, issues were each given a particular thematic emphasis; “exhibits,” “living history,” “interpretation as a management tool,” “volunteerism,” and “gimmicks and gadgets” were among the featured topics. The articles, though dated in some cases, are still worth browsing.

[year] Interpretive Sourcebook: proceedings of the National Interpreters Workshop. National Association for Interpretation. Published annually. Since 1988.

The National Association for Interpretation (NAI) is an organization whose mission is “inspiring leadership and excellence to advance natural and cultural interpretation as a profession.” Toward that end, NAI hosts a “National Interpreters Workshop” each year to exchange information and ideas.

Published yearly, the *Interpretive Sourcebook* is a transcript of presentations made at the workshop. Topics span the whole interpretive field—resource interpretation, program planning and management, environmental education, critical issues, arts in interpretation, cross-cultural communication, accessibility, partnerships, professional development, research, and more. Due to the high quality of the presentations, interpreters should find these annual volumes to be interesting as well as useful sources.

Prior to 1994 this periodical was called *Proceedings of the [year] National Interpreters Workshop* or a variation of that title.

Legacy. Fort Collins, Colorado: National Association for Interpretation. Published bimonthly. Since 1990.

Legacy, the magazine of the National Association for Interpretation (NAI), reflects current thinking within the interpretive field. Along with feature articles on such topics as “establishing interpretive competencies” and “thesis-based interpretation,” readers will find commentaries, technical bulletins, book and video reviews, and notices of upcoming professional events.

Between 1988 and 1990 NAI published a comparable magazine titled *Journal of Interpretation*.

***National Parks*. Washington, D.C.: National Parks and Conservation Association. Published bimonthly. Since 1919.**

National Parks is the magazine of the National Parks and Conservation Association, an organization dedicated to “protecting, preserving, and enhancing the U. S. National Park System.”

Articles in this periodical examine National Park System units, proposed additions to the system, threats to parks or their resources, trends in park use, management efforts, legislative issues, and more. Regular features include news updates, association views, and suggestions for enjoying the parks.

Before 1981, *National Parks* went by the name *National Parks and Conservation Magazine* and other titles.

***National Wildlife*. Vienna, Virginia: National Wildlife Federation. Published bimonthly. Since 1962.**

Beautiful color photographs enhance this magazine’s articles about America’s wildlife and natural habitats. Environmental issues are covered, too, in keeping with the National Wildlife Federation’s mission to “educate, inspire and assist” for conservation purposes. Also, a “News of the Wild” section regularly apprises readers of interesting animal-related discoveries and developments.

***Natural History*. New York: American Museum of Natural History. Published most months (ten times per year). Since 1900.**

As its title indicates, *Natural History* embraces all of nature and its study. Articles examine topics in astronomy, earth science, biology, and ecology; archeology and anthropology are represented, too, as well as the history of scientific thought.

Over the past quarter-century, the magazine has also featured a series of interesting essays by Stephen Jay Gould, many of them combining curious bits of scientific and cultural lore with the author’s views on evolutionary biology.

***News from Native California*. Berkeley, California: Heyday Books. Published quarterly. Since 1987.**

The subtitle appearing on later issues sums up this periodical quite nicely: “an inside view of the California Indian world.”

This magazine reveals much about the state’s native cultures, past and present. Articles range from accounts of traditional activities to interviews with notable

individuals to discussions of legal and political concerns. The writings often convey not only personal knowledge and experience, but also strong feelings of respect and caring.

***Orion*. Great Barrington, Massachusetts: The Orion Society and The Myrin Institute. Published quarterly. Since 1982.**

A literary magazine, *Orion* is quite unlike the other periodicals cited in this section. The thought-provoking essays, poems, and illustrations gathered in it are an attempt to integrate different aspects of the relationship between people and nature — “the physically immediate, the analytical and scientific, the inspirational and creative.” Each issue has its own thematic emphasis; “The Place Where You Live,” “Rivertime,” “Tell Me a Story,” and “Wonder and Other Survival Skills” are some examples.

Until 1991 *Orion* was called *Orion Nature Quarterly*.

***Outdoor California*. Sacramento: California Department of Fish and Game. Published bimonthly. Since 1953.**

As a Department of Fish and Game publication, *Outdoor California* is primarily concerned with California’s wildlife and wildlife-related matters—habitat, protection, management, harvesting, and such. An annual photo contest helps bring high-quality pictures of animals, plants, and the natural environment to the magazine’s pages.

From the mid-1960s to the mid-’80s, *Outdoor California* featured a series of informative articles about many of the state’s wild animals. Reprinted in single-sheet format as “wildlife leaflets,” more than a hundred of these species-sketches are still available today.

***Ranger Rick*. Vienna, Virginia: National Wildlife Federation. Published monthly. Since 1967.**

A nature magazine “just for kids,” *Ranger Rick* is packed with eye-catching color photographs of animals as well as articles, stories, and activities designed to interest youngsters aged seven and up. Interpreters may be interested, too, because they’re likely to pick up ideas and information here that they can use in children’s programs.

This periodical was called *Ranger Rick’s Nature Magazine* until 1983.

***Scientific American*. New York: Scientific American, Inc. Published monthly. Since 1845.**

Articles in this magazine cover a broad range of science-related topics, some of which might seem rather technical to lay readers. One issue, for instance, contained pieces on “the asymmetry between matter and antimatter,” “the artistry of microorganisms,” and “computer security and the Internet.”

Diagrams, charts, and photographs help clarify the text. Also worth noting are two regular “commentary” columns: “Wonders” (by Philip and Phylis Morrison) and “Connections” (by James Burke).

***Sky and Telescope*. Cambridge, Massachusetts: Sky Publishing Corporation. Published monthly. Since 1941.**

This magazine is a fine source of current information pertaining to astronomy. Along with well-illustrated feature articles, there are news reports, reviews of telescopes and accessories, tips for backyard observers, a detailed guide to celestial happenings, and advertising that directs attention to all sorts of products for skygazers.

***Vital Signs [year]*. New York: W. W. Norton & Company. Published annually. Since 1992.**

For those who’d like current information about wide-ranging environmental issues, here’s a handy source.

The volumes in this series from the Worldwatch Institute summarize global environmental trends—“trends that are shaping our future.” With tables, graphs, and explanatory text, *Vital Signs* examines such “key indicators” as food production, world trade, population growth, energy development, and climate change.

*"In Nature's infinite book of secrecy
A little I can read."*

—William Shakespeare

Science, Poetry, and Parks

RECOMMENDATION FORM

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