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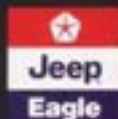
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You say it's Muir birthday, zoos go wild, grannies for peace, touchy stalactites, fishy gutters, and more.

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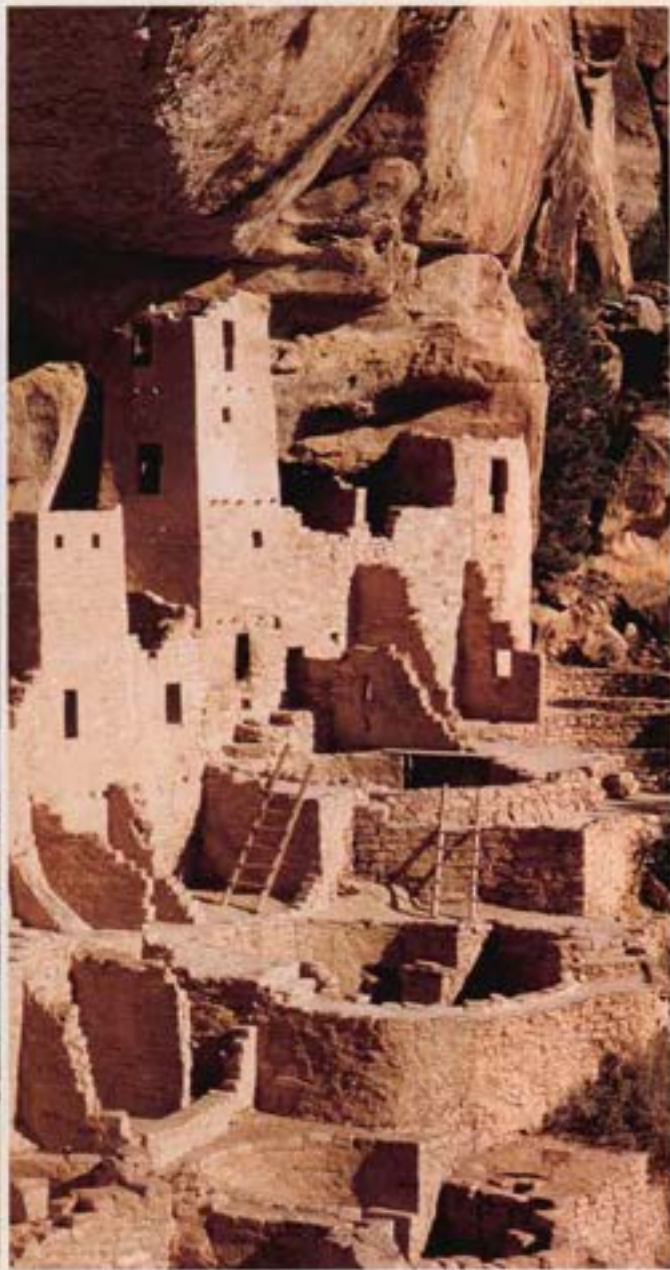
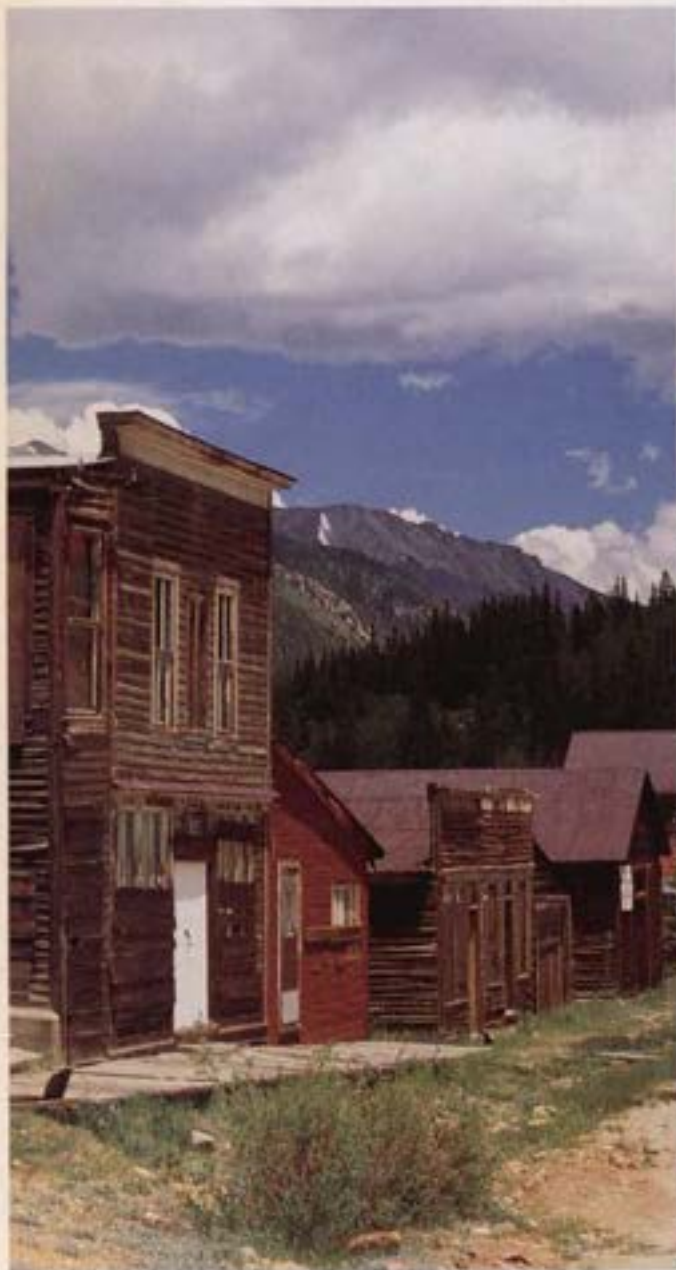
COVER: A lichen's-eye view of the Ruby Mountains. For more on Nevada's proposed wilderness areas, see page 46.

Photo by David Muench.

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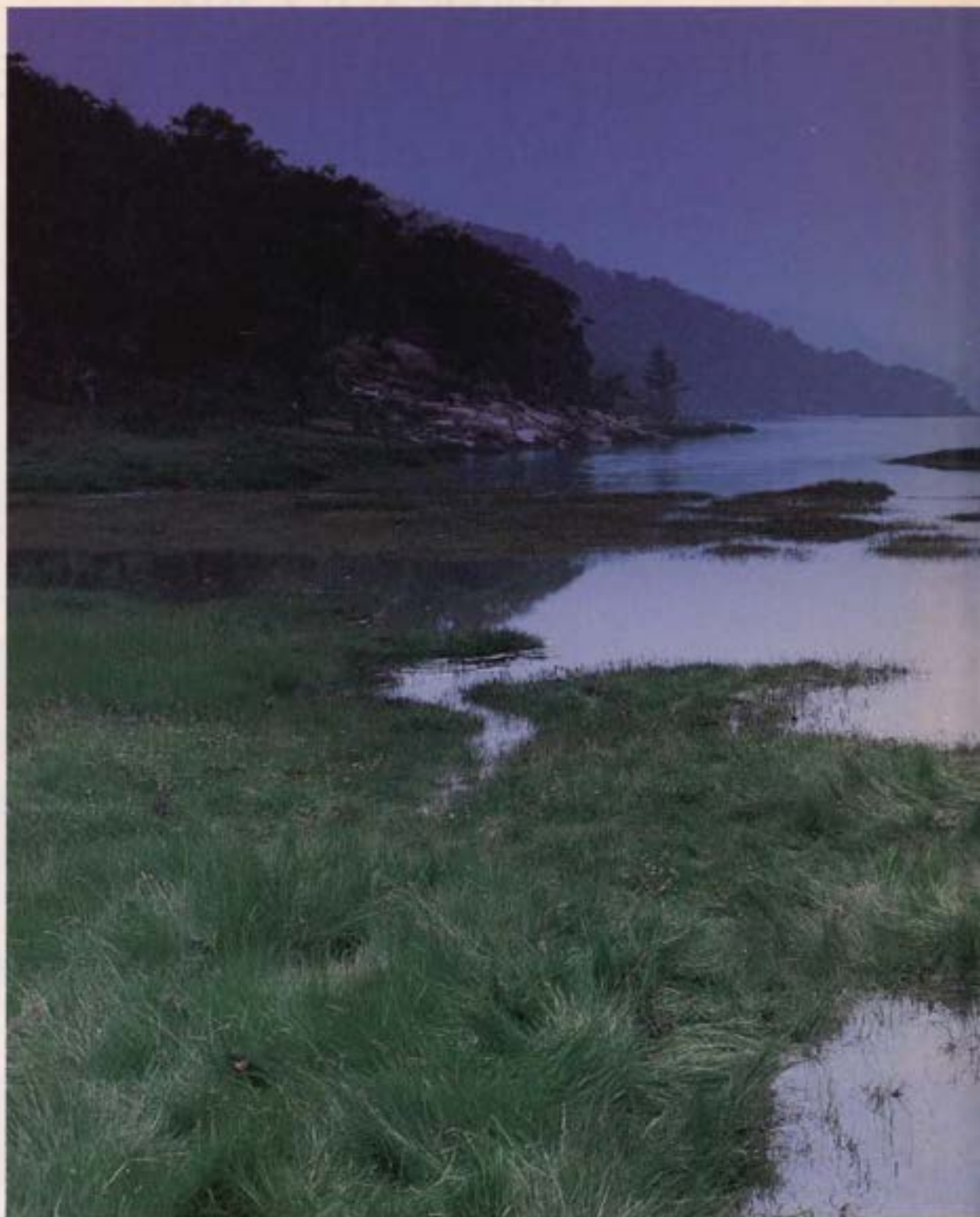
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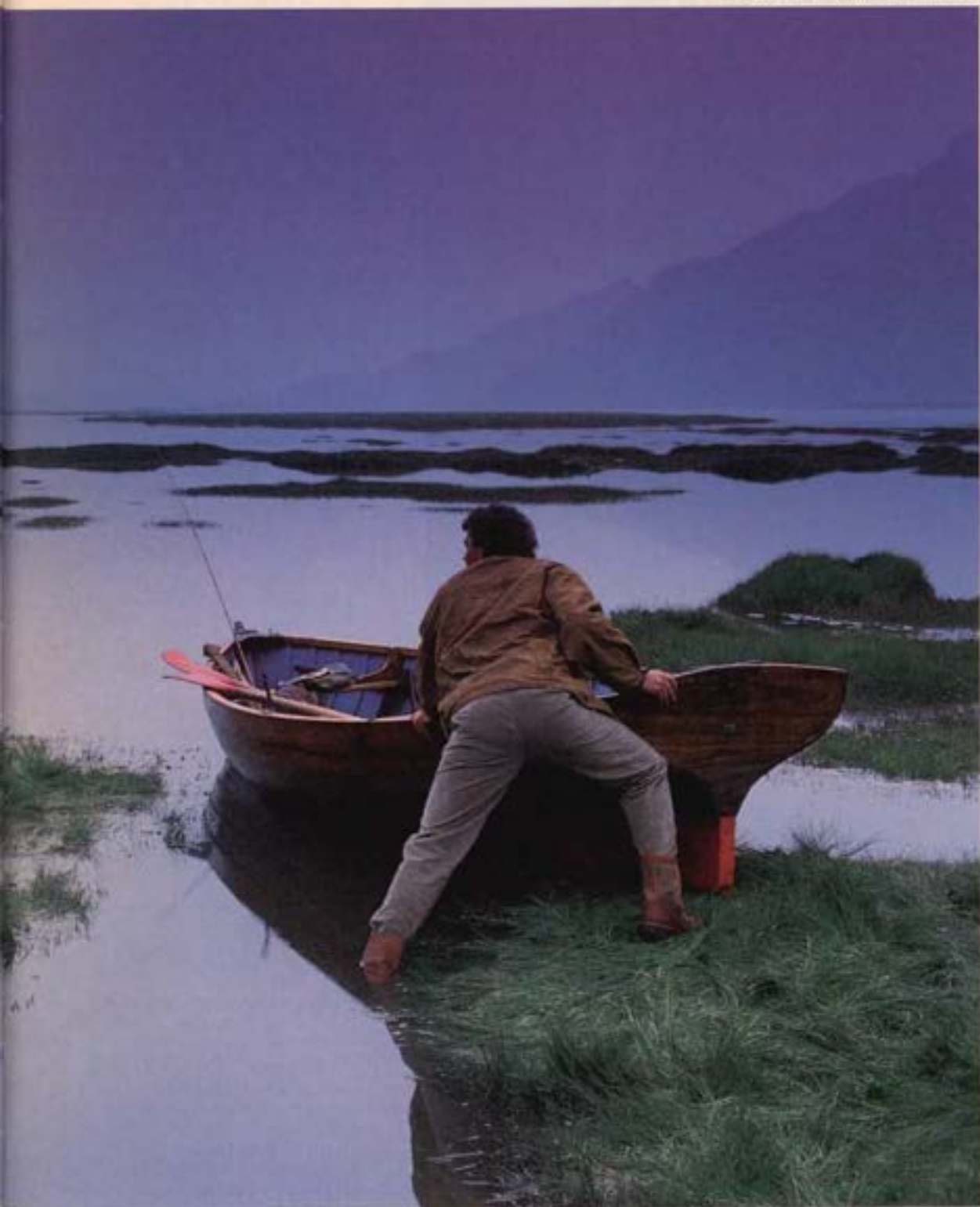


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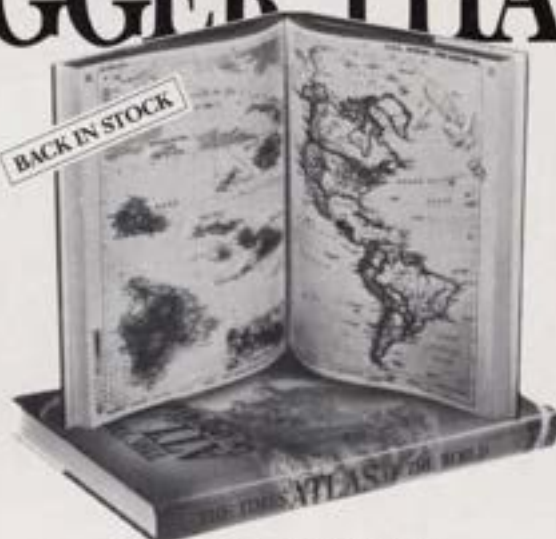
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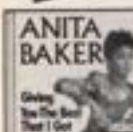
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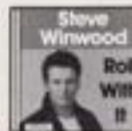
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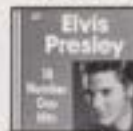
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Olympic
Silver Medalist

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LETTERS

WHERE THERE'S SMOKE...

The fires in Yellowstone National Park have been duly noted in the January/February issue of *Sierra* ("Beyond the Burn"). And the conventional wisdom—that the fires may in the long term be beneficial to the park—has been affirmed. What has not been so well observed is the effect on the inhabitants of the Montana-Wyoming area; in that respect the fires have been a disaster that could set back rational, well-informed environmental policy by a decade.

A first consideration for anyone who cares about forests and mountains and wild places is a proper respect for the neighbors of such places. I spent several weeks in Red Lodge, Montana, when the fires were just getting under way. Even then the air was fouled daily by clouds of smoke that stung the eyes and hid the sky behind an ugly brown haze. The scene was worse than the worst I've seen of California smog. Is not the whole environment, even the environment on the prairies 300 miles downwind from Yellowstone, the concern of the Sierra Club? I have newspaper clippings and photos that were forwarded to me later in the summer showing monstrous clouds of smoke 200 miles from Yellowstone. I saw those same clouds of smoke in September 35,000 feet over Ohio, thinner but still signifying an environmental disaster. Does the Sierra Club favor air pollution?

In the midst of a hot, dry, smoky summer, the people of eastern Montana and Wyoming had to listen to statements that the fires were a good thing for the park. For the park, perhaps; but for the people, definitely not. Were park officials so unfamiliar with the very special weather of that region that they expected the rains to come without fail? After three or four hot, dry weeks those officials could have realized that a fixed policy of letting every fire burn itself out needs occasional modification.

Gerald Davidson
Menlo Park, California

OFF THE ROAD: IS FAIR FAIR?

Dan Dagget's article "An Old Foe With

New Tricks" (January/February) suggests that off-road-vehicle activists are finally organizing against environmental groups. Apparently Mr. Dagget feels the right to this sort of power should belong only to certain "select" groups, such as the Sierra Club. But if there were no significant backing for such organizations, they would cease to be a threat. Since they do exist, they need to be recognized and dealt with—not ignored, or forced out of existence. The ORV organizations are operating within the system and deserve to be dealt with fairly. Users of these vehicles (and I am one) need to be educated about using designated areas responsibly and staying out of restricted areas—but without designated areas, ORV use will continue without any control at all.

A caption to a photo that accompanied this article read: "Leaving no habitat untouched, a motorcyclist roars through a cattail marsh." This claim is totally without merit. The motorcycle in the photo is not "roaring" through the marsh: There is no spray flying from the tires (indicating excessive speed); in fact, it appears the motorcyclist is barely moving. The motorcycle pictured is an enduro bike designed for slow speed and maneuverability. This could easily serve as a perfect example of an ORV being operated in a responsible manner in a designated area.

Eric M. Sween
Somerset, New Jersey

The Sierra Club doesn't oppose off-road-vehicle recreation, but does insist that it be judged on environmental merits. The motorcycle shown in the last issue—even if it were being ridden slowly and carefully, as reader Sween suggests—is inappropriate in a wetland. In this life-rich zone, vegetation, nesting waterfowl, and many other animals and organisms are vulnerable to off-road traffic.

THE FACTS HAVE REGISTERED

Your January/February "Afield" article on the Sierra Register Committee's work to preserve historic mountaineering summit registers is appreciated. However, the claim that we bring any

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original register we locate to the Sierra Club Archives at the University of California, returning only a photocopy to the summit, is inaccurate. We have never removed any register from a summit unless it was either completely full or weather-damaged, and I'm appalled at the thought of removing registers that don't meet these criteria.

Robin Ingraham, Jr.
Sierra Register Committee
Merced, California

CONSUMERS CORNER(ED)

I was momentarily intrigued by the statistical data collected on Sierra Club members, as reported in January/February's "Afield." Then, on second thought, my intrigue turned somewhat sour. What is the purpose of such a survey other than to show how wealthy and consumerist the average Club member is? At a time when so many are homeless, ill-fed, poorly housed, illiterate, or suffering from AIDS, knowing who owns a CD player or has ski equipment seems such a slap in the face to the less fortunate. Your survey may play well on Madison Avenue, but what does

it have to do with the environment?

Craig Machado
Oakland, California

I have been troubled for some time by the consumerism in *Sierra* articles and especially on the advertising pages. But your November/December 1988 "Outdoors" column ("More Than Just Kicks") bothered me to the point of protest.

If we truly value conserving our world, we need to get along without the newest toy or a visit to the newest yuppie place. Each thing that we "have to have" uses resources that are then either changed or gone forever. If author Reed McManus' four pairs of skis are made of wood, timber companies have destroyed whole ecosystems for the lumber used to manufacture them, replanting with single-species trees if they have bothered to replant at all. If the skis are plastic, they have been made with other resources that are now gone.

Rather than print articles that push consumerism as a value, please encourage people to do with less, to live minimally and lightly on this Earth we cher-

ish. Trying to preserve forests while bragging about eight skis for the use of two feet is what used to be termed "two-faced." Get back to basics.

E. H. Stewart
Eugene, Oregon

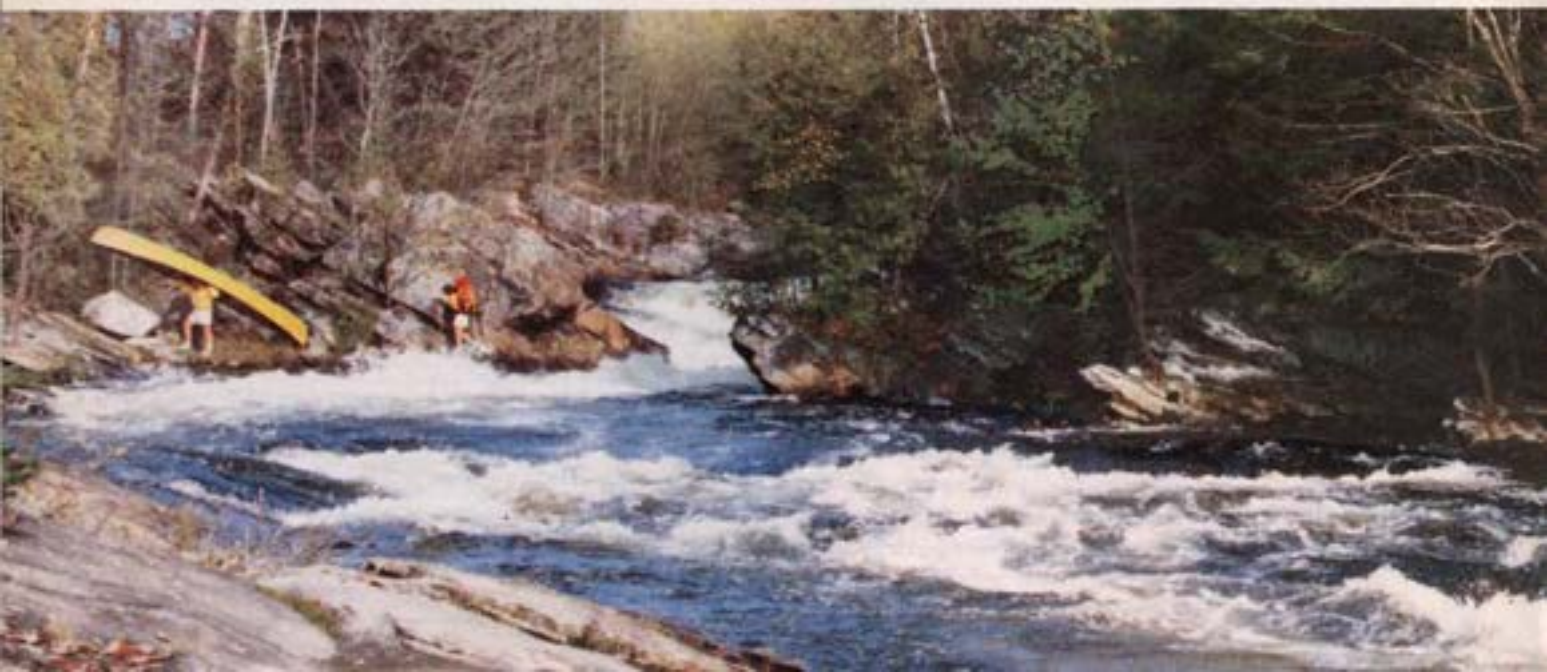
In your reply to Susan Allen's question about energy-efficient refrigerators ("Questions & Answers," January/February) you failed to mention an important fact: Manual-defrost models use only about half as much energy as do frost-free models. Although manual-defrost models can be difficult to find (try Sears), their efficiency makes them worth looking for.

Jeff Stone
Tulelake, California

THE U.S. WAR ON COCA

"The Big Push" (November/December 1988) smacks of the anti-establishment bias that often taints articles about the environment. Writers enjoy portraying government officials as bumbling idiots. The truth is that officials have to make difficult, balanced decisions that are never clear-cut, and that address the

Many of our outdoor activities are connected by rapid transit.



interests of all, not just a few. That includes the worldwide battle against drugs and the battle against illegal coca cultivation and cocaine production in the Andean countries.

Neither the State Department nor the Peruvian government is the environment's enemy in Peru. It is the drug traffickers, who practice slash-and-burn agriculture that scars the land, who indiscriminately use herbicides, pesticides, and massive amounts of chemicals on their coca crops, and who dump millions of gallons of harsh chemicals (used to process the coca leaf) onto the jungle floor and into its streams. If coca cultivation could be effectively deterred, the land would have a chance to heal.

I do not agree that the fight against coca is a "no win" situation. There is one way we all can win, and that is to fight both production and consumption. Instead of scoffing at the State Department's programs in Peru, the Sierra Club and others who care about the Andean environment should work together to find the most safe and effective way to eradicate the coca while also encouraging ecologically sound develop-

ment efforts in all areas where illegal drugs are grown.

*Martin B. Tatum
United States Embassy
Bogotá, Colombia*

Your overview of our nation's efforts to take its domestically failed War on Drugs to the highlands of Peru was very informative, but I believe your readers were left with a misconception regarding the apparent innocuousness of the State Department's pesticide of choice: tebuthiuron ("Spike").

Because of the shambles the U.S. pesticide-registration program is in, neither State nor the consulting firm that prepared the superficial environmental assessment for the coca-growing nations of the Andes can correctly say "Spike is essentially nontoxic," because the data to back up such a statement simply are not there.

Indeed, although Spike is widely used in the United States, an EPA review of its data base in 1987 led the agency to request that Spike's manufacturer, Elanco (Eli Lilly), submit further data on virtually every aspect of long-term toxicity

to mammals, from cancer to birth defects, genetic damage, and other forms of chronic toxicity. Such studies will take from one to more than four years to complete, and even longer to review.

Rather than assume that a pesticide like Spike is innocent until proven guilty, the inverse is more appropriate—especially considering that pesticides are developed specifically to be used as poisons. For instance, according to the EPA review, data on tebuthiuron's chemical cousins (linuron, diuron, and monuron) show that they can cause bladder, kidney, or testicular tumors. Tebuthiuron is known to cause liver and kidney damage and has also been found in the milk of lactating lab rats.

The use of Spike in the United States as proposed for Peru would be considered illegal on a number of grounds. Not only is the chemical not registered for use in Peru, its use would violate virtually every warning on the product label, which cautions against applying Spike where it may contaminate water or food or result in erosion, or where "future landscaping" (i.e., forest or agricultural growth) is planned. The United

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States plans to use it on the hillsides of the rain-soaked valley that forms the headwaters of the Amazon Basin, in an area (as the article points out) where food is grown.

As Greenpeace and six other environmental organizations stated in a June 1988 letter to the Department of State, "The drug-enforcement mandate of the U.S. government does not justify activities that run counter to all principles of human health and environmental protection."

*Sandra Marquardt
Pesticide Information Coordinator
Greenpeace U.S.A.
Washington, D.C.*

GREAT SMOKY MISHAPS

A number of errors in the November/December 1988 "Afield" article about invasive species in the national parks ("Invasion of the Parks") could do immeasurable damage to the campaign for a Great Smoky Mountains Wilderness.

George Moore's preserve was never in the Great Smoky Mountains—not in the area now within the park, nor in the mountain range bearing that name. It was in the Unicoi Mountains, now a part of the Nantahala National Forest.

The article implies Moore obtained permission to establish his preserve from the national park, when in fact there was no park in those days. Moore owned his land, and there were no restrictions on its use. He got no permission for what he did from anybody; he didn't have to.

Moore's hogs were not Russian; they came from Prussia, and that name became corrupted into "Rooshian." The hogs got into the park for the first time in the 1940s or '50s. (The most logical theory is that they walked across the bridge at Tapoco.) Control of the hogs has been a major success by the park management, which you overlook, or ignore.

Hardest to bear for us on the front lines will be the taunts of local anti-wilderness radicals that if we don't know where the wild boars came from, we can't know anything else.

*Theodore A. Snyder, Jr.
Walhalla, South Carolina*

Sierra regrets these errors.

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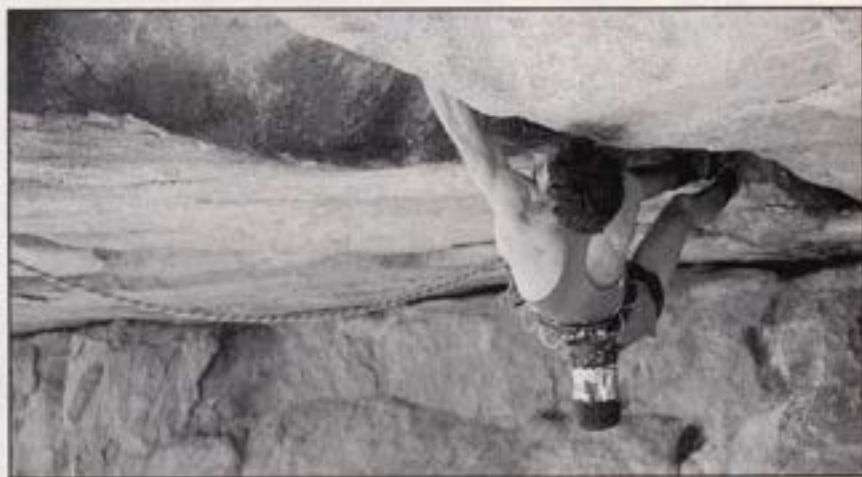


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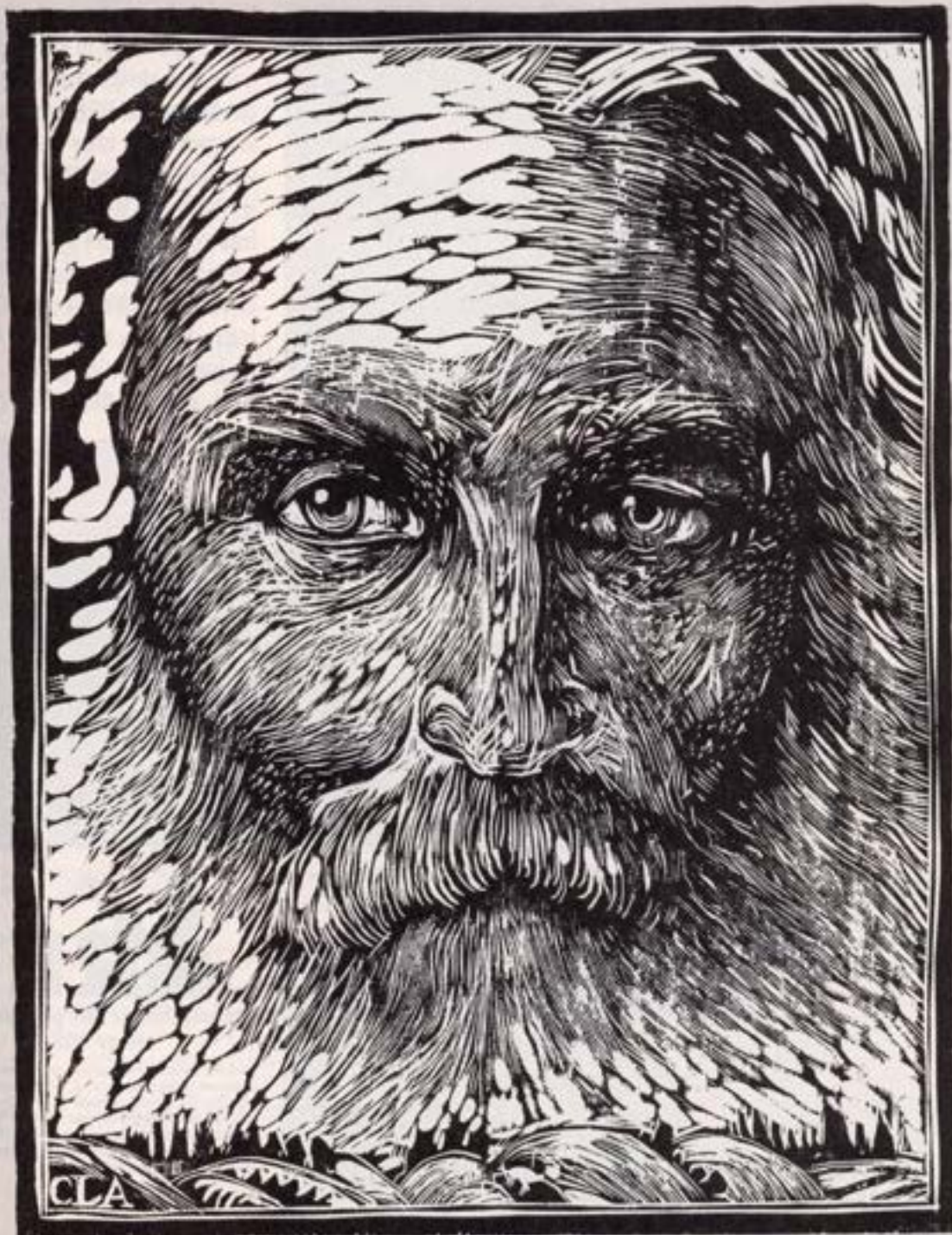


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JAFIELD JOHN

Happy birthday, John! A celebration of the Sierra Club's founder (born on April 21, 1838) by his friends and colleagues.



M U I R



I wonder sometimes if there was ever such another lover of nature as John Muir.

Never at least for me! He really loved every littlest thing that grows; studied the mole, the beetle, the lily, with complete and perfect sympathy. And for his glorious commanding love nothing was too sublime—not the sequoia, the cat- aract, the blizzard in the mountains.

—**Harriet Monroe**

(founder and editor of *Poetry Magazine*; leader in the Hetch Hetchy Valley campaign)

Here was a real man, one who would get lost on the city streets, but could find his way through any unmapped wilderness; one who had the outward bearing of an unsophisticated farmer but was at home with the most polished man of the world. Devoid of all shams and affectations, sincere to the very roots of his being, his deadly earnestness was saved by that touch of Scotch humor and that deep tenderness and sympathy which shone through his being despite the habitual absorption in impersonal matters. And that Muir was

able to fight, those who know with what zeal and single-minded devotion to a cause he carried on his campaign to save the Hetch Hetchy Valley, can testify. Recluse and devotee of nature though he was, he could come out among men and with unflinching courage, untiring energy and rare practical sense, work to save his beloved trees and mountains from being despoiled.

Others may praise him for his keen eye, his grasp of nature's laws, his enthusiasm as an explorer, his grace and charm of literary style, but for me he was a personality that defies analysis—a great soul, a genuine friend, and I am grateful to share, with all who touched his life closely, in the consciousness that we are better and closer to the great primal things because we knew and loved him.

—**Charles Keeler**

(*Sierra Club* founding member)



To some, beauty seems but an accident of creation: to Muir it was the very smile of God. He sung the glory of nature like [a] Psalmist, and, as a true artist, was unashamed of his emotions.

An instance of this is told of him as he stood with an acquaintance at one of the great view-points of the Yosemite Valley, and, filled with wonder and devotion, wept. His companion, more stolid than most, could not understand his feeling, and was so thoughtless as to say so. "Mon," said Muir, with the Scotch dialect into which he often lapsed, "Can ye see unmoved the glory of the Almighty?" "Oh, it's very fine," was the reply, "but I do not wear my heart upon my sleeve." "Ah, my dear mon," said Muir, "in the face of such a scene as this, it's no time to be thinkin' o' where you wear your heart."

—**Robert Underwood Johnson**

(editor of *Century Magazine*, which gave Muir's writings a nationwide forum)

When starting out on [his] South American journey, from which I among other friends tried to dissuade him, he often quoted the phrase "I never turn back." Although he greatly desired to have a comrade on this journey, and often urged me to accompany him, he finally was compelled to start out alone, quoting Milton: "I have chosen the lonely way."

—**Henry Fairfield Osborn**

(founder of the Save the Redwoods League)

John Muir will never be fully appreciated by those whose minds are filled with money getting and the sordid things of modern everyday life. To such Muir is an enigma—a fanatic—visionary and impractical. There is nothing in common to arouse sympathetic interest. That anyone should spend his whole life in ascertaining the fundamental truths of nature and glory in their discovery with a joy that would put to shame even the re-

ligious zealot is to many utterly incomprehensible. That a man should brave the storms and thread the pathless wilderness, exult in the earthquake's violence, rejoice in the icy blasts of the northern glaciers, and that he should do all this alone and unarmed, year in and year out, is a marvel that but few can understand.

—**William E. Colby**

(member of the *Sierra Club* Board of Directors, 1900–1949; organizer of the first Club outing)



Screaming Speleothems

Each year some 800,000 people trek through the underworld of Carlsbad Caverns National Park. On their self-guided, three-mile trip 750 feet beneath Earth's surface, they're treated to one of the world's most spectacular displays of stalagmites and stalactites. So dazzling are many of the speleothems (as they're properly called) that some visitors are unable to resist the temptation to reach out and take home a unique souvenir. Consequently, hundreds of the irreplaceable formations are broken annually.

A year and a half ago, Carlsbad Caverns officials

decided that the memento-moochers had to be curtailed. More staff, higher railings, and rerouted trails all seemed either too expensive or too impractical. Finally Gary Arenson, then the park's administrative officer, hit on it: screaming speleothems. A variation on the automobile-alarm theme, Arenson's idea was to use intrusion-detection devices to keep sticky fingers off the caverns' delights.

In October 1987, seven passive infrared devices were placed in two chambers where there had been extensive speleothem damage. The monitors, which sense body heat and motion with-

in a two-foot field, emit a loud alarm when a cave visitor intrudes on a speleothem's space. Presumably embarrassed as well as deterred, would-be thieves put their hands back in their pockets—and the million-year-old treasures hang on.

Park officials estimate that speleothem damage in the two trial areas has been reduced by 95 percent, and they intend to plant the devices in other choice chambers at Carlsbad.

The success of the screaming speleothems has proved one of Arenson's pet theories: Give a natural resource a voice, and it'll speak up for itself. —Robin J. Robbins

STENCIL THE TOWN FISHY

Mention kids, spray paint, and public property in the same breath and most people instinctively think "graffiti." But in the Pacific Northwest, a more accurate conclusion might be "clean water."

Armed with stencils and cans of spray paint, members of organizations ranging from the Boy Scouts to the Northwest Steelheaders are roaming the streets of Washington state looking for storm drains, hundreds of which are now adorned with a spray-painted cutthroat trout and the message "Dump No Waste—Drains to Stream."

Coordinated by the Washington Department of Ecology, the stenciling campaign seeks to alert people to the fact that what they discard in the gutter—be it oil, paint thinner, antifreeze, or household cleaners—ends up not at a sewage-treatment plant but in the nearest stream, lake, or ocean. The Seattle Aquarium estimates that 2 million gallons of used



motor oil are indirectly dumped into Puget Sound via storm drains every year.

Hoping to help protect the prime salmon habitat of the Sound and its tributaries, the state is distributing stenciling kits to interested organizations and communities. The kits include flexible mylar stencils, instructions, and brochures on recycling waste oil and hazardous materials. Recipients are asked to contact their local public-works department to get permission to spray and, if needed, a map of the area's storm drains.

So far 36 municipalities have requested the kits. In some towns public-works crews carry stencils to mark the fouled drains they clean out, and violators of toxic-waste-disposal laws are sentenced to stenciling as community service.

If the initial success of the program is any indication, plenty of folks are eager to get out and paint their town, especially if it means helping fellow residents distinguish a drain from a dump.

—Stephen Cline

SCORECARD

• *The Montreal Protocol on Substances that Deplete the Ozone Layer* went into effect on January 1. So far, the treaty has been signed by 24 nations that account for at least two thirds of the world's consumption of chlorofluorocarbons. Participating developed nations have promised to cut their use of CFCs in half by mid-1998; developing nations are exempt from the reductions for up to ten years.

• Legislation designating 1.5 million acres of the *Arctic National Wildlife Refuge* as wilderness was reintroduced in the opening days of the 101st Congress, as was a bill protecting some 10 million acres of the *California Desert*.



Feeling guilty about Mom? Join the Club!

So That's How We Do It!

The following passage is excerpted from a paper written by Ron Arnold, executive director of the Centre for the Defense of Free Enterprise, and presented to the Ontario Forest Industries Association in Toronto in February 1988. In the piece, published in the April 1988 issue of *Logging and Sawmilling Journal*, Arnold introduces himself as a former member of the Sierra Club; in his case, apparently, the Club's devious psychological tactics failed to inspire a long-term commitment.

... So the primary tactic environmentalists use to win public support is to appeal to emotion and intuition while taking care not to offend the intellect too much. They get people to support wilderness preservation and all their other issues not by providing information, but instead by evoking archetypes and great symbols that touch the collective unconscious—such things as lashing out against oppressive authority figures and father figures, symbolized by big business; such things as the urge to return to paradise, the urge to return to the womb, as symbolized by the wilderness; such things as primal guilt for disrupting the life web of mother earth, which in the unconscious evokes all sorts of powerful links to the listener's actual biological mother.

When you see a picture of a cutover forest in an environmentalist recruiting ad, you're looking at an appeal that goes straight into the unconscious and plays on emotions the viewer isn't even aware of. You'll seldom find these unconscious archetypes discussed openly, but they're always present as a silent subtext to everything environmentalists say and do—it's genuine psychological warfare. And once a person is emotional, hooked, you have a person committed to the cause, and commitment to a cause is the most powerful instrument of social change available to human manipulation. . . .

You can't fight archetypal commitment with rational arguments. But you must fight it, you must turn the public against environmentalists, or you will lose your environmental battle as surely as the U.S. timber industry has lost theirs.



Y

ou've gotten used to talking boxes at the zoo—now

it's time for preservation-promoting parking meters.

In an effort to raise money for the protection of habitats of endangered species, the San Francisco Bay Chapter of the American Association of Zoo Keepers has devised the Ecosystem Survival Plan (ESP), which urges people to "give your change to make a change" by dropping coins into an unlikely receptacle: old parking meters. Donated by the San Francisco Department of Public Works, the meters will be redesigned so that when money goes in, a picture of an animal such as a jaguar or an anteater will race across the window.

Five zoos (including San Francisco's) have agreed to install the meters in

Lovely Cheetahs, Meter-Saved

strategic places on their grounds, and twenty-five others have expressed interest. With 114 million people visiting zoos and animal parks every year, there's a lot of potential money for the kitty. "If every visitor put 50 cents in the meter instead of buying a bag of peanuts, we could purchase 4.8 million acres in the tropics each year," says Leslie Saul, one of the plan's initiators.

While many zoos have captive-breeding programs designed to help save endangered species, Saul and another ESP organizer,

Norm Gershenz, see limitations to that approach. "If you want

to save the jaguar forever, you must save its habitat," Gershenz says. "And as a bonus you save the millions of species that share the jaguar's home."

The zookeepers are putting the meter money into the Guanacaste National Park project in Costa Rica, where they have purchased 10 acres so far. The goal of the project, headed by biologist David Janzen, is to establish a 295-square-mile

national park to preserve existing habitat and to restore damaged areas of this tropical dry forest. Because the ESP works through The Nature Conservancy and the World Wildlife Fund, it has no administrative costs: 100 percent of the meters' proceeds goes toward habitat preservation.

So what do your coins buy? Three hundred dollars buys two and a half acres of tropical dry forest on which you might find 200 orchids, 10,000 mushrooms, 200 frogs, .04 anteater, .001 jaguar, and a million ants.

Of course, if you're just not in the mood, you can always buy 600 bags of peanuts.

—Judy Howard



GRANNIES GO FOR PEACE

At an age when they might be expected to be swatting golf balls or gassing up the Winnebago, a group of grandmas is occupying itself with something a little more grandiose: helping to



free the world from the threat of nuclear war.

Since it was founded in 1982 by 60-year-old Barbara Wiedner of Sacramento, California, Grandmothers For Peace has mushroomed much like the atomic cloud printed on the organization's T-shirts. The initial group of 11 women now includes more than 20,000 supporters in some 30 nations. Much of the members' work involves hounding legislators about

the perils of nuclear proliferation and explaining the sometimes complicated arms-control puzzle to the public. Wiedner, for instance, trots around the globe attending peace conferences and organizing events like the Grandmothers Walk for Peace that's scheduled to begin in

Moscow early this summer.

Civil disobedience plays an important role too. "After I met Barbara I decided I had to do something besides write letters and pray," says 65-year-old Trude Britton, one of the group's cofounders and a veteran of eight trips to jail. "I had to act, get arrested, demonstrate. I had to be visible and vocal. I had to make some noise."

Ella Lively, a former treasurer of the organization, is of like mind. "I'd been a peace activist for years, but I didn't feel that letters and meetings made much of a difference. For me, getting arrested is simply a more assertive way to work toward an end to nuclear war."

According to Wiedner, the assertiveness is paying off. She cites the signing of the Intermediate-Range Nuclear Forces (INF) Treaty in December 1987 as an example of how committed grassroots organizations can

influence global nuclear policy. "[Soviet Foreign Minister] Eduard Shevardnadze told me at the Moscow summit last year that the summits and the INF treaty wouldn't have happened if it hadn't been for the pressure that groups like ours put on. We are getting through."

What satisfaction do these grandmothers get from their involvement in the high-stakes world of international affairs? "A significance to their lives that they never expected," responds Wiedner, whose arrest outside the Nevada Test Site near Las Vegas in 1987 marked her 14th trip to the hoosegow on behalf of peace. Adds Britton: "The threat of nuclear war and what it could do to my grandchildren's future was more than I could handle. I'll do this work until I can't anymore, or until God says, 'Hey, that's enough—come home.'"

—Dennis Pottenger



SIEMAN BOWEN PHOTOS COURTESY GRANDMOTHERS FOR PEACE

SHE WHO WATCHES

More than just a pretty face, Tsagaglallal was a symbol of conscience to the Native Americans of the Pacific Northwest. Her image was carved on trees and painted on rocks from the Wallowa Mountains to the mouth of the Columbia River. She is now the poster person for Operation Save, a project sponsored by the Washington-Oregon Bureau of Land Management to protect archaeological sites in the area.—Rick Rubin



A Clearcutting Ban for the Birds

A court ruling aimed at protecting the red-cockaded woodpecker has revolutionized logging practices on national forests in Texas.



KENT & DORNA GARDNER

The native forests of Texas contain a colorful mixture of trees, including sumac and pine.

Paul Larmer

THE EAST TEXAS forests George Russell roamed in the 1950s were a youngster's paradise. Tall pines reached to the sky, and the rich foliage of oak, ash, and hickory created a natural haven below. The diverse groves, with about a hundred broadleaf tree and shrub species, also provided ideal habitat for a small, inconspicuous woodpecker that years later would bring Russell to the center of a major battle over how these forests should be managed.

Unbeknownst to Russell, the agency charged with protecting these lands, the U.S. Forest Service, began in 1964 to require use of a timber-cutting method that would transform the complex forests of his youth into single-species pine plantations. The method was clearcutting: wholesale removal of all trees from a site. In the 25 years that followed, clearcutting and its variations, which eliminate the trees in two stages, were the only techniques used to log national forestland in Texas—until Russell and other environmentalists represented

by the Sierra Club Legal Defense Fund won a lawsuit last summer.

In June a U.S. District Court judge in Houston ruled that the Forest Service had been violating the Endangered Species Act by failing to protect the nesting and foraging habitat of the red-cockaded woodpecker. He ordered the agency to stop clearcutting within 1,200 meters (3,937 feet) of the woodpeckers' colonies, a ruling that effectively halted clearcutting on about one third, or 200,000 acres, of the national forestland in Texas.

The Texas ruling is good news for the endangered bird, which has been on a collision course with clearcutting. The number of red-cockaded woodpecker colonies in Texas' national forests plummeted from 455 in 1978 to 174 in 1988, according to a Forest Service study. Scientists estimate that only 4,000 to 7,000 of the birds remain in the world—primarily on Forest Service lands in Texas, Louisiana, Alabama, Mississippi, Arkansas, Georgia, Florida, South Carolina, North Carolina, and Kentucky.

The decision is also a victory for those who would like to see national forests managed as biologically diverse ecosystems rather than monoculture pine plantations. It's the first time since passage of the 1976 National Forest Management Act, which condoned clearcutting, that the Forest Service has been forced to abandon the technique in favor of the "much more environmentally benevolent practice of selection management," says Ned Fritz of the Texas Committee on Natural Resources, the group that initiated the lawsuit.

Selection management involves cutting only a small part of the forest, leaving the best trees to reproduce. With every harvest, the quality of the forest's gene pool is thus improved. Clearcutting, on the other hand, is a type of "even-aged management," which results in a forest of trees that are all the same age. This homogenization threatens the forest's long-term health and productivity.

The most destructive aspect of even-aged management is site preparation, according to Bill Carroll, an independent forestry consultant who testified during the trial. After a cut, huge bulldozers clear the area of all vegetation, scraping away valuable topsoil. Next, herbicides are applied to ensure that the one species of pine planted—the loblolly—has little competition. Later the area is burned to control sprouting hardwoods, in the process often destroying the productivity of the soil.

"To the Forest Service, the only good trees are loblolly pine trees," says George Russell, who now chairs the Forest Practices and Wilderness Committee of the Sierra Club's Lone Star Chapter. "Even-aged management represents the McDonaldization of the forest—everything looks alike."

The monocultures that result from even-aged management are highly susceptible to insect infestation, especially by the southern pine beetle. The Forest Service's response to recent epidemics has been to authorize more clearcutting, in the form of "buffer cuts" around infested areas. Ironically, red-cockaded woodpeckers feed on the beetles and could, in sufficient numbers, reduce their impact.

Robert F. Birch of the Angelina County (Texas) Farm Bureau argues that the recent court ruling will hurt the local timber industry, forcing the Forest Service to "leave enough timber uncut to operate five sawmills." Bill Carroll disagrees, noting that the decision "doesn't take one acre out of timber harvest that wasn't already excluded—it merely changes the method." Carl Gidlund, a public-information officer for the Texas national forests, concurs: "No great drop-off [in the timber harvest] is projected for the near future."

The Forest Service has decided to ap-



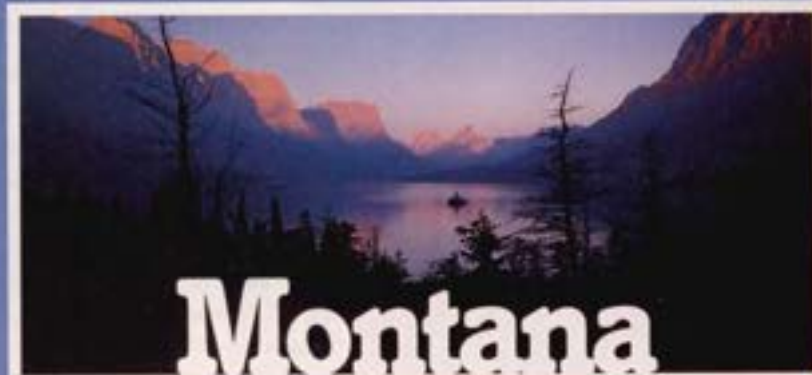
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peal the decision, but that move hasn't stopped environmentalists from using the ruling as a springboard for legal action against the agency in the nine other states where significant numbers of red-cockaded woodpeckers are found. The Sierra Club and The Wilderness Society told the Forest Service in December that they intend to file lawsuits on behalf of the woodpeckers in 12 southeastern national forests. Eliminating clearcutting in all these places is "the only remaining hope for the bird," says Fred Cheever, a Sierra Club Legal Defense Fund attorney in Denver who is preparing the cases.

At presstime in January, Ron Escañó of the Forest Service's regional office in Atlanta was hoping to head off legal action by meeting with representatives of the two environmental groups.

For George Russell, saving the red-cockaded woodpecker is much more



TM THOMPSON

The red-cockaded woodpecker. Supporters recently won an important victory for the species and its woodland home.

than preserving a childhood memory. "Human beings are all ultimately dependent upon genetic diversity for their survival," he says. "By destroying ecosystems such as the native forests of Texas, we are undermining the very basis of our civilization."

PAUL LARMER is the assistant editor of the Sierra Club National News Report.

MARINE HABITATS

Down on the Fish Farm

Pen-raised seafood is the latest trend in aquaculture. But like any booming industry, it can be a messy business.

Stephen Cline

AS HEALTH CONSCIOUSNESS has grown in the United States, so has the craving for fish. This appetite, along with a static seafood harvest in recent years, has made the nation the world's primary market for fish, and produced a \$7.1-billion fisheries trade deficit in 1987.

Now a "blue revolution" in aquaculture could help reduce that deficit and provide the fish Americans hunger for—or so industry supporters believe. But some residents of the states considered to be prime locations for fish farming are looking at possible side effects of that

revolution, and they don't like what they see.

Finfish, shellfish, and aquatic plants have been cultivated worldwide for millennia. Traditionally, most aquaculture has involved raising shellfish or introducing stocks of smolt into the ocean to mature. Recent research, however, has led to new techniques, such as raising salmon in floating "net pens." These pens, developed in Norway and typically measuring in acres, are anchored, floating sea cages.

The new technology has met stiff resistance in the United States. In Alaska, home of the planet's healthiest runs of

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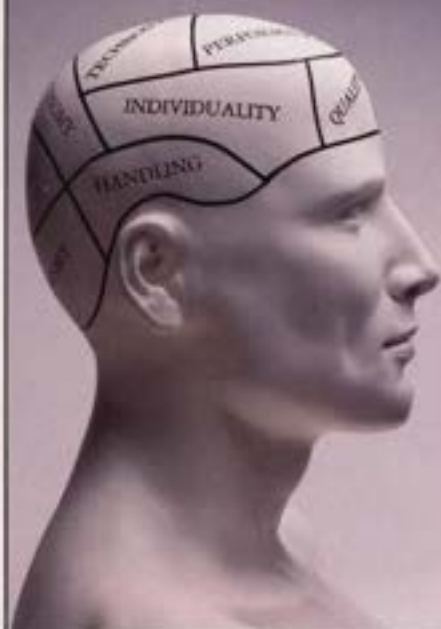
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wild salmon, a moratorium on estab-
lishing net pens has delayed the indus-
try's expansion while the state ponders
potential impacts on commercial fishing
and wild salmon. In Maine, where fish
farmers have just begun using net pens,
opposition from environmentalists and
property owners has led to stringent ap-
plication requirements for the pens,
which state officials expect will keep the
industry's growth to a slow pace.

In Washington, the third state slated
for development of the net-pen industry,
concerned Puget Sound residents have
held the number of commercial farms to
13, even as neighboring British Colum-
bia has permitted more than 200. Upset
that the facilities would obstruct their
seascape views and conflict with recrea-
tional opportunities, shoreline property
owners have voiced their opposition by
packing local hearings, hiring a lawyer,
and lobbying the pro-aquaculture state
government.

Although most people hear first
about aesthetic issues, "once you learn
something about the industry, you
quickly discover that aesthetics are the
least of the problems," says L. Joe Mil-
ler, president of the Marine Environ-
mental Consortium, a coalition of local
groups opposed to the net pens.

Other environmental questions—
some relating to the water pollution that
could result from the industry—are po-
tentially more serious. Fish feces and
uneaten food from a single fish factory
can create waste equivalent to a small
town's sewage outfall and lead to
plankton "blooms" (excessive bacteria
growth) that may be dangerous to fish
and humans. Chemicals sometimes
used in salmon farming—fish antibiot-
ics, insecticides, herbicides, and anti-
foulants—also end up in the ocean.

John Pitts, a veterinarian and the
aquaculture coordinator for the Wash-
ington Department of Agriculture, says
pollution problems can be minimized
by proper siting. He believes the state's
water regulations provide adequate pol-
lution control.

The state regulations are *not* strong
enough, counters Stephan Volker of the
Sierra Club Legal Defense Fund. Under
the Clean Water Act, the net pens
qualify as point sources of pollution and
therefore need federal discharge per-

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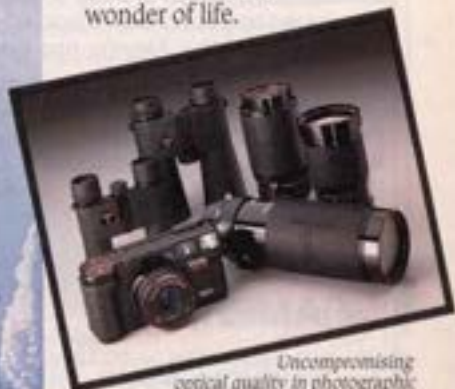
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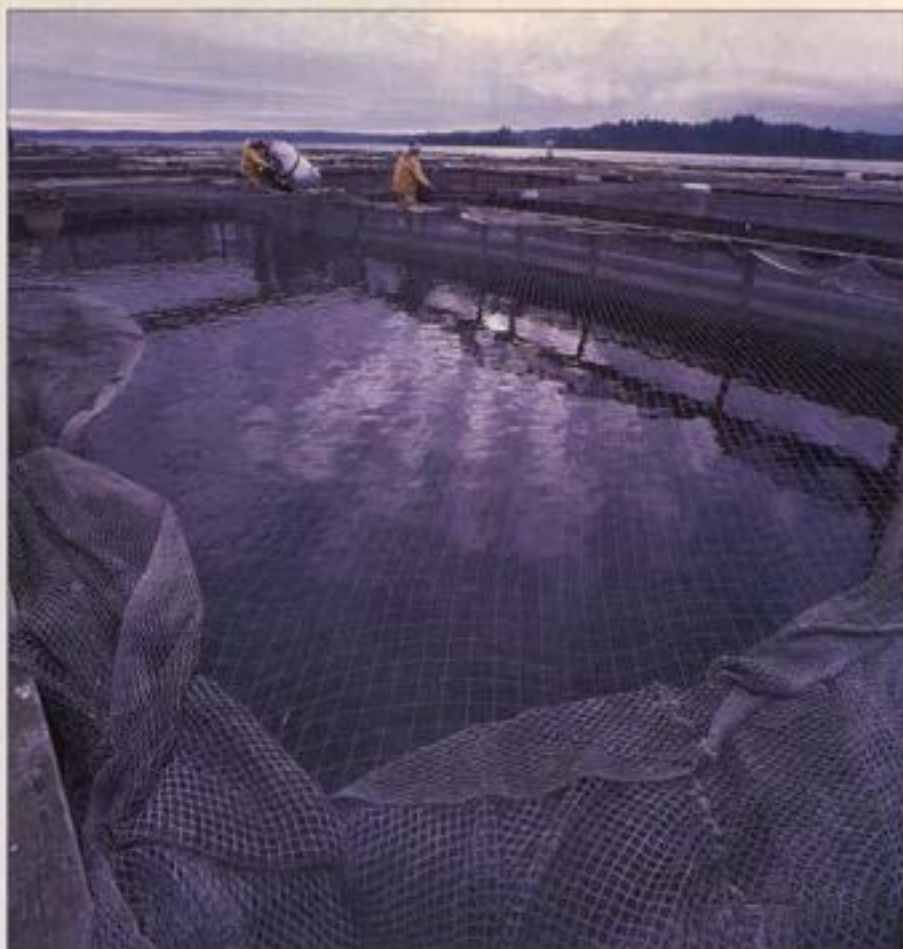
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Commercial fish-pens are filling the seascape of Puget Sound. One farm covers 23 acres.

mits. Puget Sound environmental groups, with the SCLDF's help, are suing the Environmental Protection Agency to require permits, detailed environmental reviews, and monitoring of net-pen operations.

The biological risks of raising fish from imported eggs have also been substantiated, Miller says. Pen-raised fish that escape and interbreed with wild populations can weaken genetic adaptations of indigenous fish. Recognizing this, Norway, which has an enormous salmon-farm industry and dwindling native stocks, is preserving its wild-stock gene pool in a sperm bank. The country has also been forced to poison fish in entire watersheds to combat a wild salmon parasite traced to a hatchery. That parasite, *Gyrodactylus salaris*, has contaminated 30 rivers since its detection in 1975.

"If we're going to get into trouble," Pitts says, "it's going to be with imported diseases." He defends the state's strict regulation of the importation of

eggs and live fish but admits that disease "is still a possibility. It's my biggest concern, and we must continue to be diligent and minimize the need for imported eggs."

Opponents argue that Washington officials see aquaculture as an environmentally sound means of providing jobs and have not treated potential problems seriously. "There were no regulations regarding net pens" when the industry first began in the area, says Miller. "Organizations like ours raised a lot of hell about it, so finally the state developed interim guidelines" to serve until an environmental impact statement for the industry is developed. A draft statement was released in January.

"There is no question that research needs to be continued with salmon farming," Pitts acknowledges. "I have no problem with limiting aquaculture in terms of environmental and aesthetic concerns, but there needs to be a distinction between those who are totally opposed to any development and those

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who have concerns that need to be met."

Explains Alan Reichman of the Seattle Greenpeace office: "We are not in opposition to salmon farming and aquaculture. But it's a new industry. A lot of research needs to be done. It needs to move very slowly."

Both Greenpeace and the Audubon Society have been concerned about the pens' effects on marine birds and mammals that feed on salmon. Birds trying to get at the fish through the nets and wires strung over pens have gotten caught in the barriers and died. The pens also draw seals, sea lions, and orca whales, all voracious salmon eaters. Farmers' attempts to control the predators by using barriers, electric shock, and gunfire have sometimes resulted in injury or death to the animals.

Whatever the immediate outcome at Puget Sound, pressure to develop the industry will increase. "The catch of fish is level," says Ken Chew, director of the

U.S. Department of Agriculture's Western Regional Aquaculture Consortium. "The only way we'll expand production is through aquaculture. Otherwise, we can just forget it and import the fish. Other countries are going like gangbusters."

Indeed, British Columbia is now challenging Norway's leadership in salmon farming, and 13 nations—from Chile to Japan and the United Kingdom—have entered the market. European researchers are developing pen-raising techniques for halibut, cod, and lobster as well.

It's not too late, though, say the residents of Puget Sound, to ask questions about the environmental impacts of farming the sea—questions we didn't know to ask, years ago, about farming the land.

STEPHEN CLINE, a former editorial intern for *Sierra*, is a freelance writer in San Francisco.

NUCLEAR WASTE

Land of Disenchantment

As problems fill an underground nuclear-waste dump,
New Mexicans wonder if they've dug themselves in too deep.

Daniel Gibson

TIME IS AN AFTERTHOUGHT in New Mexico, where bones bleach white beneath an enduring sun and a brilliant turquoise sky. But alarm clocks are going off all over the state as the Department of Energy (DOE) prepares to dump much of the radioactive waste from the nation's nuclear-weapons facilities in subterranean caverns here, where it will remain lethal for 240,000 years.

The world's first permanent storehouse for low-level nuclear waste, the Waste Isolation Pilot Plant (WIPP), nears completion some 2,150 feet underground, 26 miles from Carlsbad. The maze of tunnels, shafts, and chambers carved from ancient salt beds has brought more than 600 new mining and construction jobs to economically strapped southeastern New Mexico. But it has also saddled the state with some long-term problems.

In September 1988, DOE engineers issued a report questioning the \$680-

million facility's safety and the quality of its construction, forcing the department to postpone WIPP's October opening indefinitely. Congress followed up in early October by refusing to give the DOE jurisdiction over the site. These actions signaled that WIPP, even after ten years of construction, is not a fait accompli.

The project is the critical tail end of the DOE's 13-state chain of nuclear-weapons facilities. Radioactive trash from nearly 45 years of production piles up steadily at its plants, most of it stored in 55-gallon drums. The barrels contain low-level waste: cast-off gloves, tools, clothing, leftover bomb materials, and equipment tainted with plutonium and other radioactive isotopes, as well as toxic solvents, heavy metals, and decomposing organic matter. The materials have relatively low radiation levels but extremely long half-lives. (The DOE plans to entomb high-level refuse—radioactive sludge and spent fuel from civilian and military reactors—beneath

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DEPARTMENT OF ENERGY

Nevada's Yucca Mountain. See "The Wasting of Nevada," July/August 1988.)

The drums will be placed in chambers hollowed out of the salt beds. If all goes well after a 5-year test period, WIPP will accept up to 1 million barrels during its 25-year life. When the caverns are filled, the shafts will be plugged, the surface above the caverns decontaminated, and the site abandoned. Within a hundred years, the DOE says, the salt formation will creep inward, swallowing the waste forever. If the project doesn't pass its test, the department says it will retrieve the material and put it someplace else.

That's how WIPP is supposed to work. Yet the General Accounting Office, the National Academy of Sciences, and two independent review groups have cast doubt on the DOE scenario. They have criticized the department for forging ahead without adequately addressing essential scientific and engineering issues, including the reliability of the storage experiments and the design of the vault. They also charge that the DOE has failed to comply with federal environmental regulations.

Seepage at the site is WIPP's most

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serious problem. Scientists suspect that moisture in the caverns might combine with salt to form a corrosive brine that could eat through the steel drums, releasing radioactivity into the Pecos River, a tributary of the Rio Grande. In addition, a 15-million-gallon, high-pressure brine pocket sits below the repository. If the pocket were breached, contaminated water could erupt on the surface.

The independent Scientists Review Panel says that the DOE's five-year trial period won't test the caverns' safety: Because waste will have to be exhumed if experiments fail, the drums will be kept away from the walls and floors—safe from the caverns' seepage. The group argues that WIPP's tests can best be carried out in a laboratory, without committing any waste to the depths.

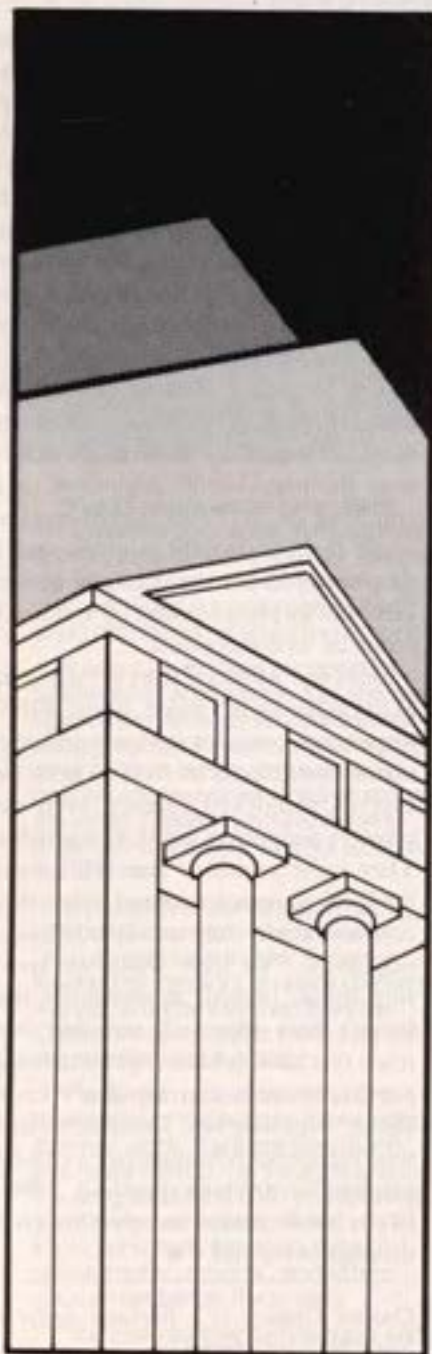
Other safety concerns carve away at the scheme. The container used to transport waste to the facility has repeatedly failed to pass impact tests; little money is available to train and equip emergency-response teams along shipping routes that cross more than 20 states; and the Environmental Protection Agency (EPA) has yet to approve burial of "mixed" (radioactive and toxic) waste at the Carlsbad site.

Despite these obstacles, the Energy Department believes it can resolve WIPP's problems before September 1989, its latest target start-up date. Critics counter that the DOE is underestimating WIPP's shortcomings. Even September is optimistic, they say, and the project, in fact, may never open.

Charges that the DOE is a poor steward of radioactive waste overshadow the debate. The department, which functions with virtually no oversight from Congress, the EPA, or environmental groups, has come under fire for lax management and unsafe handling of nuclear waste at nearly all of its 17 weapons facilities.

As doubts about WIPP grow, legislators once proud to have wooed the project to New Mexico have backtracked. Governor Garrey Carruthers (R), who suggested in 1988 that his state become the host for all of the nation's nuclear waste, has said he won't allow WIPP to open until Congress appropriates \$250 million for road improvements along

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the shipping routes. The state's five-member congressional delegation is divided. Representative Bill Richardson (D-Santa Fe) wants WIPP to meet EPA standards before it is allowed to accept any waste, and the others are pushing for WIPP to begin storing and testing waste in September.

Last fall's postponement set off a feud between three western governors and the Energy Department. The bulk of waste slated for delivery to New Mexico comes from the DOE's Idaho National Engineering Laboratory, which in turn gets most of its waste from the department's bomb-trigger plant at Rocky Flats, Colorado. Unable to hand off his state's barrels to New Mexico, Idaho Gov. Cecil Andrus (D) refused to accept more waste from Colorado. Yet Rocky Flats, which continues to produce hundreds of barrels of waste each month, will exhaust its state-mandated storage capacity early this year. Colorado Gov. Roy Romer (D) has threatened to shut down Rocky Flats if the DOE can't solve the waste problem.

The DOE is certain to continue its push for WIPP. The department has invested nearly \$700 million in the facility over the past decade. Moreover, it is counting on WIPP to inherit nuclear waste from across the country, and it desperately needs the dump if it is to carry out its plans to clean up and modernize its weapons plants.

But New Mexico's fears are piling up as fast as the DOE's waste. While WIPP's opponents consider lawsuits and regulatory roadblocks as ways to keep the caverns padlocked forever, even the project's supporters are thinking twice: They want assurance that WIPP—and the DOE—are under control before they commit their state to 240,000-year neighbors. "We have waste we aren't sure about, [stored] in containers that haven't been approved, traveling over roads that haven't been improved, being put in salt beds that we don't know about," says state Sen. Tom Rutherford, who represents Albuquerque, a city dependent on military spending. "We'd like to put the brakes on before we get to the edge of the cliff." ■

DANIEL GIBSON is a freelance writer in Santa Fe, New Mexico.

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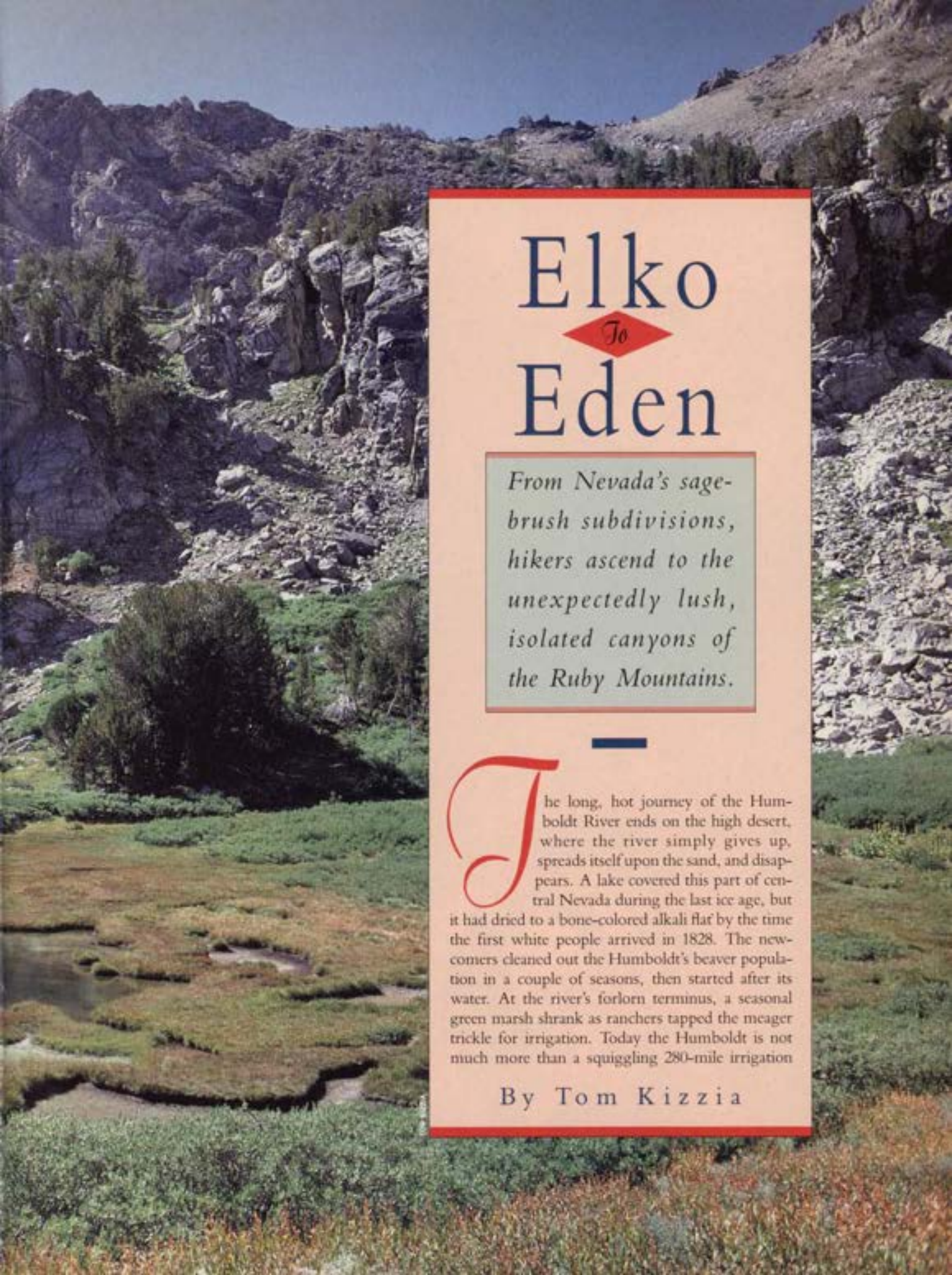
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Dollar Lakes, Lamaille Canyon



Elko *To* Eden

From Nevada's sagebrush subdivisions, hikers ascend to the unexpectedly lush, isolated canyons of the Ruby Mountains.

The long, hot journey of the Humboldt River ends on the high desert, where the river simply gives up, spreads itself upon the sand, and disappears. A lake covered this part of central Nevada during the last ice age, but it had dried to a bone-colored alkali flat by the time the first white people arrived in 1828. The newcomers cleaned out the Humboldt's beaver population in a couple of seasons, then started after its water. At the river's forlorn terminus, a seasonal green marsh shrank as ranchers tapped the meager trickle for irrigation. Today the Humboldt is not much more than a squiggling 280-mile irrigation

By Tom Kizzia



Above Seltz Canyon

ditch, a doleful river flowing nowhere.

"It's not forlorn," my wife, Sally, insists as we drive east from Reno along Interstate 80. "It's enigmatic."

For several years Sally has been working with conservationists to protect parts of the Great Basin as wilderness, and she's grown to appreciate the country's paradoxical charms. Personally, I see nothing enigmatic about the death of a river in this sink of sagebrush and iodine bush, of greasewood and desert blite and four-winged saltbush. The mystery is how a river got here at all.

I find it hard to imagine, as Sally claims, that some of the mountains in this bleached-out place are wet and green, fountains of running water year-round. But when that ice-age lake evaporated, it left islands of a different sort—lush fragments of the former world, with marooned pine forests and mule deer and mountain lions. Tall enough to catch the passing moisture, these mountains make their own weather. Sally says that, like most people who pass through Nevada, I'm missing the strange and lovely drama of basin and range.

We're on a summer trip to the Ruby Mountains, an 11,000-foot rainmaker range in northeastern Nevada where the Humboldt River springs to life. We have two reasons for wanting to hike there: The Rubies are reputed to be one of the most beautiful ranges in the Great Basin—and one of the most controversial.

The vast concave landscape of the Great Basin takes in nearly all of Nevada, western Utah, and edges of Wyoming, Idaho, Oregon, and California. The Nevada portion is famous for casinos and nuclear bombs, not camping vacations—a point made frequently by the media when Great Basin National Park was established in 1986. The effort to protect the park's 77,000 acres was spun off from a larger campaign still under way. In 1985 environmental groups proposed designating 21 Nevada wilderness areas on mountainous land managed by the U.S. Forest Service—a total of 1.4 million acres, or a little more than 2 percent of the state. Congress has considered various bills since then, but has yet to adopt one.

The Ruby Mountains have been key to the debate. Most wilderness advocates put them near the top of their wish

lists, saying the scenery compares to that of the Sierra Nevada. But Republicans in Nevada's congressional delegation, citing objections from ranchers and miners, have so far refused to consider any bill that includes a Ruby Mountain wilderness.

Just 20 miles from the Rubies, we stop in Elko, an angry nest of rural anti-wilderness sentiment, to pick up two companions. Elko is a former transcontinental railroad stop and cow town,

paper rails against "the scenic route to socialism" and the "skull and crossbones banner" of "ecology nuts." Bob McGinty is a member of a brave minority. He is an outspoken Sierra Club activist and a frontline battler for Friends of Nevada Wilderness, a group whose strength lies in urban Reno and Las Vegas. Wilderness opponents complain that these groups are made up mostly of Californians and "newcomers," but Bob's love for the land is the love of a



Above: Ten-thousand-foot peaks frame the shimmering waters of Liberty Lake. Left: After a hard hike to the crest of the Ruby Mountains, Bob and Sean McGinty stop to survey the Nevada desert below and the ranges beyond.

population 14,000 and growing fast. The sagebrush at the outskirts is filling in with mobile homes, a sign of the huge mining boom that is rolling through rural Nevada. High gold prices and new extraction methods make it profitable for big mining companies to pulverize entire mountains, sometimes crushing 25 tons of rock for only an ounce of gold. The dust and commotion in Elko are reminders of how suddenly change can come to remote regions of the once-wild West.

In a town where the leading news-

fourth-generation Nevada native. His great-grandmother was born in a railroad stop along the Humboldt River, and Bob grew up trapping and hunting around Reno. For the past 12 years he has taught English to high-school students in Elko. He has camped in much of the range, and bowhunts there each fall before school starts. Bob and his 10-year-old son, Sean, seem ideal companions for the trip.

Early one morning we drive east from Elko across subdivided ranchland, a suburb of the future. Paved driveways

Protecting America's Basin and Range

Despite 25 years of conservationists' efforts, Nevada has the least amount of protected wilderness of any western state. But recent shifts in the political winds may cause Nevada to lose that dubious distinction soon.

The state's one officially designated wilderness area, the 64,000-acre Jarbidge, was established in 1964 as part of the original Wilderness Act. Momentum for protecting additional land in the state began to build in 1985, when the Sierra Club and a statewide coalition, Friends of Nevada Wilderness, proposed wilderness designation for 21 areas in the Humboldt, Toiyabe, and Inyo national forests. The character of these areas varies widely: from Mt. Rose, minutes from downtown Reno, to the more remote meadows and trout streams of Arc Dome in central Nevada, to the rugged Grant and Quinn Canyon ranges to the south. The 1.4-million-acre package embraces alpine scenery, limestone caves, remnant Pleistocene forests, gnarled bristlecone pines, and habitat for abundant wildlife (including mule deer, bighorn sheep, and mountain lions).

In 1985, Nevada's only Democrat in Congress, Rep. Harry Reid, toured the proposed wilderness areas and found what he later called "a proverbial wonderland . . . some of the most beautiful mountains and mountain peaks in the world." When he returned to Washington, Reid introduced a bill that would have protected ten areas totaling 731,000 acres. Nevada's other representative and its two

senators were far less enthusiastic, proposing only 137,000 acres in four areas. Nevada conservationists, meanwhile, backed the 1.4-million-acre bill offered by the House Interior Committee members who toured with Reid: John Seiberling (D-Ohio), George "Buddy" Darden (D-Ga.), Peter Kostmayer (D-Penn.), and James Weaver (D-Ore.).

The competing proposals led to the establishment of Great Basin National Park in eastern Nevada, but no wilderness. Three things stood in 1986, when Reid made a run for the seat of retiring senator Paul Laxalt (R). Reid's opponent tried to win votes by dismissing him as a pro-wilderness candidate. But in an increasingly urbanized state with a tourism-based economy, conservation is no longer just a maverick's brand. In fact, recent polls show that Nevadans overwhelmingly support protection of air, water, and wildlife in their state.

Reid won the Senate race, and his former House seat was taken by a conservation-minded Democrat, James Bilbray, who pushed a 760,000-acre wilderness and recreation-area bill through the House in 1987. Once again, however, Republican opposition killed the bill in the Senate.

Throughout the debate, the most vociferous cries against wilderness have come from residents of Nevada's rural counties, who have a history of distrusting the federal government. Though the 1964 Wilderness Act permits grazing in wilderness areas to continue, ranchers fear new restrictions. Their allies in the mining and oil industries have helped finance the state's antiwilderness forces.

Conservationists have tried to avoid mining claims when drawing the boundaries of their proposals, but rising gold prices and improved mining technology have touched off an exploration boom. If Nevada's wilderness is not protected, it could soon be riddled with new claims and roads.

Prospects for a Nevada bill improved dramatically last November when an implacable wilderness foe, Chic Hecht

lead to sagebrush lots, empty and waiting. Looming ahead are mountains more massive than any we have seen from I-80.

Typical of Great Basin ranges, the Ruby cordillera extends northeast for 100 miles and is barely 10 miles wide. Narrow as that is, we quickly lose sight of the desert as we drive up Lamoille Canyon, a grand concourse into the heart of the range. Ice-scoured cliffs of metamorphic rock tower half a mile above, plain evidence of a wetter past. The continental ice cap did not reach Nevada during the Pleistocene, but the Rubies made enough snow to develop glaciers of their own. A paved road leads up the U-shaped canyon, from sagebrush through dense aspen to a sunny landscape of pines and open meadows,

where a parking area sits below a headwall at 8,800 feet.

We have chosen to begin at the most popular spot in the Rubies. From the head of Lamoille Canyon, the Ruby Crest Trail runs south for 40 miles. Though the trail makes a good four-day backpack, we plan only to sample the route before dropping into a remote canyon.

It is midweek, and half a dozen cars are parked at the trailhead. On weekends the first few miles up to 10,400-foot Liberty Pass are especially busy with Elko day-trippers—anglers and families and spruced-up young cowboys with their dates. The Forest Service says the trail is used by close to 100 hikers a day on weekends and 50 to 80 a day midweek during the summer.

"A lot of people in Elko say they like the Rubies just the way they are," Bob says as we start out. "They act like wilderness would be a big change. But I tell them, 'If you like the land the way it is, why not keep it that way by declaring it wilderness?'"

Bob, a jogger who works out daily at Elko's mile-high elevation, takes off with a long-legged stride. Sean keeps up with his dad, while Sally and I lag behind, stopping to catch our breath in the shade of limber pines. Sturdy old trees straggle over the upper canyon and hang as if on belay from sheer cliffs where it's likely they've been planted by Clark's nutcrackers, those audacious landscapers that bury pine nuts for winter on remote ledges. As we amble by, several of the black-and-white-winged birds

(R), lost his Senate seat to Gov. Richard Bryan, a moderate Democrat who supports a 600,000-acre wilderness bill.

But the battle is far from over. At presstime in January the new Nevada delegation was discussing proposals that leave about half the acreage sought by conservationists unprotected and exclude worthy areas such as the Toiyabe Crest, the Excelsior Mountains, and Pearl Peak. In areas that the delegation is considering, wilderness opponents have chipped away. In 1987, for instance, oil and recreation interests convinced House members to make significant cuts in the proposed Ruby, Grant, and Quinn wilderness areas. To make room for a mining road, Reid cut a canyon below Arc Dome from the 1987 legislation he introduced in the Senate. Reid also suggested opening the proposed Mt. Rose wilderness to snowmobiles.

Readers interested in helping secure designation for these and other Nevada wildlands should write to their congressional representatives and senators. They should also contact Sen. Dale Bumpers (D-Ark.), Chair of the Public Lands, National Parks, and Forests Subcommittee, U.S. Senate, Washington, DC 20510; and Rep. Bruce Vento (D-Minn.), Chair of the Subcommittee on National Parks and Public Lands, U.S. House of Representatives, Washington, DC 20515. They should thank Bumpers and Vento for their advocacy of Nevada wilderness in the last Congress and urge them to support the 21 areas proposed by the Sierra Club and Friends of Nevada Wilderness.

Twenty-five years after passage of the Wilderness Act, prospects for a Nevada wilderness bill look more promising than ever. Less certain is whether Congress will be farsighted enough to protect more than just a sampling of America's splendid basin and range country. —*Marjorie Sill*

Marjorie Sill is conservation chair of the Sierra Club's Toiyabe Chapter and a longtime wilderness and national-park activist.

NEVADA WILDERNESS

The Sierra Club and Friends of Nevada Wilderness have proposed 21 national-forest areas for wilderness designation.



swoop about in the trees, shrieking like blue jays.

The proposed wilderness begins beneath a tangle of peaks at Liberty Pass. From the main ridge of the Ruby crest the landscape tilts west, draining through steplike basins to the desert. The range's tallest mountain, 11,387-foot Ruby Dome, rises on our right, perpendicular to the crest. We descend into a wet alpine world. Liberty Lake is a dizzying blue below white rocks. Farther on, two other lakes are just as full of sky. We have reached the headwaters of the Humboldt's South Fork.

High mountain lakes like these are a rarity in Nevada, Bob says. The Sierra Nevada robs moisture from some of the state's ranges farther west. And the Rubies cast a rain shadow of their own

across the Utah salt flats to the east. Moreover, unlike the porous limestone and sedimentary ranges typical of most of the Great Basin, the Rubies' hard metamorphic rock holds water on the surface, in alpine tarns and early-summer waterfalls.

The lakes are loaded with naturally reproducing brook trout. I wonder which creeks still hold Lahontan cutthroat trout, a threatened native species that is a true link to the Great Basin's past. The Pleistocene lakes of Nevada were home to 30-pound cutthroats that migrated into rivers to spawn. As the lakes dried up and turned salty, the species grew smaller and backed into the mountains. Today many Nevada mountain ranges, including the Rubies, have remnant Lahontan or Bonneville

cutthroat populations—the particular subspecies depending on which ice-age lake they retreated from.

Bob and Sean reach camp first. We chose the farthest and most isolated of the lakes, set in a cirque of gneiss and quartzite that looks, with only a little squinting, like the granite of the High Sierra. Patches of snow on a north face remind us how far we've come from the desert floor in a day.

We camp under the pines by an old fire ring and have the lake to ourselves. Though the scenery is reminiscent of the Sierra, the foot traffic is much lighter. In Nevada, Bob says, activists are torn between keeping secrets like these lakes to themselves and publicizing them to win support for preservation efforts.

I ask Bob about the name of the

mountain range. I'd read in a Forest Service brochure that it came from soldiers in the first western expeditions who stopped to pan for gold and found sparkling red stones. Fortunately for the cause of wilderness preservation, the stones turned out to be garnets.

Bob says he's never seen garnets here—the way he heard it, the Rubies were named after the glow of the peaks at sunset. As he speaks, the cliffs in the cirque blush obligingly.

After dark we hear a sudden loud hoot that sounds almost human. We stare at one another in the firelight until the silence is broken by a burst of crazy, echoing yaps. Coyotes have skirted our camp to reach the lake. One night on a hunting trip up here, Bob heard what sounded like a woman screaming in terror. His hunting partner told him it was the cry of a mountain lion.

We set out the next morning with daypacks to explore the crest of the range. The trail climbs past mattressy meadows and thumbprint pools. Limber pines provide plenty of high-altitude, high-contrast shade. Where we stop to watch a golden eagle soar, we are surrounded by colorful dabs of Indian

paintbrush and lupine and fireweed. But there are fewer flowers than usual, Bob says, because it has been a dry summer—which is to say that the preceding winter was dry, since most of the Rubies' moisture comes from the melting snowpack.

The footpath is horse-pounded and dusty. Bob grumbles about redundant cairns and the Forest Service signs bolted to pines that remind us we are on the Ruby Crest Trail. After ascending a series of switchbacks, we cross a pass and sprawl on a ledge to rest. A new vista, a huge stadium of creeks and lakes, has opened below.

"Look at it," Bob says. "Why isn't this wilderness already?"

He knows the answer all too well. Although mineral conflicts are few in the Rubies and no one wants to build a road here, the range has become a symbol to rural opponents of wilderness. And there is another obstacle in the Rubies, a surprising one for the Great Basin: heavy snow. A helicopter operator in Elko flies here in winter to drop off skiers, and helicopters would be banned from a wilderness.

At last we climb to the crest, a broad,

windy ramp with a view of the desert. On a brambly currant bush along the high trail, Sean finds a white tuft of hair from a mountain goat. We keep our eyes open for the small herd that the Nevada Department of Wildlife has introduced along the spine of the range. They are the only mountain goats in Nevada. Bighorn sheep were once native to the Rubies—indeed, probably because they are easier to ambush, the sheep were more important than goats to the area's aboriginal people, according to archaeologists. But the bighorns disappeared, victims of unregulated hunting and of diseases caught from domestic sheep. The state wants to restore bighorns to the Rubies, even though local ranchers, prickly about competition, oppose the plan. The mountain goats are easier for ranchers to abide because they stay high on the ridges all year.

On the summit of Wines Peak we stop for a snack of cheese and candy bars. The view has opened up: We are perched high atop a discrete range that falls off sharply to the east. On the desert floor are several green coins of irrigated alfalfa. Farther out, the white stain of an alkali sink snakes down the valley. Then more ranges, more basins, more ranges.

Bob and Sally talk knowledgeably of each range in turn, discussing land status, resource conflicts, and wilderness potential. Sean, meanwhile, prowls the summit, returning with pockets so full of quartz and mica specimens that his shorts are sliding down his hips.

Bob stares down at the many ice-cut canyons south of Wines Peak, places he hasn't reached yet. "You could spend a week in each canyon, finding out whatever there is to find out," he marvels.

The next day Sally and I set off alone to find out about one of these hidden valleys. It has been a noisy morning in the wilderness. First, during breakfast, an explosion shook the mountain above camp. Sally and I looked up, like visitors from the country taking a first gawk at city skyscrapers. Sean didn't even blink. Sonic booms from Air Force and Navy jets are familiar to Nevadans. A short while later we heard a distant triplicate



FROM A PHOTO BY SEAN

A young mountain lion. Though seldom seen, this native species thrives in the Rubies.



Above Liberty Lake

boom—blasting going on at some mines in a range to the north.

Then, after we say goodbye to Bob and Sean, who have to head home that day, a more familiar percussion rattles the peaks. During breakfast small white clouds had appeared, a phenomenon that Bob said was often a forewarning. By the time Sally and I start bushwhacking across the flank of a mountain, a black-bellied thundercloud is bearing up a canyon toward us.

We keep on for the saddle, hoping to beat the storm but ready to descend at the first flash of lightning. Wind blows up at our feet, flattening the grass, bending the trees, whipping our faces with clusters of orange pine needles. The ex-

citement of the coming storm makes it easy to rush along, though we've left the dusty trail and are traveling cross-country. We gain the saddle in a fine spray of rain and follow deer trails into Box Canyon on the far side.

A beautiful discovery! Wet rock walls descend to a soft green basin tinged with colors of early autumn, yellow skunk cabbage and crimson knotweed. Stands of big pines. Thickets of willow. A creek knifes through glaciated bedrock and spills over a 15-foot shelf. "It's a little Eden," Sally says.

A deer pogo-hops across a meadow into a copse of aspen, as if surprised to see people descending into its valley. Here at last is the isolation, the sense of

exploration and lucky reward that we never quite felt along the well-traveled crest trail, for all its alpine splendor.

Unfortunately, this hidden valley was cut from the wilderness bill that advanced furthest in Congress last year. The bill included the crest of the Ruby Mountains, but ignored several of the range's side canyons in deference to the heliski operator, leaving them open to road construction and future mining claims.

The sun is shining by the time we reach the waterfall. Many creeks join to form the Humboldt, but this one alone is enough to redeem the promise of a trip to the Great Basin. Bound for the desert sands, the water jumps off here,

cold and boisterous, with a headlong rush.

We spot a level space with shade and boulders, and head there to pitch our tent. But a deer is sprawled beneath the trees. The small doe, rigid in death, lies in a scooped-out dish of dirt, as if something has half-tried to bury it. Her head is thrown back, her mouth frozen open. There is no visible wound, though when I lean over her I think I can see a black gash. Our suspicion is later confirmed by wildlife biologists: We have come upon a mountain lion kill. One swift blow from a lion's powerful foreleg can snap a deer's spine. So much for our little Eden.

I wonder if the lion is hiding somewhere, watching. But shiny green flies are already swarming. Lions are fussy cats, and a rotting kill would hold no interest.

Sally, venturing downwind by mistake, gags at the odor. "It's not disgusting," I say. "It's enigmatic."

The canyon holds more surprises. We back off from the deer and set up camp where we can listen to the waterfall.

When another shower blows up from the desert, it seems time for a nap. We climb into the tent while thunder rolls and echoes among the peaks. Toward evening, with the sun hitting the tent again, I smell a campfire. I think it might be last night's wood smoke on my clothes. But no, I stick my nose outside the tent: Someone else must be in the valley.

I pull on my sneakers and step out to discover the canyon below lost in a haze of smoke. There's a fire somewhere. Probably ignited by lightning. Probably in the canyon. Is it burning toward us? Sally has also smelled the smoke and tumbles out behind me.

"I wonder if this is a let-burn area," I say. Sally doesn't smile. We've been reading headlines all summer about wildfires in the West, but this is a wilderness experience we haven't counted on. We are completely on our own. I look up at the ridges, wondering how long it will take to climb out of harm's way. Maybe if we reach that high slab of rock . . .

Seeing no flame, we leave camp to



The Ruby Mountains offer hikers the rare combination of solitude and sublime scenery.

investigate. By the time we reach a prominent rib of rock for a better view, the smoke has started to clear. Sometimes a lone pine, hit by lightning, will ignite like a smoky candle and never catch the surrounding brush. Wherever it was, the fire is out.

Full of adrenaline, we practically skip back up the valley in the rich evening light. Cool air has begun descending from the peaks, reversing the day breeze. A half-mile below camp the smell hits us. We are directly downwind from the dead deer. Grinning like fools, we pull up stakes and carry the tent, sleeping bags and all, across the stream and away from the sweet stench of death. A faint hint of trouble lingers in the canyon after that smoky intrusion.

We explore along the creek the next day, discovering one watery spectacle after another, extravagant spillways and scuppers cut in the quartzite white stone. In a grove of big aspen, Basque sheepherders from another time have carved their names in the trees' pale, mummy-wrapped bark. All over the Nevada high country, lonely, dark-eyed men from the Pyrénées left their marks this way. One signature, scabbed with age, is from 1918, while the most recent celebrated the *Fiesta de la Virgen Blanca* in 1975. We also find etchings depicting acts of congress that have nothing

to do with protecting federal land.

For some reason the wilderness graffiti do not trouble me as "Jason loves Lisa" would. They give the valley human folklore, as do the archaeological sites of eastern Nevada's aboriginal people, whose name, Shoshone, means "whole land." No doubt the absence of any sign of livestock—cow pies are a common sight in Nevada's high country—makes it easier to see the romance in the etchings. Native grasses loft over our heads, showing how long it has been since the canyon was grazed. In the aspen groves we find old fire rings with grass growing between the blackened stones. Wood for the sheepherders' next fire, stacked neatly to one side, has turned powdery and useless.

We climb to a steep hanging canyon carved by an ancient glacier. A cool breeze offers relief from the sun, as do the tussocky channels of water that we use to wet our bandanas. We top out beneath a rocky parapet leading to Ruby Dome, where a cliff drops into a cold, blue lake. On our descent we stop to eat lunch in the shade of a rock overhang—a cool microclimate of moss and maidenhair ferns sprayed by a waterfall.

Deer warily give way as we hike back through meadows where half the flowers have been nipped off. The coarse sand along the creek is mealed with hoofprints. One mudcourse preserves the passing of a paw—clear proof that a stealthy lion is around. In a pool beneath a noisy chute, half a dozen trout dart among the shadows. Maybe *these* are the Lahontan cutthroat, holed up in high-mountain wilderness.

Our last day's route home leads over a rubbly ridge—mountain-goat country. We follow the creek above the waterfall toward its source, then turn to the rim that will take us back to Lamoille Canyon. From the last saddle I look higher still, toward the bowl from which the enigmatic river pours—wondering what mysteries we might encounter in the Ruby Mountain canyons if we kept on going, finding out what there is to find out. ■

TOM KEZZIA, a former reporter for the Anchorage Daily News, is writing a book about the Alaska bush, to be published by Weidenfeld & Nicolson.



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STREETWISE. WILDERNESS WORTHY.

AS THE
PLANET HEATS UP,
SO DOES THE
NUCLEAR INDUSTRY'S
CAMPAIGN TO
TRANSFORM ITS
IMAGE FROM PARIAH
TO SAVIOR.

REACTORS REDUX

IT'S AN EXEMPLARY PROMO FILM: The music ebbs and flows in the background; the narrator's voice massages his unseen audience. The topic is power without fear. General Atomics, we are told, has a new process for generating electricity, a process that will satisfy the public, the utilities, and the investment community. The product—the high-temperature, gas-cooled nuclear reactor—may sound technical and recondite, but it lays claim to some comforting and simple adjectives: safe, reliable, and cost-effective.

BY MICHAEL PHILIPS



1953? No, 1989. The General Atomics nuclear reactor is just one of several so-called advanced models emerging in the energy spotlight as concern over global warming increases. To more and more policymakers, the newly designed reactors are feasible alternatives to coal, oil, and natural-gas power plants, all of which emit carbon dioxide (CO₂), one of the primary culprits behind the greenhouse effect.

Somewhat fewer people see the reactors as preferable to the large, expensive, and cumbersome water-cooled models that, despite their faults, have so far been the United States' reactors of choice. With sufficient federal support the gas-cooled version could, its sponsors speculate, be in the vanguard of a second generation of nuclear reactors.

Even some members of Congress who have historically made themselves at home in the environmentalist camp are tempted by the new reactors, saying that in light of the greenhouse effect it's time to reevaluate nuclear power.

Any such appraisal must begin with an understanding of the contribution nuclear reactors could reasonably make toward reducing greenhouse-gas emissions. Obviously, to the extent that a nuclear plant is built instead of, or as a replacement for, an existing fossil-fuel plant, CO₂ emissions will be reduced. If it were possible to replace all U.S. fossil-fuel-burning plants with nuclear facilities, total CO₂ emissions would be reduced by 28 percent nationwide. (This estimate does not reflect the undetermined but possibly significant amount of fossil fuels used—and CO₂ emitted—during the construction and operation of a nuclear plant.)

But CO₂ is not the only malefactor. Taking into account the methane, chlorofluorocarbons, and other trace gases that are also warming the planet, nuclear power could offset only 14 percent of all U.S. greenhouse-gas emissions.

Nuclear power's contribution dwindles as the territory expands. Replacing all U.S. fossil-fuel plants with nuclear reactors would reduce global greenhouse-gas emissions by about 4 percent. And as the use of fossil fuels grows in the Third World, the figure drops further.

Assuming that a full-scale nuclear mobilization were nonetheless desirable, and assuming no inflation in the 1987 average cost of constructing a nuclear reactor in the United States, replacing the nation's fossil-fuel-generated electricity with nuclear-generated electricity would cost \$1.2 trillion. And if nuclear advocates are not yet deterred, there's one more consideration: According to analyst Bill Keepin of the Rocky Mountain Institute, to replace coal-burning power plants, nuclear capacity would have to increase "at the staggering rate of one large nuclear plant every 1.6 days for the next 38 years" in a high-growth scenario, every 2.4 days in a medium-growth scenario. Utility analyst Charles Komanoff adds that nuclear reactors would have to come on line worldwide at the rate of eight per week to displace just half the

CO₂ emissions of fossil-fuel plants over the next 35 years.

Formidable as these numbers are, they do not daunt the nuclear industry. In press releases and congressional testimony, industry representatives repeatedly tout nuclear as CO₂-free. In a statement submitted to the House Science and Technology Committee in June 1988, Edward Davis, president of the American Nuclear Energy Council, said that the United States must revitalize its nuclear option "in order to alleviate the greenhouse effect and to meet our growing demand for electricity."

When critics pull out the numbers showing nuclear's limited potential, industry spokespersons hold up the red flag of global warming. "Groups that have opposed nuclear energy have to reconsider their opposition in light of this environmental problem," Davis says. "All Americans, including nuclear energy's opponents, must be open to considering every energy source as a valuable component of a balanced national energy policy."

Indeed, one of the major pieces of federal legislation addressing the greenhouse effect, introduced by Sen. Timothy Wirth (D-Colo.), proposes, among other things, spending \$500 million to demonstrate the feasibility of advanced reactors. Wirth, considered one of the more environmentally minded members of Congress, has said that Americans must get over their "nuclear measles" and that "environmentalists will come around. They can't help but come around."

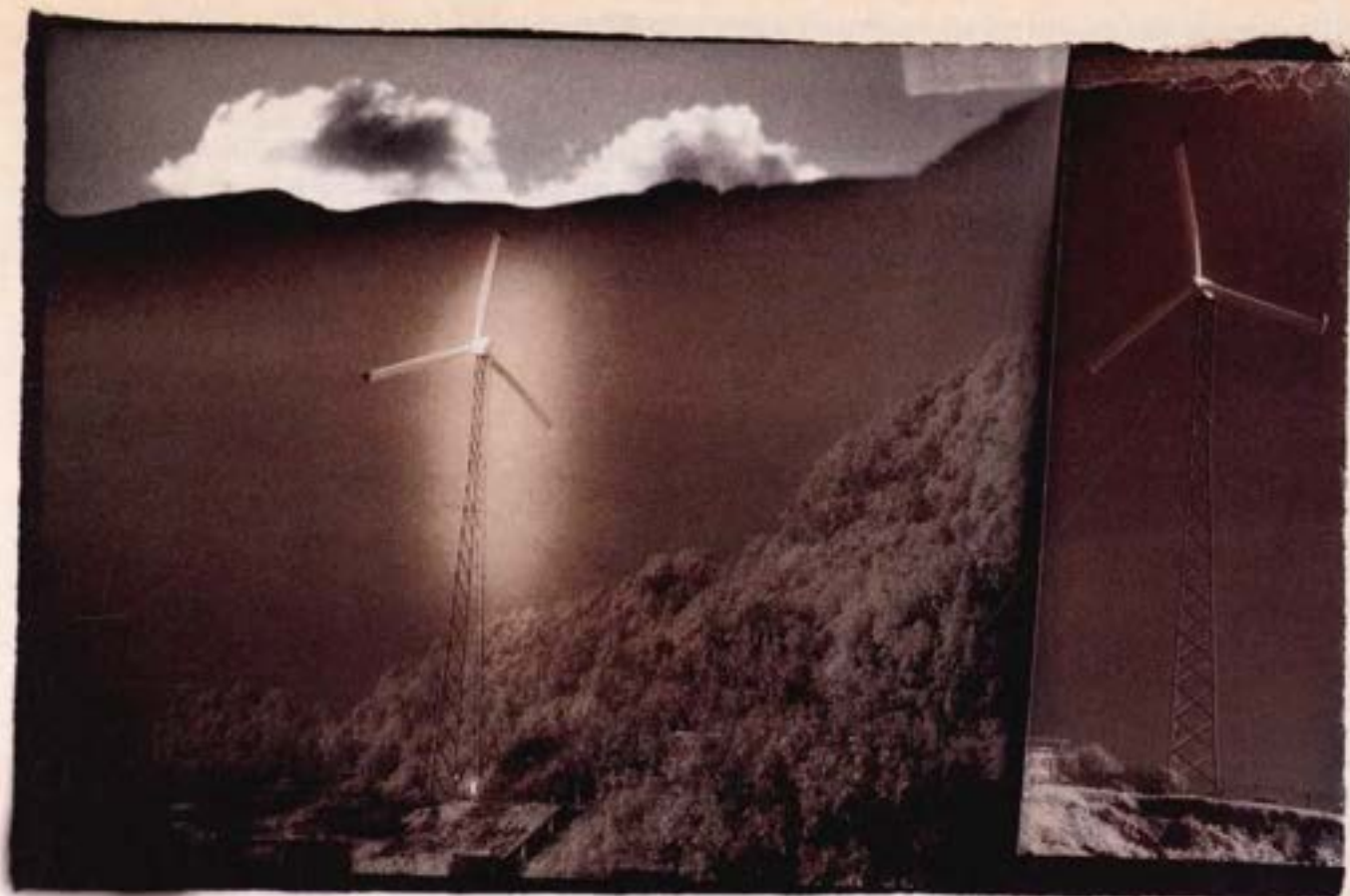
Perhaps more to the point is whether, given its technical, financial, and regulatory difficulties, nuclear power itself can come around. No new reactors have been ordered in the United States since 1978, and all those ordered between 1974 and 1978 have been canceled. The problems at the 111 licensed civilian reactors make it unlikely that any new ones will be ordered soon. Many facilities are aging prematurely, their reactor vessels becoming "embrittled"—that is, weakened from continuous exposure to radiation. Despite modifications, the eight reactors designed by Babcock & Wilcox (manufacturers of the reactors at Three Mile Island) are still trouble-prone, while the containment systems for 24 operating General Electric reactors are, according to a study sponsored by the Nuclear Regulatory Commission (NRC), likely to fail in the event of a major accident.

After more than three decades of commercial operation, nuclear power has yet to prove itself safe. During the last decade U.S. nuclear utilities have reported nearly 30,000 mishaps at their plants, including the partial meltdown in 1979 at Three Mile Island and several close calls since then.

The NRC, the agency charged with oversight of the nation's nuclear power plants, inspires little confidence. Congressional hearings have focused on the NRC's "coziness" with the industry it regulates: Rule changes often benefit the industry; safety procedures are haphazardly enforced; and in



SUDDENLY THE TERM "INHERENTLY SAFE" IS EVERYWHERE. SOMETIMES THE LESS COLORFUL TERM "PASSIVELY SAFE" IS USED; ONE ADVANCED-REACTOR DESIGN IS NAMED P.I.U.S.—PASSIVE INHERENT ULTIMATE SAFE.



GETTY IMAGES

general the agency is unwilling to require safety improvements that might be expensive for a utility to implement.

The NRC is in short reluctant to take any action that might imply that all is not quiet on the nuclear front. The agency's 1987 shutdown of Pennsylvania's Peach Bottom plant in the wake of disclosures about operators sleeping on the job was an exception: The NRC has closed only five plants in the last sixteen years. Facilities continue to operate, even in known violation of operating standards, and, according to a 1987 General Accounting Office report, even if they have a record of chronic safety infractions.

The present aside, no one yet knows what to do with a reactor once it has reached the end of its useful life. Nor has a politically and technologically trustworthy decision been made regarding nuclear waste. Last year Congress decided to send the nation's high-level nuclear waste to an underground repository to be built below Yucca Mountain, Nevada; but controversy over that choice has delayed exploratory work, and few observers expect Yucca Mountain to open its doors on schedule in 2003.

ADVOCATES OF ADVANCED REACTORS believe that the new design of their machines will diminish concerns about nuclear safety and, by extension, about regulation. Senator Wirth's interest in nuclear power as part of any greenhouse solution is predicated on the belief that an "inherently safe" reactor can in fact be built. Last year Rep. Morris Udall (D-Ariz.) and Sen. John McCain (R-Ariz.) introduced companion bills that would require the Department of Energy to

develop an inexpensive, easily built, "inherently safe" reactor. Udall envisions a development program in place within a year and, in an approach reminiscent of the Strategic Defense Initiative, sets deadlines by which technological breakthroughs shall be achieved.

Suddenly the term "inherently safe" is everywhere. Sometimes the somewhat less colorful term "passively safe" is used; one advanced-reactor design is even named PIUS—Passive Inherent Ultimate Safe.

For those who believe nuclear's woes are a result of bad P.R. and an irrationally fearful public, the new and improved lingo may hold a certain attraction. But Robert Pollard, a former safety engineer with the NRC who now works with the Union of Concerned Scientists, points out that fissioning atoms is, if anything, inherently *dangerous*. You can compensate for that and perhaps make it acceptable to the public, he says, but you can't make it inherently safe.

Many in the nuclear industry itself are also uncomfortable with the terminology. "The connotation of the term is misleading," says Carl Goldstein of the U.S. Committee on Energy Awareness, a nuclear-industry trade group. "We absolutely cannot tell the public that something is inherently safe." Goldstein says a significant number of his organization's members feel likewise. The industry is wary, he says, because of the way it's been burned by the catchphrase "too cheap to meter," which was used to promote nuclear power in its early years. Goldstein fears that "inherently safe" may similarly boomerang.

Semantics aside, how advanced *are* the advanced reactors?

While there have been the sorts of improvements in circuitry, piping, and so forth that one would expect in any technology, the basic advance is in the method of cooling the reactor core. All nuclear reactors must have a system for cooling the core in case of an accident, to avoid melting the reactor fuel and releasing radioactivity into the environment. The new designs all move away from the conventional "active" pumping systems laden with moving parts to "passive" systems that rely to a greater extent on natural forces such as gravity. (See "The Technological Fix," page 61.)

The advanced reactors sound impressive. Not only are they supposed to be safer, they'll be smaller and possibly less expensive than conventional nuclear plants. There's just one problem: Most exist only on paper. Karl Stahlkopf, who directs advanced-reactor research at the Electric Power Research Institute in Palo Alto, California, notes that while portions of the designs do exist at some plants in the United States and overseas, "We're looking well into the next decade before any of these are certified" by the NRC.

General Atomics disagrees. The company believes that the basic concept of the high-temperature, gas-cooled reactor (HTGR) has already been proved, and that only the specifics need to be demonstrated. The company also says that while it is confident of the HTGR's cost-effectiveness, it does need several hundred million dollars from the federal government to prove this fact. William Moomaw, director of the World Resources Institute's climate and energy program, questions the wisdom of such a subsidy: "With an industry as mature as the nuclear industry, shouldn't it be paying for this itself?" Pollard of the Union of Concerned Scientists concurs: "If you can't find private investors, that should tell you something."

General Atomics is caught in a contradiction, claiming simultaneously that the technology has been proved, yet it needs to be refined further; that the HTGR is economical, yet its cost-effectiveness needs to be demonstrated.

Ultimately, the safety assurances of General Atomics and others melt away when the companies are pressed on the issue of accident liability. The Price-Anderson Act, renewed by Congress last year, protects the nuclear utilities—and by extension the reactor manufacturers—by placing a dollar limit on the liability they would face in the event of a nuclear accident. Is the industry willing to forgo that coverage and accept financial liability for an accident at one of their "inherently safe" reactors? "No," says Tom Johnston, executive consultant to General Atomics. But if the reactors will be so safe, then why not? "People in this business," Johnston explains, "are very, very conservative."

DESPITE ATTEMPTS BY THE NUCLEAR INDUSTRY to characterize environmentalists as being "split" on the question of a nuclear revival, the environmental community generally agrees that

nuclear power need not play a role in any comprehensive response to global warming.

The best CO₂-free "source" is energy efficiency. Analyses conducted at Princeton University and the Lawrence Berkeley Laboratory show that developed countries could cut per-capita energy demand by as much as 50 percent over the next 20 to 30 years and still maintain current rates of industrial expansion and economic growth.

Although improvements in energy efficiency will require capital investment, Rocky Mountain Institute's Keepin estimates that each dollar put into efficiency displaces seven times more CO₂ than a dollar spent on nuclear power.

The United States in particular has a long way to go to improve its energy efficiency. Last summer the World Resources Institute's Moomaw testified before the Senate that "Japan produces a dollar of GNP, or the equivalent in yen, while using about half of the energy" that Americans use. In fact, Moomaw testified, Japan is "actively beginning to think [of] . . . this as a potential market. That is, if the greenhouse effect is really going to be a major issue, they see themselves poised as having the products, the energy-efficient autos, the energy-efficient light bulbs . . . to be able to move into these markets very rapidly."

After efficiency, renewable sources of energy such as solar, wind, and geothermal power are the next-best energy investments. According to the Department of Energy, renewable resources constitute one of the nation's largest energy reserves—more than five times the energy potential embedded in the country's coal reserves—and could meet up to 80 percent of America's projected energy needs in 2010.

In addition to Sen. Wirth, several other members of Congress have sponsored legislation addressing global warming. So far, the bill introduced by Rep. Claudine Schneider (R-R.I.) has attracted the most bipartisan congressional support and the endorsement of many environmental groups, including the Sierra Club, the National Audubon Society, and the Natural Resources Defense Council. Environmental organizations have withheld their endorsements of Wirth's bill because Schneider's is more comprehensive and maps out a specific plan for reducing greenhouse-gas emissions.

Asked to explain the lack of a nuclear component in her bill, Schneider responds, "Nuclear power is not cost-effective now, nor will it be in the future. My goal is to minimize cost, not just to throw money at any option." The Schneider bill does not, however, impose an outright ban on nuclear spending; it requires the Energy Department to reorder its spending priorities according to a least-cost test. Such a test ranks energy technologies according to how economical they are.

Since the energy choices made by the developing world are key to the success of any greenhouse strategy, one section of the Schneider bill requires all recipients of U.S. foreign energy-

IMPROVEMENTS IN ENERGY EFFICIENCY WILL REQUIRE CAPITAL INVESTMENT, BUT EACH DOLLAR PUT INTO EFFICIENCY DISPLACES SEVEN TIMES MORE CO₂ THAN A DOLLAR SPENT ON NUCLEAR POWER.

THE TECHNOLOGICAL FIX

THE ADVANCED REACTORS fall into three categories, each with its own cheering section in the nuclear industry. The new players are the liquid-metal reactor, which uses liquid sodium to cool the core; the advanced light-water reactor, an improved version of the model currently in commercial use that moderates and cools the reactor core with water; and the high-temperature, gas-cooled reactor, the core of which is cooled by helium.

The liquid-metal reactor uses liquid sodium as a coolant because, unlike water, it doesn't need to be pressurized to avoid boiling at high temperatures. (Sodium boils at 1,592 degrees Fahrenheit, a temperature it would not reach during normal operation.) A small, government-owned experimental liquid-metal reactor in Idaho was tested in 1986 to see what happened when power to the active cooling system was shut off. The sodium coolant sur-

rounding the core was able, despite thermal expansion of the fuel components, to absorb sufficient heat from the reactor core to prevent the fuel from melting.

One of the new light-water-reactor designs envisions the reactor sitting beneath tanks containing 400,000 gallons of water. In the event of an accident during which the active pumps failed to kick in, valves would open and the water would flow in to cool the reactor. In a Swedish variation, boric acid, which halts nuclear reactions by absorbing neutrons, would automatically flood the reactor in the event of an accidental loss of the regular water coolant.

The advanced light-water reactors will have roughly half the cables and pumps and 70 percent of the buildings and components required by today's light-water reactors. Karl Stahlkopf of the Electric Power Research Institute maintains that advanced light-water

reactors will likely be the preference of utilities for the next generation of nuclear plants. "Utilities understand light-water reactors and are comfortable with their operation," he says.

But it's the high-temperature, gas-cooled reactor (HTGR) that is getting the most attention. The helium-cooled HTGR has a revolutionary core design using clusters of thousands of tiny uranium fuel particles coated with multiple layers of ceramic materials. According to General Atomics, the coating can withstand a temperature of about 3,200 degrees Fahrenheit; during normal operation the maximum fuel temperature would not exceed about 2,900 degrees. Even with the failure of all engineered safety systems and loss of the helium coolant, heat from the core would be passively removed by means of conduction, radiation, and natural convection. A meltdown, says General Atomics, would be virtually impossible. —M.P.

development aid to prepare and implement least-cost energy plans. The importance of developing countries is not lost on General Atomics: One official says his company is "absolutely" looking to these nations as potential markets. According to Keepin of the Rocky Mountain Institute, however, the tremendous cost of nuclear facilities makes "large-scale nuclear investment by developing countries an alternative to, rather than a prerequisite for, economic development."

Slowing the warming of our planet will be costly no matter what steps are taken. It will involve international cooperation to stop deforestation, increase tree-planting, eliminate chlorofluorocarbon emissions, and reduce fossil-fuel combustion in transportation, industry, residences, and power plants. But taking no action at all would end up being even more costly and would mean a tripling of CO₂ emissions over the next 50 years. Investments in energy efficiency will not only reverse that, but will free capital for reforestation and other greenhouse-mitigating activities.

The Schneider bill puts forth the modest goal of a 20-percent reduction in CO₂ emissions over the next 16 years. Meeting this goal will require the redirection of subsidies, incentives, and investment capital in both the public and private sectors. Some steps, such as improving auto efficiency, will reduce CO₂ emissions while reducing fuel expenditures, and will require little or no investment by the federal

government. Other steps, such as expanding solar-energy research, will be expensive at first.

Although no approach should be rejected prematurely, it is clear that the federal government cannot fund all potential solutions. But if the least-cost test is used to pick and choose options, there is little doubt of the results: Efficiency and renewables are at the top of the list. And at the bottom? Nuclear.

Nonetheless, nuclear power still has the upper hand in at least two respects, according to David Hawkins, an attorney with the Natural Resources Defense Council. "We're dealing with human beings, whose psychology tends to be dominated by what appears to be the easiest fix. Somehow, we must focus on harder-to-grasp issues like energy efficiency. It's difficult, for we're sitting at a table with people who say, 'Here, we'll sell you the answer, in a technological box.'"

Hawkins points out that in addition to holding this psychological advantage, the nuclear industry tends to dominate the agenda of energy policymakers. "It's like going to a dinner party with Henry Kissinger," he says. "Everyone is going to pay attention to him, even if someone else has something better to say." ■

MICHAEL PHILIPS is a project associate with the International Institute for Energy Conservation in Washington, D.C.



The students size up the dump. Some had played on the leaking drums before learning they contained residues of toxic wastes.

The Children's Cleanup Crusade

"Who could we ask to find out whether our water supply has been contaminated?" I asked the children.

"The health department," Heather suggested, commanding the attention of the other children despite her soft voice.

As the sixth graders' enthusiasm grew, the fourth and fifth graders in my classes also became interested. I made preliminary phone calls to alert officials that the students would be calling and to ask what they might do to help. "There's nothing children can do," one state Department of Health spokesperson told me. "They'll be in high school before they see any results." Later, when the children themselves called the officials, they were shooed away like pesky flies.

Undaunted, the students conducted a door-to-door survey of their industrial

Black dots representing potentially hazardous waste sites were sprinkled across the wall map of Salt Lake City. One of the sites, the children discovered, was just three blocks from our school.

"That old barrel yard?" 11-year-old Maxine asked, shocked at how close the site was to us. "Kids climb all over those barrels."

"I bet there are at least a thousand barrels in one pile," added Chris. He grabbed a marking pen and circled the spot.

The exercise was the beginning of a spring course on groundwater that I had planned for the academically talented sixth graders at Jackson Elementary, where I teach special classes of fourth through sixth graders. I had no idea then that I was unleashing a tiger.

As it turned out, Chris had underestimated: The site held 50,000 barrels that at one time had contained everything from molasses to hazardous chemicals. Now, after a recycling business had stockpiled them for more than 40 years, many were rusted and corroded.

BY BARBARA A. LEWIS

Rites of passage: from Jackson Elementary School to the Utah state capitol.



neighborhood, informing residents about the dangers of hazardous waste and searching for wells from which health officials could take water samples. In a four-block area that included several abandoned houses and warehouses with wooden planks slapped haphazardly over jagged window glass, the children discovered only a few wells—all cemented over—and a largely indifferent response to their information campaign. Their efforts that day appeared to be futile. The children had, however, attracted a following of television and newspaper reporters who were intrigued that youngsters had ventured into an area where adults were generally apathetic.

Before returning to school, we paused outside the barrel-site fence. Covering three blocks, the steel mountain of drums obstructed the children's view of a community sports arena, the Mormon Temple, and the Wasatch Mountains in the distance.

"Look," Maxine said, pointing. "Some of the barrels are orange and yucky."

"Rusted," Chris said.

"And some have big holes."

"Corroded," Chris corrected.

"Look at all the orange colors in the dirt," Heather said. "And black, too. I wonder if anything leaked out of the barrels."

Maxine bent down. "The fence has lots of holes in it," she said. "Bet I could climb through one."

The protective fence sagged in spots like stretched-out potbellies. In a later survey of the school's students, 32 children would admit to having played on the barrels.

"I've seen bums build fires in those barrels," one child said now.

"Chemicals in the bottoms could cause an explosion," another added.

Kory's brown eyes popped. "And blow up the whole school."

"Don't exaggerate," Chris scoffed.

While we were at the site, we decided to stop at the barrel yard's office. A worker who answered the children's knock denied that there were any problems at the site. A newspaper reporter who had remained with us questioned the man and was told that no chemicals from the drums had leaked onto the soil;



furthermore, the owner had never accepted barrels that had more than an inch of residue in the bottom. The owner had spent more than \$50,000 in the past few years to meet regulations set by the Environmental Protection Agency (EPA), the worker insisted.

The children were not convinced. "What happened to the ground before we had those laws?" Heather asked when we were back in the classroom. To learn more, they began reading articles on hazardous waste in such magazines as the *New England Journal of Medicine*, *Newsweek*, and *National Wildlife*. I obtained more information from a periodical-clipping service and distributed it to the children, who then wrote papers on related topics. I invited an environmental consultant, health officials, and Salt Lake City's emergency hazardous-waste-cleanup team to lecture in class. One health official told us that even a single inch of chemical residue in the barrels could leak into groundwater and contaminate it.

With newly developed expertise, the children brainstormed solutions to the problem. One child called the EPA's national hot line to ask for assistance; others wrote to the agency's regional office in Denver; another called the Utah Power and Light Company, owner of the land on which the barrel yard was located.

The children's first major success was gaining the support of Mayor Palmer DePaulis during a visit to his office. Their recommendation: Remove the drums and test the soil and water for contamination. DePaulis, a former teacher, promised to work toward cleaning up the site within 18 months.

In a few weeks, changes began at the barrel site. Utah Power and Light refused

to allow the owner of the barrel yard to renew his lease on the land; he retired and sold the business to a California-based barrel-recycling operation. DePaulis pressured the new owner to move the barrels to another location, while media coverage increased awareness of social responsibility within the community.

Removal of the barrels began immediately. At a cost of a dollar a barrel, the new owner would remove more than 37,000 reusable drums during the next year, sending most of them to its California plant. The former owner would pay to remove the disintegrating remains of nonusable barrels and to send toxic materials to a hazardous-waste disposal facility.

At the same time, a local television station aired the draft findings of an EPA audit of the state health department's Division of Environmental Health (DEH). The EPA accused health officials of failing to carry out their responsibilities to clean up at least seven of Utah's toxic-waste sites. The barrel yard, which had previously received little attention, was on that list.

In early June 1987, just a few months after the children had begun their campaign, researchers from the Denver EPA office came to Utah to collect soil and water samples at the barrel site, taking operation of the investigation away from local health officials. Ken Alkema, DEH director, said the change was intended to even out workloads and had nothing to do with the draft audit—but whatever the reason, analysis had begun at last.

Many of the children were attending their sixth-grade graduation party the day the EPA started work, but they chose to leave it so they could watch as the water and soil samples were col-



No longer content to sit at their desks, the students leave the classroom and take to the field. On their excursions, the young activists (left to right) discuss hazardous waste with neighbors, take notes on local drinking-water wells, and lobby state politicians.

lected. Clad in pressed pants and lace-edged skirts rather than their usual baggy T-shirts and torn jeans, they looked like aliens among the corroded barrels and tainted soil. They would have the test results by fall, EPA officials promised.

The children twirled and danced, two girls catching the breeze in their puffed-out skirts. "Kids can make a difference," they began saying—kids from Jackson, which has the lowest income per capita and one of the largest minority populations in the Salt Lake City School District.

But their pride faded when they learned that the original owner of the barrel yard had suffered a heart attack and was in intensive care. One of his workers said the recent pollution dispute had aggravated a preexisting heart ailment.

"Don't you know that this man has contributed thousands of dollars to the local children's hospital, Little League teams, and other charities?" the worker asked me. "Why are the children investigating his plant? We're not contaminating anything. By recycling barrels, we're cleaning up the environment." Confused, I pondered whether I should have allowed the children to enter such a controversial arena.

The question didn't need answering immediately, because the project slowed for summer recess. Still, the children called me at home to tell me what was going on at the site. Leaning on the walkway fence outside the barrel yard, they watched as the drums were removed, carried away by train or by truck, and the pile shrank.

In the meantime, I received two

phone calls from an individual who threatened that parents would take legal action against the school if the children remained involved. I suspected the calls were a ruse to scare me—parents had submitted permission slips for every excursion—and I questioned each parent to confirm my theory. All were highly supportive and eager to have their children participate. Our principal, Pete Gallegos, encouraged us to forge ahead, and the school district promised legal help if we needed it.

When the children returned to school in the fall, I expected their enthusiasm to have waned, but they immediately proved me wrong. I had told last year's sixth graders that I would call them in September so they could remain involved if they chose to. Now I invited them back to brainstorm additional strategies with the new sixth graders—and when I drove to the junior high to pick them up, expecting only a few to be waiting, 10 of the original 14 piled into my compact car.

I covered the chalkboard with their ideas: Write to the Denver EPA to check for test results; contact local health officials; call the mayor, the power company, the new owner of the barrel yard. Removal of the barrels had slowed down, so the children suggested applying more pressure. Do more research, they said.

Some of the children were concerned about the ailing barrel-yard owner. Was it their fault that he was in the hospital? Did winning always mean that someone else had to lose? We learned that the former owner was in stable condition. "Who else has rights that need to be protected?" I asked.

"The barrel-yard owner," Chris said. "What's going to happen to small-business owners like him, who can't afford to clean up their messes? They could lose their businesses, and then only the big guys would still be around."

"But we have a right to know what's in that dirt," Heather insisted. "We're living by it." The other children agreed.

"Then who should be responsible for cleaning up hazardous waste?" I asked.

"Maybe the health department," a child said.

But a health department spokesperson had already told us that the agency, underfunded and understaffed, had no money for cleaning up the waste.

"Let's earn some money to help everyone, like small businesses and people like us," one child suggested.

"And give it to the health department," another added.

"Let's clean up all the hazardous waste in the state!" Kory suggested, jumping up and knocking a stack of magazines to the floor.

"Get real," Chris sneered. "That would cost too much."

"If you're serious about helping, how could you raise money?" I asked.

After deciding to hold a white-elephant sale, the children gathered used items from home and collected new products from 12 local merchants. They raised \$468.22—not a hefty sum, but enough to clean up one square foot of a mound of toxic mess. Heather, always the philosopher, remained optimistic. "Big things can happen in small steps," she said. "Like climbing mountains."

By Christmas the long-awaited EPA test results were announced publicly. Heather tore down the hall, waving a large manila envelope. "The health department just brought this to the office and asked for me!" Her cheeks glowed.

We flipped through the pages together. The report indicated that harmful chemicals, solvents, coal tars, pesticides, and heavy metals had con-

taminated the soil and groundwater. It listed such substances as benzene, toluene, lead, zinc, and copper. A health official visited our class to help us understand the results.

The EPA, which was now investigating the surrounding neighborhood to determine how far the contamination had spread, promised additional test results within a year. After that, a Utah health official told me, the site would probably go onto the EPA's Utah Priorities List of areas slated for cleanup.

By last April all 50,000 barrels had been removed, and the EPA began pressuring the yard's new owner to build a fence that would effectively keep out transients and children. Already my students had warned the entire school to stay away.

Meanwhile, the children had received invitations to speak before a number of organizations. They gave presentations about their project to the Women's State Legislative Council, the Women's Garden Club, and the Utah Education Association.

Their next step was to mail out 550 letters to industries, environmental groups, and service organizations to seek additional funds for cleanup, which they could add to their own \$468.22. We received stacks of congratulatory letters and checks. Only two negative letters (from industries) arrived, and we got one discouraging phone call. No further threats were made.

Altogether the children raised more than \$2,200 in cash and another \$500 in promised services. They were disappointed to learn, however, that they could not legally contribute the money to the state and have its use monitored. They didn't want their money wasted in court battles; they wanted it to go directly toward cleanup of some site.

Having read about the national Superfund, which helps clean up abandoned toxic-waste sites, one child suggested a law that would create a similar state fund to which anyone could contribute. Utah had no such fund and ranked 45th among the states for developing environmental programs, according to "The State of the States," a 1987 study published by the Fund for Renewable Energy and the Environment.

Each fifth and sixth grader involved

with the project wrote legislation, and the children combined the best points. The result was a draft bill to set up a state contributory Superfund that would not require state tax revenues. Utah House Reps. Olene Walker (R) and Ted Lewis (D) cosponsored the children's bill.

April, a fifth grader, then contacted Rex Black (D), who agreed to sponsor H.B.199 in the state Senate. The children lobbied in person, handing out fliers with red-crayon trim. Sitting on



The exhaustion of waiting for the final vote.

plush couches, they tried to look sedate in the regal surroundings of Utah's capitol building. They crossed their legs and folded their hands—but within two minutes they were bouncing on their cushions. Then they rushed to the window. In the distance they could see the barrel site where their odyssey had begun almost a year ago.

The children were clearly enjoying themselves, but they were also aware that this was serious business: They had to reach each member of the Utah House and Senate. Back at Jackson Elementary, they tied up the phones for two days as they called each legislator. Later five children addressed the Utah Senate and five others spoke before a House committee.

"Please vote for House Bill 199," Heather said into the microphone as she stood before the House committee. "It will benefit everyone, and it will cost the state nothing."

They received a standing ovation.

As the final votes were tallied, the children sat quietly counting in the Senate gallery. House Bill 199, a state contributory Superfund, passed without a single dissenting vote. Not allowed to

applaud in this formal setting, the children grinned, mouths open in silent cheers, arms waving wildly.

"No one has more effectively lobbied us than these young kids," Sen. Darrell Renstrom said before the Senate, "and they didn't even have to buy us dinner."

"These children did something we couldn't do because 'superfund' is such a political issue," Brent Bradford, director of the Bureau of Solid and Hazardous Waste, told the Women's State Legislative Council. "No one thought to tell the children they couldn't succeed. They got people who wouldn't even speak to us to talk to them and even to donate. . . . They've raised the level of awareness of the whole valley to hazardous-waste issues."

Since then the children have received awards of appreciation from Mayor DePaulis, the Department of Health, and Utah Gov. Norman Bangerter. They also won the National Community Problem Solving Award in education, and the President's Environmental Youth Award. On May 27, 1988, U.S. Sen. Orrin G. Hatch (R-Utah) commended them in the *Congressional Record*.

Last fall, a year and a half after they began their project, the children applied for a Waste Minimization and Recycling Grant, attaching it to a Department of Health proposal, which could increase their \$2,200 to \$22,000 with a 10-to-1 match from the EPA. The health department's proposal was for a match to implement a program for reducing waste at its source and for encouraging recycling. In addition, legislators are considering appropriating sizable funds in their next legislative session for cleanup of toxic waste.

What next? That depends on the children. Currently they are selling popcorn to raise money to buy and plant 18 trees on some barren street islands near their school.

Already they have proven that kids can solve problems, as Heather says, "one small step at a time." If they can climb mountains, one would hope adults can too. ■

BARBARA A. LEWIS is a teacher and freelance writer in Salt Lake City.

10TH ANNUAL SIERRA PHOTO CONTEST

For nine years *Sierra*, the national magazine of the Sierra Club, has celebrated the art of photography through an annual contest. Each year the submissions get better and better; we anticipate that our tenth contest will bring in some truly stellar entries. The winning photos will be published in *Sierra's* September/October issue, then mounted and displayed for a year at the Sierra Club's headquarters in San Francisco.

PRIZES

■ Grand Prize: A Nikon N4004S 35mm SLR camera with an AF Zoom-Nikkor 35-70mm f/3.3-4.5 lens and a versatile all-terrain bike, the Iguana, from Giant Bicycle.

■ Eight first prizes (awarded for the winning black-and-white and color photo in each category): a pair of 8×42 Vivitar Series 1 binoculars.

■ Eight second prizes (awarded for the winning black-and-white and color photo in each category): a special-edition folding knife from Buck Knives.



"PEBBLES, FROSTED LEAVES, AND ICE." JIM MAROTTA-JAENECKE, FIRST PLACE (COLOR),
"THE MEETING OF LAND AND WATER," 1988



CATEGORIES

■ *Abstracts in Nature*: Focus on the form, symmetry, or asymmetry of natural objects.

■ *The Meeting of Land and Water*: Anywhere, anyway the two elements touch—surf on shore, snow on hummock, rain on Spain.

■ *Wildlife*: Animals in their native habitats.

■ *Our Troubled Earth*: Clearcuts, pollution, and other planetary insults.

The yin to beauty's yang.

HOW TO ENTER ■ For contest rules and submission forms, write to *Sierra Photo Contest*, 730 Polk St., San Francisco, CA 94109. No phone calls, please. Entry deadline is June 1. Do not send photos until you receive the materials.

ELIGIBILITY ■ The contest is open to all amateur and professional photographers. Sierra Club staff, their immediate families, and suppliers to *Sierra* are not eligible. Previously published work, photos pending publication, or photos that have won other contests are not eligible. Void where prohibited.

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By Page Stegner

he students in the back of the van think I'm nuts. For the past three hours I've been talking about nothing but the Navajo taco I'm going to consume at the Golden Sands in Kayenta, and to them a taco is a *Mexican* taco, no gustatory memory of fry bread and beans. In point of fact they have very little curiosity about anything foreign to their subadult palates, their tastebuds having been destroyed by tofu, alfalfa sprouts, yogurt, and herbal tea.

These students seem to evidence very little curiosity about anything at all. From Monterey Bay to Flagstaff, a distance of nearly nine hundred miles, they have lain supine on the floor of the van, sleeping, rummaging through my Conway Twitty, Merle Haggard, Charlie Pride, and Melba Montgomery tapes (complaining), and occasionally dipping into private stocks of seeds and nuts. One girl has eaten nothing for two days but garlic-flavored popcorn. The Mohave, beyond which few of them have ever been, holds no interest. One or two bestir themselves to look at the Colorado when we cross it, largely because they have read (or are supposed to have read) portions of Powell's *Exploration*, and because they've been lectured on the fact that this river is the major artery of the entire western drainage between the Sierra Nevada and the Rocky Mountains—a drainage, they dimly understand, that we will be floating when we put onto the San Juan River near Bluff, Utah.

"Looks dirty," the popcorn eater remarks.

The San Francisco peaks above Flagstaff inspire a yawn, as do the Painted Desert and the Little Colorado. Black Mesa, on the other hand, produces a communal outpouring of invective di-



Join Chanterelle, Professor
Psbaw, and the Beaver on, like,
a totally nectar river trip.



DEEP ECOLOGY





HOWARD SALA

rected at Peabody Coal and Uncle Tomahawk Native Americans who conspire in the rape of Mother Earth. These students are, after all, majors in environmental studies, and while they take little interest in the actual environment, they are not short on opinions about its defilers.

We reach Kayenta about five o'clock, and I see Bud's truck parked in front of the Golden Sands, its trailer load of boats, rowing frames, oars, coolers, and miscellaneous gear in marked contrast to the more labor-oriented contents of the local Indian pickups. A patchwork of bondo and rust, it has once again earned its reputation as "the puker." I notice most of its human cargo sprawled in various angles of repose around the parking lot, exhaling carbon monoxide and trying to regain their stomachs.

My group, as usual, begins what is for them a laborious process of democratic

resolution—will they eat or will they wait in the van?—but their need to hold a town meeting pursuant to action (any action) soon defeats me and I head for the restaurant alone. One of the remarkable things about this outfit, I mutter to myself, is that no one will commit to anything unless *everyone* commits.

Bud is inside concentrating on the purpose of our pit stop—the Navajo taco. The LARGE Navajo taco. A massive, mammoth, monstrous, Falstaffian, Brobdingnagian, Gargantuan, Cyclopean fatty of a taco served up on a plate the size of a turkey platter and weighing about twenty-five pounds. An acre of fry bread, a bushel of beans, a furlong of cheese, a firkin of lettuce . . . God knows what else. I can't see the top of his head behind the escarpment of his victuals, but I can hear heavy breathing and sybaritic moans.

The student consensus, apparently, is

that it is too early for chow, and most have elected to cool their heels in the parking lot with the refugees from the puker. Four of the more adventurous ladies wander into the restaurant, through the melee of Kayenta Navajos, and sit sullenly at one of the few empty tables. I observe them shake their collective head when they are handed menus. Nothing to eat, thank you. We *will* have four glasses of water. The waitress regards them a moment without emotion. "You don't order, you don't sit," she says. They sigh, look put-upon, rise. As they make their way to the front and are about to exit, a young Indian with a walking cast on his left leg comes through the door. The popcorn eater nearly runs him down. "Excuse me," he says, lurching back. No response. She not only doesn't acknowledge his courtesy, she doesn't even notice him. He is vapor, wind, a figment of her imagina-



tion; he has to flatten himself against the wall to avoid getting knocked on his behind. "Excuse me again," he mutters.

Bud watches this cultural interface, slowly masticating the last wad of his fry bread and beans. "Maybe we better round up the wagons, Kemo Sabe," he says. "One of these dog soldiers is likely to give offense."

"You round up the wagons," I tell him. "I'll catch you in Mexican Hat. Because I'm gonna eat my taco, I don't care what."

Bud inspects the toothpicks in a shot glass on the table. "That's exactly what Custer said to Reno down there on the Little Big Horn," he says. "So maybe you'll catch me in Mexican Hat. Then again, maybe not."

Back on the road. Great thunderheads over in the direction of the San Juan Mountains, and rainsqualls streaking the sky around Mesa Verde. Or maybe it's just fallout from the Four Corners power plant. All around us the de Chelly sandstone buttes of Monument Valley are ablaze in the afternoon sun. One of my wards is moved to crawl up off the floor and ask what makes them red. "Iron," I say. He wants to know how they got here in the first place. "Erosion," I tell him. Yesterday I might have been up to a more expansive discourse, might have bored him with the little information I possess about the intrusion of ancient seas and the deposition of sedimentary beds; about coral reefs and biothermal banks; about upwarping, downwarping, slumping; about river cutting, wind, spheroidal weathering, oxidation—nifty stuff like that. But this evening I just want to drive across the "rez" with my own head for company. I'm beginning to wonder if joining this expedition was such a good idea after all.

Who knows? It would seem that taking students who study the environment out of the classroom and into the "field" (I should say "down the river") ought to be an act of true pedagogical devotion. Either that or the greatest academic scam ever conceived—rafting on the taxpayer's dime, so to speak. Of course, those of us who are merely serv-

ing here as "guides" don't have to concern ourselves with such hairsplitting—don't have to do anything, in fact, but drive the trucks and row the boats. Professor Pshaw, who should be waiting for us at the put-in at Sand Island, has done all the planning and outfitting. He's the one who will give the lectures and lead the hikes. He's the one who has to worry about one of these narcolepts doing a head-plant off a cliff (ground balls we used to call them at Search and Rescue). Drownings, broken bones, hyperther-

five miles wide and a hundred miles long, between the Colorado River on the west and the Paradox, Salt, and Blanding basins on the east. Its northern definition begins approximately at the confluence of the Green and Colorado rivers in Canyonlands National Park, Utah, and its southernmost extension is the Golden Sands Restaurant in Kayenta, Arizona. Well... near there, anyway.

Bisecting this wasteland of wrinkled rock and treacherous little thorny plants is the canyon of the San Juan (canyons,



mia, PMS, snakebite, scorpions, fire ants, fire pants, impregnations, drug abuse—all his responsibility. The rest of us just have to keep this torpid, temperamental, hormonal mass moving in more or less the same direction—a chore, Bud has observed, rather like trying to direct a centipede through a maze one leg at a time.

Dusk is upon us as we loop over the north end of the Raplee anticline a few miles southeast of Bluff. The great Comb Ridge monocline lies just in front of us, eighty miles of abrupt cliff face that mark the eastern boundary of the geological formation across which we have been bouncing for the past hour. The Monument Upwarp, as it is called, is a kind of natural superdome, thirty-

actually), cutting across the Grand Gulch Plateau, down through the Permian to the Pennsylvanian, exposing on its way a host of stratigraphic terms that basically describe time deposits of limestones, sandstones, shales, siltstones, marine organisms, layers of this and that—a kind of geological Navajo taco. I can never remember half the ingredients, much less the order of their spread. I can never remember whether the Cedar Mesa formation is on top of the Hlgaito, or the Hlgaito on top of the Hermosa. Or all of the above. Is it Moenkopi shale that caps the de Chelly sandstone, or Sinarump? And things like the simple distinction between, say, a syncline and an anticline just flat out elude me. I have to conjure the letter A



(for "Anti") in my mind's eye and translate it to my finger, draw a diagram in the dashboard dust. The slopes meet at the top in a picture worth a thousand words.

But such details are of limited importance. I want you to sit up back there, you louts, and take notice. What is before you in this failing light is not scientific nomenclature; it is the most staggering image of cliffs, washes, canyons, buttes, mesas, towers, cathedrals, walls, potholes, draws, swells, folds, pockets,



RICHARD SMILA

cones, spires, needles, and labyrinths you're ever likely to see. Attention must be paid.

The San Juan River flows quietly between its banks at Sand Island, gurgling occasionally in the darkness when the subsurface current decides to boil up for a look-see. No telling what the river gods are doing out there. Once on the Rogue in Oregon I had one of those random boils suck down the rear tube of my raft before it decided to let go. But not on the San Juan. The San Juan is a gentle float without serious hydraulics. No rapids worthy of notice. Magnifi-

cent, towering walls, sandy beaches, hot sun and smooth rock, cottonwoods, the invader tamarisk, canyon wrens. The San Juan is distinctly a mellow experience. . . .

"Except that we've got a problem," Bud says, coming out of the campfire light where he has been overseeing the preparation of supper and into the riverbank darkness where I have been hiding. He sits on a pile of life jackets unloaded earlier off the trucks and rolls a smoke. "We've got five vegetarians on board. They're caucusing right now about what they delicately describe as the 'nutritional inadequacy' of our commissary. They want to go into Blanding and buy tofu."

"Tofu! Blanding is thirty miles . . . and they're not going to find tofu in Blanding, Tofu?"

"I told them. They say they can't go five days without an acceptable source of protein."

"We've got all kinds of protein. Eggs, cheese, nuts, tuna fish. What do they usually eat?"

"Tofu."

"Jesus."

We walk down to confront the congress gathered just outside the kitchen area where the other guides, Lynn and Don, are grilling burgers. Bud explains that going to Blanding is out of the question, and points to all the protein goodies we already have in the dry boxes—eggs, cheese, peanut butter, beans. "Those of you who don't eat meat can load up on beans tonight," he says. "We've got a huge pot going; you can eat bean-burgers, salad, fruit, cookies."

"We're not in the midst of civilization, folks," I add. "We'll just have to make do."

A girl named Chanterelle steps forward and eyes me malevolently. She is one of the smokers on the trip—she and a frail asthmatic kid everyone calls "Fuckin'-A-Fred"—though the connection between this sobriquet and its object is opaque to say the least. Chanterelle, on the other hand, looks a lot like the mushroom she is named after—flat-headed and short-necked, shoulders like

a nose tackle, no waist, no hips, no glutes. All stem from the armpits down. "What kind of beans are they?" she asks, letting me know by her inflection that I am about to learn something.

"I don't know . . . beans are beans."

Chanterelle produces the empty #10 can and holds it up for inspection. "Have you read the label? *Ranch beans!*" she intones. "Cooked in *pork by-products.*"

Great God. Skewered by a toadstool. We can only shrug, walk away, hope everyone recognizes a Mexican standoff. "Bad'ges? We don't need no stinking bad'ges." Anyway, this is Professor Pshaw's problem, not ours. We just drive the trucks and row the boats. "Where is Pshaw?" I ask Bud. "In our hour of travail."

"At the Recapture Lodge in Bluff."

"Doing what?"

"Lodging. He said he's slept on the ground before. He said he'll be here in the morning to help load the boats."

The moon has come out. Same old moon, I imagine, that the Anasazi admired when they lived in these canyons as far back as two thousand years ago. They did all right on beans. A complete protein, the bean, when mixed with a little corn and squash. Freed the ancient ones from all that hunting and gathering and hitchhiking into Blanding for tofu. Gave them time to settle down a bit, take up the arts. In fact tomorrow we'll stop a few miles downriver to look at a whole wall of their art (petroglyphs carved into the Navajo sandstone at the mouth of Butler Wash), and to pick through a field of their pottery shards scattered around the base of the cliffs. Have to remember to tell the children to put everything back where they find it. It's wicked to steal samples.

There were at least three separate periods of Anasazi occupation in the San Juan drainage—roughly A.D. 200–400, 650–700, and 1050–1275. And then rather suddenly they left. *Why* they left is a matter of some speculation, but climate was probably the major factor. Tree ring counts and pollen studies in a number of granaries show a decrease in rainfall that reached serious proportions



during the last quarter of the thirteenth century. Twenty-five years of drought coupled with a long-term population increase undoubtedly spawned a host of ancillary problems—overuse of depleted land, overirrigation, increased erosion, reduction of game animals, reduced nutrition and a resultant susceptibility to disease—all that plus a growing paranoia that the guy in the next gulch over might be plotting a raid on the food cache. Whatever the specifics, by about 1300 they were gone. And except for Fathers Escalante and Dominguez in 1775, and a few trappers in the 1840s, nobody came here again until the Corps of Topographical Engineers under Captain J. N. Macomb in September of 1859. Macomb was not overly impressed. "I cannot conceive of a more worthless and impracticable region," he said.

We commence our float around mid-morning. Lynn and Bud will row the two bright yellow Domars, Don the Avon Pro, I the old Achilles. We will each take three passengers, except Don, who gets the bonus extra—Professor Pshaw. The well-rested doctor makes his appearance at the last moment (looking badly hung over, to tell the truth), but manages a brief discourse on the genesis of "desert varnish" before dropping a wet beach towel over his freckled pate and retiring to the shade of a cottonwood tree. The guides marshal the centipede into the boats, give instructions about life jackets and sunstroke, and shove off. Rendered mute by the feeling of release that comes with departure (all hype at last hypostatized), we slide quietly past low banks of gravelled terrace and lean back at the oars to gaze on the flat-topped mesas encircling the river valley around Bluff. Boat bottoms scrape occasionally against submerged spurs of mid-channel sandbars. The current wanders. Seven miles to the west the river will slice through the Comb Ridge monocline and speed up its twisted descent across the Monu-

ment Upwarp toward the Colorado, but here it is a slow meander, a good place to let the raft drift through lazy 360s. Work on a tan.

The students have decided to give themselves nicknames. As I float down on the Domars I hear passengers shouting back and forth across the water.

"Hey 'Shrooms, you got my #8?"

The unmistakable conformation previously known as Chanterelle rises from Bud's thwart tube. "What? Say again, Beaver?"

"My sunscreen. You got it?"

"Gave it to Warbler."

"Yo, Warbles, 'Shrooms says you got my sunscreen. I need it man, I'm turning the color of a crawdad."

"No way, Beav. Fuckin'-A had it at the put-in."

The boy called the Beaver turns to the apparition next to him, something shrouded from hood to hoof in a white nylon rain poncho. Must be two hundred degrees in there. "Hey, dude, you got my #8?"

"Fuckin' A," says the wraith, poking it out through the armhole of his tent.

Warbler? The Beaver? 'Shrooms? The current catches my boat and carries me past the Domars. I look for expression beneath the baseball caps that Bud and Lynn wear low on their foreheads; see only the glint of river and sun in the lenses of their mirrored shades.

The great cliff of petroglyphs at Butler Wash is a howling success, less for the mystery of its symbolic representation than for the manner in which it has been defaced by modern scribes recording names, dates, sweethearts, and hometowns in the soft surface of its ancient rock. There is also a spray-painted message across the length of the wall, "River Runners Go Home." Like the strip mine at Black Mesa, Butler Wash inspires outrage, as well as loudly expressed opinions about the disposition, percipience, and cultivation (not to mention lineage and pedigree) of the Caucasian geeks ("probably Mormons, probably from Moab") who carved these pitiful forgeries into the face of time. It seems pointless to brand oneself a racist by suggesting that the culprits

are as likely young Navajos as Moabite whites—young Navajos who despise river runners (most of whom are white), and who have no reverence for the Anasazi either. The Anasazi are not the ancestors of the Navajo. Only the word is Navajo. Meaning "ancient enemies."

Interest in pot shards and geriatric graffiti terminates with the call for lunch. The discussion around the tuna salad (p.b. & j. for nonusers) turns to the Grateful Dead. Chanterelle and Warbler continue to demonstrate their contempt



for the bill of fare and boycott the table, choosing instead to sit in a thicket of tamarisk and smoke perfumed cigarettes. I take my sandwich and walk up the talus slope below the wall to eat in the company of one of my favorite rock art characters—a little trapezoidal man (or woman) with a little trapezoidal head and little stick arms, legs, and fingers. Inside his trapezoidal head stands still a littler trapezoidal man (or woman) with all the appropriate appendages. What is the meaning of this? What is that second fellow doing up there in that head? A mystery. Somebody once told me that the Navajo word for *soul*, directly translated, means "the one who guides me from within." Is that what we have here? Some Anasazi scratched a



picture of his *soul* into the oxidized face of this ancient seabed? Totally far out! Intense . . . as the young persons say.

We make our first camp at mile 10 below the Mule Ear diatreme. Dr. Pshaw seems to have recovered from whatever ailed him at the put-in (the nap he took at mile 6 while the rest of us hiked to the cliff dwellings must have helped), and he steals a text from D. L. Baars' *Geology of the Canyons of the San Juan River*. Baars tells us (in Pshaw's voice) that the Mule Ear diatreme "is a

will make small red garnets on you.

As the students prepare for departure the vegetarian delegation approaches the kitchen. A swarthy, dark-haired boy now known as "T.V." (for turkey vulture) asks Bud what they can expect in the way of sustenance when they get back from the "dithyramb."

"Road-kill stew," Bud says.

"Sir?"

"An old river tradition. First night out we always have road-kill stew. Got real lucky at the junction of 89 and 160 and

"do not flour the pan"), and (c) the groover accepts only solids. "Do not pee in it," Bud intones. "Pee in the river."

There would be little point in bringing this subject up had it not provoked our band of merry travelers into yet another attitudinal outburst. An endorsement of child molestation could not have been more enthusiastically received. The chorus of boos verily echoed off the adjacent cliffs—*pee in the river . . . boo*. Bud remained calm. "Pee in the water, or in the damp sand beside the water, not in the groover. Everything we bring with us, we take with us—except liquid."

"Boo. Polluter. Pig. Boo."

"When we get into the Goosenecks this practice is particularly important because the beaches are small and narrow, and the plant life is fragile. About six thousand people a year float this canyon, and if every one uses the area just around camp as a latrine, it becomes a very smelly affair indeed."

"Swine. Litterbug. Don't listen to him. Boo."

"You better listen to me," Bud says. "Because if I find liquid in the groover, you'll find it in your morning coffee."

When the moon comes up I walk down to the beach to check bowline knots and make sure everything is secure. Night winds have been known to whisk unfastened tarps, life jackets, clothing, even boats themselves into the river, and I have encountered some screamers in this canyon—night and day. At the Clay Hills take-out I once watched an unloaded sixteen-foot Avon picked up by a tremendous gust and blown like a leaf (or a barn door) for two hundred yards across the parking lot, flattening a half dozen rafters along the way, and taking out a loaded picnic table set up by a commercial outfitter for the delectation of his hungry customers. And more than once I have spent an irritable night sweltering in the bottom of my sleeping bag trying to avoid being sandblasted by a San Juan scirocco.

Don and Lynn are battering down the kitchen and discussing itinerary with Professor Pshaw—arguing a long river

Continued on page 112



RONALD SALA

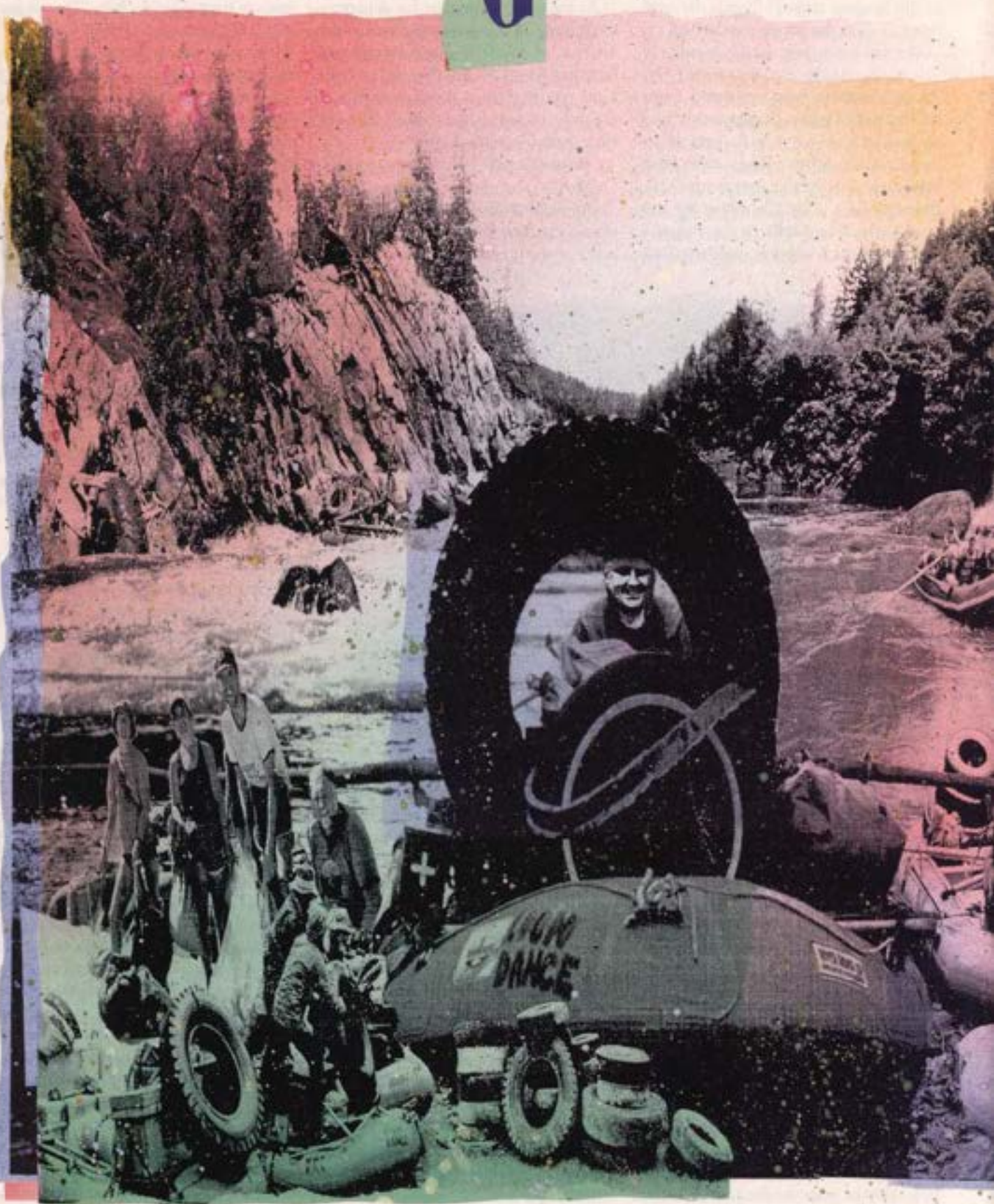
kimberlite-bearing diatreme and contains a great variety of crystalline rocks from the Precambrian basement complex ranging from coarse-grained granite to gneiss to serpentized talchlorite schist." Pay attention, scholars. There will be a quiz. "The presence of eclogite with dunite, pyroxenite, peridotite, and large blocks of kimberlite suggest that the separation of the gas phase took place at considerable depth, possibly near the crust-mantle boundary." Now . . . if there are no questions? . . . we are going to hike to the top of this volcanic vent to see if we can find any small red garnets lying around in its seventeen-hundred-million-year-old rubble. Look in the ant hills. The fire ant hills. Do not provoke the ants—or they

found us some prime cuts, so tonight you get a choice—treaded veal cutlets or snake tire-tire."

As it turns out, this is the last discussion we will have about ingestion.

Expulsion, on the other hand, is the subject of the evening performance—Bud and Don demonstrating the proper use of the w.c. (wilderness crapper), also referred to as the port-a-pot, or the groover. Regardless of its designation, its construction is always the same—a steel rocket can, double-lined with plastic garbage bags, and a removable toilet seat. Instruction is needed because (a) some people are shy, embarrassed, and revolted, (b) a *restrained* use of Clorox and lime disinfectants is required ("You are not baking bread," Bud always says;

Give Us Your

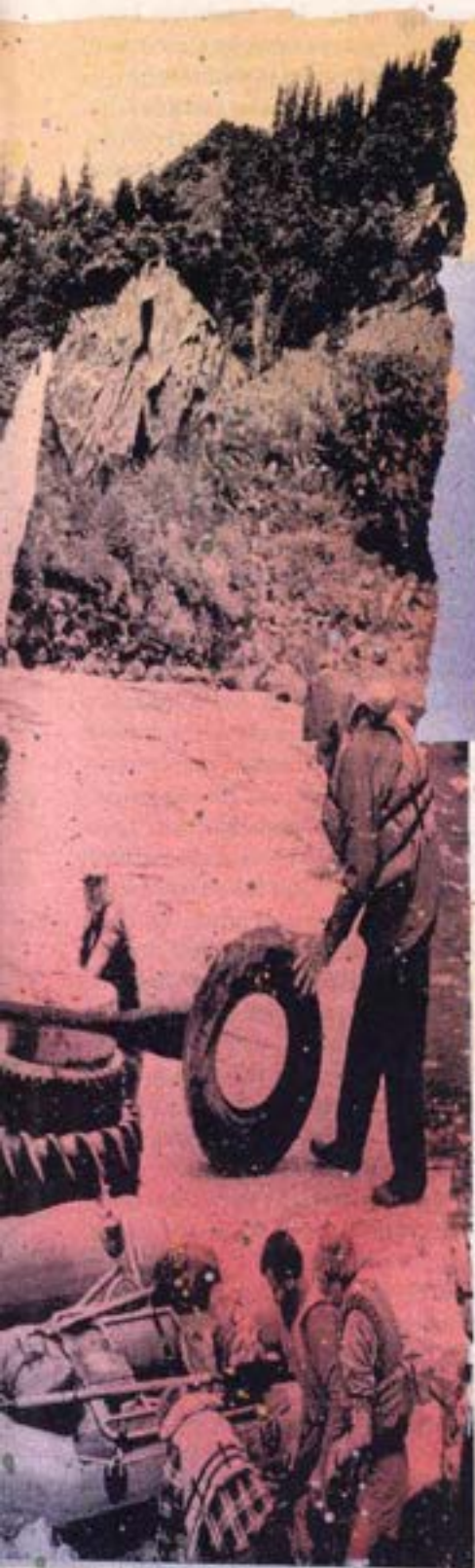


NICHOLE STUTTING - SOURCE PHOTOS COURTESY OF THE CALIFORNIA RIVER EXPERIENCES, TULSA, OKLAHOMA

Tires, Your Coors Cans...

...your Whopper wrappers yearning to float free.

To keep a wild river wild, rafters stalk the rubbish between the rapids.



ur guide has a problem. Dan Geyer's big raft, loaded with camping equipment, is perched on a rock at the head of a rapid, Oregon's Rogue River pouring off on either side. It's an embarrassing place to be stranded, with eleven customers, two reporters, and his lead guide watching from the eddy below.

The tires don't help. Truck tires, car tires, whole ones and chunks of tread—the raft is piled high and weighted down with old rubber. But Geyer can't jettison a one. The tires are our reason for being there.

The Rogue River begins near Crater Lake, drops out of the Cascades and flows past the cities of Medford and Grants Pass, then cuts a deep gorge through the Coast Range forests to the Pacific Ocean. In 1968 Congress determined that 34 miles of that gorge merited inclusion in the national Wild and Scenic River System. The stretch was designated "wild," a classification that would protect it from dams and other federal projects. The Rogue offers excellent scenery, boating rapids, salmon and steelhead fishing, and possibly more abandoned tires than any wild river in the country.

In 1983 the Sierra Club and Oregon River Experiences (ORE), a whitewater outfitter based in Junction City, Oregon, began co-sponsoring cleanup trips down the Rogue, giving river enthusiasts the opportunity to bag litter and remove tires. Although the Club canceled its river program in 1986 for insurance reasons, individual Club members continue to sign up directly with ORE. This September afternoon they make up most of the audience watching Geyer struggle with his raft.

Unable to move the boat against the force of the river, the guide takes the opposite approach, leaning on the pontoon closest to the water, giving the current even more to work with. The raft pivots slowly on the rock, begins to slide, and then plunges over the edge. Geyer floats down to us with an embarrassed grin.

No one is about to criticize; we have all had our own relationships with rocks. Like most ORE trips, this one is "row your own," with two people to a raft. The guides coach, and stand by for rescue, but in the rapids the boats are all ours. On cleanup trips the mental concentration required in whitewater is intensified because we're constantly on the lookout for trash.

Policing the river starts out as altruism, but quickly develops

By
Talbot
Bielefeldt

into a sport of its own. Tires are the big game. Cans are of intermediate status, the more the better. Cigarette butts are "trash fish." We find fertile hunting grounds just off the river in the oak and madrone along Whiskey Creek, where an old miner's cabin is preserved along with antique mining implements and very contemporary piles of aluminum beer cans.

The cabin, however quaint, and its surrounding litter serve as a reminder that Wild and Scenic rivers outside Alaska are rarely true wilderness. Maine's Allagash flows through old logging country and is interrupted by dams. The Salmon River in Idaho begins to pick up tires and other urban litter as soon as it leaves the protection of the wilderness areas around its upper stretches. Popular whitewater streams outside the national system suffer greater indignities. In West Virginia, boaters contend with flotsam the New River dumps over the Bluestone Dam, while power-plant releases make the water in the late-summer Cheat River uncomfortably hot for miles below a popular put-in.

Miners and boaters have been part of the Rogue since the middle of the last century. A well-worn backpacking trail runs along the north bank, roads carve close to the scenic corridor of the river, and several permanent lodges are served by boat and small aircraft. Many of the river's rapids exist in their present form because pioneer guide Glen Wooldridge dynamited boulders out of the way.

The Rogue today continues to be an accessible and popular stream, and management focuses on controlling recreational use. In 1974 the U.S. Forest Service, the Bureau of Land Management (BLM), the state Scenic Waterways Commission, and other concerned agencies began limiting the number of boaters. The present system allows 120 people per day to enter the Wild and Scenic section during peak season (between June and early September). Of those spaces, 60 are allotted to clients of commercial outfitters and 60 are open to the general public through a Forest Service lottery.

The procedure is more or less typical of controls on U.S. rivers under federal jurisdiction that boast wild stretches long enough to support multiday trips. The most famous permit system—or infamous, depending on whom you talk to—is for the Grand Canyon of the Colorado, which has a years-long waiting list for private parties. Many boaters maintain that the National Park Service's division of permits is unfair, since private boaters often can't get on the streams while commercial guides may have spaces to fill. On the Rogue, the Forest Service and the BLM have tried to minimize the conflict by putting unused commercial spaces into a common pool, from

which private boaters can claim them on a first-come, first-served basis.

Although the absolute numbers and method of administration are open to debate, guides, private boaters, and federal agencies agree in general on the need for some limits on use. River managers on the Rogue point to September days after permit restrictions are lifted when more than 400 people have started down the river. The result has been crowds of "giggle-and-splash" rafters competing for space with anglers trying to quietly drift flies past steelhead trout. In response to the fall rush, the managing agencies extended the end of the permit season in 1986 from Labor Day to September 15. The move was intended to keep the open season free of the holiday crowds, moving it closer to Oregon's winter rainy season.

As far as we can tell, the agencies succeeded. On September 23, our third day on the river, the morning fog thickens into a cold drizzle. Ridge silhouettes vault into the clouds, and spiky trees float on a gray mist. We hear rapids long before we can see them. Hunkering down over our oars, not stopping to scout, we follow the guide boats through one riffle after another. For most of the day we see only the Rogue's native residents. Herons and osprey cruise the canyon, while mergansers paddle back and forth in the eddies, watched by dark-eyed otters.

At Winkle Bar, where Zane Grey lived and wrote in the 1920s, several of us ferry across the river to clean up a camp area on the opposite bank. A guided party of fishermen in cowboy hats eats lunch around a fire. We wander the perimeter of their site, dismantling fire rings and collecting litter. We're self-conscious, aware of certain stereotypes: Fishermen in cowboy hats leave litter and spoil the wilderness experience;

we rafters talk environment, but actually crowd the river and spoil the fishing. In fact, our party includes several anglers, and fishing guides on the Rogue and most other regulated rivers operate under the same rules as everyone else does—fires only in metal fire pans, all refuse and human waste packed out.

According to the river's managers, the trait shared by individuals who soap up in streams, defecate on beaches, and build fire rings in camp is not river-running savvy but ignorance. Fire rings on the Rogue appear mainly after permit season, when boaters are not required to check in with the Forest Service and don't get the official pitch on fire pans and camping practices. And numbers alone don't make a dirty river. Only 11,000 boaters float the Rogue during the permit season, and the Forest Service estimates that the total number for an entire year is less than 20,000. Some whitewater streams of the East

As the
hours wear
on and the
rain soaks
in, the real
trashbusters
emerge from
among the
fair-weather
caretakers.

—Pennsylvania's Youghiogheny, West Virginia's Gauley, North Carolina's Nantahala—have seven or eight times that amount. Yet boater-deposited litter is not a major problem on these streams. Most runs there are single-day, so camping is not an issue. And with so many people around, it's hard to chuck a beer can into the water without witnesses.

As a cleanup party, we are generally hypersensitive to litter. But as the hours wear on and the rain soaks in, the real trash-busters emerge from among the fair-weather caretakers. The champion tire-spotter of the group is a Seattle bus driver whose life on wheels seems to have given him a sharp eye for rubber. Late on a drizzly afternoon, while most of us hope only for camp around each bend, he still burns with the spirit of the hunt.

"Tire! Right bank! Two on the left! Pull into the eddy!"

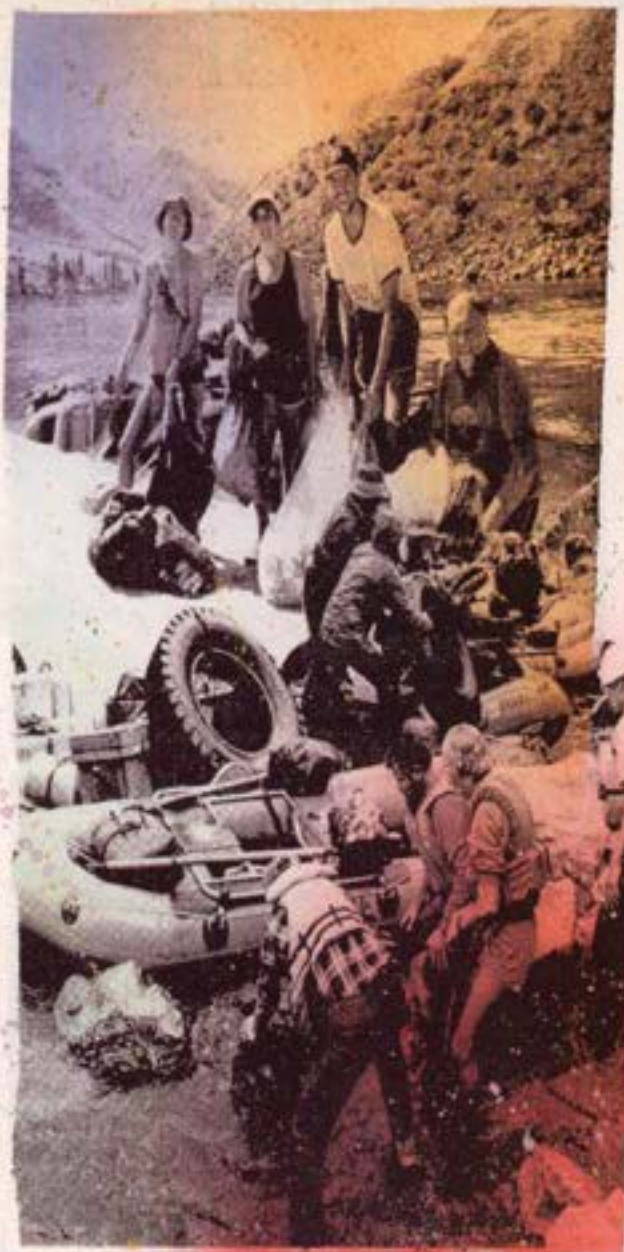
The day is filled with tires—heavy, cold, wet tires covered with coarse sand that abrades numb fingers. The lead guide, Gregg McKay, grins as we help him pile another hunk of tread onto his sagging boat. "I think we broke the record," he says. Four of the Sierra Club people who had been in eastern Oregon on an Owyhee River cleanup earlier in the summer are impressed. Their take was not nearly so large. "Over there we were looking for any old cigarette butt we could find," one of them says.

Comparing the impacts of humans on different rivers is tricky because so much depends on factors other than boater behavior. The Owyhee is cleaner than the Rogue partly because it has enough water for whitewater runs during only a short time each year. The Western River Guides Association maintains that the Gunnison River in Colorado owes most of its litter to walk-in fishermen despite its quarter million yearly rafters, while the Arkansas, heavily used by boaters, is comparatively clean. The Green and Colorado rivers in Utah, although regulated by the BLM and worshipped by boaters, get the same kind of debris that shows up in the Rogue and Salmon. The general rule: The greater the access to a river, the more trash you'll find on a river.

Our major cleanup duties end at our third campsite, near Rogue River Ranch and the start of the whitewater of Mule Creek Canyon and Blossom Bar. (Below the rapids, beyond the river's "wild" section, the Forest Service patrols for litter in jet boats.) Before shoving off in the morning, we haul our trash bags and 22 tires up to the ranch pasture for removal by truck. It takes two or three people to roll each of the larger tires up from the riverbank. The rain falls in a solid down-pour, and the cold, slippery tires topple and roll back on the rocky slopes.

There's a certain futility to it all; despite its protected status, the wild Rogue is not invulnerable. New tires will wash in next year, and other intrusions from upstream can't be removed by litter bag and raft. The partially completed Elk Creek flood-control dam threatens to raise water temperatures and damage fish runs. Mining in the Rogue River National Forest exposes the stream to cyanide poisoning. And the Rogue is one of the lucky ones. Dams don't threaten its rapids with inundation, as on California's late Stanislaus, or near-total diversion, as on Tennessee's Ocoee.

Still, it's satisfying to look at a cord-size heap of trash and



HOWARD STUTTING SOURCE PHOTOS COURTESY OREGON RIVER EXPERIENCES TALBOT BIELEFELDT

know that a once-wild place has been even partially cleaned up. Most floaters down the Rogue will probably not even notice that the tires and cans are gone. But if they come to expect to find their river clean and free-flowing, they may be less tolerant of trash and poisons and dammed water on this and other streams.

Late in 1988, Congress passed an omnibus river-protection bill that added the upper Rogue and 39 other Oregon river segments to the Wild and Scenic River System. Oregonians backed up the federal legislation with a state measure adding parts of the Rogue and other streams to their own Scenic Waterways System. Ultimately, protection of rivers depends on lawmakers and law enforcers. But it's the work of river advocates, as lobbyists and as tire-rollers, that helps show them the way. ■

TALBOT BIELEFELDT is a freelance writer in Eugene, Oregon.

Sierra Club Third International Assembly



(Photos Courtesy of Travel Bureau, Michigan Dept. of Commerce)

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SIERRA CLUB FINANCIAL REPORT

Pursuant to provisions of sections 6321 and 6322 of the California Corporations Code, the following information is furnished as an annual report:

The Club's complete financial statements for the fiscal years ended September 30, 1988 and September 30, 1987, together with the report of Peat Marwick Main & Co., independent auditors, are available on request from Sierra Club headquarters at 730 Polk Street, San Francisco, California 94109.

The membership list of the Sierra Club is on file at the Club's headquarters at 730 Polk Street, San Francisco, California 94109.

There are no transactions to disclose that constitute a conflict of interest involving directors or officers; no member has voting power of 10% or more. The books of account and minutes of meetings of the Board of Directors are available for inspection by members on written request at the Club's headquarters at 730 Polk Street, San Francisco, California 94109.

INDEPENDENT AUDITORS' REPORT

Board of Directors
Sierra Club
San Francisco, California

We have audited the accompanying consolidated balance sheet of Sierra Club and subsidiary as of September 30, 1988, and the related consolidated statements of revenue, expenses and changes in fund balances, and changes in financial position for the year then ended. These financial statements are the responsibility of the Sierra Club's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles

used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Sierra Club and subsidiary at September 30, 1988, and the results of their operations and changes in their fund balances, and changes in their financial position for the year then ended in conformity with generally accepted accounting principles.

Peat Marwick Main & Co.

Certified Public Accountants
December 14, 1988

TO THE MEMBERS OF THE SIERRA CLUB:

Fiscal year 1988 was exciting and challenging for the Sierra Club. The Club continued its enormous growth, with membership up 15% to more than 490,000 members at year end. The Club volunteer groups increased to more than 350, and chapter dues allocations increased over \$400,000 to a record high of \$2,288,800.

Revenue increased by \$4,096,400 to \$29,324,200. Member dues, up \$2,197,100, was the largest increase, but contributions and grants were also up \$1,035,000, outings and lodge fees up \$150,100, book sales up \$465,500, royalties up \$40,700, and advertising, investment and other income up \$208,000.

Expenses increased by \$5,145,900 to \$29,981,400. Studying and influencing public policy expense rose \$1,772,300 to \$7,952,700, and information and education was up \$766,000 to \$6,530,500. Outdoor activities expense was up \$304,900 to \$2,289,800. Expenses for support services of \$10,949,600 were up \$1,891,000 over fiscal 1987.

In spite of significantly increased revenues, the Club closed the fiscal year with a deficit. This occurred because of the urgent need to purchase new space for our Washington, D. C., staff, the start-up costs of the new Office of Volunteer Development and the first handbook for all Club members in many years, and the phase-out expenses of the catalog sales operation.

The Club is basically sound financially, with a growing membership base and a fundraising effort that is gaining in sophistication. Moreover, we have instituted a major revision of our budget and financial-review processes to bring them more in line with the needs of an organization the size and complexity of the Sierra Club. Because of the one-time nature of the costs that resulted in the deficit and these procedural changes, the Board anticipates that such a deficit will not recur.

Richard Fiddler
Acting Treasurer

SIERRA CLUB FISCAL YEAR 1988



SIERRA CLUB & SUBSIDIARY CONSOLIDATED BALANCE SHEET

September 30, 1988 (With Comparative Totals for September 30, 1987)

ASSETS	September 30		LIABILITIES AND FUND BALANCES	September 30	
	1988	1987		1988	1987
CURRENT ASSETS:			CURRENT LIABILITIES:		
Cash (primarily interest-bearing accounts)	\$1,007,600	\$ 947,000	Current portion of long-term debt (NOTE 5)	\$ 6,900	—
Trade accounts receivable, less allowances for returns of \$93,000 and \$85,000	1,317,100	1,176,200	Current portion of capital lease obligations (NOTE 7)	69,500	136,800
Other receivables, less allowances for doubtful accounts of \$49,000 and \$49,000	701,200	711,600	Accounts payable	2,664,900	2,614,000
Grants receivable	301,700	333,900	Accrued expenses	1,352,500	940,500
Inventories	952,300	1,475,400	Deferred revenue	388,800	198,000
Net realizable value of assets held for resale—discontinued operations (note 11)	18,400	—	Deferred revenue—restricted	422,500	76,200
Advances, less allowances of \$40,000 and \$60,000	578,400	460,800	TOTAL CURRENT LIABILITIES	4,904,900	3,965,300
Prepaid expenses	796,900	798,900	CAPITAL LEASE OBLIGATIONS (NOTE 7)	102,500	172,000
TOTAL CURRENT ASSETS	5,667,600	5,903,800	LONG-TERM DEBT (NOTE 5)	1,612,000	—
INVESTMENTS-ENDOWMENT FUND (NOTES 3 AND 8)	4,261,100	3,626,300	FUND BALANCES (NOTE 9)		
PROPERTY AND EQUIPMENT (NOTE 4)	2,732,100	839,800	Endowment	4,261,100	3,626,300
PAINTINGS, PHOTOGRAPHS AND BOOKS (NOTE 13)	—	—	Unrestricted	1,780,300	2,606,100
				6,041,400	6,232,400
TOTAL ASSETS	\$ 12,660,800	10,369,900	COMMITMENTS AND CONTINGENCIES (NOTES 5, 6, 7, AND 10)	—	—
			TOTAL LIABILITIES AND FUND BALANCES	\$ 12,660,800	\$ 10,369,900

SIERRA CLUB & SUBSIDIARY CONSOLIDATED STATEMENT OF REVENUE, EXPENSES & CHANGES IN FUND BALANCES

Year Ended September 30, 1988 (With Comparative Combined Totals for September 30, 1987)

	1988			1987	
	Unrestricted	Endowments	Restricted	Total	Total
REVENUE:					
Member dues	\$12,169,600	\$ —	\$ —	\$12,169,600	\$ 9,972,500
Contributions and grants	6,577,400	—	1,798,300	8,375,700	7,340,700
Cottages and lodge reservations and fees	2,012,200	—	—	2,012,200	1,862,100
Book sales	2,989,600	—	—	2,989,600	2,524,100
Royalties	1,275,200	—	—	1,275,200	1,234,500
Advertising, investment and other income	2,496,400	—	3,500	2,501,900	2,293,900
TOTAL REVENUE	27,522,400	—	1,801,800	29,324,200	25,227,800
EXPENSES:					
Program services:					
Studying and influencing public policy	6,623,400	—	1,329,300	7,952,700	6,180,400
Information and education	6,261,500	—	269,000	6,530,500	5,764,500
Outdoor activities	2,210,000	—	79,800	2,289,800	1,984,900
Chapter allocations	2,258,800	—	—	2,258,800	1,847,100
	17,353,700	—	1,678,100	19,031,800	15,776,900
Support services:					
General and administrative	4,389,900	—	71,300	4,461,200	4,158,700
Membership	4,536,900	—	—	4,536,900	3,323,200
Fund raising	1,899,100	—	52,400	1,951,500	1,576,700
	10,825,900	—	123,700	10,949,600	9,058,600
TOTAL EXPENSES	28,179,600	—	1,801,800	29,981,400	24,835,500
Excess (deficiency) of revenue over expenses from continuing operations	(657,200)	—	—	(657,200)	392,300
Discontinued operations (NOTE 11):					
Income (loss) from operations of discontinued catalog division	80,600	—	—	80,600	(321,000)
Loss on disposal of catalog division	(252,200)	—	—	(252,200)	—
Loss from discontinued operations	(168,600)	—	—	(168,600)	(321,000)
Excess (deficiency) of revenue over expenses before capital additions	(825,800)	—	—	(825,800)	71,300
Capital additions:					
New life membership endowments	—	577,600	—	577,600	564,800
Other endowments	—	57,200	—	57,200	328,900
Excess (deficiency) of revenues over expenses after capital additions	(825,800)	634,800	—	(191,000)	965,000
Fund balances at beginning of year	2,606,100	3,626,300	—	6,232,400	5,267,400
FUND BALANCES AT END OF YEAR	\$ 1,780,300	\$ 4,261,100	\$ —	\$ 6,041,400	\$ 6,232,400

SIERRA CLUB & SUBSIDIARY CONSOLIDATED STATEMENT OF CHANGES IN FINANCIAL POSITION

Year Ended September 30, 1988 (With Comparative Totals for September 30, 1987)

	Year Ended September 30		Year Ended September 30	
	1988	1987	1988	1987
FINANCIAL RESOURCES WERE PROVIDED BY:			CHANGES IN COMPONENTS OF WORKING CAPITAL:	
Excess (deficiency) of revenues over expenses before capital additions	\$ (825,800)	\$ 71,300	Increase (decrease) in current assets:	
Add (deduct) items not requiring working capital:			Cash	\$ 40,600
Depreciation and amortization	295,800	379,800	Trade accounts receivable, net	140,900
Amortization of discount on investments	(196,800)	(135,700)	Other receivables, net	(10,400)
TOTAL RESOURCES PROVIDED FROM (USED BY) OPERATIONS	(726,800)	315,400	Grants receivable	(32,200)
Proceeds from sale of investments	1,221,600	370,200	Inventories	(523,100)
Proceeds from acquisition of long-term debt	1,620,000	—	Net realizable value of assets held for resale—discontinued operations (NOTE 11)	18,400
New life membership endowments	577,600	564,800	Advances, net	117,600
Other endowments	57,200	328,900	Prepaid expenses	(8,000)
TOTAL RESOURCES PROVIDED	2,749,600	1,579,300		(236,200)
FINANCIAL RESOURCES WERE USED FOR:			Decrease (increase) in current liabilities:	
Purchase of noncurrent investments	1,625,600	1,131,700	Current portion of long-term debt	(6,900)
Acquisition of property and equipment, net	344,800	234,100	Current portion of capital lease obligations	67,300
Acquisition of Washington, D.C. building	1,843,300	—	Accounts payable	(50,900)
Reduction of capital lease obligations	69,500	139,700	Accrued expenses	(412,000)
Reduction of long-term debt	8,000	—	Deferred revenue	(190,800)
TOTAL RESOURCES USED	3,925,200	1,505,500	Deferred revenue—restricted	(346,100)
INCREASE (DECREASE) IN WORKING CAPITAL	\$ (1,175,600)	\$ 73,800		(939,400)
			INCREASE (DECREASE) IN WORKING CAPITAL	\$ (1,175,600)

See accompanying notes to consolidated financial statements.

SIERRA CLUB & SUBSIDIARY NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1—Summary of Significant Accounting Policies

(a) Basis of Presentation

The financial statements include the accounts of the Sierra Club (the Club) and its wholly owned subsidiary, Sierra Club Property Management, Inc. All material intercompany transactions have been eliminated. The financial statements do not include the financial activities of the Club's various self-directed chapters and group organizations.

To ensure observance of limitations and restrictions placed on the use of resources available to the Club, the accounts of the Club are maintained in accordance with the principles of fund accounting. This is the procedure by which resources for various purposes are classified for accounting and reporting purposes into funds established according to their nature and purposes. Separate accounts are maintained for each fund, however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups. Accordingly, all financial transactions have been recorded and reported by fund group.

The assets, liabilities and fund balances of the Club are reported in two self-balancing fund groups as follows:

Endowment funds represent funds that are subject to restrictions of gift agreements or board designations requiring that the principal be invested and only the income be used.

Unrestricted funds represent the portion of expendable funds that is available for support of the Club's operations.

(b) Donated Services

Some members of the Club have donated significant amounts of time to both the Club and its chapters, groups and committees in furthering the Club's programs and objectives. No amounts have been included in the financial statements for donated member or volunteer services since no objective basis is available to measure the value of such services.

(c) Debt Accruals Receivable

Allowances for publication and returns are determined using historical return rates.

(d) Inventories

Inventories consist primarily of books and are stated at the lower of cost or market. Unit costs for new books are based on paper, printing and loading charges only. Production costs are amortized over unit sales for the first printing, but for no longer than the first twelve months of sales.

(e) Advances

Advances are advanced to authors involved with publications. An allowance is provided against advances to authors for estimated losses resulting from unearned royalties.

(f) Investments

Investments are presented in the financial statements at amortized cost.

(g) Property and Equipment

Property and equipment are stated at cost at the date of acquisition or fair value at the date of gift or bequest. Donated paintings, photographs and books are not reflected in the accompanying financial statements (note 13). Depreciation expense is provided on a straight-line basis over the estimated useful lives (2 to 12 years) of the related assets. When assets are retired or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts, and any resulting gain or loss is recognized in income for the period. The cost of maintenance and repair is charged to expense as incurred, significant renewals and betterments are capitalized.

(h) Deferred Revenue

The Club defers revenue from outings, grants and other donor restricted activities until the period the trip is completed or the restrictions are met.

(i) Member Dues

Membership dues are recognized as revenue when received.

(j) Contributions

All contributions are considered available for unrestricted use unless specifically restricted by the donor. Restricted contributions are recognized as revenue as the restrictions are met.

Legal services performed on behalf of the Club by the Sierra Club Legal Defense Fund are recorded as contributions with equivalent amounts charged to expense (note 12).

NOTE 2—Organization

The Sierra Club is a nonprofit voluntary membership organization established to explore, enjoy and protect the wild places of the earth. The Club operates many public service programs covering a broad range of environmental issues. The studying and influencing public policy program consists of staff and volunteers engaged in legislative and nonlegislative activities, including lobbying, research, legal and policy development. Information and education includes the literary programs of Sierra Club books, catalog operations, and Sierra, the Club's magazine. Outdoor activities include national and international outing programs, covering of approximately 270 trips annually. The membership program serves approximately 400,000 members and includes support and funding of 57 volunteer chapters and over 300 groups, and the development of a broad-based volunteer membership.

NOTE 3—Investments—Endowment Fund

Investments of the Endowment Fund are stated at amortized cost if it is the Club's intention to hold investments to maturity. No allowance for the decline to market value below cost is established unless there is a permanent impairment of value.

Cost and market values at September 30, 1988 and 1987 were:

	1988	
	Amortized Cost	Market Value
U.S. government and Federal agency bonds	\$4,083,900	\$4,148,800
Money market funds and savings accounts	177,200	177,200
	<u>\$4,261,100</u>	<u>\$4,326,000</u>

	1987	
	Amortized Cost	Market Value
U.S. government and Federal agency bonds	\$3,502,500	\$3,381,000
Money market funds and savings accounts	123,800	123,800
	<u>\$3,626,300</u>	<u>\$3,504,800</u>

Investment income amounted to \$323,045 in 1988 and \$282,800 in 1987. The rate of return on endowment investments was 8% in 1988 and 9% in 1987.

NOTE 4—Property and Equipment

	September 30	
	1988	1987
Land	\$ 3,300	\$ 3,300
Buildings and leasehold improvements	2,215,800	332,100
Furniture and equipment	1,960,500	1,475,000
Leased equipment (note 7)	328,400	505,000
	<u>4,528,000</u>	<u>2,315,400</u>
Less accumulated depreciation and amortization	(1,775,000)	(1,529,600)
	<u>\$2,753,000</u>	<u>\$885,800</u>

Depreciation and amortization expense was \$295,800 and \$379,800 for the years ended September 30, 1988 and 1987, respectively. Accumulated depreciation for leased equipment was \$276,300 in 1988 and \$308,700 in 1987.

NOTE 5—Long-term Debt

In August 1988, the Club entered into a loan agreement for \$1,620,000 with American Security Bank to provide financing for the purchase of an office building. The agreement allows the bank to call the loan or change the interest rate at the end of each three-year period and expires at the end of 15 years, at which time the remaining balance is due in the form of a balloon payment. The current monthly payments are \$15,833 with an interest rate of 11.33%. The debt is secured by a deed of trust on the office building. Scheduled maturities of long-term debt outstanding on September 30, 1988 are as follows:

Year Ended September 30	
1989	\$190,000
1990	190,000
1991	190,000
1992	190,000
1993	190,000
Thereafter	<u>3,226,300</u>
Total obligations	<u>4,186,300</u>
Less amount representing interest	<u>(2,567,600)</u>
Present value of total obligations	<u>\$1,618,700</u>

The Club is in compliance with all covenants of the loan agreement.

NOTE 6—Line of Credit

The Club has available to April 30, 1989 a revolving line of bank credit which permits borrowings of up to \$3,000,000 at the bank's prime interest rate. The line is secured by the Club's endowment investments. No amounts were outstanding at September 30, 1988 and 1987.

NOTE 7—Leases

Leases are for office facilities (note 12), computer equipment, system software and other equipment. Certain leases provide for extensions and additional rental payments based on expenses. Future minimum payments under all noncancelable leases with terms greater than one year at September 30, 1988 are as follows:

Year Ended September 30	Capital Leases	Operating Leases
1989	\$ 83,400	\$1,252,900
1990	83,400	1,228,800
1991	26,500	1,208,300
1992	—	1,191,200
1993	—	1,188,000
Thereafter	<u>—</u>	<u>3,336,300</u>
Total lease payments	<u>193,300</u>	<u>\$7,405,700</u>

Less amount representing interest (21,300)
Present value of lease payments 172,000
Less current portion of capital lease obligations (89,300)

Long-term capital lease obligations \$82,700

The Club is leasing part of the building it acquired in 1988 for \$30,000 annually. Minimum future rentals irrevocable under noncancelable operating subleases and operating leases at September 30, 1988 are as follows:

Year Ended September 30	Operating Subleases	Operating Leases
1989	\$140,800	30,000
1990	140,800	30,000
1991	93,400	2,500
1992	76,000	—
1993	53,500	—
Thereafter	<u>111,450</u>	<u>—</u>
Total rentals receivable	<u>\$615,900</u>	<u>62,500</u>

Rent expense for operating leases was \$1,201,005 in 1988 and \$1,301,600 in 1987. Leased equipment is pledged in security under the related capital leases. Rental income on subleases was \$135,300 in 1988 and \$85,000 in 1987.

Interest expense was \$53,300 and \$49,500 in 1988 and 1987, respectively.

NOTE 8—Fund Balances

The following is a summary of fund balances:

	September 30	
	1988	1987
Endowment Funds		
Life memberships	\$3,354,100	\$2,776,500
Designated by Board for permanent investment	864,800	818,300
Endowment—income restricted	32,200	21,500
Term endowments	10,000	10,000
	<u>\$4,261,100</u>	<u>\$3,626,300</u>
Unrestricted Funds		
Invested in property and equipment	\$ 941,200	\$ 531,000
Other unrestricted funds	829,100	2,075,100
	<u>\$1,770,300</u>	<u>\$2,606,100</u>

The Club's bylaws provide that all life memberships and such other funds as designated by the Board for permanent investment shall be held as endowment funds. The income from these endowments is unrestricted. In addition, the Club has received certain funds for which the donors have specified that the principal be maintained in perpetuity, with the income to be used for certain specified activities (primarily related to outings).

NOTE 9—Income Tax Status

The Club's principal activities are exempt from Federal and California income taxes. However, certain of the Club's revenues are subject to the unrelated business income tax. Provision for the unrelated business income tax was \$310,000 and \$281,000 in 1988 and 1987, respectively.

Contributions to the Club are not deductible as a charitable contribution for tax purposes by the donor.

NOTE 10—Pension Plan

The Club has a defined-benefit pension plan, covering substantially all of its employees. The benefits are based on years of service and employee's compensation history.

The following schedule sets forth the plan's funded status and amounts recognized in the Club's balance sheet on September 30, 1988:

Actuarial present value of benefits obligations:	
Accumulated benefit obligations all of which is vested	<u>\$1,010,098</u>
Projected benefit obligation for service rendered to date	(1,894,987)
Plan assets at fair value, which consists of a pooled investment account	<u>2,123,153</u>
Plan assets in excess of projected benefit obligations	228,306
Unrecognized net gain	(29,884)
Unrecognized net asset as of October 1, 1987 being amortized over 15 years	<u>(121,389)</u>
Prepaid pension cost included in prepaid expenses	<u>\$ 67,024</u>

Net pension cost for 1988 included the following components:

Service cost	\$173,142
Interest cost	136,059
Actual return on plan assets	(185,530)
Net amortization and deferral	(9,380)
Deferred asset gain	<u>29,884</u>
Net periodic pension costs	<u>\$144,165</u>

The weighted average discount rate and rate of increase in future compensation levels used in determining the actuarial present value of the projected benefit obligations were 8.5% and 7%, respectively. The expected long-term rate of return on assets was 9%.

NOTE 11—Discontinued Operations

In late March 1988, the Club decided to discontinue its Catalog Sales Department. The Club plans to dispose of its catalog inventory by April 30, 1989. Final liquidation will be in the form of bulk sales to wholesalers. As of September 30, 1988, catalog inventory is valued at \$18,400. The Catalog Sales Department income and loss from operations in 1988 and 1987 was \$83,600 and \$321,000, respectively. Net sales of the division were \$3,106,200 and \$2,349,500 for 1988 and 1987, respectively. Net sales of the division were \$37,400 from April 1, 1988 to September 30, 1988.

NOTE 12—Transactions with Affiliates

The Sierra Club receives contributions from the Sierra Club Foundation and the Sierra Club Legal Defense Fund. Contributions from the Sierra Club Foundation represent direct grants to the Club in support of various programs and totaled \$1,481,700 in 1988 and \$1,332,900 in 1987. Of the preceding amounts, \$301,700 and \$331,900 were receivable at September 30, 1988 and 1987, respectively. Contributions from the Sierra Club Legal Defense Fund for legal services performed on behalf of the Club totaled \$3,309,800 in 1988 and \$2,271,900 in 1987.

The Club's wholly owned subsidiary, Sierra Club Property Management, Inc., is the general partner of National Headquarters Associates (a limited partnership). The limited partnership was formed to raise capital for purposes of acquiring and rehabilitating an office building for lease by the Club. The building was completed and occupied by the Sierra Club in November 1983. This operating lease has a ten-year term and requires monthly payments of \$99,000, subject to adjustment in certain circumstances for changes in the limited partnership's debt service requirements. In addition, the Club is responsible for taxes on the property, repair and maintenance, and shares insurance, utility and security costs with the limited partnership.

NOTE 13—Paintings, Photographs and Books

Since its inception, the Sierra Club has been the recipient of various donated paintings, photographs and rare books. During 1987, the Club had certain paintings and photographs appraised for insurance purposes. The appraised market value of these paintings and photographs totaled \$950,000 at that time. The books have not been appraised for several years. The last appraisal indicated a market value of \$50,000. There is no value assigned to these items in the accompanying financial statements.

Pete Seeger: Keeping the Dream

Leslie Ware

PETE SEEGER HAS SUNG about hammers of justice and bells of freedom, about war and peace, hatred and hope. Last fall, standing on the shores of New York's Hudson River, the folksinger expounded on a subject of narrower scope. "Over there," he said, pointing to his right, "was an old garbage dump. The club I belong to wanted to make it into a park. It took us eight years, but in 1980 the bulldozers started moving. I never felt so much like Don Quixote in my life."

What's this? Pete Seeger—world traveler, survivor of the House Un-American Activities Committee, guru of folk music—fired up about a local garbage dump? Seeger may feel like Don Quixote, but he bears more of a resemblance to Candide, the incurable optimist who crisscrossed the globe, weathered the Inquisition, and finally decided it was most important to cultivate his own garden.

Seeger's "garden" is Beacon, New York, and the river that runs by it. After decades of wandering the world, he's planted himself firmly in the community where he and his wife, Toshi, have been nominal residents for 40 years.

Born in New York City in 1919, Seeger first glimpsed life beyond the Northeast in the late '30s, when he dropped out of Harvard and took to the road with Woody Guthrie. Literally singing for his supper, he headed west, studying the nation's people and music as he hitchhiked across the country. In 1941, he and Guthrie formed the Almanac Singers; that group, which also included Lee Hays and Mill Lampell, used its music in part to encourage the organization of unions. About the same time, Seeger joined the American Communist Party, believing it was helping workers find jobs. After a year the Almanacs disbanded, and its members scattered to take part in the war, Seeger making musical radio broad-

casts for the Office of War Information.

Following a stint with a leftist talent agency called People's Songs, Seeger returned to performing in 1948. With Lee Hays, Ronnie Gilbert, and Fred Hellerman he formed the Weavers, recording such hits as "Good Night Irene,"

"Wimoweh," "Kisses Sweeter Than Wine," "Rock Island Line," and "If I Had a Hammer." The group's success was short-lived, however. The FBI had tracked the Almanacs, thinking its songs a threat to the war effort (at the time, Seeger points out, "peace was a

"I don't look upon the world's problems as an environmental crisis or a militarist crisis. It's many-faceted. There's a question of force and violence, war and peace; it's a crisis of discrimination, whether it's racism or sexism or ageism or whatever; it's a crisis of poverty amidst plenty."—Pete Seeger



DAVID SARKIS / DOW PHOTO

dirty word"), and the Bureau continued to keep tabs on the Weavers. In the hysteria of McCarthyism, Seeger was labeled a "Red" for his earlier affiliation with the Communist Party and his union work. The Weavers' bookings evaporated: Radio stations and television networks—responding to pressures from executives, advertisers, or witch-hunting members of the public on which both media relied—froze the group out. Then, in 1953, Seeger himself was blacked out.

"I knew as long as you have opinions the establishment is wary of, you will be kept out of positions of influence," says Seeger, who was not surprised by the blacklisting. "I knew it the moment I started singing for the Communist Party. To find myself a pop star was hilarious. I knew it wouldn't last long."

Two years later, when called before the Un-American Activities Committee, he refused to invoke the Fifth Amendment and was convicted of contempt of Congress. He was sentenced to a year in jail, but the case was later thrown out on appeal.

Although Seeger's name remained on the blacklist, the ban could not keep him quiet. "I used to spread myself all over the map in the '50s," he says. "See, the object of the blacklists was to put me in a corner and keep me there. If they couldn't keep me behind barbed wire, they would, in effect, keep me under house arrest. . . . So I decided, nope—I'm not going to give them the pleasure. Much though I like singing for little left-wing parties in New York and for kids in summer camp, I was going out to see if I could get bigger audiences across the country."

The network ban remained in effect until 1967, when he sang on the *Smothers Brothers Comedy Hour*. Even then, it was a halfhearted welcome back: CBS cut from the tape the song "Waist Deep in the Big Muddy," a denunciation of U.S. involvement in Vietnam.

In the '60s Seeger was shocked to find himself a stranger in his own town. Admittedly he'd been looked on as a bit odd ever since he and Tosh moved near Beacon, 60 miles from New York City, in 1949, living without running water and electricity in their log cabin. But as time went on the antipathy grew strong-

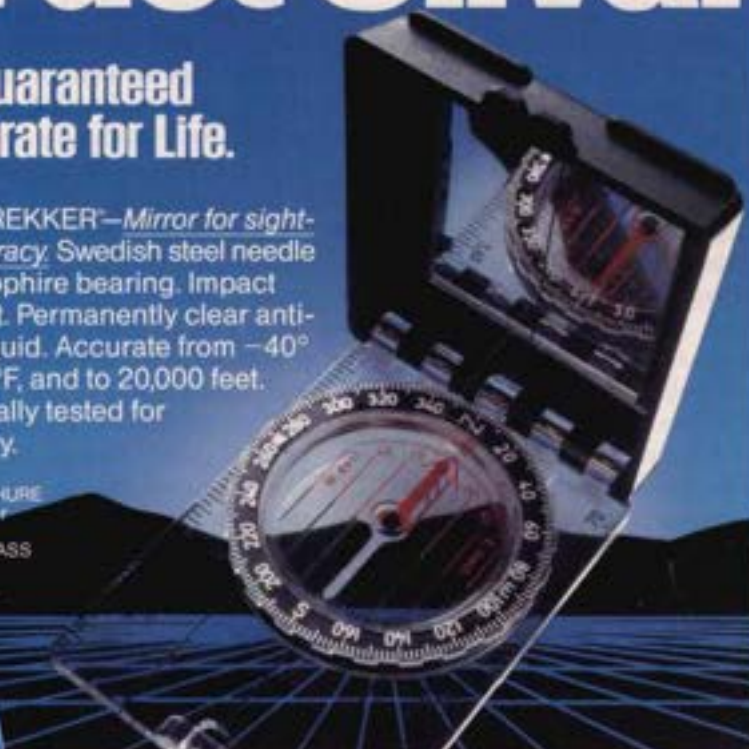
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er. In 1965, 700 of Seeger's more conservative neighbors signed a petition to protest a concert he planned to give at the local high school. The show went on, but the irony was not lost on the singer: "I realized that for nearly 20 years I'd treated my hometown like a hotel. I'd come down, got my groceries, picked up my mail, and gone back home. I wasn't a member of any church in town; I wasn't a member of any service club; I didn't hang around in the local bars."

About that time, Seeger began a project that would fulfill his new motto: Think globally, act locally. When a friend sent him *Sloops of the Hudson*, a book published early in the century, he fell in love with the broad-beamed vessels it portrayed. In the 1800s the boats carried bricks, stone, plaster, even hay downriver from Albany to New York City. Seeger and several others hatched a plan to raise funds and build a new Hudson River sloop. It would not be a rich man's plaything but a boat with a mission: to teach Hudson Valley residents to love their river. Calling attention to the river's plight, Seeger sang, "Sailing

down my dirty stream,/Still I love it, and I'll keep the dream./That some day, though maybe not this year,/My Hudson River will once again run clear."*

In 1969 the *Clearwater* was launched.

Now, two decades later, the 76-foot sloop still sails the Hudson from April through November. It is particularly popular among schoolkids, who scoop up fish, peer through a microscope, steer, and learn to read charts while on board. "Four hours later," Seeger says, "they've never been bored once, and they've sung a few songs, had a whiff of history, a whiff of science."

Because of high demand for the sloop's services, Seeger would like to build more vessels. "Figure how many millions of people live within ten miles of the Hudson," he says. "If all of them were to sail on the *Clearwater* once in their lifetime, you'd need 15 *Clearwaters* at least."

The boat is only a symbol, albeit a potent one, for the 12,000-member Clearwater organization. That group has fought, in court when necessary, to

*Copyright © 1964 by Fall River Music Inc.

force government and business alike to heed laws designed to clean up the Hudson. And to some extent it has succeeded, for the river is cleaner now. Asked to give the Hudson a medical report card, Seeger pronounces the patient "on the mend." Yet he admits that much work remains: "It's like somebody's coming calling and you sweep the dirt under the rug and it's okay. But if you want to really clean that house you've got to go underneath everything and move everything. That's what needs to be done now."

Although Seeger has not been heavily involved in the business of the Clearwater organization for some time, the boat is still his in spirit. Says Cara Lee of the environmental group Scenic Hudson, "When you're on the *Clearwater*, people will zoom by in a motorboat, crane their necks, and say, 'Is that Pete Seeger's boat? Is he on board?'"

When the singer thinks of the environment nowadays, though, he thinks not of the large Clearwater organization, but of a local group he helped organize, the Beacon Sloop Club. Launched a couple of years after the

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Clearwater, the club was the prime mover behind converting Beacon's garbage dump to a park. On the first Friday of each month, as many as a hundred members—diehard anti-Communists, revolutionists, Republicans, Democrats, teachers, plumbers, businesspeople, and one banjo-picker—meet to plan waterfront cleanup activities and, sometimes, fundraisers for the *Clearwater*.

The clubhouse, next to the Beacon train station, is an ex-diner most charitably described as ramshackle, though its turquoise exterior is covered with fresh, fanciful paintings of clouds and fruit. Along one end run the words of Seeger's "Rainbow Race": "One blue sky above us, one ocean, lapping all our shores/ One Earth so green and round, who could ask for more . . ."

One blustery September day the singer sits inside the clubhouse on a folding chair, his long legs stretched out. He wears a flowered shirt, jeans, and hiking boots under which, one imagines, are his trademark mismatched socks—one red, one green. It's been reported that he first wore the socks to protest having to don a tuxedo at a Weavers gig, but Seeger remembers being inspired by an old sailors' tale: Before reviewing his fleet, a somewhat doddering admiral pulls on different socks so he can tell port from starboard.

At 69, Seeger is still lean and straight as the neck of his five-string banjo, but his wispy beard is graying and his hair is sparse. He needs a hearing aid now. Oars, orange life vests, and other nautical odds and ends surround him. As Seeger speaks of his attraction to the outdoors, his voice is soft, with traces of a Yankee accent that turns "ideas" into "idears" and "at all" into "a-tall."

"As a boy I took long hikes," he says, "10, 15, 20 miles sometimes. But it was mainly Ernest Thompson Seton who influenced me. At age seven I got hold of his books. Each chapter is a new lesson about an animal, plant, or problem. I thought they were a great improvement on knights in armor."

It took a while for this interest in the natural world to show up in Seeger's work. "For a good many years I said, 'I love nature and nature is being de-

spoiled, but really what's needed is for the meek to inherit the Earth; and then, without the profit system to run amok, why, we'll take care of the Earth.' It was Rachel Carson's *Silent Spring* that changed my thinking. I realized the meek might inherit the Earth, but what they'd inherit would be such a poisonous garbage dump that it wouldn't be much fun for anybody. So I guess I became some kind of econik."

While some of Seeger's lyrics speak directly of his concerns—the population explosion, the whale's demise, sludge in

San Francisco Bay, gum wrappers in the Hudson—he rarely lectures. In promoting a cause, he believes, an artist pays a price: "There's an ancient Arab saying: When the king puts the poet on his payroll, he cuts off the tongue of the poet. I think of this every time I get a job on TV."

Nevertheless, on at least one occasion he kept his tongue, and his message, intact. "I was on the *Today* show and I wanted to sing 'Garbage,' and I knew they wouldn't want me to sing that song," Seeger recalls. (Bill Steele's lyrics

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pressed" with Greenpeace's confrontational techniques: "Its members take personal risks—to stop up a pipe, maybe—but they go to great lengths to see that no one is hurt." When reminded that the *Cleanwater* is no *Rainbow Warrior* (Greenpeace's flagship), Seeger feigns consternation. "We're so respectable it's shameful," he says.

His final words on his environmental expertise are tinged with the usual modesty. "I'm not an expert on anything," he points out. "I'm somebody who reads a lot. I have a smattering of ignorance on a wide range of things."

In the failing light at the Beacon clubhouse, the singer's thoughts range far afield, the scope of his talk dilating and contracting and dilating again as his mind's eye shifts from the globe to the individual and back. He jumps easily from Marx to Malthus, from *New Yorker* cartoons to "L'Internationale."

He gets itchy when branded with an "ist," even when the root is "environmental." Those who would say he focused on labor in the '40s, civil rights in the '50s, and the environment thereafter are "simplistic," he says. He calls the world's problems "one huge crisis. I don't look upon it as an environmental crisis or a militarist crisis. It's multifaceted. There's a side of it with a question of force and violence, war and peace; it's a crisis of discrimination, whether it's racism or sexism or ageism or whatever; it's a crisis of poverty amidst plenty."

The outcome of this crisis? "I like to say there's a 50-50 chance we'll all be around a hundred years from now, but I have to confess I think it's less than that."

The pessimistic 50-plus percent is based largely on the population explosion and the dangers inherent in some kinds of scientific research. "Think what Hitler would have done with recombinant DNA," Seeger suggests. "There are little Hitlers all around the world." Some branches of science are neutral, he says; others "so obviously evil you could say, as Einstein did about the nuclear bomb, 'Ach, mankind is not ready for it.' There are going to be more and more things about which you can say, 'Ach, mankind is not ready for it.'"

What can be done to ensure that our descendants will be on this planet in

2089? Seeger narrows his focus. Gaze around you, he urges. The key issues are those nearby, geographically and spiritually, and if the world is saved, it will likely be by people fighting for their homes. It is the lesson of the American Revolution, he believes, of Hitler's defeat, of North Vietnam's victory. "I look around the world," he says, "and there are people struggling for their homes in one way or another—it may be a struggle against a dictator, an oil company, a pollution problem."

"In the long run," Seeger says, his vision now a pinprick, "it gets right down to your own heart and mind. This is what many religions have said: The world won't be saved until your soul is saved. I'm sure that reexamining our own attitudes is going to have to take place worldwide."

Seeger uses the argument of every parent who wants to teach individual responsibility to a child bent on littering: What if *everybody* did that? And, focusing on the future, he seems to be saying, What if *nobody* did?

The singer's discouraging words give way, and optimism—try as he might to keep it at bay—seeps into his conversation. After all, it fits him: Why spend a lifetime attempting to change the world if a change for the better is impossible? "I met some biologists once," Seeger relates, "who said, 'We're not going to have any children, because it's unfair to bring them into the world with such a slim chance of survival.' I said, 'Well, you are biologists, and you should know; I am only a banjo player, but I've seen people change their minds 180 degrees in two hours.'"

That a bit of the '60s child remains in the singer is clear just from the stickers coating his guitar case: "War is costly, peace is priceless." "If you want peace, work for justice." Or the one on his Volvo's bumper: "If the people lead, eventually the leaders will follow."

"I'm not as pessimistic as I might be, because people don't commit suicide normally," Seeger says. "I'm quite confident we're going to put the nuclear genie back in the bottle. I'm much less confident that we'll put 80,000 toxic substances into hundreds of millions of bottles. But that also can be done if we have a world without hunger and pover-

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ty." Seeger's words start bumping into each other, his voice rising. "And when somebody says, well, you're asking for utopia, I say you are the utopian; there's a snowball's chance in hell of this world surviving if we don't put an end to poverty and hunger."

Despite Seeger's disavowal, even friends and co-workers see an aura of the utopian about him. "Some of Pete's ideas are outlandish," admits Stephen Stanne. "You say, 'Yeah, Pete, yeah, but what about...?' Perhaps there's a bit of naïveté there. There's a sense that he believes these ideas of his could all be realized."

If some of his dreams have come true it is due in large part to Toshi, whom Geoff Brown calls "a tough customer, a lovely woman, a great organizer, the best gardener in the world, the best cook in the world."

"Toshi is the one who brings Pete's schedule into reality," Stanne says. "It's her sense of logistics—whether it's getting garbage cans to the proper place or contacting the right person to ensure that black churches have booths at a festival. Her sense of the nuts and bolts makes Pete's visions hold water."

Seeger's enthusiasm has its charms. Brown, who calls the singer Pop and does a wicked imitation of his soft-spoken my goshes and holy mackerels, tells of a winter day he and Seeger spent steaming white oak for a boat-building project. That night, exhausted, Brown crawled into a sleeping bag in the cabin where he was staying. "The next thing I know," he relates, "I hear banjo music. It's colder than hell, bitter, and I hear a familiar voice: 'Wake up, it's ten below, and I've cooked hot muffins!' Pop's standing there ankle-deep in snow with only socks on, no shoes, yodeling, and the sun isn't even up!

"I've been through all this and survived it," Brown adds. "I get right in his face and tell him, 'I love you, Pete Seeger,' but I'm not going to worship the guy." Yet Brown delights in talking of those who do: "One guy has a Pete Seeger-model banjo, the same wool shirt, mismatched socks, the same blue-jeans with the same holes, and he's singing Pete's songs."

Excepting clones, is there a young Pete Seeger out there, singing songs of

outrage and hope in the '80s? "There are thousands," says the man who should know. "Some are young blacks singing rap songs. Some are religious people working through a traditional Christian church and making up songs." There are newly minted songs about unions, conservation, peace, gay liberation; he sings snatches of a few in a quavery voice as the air grows misty outside the clubhouse.

It seems natural to ask Seeger, who thinks of folksingers as descendants of Johnny Appleseed, what he's sown. "Ideas," he says, and pauses. "Concepts." Another pause. "Possibilities."

Stephen Stanne thinks Seeger is leaving behind the proof that it's possible to interweave music and a strong message. "To hear him sing," he says, "express his feelings, see the people join in, gives me, an old '60s person at heart, encouragement that it can be done. He's a star not for his songs—although they're classics—but for that ability."

It's really too soon, though, to be talking of legacies. "Every few hours I'm up to something new," Seeger says. He still gives concerts, many for free. (He doesn't need much money, he points out, and he hates to pay taxes.) He admits that his singing, never exactly operatic, isn't what it was: "My voice is about 50-percent gone, but I can still lead songs. So if I find a song everybody knows, I shout out the words and the audience sings. I can imagine somebody going to one of my concerts and they come home and someone asks how'd Seeger sing, and the person says, 'Come to think of it, I couldn't hear him, we were all singing so loud.'" Luckily, as has been noted frequently, he can get almost anybody singing.

Today he'll perform for a Baha'i group at the reincarnated garbage dump. Tomorrow there's the fireplace he volunteered to help build at the Beacon Sloop clubhouse. There's next year's "weed wallow," a get-together to clear out water chestnuts along the Hudson's shore. And there's that place in his own backyard, the one where those red worms wait, hungry for the leaves that soon will be falling. There's his garden. ■

LESLIE WARE is a senior editor of Audubon magazine.

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HOT SPOTS



Burning fields fill the Willamette Valley with clouds of smoke each summer. The region, sometimes described as a huge gas chamber, is hemmed in by mountains on three sides.

Farmers Playing With Fire

WILLAMETTE VALLEY, OREGON

TROUBLE FLARED along Interstate 5 in Oregon's Willamette Valley on the afternoon of August 3, 1988.

Without warning, the freeway was enveloped in thick smoke drifting from a nearby field; within seconds, 34 cars collided. Shaken drivers scrambled for the roadside as even more vehicles approached, unseen, at freeway speeds. A woman watched as a young boy was thrown from one car and run over by another. A family of four was trapped inside a flaming van.

When the smoke cleared, 7 people were dead and 37 injured—and Willamette Valley residents were organizing to end an agricultural practice that has darkened their skies for 40 years.

Each summer 780 Willamette Valley farmers plant nearly 400,000 acres of grass seed. After the harvest, they plow fire breaks around slightly more than half their fields, then torch the perimeters and burn inward. This method of sterilizing the land and eliminating nearly a million tons of straw waste a year

helps them grow a high-quality grass seed used everywhere from English churchyards to the Rose Bowl. Last year farmers sold more than \$170 million of rye, fescue, and other seed varieties, making grass seed the state's fourth-biggest legal cash crop.

But opponents of the burnings are unimpressed by such figures. "The farmers are avoiding the expense of waste disposal, pocketing their savings, and calling it profit," says state Sen. Grattan Kerans (D). "The public pays the cost."

That cost is extracted not only in gray skies but in human health. Like any vegetative matter, notes Brian Finneran of the Oregon Department of Environmental Quality (DEQ), straw produces a carcinogenic smoke containing tiny particles that irritate the lungs. What's more, most fields are treated annually with fungicides, herbicides, and insecticides, all of whose combustion products are little known.

After a cloud of smoke blanketed the southern part of the valley one day in 1969, the state legislature voted to phase



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out open-field burning by 1975. But the growers won successive extensions, and by 1979 the phaseout had been scrapped in favor of limiting burns to 250,000 acres annually. Burning was allowed only when the wind was blowing away from Eugene and Salem, and a \$3.50-per-acre fee was instituted to fund research into alternatives.

No alternatives, however, have taken root. Large rolling combustion chambers have fizzled in midfield; substitute crops have failed to reap a profit; DEQ-sponsored research has been unable to find an economically viable use for the straw; and new techniques for sterilization have yet to be widely tested. Many farmers have begun sterilizing their fields with propane blowtorches after clearing the straw—but this method is expensive, and smoke is still produced when the straw is burned later.

To hasten the search for alternatives, valley resident Bill Johnson, founder of a group called ENUF (End Noxious and Unhealthy Fumes), has drawn up a petition to put a grass-seed-burning ban on the state ballot in 1990. Kerans plans to introduce a similar bill in the legislature. Another bill in the hopper would set up a statewide board to find uses for the straw now being burned; paper, feed, fuel, and mulch are just a few possibilities, Johnson says.

In December, Gov. Neil Goldschmidt convened a task force to resolve the problem. Jan Wroncy, a member of that committee and founder of a group called ROADS₂ (Residents of Oregon Against Deadly Sprays and Smoke), says she hopes the task force will be successful—but in the meantime, ROADS₂ is preparing a lawsuit against the state and the DEQ to force compliance with the Clean Air Act. If that doesn't work, Wroncy adds, her group will file civil suits against farmers who burn their fields.

Whatever happens, the debate over grass-seed burning is likely to be only the beginning of a battle against other types of agricultural and timber burning as well.

"The air in this state and beyond is continually polluted by all this burning, making life miserable for hundreds of thousands of people," says Johnson. "We've had it." —*Jim Stiak*

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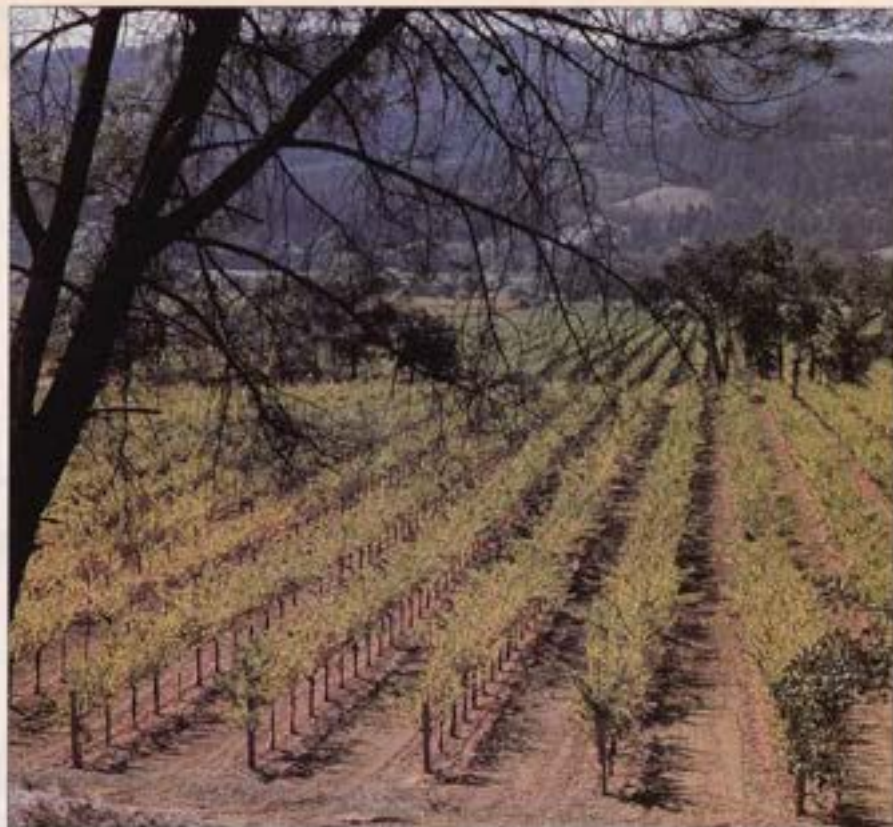


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many others in the Napa Valley—share local residents' reservations about the Wine Train, despite claims by proponents that it will be an asset to the valley's economy. That economy is already firmly linked to the tourist trade, with 2.5 million visitors passing through each year to visit the area's 200 wineries, stay in its bed-and-breakfast inns, cycle its vineyard lanes, ride in its hot-air balloons, and lounge in its mud baths. Opponents worry that the Wine Train will be just one more Disneyland-style attraction to add to the tourist crush.

"The Napa Valley is a very special place, for its beauty and for its people," says Nancy Caffo, a Sierra Club member in St. Helena. "The Wine Train will just help destroy all of that." Caffo is active in Friends of Napa Valley, a 1,300-member citizens coalition that is fighting the railroad. Her group is alarmed by projections that the Wine Train will carry 450,000 tourists annually through the valley (on as many as 16 daily round-trip runs during peak season), sounding repeated whistles, delaying already-heavy traffic at road crossings, and pos-

ing a safety threat to sober resident and tipsy tourist alike. Several dozen public road crossings lack safety gates, as do 44 private driveways, many of which lead to winery tour-and-tasting facilities.

Friends of Napa Valley, backed by the area's powerful grapegrowers and vintners associations, is seeking a full environmental review of the safety of the

Wine Train, as well as its noise and traffic impacts. Napa County and most local towns have joined the opposition. The key exception is the city of Napa, the county seat and point

of embarkation for Wine Train riders, which counts on sharing any economic benefits the train may generate. Napa's off-the-tourist-track location has frustrated its boosters for years, despite the millions of dollars that have been spent in an attempt to revitalize the downtown area.

California's Public Utilities Commission (PUC) last summer sided with opponents, ordering sponsors of the Wine Train to conduct an environmental impact study before starting service. But the U.S. Interstate Commerce Com-



mission (ICC) quickly countered that ruling with one of its own. In a 3-2 decision the ICC determined that the Wine Train, as a successor to Southern Pacific Railroad, qualifies as an interstate carrier exempt from state environmental review even though its tracks lie solely within Napa County. Community groups representing residents, businesses, and government agencies have asked the ICC to reconsider the case.

Meanwhile, the PUC has appealed to the U.S. Circuit Court of Appeals in Washington, D.C., which isn't expected to hear the case for at least a year. If the ICC does reverse itself, Wine Train organizers will likely seek their own appeal. For now, they are proceeding with

the renovation of the railroad cars, planning to begin dinner service in March and full service in July.

"We feel an environmental impact report is the only way to get the Wine Train to lay all the cards out on the table," says Norm Manzer of Friends of Napa Valley. He notes that state and local governments could be stuck with a \$2-million bill for installing more safety gates and another \$3-million tab for elevating the tracks over a major highway intersection. "Many of the train's impacts would be impossible to mitigate. We're convinced—and we believe the Wine Train's promoters are convinced—that an EIR would kill the project."

—Kevin Courtney

Necessary Defense or Technological Toy?

SNAKE RIVER VALLEY, IDAHO

Idaho's Snake River region is home to cowboys, farmers, and nuclear workers. It's fertile ground for raising the state's famous potatoes—but less so, one would suppose, for cultivating effective grassroots opposition to the nation's

atomic-weapons establishment.

Yet in two years local activists have turned a routine approval process for a plutonium-processing plant into a political struggle that has garnered national attention.

The proposed \$1-billion Special Isotope Separation (SIS) project would use

laser technology to purify plutonium, one of the deadliest substances known, for use in nuclear weapons. The plant would be built at the Idaho National Engineering Laboratory, a complex of labs, reactors, and chemical plants run by the Department of Energy (DOE) and located near Idaho Falls some 530 feet above the Snake River Aquifer. According to a draft environmental impact statement (EIS), carbon tetrachloride, a highly toxic solvent used at the laboratory, has already reached the aquifer, which irrigates Idaho's famous potato crop and supplies drinking water to 41 communities.

Appalled when she heard of the Energy Department's plans, Sierra Club member Liz Paul proposed to the Snake River Alliance, a nuclear and environmental watchdog, that it fight the project. "I knew I'd never be able to live with myself if I didn't do something," says Paul, now coordinator of that group. "I couldn't let the DOE come in and dump this on us."

Citizen education in Idaho, national and local media campaigns, technical



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analysis supplied by the Natural Resources Defense Council, and NRDC-led lobbying in Washington, D.C., sparked a debate on the SIS project in Congress, where its implications had been virtually unexamined. Some 500 people testified at the Energy Department's EIS hearings in Idaho in March 1988. Of nearly 2,000 written comments received, about two thirds opposed the project, Paul says.

The plant is designed to enrich low-grade plutonium so that it can be used in nuclear weapons. Existing stockpiles of low-grade plutonium would be depleted within seven to eight years, according to the DOE, and then the plant would be shut down or converted to other, currently undefined, uses.

Opponents say the project is superfluous—that existing supplies, retired warheads, and alternate processes can satisfy the nation's need for weapons-grade plutonium. Even former Energy Secretary John S. Herrington has acknowledged the surplus. "We're awash in plutonium," he told a congressional committee last year. "We have more than we need."

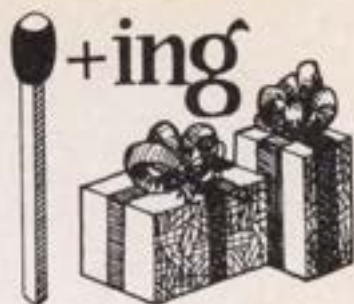
"It's a pork-barrel project," Paul says, "a technological toy supported by a small contingent within the Energy Department."

Officials at the DOE, however, insist that the country needs diverse options for producing weapons-grade plutonium because of uncertainty about future demands, treaties, and international developments. "The basis of SIS, beyond the near term, is to provide flexibility against the unforeseen," says Clay Nichols, former project manager.

Proponents of the plant include businesses, labor unions, and local and state politicians, all of whom would welcome the hundreds of jobs and millions of federal dollars it would bring. Despite that support, anti-SIS forces have convinced Congress—which appropriated \$100 million in 1988 for SIS development—to delay the start of construction until this spring to allow time for further evaluation.

"Local politicians' ears are open now," Paul says. "If we don't get the project killed this year, we'll be back next year, and the next . . . until we do."

—Stephen Cline



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To take part, simply contact your community relations or personnel office. They will let you know if your company has a matching gift program, and whether donations to The Sierra Club Foundation are eligible. A form will be provided which can even be forwarded after a gift has been made. For additional information, call (415) 776-2211.

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SIERRA NOTES

Seven national Sierra Club conservation campaigns are now in full swing for 1989-90. After consulting with Club leaders throughout the United States and Canada, the Board of Directors unanimously agreed last November that the following issues would receive priority attention from Club volunteers and staff:

■ **Clean Air Act.** More than 100 million Americans reside in urban areas where the air fails to meet minimum health standards. The Club seeks legislation imposing stricter emission controls on motor vehicles and industry, and more effective regulation of toxic air pollutants.

■ **Arctic National Wildlife Refuge.** Oil and gas developers want to exploit the coastal plain where grizzly and polar bears, musk-oxen, and caribou thrive. The Club urges Congress to reject oil-development legislation and to designate the plain as wilderness.

■ **Bureau of Land Management wilderness/desert national parks.** Club activists are working to protect all deserving lands under BLM jurisdiction from development. The centerpiece of this campaign is the California Desert Protection Act, which among other provisions would establish 4.5 million acres of desert wilderness in southeastern California.

■ **National forests and national parks.** The Club seeks wilderness status for selected national-forest lands in Colorado, Idaho, Illinois, Montana, and Nevada, as well as the designation of a Tallgrass Prairie Preserve in Oklahoma and a Petroglyphs National Monument in New Mexico. Activists are also working to improve management plans for national forests.

■ **Toxics: Resource Conservation and Recovery Act.** This law regulating hazardous-waste disposal is scheduled for congressional review in 1989, and the Club is working to see it renewed and strengthened. The Club also urges more effective enforcement of the Superfund, which mandates and funds cleanup of abandoned waste sites.

■ **Global warming/greenhouse effect.** Earth's atmosphere is heating up

as carbon dioxide, chlorofluorocarbons (CFCs), and other gases accumulate in the atmosphere. To reverse that trend the Club is promoting energy conservation, the use of renewable resources, a phaseout of CFCs, a halt to deforestation, and an increase in fuel-efficiency standards for automobiles.

■ **International development lending.** Every year billions of dollars in loans directly or indirectly subsidize the clearcutting of tropical rainforests, the overgrazing of African grasslands, the flooding of wilderness behind unnecessary dams, and the destruction of coastal wetlands. The Club is working to reform the lending practices of multilateral banks (such as the World Bank and the African Development Bank) that have contributed to such disasters.

In addition to these seven campaigns, Sierra Club members are continuing to work on a broad range of issues. These include population stabilization, protection of coastal and marine resources, promotion of mass transit, and the safe disposal of nuclear wastes.

The Sierra Club Annual Dinner will be held May 6 at the Hotel Nikko in San Francisco. National honors and awards will be presented. For more information contact the Sierra Club's executive office at (415) 776-2211.

Nature-loving youngsters will find many hours of pleasant reading in this spring's collection of children's books from Sierra Club Books/Little, Brown.

Record-Setting Animals (\$7.95) is a deck of 48 Sierra Club "Wildcards" printed on heavyweight, perforated pages. Each tear-out card features a full-color illustration of a wild animal on one side and facts about that creature on the other. Designer Melinda Bergman Burger has included instructions for 14 games that children of all ages can enjoy.

Author Edith Thacher Hurd and artist Jennifer Dewey trace the life of one oceangoing creature in *Song of the Sea Otter* (\$5.95). Appropriate for readers ages 7-10, the book introduces the concepts of evolution, migration, life cycles, and the food chain.

Readers from 8 to 12 who are looking for ways to liven up their summer will find information on the sun and the seasons, what makes people hot and how to keep cool, gardens and growing things, insects and birds, hiking and camping, and more in *The Sierra Club Summer Book* by Linda Allison (\$7.95).

These books may be ordered from the Sierra Club Store, Dept. T-150, 730 Polk St., San Francisco, CA 94109. Include \$3 per order for shipping and handling; California residents should also enclose applicable sales tax. Club members may subtract a 10-percent discount from prices listed. Allow four weeks for delivery.

Sierra Club members visiting Washington, D.C., are invited to stop by the Club's new lobbying headquarters at 408 C St., N.E., Washington, DC 20002. This recently purchased building on Capitol Hill consists of three interconnected townhouses bordering a park two blocks from the Senate office buildings. From this new vantage point, 17 staff members and visiting volunteers are poised to beat a quick path to lawmakers' offices, helping the Club influence national legislation and policy on a range of environmental issues.

If you're planning a trip to the nation's capital and can help carry the Club's message to your state's congressional delegation, please give advance notice of your trip to your chapter conservation chair and regional office—they will in turn notify the Washington office staff.

The Tropical Rainforest: Diverse, Delicate, Disappearing is the title of an audiocassette and slide show available for rental through the Sierra Club's Public Affairs office. Produced by the Club's International Committee, the 30-minute program includes a recorded narrative written by biologist Marshall Hasbrouck. The program examines the complex ecology of tropical wet forests in Latin America and explains the causes and consequences of forest destruction. It concludes with suggestions for what people can do to help preserve the forests. A two-week rental costs \$10. Contact Sierra Club Public Affairs, 730 Polk St., San Francisco, CA 94109; phone (415) 776-2211. ■



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A Look at Animal Vision



Imagine that you are standing in a green, grassy meadow filled with colorful wildflowers. A plump, grayish-brown rabbit scampers from one plant to another, stopping frequently to survey the area, scarcely disturbing the meadow's peaceful silence. Does the rabbit see what you see when it looks at the field?

The answer is no. A person standing in the meadow sees green leaves and pink, red, purple, and yellow flowers. To the rabbit all objects appear black, white, or gray; it sees the shapes we see but can't detect the colors. Yet the rabbit has no trouble making its way through the field, distinguishing one plant from the next, and watching for enemies.

In fact, rabbits can see more of the meadow than humans can. Because our eyes are in the front of our heads, we see directly ahead of us but only partway around us. A rabbit's eyes bulge outward and are set far back on the sides of its head. As a result, it can see almost in a complete circle without moving its head or body.

This wide field of vision is more important to a defenseless rabbit than the ability to see colors. It enables the rabbit to see bobcats or other predators approaching from any direction without drawing attention to itself. With luck, this gives it enough time to escape. In contrast, the bobcat has eyes set in the front of its head, just like we do. It doesn't get an all-around view, but it has excellent vision for hunting: When eyes are set close together, one eye's field of vision overlaps the other's. This enables the two eyes to focus together and judge shape and depth.

Animals rely on vision to find food, escape from enemies, and find and attract mates, and every animal's eyes have adapted to meet its specific needs and environment. Although humans don't see the same way animals do, we can understand vision better if we know how our own eyes work.

When we see an object, we actually see the light that the object reflects. Sunlight is made of many types of light, and each type produces a different color when it hits an object. An object's chemical structure determines which colors it will absorb and which colors it will reflect. A leaf, for example, reflects green light. Our eyes receive the reflected light and change its energy into a form that our brains understand as a picture.

Eyes have millions of tiny nerve cells (called photoreceptors) that recognize light or patterns of light. (*Photo* refers to photons, or units of light; *receptors* means receivers.) There are two types of photoreceptors: Rods allow eyes to see in dim light, such as night light, while cones function in bright light, such as daylight. Rods and cones are found at the back of the eyeball, in the retina. The retinas of humans, birds, and many other animals contain more cones than rods; this allows them to see colors and sharp details. ■

MELISSA ABRAMOVITZ is a freelance writer in San Luis Obispo, California.



▲ Owls, which are nocturnal (active at night), have no color vision. But they can find their prey in places where people could not see their hands in front of their faces. They see well because their eyes and pupils absorb even the dimmest light, their retinas have more rods than cones, and the forward-facing position of their eyes gives them excellent vision for judging distance. Owl eyes are about a hundred times more sensitive to light than human eyes. Like humans, though, owls can't see in total darkness, because there is no light for objects to reflect.





BRIAN LUTCH / DINK PHOTO

▲ A frog will not try to catch a dead or still insect; it can't see an object unless the object is moving. Because frogs use their eyes primarily to help them catch food, and because their food consists of flying insects, the design of their eyes as motion detectors is well suited to their needs.

▼ Bees see colors even better than humans do: They can see all the colors that people can see (what's called the visible spectrum), as well as ultraviolet (UV) light. UV light, which causes humans to tan and sunburn, is invisible to us. Many flowers contain ultraviolet markings. These spots guide bees to the pollen in the flower.



DWAYNE B. KUNDEL / BRUCE COLEMAN INC.



TOM & PINE LECTURE

▲ In contrast to owls, diurnal birds (those active during the day) have retinas that contain mostly cones, giving the birds very accurate vision as well as a wide range of color perception, which helps them find food while flying. Their retinas have more photoreceptors than those of any other animal: While human retinas have about 200,000 photoreceptors per square millimeter, a sparrow's eyes have roughly twice as many. Birds of prey, such as the eagle (above), have the best vision of any animal. They have about 1 million photoreceptors per square millimeter. It's difficult to imagine 1 million of anything in such a small space, but this huge number of nerve cells gives falcons, vultures, eagles, and other birds of prey the ability to spot small mice in a field from 3,000 feet in the air. A person on the ground could not even see a hawk flying at that height.

► Fish that live near the water's surface have large, well-developed eyes that can see through both air and water, something our eyes can't do. Deeper down some fish are blind, while others have huge eyes that absorb the tiny amount of light that reaches the sea bottom.



LARRY LUSKEY / DINK PHOTO

◀ Cats can see blue and yellow only. An object that a person may see as red merely appears dark to a cat, and what people see as green appears bright or whitish to a cat. Because cats are mainly active at night, their limited color vision does not slow them down. They can see the outlines and forms of objects at night much better than humans can. Their eyes have mirrorlike devices that reflect light and help them see in the dark; this is why cats' eyes shine when caught in the beam of a flashlight or an automobile headlight.

► Aquatic creatures have also developed vision that enables them to survive in their environments. The sea scallop, for example, has rows of eyes containing nerve cells that respond to the slightest movement. Although the scallop can't distinguish shapes well, it is quick to close its shell when its eyes sense any movement suggesting that a predator is approaching.



WILLIAM AMOS / BRUCE COLEMAN INC.

Cool Comfort in the Hot Sun

The sun offers painful lessons to the unprepared hiker.

Stephen Kasper

WAKE UP SHIVERING and groggily cinch up the collar on my sleeping bag. It's not unusual to wake up cold while camping, but why is this happening in Death Valley, where the temperature, even in the middle of the night, is nearly 90 degrees Fahrenheit?

Seduced by warm winds and sunny skies, I had spent most of the day hiking in shorts and shoes, only to find myself deeply burned a few hours later. With the burn came chills—and a reminder that the sun has a dark side.

In the great outdoors, what you can't see can hurt you. Visible light accounts for a small fraction of the total radiation that washes over our vulnerable bodies. Extended exposure to invisible ultraviolet (UV) light causes blood vessels in the skin to dilate, producing the stinging pain and redness of sunburn. The effects are compounded at high altitudes, where the thinner atmosphere filters less UV radiation, and near snow, sand, and water, which reflect it.

The obvious remedy is to shield your skin from the sun. Areas not easily covered with clothing need to be protected with sunscreen. These may include your face, neck, and ears, and even the backs of your hands. Since sunburn doesn't begin to show until a couple of hours after overexposure, and a severe burn doesn't peak for 12 to 24 hours, don't wait for color to show. And don't let your guard down on a cloudy day. Clouds may let through 80 percent of the ultraviolet rays you'll encounter on a clear day. If you dare old Sol, you risk suffering severe burn symptoms (fever, chills, sweating, and nausea) in the short run, and premature skin-aging

or skin cancer further down the road.

A sunscreen is classified by its sun protection factor, or SPF. The Skin Cancer Foundation recommends using nothing less than SPF 15, which enables you to stay in the sun 15 times longer than if you were using no sunscreen at all. While sunscreens with an SPF rating as high as 50 are available, there is little agreement among dermatologists about the effectiveness of the higher-rated ointments: Some believe that the higher SPF ratings are realistic, while others claim that any extra protection is washed off by sweat long before it has a chance to show its stuff.

Waterproof sunscreens last the longest, but even these will sweat or wash off eventually. Only repeated applications will maintain the SPF you've paid for. For lips, use a waxy sunscreen. To protect your nose, try zinc oxide. Though

zinc oxide blocks all rays, you'd never want to slather the greasy opaque paste on larger areas of skin.

The eye also absorbs UV radiation. While pupils protect the eyes somewhat by contracting or dilating as light conditions change, prolonged exposure can cause sun blindness, a burning of the cornea (the clear surface of the eye) that impairs vision for up to 48 hours. At high altitudes sun blindness can occur quickly. More severe exposure (such as staring at the sun) can permanently burn your retinas.

Wearing high-priced sunglasses doesn't guarantee protection from ultraviolet rays. Cost is often determined by the quality of the frames or simply the trendiness of the brand name. Buying the darkest lenses you can find may not help, either. Because dark glasses dilate your pupils, they let in more UV rays

than when your eyes are unprotected. The best sunglasses block 95 to 100 percent of UV rays and nearly all infrared rays (which cause eye fatigue), but impede yellow light as little as possible, enabling the pupils to dilate and contract naturally. The American National Standards Institute sets standards for UV protection, impact resistance, and optical distortion in nonprescription sunglasses; look for a manufacturer's label stating that its shades meet or exceed the standards. Opticians can apply a UV coating to standard eyeglasses or sunglasses for \$10 to \$30.

Even if you protect your skin and eyes, the sun is not done with you yet. When you're in the hot sun you must be wary of excessive heat gain, or hyperthermia. Sweating is our most effective way of cooling the body, but it's costly in terms of water loss. In dry air you



An unseasoned desert hiker: no water, no hat, no sunglasses.

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may not think that you're sweating at all, but your unmoistened skin belies the fact that your body's 2.5 million sweat glands are losing up to a quart of water every hour through evaporation.

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Thirst is a poor indicator of your body's need for fluids; it's best to examine your urine. It should be clear and flow copiously. The darker it is, the more liquid you need. (Vitamins can skew the results by turning urine yellow.) Electrolyte drinks such as Gatorade help counter salt loss from extreme sweating, but salt tablets should be avoided because they irritate the stomach.

Proper clothing is the next line of defense. When temperatures soar, there's a compelling urge to strip down to the bare minimum of clothing. This leaves you vulnerable to heat exhaustion or heatstroke: Stripped down, you may sweat twice as much as someone wearing clothes. The more you sweat, the more you must drink to stay hydrated. This becomes especially significant when you must carry your water with you: It weighs eight pounds per gallon.

Light-colored, loose-fitting cotton trousers and cotton shirts with long sleeves provide the best protection. A brimmed, well-ventilated hat is a must. If the hat doesn't shade your ears and neck sufficiently, a bandana tucked underneath Foreign Legion-style will do the trick.

Finally, carry first-aid instructions so that you can help someone who has been overexposed to the sun (and remind yourself of the sun's dangers).

The alternative to sunburn doesn't have to be staying indoors. If you wear proper clothing and sunglasses, faithfully apply sunscreen to exposed skin, and stay hydrated, you'll find satisfaction rather than suffering in the sun. ■

STEPHEN KASPER is a writer and photographer in Truckee, California.

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1990 Foreign Trips

With this issue we introduce the first of our 1990 Foreign Outings. For more detailed information on these trips, send in the coupon below. Refer to the January/February 1989 issue of *Sierra* for our reservation and cancellation policy and an application form. Note that trip prices are subject to change and do not include airfare. Leader approval is required for all foreign trips.

[90530] Zanzibar to Ngorongoro Crater, Tanzania—February 14–March 1, 1990. Leader, Kern Hillebrand, 49 Canyon Rd., Berkeley, CA 94704. Price: \$3,460; Dep: \$100. We will begin our Tanzanian experience on the narrow streets and broad beaches of Zanzibar. In this centuries-old city we will tour an old Portuguese fort, the marketplace, and nearby spice plantations. From the Indian Ocean we will travel inland via Dar es Salaam to some of the best wildlife areas in East Africa: Tarangire, Manyara, the Serengeti, and the unique Ngorongoro Crater, home to more than 30,000 animals. Expect to see herds of plains animals as well as elephants, lions, gazelles, splendid birds, and perhaps a dikdik. We will travel mostly by Land Rover, and our accommodations will be in comfortable lodges, hotels, and tented camps.

[90535] Gorkha-Chitwan Trek, Nepal—February 26–March 17, 1990. Leader, Peter Owens, c/o Pete Nelson, 5906 Dinac St., San Diego, CA 92122. Price: \$1,450; Dep: \$100. After sightseeing in Kathmandu we begin our moderate 13-day loop trek. Starting in historic Gorkha, our route will take us through Gurung, Tamang, and Brahmin-Chhetri villages and up rhododendron-covered slopes. Reaching an area that's seldom visited by westerners, we can expect views of Annapurna, Lamjung, Manaslu, Ganesh, and Langtang peaks. We will be closest to the peaks of the Manaslu



Masai giraffe, Masai Mara National Park, Kenya

Himal: Himalchuli (25,801 feet), Baudha (21,890 feet), and Manaslu (26,760 feet), the eighth-highest in the world. Our return route will take us through the Tamang village of Serandanda (where we will visit a Buddhist gomba) and end on the Marsyangdi River beneath the Annapurna foothills. Our trip will conclude with three days of elephant safaris and jungle walks in Royal Chitwan National Park.

[90540] Rolwaling Trek, Nepal—March 24–April 13, 1990. Leader, Peter Owens, c/o John Bird, P.O. Box 126, Point Richmond, CA 94807. Price: \$1,470; Dep: \$100. This trip offers a 19-day trek into the remote Rolwaling Himal, west of Mt. Everest a few miles south of the Tibetan border. Known as "the furrow" in the Sherpa language, the Rolwaling has always held a mysterious fascination; tales of the Yeti, the elusive abominable snowman, have poured from the Sherpas who live there. Spring comes early to Nepal, and

the rhododendron, Nepal's national flower, will be in full bloom. Maximum elevation reached will be 16,000 feet.

New 1989 Service Trip

[89276] Golden Link Trail Maintenance, Gila Wilderness, New Mexico—August 11–19, 1989. Leader, Barbara Coon, 2900 E. Seneca, Tucson, AZ 85716. Price: \$150; Dep: \$50. A 12-mile hike will take us to our base camp on Spruce Creek, home of the endangered Gila trout. On workdays we will walk several miles along the Golden Link Trail to the stretch where we will clear heavy brush. On days off we can peakbag or poke around ruins and equipment from turn-of-the-century mining operations. Difficult terrain and potential thunderstorms make this a trip for the sturdy and well-motivated. Leader approval required.

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BOOKS

On the Verge of Distinction

*Enduring Seeds: Native American
Agriculture and Wild Plants*

by Gary Paul Nabhan

North Point Press

\$17.95, cloth

Carol Polsgrove

TOWARD THE END of *Enduring Seeds*, Gary Paul Nabhan tells of his journey to North Dakota, where three Native American tribes—the Hidatsa, Arikara, and Mandan—had lost their fields to the reservoir created by Garrison Dam. Relocated on higher ground, they had also, it seemed at first, lost their gardening tradition. Driving into Fort Berthold reservation, Nabhan searched in vain for plots of cultivated land.

"No, we don't garden anymore," one man told him. "Since we moved from out there in the country, we don't grow any corn anymore. It's been years since we moved away from it all."

Nabhan had brought along a gift: small red Hidatsa beans, descendants of seeds collected by these very tribes. To return them to the land where they once had grown, he had to find someone who still planted, harvested, planted again, and kept the cycle going.

Finally, on the west side of the reservation, he found Cora Baker. He poured the beans into her hand.

"She just looked at them, saying nothing, as if seeing an old friend for the first time in years."

Then she spoke. "May I keep them? May I grow these? Here, put some in envelopes for me. I'll go get you some of our family's Indian corn to try."

In that moment lies the note of hope that echoes in the title of this fine book. But most of the time, *Enduring Seeds* is more a lament for all that we lost when we dammed rivers and flooded Native American gardens, or diverted streams for our own monotonous, single-crop fields. Whatever happened to Texas wild rice? asks Nabhan. And the

Okeechobee gourd? And the mid-western sumpweed?

What we've lost, Nabhan says, is more than just ancient food plants, both domesticated and wild, in all their useful variety. We've lost the ways of life that made those seeds last: the cultures that supported agriculture.

We are left with a slender seed-saving line, held by people like Cora Baker. As traditional farmers vanish, not only in this country but around the world, their seeds pass from hand to hand, to be kept alive in scattered gardens or kept frozen in seed-saving centers.

Can varieties of domesticated plants—the kinds we count on for our food—last long outside the farming systems that once sustained them?

Freezing seeds is no guarantee that we will have the strains we need when insects or environmental changes wipe out those we're using now. Nabhan offers up this fantasy of the year 2089: Demand for salt-tolerant plants has become intense. A researcher sprouts an ancient bean in his peat pot—and watches as the plant dies from a strain of virus that didn't exist when the seeds were first brought to the laboratory.

Another way to preserve seeds is in gardens—"heritage farms" like the Whealy family's farm near Decorah, Iowa. The Wheelys became seed savers soon after they were married, when Diane Whealy's grandfather gave them seeds of a tomato, a morning glory, and a runner bean that his family had brought from Bavaria, four generations past. "The old man didn't make it through the winter," Kent Whealy recalls, "and I realized that if his seeds were to survive, it was up to me."

Thus the Wheelys became collectors of "heirloom seeds." Kent sought out others like himself and now runs the Seed Savers Exchange. Trading back and forth among themselves, members have kept some 5,000 heirloom seed stocks in circulation that weren't in any seed catalog at the time and that in some

cases were verging on extinction.

Whealy's exchange inspired Nabhan and three others in the early 1980s to start a similar exchange in the Southwest. Native Seeds/SEARCH collects, stores, and distributes seeds to Native American farmers whose ancestors once grew the same varieties. In addition, the organization sends seeds to more than 1,500 home gardeners.

But preserving seeds through gardens and exchanges has its drawbacks, notably the lack of institutional support. The survival of innumerable useful varieties of seeds depends on successive generations of individuals. Will the Whealy children continue the heritage farm once their parents have passed on?

The consequences of continuing to lose plant varieties could be dire. Heavily dependent on a few cultivars, U.S. agriculture is vulnerable to environmental stress and disease. Nabhan notes that the National Research Council, an agency of the National Academies of Sciences and Engineering, has predicted that under the present circumstances, an epidemic could easily devastate the entire western dry bean industry.

Conservationists have given much attention to the drain on the gene pool posed by tropical forest destruction. Nabhan would have us attend as well to the genetic loss posed by destruction of native farms and their replacement by monocrop systems.

He is concerned, too, about the loss of wise farming ways: planting different kinds of crops together, accepting seed variations rather than insisting on genetically pure strains, and planting in ways that adapt to rather than dominate wild landscapes. Gently he counters the notion that traditional farmers destroy wilderness. In fact, he says, communities that are culturally stable may help sustain overall biotic diversity. The wild and domestic nurture each other.

Like Wendell Berry, who encouraged him to write this book, Nabhan believes farms need ragged edges, where the domesticated world encounters the wild. He notes the sad fate of the turkey, once "bright in mind, quick in movement," now so completely tame through selective breeding that it has lost its ability to fear—and thus its ability to get out of danger's way.

"Wildness, it seems, has to do with the appropriateness of one's responses to unpredictable conditions," Nabhan says.

This is a rich, complex book—wise, personal, and beautifully written by a man as comfortable with words as he is with nature. In its quiet way, it is a call to personal action. Reading it, I began to long for a small patch of ground where I could plant a few seeds. I kept remembering my mother planting garden after garden in my childhood, as her mother did, and her mother before her.

CAROL POLSGROVE teaches journalism at California State University, Hayward.

Taking It Easy

Soft Paths: How to Enjoy the Wilderness Without Harming It
by Bruce Hampton and David Cole
Stackpole Books
\$10.95, paper

Charles Hardy

AS THE GOSPEL of wilderness wonder has spread, the number of backcountry worshipers has increased dramatically. Once-pristine areas now show signs of stress caused by negligent human behavior. Even on the highest mountain passes in California's Sierra Nevada, a backpacker is likely to find litter or campfire scars left by other hikers. This poses a dilemma: How are people to visit and absorb the special qualities of wilderness areas without, as the oft-used phrase goes, "loving them to death"?

Bruce Hampton and David Cole confront this issue in *Soft Paths*. In contrast with many backpacking guides that focus broadly on planning outings from start to finish, *Soft Paths* confines itself to practical advice for backpackers on how to leave minimal traces of their presence in the wilds. The inspiration for the book comes from decades of work with Paul Petzoldt's National Outdoor Leadership School (NOLS) in the Grand Tetons of Wyoming. Hampton serves on the NOLS staff; Cole is a research biologist with the U.S. Forest Service in Montana. Both have taken to heart

Petzoldt's teachings on becoming stewards of the land.

Soft Paths is a kind of wilderness scripture. The authors espouse "ethical behavior among wilderness visitors." They understand the frustrations of public-land managers who attempt to enforce such behavior with rules and regulations. But regulations alone are not the answer, the authors proclaim: "Appropriate behavior flows from an understanding of and respect for the land, an inherent set of values within the individual user—a land ethic."

Some of the book's best advice is often fundamental. "Stay on the path," for example, may sound obvious, but walking outside a deep trail rut or around a snow patch seriously scars the landscape. This bit of guidance happens to address an issue I have often confronted on my own backpacking trips. Should I walk through the middle of a mud patch or skirt the edge? Hampton and Cole suggest I take the path through the muck to avoid creating a second trail around the mud.

Are campfires taboo? The authors answer, "No, not by a long shot in most backcountry." They reluctantly conclude that the tradition is here to stay, noting that "campfire advocates affirm the qualities of a night held back by firelight." When are the fires acceptable? When they are "safe, damage to the site is minimal, construction of the fire is simple, firewood is abundant, and cleanup and camouflaging of the site are easy." This enlightened attitude has somewhat softened my resolute anti-fire bias.

Improper disposal of human feces, the authors note, creates eyesores, fouls water with pathogens, and spreads disease to animals and insects. Should a hiker always dig a hole and never defecate on top of the ground? Surprisingly, the authors promote surface decomposition of human waste under limited conditions: when human visitation to the area is infrequent and when water is at least 200 feet distant. One might encounter such circumstances in desert or tundra areas.

Spreading the concept of wilderness as a positive value was the first stage in the long, hard struggle to protect our wild places. Introducing the legions of

wilderness worshipers to the gospel of treading lightly on the land is the second stage, and *Soft Paths* is a major contribution to that effort.

CHARLES HARDY works on the staff of the Sierra Club's national outing program.

Incomplete Portraits

Dreamers and Defenders: American Conservationists

by Douglas H. Strong
University of Nebraska Press
\$26.95, cloth; \$9.95, paper

Peter Wild

THE ROMANCE of environmentalism has much to do with the fact that, until recently, activism was an unpaid endeavor. An individual rose to protect the planet, as John Muir did, out of conviction, not from any hope of personal gain. Such people were passionate dreamers, armed with visions that often challenged the status quo. Hence, environmentalists have tended to be a diverse and colorful tribe.

Dreamers and Defenders certainly confirms this view. The author, Douglas H. Strong, a professor of history at San Diego State University, takes a look at the movement through portraits of nine conservation advocates: explorer John Wesley Powell, forester Gifford Pinchot, wilderness traveler John Muir, the first head of the National Park Service, Stephen Mather, and more contemporary conservation figures Aldo Leopold, Harold Ickes, Rachel Carson, David Brower, and Barry Commoner. Among the nine are at least two millionaires, a couple of paupers, a one-armed boatman, and several social sophisticates. Their politics vary from anarchist to staunchly conservative.

Getting at history through its key personalities holds out advantages as well as yawning pitfalls. Most of us like to read about heroic people, and Strong's sketches serve as colorful hooks on which to hang environmentalism's major developments. The beginning of the chapter on John Muir, a vignette of the large-souled mountaineer joyously

swaying in a treetop through a Sierra windstorm, tells us much about the man's exuberance. It's a scene likely to stick in the reader's mind.

Elsewhere, however, Strong misses opportunities to catch our imaginations. In a description of Stephen Mather's adamant stance against commercialism in Glacier National Park, Strong writes: "[Mather] personally directed and watched the destruction of an unsightly sawmill." True enough, but a limp way of putting it. In fact, the wily Mather ordered dynamite placed under the eyesore, invited wondering tourists to a "demonstration," then lit the fuses himself—all the while claiming he was celebrating his daughter's 19th birthday. Strong could have told us that.

Far more problematic, however, is Strong's vulnerability to the Great Man theory of history that the biographical approach tends to cultivate. Did Thoreau first propose that wild nature had value in itself and should therefore be preserved intact? Or did the notion evolve slowly in the culture through many minds, to find its expression in a man who happened to be Henry David Thoreau?

It's the old chicken-or-egg conundrum, and to his credit Strong is aware of it. In the introduction he warns that his subjects serve only as convenient mileposts to help us trace the "development of a more enlightened attitude toward the land." Yet the author doesn't always follow his own cautions. Strong's chapter on Aldo Leopold and the 20th-century wilderness movement is fine as far as it goes. However, the sketch says little or nothing about Robert Marshall, Arthur Carhart, and other tireless wilderness advocates. Leopold was but one star—though perhaps the brightest—in a cluster of innovative thinkers. Without that context, readers get a distorted view of Leopold's achievements.

Despite the superficial nature of the portraits, most historians of the movement would nod approvingly over the major environmental lights Strong selects—with one possible exception. In the critical Depression years, Harold Ickes served as Secretary of the Interior under Franklin Delano Roosevelt. The environmental gains were many. Ickes

put Interior's corrupt house in order. Yet it could be argued that Ickes served more as the president's willing lieutenant than as the initiator of such projects.

Drawing on old rivalries between two departments, the president played Ickes against Secretary of Agriculture Henry Wallace. The chief executive's machinations kept the two cabinet members competing and eager to please. It's a revealing point that Strong barely broaches.

Throughout *Dreamers and Defenders* the author ably delineates environmentalism's major issues. He shows the philosophic split between Gifford Pinchot, first head of the U.S. Forest Service, and John Muir. (The rift continues to this day in disputes between the "conservationists" of the Pinchot tradition, who believe humans must conserve natural resources for future use, and the holistic "preservationists" of the Muir tradition, who believe nature must be preserved for its beauty and spiritual value.) Strong succeeds also in explaining the changes in the environmental movement over the decades. Once romantically concerned with protecting wild scenery, since the Second World War the movement has recognized the looming catastrophes of overpopulation and nuclear warfare. "Today's problems are of a new order," Strong writes. Now survival itself is the issue.

Though the portraits in *Dreamers and Defenders* serve fairly well as an overview of environmentalism's movers and shakers, the collection suffers from curious gaps, and Strong presents little that is new to readers generally familiar with the movement's major figures.

PETER WILD is author of two books on pioneer conservationists in America.

BRIEFLY NOTED

"These could easily be the last days of America's last great forest," writes Oregonian David Kelly in *Secrets of the Old Growth Forest* (Peregrine Smith Books; \$29.95). "Time has all but run out for the spotted owl, the marbled murrelet, the pileated woodpecker, the fisher, the marten, the cougar." Kelly and photojournalist Gary Braash have combined their talents to portray both the solemn beauty and the harrowing

plight of the few remaining stands of 1,000-year-old redwoods and Douglas firs, spruce, cedars, and pines that loggers in the Northwest are greedily felling for timber. . . . Selections from three books by *New Yorker* staff writer John McPhee—*Basin and Range*, *Encounters With the Archdruid*, and *Rising From the Plains*—make up half of *Outcroppings* (Peregrine Smith Books; \$34.95). Tom Till's photographs of such sights as snow-covered sage on the Wyoming plains, storm waves on the Great Salt Lake, and copper-mine tailings in Nevada complete the package, a literary and pictorial exploration of the geology and landscape of the American West. . . . "Even as it struggles against the mounting threats to the integrity of our national parks," writes George Hartzog, Jr., in *Battling for the National Parks* (Moyer Bell Limited; \$19.95), "the National Park Service itself has come under political assault." In this account of the inner workings of the agency he directed between 1964 and 1973, Hartzog argues that we must work to prevent the service's professional management from succumbing to political patronage. . . .

Perhaps all the inspiration you'll need to strap on a pack and head for the northern Rockies this summer is a look at *Wyoming's Wind River Range* (American Geographic Publishing, P.O. Box 5630, Helena, MT 59604; 14.95, paper). The photographers whose work appears in the book—including Pat O'Hara, Jeff Gnass, George Wuerthner, and Kent and Donna Dannen—are among the finest in the field. Joe Kelsey, who wrote the text, first visited the range in 1969 to satisfy his zeal for rock climbing. He has returned every summer since. . . . Anybody who's daffy enough to even consider paddling hundreds of miles on the open ocean in a contraption that looks as sturdy as a Christmas-tree ornament should probably first consult *Sea Kayaking: A Manual for Long-Distance Touring* (University of Washington Press; \$14.95, paper). In this revised and expanded edition of his 1981 book, John Dowd expounds on hull design, Eskimo rolls, seasickness, sharks, navigation, and other kayaking matters. . . . Contributing editor John Cleare and nine other adventure-travel writers take turns de-

scribing their favorite paths through Earth's wilderness in *Trekking: Great Walks of the World* (Salem House; \$24.95). . . . Yosemite Valley received its name from a battalion of white soldiers that pursued the Yosemite Indians there in 1851. Up to that time the valley was called *Ahwasnee*, meaning "deep grassy valley." The grass survives, but the Indians are now gone. Many such curiosities surface in Peter Browning's alphabetically arranged *Yosemite Place Names* (Great West Books, P.O. Box 1028, Lafayette, CA 94549; \$12.95, paper). . . . Meanwhile, a little farther north in the Sierra Nevada range, a certain large lake has borne many different names, changed seemingly at the whims of explorers. A Frenchman named Bonpland gave it his name, and John C. Fremont called it Mountain Lake. On most maps it was Lake Bigler, but at least one person wanted to call it Truckee Lake. Common sense prevailed and the lake's Native American name finally stuck: Tahoe. Barbara Lekisch offers us this history in *Tahoe Place Names*, also from Great West Books (\$11.95, paper). —Mark Mardon

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DEEP ECOLOGY

Continued from page 73

day tomorrow because we want to get at least to the entrance to the Goosenecks below Mexican Hat to camp. The students have retired to a tent ghetto they established before dinner, a circular arrangement with the opening of each hovel facing in toward the center. Bud is on his raft drinking a beer and trying, by flashlight, to unthread a nut off a bent thole pin. I sit on one of his tubes and dangle my feet in the water, looking up at the moonlit spine of the Lime Ridge anticline. "Why do you suppose they're all sleeping in a circle?"

Bud turns off the flashlight and stares out across the river—the grey-green, greasy Limpopo. "So that they can maintain constant audiovisual contact with each other," he says. "Part of the wilderness experience." He yawns, and tosses the thole pin into his repair kit. "You know, there's something about these folks that really gets to me."

"I can't imagine what."

"They've got an attitude about everything. They don't know anything but what they've read in *Earth First!*, and they think that's all they need to back their self-righteous opinions."

"Sounds to me like you've been quarreling with the clients again."

"Not quarreling, merely trying to instruct. I told T.V. to take the soap and wash before doing kitchen duty, and he said he didn't use soap because it was made from animal fat."

"I hope you threw him in the drink."

"Actually, I just threw him out of the kitchen."

Day two, and we need to make some river miles if we are going to get a decent place to camp tonight. Lieutenant Joseph C. Ives, who had about the same opinion of slickrock topography as his predecessor, Captain Macomb, commented on the paucity of decent places on the Colorado Plateau in his 1861 *Report Upon the Colorado River of the West*. The area, he said, "is, of course, altogether valueless. It can be approached only from the south, and after entering it there is nothing to do but to leave.

Ours has been the first, and will doubtless be the last, party of whites to visit this profitless locality." Wouldn't it be nice if that were so. Unfortunately there are a good many parties in this profitless locality right now, all hiking in the same side canyons, all vying for the best ground at night, all scowling at one another as they pass on the river. It used to be considered poor form to be *obviously* trying to out-row another trip to the primo campsite just around the bend, but now it is the norm. The BLM limits the number of groups that can launch on any given day through a lottery permit system, but the river still gets maximum usage, and the old camaraderie that once defined an encounter between hominoids in the wilderness is a thing of the past. "Howdy" is an anachronism in the wilderness. Proprietary resentment is the fashion. "Who are those sons-abitches?"

So we log miles, while the students sprawl on the raft tubes and doze. The sun beats down, but there is a nice breeze that cools the sweat—and dupes the dreamer as he slowly dehydrates. Repeated warnings have been given about hyperthermia, but they have been received by our young hotspurs with the same attention paid all such instruction. "You ought to drink some water," I tell the people in my boat. "The desert is deceptive. Even when you think you're cool you're losing a lot of moisture." Patricia Clotworthy ("Cow Patty") raises her head and scowls, thereby exhausting her range of expression. The others sleep on.

Occasionally Professor Pshaw, riding in the lead boat, requests that we stop—twice for people to go into the bushes, once to inspect evidence of a fossil oil field called the Ismay algal biotherm ("See the leached oolites? That's the top of the Desert Creek cycle."), once at Mexican Hat Rock. There is a short trail to the base of the hat that the guides and four or five students run up. The rest of the party huddles in whatever shade is available along the bank. We make a fruit salad for lunch during this interlude, and when we're done Bud throws the residue in the river. Chanterelle regards him as if he just spat on the eucharist wafers. "The catfish and suckers will eat it," he says. "It's biodegradable."

"I wish you wouldn't do that anymore," she says, exhaling a cloud of cigarette smoke. "It's very offensive."

Twice during this layover I catch the Beaver doing his business up behind the small sandy area where we have stopped. Twice I ask him not to do it again. He responds by briefly contemplating the rim of the canyon and walking away.

Our hopes for the good camp at mile 29 are dashed when we pull up on the beach under Mexican Hat Bridge to refill our five-gallon water jugs. The highway crosses the river here, and a short, rocky road down from the trading post above has been blasted out of the shale, making this a relatively quick and easy stop. It is even possible, with a little nerve, to drive down to the water's edge—indeed, two pickup trucks are parked at the far end now, two families of Navajo occupying an area next to the cottonwood trees. The kids frolic in the water, the women sit stolidly in the cab, the adult males hunch under the tailgate and stare out at the kids from under baseball caps that advertise the main reason they have come off the reservation. Budweiser. Coors. They are drunk. And they are not friendly. And when their kids start climbing on our rafts they call them sharply off. "Get away from those people. They got VD."

Under the circumstances it is, of course, impossible to keep our kids away from their metaphoric raft. It now becomes essential to demonstrate that the white brothers and sisters understand. The white brothers and sisters want to confirm the validity of the insult, and to assume full responsibility for the fact that the red brothers are wasted on a Tuesday afternoon, sitting in the dirt under a pickup truck with a six-pack and a brown bag and looking like they can't decide whether to wind their ass or scratch their watch. The white brothers and sisters would like to share the pain, the anguish, the all-consuming, uncompromising rage.

The red brothers, however, don't want to share anything. Including the same air. Custer's offspring are a familiar pain in the neck and can be either side-stepped, ignored, or swatted like a horsefly, but they're too dumb to be insulted. Insults merely inspire them to

higher levels of obsequiousness. And since they've got the red brothers and sisters trapped at the end of the beach, they can't even be sidestepped or ignored. Perhaps they can be run over. *If they won't leave us alone, we'll leave them alone. Excuse me, again.*

As Bud and I are returning from the trading post with the water jugs we can see there's trouble down below. Evidently the Navajo have tried to depart by backing along the beach (no doubt at full throttle), and have been thwarted by Demon Rum and their own tempers. One of the pickups is half on its side, right rear wheel in the river and the other madly spinning a continuous plume of sand into the boats; the second pickup has a chain attached to the first and is creating its own grit storm as its tires scream and smoke on the loose shale of the ramp. A pale clutch of white brothers and sisters cringes behind the cottonwoods, confused, wanting to help but dimly aware, at last, that help is not wanted. The Indians are cursing as they try to avoid being decapitated by the shrapnel fired from under the tow, while at the same time they strain to keep the rear pickup from completely collapsing on its side. The truck drivers (now both women) seem to have but one purpose in mind—to mash the hammer to the floor until things either come unstuck or the engines blow. Bud sets his jerry can on the ground. "How do you feel about let's go get an Eskimo Pie?" he says. "Let things sort of work themselves out."

Except for the loss of the campsite caused by this minor delay we are not otherwise inconvenienced by our skirmish. The scene under the bridge seems to chasten the California cosmologists for a time, though there is heated discussion around the postprandial fire to the effect that the Native American predicament, as evidenced by the afternoon's events, is directly attributable to long-standing Bureau of Indian Affairs paternalism and a resultant confusion on the part of the Indian as to his status. This leads T.V. to a definition of Indian status. The Indian is the "first ecologist," he says. There is a collective murmur of affirmation. No one questions the absence of stitching in his segue. One brave lad named Wickham Snavely of-

fers the unpopular opinion that Indians have been as guilty of clear-cutting, overgrazing, strip-mining, wasteful hunting and fishing practices, resort development, etc. etc., as anybody else, but his argument is spiked by Deadhead Darleen before it gets off the ground. "You're full of shit, Wickham." Touché! Before long the circle around the fire tightens and Wickham, finding himself squeezed, goes off to bed. Thus we deal with the Pyrrhonist.

Day three, and we float through the Goosenecks, that curvilinear, meandering section of the San Juan that begins at the Mendenhall Loop and continues for thirty miles to John's Canyon, where things begin to run a little straighter, west-northwesterly, for another twenty-three miles to the take-out at Clay Hills crossing. The canyon is the deepest through this part, 1,235 feet deep at the foot of the Honaker Trail, where we spend an afternoon climbing the two and a half miles of switchbacks built in 1904 by a gold prospector named Henry Honaker. Some of us, anyway. Cow Patty and Deadhead Darleen are suffering from early symptoms of hyperthermia and have to be attended to by Lynn (male concern simply elicits tears and irritability). Others take one look at that monstrous, near-vertical wall of three-hundred-million-year-old sandstones, limestones, and shales, and decide to wash their hair. Wilderness exploration goes on the shelf when it comes to hair.

Too bad. Because from the top the view is unparalleled—the Abajos and the Henry Mountains rise over 11,000 feet to the north; the snowcapped San Juans rise 13,000 and 14,000 feet to the east. Behind us Monument Valley spreads out in subtle shades of ocher, backdropped by the dark, looming mass of Navajo Mountain—which is backdropped in turn by a towering bank of thunderheads coming in from the west. And to our left, off in the direction of the Colorado River, lies the vast expanse of the Glen Canyon National Recreation Area, 1.2 million acres, decipherable in the late afternoon light only by shadow and horizon. We do not stand close to one another up here on this stone cap of the earth. We seek private spots for private thoughts, albeit

private thoughts with a common base. Alone in the wind and rock it is perversely comforting to acknowledge, however briefly, one's utter chronometric and horologic insignificance. We don't matter, therefore it doesn't matter. Nothing matters. It takes a great load off. Relieves us of a great freight of pompous responsibility—before we dive back into our crack in the ground and return to the river.

Where our thoughts are less transcendental. Simple matters prevail, like when to eat, where to sleep, where to set up the groover, who are those sons-abitches?—*they better not pull in here.* On the San Juan there are over three hundred campers stretched out along less than a hundred miles. Almost three people per mile. About five to six thousand each season. Outrageous. Given the circumstances, what is truly amazing is the relatively pristine quality of the riparian corridor. There is a reason for this, and it has nothing to do with an environmentally sensitive user public. It has to do with regulations that require the use of fire pans for campfires (and the removal of charcoal), bags or containers for carrying out all bottles, cans, and wet garbage, and the deployment of the portable pot. Why do the custodians of our national playgrounds not provide us with well-spaced, semipermanent, chemical johns, you ask? On some of the filthiest rivers in this country, they do. The problem is that many folks are called but few are chosen at the specific moment an outhouse floats by. The groover floats with you.

On the morning of our last day the sky emerges pale lavender above the cliff walls, unbroken and cheerless without sun. The night chill does not dissipate, and the students are slow getting up. I pull on my filthy old Patagonia jacket before crawling out of my bag, and squish down to the kitchen area on flip-flops that feel like two cold pieces of liver on my feet. Bud and Don already have the coffee going, and we stand with steaming mugs, staring stupidly at the river and listening to a canyon wren pipe crystal notes from somewhere in the rocks behind us. Gradually we achieve a functional level of con-

sciousness and start to consider breakfast. Bud takes our big chili pot and a metal spoon and goes off to perform what has become his favorite chore—banging loudly and repeatedly in the center of the tent ghetto in order to rouse the inhabitants in as irritable a frame of mind as possible. Lynn appears, yawning, an "oh gosh, you're all up, shame on me" look on her face, grabs a cup of coffee, and disappears with her towel and toothbrush.

Don and I are cracking eggs when Bud returns with a look of deep disappointment. "Everybody's up," he says. "I don't understand it." He puts his pot and spoon on the kitchen box and waves irritably in the direction from whence he has come. Indeed, people are up. Not only up, but packing their gear before coming down to whine about the coffee. T.V., Cow Patry, and the Beav come up from the beach where they have been washing their hands. "Get outta here," they say to us. "We're kitchen crew this morning."

There is a lot of loud, angry shouting going on over by the tamarisk where three or four campers pitched their tents last night (the great circle of conjugates having apparently been disbanded). Pshaw, as usual, is still in the sack, and since we have been banned from the kitchen area by these uppity sous chefs, the four of us drift over to see what the fuss is about. Chanterelle is berating Wickham for having smashed a scorpion with his shoe. He protests that it was crawling on his ground cloth and he didn't want to get stung. "It was out to get me," he says, in a fatal attempt at levity.

"This is totally anthropomorphic," Chanterelle tells him. "Totally. Why do you ascribe your own miserable aspirations to that harmless bug?"

"Because he was going to sting me," Wickham says. "And because he's not harmless."

"He?"

"Well, it . . ."

"You're not only racist, Wickham, you're sexist," Chanterelle says. "You're also an asshole."

It's good to see that some things are still normal this morning. "I hate to interrupt," I say, stepping forward, "but breakfast is about ready and we need

your gear down on the beach before you eat. There isn't much current left and we're probably going to have to row most of the last five or six miles, so we need to move it."

Indeed, not far below our camp at Grand Gulch the current does give out. Lake Powell backs up the canyon of the San Juan nearly fifty miles from its confluence with the Colorado—that is to say, with the confluence of what *used* to be the Colorado, now a two-hundred-mile, stagnant, silt-laden reservoir behind Glen Canyon Dam. What puddles up beneath us at this point is just the dead backwater of one of its torpid tentacles.

We pass the mouth of Oljeto Wash, flooded to the base of its first sandstone terrace. When the lake is low and the San Juan still a live river all the way to Clay Hills, this is the finest of camps—broad, sandy, protected—with one of the most enchanting hikes up through high, sweeping walls of Cedar Mesa sandstone. Today Oljeto is a shallow pond, a languid eddy with a Clorox bottle and a plastic plate slowly circumnavigating its perimeter. A half-mile below the wash Steer Gulch enters on the right, occupied by two boatloads of nudists who regard our passage with vacant disinterest.

Another mile, at Whirlwind Draw, I see Lynn's boat snubbed up to the rocks and Professor Pshaw wildly gesticulating from the shore. Both Bud and I hang up on sandbars trying to pull in, and Pshaw is beside himself when finally, towing ourselves with our bowlines through knee-deep quicksand, we reach the bank. "Hurry up, hurry up, hurry up," he keeps yelling. "We got an emergency. Chanterelle's down."

Down? Drown? What's he saying? We scramble over the rocks to a patch of sand where Chanterelle is indeed down, stretched out on a tarp in the shade with Lynn kneeling beside her, wiping her face with a damp cloth and talking to her in a quiet voice. The other passengers from the first boat hang around on the fringe, looking as if an alien had been discovered in their midst. "What's the problem?" Bud asks. We can hear Pshaw back at the river's edge bellowing for Don's boat to "eddy out, eddy out!"

"She got stung by a scorpion," Lynn

says. "Apparently it crawled into one of the folds of her life jacket." Chanterelle moans that she's feeling faint, that her arm hurts, that she's cold, that she's burning up. "The problem is she says she's allergic to insect bites . . . bee stings anyway. But I don't know if this is a reaction to venom or histamine. I guess we could give her some Chlo-Amine and see what happens."

"We can give her a shot of epinephrine," Bud says.

Pshaw is practically tearing out the remnants of his hair. "What is that, epinephrine? Does that work on scorpions?"

"I don't know. Probably not."

"Well, you're supposed to know. You're supposed to be a guide."

"I'll get the medical kit while you folks debate," I say, and jog back to the boat. Wickham is sitting on a rock holding my bowline, the faintest curvature of a smile gracing his lips. He looks at me without curiosity, but for some reason his disinterest seems manufactured. "Chanterelle got stung by a scorpion," I tell him.

"No kidding," he mutters.

When I get back with the kit Chanterelle already appears much better, and in fact is not going to suffer much more than a sore arm and a case of the woozies. Bud winks at me out of her line of sight and says, "I hope I remember how to stick a needle in. Only did this once before and that was to an orange."

"Naaooowwww," Chanterelle moans. "I don't wanna shot."

"Sure hope this doesn't induce cardiac arrhythmia," Bud says.

"Forget it, Buster," Chanterelle tells him. "You're not going to use that needle on me."

"Looks like you're feeling better now, Chanterelle," Bud says. "Looks like a nice recovery."

But we wait for a while anyway, rocking on our heels in the cool shade of the cliff, until our patient's normally sour temperament begins to manifest itself in the suspicion "that sonofabitch Wickham" might be responsible for her malaise. Recovery complete. Back to the river.

A faint roll of thunder booms up the canyon from off in the direction of the

Kaiparowits Plateau. The sky has turned dark and the air holds the smell of distant rain. Bud crawls across his rowing frame and jams his oars on the thole pins, anxious to get going before the wind comes up. For a moment he sits limply on his cooler, miming the wrist action of a dart thrower. "Actually," he says, "I bet there isn't a lot of difference between a mushroom and an orange. I bet it would have been the most fun I've had on this whole trip."

The rain comes down in sheets at the take-out, turning the clay banks where we unload the boats into a grease pit. "Slicker than snot on a doorknob," Chanterelle observes in her first approximation of humor. Maybe scorpion venom has a non-toxic effect on her. The California cosmologists look forlornly at the trucks up on the rise as they trudge through knee-deep gumbo with oars, frames, coolers, dry boxes, Bill's bags. A few revolt and head for high ground, but everybody else, amazingly, bends to the work without complaint. They are, in fact, so cooperative that once the gear is portaged they start to get in the way, and we have to prevail upon Pshaw to throw together whatever he can for a lunch and then load as many of them as will fit into his Volkswagen van and head back to Mexican Hat. From there they will go on to a Holiday Inn in Page, Arizona. Don volunteers to take the rest if we will load his raft and frame in one of the remaining rigs. Our pleasure, we assure him. We'll even clean off the mud.

When they are gone we pack gear into the trailer and Lynn's pickup, whistling while we work, stopping for a sandwich and a beer when the storm blows over. But we find there isn't much left worth eating. No tuna fish, canned chicken, potted ham, lunch meats, Bac-o-Bits, pepperoni sticks. There's a lot of wilted alfalfa sprouts, limp lettuce, and a few bruised tomatoes. Some avocados the consistency of guacamole. Some fruit. No cookies. We agree it just won't do. The herbivores have cleaned us out. There isn't even a can of ranch beans left to fill an omnivorous stomach. A solution, however, occurs. Get this junk loaded and hit the dusty trail—up the anticline, through the potholes, washes, draws, swells, pockets, folds, gullies to

the Golden Sands Restaurant where they offer up a gustatory memory. A great fatty of a gustatory memory. A LARGE gustatory memory.

Alone in the van I put on a Melba Montgomery tape and settle down for the long, slow drive back across the Up-warp to Mexican Hat and south through Monument Valley to Kayenta. The road over Cedar Mesa skirts the prologue to all the side canyons that dump into the San Juan from the north—Grand Gulch, Slickhorn, Johns—drops down into a corner of the Valley of the Gods to the river, then angles southwest across the Navajo reservation. A great pileup of afternoon clouds causes the light to slant sideways across the desert, illuminating a pinnacle here and a tower there, bringing a distant butte into sudden, radiant relief. Hail dumps on me as I cross onto the "rez" at the corner of the tribal park, but a mile down the road I am back in bright sunlight.

A Volkswagen van is pulled off to the side near Owl Rock. A dozen people with cameras blazing. Do I recognize this herd? I do. Darleen, Fred, Warbler, T.V., Chanterelle, the Beaver, Wickham, Pshaw. They have, of course, seen me. All waving madly. Better pull over. Might be something wrong with the Volks. Damn, a boatman's work is never done. They crowd around my van, pointing out rock formations, shafts of light, tattered hems of rainclouds, fork lightning on Navajo Mountain. *Intense. Far out. Totally nectar.* Have I ever seen anything like it? Can I believe it? Is it too much, or what? *Outsight. Awesome. We don't want to leave.* I nod my head in assent. I agree with everything, with everybody. Cow Patty is actually smiling. Everybody is smiling. "Where was that Navajo taco place we stopped at before?" someone wants to know. Now I'm smiling. Pointing. Just up the road. "We'll follow you," they shout. All in unison. A democratic resolution, perhaps, but *right on.* ■

PAGE STEGNER is Professor of American Literature and Director of Writing at the University of California at Santa Cruz. "Deep Ecology" is one of eleven essays in *Outposts of Eden: A Curmudgeon at Large in the American West*, to be published in April by Sierra Club Books.



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
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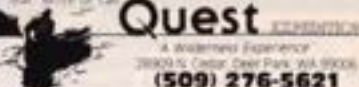
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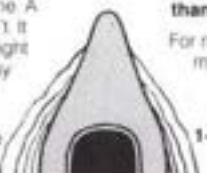
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QUESTIONS & ANSWERS

Are the environmental problems associated with disposable diapers really great enough to counter their convenience? (Dan Wolk, Narberth, Pennsylvania)

When a baby can go through as many as 10,000 diaper changes before graduating to the toilet, it's difficult to debunk a product that offers parents an escape from endless laundering.

Unfortunately, disposable diapers create a garbage problem on the order of about 18 billion dirty diapers a year in the United States alone. Roughly 75,000 metric tons of plastic that won't decompose for 500 years end up in municipal landfills.

A more serious threat comes from the untreated excrement in the discarded diapers. Live polio virus, hepatitis, and other viruses and bacteria present in infants' feces pose health hazards to sanitation workers and may contaminate underground water supplies. Although consumers are instructed to flush a disposable's removable lining down the toilet before discarding the diaper (so the fecal matter can be treated at a sewage plant), several studies suggest that less than 10 percent actually do so, for reasons ranging from clogged plumbing to difficulty removing the lining.

At least one environmentally conscious diaper company has come up with a partial solution to the litter problem. Taking advantage of consumer preference for disposables (they account for more than 80 percent of U.S. diaper changes), TenderCare Diapers in Se-



dona, Arizona, is selling a chemical-free diaper that breaks down into carbon, hydrogen, and oxygen in two to five years.

Poison ivy is a great problem at our cottage. Is there a way of destroying it without endangering our well-water supply and the surrounding trees and wildlife? (Lawrence Puente, Stouffville, Ontario)

The best way to remove poison ivy is to get down on your knees and pull it out. Wear gloves (washable cotton ones are best), and don't take them off until you've undressed and bagged your clothes. Even indirect contact with the plant can raise itchy blisters on exposed parts of your body.

Poison ivy has runner roots that may break when you try to pull them, but dig

up what you can and either bury the plants or pile them in an out-of-the-way place with an earth floor.

Urushiol, the element in poison ivy that causes so much misery, sticks around long after the plant itself has decomposed, so don't use the weed in compost or you may be sorry come planting time. Above all, never burn poison ivy: The smoke is extremely toxic and can infect your lungs if inhaled.

Herbicides are also widely used to get rid of poison ivy, though sometimes it is difficult to keep the chemicals from harming nearby plants and animals. For spot treatment, the National Coalition Against the Misuse of Pesticides recommends cutting through one of the runner roots in the ground and setting one end in a jar of ammonium sulfamate,

available at garden-supply stores under such trade names as Ammate X and Sulfamate. The plant will drain the jar of the poison, thus sparing the rest of the environment any harmful effects.

If the very idea of getting close to the stuff makes you itch, you might invest in a goat or three. Goats enjoy eating poison ivy and don't suffer for it.

I'd like to work as a volunteer in a national park or forest. What kinds of jobs are available and how can I apply? (Jean Russell, Dallas, Texas)

A 1988 National Park Service survey of volunteer work listed 253 job categories, from cleaning up litter to restoring ships to putting on an environmental puppet show. All told, 42,000 people donated their time and skills to the parks last year.

The Forest Service's 65,000 volunteers in 1988 performed work valued at more than \$25.4 million. Most participants in the volunteer program helped with recreation-related tasks such as trail construction and campground maintenance.

Whether you're a Boy Scout with three hours to spare or a retired executive with three months, you can contribute to the national parks or forests. Volunteer coordinators will match you with a job that utilizes your expertise and interests. To apply, contact the park or forest area you want to serve. Check your local bookstore for park and forest guides that provide descriptions and addresses. ■

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