

Mountain Time

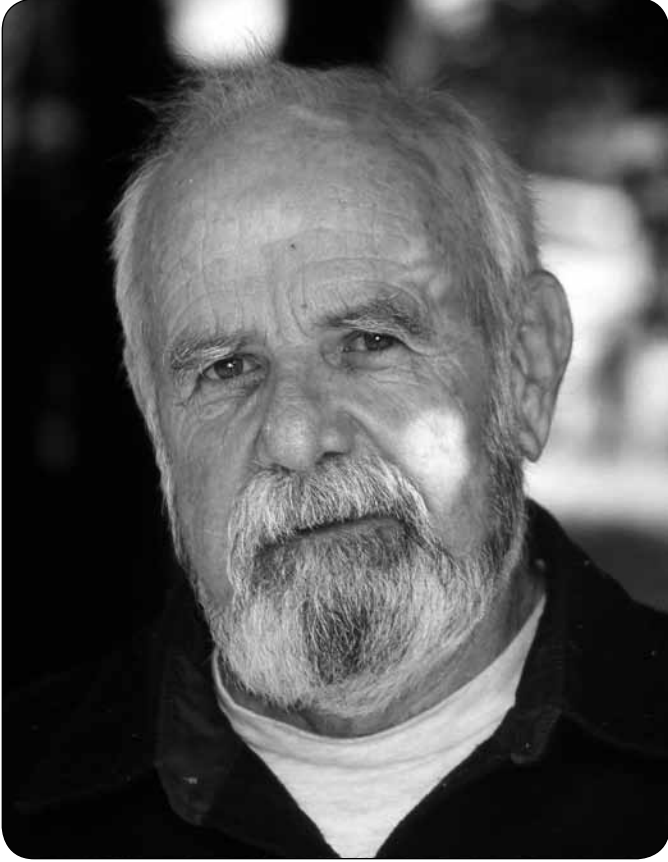


Photo courtesy of the Norris Collection

Kenneth S. Norris

Mountain Time

*Reflections on the Wild World
and Our Place in It*

Kenneth S. Norris

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(front) The Palisades, Sierra Nevada, viewed from
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(back) Ken Norris at Laguna Creek below the Norris house
in July 1996, courtesy of Dick and Teresa Norris

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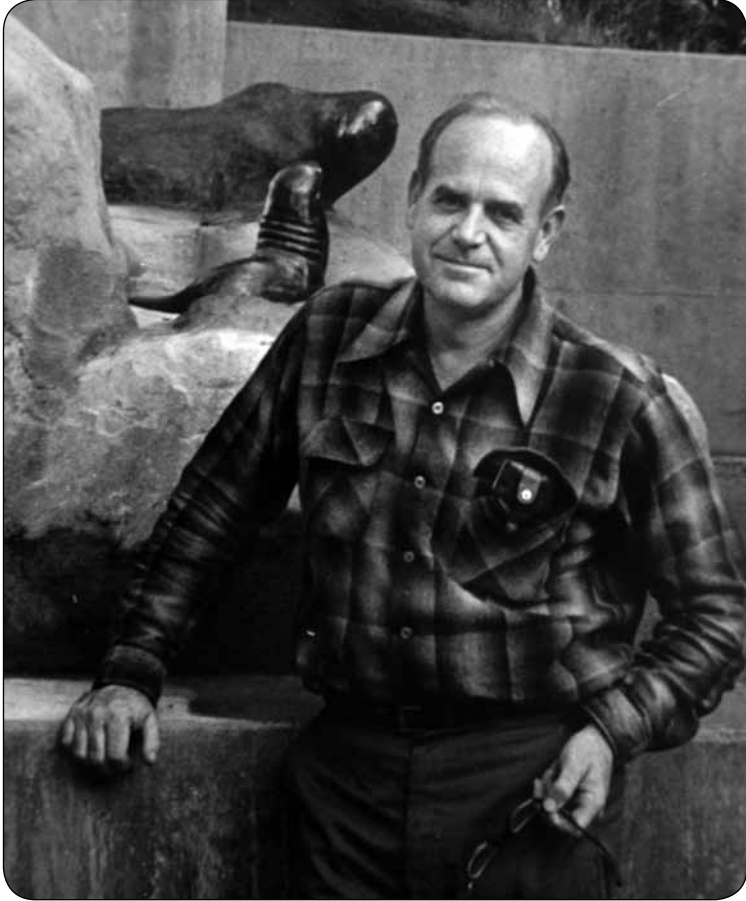


Photo courtesy of the Norris Collection

Ken Norris at the University of California, Santa Cruz campus, 1975.

FOREWORD

To understand how Dr. Norris's final work, *Mountain Time*, can keep a significant readership awaiting its publication nearly ten years after the author's passing, it is necessary to recall the life and stature of this unusual man. As a scientist, teacher, author, and champion of the natural world, Dr. Norris left a rich and varied legacy.

For eighteen years, he was a professor of natural history at UC Santa Cruz, where he became legendary for his ability to inspire students. He taught the highly popular Field Quarter class in UCSC's Environmental Studies Department, a wide-ranging and rigorous course in the natural history of California. Each spring, Dr. Norris led two dozen Field Quarter students into California's mountains, forests, and deserts to learn firsthand from nature. As a teacher and mentor, Dr. Norris influenced both undergraduate and graduate students, helping to launch many careers. In *Mountain Time*, Dr. Norris imaginatively recreates the experience of "going on Field Quarter" and, once again, emphasizes how critically important direct observation of nature is in both the sciences and the arts.

As a researcher, Dr. Norris divided his time and attention between the desert and the ocean. His early research focused on desert reptiles, and it was as a desert ecologist at UCLA that Norris discovered circadian rhythms in snakes and the function of color changes in reptiles and amphibians. By 1959, however, when Dr. Norris began teaching herpetology at UCLA, he had already spent a number of years as the founding curator at Marineland of the Pacific, the country's second oceanarium. Eventually, his interest in marine life led him to Hawaii, where he served, from 1968 to 1971, as founding scientific director of the Oceanic Institute. His research in Hawaii

included studies of spinner dolphins and fish culture, and much of what is now known about whales and dolphins, particularly their social patterns and echolocation skills, is due to groundbreaking investigations by Dr. Norris and his various research teams. In *Mountain Time*, Dr. Norris describes his desert experiences, in the Mojave Desert and in Baja California, and his marine experiences, in California and Hawaii, that led to some of his most remarkable discoveries.

Dr. Norris authored several books on whales, dolphins, and porpoises, and coauthored or acted as editor for several more. In 1992, he was awarded the prestigious John Burroughs Medal for his distinguished book of natural history, *Dolphin Days: The Life and Times of the Spinner Dolphins*, published by W. W. Norton and Company. His stature as a scientist enabled Dr. Norris to influence public policy in significant, long-lasting ways. As a scientific adviser to the U.S. Marine Mammal Commission, he helped write the Marine Mammal Protection Act of 1972. He also led a national campaign to reduce the numbers of dolphins killed in tuna-fishing nets.

Among Dr. Norris's many life accomplishments, he was especially proud of having conceived of and played a crucial role in founding the UC Natural Reserve System (NRS). Even as an assistant professor at UCLA in the late fifties and early sixties, he possessed the foresight to recognize the need to set aside undisturbed natural areas for teaching and research. Through his efforts and those of other UC faculty and administrators, the NRS was established in 1965 with seven original UC properties; today the NRS manages a reserve system of 36 sites. In June 1998, 33 years after the start of the UC reserve system and only weeks before Dr. Norris's death, the NRS received a \$4-million endowment from the David and Lucile Packard Foundation, which was named the Kenneth S. Norris Endowment Fund for the California Environment as an enduring tribute to his leadership.

Mountain Time will naturally please long-time devotees of Dr. Norris who are eager for new stories told in that idiosyncratic narrative voice they still remember so well. Readers of natural history will appreciate the insights Dr. Norris offers into our natural world.

For *Mountain Time* is also a work of considerable didactic power, in which Dr. Norris raises issues regarding the environment, and our understanding of it, that are even more relevant and more critical to the well-being of the Earth and our survival as a species than when he completed the book.

— *Susan Gee Rumsey*
Tim Stephens
NRS Publications Program
Natural Reserve System
University of California



Photo courtesy of the Norris Collection

Ken Norris and his field assistant Larry Ford kneel beneath a tree for a reverential moment during the 1979 UC Santa Cruz Natural History Field Quarter.

EDITOR'S PREFACE

Mountain Time has taken a long and somewhat unusual route from Ken Norris's keyboard to these pages. Those of us involved in getting the book into print recognize that readers—many of whom were acquainted with Ken—deserve to know what transpired between its composition and its publication. This preface tells some of that story and offers other information that may enhance your reading of the book.

Ken Norris began working on *Mountain Time* shortly after he retired from active teaching in 1990, seeing the book as an opportunity to write about his diverse passions free from the formal constraints of academic publishing. He wanted to recount his scientific epiphanies, describe how he inspired students in the field, warn about our ongoing destruction of the environment, explain how it was possible to meld the objectivity of a scientist and the emotional engagement of a poet—and not be terribly concerned about how it all fit together.

On the several occasions when I saw Ken post-retirement, he talked of his progress on *Mountain Time* with obvious enthusiasm. I understood that the book was to be much more than a memoir—Ken wanted it to be a vehicle for passing on his insights about teaching and the way the world works, a soapbox for airing his views on what really mattered. And I gathered that he was spending considerable time writing and rewriting, honing each piece and changing it to reflect his evolving ideas on each subject.

When a malfunctioning heart began necessitating doctor visits and tests, Ken was still writing. There were more stories to tell, better ways to say what had already been put into words, and new ideas to explore. Soon, operations and hospital stays intervened. But Ken made *Mountain Time* a priority. By the time he was admitted to the

hospital for the last time, Ken's final work was essentially complete—in the sense that drafts of all the planned chapters were written—but not, in his view, truly finished.

After Ken's death in August 1998, the manuscript for *Mountain Time* languished on his ancient computer at his home near Santa Cruz, California. After six years, two of Ken's former students—Larry Ford, a consultant in rangeland management, and David Hart, director of the Senator George J. Mitchell Center for Environmental and Watershed Research at the University of Maine—received permission from Ken's widow, Phylly, to begin shepherding the work towards publication. Ken's son Dick had copied the files to a floppy disk before Ken's computer was discarded, but those files were in what had become a nearly inaccessible format (and neither Larry nor Dave had a computer with a floppy disk drive). Fortunately, Dick's 15-year-old son, Tom Norris, knew how to read the files and copy them to a CD. After they received the CD from Tom in early 2005, Larry and Dave set about reassembling the manuscript, which involved much reformatting, restoration of footnotes, removal of in-text page numbers, and the like. Larry and Dave were subsequently joined in their editorial planning by Steve Gliessman, professor of agroecology at UC Santa Cruz (and Ken's teaching colleague), and Susan Gee Rumsey, principal publications coordinator for the UC Natural Reserve System, a program that Ken conceived of and founded.

Larry, David, Steve, and Susan ("the publishing committee") carefully reviewed and critically analyzed the *Mountain Time* manuscript. They noted that it was overly long and in need of editorial attention. They identified chapters that should perhaps be left out of a published volume because they were incompletely developed or on topics peripheral to Ken's central themes. In time, they also realized they lacked the time and expertise to carry out the editing that seemed necessary if the manuscript was to be published. That's when they contacted me and asked if I would be interested in editing *Mountain Time*.

Just skimming through the manuscript, I could see that it had many needs. There were four distinct pieces that might qualify as

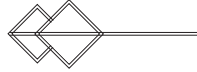
an “Introduction.” Several chapters were in such a rough form that they seemed more like expanded outlines. One chapter existed in two alternative versions. Halfway through a long chapter about religion, after a “postscript” notation, Ken had interrupted himself with a paragraph about plans to go to the hospital the very next day for open-heart surgery. The table of contents, which divided the chapters into three sections, called for placing the final chapter in the third section all by itself. In a few chapters, there were short passages that seemed out of place, possibly former footnotes now floating in the running text.

Reading the manuscript in depth, I discovered much else that required my attention: present-tense narrative shifted suddenly to past tense, long sections seemed to repeat much of what had been said in other sections, stories and arguments had noticeable gaps, chapters opened with vague big-picture ideas, reflections on the narrative appeared suddenly and without warning. Everywhere were the results of Ken’s tendency to digress, to forget the point he was making and begin exploring some new thread of an idea that his writing had just revealed to him. To the extent that Ken was aware of these problems, he had probably thought of them as extraneous to the real thrust of his writing, yet they most certainly stood in the way of readers navigating the text and gleaning the intended meaning.

Despite the manuscript’s faults, Ken’s writing enchanted me from the very beginning. Along with the hard-to-follow tangents, he had created evocative images, invented apt and lovely metaphors, used juicy verbs, and set down crisp detail. At his best, he had made his points with an elegant, poetic economy of words. The passion he felt for his topics was vibrating just below the surface of his prose, emerging at just the right times to send a tingle down my spine or a tear down my cheek.

The challenge I faced was clear: allow the poet, the wise sage, the perceptive scientist, the inspiring teacher to emerge from the tangle of the manuscript. I had to force Ken, *ex post facto*, to be a more disciplined writer than his nature had allowed. It was one thing to hear Ken expound on some subject in person—you could follow

him even if the path was crooked—and another to be reading his words without the benefit of dialogue and context.



I suspect that many readers want to know in some detail how this book, in its finished form, differs from Ken’s manuscript. Therefore, I will deviate from standard editorial practice (which is to be quiet about such matters) and tell you. The first thing to know—which you may already have inferred—is that the level of editing I applied is what’s known in publishing as “heavy” or “developmental.” I excised long passages of mostly redundant manuscript, moved paragraphs, re-ordered sentences, wrote new sentences and paragraphs, even moved passages from one chapter to another. I changed all the Field Quarter chapters from mostly past tense to consistent present tense. I combined short paragraphs into longer ones, restructured dialogue, resolved contradictions, and fashioned new chapter openings. Through it all, however, my utmost goal was to preserve Ken’s lucid and distinct voice and be true to his intentions. When the need for continuity called for inserting a new sentence or paragraph, for example, I constructed it, as much as was possible, with Ken’s words, phrases, and sentences—taken from the considerable store of deleted material.

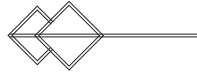
This published version of *Mountain Time* has five fewer chapters than Ken’s original (four of the five were earlier recommended for deletion by the publishing committee). Unfortunately, you won’t be reading the chapters Ken titled “Patent Application,” “Microbes in the Mist,” “Of Dolphin’s Ears and Violins,” “Lamb Chompksy,” and “Mountain Time in Brooklyn.” In addition, “What Can Eyes See?” no longer exists as a separate chapter, though its core has been preserved in “The Canyon.” These chapters contained worthy material, but each was either too roughly written, too speculative, or too far outside what the publishing committee and I considered to be the core of Ken’s philosophical universe. The manuscript had to be shortened if it was going to be published, and we deemed these chapters the most expendable.

Three chapters now bear titles different from Ken's. "The Granite Mountains" was formerly called "Field Quarter"; we changed it because we wanted "Field Quarter" to be the title of the first section. We changed the fifth chapter's title from "Mountain Time" to "The Canyon" because we didn't want to imply that this chapter had more to say about the Mountain Time concept than any other. Finally, we replaced Chapter 13's former title of "7±2" with "Of Chorus Lines, Fighter Pilots, and Shark Attacks" because "7±2" has acquired some unfortunate baggage over the years.

The book's chapters are still divided into three sections, as Ken had it, but they are allocated somewhat differently. Ken had placed all the chapters that weren't about Field Quarter into one long middle section he called "Windows to the World." Now, chapters about events in Ken's research career make up a shortened Section II titled "From Desert to Ocean," and the set of six philosophical, essaylike chapters (along with a final Field Quarter chapter formerly placed in its own section) comprise Section III, which retains its original title: "Windows to the World."

The table of contents includes a one-sentence description of each chapter. Although many of the phrases that make them up are Ken's, the summaries are my inventions. I decided to add them because they reflect one of Ken's intentions. He filled up considerable space in the introductory pieces of his manuscript with previews of the chapters, and since I deleted virtually all of these I wanted their function to live on in some form. In any case, they seem a good counterbalance to the cryptic nature of most of the chapter titles.

The current introduction is really a composite, made up of four introductory pieces included in the original manuscript: "To Begin With" (which contributes the title), "Who is This Author of Yours?" "An Autobiographical Note," and "What Do I Mean by Mountain Time?" The current introduction is much shorter than these four pieces together; what's been excised is mostly redundant material and summaries of the chapters. The chapter entitled "Uncharted Territory" is also an amalgam of two manuscript parts: the chapter by the same name and a free-floating essay (not in Ken's original table of contents) called "Humans and the Environmental Crisis."

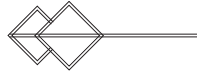


Throughout much of *Mountain Time*, Ken tells stories about his life and experiences. He recounts his childhood and college career in “To Begin With,” trips with Field Quarter classes in Section I, and his work with lizards, fish, and dolphins in Section II. You may be tempted, therefore, to think of *Mountain Time* as a memoir or autobiography. But Ken never intended for it to be that kind of work. The narrative in the book exists mainly as a means of communicating ideas and demonstrating points.

If you read *Mountain Time* expecting it to chronicle Ken’s life accurately and comprehensively, you will be disappointed on both counts. Whether it came from faulty memory, a perceived need for pedagogical efficacy, or his impish nature, Ken sometimes did get facts wrong, leave out critical details, order events differently from the way they actually occurred, and narrate in a way that might create mistaken impressions. How often this occurs no single person can say. I became aware of a few such embellishments; there are probably others.

The important thing with regard to the editing is that I did not attempt, for the most part, to find and correct narrative “errors.” Not only would this have been virtually impossible, but it would also have meant being too fussy about something Ken thought unimportant. Leaving in some facts of questionable veracity is a way, I think, of honoring one of Ken’s signature traits—he was a masterful teller of tall tales who oscillated freely between seriousness and whimsy.

I mention the issue of biographical comprehensiveness in part because of how it may concern those family members, colleagues, friends, and former students who took part in important parts of Ken’s life but don’t find their names mentioned here. For you, I cite again the fact that this book is not an autobiography. It is necessarily selective. Many people play major and minor roles in these chapters, but their inclusion has more to do with their connection to particular trips, events, or work that Ken picked out as exemplifying certain concepts or principles than with their significance in Ken’s life or career. If you are not among these folks, you should not feel slighted.



Although I did all the actual wordsmithing, I must acknowledge the active assistance and support of Larry Ford, Steve Gliessman, Dave Hart, and Susan Gee Rumsey. They reviewed the edited chapters, helped clarify details, answered questions, provided guidance when I asked for it, and relinquished control of the details of the process. When larger decisions had to be made—which chapters to leave out, what order to put them in, how to divide them into sections—we put our heads together and came up with a consensus view. And of course it was these four people who rescued Ken’s manuscript in the first place, did the editorial groundwork, and committed themselves to the goal of getting the book published. If they hadn’t taken the initiative and contributed many hours of their time, this book would not exist. I know they share my sincerest wish that you experience this volume as the living voice of our beloved “professor of wonderment.”

— *Eric W. Engles, PhD*
EditCraft Editorial Services
Grass Valley, California



Photo courtesy of the Norris Collection

Ken Norris at the Granite Cabin, Granite Mountains.

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Thanks to Phylly Norris—“Far and away my best critic”

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Steve Gliessman	Phil Pister
Dawn Goley	Paul Rich
David Hart	

As well as—

Miss Preen and Dr. V.

Finally, the Mountain Time publishing committee wishes to thank Alexander N. Glazer, director of the University of California Natural Reserve System, 1997-2009, for “spinning the wheel” to support the development and production of this book.



Art and photo courtesy of the Norris Collection



Ken Norris's original field vehicle, as it was in the desert at the Granite Mountains around 1949 (below, with Ken far left) and as he later remembered it (above).

TO BEGIN WITH

I'll admit it: this book skips all over the map. It might not seem to be about anything in particular except the wild world and our place in it. That's because I wrote it, and that's the way I am. Bear with me and the pieces may begin to fit together for you. They have fit together for me in a way that locks me to the earth and its life with the impassioned embrace of lovers.

To say what I want to say, I seem to need to talk about all sorts of seemingly unrelated things. I need to write about the shifting plates of the earth and who has hitch-hiked on them, the airy world of spores and floating spiders and those birds that slice by up among the clouds, and the myriad tiny spheres of quartz and feldspar that make up the dunes of the desert. I have to see if mere words can say why there is absolute elegance in a watershed, and in so doing I must describe the journey of water molecules after they slam as cold drops of rain into the soil skim of high crags and gather into a filigree of channels where trout flash, and then flow downward in close to a single precise arc while they wiggle like snakes in a graceful dance until they meet the sea. I must take you to a crystal cold sweet seep out among jumbled monoliths of pale peach granite and tell you what it was like to live by a song, sung by Chemehuevi elders, that knitted the austere-appearing world of the desert together into a place of plenty, where food could be had by sweeping the nodding heads of grass or chia with baskets, or in fall by sending young lads up scaly piñons oozing with sticky amber sap to gather cones.

You could simply skip ahead and read about these things, but I suspect you may want to know a little about the person who put them on these pages. That's the way it works for me, anyway—when I pick up a book such as this, I want to know something about the author. Who is this guy preaching to me?

The book you hold is an old scientist's book, the product of a reasonably gentle, social man who cares a great deal about those who travel the earth with him, would rather tell a joke than start a fight, and spent his life following the threads of his excitements. I began writing it when I entered the province of old age and realized I should no longer hold back because my perceptions might differ from those of friends. (I hope they will excuse me, even dismiss me, if I prove too troublesome. That is easy enough to do with old guys. You just prop them in a corner with some pillows and let them prattle on.)

So, I'll mention a few of the experiences that set me on my way, made me who I am, and determined the shape of this book. My childhood and early career were most formative—I imagine it is like that with most people—so it is mostly those times that I will describe here.

As a child, I was a clear amalgam of my mother and father. My artist mother, Jessie, was a resolute and remarkably energetic woman who dragged our family through the Great Depression by the scruff of its collar. She would shoo my brother, Bob, and I into the 1928 Chevrolet and head for Senegram's Used Clothing Warehouse down in the depths of skid row in Los Angeles, where the three of us winnowed through pungent piles of old clothing looking for wool items—old polo coats, pants, and the like—that she'd buy for a nickel a pound. At home she washed her treasures, cut them into strips, dyed them two dozen colors, rolled them into balls and then created the loveliest rugs you ever saw. These found favor with interior designers who catered to some of Hollywood's top stars. So, the Senegram's forays were matched with ones in which we drove the little Chevy, a lovely new hooked carpet poking out a window, up the arcing driveways of such personages as Lily Pons, the famous opera singer-actress. (As we approached Lily's home, Mom leaned over and told us, "Kids, she's a famous star, but remember, you're as good as anybody.")

My engineer father, Robert, kept his 4H pencils sharp for his elegant draftings of hospitals, check dams, and airports, but his heart

was mostly in the mountains, flicking his fly line across the water. I remember him as a dreamer and a sponge for the wild world. He knew much less about how to survive in the hurly-burly of the commercial world than my mother.

With such parents, it seems only natural to me now that I should grow up thinking in patterns, like my mother the artist, but also loving to thread my way through the analysis of natural puzzles, piece by piece, like my father. Exhibiting these tendencies early on, it was clear that I was a naturalist down to my toes and fingertips—teetering between art and science, seeking synthesis. Even when I was very small, the fascinations of the wild world gripped me. My little room was full of dried bats; the odorous tails of road-kill animals were tacked to the wall; stones with fossils protruding were piled around; and live lizards scurried in a sand-filled dresser drawer. (I can't recall where I put my socks and shirts, but I did understand my priorities.)

I grew up in the welcomed shade of a talented and very forgiving older brother, who became a well-known geologist and a magnificent teacher, and who seemed to know just how to do things. Bob and his pals took long trips across the wild lands of the West in the old cars he had salvaged, and he graciously invited me along. Those trips nurtured my love of nature and became the very foundation of most of what I would later do.

My unfolding as someone who could write this book started, of course, with childhood, but I was shaped and prodded into something close to a professional scientist as I explored my way through the University of California at Los Angeles (UCLA). When I came back from World War II, a grateful country paid most of my educational expenses, and the University didn't seem wholly rigid about how I spent the money I was given.

So, at UCLA I began a search through my loves. I started with the oldest one—chemistry—lured by romantic tales, such as the Curries starting with a ton of pitchblende and somehow reducing it to a tiny pinch of radium. But the reality of chemistry was pipe runs, foul air, and dark benches down deep inside a building.

I fled upstairs toward the light, to geology where people dealt with the entire earth. The concept of isostasy—the notion that mountains of “light” rock actually float in the denser rock beneath, like apples in a tub—was undergoing its first tests in those halls, and it was an exciting time. But for me, there seemed to be an invisible line drawn by many geologists. It separated life from non-life. Few seemed to notice the lizards that skittered across the sand or the cawing ravens, rolling and diving in the air above the dune slopes. I wandered on, seeking my center.

My hiking buddy, Bob Lindberg, suggested I come along on a class trip with a naturalist whose class he was taking. I signed up. The instructor, Dr. Ray Cowles, had been raised among the Zulus of South Africa, and he spoke that curious clacking language and still slept with a pistol under his pillow for protection from the many dangers of his youth.

Cowles seemed to miss nothing. As we drove along, a dove flew next to us. Cowles adjusted his speed until he could hold the bird at the edge of his rear-view mirror. Then, looking at the speedometer, he said, “Twenty three miles per hour, slower than most people would guess.”

Near dusk, we made the night’s camp amid the Joshua trees. Cowles heard a rattle, as from pebbles being shaken in a bowl. He stepped quickly back, peering into a bush. There was a two-and-a-half-foot rattlesnake, backed into a sinuous striking coil, its head and upper body wavering back and forth at ankle height. Swiftly, Cowles pinned the snake to the ground with the snake stick he routinely carried—another holdover from his days as a young boy in South Africa, where cobras, boomslangs, and vipers were common facts of life. He bent down and slipped his thumb and forefinger tight behind the snake’s jaws, while with his other hand he grasped the snake’s tail as its body looped and twisted, seeking purchase. Then he stretched the snake out, until it was held nearly immobile.

Under the pressure of Cowles’ fingers, the snake’s mouth opened, revealing erect needlelike fangs, drops of honey-colored venom welling from their tips. “It’s a Mojave Green; see the broad scales between its

eyes. This is the most dangerous rattlesnake in the United States. Those venom drops are neurotoxic; you slowly stop breathing. The venom is about three times as potent as that of any other rattlesnake.”

“Look at its upper lip,” he said, turning the snake’s head toward me. A chill passed over me to be so close. “That pair of pits are its heat sensors. This snake can hit a jumping mouse in the dark. It uses those pits to sense the mouse’s body warmth and to triangulate its strike.”

“I’ll put him down now,” he said. “Stand back.” He bent close to the ground and lightly tossed the snake next to a bush. It quickly slid away among the branches. I was deep in a chaos of emotions—of fear at being so close to this deadly snake, of fascination about its remarkable attributes, and of awe at the insouciance of the Doc in handling it for us. (Later, I was to repeat this demonstration once a year for my own classes, always knowing that sometime I must slip and perhaps be bitten. Then toward the end of my teaching career, I quit the demonstration for different reasons. I’ll tell you about them later on.)

After our sparse dinner was complete, Cowles called me over. Already he had seen how keen I was in that class of twenty. “I thought you might be interested in this,” he said, digging into a deep pocket of his canvas field jacket. “It’s the seed pod of the Joshua tree.” He opened it, showing me the black seeds stacked like poker chips.

“Notice,” he said, handing me a pod, “that many of these seeds have holes in them, while others don’t. The holes are made by the larva of the moth that pollinates only the Joshua tree.” He told me that the tree is entirely dependent upon these little moths if it is to reproduce successfully, and that the moths take their tithe by laying eggs that hatch into caterpillars that ultimately eat many of the seeds—but not all. Perhaps 30 percent survive uneaten. Cowles told me of the moths that might flutter near our camp at dusk, and then we saw them. He speculated that the big ivory-white Joshua flowers are beacons for the moths in the twilight.

Moths and Joshua trees! A tithe of seeds paying one for the service of another, and the other way around, too! Moths that must

emerge and find Joshua trees at the right time for their species to continue. Precise interlocking life plans had somehow stitched together two very different species. I walked through the dusk filled with wonder.

In a week, even though I was a senior geology student and all my requirements for graduation were complete, I switched to biology. It was total, instant commitment. My companions were Charlie Lowe, the teaching assistant for Cowles' class, and intent, humorous Dick Zweifel. We three virtually lived in the lab next to Cowles' office where all the lizards and snakes were kept, and where the big zinc cabinets of bird and mammal skins sat. Charlie cooked hot dogs in a beaker while we steeped ourselves in desert biology. (All three of us would go on to careers in field biology: Charlie to a distinguished professorship at the University of Arizona, where only a few called him "Charlie," and Dick to the curatorship of reptiles and amphibians at the American Museum of Natural History in New York, where he became a world authority on amphibian evolution.)

Ray Cowles proved to be much more than a desert biologist to me. He was also a seer, a man of deep concern for and knowledge about the earth, writ large. His gentle accessibility and patience let us ask him anything at all that was coursing through our restless young minds.

One day, a sheaf of yellow typewritten paper in my hand, I approached Cowles' office door and looked inside to see him working at a pile of correspondence. He motioned me to the chair beside his desk and turned toward me. "What is it, Ken?" I can't remember how I broached it, but the gist of my question was this: Nature's rules seem so concrete, so ultimately definable (even though many remained only partially understood), yet in our society we often seemed to disregard these rules altogether in favor things we make up about ourselves. For instance, we seemed to regard ourselves as above Nature. In some ways, it seemed to me, we lived in a self-constructed dream world.

"Wouldn't it be better," I asked, "if we learned to run our affairs in terms of who we really are, and how the natural world actually

works, than to live by imagined rules?" I placed my little treatise on Cowles' desk, its title—*The Naturalistic Ethic*—plainly visible. "I've put some of my ideas down here; could you take a look at it when you have the time?"

The Doc nodded and swiveled around. "That's a handful, Ken. Do you have time to talk a little?" That was the Doc for you—he so graciously pushed aside his own affairs that I quite forgot my intrusion. "You know, Ken, I've thought about those questions a lot. Our understanding of ourselves is way out of kilter with how we behave in the world." He talked of our exploding population, which even then was eroding the world. He talked of our agriculture, which traded tractor fuel for food, without concern for where the fuel was coming from, its effects, or how long it would last.

"And what sense do wars make, Ken?" he added. Pulling a volume from the shelves alongside his desk, he said, "Here's a book you might find interesting. It's about us and the great apes and aggression." He pushed the volume toward me. I rose, and took it.

"Thanks, Doc," I said, and walked, bemused, out into the laboratory. Those yellow, badly typed pages (which I still have) and that conversation mark the beginning of this book. Though many of my formulations seem now to miss the point, and my views of human society have evolved, the questions I grappled with then are alive in the chapters that follow.

Later, as a new-minted zoology graduate student, I found myself immersed, with a kind of timid awe, in profound debates about the nature of inheritance and how species are formed. Remember, this was the late 1940s, before the DNA molecule was revealed as the road map of inheritance, before we understood that continents were rafted on the earth's mantle to rift apart, swirl, and grind, or to dive under each other, taking their skim of life with them.

Charlie Lowe had acquired a remarkably subtle understanding of how evolution was then thought to work. He located an almost clandestine epicenter of the debate up high in the botany building, in the laboratory of a gentle old botanist, Carl Epling. I trooped along after Charlie, taking it all in. It surprises me even now that

such centers of ferment can exist on a big university campus without ruffling the surface of most of what goes on. Most of the staff of UCLA in those days had no idea that the very conception of how life had evolved was being tested on their own campus. The old conceptions flowed placidly along in the minds of most scholars, while the basic underpinnings of their world were being nudged and prodded.

A few from campus were regulars at our seminars. Usually it was Professor Dan Axelrod from Geology, who even then was a major student of ancient floras, Professor Harlan Lewis, another botanist who was soon to become an important figure in studies of plant evolution, Mildred Mathias, Epling's totally encyclopedic assistant, and we zoology students who gathered up in Epling's lab to experience the ferment.

The great outside protagonists of evolutionary theory came through as well, and we graduate students listened and argued interminably about the doctrines they espoused. Better still, we went into the field with these almost mythic figures and ate each other's cooking. The greatest evolutionary geneticist of that day, Theodosius Dobzhansky, had set up a massive experiment with Epling to test whether or not they could actually document evolution as it took place in nature. The idea was that if a long series of stations where wild fruit flies could be collected was established across the top of Mount San Jacinto and down the desert slope toward Palm Springs, the scientists should be able to test the effects of the changing seasons and climates upon the genetic structure of the flies, who reproduced more than once a year. Some of the fly's gene frequencies should change over time.

Nobody cared if you squashed flies, so Dobzhansky and Epling attempted to detect such change under their microscopes by raising thousands upon thousands of flies, derived from ones caught in nature, smearing out their chromosomes, and matching up the banding patterns, the loops and inversions of the chromosomes they found there. This test, begun out across the mountain, had the potential of detecting evolution as it occurred.

Along with the two scientists, several students and I combed the mountain pass for fly populations (though I spent much of my time catching reptiles). Finally we did show that these little animals were “genetically polymorphic.” In one season, one genetic arrangement predominated over another, and then as the season changed, the frequency of the arrangement shifted back again. This was not quite evolution, but it was very close. Should the climate of the pass have changed permanently, it seemed certain that the populations of flies and their genetic structure would have responded, adjusting to the new climatic regime. And that would be evolution.

Another thing the test showed, and almost as important, was that such evolutionary changes could be expected to occur rapidly—even from one generation of fruit flies to the next—using stored-up variation. That, I later came to understand, was how multicellular creatures managed to keep up with the simpler forms, who simply played out evolution through their almost incalculable numbers, chance change in their genic arrangements, and the ubiquity and statistics of cell division and death.

Epling tried another brave test, and we students—his enlisted, unpaid research army—followed after him. We crept the desert floor, attempting to make exact maps of a tiny inch-high “belly plant,” *Linanthus parryi*, that flowered in dense profusion in two color morphs, one white and one royal blue, all scattered together like pepper and salt across the desert gravel. Epling hoped that he could show changing patterns of the two colors, which he knew were lodged in the plant’s basic genetic structure, and thus show gene exchange in a wild population of a living species, something that must happen in the course of evolution, but which remained untested. This quite staggering effort didn’t bear any fruit—founding on the sheer difficulty of making exact maps, year after year, of where each flower type had been sprouted from its tiny seed and where it had shouldered aside the gravel grains. But for we students, on our hands and knees amid the cactus spines, what mattered more was that we were savoring actual contact with a frontier in human understanding.

We were down there, sitting on the desert sand with brown bags and sandwiches, eating lunch with the greats in the field. What we participated in was not a new understanding about the world, but a demonstration of the integrity of our leaders. To them, it mattered only that we all get it right and that the results be interpreted without any human bias at all. Their willingness to cast off disproven ideas, and the sheer difficulty of the task they undertook, told me how the naturalist must work. Nature didn't always give up easily; that was obvious.

After these experiences, my search progressed from the desert to the sea, from reptiles and amphibians to fish. I moved on to Scripps Institution of Oceanography, where I studied a little piscine inhabitant of the local tidepools. In the course of this research, however, I became enamored of the open ocean, and it turned out that this new fascination would steer my course for the next two decades and beyond.

All Scripps students were expected to go to sea, so I took part in an expedition trawling for deep-sea fishes. I marveled at these otherworldly creatures, with their rows of living lights, and then succumbed to malaise as I tried to sort our catch on the afterdeck, the fishes sluicing back and forth in their tray as the ship rolled. But I was transfixed when a great blue whale coursed alongside our inadequate 85-foot seiner, and I sucked in a breath as the whale swung under us, producing a false bottom on our fathometer seventy feet down. I watched enthralled when, on a black night, Pacific white-sided dolphins crowded to our bow, sleeves of phosphorescence sliding over their bodies and roiling behind their fins as they cut and dove. In time, I came to understand that, out there in the open sea, different imperatives rule than in the intertidal fringe or on land. For a terrestrial naturalist like me, the open sea was a world that needed much rethinking.

Even before I finished my PhD, I landed a job as director of the brand-new Marineland of the Pacific. Soon, dolphins and other cetaceans became a major focus of my efforts to build up the collections and exhibits at the oceanarium. With the dolphins, I found myself immersed in the study of mammals that, in the total isolation of a long evolution at sea, had evolved brains to rival our own in size. Of

what use was this obviously powerful possession? I wondered. What hidden purposes had it come to serve? As I spent more time with these remarkable creatures, many other questions arose. Why did dolphins always swim together? What did I mean when I talked so blandly about “schools”? What lay hidden in their internal communication?

Then followed a twenty-five-year-long natural history effort, the most difficult I ever undertook, to learn about the lives of these graceful, elusive animals at sea. My colleagues and I came part way, but most still remains out there, masked from our present understanding by the sheer difficulty of our being in one world—the air—and they in another—almost always beneath the water.

While still embroiled in dolphin work, I took a position at the relatively new University of California, Santa Cruz, where I would finish out my career. It was here that I resolved more than three decades of confusion about what to call myself, finally settling on “Natural Historian.” So, for years the little card on my door in the Department of Environmental Studies said “Kenneth S. Norris, Professor of Natural History” and listed courses in both the traditional discipline of Biology and the new interdisciplinary field of Environmental Studies.

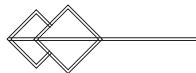
Beginning in 1973, my first full year at Santa Cruz, the spring quarter slot on this list was almost always filled by what would become a three-course, 15-unit composite called “Natural History Field Quarter.” For this class, a teaching colleague and I, together with a teaching assistant, explored wild California with twenty-three eager students, camping, teaching each other, and beginning to unravel the fundamental patterns of nature. We left campus in a patient old blue bus, prepared our camp meals on student budgets, and reported our ideas to each other while sitting around a campfire, smoke swirling around, considering such things as the behavior of trees in high mountain winds, why rivers twist and turn, how the Forest Service protects our National Forests, and the source of our deep emotional attachment to the things of life. In between trips, the students invaded libraries, called officials, consulted authorities, and composed their presentations.

We leaders recognized that there are many windows to the world and so we selected our students broadly. We traveled with emerging biologists, musicians, economists, grade-school teachers, outdoor educators, agriculturalists, geologists, poets, and more. I think there were a few more women than men out of the 400 who ultimately traveled with me in my fourteen years in the bus.

In such intimate company, we found our way deep into each other's lives. One day, two of the students came to me and asked: "Ken, would you marry us?" I dismissed the idea with a wave of the hand, citing my lack of credentials to do such a thing. "No problem, Ken, we'll fix that." And so, accepting that I was something like a ship captain, I became a lay minister, and later, certificate at the ready, six more couples were joined by me in the most intensely human rituals I was to experience. Our theatre, as you might expect, was in each case the majesty of Nature.

I learned much from the students, who were in that formative, often painful time of life when a new-minted adult breaks loose from family to seek his or her place in the swirling chaotic world, all the while listening to the powerful imperatives of growing up. They were searchers themselves—the world spread out before them, theirs to interpret, theirs to change, theirs to lead. Thus I found myself in an exploration of our world much broader than I had planned. Together we held a slice of time, a little longer than either of us could have held alone. Sometimes we could see where things had come from; sometimes we could sense where they were going. And in this way we came to form little incomplete windows of wisdom that most others seemed unable to see.

I carried a long string of insights and observations with me in these fervent explorations with our 400 students. As I learned and pondered with them, I reflected over and over about the questions I posed so many years ago on those yellow sheets of paper that I had given to Doc Cowles.



This book is organized in a way that reflects—in a nonlinear way, of course—the wandering trajectory of the life I’ve just described. I think of the chapters as beads on a string, which together form a single, complete necklace. In the first five chapters (Section I: Field Quarter), I describe some of the ventures during which the Field Quarter students and my colleagues and I found our place with each other, how we learned to see in Nature, how we grasped that the scientific viewpoint is just one way to see the world.

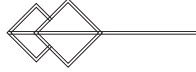
Then, because every teacher like me is the sum of his or her experiences, I go back in time to describe, in the next eight chapters (Section II: From Desert to Ocean), some of the moments when I saw deeper than before into some aspect of life, the times when I formed my personal understanding of natural process. These times of insight sketched out what I could teach and shaped the philosophical core that I could bring to that endeavor. These chapters more or less follow the unfolding of my scientific career, which led from the desert to the edge of the sea, and then to the *terra incognita* of the open sea. Through them run several themes, the most inclusive of which is the antiquity of the arrangements of life.

In the last section of the book (Section III: Windows to the World), I take this theme further to reflect on how the unbroken sweep of life takes human history deep into the past—far, far beyond what we usually think of as our origins, revealing our species as a simple twig on a very large, ramifying tree of life, a tree that has taken at least three quarters of Earth history to grow. It’s in this section that I present my sometimes-iconoclastic ideas about human society, our systems of faith, and our clouded future as a species.

At the very end, I take you back to the Field Quarter class on our last trip high on a majestic fin of a mountain, where we share an intense last time together, emotions held in check just below the surface—the students poised to leave the safe capsule of the blue bus and each other, to scatter throughout society, and me looking at the end of my teaching career.

I hope, when you are finished reading, that all these times of seeing and of insight seem strung together into that necklace I men-

tioned, painting in the pieces of my larger view of Mountain Time and beyond.



If you've followed me this far, I expect you want one more question answered before you launch into the chapters: "What the heck does he mean by 'Mountain Time'?" Mountain Time is simply my metaphor for natural process. At its basic level, it expresses something akin to what ecologists mean when they use the concept of niche. By making *Mountain Time* the book's title and central metaphor, I hope to impart the idea that Nature is not just a here-and-now thing, but a thing-through-time, built of nesting, connected layers of organization that allow the many faces of life to be expressed.

Life, of course, exists in space as well as in time. Plants and animals occupy a patchwork quilt of space out on the wild mountain. Think about redwood trees. They don't grow everywhere, especially down where their occurrence is patchy, as on the southern edge of their range. They are down in river canyons and on north-facing slopes, out of the hottest sun. That's mountain space, and you can go and actually see it. What you can't see is that the distribution of redwood trees has changed profoundly through time. They were once much more widespread than they are today, and then before that they had a beginning somewhere. That time dimension has been just as complex as the space dimension is now.

By using a term that doesn't refer directly to the space part of the equation, I know that I irritate some people and sow a little confusion. But I don't want to call the book *Mountain Space-Time*, because that would throw my poetry out the window. So, trusting that most readers will infer the spatial aspect of Nature lurking within my title, I stick with *Mountain Time*. Anyway, *Mountain Time* has a nice ring to it, and I like it.

— *Kenneth S. Norris*
Santa Cruz, California
1998

PART I • FIELD QUARTER



Photo by Steve Gilessman

*Students visiting Kelso Dunes during the travels of UC Santa Cruz
Natural History Field Quarter 1984 rest in the shade of the Blue Bus.*



Photo by Steve Gliessman

UC Santa Cruz Natural History Field Quarter at the Granite Cabin, Granite Mountains Reserve: (top) the cabin nestled among the boulders, 1984, (middle) students setting up camp, 1989, and (bottom) students on deck, 1981.



Photo courtesy of the Norris Collection



Photo by Steve Gliessman

CHAPTER I: THE GRANITE MOUNTAINS

A slight, almost forlorn figure stands under a parking lot floodlight, surrounded by a mound of her field gear. A zippered field notebook hangs like a tether around her neck.

“You’re Kathy, aren’t you?” I ask as I drive up.

“Yes,” she replies tentatively, peering into my pickup window in the fading darkness.

“It’s me, Ken, your fearless professor. You’re in the right place. The others will be coming soon.”

As dawn begins to streak the eastern sky, students pour into the Barn Theatre parking lot at the University of California, Santa Cruz, and then the big blue bus rumbles up. We are beginning an odyssey during which we will quit our campus in favor of living, camping, and traveling in the outside world. We will stay out most of the spring and wander wild California from top to bottom, from the starkest desert to the glaciated crest of the Sierra Nevada. We will become explorers together. The rigid separations between student and teacher will quickly soften until we become a tiny society built, as it should be, of elders who carry the dimension of time and of new questers, looking ahead to see how the world must be changed. We will learn from each other, and in the end many will never want to go back.

Steve Gliessman, my teaching colleague, and Larry Ford, our teaching assistant, jump out and begin to organize the packing of the bus for the long trip ahead. A massive mound lies on the ground: crated vegetables; cardboard boxes bulging with bagels, loaves of bread, fresh tomatoes, a sack of potatoes, peppers, onions, and garlic; the first aid kit; and the “Parnassus,” a portable library with carefully selected books arranged in two long wooden boxes.

I will soon tell everybody that we carry a dehydrated librarian, Miss Preen, in a separate box and that, when we get to camp, all we will have to do is add water and she will sit up and rap anyone's knuckles who doesn't get his book back on time.

But, alas, she is imaginary.

Soon everything is passed into the bus, bucket-brigade style, and strapped in place. Larry and Steve take extra pains to see that the rear door of the bus remains unobstructed by this huge pile, so that we can all escape out the back in case of an emergency on the road.

A pair of sweethearts drives up in a battered old car, the engine revving in neutral. A young woman decked in field gear steps out, embraces her friend, and slings her bags on the pile. The two reach toward each other, lock hands for a moment, kiss, and then he drives off. I must warn her, I think, that when she returns from this trip, she cannot hope to share her new world fully with him. He will want her back in his reality, and she will be partly in another.

We three teachers have learned that none of us can guide this little society alone; not one of us is to be a leader for everybody. Some students will gather around Steve, he the quiet deep seeker, sometimes on a buffeting ride of his own. He will prove a magnet to those who share similar paths. Buses and engines love Steve, telling him where it hurts and letting him get them going again with pieces of wire or paper clips. I, older and no longer so challenged by the present, can dispense my hopeful vision, and so another group will hew to me. Alas, mechanical things fall apart in my hands, and I can name you ten places on our travels where we would still be calling for help were it not for Steve.

Larry, our teaching assistant and just recently a student himself, never met a list or a schedule he didn't like, and he understands the crosscurrents flowing among the students better than either of us. He will tell us: "Laura needs assurance from one of you; she wonders if she fits here."

Each of us, in his own way, deals with the constant social battering we take as leaders in this questing, intense society. As a first line of defense, I protect my private space with jokes, and then some-

times I sign out and wander alone near camp, to lie down under a pine and watch the clouds sweep by. Steve's refuge is sometimes his tent, but more he often walks to some mountain ledge to watch the sunset as the cold wind begins to grip and the owls to call.

Our invited visitors this trip are "Cosmic" Joe Jordan, a scientist from the space laboratory of NASA Ames, over the hill in Silicon Valley, and his estimable lady, Mary Flodin. When he can find time from work, Joe handles the cosmos for us. He visibly vibrates at the chance to show students the things of the physical universe, such as double or pulsating stars, 46-degree haloes and sun dogs, the Moire patterns formed by rows of grapes as the bus glides by, or the curious behavior of raindrops falling in tire ruts. He is a treasure. Mary, a very experienced outdoor education teacher, will gather around her our half dozen fledgling outdoor teachers and quietly show them the way.

We climb aboard Old Blue, Steve at the wheel. Larry sits behind him, while I stand in the front door well. Steve starts up our familiar old bus for another year's adventure; the air brakes are checked with a hiss. I pull down the microphone hanging from the door stanchion above me. "Welcome to Field Quarter '82. Check your triads."

Throughout the spring, this little triad routine will save us hours of counting heads. Each student had previously been assigned to a private group of three. They didn't even have to like each other. Whenever we ask, they have but to look around to see if the other two triad members are present. It gives us an almost instant answer to whether or not everybody is down off the mountain.

Steve inches the bus forward, crunching over the gravel.

"Robert is not here," comes a voice from the back of the bus.

We look back at the now-vacant parking lot and, sure enough, here comes Robert, trotting hurriedly out of the big California Bay thicket, pulling at his fly. The three of us look at each other and wordlessly file Robert in the "to be watched" category.

On this first trip, we are heading south, down between the Coast Range mountains, across the southern toe of the great Valley of the San Joaquin, up the tilted granite slab of the Sierra Nevada, out through a gap in its crest, Walker Pass, down onto the limitless

desert, and 150 miles later we will stop at a tiny shack, a redoubt set among the rocks of a lonely mountain in the wildest Mojave Desert. There we will stay for seven days, learning to know each other, dispelling fears, and beginning the long process of learning to see how the wild world works.

For we three leaders, mother-henning it over our diverse and largely unknown brood, the spring will be an almost constant exercise in vigilance. Thus Larry, Steve, and I learn about motherhood. We silently wish for a safe spring, as fervently as any parents.

I have come to understand that these trips mean much more than teaching in any formal classroom setting. I am not up there behind a lectern, proper and remote, handing down the holy writ. Instead I am a sharer in the quest as much as they. They will draw that sense of time's dimension from me, and from them I will come to partake of the present shape of their changing world, its fears and vibrance. Rednecks, I had come to understand, were people who had stopped their growth and become frozen in time and place. These students were to keep us from that, and were to keep alive my wonder at this world of ours.

There is, indeed, much ahead for these students, and we will work them hard. Each will keep a daily personal journal, which we leaders will share with each student after each trip, all twenty-three volumes of them. We write our comments in pencil in page margins, should they want to erase them. Many will pour out hopes and fears in those pages, and thus we will come to know them better than most friends. We, older, have little trouble imagining ourselves back at their age, to that time of earliest adulthood when families, lovers, futures were often a trembling muddle, yet to be sorted out.

Each student will prepare and give oral presentations, often their first, on matters as diverse as the state of forestry practice, the habits of coyotes, or how mountains are formed. Sometimes, in past years, these have been given as little playlets, a practice we came to accept as a good and reasonable way of getting across the gist of, say, how continents collide. They will form their own thoughts more silently about larger, deeper puzzles.

Between trips, the students use libraries to prepare their reports, then contact officials, if need be, and compose their remedies. The results are delivered to the group after dinner in some cabin or around a windy campfire with the smoke swinging in to sting the eyes of listeners. On the trips, each will practice the arts of observation and record the results in special journal entries called "Observation Series." The subject might be how a three-foot waterfall shaped the rock onto which it fell, the curious clumping behavior of brine flies, or the vigilant behavior of hummingbirds, who continuously swivel their heads in a search for rivals and predators.

We will clean up camps until every last shred of trash has disappeared from the pine needle blanket. Frequently the students will jog us with some new wrinkle of care for the wild world, just when we thought we were leading them. New replaces old, and they are from a more-concerned generation than we had been at their age.

The students settle back as Steve noses us out onto the nearly vacant street. Most of them know from student word-of-mouth that they are beginning an adventure that will change many, that lifetime bonds will be cast, and that the spring will be one long epic of as-yet-almost-unfathomable form. Most are still alone, sitting quietly in their seats, watching the streets of Santa Cruz go by, waiting for it to happen.

The bus skirts by the little harbor at Moss Landing, on deepest Monterey Bay. I take the microphone. "Out there under that flat ocean, lies one of the deepest submarine canyons in North America," I say, pointing to the calm sea. "Beginning right here at Moss Landing, the canyon drops below the sea surface, following a zigzag channel down to about 6,000 feet below sea level, deeper than almost any other canyon in North America. After that, it winds its way down to the 12,000-foot deep abyssal sea floor. In its black waters live some of the most exotic life-forms on earth, and they are just now being seen for the first time, transmitted up a long fiber-optic tether from the underwater television cameras of the Monterey Bay Aquarium Research Institute's remote-operated vehicle. The institute's headquarters is that big gray building over there. It's somehow hard for me to

grasp that one has to go just half a dozen miles offshore to reach one of the least-known parts of the earth and to see living creatures that almost no one has ever seen before.”

On south we drive. Steve takes the mike and begins identifying the native trees of the nearby hills as he drives along. “Those ones with the bluish caste to their leaves are blue oaks. Look down in the river valley and you will see one of California’s most magnificent trees, the valley oak. You can tell it because its leaves are greener than the blue oak. It can be huge, and it has long dangly branches and leaves that hang down like a skirt. The valley oak is in trouble, since grazing animals apparently eat every young tree before it can grow up.” He pauses. “Who knows what its Latin name is?”

“*Quercus lobata*” comes a voice from the seats. Steve looks in the rear view mirror to see who his new botanical confrere is.

A few miles later, I take the mike again. “Here it comes, everybody. We’re about to go across the San Andreas Fault. That’s where many of the earthquakes in California come from. Think of it as a long, deep crack in the earth that runs all the way up from Mexico and goes out to sea way north of San Francisco. The San Andreas is the boundary between two tectonic plates that ride on the earth’s surface. We’ll be leaving the Pacific Plate, which is to the west, and we’ll drive right onto the North American Plate to the east, if all goes well. The fault’s just up ahead in that broad valley there.” I point to a jagged fault trace running up the hills to the south. “I hope we make it. If that baby goes off while we’re on it, we’ll spin like a top.”

“Aww, Dr. Norris, you wouldn’t josh a naïve young student, would you?” comes another voice from the seats. The student telegraph had been at work again. They are already onto me. On across the south end of the Great Valley we drive. I explain that in Miocene time there had been a deep, almost enclosed arm of the sea in this valley. Then we climb up the south end of the Sierra Nevada mountains amid the wildflowers of early spring.

“A dime for the first Joshua tree,” I announce.

I can faintly see a forest of them in the east-west valley we were traversing. It is a westward salient of this typically desert tree that

at a somewhat warmer time had made it over the mountain pass ahead of us.

“There,” says Rebecca, pointing. “Where’s my dime?”

Steve soon pulls to a stop just off the pavement. Among the blocks of tumbled granite he has sighted the gaudy blaze of a Sierra redbud in full bloom and, up the hill behind, the sticky golden cups of the flannel bush, newly unfurled.

“Two new plant families for you to learn,” says Steve.

The old blue bus groans its way over the pinyon-clad crest of Walker Pass and onto the east-sloping margin of the Mojave Desert. Ahead of us is a vast vista of buttes protruding from sloping aprons of alluvium called bajadas, while deep in the valleys between lie pale, dry lake beds.

“We didn’t even have to use granny gear,” says Steve. “Old Blue is running good, so far.” He cruises to a stop. “You take over, Larry, after we look around; I need a snooze.”

We know we have hit a “flower year.” Every sixth or seventh spring, the western desert lights up with flowers. Apparently, when the fall rains come at the right time and in sufficient quantity, they prepare the seeds, which are then incubated in moist soil to burst forth into one vast garden. Yellow *Lasthenia* tints the dun hills; lower down, amid the dark Joshua forest, the pale orange mounds of desert apricot are in bloom; and the gravel between is washed with purple *Gilia* and tiny yellow poppies.

In moments, Steve has a dozen students down on the ground, learning to identify plants. “Key them out” is the phrase he uses for learning to fly our plant bible, *A California Flora and Supplement* by Philip Munz.¹ “A half dozen well-prepared students carry this big red volume in special zipped shoulder bags, just as Steve does. We know that, before the spring is over, these six and probably several more will be arguing about the newest plant taxonomy and spitting out Latin names at a remarkable rate.

I kick over the rotted trunk of a downed Joshua branch and see movement amid the fibrous duff. I call the nearest students to me and soon hold a tiny wriggling brown lizard, *Xantusia vigilis*, by one

hind foot. This creature, I tell them, violates what zoology textbooks tell you about the difference between reptiles and mammals. This lizard nourishes its unborn young internally through a placenta-like structure and then gives birth to one to three minute brown young, each wrapped inside an enveloping membranous sheath. At birth, the little mother bends around to bite and tear away the restraining membranes, freeing her young, which at once wriggle deep into fallen Joshua tree debris. After that, they're on their own.

We rumble our way down past the east rampart of the Sierra Nevada, its crests hidden in clouds, on down the sweeping bajada. Inch-high flowers grow so thickly between the clumps of saltbush that melted butter seems to have been poured there.

On we drive in the afternoon warmth. All, except Larry the driver, begin to succumb to the somnolence of the afternoon, and the buzz of voices subsides. Feet go up on seat backs and heads nod. Finally, three hours later, Larry swings the big bus off the pavement and onto a two-rut dirt road, banked on each side by a colonnade of big creosote bushes, almost touching the bus as it passes. He picks our way along delicately, if one can be called "delicate" driving a bus. The ruts lead toward a thousand-foot wall of huge granite slabs and pinnacles looming just ahead of us. Larry expertly bridges ruts that I expect to hang up the bus at any moment, but rocking and creaking we wind through an arid scrubland, which becomes ever more dense with bushes of several kinds as we near the mountain. Some flower yellow, and the spiky-leaved yuccas are in full bloom, topped by thick opulent spires of waxy white. Everybody is up in their seats, looking for some evidence of the cabin. There is no habitation to be seen, only that rampart of granite, notching the sky.

"Look up the mountain a little," I instruct. "It's colored like the rock. I can see the chimney now, and the roof." I point. "That's it. What did you expect, the Sheraton Mojave?"

Larry pulls the bus to a stop atop a gravelly hill across a deep sandy wash from the granite outliers of the mountain. We cannot drive further, so everything will have to be portaged down the hill, across the wash, and up the rock stairs to the cabin, which is built in amongst the

huge boulders—two inner walls are faces of the rocks themselves. The portage takes a remarkably short time. A long winding line of students, each bearing a box, a sleeping bag, or a tent threads its way from the bus and up to the cabin. Soon an enormous pile of dunnage is heaped on the cabin's spacious wooden deck, with things rodents would like to eat stowed in cabinets and drawers inside.

I gather everyone around me on the deck. "I'll tell you how we found this place. It was in the late 1950s. We had decided to build a desert retreat. So we began exploring. I knew about these mountains from my earlier work on dune animals, and so we came here. The others were making lunch out there on the bajada as I climbed along this rock face. I came up over that boulder there," I said, pointing south past a gnarled old pinyon pine. "I saw that crack in the rock, with a film of water running over its face. Goldfinches were clinging to the rock, drinking. Even a little seep of water like that is precious in the desert so I immediately wanted to explore its source."

"The others shouted from below, saying the sandwiches were ready. I told them to hold on, that I'd found water. I made my way toward the cleft, entered it, and there in the semi-darkness I saw a clear pool of water gleaming in the shadows. I knelt and tasted it. It was sweet and cool, a priceless find on this arid desert, where most water is heavy with salts."

"I've found it, I've found it!" I shouted to the lunch makers. The upshot was that we looked up who owned the land—it was the railroad—and we obtained a lease on one acre, including the spring, and built our cabin. It was built mostly out of discarded materials from abandoned mines or from old railroad ties that had been pulled out from under the rails by maintenance crews and thrown aside as new ones were put in place. Today the railroad saves all those old ties and sells them to gardeners for building walkways and retaining walls, but not then. They just tossed them out. The desert was littered with them. Every rancher had built his corrals out of them and sometimes his headquarters buildings, too. The roof beams of the cabin were built of telephone poles that had been struck by lightning and likewise thrown aside."

“One could never do things now the way we did back then. It was all John Wayne and the Wild West out here. It’s much better now. This desert is not being torn up the way it once was. I have hope for the wildlife and the plants now the way I never did then.”

Today the cabin site is far inside the fenced and protected boundaries of a huge university teaching and research reserve. When the reserve was formed, the cabin was given to the University of California and sometimes used for classes like ours.

I know that some of the students, not yet in tune with the exotic and austere landscapes of the desert, view our surroundings with fear, but experience tells me that it won’t take long for such concerns to dissipate as we introduce them to the flowers now blooming, the gaudy cactus and succulents cupped in dozens of hidden rock gardens, the singing toads that emerge at dusk to crouch in rocky pools, trilling, the flitting canyon bats who crawl alone from crevices in the afternoon while it is still light, and the canyon wrens whose fluted calls ring like liquid silver in every little draw. Tonight the cacomistle may even come out, though it seems impossible that this lovely ring-tailed cat, a wild animal that lives under the cabin, will stand such traffic as we have brought with us. (Amazingly, the beautiful animal will later appear right among the students and lay down on the highest bunk.)

Steve instructs the students about the flight log. “Before going on any hike out of earshot of the cabin, everyone must—I repeat, *must*—fill out the flight log. It’s that black-covered, bound notebook marked ‘Flight Log.’ Take your topographic maps with you (we had provided copies for everybody). Write exactly where you plan to go, and, above all, stick to your plan. Do not change it in the middle of a hike.”

A special urgency fills his voice as he emphasizes the flight log, but we three know that we will have to keep after these new companions for a while until the urgency of the matter strikes home—probably after some group is a bit late coming down off the mountain. Then the looks of concern on everyone’s faces will show that Steve’s serious words had finally been taken to heart.

“Look around you. This place is a wilderness. Someone could fall off a rock and not be found until the stink attracted vultures.” He pauses for emphasis. “We have saved three groups of hikers with that flight log. Because the hikers had done what we’d asked them to—filled out exactly where they planned to go and then stuck to it. In every case, we were able to walk right to them.”

I feel a little private grip of fear, a fear that will not wholly go away until we deposit everyone at the barn parking lot after the last trip of the spring. Such restrictions of freedom as we try to extract are the price of coming here, I think. Nature could care less. (Looking back, though, in all my seventeen years we never had an injury we couldn’t care for, and though sometimes people wandered, in the end they were all safe, all 400 of them.)

The food group begins preparing our first meal together amid much chatter, as others shift and store supplies in the lockers. A huge pot for spaghetti goes on the propane stove, long loaves of bread are fished out of the chaotic pile of gear, sliced and buttered and put to warm by the now-crackling fire. Over on the drain board, three other members of the food group begin assembling a giant salad.

Good, good, we leaders think. It seems like a wonderful, willing group, full of good spirits. We already know from the interviews that there are many talents among them. Such folks will, in time, be our extra teachers.

By this time, more than a decade after my first trip, a great many lessons have been impressed upon us, most having to do with the social equation presented by traipsing off across wild California with twenty-three young people deep in finding themselves, each at that stress-filled fulcrum point of life where they know they must break free of families, loved or not, to find their own way. Fears in these adults-in-information are often deep, their need for love deeper still, and the necessity of forming a new world from the old a commandment.

My natural reticence and a perhaps subliminal sense of my role carried me through the early years before I began to understand what must guide the leaders of such a class. We must be guides and adjudicators, sharers of discoveries, salvers of sorrows, and givers of the

hope and excitement of life just ahead, but we must remain outside the intimate tug and haul of the student dynamic. Otherwise our presence will polarize rather than weld the group together. "We leaders must become sexless uncles," I finally verbalized to myself.

My first intimation of this came on my first class in 1973, on a trip to Santa Cruz Island, a few miles off the coast of California. We had hiked hard that day, climbing the highest peak of the island and had then skirted down the long dry slopes to a tiny pond impounded in a rocky draw near the center of the island. The water was deep and bone-chillingly cold. A single stream, like the water from a farm pump, arced in from ten feet up, drawing a veil of bubbles down into the black water.

In a trice, with no word from me, clothes were cast aside and sleek young people were diving off rocky perches and into the water, their laughter ringing from the cliffs. I, too shy and uncertain to join them, clambered around the rocky shore to a secluded place where I too, shed my clothes and slipped into the water for a refreshing moment before coming quickly out to sit shivering on a pool-side rock.

I hadn't been there long when I heard loud, garbled, echoing voices from around the bend. Five young women in gay conversation appeared and paddled toward me. They saw me and, with a cheery welcome, swam over, slid out of the water like penguins onto the ice, and took places on both sides of me, dabbling their toes in the water.

"Hi," I said, reeling off their names, but feeling alone and wholly exposed. They continued their previous conversation as if I had not been sitting there between their dripping bodies. The discussion turned to menstruation, and to the problems of taking long hikes when one's period came, and then, for Heaven's sake, one of them began discussing the state of her clitoris. No one had ever discussed the state of her clitoris in my presence before.

For all my discomfort, something vital was revealed in those moments. I had been accepted as a sexless uncle. I was above the fray, which was exactly where I strove to be. Yet, like the monk taking the vows of celibacy, I knew that I remained just as I had been, a sexual being. The monk could speak of the Lord testing his will. I simply knew that sexuality is an intrusion that can shatter and divide. It

wasn't so hard, really; our trips were interludes, and it was wonderful to sing old show tunes up in the front of the bus with my new young woman friends, with none of the usual electricity or tension between us. Miraculously, we could ask the questions that came to mind, exchange ideas, fears, and hopes, once our different sexes were out of the equation.

Other dimensions of this odyssey of ours have slowly come clear to me. I know that we leaders have three major roles. First, we define the journey and lead the way across the mountains and down the rivers. We describe the world through which we travel in all those dimensions I have mentioned. That is a pretty straightforward assignment. Not simple—but straightforward.

Second and not so obvious, we try to release in each of the twenty-three, shy and bold, the feeling that they are free to explore with us, that their eyes are as good as ours. I know instinctively that we leaders must not overwhelm these young people with our own attitudes; many are so tentative, so uncertain of their personal worth. We must make clear that, while we are repositories of knowledge who can provide much of what has been learned about this wild world, they are the ones who will take these materials and reshape the present, and they will take different paths than ours. They are the ones to begin the redefinition of the future. We are, student and leader alike, integral parts of the process of social change, neither better nor worse than the other.

Finally, the key to releasing this feeling of belonging, of freedom to take part, is to make our blue time-capsule a moving island of trust where everyone inside feels safe, where everyone feels listened to. I know it will take much of the quarter for some in this year's group to emerge from their layers of reticence, and that it will only happen because we provide different ways, different levels of expression to them.

On this trip, I've noticed that some already feel free to express themselves—to borrow the bus mike from us, for example, and tell everyone what it was like to grow up on a farm like the one we are passing. I know that others, a little less bold, will feel released a few days hence when they get a chance to demonstrate their knowledge—

identifying a phainopepla, being the first to key out a bladderpod, giving a report under the glowing lantern about the elements of bird migration. Others, more private still, will speak at first through their journals.

This first night, some of them write on the kitchen tables until long after midnight, late enough that I finally shoo them out to their sleeping bags so the lanterns can be doused and others can sleep. “Time to quit now. You can’t see Orion very well with the lamp turned on.”

The brilliant white of the mantles fades, turns to pale wavering blue, and pinches off into darkness. Tomorrow I will show them how to see.



Photo courtesy of the Norris Collection

Resident ringtail at the Granite Cabin, Granite Mountains.